SMITHFIELD TOWN COUNCIL AGENDA

September 2, 2025 at 6:30 PM
220 North Church Street

1. **Call To Order**

2. **Pledge Of Allegiance**

3. **Closed Session**

   a. Closed Session for the Purpose of Discussing Personnel Matters, more specifically, the Four Appointed Positions by Town Council as follows: Town Manager, Town Treasurer, Town Clerk, and Town Attorney, Pursuant to Section 2.2-3711 A1 of the Code of Virginia.

4. **Informational Reports**

   a. Town Manager's Activity Reports

   b. Committee Summary Reports

5. **Upcoming Meetings And Activities**

September 1 -	Town Offices are Closed in Observance of Labor Day
September 2 -	6:30 p.m. - Town Council Meeting
September 9 -	6:30 p.m. - Planning Commission Meeting
September 13 -	6:30 p.m. - Board of Historic and Architectural Review
September 16 -	7:30 p.m. - Board of Zoning Appeals
September 22 -	3:00 p.m. - Town Council Committee Meetings
September 23 -	6:30 p.m. - Special Planning Commission Meeting

NOTE: All of the above public meetings will be held at the Smithfield Center, unless otherwise noted.

6. **Presentations**

a. Swear-In New Police Officer, Ava Abbott

b. Resolution of Appreciation - Terry Andrews

c. Resolution of Appreciation - Bill Davidson

7. Public Comments

8. Council Comments

NOTICE OF INTENT TO COMPLY WITH THE AMERICANS WITH DISABILITIES ACT (ADA) Reasonable efforts will be made to provide assistance or special arrangements to qualified individuals with disabilities in order to participate in or attend Planning Commission meetings. ADA compliant hearing devices are available for use upon request. Please call 1-(757)-365-4200 at least twenty-four (24) hours prior to the meeting date so that proper arrangements may be made.

9. Consent Agenda Items

a. Motion to Amend the Town's Pay and Classification Plan
Finance Committee Chair, Jeff Brooks

b. Resolution to Appropriate Funds to the 2025/2026 General Fund Operating Budget for Vehicle Purchase
Finance Committee Chair, Jeff Brooks

c. Invoices Over $20,000 Requiring Council Authorization:
Finance Committee Chair, Jeff Brooks

i.	The Peterbuilt Store - New Public Works Truck	$129,324.00
ii.	The Blair Brothers, Inc. - Sykes Court Paving	$ 41,450.00

d. Resolution to Accept St, Andrews, Royal Blackheath, Ayrshire Loop and St. Annes located in Cypress Creek Phase 6 into the Town's Maintenance System for Funding
Public Works Committee Chair, Bill Harris

e. Motion to Accept the Proffer Amendment for Battery Park Storage
Public Buildings and Welfare Committee Chair, Valerie Butler

10. Action Items

a. PUBLIC HEARING: Conditional Rezoning and Special Use Permit - The Promontory
Public Buildings and Welfare Committee Chair, Valerie Butler

b. PUBLIC HEARING: Text Amendments to the following sections of the Zoning Ordinance
Public Buildings and Welfare Committee Chair, Valerie Butler

i.	Article 2.Q and P	Reclassify Accessory Apartments as Accessory Dwelling Units and Clarify Regulations
ii.	Article 3.O	Update the Floodplain Overlay
iii.	Article 3.S	Create the Pinewood Heights Industrial Park Overlay

c. Motion to Approve the Town Council Summary Minutes from August 5th, 2025
William H. Riddick, III, Town Attorney

11. New Business

a. Additional Invoice Received Since Finance Committee Requiring Council Authorization:
Michael Stallings, Town Manager

i. Lewis Construction of Virginia - Cypress Creek Bridge Waterline Work $ 25,923.60

12. Old Business

13. Additional Discussion

14. Adjournment

August 29, 2025

TO: **SMITHFIELD TOWN COUNCIL**

FROM: **MICHAEL R. STALLINGS, JR. ICMA-CM**
TOWN MANAGER

SUBJECT: **MONTHLY ACTIVITY REPORT – AUGUST 2025**

TOWN MANAGER:

- Attended Public Works Staff meeting – 8/12/25
- Met with Financial Advisors – 8/12/25
- Attended Crisis Communication Training – 8/13/25
- Met with Town Attorney Re: Mallory Pointe – 8/18/25
- Attended IOW Emergency Management Hurricane meeting – 8/18/25
- Attended Staff meeting – 8/19/25
- Attended Hurricane Erin meeting – 8/19/25
- Attended Luter Sports Complex Master Plan meeting – 8/19/25
- Attended Tourism Breakfast – 8/20/25
- Attended Dominion Energy Hurricane Call – 8/20/25
- Attended Ribbon Cutting for PDCCC Lab School – 8/21/25
- Met with IOW County Admin – 8/21/25
- Met with staff Re: storm prep – 8/21/25
- Attended Committee meetings – 8/25/25
- Attended Chamber of Commerce Event – 8/28/25
- Attended Called Council meeting – 8/29/25
- Responded to multiple FOIA requests throughout the month

DIRECTOR OF HUMAN RESOURCES:

- Processed property/liability claims with VRSA as appropriate.

- Processed Workers Compensation claims as appropriate.
- Conduct recruiting efforts for the following positions:
    - Patrol Officer (Certified) (2) – Police Department
    - Transportation & Storm Water Manager - (Public Works & Utilities) - Request to be changed to Engineer I
    - Utilities & Grounds Helper (Public Works & Utilities - 2)
    - Utilities Mechanic – (Public Works & Utilities)
    - Utilities Maintenance Technician (Public Works & Utilities)
- Conducted interview for Utilities & Grounds Helper I position on August 26th
- Submitted Risk Management Grant request and was approved for 2 Gas Monitors with clips for the Public Works Department. This was done through VRSA, our property & liability insurance carrier.
- Participated in a webinar on Workers' Compensation on August 20th
- Facilitated Safety Committee meeting on July 14th
- Continued implementation of NeoGov Insight for Applicant Tracking
- Continued work on RDA implementation
- Continued work with the Initial Process for Council Appointee Performance Evaluations
- Managed any personnel-related & benefits questions/issues as appropriate.
- Participated in all scheduled staff and Council meetings.

TOWN CLERK:

- Transcribed and proofed the monthly minutes from Town Council, Planning Commission, Board of Historic and Architectural Review, and the Board of Zoning Appeals.
- Attended Town Council meeting on August 5th.
- Prepared August Town Council Committee Agenda and September Town Council Agenda.
- Prepared summary reports from Town Council Committee meetings on August 25th.
- Participated in the Implementation of the new Agenda Management Software through Civic Plus, August 20th.
- Staff is working with the Public Works Department to put Surplus Property items out on GovDeals.
- Worked to fill multiple requests throughout the month for information through the Freedom of Information Act
- Attended Called Special Town council Meeting, August 29th.
- Continue to work on organizing Town records and disposing of documents according to General Schedules of the Library of Virginia.

TREASURERS DEPARTMENT:

- TC Committee Meeting presentation on the 28th.

- Worked on notes from RDA Meeting
- Started the timeline documents for RDA implementation
- Began working on revising the purchasing procedures/policies
- Riverside hospital tour on Friday
- Worked on the Collection Letter file
    - Uploaded to the VA Auction site
    - Discussion with the VA Auction folks on uploads
- Worked on the forecast
- Started the revisions on the Business License Forms and regulations
- TC Committee Meeting Tuesday night the 5th
- Participated in RDA meeting on Monday the 4th
- Met with Fran, Jay and Lesley about purchasing
- Continued the timeline documents for RDA implementation
- Phone discussion with Riley/RDA on progress
- Finished working on the Purchasing Policy
- Continued working on the purchasing procedures
- Direct reports meeting on Thursday
- Staff meeting on Friday
    - RDA
    - Audit
    - Timeline
- Worked on the Collection Letter file
- Worked on the forecast
- Continued revisions on the Business License Forms and regulations
- Two hours late on Monday - MRI
- Participated in Davenport meeting on Tuesday
- Participated in RDA meeting on Employee Self Service portal
- Met with Fran, Jay and Lesley about purchasing
- Finished working on the Purchasing Procedures
- Worked on the Collection Letter file
- Worked on the forecast – trying to improve it
- Continued revisions on the Business License Forms and regulations
- Worked on Policies and Procedures list for Treasurer's Association of VA certification
    - Customer Service policies
    - Delinquent Collections polices and procedures
    - Collection rate for 12 month period after tax due date, adjusted by local unemployment rate, is not less than 95% for RE and 90% for PP
    - Bank statements reconciled within 60 days of the close of the month

    - Policy of not cashing personal checks
    - Mail tax bills at least 30 days before the deadline, bills are never mailed less than 14 days before the deadline. Policy. Action: We need a policy
    - Policy to mail delinquency notices to taxpayers within 60 days after each deadline. We need a policy
    - Policy to deposit local funds within 48 hours of their arrival, except weekends and holidays. We need a policy
    - Policy that all written complaints by citizens are responded to within 14 days of their arrival in my office. We need a policy.
- ½ day on Friday the 15th.
- RDA Teams Meeting on Monday to go over the project list
- Researched attorney fees
- Researched all contracts and compiled list (took hours)
- Prepared Financial Statements for the TC Committee Meeting
    - Graphs
    - Footnotes
    - Investment Report
- Discussion with Lawson and Barbara regarding the PP Bills that will go out in November
- Discussion with Lawson about delinquent RE Bills that will go out in a week.
- Followed up with several distress warrants with Virginia Auction (three)
- Updated Collections list
- Worked on the Finance Policies
- Worked on the Accounts Payable Policies
- Continued work on Policies and Procedures list for Treasurer's Association of VA certification
    - Customer Service policies
    - Delinquent Collections polices and procedures
    - Collection rate for 12 month period after tax due date, adjusted by local unemployment rate, is not less than 95% for RE and 90% for PP
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- Policy that all written complaints by citizens are responded to within 14 days of their arrival in my office. We need a policy.

- Worked on A/P Vendor list to begin tracking variances in monthly bill

Team:

- Worked on ACH transition for payables
- Worked on VRSA payments
- Worked on financial statements and cash balance reports
- Reviewed the RDA Financial and Workforce download sheets
- Downloaded Munis historical data
- Eric – provided the files that RDA will need to implement the GL
- Worked on OPAY list and working on resolving overpayments
- Worked on Unclaimed Property

COMMUNITY DEVELOPMENT AND PLANNING:

Planning Commission – AUGUST 12TH, 2025

Special Sign Exception & Entrance Corridor Overlay Review – Sheetz – Interstate Realty C/O J. Michael Nidiffer, applicant. CONDITIONALLY APPROVED.

Public Hearing Text Amendment (ADUs) – Smithfield Zoning Ordinance Article 2.Q & P – Town Staff, applicant. FAVORABLE RECOMMENDATION.

Public Hearing Text Amendment (FPO) – Smithfield Zoning Ordinance Articles 3.O – Town Staff, applicant. FAVORABLE RECOMMENDATION.

Public Hearing Text Amendment (PHIPO) – Smithfield Zoning Ordinance Article 3.S – Town Staff, applicant. FAVORABLE RECOMMENDATION.

Public Hearing Text Amendment (Site Plan Requirements) – Smithfield Zoning Ordinance Article 11 – Town Staff, applicant. TABLED.

Public Hearing Text Amendment – Smithfield Subdivision Ordinance and Town Design Standards – Town Staff, applicant. TABLED.

DISCUSSION ITEM Land Use Matrix.

Special Use Permit Applications under review

A. 13458 Benns Church Blvd – Miller Oil Co., Inc., applicant
B. 1810 S Church St – Natale & Josephine Carrollo, applicants
C. 895 W Main St – Brown's Enterprises, LLC, applicant
D. TPIN: 32-01-005 – L & L Land Development, LLC, applicant (The Promontory)
E. TPIN: 22-01-006C5 - Smithfield Retail Management LLC, applicant
F. TPIN: 22J-01-013 – Feeman and Associates c/o Steven Gaskins
G. TPIN: 32-01- 096A2 – Randy Royal, applicant

Subdivision and Site Plans under review

A. TPIN:22-01-006C5 – Steven Barrett, applicant (restaurant w/drive-in)
B. Phase B, Mallory Pointe
C. Phase C, Mallory Pointe
D. Phase D, Mallory Pointe
E. TPIN:22-01-020 – Brad Martin, applicant (Battery Park Storage)
F. Cypress Crossing Infrastructure – Cameron Morgan, applicant
G. TPIN: 21A-01-511 – Development Logistics and Consulting (DLAC, LLC) (The Cottages at Battery)

Rezonings under review

32-01-005 The Promontory – Kent Henry, applicant
32-01-096A2 Randy Royal, applicant

Subdivision and Commercial Sites Under Construction and Inspection

A. Church Square, Phase II
B. Washington & James – James & Washington Square
C. 16" Water Main – Ken Turner (Mallory Point)
D. 1305 S. Church St. TPIN: 21A-01-511C – KLS Battery Park Development Group, LLC (Retail & Restaurant)
E. 201 Battery Park Road – Trey Gwaltney (Self Storage)
F. Phase A Erosion & Sediment Controls – Mallory Point
G. Phase A1, Mallory Pointe
H. Phase A2, Mallory Pointe
I. 204 Wimbledon Lane – Jack Bloom, applicant (Liberty Live Church)
J. 18403 Cypress Crossing – John Lombardo, applicant (Mod Wash)

Board of Historic & Architectural Review – AUGUST 19TH, 2025

Awning Installation – 224 Main Street – Contributing – Hallwood Properties LLC c/o Mark Hall, applicant. APPROVED.

Fence Installation – 102 Underwood Land – Contributing – Great Oaks Learning c/o Sarah Edwards, applicant. APPROVED.

Windows (after-the-fact) – 360-368 Main Street – Contributing – Yusuf Atay, applicant. CONDITIONALLY APPROVED.

Board of Zoning Appeals – AUGUST 19TH, 2025 (CANCELED)

Erosion & Sediment Control Program

Erosion and sediment control inspections were performed at 29 active residential construction sites throughout the Town and the required reports were submitted to Isle of Wight County for submission to the Department of Environmental Quality.

Certificate of Occupancies issued in AUGUST 2025

4 Issued

Code Enforcement Updates Across Town AUGUST 2025

A. Notices were sent/issued for the following violations:
    a. Inoperable Vehicle, 2 locations
    b. Grass Height Violation, 5 locations
    c. No Permit, 1 location
    d. No HP-O approval, 1 location
    e. RV in front yard/driveway, 1 location
    f. 20 Door hangers issued (3 Inoperable Vehicle, 7 Nuisance, 4 Grass Height Violations, 3 Utility trailer on ROW, 2 RV in front yard/driveway, 1 Other.)

PUBLIC WORKS & UTILITES:

1. Directors Report

Utility Staff performs the following duties monthly

A. Miss Utility marking
B. Read meters for billing and to transfer property owners.
C. Water cut-offs and cut-on
D. Check sewer pump stations daily.
E. Install and repair street signs.
F. Replace and repair broken water meters.
G. Perform maintenance on town-owned buildings such as Atlantic Contractors installing new hvac units at town hall.

2. Sewer Line Repairs and Maintenance

3. Sewer Pump Station Repairs and Maintenance

A. Weekly and daily checks on all 27 pump stations.
Performed the following scheduled maintenance at all pump stations.
    1. Cleaning of wet-well
    2. Alarm testing
    3. Sump pump cleaning
    4. Check Valve cleaning and repair.
    5. Generator check / Godwin pump check
    6. Control Panel / Flow monitor check
    7. Fence and Grounds inspection
    8. Inspected Structure
    9. Inspect and clean pumps.
    10. Level system check
    11. Test limit switches
    12. Bar screen cleaning
    13. Rain gauge cleaning

14. Head pressure reading at 7 pump stations.

B. Virginia Control and Electrical Systems are working on alarm system for pump stations, also working on Godwin bypass pump install at Cypress pump station.

4. Water Line Repairs and Maintenance

A. Assisted Lewis Construction with water line repair on water line at the Cypress Creek bridge.

5. Well Repairs and Maintenance

A. All wells except 8A and 10 (at RO Plant) are off now that RO plant is running. Upgrades to well houses have been completed to keep wells in operating condition in case of an emergency. Emergency wells are flushed, sampled, and inspected once a month.

6. Water Treatment Plant

A. Operate RO Plant and monitor distribution system.
B. Daily lab analysis, monthly sampling, and reports for VDH, HRSD, DEQ and RO contractors.
C. Performed monthly routine tasks including but not limited to:
    1. Daily Inspection of RO Plant and grounds.
    2. Monthly Tank inspections.
    3. Inspect and exercise plant generator monthly.
    4. Fill antiscalant day tank.
    5. Truck Inspections.
    6. Routine service of lime system.
    7. Service online fluoride and chlorine analyzers.
    8. Calibrate online turbidimeter and pH meter.
    9. Check and replace air filters.
    10. Test Alarms.
    11. Completed HRSD inspection with no violations.
    12. Va Controls worked on CPS pump
    13. HVAC in electrical room fixed.
    14. Rebuilt HYPO pump #2
    15. Changed Cartridge Filters
    16. Replaced 3rd Stage membranes
    17. Fixed leak on the Lime Feeder Mixing Box

7. FOG/ Backflow/ Septic Pump Out Program

A. Implementing the FOG Program to ensure compliance by:
   1. Scheduling and meeting with FSE's for routine inspections.
   2. Checking FSE's for compliance in record keeping and HRFOG Certifications, trying to get more certifications for education outreach.
   3. Inspections to include proper record keeping of pump outs.
   4. Inspections include proper record keeping of rendered grease clean out and pick up/throw out.
   5. Working with FSE's to get more employees, specifically dishwashers certified by HRFOG.
   6. Working to schedule inspections around FSE's clean out/pump out schedule for pump station problem areas.
   7. Sending emails/letters to schedule more inspections.
   8. Working with select FSE's to schedule inspection during pump out to monitor clean out and pumping is done to compliance.
   9. Attendance of the HRFOG meeting via Zoom.

B. Implementing the Cross Connection and Backflow Program to ensure compliance by:
   1. Entering reports and filing reports.
   2. Conducted backflow inspections for new irrigation installations.
   3. Conducted backflow inspections for CO requests.
   4. Following up with residents with disconnected systems and/or placed on irrigation well, making letter to inform well drillers of new ordinance change.
   5. January mailers' final non-compliance notices sent.
   6. Sending out failed device notices as received.
   7. July mailers' non-compliance notices sent.
   8. Studying to become backflow certified.
   9. Providing education to residents installing frost free yard hydrants.
   10. Starting 2024 January mailers.

C. Maintaining of the Septic Pump Out Program
   1. Sending 2023 non-compliance notices out for the invoices that were not provided by the due date.
   2. Sending pump out reminders for 2024 were sent.
   3. Sending pump out letters for 2023.
   4. Working with the water department to get a complete town sewer list from the water dept to fill in gaps on non-town sewer residents.

ENGINEERING

1.) Blair Brother's Contracting: The contractor repaired roadway sections and installed asphalt patches on the following streets, Cypress Creek Parkway, Muirfield and at 501 Huntington Way which is in the Waterford Oaks subdivision. Contractor has completed milling and installation of a 2" asphalt overlay on Sykes Court and a portion of South Mason Streets.
2.) Lewis Construction: Contractor started repair of storm drainpipe in the cul-de-sac area of Royal Birkdale in the Cypress Creek subdivision.
3.) Smithfield Lake Dam: Field inspections continue to be held this month involving the Dam. No structural deficiencies were noted this month on the dam site. The Town's engineer and TRC Companies have recently completed a full structural inspection of the dam and have submitted a 2-year recertification application for the dam to DCR. The Town has now purchased a level sensor which is currently being scheduled for installation. It will be installed in the emergency outfall area.
4.) The following projects are currently under design and review:
    a.) Battery Park Road storm pipe replacement near the Villas Subdivision. Plans have been developed to replace the existing 18" storm pipe with twin 48" x 68" elliptical pipes.
    b.) Battery Park Road culvert outfall and ditch enhancements project which is located near Greenbriar Lane. The site plans are complete and approved.
    c.) Cedar Street culvert outfall storm pipe extension and shoulder repair. Site plans are complete and approved. Additional drainage easement areas are being acquired.
5.) South Church Street to Nike Park Bike Trail Project:
    Site plans are being completed and various sources of funding involving the construction of the project are now being examined.
6.) Meetings with VDOT representatives have been held to discuss the reconstruction of Grace Street. VDOT has now determined the corrective measures required involving the drainage concerns at the intersection of Grace & James Streets. Reconstruction of this intersection has now begun.
7.) The developer has requested an inspection of Cypress Creek Phase VI for the acceptance of the streets into the Towns Maintenance system. A final inspection has now been completed. The developer has been notified of the required bonding amounts required for the one-year warranty period. The Town is now compiling the documentation which is required to be submitted to VDOT for the streets to be accepted into the Urban Maintenance system.
8.) A review of the proposed engineering site plans continues regarding the Mallory Farms subdivision Phases B, C & D.
    With respect to Mallory Farms subdivision Phase A, Section 1 the contractor has now installed base asphalt as per approved site plans on Wharf Hill Drive, Wentworth Crossing, Purdie Lane & St. Luke's Lane. Homes are now under construction.
    Regarding Battery Park Road the contractor has installed the required base, intermediate and surface asphalt courses. All required line striping has also been installed and completed. Installation of signage has now been completed.

Phase A Section 2 the contractor has begun and now completed the installation of the storm water structures and storm pipe. The contractor is currently completing the installation of the sanitary sewer main, laterals and water main and laterals.

Parks and Recreation Activity Report for August 2025

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					1	2
					WC Elevator Insp 4:00 PM - 6:30 PM LSC Parking Ruritan Cruise In 4:00 PM	**2:00 PM - 12:00 AM SC MHSu Lane Party 7:00 PM**
3	4	5	6	7	8	9
11:00 AM - 3:00 PM LSC Field 1 ZT Mid Atlantic Baseball 11:00 AM 2:00 PM - 3:00 PM WC Grounds WC Historic Walking Tours 2:00 PM	5:00 PM - 6:00 PM WC MHouse WCFB Meeting 5:00 PM	**12:30 PM - 5:30 PM WC MHouse Suffolk Foundation Retreat 1:00 PM** 6:30 PM - 8:00 PM SC AB Town Council 6:30 PM	7:30 AM - 3:00 PM WC MHouse NOAA Teacher Training 8:00 AM	Outdoor Team-Tour of Warhill Complex **12:00 PM - 11:00 PM SC MHSu Dorsett Davis Wedding and Reception 2:00 PM**		1:00 PM - 11:00 PM LSC Field 6 SPYS Football Season 1:00 PM
10	11	12	13	14	15	16
	4:00 PM - 10:00 PM SC MH Isle of Wight County Farm Bureau 6:00 PM	6:30 PM - 8:00 PM SC AB Planning Commission 6:30 PM	11:00 AM - 12:00 PM WC MHouse VA 250 11:00 AM **1:15 PM - 5:00 PM SC MH Dollar General Meeting 1:15 PM**	**8:00 AM - 6:00 PM SC MHSu Dollar General Meeting 8:00 AM**		1:00 PM - 11:00 PM LSC Field 2 SRA Baseball/Softball 1:00 PM
17	18	19	20	21	22	23
1:00 PM - 11:00 PM LSC Field 2 SRA Baseball/Softball 1:00 PM	**7:30 AM - 5:00 PM SC MH Carrollton Elementary Teacher Meeting 7:30 AM**	1:00 PM - 5:00 PM SC MH Tourism Breakfast Set 1:00 PM 2:00 PM - 3:00 PM WC MHouse Town Mgrs Mtg 2:00 PM 6:00 PM - 7:30 PM SC CD LSC Master Plan Review 6:00 PM 6:30 PM - 8:00 PM SC AB BHAR Meeting 6:30 PM	6:00 AM - 11:00 AM SC MH Tourism Breakfast 6:00 AM		**4:00 PM - 8:00 PM WC MHouse Blair-Anthony Wedding and Reception 4:00 PM** **5:00 PM - 7:00 PM SC MHSu Vanhook-Jones Rehearsal and Rehearsal Dinner 5:00 PM**	**9:00 AM - 11:00 PM SC MHSu Vanhook-Jones Wedding and Reception 5:00 PM** **10:00 AM - 10:00 PM WC MHouse Blair-Anthony Wedding and Reception 3:00 PM** 1:00 PM - 11:00 PM LSC Field 2 SRA Baseball/Softball 1:00 PM 1:00 PM - 11:00 PM LSC Field 6 SPYS Football Season 1:00 PM
24	25	26	27	28	29	30
1:00 PM - 11:00 PM LSC Field 2 SRA Baseball/Softball 1:00 PM	12:30 PM - 6:00 PM SC AB Committee Meetings 12:30 PM 6:00 PM - 7:00 PM SC AB Schoolhouse Mtg 6:00 PM		**8:00 AM - 5:00 PM SC MHSu Smithfield (Foods) Town Hall Set 8:00 AM**	**7:00 AM - 5:00 PM SC MHSu Smithfield (Foods) Town Hall 11:30 AM**	9:00 AM - 11:00 AM SC D Committee Meetings 9:00 AM	**11:00 AM - 5:00 PM WC MHouse Phillip Bradshaw Retirement Party 1:00 PM**
31						

Parks and Recreation Activity Report for August 2025

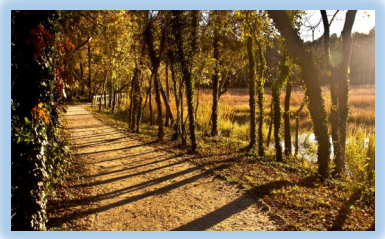


SMITHFIELD CENTER EVENTS STATISTICS & REVENUES			
Number of Events for month	14	Complimentary / Discounted Events for Month (town meetings, events, civic clubs)	8 events at 100 % discount 1 event at 50% discount
Sales Totals for Month	$ 21,360	Total Event Attendance for month	1350

WINDSOR CASTLE EVENTS STATISTICS & REVENUES			
Number of Events for Month	7	Complimentary/ Discounted Events for Month (town meetings, events, civic clubs)	4 events at 100% discount
Sales Totals for Month	$ 4,750	Total Event Attendance for month	220



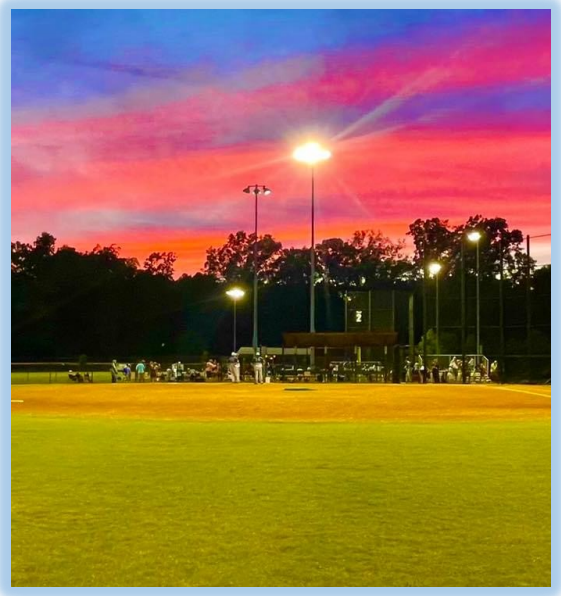
Parks and Recreation Activity Report for August 2025



WINDSOR CASTLE PARK Trail Doctor Hours
2025 Total as of August
166 Hours of Trail Repairs and Invasive Species Eradication



WINDSOR CASTLE PARK Kayak Kiosk Revenue Share	
2025 Total (through Aug)	$ 5,022
2024 TOTAL (Mar-Nov)	$ 8,666
2023 TOTAL (Jul-Nov)	$ 3,088



LUTER SPORTS COMPLEX
August
Totals
$ 200

PARKS NEWS

ODU Graduate Study Project at Windsor Castle Park

This project aims to identify the best times for the collection of Spartina alterniflora seed from native marsh populations as part of a regional effort to improve coastal marsh plant propagation. Test plots will be set in the marsh areas of Windsor Castle Park and be tested every two weeks by the graduate students at ODU through the end of the year.





Parks Staff Receive Hambassador Certification

The entire parks staff recently received their Hambassador Certification from the tourism department. This involved attending an informational session, completing courses online and doing a familiarization tour of all of the county's hot spots for visitors.

Virginia Wesleyan Awarded NOAA Grant to Develop Accessible Environmental Education

Beginning this school year, teachers from various schools throughout Hampton Roads will use Windsor Castle Park as a field trip destination to offer accessible environmental education to their elementary school students. Professors from Virginia Wesleyan did a teacher training event at the Manor House this August, with the assistance of our local master naturalists chapter members, Beverly Ruegsegger and Karen Barlow. The naturalists interpretive signage and tree identification projects make Windsor Castle the perfect environment for educating our youth.

Parks and Recreation Activity Report for August 2025

Special Events

August 2025

Friday, August 1, 2025	5-8 P LSC Car Show 100 p	**Ruritans Cruise In Car Show**

UPCOMING in September 2025

Wednesday, September 3, 2025	1 P-6 P WC Kayak Field Cross Country Meet 700 p	**Smithfield High Cross Country Meet**
Friday, September 5, 2025	7 PM-8:30 PM Smithfield Center 400 P	**Summer Concert Series Finale**
Friday, September 5, 2025	5-8 P LSC Car Show 100 p	**Ruritans Cruise In Car Show**
Saturday, September 6, 2025	9 A-12 P WC Kayak Field Cross Country Meet 700 p	**Smithfield High Cross Country Meet**
Wednesday, September 10, 2025	1 P-6 P WC Kayak Field Cross Country Meet 700 p	**Windsor High Cross Country**
Saturday, September 20, 2025	1-11 P LSC Community Fundraiser 100 P	**Relay for Life**
Saturday, September 27, 2025	10 AM-4 PM Main Street 100-300 Market 7000 p	**Autumn Vintage Market** Tourism

Smithfield/Isle of Wight Tourism
Activity Report AUGUST 2025

- Meeting held with David Hundley re: Christmas in Smithfield 2025 8/4/25.

- Tourism team budget meeting held regarding Raleigh/Durham marketing project grant 8/4/25.

- Full time staff meeting held 8/4; 8/11; 8/18.

- Full Tourism staff meeting held 8/5/26.

- Director and Special Events Coordinator attended Smithfield Special Events Committee meeting 8/5/25.

- Tourism team met with Cypress Creek Golfing Club and Creekside Landing Restaurant marketing staff to flesh out some future marketing plans and include them in future promotions 8/5/25.

- Director and Assistant Director attended Town Council meeting 8/5/25.

- Director helped to coordinate weekly artists for the Smithfield Summer Concert Series in conjunction with the IOW Arts League and Smithfield Times throughout the month.

- Director attended VTC Coastal Virginia Steering Committee meeting for new statewide tourism strategic plan 8/6/25.

- Director attended County staff meeting 8/7/25.

- Meeting held with ICMA-TV producer 8/7/25 to flesh out shoot schedule to have Smithfield featured at the 2025 ICMA Conference. Plans are proceeding for this important video project through fall. Crew will be here on September 27th.

- Director and Assistant Director met with County Administrator to plan future County communications directions and plan upcoming projects 8/7/25.

- Director worked with Laura Messer with VTC to plan upcoming Smithfield & IOW Strategic Planning Sessions to take place in September and October. The plan will cover tourism initiatives for the next 5 years.

- Director held local VA250 committee meeting in conjunction with IOW Museum Director 8/13/25. Many events and projects are planned over the remainder of

2025 and 2026 to coincide with the VA250. Director attended virtual VA250 statewide meeting on 8/12/25.

- FARMERS MARKETs held throughout month. Met with BSV on 8/15/25.

- Work continues on the Smithfield SAIL250 event. Smithfield will be hosting a SAIL250 Skipjack ship SIGSBY, and the Buyboat MILDRED BELLE, from the Living Classroom in June 2026, as part of the SAIL VA event ***Smithfield Maritime Rendezvous*** (June 12-14, 2026). Both tall ships that were under consideration have declined due to the water depth in the Pagan and turning radius issues. But the new boats will be less expensive to host (we completed a grant application to host these ships and expect it to be successful) and offer far more programming possibilities than the tall ships. We are listed as an official SAIL250 Affiliate Harbor and will enjoy all of the promotional benefits befitting that affiliation.

- Salty Southern Route (regional trail featuring pork and peanuts with participating localities: Smithfield/IOW; Surry; Suffolk; Franklin/Southampton; Sussex.) Group continues to work with Visit Widget to create a new website and online trail app. The group has hired Pat Bernshausen, formerly the Director of Tourism for Surry County as the SSR Coordinator.

- Director and Tourism team met with Tourism team from Hopewell, Virginia to share best practices and consult regarding small town tourism initiatives and successes 8/14/25.

- Director and Special Event Coordinator met with the Coastal Virginia Culinary Coalition (CVCC) on 8/14/25. September will be SAVOR SEPTEMBER in all of the Coastal Virginia localities and restaurants will be widely promoted that month.

- Director attended VRLTA's (Virginia Restaurant, Lodging and Travel Association) Legislative Priorities meeting 8/15/26. Director is on the VRLTA Board.

- Director attended CVTA (Coastal Virginia Tourism Alliance) Marketing Committee meeting 8/15/25.

- Director and Marketing Director continue to meet with website redesign company, Louder, Inc. Rollout expected by September 2025.

- New Event Assistant, David Berrien hired and brought on board 8/18/25.

- Director met with Acting Assistant County Administrator/HR Director, Michelle Clark regarding future tourism initiatives 8/18/25.

- Tourism Team attended Hurricane Week kick-off meeting 8/18/25.
- Director attended Town Staff Meeting 8/19/25.
- Annual Tourism Breakfast held 8/20/25. Excellent attendance and well supported by community and leadership.
- Assistant Director attended County Staff Meeting 8/25/25.
- Director PTO 8/25-29/25.
- Assistant Director attended Council Committees held 8/25/25.
- Director attended Historic Saint Luke's Church & Museum Board meeting 8/26/25.
- VISITOR CENTER open throughout Month. Tourism, County and Town Facebook postings throughout month. Update website events and ***Where the Locals Go*** event promotion newsletter weekly.

Isle of Wight County Museum &
Isle of Wight County Historic Resources



July 2025 Report

J.L. England, Museum Director & Isle of Wight County Historic Resources Manager

Isle of Wight County Museum 103 Main Street, Smithfield



- **VISITATION**: 897
- **SPECIAL EVENTS**
  - **July 11. NIGHT AT THE MUSEUM: THE WORLD'S OLDEST HAM'S BIRTHDAY SLEEPOVER.** Calling all well-loved teddy bears, dogs, unicorns and hippos for a NIGHT AT THE MUSEUM! The World's Oldest Ham's birthday is tomorrow, and he'd like nothing more than to have an evening of fun with some of his friends. Kids are encouraged to put on their PJs and bring their favorite stuffed animal or doll to the museum. Museum staff will read a bedtime story or two before our special guests are tucked in. Kids will head home, but their stuffed animal friends will stay the night. Pick up the overnight guests on the morning of the World's Oldest Ham's birthday while hearing about everyone's adventures. Representatives and books from Blackwater Regional Library will also be here to help us celebrate. 75 guests.



  - **July 12. HAMMY BIRTHDAY: THE WORLD'S OLDEST HAM'S 123RD BIRTHDAY.** The World's Oldest Ham is turning 123! It will be a real **plus** if party guests can help him **COUNT** up all those years at his annual birthday bash. After the singing of *Hammy Birthday*, we will **divide** up the cake, **plot** some fun activities, **solve** some puzzles and maybe do **sum** dancing. You don't have to be a **mathlete** to enjoy this **equation** for fun! This is also the launch of our annual **Pan Ham Photo Contest**. Representatives and books from Blackwater Regional Library will also be here to help us celebrate. 106 guests.











- **July 22. LUNCH & LEARN: JOHN SINCLAIR V. GENERAL JOHN MARSHALL, 1794.** Today is the 231st anniversary of the town's second most dramatic event—the confrontation between accused "privateer" John Sinclair and U.S. Cavalry commander John Marshall, future Chief Justice of the U.S. Supreme Court. Join us to learn the details of this locally infamous engagement and then take a short walk down South Church Street to the actual scene of the drama. 14 guests.



- **July 29. BOOKWORM DISCOVERIES AT WINDSOR CASTLE PARK.** Join the Blackwater Regional Library and Isle of Wight County Museum at Windsor Castle Park for outdoor programming featuring themes of agriculture, nature and bugs! This fun and free opportunity to learn a little local history with STEAM themes while enjoying some fresh air and the chance to check out some books is perfect for bookworms of all ages. Theme: Postcards. NOTE: This event, because of the heat index, was moved to the museum. 8 bookworms.



- **July 30. I NEVER FORGET A FACE: ALBERT DURANT PHOTOGRAPHY IDENTIFICATION.** Albert W. Durant, 1920-1991, was an entrepreneur and Williamsburg's first African-American city-licensed photographer. Colonial Williamsburg's Albert Durant Photography Collection provides a priceless visual history of Black life in Williamsburg and surrounding communities from the late 1930s to the early 1960s. Isle of Wight County is the focus of a portion of his photographs, and subjects include Smithfield school activities and yearbook portraits, basketball teams, a hunt club, homecoming parades and churches. Please join us to participate in a photo identification session to help name the people, places and events captured in Durant's photographs.

- **LIVESTREAMING EVENTS AND OTHER VIDEO PRODUCTIONS.** We continue to connect with visitors, supporters, fans and the community via social media. ***(NOTE: Facebook changed its permanency for livestreaming videos in February. As of March 1, we are beta-testing a Thursday-only produced format of this staple.)*** Our livestreaming tours and programs on Facebook are driving traffic and enhancing interaction on our sites. Events this month, still viewable in the videos section of our Facebook page and on our YouTube Channel, include:



  - **July 3. LIVE at 12:05: The B.A. Chapman Genealogical Collection, Smithfield, Virginia.** Together the Blackwater Regional Library and the Isle of Wight County Museum work to make our community better. Former Smithfield resident Blanche Adams Chapman, 1895-1958, was a local researcher and historian who traced family lineages in Hampton Roads. Her copious notes were filed at the Blackwater Regional Library and used by patrons via a collection-specific card catalog. The files themselves were well used by genealogical researchers to discover information about family lineages, local connections and court

records. Digitizing these archives was a logical step. It prevents further damage to the delicate originals while making this extensive resource available to researchers everywhere. While this collection was previously only available in person via a singular local library location, it can now be used by researchers far and wide. Furthermore, the alphabetical layout of the digital collection under family names is very user friendly. The originals are now housed permanently in the Isle of Wight County Museum's archives.



- **July 10. LIVE at 12:05: Digitized Town of Smithfield, Virginia, Meeting Minutes.** Together the Blackwater Regional Library and the Isle of Wight County Museum work to make our community better...and more accessible! Two years ago, the Town of Smithfield's Clerk discovered eight volumes of Council minutes and related documents from 1891 to 1912. These notes document the Town's day-to-day goings on as well as citizen concerns. In order to preserve these documents, the originals were moved permanently to the Isle of Wight County Museum to preserve their physical integrity into perpetuity, and to make them more accessible to citizens and researchers, the documents were scanned and digitized by former Blackwater Regional Library staff member and museum volunteer Chris Claud. The information can now be viewed in person by appointment at the museum - or more easily online via the library's internet archive at any time.



- **July 17. LIVE at 12:05: Simpson's Pharmacy, Smithfield, Virginia.** Simpson's Pharmacy, formerly located at 221 Main Street, Smithfield, was established early as 1910 and with the same pharmacy name maintained through multiple business owners. We have numerous objects in our collection related to this business. Join Emmi Goodman as she explores the history of some of these items. Note: Simpson's Pharmacy closed in 2011.



- **July 24. LIVE at 12:05: Volunteers Make the Museum Go 'Round.** Museums, like many non-profit businesses and community service programs, rely on volunteers "to make the world go 'round." Our wonderful volunteers are often the beloved extra helping hand at large events, the sprinter who picks up that difficult project and takes it the last yards across the finish line and the public speaker who lightens the long list of outreach programs by giving tours and lectures. Thank you to our volunteers for always making the list a little shorter and the project a little lighter. Plus, our young volunteers are able to gain experience in a myriad of museum-related tasks as they take steps toward pursuing their own professional goals.



- **July 31. LIVE at 12:05: Please Don't Eat Our Exhibits.** You've probably seen the articles online about the banana on exhibit. "Comedian," a 2019 artwork by Italian artist Maurizio

Cattelan, is a fresh banana taped to a wall. As a work of conceptual art, it consists of a certificate of authenticity with detailed diagrams and instructions for its proper display. Most recently the artwork was eaten while on exhibit in France. BUT while we here at the Isle of Wight County Museum have artifacts that can be eaten, this is not acceptable museum practice. As we take a prowl through the museum to see what we have that might inspire your lunch, we encourage you to eat before your visit!

- **MY ISLE: MEMORIES & RECOLLECTIONS**
  - This video series, launched in 2023, features residents and family members sharing stories of Isle of Wight County. **One piece is currently in production.** View all episodes in this series on our YouTube Channel, Facebook page or website.
- **BEHIND THESE WALLS**
  - This video series, launched in 2020, allows some of the county's most interesting structures to share their stories. View all episodes in this series on our YouTube Channel, Facebook page or website. **One piece on Bethany Presbyterian Church is in production.**
- **OTHER VIDEO PRODUCTIONS**
  - **July 18. The Faces of the World's Oldest Ham.**
- **GROUPS/TOURS/PROGRAMS**
  - **July 9. Hambassador Tour.** Hosted by Smithfield & Isle of Wight County Tourism. 5 guests.
  - **July 15. Daughters of the American Revolution, Great Bridge Chapter,** Virginia Beach/Norfolk**.** 15 guests**.**
  - **July 18. Smithfield Police Department Summer Camp, Smithfield.** 25 guests.
  - **July 26. Pawsitive Attitudes, Carrollton.** 7 guests and 5 dogs.







World's Oldest Ham @worldsoldestham.bsky.social · 22d
Some very good boys came to visit their first museum yesterday! A celebratory field trip to the museum was scheduled for dogs graduating from an advanced task course at Pawsitive Attitudes in Carrollton, Va.
#goodboys #community #fieldtrip #DogDays





- **GIFT SHOP**
  - With the start of the new fiscal year, items such as books, rubber ducks, Christmas ornaments, postcards and stickers were reordered. New orders included puzzles, socks and games.



- **EXHIBIT/PROJECT UPDATE**
  - **Sprigg Wing, Phase III: Tobacco History.** Awaiting installation of barn.
  - **First Residents.** Awaiting mounting of longleaf pine tree branches.
  - **Local Treasures**. Currently on display is the collection of **Robert Cox** showcasing artifacts recovered from one of Isle of Wight County's early courthouses, the **Mount Holly Courthouse**. This exhibit concept displays the private collections of Isle of Wight County residents and/or those with a local connection. For more information and applications: www.historicisleofwight.com/local-treasures.html.
  - **English Telephone Box**. In design with the exhibit for the phone box's interior.
  - **Steamboats & Life on the Water; Unusual Objects; Vietnam War Veterans in Isle of Wight County: Online Exhibit; Unsung Heroes of Isle of Wight County: Online Exhibit.** Under development.
  - **ISLE Be Home for Christmas.** This book project is collecting photographs, postcards, stories, mementos, songbooks, recipes and more that detail the holiday season in Isle of Wight County. To be published in November 2026.
  - **Nike-Ajax N-75.** A book about the former missile battery in Carrollton is in production. To be published in 2026.
  - **Riverside Smithfield Hospital.** Installation of our exhibits will take place by September 2025.
  - **Main Gallery.** A new sign was added to highlight the World's Oldest Peanut.



- **ARTIFACTS**
  - Additions to the collection include photographs, a collection of images from Tyler's Beach and postcards.
- **STAFF UPDATES, TRAINING AND REQUIREMENTS**
  - Docent Emmi Goodman has been promoted to the role of registrar. Our registrar is responsible for the care, management and documentation of our collection as well as ensuring the proper handling, storage and movement of objects and the accuracy of all associated records.



Financials

• Gift Shop Sales:	$ 1,654.44
• Gift Shop Tax:	$ 99.58
• Donations:	$ 58.00
• Admission:	$ 1,060.00
• Program/Lecture Fees:	$ 0.00
Total Monthly Deposit:	**$ 2,872.02**

Social Media/Online Presence





- Visit our website at www.historicisleofwight or www.hamcamva.com.
- **LIVE at 12:05.** Each Thursday, we host broadcasts on the museum's Facebook page. Our segments, shot in the museum or at our historic sites, highlight events at the museum, announcements or artifacts from our collection. Tune in at 12:05 p.m. on the museum's Facebook page – or view productions on our YouTube channel.
- **Facebook:** Isle of Wight County Museum: 3.8K likes and 5.0K followers. Daily posts.
- **Facebook:** World's Oldest Ham: 342 followers. Semi-weekly posts.
- **Facebook:** Town of Smithfield. Periodic posts, responses and maintenance.
- **Twitter.** @WorldsOldestHam. The world's oldest ham has his own account. 1,325 followers.
- **BlueSky.** @WorldsOldestHam. 90 followers.
- **Instagram.** @Isleofwightcountymuseum. 1,202 followers.
- **YouTube.** Isle of Wight County Museum. 328 subscribers.
- **Google Reviews.** 4.7/5 overall rating.
- **TripAdvisor.** 4.5/5 star overall rating.
- **Yelp.** 4.5/5 star overall rating.
- **Foursquare/Swarm.** 7.3/10 rating.
- **EarthCam/HamCam.** Streaming views from Feb. 7 to May 7, 2025: 107,043.

Media Coverage/Promotion/Advertising/Lobbying

- Various pieces in area publications to include calendars and events.
- **July 2: Smithfield Times.** Article: Commemorating 250 years of freedom: Education was a priority in early Virginia; Cutline: D. Reynolds Parker.
- **July 8: WAVY TV-10: The Hampton Roads Show**. Segment: HRS: Celebrating the World's oldest ham - https://www.wavy.com/hr-show/community-connection/hrs-celebrating-the-worlds-oldest-ham/
- **July 9: Smithfield Times.** Article: 'World's Oldest Ham' turns 123; party set for July 11-12.
- **July 11: WAVY TV-10.** Segment: World's oldest ham party Saturday in Smithfield - https://www.youtube.com/watch?v=qXvv6K6PSNE and https://www.wavy.com/video/worlds-oldest-ham-party-saturday-in-smithfield/10884169/
- **July 16: Northern Virginia Magazine.** Article: 5 Ways to Celebrate VA250 Throughout Virginia - https://northernvirginiamag.com/things-to-do/2025/07/16/5-ways-to-celebrate-va250-throughout-virginia/
- **July 16: Smithfield Times.** Cutline: Happy Birthday, Hammy; Second front: 'World's Oldest Ham' turns 123.
- **Summer 2025: Slice of Smithfield Magazine.** Editorial: Preserving history one page at a time.
- **July 24 and 30: Smithfield Times.** Article: Stamp unveiled in Smithfield commemorates 250th anniversary of Postal Service - https://www.smithfieldtimes.com/2025/07/24/stamp-unveiled-in-smithfield-commemorates-250th-anniversary-of-postal-service/
- **July 29: World Atlas.** Article: 9 Undisturbed Towns to Visit in Virginia - https://www.worldatlas.com/cities/9-undisturbed-towns-to-visit-in-virginia.html



Outreach Lectures & Events

- July 10. Williamsburg Stamp Club, Williamsburg. 20 attendees.
- July 17. Riverside Lifelong Health and Rehabilitation, Smithfield. Theme: I Scream, You Scream, We All Scream for Ice Cream! 12 attendees.
- July 18. The Chesapeake, Newport News. Theme: Christmas in July. 25 attendees.





- July 23. Isle of Wight County Parks and Recreation Summer Blast Summer Camp. Theme: the history of vacations, past and present vacation sites in Isle of Wight County, cameras, postcards and 1887 switchel. 36 students in Windsor and 45 students in Smithfield.









Safety & Repairs

- July 16. Town of Smithfield Safety Committee meeting.

Windsor Castle 705 Cedar Street, Smithfield

- No updates.

Fort Boykin 7410 Fort Boykin Trail, Isle of Wight County

- No updates.

Fort Huger 15080 Talcott Terrace, Isle of Wight County

- No updates.

Nike-Carrollton Park 13036 Nike Park Road, Carrollton

- **Nike-Ajax Missile Restoration.** ECS Mid-Atlantic LLC completed the subsurface exploration, laboratory testing and geotechnical engineering analyses. ATCS supplied the plan set for the artifact's structure. Parks and Recreation is working with Purchasing to create a bid package for the site plan.
- **Nike-Ajax Missile Mural Atop Missile Magazine B.** Awaiting an update from the Boy Scout heading up the project.

Boykin's Tavern, 1820 Clerk's Office & Isle of Wight County Court House Complex 17146 Monument Circle, Isle of Wight County

- Boykin's Tavern Visitors: 4
- **July 19. ISLE OF WIGHT COURTHOUSE COMPLEX WALKING TOUR.** Join us as we explore this 19th, 20th and 21st century site and share the story of its beginnings as well as a few tales of capers and duels. This tour begins at Boykin's Tavern, 17146 Monument Circle, Isle of Wight. 4 guests.

Meetings

- July 22. Town of Smithfield staff meeting.
- **July 23. 250 Years of Delivering**. The Smithfield Post Office, 23430, unveiled the U.S. Postal Service's new stamp marking 250 years of serving their mission unstoppable by rain, sleet, snow or gloom of night. Each Forever stamp shows a mail carrier in action throughout the year in a town scene. The USPS was established on July 26, 1775, by the Second Continental Congress with Benjamin Franklin as the first postmaster general. The Office of the Postmaster General documents Smithfield as one of the earliest post offices established in Isle of Wight County.



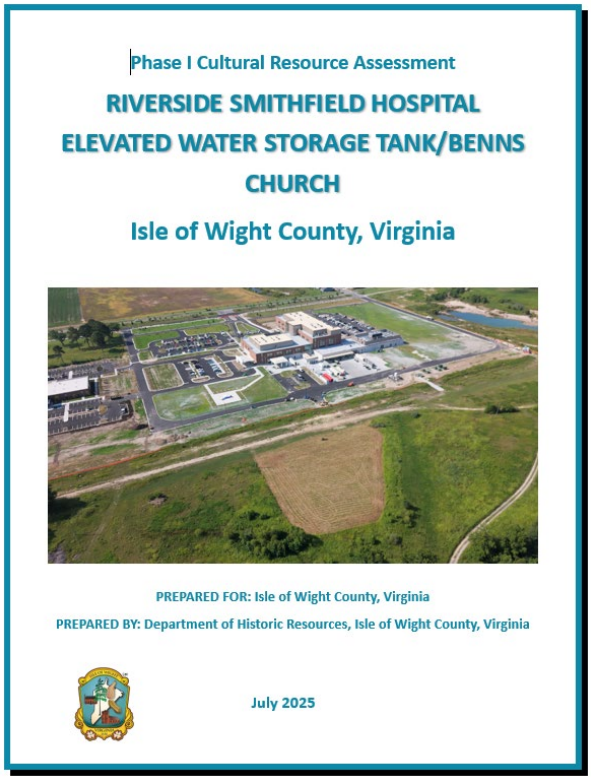
Other Events & Notable Information

- **Volunteer Hours**: 202
  - Alyssa Dawson, a recent graduate of the University of Lynchburg, is volunteering with us for the summer.
  - Alex Lewis--future museum professional headed to James Madison University in the fall--spent two weeks with us doing anything and everything museum and history-related. We are ready for her to come back during her next break!





- **Isle of Wight County Museum Economic Impact Survey for July 2025:**
  - 15.5% made a gift shop purchase
  - 52.4% indicated that they had lunch/dinner plans in Smithfield/Isle of Wight County
  - 54.1% indicated that they were planning to or had already shopped in Smithfield/Isle of Wight County
- **Virginia American Revolution 250 Commission**
  - **Smithfield Times Article Series**: 2024-2026. Published July 2 was *Commemoration 250 Years of Freedom:* Education was a priority in early Virginia.
- **Isle of Wight County Department of Community Development & Planning**
  - **Griffin/Smith Rezoning**. Commentary was provided for Griffin/Smith Rezoning to C-RR Rezoning Application of two acres REZN-25-5 RE: Tax Map No. 70-01-023.
  - **JRCA Turn Lane and Pump Station**. Commentary was provided for JRCA Turn Lane and Pump Station to be located at 14353 Benns Church Boulevard in Isle of Wight County.
  - **Joyners Bridge Mitigation Site**. Commentary was provided for the preliminary site development plan for the Joyners Bridge Mitigation Site, Carrsville.
  - **Riverside Smithfield Hospital Elevated Water Storage Tank/Benns Church**. At the request of Isle of Wight County Community Development & Planning and Isle of Wight County Public Utilities, this department performed a Phase 1 archaeological investigation and report for the site slated for an elevated water tower to be affiliated with the new hospital. Due to the large budget impact to Isle of Wight County for the tower's construction, it was necessary to perform a field investigation in-house. Over the course of two



weeks, the site was examined through pedestrian assessments and judgmental shovel testing. The report was written, and a copy was sent to the Virginia Department of Historic Resources and cataloged as IW-131 in their grey literature collection.

- **Town of Smithfield Department of Community Development & Planning**
  - No updates.
- **The Schoolhouse Museum**
  - No updates.
- **Ivy Hill Cemetery**
  - No updates.
- **Norfolk Southern Grant**
  - Application submitted but not approved.

Safety & Repairs

- No updates.

Selections from Our Website and Social Media



July 7



July 11

ZONING PERMIT AUGUST 2025

PERMIT #	CONSTRUCTION TYPE	PROJECT	ADDRESS	CONTRACTOR/ OWNER
0912	FENCE		222 SAINT PAULS AVENUE	ROSENBAUM FENCE COMPANY / CHURCH SQUARE DEVELOPMENT LLC
0913	COMMERCIAL RENOVATIONS		1102 WHARF HILL DRIVE	EASTWOOD HOMES OF RICHMOND LLC
0914	FENCE		301 SMITHFIELD BOULEVARD	JERREY ROWLEY
0918	POOL		105 THE FIRTH	HBN ENTERPRISES / RICHARD JOHNSTON
0919	FENCE		105 THE FIRTH	RICHARD JOHNSTON
0921	POOL		8 DASHIELL DRIVE	ANTHONY GOSLIN
0922	POOL		113 GLENEAGLES	OASIS POOLS / CHRIS SCHEIER
0923	DECK		1200 WILSON ROAD	RUBEN SERRATO
0926	POOL		125 LENORA COVE	HBN ENTERPRISES / ROANALD LEVI
0927	FENCE		378 SOUTH CHURCH STREET	CHARLIE BASS
0928	QUADPLEX		104 CATHEDRAL STREET	C H CONSTRUCTION LLC / CHURCH SQUARE DEVELOPMENT LLC
0929	QUADPLEX		205 CATHEDRAL STREET	C H CONSTRUCTION LLC / CHURCH SQUARE DEVELOPMENT
0930	QUADPLEX		100 CATHEDRAL STREET	C H CONSTRUCTION LLC / CHURCH SQUARE DEVELOPMENT
0931	QUADPLEX		203 OXFORD AVENUE	C H CONSTRUCTION LLC / CHURCH SQUARE DEVELOPMENT
0935	PERGOLA		201 ST ANDREWS	ACCENT CUSTOM HOMES LLC / MATTHEW WITTE
0936	SHED		205 BISHOP CIRCLE	RALPH BENHART
0939	FENCE		102 UNDERWOOD LANE	GREAT OAKS LEARNING / MARK POTTER
0944	FENCE		101 LUMAR ROAD	BRANDON TEDROW

August 29, 2025

TO: SMITHFIELD TOWN COUNCIL

FROM: LESLEY G. KING
TOWN CLERK

SUBJECT: INFORMATIONAL REPORT FOR THE PUBLIC SAFETY COMMITTEE MEETING HELD ON MONDAY, AUGUST 25th, 2025

The Public Safety Committee met Monday, August 25th, 2025 at 3:14 p.m. at the Smithfield Center located at 220 North Church Street, Smithfield Virginia. Committee members attending were Mr. Steven G. Bowman, Ms. Mary Ellen Bebermeyer and Mr. Bill Harris. Other Council members present were Ms. Valerie Butler, Mr. Jeff Brooks, and Mr. Darren Cutler. Staff members present were Mr. Michael R. Stallings, Town Manager; Mrs. Lesley King, Town Clerk; Ms. Laura Ross, Town Treasurer; Mrs. Ashley Rogers, Director of Human Resources; Mr. Chris Meier, Deputy Chief of Police; Mrs. Tammie Clary, Director of Planning and Community Development; Mrs. Amy Novak, Director of Parks and Recreation; Mr. Ed Heide, Director of Public Works and Utilities; Ms. Stephanie Kensicki, Assistant Director of Tourism; Mr. Steve Clark, Parks and Recreation; and Mr. Eric Phillips of the Smithfield Police Department. Also in attendance were Mr. Jeff Smith of the Smithfield Volunteer Fire Department and Mr. Brian Carroll of the Isle of Wight Rescue Squad. There were 4 citizens present. The media was represented by Stephen Faleski and Steve Stewart of the Smithfield Times.

Public Safety Committee Chair, Mr. Steven G. Bowman, called the meeting to order.

A. MATTERS DISCUSSED BY COMMITTEE WHICH WILL NOT BE ON THE COUNCIL'S AGENDA

1. Operational Update for the Smithfield Police Department – July Activity Report – Deputy Chief Meier reported that their July Activity Report was included in today's agenda packet, and he would be glad to answer any questions as they relate to this report. Councilman Bowman thanked the Police Department for bringing out the new equipment today for all to see. It was very impressive, and it will serve the department well. It will provide a safer environment for our officers to work in.

2. Operational Update for the Smithfield Volunteer Fire Department – Assistant Chief Smith reported that in June they responded to 89 calls for service and in July they responded to 114 calls for service. This past weekend seven members of their department completed a surface water rescue class here in the Town of Smithfield. They also had five

members take a safety officer class. The water rescue class was held on the Pagan River and included training the members on how to do flood stage rescues. Assistant Chief Smith stated that outside prior to the meeting today they had their new brush truck. They hope to put that unit in service within the next thirty days. Committee thanked Assistant Chief Smith for the update.

3. Operational Update for the Isle of Wight Rescue Squad – Chief Carroll gave a brief update on the Nansemond Suffolk ambulances that they were looking at buying a couple of months ago. At this time, they have purchased the Suffolk trucks, and they have less than 50,000 miles on them. They have been added to their reserve fleet while they wait for the last radios to come in and then these trucks will go into service. The plan is to run these ambulances as front-line trucks for the first couple of months to make sure there is nothing wrong with them. They have some age on them but with only 50,000 miles on them they should not need a whole lot of work. Once these trucks are in the reserve fleet they will go where they are needed to cover all five stations in the County. Their first two trucks that were ordered three years ago will go to Carrsville and Rushmere. Although they were ordered three years ago, they were able to update the specs because the build time is so long. Chief Carroll stated that these two trucks will go into production around January 2026 and will be here in July 2026. The second two trucks that we just ordered will be 3 years behind those. They are excited for the new trucks coming but even more excited that all trucks will be built to the same specs for consistency in where things are located on the trucks. Chief Carroll reported that they just completed an EMT class. He also mentioned that there have been some questions on Facebook about where you can get CPR training. Isle of Wight Rescue offers CPR training every month and it is free to participate. They have started a new recruit program which allows folks to come in with no certifications and get the opportunity to ride in an ambulance to decide if that is what they want to do before they go through all those classes and then decide it is not what they want to do. Councilman Bowman gave the Isle of Wight Rescue kudos for getting the pharmaceutical conversion program into place as quickly as they did. Congratulations to you, Chief Wenley and everyone that was involved. Committee thanked Chief Carroll for the update.

The meeting was adjourned at 3:19 p.m.

August 29, 2025

TO: SMITHFIELD TOWN COUNCIL

FROM: LESLEY G. KING
TOWN CLERK

SUBJECT: WATER AND SEWER COMMITTEE MEETING - CANCELLED

The Water and Sewer Committee scheduled for Monday, August 25th, 2025 at the Smithfield Center located at 220 North Church Street was cancelled due to lack of agenda items.

August 29, 2025

TO: SMITHFIELD TOWN COUNCIL

FROM: LESLEY G. KING
TOWN CLERK

SUBJECT: PARKS AND RECREATION COMMITTEE MEETING - CANCELLED

The Parks and Recreation Committee scheduled for Monday, August 25th, 2025 at the Smithfield Center located at 220 North Church Street was cancelled due to lack of agenda items.

August 29, 2025

TO: SMITHFIELD TOWN COUNCIL

FROM: LESLEY G. KING
TOWN CLERK

SUBJECT: INFORMATIONAL REPORT FOR THE PUBLIC WORKS COMMITTEE MEETING HELD ON MONDAY, AUGUST 25TH, 2025

The Public Works Committee held a meeting on Monday, August 25th, 2025 at 3:47 p.m. at the Smithfield Center located at 220 North Church Street, Smithfield Virginia. Committee members attending were Mr. Bill Harris, Mr. Jeff Brooks, and Mr. Bowman. Other Council members present were Mr. Darren Cutler, Ms. Valerie Butler, and Mrs. Mary Ellen Bebermeyer. Staff members present were Mr. Michael R. Stallings, Jr. Town Manager; Ms. Lesley King, Town Clerk; Ms. Laura Ross, Town Treasurer; Ms. Ashley Rogers, Director of Human Resources; Mr. Ed Heide, Director of Public Utilities and Public Works; Mrs. Amy Novak, Director of Parks and Recreation; Mr. Chris Meier, Deputy Chief of Police; Mr. Stephen Clark, Parks and Recreation; and Stephanie Kensicki, Assistant Director of Tourism. There were three (3) citizens present. The media was represented by Stephen Faleski and Steve Stewart of The Smithfield Times.

Public Works Committee Chair, Mr. Bill Harris, called the meeting to order.

A. MATTERS DISCUSSED BY COMMITTEE WHICH WILL BE ON THE COUNCIL'S AGENDA

1. Accept St. Andrews, Royal Blackheath, Ayrshire Loop, and St. Annes Located in Cypress Creek Phase 6 into the Town's Maintenance System for Funding – Mrs. Clary stated that this is the acceptance of the above-mentioned streets in the Town's Street Maintenance System. They are all located in Phase 6 of the Cypress Creek development. Staff have gone through them, and we are ready to accept them into the Town's maintenance system with a defect bond. Committee recommended placing this item on Town Council's Consent Agenda for consideration at their September 2nd, 2025 meeting.

2. Additional Comment: Councilman Bowman stated that he would like to give kudos to Public Works. You may have noticed that the South Church Street corridor that runs from Farmers Bank to Anna's Restaurant needed some cleaning up. There were lots of weeds and a lot of debris in the storm drains. He would like to compliment our Town Manager and Mr. Heide for getting in touch with VDOT. VDOT came out and it

looks a lot better. The weeds are gone, and all the storm drains have been cleaned, which will be very helpful when we have significant weather events. Councilman Bowman also mentioned that he was on his boat this past weekend and noticed under the Cypress Creek Bridge where the contractor for those improvements had left a couple of anchor lines off the back of a barge. The anchor lines were black in color and located close to the navigational channel. He got in touch with Mr. Heide where in return he contacted Crofton Contracting over the weekend and that has been addressed. He thanks them for their responsiveness.

Meeting adjourned at 3:48 p.m.

August 25, 2025

TO: SMITHFIELD TOWN COUNCIL

FROM: LESLEY G. KING
TOWN CLERK

SUBJECT: INFORMATIONAL REPORT FOR THE PUBLIC BUILDINGS & WELFARE COMMITTEE MEETING HELD ON MONDAY, AUGUST 25th, 2025.

The Public Buildings and Welfare Committee held a meeting on Monday, August 25th, 2025 at 3:48 p.m. at the Smithfield Center located at 220 North Church Street, Smithfield Virginia. Committee members attending were Ms. Valerie Butler, Mr. Bill Harris, and Mr. Darren Cutler. Other Council members present were Mr. Jeff Brooks, Mrs. Mary Ellen Bebermeyer, and Mr. Steve Bowman. Staff members present were Mr. Michael R. Stallings, Town Manager; Mrs. Lesley King, Town Clerk; Ms. Laura Ross, Town Treasurer; Mrs. Ashley Rogers, Director of Human Resources; Mrs. Tammie Clary, Director of Planning and Community Development; Mr. Chris Meier, Deputy Chief of Police; Mr. Ed Heide, Director of Public Works and Utilities; Mrs. Amy Novak, Director of Parks and Recreation; Mr. Steve Clark, Parks and Recreation; and Ms. Stephanie Kensicki, Assistant Director of Tourism. There were three (3) citizens present. The media was represented by Stephen Faleski and Steve Stewart representing of "The Smithfield Times".

Public Buildings and Welfare Committee Chair, Mrs. Valerie Butler, called the meeting to order.

A. **MATTERS DISCUSSED BY COMMITTEE WHICH WILL BE ON COUNCIL'S AGENDA**

1. PRE-PUBLIC HEARING DISCUSSION: Conditional Rezoning and Special Use Permit - The Promontory – Mrs. Clary reported that the applicant was seeking a conditional rezoning to Planned Mix Use Development (PMUD) to facilitate the construction of 5 Commercial lots, future commercial area, 107 single family detached units, 103 single family-attached units (67 villa units, 36 townhouse units) a maximum of 210 units in total, and 22.93 acres of open space. She explained that the project would be phased, starting with the commercial sites, and the road beside Tractor Supply would be extended with a network of public roads that connected to Cypress Run Drive and Turner

Drive. Mrs. Clary said that in order to facilitate the project, the applicants applied for the following:

> Conditional Official Zoning Map Amendment (Rezoning): The uses the applicant is proposing (attached and detached units, fast food restaurant, car wash, restaurant, drive in bank) are permissible in the Planned Mixed Use Development District (PMUD). These uses are also in line with the Future Land Use Map, as the current designations are Residential Mixed Use and Corridor Mixed Use, which provide for primary residential uses and primary mixed commercial / multifamily residential uses.
>
> 1st Special Use Permit- Article 3.J2.C.7: Drive-thru facilities. The applicant is requesting flexibility to utilize drive-thru facilities on all 5 commercial parcels, with the current plan of a drive-in bank and fast-food restaurant with a drive-thru window.
>
> 2nd Special Use Permit- C.20: Waiver of yard requirements for reduced setbacks:

Townhouse:	Villa:	SFD:	Required:
Front 25'/20'	Front 25'/20'	Front: 25'	Front 35'
Side 10'	Side 12'	Side: 10'	Side 15'
Rear 25'	Rear 25'	Rear: 25'	Rear 35'

Mrs. Clary continued that the amenities included: signage, multipurpose lawns, grill area, waterfront deck, fishing outpost, native plantings, seating nook, tot lot, seating with open views to the lake, trails, firepit, picnic pergola with tables and benches, Adirondack chairs, sand beach, and a dog park with play equipment. She stated that the applicants would have a property owners association that will be responsible for the maintenance and upkeep of the following:

1. all open space, common areas, and other amenities noted in the Conceptual Plan;
2. all stormwater management infrastructure, including "wet" stormwater management infrastructure, specifically best management practices; and
3. landscaped buffer areas, as shown in the Conceptual Plan.

She said that the applicants were proffering the following road improvements:

1. Southbound right-turn lane (100-foot storage plus 200-foot taper) into right in/right out proposed Project entrance off of US 258/Rt. 10 (Benns Church Boulevard) designated as Public Road A on the Conceptual Plan and currently serving as an entrance to the existing Tractor Supply;
2. Southbound right-turn lane (100-foot storage plus 200-foot taper) into right in/right out proposed Project entrance off of US 258/Rt. 10 (Benns Church

Boulevard) designated as Public Road J on the Conceptual Plan (in between Turner Dr & Tractor Supply); and

3. A conditional payment of $1,000,000.00 toward the construction of the roundabout at Turner Drive.

Mrs. Clary added that the applicants were proffering a conditional cash proffer to Isle of Wight County Schools if they were over enrollment capacity at the Smithfield Middle School at the time the Certificate of Occupancy is issuance. She said that no more than 60 zoning permits would be issued in a 12 consecutive month period for the residential units. She noted that the application was favorably recommended to Town Council at the July Planning Commission. Councilwoman Butler asked if there were any comments or questions, and hearing none reported that the matter would be moved to the Council's agenda.

2. PRE-PUBLIC HEARING DISCUSSION: Text Amendments to Reclassify Accessory Apartments as Accessory Dwelling Units and Clarify Regulations in Article 2.Q and P; to Update the Floodplain Overlay in Article 3.O; and create the Pinewood Heights Industrial Park Overlay in Article 3.S – Mrs. Clary explained that the proposed text amendment was to Article 2Q updating accessory apartments to accessory dwelling units (ADUs). She reported that ADUs would still require an SUP; however, the family relationship and age requirements were removed. She noted that the change would also allow free standing ADUs in addition to ADUs over detached garages, and would not require the removal of the kitchen. Mrs. Clary reported that Article 2P changed accessory apartments to ADUs. She stated that the Planning Commission favorably recommended the application with the conditions: Removal of item 4. Remove breezeway from 8a. 8c replace shall with "may." She related that Town Staff suggested also removing porch, patio, etc. from 8a. Councilwoman Butler asked if there had been a maximum number of people residing in an ADU provided. Mrs. Clary reported that issues with maximum occupancy would need to be reviewed by the Building Official. She recapped that originally the ordinance had limited the occupancy to two people, but the Planning Commission had recommended that they remove that requirement. Councilman Bowman reported that the General Assembly had weighed in on the issue last session, and he would not be surprised if it was brought up again in the current session.

Mrs. Clary continued with the proposed text Amendment to Article 3.O which would update Smithfield's Floodplain Ordinance. She stated that the Federal Emergency Management Agency (FEMA) had updated the Town's Flood Insurance Rate Map (FIRM) and Flood Insurance Study (FIS). She said that Town Staff utilized the model ordinance, which had already been approved by the Department of Conservation and Recreation (DCR). Mrs. Clary explained that once approved by Town Council, it will need to be approved by FEMA. She noted that the item appeared on the April 9th, 2024 Planning Commission agenda as a discussion item and the Planning Commission

favorably recommended the application with the condition of alternative language regarding accessory structures in the Special Flood Hazard Area (SFHA). Staff suggested removing that language allowing accessory structures and instead prohibiting accessory structures in the SFHA, as that would be in conformance with our Chesapeake Bay Preservation Area (CBPA) guidelines, which do not allow accessory structures in the Resource Protection Area (RPA). Councilwoman Butler confirmed that there were no additional questions for Mrs. Clary on the matter.

Mrs. Clary stated that final proposed text amendment was to Article 3S in order to create a new Pinewood Heights Industrial Park Overlay (PHIPO) District. This item appeared as a discussion item at the July Planning Commission meeting, and a red-lined version is attached. Planning Commission made suggested changes as a discussion item and favorably recommended it to Town Council. She detailed that in the new district shipping containers would still require a SUP, accessory structures were to be located in side or rear yards with allowance in the front yard via Planning Commission waiver, and the removal of non-stacked shipping containers as by-right. Mr. Stalling pointed out that the intent behind the creation of the PHIPO district was in relation to their knowing what they wanted the Pinewood Heights area to be as it is redeveloped. He continued that they wanted to look at creating a zoning environment that would make that vision as easy as possible to achieve for small businesses. He added that the change would also allow Town Staff to apply for grants available through the Virginia Economic Development Program to offset some of the infrastructure costs. Councilwoman Butler asked if the type of fencing for businesses and residential be the same. Mr. Stallings said that residential development would not be allowed in that area. Councilwoman Butler clarified that she was asking if the fencing ordinance was the same for businesses as it was in residential districts. Mr. Stallings stated that they were for front yards. Councilwoman Butler questioned why the Town did not a have an ordinance to address fencing in industrial areas. Mrs. Clary stated that the goal of the overlay was to ensure that businesses in that area had the flexibility to be treated as an industrial park area. Mr. Stallings related that there may need to be additional conversation surrounding shipping containers in that area as many industrial users, especially small businesses, liked to use the containers as outdoor storage. He asked them to consider that if the containers were shielded from view, would they be something that the Council was ok with being on site. Councilman Bowman recognized that the creation of the overlay would allow for more flexibility, but he was hoping that as the development was underway the Town was ensuring the quality and integrity of the appearance of what they wanted to see in Smithfield. Councilwoman Butler asked Councilman Cutler to give more information about the discussion held at the Planning Commission meeting. Councilman Cutler recalled the conversation dealing with the aesthetics of the area and ease of use for small businesses. He said he believe there was middle ground that could be reached, as he did not want to see the citizens have to submit a $400 SUP fee in order to do something that would be on a large number of lots in that district. Councilwoman Bebermeyer asked Mr. Stallings if he saw the issue as a

work-in-progress, clarifying that she did not want to charge the fee to apply for an SUP and then change the requirement after-the-fact. Mr. Stallings confirmed that it was; he related that they were still in the master planning phase for utilities at the site and it would probably be next year by the time they had all of the requirements in place to qualify for the previously mentioned grants. Councilman Cutler stated that he had asked Mrs. Clary research other localities on the subject as certainly they had to have similarly zone areas, or regulations that governed shipping containers in industrial areas. Mr. Stallings clarified that what was presented was a result of their research of other localities overlay districts and industrial zoning. Mrs. Clary explained that the research had been completed during the update of the ordinance regarding shipping containers. Councilwoman Butler reported that the amendments would move to the Council agenda for action.

3. PROFFER AMENDMENT: Battery Park Storage – Mrs. Clary reported that the proposed Proffer Amendment for Battery Park Storage added language that would provide the Town extra assurances that if the use ever changed from self-storage, the Town would be able to review and approve such change in use. She stated that Town Staff was in support of this proffer amendment as it would provide a mechanism for enforced review of any change in use. Councilwoman Butler reported that the amendments would move to the Council agenda for action.

B. **MATTERS DISCUSSED BY COMMITTEE WHICH WILL NOT BE ON COUNCIL'S AGENDA**

1. Special Use Permit - Short Term Rental - 139 Sykes Court – Mrs. Clary reported that the applicant was seeking approval to rent 139 Sykes Court as a short-term rental property with no changes to the property proposed in order to accommodate that use. She noted that there were four other approved Special Use Permits (SUPs) for short-term rentals within the downtown area. She suggested that approval be conditioned on the applicant following the requirements outlined in Article 2.Z.1.a through Article 2.Z.1.i., except for Article 2.Z.1.b. Mrs. Clary reported that the conditions required a signed and notarized short-term rental affidavit to ensure compliance. She noted that the application had been recommended favorably by the Planning Commission with the condition that the applicant return in one year to have the application review. Councilwoman Butler recalled that the matter had been heard before. Mrs. Clary confirmed that the matter had appeared at the last meeting as a public hearing item and had been tabled. Councilwoman Butler said that it had been her understanding that further discussion would be held regarding short-term rentals in the Town of Smithfield, specifically in the Historic District. Mr. Stallings reported that Town Staff had gathered short-term rental ordinances from small towns across the region and were in the process of compiling that data. Councilwoman Butler questioned how they could have additional discussion if there was

not data to review. Mr. Stallings clarified that they wanted to offer another opportunity for the Council to ask any additional questions or direct Town Staff to research additional information. Councilman Brooks asked for confirmation whether the matter would appear on the next Town Council agenda. Mr. Stalling said that the item could be moved to the September Committee Meetings to allow for additional time to review the data.

2. Conditional Rezoning and Special Use Permits – Sheetz – Mrs. Clary reported that the application was for conditional rezoning to Highway Retail Commercial (HRC) to facilitate the construction of a convenience store with fueling station islands, with two, potentially three additional retail users. She observed that the uses were in line with the Future Land Use Map (FLUM), as the current designation is Corridor Mixed Use, which provided for primary commercial uses. Mrs. Clary detailed that the 6,139 square foot convenience store would include a 4,170 square foot fueling station canopy, with 6 double sided self-serve fueling stations. She said that in addition to traditional convenience store offerings, there will be a made-to-order food menu, Coffee bar, and smoothies. She continued that indoor and outdoor seating was proposed with the store operating 24 hours a day, 7 days per week. She pointed out that the site had existing access servicing Sherwin Williams and would include a right-in/ right-out entrance shared amongst the subdivided parcels. She added that a pedestrian path along Route 10 for connectivity had been included. Mrs. Clary explained that the application included the following:

> 1st Special Use Permit- Article 3.J2.C.7: Drive-thru facility. The applicant is requesting to utilize a drive-thru facility at the convenience store for made to order food or other items from the store, excluding alcohol.
>
> 2nd Special Use Permit- C.20: Waiver of parking and loading: The applicant would like to exceed the maximum number of parking spaces allowed by 7 spaces, providing up to 44 spaces instead of the maximum of 37 spaces.
>
> 3rd Special Use Permit – C. 15: Service Station: The applicant would like to utilize one parcel as a 5,500 square foot oil express facility.

Mrs. Clary continued that the applicants included an updated conceptual plan in general conformance with the originally submitted plan for potentially three users in addition to the Sheetz. She reminded them that as proffered, any additional users would need to be reviewed and approved by the Planning Commission. She recapped that the application package had been favorably recommended to Town Council at the July Planning Commission meeting provided the applicants determine a way to review/ limit the third parcel and they address the Virginia Department of Transportation's (VDOT's) comments prior to the Council meeting. Mrs. Clary updated that she had spoken with VDOT and they reported that they were still working on those comments, and she did not

have an official letter from them at that time. Councilman Bowman asked when they could expect VDOT to provide their comments. Mrs. Clary stated that VDOT had not given her a timeline for completion. Councilman Bowman asked if there were any objections reported. Mrs. Clary reported that the comments were circulating around the Traffic Impact Analysis (TIA) that had been done and the calculations that had been used. She acknowledged that she was unsure of the specifics involved. Councilman Bowman expressed concern that if VDOT had still not come to a conclusion, then it may not be the right time for the Council to make a decision of such magnitude. Mrs. Clary stated that Town Staff suggested that any action, if the Council wanted to take any, be conditioned on the applicants successfully resolving all of VDOT's comments. Mr. Stallings stated that the best action may be to table the matter if they had not received the pertinent information. Councilwoman Bebermeyer stated that she was in agreement with Councilman Bowman. Councilman Cutler pointed out that VDOT had made quite a few comments and it had not been just one or two. Councilman Bowman advised that they should wait to make a decision. Councilwoman Bebermeyer directed them to page 13 in the statement regarding items of historical significance. She observed that the area in question was very close in proximity to the Sweetgrass development and the Isle of Wight County Museum had just recovered artifacts from that property. She said that the area could possibly have the same items, and asked if nothing had been done in that regard. Mrs. Clary related that the information Councilwoman Bebermeyer had directed them to was provided by the applicant as part of their informational package. Councilman Bowman speculated that either the applicant was exempt from the study due to location, or they had received documentation from the Department of Historical Resources (DHR) in regard to the property. Councilman Cutler noted that they were planning to table the matter and the question could be sent to the developer for follow up. Mr. Stallings explained that normally the Museum was given the opportunity to comment on an application. Councilwoman Bebermeyer asked if the Museum had been provided the opportunity to comment. Mrs. Clary reported that Jennifer England, of the Isle of Wight County Museum, requested that as the project proceeded any discoveries go to the Museum. Vice Mayor Harris asked if there was any reference to the completion of a Phase 1 study. Mrs. Clary reported that a Phase 1A cultural resource assessment was prepared by Kimley-Horn and Associates for Benn's Church Investments LLC. She continued that neither the DHR or Isle of Wight County Museum had reported objections or concerns regarding the report's findings and conclusions. Councilwoman Butler asked if that information could be included in the staff report in order to make the information easier for the Council to see. She concluded that the item would be tabled until the next Committee meeting. Mr. Stallings explained that since the public hearing had already been held if VDOT's comments have not been received by the September Town Council meeting the matter could be tabled until September Committees. Councilwoman Butler recalled that there had been questions raised at the Planning Commission regarding signage, and Mrs. Clary confirmed that the Commission would be responsible for the Special Sign Exception.

3. Red Point Taphouse - Water Connection – Vice Mayor Harris reported that the Council would be postponing the discussion on the Red Point Taphouse water connection until after their Closed Session due to materials being relevant to the follow-up. Vice Mayor Harris stated that as discussed in Closed Session Town Council has authorized the Town Manager to negotiate with the representatives of Red Point Taphouse in regard to the possible purchase of right-of-way land as well as land necessary for drainage system. The Town Manager will report back to Town Council once he has reached out to the representatives of Red Point Taphouse.

Meeting Adjourned at 4:23 p.m.

Additional Discussion Held Outside of Committees:

Vice Mayor Harris stated that before they go into closed session there are a couple of remarks that he would like to make. As they go into closed session today, they will be going into the closed meeting with a new set of guidelines that they are working on with Town Staff. These new guidelines will provide a clearer, more transparent reason for going into closed session for any matter. They do not want the public to believe at any time that what they are doing in closed session does not meet the legal requirement for closed sessions. They also want to make sure that what they are talking about during the closed session is pertinent to the subject and they do not branch off and start talking about things that were not disclosed as the closed session topic. Vice Mayor Harris stated that they have asked the Town Clerk to join them today to act as a recorder of main points. He noted that we will then have some sort of reference to the discussion that was held during the closed meeting. The Town Manager reported that Town Council had received a draft procedure for closed sessions and explained the draft procedure so everyone was clear on how they will handle closed sessions moving forward. He noted that included on the agenda were four different items listed as a closed session topic. Closed Session items will be placed on the agenda after either the Town Manager or the Town Attorney have reviewed them and find reason for them to be listed as a closed session topic. Determination will come from looking at the state code to make sure there is a relevant exemption. Town Council will then make a motion to go into closed session, again, based off of what is on the agendas. Once Council gets into closed session the Town Manager or the Town Attorney will identify the topic, the specific state code section that allows us to be in closed session to discuss that topic as well as the justification for it. Council will then have the opportunity to say yes or no that you want to proceed with discussion. If Town Council disagrees with the discussion that matter will be moved back to open session and no discussion will be held in

closed session. At the conclusion of the closed session Council will make the normal motion to come back into open session and that only the appropriate matters were discussed. If Council had elected not to discuss any topic it will be disclosed in open session. Councilwoman Bebermeyer stated that she is glad that we have this new procedure and thought it was worth noting this meeting is unusual in the fact that we have this many closed session topics. This will not be the norm moving forward. Councilman Cutler asked the Town Clerk if the closed session meeting would be recorded. The Town Clerk replied that the meetings would be recorded and used for reference in the future. He clarified that if they need the Town Clerk to leave the room, she would be able to leave the recorder. The Town Clerk replied that she could leave the recorder. Councilman Cuter made some points on transparency, as it relates to closed session. He stated that closed session meetings are a choice. It is not a requirement in most cases. It is clear that they are lacking some resources in one of the topics they are going to be discussing in closed session and acknowledged that after last month's meeting it is difficult to navigate into closed session without having some legal representation. Councilman Cutler mentioned that he had spent a fair amount of time this week seeking some legal advice. He learned that different attorneys have different things to say but there was one consistent message which was to seek outside counsel to get your questions answered. Councilman Cutler stated that he would like to make a motion that we hire outside counsel to assist with resolution of the distribution of taxpayer funds for legal services. Councilwoman Butler stated that we do not typically vote in committee meetings. Councilman Cutler stated that he does not see anything procedurally that says there is no voting in committee meetings. The Town Manager stated that he is not aware of anything that strictly prohibits you from voting at committee meetings; however, we do not typically vote outside the regular Town Council meetings. Councilman Cutler stated that he understands but feels that this is a very unique situation and unless there is a procedural limitation on it, his motion stands. Councilwoman Butler stated that if this is a new procedure that they want to do then the Town Manager may want to draft a new procedure. If they vote tonight, she would like to see it applicable to all committee meetings moving forward. She also expressed concern over the comment that closed sessions are not required and that it is a decision by Town Council. Councilwoman Butler recapped that with a previous Town Council they had a councilmember that shared a topic that was discussed in close session and when they had their next Town Council meeting, she was lam blasted by some of her colleagues for sharing. Councilwoman Butler stated that her feelings on sharing closed session information is that there are no consequences when closed session meetings are shared. She expressed her concern about the recent situation being shared with the media before they could discuss it as a group. All kinds of things have been said, and I think because of that it has created a lot of chaos in the community. She feels like we should have had a closed session first and then shared it with the media. Councilwoman Butler stated that she has tried to be flexible on Town Council but

clearly, we are doing away with flexibility. She stated that she is feeling inadequate as a councilmember based on the topics of transparency or whatever else you are disclosing. She has come to the decision that it depends on relationships. People on the outside assumed that a lot of backdoor deals were made with the old council. She continued to explain there is no difference between that council and this council. There are meetings before the meetings, and she has not been included. She is fine with that because she did not get on Town Council to earn new friendships, and she is fine with that as long as it does not affect her voting. Councilwoman Butler stated that this is her opinion on what has transpired over the last week and she is disappointed that it happened, but she is also disappointed at how it has played out. Councilman Cutler stated that he appreciates her statement. He does not know about the paper but as far as he is concerned everything is foiable. I am neighbors with the editor of the "Smithfield Times" but when you say shared as far as I am aware everything was received through FOIA. Councilwoman Butler felt that Councilman Cutler had shared a special called meeting with the Smithfield Times before it was scheduled because the paper could not have FOIAed that information. The article in the paper stated that the special-called meeting had been cancelled. Councilwoman Butler expressed concern that there is clearly a lack of communication. In the last five to seven days she has received more emails in her town email account than she has ever received. Councilman Cutler stated that he does see anything wrong with sharing with the citizens and the newspaper that action is being taken to address the matter on the Town Attorney. He stated that we are going to sorely miss having an attorney; however, he thinks that we have an identified conflict of interest. Taking steps to identify that we need outside counsel as a goal to resolve this issue will let our citizens know we are working to resolve the matter. He thinks it is a valid necessity to have that resource so that they can ask questions and receive answers appropriately to guide our discussions. Councilwoman Butler stated that she feels like she is experiencing her worst nightmare on Town Council. One of the things that she shared with one of her colleagues during her first term, especially after attending VML Conferences, was not wanting the actions of Town Council to spill over into the community like many localities have had happen. That is exactly what has happened here. She stated that they are not all going to vote the same all the time but I hate the dynamics of this current Town Council. Councilwoman Bebermeyer stated that she was one of the people that was in favor of having a special meeting. She wished they could have met a week ago and maybe put a lot of this to rest. Vice Mayor Harris stated that collectively they need to decide whether they are going to proceed with the motion that has been made. Councilman Brooks stated that they may end up with that solution but at this time they have not had an opportunity to discuss it amongst themselves whatsoever. He said that he has not had one single conversation with Councilwoman Butler. In his opinion it would be premature to go into a vote and say this is what we are going to do without even talking as a council. It is our duty as a council to discuss this matter. Councilman Cutler asked if there

was any impediment to a vote after the closed session then? The Town Manager stated that he has not found anything that would prevent them from having a vote at committee. Councilman Cutler stated that he is in agreement that we need to go into closed session, but he thinks there are a lot of things that can be discussed as well in the public sphere. He just wanted to encourage all of Town Council as they progress through this to account for that. If Town Council finds themselves deviating from the topic of discussion, they need to bring it back in. Councilwoman Butler stated that prior to the new process of how we were going to handle closed sessions she called three of her friends that serve on other boards in other localities and the way they were handling them before was the way these other localities are handling them. Councilman Bowman stated that he thinks it is a fine line as far as the closed sessions that he has been involved in and how much information you give. The reality and necessity for closed sessions are not to reveal at a certain point. Certain things that could jeopardize the financial wellbeing of both the Town and the citizens of the Town or it could be a situation where whether you like it or not the General Assembly has decided that personnel matters in the Commonwealth of Virginia are private matters, and they are private matters for the most part between the employer and employee. He does agree that there are certain decisions to be made as to how much is divulged at that given time. After all, Council is elected to do the people's business in the best manner that we possibly can. That responsibility is laid at Council's feet when you are elected. Again, there is a fine line on how much you put on the agenda and how much you don't. Vice Mayor Harris stated that before we read the motion to go into closed session, he thinks it is important what Councilman Cutler said and would agree with that. If at any point in our discussions, they get to a point where they cannot proceed because we need legal advice, they should stop their discussion until they have legal representation. Vice Mayor Harris also stated that he would like to back what Councilwoman Butler said in that governance by Town Council and the system we have is governance by consensus. He said that they have not done a very good job over the last couple of weeks and to Councilman Brooks point until they sit down and share and examine everything in front of them collectively, we cannot get to that point of understanding or consensus. It is necessary for us to go into closed session now to discuss each of the four matters. At any time, we hit something that we cannot answer in terms of legality, they shall stop and come back and seek proper counsel. If there is no further discussion at this point Councilman Bowman will read the motion.

Councilman Bowman made a motion that they adjourn in a closed session for the purpose of discussing personnel matters, more specifically, the four appointed positions by Town Council as follows: Town Manager, Town Treasurer, Town Clerk, and Town Attorney, Pursuant to Section 2.2-3711 A1 of the Code of Virginia; Closed Session for the purpose of cost negotiations for Red Point Taphouse Right-of-Way Valuations Pursuant to 2.2-3711 A3 of the Code of Virginia; Closed Session for the

discussion of acquisition / disposition of real property, more specifically, The Grange @ 10Main Pursuant to 2.2-3711 A3 of the Code of Virginia; and Closed Session for the discussion of personnel matters, more specifically, the Town Attorney, Pursuant to 2.2-3711 A1 of the Code of Virginia and that they reconvene after this closed session back to the open session. Councilman Brooks seconded the motion. Vice Mayor Harris called for the vote, with six members present. Councilman Bowman voted aye, Councilwoman Butler voted aye, Councilman Cutler voted aye, Councilwoman Bebermeyer voted aye, Councilman Brooks voted aye, and Vice Mayor Harris voted aye. Mayor Smith was absent. The motion passed unanimously.

In Closed Session @ 4:48 p.m.
Out of Closed Session @ 9:25 p.m.

Councilman Bowman made a motion to come back into open session and to certify that during closed session the only matters discussed were personnel matters, more specifically, the four appointed positions by Town Council as follows: Town Manager, Town Treasurer, Town Clerk, and Town Attorney, Pursuant to Section 2.2-3711 A1 of the Code of Virginia; cost negotiations for Red Point Taphouse Right-of-Way Valuations Pursuant to 2.2-3711 A3 of the Code of Virginia; acquisition / disposition of real property, more specifically, The Grange @ 10Main Pursuant to 2.2-3711 A3 of the Code of Virginia; and personnel matters, more specifically, the Town Attorney, Pursuant to 2.2-3711 A1 of the Code of Virginia. Councilwoman Bebermeyer seconded the motion. Vice Mayor Harris called for the vote, with six members present. Councilman Bowman voted aye, Councilwoman Butler voted aye, Councilman Cutler voted aye, Councilwoman Bebermeyer voted aye, Councilman Brooks voted aye, and Vice Mayor Harris voted aye. Mayor Smith was absent. The motion passed unanimously.

Additional Item for Action:

Councilman Cutler made a motion to Direct the Town Manager to hire outside Counsel to assist with the closed session item pertaining to the Town Attorney. Councilwoman Bebermeyer seconded the motion. Vice Mayor Harris called for the vote, with six members present. Councilman Bowman voted aye, Councilwoman Butler voted aye, Councilman Cutler voted aye, Councilwoman Bebermeyer voted aye, Councilman Brooks voted aye, and Vice Mayor Harris voted aye. Mayor Smith was absent. The motion passed unanimously. Vice Mayor Harris stated that we are asking the Town Manager to look into the selection of a attorney to help us and advise us through this process.

Meeting adjourned @ 9:28 p.m.

Memo

To: Honorable Mayor & Town Council

From: Ashley Rogers, Human Resources Director

cc: Michael Stallings, Town Manager
Ed Heide, Director of Public Works & Utilities

Date: August 25, 2025

Re: Addition of Engineer I to Compensation Plan

The Director of Public Works & Utilities is evaluating the structure of the department and believes an Engineer I position would better benefit the needs of the department and the Town than the currently posted and approved position of Transportation and Storm Water Manager.

In order to accomplish this the Council would need to approve the addition of the Engineer I position to the Compensation Plan. Please note that this would not result in the addition of approved headcount; it would replace the currently approved position of Transportation and Storm Water Manager from a budgeting perspective.

We would propose the Engineer I position be placed in grade 115 with a salary range of $68,974.38 – $113,807.73.

The Transportation & Storm Water Manager is currently placed in salary grade 118 with a salary range of $80,418.16 - $132,689.96.

Of note, any budget impact should be positive as this requested position has a lower pay range than the current, approved position.

Position Description

To perform this job successfully, an individual must be able to perform the essential job functions satisfactorily. Reasonable accommodations may be made to enable individuals with disabilities to perform the primary job functions herein described. I understand that this job description is intended to describe the general nature and level of work involved for this job. Nothing in this job description restricts management's right to assign or reassign duties and responsibilities to this job at any time.

Job Title: **Engineer I**

Department: Public Works & Utilities

Pay Grade: 115

Last Updated: **August 2025**

JOB SUMMARY

Under general supervision, performs engineering design, analysis, and reviews municipal and private developments in the Town. Position is responsible for reviewing construction plans, maintenance, and operational plans; managing municipal projects, conducting field investigations; and meeting with developers, consultants, contractors, and the public to resolve problems and explain Town policies. Performs related work as required. Position is an entry-level position performing engineering tasks of lesser complexity.

ESSENTIAL JOB FUNCTIONS:

- Reviews construction development plans for conformity to Town and State codes, policies, and specifications. Coordinates roads and utilities projects with other departments and organizations; prepares written comments.
- Meets with developers, consultants, contractors, and the public to resolve problems and explain Town policies; responds to citizen inquiries.
- Prepares and reviews specifications, plans, estimates, and reports involving the construction, maintenance, and operation of a variety of Town infrastructure, to assure compliance with Town standards and design; performs engineering and hydrologic calculations to assure adequate drainage; develops and implements stormwater drainage standards and design.
- Manages municipal projects to assure timely coordination of design and construction, including the administration of contracts.
- Conducts field investigations; prepares reports and presentations.
- Assists the Director of Public Works and Utilities with a variety of related tasks.
- Assist in administration of the Town Safety program.
- Must carry assigned communication devices as required.
- Performs site plan review with respect to roadway, storm drainage, water, and sanitary sewer installation in compliance with the current local and state specifications.
- Plans and coordinates with the Public Works Department roadway maintenance operations.

- Files documents; locates files and plans on request; researches plans, files, Town ordinances, and design standards.
- Serves as ADA Coordinator and ensures compliance with the American Disabilities Act.
- Performs other duties as assigned.

MINIMUM REQUIREMENTS TO PERFORM WORK:

- Bachelor's degree in Engineering, Engineering Technology, or closely related field from an accredited university or equivalent training, education, and experience. Prefer Virginia Engineer–in–Training certification.
- Minimum of 5 months previous experience and/or training involving engineering plan review, project management, computer-aided engineering design, or personal computer operations.
- Must possess a valid Drivers' License.

Knowledge, Skills and Abilities:

- Knowledge of the principles and practices of Civil Engineering design, construction and inspection;
- Knowledge of general construction practices, particularly as they relate to municipal improvement projects;
- Knowledge of the principles of land surveying as it relates to civil engineering design and construction, and property and easement descriptions and acquisitions.
- Knowledge of engineering standards to review site plans relating to traffic, grading, hydrology, storm drainage, infrastructure layout, utilities, materials, and other engineering aspects.
- Knowledge of safe working practices;
- Skill in communicating and working effectively with a team;
- Skill in planning and organizing work; excellent attention to detail
- Skill in communicating effectively both orally and in writing;
- Ability to review design and construction of facilities, soil erosion, sediment control, site and right-of-way drainage, utilities, and road construction.
- Ability to research and prepare detailed engineering reports regarding proposed municipal improvements and operations and to effectively express ideas and concepts in a clear and precise manner, both verbally and in writing;
- Ability to organize and formulate effective maintenance and construction programs for the Town's infrastructure, working with large groups of employees from various technical, non-technical, and professional fields in the accomplishment of these tasks;
- Ability to complete assigned work within established deadlines in accordance with directives, policies, standards, and prescribed procedures.
- Ability to exercise judgment, decisiveness and creativity in situations involving the evaluation of information against sensory, judgmental, or subjective criteria, as opposed to that which is clearly measurable or verifiable.
- Ability to speak with and before others with poise, voice control, and confidence using correct grammar and well-modulated voice.
- Ability to apply principles of influence systems, such as motivation, incentive, and leadership, and to exercise independent judgment to apply facts and principles for developing approaches and techniques to resolve problems.
- Ability to meet regular attendance requirements;

- Ability to adhere to all established safety standards and ensure such standards are not violated;

PHYSICAL DEMANDS:

Must be physically able to operate a variety of machinery, tools and equipment, such as a motor vehicle, printer, plotter, copy machine, blueprint/plan copier, fax machine, telephone, cellular telephone, two-way radio, pager, drafting instruments, engineer's scale, planimeter, or measuring devices. Tasks require the ability to exert very moderate physical effort in light work, typically involving some combination of stooping, kneeling, crouching and crawling, and which may involve some lifting, carrying, pushing and/or pulling of objects and materials of moderate weight (12-20 pounds). Requires the ability to coordinate hands and eyes in using job-related equipment and in driving a motor vehicle. Requires the ability to handle a variety of items, job-related equipment, control knobs, switches, etc. Must have the ability to use one hand for twisting or turning motion while coordinating other hand with different activities. Must have moderate levels of eye/hand/foot coordination. May require the ability to differentiate colors and shades of color. Requires the ability to deal with people beyond giving and receiving instructions. Must be adaptable to performing under minimal stress when confronted with an emergency. Requires the ability to talk and/or hear (talking - expressing or exchanging ideas by means of spoken words; hearing - perceiving nature of sounds by ear).

WORK ENVIRONMENT:

Tasks are regularly performed with exposure to adverse environmental conditions. Tasks may risk exposure to traffic hazards, adverse weather conditions, dust, pollen, odors and loud noise.

I have received and fully understand the job description for the above position. I further understand that I am responsible for the satisfactory execution of the essential functions described therein.

This job description is designed to provide an employee with a basic understanding of the essential functions, duties, and responsibilities entailed in their job performance and is not intended to be all-inclusive. This description does not constitute an employment contract, either expressed or implied. Job functions and responsibilities are subject to change at the discretion of management. Efforts will be made to provide advance notice of such changes whenever possible

_____ _____

Employee Signature Date

_____ _____

Supervisor Signature Date

The Town of Smithfield provides equal employment opportunities to all employees and applicants for employment and prohibits discrimination and harassment of any type without regard to race, color, religion, age, sex, national origin, disability status, genetics, protected veteran status, sexual orientation, gender identity or expression, or any other characteristic protected by federal, state or local laws.

Town of Smithfield

Memorandum

August 25, 2025

TO: The Honorable Mayor and Town Council

FROM: Michael Stallings, Town Manager

SUBJECT: Appropriation of Funds For Vehicle Purchase

The 2024/25 operating budgets for the Water Fund, Sewer Fund, Highway Fund, and General Fund all contained funding for the purchase of a new dump truck. The vehicle purchase was not able to be completed before the end of the fiscal year due to lead time and production delays, and as such, those funds rolled into the Fund Balance of the respective Funds.

The breakdown of funds is as follows:

$25,000 from Water Fund
$25,000 from Sewer Fund
$25,000 from Highway Fund
$54,324 from General Fund

In order to complete the purchase in this fiscal year, the funds must be appropriated into this year's operating budget.

The attached resolution will appropriate the requisite funds into the General Fund – Public Works Capital Expenditures line item to complete the vehicle purchase.

Recommended Motion

Move that Council adopt the enclosed resolution entitled:

> A Resolution Appropriating The Sum Of $129,324 from the Water, Sewer, Highway, and General Fund Budget Fund Balance to the 2025/2026 General Fund Operating Budget.

Resolution

A Resolution Appropriating The Sum Of $129,324 from the Water, Sewer, Highway, and General Fund Budget Fund Balance to the 2025/2026 General Fund Operating Budget.

WHEREAS, the fiscal year 2024/25 Water, Sewer, Highway, and General Fund Budgets provided capital funding for the purchase of a new dump truck, and;

WHEREAS, the vehicle was not delivered until after the end of the 2024/25 fiscal year, and;

WHEREAS, these funds rolled over into the respective fund balances for each fund, and must be re-appropriated to cover the purchase of the vehicle totaling $129,324.00.

NOW, THEREFORE BE IT RESOLVED by the Council of the Town of Smithfield, Virginia as follows:

Section 1. That the following sums be appropriated into the Fiscal Year 2025/26 General Fund Operation Budget – Public Works Capital Expenditures:

$25,000 from the Water Fund Fund Balance
$25,000 from the Sewer Fund Fund Balance
$25,000 from the Highway Fund Fund Balance
$54,324 from the General Fund Fund Balance

Section 2. The Town Manager is hereby authorized and directed to do all things necessary to complete this transaction

Section 3. This resolution shall be effective on and after its adoption.

Adopted:

TESTE:

_____
Town Clerk

INVOICE

THEPETESTORE.COM

PETERBILT OF RICHMOND, INC DBA
THE PETERBILT STORE – CHESAPEAKE
201 BULLDOG DRIVE
CHESAPEAKE, VA 23320
757.819.4300

Invoice: **14S1504**
Invoice Date: **08/12/2025**
Deal/Packet: **23221/1**
Branch: **Chesapeake**
Department: **New**

Bill-To:	Ship-To:
TOWN OF SMITHFIELD 310 INSTITUE AVE SMITHFIELD, VA 23431	TOWN OF SMITHFIELD 310 INSTITUE AVE SMITHFIELD, VA 23431

ID: 26128 Ph: 757-365-4200 P/O: PW-25-01 Salesperson: David Askew

\+ SOLD UNIT(S)

Stock Number: **TM802110** Price: $127,943.00
VIN: **2NPKHM6X9TM802110**
Year: **2026** Make: **PETERBILT** Model: **536**

ADDITIONAL UNIT CHARGES

5 YR SMART LINQ SUBSCRIPTION	Price:	$799.00
DEALER BUSINESS FEE	Price:	$283.00
	Unit Price:	$129,025.00
	Total Sold Unit(s):	**$129,025.00**

ADDITIONAL DEAL CHARGES

PROCESSING FEE		$299.00
	Deal Add-On Fees:	$299.00
	Total FET:	$0.00
	Total:	**$129,324.00**
	Net:	$129,324.00
	Balance Due:	**$129,324.00**

Terms Due: 09/11/2025

Remit Balance Due To:
The Peterbilt Store - Chesapeake
5100 Holabird Ave
Baltimore, MD 21224

WIRE FRAUD NOTICE: Always independently confirm wiring instructions from The Pete Store either in-person or via a telephone call to a known and verified phone number. Never trust wiring instructions sent via email.

INVOICE

THEPETESTORE.COM

PETERBILT OF RICHMOND, INC DBA
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Terms Due: 09/11/2025

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The Peterbilt Store - Chesapeake
5100 Holabird Ave
Baltimore, MD 21224

WIRE FRAUD NOTICE: Always independently confirm wiring instructions from The Pete Store either in-person or via a telephone call to a known and verified phone number. Never trust wiring instructions sent via email.

The Blair Bros., Inc.

P.O. Box 5413
Suffolk, VA 23435
(757) 538-1696 Fax: (757) 538-0714
www.blairbros.com

Invoice

Terms	P.O. No.	Date	Invoice #
NET 30 DAYS	ARPA-25-01	8/18/2025	20315

Bill To:

Town of Smithfield
P O Box 246
Smithfield VA 23431

Project:

Sykes Ct.

Description	Amount
Provide equipment, labor, and materials to accomplish the following work on Sykes Ct.:	
Concrete Replacement: 1. Saw cut along edge of existing concrete gutter pan then demo existing concrete curb, driveway aprons and sidewalk. (Spoils to become property of the Blair Brothers Inc.) 2. Prep area to receive new concrete. To include standard 4" sidewalk, concrete aprons being prepped to receive 7" and standard curb and gutter CG-6 (handwork) detail. (Survey by others) 3. Furnish and install 345 LF of CG-6 (hand work), 134 SY of 4" std. sidewalk and four (4) concrete aprons at 7". 4. Topsoil and seed as needed.	
Mill/ Pave: 1. Mill approx. 981 SY at a depth of 2" on Sykes Ct. to include 20' of South Mason Street. 2. Clean and haul millings off site. Millings shall become property of The Blair Bros. Inc. 3. Tack surface prior to overlay to ensure proper bond with new asphalt. 4. Overlay same area with 2" of SM12.5A asphalt and compact accordingly. 5. Provide traffic control as needed.	
Total Contract Price: $116,450.00	
Final Invoice, Balance Remaining:	32,000.00

THANK YOU FOR YOUR BUSINESS

Invoice Total: $32,000.00

All charges during the month are due and payable by the 10th of the following month or as per stated terms. A SERVICE CHARGE OF 2% PER MONTH will be added to account from invoice date on past due accounts. This is an annual percentage rate of 24%. The customer agrees to pay service charges and the cost of collection, including attorney's fees.

If prices and terms on invoice are not as agreed, or if any claim or damage or deficiency is to be made, please notify us at once, as no claim made at maturity will be allowed.

We Accept
VISA MasterCard
Convenience fee added

The Blair Bros., Inc.

P.O. Box 5413
Suffolk, VA 23435
(757) 538-1696 Fax: (757) 538-0714
www.blairbros.com

Invoice

Terms	P.O. No.	Date	Invoice #
NET 30 DAYS	HWY-26-01	8/18/2025	20316

Bill To:

Town of Smithfield
P O Box 246
Smithfield VA 23431

Project:

Skyes Ct. Paving Extension

Description	Amount
Provide equipment, labor, and materials to accomplish the following: 1. Mill an additional 379 SY at a depth of 2" on Mason St.. 2. Clean and haul millings off site. Millings shall become property of The Blair Bros. Inc. 3. Tack surface prior to overlay to ensure proper bond with new asphalt. 4. Overlay same area with 2" of SM12.5A asphalt and compact accordingly. 5. Provide traffic control as needed.	
Total Contract Price:	9,450.00

THANK YOU FOR YOUR BUSINESS

Invoice Total: $9,450.00

All charges during the month are due and payable by the 10th of the following month or as per stated terms. A SERVICE CHARGE OF 2% PER MONTH will be added to account from invoice date on past due accounts. This is an annual percentage rate of 24%. The customer agrees to pay service charges and the cost of collection, including attorney's fees.

If prices and terms on invoice are not as agreed, or if any claim or damage or deficiency is to be made, please notify us at once, as no claim made at maturity will be allowed.

We Accept
VISA MasterCard
Convenience fee added

RESOLUTION
MAINTENANCE FUNDING FOR STREETS

WHEREAS, certain streets in the Town of Smithfield, in particular St. Andrews from its intersection with Cypress Creek Parkway to the end of the cul-de-sac; Royal Blackheath from its intersection with St. Andrews to the end of the cul-de-sac; Ayshire Loop from its intersection with St. Andrews to its intersection with St. Andrews; and St. Annes from its intersection with St. Andrews to its intersection with St. Annes, all as identified on a Request For Street Additions, Deletions and Conversions For Street Payments, a copy of which is attached hereto as Exhibit "A", is and has been part of the transportation system maintained by the Virginia Department of Transportation; and,

WHEREAS, the Town of Smithfield is willing and desires to take over the maintenance responsibility for these streets; and,

WHEREAS, this streets have not been accepted by the Virginia Department of Transportation for qualification in its Municipal Assistance Payment program; and,

WHEREAS, the Town Council deems it to be in the best interest of the Town and its citizens to enroll all qualifying streets in the Municipal Assistance Payment program so that the Town may receive additional funding for the maintenance of this street.

NOW, THEREFORE, BE IT RESOLVED that the Town Council directs the Town Manager to make application to the Virginia Department of Transportation to enroll all qualifying streets, as identified on Schedule "A" attached hereto, in the Municipal Assistance Payment program so that the Town may receive additional funding for the maintenance of these streets as identified on Schedule "A" attached.

Adopted this 2nd day of September, 2025.

TOWN COUNCIL OF THE
TOWN OF SMITHFIELD

By:_____
Michael G. Smith, Mayor

ATTEST:

_____
Clerk

Appendix B
Form U-1 (rev. 7-1-20)

LOCAL ASSISTANCE DIVISION
VDOT
REQUEST FOR STREET ADDITION, DELETIONS AND CONVERSIONS FOR
STREET PAYMENTS SECTION 33.2-319
CODE OF VIRGINIA

MUNICIPALITY Smithfield **DISTRICT** Hampton Roads

ACTION REQUIRED (SELECT BELOW)	STREET NAME ROUTE NUMBER	FROM TERMINI TO	R/W (Width) (FEET)	PAVEMENT WIDTH (FEET)	CENTER LINE (MILES)	NUMBER OF LANES	MOVING LANE MILES	Eligibility Code Reference Link	FUNC. CLASS. (TMPD USE except for HR and NOVA)
SELECT ONE	St. Andrews	Cypress Creek Parkway to Cul-de-sac	50	30	0.39	2	0.78	1	
SELECT ONE	Royal Blackheath	St. Andrews to Cul-de-sac	50	30	0.33	2	0.66	1	
SELECT ONE	Ayrshire Loop	St. Andrews to St. Andrews	50	30	0.40	2	0.80	1	
SELECT ONE	St. Annes	St. Andrews to St. Annes	50	30	0.17	2	0.34	1	
SELECT ONE							0.00	Select one	
SELECT ONE							0.00	Select one	
SELECT ONE							0.00	Select one	
SELECT ONE							0.00	Select one	
SELECT ONE							0.00	Select one	
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SELECT ONE							0.00	Select one	
SELECT ONE							0.00	Select one	
SELECT ONE							0.00	Select one	
SELECT ONE							0.00	Select one	
SELECT ONE							0.00	Select one	

*** Council Resolution and Map Attached**

SIGNED _____
MUNICIPAL OFFICIAL **DATE**

SIGNED _____
AUTHORIZED VDOT OFFICIAL **DATE**

Submit to: District Point of Contact in triplicate

CLASSIFIED BY _____
T&MPD ENGINEER **DATE**

AMENDED STATEMENT OF PROFFERED CONDITIONS
AUGUST 21, 2025

The undersigned applicant, BATTERY PARK, LLC (hereinafter "Owner" or "Developer"), is the current owner of the property identified as Tax Map Parcels No. 22-01-013, 22-01-014 & 22-01-020 (collectively, "Property"), which is subject to the following conditions 1-7 below, which were voluntarily proffered in connection with the change in zoning classification of the Property from Community Conservation (C-C) District to Light Industrial (I-1) District. The Owner hereby voluntarily proffers that the development of the Property, which is the subject of this proffer amendment, shall be in accordance with the amended conditions set forth below, which include new condition 8:

1. The Developer shall maintain a 50foot wide existing vegetative buffer along the northerly boundary line parallel to Battery Park Road and along the common boundary with the Wellington Estates Subdivision. In addition to the 50 foot wide existing vegetative buffer, there shall be an additional buffer area ten feet in width immediately adjacent to the fence line wherein the landscape buffer provided in paragraph 2, below shall be planted. The Developer shall maintain a 30 foot wide existing vegetative buffer around the entire remaining perimeter of the Property.

2. The Developer will plant a landscape buffer comprised of evergreen plants along the exterior of the fence line running parallel to the Wellington Estates Subdivision.

3. The architectural style of the office shall be approved by the Smithfield Planning Commission.

4. All exterior lighting to be "dark sky" qualified.

5. The Developer hereby dedicates a strip of land 25 feet in width along Battery Park Road as additional right of way for road improvements and/or a bicycle/pedestrian trail.

6. The Developer will increase the capacity of the BMP required to be built upon the subject property to accept excess runoff from the Wellington Estates Subdivision.

7. The hours of operation will be restricted from 6 a.m. to 8 p.m.

8. The Developer agrees that a change in the use of the improvements depicted on the site plan entitled "Site Development of Battery Park Storage Parcel 22-01-020 & 22-01-014" prepared by WPL dated July 22, 2025 that would require more than a total of 4 bathrooms or capacity of more than 4,000 gallons of water per month, whichever is greater, will require a review and approval by the Town of Smithfield Public Utilities Department of the available capacity of the Rising Star Pump Station.

OWNER/DEVELOPER:

BATTERY PARK, LLC, a Virginia limited liability company
By: Battery Park Manager, LLC, its Manager

By:_____
Terry M. Marshall, Vice President

TOWN COUNCIL STAFF REPORT: PROFFER AMENDMENT
Battery Park Storage
TUESDAY, SEPTEMBER 2nd, 2025, 6:30 PM

This is a proposed Proffer Amendment for Battery Park Storage adding language that would provide the Town extra assurances that if the use ever changed for self-storage, the Town would be able to review and approve such change in use.

Town staff is in support of this proffer amendment as it would provide a mechanism for enforced review of any change in use.

Please direct inquiries to Tammie Clary at 1-(757)-365-4200 or tclary@smithfieldva.gov.

NOTICE OF PUBLIC HEARING

TOWN COUNCIL OF THE TOWN OF SMITHFIELD

AMENDMENT & REVISION OF OFFICIAL ZONING MAP (CONDITIONAL REZONING)

Notice is hereby given that the Town Council of the Town of Smithfield, Virginia will hold a public hearing at the regular meeting of the Town Council at the Smithfield Center, 220 N Church St, Smithfield, VA 23430, on Tuesday, September 2nd, 2025 at 6:30 PM to consider the application of Kent Henry, applicant on behalf of L & L Land Development LLC & Mollie G Turner Family LTD Partners C/O Carmine Robbins Co, owners, for an official zoning map amendment (conditional rezoning) application.

The property which is the subject of this conditional rezoning application is located at TPINs 32-01-005 & 32-01-006 and is requesting to rezone the "Community Conservation" zoned portions of this property to "Planned Mixed Use Development." The intent of this application is to accommodate the applicant's desired uses listed in Smithfield Zoning Ordinance Sections 3.J2.B.1 & 3.J2.B.16. These uses are necessary to facilitate the construction of commercial structures and 238 dwelling units, in the form of single-family attached and detached homes, and open space.

Copies of the current Zoning Ordinance of the Town of Smithfield, Virginia, adopted Tuesday, September 1st, 1998, and all amendments thereto, along with copies of the current official zoning map and the applicant's conditional rezoning application, are on file and may be examined in the Community Development & Planning Department, 310 Institute St, Smithfield, VA 23430.

Any person desiring to be heard in favor of, in opposition to, or to express his or her views with respect to the aforesaid revisions and amendments may appear and be heard.

TOWN OF SMITHFIELD, VIRGINIA

Lesley G. King, Clerk

Publish: Wednesday, August 20th, 2025, and Wednesday, August 27th, 2025.

NOTICE OF PUBLIC HEARING

TOWN COUNCIL OF THE TOWN OF SMITHFIELD

SPECIAL USE PERMITS

Notice is hereby given that the Town Council of the Town of Smithfield, Virginia will hold a public hearing at the regular meeting of the Town Council at the Smithfield Center, 220 N Church St, Smithfield, VA 23430, on Tuesday, September 2nd, 2025 at 6:30 PM to consider the application of Kent Henry, applicant on behalf of L & L Land Development LLC & Mollie G Turner Family LTD Partners C/O Carmine Robbins Co, owners, for Special Use Permit (SUP) applications under the provisions of Article 3.J2.C.7 and C.20, of the Zoning Ordinance of the Town of Smithfield, Virginia, adopted Tuesday, September 1st, 1998, and as amended thereafter, to allow drive-thru facilities and a waiver of yard requirements for reduced setbacks.

The property which is the subject of this SUP application is located at TPINs 32-01-005 & 32-01-006.

Copies of the current Zoning Ordinance of the Town of Smithfield, Virginia, adopted Tuesday, September 1st, 1998, and all amendments thereto, along with copies of the SUP application, are on file and may be examined in the Community Development & Planning Department, 310 Institute St, Smithfield, VA 23430.

TOWN OF SMITHFIELD, VIRGINIA

Lesley G. King, Clerk

Publish: Wednesday, August 20th, 2025, and Wednesday, August 27th, 2025.

TOWN COUNCIL STAFF REPORT
CONDITIONAL REZONING & 2 SPECIAL USE PERMITS
PUBLIC HEARING
TUESDAY, SEPTEMBER 2nd, 2025, 6:30 PM

Applicant Greenwood Homes
C/O Kent Henry
3122 Marshall St Ste 100
Richmond, VA 23230

Owner L & L Land Development LLC
PO Box 231
Smithfield, VA 23431

Property TPIN 32-01-005 & 32-01-006 (partial)
135.3 ac W side Benns Church Blvd
Corner of Benns Church & Turner Dr

Zoning Community Conservation (CC) & Entrance Corridor Overlay (ECO)

Adjacent Zoning Highway Retail Commercial (HRC), CC, & ECO

Proposed Zoning Planned Mixed Use Development (PMUD) & ECO

Future Land Use (FLU) Residential Mixed Use & Corridor Mixed Use

Adjacent FLU Conservation, Residential Mixed Use & Corridor Mixed Use

Project Description The applicant is seeking a conditional rezoning to Planned Mix Use Development (PMUD) to facilitate the construction of 5 Commercial lots, future commercial area, 107 single family detached units, 103 single family-attached units (67 villa units, 36 townhouse units) a maximum of 210 units in total, and 22.93 acres of open space. The project will be phased, starting with the commercial sites. The road beside Tractor Supply will be extended, with a network of public roads, connecting to Cypress Run Drive and Turner Drive.

In order to facilitate this project, the applicants have applied for the following:

Conditional Official Zoning Map Amendment (Rezoning):
The uses the applicant is proposing (attached and detached units, fast food restaurant, car wash, restaurant, drive in bank) are permissible in the Planned Mixed Use Development District (PMUD). These uses are also in line with the Future Land Use Map, as the current designations are Residential Mixed Use and Corridor Mixed Use, which provide for

primary residential uses and primary mixed commercial / multifamily residential uses.

1st Special Use Permit- Article 3.J2.C.7: Drive-thru facilities.
The applicant is requesting flexibility to utilize drive-thru facilities on all 5 commercial parcels, with the current plan of a drive-in bank and fast-food restaurant with a drive-thru window.

2nd Special Use Permit- C.20: Waiver of yard requirements for reduced setbacks:

Townhouse:	Villa:	SFD:	Required:
Front 25'/20'	Front 25'/20'	Front: 25'	Front 35'
Side 10'	Side 12'	Side: 10'	Side 15'
Rear 25'	Rear 25'	Rear: 25'	Rear 35'

The amenities will include the item depicted on L11- L15: signage, multi-purpose lawns, grill area, waterfront deck, fishing outpost, native plantings, seating nook, tot lot, seating with open views to the lake, trails, firepit, picnic pergola with tables and benches, Adirondack chairs, and sand beach. The applicants have added a dog park with play equipment.

The applicants will have a property owners association that will be responsible for the maintenance and upkeep of the following: (i) all open space, common areas, and other amenities noted in Conceptual Plan; (ii) all stormwater management infrastructure, including "wet" stormwater management infrastructure, specifically best management practices; and (iii) landscaped buffer areas, as shown in the Conceptual Plan.

They are proffering the following road improvements:

1. Southbound right-turn lane (100-foot storage plus 200-foot taper) into right in/right out proposed Project entrance off of US 258/Rt. 10 (Benns Church Boulevard) designated as Public Road A on the Conceptual Plan and currently serving as an entrance to the existing Tractor Supply;
2. Southbound right-turn lane (100-foot storage plus 200-foot taper) into right in/right out proposed Project entrance off of US 258/Rt. 10 (Benns Church Boulevard) designated as Public Road J on the Conceptual Plan (in between Turner Dr & Tractor Supply); and
3. A conditional payment of $1,000,000.00 toward the construction of the roundabout at Turner Drive.

Additionally, they are proffering a conditional cash proffer to Isle of Wight County Schools if they are over enrollment capacity at SMS at the time of CO issuance. Finally, no more than 60 zoning permits will be issued in a 12 consecutive month period for the residential units.

This application was favorably recommended to Town Council at the July Planning Commission.

Enclosures 1. VDOT Approval

Please direct inquiries to Tammie Clary at 1-(757)-365-4200 or tclary@smithfieldva.gov.

ISLE of WIGHT COUNTY MUSEUM

MEMORANDUM

TO: Tammie Clary
Community Development & Planning Director
Town of Smithfield, Virginia

FROM: Jennifer England
Director, Isle of Wight County Museum
Historic Resources Manager, Isle of Wight County

RE: The Promontory TPIN32-01-005, Second Submission

DATE: September 9, 2024

After reviewing the desktop survey for the rezoning of The Promontory TPIN32-01-005, 1849 Cypress Run Drive Smithfield, VA 23431 (Tax Map No. 32-01-005) as prepared by Circa~ Cultural Resource Management, LLC, the Isle of Wight County Museum/Isle of Wight County Department of Historic Resources finds that the site should be investigated with a Phase I study.

While the site that will contain the housing project has been farmed for several decades and used for mining operations, there should be such a study to better understand the potential impacts to both architectural and archaeological resources. And while there are no previously identified archaeological or architectural resources within the proposed project area, the site is still located within one mile of several notable archaeological and architectural resources, some of which include cemeteries. Additionally, the viewsheds of several of these resources should be considered and evaluated for adverse effects.

The potential on the project site for archaeological artifacts is likely. As the project proceeds, the Isle of Wight County Museum should be the repository for discovered artifacts and future finds on this site as they will further the interpretation or discovery of Isle of Wight County history.

103 Main Street
Smithfield, VA 23430
(757) 356-1014
(757) 357-0114 FAX

COMMONWEALTH of VIRGINIA

DEPARTMENT OF TRANSPORTATION
23116 Meherrin Road
COURTLAND, VIRGINIA 23837

June 5, 2025

Tammie Clary
Planning & Zoning Administrator
310 Institute Street
Smithfield, VA 23430

RE: The Promontory Rezoning
Benn's Church Blvd. (Rt. 10/258)
Town of Smithfield

The Residency has completed its review of the submitted TIA Consistency memo dated June 2, 2025 and received by the VDOT Land Development Office on June 3, 2025 for the proposed Promontory mixed use development. Our previous comments have been satisfactorily addressed and we have no additional comments.

If you have any questions, please contact me at (757) 346-3068 or Joshua.Norris@vdot.virginia.gov.

Sincerely,



Joshua R. Norris
Land Use Engineer
Virginia Department of Transportation
Franklin Residency

EXISTING CONDITIONS

LEGEND:

- SLOPES GREATER THAN 30%
- 20% TO 30% SLOPES
- 10% TO 20% SLOPES

TAX MAP: 32-01-003
OWNER: HENRY E LAYDEN REVOCABLE LIVING TRUST TRUSTEE HENRY E LAYDEN
OWNER ADDRESS: P O BOX 231 SMITHFIELD, VA 23431

TAX MAP: 32-01-003E
OWNER: GARY A TERWILLIGER TR G A TERWILLIGER REV TR & GAYLE W TERWILLIGER TR
OWNER ADDRESS: 10 OAK ALLEY SMITHFIELD, VA 23430

TAX MAP: 32-02-004
OWNER: L&M BROTHERS FARM LLC
OWNER ADDRESS: 14112 GREAT SPRINGS ROAD SMITHFIELD, VA 23430

TAX MAP: 32-01-005
OWNER: L & L LAND DEVELOPMENT LLC
OWNER ADDRESS: PO BOX 231 SMITHFIELD, VA 23431

TAX MAP: 32-01-010
OWNER: MOLLIE G TURNER FAMILY LTD PARTNERS C/O CARMINE ROBBINS CO
OWNER ADDRESS: 11815 ROCK LANDING DRIVE NEWPORT NEWS, VA 23606

TAX MAP: 32-01-006
OWNER: MOLLIE G TURNER FAMILY LTD PARTNERS C/O CARMINE ROBBINS CO
OWNER ADDRESS: 11815 ROCK LANDING DRIVE NEWPORT NEWS, VA 23606

TAX MAP: 32-01-005
TAX MAP: 32-01-006

TAX MAP: 32-01-096A
OWNER: PHILIP FLEETWOOD EDWARDS III
OWNER ADDRESS: 13453 BENNS CHURCH BLVD SMITHFIELD, VA 23430

TAX MAP: 32-01-096A2
OWNER: SFD PROPERTIES LLC
OWNER ADDRESS: 20 S KING ST HAMPTON, VA 23669

TAX MAP: 32-10-001
OWNER: TRS HOPE PRESBYTERIAN CHURCH
OWNER ADDRESS: 13490 BENNS CHURCH BLVD SMITHFIELD, VA 23430

TAX MAP: 32-10-002
OWNER: MIP VIRGINIA BEACH LLC
OWNER ADDRESS: PO BOX 2450 VIRGINIA BEACH, VA 23462

TAX MAP: 32-10-002A
OWNER: GLOBAL MONTELLO GROUP CORP
OWNER ADDRESS: PROPERTY TAX DEPT WALTHAM MA 02454

TAX MAP: 32-01-005A
OWNER: RPA TS SMITHFIELD LLC C/O S.L. MUSSELMAN REALTY CO
OWNER ADDRESS: PO BOX 2481 NORFOLK, VA 23510

CYPRESS CREEK

CYPRESS RUN DRIVE

BENNS CHURCH BLVD ROUTE 258/10 (VAR WIDTH R/W)

TURNER DRIVE ROUTE 644 (VAR WIDTH R/W)

EXISTING POND

WETLANDS

EDGE OF WATER

RESOURCE PROTECTION AREA

EX. TREELINE

EXISTING WATER LINE

EXISTING FIRE HYDRANT

EXISTING SANITARY SEWER MAIN

EXISTING SIGNALIZED INTERSECTION

EX. ISLE OF WIGHT MASTER METER

30' VEPCO EASEMENT D.B. 415 PG. 686

15' DVP UG EASEMENT

10' PRIVATE UTILITY EASEMENT INSTRUMENT #2011-28-1

20' PRIVATE UTILITY EASEMENT INSTRUMENT #2011-28-1

50' INGRESS/EGRESS EASEMENT INSTRUMENT #2011-28-1

15' UTILITY EASEMENT INSTRUMENT #2011-28-1

TEMPORARY CONSTRUCTION EASEMENT INSTRUMENT #2011-28-1

15' PRIVATE DRAINAGE EASEMENT INSTRUMENT #2011-28-1

21' VEPCO EASEMENT INS#110002100 AND #160003493

VAR WIDTH HRSD AND 5' TEMPORARY CONSTRUCTION EASEMENTS INS#190035100-004

EXISTING HRSD FORCE MAIN

3.68 ACRES (GREATER THAN 30% SLOPES)

4.80 ACRES (20% TO 30% SLOPES)

0.99 ACRES (10% TO 20% SLOPES)

1.41 ACRES (GREATER THAN 30% SLOPES)

0.22 ACRES (GREATER THAN 30% SLOPES)

1.66 ACRES (GREATER THAN 30% SLOPES)

0.63 ACRES (20% TO 30% SLOPES)

2.75 ACRES (20% TO 30% SLOPES)

1.58 ACRES (20% TO 30% SLOPES)

0.52 ACRES (20% TO 30% SLOPES)

0.18 ACRES (20% TO 30% SLOPES)

0.76 ACRES (10% TO 20% SLOPES)

0.13 ACRES (20% TO 30% SLOPES)

0.15 ACRES (GREATER THAN 30% SLOPES)

0.27 ACRES (20% TO 30% SLOPES)

0.34 ACRES (GREATER THAN 30% SLOPES)

0.10 ACRES (10% TO 20% SLOPES)

0.30 ACRES (GREATER THAN 30% SLOPES)

0.46 ACRES (10% TO 20% SLOPES)

NOTE:
TOPOGRAPHY AROUND POND MAY NOT REPRESENT CURRENT CONDITIONS SINCE POND IS ACTIVE BORROW SITE.

PHASING PLAN

PHASE 1

PHASE 2

PHASE 3

PHASE 4

PHASE 5

PHASE 6

PHASING NOTES:

- PHASE 1 = COMMERCIAL PAD SITES
  START LAND DEVELOPMENT = 8/1/2026
  START SALES AND HOMEBUILDING = 2/1/2027
  COMPLETED PHASE = 9/1/2030
- PHASE 2 = 29 VILLA UNITS
  START LAND DEVELOPMENT = 8/1/2026
  START SALES AND HOMEBUILDING = 2/1/2027
  COMPLETED PHASE = 9/1/2027
- PHASE 3 = 36 TOWNHOUSE UNITS; 10 VILLA UNITS & 4 SINGLE FAMILY UNITS
  START LAND DEVELOPMENT = 2/1/2027
  START SALES AND HOMEBUILDING = 9/1/2027
  COMPLETED PHASE = 9/1/2028
- PHASE 4 = 43 SINGLE FAMILY UNITS
  START LAND DEVELOPMENT = 2/1/2028
  START SALES AND HOMEBUILDING = 9/1/2028
  COMPLETED PHASE = 9/1/2029
- PHASE 5 = 28 VILLA UNITS & 26 SINGLE FAMILY UNITS
  START LAND DEVELOPMENT = 2/1/2029
  START SALES AND HOMEBUILDING = 9/1/2029
  COMPLETED PHASE = 9/1/2030
- PHASE 6 = 34 SINGLE FAMILY UNITS
  START LAND DEVELOPMENT = 2/1/2030
  START SALES AND HOMEBUILDING = 9/1/2030
  COMPLETED PHASE = 3/1/2032

200 0 200 400 600

Scale: 1" = 200'

THIS DRAWING IS THE PROPERTY OF THE BAY COMPANIES INC. AND IS NOT TO BE REPRODUCED OR USED FOR ANY PROJECT IN WHOLE OR IN PART WITHOUT EXPRESS WRITTEN PERMISSION.

FILED: 23021_Existing Conditions

DATE: August 31, 2023

REVISED: December 13, 2023
July 29, 2024
October 15, 2024

REVISED: January 2, 2025
March 7, 2025

REVISED: May 22, 2025
August 13, 2025

THE BAY COMPANIES
CIVIL ENGINEERS
8500 BELL CREEK ROAD
MECHANICSVILLE, VA 23116
(804) 569-7060
FAX: (804) 569-7061

PROJECT:

The Promontory

Zoning Concept Plan

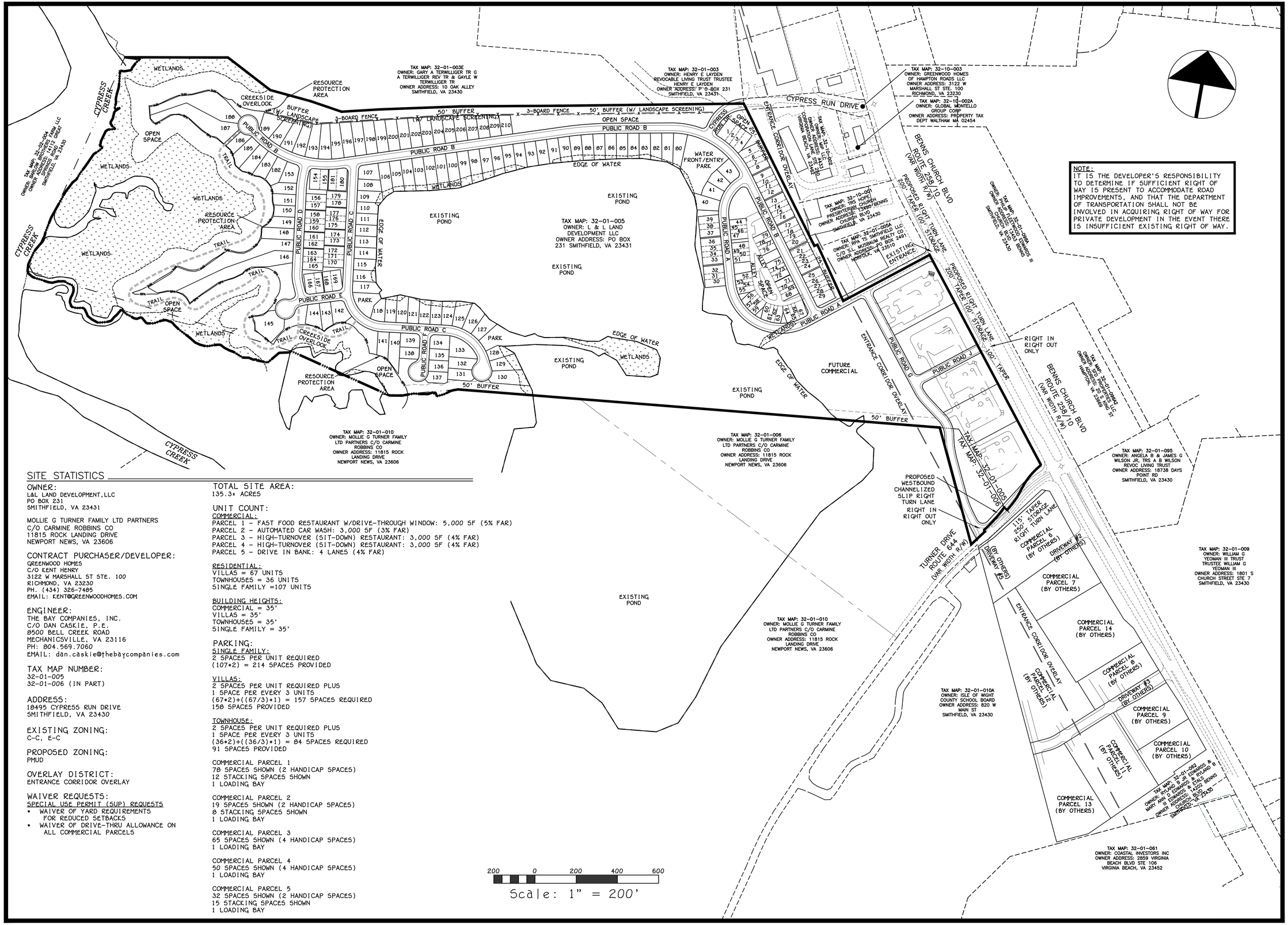
Smithfield, Virginia

SHEET: Phasing Plan and Existing Conditions

SHEET NO: C1

JOB NO. 23021

www.thebaycompanies.com



NOTE:
IT IS THE DEVELOPER'S RESPONSIBILITY TO DETERMINE IF SUFFICIENT RIGHT OF WAY IS PRESENT TO ACCOMMODATE ROAD IMPROVEMENTS, AND THAT THE DEPARTMENT OF TRANSPORTATION SHALL NOT BE INVOLVED IN ACQUIRING RIGHT OF WAY FOR PRIVATE DEVELOPMENT IN THE EVENT THERE IS INSUFFICIENT EXISTING RIGHT OF WAY.

SITE STATISTICS

OWNER:
L&L LAND DEVELOPMENT,LLC
PO BOX 231
SMITHFIELD, VA 23431

MOLLIE G TURNER FAMILY LTD PARTNERS
C/O CARMINE ROBBINS CO
11815 ROCK LANDING DRIVE
NEWPORT NEWS, VA 23606

CONTRACT PURCHASER/DEVELOPER:
GREENWOOD HOMES
C/O KENT HENRY
3122 W MARSHALL ST STE. 100
RICHMOND, VA 23230
PH. (434) 326-7485
EMAIL: KENT@GREENWOODHOMES.COM

ENGINEER:
THE BAY COMPANIES, INC.
C/O DAN CASKIE, P.E.
8500 BELL CREEK ROAD
MECHANICSVILLE, VA 23116
PH: 804.569.7060
EMAIL: dan.caskie@thebaycompanies.com

TAX MAP NUMBER:
32-01-005
32-01-006 (IN PART)

ADDRESS:
18495 CYPRESS RUN DRIVE
SMITHFIELD, VA 23430

EXISTING ZONING:
C-C, E-C

PROPOSED ZONING:
PMUD

OVERLAY DISTRICT:
ENTRANCE CORRIDOR OVERLAY

WAIVER REQUESTS:
SPECIAL USE PERMIT (SUP) REQUESTS
- WAIVER OF YARD REQUIREMENTS FOR REDUCED SETBACKS
- WAIVER OF DRIVE-THRU ALLOWANCE ON ALL COMMERCIAL PARCELS

TOTAL SITE AREA:
135.3± ACRES

UNIT COUNT:
COMMERCIAL:
PARCEL 1 - FAST FOOD RESTAURANT W/DRIVE-THROUGH WINDOW: 5,000 SF (5% FAR)
PARCEL 2 - AUTOMATED CAR WASH: 3,000 SF (3% FAR)
PARCEL 3 - HIGH-TURNOVER (SIT-DOWN) RESTAURANT: 3,000 SF (4% FAR)
PARCEL 4 - HIGH-TURNOVER (SIT-DOWN) RESTAURANT: 3,000 SF (4% FAR)
PARCEL 5 - DRIVE IN BANK: 4 LANES (4% FAR)

RESIDENTIAL:
VILLAS = 67 UNITS
TOWNHOUSES = 36 UNITS
SINGLE FAMILY =107 UNITS

BUILDING HEIGHTS:
COMMERCIAL = 35'
VILLAS = 35'
TOWNHOUSES = 35'
SINGLE FAMILY = 35'

PARKING:
SINGLE FAMILY:
2 SPACES PER UNIT REQUIRED
(107*2) = 214 SPACES PROVIDED

VILLAS:
2 SPACES PER UNIT REQUIRED PLUS
1 SPACE PER EVERY 3 UNITS
(67*2)+((67/3)*1) = 157 SPACES REQUIRED
150 SPACES PROVIDED

TOWNHOUSE:
2 SPACES PER UNIT REQUIRED PLUS
1 SPACE PER EVERY 3 UNITS
(36*2)+((36/3)*1) = 84 SPACES REQUIRED
91 SPACES PROVIDED

COMMERCIAL PARCEL 1
78 SPACES SHOWN (2 HANDICAP SPACES)
12 STACKING SPACES SHOWN
1 LOADING BAY

COMMERCIAL PARCEL 2
19 SPACES SHOWN (2 HANDICAP SPACES)
0 STACKING SPACES SHOWN
1 LOADING BAY

COMMERCIAL PARCEL 3
65 SPACES SHOWN (4 HANDICAP SPACES)
1 LOADING BAY

COMMERCIAL PARCEL 4
50 SPACES SHOWN (4 HANDICAP SPACES)
1 LOADING BAY

COMMERCIAL PARCEL 5
32 SPACES SHOWN (2 HANDICAP SPACES)
15 STACKING SPACES SHOWN
1 LOADING BAY

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FILED: 23021_general development

DATE: August 31, 2023

REVISED: December 13, 2023
July 29, 2024
October 15, 2024

REVISED: January 2, 2025
March 7, 2025

REVISED: May 22, 2025
August 13, 2025

THE BAY COMPANIES
CIVIL ENGINEERS
8500 BELL CREEK ROAD
MECHANICSVILLE, VA 23116
(804) 569-7060
FAX: (804) 569-7061

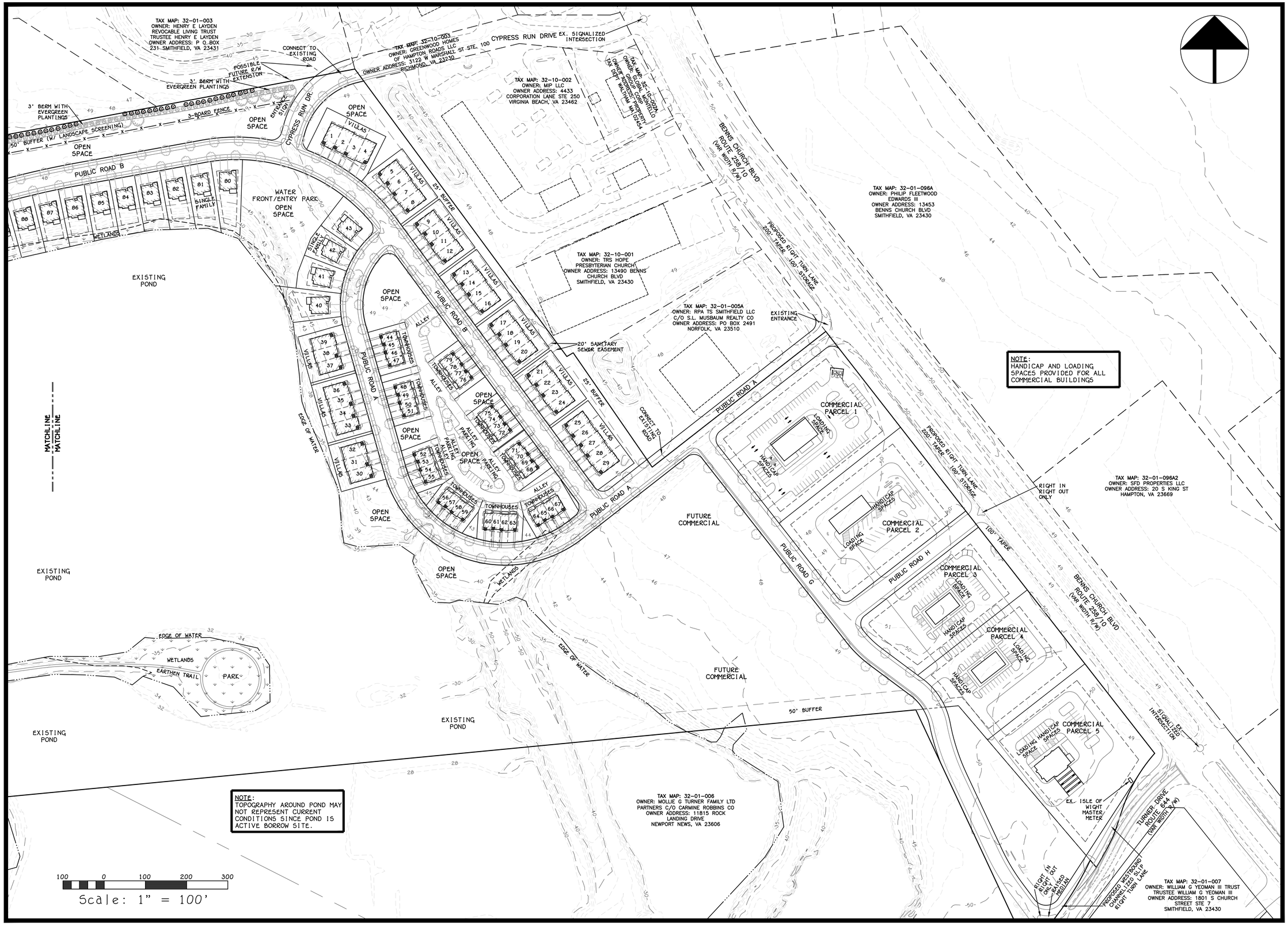
PROJECT:
The Promontory
Zoning Concept Plan
Smithfield, Virginia

SHEET:
General Development Plan

SHEET NO: C2

JOB NO. 23021

www.thebaycompanies.com



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FILED: 23021_Zoning Concept

DATE: August 31, 2023

REVISED: December 13, 2023
July 29, 2024
October 15, 2024

REVISED: January 2, 2025
March 7, 2025

REVISED: May 22, 2025
August 13, 2025

THE BAY COMPANIES
bay
CIVIL ENGINEERS
8500 BELL CREEK ROAD
MECHANICSVILLE, VA 23116
(804) 569-7060
FAX: (804) 569-7061

PROJECT:

The Promontory

Zoning Concept Plan

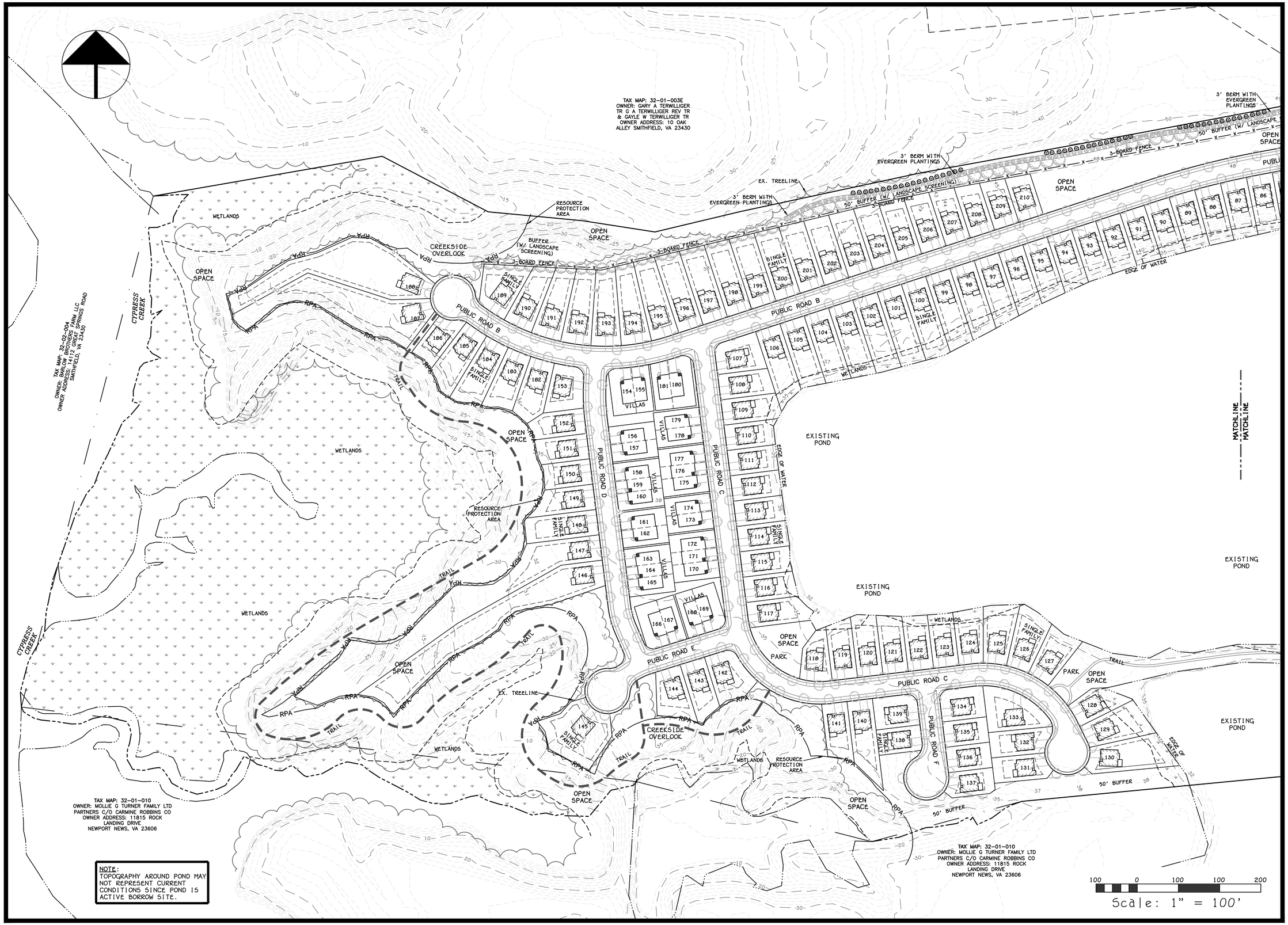
Smithfield, Virginia

SHEET: Zoning Concept Plan (East)

SHEET NO: C3

JOB NO. 23021

www.thebaycompanies.com



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FILED: 23021_Zoning Concept

DATE: August 31, 2023

REVISED: December 13, 2023
July 29, 2024
October 15, 2024

REVISED: January 2, 2025
March 7, 2025

REVISED: May 22, 2025
August 13, 2025

THE BAY COMPANIES
bay CIVIL ENGINEERS
8500 BELL CREEK ROAD
MECHANICSVILLE, VA 23116
(804) 569-7060
FAX: (804) 569-7061

PROJECT:

The Promontory

Zoning Concept Plan

Smithfield, Virginia

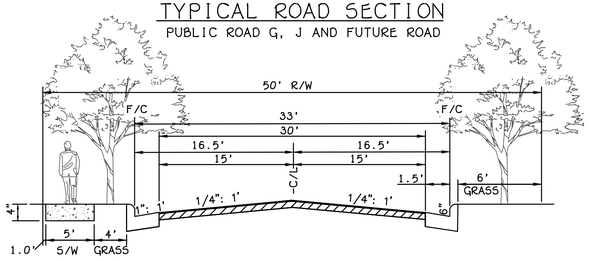
SHEET: Zoning Concept Plan (West)

SHEET NO: C4

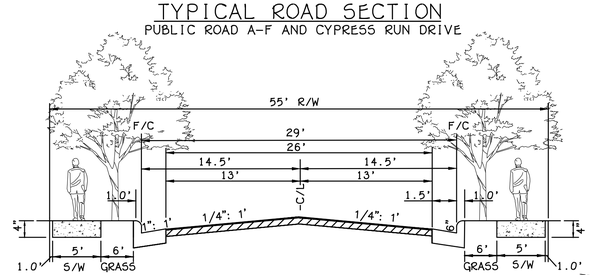
JOB NO. 23021

www.thebaycompanies.com

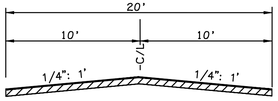
TYPICAL ROAD SECTION
PUBLIC ROAD G, J AND FUTURE ROAD

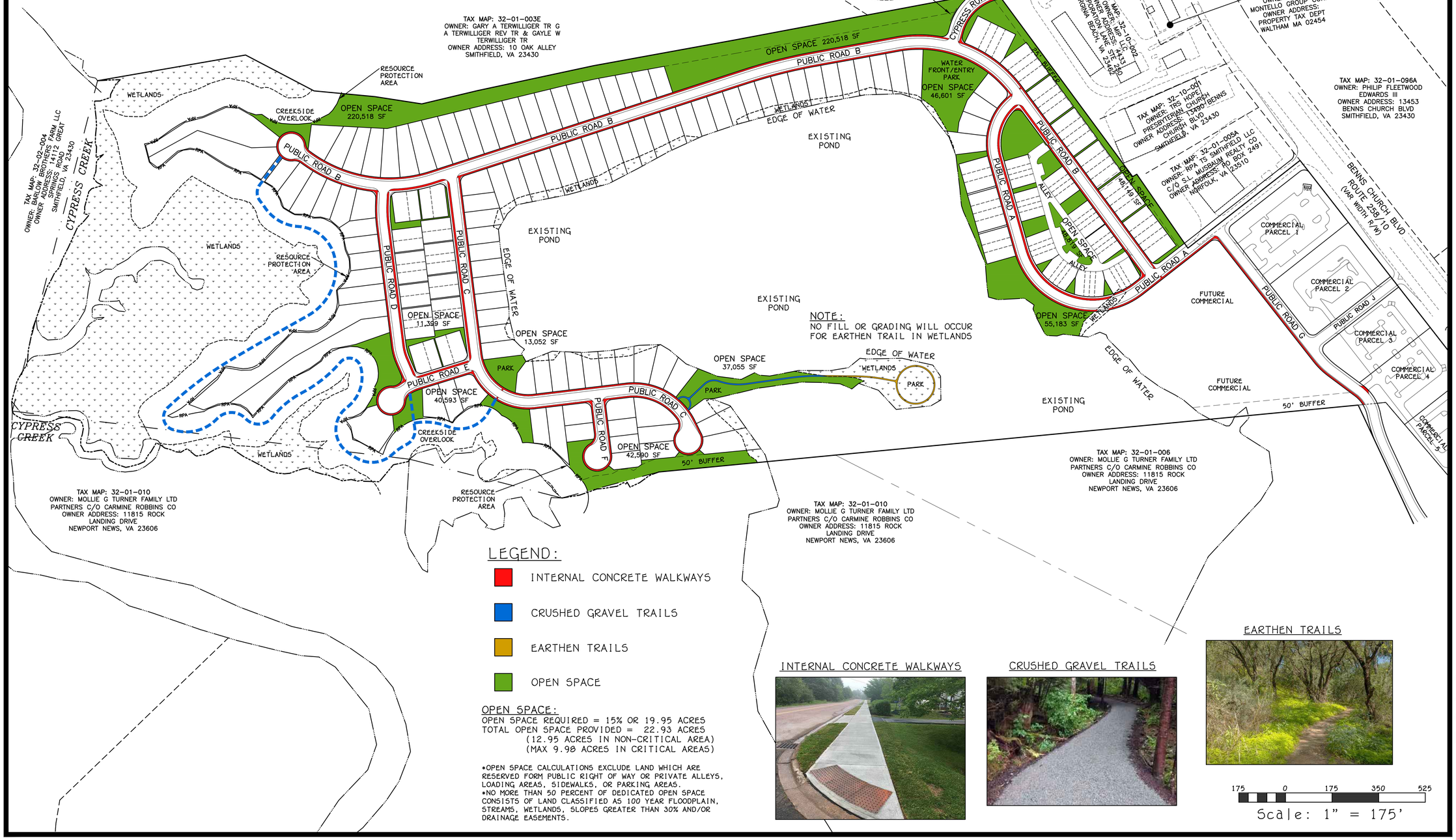


TYPICAL ROAD SECTION
PUBLIC ROAD A-F AND CYPRESS RUN DRIVE



TYPICAL ROAD SECTION
ALLEYS





LEGEND:

- INTERNAL CONCRETE WALKWAYS
- CRUSHED GRAVEL TRAILS
- EARTHEN TRAILS
- OPEN SPACE

OPEN SPACE:

OPEN SPACE REQUIRED = 15% OR 19.95 ACRES
TOTAL OPEN SPACE PROVIDED = 22.93 ACRES
(12.95 ACRES IN NON-CRITICAL AREA)
(MAX 9.90 ACRES IN CRITICAL AREAS)

*OPEN SPACE CALCULATIONS EXCLUDE LAND WHICH ARE RESERVED FORM PUBLIC RIGHT OF WAY OR PRIVATE ALLEYS, LOADING AREAS, SIDEWALKS, OR PARKING AREAS.
*NO MORE THAN 50 PERCENT OF DEDICATED OPEN SPACE CONSISTS OF LAND CLASSIFIED AS 100 YEAR FLOODPLAIN, STREAMS, WETLANDS, SLOPES GREATER THAN 30% AND/OR DRAINAGE EASEMENTS.

INTERNAL CONCRETE WALKWAYS

CRUSHED GRAVEL TRAILS

EARTHEN TRAILS

175 0 175 350 525
Scale: 1" = 175'

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FILED: 23021_Open Space

DATE: August 31, 2023

REVISED: December 13, 2023
July 29, 2024
October 15, 2024

REVISED: January 2, 2025
March 7, 2025

REVISED: May 22, 2025
August 13, 2025

THE BAY COMPANIES
bay
CIVIL ENGINEERS

8500 BELL CREEK ROAD
MECHANICSVILLE, VA 23116
(804) 569-7060
FAX: (804) 569-7061

PROJECT:

The Promontory

Zoning Concept Plan

Smithfield, Virginia

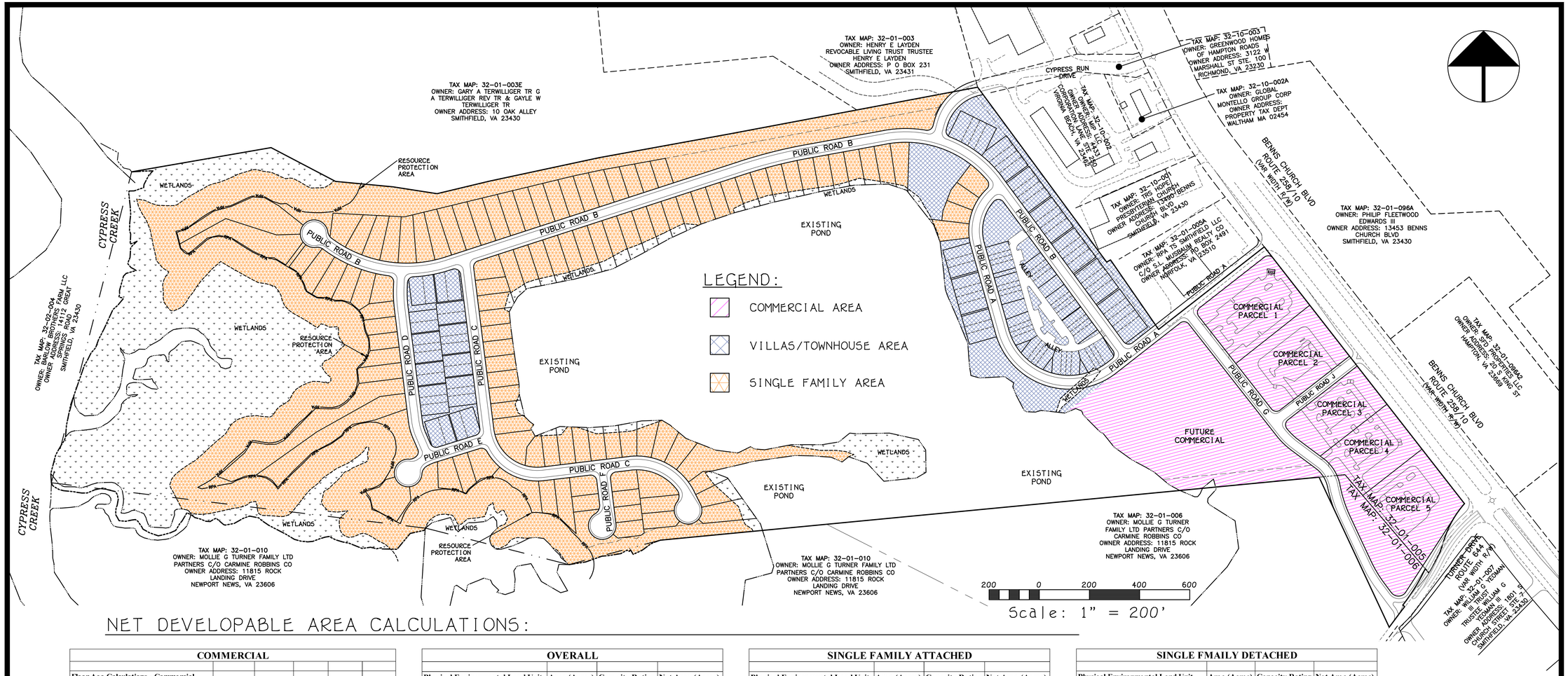
SHEET:

Open Space and Pedestrian Connectivity Plan

SHEET NO: C5

JOB NO. 23021

www.thebaycompanies.com



NET DEVELOPABLE AREA CALCULATIONS:

COMMERCIAL

Floor Aea Calculations - Commercial	Parcel 1	Parcel 2	Parcel 3	Parcel 4	Parcel 5
Total Commercial Site Area	100,939 sf	96,082 sf	69,579 sf	71,969 sf	93,832 sf
Proposed Commercial Floor Area *	5,000 sf	3,000 sf	3,000 sf	3,000 sf	4,000 sf
Floor Area Ratio	5%	3%	4%	4%	4%

*Commercial flloor area includes all floors

OVERALL

Physical Environmental Land Unit	Area (Acres)	Capacity Rating	Net Area (Acres)
Slopes Less than 10%	42.41	1	42.41
Slopes From 10% but less than 20%	2.32	0.75	1.74
Slopes From 20% but less than 30%	10.86	0.5	5.43
Slopes 30% or more	7.76	0.1	0.78
Shrink Swell Soil	0.00	0.75	0.00
Wetlands	20.69	0	0.00
Stormwater Management	32.53	0	0.00
69 KV or greater transmission lines	0.00	0	0.00
Public Right of Way	13.92	0	0.00
Private Street and Parking Bays	4.81	0	0.00
Total	**135.30**		**50.36**
Total Units Proposed			210
Density			4.17

SINGLE FAMILY ATTACHED

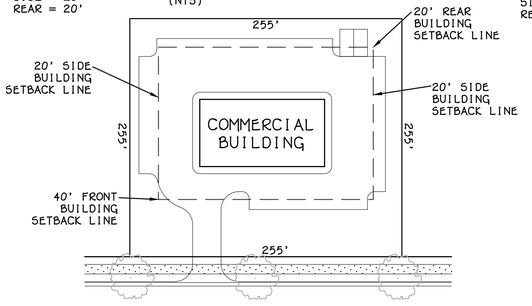
Physical Environmental Land Unit	Area (Acres)	Capacity Rating	Net Area (Acres)
Slopes Less than 10%	12.40	1	12.40
Slopes From 10% but less than 20%	0.81	0.75	0.61
Slopes From 20% but less than 30%	0.58	0.5	0.29
Slopes 30% or more	0.27	0.1	0.03
Shrink Swell Soil	0.00	0.75	0.00
Wetlands	0.00	0	0.00
Stormwater Management	0.00	0	0.00
69 KV or greater transmission lines	0.00	0	0.00
Public Right of Way	3.65	0	0.00
Private Street and Parking Bays	0.75	0	0.00
Total	**18.46**		**13.32**
Total Units Proposed			103
Density			7.73

SINGLE FMAILY DETACHED

Physical Environmental Land Unit	Area (Acres)	Capacity Rating	Net Area (Acres)
Slopes Less than 10%	28.45	1	28.45
Slopes From 10% but less than 20%	1.05	0.75	0.79
Slopes From 20% but less than 30%	10.09	0.5	5.05
Slopes 30% or more	7.13	0.1	0.71
Shrink Swell Soil	0.00	0.75	0.00
Wetlands	20.69	0	0.00
Stormwater Management	32.53	0	0.00
69 KV or greater transmission lines	0.00	0	0.00
Public Right of Way	7.48	0	0.00
Private Street and Parking Bays	0.00	0	0.00
Total	**107.42**		**35.00**
Total Units Proposed			107
Density			3.06

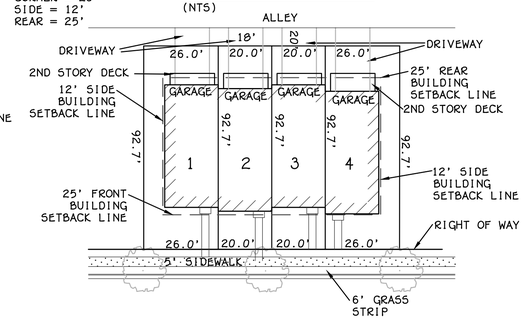
BUILDING SETBACKS:
FRONT/CORNER = 40'
SIDE = 20'
REAR = 20'

COMMERCIAL
TYPICAL LOT LAYOUT
(NTS)



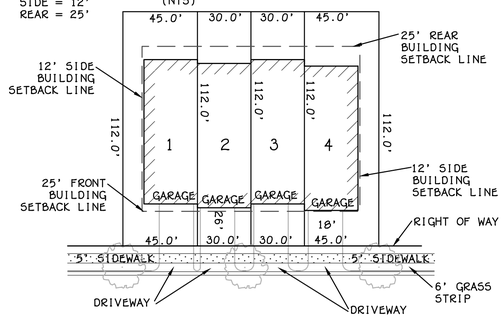
BUILDING SETBACKS:
TOWNHOUSE
FRONT = 25'
CORNER = 20'
SIDE = 12'
REAR = 25'

TOWNHOUSE
TYPICAL LOT LAYOUT
(NTS)



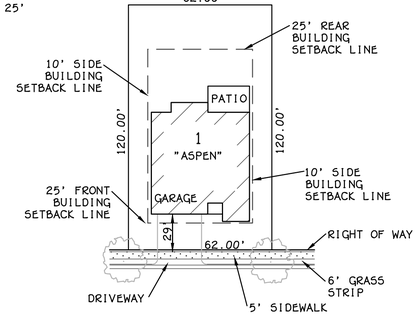
BUILDING SETBACKS:
TOWNHOUSE
FRONT = 25'
CORNER = 20'
SIDE = 12'
REAR = 25'

VILLA
TYPICAL LOT LAYOUT
(NTS)



BUILDING SETBACKS:
SINGLE FAMILY LOTS
"CLUSTER"
FRONT/CORNER = 25'
SIDE = 10'
REAR = 25'

SINGLE FAMILY
TYPICAL LOT LAYOUT
(NTS)



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FILED: 23021_Site Details

DATE: August 31, 2023

REVISED: December 13, 2023
July 29, 2024
October 15, 2024

REVISED: January 2, 2025
March 7, 2025

REVISED: May 22, 2025
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THE BAY COMPANIES
CIVIL ENGINEERS
8500 BELL CREEK ROAD
MECHANICSVILLE, VA 23116
(804) 569-7060
FAX: (804) 569-7061

PROJECT:

The Promontory

Zoning Concept Plan

Smithfield, Virginia

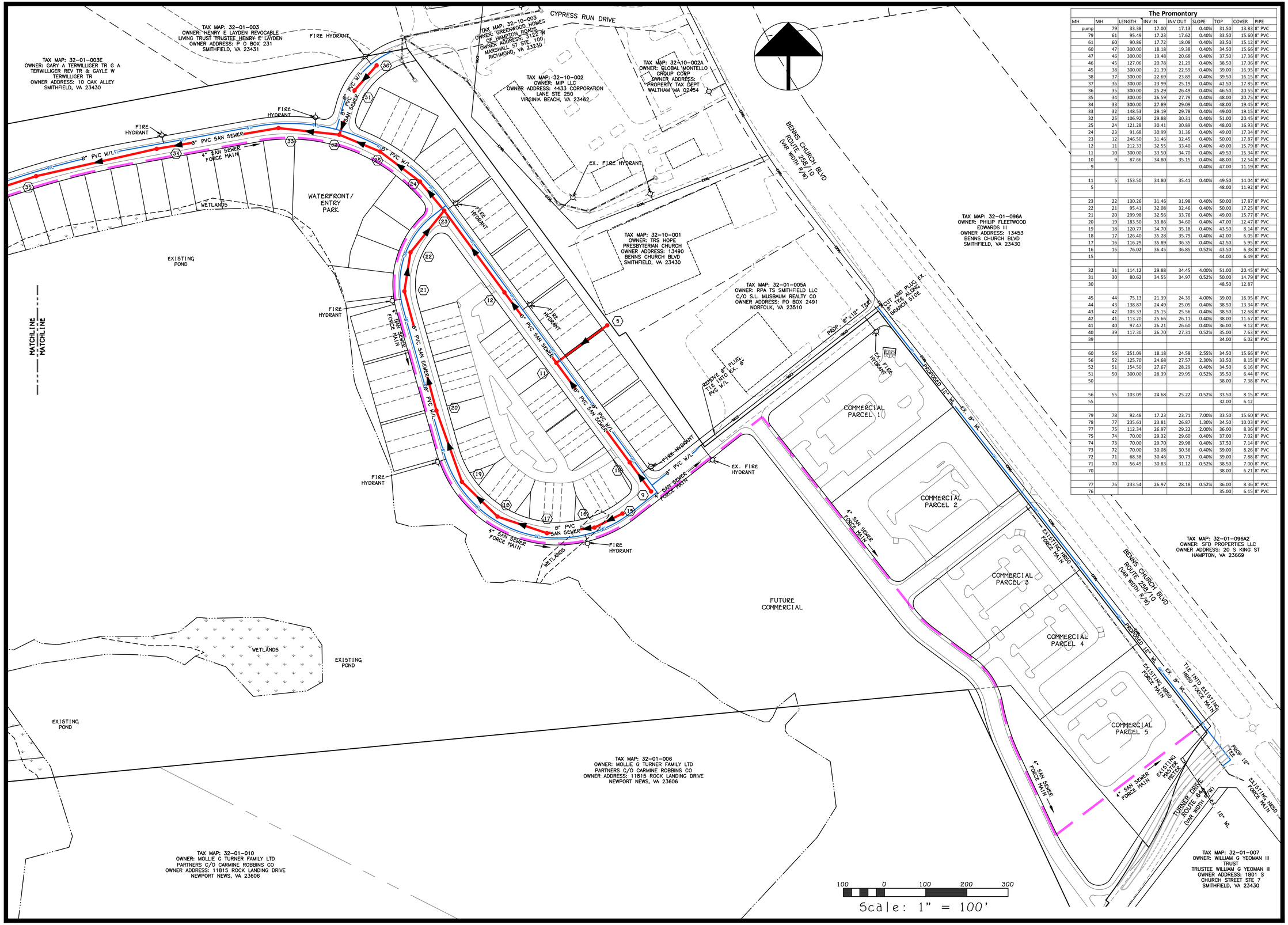
SHEET:

Density and Lot Exhibits

SHEET NO: C6

JOB NO. 23021

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The Promontory								
MH	MH	LENGTH	INV IN	INV OUT	SLOPE	TOP	COVER	PIPE
pump	79	33.38	17.00	17.13	0.40%	31.50	13.83	8" PVC
79	61	95.49	17.23	17.62	0.40%	33.50	15.60	8" PVC
61	60	90.86	17.72	18.08	0.40%	33.50	15.12	8" PVC
60	47	300.00	18.18	19.38	0.40%	34.50	15.66	8" PVC
47	46	300.00	19.48	20.68	0.40%	37.50	17.36	8" PVC
46	45	127.06	20.78	21.29	0.40%	38.50	17.06	8" PVC
45	38	300.00	21.39	22.59	0.40%	39.00	16.95	8" PVC
38	37	300.00	22.69	23.89	0.40%	39.50	16.15	8" PVC
37	36	300.00	23.99	25.19	0.40%	42.50	17.85	8" PVC
36	35	300.00	25.29	26.49	0.40%	46.50	20.55	8" PVC
35	34	300.00	26.59	27.79	0.40%	48.00	20.75	8" PVC
34	33	300.00	27.89	29.09	0.40%	48.00	19.45	8" PVC
33	32	148.53	29.19	29.78	0.40%	49.00	19.15	8" PVC
32	25	106.92	29.88	30.31	0.40%	51.00	20.45	8" PVC
25	24	121.28	30.41	30.89	0.40%	48.00	16.93	8" PVC
24	23	91.68	30.99	31.36	0.40%	49.00	17.34	8" PVC
23	12	246.50	31.46	32.45	0.40%	50.00	17.87	8" PVC
12	11	212.33	32.55	33.40	0.40%	49.00	15.79	8" PVC
11	10	300.00	33.50	34.70	0.40%	49.50	15.34	8" PVC
10	9	87.66	34.80	35.15	0.40%	48.00	12.54	8" PVC
9					0.40%	47.00	11.19	8" PVC
11	5	153.50	34.80	35.41	0.40%	49.50	14.04	8" PVC
5						48.00	11.92	8" PVC
23	22	130.26	31.46	31.98	0.40%	50.00	17.87	8" PVC
22	21	95.41	32.08	32.46	0.40%	50.00	17.25	8" PVC
21	20	299.98	32.56	33.76	0.40%	49.00	15.77	8" PVC
20	19	183.50	33.86	34.60	0.40%	47.00	12.47	8" PVC
19	18	120.77	34.70	35.18	0.40%	43.50	8.14	8" PVC
18	17	126.40	35.28	35.79	0.40%	42.00	6.05	8" PVC
17	16	116.29	35.89	36.35	0.40%	42.50	5.95	8" PVC
16	15	76.02	36.45	36.85	0.52%	43.50	6.38	8" PVC
15						44.00	6.49	8" PVC
32	31	114.12	29.88	34.45	4.00%	51.00	20.45	8" PVC
31	30	80.62	34.55	34.97	0.52%	50.00	14.79	8" PVC
30						48.50	12.87	
45	44	75.13	21.39	24.39	4.00%	39.00	16.95	8" PVC
44	43	138.87	24.49	25.05	0.40%	38.50	13.34	8" PVC
43	42	103.33	25.15	25.56	0.40%	38.50	12.68	8" PVC
42	41	113.20	25.66	26.11	0.40%	38.00	11.67	8" PVC
41	40	97.47	26.21	26.60	0.40%	36.00	9.12	8" PVC
40	39	117.30	26.70	27.31	0.52%	35.00	7.63	8" PVC
39						34.00	6.02	8" PVC
60	56	251.09	18.18	24.58	2.55%	34.50	15.66	8" PVC
56	52	125.70	24.68	27.57	2.30%	33.50	8.15	8" PVC
52	51	154.50	27.67	28.29	0.40%	34.50	6.16	8" PVC
51	50	300.00	28.39	29.95	0.52%	35.50	6.44	8" PVC
50						38.00	7.38	8" PVC
56	55	103.09	24.68	25.22	0.52%	33.50	8.15	8" PVC
55						32.00	6.12	
79	78	92.48	17.23	23.71	7.00%	33.50	15.60	8" PVC
78	77	235.61	23.81	26.87	1.30%	34.50	10.03	8" PVC
77	75	112.34	26.97	29.22	2.00%	36.00	8.36	8" PVC
75	74	70.00	29.32	29.60	0.40%	37.00	7.02	8" PVC
74	73	70.00	29.70	29.98	0.40%	37.50	7.14	8" PVC
73	72	70.00	30.08	30.36	0.40%	39.00	8.26	8" PVC
72	71	68.38	30.46	30.73	0.40%	39.00	7.88	8" PVC
71	70	56.49	30.83	31.12	0.52%	38.50	7.00	8" PVC
70						38.00	6.21	8" PVC
77	76	233.54	26.97	28.18	0.52%	36.00	8.36	8" PVC
76						35.00	6.15	8" PVC

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MECHANICSVILLE, VA 23116
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PROJECT:

The Promontory

Zoning Concept Plan

Smithfield, Virginia

SHEET:

Master Utility Plan (East)

SHEET NO: C7

JOB NO. 23021

www.thebaycompanies.com

The Promontory

MH	MH	LENGTH	INV IN	INV OUT	SLOPE	TOP	COVER	PIPE
pump	77	35.00	17.00	17.14	0.40%	31.50	13.83	8" PVC
77	61	111.00	17.24	17.68	0.40%	34.00	16.09	8" PVC
61	60	85.00	17.78	18.12	0.40%	34.00	15.55	8" PVC
60	59	80.00	18.22	18.54	0.40%	34.80	15.91	8" PVC
59	47	300.00	18.64	19.84	0.40%	34.50	15.19	8" PVC
47	46	188.00	19.94	20.70	0.40%	38.00	17.39	8" PVC
46	45	160.00	20.80	21.44	0.40%	38.50	17.04	8" PVC
45	38	218.00	21.54	22.41	0.40%	38.50	16.30	8" PVC
38	37	300.00	22.51	23.71	0.40%	38.50	15.33	8" PVC
37	36	300.00	23.81	25.01	0.40%	40.50	16.03	8" PVC
36	35	300.00	25.11	26.31	0.40%	44.00	18.23	8" PVC
35	34	300.00	26.41	27.61	0.40%	47.50	20.43	8" PVC
34	33	300.00	27.71	28.91	0.40%	47.00	18.63	8" PVC
33	32	234.00	29.01	29.94	0.40%	48.00	18.33	8" PVC
32	25	121.00	30.04	30.53	0.40%	49.50	18.79	8" PVC
25	24	121.00	30.63	31.11	0.40%	48.00	16.71	8" PVC
24	23	92.00	31.21	31.58	0.40%	49.00	17.12	8" PVC
23	12	247.00	31.68	32.67	0.40%	50.00	17.65	8" PVC
12	11	212.00	32.77	33.62	0.40%	49.00	15.57	8" PVC
11	10	300.00	33.72	34.92	0.40%	49.50	15.12	8" PVC
10	9	88.00	35.02	35.37	0.40%	48.00	12.32	8" PVC
9					0.40%	47.00	10.97	8" PVC
11	5	154.00	35.02	35.63	0.40%	48.00	12.32	8" PVC
5						48.00	11.70	8" PVC
23	22	130.00	31.68	32.20	0.40%	50.00	17.65	8" PVC
22	21	95.00	32.30	32.68	0.40%	50.00	17.03	8" PVC
21	20	300.00	32.78	33.98	0.40%	49.00	15.55	8" PVC
20	19	184.00	34.08	34.82	0.40%	47.00	12.25	8" PVC
19	18	121.00	34.92	35.40	0.40%	43.50	7.92	8" PVC
18	17	126.00	35.50	36.00	0.40%	43.00	6.83	8" PVC
17	16	116.00	36.10	36.57	0.40%	43.00	6.23	8" PVC
16	15	76.00	36.67	37.06	0.52%	44.00	6.67	8" PVC
15						44.00	6.27	8" PVC
32	31	130.00	30.04	34.82	3.67%	49.50	18.79	8" PVC
31	30	81.00	34.92	35.34	0.52%	49.50	13.92	8" PVC
30						48.50	12.50	
45	44	179.00	21.54	23.00	0.82%	38.50	16.30	8" PVC
44	43	106.00	23.10	23.53	0.40%	38.50	14.73	8" PVC
43	42	120.00	23.63	24.11	0.40%	38.00	13.70	8" PVC
42	41	103.00	24.21	24.62	0.40%	36.00	11.12	8" PVC
41	40	196.00	24.72	25.50	0.40%	35.00	9.61	8" PVC
40	39	157.00	25.60	26.42	0.52%	33.80	7.53	8" PVC
39						33.20	6.11	8" PVC
59	58	98.00	18.64	25.50	7.00%	34.50	15.19	8" PVC
58	57	81.00	25.60	25.93	0.40%	35.00	8.73	8" PVC
57	52	120.00	26.03	28.07	1.70%	35.00	8.31	8" PVC
52	51	120.00	28.17	28.65	0.40%	35.00	6.17	8" PVC
51	50	300.00	28.75	30.31	0.52%	36.00	6.59	8" PVC
50						37.80	6.83	8" PVC
57	56	124.00	26.03	26.52	0.40%	35.00	8.31	8" PVC
56	55	135.00	26.62	27.33	0.52%	34.00	6.71	8" PVC
55						34.00	6.01	
77	76	123.00	17.24	25.85	7.00%	34.00	16.09	8" PVC
76	75	196.00	25.95	26.73	0.40%	35.00	8.38	8" PVC
75	73	116.00	26.83	27.30	0.40%	36.00	8.50	8" PVC
73	72	69.00	27.40	29.81	3.50%	37.00	8.94	8" PVC
72	71	69.00	29.91	30.19	0.40%	38.00	7.42	8" PVC
71	70	184.00	30.29	31.25	0.52%	39.00	8.04	8" PVC
70						38.00	6.09	
75	74	154.00	26.83	27.63	0.52%	36.00	8.50	8" PVC
74						34.50	6.20	8" PVC

TAX MAP: 32-01-003E
OWNER: GARY A TERWILLIGER TR G A TERWILLIGER REV TR & GAYLE W TERWILLIGER TR
OWNER ADDRESS: 10 OAK ALLEY
SMITHFIELD, VA 23430

TAX MAP: 32-01-003E
OWNER: GARY A TERWILLIGER TR G A TERWILLIGER REV TR & GAYLE W TERWILLIGER TR
OWNER ADDRESS: 10 OAK ALLEY
SMITHFIELD, VA 23430

TAX MAP: 32-01-010
OWNER: MOLLIE G TURNER FAMILY LTD PARTNERS C/O CARMINE ROBBINS CO
OWNER ADDRESS: 11815 ROCK LANDING DRIVE
NEWPORT NEWS, VA 23606

WETLANDS
RPA
CREEKSIDE OVERLOOK
FIRE HYDRANT
8" PVC W/L
8" PVC SAN SEWER
4" SAN SEWER FORCE MAIN
EXISTING POND
PROPOSED PUMP STATION
PARK
MATCHLINE

100 0 100 200 300
Scale: 1" = 100'

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Zoning Concept Plan

Smithfield, Virginia

SHEET: Master Utility Plan (West)

SHEET NO: C8

JOB NO. 23021

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THE PROMONTORY
DESIGN GUIDELINES

TOWN OF SMITHFIELD
ISLE OF WIGHT COUNTY
VIRGINIA

THE PROMONTORY | GREENWOOD HOMES
DESIGN GUIDELINES | MARCH 2025

GREENWOOD HOMES

CITE DESIGN

Developer

GREENWOOD HOMES

Landscape Architects/Conceptual Planners

CITE DESIGN

Civil/Environmental Engineers

BAY design group
Engineering, Surveying & Land Planning

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INTRODUCTION

Location & Context	L5
Vision & Intent	L7
Vision of The Promontory	L8

LOCATION & CONTEXT

The Promontory will be a landmark development anchoring the southern gateway to the Town of Smithfield. The 133+/- acre site is located at the doorstep to a unique natural setting that celebrates the charm and beauty of Smithfield. Offering great access and visibility, the project is positioned at the intersection of Benns Church Blvd (US Route 258/State Route 10) and Cypress Run Dr.

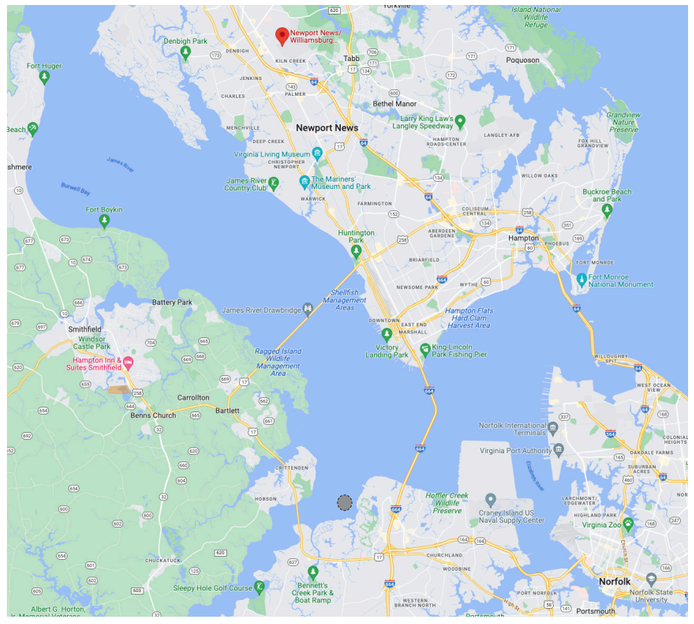
The Promontory neighborhood will integrate commercial, residential (single-family, townhomes, and villas), and outdoor recreational areas providing residents and customers an environment that is both beautiful and functional blending natural beauty with the elegance of the town.

From The Promontory to:

Newport News - 20 miles (30 minutes)

Norfolk – 28 miles (35 minutes)

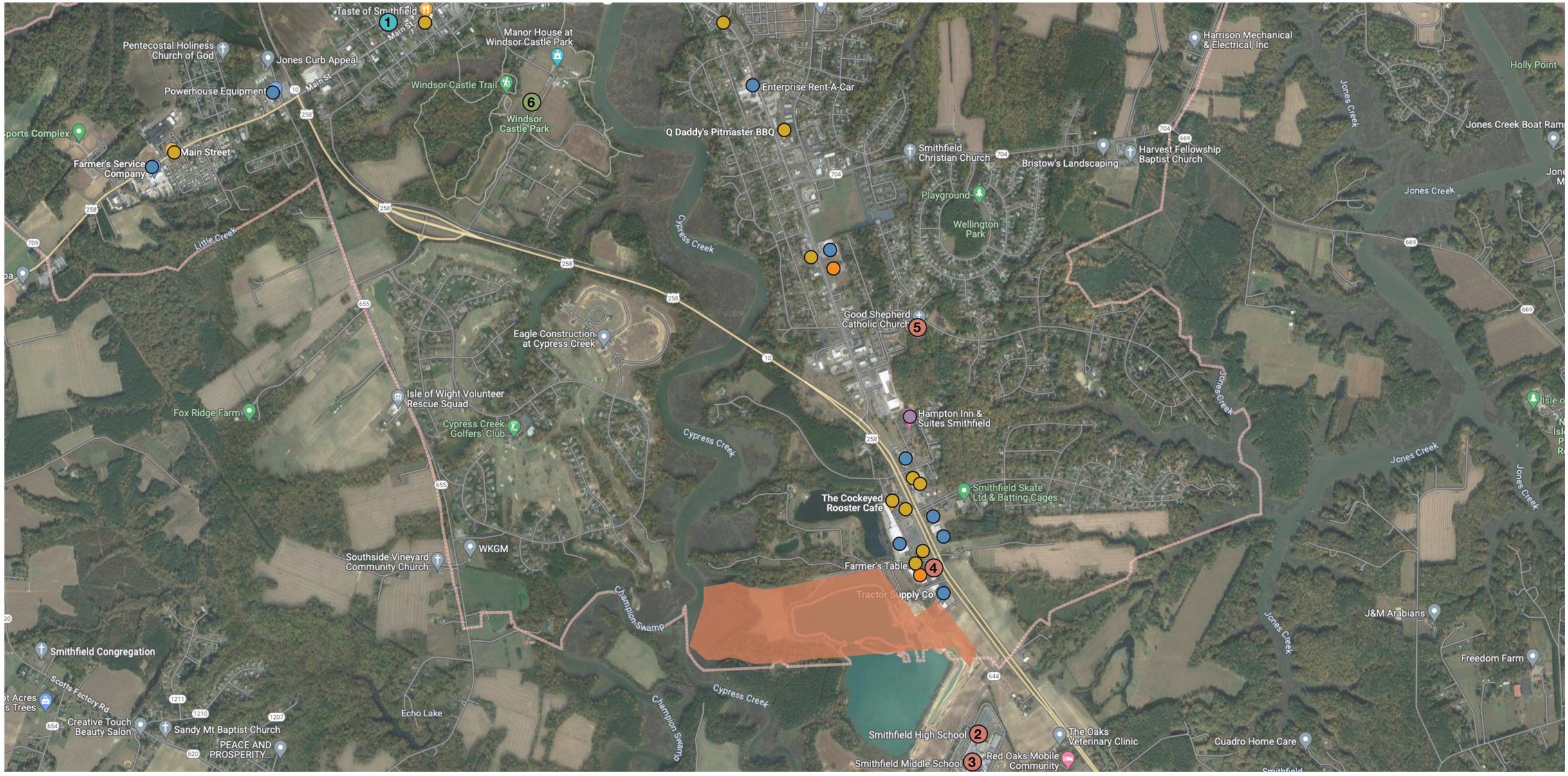
Newport News/Williamsburg International Airport – 17.6 miles (24 minutes)





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LOCATION & CONTEXT



- *Civic*
  - 1 Town of Smithfield
    310 Institute Street
    Smithfield, VA 23430
- *Community (schools, churches, libraries)*
  - 2 Smithfield High School
  - 3 Smithfield Middle School
  - 4 Hope Presbyterian Church
  - 5 Good Shepherd Catholic Church
- *Parks/open space*
  - 6 Windsor Castle Park
- *Lodging (hotel/motel)*
- *Restaurant*
- *Gas station/convenience store*
- *Business/Industrial*

VISION & INTENT

At Greenwood Homes, our vision transcends the construction of houses; we are dedicated to crafting vibrant neighborhoods that foster *connection, joy, and a sense of belonging*.

We aspire to create living spaces where *every resident feels part of a greater whole*, enjoying not only the comfort of their individual homes but also the shared amenities and Smithfield community.

Our intent is to build more than just houses; we build places where life thrives. The Promontory neighborhood in Smithfield is a testament to this philosophy, extending the charm of the town into a serene coastal haven centered around the pristine waters of a crystal-clear pond. Through thoughtful design and meticulous craftsmanship, we aim to:

Create High-Quality Housing
Each home is constructed with superior materials and attention to detail, ensuring durability, comfort, and style.

Foster Neighborhood Connections
Shared amenities such as parks, walking trails, community gardens and docks provide spaces for residents to gather, interact, and build lasting relationships.

Enhance Aesthetic Appeal
Our layouts are designed to be visually harmonious, integrating natural landscapes with elegant architecture to create an environment that is both beautiful and functional.

Sustain Natural Beauty
The Promontory features a central pond and a bucolic connection to Cypress Creek, creating a unique and diverse connection to the natural beauty of the coastal environment.

We believe that by focusing on these core principles, The Promontory will not only extend the town of Smithfield but also enrich the lives of all who call it home. **Together, we are building not just homes, but a neighborhood where people come together to live, laugh, and flourish**.



VISION OF THE PROMONTORY

The Promontory is committed to quality materials such as natural stone, cementitious siding, accent elevations with board and batten and metal roofing and a lattice pattern specifically developed to accentuate the Tidewater region.

Example Exterior Materials

- Board & Batten and Traditional Lap Siding
- Cementitious siding or equivalent

Foundation Treatment

- Lattice
- Parged
- Real stone or masonry foundations

Architectural Shingles

Standing Metal Seam Accent Roofs

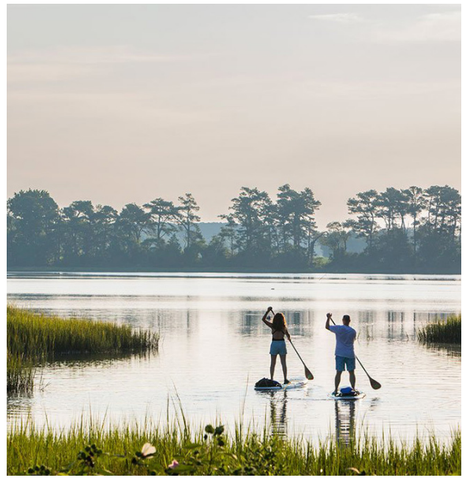
Metal Accent Railings

Synthetic Decks



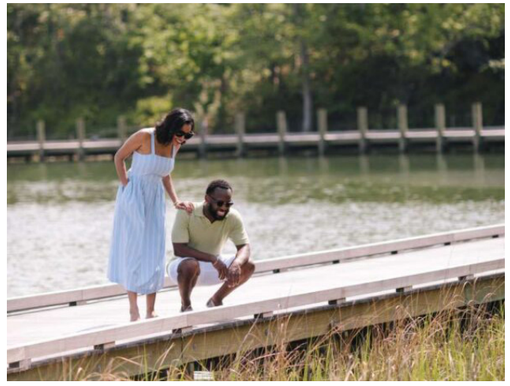














MASTER PLAN

Master Plan Layout	L10
Pedestrian System	L16
Street Trees	L17
Amenities	L18
Site Furnishings	L19
Site Lighting	L20

MASTER PLAN LAYOUT



1. PROMONTORY PARK
2. DRAGONFLY PARK
3. LAKESIDE PARK
4. DOG PARK
5. MEADOW PARK
6. NATURAL AREA (TYP.)
7. WOODED AREA (TYP.)

TRAIL

TRAILHEAD

Amenity area layouts are for design intent only. All elements and layout are subject to change.

The HOA will maintain the amenities, parks, and trail systems.

N

PROMONTORY PARK





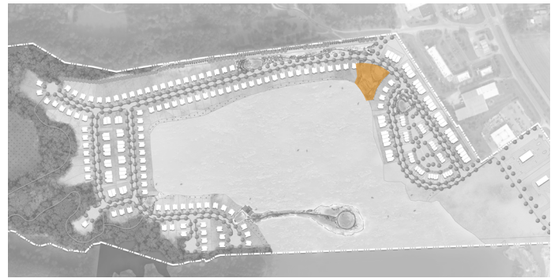
FEATURES

1. PARK SIGN
2. MULTI-PURPOSE LAWN
3. GRILL AREA
4. WATERFRONT DECK
5. PATH/NATIVE PLANTINGS
6. FISHING OUTPOST
7. TRAIL

N

DRAGONFLY PARK

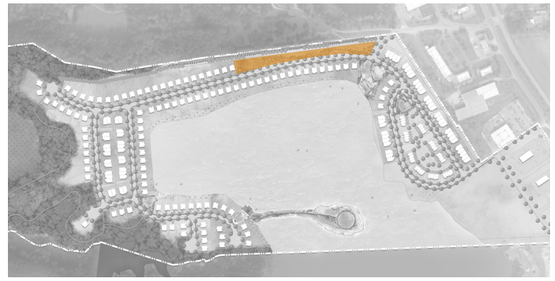




FEATURES

1. LAWN WITH OPEN VIEWS TO THE LAKE
2. NATIVE PLANTINGS
3. SEATING NOOK
4. SEATING
5. TOT LOT

MEADOW PARK



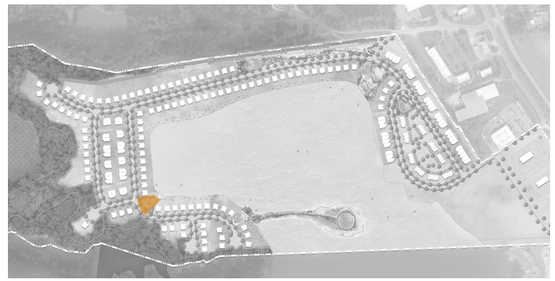


FEATURES

1. MAIN ENTRY SIGNAGE
2. TRAILS
3. MEADOW GRASS
4. NO-MOW GRASS
5. FIREPIT
6. SIDEWALK

LAKESIDE PARK

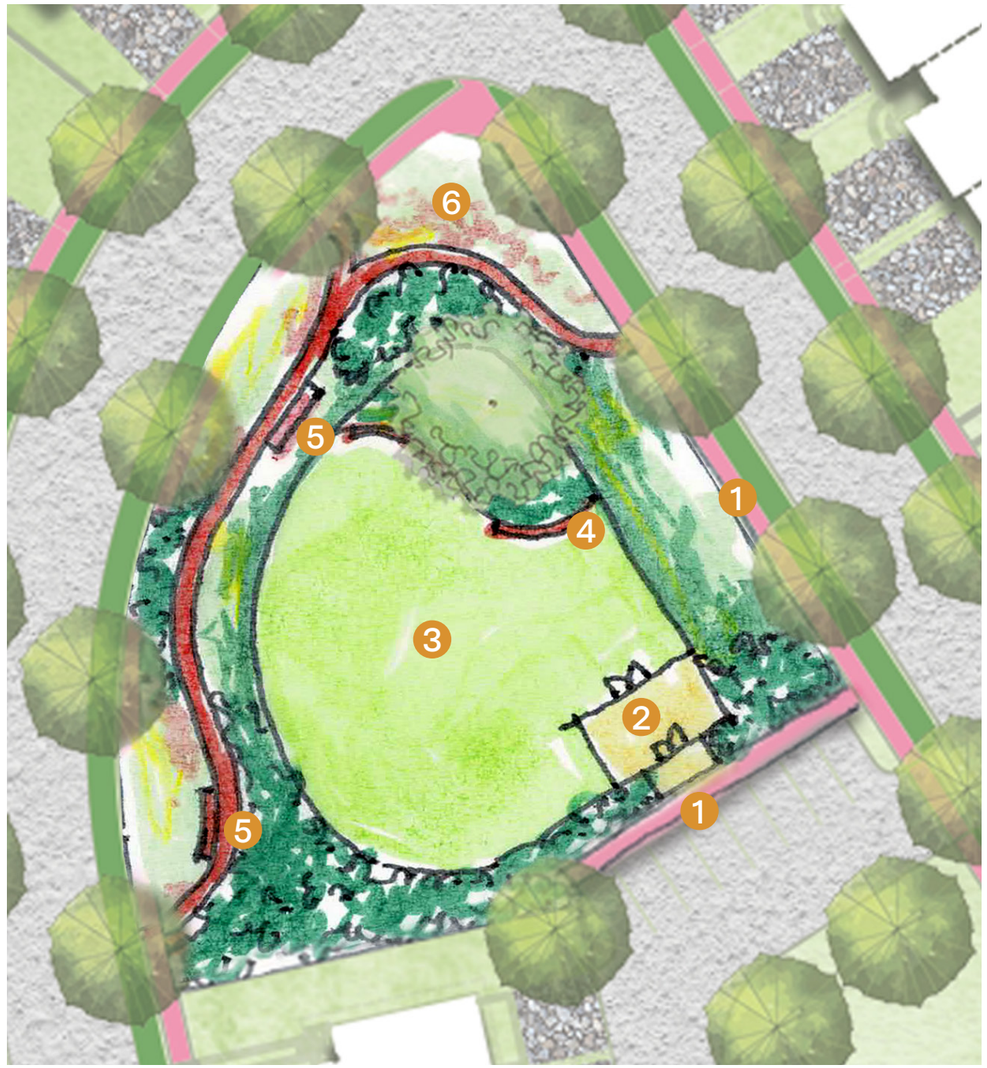


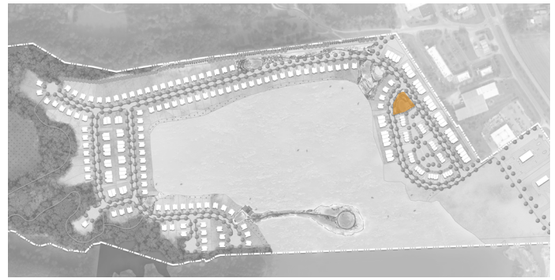


FEATURES

1. PICNIC PERGOLA W/TABLE & BENCHES
2. ADIRONDACK CHAIRS
3. LAWN
4. SAND BEACH
5. LAKESIDE PARK ENTRY
6. CONNECTION TO WOODED NATURE TRAIL

LAKESIDE PARK





FEATURES

1. SIDEWALK
2. DOG PARK DOUBLE GATE
3. DOG PARK WITH PLAY EQUIPMENT
4. BENCHES
5. SEATING ALONG POCKET PARK TRAIL
6. LAWN

PEDESTRIAN SYSTEM



LEGEND

WOODLAND TRAIL *(MULCH)*

CONCRETE SIDEWALK

OPEN SPACE

PROPERTY LINE

All paths, walks, and trails are for design intent only. All materials, elements, and layout are subject to change.

The HOA will maintain the amenities, parks, and trail systems.

N

STREET TREES AND LANDSCAPE BUFFER



LEGEND

PROPERTY LINE

AMENITY AREA

STREET TREE

LANDSCAPE BUFFER EVERGREEN TREES

Per Town of Smithfield Design Guidelines, street trees shall be spaced 40 ft. on center.Tree locations are for conceptual use only. Actual quantity and spacing may vary due to sight distance lines, utilities, grading, drainage, road improvements, etc. and street trees will be field adjusted per final design and utility layout.

N

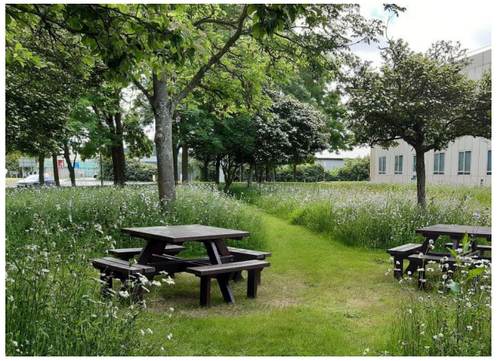
AMENITIES

















AMENITY PROGRAM LIST MAY INCLUDE:

- Nature Trails
- Multi-Purpose Area
- Grilling Areas
- Kayak/Canoe Areas
- Outdoor Games
- Swing Benches
- Picnic Pavilions
- Lake Access
- Dog Park
- Kids Play
- Fire Pit Areas

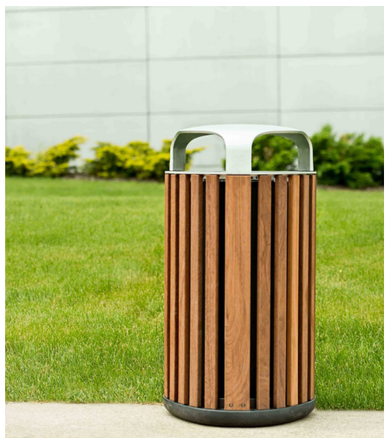
SITE FURNISHINGS












SITE LIGHTING





Parking lot light fixture Options



Entryway Street Light - Required by Town of Smithfield
Traditional Colonial light fixture (Dominion Energy)





Inside Subdivision - Street Light Options
All fixtures shown may be used with or without an armbar.

PARKING LOT LIGHTING

Parking lot lighting fixtures shall not exceed twenty-five (25) feet in height as measured from the grade at the base of the lighting standard. Parking lot lighting shall otherwise comply with the requirements in the Town's Zoning Ordinance for parking illumination.

The colors/finishes shown are examples only; final colors/finishes shall be determined at a later date. The owner may propose alternate site lighting fixtures that are substantially similar in architectural form for approval by the Town of Smithfield.

STREET LIGHTING

(From the Town of Smithfield Design Standards, Feb 2023)

Residential (Neighborhood and Suburban Residential) New Development

Street lights in newly developed residential neighborhoods should be no more than 400 feet apart.

Entrance

Entryway streetlights must be:

- between 10' and 14' height
- be at least 8,000 lumens
- must be mounted on a sturdy decorative pole
- be no further than 100 feet apart
- installed on both sides of the entrance and along the front of the property

The required lights are the 8,000 lumen Traditional Colonial lights on the approved list provided by Dominion Energy (dominionenergy.com/virginia/products/lighting-fixtures) and/or Community Electric.

The entrance will be defined as the section of road at the beginning of the subdivision to the first cross-street. All subdivisions are encouraged to install LED streetlights where feasible in lieu of traditional street lights.

Inside Subdivision

When built as part of a subdivision where underground utilities are present, all interior street lights must be:

- in substantial conformance with entryway streetlights
- no less than 14' in height
- at least 8,000 lumens

ARCHITECTURE & LANDSCAPE

Use Areas	L22
Single-Family	L23
Townhomes	L25
Villas	L27

USE AREAS



RESIDENTIAL | COMMERCIAL | NATURAL/ WOODED AREAS | AMENITY AREAS | OPEN GREEN SPACE | BUFFER | PROPERTY LINE

N

SINGLE-FAMILY



Front elevation



Left elevation *Rear elevation* *Right elevation*



Front elevation



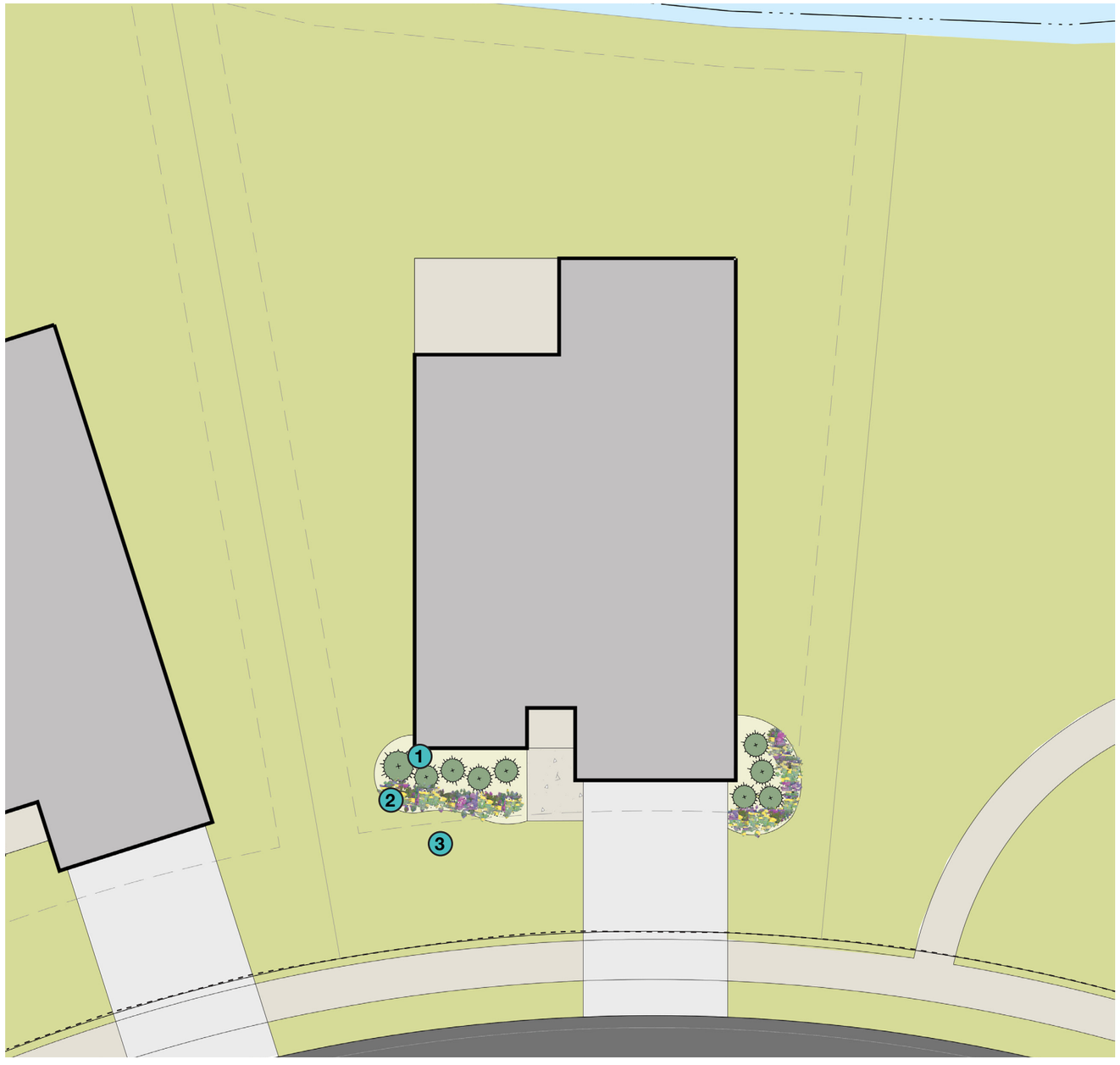
Left elevation *Rear elevation* *Right elevation*

Conceptual elevation of proposed single-family buildings (not to scale)

Example of typical exterior materials

1. Board & Batten siding and Traditional lap siding
2. Cementitious siding or equivalent
3. Standing metal seam accent roof
4. Architectural shingles
5. Metal accent railings
6. Synthetic decks
7. Foundation treatment:
   - Lattice
   - Parged
   - Real stone or masonry foundations

SINGLE-FAMILY



Typical Landscape Plan for Single-Family

1. Small/medium evergreen shrub (typ.)
2. Perennials/ornamental grasses (typ.)
3. Turf grass (typ.)

Plant locations and quantities are conceptual and subject to change (based on utility locations, etc.). These landscape requirements represent the minimum landscape requirements. Additional landscaping and landscape features, such as fences, walls, and hardscapes, may be used. The plants on each face of the building to be chosen appropriately for sun exposure; may vary by building depending on the building orientation. Street trees are shown for reference only and are subject to change.

- Lake (typ.)
- Lead walk (typ.)
- Driveway (typ.)
- Road (typ.)
- Single-family house
- Right-of-way (typ.)

TOWNHOMES



Front elevation



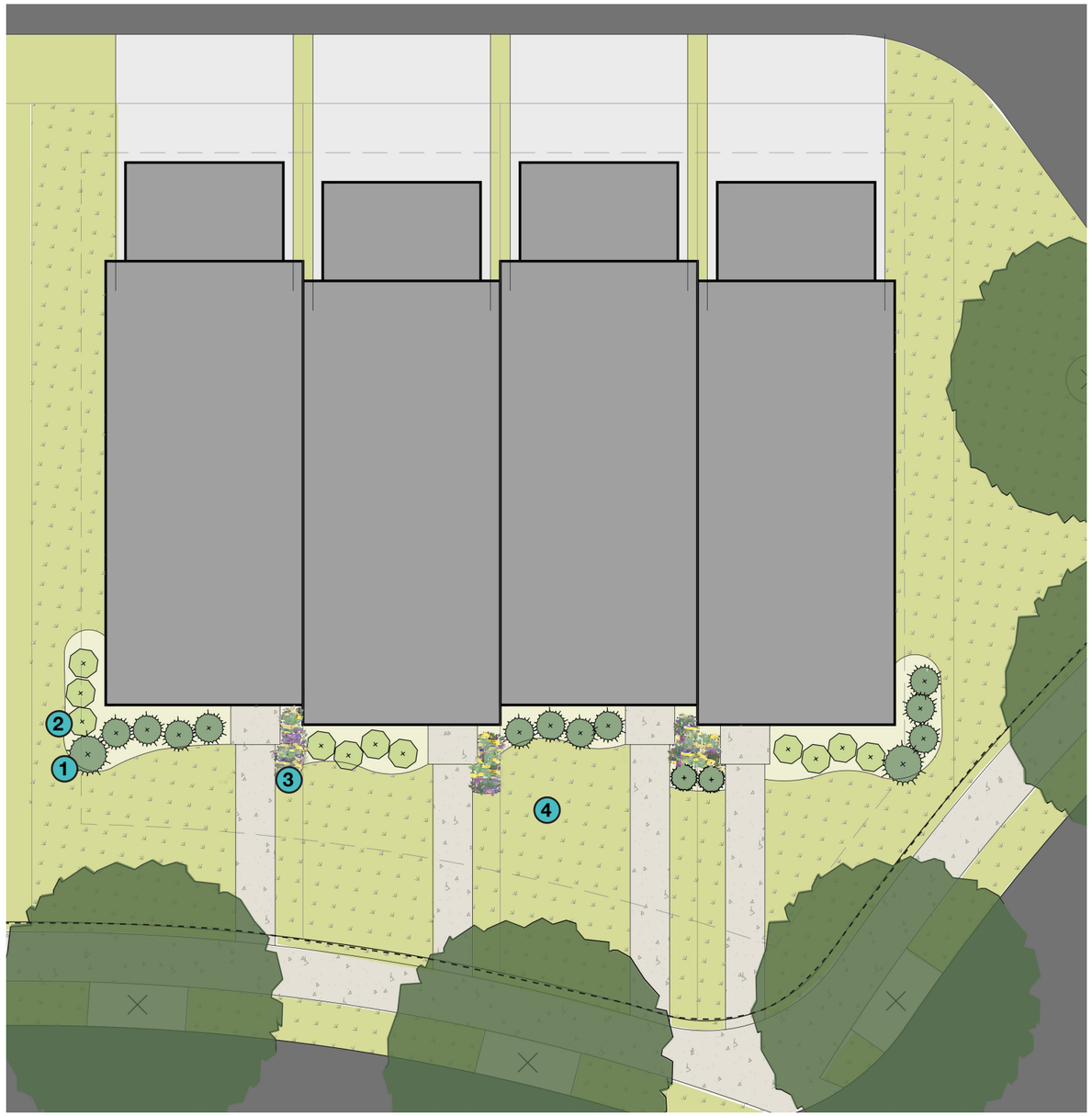
Left elevation *Rear elevation* *Right elevation*

Conceptual elevation of proposed townhome buildings (not to scale)

Example of typical exterior materials

1. Board & Batten siding and Traditional lap siding
2. Cementitious siding or equivalent
3. Architectural shingles
4. Foundation treatment:
   - Lattice
   - Parged
   - Real stone or masonry foundations
5. Synthetic decks

TOWNHOMES



Typical Landscape Plan for Townhomes

1. Small/medium evergreen shrub (typ.)
2. Small/medium deciduous shrub (typ.)
3. Perennials/ornamental grasses (typ.)
4. Turf grass (typ.)

Plant locations and quantities are conceptual and subject to change (based on utility locations, etc.). These landscape requirements represent the minimum landscape requirements. Additional landscaping and landscape features, such as fences, walls, and hardscapes, may be used. The plants on each face of the building to be chosen appropriately for sun exposure; may vary by building depending on the building orientation. Street trees are shown for reference only and are subject to change.

- Lead walk (typ.)
- Driveway (typ.)
- Road (typ.)
- Townhome
- Right-of-way (typ.)

VILLAS



Front elevation



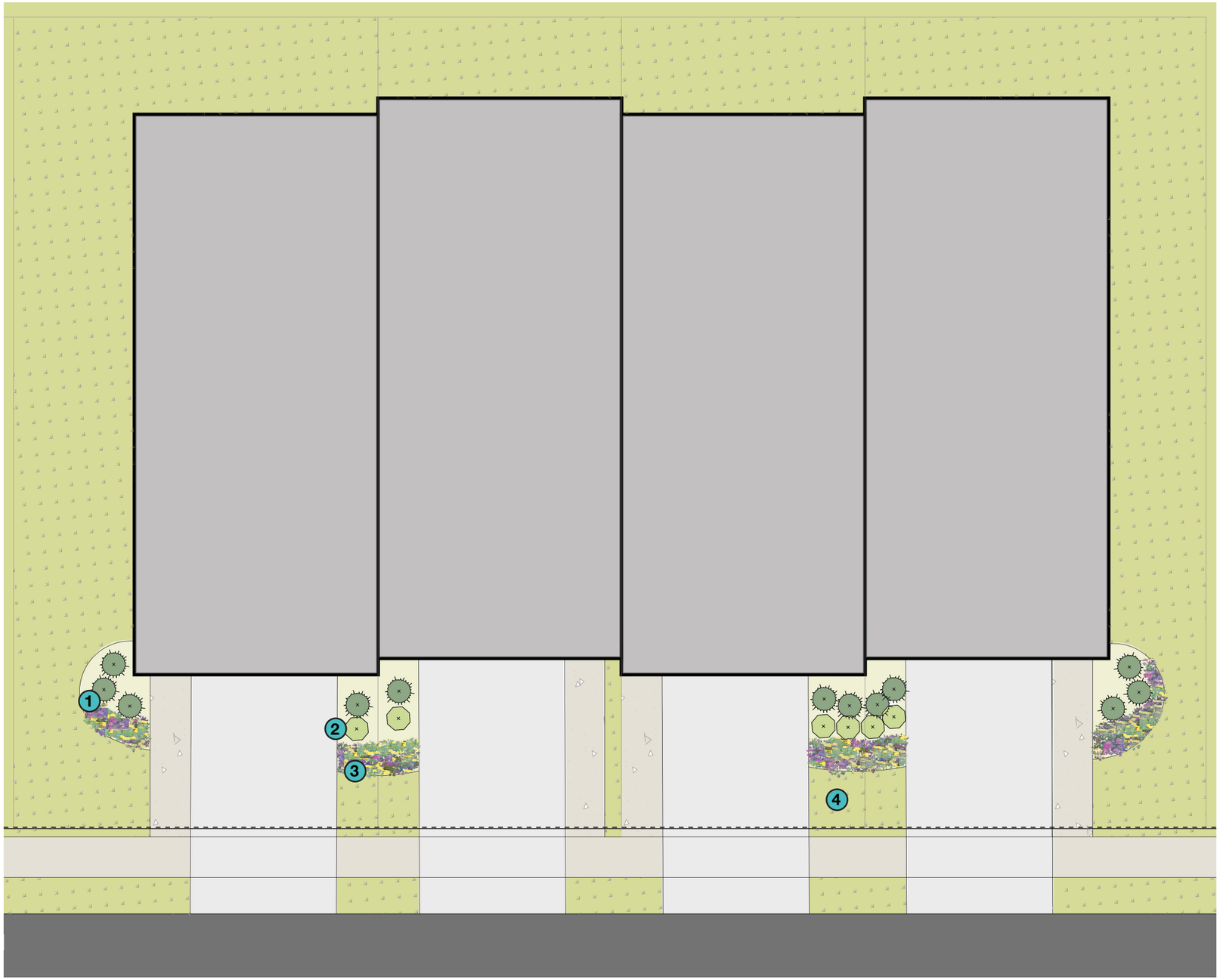
Left elevation *Rear elevation* *Right elevation*

Conceptual elevation of proposed villa buildings (not to scale)

Example of typical exterior materials

1. Board & Batten siding and Traditional lap siding
2. Cementitious siding or equivalent
3. Standing metal seam accent roof
4. Architectural shingles
5. Metal accent railings
6. Synthetic decks
7. Foundation treatment:
   - Lattice
   - Parged
   - Real stone or masonry foundations

VILLAS



Typical Landscape Plan for Villas

1. Small/medium evergreen shrub (typ.)
2. Small/medium deciduous shrub (typ.)
3. Perennials/ornamental grasses (typ.)
4. Turf grass (typ.)

Plant locations and quantities are conceptual and subject to change (based on utility locations, etc.). These landscape requirements represent the minimum landscape requirements. Additional landscaping and landscape features, such as fences, walls, and hardscapes, may be used. The plants on each face of the building to be chosen appropriately for sun exposure; may vary by building depending on the building orientation. Street trees are not shown on this plan.

- Lead walk (typ.)
- Driveway (typ.)
- Road (typ.)
- Villa
- Right-of-way (typ.)

The Promontory – Rezoning – Town of Smithfield

Site Address: 18495 Cypress Run Drive Smithfield, VA 23431 (Tax Map No. 32-01-005 and 32-01-006 in part)

Statement of Reasons, Narrative Description, and Community Impact Statement

Project Consultants:

Civil Engineer	-	Dan Caskie The Bay Companies 8500 Bell Creek Road Mechanicsville, VA 23116
Landscape Architect	-	Jon Hershey, Veronica Malinay Cite Design 301 N. Adams Street Richmond, VA 23220
Traffic Engineer	-	Kimley Horn Suite 200 2035 Maywill Street Richmond, VA 23230
Fiscal Analyst	-	Ted Figura 118 Logan Avenue Asheville, NC 28806

Statement of Reasons:

The property known as Tax Map Parcel No. 32-01-005 is currently designated Residential Mixed-Use and Commercial Mixed-Use in the Town's Comprehensive Plan (adopted 2022) and are presently zoned Community Conservation (C-C) and Environmental Conservation (E-C). The applicant seeks to amend the existing zoning to Planned Mixed-Use Development (PMUD), in a manner consistent with the Comprehensive Plan, to develop the property for commercial and residential uses. The property is unique with adjacency to Cypress Creek and access to a large man-made lake. By rezoning the property, the parcel will not only provide the Town of Smithfield with one of the most unique neighborhoods in Virginia but will also foster commercial development along Benn's Church Blvd.

Narrative Description:

The bulk of the existing parcel has served as a sand and stone quarry for approximately 29 years. The remaining pond provides an opportunity for a neighborhood to extend around the arc of the pond to the western section. This provides ample opportunity to create trails, docks, and other water access, it is anticipated that The Promontory will be one of the most appealing places to live in Hampton Roads. The Commercial portion of the site has been approached by franchisees and developers for the last decade with

interest to add highly desirable restaurants, retail, and other service oriented commercial. Due to the limitations of the existing zoning, the owners of the property have had to pass on significant opportunities for the residents of the Town of Smithfield. Rezoning this property to PMUD will provide commercial development that will elevate the current offerings of Benns Church Blvd.

The amended zoning proposes to feature 88 townhome units, 154 single-family detached units, and 20 villa units, totaling 262 units on the property. The commercial parcels adjacent to Benn's Church Blvd. will remain unchanged from the approved layout. The tabulation below provides an overview of the proposed plan:

- The total number of dwelling units proposed by type of structure
  - 154 - single family units
  - 88 – 20' wide townhouse units
  - 20 - 30' wide villa units
  - Total = 262 units
- The total land area and net developable area is shown below:

OVERALL			
Physical Environmental Land Unit	**Area (Acres)**	**Capacity Rating**	**Net Area (Acres)**
Slopes Less than 10%	42.80	1	42.80
Slopes From 10% but less than 20%	3.36	0.75	2.52
Slopes From 20% but less than 30%	6.27	0.5	3.14
Slopes 30% or more	4.31	0.1	0.43
Shrink Swell Soil	0.00	0.75	0.00
Wetlands	20.67	0	0.00
Stormwater Management	33.60	0	0.00
69 KV or greater transmission lines	0.00	0	0.00
Public Right of Way	13.39	0	0.00
Private Street and Parking Bays	10.90	0	0.00
Total	**135.30**		**48.89**
Total Units Proposed			262
Density			5.36

- The density calculations for the residential lot areas have been provided below:

SINGLE FAMILY DETACHED			
Physical Environmental Land Unit	**Area (Acres)**	**Capacity Rating**	**Net Area (Acres)**
Slopes Less than 10%	27.25	1	27.25
Slopes From 10% but less than 20%	3.36	0.75	2.52
Slopes From 20% but less than 30%	6.02	0.5	3.01
Slopes 30% or more	1.05	0.1	0.11
Shrink Swell Soil	0.00	0.75	0.00
Wetlands	20.69	0	0.00
Stormwater Management	33.60	0	0.00
69 KV or greater transmission lines	0.00	0	0.00
Public Right of Way	7.01	0	0.00
Private Street and Parking Bays	0.00	0	0.00
Total	**98.98**		**32.89**
Total Units Proposed			154
Density			4.68

SINGLE FAMILY ATTACHED			
Physical Environmental Land Unit	**Area (Acres)**	**Capacity Rating**	**Net Area (Acres)**
Slopes Less than 10%	7.29	1	7.29
Slopes From 10% but less than 20%	0.00	0.75	0.00
Slopes From 20% but less than 30%	0.25	0.5	0.13
Slopes 30% or more	1.08	0.1	0.11
Shrink Swell Soil	0.00	0.75	0.00
Wetlands	0.00	0	0.00
Stormwater Management	0.00	0	0.00
69 KV or greater transmission lines	0.00	0	0.00
Public Right of Way	3.83	0	0.00
Private Street and Parking Bays	1.27	0	0.00
Total	**13.72**		**7.52**
Total Units Proposed			108
Density			14.36

COMMERCIAL					
Floor Aea Calculations - Commercial					
	Pacel 1	Pacel 2	Pacel 3	Pacel 4	Pacel 5
Total Commercial Site Area	100,939 sf	96,082 sf	69,579 sf	71,969 sf	93,832 sf
Proposed Commercial Floor Area *	5,000 sf	3,000 sf	3,000 sf	3,000 sf	4,000 sf
Floor Area Ratio	5%	3%	4%	4%	4%

- The proposed schedule of off-street parking and loading spaces for each proposed type of land use
    - Residential:
        - Single Family: 2 spaces per unit required = 308 spaces required. 308 spaces provided.
        - Villas: 2 spaces per unit required plus 1 space per every 3 units = 46 spaces required. 46 spaces provided.
        - Townhouses: 2 spaces per unit required plus 1 space per every 3 units = 205 spaces required. 225 spaces provided.
    - Commercial:
        - Commercial Parking = 249 spaces
        - Commercial Stacked parking = 35 spaces
        - Commercial Loading Spaces = 4 spaces (assumes 1 loading space per commercial parcel)

The homeowner's association shall be responsible for the maintenance, upkeep, and improvement of all common areas, including but not limited to parks, trails, landscaping, and recreational facilities within the neighborhood.

Architecture:

The intent of the architecture at The Promontory is to build upon the rich history in the Town of Smithfield. By referencing the materials and massing of the homes and businesses in the Town, the neighborhood will feel connected to something much larger. Greenwood Homes has an in-house architecture team that will build upon the current layouts of our homes and provide architectural components reminiscent of the traditional design of the Town. Low-country motifs will also be utilized to connect to the characteristics of the site.

For the commercial property, materials such as masonry and metal roof accents will connect to the Town of Smithfield commercial area.

Landscaping along Benns Church Boulevard will be significant to reinforce the intent of the Entrance Corridor.

Amenities:

The amenity package of the neighborhood will provide access to the lake in parks on the east side of the neighborhood and adjacent to the single-family attached product. The promontory itself, the point of land extending into the lake, will become the focal point of the community allowing residents to have access potentially to boat, kayak, and fish.

The trail system will provide exercise opportunities throughout the neighborhood and access to the beautiful natural area along Cypress Creek. Potentially a dock could extend to Cypress Creek, allowing access to residents to boat and fish.

The homeowner's association will own and maintain all common areas including the infrastructure. Residents participate in a comprehensive program with curbside collection for garbage, recycling, and organic waste. Every Monday, bins of household waste are collected, while Tuesdays are reserved for single-stream recycling. Organic waste is gathered on Thursdays and sent to a municipal composting facility. Monthly bulk waste pickups and quarterly hazardous waste collection events ensure that larger and more dangerous items are responsibly managed

See attached amenities exhibit.

Community Impact Statement:

Drainage:
The stormwater management for this site will consist of water quality and water quantity controls. The existing pond will be retrofitted with an outlet riser structure and outlet pipe as well as an armored emergency spillway. Since the receiving channel meets the 1% rule, and a proposed sheet flow to open space level spreader is proposed at the end of the outlet pipe outfall, the water quantity aspects of the requirements are met. See detailed analysis by The Bay Companies attached.

Sanitary:
The project will tie into Hampton Roads Sanitation District's (HRSD) existing 30" sanitary force main sanitary sewer system at the northwest corner of Turner Dr. and Benn's Church Blvd. The tie in will be made with a 4" sanitary force main that will be serving the entire Promontory development. The onsite pump station will receive gravity fed service from the entire residential site.

Water:
The project will tie into Isle of Wight County's water system for residential domestic water by extending the existing 12" waterline from the intersection of Benn's Church Blvd. and Turner Dr. to the intersection of Public Road A (Tractor Supply entrance) and Benn's Church Blvd. There it will connect to a proposed 8" x 12" Tee. The site will be tied into an existing 8" waterline on Public Road A southwest of the Tractor supply. Fire flow demands will be met by proposed fire hydrants on the extended line, as well as supplying 6 dry hydrants that are fed by the existing pond.

Fire Stations:
There are three fire stations near the site that will serve the proposed site.

The Smithfield Volunteer Fire Department Station 50 is located at 1804 South Church St, Smithfield, VA 23430. This is 0.9 miles North of the Promontory Property and approximately a three-minute drive.

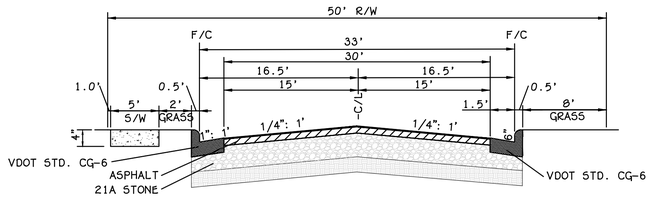
The Smithfield Volunteer Fire Department Station 51 is located at 310 Institute Street, Smithfield, VA 23430. This is 3.5 miles Northwest of the Promontory Property and approximately a seven-minute drive.

The Isle of Wight Volunteer Rescue Squad is located at 13080 Great Spring Road, Smithfield, VA 23430. This is 3.4 miles Northwest of the Promontory Property and approximately an eight-minute drive.

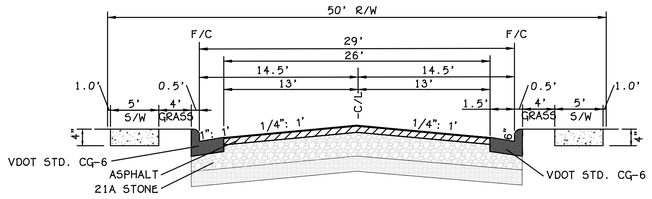
Roadways:
The roadway system serving this development has been analyzed in the Traffic Impact Analysis, prepared by Kimley Horn. See attached analysis for this information.

Fiscal Impact Analysis:
The fiscal impact analysis has been prepared by Ted Figura Consulting and is attached.

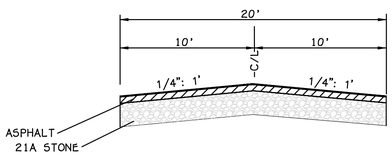
TYPICAL ROAD SECTION
PUBLIC ROAD B AND FUTURE ROAD



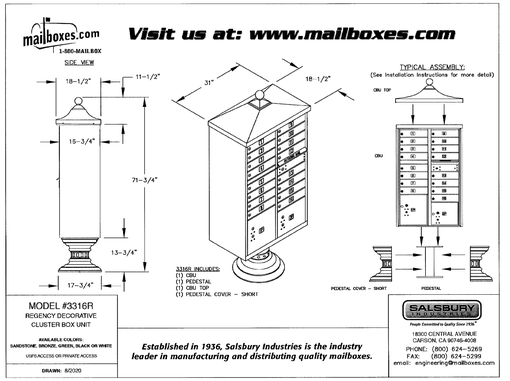
TYPICAL ROAD SECTION
PUBLIC ROAD A, C-1 AND CYPRESS RUN DRIVE



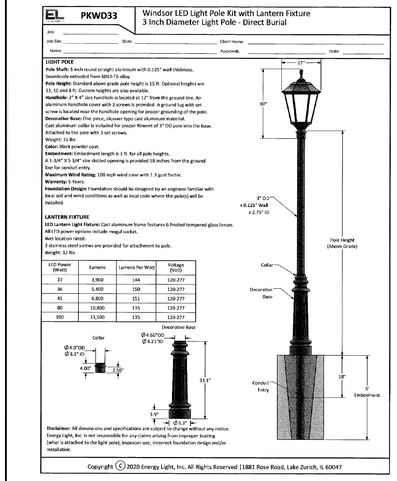
TYPICAL ROAD SECTION
ALLEYS

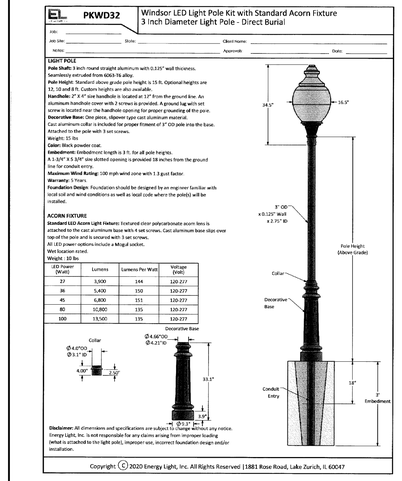


MAIL KIOSK DETAIL



LIGHT DETAILS

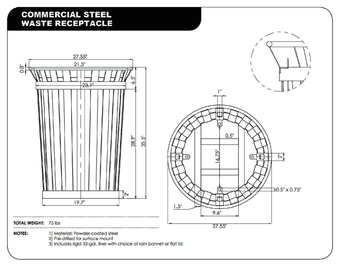




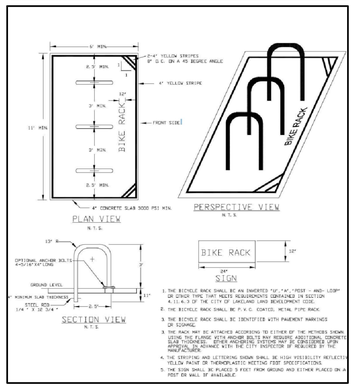
BENCHES (OR SIMILAR EQUIVALENT)



TRASH CAN DETAIL



BIKE RACK DETAIL



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FILED: 23021_Site Details

DATE: August 31, 2023

REVISED:

REVISED:

REVISED:

THE BAY COMPANIES
CIVIL ENGINEERS
8500 BELL CREEK ROAD
MECHANICSVILLE, VA 23116
(804) 569-7060
FAX: (804) 569-7061

PROJECT:

The Promontory

Zoning Concept Plan

Smithfield, Virginia

SHEET: Road Sections and Site Details

SHEET NO: C6

JOB NO. 23021

www.thebaycompanies.com

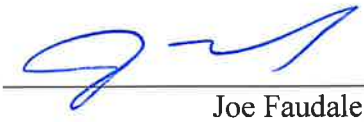
Preliminary Drainage and Stormwater Management Study

Prepared for:

Greenwood Homes
Kent Henry
3122 W. Marshall St. STE 100
Richmond, VA 23230

Prepared by:

The Bay Companies
8500 Bell Creek Road
Mechanicsville, VA 23116
Telephone: (804) 569-7060
Fax: (804) 569-7061

Prepared By: 

Joe Faudale, P.E.

Drainage Narrative

Greenwood Homes plans to develop Parcel 32-01-005 into 262 single family detached and attached homes. The 130 acre +/- site is currently zoned C-C, E-C and is located in the Town of Smithfield, Virginia. This preliminary drainage and stormwater management study is being provided as part of the rezoning package to revise the zoning to PMUD. The site is accessed from Virginia Route 10 and Cypress Run Drive. It is currently a cleared sand and stone quarry pit that borders Cypress Creek and Champion Swamp and contains a man made pond. A total of 57 acres will be disturbed during construction. The site drains to the man made pond but does not have a well defined outfall to Cypress Creek. Due to the topography and control measures, no negative erosion and sediment control impacts are anticipated to affect adjacent properties.

Existing Conditions

The existing site is generally flat and drains to the manmade quarry pond in the center of the site. Beyond the quarry pond, the sight falls off drastically to Cypress Creek. There is about 30' of fall from the edge of the pond to Cypress Creek. Most of the site has been cleared and graded for quarry operations. Beyond the pond, the site is wooded with RPA, floodplain and the natural channel of Cypress Creek. The current pond has no outfall structure and does not show signs of stormwater overtopping the dam toward Cypress Creek.

Proposed Conditions

The proposed project will develop the site into a combination of single family detached and attached lots, along with the necessary roads and parking. The proposed drainage will take as much area to the existing pond as possible. The pond will be outfitted with an adequate outfall riser and pipe system to a 'sheet flow to open space' level spreader. Cypress Creek's drainage area at the point of the project's discharge is 164,000 acres. The project drainage area is 170 acres. Since the project's contributing drainage area is less than 1% of the total watershed at the point of discharge to Cypress Creek and the 2 year storm in a manmade system to the 1% point is non erosive, the project will meet channel protection requirements per 9VAC25-875-600 B.4.a of Virginia law (the 1% rule).

The concentrated stormwater flow to the existing conveyance systems currently experience flooding during the 10 year storm. The point of discharge will release a post developed flow for the 10 year event that is less than the predevelopment flow rate. The proposed stormwater conveyance system will be analyzed and deemed to be adequate to handle the flows.

Downstream stormwater conveyance systems do not require additional analysis to show compliance with flood protection criteria per **9VAC25-875-600 C.3.a** of Virginia Law. The project site discharges directly into a mapped floodplain. **9VAC25-875-600 C.3.c** when a stormwater conveyance system enters a mapped floodplain, the project is meeting flood protection requirements.

Due to the 1% rule and the outflow from the pond going to sheet flow to open space, the energy balance equation is not needed for this development. Therefore, the rational method is used for routing the pond and for all peak flow calculations.
The proposed drainage area to the retrofitted pond will have a conservative c factor of 0.70 (68% impervious) and a time of concentration of 15 minutes, which is conservatively assumed low for a drainage area of 118 acres.

Stormwater Management

The stormwater management for this site will consist of water quality and water quantity controls. Since the receiving channel meets the 1% rule, and a proposed sheet flow to open space level spreader is proposed, the water quantity aspect of the requirements are met.

The proposed pond will have a proposed junction box and outfall pipe to the receiving channel. The 100 year storm will be greater than 2' below the top of the dam per state regulations, and the normal water surface will be elevation 27.5, so the 100 year storm doesn't come close to encroaching on the lots backing up to the existing pond.

Care should be exercised in future projects / construction due to the property being located within the Chesapeake Bay Watershed.

The water quality component of the project will be addressed by all the project's drainage draining to the existing pond and outfalling through the Sheet Flow to Open Space Soils C/D Level Spreader. This practice removes 50% of the phosphorous going through it. Because the site has been previously developed and used, the Redevelopment standards apply. Based on the Virginia Runoff Reduction Method spreadsheet, a total of 79 pounds of phosphorous must be removed from this development through runoff reduction practices. The Sheet Flow to Open Space level spreader removes 112 pounds of phosphorous per year, which exceeds the total phosphorous reduction target by 33 pounds per year.

Significant Assumptions

i. Very limited disturbance to the wetlands and RPA will be required for site development.
ii. Due to the County and State's Stormwater regulations, a wet pond (quantity detention only) and a level spreader that complies with Sheet Flow to Open Space will be constructed for stormwater management. This basin and level spreader have been designed to treat and release storm runoff as required by the applicable standards. Disruption or reduction in the supply of water to the downstream wetlands and resources will be minimized to the greatest extent possible.
iii. It is anticipated that no disruption to existing hydrology including wetland and stream circulation patterns will be realized by this development.
iv. Final site design will balance cut and fill materials on-site as much as possible. A large amount of fill material for site development is not anticipated.
v. Dredging and likewise dumping of such material onsite will not be required for site development.
vi. No known shellfish beds, submerged aquatic vegetation, or fish spawning areas exist on

site. The proposed BMPs will be incorporated in the site to minimize any impact to these resources which likely exist downstream in Cypress Creek and Champion Swamp.

vii. The project falls under redevelopment guideline requirements A total load reduction of 78.81 pounds/year is required, and a total load reduction of 111.8 pounds/year is achieved with the primary BMPs. During final design, we will explore where additional BMPs can be integrated into the site design to achieve the full load reduction required. If it is not feasible to achieve the full load reduction requirement, we will explore the purchase of nutrient credits from a certified nutrient bank located within the same watershed as this project. Supporting water quality calculations are included in this report.

viii. The assumed impervious percent for this site is 50% for the single family detached residential areas, 70% impervious for single family attached residential areas and commercial areas, and 65% impervious for mixed residential and commercial areas. The overall impervious cover is assumed to be approximately 68%. Anticipated impervious area totals approximately 118 acres out of a total of 170 acres of the drainage area to the existing pond. Surfacing materials will include roofs, asphalt paving, and concrete walks and curbing. A significant portion of the total impervious area is the water surface of the existing pond.

ix. As the majority of the site is currently cleared, additional site clearing is not expected.

x. A limited amount of offsite clearing may be required in the Route 10 right-of-way to provide the sanitary sewer tie in and waterline extension.

xi. It is expected to begin the project soon after closing and will be completed in six phases. Detailed phasing information provided on Phasing Plan sheet.

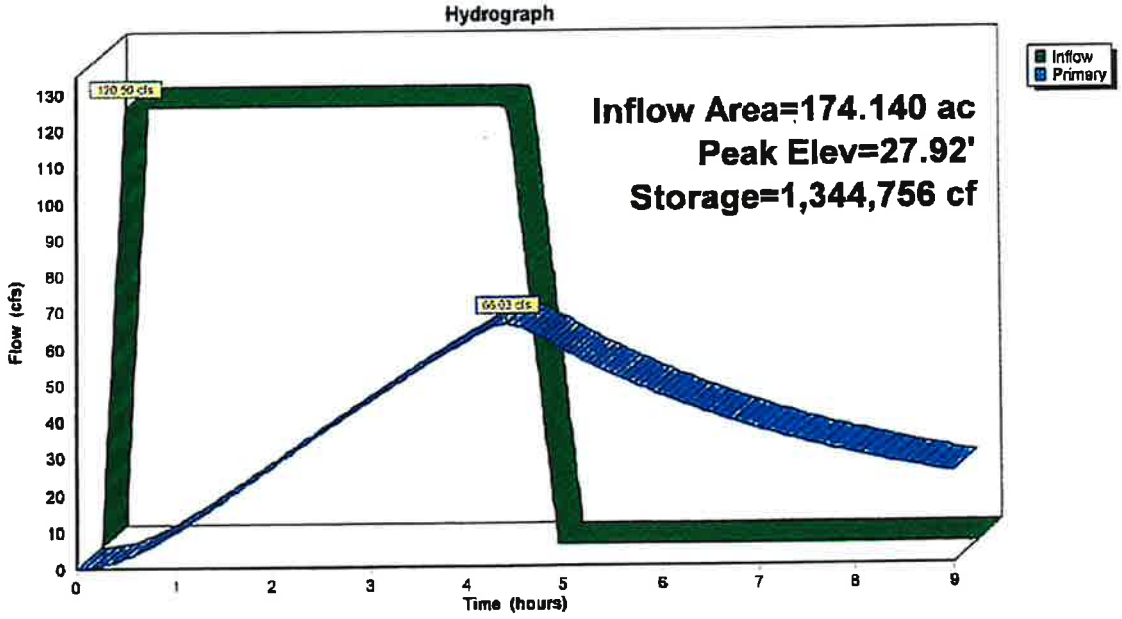
xii. It is anticipated that permits required to complete this project will be required from: The Town of Smithfield, Isle of Wight County, Virginia DEQ, and VDH.
Proposed mitigation measures for potential hydrogeological impacts include implementing an Erosion and Sedimentation Control Plan completed by a Licensed Virginia PE, temporary construction and permanent stormwater management systems, construction entrance, and a site design to minimize cut and fill. It is anticipated that wetlands will be minimally disturbed; however, mitigation measures will be implemented for this should the need arise during final design.

Landscape Element

Existing vegetation consists primarily of indigenous plants, grass, brush cover and trees within the existing outskirts of the pond and borrow areas. in the previously developed portions of the south side of the site. Wooded areas are located on site outside of the pond and borrow areas. Wooded area ranges from small understory trees to large hardwood canopy trees. General limits of clearing will be at and directly adjacent to the site's proposed features. The clearing and grading will be minimized to the greatest extent practical. Mitigation will be implemented for the impacted trees removal consistent with the tree canopy requirements of the Town of Smithfield and/or Isle of Wight County. Tree and shrubs will be selected to comply with the specifications listed in Article 9 of the Smithfield Zoning Ordinance.

STORMWATER CALCULATIONS

Pond 2P: Retrofitted Ex Pond



Stage-Area-Storage for Pond 2P: Retrofitted Ex Pond

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
27.50	3,145,645	0
27.55	3,157,826	157,587
27.60	3,170,007	315,783
27.65	3,182,188	474,587
27.70	3,194,369	634,001
27.75	3,206,550	794,024
27.80	3,218,731	954,656
27.85	3,230,912	1,115,897
27.90	3,243,093	1,277,748
27.95	3,255,274	1,440,207
28.00	3,267,455	1,603,275
28.05	3,274,352	1,766,820
28.10	3,281,250	1,930,710
28.15	3,288,147	2,094,945
28.20	3,295,044	2,259,525
28.25	3,301,942	2,424,450
28.30	3,308,839	2,589,719
28.35	3,315,736	2,755,334
28.40	3,322,634	2,921,293
28.45	3,329,531	3,087,597
28.50	3,336,429	3,254,246
28.55	3,343,326	3,421,240
28.60	3,350,223	3,588,578
28.65	3,357,121	3,756,262
28.70	3,364,018	3,924,291
28.75	3,370,915	4,092,664
28.80	3,377,813	4,261,382
28.85	3,384,710	4,430,445
28.90	3,391,607	4,599,853
28.95	3,398,505	4,769,606
29.00	3,405,402	4,939,704
29.05	3,412,299	5,110,146
29.10	3,419,197	5,280,933
29.15	3,426,094	5,452,066
29.20	3,432,991	5,623,543
29.25	3,439,889	5,795,365
29.30	3,446,786	5,967,532
29.35	3,453,683	6,140,043
29.40	3,460,581	6,312,900
29.45	3,467,478	6,486,102
29.50	3,474,376	6,659,648
29.55	3,481,273	6,833,539
29.60	3,488,170	7,007,775
29.65	3,495,068	7,182,356
29.70	3,501,965	7,357,282
29.75	3,508,862	7,532,553
29.80	3,515,760	7,708,168
29.85	3,522,657	7,884,129
29.90	3,529,554	8,060,434
29.95	3,536,452	8,237,084
30.00	**3,543,349**	**8,414,079**

Stage-Discharge for Pond 2P: Retrofitted Ex Pond

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
27.50	0.00	28.54	164.25	29.58	203.10
27.52	0.68	28.56	164.40	29.60	204.94
27.54	1.94	28.58	164.56	29.62	206.81
27.56	3.56	28.60	164.71	29.64	208.71
27.58	5.48	28.62	164.87	29.66	210.65
27.60	7.65	28.64	165.02	29.68	212.63
27.62	10.06	28.66	165.18	29.70	214.63
27.64	12.68	28.68	165.33	29.72	216.67
27.66	15.49	28.70	165.49	29.74	218.74
27.68	18.48	28.72	165.64	29.76	220.85
27.70	21.64	28.74	165.80	29.78	222.98
27.72	24.97	28.76	165.95	29.80	225.15
27.74	28.45	28.78	166.10	29.82	227.35
27.76	32.08	28.80	166.26	29.84	229.59
27.78	35.85	28.82	166.41	29.86	231.86
27.80	39.76	28.84	166.57	29.88	234.15
27.82	43.80	28.86	166.72	29.90	236.49
27.84	47.97	28.88	166.87	29.92	238.85
27.86	52.27	28.90	167.03	29.94	241.24
27.88	56.68	28.92	167.18	29.96	243.67
27.90	61.22	28.94	167.33	29.98	246.12
27.92	65.86	28.96	167.49	30.00	**248.61**
27.94	70.63	28.98	167.64		
27.96	75.49	29.00	167.79		
27.98	80.47	29.02	168.13		
28.00	85.55	29.04	168.62		
28.02	90.74	29.06	169.22		
28.04	96.02	29.08	169.90		
28.06	101.41	29.10	170.65		
28.08	106.89	29.12	171.47		
28.10	112.46	29.14	172.34		
28.12	118.13	29.16	173.28		
28.14	123.89	29.18	174.27		
28.16	129.75	29.20	175.31		
28.18	135.69	29.22	176.40		
28.20	141.72	29.24	177.53		
28.22	147.84	29.26	178.72		
28.24	154.04	29.28	179.94		
28.26	160.32	29.30	181.21		
28.28	162.21	29.32	182.53		
28.30	162.36	29.34	183.88		
28.32	162.52	29.36	185.27		
28.34	162.68	29.38	186.71		
28.36	162.84	29.40	188.18		
28.38	162.99	29.42	189.69		
28.40	163.15	29.44	191.24		
28.42	163.31	29.46	192.83		
28.44	163.46	29.48	194.45		
28.46	163.62	29.50	196.11		
28.48	163.78	29.52	197.80		
28.50	163.93	29.54	199.54		
28.52	164.09	29.56	201.30		

Summary for Pond 2P: Retrofitted Ex Pond

Inflow Area = 174.140 ac, 0.00% Impervious, Inflow Depth = 2.97" for 10-Year event
Inflow = 120.50 cfs @ 0.25 hrs, Volume= 43.073 af
Outflow = 66.03 cfs @ 4.43 hrs, Volume= 27.215 af, Atten= 45%, Lag= 250.6 min
Primary = 66.03 cfs @ 4.43 hrs, Volume= 27.215 af

Routing by Stor-Ind method, Time Span= 0.00-9.00 hrs, dt= 0.01 hrs
Peak Elev= 27.92' @ 4.43 hrs Surf.Area= 3,248,123 sf Storage= 1,344,756 cf

Plug-Flow detention time= 208.2 min calculated for 27.185 af (63% of inflow)
Center-of-Mass det. time= 160.4 min (297.8 - 137.4)

Volume	Invert	Avail.Storage	Storage Description
#1	27.50'	8,414,079 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
27.50	3,145,645	0	0
28.00	3,267,455	1,603,275	1,603,275
30.00	3,543,349	6,810,804	8,414,079

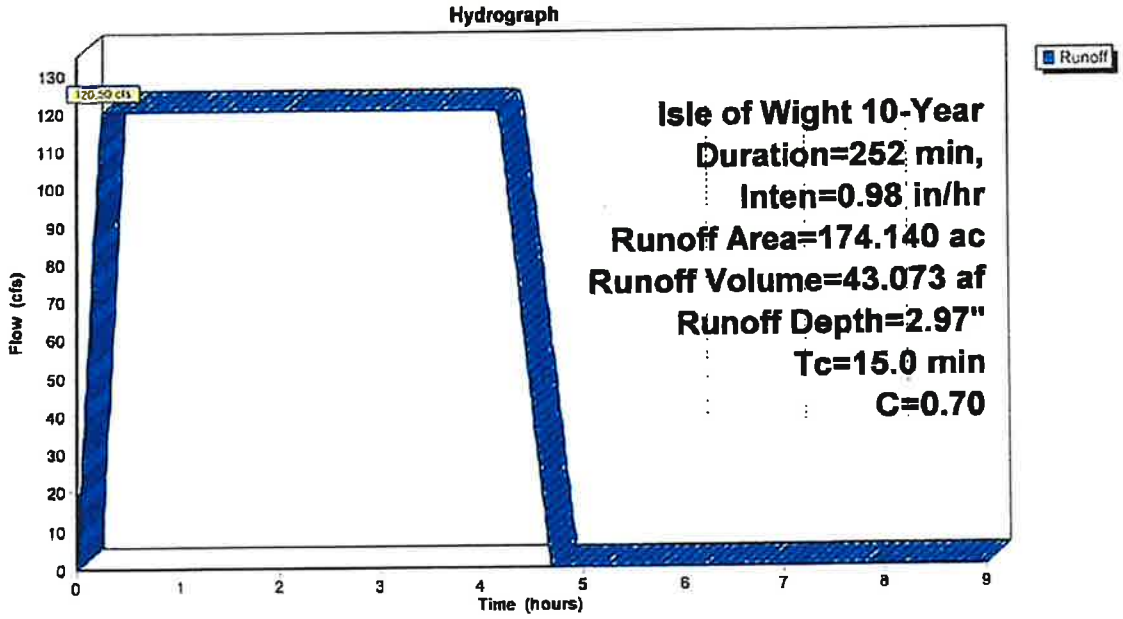
Device	Routing	Invert	Outlet Devices
#1	Primary	18.00'	**48.0" Round Culvert** L= 783.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 18.00' / 14.00' S= 0.0051 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 12.57 sf
#2	Device 1	27.50'	**78.0" x 144.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Primary	29.00'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 1.00 Width (feet) 20.00 26.00

Primary OutFlow Max=66.02 cfs @ 4.43 hrs HW=27.92' (Free Discharge)
↑—1=**Culvert** (Passes 66.02 cfs of 159.35 cfs potential flow)
↑—2=**Orifice/Grate** (Weir Controls 66.02 cfs @ 2.12 fps)
—3=**Custom Weir/Orifice** (Controls 0.00 cfs)

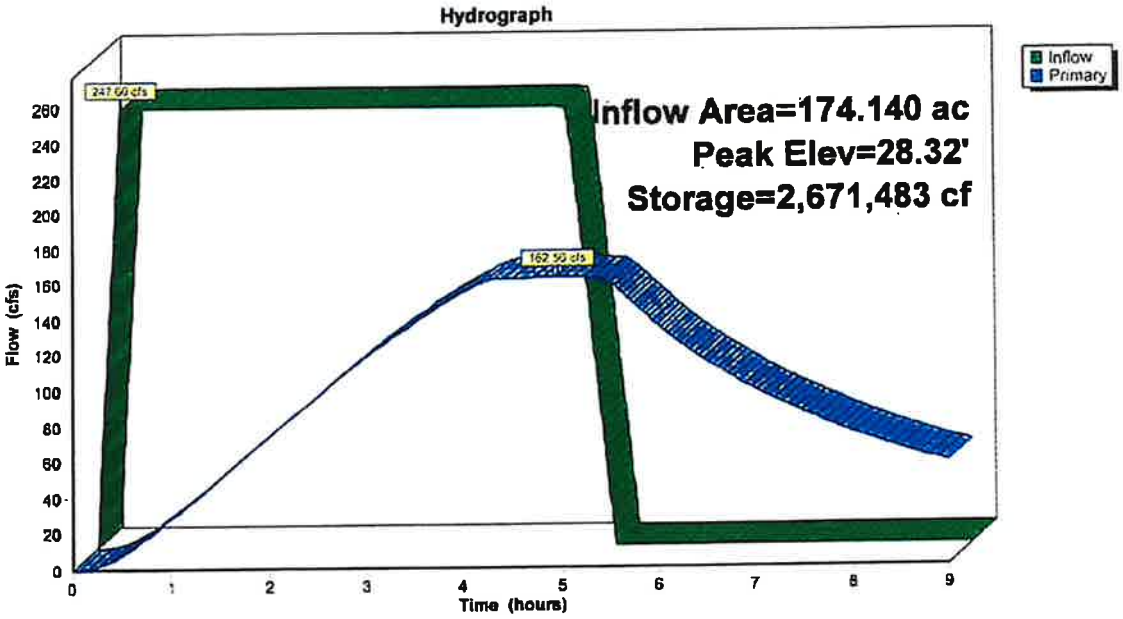
Hydrograph for Pond 2P: Retrofitted Ex Pond

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	27.50	0.00
0.20	**96.40**	34,604	27.51	0.42
0.40	**120.50**	118,469	27.54	1.84
0.60	120.50	203,173	27.56	4.01
0.80	120.50	286,133	27.59	6.65
1.00	120.50	367,066	27.62	9.62
1.20	120.50	445,765	27.64	12.84
1.40	120.50	522,077	27.66	16.24
1.60	120.50	595,893	27.69	19.77
1.80	120.50	667,136	27.71	23.38
2.00	120.50	735,760	27.73	27.03
2.20	120.50	801,740	27.75	30.69
2.40	120.50	865,073	27.77	34.36
2.60	120.50	925,778	27.79	38.01
2.80	120.50	983,883	27.81	41.60
3.00	120.50	1,039,424	27.83	45.11
3.20	120.50	1,092,452	27.84	48.57
3.40	120.50	1,143,031	27.86	51.94
3.60	120.50	1,191,217	27.87	55.19
3.80	120.50	1,237,088	27.89	58.38
4.00	120.50	1,280,712	27.90	61.43
4.20	120.50	1,322,165	27.91	64.41
4.40	72.30	**1,344,472**	**27.92**	**66.01**
4.60	24.10	**1,331,832**	**27.92**	**65.10**
4.80	0.00	1,290,306	27.90	62.12
5.00	0.00	1,246,701	27.89	59.05
5.20	0.00	1,205,233	27.88	56.16
5.40	0.00	1,165,778	27.87	53.48
5.60	0.00	1,128,197	27.85	50.94
5.80	0.00	1,092,388	27.84	48.57
6.00	0.00	1,058,228	27.83	46.34
6.20	0.00	1,025,634	27.82	44.23
6.40	0.00	994,499	27.81	42.27
6.60	0.00	964,744	27.80	40.40
6.80	0.00	936,298	27.79	38.65
7.00	0.00	909,067	27.79	37.00
7.20	0.00	882,997	27.78	35.42
7.40	0.00	858,029	27.77	33.96
7.60	0.00	834,084	27.76	32.57
7.80	0.00	811,117	27.76	31.24
8.00	0.00	789,087	27.75	29.97
8.20	0.00	767,929	27.74	28.81
8.40	0.00	747,595	27.74	27.68
8.60	0.00	728,053	27.73	26.61
8.80	0.00	709,272	27.72	25.58
9.00	0.00	691,196	27.72	24.64

Subcatchment 1S: Drainage area to Ex Pond



Pond 2P: Retrofitted Ex Pond



Hydrograph for Pond 2P: Retrofitted Ex Pond

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	27.50	0.00
0.20	**198.08**	71,101	27.52	0.86
0.40	**247.60**	242,905	27.58	5.18
0.60	247.60	415,238	27.63	11.55
0.80	247.60	582,538	27.68	19.11
1.00	247.60	744,081	27.73	27.49
1.20	247.60	899,378	27.78	36.42
1.40	247.60	1,048,114	27.83	45.68
1.60	247.60	1,190,102	27.87	55.12
1.80	247.60	1,325,264	27.91	64.63
2.00	247.60	1,453,605	27.95	74.06
2.20	247.60	1,575,192	27.99	83.37
2.40	247.60	1,690,149	28.03	92.47
2.60	247.60	1,798,632	28.06	101.34
2.80	247.60	1,900,832	28.09	109.93
3.00	247.60	1,996,963	28.12	118.19
3.20	247.60	2,087,256	28.15	126.13
3.40	247.60	2,171,956	28.17	133.72
3.60	247.60	2,251,314	28.20	140.97
3.80	247.60	2,325,586	28.22	147.86
4.00	247.60	2,395,030	28.24	154.39
4.20	247.60	2,460,150	28.26	159.33
4.40	247.60	2,522,421	28.28	162.20
4.60	247.60	2,583,854	28.30	162.35
4.80	247.60	**2,645,182**	**28.32**	**162.50**
5.00	148.56	**2,670,771**	**28.32**	**162.56**
5.20	49.52	2,625,068	28.31	162.45
5.40	0.00	2,517,106	28.28	162.19
5.60	0.00	2,402,495	28.24	155.10
5.80	0.00	2,294,525	28.21	144.97
6.00	0.00	2,193,537	28.18	135.69
6.20	0.00	2,098,950	28.15	127.17
6.40	0.00	2,010,239	28.12	119.34
6.60	0.00	1,926,933	28.10	112.14
6.80	0.00	1,848,607	28.07	105.50
7.00	0.00	1,774,877	28.05	99.37
7.20	0.00	1,705,393	28.03	93.71
7.40	0.00	1,639,841	28.01	88.46
7.60	0.00	1,577,931	27.99	83.59
7.80	0.00	1,519,401	27.97	79.05
8.00	0.00	1,464,012	27.96	74.85
8.20	0.00	1,411,553	27.94	70.93
8.40	0.00	1,361,816	27.93	67.26
8.60	0.00	1,314,623	27.91	63.86
8.80	0.00	1,269,808	27.90	60.66
9.00	0.00	1,227,209	27.88	57.69

Summary for Pond 2P: Retrofitted Ex Pond

Inflow Area = 174.140 ac, 0.00% Impervious, Inflow Depth = 6.94" for 100-Year event
Inflow = 247.60 cfs @ 0.25 hrs, Volume= 100.780 af
Outflow = 162.56 cfs @ 4.97 hrs, Volume= 72.631 af, Atten= 34%, Lag= 283.3 min
Primary = 162.56 cfs @ 4.97 hrs, Volume= 72.631 af

Routing by Stor-Ind method, Time Span= 0.00-9.00 hrs, dt= 0.01 hrs
Peak Elev= 28.32' @ 4.97 hrs Surf.Area= 3,312,246 sf Storage= 2,671,483 cf

Plug-Flow detention time= 182.8 min calculated for 72.550 af (72% of inflow)
Center-of-Mass det. time= 141.5 min (296.9 - 155.3)

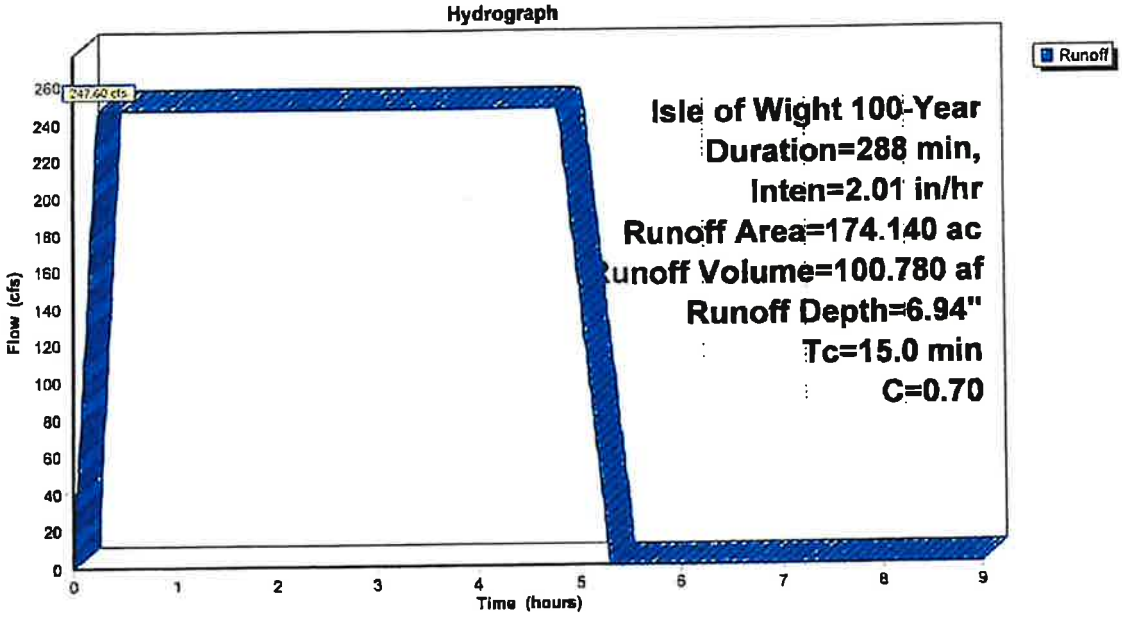
Volume	Invert	Avail.Storage	Storage Description
#1	27.50'	8,414,079 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

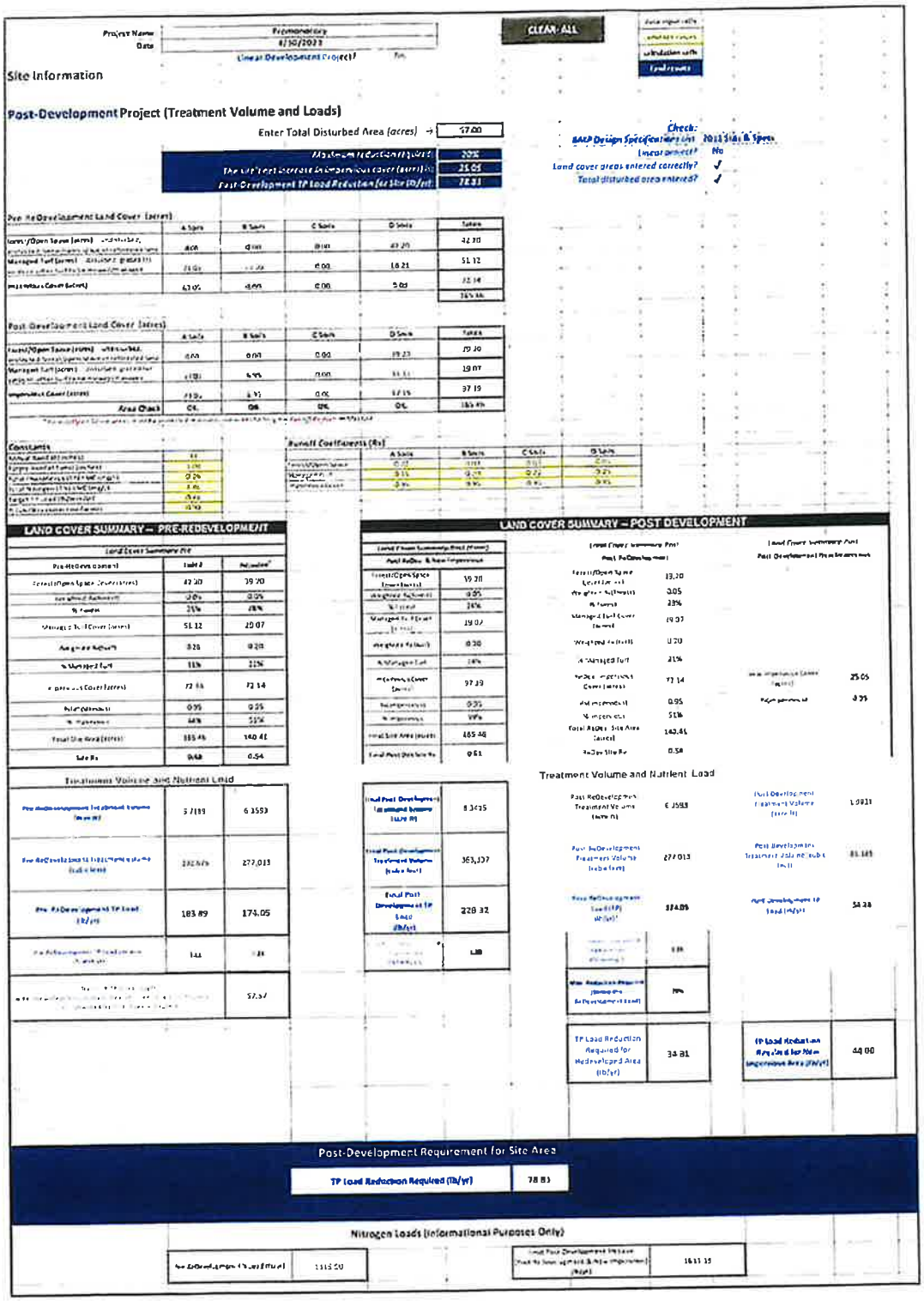
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
27.50	3,145,645	0	0
28.00	3,267,455	1,603,275	1,603,275
30.00	3,543,349	6,810,804	8,414,079

Device	Routing	Invert	Outlet Devices
#1	Primary	18.00'	**48.0" Round Culvert** L= 783.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 18.00' / 14.00' S= 0.0051 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 12.57 sf
#2	Device 1	27.50'	**78.0" x 144.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Primary	29.00'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 1.00 Width (feet) 20.00 26.00

Primary OutFlow Max=162.56 cfs @ 4.97 hrs HW=28.32' (Free Discharge)
↑—1=**Culvert** (Barrel Controls 162.56 cfs @ 12.94 fps)
↑—2=**Orifice/Grate** (Passes 162.56 cfs of 181.23 cfs potential flow)
—3=**Custom Weir/Orifice** (Controls 0.00 cfs)

Subcatchment 1S: Drainage area to Ex Pond




Project Name
Date
Site Information
Post-Development Project (Treatment Volume and Loads)
Enter Total Disturbed Area (acres)
Check:
Land cover areas entered correctly?
Total disturbed area entered?
LAND COVER SUMMARY – PRE-REDEVELOPMENT
LAND COVER SUMMARY – POST DEVELOPMENT
Treatment Volume and Nutrient Load
Post-Development Requirement for Site Area
TP Load Reduction Required (lb/yr)
78.83
Nitrogen Loads (informational Purposes Only)

Drainage Area A

Drainage Area A Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals	Land Cover No.
Forest/Open Space (acres)	0.00	0.00	0.00	00.00	13.22	0.05
Managed Turf (acres)	0.00	0.00	0.00	00.00	25.03	0.10
Impervious Cover (acres)	0.00	0.00	0.00	00.00	97.13	0.95
				Total	165.46	

CLEAR BMP KALAS

Total Phosphorus Available for Removal in D.A. A (lb/yr): 221.61

Post-Development Treatment Volume in D.A. A (ft³): 156,287

Stormwater Best Management Practices (RR = Runoff Reduction)

Values from Simplified Method

Practice	Runoff Reduction Credit (%)	Managed Turf Credit Area (acres)	Impervious Cover Credit Area (acres)	Volume from Upstream Practice (ft³)	Runoff Reduction (ft³)	Remaining Runoff Volume (ft³)	Total BMP Treatment Volume (ft³)	Phosphorus Removal Efficiency (%)	Phosphorus Load from Upstream Practices (lb)	Untreated Phosphorus Load to Practice (lb)	Phosphorus Removed By Practice (lb)	Resulting Phosphorus Load (lb)	Downstream Practice to be Employed
1. Vegetated Swale (RR)													
1.a Vegetated Swale #1 (Spec #6)	20				0	0	0	0		0.00	0.00	0.00	
1.b Vegetated Swale #2 (Spec #6)	20				0	0	0	0		0.00	0.00	0.00	
2. Rooftop Disconnection (RR)													
2.a Simple Disconnection #1 (Spec #1)	50			0	0	0	0	0	0.00	0.00	0.00	0.00	
2.b Simple Disconnection #2 (Spec #1)	25			0	0	0	0	0	0.00	0.00	0.00	0.00	
2.c To Soil Area (25% Rain Barrel Overflow) (Spec #3)	25			0	0	0	0	0	0.00	0.00	0.00	0.00	
2.d To Dry Well or Trench Spec #4	50			0	0	0	0	0	0.00	0.00	0.00	0.00	
2.e To Rain Barrel #1 (Spec #5)	50			0	0	0	0	0	0.00	0.00	0.00	0.00	
2.f To Rain Barrel #2 (Spec #5)	50			0	0	0	0	0	0.00	0.00	0.00	0.00	
2.g To Green Roof #1 (Spec #7)	50			0	0	0	0	0	0.00	0.00	0.00	0.00	
2.h To Green Roof #2 (Spec #7)	50			0	0	0	0	0	0.00	0.00	0.00	0.00	
2.i To Rainwater Harvesting (Spec #5)	0			0	0	0	0	0	0.00	0.00	0.00	0.00	
2.j To Manmade Rooftop (Spec #9)	50			0	0	0	0	0	0.00	0.00	0.00	0.00	
3. Permeable Pavement (RR)													
3.a Permeable Pavement #1 (Spec #8)	45				0	0	0	50		0.00	0.00	0.00	
3.b Permeable Pavement #2 (Spec #7)	45				0	0	0	50		0.00	0.00	0.00	
4. Grass Channel (RR)													
4.a Grass Channel #1 (Spec #10)	20			0	0	0	0	25	0.00	0.00	0.00	0.00	
4.b Grass Channel #2 (Spec #10)	20			0	0	0	0	25	0.00	0.00	0.00	0.00	
4.c Grass Channel with Compost Amended Soils and Underdrain (Spec #10)	20			0	0	0	0	25	0.00	0.00	0.00	0.00	
5. Dry Swale (RR)													
5.a Dry Swale #1 (Spec #10)	20			0	0	0	0	50	0.00	0.00	0.00	0.00	
5.b Dry Swale #2 (Spec #10)	20			0	0	0	0	50	0.00	0.00	0.00	0.00	
6. Bioretention (RR)													
6.a Bioretention #1 on Native Soil (Spec #9)	45			0	0	0	0	25	0.00	0.00	0.00	0.00	
6.b Bioretention #2 on Native Soil (Spec #9)	45			0	0	0	0	50	0.00	0.00	0.00	0.00	
7. Infiltration (RR)													
7.a Infiltration #1 (Spec #3)	50			0	0	0	0	75	0.00	0.00	0.00	0.00	
7.b Infiltration #2 (Spec #3)	50			0	0	0	0	75	0.00	0.00	0.00	0.00	
8. Extended Detention Pond (RR)													
8.a ED #1 (Spec #15)	0			0	0	0	0	25	0.00	0.00	0.00	0.00	
8.b ED #2 (Spec #15)	0			0	0	0	0	25	0.00	0.00	0.00	0.00	
9. Undisturbed Forest/Open Space (RR)													
9.a Undisturbed Forest/Open Space #1 (Spec #2)	75			0	0	0	0	0	0.00	0.00	0.00	0.00	
9.b Undisturbed Forest/Open Space #2 (Spec #2)	75	13.22	41.14	0	138,161	138,161	138,161	0	0.00	221.00	111.80	111.80	
9.c Undisturbed Forest/Open Space, Amended Soils (Spec #2 & #4)	75			0	0	0	0	0	0.00	0.00	0.00	0.00	

TOTAL IMPERVIOUS COVER TREATED (ac)	97.14	AREA CHECK: OK
TOTAL MANAGED TURF AREA TREATED (ac)	25.03	AREA CHECK: OK
TOTAL RUNOFF REDUCTION IN D.A. A (ft³)	138,161	

TOTAL PHOSPHORUS AVAILABLE FOR REMOVAL IN D.A. A (lb/yr): 221.61

TOTAL PHOSPHORUS REMOVED WITH RUNOFF REDUCTION PRACTICES IN D.A. A (lb/yr): 111.80

TOTAL PHOSPHORUS REMAINING AFTER APPLYING RUNOFF REDUCTION PRACTICES IN D.A. A (lb/yr): 111.80

SEE WATER QUALITY COMPLIANCE TAB FOR SITE COMPLIANCE CALCULATIONS

Site Results (Water Quality Compliance)

Area Checks	D.A. A	D.A. B	D.A. C	D.A. D	D.A. E	AREA CHECK
FOREST/OPEN SPACE (ac)	39.20	0.00	0.00	0.00	0.00	OK.
IMPERVIOUS COVER (ac)	97.19	0.00	0.00	0.00	0.00	OK.
IMPERVIOUS COVER TREATED (ac)	97.19	0.00	0.00	0.00	0.00	OK.
MANAGED TURF AREA (ac)	29.07	0.00	0.00	0.00	0.00	OK.
MANAGED TURF AREA TREATED (ac)	29.07	0.00	0.00	0.00	0.00	OK.
AREA CHECK	OK.	OK.	OK.	OK.	OK.	

Site Treatment Volume (ft^3)	363,397

Runoff Reduction Volume and TP By Drainage Area

	D.A. A	D.A. B	D.A. C	D.A. D	D.A. E	TOTAL
RUNOFF REDUCTION VOLUME ACHIEVED (ft^3)	178,141	0	0	0	0	178,141
TP LOAD AVAILABLE FOR REMOVAL (lb/yr)	223.85	0.00	0.00	0.00	0.00	223.85
TP LOAD REDUCTION ACHIEVED (lb/yr)	111.80	0.00	0.00	0.00	0.00	111.80
TP LOAD REMAINING (lb/yr)	112.05	0.00	0.00	0.00	0.00	112.05
NITROGEN LOAD REDUCTION ACHIEVED (lb/yr)	799.79	0.00	0.00	0.00	0.00	799.79

Total Phosphorus

FINAL POST-DEVELOPMENT TP LOAD (lb/yr)	228.32
TP LOAD REDUCTION REQUIRED (lb/yr)	78.81
TP LOAD REDUCTION ACHIEVED (lb/yr)	111.80
TP LOAD REMAINING (lb/yr):	116.52
REMAINING TP LOAD REDUCTION REQUIRED (lb/yr):	0.00 **

** TARGET TP REDUCTION EXCEEDED BY 32.98 LB/YEAR **

Total Nitrogen (For Information Purposes)

POST-DEVELOPMENT LOAD (lb/yr)	1633.38
NITROGEN LOAD REDUCTION ACHIEVED (lb/yr)	799.79
REMAINING POST-DEVELOPMENT NITROGEN LOAD (lb/yr)	833.59

Runoff Volume and Curve Number Calculations

Enter design storm rainfall depths (in):

1-year storm	2-year storm	10-year storm
2.70	3.30	5.00

Use NOAA Atlas 14 (http://hdsc.nws.noaa.gov/hdsc/pfds/)

***Notes (see below):**

[1] The curve numbers and runoff volumes computed on this spreadsheet for each design area must be used in the graphical ability for determining and demonstrating compliance with the applicable requirements specified in the Design Manual for Stormwater Quality Control, Chapter 5.

[2] Runoff curve numbers for urban areas shown are composites suitable for direct use for typical land cover conditions. Where the designer proposes to divide a drainage area into separate sub-areas for the purpose of applying different curve numbers to each sub-area, the composite curve number for the total drainage area may not be used for the purpose of reducing the size of any runoff control facility required by the drainage area.

[3] Adjusted CNs are used to reflect runoff reduction when less than 100% of the impervious area is directly connected to the drainage system. See the Design Manual for additional information on the application of impervious area reduction techniques.

Drainage Area Curve Numbers and Runoff Depths*

Curve numbers (CN, CNadj) and runoff depths (RV Developed) are computed with and without reduction practices.

Drainage Area A		A Soils	B Soils	C Soils	D Soils
Forest/Open Space -- undisturbed, protected forest/open space or reforested land	Area (acres)	0.00	0.00	0.00	39.10
	CN	30	55	70	77
Managed Turf - disturbed, graded for yards or other turf to be mowed/managed	Area (acres)	13.03	6.95	0.00	11.11
	CN	39	61	74	80
Impervious Cover	Area (acres)	33.05	6.95	0.00	17.19
	CN	98	98	98	98
					$CN_{10\text{-}yr\ Adj}$
					66

	1-year storm	2-year storm	10-year storm
$RV_{Developed}$ (watershed-inch) with no Runoff Reduction*	1.41	1.92	3.47
$RV_{Developed}$ (watershed-inch) with Runoff Reduction*	1.13	1.63	3.17
Adjusted CN*	81	82	83

Total Area (acres):	165.46
Runoff Reduction Volume (ft³):	178,141

*See Notes above

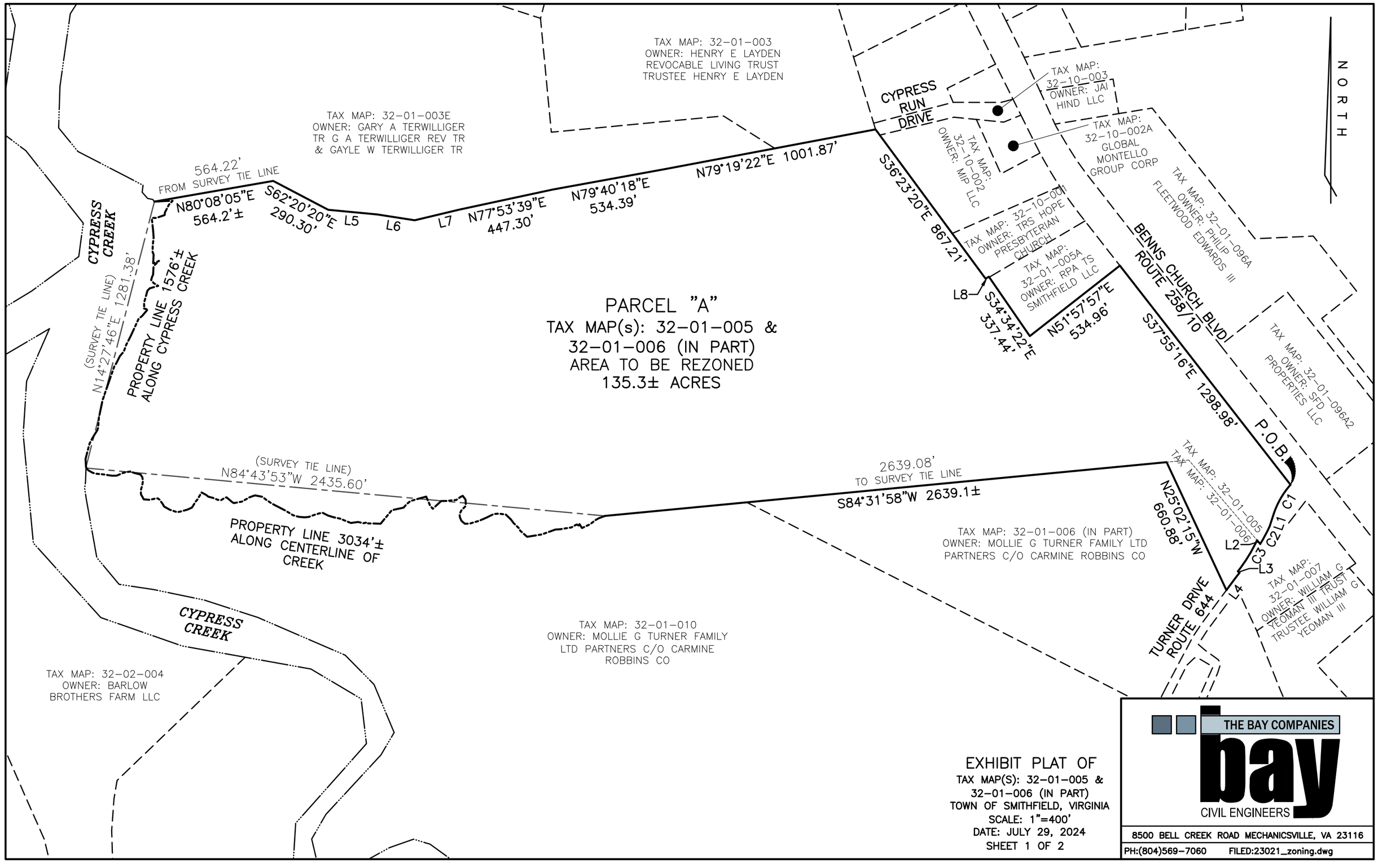


EXHIBIT PLAT OF
TAX MAP(S): 32-01-005 &
32-01-006 (IN PART)
TOWN OF SMITHFIELD, VIRGINIA
SCALE: 1"=400'
DATE: JULY 29, 2024
SHEET 1 OF 2

THE BAY COMPANIES
bay
CIVIL ENGINEERS
8500 BELL CREEK ROAD MECHANICSVILLE, VA 23116
PH:(804)569-7060 FILED:23021_zoning.dwg

July 29, 2024

Town of Smithfield
Department of Planning, Engineering, and Public Works
310 Institute Street, Smithfield, VA 23434

List of Adjacent Property Owners

Tax Map: 32-01-003E
Owner: GARY A TERWILLIGER TR G A TERWILLIGER REV TR & GALE W TERWILLIGER TR
Owner Address: 10 OAK ALLEY, SMITHFIELD VA 23430

Tax Map: 32-01-003
Owner: HENRY E LAYDEN REVOCABLE LIVING TRUST TRUSTEE HENRY E LAYDEN
Owner Address: P O BOX 231, SMITHFIELD, VA 23431

Tax Map: 32-10-003
Owner: GREENWOOD HOMES-HAMPTON ROADS LLC
Owner Address: 1135 ROSE HILL DR, CHARLOTTESVILLE, VA 22903

Tax Map: 32-10-002
Owner: MIP LLC
Owner Address: 4433 CORPORATION LANE STE 250, VIRGINIA BEACH, VA 23462

Tax Map: 32-10-001
Owner: TRS HOPE PRESBYTERIAN CHURCH
Owner Address: 13490 BENNS CHURCH BLVD, SMITHFILD, VA 23430

Tax Map: 32-01-005A
Owner: RPA TS SMITHFIELD LLC
Owner Address: PO BOX 31372, CHARLOTTE, VA 28231

Tax Map: 32-01-096A
Owner: PHILIP FLEETWOOD EDWARDS III
Owner Address: 13453 BENNS CHURCH BLVD, SMITHFIELD, VA 23430

Tax Map: 32-01-096A2
Owner: SFD PROPERTIES LLC
Owner Address: 20 S KING ST, HAMPTON, VA 23669

Tax Map: 32-01-007

Owner: WILLIAM G YEOMAN III TRUST TRUSTEE WILLIAM G YEOMAN III
Owner Address: 1801 S CHURCH ST STE 7, SMITHFIELD, VA 23430

Tax Map: 32-01-006
Owner: MOLLIE G TURNER FAMILY LTD PARTNERS C/O CARMINE ROBBINS CO
Owner Address: 11815 ROCK LANDING DRIVE, NEWPORT NEWS, VA 23606

Tax Map: 32-01-010
Owner: MOLLIE G TURNER FAMILY LTD PARTNERS C/O CARMINE ROBBINS CO
Owner Address: 11815 ROCK LANDING DRIVE, NEWPORT NEWS, VA 23606

Tax Map: 32-02-004
Owner: BARLOW BROTHERS FARM LLC
Owner Address: 14112 GREAT SPRING ROAD, SMITHFIELD, VA 23430

Tax Map: 22-01-004B
Owner: CCGC SMITHFIELD LLC
Owner Address: 330 MAIN ST, SMITHFIELD, VA 23430

Tax Map: 32-01-095
Owner: ANGELA B WILSON & JAMES G WILSON JR
Owner Address: 18738 DAYS POINT ROAD, SMITHFIELD, VA 23430

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

1001 Boulders Parkway
Suite 300
Richmond, VA 23225

P 804.200.6500
F 804.560.1016
www.timmons.com

August 28, 2023

Greenwood Homes
c/o Hunter Taylor
999 Jolly Pond Road
Williamsburg, VA 23188

Re: Wetlands Jurisdictional Determination
Benn's Church
Isle of Wight County, Virginia

Dear Mr. Taylor:

I am pleased to inform you that the wetlands confirmation has been completed for the Benn's Church site. The U.S. Army Corps of Engineers (USACE) has confirmed the size and location of aquatic resources onsite, including both streams and wetlands, through their issuance of the attached Preliminary Jurisdictional Determination (JD) Letter and Form. This determination is valid for five (5) years and will expire on August 28, 2028.

We would like to ensure that you are aware of the approvals and limitations that your JD provides.

- The JD is a regulatory requirement and an important step in project development which identifies key environmental constraints for project planning.
- The JD provides the USACE's concurrence with the limits of the onsite wetland delineation and establishes that the confirmed streams and wetlands are federally protected.
- The JD is valid for a period of five years from the date of the attached JD letter.
- The JD does not authorize any work in the confirmed streams or wetlands. Disturbance, impacts, or discharges of materials, including those associated with land clearing, in these confirmed aquatic resource areas will require a federal and/or state permit.

We appreciate the opportunity to complete the wetland delineation and confirmation in support of the Benn's Church site. We look forward to providing additional assistance throught the duration of this project. If you have any questions please do not hesitate to contact me at (804.200.6465) or lindsey.hall@timmons.com.

Respectfully,
Timmons Group

Lindsey Hall
Environmental Scientist I

Attachments:

USACE Jurisdictional Determination (JD) Letter
USACE Jurisdictional Determination (JD) Form
USACE Administrative Appeals Form
Figure 4: Wetlands and Waters of the U.S. Delineation Map

DEPARTMENT OF THE ARMY
US ARMY CORPS OF ENGINEERS
NORFOLK DISTRICT
FORT NORFOLK
803 FRONT STREET
NORFOLK VA 23510-1011

August 28, 2023

PRELIMINARY JURISDICTIONAL DETERMINATION (PJD)

Eastern Virginia Regulatory Section
NAO-2022-01732 (Cypress Creek)

Greenwood Homes
c/o Hunter Taylor
3481 Frances Berkeley
Williamsburg, VA 23188

Dear Mr. Taylor:

This letter is in regard to your request for a preliminary jurisdictional determination of the aquatic resources for 166.5 acres located off Benn's Church Boulevard within the Town of Smithfield in Isle of Wight County, Virginia.

Sheets 1-3 entitled, "Figure 4: Wetlands and Waters Delineation Map-Benn's Church, Isle of Wight County, Virginia" by Timmons Group dated 6-28-2022 (copy enclosed) provides the location of the aquatic resources on the property referenced above. The 166.5-acre site contains approximately 72.35 acres of wetlands, and 1.99 acres of stream.

These aquatic resources exhibit wetland criteria as defined in the 1987 Corps of Engineers Wetland Delineation Manual and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region. This preliminary jurisdictional determination and associated aquatic resource delineation map may be submitted with a permit application. This letter is not confirming the Cowardin classifications of these aquatic resources.

Please be aware that you may be required to obtain a Corps permit for any discharge of dredged and/or fill material, either temporary or permanent, into a water of the U.S. In addition, you may be required to obtain a Corps permit for certain activities occurring within, under, or over a navigable water of the U.S. subject to the Section 10 of the Rivers and Harbors Act. Furthermore, you may be required to obtain state and local authorizations, including a Virginia Water Protection Permit from the Virginia Department of Environmental Quality (DEQ), a permit from the Virginia Marine Resources Commission (VMRC), and/or a permit from your local wetlands board.

This is a preliminary jurisdictional determination and is not a legally binding determination regarding whether Corps jurisdiction applies to the aquatic resources in question. To determine Corps' jurisdiction, you may request and obtain an approved jurisdictional determination.

This delineation of aquatic resources can be relied upon for no more than five years from the date of this letter. New information may warrant revision. Enclosed is a copy of the "Preliminary Jurisdictional Determination Form". Please review the document, sign, and return one copy to the Corps, either by email (Melissa.a.nash@usace.army.mil) or by standard mail to 803 Front Street Norfolk, VA 23510

If you have any questions, please contact me either by telephone at (757) 201-7489 or by email at melissa.a.nash@usace.army.mil .

Sincerely,

Melissa A Nash

Melissa Nash
Eastern Virginia
Regulatory Section

Enclosure(s):

cc:

Lindsey Hall, Timmons Group

BACKGROUND INFORMATION

A. **REPORT COMPLETION DATE FOR PJD:** 8-28-2023

B. **NAME AND ADDRESS OF PERSON REQUESTING PJD:**
Taylor Hunter
Greenwood Homes
3481 Frances Berkeley
Williamsburg, VA 23188

C. **DISTRICT OFFICE, FILE NAME, AND NUMBER:**
NAO, Hunter, Taylor-Greenwood Homes / JD / Benn's Church / Isle of Wight County, NAO-2022-01732

D. PROJECT LOCATION(S) AND BACKGROUND INFORMATION:
(USE THE TABLE BELOW TO DOCUMENT MULTIPLE AQUATIC RESOURCES AND/OR AQUATIC RESOURCES AT DIFFERENT SITES)

State: VA County/parish/borough: Isle of Wight County City: Smithfield
Center coordinates of site (lat/long in degree decimal format):
Lat.: 36.95356° Long.: -76.608°
Universal Transverse Mercator: 18
Name of nearest waterbody: Cypress Creek

E. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):
☐ Office (Desk) Determination. Date:
☐ Field Determination. Date(s): 11-8-2022

TABLE OF AQUATIC RESOURCES IN REVIEW AREA WHICH "MAY BE" SUBJECT TO REGULATORY JURISDICTION.

Site Number	Latitude (decimal degrees)	Longitude (decimal degrees)	Estimated amount of aquatic resource in review area (acreage and linear feet, if applicable)	Type of aquatic resource (i.e., wetland vs. non-wetland waters)	Geographic authority to which the aquatic resource "may be" subject (i.e., Section 404 or Section 10/404)
EEM	36.951554	-76.613422	18.88 acres	Wetland	Section 10/404
EOW	36.951388	-76.615471	2.66 acres	Non-wetland waters	Section 10/404
PFO	36.95174	-76.612499	3.23 acres	Wetland	Section 10/404
POW	36.951453	-76.606908	46.19 acres	Non-wetland waters	Section 10/404
PSS	36.952846	-76.607335	1.39 acres	Wetland	Section 10/404
stream 1	36.951428	-76.614052	2408 feet	Non-wetland waters	Section 10/404
stream 2	36.949395	-76.611535	97 feet	Non-wetland waters	Section 10/404
stream 3	36.950289	-76.611886	583 feet	Non-wetland waters	Section 10/404

1) The Corps of Engineers believes that there may be jurisdictional aquatic resources in the review area, and the requestor of this PJD is hereby advised of his or her option to request and obtain an approved JD (AJD) for that review area based on an informed decision after having discussed the various types of JDs and their characteristics and circumstances when they may be appropriate.

[1] Districts may establish timeframes for requester to return signed PJD forms. If the requester does not respond within the established time frame, the district may presume concurrence and no additional follow up is necessary prior to finalizing an action.

2) In any circumstance where a permit applicant obtains an individual permit, or a Nationwide General Permit (NWP) or other general permit verification requiring "pre-construction notification" (PCN), or requests verification for a non-reporting NWP or other general permit, and the permit applicant has not requested an AJD for the activity, the permit applicant is hereby made aware that: (1) the permit applicant has elected to seek a permit authorization based on a PJD, which does not make an official determination of jurisdictional aquatic resources; (2) the applicant has the option to request an AJD before accepting the terms and conditions of the permit authorization, and that basing a permit authorization on an AJD could possibly result in less compensatory mitigation being required or different special conditions; (3) the applicant has the right to request an individual permit rather than accepting the terms and conditions of the NWP or other general permit authorization; (4) the applicant can accept a permit authorization and thereby agree to comply with all the terms and conditions of that permit, including whatever mitigation requirements the Corps has determined to be necessary; (5) undertaking any activity in reliance upon the subject permit authorization without requesting an AJD constitutes the applicant's acceptance of the use of the PJD; (6) accepting a permit authorization (e.g., signing a proffered individual permit) or undertaking any activity in reliance on any form of Corps permit authorization based on a PJD constitutes agreement that all aquatic resources in the review area affected in any way by that activity will be treated as jurisdictional, and waives any challenge to such jurisdiction in any administrative or judicial compliance or enforcement action, or in any administrative appeal or in any Federal court; and (7) whether the applicant elects to use either an AJD or a PJD, the.JD will be processed as soon as practicable. Further, an AJD, a proffered individual permit (and all terms and conditions contained therein), or individual permit denial can be administratively appealed pursuant to 33 C.F.R. Part 331. If, during an administrative appeal, it becomes appropriate to make an official determination whether geographic jurisdiction exists over aquatic resources in the review area, or to provide an official delineation of jurisdictional aquatic resources in the review area, the Corps will provide an AJD to accomplish that result, as soon as is practicable. This PJD finds that there “may be” waters of the U.S. and/or that there “may be” navigable waters of the U.S. on the subject review area, and identifies all aquatic features in the review area that could be affected by the proposed activity, based on the following information:

SUPPORTING DATA. Data reviewed for PJD (check all that apply)

Checked items should be included in subject file. Appropriately reference sources below where indicated for all checked items:

_X__ Maps, plans, plots or plat submitted by or on behalf of the PJD requestor:
Map: _Sheets 1-3 entitled, "Figure 4: Wetlands and Waters Delineation Map-Benn's Church, Isle of Wight County, Virginia" by Timmons Group dated 6-28-2022_ .
_X__ Data sheets prepared/submitted by or on behalf of the PJD requestor.
_X__ Office concurs with data sheets/delineation report.
___ Office does not concur with data sheets/delineation report. Rationale:
_____.
___ Data sheets prepared by the Corps: _____.
___ Corps navigable waters' study: _____.
___ U.S. Geological Survey Hydrologic Atlas: _____.
___ USGS NHD data.
___ USGS 8 and 12 digit HUC maps.
_X__ U.S. Geological Survey map(s). Cite scale & quad name: __Benns Church Quad_____.

[1] Districts may establish timeframes for requester to return signed PJD forms. If the requester does not respond within the established time frame, the district may presume concurrence and no additional follow up is necessary prior to finalizing an action.

_X__ Natural Resources Conservation Service Soil Survey. Citation: _NRCS Online Isle of Wight___.
_X__ National wetlands inventory map(s). Cite name: __NWI Online Isle of Wight____.
___ State/local wetland inventory map(s): _____.
___ FEMA/FIRM maps: _____
___ 100-year Floodplain Elevation is: _____. (National Geodetic Vertical Datum of 1929)
_X__ Photographs: _X__ Aerial (Name & Date): __Google Earth_____.
___ or _X__ Other (Name & Date): __Site photos June 2022___.
___ Previous determination(s). File no. and date of response letter: _____.
___ Other information (please specify): _____.

IMPORTANT NOTE: The information recorded on this form has not necessarily been verified by the Corps and should not be relied upon for later jurisdictional determinations.

Melissa A Nash 8-28-2023
_____
Signature and date of Regulatory staff member completing PJD

_____
Signature and date of person requesting PJD (REQUIRED, unless obtaining the signature is impracticable)[1]

[1] Districts may establish timeframes for requester to return signed PJD forms. If the requester does not respond within the established time frame, the district may presume concurrence and no additional follow up is necessary prior to finalizing an action.

NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL

Applicant: Greenwood Homes	File Number: NAO-2022-01732	Date: 8-28-2023
Attached is:		See Section below
	INITIAL PROFFERED PERMIT (Standard Permit or Letter of permission)	A
	PROFFERED PERMIT (Standard Permit or Letter of permission)	B
	PERMIT DENIAL	C
	APPROVED JURISDICTIONAL DETERMINATION	D
X	PRELIMINARY JURISDICTIONAL DETERMINATION	E

SECTION I - The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at http://www.usace.army.mil/Missions/CivilWorks/RegulatoryProgramandPermits/appeals.aspx or Corps regulations at 33 CFR Part 331.

A: INITIAL PROFFERED PERMIT: You may accept or object to the permit.

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- OBJECT: If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Your objections must be received by the district engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

B: PROFFERED PERMIT: You may accept or appeal the permit

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- APPEAL: If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

C: PERMIT DENIAL: You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

D: APPROVED JURISDICTIONAL DETERMINATION: You may accept or appeal the approved JD or provide new information.

- ACCEPT: You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice, means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.
- APPEAL: If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

E: PRELIMINARY JURISDICTIONAL DETERMINATION: You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also you may provide new information for further consideration by the Corps to reevaluate the JD.

SECTION II - REQUEST FOR APPEAL or OBJECTIONS TO AN INITIAL PROFFERED PERMIT

REASONS FOR APPEAL OR OBJECTIONS: (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record.)

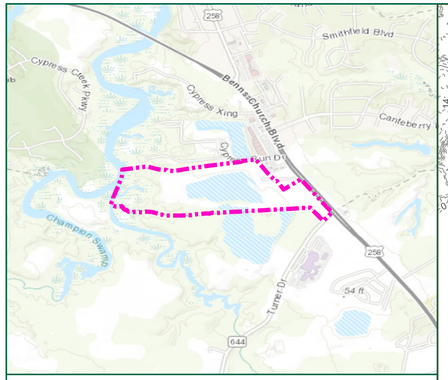
ADDITIONAL INFORMATION: The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.

POINT OF CONTACT FOR QUESTIONS OR INFORMATION:

If you have questions regarding this decision and/or the appeal process you may contact:	If you only have questions regarding the appeal process you may also contact: Mr. Andrew Dangler Regulatory Appeals Review Officer U.S. Army Corps of Engineers North Atlantic Division – Fort Hamilton 301 John Warren Avenue – First Floor Brooklyn, New York 11252-6700 Mobile: (518) 487-0215

RIGHT OF ENTRY: Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15 day notice of any site investigation, and will have the opportunity to participate in all site investigations.

_____ Signature of appellant or agent.	Date:	Telephone number:



TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

Confirmation #:
NAO-2022-01732

Confirmation Date:
August 28, 2023

Resource Identification	Confirmation											Resource Description Notes*
	PFO (sq ft)	PSS (sq ft)	PEM (sq ft)	POW (sq ft)	EOW (sq ft)	R1 (lf)	R3 (lf)	R4 (lf)	R6 (lf)	Ditch (lf)	Stream (sq ft)	
A	130,420		761,824		115,871							NT/V & NT/NV
B	10,401			62,989								NT/V & NT/NV
C		60,486	60,444	1,949,186								NT/V & NT/NV
D							97				406	NT/NV
E								362			728	NT/NV
F								59			120	NT/NV
G								19			82	NT/NV
H								143			577	NT/NV
I						1,006					49,514	NT/NV
J						1,402					35,429	NT/NV
Total	**140,821**	**60,486**	**822,268**	**2,012,175**	**115,871**	**2,408**	**97**	**583**	**0**	**0**	**86,856**	
Total Wetland Area =	**3,151,621 sq ft**					**72.35 ac**						
Total Stream Area =	**86,856 sq ft**					**1.99 ac**						
Total Stream Length =	**3,088 lf**											

* Tr-Tidal; NT=Non-tidal; V=Vegetated; NV=Non-Vegetated; PFO=Palustrine Forested Wetland; PSS=Palustrine Scrub-Shrub Wetland; PEM=Palustrine Emergent Wetland; POW= Palustrine Open Water; EOW= Estuarine Open Water; EIW= Estuarine Intertidal Wetlands; R3= Upper Perennial Streams; R4=Intermittent Streams; R6 = Ephemeral Streams

Legend

- Project Study Limits- 166.5 Acres
- Stream Identifier
- Wetland Identifier
- Flag
- Field Data Station
- Perennial Stream (R1)
- Perennial Stream (R3)
- Intermittent Stream (R4)
- Culvert
- Estuarine Open Water (OW)
- Estuarine Emergent (EEM) Wetland
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- Palustrine Scrub-Shrub (PSS) Wetland
- Palustrine Open Water (POW)

Topographic Contours

- Major- 10 Foot
- Minor- 1 Foot

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PROJECT NAME & LOCATION

BENN'S CHURCH
ISLE OF WIGHT COUNTY, VIRGINIA

DATE: 06/28/2022
PROJECT NUMBER: 49527
PROJECT NAME: BENN'S CHURCH
DESIGNED BY / DRAWN BY: M.COOLEY

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REVISIONS

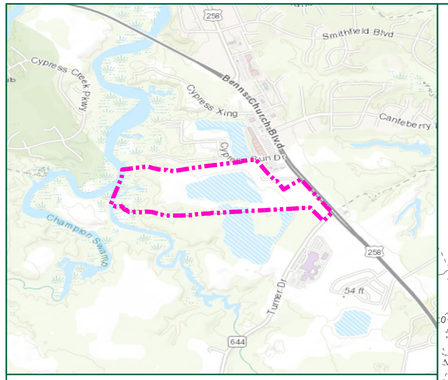
#	MM/DD/YY	DESCRIPTION

DRAWING DESCRIPTION
FIGURE 4:
WETLANDS AND WATERS DELINEATION MAP

SCALE (FEET)
0 250 500
PLANS PRINTED AS 11X17 ARE HALF SCALE

SCALE	SHEET NUMBER
H:1 " = 250 '	1 of 3

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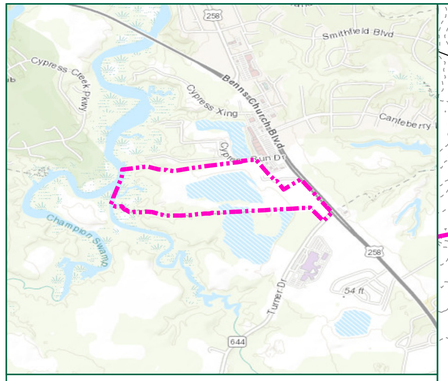
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SCALE (FEET)
0 100 200

PLANS PRINTED AS 11X17 ARE HALF SCALE

SCALE: H:1 " = 100 '
SHEET NUMBER: 2 of 3

Y:\804\49527-Benns_Church\GIS\WTDM\49527-JD-WTDM.mxd



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Topographic Contours

- Major- 10 Foot
- Minor- 1 Foot

Cook Rd
Cypress Run Dr
FDS-42U1-1
42C-12
42A1-20
42B-6
42A1-42
42H1-2
FDS-42G1-2
FDS-42G1-1
42A1-4

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Confirmation #:
NAO-2022-01732
Confirmation Date:
August 28, 2023

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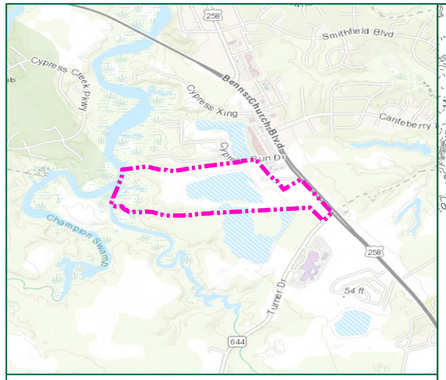
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SCALE	SHEET NUMBER
H:1 " = 100 '	3 of 3

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Legend

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- Intermittent Stream (R4)
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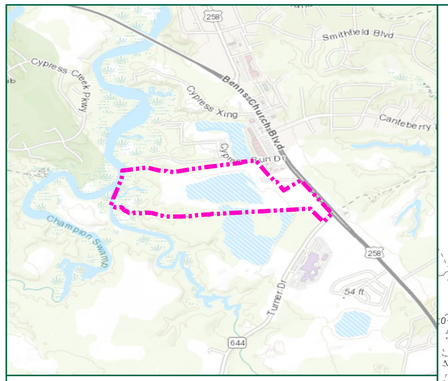
DRAWING DESCRIPTION

FIGURE 5:
RESOURCE PROTECTION AREA MAP

SCALE (FEET)
0 250 500
PLANS PRINTED AS 11X17 ARE HALF SCALE

SCALE	SHEET NUMBER
H:1 " = 250 '	1 of 3

Y:\804\49527-Benns_Church\GIS\WTDM\49527-JD-RPA.mxd



Legend

- Project Study Limits- 166.5 Acres
- Resource Protection Area
- Perennial Stream (R1)
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Topographic Contours

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Oak Ave

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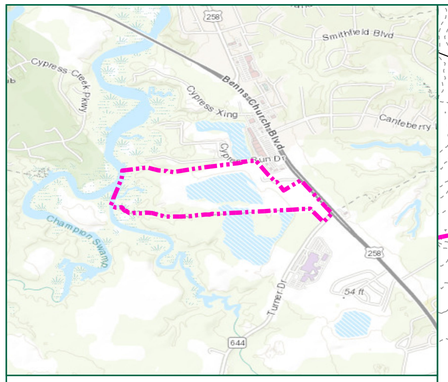
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SCALE H:1 " = 100 '

SHEET NUMBER 2 of 3

Y:\80\49527-Benns_Church\GIS\WTDM\49527-JD-RPA.mxd



Legend

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Oak Rdg

Cypress Run Dr

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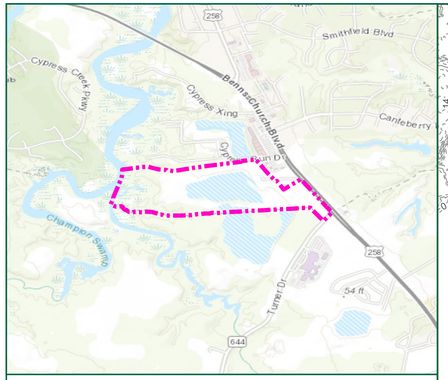
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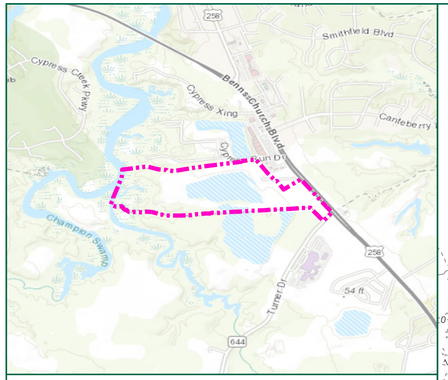
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I						1,006					49,514	NT/NV
J						1,402					35,429	NT/NV
Total	**140,821**	**60,486**	**822,268**	**2,012,175**	**115,871**	**2,408**	**97**	**583**	**0**	**0**	**86,856**	
Total Wetland Area =	**3,151,621 sq ft**					**72.35 ac**						
Total Stream Area =	**86,856 sq ft**					**1.99 ac**						
Total Stream Length =	**3,088 lf**											

* T= Tidal; NT=Non-tidal; V=Vegetated; NV=Non-Vegetated; PFO=Palustrine Forested Wetland; PSS=Palustrine Scrub-Shrub Wetland; PEM=Palustrine Emergent Wetland; POW= Palustrine Open Water; EOW= Estuarine Open Water; EIW= Estuarine Intertidal Wetlands; R3= Upper Perennial Streams; R4=Intermittent Streams; R6 = Ephemeral Streams

Legend

- Project Study Limits- 166.5 Acres
- Stream Identifier
- Wetland Identifier
- Flag
- Field Data Station
- Perennial Stream (R1)
- Perennial Stream (R3)
- Intermittent Stream (R4)
- Culvert
- Estuarine Open Water (OW)
- Estuarine Emergent (EEM) Wetland
- Palustrine Forested (PFO) Wetland
- Palustrine Scrub-Shrub (PSS) Wetland
- Palustrine Open Water (POW)

Topographic Contours

- Major- 10 Foot
- Minor- 1 Foot

Oak Ave

FDS-44A1-2
44A1-5
FDS-44A1-1
44A1-15
FDS-44U1-1
44A1-24
44A1-48
FDS-44D1-1
44D1-14.5
42D1-9
42A1-37
FDS-45F1-1
FDS-45F1-2
45F1-36
45F1-19
FDS-45U1-2
45F1-54
45F1-6
45E1-5
45E1-21
45A1-12
FDS-45U1-1
Culvert

A B C D E F G H I J

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PROJECT NAME & LOCATION

BENN'S CHURCH
ISLE OF WIGHT COUNTY, VIRGINIA

DATE 06/28/2022

PROJECT NUMBER 49527

PROJECT NAME BENN'S CHURCH

DESIGNED BY / DRAWN BY M.COOLEY

1. Wetlands and waters within the project study limits have been located using submeter, Bluetooth GPS antennas by Timmons Group.
2. Wetlands and waters have not been confirmed by the U.S. Army Corps of Engineers until stamped.
3. Project limits are approximate.
4. Topography based on USGS LiDAR.
5. Cowardin Stream Classifications are based on NC DWQ Stream Identification form version 4.11.

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REVISIONS

#	MM/DD/YY	DESCRIPTION

DRAWING DESCRIPTION

FIGURE 4:
WETLANDS AND WATERS DELINEATION MAP

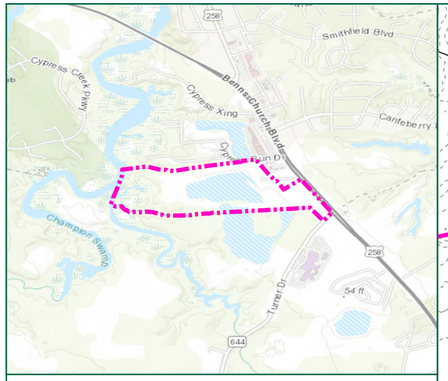
SCALE (FEET)
0 100 200

PLANS PRINTED AS 11X17 ARE HALF SCALE

SCALE H:1 " = 100 '

SHEET NUMBER 2 of 3

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Resource Identification	Confirmation											Resource Description Notes*
	PFO (sq ft)	PSS (sq ft)	PEM (sq ft)	POW (sq ft)	EOW (sq ft)	R1 (lf)	R3 (lf)	R4 (lf)	R6 (lf)	Ditch (lf)	Stream (sq ft)	
A	130,420		761,824		115,871							NT/V & NT/NV
B	10,401			62,989								NT/V & NT/NV
C		60,486	60,444	1,949,186								NT/V & NT/NV
D							97				406	NT/NV
E								362			728	NT/NV
F								59			120	NT/NV
G								19			82	NT/NV
H								143			577	NT/NV
I						1,006					49,514	NT/NV
J						1,402					35,429	NT/NV
Total	**140,821**	**60,486**	**822,268**	**2,012,175**	**115,871**	**2,408**	**97**	**583**	**0**	**0**	**86,856**	
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- Palustrine Open Water (POW)

Topographic Contours

- Major- 10 Foot
- Minor- 1 Foot

Oak Rd
Cypress Run Dr
FDS-42U1-1
42C-12
42A1-20
42B-6
42A1-42
42H1-2
FDS-42G1-2
FDS-42G1-1
42A1-4

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REVISIONS

#	MM/DD/YY	DESCRIPTION

DRAWING DESCRIPTION
FIGURE 4:
WETLANDS AND WATERS DELINEATION MAP

SCALE (FEET)
0 100 200
PLANS PRINTED AS 11X17 ARE HALF SCALE

SCALE	SHEET NUMBER
H:1 " = 100 '	3 of 3

Y:\804\49527-Benns_Church\GIS\WTDM\49527-JD-WTDM.mxd

Benns Church Master TIA

Isle of Wight County, Virginia

October 2023

Traffic Impact Analysis
for
Benns Church Master TIA
Isle of Wight County, Virginia

Prepared for:
Harrison and Lear, Inc.

Prepared by:

Kimley-Horn and Associates, Inc.
4525 Main Street, Suite 1000
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Kimley-Horn Project Number: 116596002
October 2023

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Appendix B: Approved Assumptions Document

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1.0 EXECUTIVE SUMMARY

1.1 PROJECT BACKGROUND

The purpose of the Benns Church TIA is to serve as a planning level document to analyze existing and future traffic conditions within the study area, identify necessary roadway improvements in order to serve future traffic demands, and determine potential long-term solutions along Benns Church Boulevard to support planning efforts for Isle of Wight County, the Town of Smithfield, and the Virginia Department of Transportation.

A study work group (SWG) was formed to obtain concurrence on study assumptions and identify potential roadway improvements within the study area. The SWG included members from the following organizations:

- Virginia Department of Transportation (VDOT)
- Isle of Wight County
- Town of Smithfield
- Harrison and Lear, Inc.
- Greenwood Homes
- Kimley-Horn and Associates

The SWG regularly held meetings throughout the duration of the project to determine the study area, develop study assumptions, discuss operational analysis results, and identify potential roadway improvements within the study area. The study area was determined to include four (4) existing intersections along Benns Church Boulevard and eight (8) proposed study intersections. The intersections included in this study are included below:

1. Benns Church Boulevard (U.S. Route 258/State Route 10) at Cypress Run Drive (Signalized)
2. Benns Church Boulevard at Tractor Supply Entrance (Unsignalized – Right-In/Right-Out)
3. Benns Church Boulevard at Turner Drive (State Route 644) (Signalized)
4. Benns Church Boulevard at Red Oak Drive (Unsignalized – Full Movement)
5. Benns Church Boulevard at Site Driveway #1
6. Benns Church Boulevard at Site Driveway #2
7. Benns Church Boulevard at Site Driveway #3
8. Tractor Supply Entrance at Site Driveway #4
9. Turner Drive at Site Driveway #5
10. Tractor Supply Entrance at Site Driveway #6
11. Site Driveway #3 at Site Driveway #5
12. Benns Church Boulevard at Site Driveway #7

This TIA includes an analysis for the following scenarios as described below:

- Scenario 1 – Existing (2022) traffic conditions
- Scenario 2 – Interim Year (2025) No-Build – Interim year traffic conditions (i.e., future traffic volumes *with* a 1.0% growth rate applied *without* projected site traffic) with existing roadway conditions.

- Scenario 3 – Interim Year (2025) Build – Interim year traffic conditions (i.e., future traffic volumes *with* a 1.0% growth rate applied *with* projected site traffic) with proposed roadway improvements. The projected site traffic includes the following proposed developments:
    - Turner North – Parcels 2 and 5
    - Turner South – Parcels 6 and 13
- Scenario 4 – Future Year (2029) Build – Future year traffic conditions (i.e., future traffic volumes *with* a 1.0% growth rate applied *with* projected site traffic) with proposed roadway improvements. The projected site traffic includes the following proposed developments:
    - Turner North – Full Build-Out
    - Turner South – Full Build-Out
    - 50% of Smithfield Development
    - Smithfield Intermediate School
    - Sweetgrass – Full Build-Out
- Scenario 5 – Horizon Year (2045) Build – Horizon year traffic conditions (i.e., future traffic volumes *with* a 1.0% growth rate applied *with* projected site traffic) with proposed roadway improvements. The projected site traffic includes the following proposed developments:
    - Turner North – Full Build-Out
    - Turner South – Full Build-Out
    - Smithfield Development – Full Build-Out
    - Smithfield Intermediate School
    - Sweetgrass – Full Build-Out

1.2 PROPOSED RECOMMENDATIONS

Based on the operational analysis and discussions with the SWG, several improvements were recommended at the study area intersections. These recommendations are summarized below:

Interim Year (2025) Recommendations

- Turn lane improvements as described below:
    - Exclusive southbound right-turn lane with a storage length of 100 feet and a 200-foot taper at the intersection of Benns Church Boulevard and Site Driveway #1 *(Int. #5)*
    - Exclusive southbound right-turn lane with a storage length of 100 feet and a 100-foot taper at the intersection of Benns Church Boulevard and Site Driveway #2 *(Int. #6)*
    - Extend the existing exclusive northbound left-turn lane with a storage length of 100 feet and a 200-foot taper at the intersection of Benns Church Boulevard and Site Driveway #3 *(Int. #7).* It should be noted that an increase in storage length for this movements is warranted and recommended in 2029. It is recommended that the full turn lane with a storage length of 200 feet and a 200-foot taper be constructed in 2025 when the connection to Benns Church Boulevard is made.
- Single-Lane Roundabout at the intersection of Turner Drive and Site Driveway #5 *(Int. #9)*
    - The westbound approach will include a channelized slip right-turn lane.

- Modify eastbound approach geometry at the intersection of Benns Church Boulevard and Turner Drive *(Int. #3)* to include the following laneage:
    - Exclusive left-turn lane
    - Shared through-left turn lane
    - Exclusive right-turn lane with a storage length of 250 feet and a 115-foot taper
    - Two receiving lanes

Future Year (2029) Recommendations

In addition to the recommendations included in the 2025 analysis scenarios, the following recommendations are included in the 2029 analysis scenarios:

- Turn lane improvements as described below:
    - Exclusive southbound right-turn lane with a storage length of 100 feet and a 200-foot taper at the intersection of Benns Church Boulevard and Tractor Supply Entrance *(Int. #2)*
    - Exclusive northbound left-turn lane with a storage length of 200 feet and a 200-foot taper at the intersection of Benns Church Boulevard and Site Driveway #3 *(Int. #7)*
    - Exclusive northbound right-turn lane with a storage length of 200 feet and a 200-foot taper at the intersection of Benns Church Boulevard and Site Driveway #3 *(Int. #7)*
    - Exclusive southbound left-turn lane with a storage length of 200 feet and a 200-foot taper at the intersection of Benns Church Boulevard and Site Driveway #3 *(Int. #7)*
    - Exclusive southbound right-turn lane with a storage length of 200 feet and a 200-foot taper at the intersection of Benns Church Boulevard and Site Driveway #3 *(Int. #7)*
- Install a traffic signal at the intersection of Benns Church Boulevard and Site Driveway #3/Sweetgrass Driveway *(Int. #7).* This traffic signal will be completed as part of the Sweetgrass development.
- Provide an additional exclusive northbound left-turn lane at the intersection of Benns Church Boulevard and Turner Drive *(Int. #3)* to provide a dual-left turn movement

Horizon Year (2045) Recommendations

In addition to the recommendations included in the 2029 analysis scenarios and the proposed turn lane improvements, the following recommendations are included in the 2045 analysis scenarios:

- Widen Benns Church Boulevard to a six-lane roadway (three lanes in each direction) for the extent of the study area limits from Cypress Run Drive to Red Oaks Drive. An independent roadway capacity evaluation will need to be completed along Benns Church to determine the exact termini of the widening of Benns Church Boulevard.
- Modify the westbound approach geometry at the intersection of Benns Church Boulevard and Cypress Run Drive *(Int. #1)* to include the following laneage:
    - Exclusive left-turn lane
    - Shared through-left turn lane
    - Exclusive right-turn lane with a storage length of 100 feet and a 100-foot taper
- Modify the westbound approach geometry at the intersection of Benns Church Boulevard and Turner Drive *(Int. #3)* to include the following laneage:

- Exclusive left-turn lane
- Shared through-left turn lane
- Exclusive right-turn lane with a storage length of 100 feet and a 100-foot taper

The proposed roadway improvements are also summarized in Figures **ES-1** through **ES-3**.

1.3 OVERALL SITE TRAFFIC CONTRIBUTION

In order to support the implementation of the proposed improvements recommended as part of this TIA, site traffic assignments were reviewed to determine the breakdown of traffic under the 2025 and 2029 Build scenarios as it pertains to each development. **Table 1** and **Table 2** summarize the percent of traffic by development (i.e., Turner North & South, Cypress Run South, and background traffic) at the locations where roadway improvements are recommended. This data is provided for informational purposes only and may be utilized by the SWG to aid in the determination of cost-sharing when implementing the proposed improvements.

Table 1: 2025 Peak Hour Site Traffic Breakdown

2025 Build Scenario									
No.	Intersection	AM Peak Hour Traffic by Source				PM Peak Hour			
		Turner North & South	Cypress Run South	Other	Total	Turner North & South	Cypress Run South	Other	Total
1	Benns Church Blvd at Cypress Run Dr	No Recommendations							
2	Benns Church Blvd at Tractor Supply	No Recommendations							
3	Benns Church Blvd at Turner Dr	9%	0%	91%	*100%*	7%	0%	93%	*100%*
4	Benns Church Blvd at Red Oak Dr	No Recommendations							
5	Benns Church Blvd at Site Driveway	8%	0%	92%	*100%*	6%	0%	94%	*100%*
6	Benns Church Blvd at Site Driveway	7%	0%	93%	*100%*	4%	0%	96%	*100%*
7	Benns Church Blvd at Site Driveway/Sweetgrass	5%	0%	95%	*100%*	4%	0%	96%	*100%*
8	Tractor Supply Entrance at Site Driveway	No Recommendations							
9	Turner Drive at Site Driveway	31%	0%	69%	*100%*	36%	0%	64%	*100%*
10	Tractor Supply Entrance at Site Driveway	No Recommendations							
11	Turner Drive at Site Driveway	No Recommendations							
12	Benns Church Blvd at Site Driveway	No Recommendations							

Table 2: 2025 Peak Hour Site Traffic Breakdown

2029 Build Scenario									
No.	Intersection	AM Peak Hour Traffic by Source				PM Peak Hour			
		Turner North & South	Cypress Run South	Other	Total	Turner North & South	Cypress Run South	Other	Total
1	Benns Church Blvd at Cypress Run Dr	No Recommendations							
2	Benns Church Blvd at Tractor Supply	10%	3%	87%	*100%*	7%	4%	89%	*100%*
3	Benns Church Blvd at Turner Dr	10%	2%	88%	*100%*	7%	3%	90%	*100%*
4	Benns Church Blvd at Red Oak Dr	No Recommendations							
5	Benns Church Blvd at Site Driveway	10%	3%	87%	*100%*	7%	3%	90%	*100%*
6	Benns Church Blvd at Site Driveway	7%	2%	91%	*100%*	5%	2%	93%	*100%*
7	Benns Church Blvd at Site Driveway/Sweetgrass	10%	2%	88%	*100%*	7%	2%	91%	*100%*
8	Tractor Supply Entrance at Site Driveway	No Recommendations							
9	Turner Drive at Site Driveway	25%	2%	73%	*100%*	26%	3%	71%	*100%*
10	Tractor Supply Entrance at Site Driveway	No Recommendations							
11	Turner Drive at Site Driveway	No Recommendations							
12	Benns Church Blvd at Site Driveway	12%	3%	85%	*100%*	7%	3%	90%	*100%*

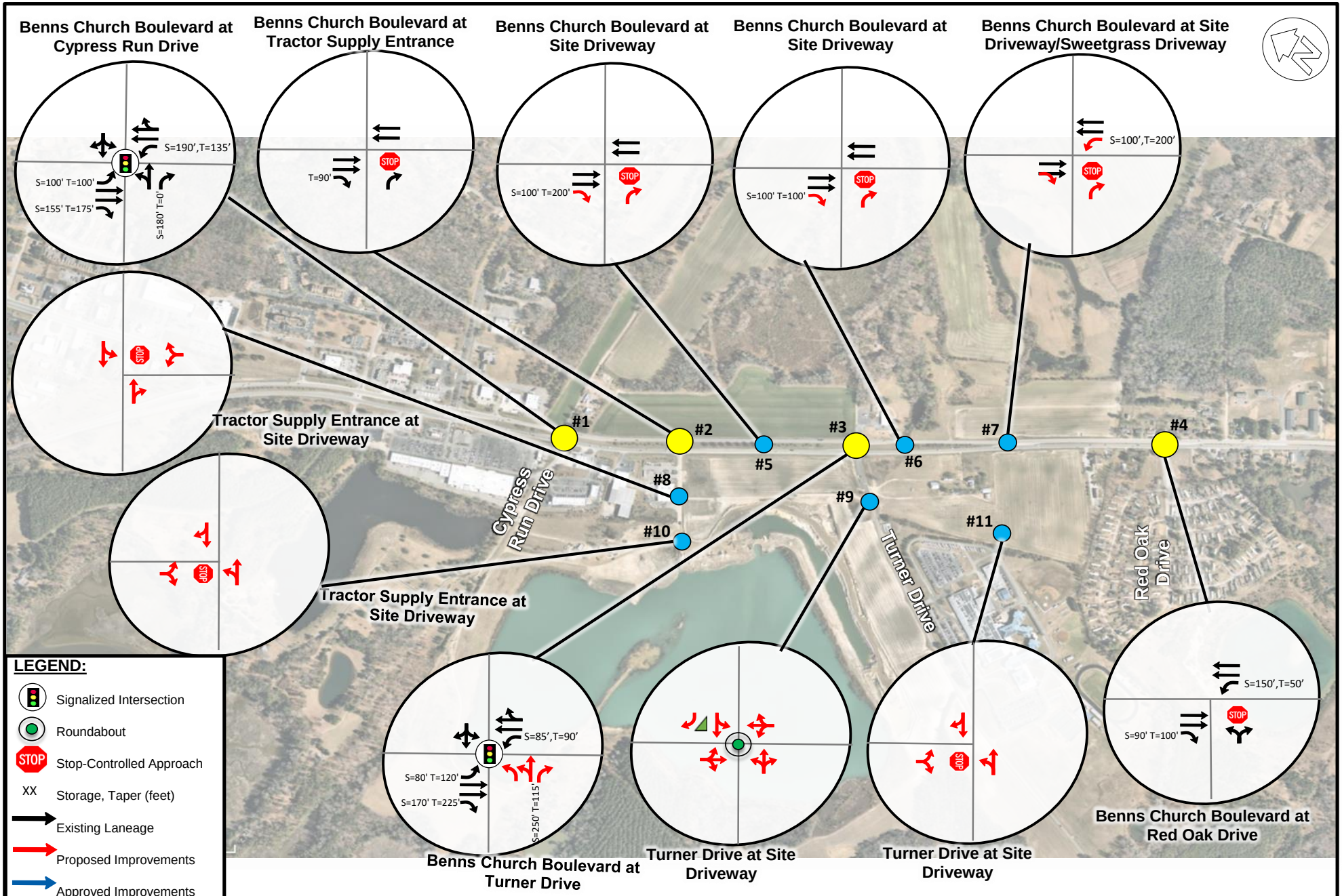
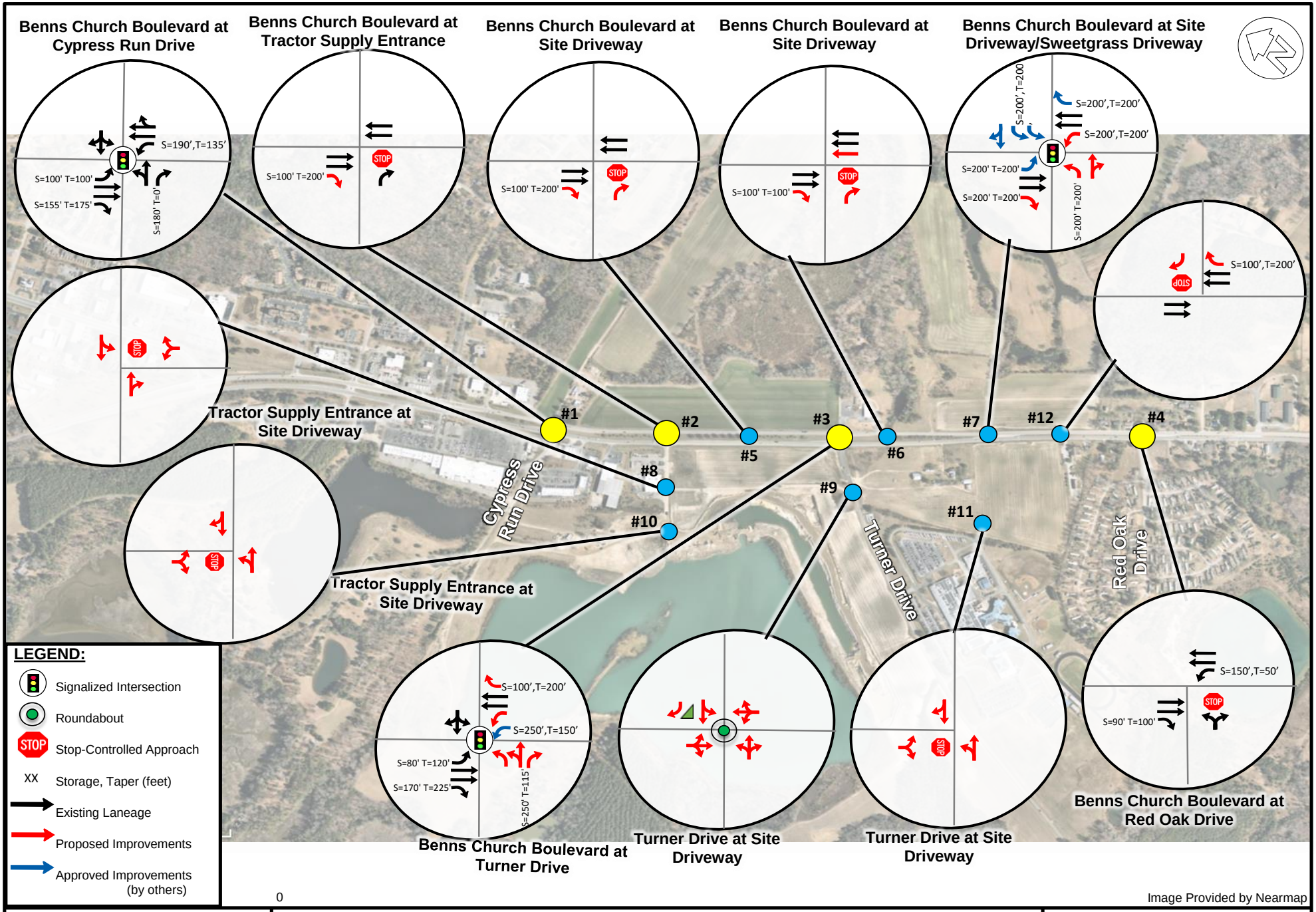


Image Provided by Nearmap

Kimley»Horn

INTERIM YEAR (2025) RECOMMENDATIONS

ES-1



Kimley»Horn

FUTURE YEAR (2029) RECOMMENDATIONS

ES-2

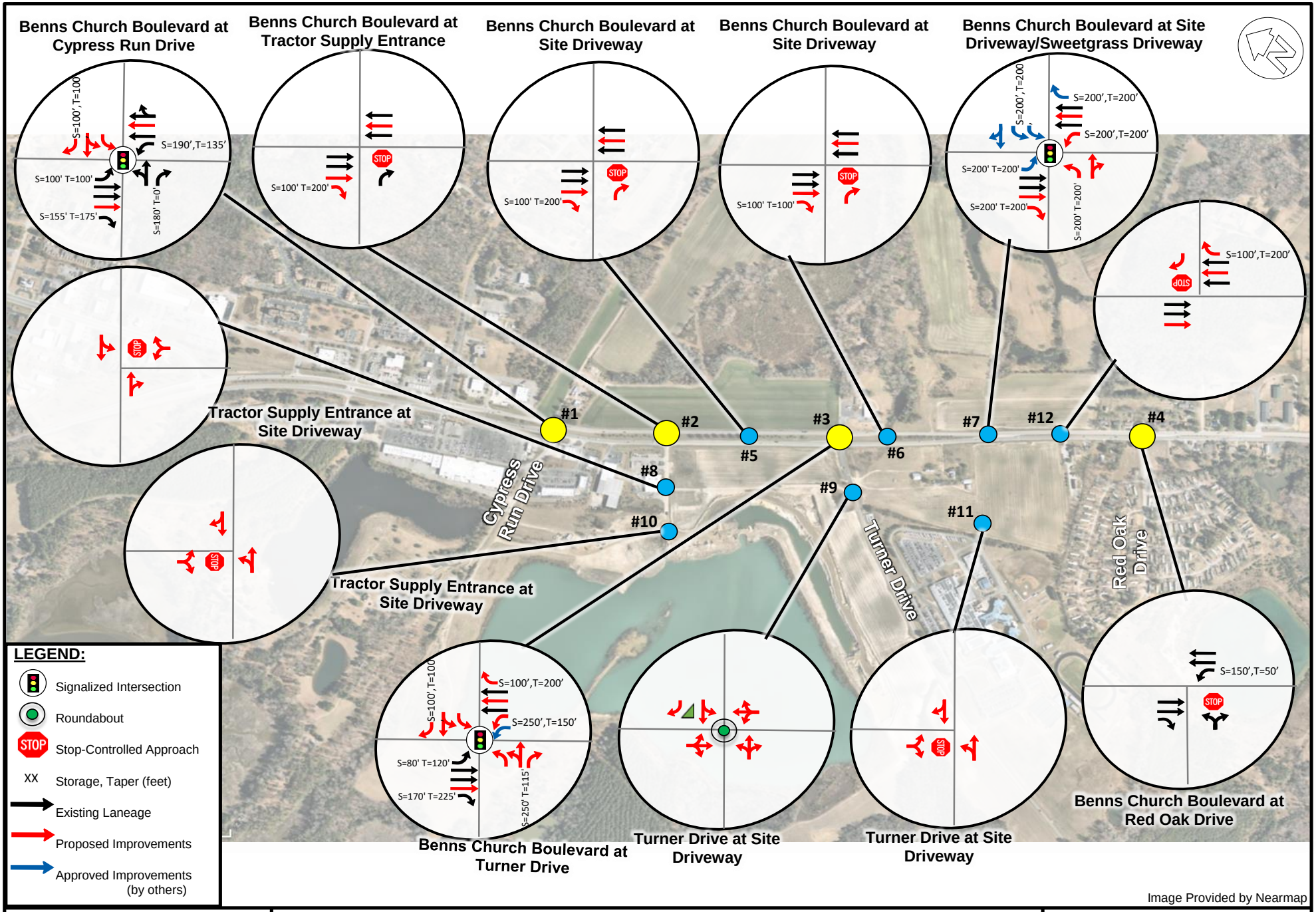


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HORIZON YEAR (2045) RECOMMENDATIONS

ES-3

2.0 INTRODUCTION

Kimley-Horn and Associates, Inc. (Kimley-Horn) was retained to perform a traffic impact analysis (TIA) for the proposed Turner North, Turner South, and Cypress Run South developments located in Isle of Wight County, Virginia. The proposed developments include commercial, residential, and warehouse-space and are located on the west side of Benns Church Boulevard (U.S. Route 258/State Route 10) between Cypress Run Drive and Red Oak Drive, as illustrated in **Figure 1**. Throughout the report, intersection numbers as they correlate to the figures will be listed after intersections as *(Int. #0)*. The Turner North and Turner South sites include a total of 14 parcels. The Cypress Run South site includes single-family attached and single-family detached housing. It is anticipated that the construction of the proposed developments will be completed in the following phases:

- Interim Year (2025)
  - Turner North – Parcels 2 and 5
  - Turner South – Parcels 6 and 13
- Opening Year (2029)
  - Full Build-Out of Turner North
  - Full Build-Out of Turner South
  - Full Build-Out of Cypress Run South

The conceptual site plan for the proposed developments is included in **Appendix A.**

The purpose of this TIA is to examine existing and future traffic conditions within the agreed upon project study area and identify traffic impacts resulting from the proposed developments on the surrounding road network. Necessary roadway improvements will be identified as part of this TIA based on traffic impacts resulting from the proposed developments

3.0 PROJECT BACKGROUND

3.1 RELEVANT STUDIES

The *Wawa Convenience Market Development Traffic Impact Analysis* in Isle of Wight County, Virginia has been completed. The proposed Wawa site is parcel 6 within the Turner South development. The Wawa TIA includes the intersections of Benns Church Boulevard at Turner Drive *(Int. #3)* and Benns Church Boulevard at Cypress Run Drive *(Int. #1)*. The turning movement counts and COVID adjustments from the Wawa TIA were used in this study for the intersection of Benns Church Boulevard at Cypress Run Drive.

Additionally, background development traffic from the following traffic studies were used in this analysis:

- *Town of Smithfield Intersection Improvements Analysis* (February 2019)
- *Yeoman's Tract Traffic Impact Study (Sweetgrass)* (On-going)

3.2 STUDY ASSUMPTIONS AND METHODOLOGY

This study consists of conducting an analysis of existing traffic conditions and future conditions to determine the impact of the traffic generated on the adjacent roadways. The methodology used for this study is consistent with the Institute of Transportation Engineers (ITE) recommendations for conducting a traffic impact analysis (TIA) and the requirements of the Isle of Wight County and the Town of Smithfield.

A study work group (SWG) was formed for this study to obtain input from major stakeholders, obtain concurrence on analysis methodologies and assumptions, and shape the development of the roadway improvement concepts. The SWG included members representing the following organizations:

- Virginia Department of Transportation (VDOT)
- Isle of Wight County
- Town of Smithfield
- Harrison and Lear, Inc.
- Greenwood Homes
- Kimley-Horn and Associates

An assumptions document detailing the study area, data collection, trip generation, and analysis methodology used for this TIA was submitted to the SWG for review and concurrence. The approved assumptions document is included in **Appendix B**.

3.3 STUDY AREA

The study area for this analysis is shown in **Figure 1** and traffic operations were analyzed at the following existing intersections:

1. Benns Church Boulevard (U.S. Route 258/State Route 10) at Cypress Run Drive (Signalized)
2. Benns Church Boulevard at Tractor Supply Entrance (Unsignalized – Right-In/Right-Out)
3. Benns Church Boulevard at Turner Drive (State Route 644) (Signalized)
4. Benns Church Boulevard at Red Oak Drive (Unsignalized – Full Movement)

Additionally, the following eight (8) site driveways were analyzed under the future Build scenarios:

5. Benns Church Boulevard at Site Driveway #1
6. Benns Church Boulevard at Site Driveway #2
7. Benns Church Boulevard at Site Driveway/Sweetgrass Driveway #3
8. Tractor Supply Entrance at Site Driveway #4
9. Turner Drive at Site Driveway #5
10. Tractor Supply Entrance at Site Driveway #6
11. Turner Drive at Site Driveway #7
12. Benns Church Boulevard at Site Driveway #8



Kimley»Horn

STUDY AREA

FIGURE 1

3.4 EXISTING CONDITIONS

Benns Church Boulevard is the primary north-south thoroughfare within the study area, providing connections to Brewers Neck Boulevard, the city of Suffolk and the James River Bridge which provides direct access to/from the City of Newport News. **Figure 2** depicts existing roadway lane conditions for study area roadways and intersections. The following provides a brief description of existing roadway characteristics for each facility:

Benns Church Boulevard (U.S Route 10) is a four-lane, divided minor arterial within the limits of the study area. Based on VDOT historic counts reported for 2021, the segment of Benns Church Boulevard within the study area carries volumes ranging from 22,000 vehicles per day (VPD) to 24,000 VPD. Benns Church Boulevard is oriented in the north-west/south-east direction with a posted speed limit of 45 miles per hour (MPH). Benns Church is classified as an "Other Principal Arterial" by VDOT.

Cyprus Run Drive (Local Road) is oriented in a general east-west direction and configured as a two lane undivided roadway that connects to Benns Church Boulevard. The posted speed limit is 15 MPH. AWDT data is not collected for the segment of Cyprus Run Drive between Oak Al and Benns Church Boulevard

Turner Drive (Major Collector) is oriented in a general north-south direction and configured as a two-lane roadway. The posted speed limit is 40 MPH that carries 3,000 VPD based on VDOT historical counts reported for 2021.

Red Oak Drive (Local Road) is oriented in a general east-west direction and configured as a two-lane undivided roadway that connects to Benns Church boulevard. The posted speed limit is 10 MPH. AWDT data is not collected for the segment of Red Oak Drive.

3.5 EXISTING TRAFFIC VOLUMES

Traffic counts collected in August 2021 as part of the Wawa TIA at the intersections of Benns Church Boulevard at Cypress Run Drive *(Int. #1)* and Benns Church Boulevard at Turner Drive *(Int. #3)* were used in this analysis. New traffic counts were also collected at the Benns Church Boulevard and Turner Drive *(Int. #3)* intersection on Wednesday, December 14, 2022, a typical weekday with school in session. The new traffic count data included seven hour turning movement count (TMC) data at the intersection of Benns Church Boulevard and Turner Drive *(Int. #3)* from 6 AM – 9 AM and 2 PM – 6 PM. The traffic volumes from 2021 were also adjusted for COVID-19 impacts. This was done by comparing the TMC data collected in August of 2021 to TMC data that was collected in August of 2017. The 2021 TMC data was grown and combined with new December 2022 count data (which accounts for influence of school related traffic/turning movements) to develop the adjusted 2022 traffic volumes.

Bus data was provided by the Isle of Wight County Schools and reviewed to ensure bus traffic is accurately captured along Turner Drive. Heavy vehicle percentages collected as part of the December 2022 count data were adjusted to account for additional bus traffic to ensure the school arrival and dismissal periods were accurately captured. Traffic counts collected in June 2022 at the intersection of Benns Church Boulevard and Red Oak Drive *(Int. #4)* were also used in this analysis. Traffic volumes at the Benns Church Boulevard and Tractor Supply Entrance *(Int. #2)* were determined using the calculated trip generation based on the ITE Trip Generation, 10th Edition (2017) Manual.

The following uniform morning (AM), and afternoon (PM) peak hours were used in this analysis based on a review of the 2022 count data and input from the SWG.

- AM Peak Hour: 7:00 AM to 8:00 AM

- PM Peak Hour: 4:15 PM to 5:15 PM

Additionally, a supplemental PM peak hour analysis scenario was included to account for school traffic dismissal traffic. This supplemental PM peak hour analysis included traffic data between 2:45 PM and 3:45 PM and only included the 2025 Build PM peak hour scenario. The purpose of this supplemental analysis is to confirm the proposed improvements can adequately serve peak school dismissal traffic in the 2025 Build scenario. Based on discussions with the SWG, the supplemental analysis only included the key intersections adjacent to the schools that carry significant amounts of school traffic during school dismissal. The supplemental analysis is discussed further in Section 5.4.

The 2022 existing peak hour analysis volumes are provided in **Figure 3**. Heavy vehicle percentages were calculated for each individual intersection movement, while overall intersection peak hour factors (PHF) were calculated and then applied to each intersection movement. This methodology is consistent with the approved assumptions document included in **Appendix B**.

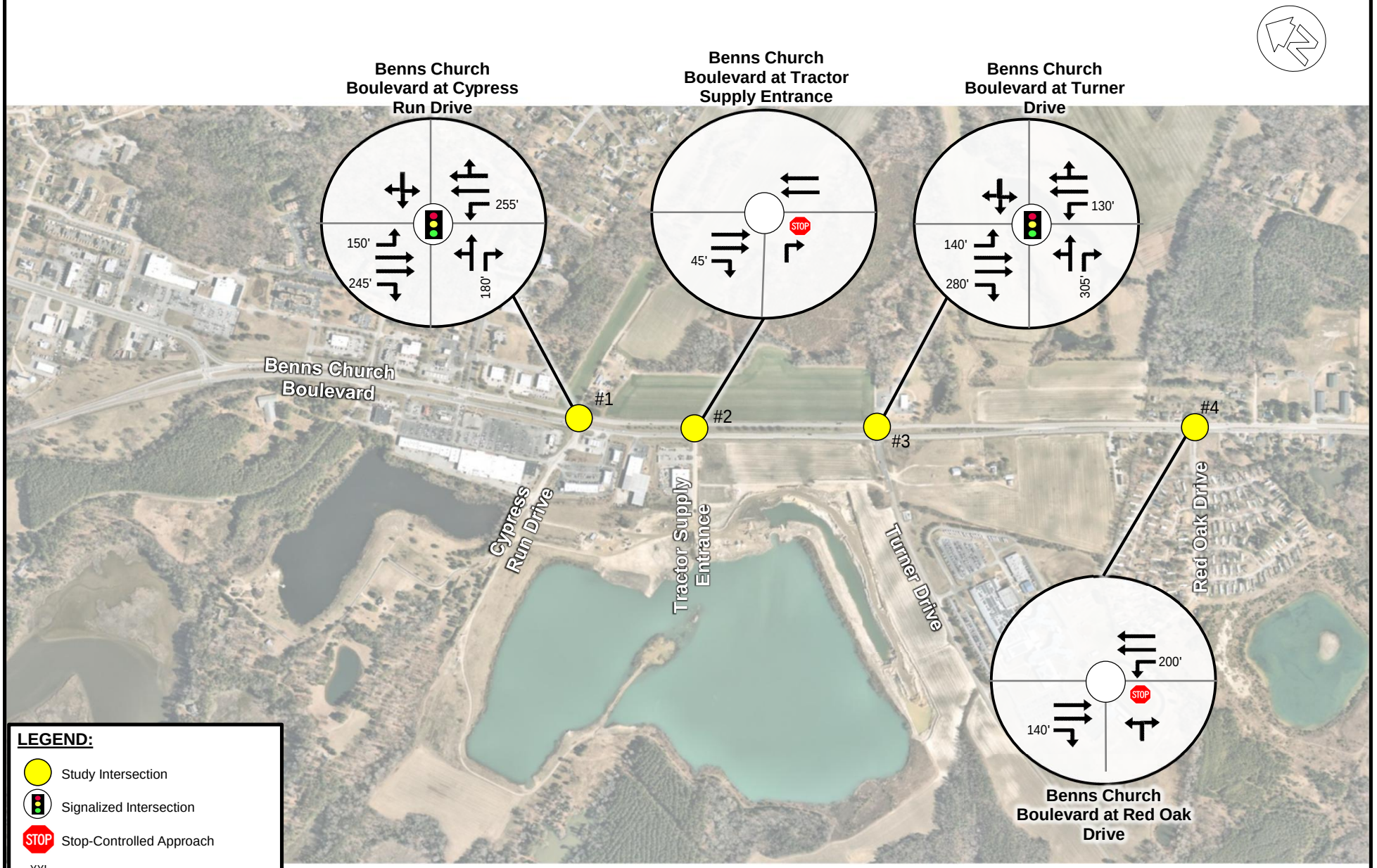
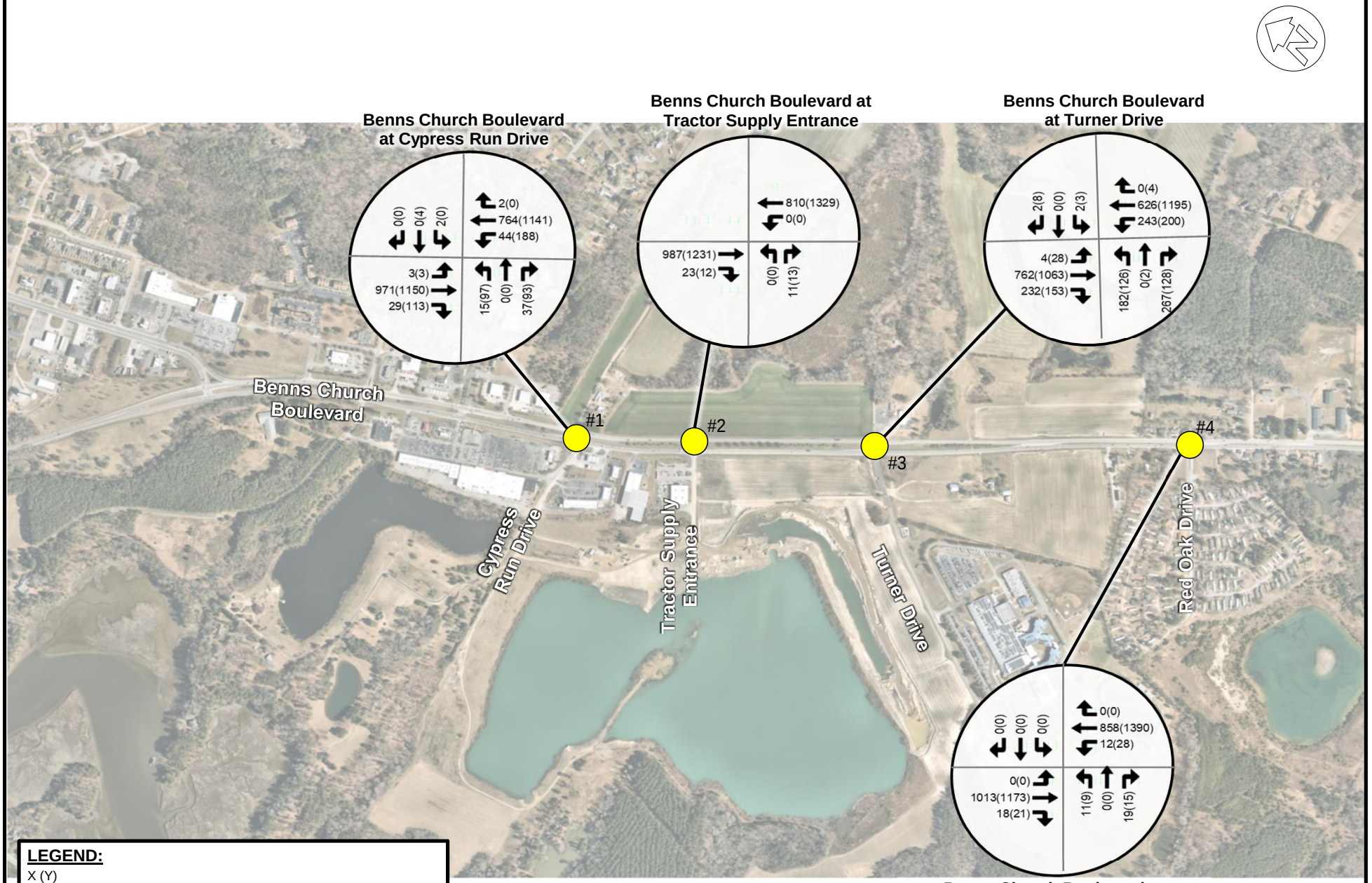


Image Provided by Nearmap

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EXISTING GEOMETRIC CONDITIONS

FIGURE 2



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2022 AM AND PM PEAK HOUR VOLUMES

FIGURE 3

4.0 FUTURE TRAFFIC VOLUME DEVELOPMENT

This study includes the analysis of the Existing, No Build, and Build Conditions during the AM and PM peak hours. The proposed Turner South, Turner North, and Cypress Run South developments are anticipated to be completed in 2029. A summary of general traffic conditions associated with each of the scenarios is described below:

- **2022 Existing –** Existing traffic volumes and conditions.
- **2025 Interim Year No-Build –** Interim year traffic conditions with a future growth rate applied to the existing volumes.
- **2025 Interim Year Build –** Interim year traffic conditions with a future growth rate applied to the existing volumes plus traffic volumes generated by the background development traffic plus traffic volumes generated by the proposed sites anticipated to be developed in 2025. This scenario also includes the proposed public roads and proposed roadway improvements included in the 2025 Interim Year scenario.
- **2029 Future Year Build –** Build-out year traffic conditions with a future growth rate applied to the existing volumes plus traffic volumes generated by the background development traffic plus traffic volumes generated by the proposed site anticipated to be developed in 2029. This scenario also includes the proposed public roads and proposed roadway improvements included in the 2025 Interim Year scenario. This scenario also includes the proposed public roads and proposed roadway improvements included in the 2029 Future Year scenario.
- **2045 Horizon Year Build –** Build-out year traffic conditions with a future growth rate applied to the existing volumes plus traffic volumes generated by the background development traffic plus traffic volumes generated by the proposed site anticipated to be developed in 2045. This scenario also includes the proposed public roads and proposed roadway improvements included in the 2045 Horizon Year scenario.

Future growth rates and site traffic were applied to the existing traffic to determine the future volumes as described in the following sections.

4.1 BACKGROUND TRAFFIC GROWTH AND DIVERSIONS

In coordination with VDOT, Isle of Wight County, and the Town of Smithfield, a growth rate of 1.0% was used to account for growth potential in the surrounding area.

This growth rate was determined by reviewing the County average growth rate from VDOT with input from the SWG. Therefore, future background peak hour traffic volumes were developed by applying the 1.0% growth rate to the existing volumes. This methodology is consistent with the approved assumptions document included in **Appendix B**.

In addition to background traffic growth, it is assumed that school background traffic patterns will change once the proposed public roads are constructed. Based on discussions with the SWG, some of the existing traffic traveling to/from Smithfield High School is expected to travel along the proposed public roadways before accessing Turner Drive or Benns Church Boulevard. School traffic accessing the northern parking lot serving Smithfield High School is assumed to divert from Benns Church Boulevard or Turner Drive onto the proposed public roads. It is assumed 25% of the school traffic enters/exits the parking lot outside the peak hours and is not reflected in the peak hour volume diversions. The school background traffic diversions are captured in the future peak hour build analysis scenarios and are summarized in Section 4.4

4.2 BACKGROUND DEVELOPMENT TRAFFIC

Other approved developments in the vicinity of the study area were included in the future traffic volumes as background traffic. VDOT and Isle of Wight County identified the following background developments to be included in the future volume determination:

- Smithfield Development
  - The Smithfield Development includes Cypress Run Developments (North), and Benns Church Retail (North). These developments include residential, and retail/commercial land uses. Trip generation associated with these developments is expected to result in an additional 8,850 daily trips in 2045.
- Smithfield Intermediate School Traffic
  - Smithfield Intermediate School is a school that is expected to have 400 students and will be located south of the existing Smithfield Middle School on Turner Dr. Trip generation associated with the new intermediate school is expected to result in an additional 776 daily weekday trips.
- Sweetgrass
  - Sweetgrass is a mixed-use development that includes single family residential, multi-family residential, and retail commercial land uses. This undeveloped parcel is located at 14096 Benns Church Blvd. The parcel is on the northeast side of Benns Church Blvd between US 258/Rt 32 (Brewers Neck Blvd) and Canteberry Lane. This development is anticipated to result in 7,285 daily new trips and is expected to be in full operation in 2029.

Trip generation, distribution, and assignment for these background developments is consistent with the *Town of Smithfield Intersection Improvement Alternatives Analysis* and the *Yeoman's Tract Traffic Impact Study (Sweetgrass)*. The location, land uses, and intensities for the sites included in the background developments are summarized in the assumptions document in **Appendix B**.

4.3 PROPOSED TRIP GENERATION

Traffic generation potential for the proposed development was obtained using *ITE Trip Generation 10th Edition* (2017). Trip generation estimates were developed based on the proposed conceptual site plan (included in **Appendix A**). The proposed developments will consist primarily of commercial and residential land uses. Trip generation calculations for the Turner North, Turner South, and Cypress Run South sites are shown in **Table 3** through **Table 5**.

Table 3: Trip Generation for Proposed Turner North Developments

Parcel ID	ITE Code	ITE Description	Density	Unit	Daily	AM Peak Hour			PM Peak Hour		
						Total	In	Out	Total	In	Out
NORTH											
1	934	Fast Food Restaurant with Drive-Through Window	5,000	SF	2,355	201	103	98	163	85	78
2	948	Automated Car Wash	3,000	SF	430	32	17	15	43	22	22
3	932	High-Turnover (Sit-Down) Restaurant	3,000	SF	337	30	17	13	29	18	11
4	932	High-Turnover (Sit-Down) Restaurant	3,000	SF	337	30	17	13	29	18	11
5	912	Drive-In Bank	4	Lanes	499	35	21	14	109	53	56
New External Site Trips					*3,958*	*328*	*175*	*153*	*373*	*196*	*178*
Parcel 1: Code 934 Pass-by (0% AM, 49% PM)					*0*	*(97)*	*(49)*	*(47)*	*(81)*	*(42)*	*(38)*
Parcel 2: Code 948 Pass-by (0% AM, 0% PM)					*0*	*0*	*0*	*0*	*0*	*0*	*0*
Parcel 3: Code 932 Pass-by (0% AM, 43% PM)					*0*	*0*	*0*	*0*	*(11)*	*(7)*	*(4)*
Parcel 4: Code 932 Pass-by (0% AM, 43% PM)					*0*	*0*	*0*	*0*	*(11)*	*(7)*	*(4)*
Parcel 5: Code 912 Pass-by (29% AM, 35% PM)					*0*	*(9)*	*(5)*	*(3)*	*(37)*	*(18)*	*(19)*
New Driveway Trips					3,958	221	120	103	232	123	113

Source: ITE Trip Generation Manual, 10th Edition, (2017)
Pass-by percentages using ITE Trip Generation Handbook, 3rd Edition (2017)

Table 4: Trip Generation for Proposed Turner South Developments

Parcel ID	ITE Code	ITE Description	Density	Unit	Daily	AM Peak Hour			PM Peak Hour		
						Total	In	Out	Total	In	Out
6	960	Super Convenience Market/Gas Station	Average		4,378	508	254	254	393	197	196
7	934	Fast Food Restaurant with Drive-Through Window	3,000	SF	1,413	121	62	59	98	51	47
8	848	Tire Store	7,680	SF	219	21	13	8	31	13	18
9	934	Fast Food Restaurant with Drive-Through Window	3,235	SF	1,524	130	66	64	106	55	51
10	934	Fast Food Restaurant with Drive-Through Window	3,000	SF	1,413	121	62	59	98	51	47
11	822	Strip Retail Plaza (Less than 40,000 SF)*	28,000	SF	1,411	66	40	26	162	81	81
12	720	Medical-Dental Office Building	21,500	SF	738	57	44	13	75	21	54
13	151	Mini-Warehouse	108,000	SF	163	11	7	4	18	8	10
14	822	Strip Retail Plaza (Less than 40,000 SF)*	28,000	SF	1,411	66	40	26	162	81	81
New Site Trips					12,670	1,035	548	487	981	477	504
Internal Capture (10%)					*(813)*	*(58)*	*(33)*	*(26)*	*(73)*	*(35)*	*(38)*
New External Site Trips					*11,857*	*976*	*515*	*461*	*908*	*442*	466
Parcel 6: Code 960 Pass-by (62% AM, 56% PM)					*0*	*(320)*	*(160)*	*(160)*	*(259)*	*(130)*	*(129)*
Parcel 7: Code 934 Pass-By (49% AM, 50% PM)					*0*	*(59)*	*(30)*	*(29)*	*(49)*	*(26)*	*(24)*
Parcel 8: Code 848 Pass-By (28% PM)					*0*	*0*	*0*	*0*	*(9)*	*(4)*	*(5)*
Parcel 9: Code 934 Pass-By (49% AM, 50% PM)					*0*	*(64)*	*(31)*	*(31)*	*(53)*	*(28)*	*(26)*
Parcel 10: Code 934 Pass-By (49% AM, 50% PM)					*0*	*(59)*	*(30)*	*(29)*	*(49)*	*(26)*	*(24)*
Parcel 11: Code 822 Pass-By (40% PM)					*0*	*0*	*0*	*0*	*(65)*	*(32)*	*(33)*
Parcel 14: Code 822 Pass-By (40% PM)					*0*	*0*	*0*	*0*	*(65)*	*(32)*	*(33)*
New Driveway Trips					11,857	474	263	212	359	165	192

Source: ITE Trip Generation Manual, 10th Edition, (2017)
Pass-by percentages using ITE Trip Generation Handbook, 3rd Edition (2017)
**Strip Retail Plaza trips estimated using the ITE Trip Generation Manual, 11th Edition, (2021)*
The trip generation for parcel 6 was obtained by averaging the trips generated using square footage and vehicle fueling positions.

Table 5: Trip Generation for the Proposed Cypress Run South Development

ITE Code	ITE Description	Density	Unit	Daily	AM Peak Hour			PM Peak Hour		
					Total	In	Out	Total	In	Out
210	Single-Family Detached	154	DU	1,501	110	29	81	149	94	55
215	Single-Family Attached	108	DU	772	50	16	34	61	35	26
New Driveway Trips				2,273	160	45	115	210	129	81

As shown in **Table 3** through **Table 5**, the proposed Turner North, Turner South, and Cypress Run South development sites have the potential to generate a total of 3,958, 11,857, and 2,273 new daily trips, respectively.

4.4 TRIP DISTRIBUTION AND ASSIGNMENT

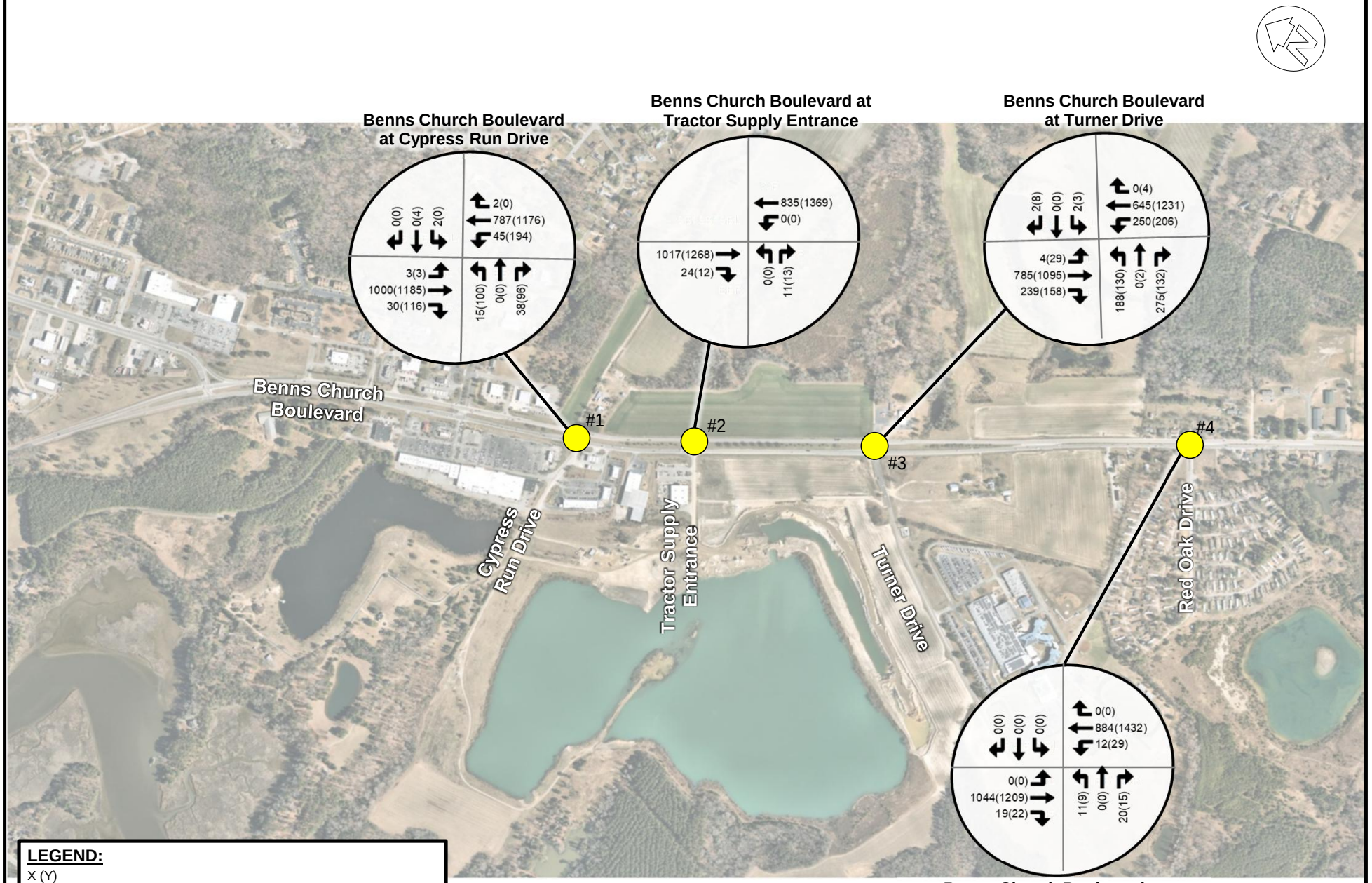
Global trip distributions for this analysis were consistent with the *Wawa Convenience Market Development Traffic Impact Analysis*. Therefore, the following global traffic distributions were used for the Turner North, Turner South, and Cypress Run South traffic assignment onto the roadway network:

- 20% to/from the west on Turner Drive
- 40% to/from the north on Benns Church Boulevard
- 40% to/from the south on Benns Church Boulevard

However, unique trip assignment percentages were developed for these developments across study intersections. The trip assignments for the Turner South, Turner North, and Cypress Run South developments were determined based on anticipated routes for vehicles entering and existing the proposed sites, and a general familiarity of the study area.

Peak hour trip assignments were developed by multiplying the proposed new trips by the agreed-to trip distributions. The Turner North, Turner South, and Cypress Run South trip assignments and the background development trips were added to the future background volumes to develop the future Build traffic volumes. The background site traffic distributions are consistent with the *Town of Smithfield Intersection Improvement Alternatives Analysis* and the *Yeoman's Tract Traffic Impact Study (Sweetgrass)*.

The future No-Build, Build, and Build Site analysis traffic volumes are illustrated in **Figure 4, and Figure 6-11**. The proposed developments are shown in **Figure 5**.



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2025 NO BUILD AM AND PM PEAK HOUR VOLUMES

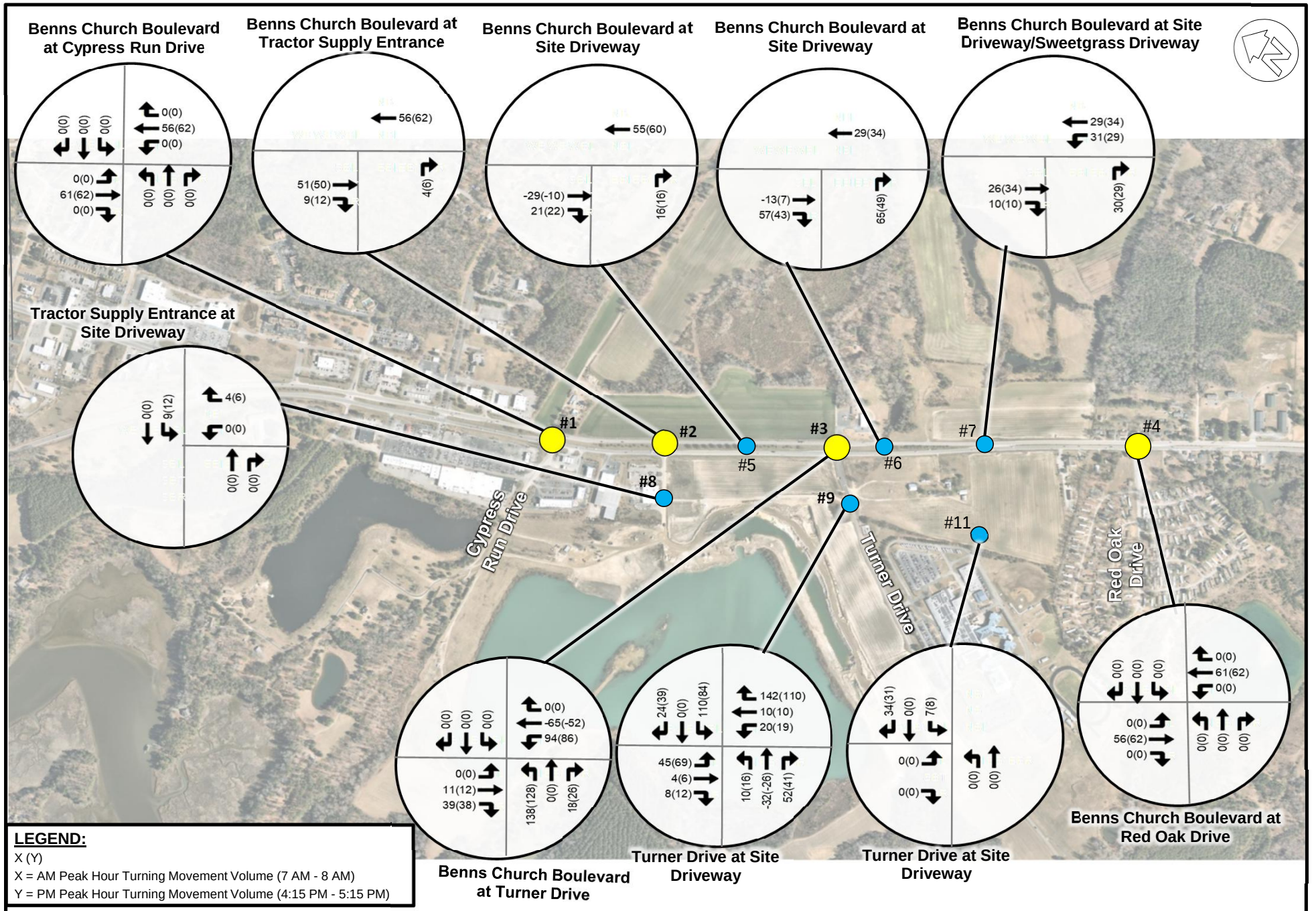
FIGURE 4



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PROPOSED DEVELOPMENTS

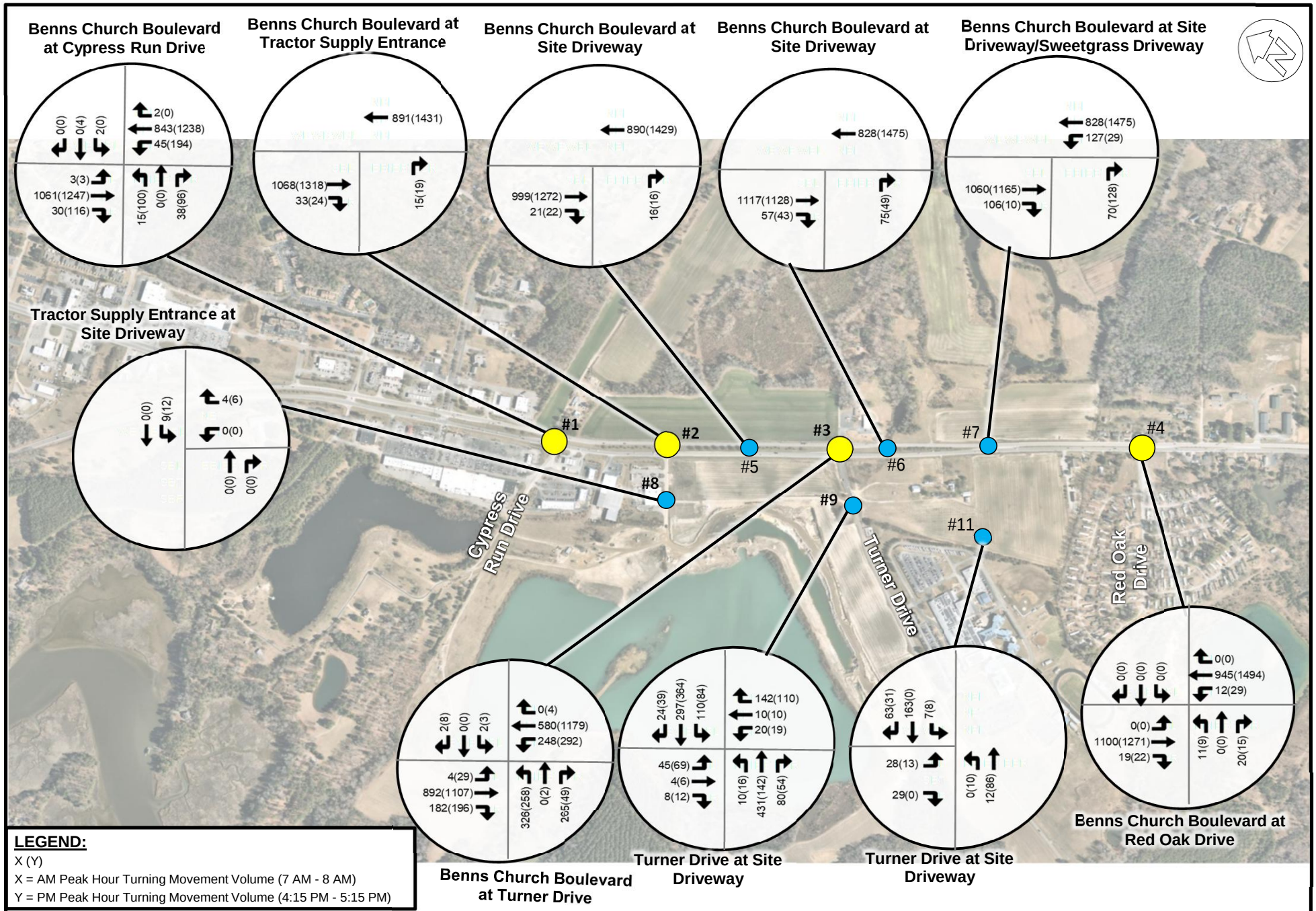
FIGURE 5



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2025 BUILD SITE AM AND PM PEAK HOUR VOLUMES

FIGURE 6



LEGEND:

X (Y)

X = AM Peak Hour Turning Movement Volume (7 AM - 8 AM)

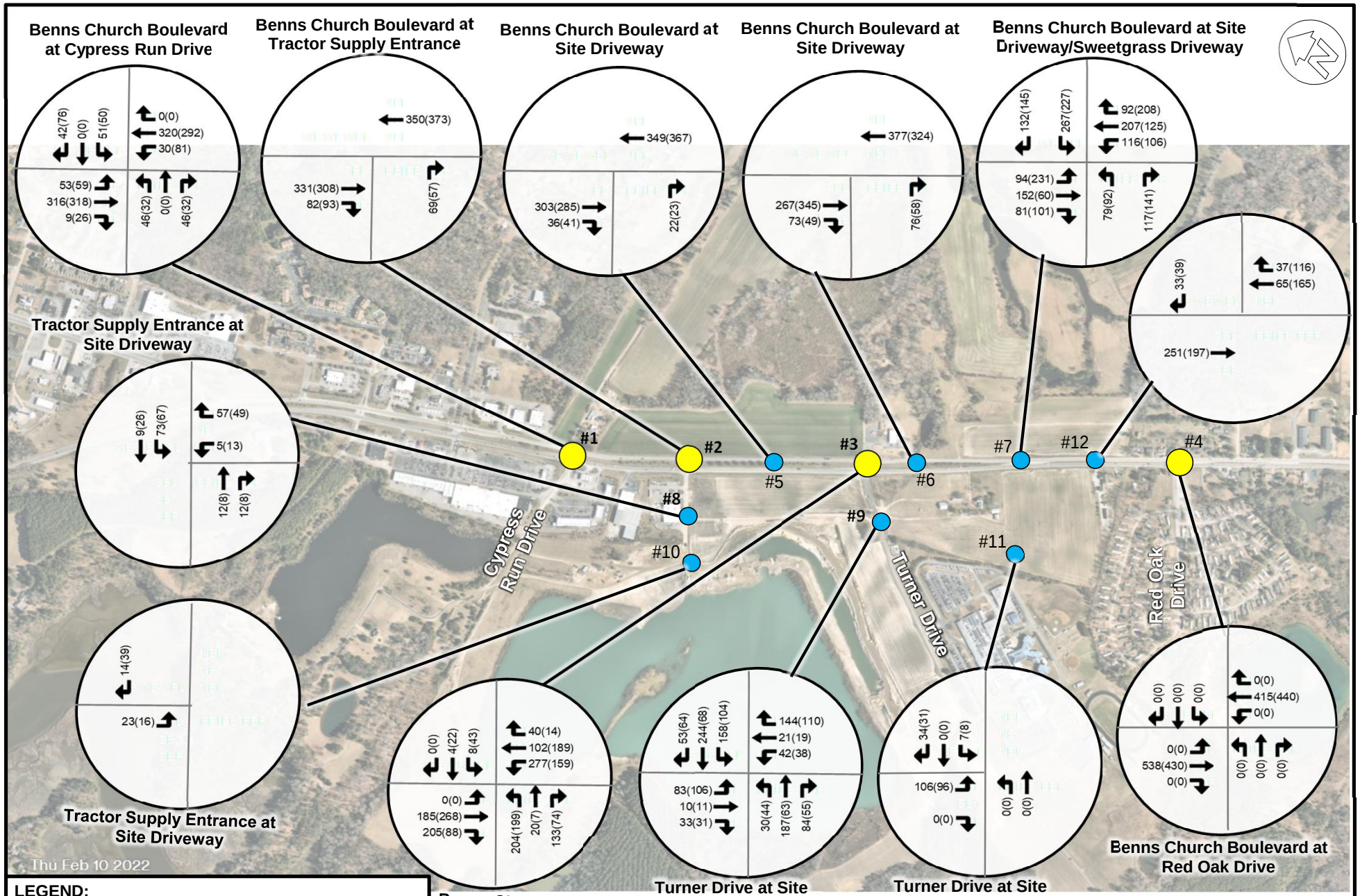
Y = PM Peak Hour Turning Movement Volume (4:15 PM - 5:15 PM)

Image Provided by Nearmap

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2025 BUILD AM AND PM PEAK HOUR VOLUMES

FIGURE 7



LEGEND:

X (Y)

X = AM Peak Hour Turning Movement Volume (7 AM - 8 AM)

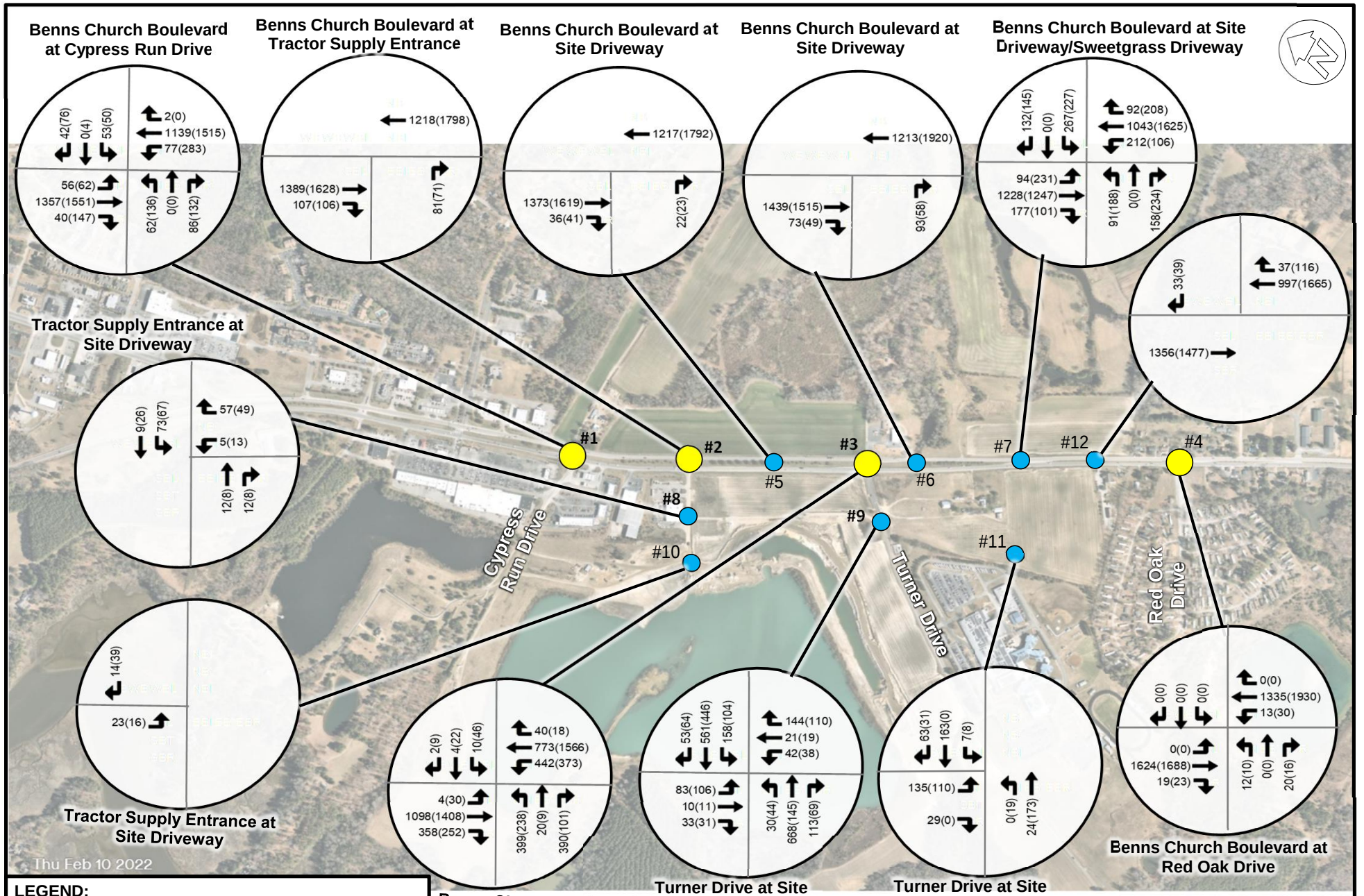
Y = PM Peak Hour Turning Movement Volume (4:15 PM - 5:15 PM)

Image Provided by Nearmap

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2029 BUILD SITE AM AND PM PEAK HOUR VOLUMES

FIGURE 8



LEGEND:

X (Y)

X = AM Peak Hour Turning Movement Volume (7 AM - 8 AM)

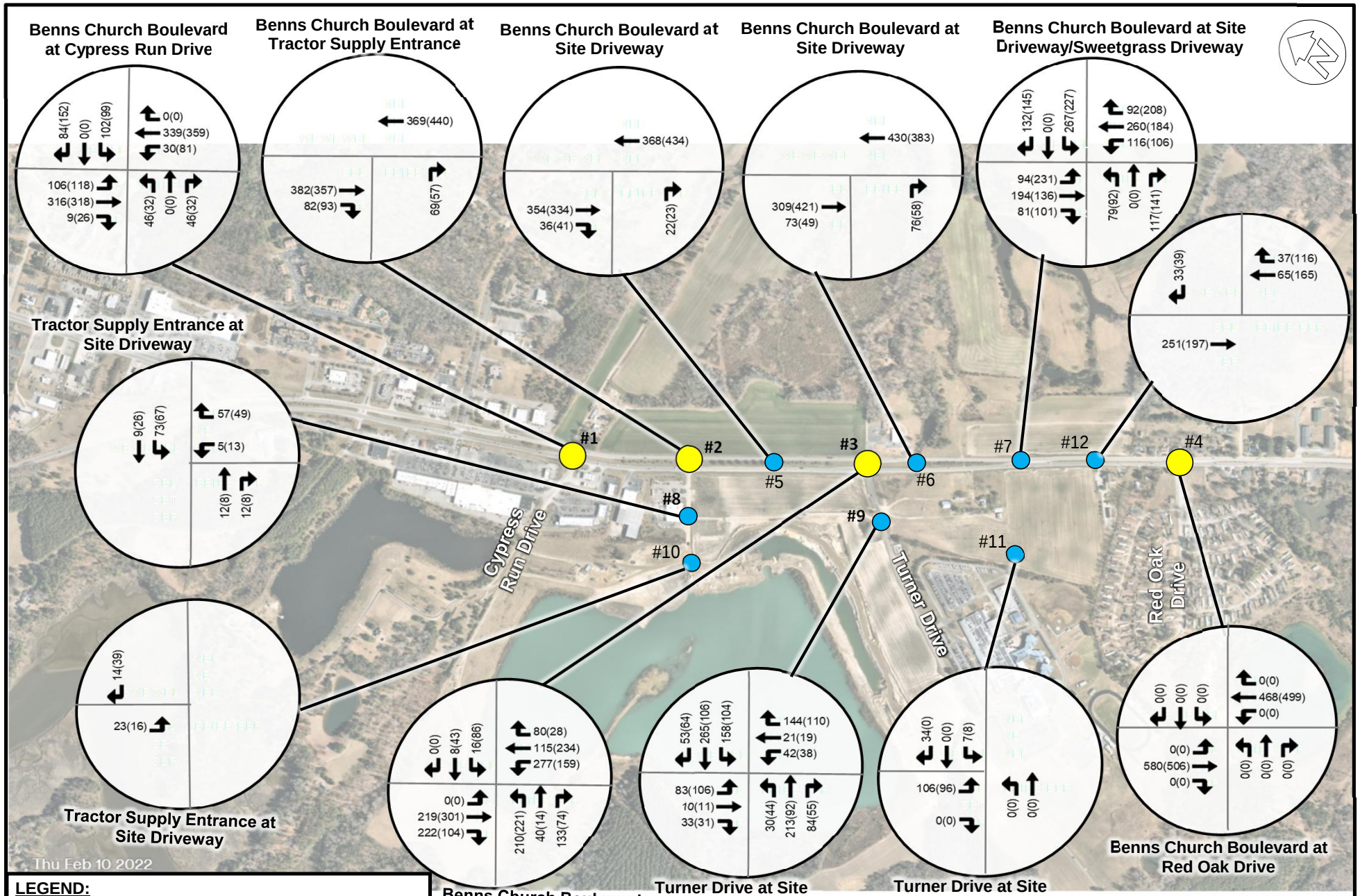
Y = PM Peak Hour Turning Movement Volume (4:15 PM - 5:15 PM)

Image Provided by Nearmap

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2029 BUILD AM AND PM PEAK HOUR VOLUMES

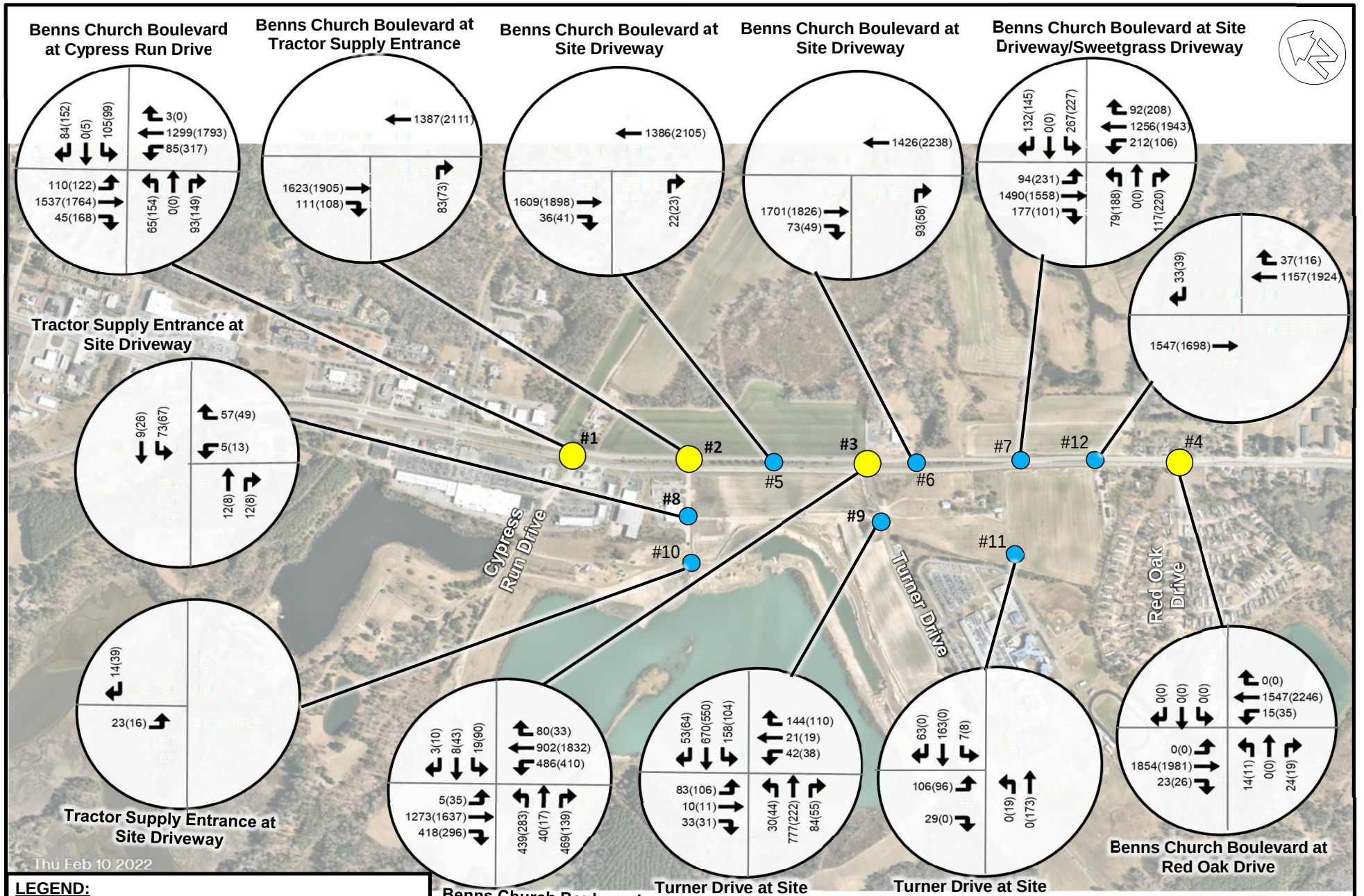
FIGURE 9



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2045 BUILD SITE AM AND PM PEAK HOUR VOLUMES

FIGURE 10



LEGEND:

X (Y)

X = AM Peak Hour Turning Movement Volume (7 AM - 8 AM)

Y = PM Peak Hour Turning Movement Volement Volume (4:15 PM - 5:15 PM)

Image Provided by Nearmap

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2045 BUILD AM AND PM PEAK HOUR VOLUMES

FIGURE 11

5.0 TRAFFIC ANALYSIS

Capacity analyses for all study intersections were performed under the peak hour conditions for the following scenarios:

- Scenario 1 – Existing (2022) traffic conditions
- Scenario 2 – Interim Year (2025) No-Build – Interim year traffic conditions (i.e., future traffic volumes *with* a 1.0% growth rate applied *without* projected site traffic) with existing roadway conditions.
- Scenario 3 – Interim Year (2025) Build – Interim year traffic conditions (i.e., future traffic volumes *with* a 1.0% growth rate applied *with* projected site traffic) with proposed roadway improvements. The projected site traffic includes the following proposed developments:
    - Turner North – Parcels 2 and 5
    - Turner South – Parcels 6 and 13
- Scenario 4 – Future Year (2029) Build – Future year traffic conditions (i.e., future traffic volumes *with* a 1.0% growth rate applied *with* projected site traffic) with proposed roadway improvements. The projected site traffic includes the following proposed developments:
    - Turner North – Full Build-Out
    - Turner South – Full Build-Out
    - 50% of Smithfield Development
    - Smithfield Intermediate School
    - Sweetgrass – Full Build-Out
- Scenario 5 – Horizon Year (2045) Build – Horizon year traffic conditions (i.e., future traffic volumes *with* a 1.0% growth rate applied *with* projected site traffic) with proposed roadway improvements. The projected site traffic includes the following proposed developments:
    - Turner North – Full Build-Out
    - Turner South – Full Build-Out
    - Smithfield Development – Full Build-Out
    - Smithfield Intermediate School
    - Sweetgrass – Full Build-Out

Table 6: Summary of Analysis Scenarios

Scenario	Developments Included	Roadway Conditions	Traffic Volumes
Scenario 1: Existing Conditions (2022)	No Developments Included	Existing Conditions Figure 2	2022 Existing Volumes Figure 3
Scenario 2: Interim Year (2025) No-Build Conditions	No Developments Included	Existing Conditions Figure 2	Existing Volumes **+** **3 Years of Background Growth (1.0% Annually)** Figure 4
Scenario 3: Interim Year (2025) Build Conditions	**Turner North – Parcels 2 and 5** **Turner South – Parcels 6 and 13**	No Build Conditions **+** **Site Driveways** **Full Build-Out of all Public Roads** **Smithfield High School Roadway Connection with right-in/right-out/left-in configuration at Intersection #7** Figure 12	2025 Background Volumes **+** **Proposed Development Trips** Figure 5: Proposed Developments
Scenario 4: Future Year (2029) Build Conditions	**Turner North – Full Build-Out** **Turner South – Full Build-Out** **Cypress Run South** **50% of Smithfield Development** **Smithfield Intermediate School** **Sweetgrass – Full Build-Out**	Interim Year (2025) Build Conditions + **Signalized Intersection at Intersection #7 (By Others)** Figure 13	Existing Volumes **+** **7 Years of Background Growth (1.0% Annually)** **Proposed Development Trips** Figure 9

Scenario	Developments Included	Roadway Conditions	Traffic Volumes
Scenario 5: Horizon Year (2045) Build Conditions	**Turner North – Full Build-Out** **Turner South – Full Build-Out** **Smithfield Development – Full Build-Out** **Smithfield Intermediate School** **Sweetgrass – Full Build-Out**	Future Year (2029) Build Conditions Figure 14	Existing Volumes**+** **23 Years of Background Growth (1.0% Annually)** **Proposed Development Trips** Figure 6: 2025 Build Site AM and PM Peak Hour Volumes

5.1 TURN LANE WARRANT ANALYSIS

The need for new/extended turn lanes were considered for the key turning movements at the study intersections under the 2025, 2029, and 2045 analysis scenarios.

The turn-lane warrants were conducted in accordance with the VDOT turn-lane warrant analysis guidelines per *Appendix F Access Management Design Standards for Entrances and Intersections*. Based on the turn lane warrant analysis, the following turn lanes along Benns Church Boulevard are warranted and recommended under the future analysis scenarios:

5.1.1 2025 Interim Year

- Exclusive southbound right-turn lane with a storage length of 100 feet and a 200-foot taper at the intersection of Benns Church Boulevard and Site Driveway #1 *(Int. #5)*
- Exclusive southbound right-turn lane with a storage length of 100 feet and a 100-foot taper at the intersection of Benns Church Boulevard and Site Driveway #2 *(Int. #6)*
- Extend the existing exclusive northbound left-turn lane with a storage length of 100 feet and a 200-foot taper at the intersection of Benns Church Boulevard and Site Driveway #3 *(Int. #7).* It should be noted that an increase in storage length for this movements is warranted and recommended in 2029. It is recommended that the full turn lane with a storage length of 200 feet and a 200-foot taper be constructed in 2025 when the connection to Benns Church Boulevard is made.

5.1.2 2029 Future Year

- Exclusive southbound right-turn lane with a storage length of 100 feet and a 200-foot taper at the intersection of Benns Church Boulevard and Tractor Supply Entrance *(Int. #2)*
- Exclusive northbound left-turn lane with a storage length of 200 feet and a 200-foot taper at the intersection of Benns Church Boulevard and Site Driveway #3 *(Int. #7)*
- Exclusive northbound right-turn lane with a storage length of 200 feet and a 200-foot taper at the intersection of Benns Church Boulevard and Site Driveway #3 *(Int. #7)*
- Exclusive southbound left-turn lane with a storage length of 200 feet and a 200-foot taper at the intersection of Benns Church Boulevard and Site Driveway #3 *(Int. #7)*
- Exclusive southbound right-turn lane with a storage length of 200 feet and a 200-foot taper at the intersection of Benns Church Boulevard and Site Driveway #3 *(Int. #7)*

5.2 SIGNAL WARRANT ANALYSIS

A traffic signal warrant analysis was conducted at the intersection of Benns Church Boulevard at Site Driveway #3/Sweetgrass Driveway *(Int. #7)*. The traffic signal warrant evaluations were conducted using methodologies set forth in the *Manual on Uniform Traffic Control Devices, 2009 Edition (MUTCD)*. The *MUTCD* describes nine warrants for providing guidance on the justification of traffic signal consideration.

Warrant 3 (Peak Hour Vehicular Volume) was the only warrant analysis included in this study due to the availability of traffic data. The warrant analysis considered the peak hours (i.e., 7:00 AM to 8:00 AM and 4:15 to 5:15 PM). **Table 7** summarizes the results from the traffic signal warrant analysis for the 2029 Build peak hour scenarios.

Table 7: Traffic Signal Warrant Results Summary

Benns Church Boulevard at Site Driveway #3/Sweetgrass Driveway *(Int. #7)*	
Scenario	**Peak Hour**
2029 Build AM Peak Hour	✔
2029 Build PM Peak Hour	✔

Based on the warrant analysis and anticipated safety improvements associated with installing a traffic signal at the intersection of Benns Church Boulevard and Site Driveway #3/Sweetgrass Driveway *(Int. #7)*, a traffic signal is recommended under the 2029 Build conditions.

5.3 BUILD INTERSECTION IMPROVEMENTS

5.3.1 Improvements By-Others

The following intersection and roadway improvements are approved or expected as part of the background developments:

- Extending the existing northbound left-turn lane at the Turner Drive and Benns Church Boulevard intersection *(Int. #3)*. The turn lane will be extended to have a total storage length of 250 feet and a 150-foot taper. This improvement is part of a funded SMART SCALE project and is expected to be constructed by 2029 and is included in the Future Year 2029 analysis scenarios.
- Installing a traffic signal at the intersection of Benns Church Boulevard and Site Driveway #3/Sweetgrass Driveway *(Int. #7)*. This improvement is expected to be implemented by the developer by 2029 and is included in the Future Year 2029 analysis scenarios.

5.3.2 Proposed Improvements

Based on the turn-lane warrant analysis, signal warrant analysis, operational screening analysis, and conversations with the SWG, the following roadway improvements are recommended to accommodate the future developments (also summarized in Figure 12 through Figure 14):

5.3.2.1 Interim Year (2025) Recommendations

- Turn lane improvements as described below:
  - Exclusive southbound right-turn lane with a storage length of 100 feet and a 200-foot taper at the intersection of Benns Church Boulevard and Site Driveway #1 *(Int. #5)*
  - Exclusive southbound right-turn lane with a storage length of 100 feet and a 100-foot taper at the intersection of Benns Church Boulevard and Site Driveway #2 *(Int. #6)*
  - Extend the existing exclusive northbound left-turn lane with a storage length of 100 feet and a 200-foot taper at the intersection of Benns Church Boulevard and Site Driveway #3 *(Int. #7).* It should be noted that an increase in storage length for this movements is warranted and recommended in 2029. It is recommended that the full turn lane with a storage length of 200 feet and a 200-foot taper be constructed in 2025 when the connection to Benns Church Boulevard is made.
- Single-Lane Roundabout at the intersection of Turner Drive and Site Driveway #5 *(Int. #9)*
  - The westbound approach will include a channelized slip right-turn lane.
- Modify eastbound approach geometry at the intersection of Benns Church Boulevard and Turner Drive *(Int. #3)* to include the following laneage:
  - Exclusive left-turn lane
  - Shared through-left turn lane
  - Exclusive right-turn lane with a storage length of 250 feet and a 115-foot taper
  - Two receiving lanes

5.3.2.2 Future Year (2029) Recommendations

In addition to the recommendations included in the 2025 analysis scenarios, the following recommendations are included in the 2029 analysis scenarios:

- Turn lane improvements as described below:

  - Exclusive southbound right-turn lane with a storage length of 100 feet and a 200-foot taper at the intersection of Benns Church Boulevard and Tractor Supply Entrance *(Int. #2)*
  - Exclusive northbound left-turn lane with a storage length of 200 feet and a 200-foot taper at the intersection of Benns Church Boulevard and Site Driveway #3 *(Int. #7)*
  - Exclusive northbound right-turn lane with a storage length of 200 feet and a 200-foot taper at the intersection of Benns Church Boulevard and Site Driveway #3 *(Int. #7)*
  - Exclusive southbound left-turn lane with a storage length of 200 feet and a 200-foot taper at the intersection of Benns Church Boulevard and Site Driveway #3 *(Int. #7)*
  - Exclusive southbound right-turn lane with a storage length of 200 feet and a 200-foot taper at the intersection of Benns Church Boulevard and Site Driveway #3 *(Int. #7)*
- Install a traffic signal at the intersection of Benns Church Boulevard and Site Driveway #3/Sweetgrass Driveway *(Int. #7).* This traffic signal will be completed as part of the Sweetgrass development.
- Provide an additional exclusive northbound left-turn lane at the intersection of Benns Church Boulevard and Turner Drive *(Int. #3)* to provide a dual-left turn movement

5.3.2.3 Horizon Year (2045) Recommendations

In addition to the recommendations included in the 2029 analysis scenarios and the proposed turn lane improvements, the following recommendations are included in the 2045 analysis scenarios:

- Widen Benns Church Boulevard to a six-lane roadway (three lanes in each direction) for the extent of the study area limits from Cypress Run Drive to Red Oaks Drive.
- Modify the westbound approach geometry at the intersection of Benns Church Boulevard and Cypress Run Drive *(Int. #1)* to include the following laneage:
  - Exclusive left-turn lane
  - Shared through-left turn lane
  - Exclusive right-turn lane with a storage length of 100 feet and a 100-foot taper
- Modify the westbound approach geometry at the intersection of Benns Church Boulevard and Turner Drive *(Int. #3)* to include the following laneage:
  - Exclusive left-turn lane
  - Shared through-left turn lane
  - Exclusive right-turn lane with a storage length of 100 feet and a 100-foot taper

5.4 INTERSECTION OPERATIONAL ANALYSIS

All signalized and unsignalized intersection capacity analyses were completed using *Synchro Professional (Version 11.1)* and *SimTraffic*, which is the microsimulation companion tool of *Synchro*. Existing traffic signal timings were provided by VDOT. The cycle lengths were kept consistent, and the splits were adjusted in the future conditions analyses.

Two (2) measures of effectiveness (MOE) were analyzed in the intersection capacity analyses – average vehicle delay (in seconds per vehicle) and maximum queue lengths (in feet, rounded up to the nearest 5 feet). Average vehicle delays were obtained using *2000 Highway Capacity Manual (HCM)* methodologies contained within *Synchro*. Maximum queue lengths were obtained by averaging results from 10 individual *SimTraffic* simulation runs. Accompanying HCM vehicle delays are HCM level of service (LOS)

designations. LOS ranges from A to F— "A" indicating a condition of little or no congestion and "F" a condition with severe congestion, unstable traffic flow, and stop-and-go conditions. **Table 8** summarizes LOS thresholds by vehicle delay for signalized and unsignalized intersections.

Throughout this section, average vehicle delay and LOS results are presented in tables, while software output results are included in **Appendix C** for the critical study area intersections. The queueing results summary tables are included in **Appendix D**. As part of the queuing analysis, instances where queues extend back and may block or impact adjacent turn- and/or through lanes were noted. Lastly, queue lengths were rounded up to the nearest 5 feet and were summarized in the queue summary tables. Detailed LOS tables are included in **Table 9** through **Table 16**.

Table 8: Level of Service (LOS) Control Delay Thresholds

LOS	Signalized Intersections Control Delay Per Vehicle [sec/veh]	Unsignalized Intersections Average Control Delay [sec/veh]	Relative Delay
A	≤ 10	≤ 10	Short Delays
	Free-flow traffic operations at average travel speeds. Vehicles completely unimpeded in ability to maneuver. Minimal delay at signalized intersections.		
B	> 10 – 20	> 10 – 15	
	Reasonably unimpeded traffic operations at average travel speeds. Vehicle maneuverability slightly restricted. Low traffic delays.		
C	> 20 – 35	> 15 – 25	
	Stable traffic operations. Lane changes becoming more restricted. Travel speeds reduced to half of average free flow travel speeds. Longer intersection delays.		
D	>35 – 55	> 25 – 35	Moderate Delays
	Small increases in traffic flow can cause increased delays. Delays likely attributable to increase traffic, reduced signal progression and adverse timing.		
E	>55 – 80	> 35 – 50	
	Significant delays. Travel speeds reduced to one third of average free flow travel speed.		
F	> 80	> 50	Long Delays
	Extremely low speeds. Intersection congestion. Long delays. Extensive traffic queues at intersections.		

As discussed in Section 3.5, a supplemental 2025 PM Build analysis was completed as part of this TIA to confirm no fatal flaws under the 2025 scenario related to school dismissal traffic. The Supplemental 2025 PM Build Analysis Outputs are included in **Appendix E**.

5.4.1 Existing Analysis Results

The Existing AM and PM peak hour LOS/delay is summarized in **Table 9**. Under existing conditions, most of the movements/approaches operate at LOS D or better. The mainline through movements of Benns Church Boulevard operate with moderate delays at LOS C or better. However, the following movements/approaches operate with more significant delays/queues:

- Eastbound and westbound approaches at Benns Church Boulevard and Cypress Run Drive *(Int. #1)*

- The eastbound and westbound approaches operates at LOS E under the Existing AM and PM peak hours. The eastbound/westbound approaches operate in “split-phase” (i.e., movements do not run concurrently) and the existing signal timing priority is given to Benns Church Boulevard. The westbound approach operates with low traffic volumes (i.e., less than 5 vehicles per hour) during the peak hours and the eastbound approach operates with nearly 200 vehicles per hour under the Existing PM peak hour. The minor street delays do not significantly contribute to the overall operations of this intersection.

- Eastbound left-turn movement at Benns Church Boulevard and Turner Drive *(Int. #3)*
  - The eastbound left-turn movement operates at LOS E under the Existing AM and PM peak hours. The eastbound left-turn movement carries over 180 vehicles per hour under the Existing AM peak hour and over 125 vehicles per hour under the Existing PM peak hour. This movement is a relatively high traffic volume movement that is served by a single lane.

Table 9: Existing LOS Summary

ID	Intersection	Traffic Control	Overall LOS	Level of Service per Movement by Approach (Delay in sec/veh)											
				Eastbound			Westbound			Northbound			Southbound		
				LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
AM Peak Hour															
1	Benns Church Boulevard at Cypress Run Drive	Signalized	B	**E**		**E**	**E**			A	A		A	B	A
				(58.5)		(56.7)				(9.4)	(8.9)		(7.1)	(14.0)	(9.6)
			(13.0)	E			(65.1)			A			B		
				(57.2)						(8.9)			(13.9)		
2	Benns Church Boulevard at Tractor Supply Entrance	Unsignalized	A	-		A	-			-	A	-	-	A	A
						(9.5)					(0.0)			(0.0)	(0.0)
			(0.1)	A						A			A		
				(9.5)						(0.0)			(0.0)		
3	Benns Church Boulevard at Turner Drive	Signalized	C	**E**		D	D			C	B		A	B	D
				(75.3)		(42.8)				(22.9)	(14.6)		(4.0)	(19.4)	(44.8)
			(28.1)	E			(40.0)			B			C		
				(56.0)						(16.9)			(25.3)		
4	Benns Church Boulevard at Red Oak Drive	Unsignalized	A	D			-			B	A		A		A
										(10.9)	(0.0)		(0.0)		(0.0)
			(0.5)	(27.3)						A			A		
										(0.1)			(0.0)		
PM Peak Hour															
1	Benns Church Boulevard at Cypress Run Drive	Signalized	B	**E**		D	**E**			C	A		B	C	B
				(61.6)		(53.8)				(21.3)	(5.9)		(13.6)	(24.3)	(15.7)
			(18.6)	E			(68.6)			A			C		
				(57.8)						(8.1)			(23.5)		
2	Benns Church Boulevard at Tractor Supply Entrance	Unsignalized	A	-		A	-			-	A	-	-	A	A
						(9.5)					(0.0)			(0.0)	(0.0)
			(0.0)	A						A			A		
				(9.5)						(0.0)			(0.0)		
3	Benns Church Boulevard at Turner Drive	Signalized	B	**E**		D	D			B	B		C	B	C
				(58.6)		(46.8)				(16.4)	(16.0)		(21.5)	(13.1)	(25.9)
			(18.9)	D			(45.9)			B			B		
				(52.7)						(16.0)			(14.9)		
4	Benns Church Boulevard at Red Oak Drive	Unsignalized	A	**E**			-			B	A		A		A
										(12.0)	(0.0)		(0.0)		(0.0)
			(0.5)	(44.3)						A			A		
										(0.2)			(0.0)		

5.4.2 *Future Analysis Results*

The future AM and PM peak hour LOS and delay results are summarized in **Table 10** through **Table 16**. Under the future conditions, the traffic volumes and magnitudes are expected to change significantly. The change in traffic patterns and the proposed roadway geometry results in different delays and queues under the future analysis scenarios when compared to the Existing and No Build peak hour scenarios.

Under No Build conditions, minor changes in traffic volume patterns are expected, and the No Build results are expected to be comparable to the existing conditions. The minor street approaches at the signalized intersections of Benns Church Boulevard at Cypress Run Drive and Benns Church Boulevard at Turner Drive continue to operate at LOS D or LOS E under the No Build conditions. However, all the study intersections operate at an overall LOS C or better under the 2025 No Build peak hour scenarios.

Under the 2025 Build peak hour scenarios, the study intersections operate at an overall LOS D or better. The proposed single-lane roundabout at the intersection of Turner Drive and Site Driveway #5 is able to support the projected traffic volumes without impacting the adjacent study intersections. The increase in traffic volumes along Benns Church Boulevard creates additional delay at the minor street approach for the Red Oak Drive intersection. Under the 2025 Build peak hour scenarios, the eastbound approach at the Benns Church Boulevard and Red Oak Drive intersection operates at LOS F. This approach experiences increased delays under the future Build scenarios, however the traffic volumes on this approach are relatively low and do not adversely impact the overall operations along Benns Church Boulevard. The proposed eastbound turn lane improvements at the intersection of Benns Church Boulevard and Turner Drive result in moderate delays with queues that are not expected to impact the adjacent study intersections. Minor delays and queues are expected at the site driveway intersections under the 2025 Build peak hour scenarios.

Under the 2029 Build peak hour scenarios, moderate congestion is expected with no intersections operating at an overall LOS E or worse. The proposed improvements along Benns Church Boulevard are able to accommodate the projected traffic volumes under the 2029 Build scenarios. The proposed dual northbound left-turn lanes at the Benns Church Boulevard and Turner Drive intersection results in manageable delays with the northbound left-turn movement operating at LOS D under the AM peak hour and LOS E under the PM peak hour scenario. Without dual northbound left-turn lanes, this movement is expected to fail and create significant impacts along Benns Church Boulevard.

Under 2045 Build conditions, the traffic volumes are much larger than the No Build volumes. With this increase in traffic volumes, there is a greater need for additional capacity along Benns Church Boulevard. Under the 2045 Build conditions, the widening of Benns Church Boulevard to a six-lane roadway results in moderate delays with no intersections operating at an overall LOS F. Some of the minor street movements and approaches are expected to operate at LOS F due to the increase in traffic along Benns Church Boulevard. However, these additional delays do not adversely impact the overall operations within the study area.

Table 10: 2025 No-Build LOS Summary

ID	Intersection	Traffic Control	Overall LOS	Level of Service per Movement by Approach (Delay in sec/veh)											
				Eastbound			Westbound			Northbound			Southbound		
				LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
AM Peak Hour															
1	Benns Church Boulevard at Cypress Run Drive	Signalized	B	**E**		**E**		**E**		A	A		A	B	A
				(58.5)		(56.7)				(9.7)	(8.7)		(7.2)	(14.3)	(9.6)
			(13.0)	E				(65.1)		A			B		
				(57.2)						(8.7)			(14.1)		
2	Benns Church Boulevard at Tractor Supply Entrance	Unsignalized	A	-		A		-		-	A	-	-	A	A
						(9.4)					(0.0)			(0.0)	(0.0)
			(0.1)	A						A			A		
				(9.4)						(0.0)			(0.0)		
3	Benns Church Boulevard at Turner Drive	Signalized	C	**E**		D		D		B	B		A	B	D
				(72.9)		(42.7)				(19.3)	(14.2)		(2.8)	(17.8)	(44.8)
			(26.9)	D				(40.3)		B			C		
				(55.0)						(15.6)			(24.0)		
4	Benns Church Boulevard at Red Oak Drive	Unsignalized	A	D				-		B	A		A		A
										(11.1)	(0.0)		(0.0)		(0.0)
			(0.5)	(28.7)						A			A		
										(0.1)			(0.0)		
PM Peak Hour															
1	Benns Church Boulevard at Cypress Run Drive	Signalized	B	**E**		D		**E**		C	A		B	C	B
				(62.5)		(53.8)				(21.6)	(5.9)		(14.2)	(25.5)	(16.1)
			(19.1)	E				(68.6)		A			C		
				(58.3)						(8.1)			(24.6)		
2	Benns Church Boulevard at Tractor Supply Entrance	Unsignalized	A	-		A		-		-	A	-	-	A	A
						(9.6)					(0.0)			(0.0)	(0.0)
			(0.0)	A						A			A		
				(9.6)						(0.0)			(0.0)		
3	Benns Church Boulevard at Turner Drive	Signalized	B	**E**		D		D		B	B		C	B	C
				(59.0)		(46.7)				(18.6)	(16.4)		(23.2)	(13.5)	(25.6)
			(19.4)	D				(45.8)		B			B		
				(52.8)						(16.7)			(15.2)		
4	Benns Church Boulevard at Red Oak Drive	Unsignalized	A	**E**				-		B	A		A		A
										(12.3)	(0.0)		(0.0)		(0.0)
			(0.6)	(48.9)						A			A		
										(0.2)			(0.0)		

Table 11: 2025 AM Build LOS Summary

ID	Intersection	Traffic Control	Overall LOS	Level of Service per Movement by Approach (Delay in sec/veh)											
				Eastbound			Westbound			Northbound			Southbound		
				LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
AM Peak Hour															
1	Benns Church Boulevard at Cypress Run Drive	Signalized	B	**E**		**E**	**E**			B	B		A	B	A
				(69.1)		(66.6)				(12.8)	(11.8)		(7.5)	(13.1)	(8.6)
			(14.0)	E			(70.1)			B			B		
				(67.3)						(11.9)			(13.0)		
2	Benns Church Boulevard at Tractor Supply Entrance	Unsignalized	A	-		A	-			-	A	-	-	A	A
						(9.8)					(0.0)			(0.0)	(0.0)
			(0.1)	A			-			A			A		
				(9.8)						(0.0)			(0.0)		
3	Benns Church Boulevard at Turner Drive	Signalized	D	**E**	**E**	D	**E**			C	B		A	D	**E**
				(68.9)	(68.9)	(52.8)				(27.9)	(16.9)		(7.9)	(35.3)	(57.9)
			(38.2)	E			(71.2)			C			D		
				(61.6)						(20.2)			(39.0)		
4	Benns Church Boulevard at Red Oak Drive	Unsignalized	A	D			-			B	A		A		A
										(11.5)	(0.0)		(0.0)		(0.0)
			(0.5)	(32.5)						A			A		
										(0.1)			(0.0)		
5	Benns Church Boulevard at Site Driveway #1	Unsignalized	A	-		B	-			-	A	-	-	A	A
						(12.5)					(0.0)			(0.0)	(0.0)
			(0.1)	B			-			A			A		
				(12.5)						(0.0)			(0.0)		
6	Benns Church Boulevard at Site Driveway #2	Unsignalized	A	-		A	-			-	A	-	-	A	A
						(9.7)					(0.0)			(0.0)	(0.0)
			(0.4)	A			-			A			A		
				(9.7)						(0.0)			(0.0)		
7	Benns Church Boulevard at Site Driveway #3	Unsignalized	A	-		B	-			B	A	-	-	A	A
						(15.0)				(13.4)	(0.0)			(0.0)	(0.0)
			(1.3)	B			-			A			A		
				(15.0)						(1.8)			(0.0)		
8	Tractor Supply Entrance at Site Driveway #4	Unsignalized	A	-	A		A		-	A	-	A	-		
					(0.0)		(7.2)			(8.3)		(8.3)			
			(7.5)	A			A			A			-		
				(0.0)			(7.2)			(8.3)					
9	Turner Drive at Site Driveway #5	Unsignalized	A	A			A			A			A		
			(7.5)	(5.0)			(7.3)			(8.8)			(6.2)		
10	Tractor Supply Entrance at Site Driveway #6	Unsignalized	A	A		-	-	A		-			A	-	A
				(0.0)				(0.0)					(8.5)		(8.5)
			(6.1)	A			A						A		
				(0.0)			(0.0)						(8.5)		
11	Site Driveway #3 at Site Driveway #5	Unsignalized	A	A		-	-	A		-			B	-	B
				(0.0)				(0.3)					(10.1)		(10.1)
			(2.1)	A			A						B		
				(0.0)			(0.3)						(10.1)		

Table 12: 2025 PM Build LOS Summary

ID	Intersection	Traffic Control	Overall LOS	Level of Service per Movement by Approach (Delay in sec/veh)											
				Eastbound			Westbound			Northbound			Southbound		
				LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
PM Peak Hour															
1	Benns Church Boulevard at Cypress Run Drive	Signalized	C	**E**		**E**	**F**			C	B		B	C	B
				(71.0)		(61.5)				(30.5)	(16.5)		(14.1)	(23.3)	(14.5)
			(23.6)	E			(88.8)			B			C		
				(66.3)						(18.4)			(22.6)		
2	Benns Church Boulevard at Tractor Supply Entrance	Unsignalized	A	-		A	-			-	A	-	-	A	A
						(9.6)					(0.0)			(0.0)	(0.0)
			(0.1)	A			-			A			A		
				(9.6)						(0.0)			(0.0)		
3	Benns Church Boulevard at Turner Drive	Signalized	C	**E**	**E**	**E**	**E**			D	B		A	C	D
				(67.3)	(67.6)	(56.1)				(43.0)	(20.0)		(6.8)	(35.0)	(42.4)
			(33.4)	E			(71.7)			C			C		
				(65.6)						(24.6)			(34.4)		
4	Benns Church Boulevard at Red Oak Drive	Unsignalized	A	**F**			-			B	A		A		A
										(12.7)	(0.0)		(0.0)		(0.0)
			(0.6)	(57.7)						A			A		
										(0.2)			(0.0)		
5	Benns Church Boulevard at Site Driveway #1	Unsignalized	A	-		B	-			-	A	-	-	A	A
						(14.4)					(0.0)			(0.0)	(0.0)
			(0.1)	B			-			A			A		
				(14.4)						(0.0)			(0.0)		
6	Benns Church Boulevard at Site Driveway #2	Unsignalized	A	-		A	-			-	A	-	-	A	A
						(9.9)					(0.0)			(0.0)	(0.0)
			(0.2)	A			-			A			A		
				(9.9)						(0.0)			(0.0)		
7	Benns Church Boulevard at Site Driveway #3	Unsignalized	A	-		C	-			B	A	-	-	A	A
						(17.1)				(11.8)	(0.0)			(0.0)	(0.0)
			(0.9)	C			-			A			A		
				(17.1)						(0.2)			(0.0)		
8	Tractor Supply Entrance at Site Driveway #4	Unsignalized	A	-	A		A		-	A	-	A	-		
					(0.0)		(7.2)			(8.3)		(8.3)			
			(7.6)	A			A			A			-		
				(0.0)			(7.2)			(8.3)					
9	Turner Drive at Site Driveway #5	Unsignalized	A	A			A			A			A		
			(6.0)	(5.7)			(4.7)			(5.0)			(6.8)		
10	Tractor Supply Entrance at Site Driveway #6	Unsignalized	A	A		-	-	A		-			A	-	A
				(0.0)				(0.0)					(0.0)		(0.0)
			(0.0)	A			A						A		
				(0.0)			(0.0)						(0.0)		
11	Site Driveway #3 at Site Driveway #5	Unsignalized	A	A		-	-	A		-			A	-	A
				(0.8)				(1.6)					(9.5)		(9.5)
			(1.8)	A			A						A		
				(0.8)			(1.6)						(9.5)		

Table 13: 2029 AM Build LOS Summary

ID	Intersection	Traffic Control	Overall LOS	Level of Service per Movement by Approach (Delay in sec/veh)											
				Eastbound			Westbound			Northbound			Southbound		
				LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
AM Peak Hour															
1	Benns Church Boulevard at Cypress Run Drive	Signalized	D	**F**		**E**	**F**			D	D		D	C	B
				(80.6)		(63.6)				(52.5)	(36.2)		(36.0)	(35.0)	(18.5)
			(39.1)	E			(80.3)			D			C		
				(70.8)						(37.3)			(34.6)		
2	Benns Church Boulevard at Tractor Supply Entrance	Unsignalized	A	-		B	-			-	A	-	-	A	A
						(10.8)					(0.0)			(0.0)	(0.0)
			(0.3)	B			-			A			A		
				(10.8)						(0.0)			(0.0)		
3	Benns Church Boulevard at Turner Drive	Signalized	D	**F**	**F**	**E**	**E**			D	C	B	A	C	C
				(91.3)	(90.3)	(59.0)				(44.7)	(24.0)	(15.5)	(6.7)	(34.8)	(21.7)
			(41.6)	E			(73.1)			C			C		
				(75.5)						(31.0)			(31.5)		
4	Benns Church Boulevard at Red Oak Drive	Unsignalized	A	**F**			-			C	A		A		A
										(15.5)	(0.0)		(0.0)		(0.0)
			(1.8)	(160.6)						A			A		
										(0.1)			(0.0)		
5	Benns Church Boulevard at Site Driveway #1	Unsignalized	A	-		C	-			-	A	-	-	A	A
						(15.4)					(0.0)			(0.0)	(0.0)
			(0.1)	C			-			A			A		
				(15.4)						(0.0)			(0.0)		
6	Benns Church Boulevard at Site Driveway #2	Unsignalized	A	-		B	-			-	A	-	-	A	A
						(10.7)					(0.0)			(0.0)	(0.0)
			(0.4)	B			-			A			A		
				(10.7)						(0.0)			(0.0)		
7	Benns Church Boulevard at Site Driveway #3	Signalized	C	**E**	**E**		**E**	**E**		B	B	A	A	C	D
				(77.6)	(68.1)		(77.6)	(65.0)		(13.6)	(10.3)	(6.9)	(7.7)	(33.4)	(48.0)
			(31.9)	E			E			B			C		
				(71.6)			(73.4)			(10.6)			(33.5)		
8	Tractor Supply Entrance at Site Driveway #4	Unsignalized	A	-	A		A		-	A	-	A	-		
					(0.0)		(6.6)			(8.7)		(8.7)			
			(6.4)	A			A			A			-		
				(0.0)			(6.6)			(8.7)					
9	Turner Drive at Site Driveway #5	Unsignalized	C	A			B			D			B		
			(16.7)	(9.5)			(2.1)			(25.5)			(12.7)		
10	Tractor Supply Entrance at Site Driveway #6	Unsignalized	A	A		-	-	A		-			A	-	A
				(0.0)				(0.0)					(8.6)		(8.6)
			(5.4)	A			A						A		
				(0.0)			(0.0)						(8.6)		
11	Site Driveway #3 at Site Driveway #5	Unsignalized	A	A		-	-	A		-			B	-	B
				(0.0)				(0.3)					(11.7)		(11.7)
			(4.7)	A			A						B		
				(0.0)			(0.3)						(11.7)		
12	Benns Church Boulevard at Site Driveway #7	Unsignalized	A	-			-		B	-	A	A	-	A	-
									(13.0)		(0.0)	(0.0)		(0.0)	
			(0.2)				B			A			A		
							(13.0)			(0.0)			(0.0)		

Table 14: 2029 PM Build LOS Summary

ID	Intersection	Traffic Control	Overall LOS	Level of Service per Movement by Approach (Delay in sec/veh)											
				Eastbound			Westbound			Northbound			Southbound		
				LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
PM Peak Hour															
1	Benns Church Boulevard at Cypress Run Drive	Signalized	D	**F**		**E**	**F**			**E**	C		D	D	B
				(105.3)		(62.3)				(66.7)	(34.8)		(36.8)	(43.4)	(19.8)
			(50.7)	F			(260.3)			D			D		
				(84.1)						(39.9)			(41.2)		
2	Benns Church Boulevard at Tractor Supply Entrance	Unsignalized	A	-		B	-			-	A	-	-	A	A
						(11.6)					(0.0)			(0.0)	(0.0)
			(0.2)	B						A			A		
				(11.6)						(0.0)			(0.0)		
3	Benns Church Boulevard at Turner Drive	Signalized	C	**E**	**E**	**E**	**F**			**E**	B	B	C	D	B
				(69.3)	(68.5)	(57.5)				(55.9)	(18.6)	(15.7)	(23.3)	(35.2)	(11.2)
			(32.6)	E			(86.6)			C			C		
				(65.6)						(25.7)			(31.4)		
4	Benns Church Boulevard at Red Oak Drive	Unsignalized	A	**F**			-			C	A		A		A
										(16.1)	(0.0)		(0.0)		(0.0)
			(2.5)	(331.2)						A			A		
										(0.2)			(0.0)		
5	Benns Church Boulevard at Site Driveway #1	Unsignalized	A	-		C	-			-	A	-	-	A	A
						(17.9)					(0.0)			(0.0)	(0.0)
			(0.1)	C						A			A		
				(17.9)						(0.0)			(0.0)		
6	Benns Church Boulevard at Site Driveway #2	Unsignalized	A	-		B	-			-	A	-	-	A	A
						(11.2)					(0.0)			(0.0)	(0.0)
			(0.2)	B						A			A		
				(11.2)						(0.0)			(0.0)		
7	Benns Church Boulevard at Site Driveway #3	Signalized	D	**F**		**E**	**E**		**E**	B	C	B	D	D	**E**
				(165.1)		(79.9)	(73.3)		(63.6)	(11.6)	(29.4)	(14.7)	(44.3)	(39.5)	(70.4)
			(45.0)	F			E			C			D		
				(117.9)			(69.5)			(26.8)			(42.2)		
8	Tractor Supply Entrance at Site Driveway #4	Unsignalized	A	-		A	A		-	A	-	A	-		
						(0.0)	(5.4)			(8.9)		(8.9)			
			(6.2)	A			A			A					
				(0.0)			(5.4)			(8.9)					
9	Turner Drive at Site Driveway #5	Unsignalized	A	A			A			A			A		
			(7.1)	(7.9)			(0.0)			(6.0)			(9.4)		
10	Tractor Supply Entrance at Site Driveway #6	Unsignalized	A	A		-	-		A				A	-	A
				(0.0)					(0.0)				(8.7)		(8.7)
			(2.5)	A			A			-			A		
				(0.0)			(0.0)						(8.7)		
11	Site Driveway #3 at Site Driveway #5	Unsignalized	A	A		-	-		A				B	-	B
				(0.8)					(6.9)				(11.3)		(11.3)
			(4.7)	A			A			-			B		
				(0.8)			(6.9)						(11.3)		
12	Benns Church Boulevard at Site Driveway #7	Unsignalized	A	-			-		C	-	A	A	-	A	-
									(20.2)		(0.0)	(0.0)		(0.0)	
			(0.2)				C			A			A		
							(20.2)			(0.0)			(0.0)		

Table 15: 2045 AM Build LOS Summary

ID	Intersection	Traffic Control	Overall LOS	Level of Service per Movement by Approach (Delay in sec/veh)											
				Eastbound			Westbound			Northbound			Southbound		
				LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
AM Peak Hour															
1	Benns Church Boulevard at Cypress Run Drive	Signalized	D	**F**		**E**	**F**	**F**	D	**E**	D		**E**	D	C
				(144.9)		(66.1)	> 300	> 300	(39.4)	(68.0)	(40.4)		(57.2)	(36.3)	(23.5)
			(54.7)	F			F			D			D		
				(98.6)			(265.9)			(42.1)			(37.3)		
2	Benns Church Boulevard at Tractor Supply Entrance	Unsignalized	A	-		A	-			-	A	-	-	A	A
						(10.0)					(0.0)			(0.0)	(0.0)
			(0.3)	A						A			A		
				(10.0)						(0.0)			(0.0)		
3	Benns Church Boulevard at Turner Drive	Signalized	D	**F**	**F**	**F**	**E**	**E**	**E**	D	C	B	A	C	D
				(121.5)	(118.5)	(108.7)	(71.5)	(72.1)	(67.2)	(43.0)	(23.1)	(15.9)	(7.3)	(26.3)	(49.0)
			(50.1)	F			E			C			C		
				(114.4)			(71.4)			(29.3)			(31.8)		
4	Benns Church Boulevard at Red Oak Drive	Unsignalized	A	**F**			-			C	A		A		A
										(19.3)	(0.0)		(0.0)		(0.0)
			(6.8)	> 300						A			A		
										(0.2)			(0.0)		
5	Benns Church Boulevard at Site Driveway #1	Unsignalized	A	-		B	-			-	A	-	-	A	A
						(13.1)					(0.0)			(0.0)	(0.0)
			(0.1)	B						A			A		
				(13.1)						(0.0)			(0.0)		
6	Benns Church Boulevard at Site Driveway #2	Unsignalized	A	-		A	-			-	A	-	-	A	A
						(10.0)					(0.0)			(0.0)	(0.0)
			(0.3)	A						A			A		
				(10.0)						(0.0)			(0.0)		
7	Benns Church Boulevard at Site Driveway #3	Signalized	C	**E**	**E**		**E**	**E**		B	A	A	A	C	**E**
				(72.6)	(67.9)		(77.6)	(64.6)		(17.1)	(9.3)	(6.9)	(8.8)	(31.3)	(77.9)
			(30.7)	E			E			B			C		
				(69.8)			(73.3)			(10.2)			(34.8)		
8	Tractor Supply Entrance at Site Driveway #4	Unsignalized	A	-	A		A		-	A	-	A	-		
					(0.0)		(6.6)			(8.7)		(8.7)			
			(6.4)	A			A			A					
				(0.0)			(6.6)			(8.7)					
9	Turner Drive at Site Driveway #5	Unsignalized	C	B			C			**E**			C		
			(23.8)	(11.1)			(2.4)			(37.6)			(16.8)		
10	Tractor Supply Entrance at Site Driveway #6	Unsignalized	A	A		-	-	A					A	-	A
				(0.0)				(0.0)					(8.6)		(8.6)
			(5.4)	A			A						A		
				(0.0)			(0.0)						(8.6)		
11	Site Driveway #3 at Site Driveway #5	Unsignalized	A	A		-	-	A					B	-	B
				(0.0)				(0.3)					(11.0)		(11.0)
			(4.2)	A			A						B		
				(0.0)			(0.3)						(11.0)		
12	Benns Church Boulevard at Site Driveway #7	Unsignalized	A	-			-		B	-	A	A	-	A	-
									(11.6)		(0.0)	(0.0)		(0.0)	
			(0.1)				B			A			A		
							(11.6)			(0.0)			(0.0)		

Table 16: 2045 PM Build LOS Summary

ID	Intersection	Traffic Control	Overall LOS	Level of Service per Movement by Approach (Delay in sec/veh)											
				Eastbound			Westbound			Northbound			Southbound		
				LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
PM Peak Hour															
1	Benns Church Boulevard at Cypress Run Drive	Signalized	D	**F**		**E**	**F**	**F**	**E**	**E**	C		D	C	B
				(132.5)		(62.2)	(145.2)	(156.8)	(67.5)	(79.5)	(32.3)		(40.6)	(29.6)	(19.1)
			(42.1)	F			F			D			C		
				(97.9)			(101.4)			(39.4)			(29.4)		
2	Benns Church Boulevard at Tractor Supply Entrance	Unsignalized	A	-		B	-			-	A	-	-	A	A
						(10.1)					(0.0)			(0.0)	(0.0)
			(0.2)	B						A			A		
				(10.1)						(0.0)			(0.0)		
3	Benns Church Boulevard at Turner Drive	Signalized	C	**E**	**E**	**E**	**F**	**F**	**E**	D	B	B	C	C	C
				(71.7)	(71.3)	(56.4)	(102.8)	(81.2)	(63.5)	(49.7)	(16.3)	(16.9)	(27.2)	(29.5)	(27.6)
			(31.2)	E			F			C			C		
				(66.7)			(89.6)			(22.3)			(29.2)		
4	Benns Church Boulevard at Red Oak Drive	Unsignalized	B	**F**			-			C	A		A		A
										(21.8)	(0.0)		(0.0)		(0.0)
			(10.3)	> 300						A			A		
										(0.3)			(0.0)		
5	Benns Church Boulevard at Site Driveway #1	Unsignalized	A	-		B	-			-	A	-	-	A	A
						(14.5)					(0.0)			(0.0)	(0.0)
			(0.1)	B						A			A		
				(14.5)						(0.0)			(0.0)		
6	Benns Church Boulevard at Site Driveway #2	Unsignalized	A	-		B	-			-	A	-	-	A	A
						(10.1)					(0.0)			(0.0)	(0.0)
			(0.1)	B						A			A		
				(10.1)						(0.0)			(0.0)		
7	Benns Church Boulevard at Site Driveway #3	Signalized	D	**F**	**F**		**E**	**E**		B	C	B	D	D	**F**
				(165.1)	(83.3)		(73.3)	(63.6)		(11.6)	(23.2)	(14.5)	(52.6)	(39.6)	(83.9)
			(42.0)	F			E			C			D		
				(120.9)			(69.5)			(21.9)			(43.5)		
8	Tractor Supply Entrance at Site Driveway #4	Unsignalized	A	-	A		A		-	A	-	A	-		
					(0.0)		(5.4)			(8.9)		(8.9)			
			(6.2)	A			A			A			-		
				(0.0)			(5.4)			(8.9)					
9	Turner Drive at Site Driveway #5	Unsignalized	A	A			A			A			B		
			(8.9)	(9.2)			(1.6)			(6.8)			(11.5)		
10	Tractor Supply Entrance at Site Driveway #6	Unsignalized	A	A		-	-	A		-			A	-	A
				(0.0)				(0.0)					(8.7)		(8.7)
			(2.5)	A			A						A		
				(0.0)			(0.0)						(8.7)		
11	Site Driveway #3 at Site Driveway #5	Unsignalized	A	A		-	-	A		-			B	-	B
				(0.8)				(7.6)					(11.1)		(11.1)
			(4.3)	A			A						B		
				(0.8)			(7.6)						(11.1)		
12	Benns Church Boulevard at Site Driveway #7	Unsignalized	A	-			-	C		-	A	A	-	A	-
								(15.5)			(0.0)	(0.0)		(0.0)	
			(0.2)				C			A			A		
							(15.5)			(0.0)			(0.0)		

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 PROJECT BACKGROUND

The purpose of the Benns Church TIA is to serve as a planning level document to analyze existing and future traffic conditions within the study area, identify necessary roadway improvements in order to serve future traffic demands, and determine potential long-term solutions along Benns Church Boulevard to support planning efforts for Isle of Wight County, the Town of Smithfield, and the Virginia Department of Transportation.

A study work group (SWG) was formed to obtain concurrence on study assumptions and identify potential roadway improvements within the study area. The SWG included members from the following organizations:

- Virginia Department of Transportation (VDOT)
- Isle of Wight County
- Town of Smithfield
- Harrison and Lear, Inc.
- Greenwood Homes
- Kimley-Horn and Associates

The SWG regularly held meetings throughout the duration of the project to determine the study area, develop study assumptions, discuss operational analysis results, and identify potential roadway improvements within the study area. The study area was determined to include four (4) existing intersections along Benns Church Boulevard and eight (8) proposed study intersections. The intersections included in this study are included below:

1. Benns Church Boulevard (U.S. Route 258/State Route 10) at Cypress Run Drive (Signalized)
2. Benns Church Boulevard at Tractor Supply Entrance (Unsignalized – Right-In/Right-Out)
3. Benns Church Boulevard at Turner Drive (State Route 644) (Signalized)
4. Benns Church Boulevard at Red Oak Drive (Unsignalized – Full Movement)
5. Benns Church Boulevard at Site Driveway #1
6. Benns Church Boulevard at Site Driveway #2
7. Benns Church Boulevard at Site Driveway #3
8. Tractor Supply Entrance at Site Driveway #4
9. Turner Drive at Site Driveway #5
10. Tractor Supply Entrance at Site Driveway #6
11. Site Driveway #3 at Site Driveway #5
12. Benns Church Boulevard at Site Driveway #7

Table 17 summarizes the anticipated developments, roadway geometry, and traffic volumes included in the existing and future analysis scenarios.

Table 17: Summary of Analysis Scenarios

Scenario	Developments Included	Roadway Conditions	Traffic Volumes
Scenario 1: Existing Conditions (2022)	No Developments Included	Existing Conditions Figure 2	2022 Existing Volumes Figure 3
Scenario 2: Interim Year (2025) No-Build Conditions	No Developments Included	Existing Conditions Figure 2	Existing Volumes **+** **3 Years of Background Growth (1.0% Annually)** Figure 4
Scenario 3: Interim Year (2025) Build Conditions	**Turner North – Parcels 2 and 5** **Turner South – Parcels 6 and 13**	No Build Conditions **+** **Site Driveways** **Full Build-Out of all Public Roads** **Smithfield High School Roadway Connection with right-in/right-out/left-in configuration at Intersection #7** Figure 12	2025 Background Volumes **+** **Proposed Development Trips** Figure 5: Proposed Developments
Scenario 4: Future Year (2029) Build Conditions	**Turner North – Full Build-Out** **Turner South – Full Build-Out** **Cypress Run South** **50% of Smithfield Development** **Smithfield Intermediate School** **Sweetgrass – Full Build-Out**	Interim Year (2025) Build Conditions + **Signalized Intersection at Intersection #7 (By Others)** Figure 13	Existing Volumes **+** **7 Years of Background Growth (1.0% Annually)** **Proposed Development Trips** Figure 9

Scenario	Developments Included	Roadway Conditions	Traffic Volumes
Scenario 5: Horizon Year (2045) Build Conditions	**Turner North – Full Build-Out** **Turner South – Full Build-Out** **Smithfield Development – Full Build-Out** **Smithfield Intermediate School** **Sweetgrass – Full Build-Out**	Future Year (2029) Build Conditions Figure 14	Existing Volumes**+** **23 Years of Background Growth (1.0% Annually)** **Proposed Development Trips** Figure 6: 2025 Build Site AM and PM Peak Hour Volumes

6.2 PROPOSED RECOMMENDATIONS

Based on the operational analysis and discussions with the SWG, several recommendations were recommended at the study area intersections. These recommendations are summarized below:

Interim Year (2025) Recommendations

- Turn lane improvements as described below:
  - Exclusive southbound right-turn lane with a storage length of 100 feet and a 200-foot taper at the intersection of Benns Church Boulevard and Site Driveway #1 *(Int. #5)*
  - Exclusive southbound right-turn lane with a storage length of 100 feet and a 100-foot taper at the intersection of Benns Church Boulevard and Site Driveway #2 *(Int. #6)*
  - Extend the existing exclusive northbound left-turn lane with a storage length of 100 feet and a 200-foot taper at the intersection of Benns Church Boulevard and Site Driveway #3 *(Int. #7).* It should be noted that an increase in storage length for this movements is warranted and recommended in 2029. It is recommended that the full turn lane with a storage length of 200 feet and a 200-foot taper be constructed in 2025 when the connection to Benns Church Boulevard is made.
- Single-Lane Roundabout at the intersection of Turner Drive and Site Driveway #5 *(Int. #9)*
  - The westbound approach will include a channelized slip right-turn lane.
- Modify eastbound approach geometry at the intersection of Benns Church Boulevard and Turner Drive *(Int. #3)* to include the following laneage:
  - Exclusive left-turn lane
  - Shared through-left turn lane
  - Exclusive right-turn lane with a storage length of 250 feet and a 115-foot taper
  - Two receiving lanes

Future Year (2029) Recommendations

In addition to the recommendations included in the 2025 analysis scenarios, the following recommendations are included in the 2029 analysis scenarios:

- Turn lane improvements as described below:
  - Exclusive southbound right-turn lane with a storage length of 100 feet and a 200-foot taper at the intersection of Benns Church Boulevard and Tractor Supply Entrance *(Int. #2)*
  - Exclusive northbound left-turn lane with a storage length of 200 feet and a 200-foot taper at the intersection of Benns Church Boulevard and Site Driveway #3 *(Int. #7)*
  - Exclusive northbound right-turn lane with a storage length of 200 feet and a 200-foot taper at the intersection of Benns Church Boulevard and Site Driveway #3 *(Int. #7)*
  - Exclusive southbound left-turn lane with a storage length of 200 feet and a 200-foot taper at the intersection of Benns Church Boulevard and Site Driveway #3 *(Int. #7)*
  - Exclusive southbound right-turn lane with a storage length of 200 feet and a 200-foot taper at the intersection of Benns Church Boulevard and Site Driveway #3 *(Int. #7)*
- Install a traffic signal at the intersection of Benns Church Boulevard and Site Driveway #3/Sweetgrass Driveway *(Int. #7).* This traffic signal will be completed as part of the Sweetgrass development.
- Provide an additional exclusive northbound left-turn lane at the intersection of Benns Church Boulevard and Turner Drive *(Int. #3)* to provide a dual-left turn movement

Horizon Year (2045) Recommendations

In addition to the recommendations included in the 2029 analysis scenarios and the proposed turn lane improvements, the following recommendations are included in the 2045 analysis scenarios:

- Widen Benns Church Boulevard to a six-lane roadway (three lanes in each direction) for the extent of the study area limits from Cypress Run Drive to Red Oaks Drive. An independent roadway capacity evaluation will need to be completed along Benns Church to determine the exact termini of the widening of Benns Church Boulevard.
- Modify the westbound approach geometry at the intersection of Benns Church Boulevard and Cypress Run Drive *(Int. #1)* to include the following laneage:
  - Exclusive left-turn lane
  - Shared through-left turn lane
  - Exclusive right-turn lane with a storage length of 100 feet and a 100-foot taper
- Modify the westbound approach geometry at the intersection of Benns Church Boulevard and Turner Drive *(Int. #3)* to include the following laneage:
  - Exclusive left-turn lane
  - Shared through-left turn lane
  - Exclusive right-turn lane with a storage length of 100 feet and a 100-foot taper

The proposed roadway improvements are also summarized in **Figure 12** through **Figure 14**.

6.3 OVERALL SITE TRAFFIC CONTRIBUTION

In order to support the implementation of the proposed improvements recommended as part of this TIA, site traffic assignments were reviewed to determine the breakdown of traffic under the 2025 and 2029

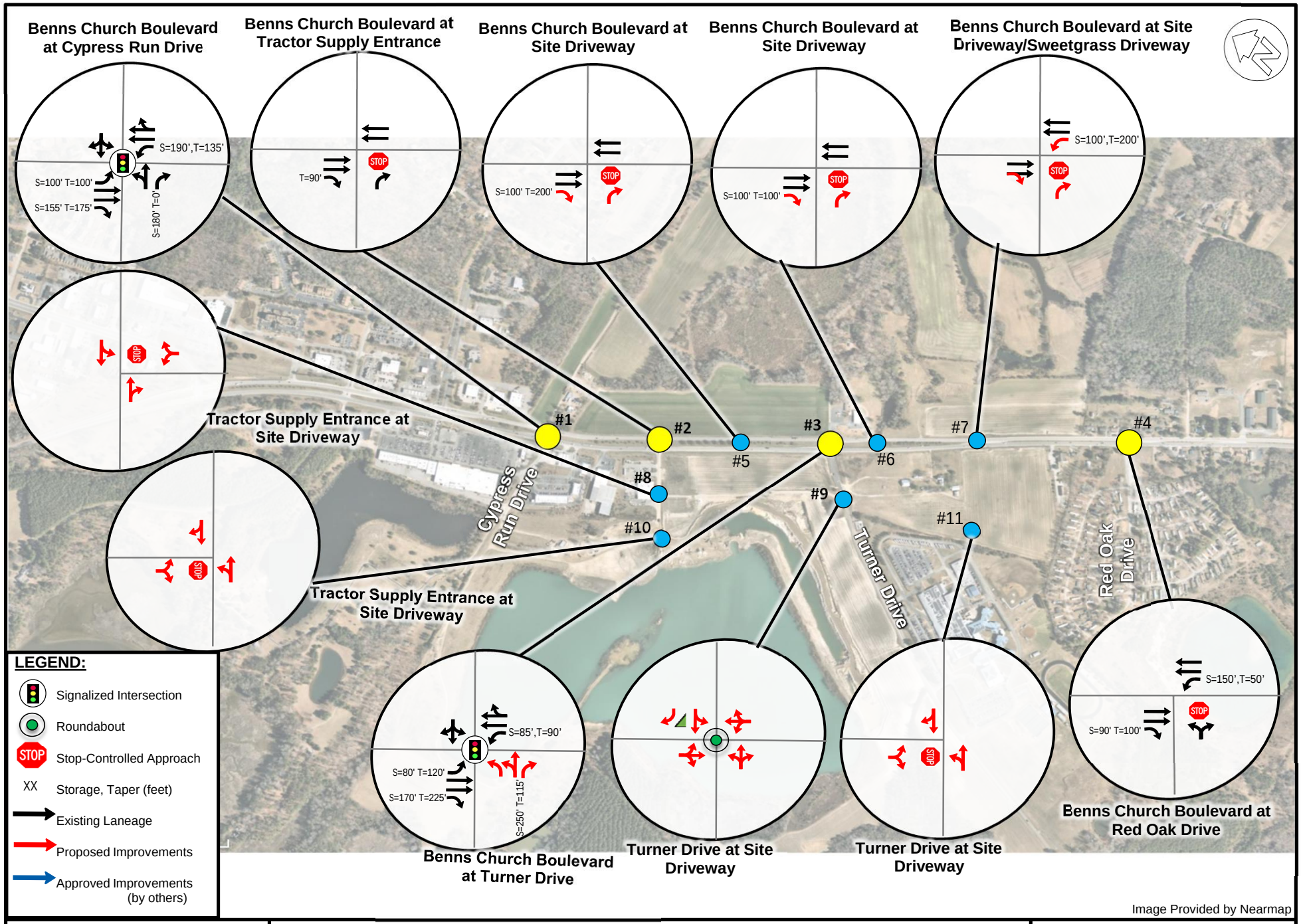
Build scenarios as it pertains to each development. **Table 18** and **Table 19** summarize the percent of traffic by development (i.e., Turner North & South, Cypress Run South, and background traffic) at the locations where roadway improvements are recommended. This data is provided for informational purposes only and may be utilized by the SWG to aid in the determination of cost-sharing when implementing the proposed improvements.

Table 18: 2025 Peak Hour Site Traffic Breakdown

2025 Build Scenario									
No.	Intersection	AM Peak Hour Traffic by Source				PM Peak Hour			
		Turner North & South	Cypress Run South	Other	Total	Turner North & South	Cypress Run South	Other	Total
1	Benns Church Blvd at Cypress Run Dr	No Recommendations							
2	Benns Church Blvd at Tractor Supply	No Recommendations							
3	Benns Church Blvd at Turner Dr	9%	0%	91%	*100%*	7%	0%	93%	*100%*
4	Benns Church Blvd at Red Oak Dr	No Recommendations							
5	Benns Church Blvd at Site Driveway	8%	0%	92%	*100%*	6%	0%	94%	*100%*
6	Benns Church Blvd at Site Driveway	7%	0%	93%	*100%*	4%	0%	96%	*100%*
7	Benns Church Blvd at Site Driveway/Sweetgrass	5%	0%	95%	*100%*	4%	0%	96%	*100%*
8	Tractor Supply Entrance at Site Driveway	No Recommendations							
9	Turner Drive at Site Driveway	31%	0%	69%	*100%*	36%	0%	64%	*100%*
10	Tractor Supply Entrance at Site Driveway	No Recommendations							
11	Turner Drive at Site Driveway	No Recommendations							
12	Benns Church Blvd at Site Driveway	No Recommendations							

Table 19: 2025 Peak Hour Site Traffic Breakdown

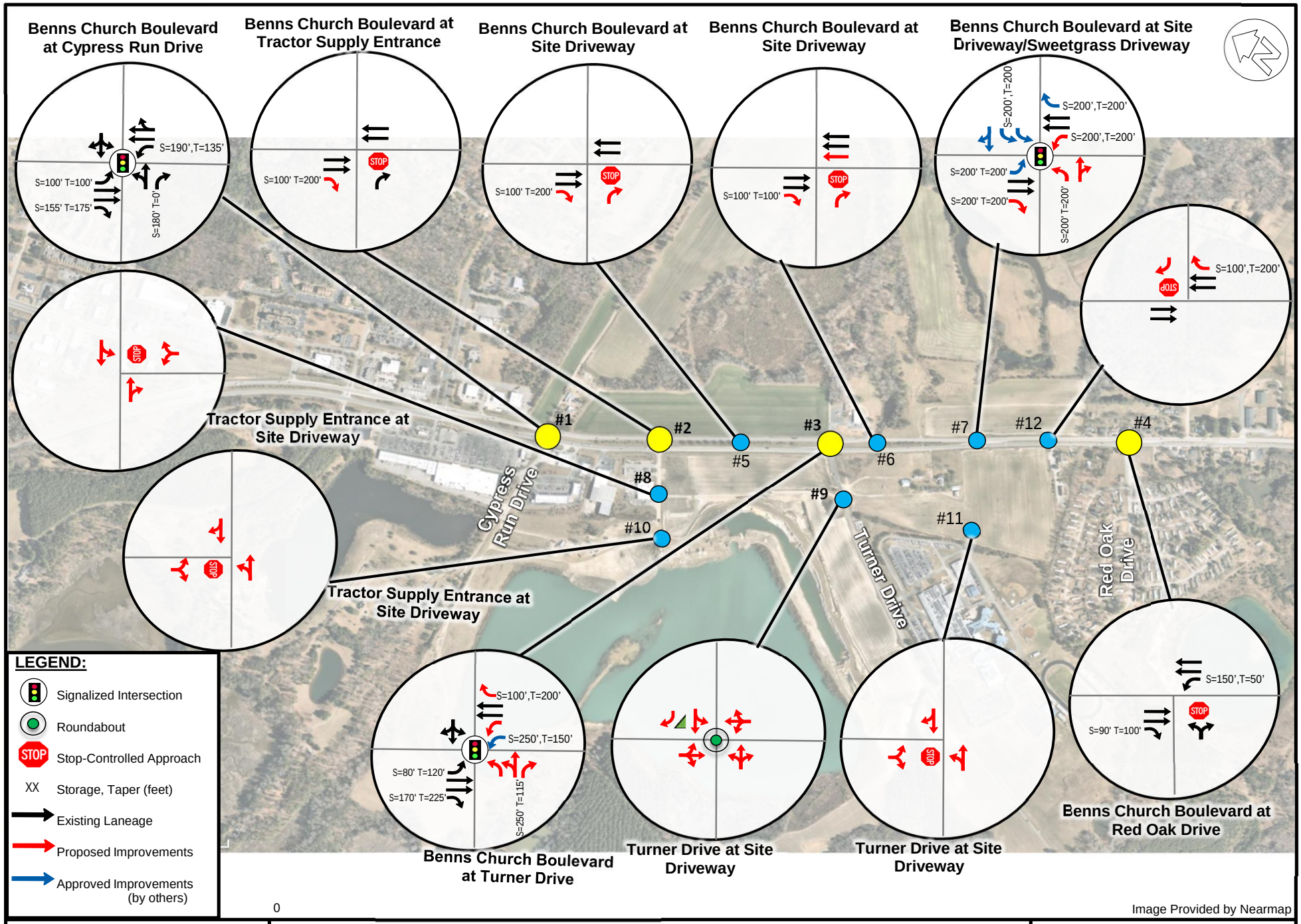
2029 Build Scenario									
No.	Intersection	AM Peak Hour Traffic by Source				PM Peak Hour			
		Turner North & South	Cypress Run South	Other	Total	Turner North & South	Cypress Run South	Other	Total
1	Benns Church Blvd at Cypress Run Dr	No Recommendations							
2	Benns Church Blvd at Tractor Supply	10%	3%	87%	*100%*	7%	4%	89%	*100%*
3	Benns Church Blvd at Turner Dr	10%	2%	88%	*100%*	7%	3%	90%	*100%*
4	Benns Church Blvd at Red Oak Dr	No Recommendations							
5	Benns Church Blvd at Site Driveway	10%	3%	87%	*100%*	7%	3%	90%	*100%*
6	Benns Church Blvd at Site Driveway	7%	2%	91%	*100%*	5%	2%	93%	*100%*
7	Benns Church Blvd at Site Driveway/Sweetgrass	10%	2%	88%	*100%*	7%	2%	91%	*100%*
8	Tractor Supply Entrance at Site Driveway	No Recommendations							
9	Turner Drive at Site Driveway	25%	2%	73%	*100%*	26%	3%	71%	*100%*
10	Tractor Supply Entrance at Site Driveway	No Recommendations							
11	Turner Drive at Site Driveway	No Recommendations							
12	Benns Church Blvd at Site Driveway	12%	3%	85%	*100%*	7%	3%	90%	*100%*



Kimley»Horn

INTERIM YEAR (2025) RECOMMENDATIONS

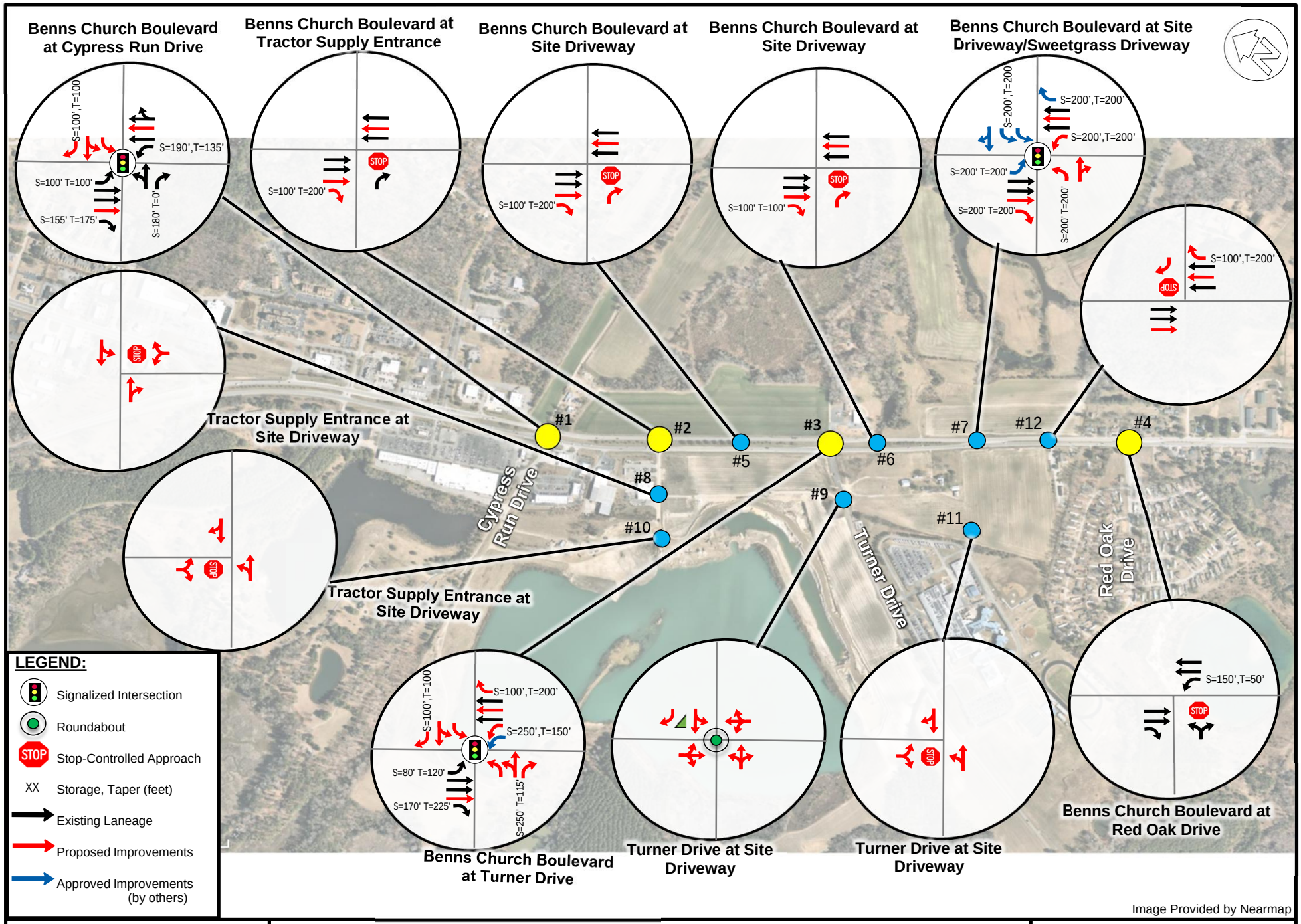
FIGURE 12



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FUTURE YEAR (2029) RECOMMENDATIONS

FIGURE 13



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HORIZON YEAR (2045) RECOMMENDATIONS

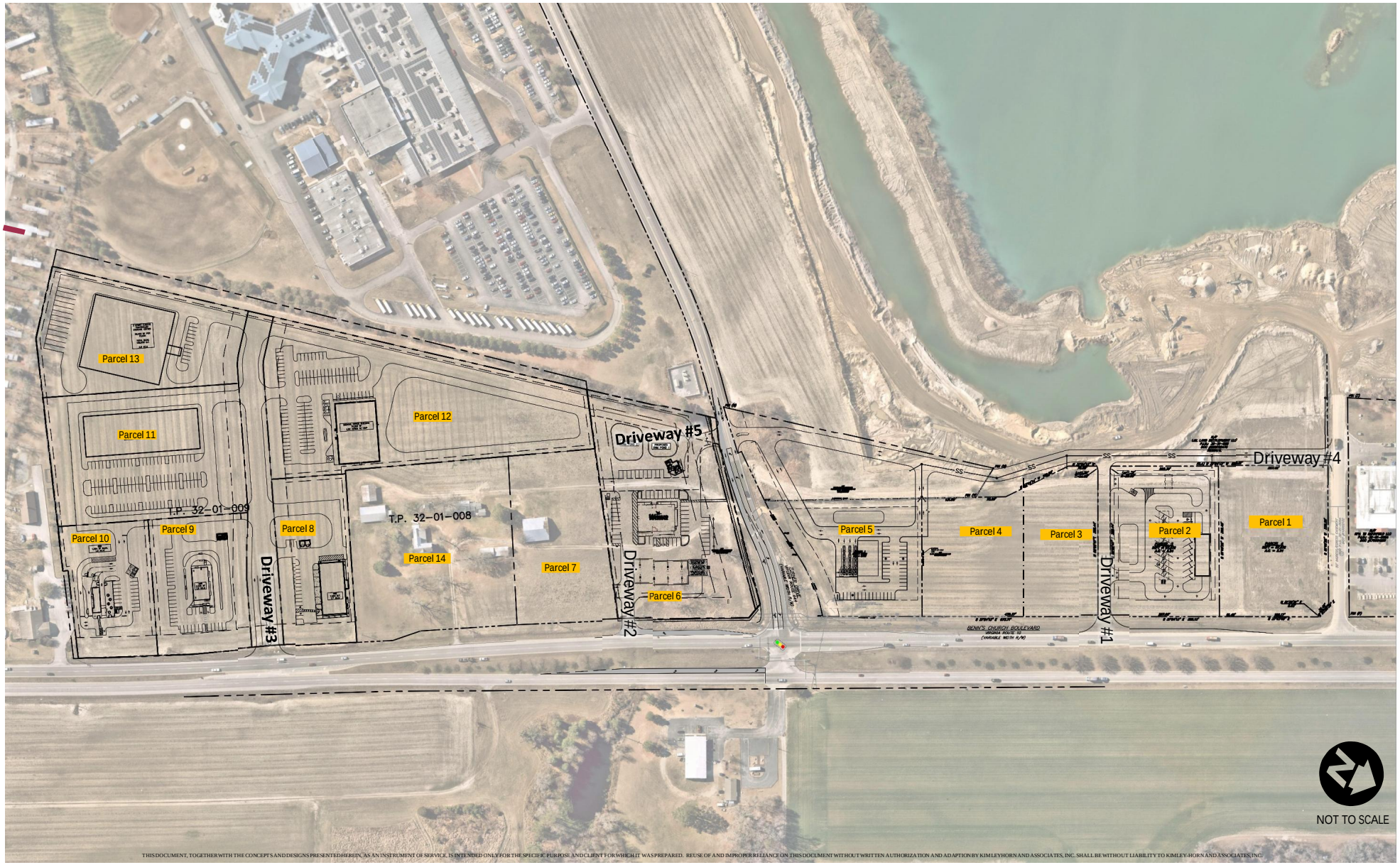
FIGURE 14

Appendix A
Conceptual Site Plan



Kimley»Horn	Benns Church TIA Isle of Wight, Virginia	Proposed Developments	Figure 1

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Kimley»Horn	Benns Church TIA Isle of Wight, Virginia	Conceptual Master Plan for Turner North and Turner South Parcels	Figure 2

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Appendix B

Approved Pre-Scope Form and Assumptions Document

The following documentation outlines the assumptions for the proposed development associated with the Benns Church TIA located in Isle of Wight County, Virginia.

The proposed developments of the TIA consist of the following and are illustrated in **Figure 1** with detailed parcel locations for Turner North and South in **Figure 2**:

- **Turner North**
  - Parcel 1: 5,000 square foot (SF) quick service restaurant
  - Parcel 2: 3,000 (SF) automated car wash
  - Parcel 3: 3,000 (SF) high-turnover (sit-down) restaurant
  - Parcel 4: 3,000 (SF) high-turnover (sit-down) restaurant
  - Parcel 5: Drive-in bank with 4 lanes
- **Turner South**
  - Parcel 6: 6,049 SF convenience market with 16 fueling positions
  - Parcel 7: 3,000 SF quick service restaurant
  - Parcel 8: 7,680 SF tire store
  - Parcel 9: 3,235 SF quick service restaurant
  - Parcel 10: 3,000 SF quick service restaurant
  - Parcel 11: 28,000 SF of retail space
  - Parcel 12: 21,500 SF of medical office space
  - Parcel 13: 108,000 SF of climate controlled self-storage space
  - Parcel 14: 28,000 SF of retail space
- **Cypress Run South**
  - 154 single-family detached housing dwelling units
  - 108 single-family attached housing dwelling units

Study Area

The study area consists of the following existing intersections, as shown in **Figure 3**:

1. Benns Church Boulevard (U.S. Route 258/State Route 10) at Cypress Run Drive *(Signalized)*
2. Benns Church Boulevard at Tractor Supply Entrance *(Unsignalized – Right-In/Right-Out)*
3. Benns Church Boulevard at Turner Drive (State Route 644) *(Signalized)*
4. Benns Church Boulevard at Red Oak Drive *(Unsignalized – Full Movement)*

The following proposed development driveways are also included in the study area as shown in **Figure 3**. The appropriate intersection access and control will be identified as part of the traffic analysis scenarios.

5. Benns Church Boulevard at Site Driveway #1
6. Benns Church Boulevard at Site Driveway #2
7. Benns Church Boulevard at Site Driveway #3
8. Tractor Supply Entrance at Site Driveway #4
9. Turner Drive at Site Driveway #5
10. Tractor Supply Entrance at Site Driveway #6
11. Site Driveway #3 at Site Driveway #5
12. Benns Church Boulevard and Site Driveway #7

Data Collection

Kimley-Horn will use the turning movement count (TMC) data, collected in August 2021, as part of the *Wawa Convenience Market Development Traffic Impact Analysis*, completed April 2022 for the intersection of Benns Church Boulevard at Cypress Run Drive.

Kimley-Horn will use the existing traffic volumes at the Benns Church Boulevard and Cypress Run Drive intersection and will include the COVID-19 adjustments consistent with the *Wawa Convenience Market Development Traffic Impact Analysis*.

In addition, Kimley-Horn will use the June 2022 traffic volumes collected by Isle of Wight County at the intersection of Benns Church Boulevard at Red Oak Drive. New traffic count data from December 2022 at the Benns Church Boulevard and Turner Drive intersection will be used in this study. The counts at the Benns Church Boulevard at Turner Drive intersection were collected with school in session and include bus traffic. Additional school bus route data was provided by the Isle of Wight County School Board staff. The school bus route data will be reviewed to verify the Benns Church Boulevard at Turner Drive counts accurately captures bus volumes.

Recent traffic volume counts are not available for the Tractor Supply Entrance intersection; therefore, Kimley-Horn will determine the intersection traffic volumes by using calculated trip generation for the existing land uses. Current traffic signal timing and phasing data will be provided by VDOT for all signalized intersections in the study area.

The AM (7:00 AM – 8:00 AM) and the PM (4:15 PM – 5:15 PM) peak hours will be used for this TIA.

Volume Development

It is proposed that a growth rate of 1.0% per year (applied exponentially) be used for adjusting the projected background traffic volumes for all turning movements. This growth rate was determined by reviewing the County average growth rate from VDOT as well as input from Isle of Wight County.

In addition, the following additional developments will be included in the future projected traffic volumes:

- Town of Smithfield Development:
  - Benns Church Retail North – retail commercial
  - Cypress Run North – residential and retail commercial
- Sweetgrass
  - 390 single-family detached housing dwelling units
  - 225 multi-family housing dwelling units
  - 35,000 square foot shopping center
- Smithfield Intermediate School – 400 pupils

Kimley-Horn will use the *Town of Smithfield Intersection Improvement Alternatives Analysis* Study completed in February 2019 for the trip generation, distribution, and assignment of the Benns Church Retail North and Cypress Run North developments. Kimley-Horn will use the Yeoman's Tract Traffic Impact Study for the trip generation, distribution, and assignment of the Sweetgrass development.

Proposed Land Use

Kimley-Horn will use *ITE Trip Generation 10th Edition* (2017) Trip Generation Rates and Land Uses for the proposed developments. Trip generation calculations for the proposed developments are shown in **Table 1** through **Table 3**.

Table 1: Turner North and Turner South Proposed Trip Generation

Parcel ID	ITE Code	ITE Description	Density	Unit	Daily	AM Peak Hour			PM Peak Hour		
						Total	In	Out	Total	In	Out
NORTH											
1	934	Fast Food Restaurant with Drive-Through Window	5,000	SF	2,355	201	103	98	163	85	78
2	948	Automated Car Wash *	3,000	SF	430	32	17	15	43	22	22
3	932	High-Turnover (Sit-Down) Restaurant	3,000	SF	337	30	17	13	29	18	11
4	932	High-Turnover (Sit-Down) Restaurant	3,000	SF	337	30	17	13	29	18	11
5	912	Drive-In Bank	4	Lanes	499	35	21	14	109	53	56
		New External Site Trips			*3,958*	*328*	*175*	*153*	*373*	*196*	*178*
		Parcel 1: Code 934 Pass-By (49% AM, 50% PM)			*0*	*(96)*	*(49)*	*(47)*	*(80)*	*(42)*	*(38)*
		Parcel 2: Code 948 (0% AM, 0% PM)			*0*	*(0)*	*(0)*	*(0)*	*(0)*	*(0)*	*(0)*
		Parcel 3: Code 932 Pass-By (49% AM, 50% AM)			*0*	*(0)*	*(0)*	*(0)*	*(11)*	*(7)*	*(4)*
		Parcel 4: Code 932 Pass-By (49% AM, 50% AM)			*0*	*(0)*	*(0)*	*(0)*	*(11)*	*(7)*	*(4)*
		Parcel 5: Code 912 Pass-By (29% AM, 35% PM)			*0*	*(8)*	*(5)*	*(3)*	*(37)*	*(18)*	*(19)*
		New Driveway Trips			*3,958*	*218*	*118*	*100*	*232*	*121*	*112*
SOUTH											
6	960	Super Convenience Market/Gas Station	Average		4,378	508	254	254	393	197	196
7	934	Fast Food Restaurant with Drive-Through Window	3,000	SF	1,413	121	62	59	98	51	47
8	848	Tire Store	7,680	SF	219	21	13	8	31	13	18
9	934	Fast Food Restaurant with Drive-Through Window	3,235	SF	1,524	130	66	64	106	55	51
10	934	Fast Food Restaurant with Drive-Through Window	3,000	SF	1,413	121	62	59	98	51	47
11	822	Strip Retail Plaza (Less than 40,000 SF)**	28,000	SF	1,411	66	40	26	162	81	81
12	720	Medical-Dental Office Building	21,500	SF	738	57	44	13	75	21	54
13	151	Mini-Warehouse	108,000	SF	163	11	7	4	18	8	10
14	822	Strip Retail Plaza (Less than 40,000 SF)** ***	28,000	SF	1,411	66	40	26	162	81	81
		New Site Trips			*12,670*	*1,035*	*548*	*487*	*981*	*477*	*504*
		Internal Capture (10%)			*(813)*	*(58)*	*(33)*	*(26)*	*(73)*	*(35)*	*(38)*
		New External Site Trips			*11,857*	*976*	*515*	*461*	*908*	*442*	*466*
		Parcel 6: Code 960 Pass-by (63% AM, 66% PM)			*0*	*(320)*	*(160)*	*(160)*	*(259)*	*(130)*	*(129)*
		Parcel 7: Code 934 Pass-By (49% AM, 50% PM)			*0*	*(59)*	*(30)*	*(29)*	*(50)*	*(26)*	*(24)*
		Parcel 8: Code 848 Pass-By (28% PM)			*0*	*0*	*0*	*0*	*(9)*	*(4)*	*(5)*
		Parcel 9 Code 934 Pass-By (49% AM, 50% PM)			*0*	*(64)*	*(31)*	*(31)*	*(53)*	*(28)*	*(26)*
		Parcel 10: Code 934 Pass-By (49% AM, 50% PM)			*0*	*(59)*	*(30)*	*(29)*	*(50)*	*(26)*	*(24)*
		Parcel 11: Code 822 Pass-By (40% PM)			*0*	*0*	*0*	*0*	*(65)*	*(32)*	*(33)*
		Parcel 14: Code 822 Pass-By (40% PM)			*0*	*0*	*0*	*0*	*(65)*	*(32)*	*(33)*
		New Driveway Trips			11,857	474	263	212	359	165	192
		TOTAL New Driveway Site Trips			*15,815*	*696*	*384*	*315*	*592*	*288*	*306*

Source: ITE Trip Generation Manual, 10th Edition, (2017)
Pass-by percentages using ITE Trip Generation Handbook, 3rd Edition (2017)
** Parcel 2 Daily and AM peak hour trip generation were developed using ITE Trip Generation 11th Edition,(2021) LUC 949 Time of Day Distribution Table*
***Strip Retail Plaza trips estimated using the ITE Trip Generation Manual, 11th Edition, (2021)*
**** Parcel 14 square footage was estimated based on existing acreage and assumed parking area*

Table 2: Cypress Run South Proposed Trip Generation

ITE Code	ITE Description	Density	Unit	Daily	AM Peak Hour			PM Peak Hour		
					Total	In	Out	Total	In	Out
210	Single-Family Detached	154	DU	1,501	110	29	81	149	94	55
215	Single-Family Attached	108	DU	772	50	16	34	61	35	26
	New Driveway Trips			*2,273*	*160*	*45*	*115*	*210*	*129*	*81*

Source: ITE Trip Generation Manual, 10th Edition, (2017)

Table 3: Sweetgrass Proposed Trip Generation

ITE Code	ITE Description	Density	Unit	Daily	AM Peak Hour			PM Peak Hour		
					Total	In	Out	Total	In	Out
210	Single-Family Detached	390	DU	3,682	289	72	217	386	243	143
220	Multifamily Housing (Low rise)	225	DU	1,660	104	24	80	126	79	47
820	Shopping Center	35,000	SF	2,994	33	20	13	250	120	130
	New External Site Trips			*8,286*	*426*	*116*	*310*	*762*	*442*	*320*
	Code 820 Pass-By (34% PM)			*1,001*	*(11)*	*(7)*	*(4)*	*(85)*	*(41)*	*(44)*
	New Driveway Trips			*7,285*	*415*	*109*	*306*	*677*	*401*	*276*

Source: Sweetgrass Supplemental Memo to December 2019 Traffic Impact Study (2021)

Analysis Years

The proposed development is anticipated to be completed in 2029. Therefore, the following analysis scenarios for the AM and PM peak hours will be studied as part of this TIA. **Figure 4** through **Figure 6** graphically depict the Build traffic analysis scenarios and associated components (e.g., site driveways and roadway connections).

- **Scenario 1 – Existing (2022) traffic conditions**
- **Scenario 2 – Interim Year (2025) No-Build conditions**
  - Interim year traffic conditions with a future growth rate applied to approved base year traffic volumes but without traffic volumes generated by the proposed developments
- **Scenario 3 – Interim Year (2025) Build conditions (Figure 4)**
  - Interim year traffic conditions with a future growth rate applied to approved base year traffic volumes with traffic volumes generated by the following proposed developments.
    - Turner North – Parcels 2 and 5
    - Turner South – Parcels 6 and 13
    - Full build-out of all proposed public roads
    - Smithfield High School Roadway Connection with right-in/right-out/left-in (RIROLI) configuration at Intersection #7
- **Scenario 4 – Future Year (2029) Build conditions (Figure 5)**
  - Future year traffic conditions with a future growth rate applied to approved base year traffic volumes with traffic volumes generated by the following proposed developments.
    - Full build-out of Turner North – Parcels 1,3, and 4
    - Full build-out of Turner South – Parcels 7, 8, 9, 10,11, 12, and 14
    - Cypress Run South
    - Smithfield Intermediate School traffic

    - Full build-out of Sweetgrass with proposed roadway and intersection improvements (e.g., traffic signal at Intersection #7)
    - 50% of Smithfield Development Traffic
- **Scenario 5 – Horizon Year (2045) Build conditions (Figure 6)**
    - Future year traffic conditions with a future growth rate applied to approved base year traffic volumes with traffic volumes generated by the following proposed developments:
        - Full build-out of Smithfield Development Traffic

Site Trip Distributions

Site trip distributions from the *Wawa Convenience Market Development Traffic Impact Analysis* will be used for this TIA which were confirmed by reviewing available traffic data, anticipated routes for vehicles entering and exiting the proposed development site, and a general familiarity of the study area. Proposed regional trip distributions determined for the proposed development are listed below.

- To/from the west on Turner Drive – **20%**
- To/from the north on Benns Church Boulevard – **40%**
- To/from the south on Benns Church Boulevard – **40%**

Kimley-Horn will use the aforementioned studies for the trip distribution and assignment of the additional developments.

Recommendations

General recommendations for necessary capacity and operational improvements will be developed for the study area intersections, roadways, and site access driveways. Kimley-horn will then determine the need for more specific laneage or traffic control improvements (e.g., turn lanes, storage lane lengths, roundabouts, traffic signals, traffic signal timing modifications, etc.) at study intersections directly impacted by the proposed development.

For the purposes of this study, the following intersection control conditions will be held constant in support of the proposed development:

- Study Intersection 3: Benns Church Boulevard at Turner Drive
    - Maintain signalization at this intersection
- Study Intersection 6: Benns Church Boulevard at Site Driveway #2
    - Proposed right-in/right-out access
- Study Intersection 9: Turner Drive and Site Driveway #5
    - Proposed unsignalized, full-access intersection or single-lane roundabout

Traffic Signal Warrant Analysis

Kimley-Horn will use the *Manual of Uniform Traffic Control Devices (MUTCD)*, to analyze the signal warrants at up to two applicable study intersections.

To evaluate the need for signalized intersection operations, we will use the traffic volume data along with the projected traffic volumes. The traffic signal warrant analyses will adhere to *MUTCD* signal warrant guidelines.

Turn-Lane Warrant Analysis

Kimley-Horn will utilize the volume data collected along with the projected traffic to perform a turn-lane warrant analyses at up to five applicable study intersections with methodologies shown in Appendix C of the VDOT *Road Design Manual* as well as guidelines provided in Appendix F of the *VDOT Access Management Design Standards for Entrances and Intersections*. Should the turn-lane(s) be warranted, recommendations for storage length and taper length will be provided.

Traffic Operations Analysis

Based on discussions with VDOT, operational analyses for the study area intersections will be conducted using traffic analysis tools (e.g., *Synchro 11.1 Professional*, SimTraffic 11.1) and Highway Capacity Manual (HCM) methodologies. The future conditions analyses will confirm the need and define the geometric configurations necessary for the proposed roadway and intersection operational or capacity improvements (e.g., signal timing adjustments, exclusive turn-lane storage and taper, etc.).

Measures of effectiveness that will be reported for each scenario will consist of delay per vehicle, level of service (LOS), and maximum queue lengths. These measures of effectiveness will be presented in tables and figures. Vehicle delay and LOS will be summarized by movement, approach, and overall intersection, while maximum queue lengths will be summarized for each movement.

Reporting

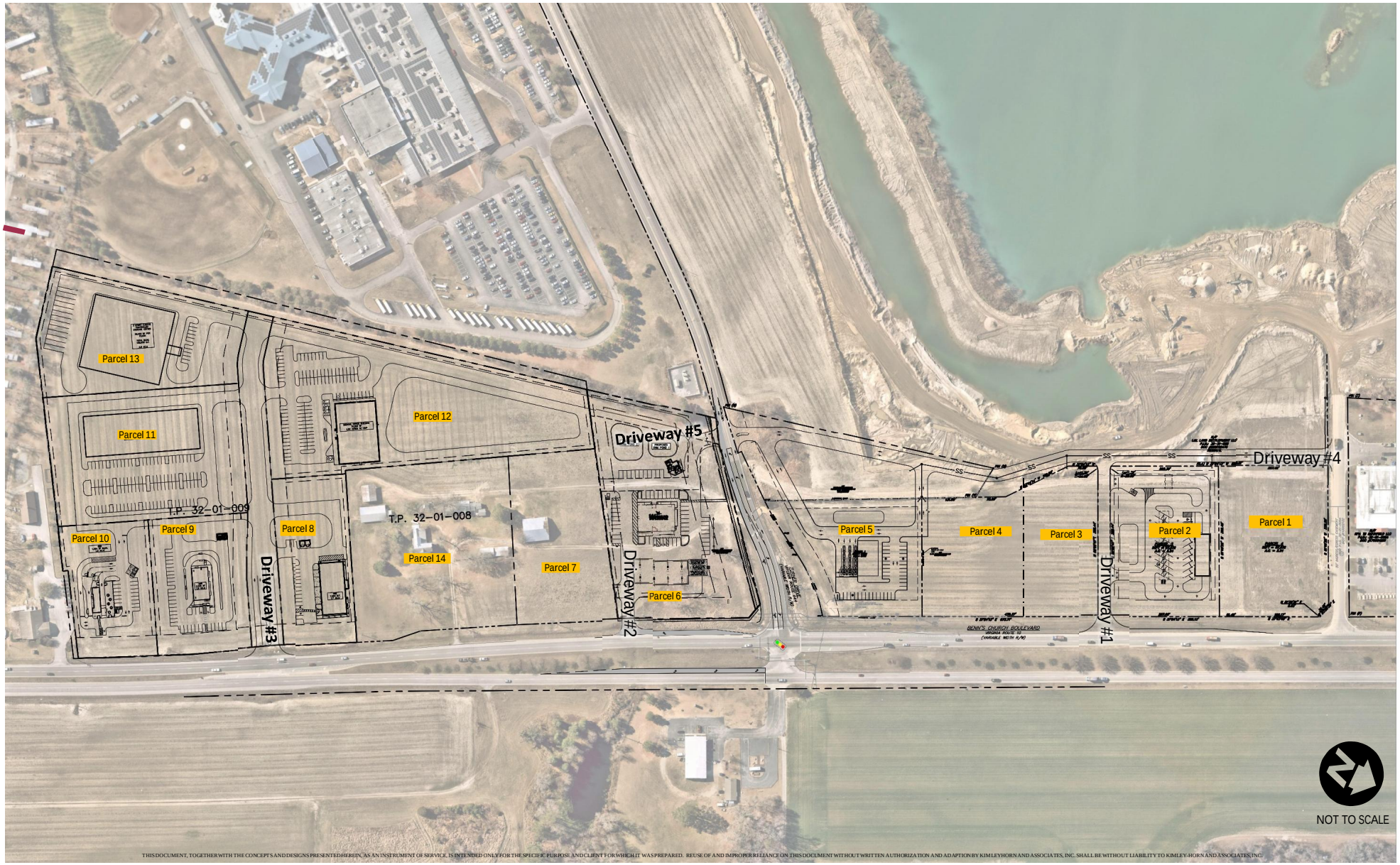
A TIA report with an accompanying technical appendix (including all analysis files) will be prepared that summarizes the analysis methodology and results. There will be two (2) electronic submittals of the technical report – DRAFT and FINAL (including supporting analytical files). Two rounds of comprehensive comments will be addressed with each report submittal through conference call. This study assumes that all deliverables will be electronic submittals (PDF report and all supporting analytical files).

Supporting Figures



Kimley»Horn	Benns Church TIA Isle of Wight, Virginia	Proposed Developments	Figure 1

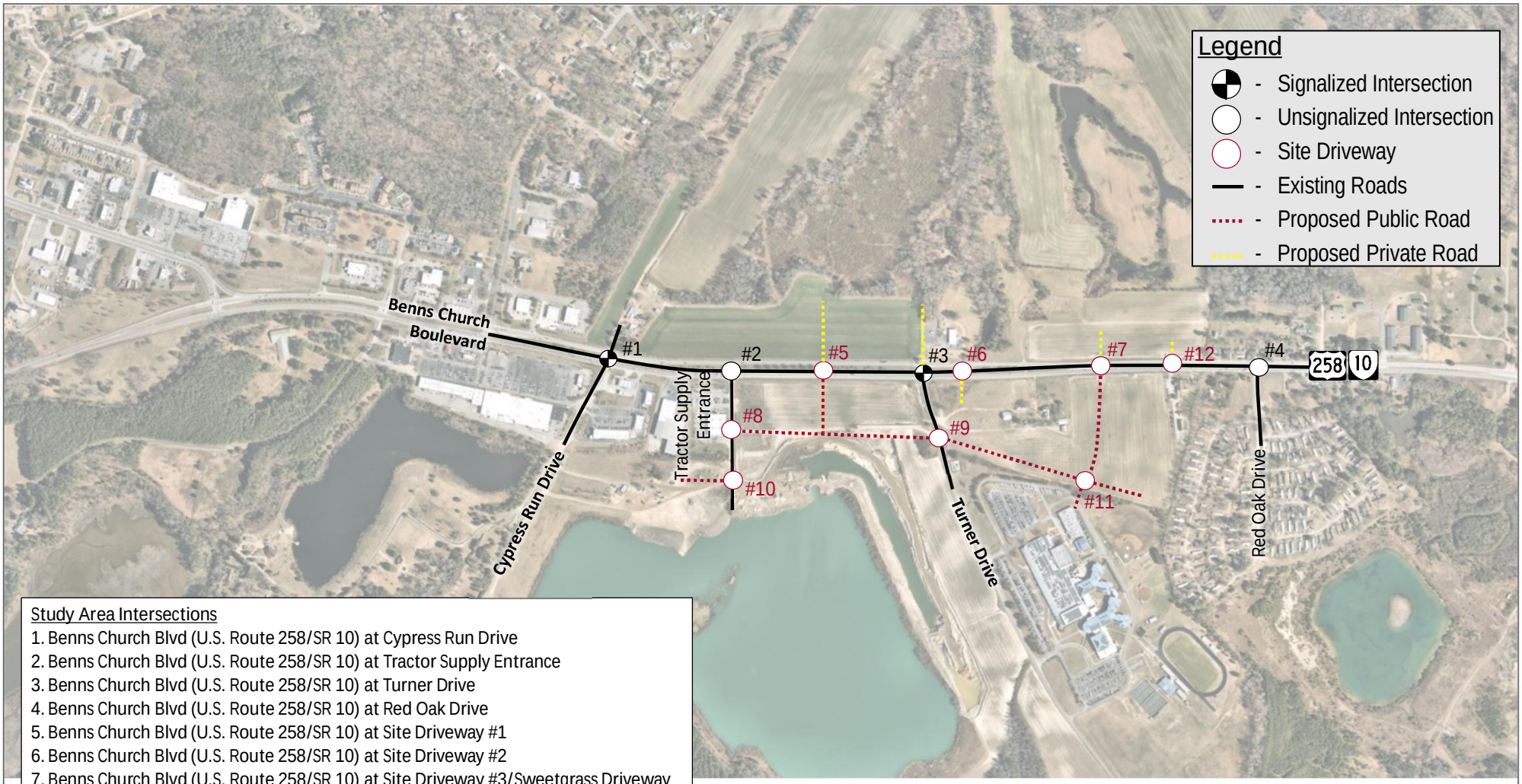
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Kimley»Horn	Benns Church TIA Isle of Wight, Virginia	Conceptual Master Plan for Turner North and Turner South Parcels	Figure 2

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Study Area Intersections

1. Benns Church Blvd (U.S. Route 258/SR 10) at Cypress Run Drive
2. Benns Church Blvd (U.S. Route 258/SR 10) at Tractor Supply Entrance
3. Benns Church Blvd (U.S. Route 258/SR 10) at Turner Drive
4. Benns Church Blvd (U.S. Route 258/SR 10) at Red Oak Drive
5. Benns Church Blvd (U.S. Route 258/SR 10) at Site Driveway #1
6. Benns Church Blvd (U.S. Route 258/SR 10) at Site Driveway #2
7. Benns Church Blvd (U.S. Route 258/SR 10) at Site Driveway #3/Sweetgrass Driveway
8. Tractor Supply Entrance at Site Driveway #4
9. Turner Drive at Site Driveway #5
10. Tractor Supply Entrance at Site Driveway #6
11. Site Driveway #3 at Site Driveway #5
12. Benns Church Boulevard at Site Driveway #7

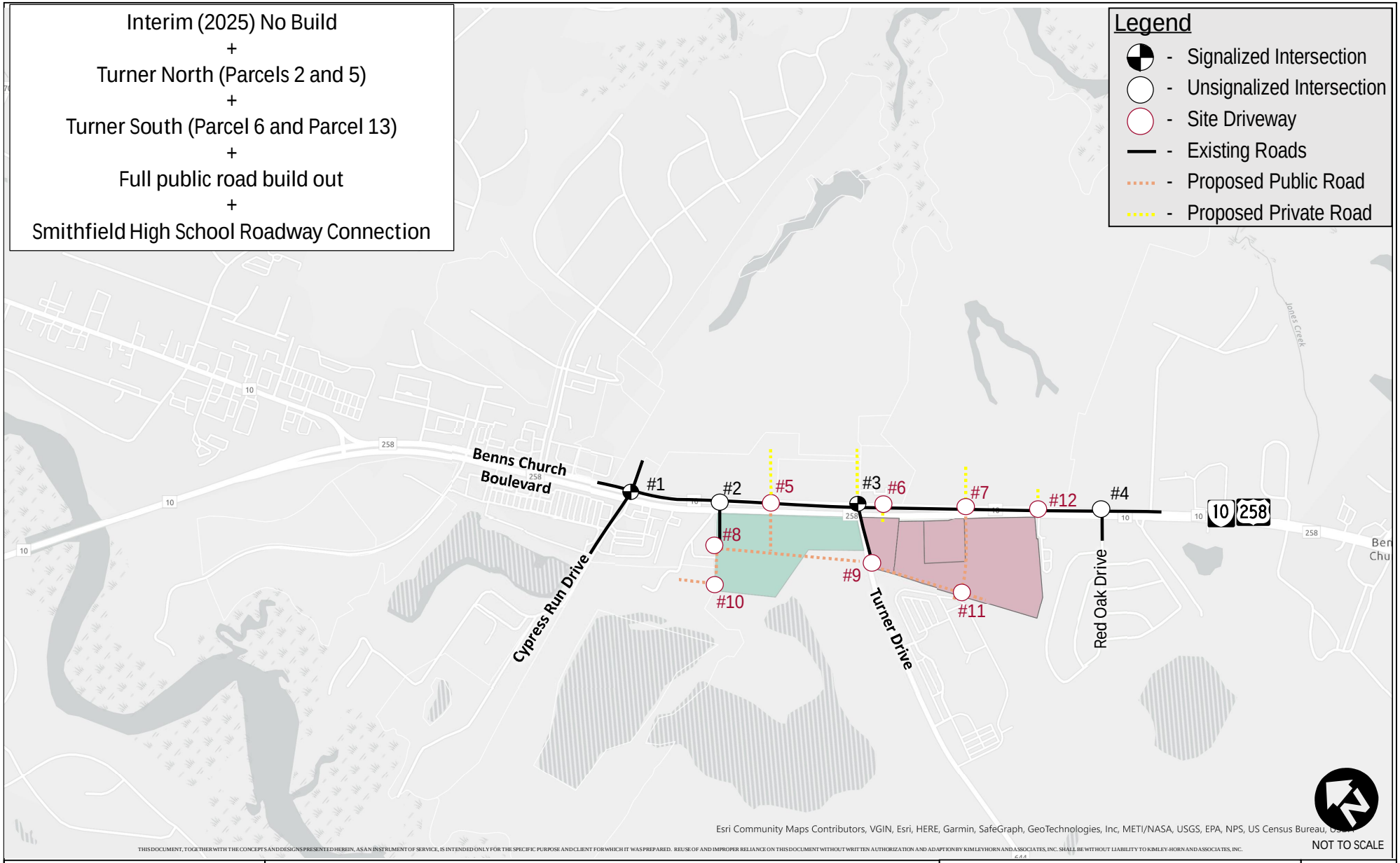
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Kimley»Horn	Benns Church TIA Isle of Wight, Virginia	Study Area	Figure 3

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Interim (2025) No Build
+
Turner North (Parcels 2 and 5)
+
Turner South (Parcel 6 and Parcel 13)
+
Full public road build out
+
Smithfield High School Roadway Connection



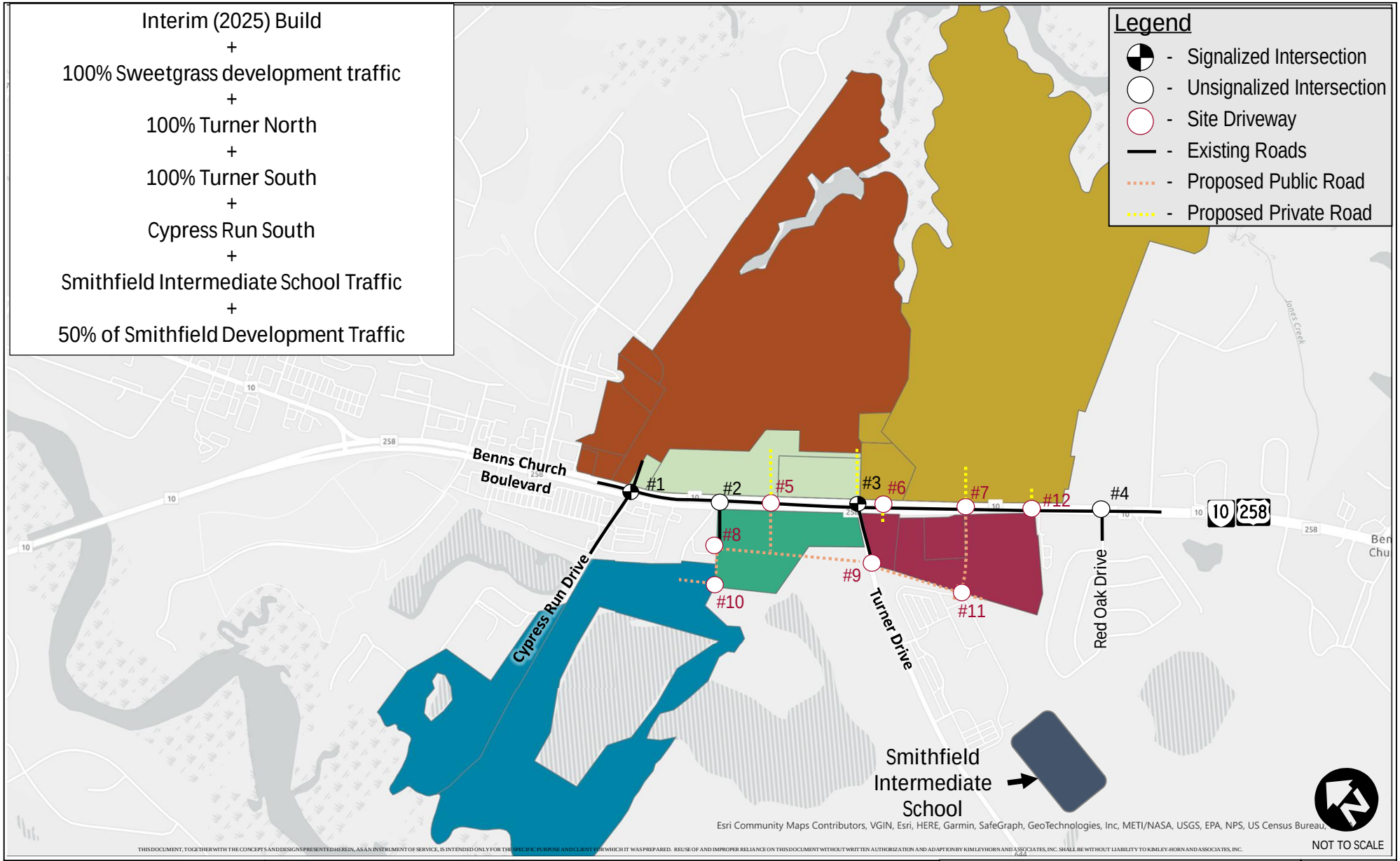
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Kimley»Horn	Benns Church TIA Isle of Wight, Virginia	Interim (2025) Build Conditions	Figure 4

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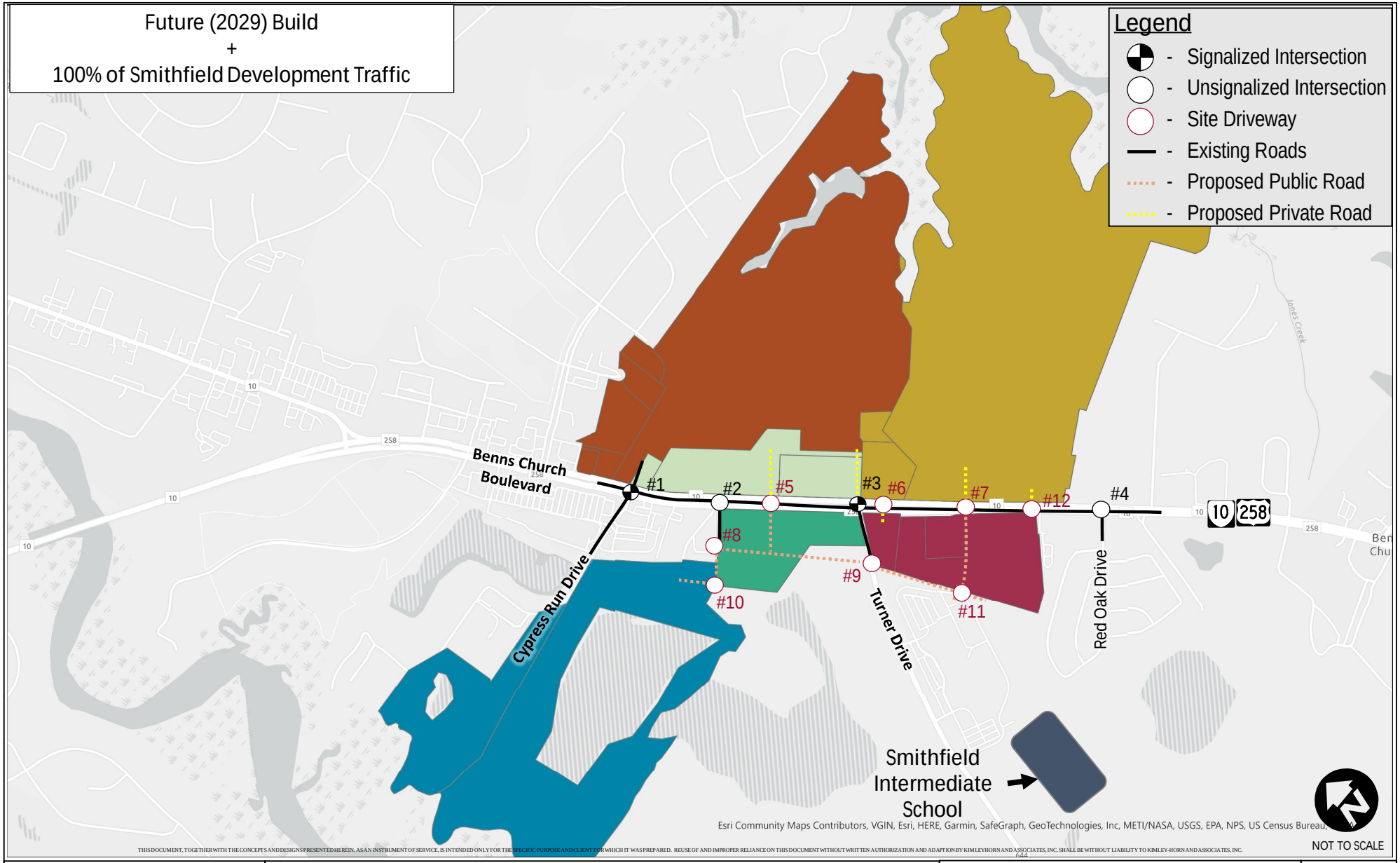
Interim (2025) Build
+
100% Sweetgrass development traffic
+
100% Turner North
+
100% Turner South
+
Cypress Run South
+
Smithfield Intermediate School Traffic
+
50% of Smithfield Development Traffic



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Kimley»Horn	Benns Church TIA Isle of Wight, Virginia	Future (2029) Build Conditions	Figure 5

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Kimley»Horn	Benns Church TIA Isle of Wight, Virginia	Horizon Year (2045) Build Conditions	Figure 6

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Appendix C
Detailed Synchro and SimTraffic Outputs

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	0	37	2	0	0	44	764	2	3	971	29
Future Volume (vph)	15	0	37	2	0	0	44	764	2	3	971	29
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt			0.850									0.850
Flt Protected		0.950			0.950		0.950			0.950		
Satd. Flow (prot)	0	1492	1495	0	1203	0	1641	3374	0	1805	3471	1509
Flt Permitted		0.950					0.239			0.335		
Satd. Flow (perm)	0	1492	1495	0	1267	0	413	3374	0	636	3471	1509
Satd. Flow (RTOR)			182									168
Adj. Flow (vph)	16	0	39	2	0	0	46	796	2	3	1011	30
Lane Group Flow (vph)	0	16	39	0	2	0	46	798	0	3	1011	30
Turn Type	Split	NA	Perm	Perm	NA		D.P+P	NA		D.P+P	NA	Perm
Protected Phases	4	4			3		5	2		1	6	
Permitted Phases			4	3			6			2		6
Total Split (s)	20.0	20.0	20.0	15.0	15.0		19.0	76.0		14.0	71.0	71.0
Total Lost Time (s)		6.8	6.8		7.1		8.4	8.4		8.4	8.4	8.4
Act Effct Green (s)		7.6	7.6		7.1		96.3	101.0		103.4	92.0	92.0
Actuated g/C Ratio		0.06	0.06		0.06		0.77	0.81		0.83	0.74	0.74
v/c Ratio		0.18	0.15		0.03		0.12	0.29		0.01	0.40	0.03
Control Delay		60.1	1.2		56.5		4.6	6.0		4.3	9.8	0.0
Queue Delay		0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		60.1	1.2		56.5		4.6	6.0		4.3	9.8	0.0
LOS		E	A		E		A	A		A	A	A
Approach Delay		18.3			56.5			5.9			9.5	
Approach LOS		B			E			A			A	

Intersection Summary			
Cycle Length: 125			
Actuated Cycle Length: 125			
Offset: 15 (12%), Referenced to phase 2:NBSB, Start of Yellow			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.40			
Intersection Signal Delay: 8.2		Intersection LOS: A	
Intersection Capacity Utilization 57.1%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 1: Benns Church Boulevard & Cypress Run Drive



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	0	37	2	0	0	44	764	2	3	971	29
Future Volume (vph)	15	0	37	2	0	0	44	764	2	3	971	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.8	6.8		7.1		8.4	8.4		8.4	8.4	8.4
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	1.00
Frt		1.00	0.85		1.00		1.00	1.00		1.00	1.00	0.85
Flt Protected		0.95	1.00		0.95		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1492	1495		1203		1641	3373		1805	3471	1509
Flt Permitted		0.95	1.00		1.00		0.24	1.00		0.34	1.00	1.00
Satd. Flow (perm)		1492	1495		1267		413	3373		637	3471	1509
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	16	0	39	2	0	0	46	796	2	3	1011	30
RTOR Reduction (vph)	0	0	37	0	0	0	0	0	0	0	0	12
Lane Group Flow (vph)	0	16	2	0	2	0	46	798	0	3	1011	18
Heavy Vehicles (%)	21%	0%	8%	50%	0%	0%	10%	7%	0%	0%	4%	7%
Turn Type	Split	NA	Perm	Perm	NA		D.P+P	NA		D.P+P	NA	Perm
Protected Phases	4	4			3		5	2		1	6	
Permitted Phases			4	3			6			2		6
Actuated Green, G (s)		6.2	6.2		1.5		86.6	85.6		86.6	76.5	76.5
Effective Green, g (s)		6.2	6.2		1.5		86.6	85.6		86.6	76.5	76.5
Actuated g/C Ratio		0.05	0.05		0.01		0.69	0.68		0.69	0.61	0.61
Clearance Time (s)		6.8	6.8		7.1		8.4	8.4		8.4	8.4	8.4
Vehicle Extension (s)		3.0	3.0		3.0		2.0	5.0		2.0	5.0	5.0
Lane Grp Cap (vph)		74	74		15		385	2309		450	2124	923
v/s Ratio Prot		c0.01					c0.01	c0.24		0.00	c0.29	
v/s Ratio Perm			0.00		c0.00		0.07			0.00		0.01
v/c Ratio		0.22	0.03		0.13		0.12	0.35		0.01	0.48	0.02
Uniform Delay, d1		57.1	56.5		61.1		11.2	8.1		7.1	13.3	9.5
Progression Factor		1.00	1.00		1.00		0.83	1.05		1.00	1.00	1.00
Incremental Delay, d2		1.5	0.1		4.0		0.0	0.4		0.0	0.8	0.0
Delay (s)		58.5	56.7		65.1		9.4	8.9		7.1	14.0	9.6
Level of Service		E	E		E		A	A		A	B	A
Approach Delay (s)		57.2			65.1			8.9			13.9	
Approach LOS		E			E			A			B	

Intersection Summary				
HCM 2000 Control Delay	13.0	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.42			
Actuated Cycle Length (s)	125.0	Sum of lost time (s)	30.7	
Intersection Capacity Utilization	57.1%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	11	0	810	987	23
Future Volume (vph)	0	11	0	810	987	23
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.865				0.850
Flt Protected						
Satd. Flow (prot)	0	1611	0	3374	3471	1583
Flt Permitted						
Satd. Flow (perm)	0	1611	0	3374	3471	1583
Adj. Flow (vph)	0	12	0	880	1073	25
Lane Group Flow (vph)	0	12	0	880	1073	25
Sign Control	Stop			Free	Free	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization	37.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	11	0	810	987	23
Future Volume (Veh/h)	0	11	0	810	987	23
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	12	0	880	1073	25
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				Raised	Raised	
Median storage veh)				1	1	
Upstream signal (ft)					870	
pX, platoon unblocked	0.84	0.84	0.84			
vC, conflicting volume	1513	536	1098			
vC1, stage 1 conf vol	1073					
vC2, stage 2 conf vol	440					
vCu, unblocked vol	1233	73	740			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	99	100			
cM capacity (veh/h)	273	820	726			

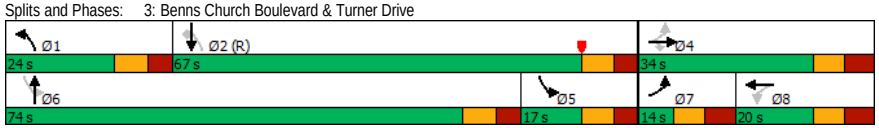
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	12	440	440	536	536	25
Volume Left	0	0	0	0	0	0
Volume Right	12	0	0	0	0	25
cSH	820	1700	1700	1700	1700	1700
Volume to Capacity	0.01	0.26	0.26	0.32	0.32	0.01
Queue Length 95th (ft)	1	0	0	0	0	0
Control Delay (s)	9.5	0.0	0.0	0.0	0.0	0.0
Lane LOS	A					
Approach Delay (s)	9.5	0.0		0.0		
Approach LOS	A					

Intersection Summary				
Average Delay	0.1			
Intersection Capacity Utilization	37.3%	ICU Level of Service		A
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	182	0	267	2	0	2	243	626	0	4	762	232
Future Volume (vph)	182	0	267	2	0	2	243	626	0	4	762	232
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt			0.850		0.932							0.850
Flt Protected		0.950			0.976		0.950			0.950		
Satd. Flow (prot)	0	1612	1524	0	1728	0	1719	3438	0	1805	3505	1538
Flt Permitted		0.755			0.863		0.225			0.329		
Satd. Flow (perm)	0	1281	1524	0	1528	0	407	3438	0	625	3505	1538
Satd. Flow (RTOR)			319		270							283
Adj. Flow (vph)	222	0	326	2	0	2	296	763	0	5	929	283
Lane Group Flow (vph)	0	222	326	0	4	0	296	763	0	5	929	283
Turn Type	pm+pt	NA	Perm	Perm	NA		D.P+P	NA		D.P+P	NA	Perm
Protected Phases	7	4			8		1	6		5	2	
Permitted Phases	4		4	8			2			6		2
Total Split (s)	14.0	34.0	34.0	20.0	20.0		24.0	74.0		17.0	67.0	67.0
Total Lost Time (s)		9.0	9.0		9.0		8.3	8.3		8.3	8.3	8.3
Act Effct Green (s)		25.0	25.0		25.0		74.4	79.3		81.0	59.9	59.9
Actuated g/C Ratio		0.20	0.20		0.20		0.60	0.63		0.65	0.48	0.48
v/c Ratio		0.87	0.58		0.01		0.75	0.35		0.01	0.55	0.32
Control Delay		79.6	9.6		0.0		24.4	12.1		2.2	19.8	6.1
Queue Delay		0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		79.6	9.6		0.0		24.4	12.1		2.2	19.8	6.1
LOS		E	A		A		C	B		A	B	A
Approach Delay		38.0						15.6			16.5	
Approach LOS		D						B			B	

Intersection Summary			
Cycle Length: 125			
Actuated Cycle Length: 125			
Offset: 49 (39%), Referenced to phase 2:NBSB, Start of Yellow			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.87			
Intersection Signal Delay: 20.3		Intersection LOS: C	
Intersection Capacity Utilization 72.6%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 3: Benns Church Boulevard & Turner Drive



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	182	0	267	2	0	2	243	626	0	4	762	232
Future Volume (vph)	182	0	267	2	0	2	243	626	0	4	762	232
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		9.0	9.0		9.0		8.3	8.3		8.3	8.3	8.3
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	1.00
Frt		1.00	0.85		0.93		1.00	1.00		1.00	1.00	0.85
Flt Protected		0.95	1.00		0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1612	1524		1729		1719	3438		1805	3505	1538
Flt Permitted		0.76	1.00		0.86		0.23	1.00		0.33	1.00	1.00
Satd. Flow (perm)		1281	1524		1529		408	3438		625	3505	1538
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	222	0	326	2	0	2	296	763	0	5	929	283
RTOR Reduction (vph)	0	0	255	0	3	0	0	0	0	0	0	147
Lane Group Flow (vph)	0	222	71	0	1	0	296	763	0	5	929	136
Heavy Vehicles (%)	12%	0%	6%	0%	0%	0%	5%	5%	0%	0%	3%	5%
Turn Type	pm+pt	NA	Perm	Perm	NA		D.P+P	NA		D.P+P	NA	Perm
Protected Phases	7	4			8		1	6		5	2	
Permitted Phases	4		4	8			2			6		2
Actuated Green, G (s)		25.0	25.0		25.0		74.4	72.7		74.4	59.9	59.9
Effective Green, g (s)		25.0	25.0		25.0		74.4	72.7		74.4	59.9	59.9
Actuated g/C Ratio		0.20	0.20		0.20		0.60	0.58		0.60	0.48	0.48
Clearance Time (s)		9.0	9.0		9.0		8.3	8.3		8.3	8.3	8.3
Vehicle Extension (s)		5.0	5.0		3.0		4.0	6.0		2.0	6.0	6.0
Lane Grp Cap (vph)		256	304		305		394	1999		388	1679	737
v/s Ratio Prot							c0.09	0.22		0.00	0.27	
v/s Ratio Perm		c0.17	0.05		0.00		c0.36			0.01		0.09
v/c Ratio		0.87	0.23		0.00		0.75	0.38		0.01	0.55	0.18
Uniform Delay, d1		48.4	42.0		40.0		14.6	14.1		13.2	23.1	18.6
Progression Factor		1.00	1.00		1.00		1.00	1.00		0.30	0.79	2.38
Incremental Delay, d2		27.0	0.8		0.0		8.3	0.6		0.0	1.3	0.5
Delay (s)		75.3	42.8		40.0		22.9	14.6		4.0	19.4	44.8
Level of Service		E	D		D		C	B		A	B	D
Approach Delay (s)		56.0			40.0			16.9			25.3	
Approach LOS		E			D			B			C	

Intersection Summary					
HCM 2000 Control Delay		28.1	HCM 2000 Level of Service		C
HCM 2000 Volume to Capacity ratio		0.86			
Actuated Cycle Length (s)		125.0	Sum of lost time (s)		34.6
Intersection Capacity Utilization		72.6%	ICU Level of Service		C
Analysis Period (min)		15			
c Critical Lane Group					

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	11	19	12	858	1013	18
Future Volume (vph)	11	19	12	858	1013	18
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	0.914					0.850
Flt Protected	0.982		0.950			
Satd. Flow (prot)	1695	0	1787	3406	3471	1599
Flt Permitted	0.982		0.950			
Satd. Flow (perm)	1695	0	1787	3406	3471	1599
Adj. Flow (vph)	12	21	13	943	1113	20
Lane Group Flow (vph)	33	0	13	943	1113	20
Sign Control	Stop			Free	Free	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 38.0%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	11	19	12	858	1013	18
Future Volume (Veh/h)	11	19	12	858	1013	18
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	12	21	13	943	1113	20
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1610	556	1133			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1610	556	1133			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	87	96	98			
cM capacity (veh/h)	95	477	618			

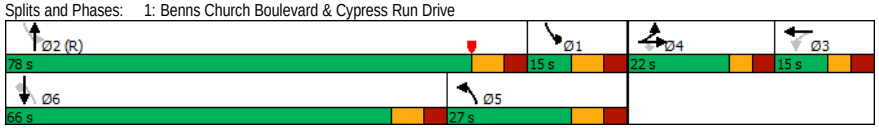
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	33	13	472	472	556	556	20
Volume Left	12	13	0	0	0	0	0
Volume Right	21	0	0	0	0	0	20
cSH	194	618	1700	1700	1700	1700	1700
Volume to Capacity	0.17	0.02	0.28	0.28	0.33	0.33	0.01
Queue Length 95th (ft)	15	2	0	0	0	0	0
Control Delay (s)	27.3	10.9	0.0	0.0	0.0	0.0	0.0
Lane LOS	D	B					
Approach Delay (s)	27.3	0.1			0.0		
Approach LOS	D						

Intersection Summary				
Average Delay	0.5			
Intersection Capacity Utilization	38.0%	ICU Level of Service		A
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	97	0	93	0	4	0	188	1141	0	3	1150	113
Future Volume (vph)	97	0	93	0	4	0	188	1141	0	3	1150	113
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt			0.850									0.850
Flt Protected		0.950					0.950			0.950		
Satd. Flow (prot)	0	1805	1615	0	1900	0	1805	3539	0	1805	3471	1553
Flt Permitted		0.950					0.156			0.200		
Satd. Flow (perm)	0	1805	1615	0	1900	0	296	3539	0	380	3471	1553
Satd. Flow (RTOR)			246									232
Adj. Flow (vph)	99	0	95	0	4	0	192	1164	0	3	1173	115
Lane Group Flow (vph)	0	99	95	0	4	0	192	1164	0	3	1173	115
Turn Type	Split	NA	Perm		NA		D.P+P	NA		D.P+P	NA	Perm
Protected Phases	4	4			3		5	2		1	6	
Permitted Phases			4	3			6			2		6
Total Split (s)	22.0	22.0	22.0	15.0	15.0		27.0	78.0		15.0	66.0	66.0
Total Lost Time (s)		6.8	6.8		7.1		8.4	8.4		8.4	8.4	8.4
Act Effct Green (s)		12.2	12.2		7.0		91.4	97.0		101.7	80.2	80.2
Actuated g/C Ratio		0.09	0.09		0.05		0.70	0.75		0.78	0.62	0.62
v/c Ratio		0.59	0.25		0.04		0.57	0.44		0.01	0.55	0.11
Control Delay		69.8	1.6		59.2		17.5	4.2		6.0	17.9	0.2
Queue Delay		0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		69.8	1.6		59.2		17.5	4.2		6.0	17.9	0.2
LOS		E	A		E		B	A		A	B	A
Approach Delay		36.4			59.3			6.1			16.3	
Approach LOS		D			E			A			B	

Intersection Summary			
Cycle Length: 130			
Actuated Cycle Length: 130			
Offset: 40 (31%), Referenced to phase 2:NBSB, Start of Yellow			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.59			
Intersection Signal Delay: 12.9		Intersection LOS: B	
Intersection Capacity Utilization 73.9%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 1: Benns Church Boulevard & Cypress Run Drive



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	97	0	93	0	4	0	188	1141	0	3	1150	113
Future Volume (vph)	97	0	93	0	4	0	188	1141	0	3	1150	113
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.8	6.8		7.1		8.4	8.4		8.4	8.4	8.4
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	1.00
Frt		1.00	0.85		1.00		1.00	1.00		1.00	1.00	0.85
Flt Protected		0.95	1.00		1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1805	1615		1900		1805	3539		1805	3471	1553
Flt Permitted		0.95	1.00		1.00		0.16	1.00		0.20	1.00	1.00
Satd. Flow (perm)		1805	1615		1900		296	3539		380	3471	1553
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	99	0	95	0	4	0	192	1164	0	3	1173	115
RTOR Reduction (vph)	0	0	86	0	0	0	0	0	0	0	0	55
Lane Group Flow (vph)	0	99	9	0	4	0	192	1164	0	3	1173	60
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	4%	4%
Turn Type	Split	NA	Perm		NA		D.P+P	NA		D.P+P	NA	Perm
Protected Phases	4	4			3		5	2		1	6	
Permitted Phases			4	3			6			2		6
Actuated Green, G (s)		12.2	12.2		1.4		85.7	84.6		85.7	67.8	67.8
Effective Green, g (s)		12.2	12.2		1.4		85.7	84.6		85.7	67.8	67.8
Actuated g/C Ratio		0.09	0.09		0.01		0.66	0.65		0.66	0.52	0.52
Clearance Time (s)		6.8	6.8		7.1		8.4	8.4		8.4	8.4	8.4
Vehicle Extension (s)		3.0	3.0		3.0		2.0	5.0		2.0	5.0	5.0
Lane Grp Cap (vph)		169	151		20		402	2303		262	1810	809
v/s Ratio Prot		c0.05			c0.00		c0.07	0.33		0.00	c0.34	
v/s Ratio Perm			0.01				0.25			0.01		0.04
v/c Ratio		0.59	0.06		0.20		0.48	0.51		0.01	0.65	0.07
Uniform Delay, d1		56.5	53.7		63.7		29.7	11.8		13.6	22.5	15.5
Progression Factor		1.00	1.00		1.00		0.71	0.44		1.00	1.00	1.00
Incremental Delay, d2		5.1	0.2		4.9		0.3	0.7		0.0	1.8	0.2
Delay (s)		61.6	53.8		68.6		21.3	5.9		13.6	24.3	15.7
Level of Service		E	D		E		C	A		B	C	B
Approach Delay (s)		57.8			68.6			8.1			23.5	
Approach LOS		E			E			A			C	

Intersection Summary					
HCM 2000 Control Delay		18.6	HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio		0.60			
Actuated Cycle Length (s)		130.0	Sum of lost time (s)		30.7
Intersection Capacity Utilization		73.9%	ICU Level of Service		D
Analysis Period (min)		15			
c Critical Lane Group					

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	13	0	1329	1231	12
Future Volume (vph)	0	13	0	1329	1231	12
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.865				0.850
Flt Protected						
Satd. Flow (prot)	0	1611	0	3539	3471	1583
Flt Permitted						
Satd. Flow (perm)	0	1611	0	3539	3471	1583
Adj. Flow (vph)	0	14	0	1445	1338	13
Lane Group Flow (vph)	0	14	0	1445	1338	13
Sign Control	Stop			Free	Free	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization	44.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	13	0	1329	1231	12
Future Volume (Veh/h)	0	13	0	1329	1231	12
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	14	0	1445	1338	13
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				Raised	Raised	
Median storage veh)				1	1	
Upstream signal (ft)					870	
pX, platoon unblocked	0.75	0.75	0.75			
vC, conflicting volume	2060	669	1351			
vC1, stage 1 conf vol	1338					
vC2, stage 2 conf vol	722					
vCu, unblocked vol	1751	0	807			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	98	100			
cM capacity (veh/h)	191	815	612			

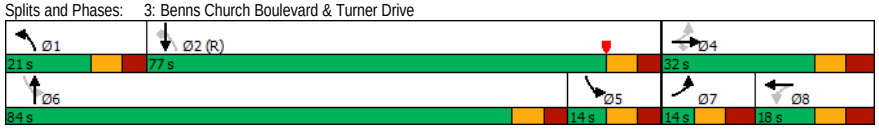
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	14	722	722	669	669	13
Volume Left	0	0	0	0	0	0
Volume Right	14	0	0	0	0	13
cSH	815	1700	1700	1700	1700	1700
Volume to Capacity	0.02	0.42	0.42	0.39	0.39	0.01
Queue Length 95th (ft)	1	0	0	0	0	0
Control Delay (s)	9.5	0.0	0.0	0.0	0.0	0.0
Lane LOS	A					
Approach Delay (s)	9.5	0.0		0.0		
Approach LOS	A					

Intersection Summary				
Average Delay		0.0		
Intersection Capacity Utilization	44.0%	ICU Level of Service		A
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	126	2	128	3	0	8	200	1195	4	28	1063	153
Future Volume (vph)	126	2	128	3	0	8	200	1195	4	28	1063	153
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt			0.850		0.902							0.850
Flt Protected		0.953			0.987		0.950			0.950		
Satd. Flow (prot)	0	1793	1599	0	1692	0	1719	3539	0	1805	3539	1615
Flt Permitted		0.722			0.914		0.185			0.163		
Satd. Flow (perm)	0	1358	1599	0	1566	0	335	3539	0	310	3539	1615
Satd. Flow (RTOR)			184		259							196
Adj. Flow (vph)	133	2	135	3	0	8	211	1258	4	29	1119	161
Lane Group Flow (vph)	0	135	135	0	11	0	211	1262	0	29	1119	161
Turn Type	pm+pt	NA	Perm	Perm	NA		D.P+P	NA		D.P+P	NA	Perm
Protected Phases	7	4			8		1	6		5	2	
Permitted Phases	4		4	8			2			6		2
Total Split (s)	14.0	32.0	32.0	18.0	18.0		21.0	84.0		14.0	77.0	77.0
Total Lost Time (s)		9.0	9.0		9.0		8.3	8.3		8.3	8.3	8.3
Act Effct Green (s)		20.8	20.8		20.8		83.6	83.5		87.0	72.3	72.3
Actuated g/C Ratio		0.16	0.16		0.16		0.64	0.64		0.67	0.56	0.56
v/c Ratio		0.62	0.33		0.02		0.63	0.55		0.11	0.57	0.16
Control Delay		63.6	4.1		0.1		17.1	15.5		9.4	13.6	2.1
Queue Delay		0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		63.6	4.1		0.1		17.1	15.5		9.4	13.6	2.1
LOS		E	A		A		B	B		A	B	A
Approach Delay		33.9			0.1			15.8			12.1	
Approach LOS		C			A			B			B	

Intersection Summary		
Cycle Length: 130		
Actuated Cycle Length: 130		
Offset: 38 (29%), Referenced to phase 2:NBSB, Start of Yellow		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.63		
Intersection Signal Delay: 15.7	Intersection LOS: B	
Intersection Capacity Utilization 75.6%	ICU Level of Service D	
Analysis Period (min) 15		

Splits and Phases: 3: Benns Church Boulevard & Turner Drive



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	126	2	128	3	0	8	200	1195	4	28	1063	153
Future Volume (vph)	126	2	128	3	0	8	200	1195	4	28	1063	153
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		9.0	9.0		9.0		8.3	8.3		8.3	8.3	8.3
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	1.00
Frt		1.00	0.85		0.90		1.00	1.00		1.00	1.00	0.85
Flt Protected		0.95	1.00		0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1793	1599		1690		1719	3538		1805	3539	1615
Flt Permitted		0.72	1.00		0.91		0.18	1.00		0.16	1.00	1.00
Satd. Flow (perm)		1358	1599		1566		334	3538		310	3539	1615
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	133	2	135	3	0	8	211	1258	4	29	1119	161
RTOR Reduction (vph)	0	0	113	0	9	0	0	0	0	0	0	72
Lane Group Flow (vph)	0	135	22	0	2	0	211	1262	0	29	1119	89
Heavy Vehicles (%)	1%	0%	1%	0%	0%	0%	5%	2%	0%	0%	2%	0%
Turn Type	pm+pt	NA	Perm	Perm	NA		D.P+P	NA		D.P+P	NA	Perm
Protected Phases	7	4			8		1	6		5	2	
Permitted Phases	4		4	8			2			6		2
Actuated Green, G (s)		20.8	20.8		20.8		83.6	80.2		83.6	72.2	72.2
Effective Green, g (s)		20.8	20.8		20.8		83.6	80.2		83.6	72.2	72.2
Actuated g/C Ratio		0.16	0.16		0.16		0.64	0.62		0.64	0.56	0.56
Clearance Time (s)		9.0	9.0		9.0		8.3	8.3		8.3	8.3	8.3
Vehicle Extension (s)		5.0	5.0		3.0		4.0	6.0		2.0	6.0	6.0
Lane Grp Cap (vph)		217	255		250		336	2182		238	1965	896
v/s Ratio Prot							0.06	c0.36		0.00	0.32	
v/s Ratio Perm		c0.10	0.01		0.00		c0.35			0.07		0.06
v/c Ratio		0.62	0.08		0.01		0.63	0.58		0.12	0.57	0.10
Uniform Delay, d1		50.9	46.5		45.9		12.2	14.8		18.7	18.8	13.6
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.15	0.64	1.89
Incremental Delay, d2		7.6	0.3		0.0		4.1	1.1		0.1	1.1	0.2
Delay (s)		58.6	46.8		45.9		16.4	16.0		21.5	13.1	25.9
Level of Service		E	D		D		B	B		C	B	C
Approach Delay (s)		52.7			45.9			16.0			14.9	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM 2000 Control Delay	18.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	34.6
Intersection Capacity Utilization	75.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	9	15	28	1390	1173	21
Future Volume (vph)	9	15	28	1390	1173	21
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	0.914					0.850
Flt Protected	0.982		0.950			
Satd. Flow (prot)	1705	0	1736	3539	3505	1615
Flt Permitted	0.982		0.950			
Satd. Flow (perm)	1705	0	1736	3539	3505	1615
Adj. Flow (vph)	9	16	29	1448	1222	22
Lane Group Flow (vph)	25	0	29	1448	1222	22
Sign Control	Stop			Free	Free	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 48.4%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	9	15	28	1390	1173	21
Future Volume (Veh/h)	9	15	28	1390	1173	21
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	9	16	29	1448	1222	22
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2004	611	1244			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2004	611	1244			
tC, single (s)	6.8	6.9	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	82	96	95			
cM capacity (veh/h)	50	442	545			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	25	29	724	724	611	611	22
Volume Left	9	29	0	0	0	0	0
Volume Right	16	0	0	0	0	0	22
cSH	116	545	1700	1700	1700	1700	1700
Volume to Capacity	0.22	0.05	0.43	0.43	0.36	0.36	0.01
Queue Length 95th (ft)	19	4	0	0	0	0	0
Control Delay (s)	44.3	12.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	E	B					
Approach Delay (s)	44.3	0.2			0.0		
Approach LOS	E						

Intersection Summary				
Average Delay	0.5			
Intersection Capacity Utilization	48.4%	ICU Level of Service		A
Analysis Period (min)	15			

Intersection: 1: Benns Church Boulevard & Cypress Run Drive

Movement	EB	EB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LTR	L	T	TR	L	T	T	R
Maximum Queue (ft)	67	64	35	73	136	157	24	182	195	53
Average Queue (ft)	14	16	3	20	26	38	2	52	53	6
95th Queue (ft)	47	42	18	52	87	110	11	135	147	35
Link Distance (ft)	656		676		798	798		1702	1702	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)		180		255			150			245
Storage Blk Time (%)					0			0	0	0
Queuing Penalty (veh)					0			0	0	0

Intersection: 2: Benns Church Boulevard & Tractor Supply Entrance

Movement	EB
Directions Served	R
Maximum Queue (ft)	29
Average Queue (ft)	7
95th Queue (ft)	25
Link Distance (ft)	693
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: Benns Church Boulevard & Turner Drive

Movement	EB	EB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LTR	L	T	TR	L	T	T	R
Maximum Queue (ft)	324	265	33	130	366	277	62	291	312	240
Average Queue (ft)	148	85	4	96	110	90	4	137	143	64
95th Queue (ft)	262	184	20	150	293	210	30	237	247	153
Link Distance (ft)	1966		472		2308	2308		1320	1320	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)		305		130			140			280
Storage Blk Time (%)	0	0		14	7		0	7	0	0
Queuing Penalty (veh)	1	0		48	19		0	0	1	0

Intersection: 4: Red Oak Drive & Benns Church Boulevard

Movement	EB	NB
Directions Served	LR	L
Maximum Queue (ft)	48	31
Average Queue (ft)	16	5
95th Queue (ft)	38	23
Link Distance (ft)	949	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		200
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 69

Intersection: 1: Benns Church Boulevard & Cypress Run Drive

Movement	EB	EB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LTR	L	T	TR	L	T	T	R
Maximum Queue (ft)	178	132	28	215	177	185	58	304	310	206
Average Queue (ft)	84	32	4	104	61	75	4	169	160	33
95th Queue (ft)	147	79	17	189	136	140	32	273	273	110
Link Distance (ft)	656		676		798	798		1702	1702	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)		180		255			150			245
Storage Blk Time (%)	0	0		0	0		0	8	1	0
Queuing Penalty (veh)	0	0		1	0		0	0	1	0

Intersection: 2: Benns Church Boulevard & Tractor Supply Entrance

Movement	EB
Directions Served	R
Maximum Queue (ft)	31
Average Queue (ft)	8
95th Queue (ft)	27
Link Distance (ft)	693
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: Benns Church Boulevard & Turner Drive

Movement	EB	EB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LTR	L	T	TR	L	T	T	R
Maximum Queue (ft)	213	109	37	130	331	299	104	260	258	129
Average Queue (ft)	101	43	9	96	148	142	25	122	130	33
95th Queue (ft)	181	85	32	152	291	261	74	206	209	84
Link Distance (ft)	1966		472		2308	2308		1320	1320	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)		305		130			140			280
Storage Blk Time (%)				8	6		0	7	0	0
Queuing Penalty (veh)				51	12		0	2	0	0

Intersection: 4: Red Oak Drive & Benns Church Boulevard

Movement	EB	NB	SB
Directions Served	LR	L	R
Maximum Queue (ft)	48	53	2
Average Queue (ft)	16	14	0
95th Queue (ft)	41	41	2
Link Distance (ft)	949		
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		200	140
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 69

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	0	38	2	0	0	45	787	2	3	1000	30
Future Volume (vph)	15	0	38	2	0	0	45	787	2	3	1000	30
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt			0.850									0.850
Flt Protected		0.950			0.950		0.950			0.950		
Satd. Flow (prot)	0	1492	1495	0	1203	0	1641	3374	0	1805	3471	1509
Flt Permitted		0.950					0.229			0.326		
Satd. Flow (perm)	0	1492	1495	0	1267	0	396	3374	0	619	3471	1509
Satd. Flow (RTOR)			182									168
Adj. Flow (vph)	16	0	40	2	0	0	47	820	2	3	1042	31
Lane Group Flow (vph)	0	16	40	0	2	0	47	822	0	3	1042	31
Turn Type	Split	NA	Perm	Perm	NA		D.P+P	NA		D.P+P	NA	Perm
Protected Phases	4	4			3		5	2		1	6	
Permitted Phases			4	3			6			2		6
Total Split (s)	20.0	20.0	20.0	15.0	15.0		19.0	76.0		14.0	71.0	71.0
Total Lost Time (s)		6.8	6.8		7.1		8.4	8.4		8.4	8.4	8.4
Act Effct Green (s)		7.6	7.6		7.1		96.3	101.0		103.4	92.0	92.0
Actuated g/C Ratio		0.06	0.06		0.06		0.77	0.81		0.83	0.74	0.74
v/c Ratio		0.18	0.15		0.03		0.13	0.30		0.01	0.41	0.03
Control Delay		60.1	1.2		56.5		4.7	5.8		4.3	9.9	0.0
Queue Delay		0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		60.1	1.2		56.5		4.7	5.8		4.3	9.9	0.0
LOS		E	A		E		A	A		A	A	A
Approach Delay		18.0			56.5			5.8			9.6	
Approach LOS		B			E			A			A	

Intersection Summary			
Cycle Length: 125			
Actuated Cycle Length: 125			
Offset: 15 (12%), Referenced to phase 2:NBSB, Start of Yellow			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.41			
Intersection Signal Delay: 8.2		Intersection LOS: A	
Intersection Capacity Utilization 57.9%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 1: Benns Church Boulevard & Cypress Run Drive



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	0	38	2	0	0	45	787	2	3	1000	30
Future Volume (vph)	15	0	38	2	0	0	45	787	2	3	1000	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.8	6.8		7.1		8.4	8.4		8.4	8.4	8.4
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	1.00
Frt		1.00	0.85		1.00		1.00	1.00		1.00	1.00	0.85
Flt Protected		0.95	1.00		0.95		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1492	1495		1203		1641	3373		1805	3471	1509
Flt Permitted		0.95	1.00		1.00		0.23	1.00		0.33	1.00	1.00
Satd. Flow (perm)		1492	1495		1267		395	3373		619	3471	1509
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	16	0	40	2	0	0	47	820	2	3	1042	31
RTOR Reduction (vph)	0	0	38	0	0	0	0	0	0	0	0	12
Lane Group Flow (vph)	0	16	2	0	2	0	47	822	0	3	1042	19
Heavy Vehicles (%)	21%	0%	8%	50%	0%	0%	10%	7%	0%	0%	4%	7%
Turn Type	Split	NA	Perm	Perm	NA		D.P+P	NA		D.P+P	NA	Perm
Protected Phases	4	4			3		5	2		1	6	
Permitted Phases			4	3			6			2		6
Actuated Green, G (s)		6.2	6.2		1.5		86.6	85.6		86.6	76.5	76.5
Effective Green, g (s)		6.2	6.2		1.5		86.6	85.6		86.6	76.5	76.5
Actuated g/C Ratio		0.05	0.05		0.01		0.69	0.68		0.69	0.61	0.61
Clearance Time (s)		6.8	6.8		7.1		8.4	8.4		8.4	8.4	8.4
Vehicle Extension (s)		3.0	3.0		3.0		2.0	5.0		2.0	5.0	5.0
Lane Grp Cap (vph)		74	74		15		374	2309		438	2124	923
v/s Ratio Prot		c0.01					c0.01	c0.24		0.00	c0.30	
v/s Ratio Perm			0.00		c0.00		0.08			0.00		0.01
v/c Ratio		0.22	0.03		0.13		0.13	0.36		0.01	0.49	0.02
Uniform Delay, d1		57.1	56.5		61.1		11.7	8.2		7.2	13.4	9.5
Progression Factor		1.00	1.00		1.00		0.83	1.01		1.00	1.00	1.00
Incremental Delay, d2		1.5	0.1		4.0		0.1	0.4		0.0	0.8	0.0
Delay (s)		58.5	56.7		65.1		9.7	8.7		7.2	14.3	9.6
Level of Service		E	E		E		A	A		A	B	A
Approach Delay (s)		57.2			65.1			8.7			14.1	
Approach LOS		E			E			A			B	

Intersection Summary				
HCM 2000 Control Delay	13.0	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.43			
Actuated Cycle Length (s)	125.0	Sum of lost time (s)	30.7	
Intersection Capacity Utilization	57.9%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	11	0	835	1017	24
Future Volume (vph)	0	11	0	835	1017	24
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.865				0.850
Flt Protected						
Satd. Flow (prot)	0	1611	0	3374	3471	1583
Flt Permitted						
Satd. Flow (perm)	0	1611	0	3374	3471	1583
Adj. Flow (vph)	0	12	0	908	1105	26
Lane Group Flow (vph)	0	12	0	908	1105	26
Sign Control	Stop			Free	Free	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization	38.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	11	0	835	1017	24
Future Volume (Veh/h)	0	11	0	835	1017	24
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	12	0	908	1105	26
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				Raised	Raised	
Median storage veh)				1	1	
Upstream signal (ft)					870	
pX, platoon unblocked	0.83	0.83	0.83			
vC, conflicting volume	1559	552	1131			
vC1, stage 1 conf vol	1105					
vC2, stage 2 conf vol	454					
vCu, unblocked vol	1272	65	759			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	99	100			
cM capacity (veh/h)	264	821	707			

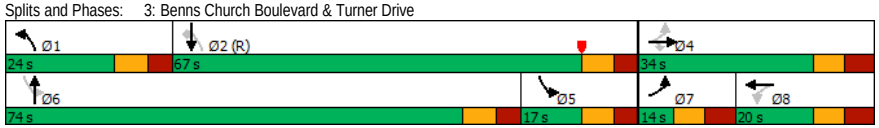
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	12	454	454	552	552	26
Volume Left	0	0	0	0	0	0
Volume Right	12	0	0	0	0	26
cSH	821	1700	1700	1700	1700	1700
Volume to Capacity	0.01	0.27	0.27	0.33	0.33	0.02
Queue Length 95th (ft)	1	0	0	0	0	0
Control Delay (s)	9.4	0.0	0.0	0.0	0.0	0.0
Lane LOS	A					
Approach Delay (s)	9.4	0.0		0.0		
Approach LOS	A					

Intersection Summary				
Average Delay	0.1			
Intersection Capacity Utilization	38.1%	ICU Level of Service		A
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	188	0	275	2	0	2	250	645	0	4	785	239
Future Volume (vph)	188	0	275	2	0	2	250	645	0	4	785	239
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt			0.850		0.932							0.850
Flt Protected		0.950			0.976		0.950			0.950		
Satd. Flow (prot)	0	1612	1524	0	1728	0	1719	3438	0	1805	3505	1538
Flt Permitted		0.755			0.863		0.244			0.343		
Satd. Flow (perm)	0	1281	1524	0	1528	0	442	3438	0	652	3505	1538
Satd. Flow (RTOR)			313		270							272
Adj. Flow (vph)	214	0	313	2	0	2	284	733	0	5	892	272
Lane Group Flow (vph)	0	214	313	0	4	0	284	733	0	5	892	272
Turn Type	pm+pt	NA	Perm	Perm	NA		D.P+P	NA		D.P+P	NA	Perm
Protected Phases	7	4			8		1	6		5	2	
Permitted Phases	4		4	8			2			6		2
Total Split (s)	14.0	34.0	34.0	20.0	20.0		24.0	74.0		17.0	67.0	67.0
Total Lost Time (s)		9.0	9.0		9.0		8.3	8.3		8.3	8.3	8.3
Act Effct Green (s)		24.6	24.6		24.6		74.8	79.7		81.4	60.7	60.7
Actuated g/C Ratio		0.20	0.20		0.20		0.60	0.64		0.65	0.49	0.49
v/c Ratio		0.85	0.57		0.01		0.70	0.33		0.01	0.52	0.31
Control Delay		77.3	9.0		0.0		19.8	11.9		1.8	18.3	6.3
Queue Delay		0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		77.3	9.0		0.0		19.8	11.9		1.8	18.3	6.3
LOS		E	A		A		B	B		A	B	A
Approach Delay		36.7						14.1			15.5	
Approach LOS		D						B			B	

Intersection Summary			
Cycle Length: 125			
Actuated Cycle Length: 125			
Offset: 49 (39%), Referenced to phase 2:NBSB, Start of Yellow			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.85			
Intersection Signal Delay: 19.0		Intersection LOS: B	
Intersection Capacity Utilization 74.0%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 3: Benns Church Boulevard & Turner Drive



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	188	0	275	2	0	2	250	645	0	4	785	239
Future Volume (vph)	188	0	275	2	0	2	250	645	0	4	785	239
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		9.0	9.0		9.0		8.3	8.3		8.3	8.3	8.3
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	1.00
Frt		1.00	0.85		0.93		1.00	1.00		1.00	1.00	0.85
Flt Protected		0.95	1.00		0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1612	1524		1729		1719	3438		1805	3505	1538
Flt Permitted		0.76	1.00		0.86		0.24	1.00		0.34	1.00	1.00
Satd. Flow (perm)		1281	1524		1530		441	3438		652	3505	1538
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	214	0	312	2	0	2	284	733	0	5	892	272
RTOR Reduction (vph)	0	0	251	0	3	0	0	0	0	0	0	140
Lane Group Flow (vph)	0	214	62	0	1	0	284	733	0	5	892	132
Heavy Vehicles (%)	12%	0%	6%	0%	0%	0%	5%	5%	0%	0%	3%	5%
Turn Type	pm+pt	NA	Perm	Perm	NA		D.P+P	NA		D.P+P	NA	Perm
Protected Phases	7	4			8		1	6		5	2	
Permitted Phases	4		4	8			2			6		2
Actuated Green, G (s)		24.6	24.6		24.6		74.8	73.1		74.8	60.8	60.8
Effective Green, g (s)		24.6	24.6		24.6		74.8	73.1		74.8	60.8	60.8
Actuated g/C Ratio		0.20	0.20		0.20		0.60	0.58		0.60	0.49	0.49
Clearance Time (s)		9.0	9.0		9.0		8.3	8.3		8.3	8.3	8.3
Vehicle Extension (s)		5.0	5.0		3.0		4.0	6.0		2.0	6.0	6.0
Lane Grp Cap (vph)		252	299		301		407	2010		405	1704	748
v/s Ratio Prot							c0.08	0.21		0.00	0.25	
v/s Ratio Perm		c0.17	0.04		0.00		c0.34			0.01		0.09
v/c Ratio		0.85	0.21		0.00		0.70	0.36		0.01	0.52	0.18
Uniform Delay, d1		48.4	42.0		40.3		13.7	13.7		12.7	22.1	18.0
Progression Factor		1.00	1.00		1.00		1.00	1.00		0.22	0.76	2.46
Incremental Delay, d2		24.5	0.7		0.0		5.6	0.5		0.0	1.1	0.5
Delay (s)		72.9	42.7		40.3		19.3	14.2		2.8	17.8	44.8
Level of Service		E	D		D		B	B		A	B	D
Approach Delay (s)		55.0			40.3			15.6			24.0	
Approach LOS		D			D			B			C	

Intersection Summary					
HCM 2000 Control Delay		26.9	HCM 2000 Level of Service		C
HCM 2000 Volume to Capacity ratio		0.81			
Actuated Cycle Length (s)		125.0	Sum of lost time (s)		34.6
Intersection Capacity Utilization		74.0%	ICU Level of Service		D
Analysis Period (min)		15			
c Critical Lane Group					



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	11	20	12	884	1044	19
Future Volume (vph)	11	20	12	884	1044	19
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	0.913					0.850
Flt Protected	0.983		0.950			
Satd. Flow (prot)	1694	0	1787	3406	3471	1599
Flt Permitted	0.983		0.950			
Satd. Flow (perm)	1694	0	1787	3406	3471	1599
Adj. Flow (vph)	12	22	13	971	1147	21
Lane Group Flow (vph)	34	0	13	971	1147	21
Sign Control	Stop			Free	Free	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization	38.9%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	11	20	12	884	1044	19
Future Volume (Veh/h)	11	20	12	884	1044	19
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	12	22	13	971	1147	21
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1658	574	1168			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1658	574	1168			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	86	95	98			
cM capacity (veh/h)	88	465	600			

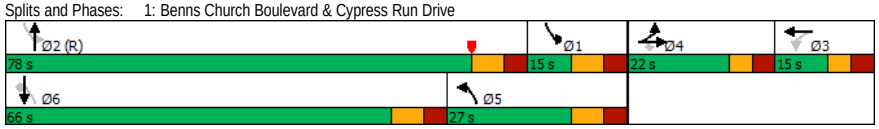
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	34	13	486	486	574	574	21
Volume Left	12	13	0	0	0	0	0
Volume Right	22	0	0	0	0	0	21
cSH	186	600	1700	1700	1700	1700	1700
Volume to Capacity	0.18	0.02	0.29	0.29	0.34	0.34	0.01
Queue Length 95th (ft)	16	2	0	0	0	0	0
Control Delay (s)	28.7	11.1	0.0	0.0	0.0	0.0	0.0
Lane LOS	D	B					
Approach Delay (s)	28.7	0.1			0.0		
Approach LOS	D						

Intersection Summary				
Average Delay	0.5			
Intersection Capacity Utilization	38.9%	ICU Level of Service		A
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	100	0	96	0	4	0	194	1176	0	3	1185	116
Future Volume (vph)	100	0	96	0	4	0	194	1176	0	3	1185	116
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt			0.850									0.850
Flt Protected		0.950					0.950			0.950		
Satd. Flow (prot)	0	1805	1615	0	1900	0	1805	3539	0	1805	3471	1553
Flt Permitted		0.950					0.142			0.190		
Satd. Flow (perm)	0	1805	1615	0	1900	0	270	3539	0	361	3471	1553
Satd. Flow (RTOR)			246									232
Adj. Flow (vph)	102	0	98	0	4	0	198	1200	0	3	1209	118
Lane Group Flow (vph)	0	102	98	0	4	0	198	1200	0	3	1209	118
Turn Type	Split	NA	Perm		NA		D.P+P	NA		D.P+P	NA	Perm
Protected Phases	4	4			3		5	2		1	6	
Permitted Phases			4	3			6			2		6
Total Split (s)	22.0	22.0	22.0	15.0	15.0		27.0	78.0		15.0	66.0	66.0
Total Lost Time (s)		6.8	6.8		7.1		8.4	8.4		8.4	8.4	8.4
Act Effct Green (s)		12.2	12.2		7.0		91.4	96.8		101.5	79.4	79.4
Actuated g/C Ratio		0.09	0.09		0.05		0.70	0.74		0.78	0.61	0.61
v/c Ratio		0.60	0.26		0.04		0.60	0.46		0.01	0.57	0.11
Control Delay		71.2	1.7		59.2		19.6	4.2		6.0	18.8	0.2
Queue Delay		0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		71.2	1.7		59.2		19.6	4.2		6.0	18.8	0.2
LOS		E	A		E		B	A		A	B	A
Approach Delay		37.1			59.3			6.4			17.1	
Approach LOS		D			E			A			B	

Intersection Summary			
Cycle Length: 130			
Actuated Cycle Length: 130			
Offset: 40 (31%), Referenced to phase 2:NBSB, Start of Yellow			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.60			
Intersection Signal Delay: 13.4		Intersection LOS: B	
Intersection Capacity Utilization 75.4%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 1: Benns Church Boulevard & Cypress Run Drive



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	100	0	96	0	4	0	194	1176	0	3	1185	116
Future Volume (vph)	100	0	96	0	4	0	194	1176	0	3	1185	116
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.8	6.8		7.1		8.4	8.4		8.4	8.4	8.4
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	1.00
Frt		1.00	0.85		1.00		1.00	1.00		1.00	1.00	0.85
Flt Protected		0.95	1.00		1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1805	1615		1900		1805	3539		1805	3471	1553
Flt Permitted		0.95	1.00		1.00		0.14	1.00		0.19	1.00	1.00
Satd. Flow (perm)		1805	1615		1900		270	3539		360	3471	1553
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	102	0	98	0	4	0	198	1200	0	3	1209	118
RTOR Reduction (vph)	0	0	89	0	0	0	0	0	0	0	0	57
Lane Group Flow (vph)	0	102	9	0	4	0	198	1200	0	3	1209	61
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	4%	4%
Turn Type	Split	NA	Perm		NA		D.P+P	NA		D.P+P	NA	Perm
Protected Phases	4	4			3		5	2		1	6	
Permitted Phases			4	3			6			2		6
Actuated Green, G (s)		12.2	12.2		1.4		85.7	84.4		85.7	67.0	67.0
Effective Green, g (s)		12.2	12.2		1.4		85.7	84.4		85.7	67.0	67.0
Actuated g/C Ratio		0.09	0.09		0.01		0.66	0.65		0.66	0.52	0.52
Clearance Time (s)		6.8	6.8		7.1		8.4	8.4		8.4	8.4	8.4
Vehicle Extension (s)		3.0	3.0		3.0		2.0	5.0		2.0	5.0	5.0
Lane Grp Cap (vph)		169	151		20		398	2297		251	1788	800
v/s Ratio Prot		c0.06			c0.00		c0.07	0.34		0.00	c0.35	
v/s Ratio Perm			0.01				0.26			0.01		0.04
v/c Ratio		0.60	0.06		0.20		0.50	0.52		0.01	0.68	0.08
Uniform Delay, d1		56.6	53.7		63.7		30.5	12.1		14.2	23.4	15.9
Progression Factor		1.00	1.00		1.00		0.70	0.43		1.00	1.00	1.00
Incremental Delay, d2		6.0	0.2		4.9		0.3	0.7		0.0	2.1	0.2
Delay (s)		62.5	53.8		68.6		21.6	5.9		14.2	25.5	16.1
Level of Service		E	D		E		C	A		B	C	B
Approach Delay (s)		58.3			68.6			8.1			24.6	
Approach LOS		E			E			A			C	

Intersection Summary					
HCM 2000 Control Delay		19.1	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio		0.63			
Actuated Cycle Length (s)		130.0	Sum of lost time (s)	30.7	
Intersection Capacity Utilization		75.4%	ICU Level of Service	D	
Analysis Period (min)		15			
c Critical Lane Group					

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	13	0	1369	1268	12
Future Volume (vph)	0	13	0	1369	1268	12
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.865				0.850
Flt Protected						
Satd. Flow (prot)	0	1611	0	3539	3471	1583
Flt Permitted						
Satd. Flow (perm)	0	1611	0	3539	3471	1583
Adj. Flow (vph)	0	14	0	1488	1378	13
Lane Group Flow (vph)	0	14	0	1488	1378	13
Sign Control	Stop			Free	Free	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization	45.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	13	0	1369	1268	12
Future Volume (Veh/h)	0	13	0	1369	1268	12
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	14	0	1488	1378	13
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				Raised	Raised	
Median storage veh)				1	1	
Upstream signal (ft)					870	
pX, platoon unblocked	0.74	0.74	0.74			
vC, conflicting volume	2122	689	1391			
vC1, stage 1 conf vol	1378					
vC2, stage 2 conf vol	744					
vCu, unblocked vol	1808	0	815			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	98	100			
cM capacity (veh/h)	183	798	595			

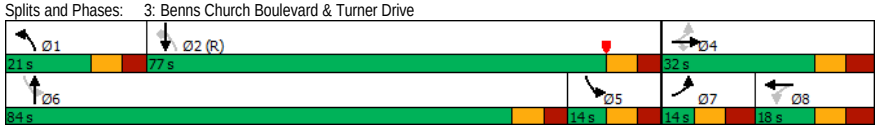
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	14	744	744	689	689	13
Volume Left	0	0	0	0	0	0
Volume Right	14	0	0	0	0	13
cSH	798	1700	1700	1700	1700	1700
Volume to Capacity	0.02	0.44	0.44	0.41	0.41	0.01
Queue Length 95th (ft)	1	0	0	0	0	0
Control Delay (s)	9.6	0.0	0.0	0.0	0.0	0.0
Lane LOS	A					
Approach Delay (s)	9.6	0.0		0.0		
Approach LOS	A					

Intersection Summary				
Average Delay	0.0			
Intersection Capacity Utilization	45.1%	ICU Level of Service		A
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	130	2	132	3	0	8	206	1231	4	29	1095	158
Future Volume (vph)	130	2	132	3	0	8	206	1231	4	29	1095	158
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt			0.850		0.902							0.850
Flt Protected		0.953			0.987		0.950			0.950		
Satd. Flow (prot)	0	1793	1599	0	1692	0	1719	3539	0	1805	3539	1615
Flt Permitted		0.722			0.914		0.173			0.153		
Satd. Flow (perm)	0	1358	1599	0	1566	0	313	3539	0	291	3539	1615
Satd. Flow (RTOR)			184		259							196
Adj. Flow (vph)	137	2	139	3	0	8	217	1296	4	31	1153	166
Lane Group Flow (vph)	0	139	139	0	11	0	217	1300	0	31	1153	166
Turn Type	pm+pt	NA	Perm	Perm	NA		D.P+P	NA		D.P+P	NA	Perm
Protected Phases	7	4			8		1	6		5	2	
Permitted Phases	4		4	8			2			6		2
Total Split (s)	14.0	32.0	32.0	18.0	18.0		21.0	84.0		14.0	77.0	77.0
Total Lost Time (s)		9.0	9.0		9.0		8.3	8.3		8.3	8.3	8.3
Act Effct Green (s)		21.0	21.0		21.0		83.4	83.3		86.8	72.0	72.0
Actuated g/C Ratio		0.16	0.16		0.16		0.64	0.64		0.67	0.55	0.55
v/c Ratio		0.63	0.34		0.02		0.67	0.57		0.12	0.59	0.17
Control Delay		64.2	4.5		0.1		20.4	15.9		9.9	14.0	2.4
Queue Delay		0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		64.2	4.5		0.1		20.4	15.9		9.9	14.0	2.4
LOS		E	A		A		C	B		A	B	A
Approach Delay		34.4			0.1			16.6			12.5	
Approach LOS		C			A			B			B	

Intersection Summary			
Cycle Length: 130			
Actuated Cycle Length: 130			
Offset: 38 (29%), Referenced to phase 2:NBSB, Start of Yellow			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.67			
Intersection Signal Delay: 16.4		Intersection LOS: B	
Intersection Capacity Utilization 77.0%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 3: Benns Church Boulevard & Turner Drive



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	130	2	132	3	0	8	206	1231	4	29	1095	158
Future Volume (vph)	130	2	132	3	0	8	206	1231	4	29	1095	158
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		9.0	9.0		9.0		8.3	8.3		8.3	8.3	8.3
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	1.00
Frt		1.00	0.85		0.90		1.00	1.00		1.00	1.00	0.85
Flt Protected		0.95	1.00		0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1793	1599		1690		1719	3538		1805	3539	1615
Flt Permitted		0.72	1.00		0.91		0.17	1.00		0.15	1.00	1.00
Satd. Flow (perm)		1358	1599		1565		314	3538		291	3539	1615
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	137	2	139	3	0	8	217	1296	4	31	1153	166
RTOR Reduction (vph)	0	0	117	0	9	0	0	0	0	0	0	74
Lane Group Flow (vph)	0	139	22	0	2	0	217	1300	0	31	1153	92
Heavy Vehicles (%)	1%	0%	1%	0%	0%	0%	5%	2%	0%	0%	2%	0%
Turn Type	pm+pt	NA	Perm	Perm	NA		D.P+P	NA		D.P+P	NA	Perm
Protected Phases	7	4			8		1	6		5	2	
Permitted Phases	4		4	8			2			6		2
Actuated Green, G (s)		21.0	21.0		21.0		83.4	80.0		83.4	71.9	71.9
Effective Green, g (s)		21.0	21.0		21.0		83.4	80.0		83.4	71.9	71.9
Actuated g/C Ratio		0.16	0.16		0.16		0.64	0.62		0.64	0.55	0.55
Clearance Time (s)		9.0	9.0		9.0		8.3	8.3		8.3	8.3	8.3
Vehicle Extension (s)		5.0	5.0		3.0		4.0	6.0		2.0	6.0	6.0
Lane Grp Cap (vph)		219	258		252		325	2177		226	1957	893
v/s Ratio Prot							0.06	c0.37		0.00	0.33	
v/s Ratio Perm		c0.10	0.01		0.00		c0.37			0.08		0.06
v/c Ratio		0.63	0.09		0.01		0.67	0.60		0.14	0.59	0.10
Uniform Delay, d1		50.9	46.3		45.7		12.9	15.2		19.8	19.3	13.8
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.16	0.64	1.84
Incremental Delay, d2		8.1	0.3		0.0		5.6	1.2		0.1	1.1	0.2
Delay (s)		59.0	46.7		45.8		18.6	16.4		23.2	13.5	25.6
Level of Service		E	D		D		B	B		C	B	C
Approach Delay (s)		52.8			45.8			16.7			15.2	
Approach LOS		D			D			B			B	

Intersection Summary				
HCM 2000 Control Delay	19.4	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.75			
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	34.6	
Intersection Capacity Utilization	77.0%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	9	15	29	1432	1209	22
Future Volume (vph)	9	15	29	1432	1209	22
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	0.914					0.850
Flt Protected	0.982		0.950			
Satd. Flow (prot)	1705	0	1736	3539	3505	1615
Flt Permitted	0.982		0.950			
Satd. Flow (perm)	1705	0	1736	3539	3505	1615
Adj. Flow (vph)	9	16	30	1492	1259	23
Lane Group Flow (vph)	25	0	30	1492	1259	23
Sign Control	Stop			Free	Free	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 49.6%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	9	15	29	1432	1209	22
Future Volume (Veh/h)	9	15	29	1432	1209	22
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	9	16	30	1492	1259	23
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2065	630	1282			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2065	630	1282			
tC, single (s)	6.8	6.9	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	80	96	94			
cM capacity (veh/h)	46	430	526			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	25	30	746	746	630	630	23
Volume Left	9	30	0	0	0	0	0
Volume Right	16	0	0	0	0	0	23
cSH	106	526	1700	1700	1700	1700	1700
Volume to Capacity	0.24	0.06	0.44	0.44	0.37	0.37	0.01
Queue Length 95th (ft)	21	5	0	0	0	0	0
Control Delay (s)	48.9	12.3	0.0	0.0	0.0	0.0	0.0
Lane LOS	E	B					
Approach Delay (s)	48.9	0.2			0.0		
Approach LOS	E						

Intersection Summary				
Average Delay	0.6			
Intersection Capacity Utilization	49.6%	ICU Level of Service		A
Analysis Period (min)	15			

Intersection: 1: Benns Church Boulevard & Cypress Run Drive

Movement	EB	EB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LTR	L	T	TR	L	T	T	R
Maximum Queue (ft)	78	64	45	72	116	134	22	158	159	41
Average Queue (ft)	15	17	3	24	26	37	1	53	51	6
95th Queue (ft)	51	42	22	54	80	101	11	118	122	26
Link Distance (ft)	656		676		798	798		1702	1702	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)		180		255			150			245
Storage Blk Time (%)								0		
Queuing Penalty (veh)								0		

Intersection: 2: Benns Church Boulevard & Tractor Supply Entrance

Movement	EB
Directions Served	R
Maximum Queue (ft)	27
Average Queue (ft)	7
95th Queue (ft)	24
Link Distance (ft)	693
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: Benns Church Boulevard & Turner Drive

Movement	EB	EB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LTR	L	T	TR	L	T	T	R
Maximum Queue (ft)	322	261	35	130	291	214	63	272	277	204
Average Queue (ft)	152	85	4	101	95	86	5	145	151	59
95th Queue (ft)	262	186	21	148	227	168	32	235	244	134
Link Distance (ft)	1966		472		2308	2308		1320	1320	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)		305		130			140			280
Storage Blk Time (%)	0	0		10	3		0	8	0	0
Queuing Penalty (veh)	1	0		35	8		0	0	0	0

Intersection: 4: Red Oak Drive & Benns Church Boulevard

Movement	EB	NB
Directions Served	LR	L
Maximum Queue (ft)	55	34
Average Queue (ft)	17	6
95th Queue (ft)	42	26
Link Distance (ft)	949	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		200
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 45

Intersection: 1: Benns Church Boulevard & Cypress Run Drive

Movement	EB	EB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LTR	L	T	TR	L	T	T	R
Maximum Queue (ft)	161	117	23	214	186	193	48	294	300	194
Average Queue (ft)	73	33	3	105	68	80	3	165	155	36
95th Queue (ft)	138	78	16	188	157	156	26	272	267	123
Link Distance (ft)	656		676		798	798		1702	1702	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)		180		255			150			245
Storage Blk Time (%)	0	0		0	0			8	1	0
Queuing Penalty (veh)	0	0		3	0			0	1	0

Intersection: 2: Benns Church Boulevard & Tractor Supply Entrance

Movement	EB	SB
Directions Served	R	T
Maximum Queue (ft)	31	5
Average Queue (ft)	8	0
95th Queue (ft)	27	5
Link Distance (ft)	693	798
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Benns Church Boulevard & Turner Drive

Movement	EB	EB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LTR	L	T	TR	L	T	T	R
Maximum Queue (ft)	191	110	44	130	363	330	131	222	239	90
Average Queue (ft)	94	42	10	100	158	154	25	129	139	33
95th Queue (ft)	165	84	35	154	315	286	79	206	215	72
Link Distance (ft)	1966		472		2308	2308		1320	1320	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)		305		130			140			280
Storage Blk Time (%)				11	7		0	8	0	0
Queuing Penalty (veh)				65	15		0	2	0	0

Intersection: 4: Red Oak Drive & Benns Church Boulevard

Movement	EB	NB	SB
Directions Served	LR	L	R
Maximum Queue (ft)	59	51	2
Average Queue (ft)	16	15	0
95th Queue (ft)	43	42	0
Link Distance (ft)	949		
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		200	140
Storage Blk Time (%)			
Queuing Penalty (veh)			

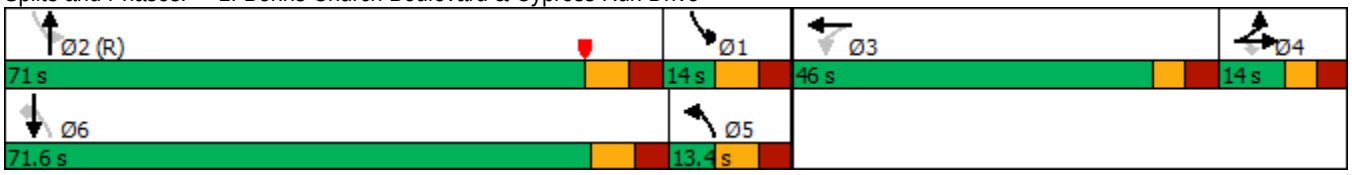
Network Summary

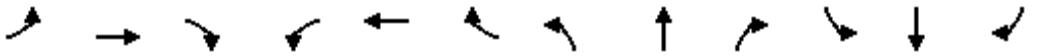
Network wide Queuing Penalty: 87

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	0	38	2	0	0	45	843	2	3	1061	30
Future Volume (vph)	15	0	38	2	0	0	45	843	2	3	1061	30
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt			0.850									0.850
Flt Protected		0.950			0.950		0.950			0.950		
Satd. Flow (prot)	0	1492	1495	0	1203	0	1641	3374	0	1805	3471	1509
Flt Permitted		0.950					0.217			0.304		
Satd. Flow (perm)	0	1492	1495	0	1267	0	375	3374	0	578	3471	1509
Satd. Flow (RTOR)			157									145
Adj. Flow (vph)	16	0	40	2	0	0	47	878	2	3	1105	31
Lane Group Flow (vph)	0	16	40	0	2	0	47	880	0	3	1105	31
Turn Type	Split	NA	Perm	Perm	NA		D.P+P	NA		D.P+P	NA	Perm
Protected Phases	4	4			3		5	2		1	6	
Permitted Phases			4	3			6			2		6
Total Split (s)	14.0	14.0	14.0	46.0	46.0		13.4	71.0		14.0	71.6	71.6
Total Lost Time (s)		6.8	6.8		7.1		8.4	8.4		8.4	8.4	8.4
Act Effct Green (s)		7.7	7.7		10.3		113.2	118.8		118.4	110.9	110.9
Actuated g/C Ratio		0.05	0.05		0.07		0.78	0.82		0.82	0.76	0.76
v/c Ratio		0.20	0.18		0.02		0.14	0.32		0.01	0.42	0.03
Control Delay		71.5	1.7		59.0		7.0	9.3		5.7	9.6	0.0
Queue Delay		0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		71.5	1.7		59.0		7.0	9.3		5.7	9.6	0.0
LOS		E	A		E		A	A		A	A	A
Approach Delay		21.6			59.0			9.1			9.4	
Approach LOS		C			E			A			A	

Intersection Summary	
Cycle Length: 145	
Actuated Cycle Length: 145	
Offset: 0 (0%), Referenced to phase 2:NBSB, Start of Yellow	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.42	
Intersection Signal Delay: 9.6	Intersection LOS: A
Intersection Capacity Utilization 59.6%	ICU Level of Service B
Analysis Period (min) 15	

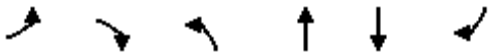
Splits and Phases: 1: Benns Church Boulevard & Cypress Run Drive





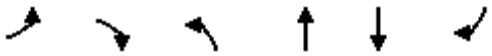
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	0	38	2	0	0	45	843	2	3	1061	30
Future Volume (vph)	15	0	38	2	0	0	45	843	2	3	1061	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.8	6.8		7.1		8.4	8.4		8.4	8.4	8.4
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	1.00
Frt		1.00	0.85		1.00		1.00	1.00		1.00	1.00	0.85
Flt Protected		0.95	1.00		0.95		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1492	1495		1203		1641	3373		1805	3471	1509
Flt Permitted		0.95	1.00		1.00		0.22	1.00		0.30	1.00	1.00
Satd. Flow (perm)		1492	1495		1267		375	3373		578	3471	1509
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	16	0	40	2	0	0	47	878	2	3	1105	31
RTOR Reduction (vph)	0	0	38	0	0	0	0	0	0	0	0	11
Lane Group Flow (vph)	0	16	2	0	2	0	47	880	0	3	1105	20
Heavy Vehicles (%)	21%	0%	8%	50%	0%	0%	10%	7%	0%	0%	4%	7%
Turn Type	Split	NA	Perm	Perm	NA		D.P+P	NA		D.P+P	NA	Perm
Protected Phases	4	4			3		5	2		1	6	
Permitted Phases			4	3			6			2		6
Actuated Green, G (s)		6.3	6.3		3.5		104.5	103.4		104.5	95.5	95.5
Effective Green, g (s)		6.3	6.3		3.5		104.5	103.4		104.5	95.5	95.5
Actuated g/C Ratio		0.04	0.04		0.02		0.72	0.71		0.72	0.66	0.66
Clearance Time (s)		6.8	6.8		7.1		8.4	8.4		8.4	8.4	8.4
Vehicle Extension (s)		3.0	3.0		3.0		2.0	5.0		2.0	5.0	5.0
Lane Grp Cap (vph)		64	64		30		348	2405		425	2286	993
v/s Ratio Prot		c0.01					c0.01	0.26		0.00	c0.32	
v/s Ratio Perm			0.00		c0.00		0.09			0.01		0.01
v/c Ratio		0.25	0.03		0.07		0.14	0.37		0.01	0.48	0.02
Uniform Delay, d1		67.1	66.4		69.2		12.0	8.1		7.5	12.4	8.6
Progression Factor		1.00	1.00		1.00		1.07	1.41		1.00	1.00	1.00
Incremental Delay, d2		2.1	0.2		0.9		0.1	0.4		0.0	0.7	0.0
Delay (s)		69.1	66.6		70.1		12.8	11.8		7.5	13.1	8.6
Level of Service		E	E		E		B	B		A	B	A
Approach Delay (s)		67.3			70.1			11.9			13.0	
Approach LOS		E			E			B			B	

Intersection Summary			
HCM 2000 Control Delay	14.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	145.0	Sum of lost time (s)	30.7
Intersection Capacity Utilization	59.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	15	0	891	1068	33
Future Volume (vph)	0	15	0	891	1068	33
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.865				0.850
Flt Protected						
Satd. Flow (prot)	0	1611	0	3374	3471	1583
Flt Permitted						
Satd. Flow (perm)	0	1611	0	3374	3471	1583
Adj. Flow (vph)	0	16	0	968	1161	36
Lane Group Flow (vph)	0	16	0	968	1161	36
Sign Control	Stop			Free	Free	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 39.5%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	15	0	891	1068	33
Future Volume (Veh/h)	0	15	0	891	1068	33
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	16	0	968	1161	36
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				Raised	Raised	
Median storage veh)				1	1	
Upstream signal (ft)					870	
pX, platoon unblocked	0.84	0.84	0.84			
vC, conflicting volume	1645	580	1197			
vC1, stage 1 conf vol	1161					
vC2, stage 2 conf vol	484					
vCu, unblocked vol	1388	122	855			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	98	100			
cM capacity (veh/h)	240	762	656			

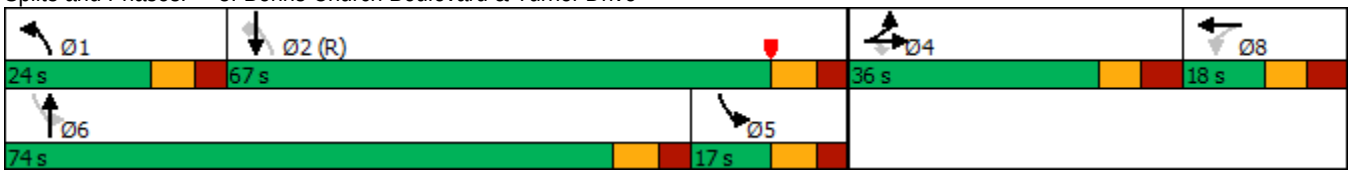
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	16	484	484	580	580	36
Volume Left	0	0	0	0	0	0
Volume Right	16	0	0	0	0	36
cSH	762	1700	1700	1700	1700	1700
Volume to Capacity	0.02	0.28	0.28	0.34	0.34	0.02
Queue Length 95th (ft)	2	0	0	0	0	0
Control Delay (s)	9.8	0.0	0.0	0.0	0.0	0.0
Lane LOS	A					
Approach Delay (s)	9.8	0.0		0.0		
Approach LOS	A					

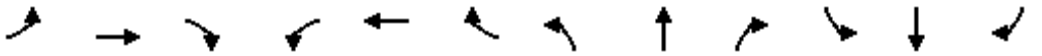
Intersection Summary				
Average Delay	0.1			
Intersection Capacity Utilization	39.5%	ICU Level of Service		A
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	326	0	265	2	0	2	248	580	0	4	892	182
Future Volume (vph)	326	0	265	2	0	2	248	580	0	4	892	182
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt			0.850		0.932							0.850
Flt Protected	0.950	0.950			0.976		0.950			0.950		
Satd. Flow (prot)	1531	1531	1524	0	1728	0	1719	3438	0	1805	3505	1538
Flt Permitted	0.950	0.950					0.167			0.370		
Satd. Flow (perm)	1531	1531	1524	0	1771	0	302	3438	0	703	3505	1538
Satd. Flow (RTOR)			301		232							197
Adj. Flow (vph)	370	0	301	2	0	2	282	659	0	5	1014	207
Lane Group Flow (vph)	185	185	301	0	4	0	282	659	0	5	1014	207
Turn Type	Split	NA	Perm	Perm	NA		D.P+P	NA		D.P+P	NA	Perm
Protected Phases	4	4			8		1	6		5	2	
Permitted Phases			4	8			2			6		2
Total Split (s)	36.0	36.0	36.0	18.0	18.0		24.0	74.0		17.0	67.0	67.0
Total Lost Time (s)	9.0	9.0	9.0		9.0		8.3	8.3		8.3	8.3	8.3
Act Effct Green (s)	24.3	24.3	24.3		7.0		91.9	96.8		98.6	70.8	70.8
Actuated g/C Ratio	0.17	0.17	0.17		0.05		0.63	0.67		0.68	0.49	0.49
v/c Ratio	0.72	0.72	0.60		0.01		0.71	0.29		0.01	0.59	0.24
Control Delay	73.3	73.3	10.5		0.0		27.8	12.6		5.2	30.9	9.9
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	73.3	73.3	10.5		0.0		27.8	12.6		5.2	30.9	9.9
LOS	E	E	B		A		C	B		A	C	A
Approach Delay		45.1						17.1			27.2	
Approach LOS		D						B			C	

Intersection Summary		
Cycle Length: 145		
Actuated Cycle Length: 145		
Offset: 49 (34%), Referenced to phase 2:NBSB, Start of Yellow		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.72		
Intersection Signal Delay: 28.1	Intersection LOS: C	
Intersection Capacity Utilization 75.4%	ICU Level of Service D	
Analysis Period (min) 15		

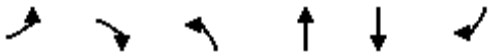
Splits and Phases: 3: Benns Church Boulevard & Turner Drive





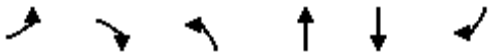
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	326	0	265	2	0	2	248	580	0	4	892	182
Future Volume (vph)	326	0	265	2	0	2	248	580	0	4	892	182
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	9.0	9.0	9.0		9.0		8.3	8.3		8.3	8.3	8.3
Lane Util. Factor	0.95	0.95	1.00		1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85		0.93		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	0.95	1.00		0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1531	1531	1524		1729		1719	3438		1805	3505	1538
Flt Permitted	0.95	0.95	1.00		1.00		0.17	1.00		0.37	1.00	1.00
Satd. Flow (perm)	1531	1531	1524		1772		302	3438		703	3505	1538
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	370	0	301	2	0	2	282	659	0	5	1014	207
RTOR Reduction (vph)	0	0	251	0	4	0	0	0	0	0	0	111
Lane Group Flow (vph)	185	185	50	0	0	0	282	659	0	5	1014	96
Heavy Vehicles (%)	12%	0%	6%	0%	0%	0%	5%	5%	0%	0%	3%	5%
Turn Type	Split	NA	Perm	Perm	NA		D.P+P	NA		D.P+P	NA	Perm
Protected Phases	4	4			8		1	6		5	2	
Permitted Phases			4	8			2			6		2
Actuated Green, G (s)	24.3	24.3	24.3		1.4		84.7	83.0		84.7	63.5	63.5
Effective Green, g (s)	24.3	24.3	24.3		1.4		84.7	83.0		84.7	63.5	63.5
Actuated g/C Ratio	0.17	0.17	0.17		0.01		0.58	0.57		0.58	0.44	0.44
Clearance Time (s)	9.0	9.0	9.0		9.0		8.3	8.3		8.3	8.3	8.3
Vehicle Extension (s)	5.0	5.0	5.0		3.0		4.0	6.0		2.0	6.0	6.0
Lane Grp Cap (vph)	256	256	255		17		383	1967		423	1534	673
v/s Ratio Prot	c0.12	0.12					c0.11	0.19		0.00	0.29	
v/s Ratio Perm			0.03		c0.00		c0.32			0.01		0.06
v/c Ratio	0.72	0.72	0.20		0.00		0.74	0.34		0.01	0.66	0.14
Uniform Delay, d1	57.2	57.2	52.0		71.1		20.2	16.4		15.5	32.2	24.4
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00		0.51	1.03	2.35
Incremental Delay, d2	11.7	11.7	0.8		0.1		7.7	0.5		0.0	2.2	0.4
Delay (s)	68.9	68.9	52.8		71.2		27.9	16.9		7.9	35.3	57.9
Level of Service	E	E	D		E		C	B		A	D	E
Approach Delay (s)		61.6			71.2			20.2			39.0	
Approach LOS		E			E			C			D	

Intersection Summary			
HCM 2000 Control Delay	38.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	145.0	Sum of lost time (s)	34.6
Intersection Capacity Utilization	75.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	11	20	12	945	1100	19
Future Volume (vph)	11	20	12	945	1100	19
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	0.913					0.850
Flt Protected	0.983		0.950			
Satd. Flow (prot)	1694	0	1787	3406	3471	1599
Flt Permitted	0.983		0.950			
Satd. Flow (perm)	1694	0	1787	3406	3471	1599
Adj. Flow (vph)	12	22	13	1038	1209	21
Lane Group Flow (vph)	34	0	13	1038	1209	21
Sign Control	Stop			Free	Free	

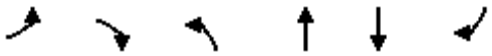
Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 40.4%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	11	20	12	945	1100	19
Future Volume (Veh/h)	11	20	12	945	1100	19
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	12	22	13	1038	1209	21
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1754	604	1230			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1754	604	1230			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	84	95	98			
cM capacity (veh/h)	76	444	568			

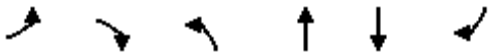
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	34	13	519	519	604	604	21
Volume Left	12	13	0	0	0	0	0
Volume Right	22	0	0	0	0	0	21
cSH	164	568	1700	1700	1700	1700	1700
Volume to Capacity	0.21	0.02	0.31	0.31	0.36	0.36	0.01
Queue Length 95th (ft)	19	2	0	0	0	0	0
Control Delay (s)	32.5	11.5	0.0	0.0	0.0	0.0	0.0
Lane LOS	D	B					
Approach Delay (s)	32.5	0.1			0.0		
Approach LOS	D						

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	40.4%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	16	0	890	999	21
Future Volume (vph)	0	16	0	890	999	21
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.865				0.850
Flt Protected						
Satd. Flow (prot)	0	1611	0	3374	3438	1583
Flt Permitted						
Satd. Flow (perm)	0	1611	0	3374	3438	1583
Adj. Flow (vph)	0	17	0	937	1052	22
Lane Group Flow (vph)	0	17	0	937	1052	22
Sign Control	Stop			Free	Free	

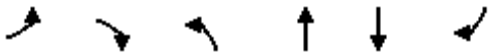
Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 37.6%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	16	0	890	999	21
Future Volume (Veh/h)	0	16	0	890	999	21
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	17	0	937	1052	22
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				Raised	Raised	
Median storage veh)				2	2	
Upstream signal (ft)				844		
pX, platoon unblocked	0.91					
vC, conflicting volume	1520	526	1074			
vC1, stage 1 conf vol	1052					
vC2, stage 2 conf vol	468					
vCu, unblocked vol	1375	526	1074			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	97	100			
cM capacity (veh/h)	280	496	645			

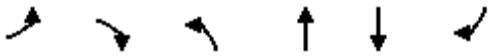
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	17	468	468	526	526	22
Volume Left	0	0	0	0	0	0
Volume Right	17	0	0	0	0	22
cSH	496	1700	1700	1700	1700	1700
Volume to Capacity	0.03	0.28	0.28	0.31	0.31	0.01
Queue Length 95th (ft)	3	0	0	0	0	0
Control Delay (s)	12.5	0.0	0.0	0.0	0.0	0.0
Lane LOS	B					
Approach Delay (s)	12.5	0.0		0.0		
Approach LOS	B					

Intersection Summary				
Average Delay	0.1			
Intersection Capacity Utilization	37.6%	ICU Level of Service		A
Analysis Period (min)	15			



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	75	0	828	1117	57
Future Volume (vph)	0	75	0	828	1117	57
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.865				0.850
Flt Protected						
Satd. Flow (prot)	0	1611	0	3406	3471	1583
Flt Permitted						
Satd. Flow (perm)	0	1611	0	3406	3471	1583
Adj. Flow (vph)	0	79	0	872	1176	60
Lane Group Flow (vph)	0	79	0	872	1176	60
Sign Control	Stop			Free	Free	

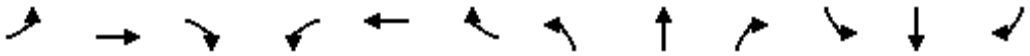
Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 42.2%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	75	0	828	1117	57
Future Volume (Veh/h)	0	75	0	828	1117	57
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	79	0	872	1176	60
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				Raised	Raised	
Median storage veh)				2	2	
Upstream signal (ft)					340	
pX, platoon unblocked	0.78	0.78	0.78			
vC, conflicting volume	1612	588	1236			
vC1, stage 1 conf vol	1176					
vC2, stage 2 conf vol	436					
vCu, unblocked vol	1209	0	724			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	91	100			
cM capacity (veh/h)	333	840	678			

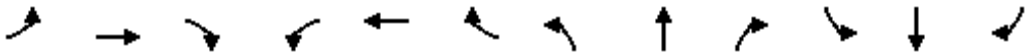
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	79	436	436	588	588	60
Volume Left	0	0	0	0	0	0
Volume Right	79	0	0	0	0	60
cSH	840	1700	1700	1700	1700	1700
Volume to Capacity	0.09	0.26	0.26	0.35	0.35	0.04
Queue Length 95th (ft)	8	0	0	0	0	0
Control Delay (s)	9.7	0.0	0.0	0.0	0.0	0.0
Lane LOS	A					
Approach Delay (s)	9.7	0.0		0.0		
Approach LOS	A					

Intersection Summary				
Average Delay	0.4			
Intersection Capacity Utilization	42.2%	ICU Level of Service		A
Analysis Period (min)	15			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	70	0	0	0	127	828	0	0	1060	106
Future Volume (vph)	0	0	70	0	0	0	127	828	0	0	1060	106
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.865								0.986	
Flt Protected							0.950					
Satd. Flow (prot)	0	0	1611	0	0	1863	1770	3406	0	0	3429	0
Flt Permitted							0.950					
Satd. Flow (perm)	0	0	1611	0	0	1863	1770	3406	0	0	3429	0
Adj. Flow (vph)	0	0	74	0	0	0	134	872	0	0	1116	112
Lane Group Flow (vph)	0	0	74	0	0	0	134	872	0	0	1228	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 46.4%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	70	0	0	0	127	828	0	0	1060	106
Future Volume (Veh/h)	0	0	70	0	0	0	127	828	0	0	1060	106
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	74	0	0	0	134	872	0	0	1116	112
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1876	2312	614	1772	2368	436	1228			872		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1876	2312	614	1772	2368	436	1228			872		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	83	100	100	100	76			100		
cM capacity (veh/h)	36	29	435	36	26	568	563			769		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	74	0	134	581	291	744	484
Volume Left	0	0	134	0	0	0	0
Volume Right	74	0	0	0	0	0	112
cSH	435	1700	563	1700	1700	1700	1700
Volume to Capacity	0.17	0.00	0.24	0.34	0.17	0.44	0.28
Queue Length 95th (ft)	15	0	23	0	0	0	0
Control Delay (s)	15.0	0.0	13.4	0.0	0.0	0.0	0.0
Lane LOS	B	A	B				
Approach Delay (s)	15.0	0.0	1.8			0.0	
Approach LOS	B	A					

Intersection Summary				
Average Delay	1.3			
Intersection Capacity Utilization	46.4%	ICU Level of Service	A	
Analysis Period (min)	15			



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	0	0	9	0	0	4
Future Volume (vph)	0	0	9	0	0	4
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.865	
Flt Protected				0.950		
Satd. Flow (prot)	1863	0	0	1770	1611	0
Flt Permitted				0.950		
Satd. Flow (perm)	1863	0	0	1770	1611	0
Adj. Flow (vph)	0	0	10	0	0	4
Lane Group Flow (vph)	0	0	0	10	4	0
Sign Control	Free			Free	Stop	

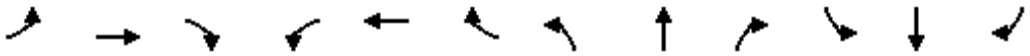
Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 13.3%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	9	0	0	4
Future Volume (Veh/h)	0	0	9	0	0	4
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	10	0	0	4
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			0		20	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			0		20	0
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		100	100
cM capacity (veh/h)			1623		991	1085

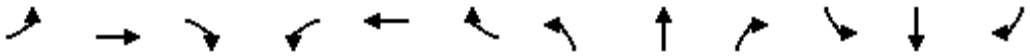
Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	0	10	4
Volume Left	0	10	0
Volume Right	0	0	4
cSH	1700	1623	1085
Volume to Capacity	0.00	0.01	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	7.2	8.3
Lane LOS		A	A
Approach Delay (s)	0.0	7.2	8.3
Approach LOS			A

Intersection Summary			
Average Delay	7.5		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	431	80	110	297	24	20	10	142	4	892	182
Future Volume (vph)	10	431	80	110	297	24	20	10	142	4	892	182
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.989				0.850		0.975	
Flt Protected		0.999		0.950				0.968		0.950		
Satd. Flow (prot)	0	1861	1583	1770	1842	0	0	1803	1583	1770	1816	0
Flt Permitted		0.999		0.950				0.968		0.950		
Satd. Flow (perm)	0	1861	1583	1770	1842	0	0	1803	1583	1770	1816	0
Adj. Flow (vph)	11	468	87	120	323	26	22	11	154	4	970	198
Lane Group Flow (vph)	0	479	87	120	349	0	0	33	154	4	1168	0
Sign Control		Free			Free			Stop			Stop	

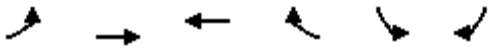
Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 108.3%		ICU Level of Service G	
Analysis Period (min) 15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	431	80	110	297	24	20	10	142	4	892	182
Future Volume (Veh/h)	10	431	80	110	297	24	20	10	142	4	892	182
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	468	87	120	323	26	22	11	154	4	970	198
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									8			
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					504							
pX, platoon unblocked	0.92						0.92	0.92		0.92	0.92	0.92
vC, conflicting volume	349			555			1736	1079	468	1148	1153	336
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	247			555			1757	1042	468	1117	1122	233
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			88			0	94	74	96	0	73
cM capacity (veh/h)	1211			1015			0	184	595	108	165	740

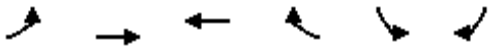
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2
Volume Total	479	87	120	349	187	4	1168
Volume Left	11	0	120	0	22	4	0
Volume Right	0	87	0	26	154	0	198
cSH	1211	1700	1015	1700	348	108	190
Volume to Capacity	0.01	0.05	0.12	0.21	0.54	0.04	6.14
Queue Length 95th (ft)	1	0	10	0	76	3	Err
Control Delay (s)	0.3	0.0	9.0	0.0	31.6	39.5	Err
Lane LOS	A		A		D	E	F
Approach Delay (s)	0.2		2.3		31.6	9965.0	
Approach LOS					D	F	

Intersection Summary				
Average Delay	4881.4			
Intersection Capacity Utilization	108.3%	ICU Level of Service	G	
Analysis Period (min)	15			



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	2	5	0
Future Volume (vph)	0	0	0	2	5	0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.865			
Flt Protected					0.950	
Satd. Flow (prot)	0	1863	1611	0	1770	0
Flt Permitted					0.950	
Satd. Flow (perm)	0	1863	1611	0	1770	0
Adj. Flow (vph)	0	0	0	2	5	0
Lane Group Flow (vph)	0	0	2	0	5	0
Sign Control		Free	Free		Stop	

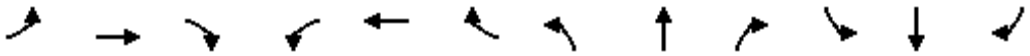
Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 13.3%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	0	2	5	0
Future Volume (Veh/h)	0	0	0	2	5	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	2	5	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2				1	1
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2				1	1
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1620				1022	1084

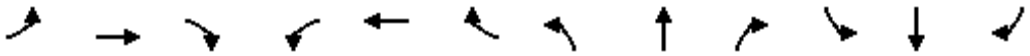
Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	0	2	5
Volume Left	0	0	5
Volume Right	0	2	0
cSH	1700	1700	1022
Volume to Capacity	0.00	0.00	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	8.5
Lane LOS			A
Approach Delay (s)	0.0	0.0	8.5
Approach LOS			A

Intersection Summary			
Average Delay	6.1		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	12	0	7	163	63	0	0	0	28	0	29
Future Volume (vph)	0	12	0	7	163	63	0	0	0	28	0	29
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.964						0.930	
Flt Protected					0.998						0.976	
Satd. Flow (prot)	0	1863	0	0	1792	0	0	1863	0	0	1691	0
Flt Permitted					0.998						0.976	
Satd. Flow (perm)	0	1863	0	0	1792	0	0	1863	0	0	1691	0
Adj. Flow (vph)	0	13	0	8	177	68	0	0	0	30	0	32
Lane Group Flow (vph)	0	13	0	0	253	0	0	0	0	0	62	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 28.3%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	12	0	7	163	63	0	0	0	28	0	29
Future Volume (Veh/h)	0	12	0	7	163	63	0	0	0	28	0	29
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	13	0	8	177	68	0	0	0	30	0	32
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	245			13			272	274	13	240	240	211
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	245			13			272	274	13	240	240	211
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	96	100	96
cM capacity (veh/h)	1321			1606			652	630	1067	711	658	829

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	13	253	0	62
Volume Left	0	8	0	30
Volume Right	0	68	0	32
cSH	1321	1606	1700	768
Volume to Capacity	0.00	0.00	0.00	0.08
Queue Length 95th (ft)	0	0	0	7
Control Delay (s)	0.0	0.3	0.0	10.1
Lane LOS		A	A	B
Approach Delay (s)	0.0	0.3	0.0	10.1
Approach LOS			A	B

Intersection Summary				
Average Delay	2.1			
Intersection Capacity Utilization	28.3%	ICU Level of Service	A	
Analysis Period (min)	15			



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	0	895	0	0	1062
Future Volume (vph)	0	0	895	0	0	1062
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Frt						
Flt Protected						
Satd. Flow (prot)	0	1863	3539	0	0	3539
Flt Permitted						
Satd. Flow (perm)	0	1863	3539	0	0	3539
Adj. Flow (vph)	0	0	973	0	0	1154
Lane Group Flow (vph)	0	0	973	0	0	1154
Sign Control	Stop		Free			Free

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 32.7%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	0	895	0	0	1062
Future Volume (Veh/h)	0	0	895	0	0	1062
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	973	0	0	1154
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1550	486			973	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1550	486			973	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	104	527			704	

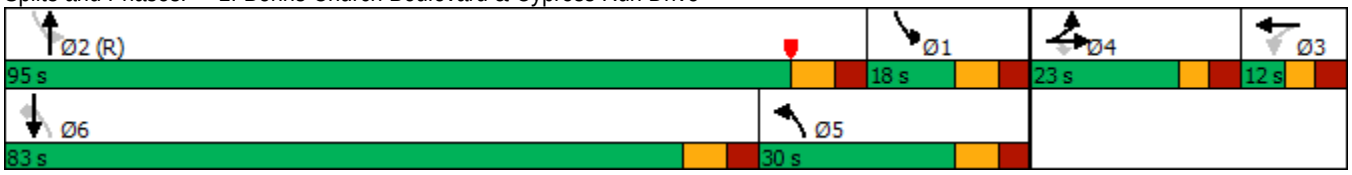
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	0	649	324	577	577
Volume Left	0	0	0	0	0
Volume Right	0	0	0	0	0
cSH	1700	1700	1700	1700	1700
Volume to Capacity	0.00	0.38	0.19	0.34	0.34
Queue Length 95th (ft)	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0
Lane LOS	A				
Approach Delay (s)	0.0	0.0		0.0	
Approach LOS	A				

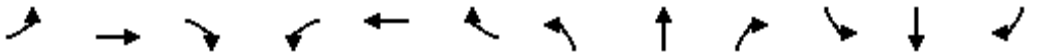
Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	32.7%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	100	0	96	0	4	0	194	1238	0	3	1247	116
Future Volume (vph)	100	0	96	0	4	0	194	1238	0	3	1247	116
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt			0.850									0.850
Flt Protected		0.950					0.950			0.950		
Satd. Flow (prot)	0	1805	1615	0	1900	0	1805	3539	0	1805	3471	1553
Flt Permitted		0.950					0.142			0.179		
Satd. Flow (perm)	0	1805	1615	0	1900	0	270	3539	0	340	3471	1553
Satd. Flow (RTOR)			216									204
Adj. Flow (vph)	102	0	98	0	4	0	198	1263	0	3	1272	118
Lane Group Flow (vph)	0	102	98	0	4	0	198	1263	0	3	1272	118
Turn Type	Split	NA	Perm		NA		D.P+P	NA		D.P+P	NA	Perm
Protected Phases	4	4			3		5	2		1	6	
Permitted Phases			4	3			6			2		6
Total Split (s)	23.0	23.0	23.0	12.0	12.0		30.0	95.0		18.0	83.0	83.0
Total Lost Time (s)		6.8	6.8		7.1		8.4	8.4		8.4	8.4	8.4
Act Effct Green (s)		13.7	13.7		6.6		108.3	113.7		118.5	96.6	96.6
Actuated g/C Ratio		0.09	0.09		0.04		0.73	0.77		0.80	0.65	0.65
v/c Ratio		0.61	0.28		0.05		0.62	0.46		0.01	0.56	0.11
Control Delay		79.6	2.1		69.8		25.1	12.0		5.7	17.5	0.2
Queue Delay		0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		79.6	2.1		69.8		25.1	12.0		5.7	17.5	0.2
LOS		E	A		E		C	B		A	B	A
Approach Delay		41.6			69.8			13.7			16.0	
Approach LOS		D			E			B			B	

Intersection Summary	
Cycle Length: 148	
Actuated Cycle Length: 148	
Offset: 0 (0%), Referenced to phase 2:NBSB, Start of Yellow	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.62	
Intersection Signal Delay: 16.7	Intersection LOS: B
Intersection Capacity Utilization 77.1%	ICU Level of Service D
Analysis Period (min) 15	

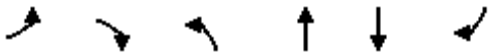
Splits and Phases: 1: Benns Church Boulevard & Cypress Run Drive





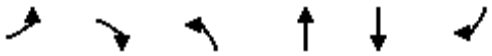
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	100	0	96	0	4	0	194	1238	0	3	1247	116
Future Volume (vph)	100	0	96	0	4	0	194	1238	0	3	1247	116
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.8	6.8		7.1		8.4	8.4		8.4	8.4	8.4
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	1.00
Frt		1.00	0.85		1.00		1.00	1.00		1.00	1.00	0.85
Flt Protected		0.95	1.00		1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1805	1615		1900		1805	3539		1805	3471	1553
Flt Permitted		0.95	1.00		1.00		0.14	1.00		0.18	1.00	1.00
Satd. Flow (perm)		1805	1615		1900		270	3539		340	3471	1553
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	102	0	98	0	4	0	198	1263	0	3	1272	118
RTOR Reduction (vph)	0	0	89	0	0	0	0	0	0	0	0	51
Lane Group Flow (vph)	0	102	9	0	4	0	198	1263	0	3	1272	67
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	4%	4%
Turn Type	Split	NA	Perm		NA		D.P+P	NA		D.P+P	NA	Perm
Protected Phases	4	4			3		5	2		1	6	
Permitted Phases			4	3			6			2		6
Actuated Green, G (s)		13.7	13.7		1.0		102.6	101.3		102.6	84.2	84.2
Effective Green, g (s)		13.7	13.7		1.0		102.6	101.3		102.6	84.2	84.2
Actuated g/C Ratio		0.09	0.09		0.01		0.69	0.68		0.69	0.57	0.57
Clearance Time (s)		6.8	6.8		7.1		8.4	8.4		8.4	8.4	8.4
Vehicle Extension (s)		3.0	3.0		3.0		2.0	5.0		2.0	5.0	5.0
Lane Grp Cap (vph)		167	149		12		378	2422		248	1974	883
v/s Ratio Prot		c0.06			c0.00		c0.07	0.36		0.00	c0.37	
v/s Ratio Perm			0.01				0.30			0.01		0.04
v/c Ratio		0.61	0.06		0.33		0.52	0.52		0.01	0.64	0.08
Uniform Delay, d1		64.6	61.3		73.2		33.0	11.5		14.1	21.7	14.4
Progression Factor		1.00	1.00		1.00		0.91	1.38		1.00	1.00	1.00
Incremental Delay, d2		6.5	0.2		15.7		0.5	0.7		0.0	1.6	0.2
Delay (s)		71.0	61.5		88.8		30.5	16.5		14.1	23.3	14.5
Level of Service		E	E		F		C	B		B	C	B
Approach Delay (s)		66.3			88.8			18.4			22.6	
Approach LOS		E			F			B			C	

Intersection Summary			
HCM 2000 Control Delay	23.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	148.0	Sum of lost time (s)	30.7
Intersection Capacity Utilization	77.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	19	0	1431	1318	24
Future Volume (vph)	0	19	0	1431	1318	24
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.865				0.850
Flt Protected						
Satd. Flow (prot)	0	1611	0	3539	3471	1583
Flt Permitted						
Satd. Flow (perm)	0	1611	0	3539	3471	1583
Adj. Flow (vph)	0	21	0	1555	1433	26
Lane Group Flow (vph)	0	21	0	1555	1433	26
Sign Control	Stop			Free	Free	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 46.4%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	19	0	1431	1318	24
Future Volume (Veh/h)	0	19	0	1431	1318	24
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	21	0	1555	1433	26
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				Raised	Raised	
Median storage veh)				1	1	
Upstream signal (ft)					870	
pX, platoon unblocked	0.75	0.75	0.75			
vC, conflicting volume	2210	716	1459			
vC1, stage 1 conf vol	1433					
vC2, stage 2 conf vol	778					
vCu, unblocked vol	1942	0	935			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	97	100			
cM capacity (veh/h)	166	809	543			

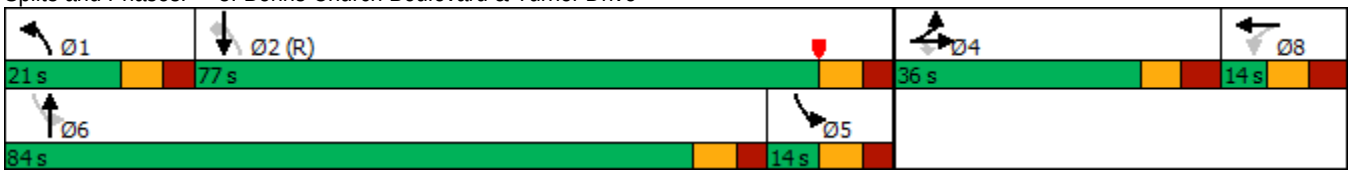
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	21	778	778	716	716	26
Volume Left	0	0	0	0	0	0
Volume Right	21	0	0	0	0	26
cSH	809	1700	1700	1700	1700	1700
Volume to Capacity	0.03	0.46	0.46	0.42	0.42	0.02
Queue Length 95th (ft)	2	0	0	0	0	0
Control Delay (s)	9.6	0.0	0.0	0.0	0.0	0.0
Lane LOS	A					
Approach Delay (s)	9.6	0.0		0.0		
Approach LOS	A					

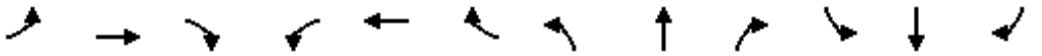
Intersection Summary				
Average Delay	0.1			
Intersection Capacity Utilization	46.4%	ICU Level of Service		A
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	258	2	49	3	0	8	292	1179	4	29	1107	196
Future Volume (vph)	258	2	49	3	0	8	292	1179	4	29	1107	196
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt			0.850		0.902							0.850
Flt Protected	0.950	0.953			0.987		0.950			0.950		
Satd. Flow (prot)	1698	1703	1599	0	1692	0	1719	3539	0	1805	3539	1615
Flt Permitted	0.950	0.953					0.115			0.158		
Satd. Flow (perm)	1698	1703	1599	0	1714	0	208	3539	0	300	3539	1615
Satd. Flow (RTOR)			228		228							186
Adj. Flow (vph)	272	2	52	3	0	8	307	1241	4	31	1165	206
Lane Group Flow (vph)	136	138	52	0	11	0	307	1245	0	31	1165	206
Turn Type	Split	NA	Perm	Perm	NA		D.P+P	NA		D.P+P	NA	Perm
Protected Phases	4	4			8		1	6		5	2	
Permitted Phases			4	8			2			6		2
Total Split (s)	36.0	36.0	36.0	14.0	14.0		21.0	84.0		14.0	77.0	77.0
Total Lost Time (s)	9.0	9.0	9.0		9.0		8.3	8.3		8.3	8.3	8.3
Act Effct Green (s)	19.6	19.6	19.6		6.6		96.8	96.7		100.1	70.7	70.7
Actuated g/C Ratio	0.13	0.13	0.13		0.04		0.65	0.65		0.68	0.48	0.48
v/c Ratio	0.61	0.61	0.13		0.04		0.76	0.54		0.12	0.69	0.24
Control Delay	71.1	71.5	0.6		0.2		42.4	18.1		3.9	30.5	7.5
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	71.1	71.5	0.6		0.2		42.4	18.1		3.9	30.5	7.5
LOS	E	E	A		A		D	B		A	C	A
Approach Delay		60.0			0.2			22.9			26.5	
Approach LOS		E			A			C			C	

Intersection Summary		
Cycle Length: 148		
Actuated Cycle Length: 148		
Offset: 38 (26%), Referenced to phase 2:NBSB, Start of Yellow		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.76		
Intersection Signal Delay: 28.1	Intersection LOS: C	
Intersection Capacity Utilization 82.0%	ICU Level of Service D	
Analysis Period (min) 15		

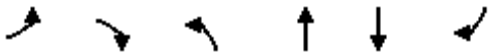
Splits and Phases: 3: Benns Church Boulevard & Turner Drive





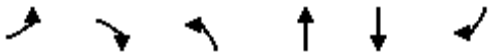
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	258	2	49	3	0	8	292	1179	4	29	1107	196
Future Volume (vph)	258	2	49	3	0	8	292	1179	4	29	1107	196
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	9.0	9.0	9.0		9.0		8.3	8.3		8.3	8.3	8.3
Lane Util. Factor	0.95	0.95	1.00		1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85		0.90		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	0.95	1.00		0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1698	1703	1599		1690		1719	3538		1805	3539	1615
Flt Permitted	0.95	0.95	1.00		1.00		0.11	1.00		0.16	1.00	1.00
Satd. Flow (perm)	1698	1703	1599		1713		208	3538		300	3539	1615
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	272	2	52	3	0	8	307	1241	4	31	1165	206
RTOR Reduction (vph)	0	0	45	0	11	0	0	0	0	0	0	104
Lane Group Flow (vph)	136	138	7	0	0	0	307	1245	0	31	1165	102
Heavy Vehicles (%)	1%	0%	1%	0%	0%	0%	5%	2%	0%	0%	2%	0%
Turn Type	Split	NA	Perm	Perm	NA		D.P+P	NA		D.P+P	NA	Perm
Protected Phases	4	4			8		1	6		5	2	
Permitted Phases			4	8			2			6		2
Actuated Green, G (s)	19.6	19.6	19.6		2.4		91.4	88.0		91.4	65.3	65.3
Effective Green, g (s)	19.6	19.6	19.6		2.4		91.4	88.0		91.4	65.3	65.3
Actuated g/C Ratio	0.13	0.13	0.13		0.02		0.62	0.59		0.62	0.44	0.44
Clearance Time (s)	9.0	9.0	9.0		9.0		8.3	8.3		8.3	8.3	8.3
Vehicle Extension (s)	5.0	5.0	5.0		3.0		4.0	6.0		2.0	6.0	6.0
Lane Grp Cap (vph)	224	225	211		27		394	2103		219	1561	712
v/s Ratio Prot	0.08	c0.08					c0.14	0.35		0.00	0.33	
v/s Ratio Perm			0.00		c0.00		c0.34			0.08		0.06
v/c Ratio	0.61	0.61	0.03		0.01		0.78	0.59		0.14	0.75	0.14
Uniform Delay, d1	60.6	60.6	55.9		71.6		33.1	18.8		24.9	34.4	24.7
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00		0.27	0.93	1.70
Incremental Delay, d2	6.7	7.0	0.1		0.1		9.9	1.2		0.1	3.0	0.4
Delay (s)	67.3	67.6	56.1		71.7		43.0	20.0		6.8	35.0	42.4
Level of Service	E	E	E		E		D	C		A	C	D
Approach Delay (s)		65.6			71.7			24.6			35.4	
Approach LOS		E			E			C			D	

Intersection Summary			
HCM 2000 Control Delay	33.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	148.0	Sum of lost time (s)	34.6
Intersection Capacity Utilization	82.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	9	15	29	1494	1271	22
Future Volume (vph)	9	15	29	1494	1271	22
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	0.914					0.850
Flt Protected	0.982		0.950			
Satd. Flow (prot)	1705	0	1736	3539	3505	1615
Flt Permitted	0.982		0.950			
Satd. Flow (perm)	1705	0	1736	3539	3505	1615
Adj. Flow (vph)	9	16	30	1556	1324	23
Lane Group Flow (vph)	25	0	30	1556	1324	23
Sign Control	Stop			Free	Free	

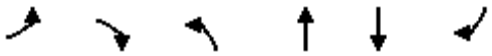
Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 51.3%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	9	15	29	1494	1271	22
Future Volume (Veh/h)	9	15	29	1494	1271	22
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	9	16	30	1556	1324	23
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2162	662	1347			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2162	662	1347			
tC, single (s)	6.8	6.9	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	77	96	94			
cM capacity (veh/h)	39	409	497			

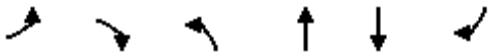
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	25	30	778	778	662	662	23
Volume Left	9	30	0	0	0	0	0
Volume Right	16	0	0	0	0	0	23
cSH	93	497	1700	1700	1700	1700	1700
Volume to Capacity	0.27	0.06	0.46	0.46	0.39	0.39	0.01
Queue Length 95th (ft)	25	5	0	0	0	0	0
Control Delay (s)	57.7	12.7	0.0	0.0	0.0	0.0	0.0
Lane LOS	F	B					
Approach Delay (s)	57.7	0.2			0.0		
Approach LOS	F						

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	51.3%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	16	0	1429	1272	22
Future Volume (vph)	0	16	0	1429	1272	22
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.865				0.850
Flt Protected						
Satd. Flow (prot)	0	1611	0	3539	3539	1583
Flt Permitted						
Satd. Flow (perm)	0	1611	0	3539	3539	1583
Adj. Flow (vph)	0	17	0	1504	1339	23
Lane Group Flow (vph)	0	17	0	1504	1339	23
Sign Control	Stop			Free	Free	

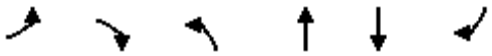
Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 45.2%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	16	0	1429	1272	22
Future Volume (Veh/h)	0	16	0	1429	1272	22
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	17	0	1504	1339	23
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				Raised	Raised	
Median storage veh)				2	2	
Upstream signal (ft)				844		
pX, platoon unblocked	0.77					
vC, conflicting volume	2091	670	1362			
vC1, stage 1 conf vol	1339					
vC2, stage 2 conf vol	752					
vCu, unblocked vol	1826	670	1362			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	96	100			
cM capacity (veh/h)	197	400	501			

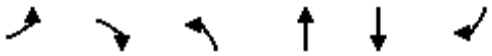
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	17	752	752	670	670	23
Volume Left	0	0	0	0	0	0
Volume Right	17	0	0	0	0	23
cSH	400	1700	1700	1700	1700	1700
Volume to Capacity	0.04	0.44	0.44	0.39	0.39	0.01
Queue Length 95th (ft)	3	0	0	0	0	0
Control Delay (s)	14.4	0.0	0.0	0.0	0.0	0.0
Lane LOS	B					
Approach Delay (s)	14.4	0.0		0.0		
Approach LOS	B					

Intersection Summary				
Average Delay	0.1			
Intersection Capacity Utilization	45.2%	ICU Level of Service		A
Analysis Period (min)	15			



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	49	0	1475	1128	43
Future Volume (vph)	0	49	0	1475	1128	43
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.865				0.850
Flt Protected						
Satd. Flow (prot)	0	1611	0	3539	3539	1583
Flt Permitted						
Satd. Flow (perm)	0	1611	0	3539	3539	1583
Adj. Flow (vph)	0	52	0	1553	1187	45
Lane Group Flow (vph)	0	52	0	1553	1187	45
Sign Control	Stop			Free	Free	

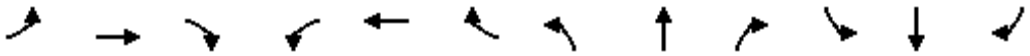
Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 44.1%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	49	0	1475	1128	43
Future Volume (Veh/h)	0	49	0	1475	1128	43
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	52	0	1553	1187	45
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				Raised	Raised	
Median storage veh)				2	2	
Upstream signal (ft)					340	
pX, platoon unblocked	0.72	0.72	0.72			
vC, conflicting volume	1964	594	1232			
vC1, stage 1 conf vol	1187					
vC2, stage 2 conf vol	776					
vCu, unblocked vol	1570	0	561			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	93	100			
cM capacity (veh/h)	294	786	729			

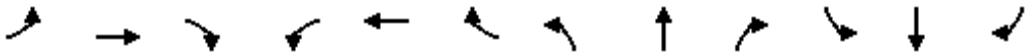
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	52	776	776	594	594	45
Volume Left	0	0	0	0	0	0
Volume Right	52	0	0	0	0	45
cSH	786	1700	1700	1700	1700	1700
Volume to Capacity	0.07	0.46	0.46	0.35	0.35	0.03
Queue Length 95th (ft)	5	0	0	0	0	0
Control Delay (s)	9.9	0.0	0.0	0.0	0.0	0.0
Lane LOS	A					
Approach Delay (s)	9.9	0.0		0.0		
Approach LOS	A					

Intersection Summary				
Average Delay	0.2			
Intersection Capacity Utilization	44.1%	ICU Level of Service		A
Analysis Period (min)	15			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	128	0	0	0	29	1475	0	0	1165	10
Future Volume (vph)	0	0	128	0	0	0	29	1475	0	0	1165	10
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.865								0.999	
Flt Protected							0.950					
Satd. Flow (prot)	0	0	1611	0	0	1863	1770	3539	0	0	3536	0
Flt Permitted							0.950					
Satd. Flow (perm)	0	0	1611	0	0	1863	1770	3539	0	0	3536	0
Adj. Flow (vph)	0	0	135	0	0	0	31	1553	0	0	1226	11
Lane Group Flow (vph)	0	0	135	0	0	0	31	1553	0	0	1237	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 47.1%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	128	0	0	0	29	1475	0	0	1165	10
Future Volume (Veh/h)	0	0	128	0	0	0	29	1475	0	0	1165	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	135	0	0	0	31	1553	0	0	1226	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	2070	2846	618	2363	2852	776	1237			1553		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2070	2846	618	2363	2852	776	1237			1553		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	69	100	100	100	94			100		
cM capacity (veh/h)	30	16	432	12	16	340	559			422		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	135	0	31	1035	518	817	420
Volume Left	0	0	31	0	0	0	0
Volume Right	135	0	0	0	0	0	11
cSH	432	1700	559	1700	1700	1700	1700
Volume to Capacity	0.31	0.00	0.06	0.61	0.30	0.48	0.25
Queue Length 95th (ft)	33	0	4	0	0	0	0
Control Delay (s)	17.1	0.0	11.8	0.0	0.0	0.0	0.0
Lane LOS	C	A	B				
Approach Delay (s)	17.1	0.0	0.2			0.0	
Approach LOS	C	A					

Intersection Summary				
Average Delay	0.9			
Intersection Capacity Utilization	47.1%	ICU Level of Service	A	
Analysis Period (min)	15			



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	0	0	12	0	0	6
Future Volume (vph)	0	0	12	0	0	6
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.865	
Flt Protected				0.950		
Satd. Flow (prot)	1863	0	0	1770	1611	0
Flt Permitted				0.950		
Satd. Flow (perm)	1863	0	0	1770	1611	0
Adj. Flow (vph)	0	0	13	0	0	7
Lane Group Flow (vph)	0	0	0	13	7	0
Sign Control	Free			Free	Stop	

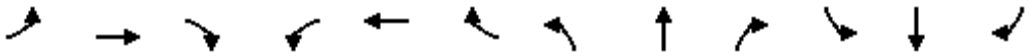
Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 13.3%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	12	0	0	6
Future Volume (Veh/h)	0	0	12	0	0	6
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	13	0	0	7
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			0		26	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			0		26	0
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		100	99
cM capacity (veh/h)			1623		981	1085

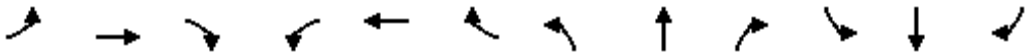
Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	0	13	7
Volume Left	0	13	0
Volume Right	0	0	7
cSH	1700	1623	1085
Volume to Capacity	0.00	0.01	0.01
Queue Length 95th (ft)	0	1	0
Control Delay (s)	0.0	7.2	8.3
Lane LOS		A	A
Approach Delay (s)	0.0	7.2	8.3
Approach LOS			A

Intersection Summary			
Average Delay	7.6		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	142	54	84	364	39	19	10	110	69	6	12
Future Volume (vph)	16	142	54	84	364	39	19	10	110	69	6	12
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.986				0.850		0.902	
Flt Protected		0.995		0.950				0.968		0.950		
Satd. Flow (prot)	0	1853	1583	1770	1837	0	0	1803	1583	1770	1680	0
Flt Permitted		0.995		0.950				0.968		0.950		
Satd. Flow (perm)	0	1853	1583	1770	1837	0	0	1803	1583	1770	1680	0
Adj. Flow (vph)	17	154	59	91	396	42	21	11	120	75	7	13
Lane Group Flow (vph)	0	171	59	91	438	0	0	32	120	75	20	0
Sign Control		Free			Free			Stop			Stop	

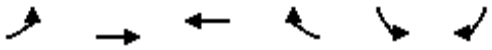
Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 50.4%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	142	54	84	364	39	19	10	110	69	6	12
Future Volume (Veh/h)	16	142	54	84	364	39	19	10	110	69	6	12
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	17	154	59	91	396	42	21	11	120	75	7	13
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									8			
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					504							
pX, platoon unblocked	0.89						0.89	0.89		0.89	0.89	0.89
vC, conflicting volume	438			213			782	808	154	852	846	417
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	312			213			697	726	154	775	768	288
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			93			93	96	87	66	97	98
cM capacity (veh/h)	1116			1357			286	288	892	222	273	671

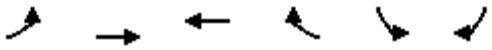
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2
Volume Total	171	59	91	438	152	75	20
Volume Left	17	0	91	0	21	75	0
Volume Right	0	59	0	42	120	0	13
cSH	1116	1700	1357	1700	1130	222	444
Volume to Capacity	0.02	0.03	0.07	0.26	0.13	0.34	0.05
Queue Length 95th (ft)	1	0	5	0	12	36	4
Control Delay (s)	0.9	0.0	7.8	0.0	11.7	29.3	13.5
Lane LOS	A		A		B	D	B
Approach Delay (s)	0.7		1.3		11.7	26.0	
Approach LOS					B	D	

Intersection Summary				
Average Delay	5.1			
Intersection Capacity Utilization	50.4%	ICU Level of Service	A	
Analysis Period (min)	15			



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	0	1863	1863	0	1863	0
Flt Permitted						
Satd. Flow (perm)	0	1863	1863	0	1863	0
Adj. Flow (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0
Sign Control		Free	Free		Stop	

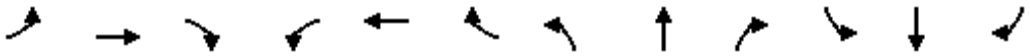
Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 0.0%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	0	0	0	0
Future Volume (Veh/h)	0	0	0	0	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	0				0	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0				0	0
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1623				1023	1085

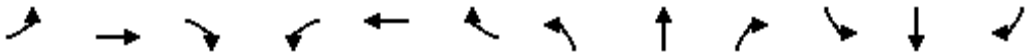
Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	0	0	0
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1700	1700
Volume to Capacity	0.00	0.00	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			A
Approach Delay (s)	0.0	0.0	0.0
Approach LOS			A

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	0.0%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	86	0	8	0	31	0	0	0	13	0	0
Future Volume (vph)	10	86	0	8	0	31	0	0	0	13	0	0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.893							
Flt Protected		0.995			0.990						0.950	
Satd. Flow (prot)	0	1853	0	0	1647	0	0	1863	0	0	1770	0
Flt Permitted		0.995			0.990						0.950	
Satd. Flow (perm)	0	1853	0	0	1647	0	0	1863	0	0	1770	0
Adj. Flow (vph)	11	93	0	9	0	34	0	0	0	14	0	0
Lane Group Flow (vph)	0	104	0	0	43	0	0	0	0	0	14	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 15.8%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	86	0	8	0	31	0	0	0	13	0	0
Future Volume (Veh/h)	10	86	0	8	0	31	0	0	0	13	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	93	0	9	0	34	0	0	0	14	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	34			93			150	167	93	150	150	17
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	34			93			150	167	93	150	150	17
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			100	100	100	98	100	100
cM capacity (veh/h)	1578			1501			810	716	964	810	732	1062

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	104	43	0	14
Volume Left	11	9	0	14
Volume Right	0	34	0	0
cSH	1578	1501	1700	810
Volume to Capacity	0.01	0.01	0.00	0.02
Queue Length 95th (ft)	1	0	0	1
Control Delay (s)	0.8	1.6	0.0	9.5
Lane LOS	A	A	A	A
Approach Delay (s)	0.8	1.6	0.0	9.5
Approach LOS			A	A

Intersection Summary				
Average Delay	1.8			
Intersection Capacity Utilization	15.8%	ICU Level of Service	A	
Analysis Period (min)	15			



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	0	1441	0	0	1230
Future Volume (vph)	0	0	1441	0	0	1230
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Frt						
Flt Protected						
Satd. Flow (prot)	0	1863	3539	0	0	3539
Flt Permitted						
Satd. Flow (perm)	0	1863	3539	0	0	3539
Adj. Flow (vph)	0	0	1566	0	0	1337
Lane Group Flow (vph)	0	0	1566	0	0	1337
Sign Control	Stop		Free			Free

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 43.2%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	0	1441	0	0	1230
Future Volume (Veh/h)	0	0	1441	0	0	1230
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	1566	0	0	1337
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2234	783			1566	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2234	783			1566	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	36	337			418	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	0	1044	522	668	668
Volume Left	0	0	0	0	0
Volume Right	0	0	0	0	0
cSH	1700	1700	1700	1700	1700
Volume to Capacity	0.00	0.61	0.31	0.39	0.39
Queue Length 95th (ft)	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0
Lane LOS	A				
Approach Delay (s)	0.0	0.0		0.0	
Approach LOS	A				

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	43.2%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection: 1: Benns Church Boulevard & Cypress Run Drive

Movement	EB	EB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LTR	L	T	TR	L	T	T	R
Maximum Queue (ft)	62	55	17	80	96	118	20	163	172	33
Average Queue (ft)	14	16	1	23	16	27	1	53	50	4
95th Queue (ft)	47	41	9	55	60	85	10	131	130	21
Link Distance (ft)	656		676		798	798		1702	1702	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)		180		255			150			245
Storage Blk Time (%)								1	0	
Queuing Penalty (veh)								0	0	

Intersection: 2: Benns Church Boulevard & Tractor Supply Entrance

Movement	EB	SB
Directions Served	R	R
Maximum Queue (ft)	27	18
Average Queue (ft)	9	1
95th Queue (ft)	27	12
Link Distance (ft)	470	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		75
Storage Blk Time (%)		0
Queuing Penalty (veh)		0

Intersection: 3: Benns Church Boulevard & Turner Drive

Movement	EB	EB	EB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	LT	R	LTR	L	T	TR	L	T	T	R
Maximum Queue (ft)	316	282	252	30	129	244	196	81	352	402	280
Average Queue (ft)	167	144	105	4	100	89	71	5	201	217	74
95th Queue (ft)	264	236	204	20	148	211	147	40	320	342	210
Link Distance (ft)	384			471		260	260		780	780	
Upstream Blk Time (%)						1	0				
Queuing Penalty (veh)						2	0				
Storage Bay Dist (ft)		305	305		130			140			280
Storage Blk Time (%)	0	0	0		9	3		0	17	2	0
Queuing Penalty (veh)	1	0	0		27	7		0	1	4	1

Intersection: 4: Benns Church Boulevard & Red Oak Drive

Movement	EB	NB
Directions Served	LR	L
Maximum Queue (ft)	52	35
Average Queue (ft)	19	6
95th Queue (ft)	43	25
Link Distance (ft)	950	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		200
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: Benns Church Boulevard & Site Driveway #1

Movement	EB
Directions Served	R
Maximum Queue (ft)	25
Average Queue (ft)	8
95th Queue (ft)	25
Link Distance (ft)	377
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 6: Benns Church Boulevard & Site Driveway #2

Movement	EB	NB
Directions Served	R	T
Maximum Queue (ft)	88	39
Average Queue (ft)	33	2
95th Queue (ft)	64	23
Link Distance (ft)	325	1039
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 7: Benns Church Boulevard & Site Driveway #3

Movement	EB	NB	NB	SB	SB
Directions Served	R	L	T	T	TR
Maximum Queue (ft)	55	125	17	2	38
Average Queue (ft)	24	49	1	0	4
95th Queue (ft)	46	97	18	2	21
Link Distance (ft)	749		261	1039	1039
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)		200			
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 8: Site Driveway #4 & Tractor Supply Entrance

Movement	NB
Directions Served	LR
Maximum Queue (ft)	31
Average Queue (ft)	3
95th Queue (ft)	18
Link Distance (ft)	679
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 9: Site Driveway #5 & Turner Drive

Movement	EB	EB	WB	NB	NB	SB	SB
Directions Served	LT	R	L	LT	R	L	TR
Maximum Queue (ft)	64	26	101	50	100	120	406
Average Queue (ft)	5	4	40	16	39	6	378
95th Queue (ft)	31	18	77	41	77	61	397
Link Distance (ft)	1402			965			712
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)		200	200		200	200	
Storage Blk Time (%)	0					0	100
Queuing Penalty (veh)	0					0	4

Intersection: 10: Tractor Supply Entrance & Site Driveway #6

Movement	SB
Directions Served	LR
Maximum Queue (ft)	31
Average Queue (ft)	5
95th Queue (ft)	24
Link Distance (ft)	938
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 11: Site Driveway #3 & Site Driveway #5

Movement	WB	SB
Directions Served	LTR	LTR
Maximum Queue (ft)	7	44
Average Queue (ft)	0	16
95th Queue (ft)	6	43
Link Distance (ft)	749	965
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 12: Benns Church Boulevard & Site Driveway #7

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 48

Intersection: 1: Benns Church Boulevard & Cypress Run Drive

Movement	EB	EB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LTR	L	T	TR	L	T	T	R
Maximum Queue (ft)	197	140	29	226	211	215	33	363	383	228
Average Queue (ft)	81	40	4	106	82	95	2	173	171	40
95th Queue (ft)	155	98	17	196	188	191	19	298	310	141
Link Distance (ft)	656		676		798	798		1702	1702	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)		180		255			150			245
Storage Blk Time (%)	1	0		0	0			10	2	0
Queuing Penalty (veh)	1	0		1	0			0	2	1

Intersection: 2: Benns Church Boulevard & Tractor Supply Entrance

Movement	EB	SB
Directions Served	R	R
Maximum Queue (ft)	37	17
Average Queue (ft)	11	1
95th Queue (ft)	32	10
Link Distance (ft)	470	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		75
Storage Blk Time (%)		0
Queuing Penalty (veh)		0

Intersection: 3: Benns Church Boulevard & Turner Drive

Movement	EB	EB	EB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	LT	R	LTR	L	T	TR	L	T	T	R
Maximum Queue (ft)	238	208	82	39	130	286	280	135	418	422	280
Average Queue (ft)	119	98	27	9	123	211	179	27	198	209	88
95th Queue (ft)	194	175	60	31	146	330	297	84	380	388	259
Link Distance (ft)	384			471		260	260		780	780	
Upstream Blk Time (%)	0					11	2				
Queuing Penalty (veh)	0					81	13				
Storage Bay Dist (ft)		305	305		130			140			280
Storage Blk Time (%)	0	0			29	14		0	11	3	0
Queuing Penalty (veh)	0	0			170	42		0	3	6	1

Intersection: 4: Benns Church Boulevard & Red Oak Drive

Movement	EB	NB	SB
Directions Served	LR	L	R
Maximum Queue (ft)	63	53	2
Average Queue (ft)	17	14	0
95th Queue (ft)	46	41	2
Link Distance (ft)	950		
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		200	140
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 5: Benns Church Boulevard & Site Driveway #1

Movement	EB
Directions Served	R
Maximum Queue (ft)	41
Average Queue (ft)	11
95th Queue (ft)	31
Link Distance (ft)	377
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 6: Benns Church Boulevard & Site Driveway #2

Movement	EB	NB	NB
Directions Served	R	T	T
Maximum Queue (ft)	70	290	251
Average Queue (ft)	25	55	34
95th Queue (ft)	54	203	164
Link Distance (ft)	325	1039	1039
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 7: Benns Church Boulevard & Site Driveway #3

Movement	EB	NB
Directions Served	R	L
Maximum Queue (ft)	145	48
Average Queue (ft)	54	13
95th Queue (ft)	109	40
Link Distance (ft)	749	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		200
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 8: Site Driveway #4 & Tractor Supply Entrance

Movement	NB
Directions Served	LR
Maximum Queue (ft)	36
Average Queue (ft)	6
95th Queue (ft)	26
Link Distance (ft)	679
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 9: Site Driveway #5 & Turner Drive

Movement	EB	EB	WB	NB	NB	SB	SB
Directions Served	LT	R	L	LT	R	L	TR
Maximum Queue (ft)	44	3	52	42	59	69	27
Average Queue (ft)	5	0	13	13	22	28	10
95th Queue (ft)	25	3	42	33	44	58	27
Link Distance (ft)	1402			965			712
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)		200	200		200	200	
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 10: Tractor Supply Entrance & Site Driveway #6

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 11: Site Driveway #3 & Site Driveway #5

Movement	WB	SB
Directions Served	LTR	LTR
Maximum Queue (ft)	13	33
Average Queue (ft)	1	10
95th Queue (ft)	8	34
Link Distance (ft)	749	965
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 12: Benns Church Boulevard & Site Driveway #7

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

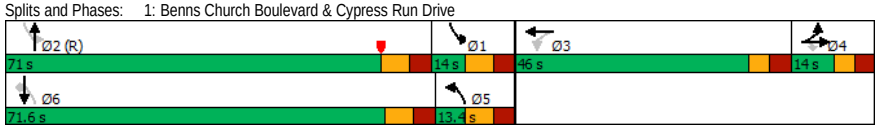
Network Summary

Network wide Queuing Penalty: 321

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	62	0	86	53	0	42	77	1139	2	56	1357	40
Future Volume (vph)	62	0	86	53	0	42	77	1139	2	56	1357	40
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt			0.850		0.940							0.850
Flt Protected		0.950			0.973		0.950			0.950		
Satd. Flow (prot)	0	1492	1495	0	1360	0	1641	3374	0	1805	3471	1509
Flt Permitted		0.950			0.122		0.077			0.145		
Satd. Flow (perm)	0	1492	1495	0	171	0	133	3374	0	276	3471	1509
Satd. Flow (RTOR)			157		155							145
Adj. Flow (vph)	65	0	90	55	0	44	80	1186	2	58	1414	42
Lane Group Flow (vph)	0	65	90	0	99	0	80	1188	0	58	1414	42
Turn Type	Split	NA	Perm	Perm	NA		D.P+P	NA		D.P+P	NA	Perm
Protected Phases	4	4			3		5	2		1	6	
Permitted Phases			4	3			6			2		6
Total Split (s)	14.0	14.0	14.0	46.0	46.0		13.4	71.0		14.0	71.6	71.6
Total Lost Time (s)		6.8	6.8		7.1		8.4	8.4		8.4	8.4	8.4
Act Effct Green (s)		9.7	9.7		25.5		79.0	76.2		80.7	74.0	74.0
Actuated g/C Ratio		0.07	0.07		0.18		0.54	0.53		0.56	0.51	0.51
v/c Ratio		0.65	0.37		0.63		0.65	0.67		0.27	0.80	0.05
Control Delay		93.8	4.2		18.4		56.5	39.3		24.1	35.7	0.1
Queue Delay		0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		93.8	4.2		18.4		56.5	39.3		24.1	35.7	0.1
LOS		F	A		B		E	D		C	D	A
Approach Delay		41.7			18.4			40.3			34.3	
Approach LOS		D			B			D			C	

Intersection Summary			
Cycle Length: 145			
Actuated Cycle Length: 145			
Offset: 0 (0%), Referenced to phase 2:NBSB, Start of Yellow			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.80			
Intersection Signal Delay: 36.7		Intersection LOS: D	
Intersection Capacity Utilization 73.9%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 1: Benns Church Boulevard & Cypress Run Drive



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	62	0	86	53	0	42	77	1139	2	56	1357	40
Future Volume (vph)	62	0	86	53	0	42	77	1139	2	56	1357	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.8	6.8		7.1		8.4	8.4		8.4	8.4	8.4
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	1.00
Frt		1.00	0.85		0.94		1.00	1.00		1.00	1.00	0.85
Flt Protected		0.95	1.00		0.97		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1492	1495		1360		1641	3373		1805	3471	1509
Flt Permitted		0.95	1.00		0.12		0.08	1.00		0.14	1.00	1.00
Satd. Flow (perm)		1492	1495		171		134	3373		275	3471	1509
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	65	0	90	55	0	44	80	1186	2	58	1414	42
RTOR Reduction (vph)	0	0	84	0	82	0	0	0	0	0	0	21
Lane Group Flow (vph)	0	65	6	0	17	0	80	1188	0	58	1414	21
Heavy Vehicles (%)	21%	0%	8%	50%	0%	0%	10%	7%	0%	0%	4%	7%
Turn Type	Split	NA	Perm	Perm	NA		D.P+P	NA		D.P+P	NA	Perm
Protected Phases	4	4			3		5	2		1	6	
Permitted Phases			4	3			6			2		6
Actuated Green, G (s)		9.7	9.7		25.5		79.1	74.6		79.1	72.4	72.4
Effective Green, g (s)		9.7	9.7		25.5		79.1	74.6		79.1	72.4	72.4
Actuated g/C Ratio		0.07	0.07		0.18		0.55	0.51		0.55	0.50	0.50
Clearance Time (s)		6.8	6.8		7.1		8.4	8.4		8.4	8.4	8.4
Vehicle Extension (s)		3.0	3.0		3.0		2.0	5.0		2.0	5.0	5.0
Lane Grp Cap (vph)		99	100		30		142	1735		197	1733	753
v/s Ratio Prot		c0.04					c0.03	0.35		0.01	c0.41	
v/s Ratio Perm			0.00		c0.10		0.28			0.15		0.01
v/c Ratio		0.66	0.06		0.58		0.56	0.68		0.29	0.82	0.03
Uniform Delay, d1		66.0	63.4		54.8		52.0	26.4		35.7	30.7	18.4
Progression Factor		1.00	1.00		1.00		0.96	1.30		1.00	1.00	1.00
Incremental Delay, d2		14.6	0.3		25.4		2.5	1.9		0.3	4.4	0.1
Delay (s)		80.6	63.6		80.3		52.5	36.2		36.0	35.0	18.5
Level of Service		F	E		F		D	D		D	D	B
Approach Delay (s)		70.8			80.3			37.3			34.6	
Approach LOS		E			F			D			C	

Intersection Summary				
HCM 2000 Control Delay	39.1	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.73			
Actuated Cycle Length (s)	145.0	Sum of lost time (s)	30.7	
Intersection Capacity Utilization	73.9%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	81	0	1218	1389	107
Future Volume (vph)	0	81	0	1218	1389	107
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.865				0.850
Flt Protected						
Satd. Flow (prot)	0	1611	0	3374	3471	1583
Flt Permitted						
Satd. Flow (perm)	0	1611	0	3374	3471	1583
Adj. Flow (vph)	0	88	0	1324	1510	116
Lane Group Flow (vph)	0	88	0	1324	1510	116
Sign Control	Stop			Free	Free	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization	50.1%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	81	0	1218	1389	107
Future Volume (Veh/h)	0	81	0	1218	1389	107
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	88	0	1324	1510	116
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				Raised	Raised	
Median storage veh)				1	1	
Upstream signal (ft)					870	
pX, platoon unblocked	0.65	0.65	0.65			
vC, conflicting volume	2172	755	1626			
vC1, stage 1 conf vol	1510					
vC2, stage 2 conf vol	662					
vCu, unblocked vol	1735	0	900			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	88	100			
cM capacity (veh/h)	186	710	491			

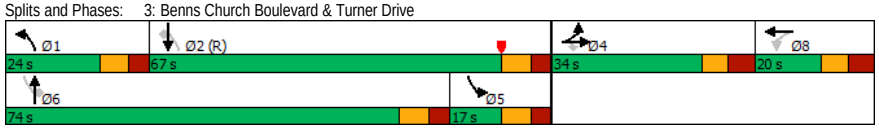
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	88	662	662	755	755	116
Volume Left	0	0	0	0	0	0
Volume Right	88	0	0	0	0	116
cSH	710	1700	1700	1700	1700	1700
Volume to Capacity	0.12	0.39	0.39	0.44	0.44	0.07
Queue Length 95th (ft)	11	0	0	0	0	0
Control Delay (s)	10.8	0.0	0.0	0.0	0.0	0.0
Lane LOS	B					
Approach Delay (s)	10.8	0.0		0.0		
Approach LOS	B					

Intersection Summary					
Average Delay		0.3			
Intersection Capacity Utilization		50.1%	ICU Level of Service		A
Analysis Period (min)		15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	399	20	390	10	4	2	442	773	40	4	1098	358
Future Volume (vph)	399	20	390	10	4	2	442	773	40	4	1098	358
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Frt			0.850		0.985				0.850			0.850
Flt Protected	0.950	0.957			0.970		0.950			0.950		
Satd. Flow (prot)	1531	1558	1524	0	1815	0	3335	3438	1615	1805	3505	1538
Flt Permitted	0.950	0.957			0.674		0.069			0.263		
Satd. Flow (perm)	1531	1558	1524	0	1261	0	242	3438	1615	500	3505	1538
Satd. Flow (RTOR)			362		2				175			315
Adj. Flow (vph)	453	23	443	11	5	2	502	878	45	5	1248	407
Lane Group Flow (vph)	236	240	443	0	18	0	502	878	45	5	1248	407
Turn Type	Split	NA	Perm	Perm	NA		D.P+P	NA	Perm	D.P+P	NA	Perm
Protected Phases	4	4			8		1	6		5	2	
Permitted Phases			4	8			2		6	6		2
Total Split (s)	34.0	34.0	34.0	20.0	20.0		24.0	74.0	74.0	17.0	67.0	67.0
Total Lost Time (s)	9.0	9.0	9.0		9.0		8.3	8.3	8.3	8.3	8.3	8.3
Act Effct Green (s)	24.9	24.9	24.9		8.0		83.9	88.8	88.8	90.5	61.2	61.2
Actuated g/C Ratio	0.17	0.17	0.17		0.06		0.58	0.61	0.61	0.62	0.42	0.42
v/c Ratio	0.90	0.90	0.79		0.25		0.81	0.42	0.04	0.01	0.84	0.49
Control Delay	93.4	92.7	22.6		68.4		45.2	20.0	0.2	4.0	30.7	6.4
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	93.4	92.7	22.6		68.4		45.2	20.0	0.2	4.0	30.7	6.4
LOS	F	F	C		E		D	B	A	A	C	A
Approach Delay		59.1			68.4			28.2			24.7	
Approach LOS		E			E			C			C	

Intersection Summary			
Cycle Length: 145			
Actuated Cycle Length: 145			
Offset: 49 (34%), Referenced to phase 2:NBSB, Start of Yellow			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.90			
Intersection Signal Delay: 34.0		Intersection LOS: C	
Intersection Capacity Utilization 82.3%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 3: Benns Church Boulevard & Turner Drive



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	399	20	390	10	4	2	442	773	40	4	1098	358
Future Volume (vph)	399	20	390	10	4	2	442	773	40	4	1098	358
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	9.0	9.0	9.0		9.0		8.3	8.3	8.3	8.3	8.3	8.3
Lane Util. Factor	0.95	0.95	1.00		1.00		0.97	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85		0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00		0.97		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1531	1558	1524		1816		3335	3438	1615	1805	3505	1538
Flt Permitted	0.95	0.96	1.00		0.67		0.07	1.00	1.00	0.26	1.00	1.00
Satd. Flow (perm)	1531	1558	1524		1261		243	3438	1615	500	3505	1538
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	453	23	443	11	5	2	502	878	45	5	1248	407
RTOR Reduction (vph)	0	0	300	0	2	0	0	0	21	0	0	190
Lane Group Flow (vph)	236	240	143	0	16	0	502	878	24	5	1248	217
Heavy Vehicles (%)	12%	0%	6%	0%	0%	0%	5%	5%	0%	0%	3%	5%
Turn Type	Split	NA	Perm	Perm	NA		D.P+P	NA	Perm	D.P+P	NA	Perm
Protected Phases	4	4			8		1	6		5	2	
Permitted Phases			4	8			2		6	6		2
Actuated Green, G (s)	24.9	24.9	24.9		5.2		80.3	78.6	78.6	80.3	57.7	57.7
Effective Green, g (s)	24.9	24.9	24.9		5.2		80.3	78.6	78.6	80.3	57.7	57.7
Actuated g/C Ratio	0.17	0.17	0.17		0.04		0.55	0.54	0.54	0.55	0.40	0.40
Clearance Time (s)	9.0	9.0	9.0		9.0		8.3	8.3	8.3	8.3	8.3	8.3
Vehicle Extension (s)	5.0	5.0	5.0		3.0		4.0	6.0	6.0	2.0	6.0	6.0
Lane Grp Cap (vph)	262	267	261		45		616	1863	875	292	1394	612
v/s Ratio Prot	c0.15	0.15					c0.13	0.26		0.00	c0.36	
v/s Ratio Perm			0.09		c0.01		0.32		0.02	0.01		0.14
v/c Ratio	0.90	0.90	0.55		0.36		0.81	0.47	0.03	0.02	0.90	0.36
Uniform Delay, d1	58.8	58.8	54.9		68.3		43.1	20.4	15.4	21.9	40.8	30.6
Progression Factor	1.00	1.00	1.00		1.00		0.85	1.14	1.00	0.31	0.67	0.67
Incremental Delay, d2	32.5	31.5	4.1		4.8		8.0	0.8	0.1	0.0	7.6	1.3
Delay (s)	91.3	90.3	59.0		73.1		44.7	24.0	15.5	6.7	34.8	21.7
Level of Service	F	F	E		E		D	C	B	A	C	C
Approach Delay (s)		75.5			73.1			31.0			31.5	
Approach LOS		E			E			C			C	

Intersection Summary					
HCM 2000 Control Delay		41.6	HCM 2000 Level of Service		D
HCM 2000 Volume to Capacity ratio		0.85			
Actuated Cycle Length (s)		145.0	Sum of lost time (s)		34.6
Intersection Capacity Utilization		82.3%	ICU Level of Service		E
Analysis Period (min)		15			
c Critical Lane Group					

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	12	20	13	1335	1624	19
Future Volume (vph)	12	20	13	1335	1624	19
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	0.915					0.850
Flt Protected	0.982		0.950			
Satd. Flow (prot)	1697	0	1787	3406	3471	1599
Flt Permitted	0.982		0.950			
Satd. Flow (perm)	1697	0	1787	3406	3471	1599
Adj. Flow (vph)	13	22	14	1467	1785	21
Lane Group Flow (vph)	35	0	14	1467	1785	21
Sign Control	Stop			Free	Free	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization	54.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	12	20	13	1335	1624	19
Future Volume (Veh/h)	12	20	13	1335	1624	19
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	13	22	14	1467	1785	21
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)					932	
pX, platoon unblocked	0.79	0.79	0.79			
vC, conflicting volume	2546	892	1806			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2429	348	1497			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	38	96	96			
cM capacity (veh/h)	21	517	357			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	35	14	734	734	892	892	21
Volume Left	13	14	0	0	0	0	0
Volume Right	22	0	0	0	0	0	21
cSH	52	357	1700	1700	1700	1700	1700
Volume to Capacity	0.67	0.04	0.43	0.43	0.53	0.53	0.01
Queue Length 95th (ft)	67	3	0	0	0	0	0
Control Delay (s)	160.6	15.5	0.0	0.0	0.0	0.0	0.0
Lane LOS	F	C					
Approach Delay (s)	160.6	0.1			0.0		
Approach LOS	F						

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	54.9%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	22	0	1217	1373	36
Future Volume (vph)	0	22	0	1217	1373	36
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.865				0.850
Flt Protected						
Satd. Flow (prot)	0	1611	0	3374	3438	1583
Flt Permitted						
Satd. Flow (perm)	0	1611	0	3374	3438	1583
Adj. Flow (vph)	0	23	0	1281	1445	38
Lane Group Flow (vph)	0	23	0	1281	1445	38
Sign Control	Stop			Free	Free	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization	48.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	22	0	1217	1373	36
Future Volume (Veh/h)	0	22	0	1217	1373	36
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	23	0	1281	1445	38
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				Raised	Raised	
Median storage veh)				2	2	
Upstream signal (ft)				844		
pX, platoon unblocked	0.85					
vC, conflicting volume	2086	722	1483			
vC1, stage 1 conf vol	1445					
vC2, stage 2 conf vol	640					
vCu, unblocked vol	1921	722	1483			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	94	100			
cM capacity (veh/h)	174	369	450			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	23	640	640	722	722	38
Volume Left	0	0	0	0	0	0
Volume Right	23	0	0	0	0	38
cSH	369	1700	1700	1700	1700	1700
Volume to Capacity	0.06	0.38	0.38	0.42	0.42	0.02
Queue Length 95th (ft)	5	0	0	0	0	0
Control Delay (s)	15.4	0.0	0.0	0.0	0.0	0.0
Lane LOS	C					
Approach Delay (s)	15.4	0.0		0.0		
Approach LOS	C					

Intersection Summary				
Average Delay	0.1			
Intersection Capacity Utilization	48.0%	ICU Level of Service		A
Analysis Period (min)	15			

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	93	0	1213	1439	73
Future Volume (vph)	0	93	0	1213	1439	73
Lane Util. Factor	1.00	1.00	1.00	0.91	0.95	1.00
Frt		0.865				0.850
Flt Protected						
Satd. Flow (prot)	0	1611	0	4893	3471	1583
Flt Permitted						
Satd. Flow (perm)	0	1611	0	4893	3471	1583
Adj. Flow (vph)	0	98	0	1277	1515	77
Lane Group Flow (vph)	0	98	0	1277	1515	77
Sign Control	Stop			Free	Free	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization	52.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	93	0	1213	1439	73
Future Volume (Veh/h)	0	93	0	1213	1439	73
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	98	0	1277	1515	77
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				Raised	Raised	
Median storage veh)				2	2	
Upstream signal (ft)				1022	428	
pX, platoon unblocked	0.70	0.67	0.67			
vC, conflicting volume	1941	758	1592			
vC1, stage 1 conf vol	1515					
vC2, stage 2 conf vol	426					
vCu, unblocked vol	916	0	899			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	87	100			
cM capacity (veh/h)	267	727	503			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	98	426	426	426	758	758	77
Volume Left	0	0	0	0	0	0	0
Volume Right	98	0	0	0	0	0	77
cSH	727	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.13	0.25	0.25	0.25	0.45	0.45	0.05
Queue Length 95th (ft)	12	0	0	0	0	0	0
Control Delay (s)	10.7	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B						
Approach Delay (s)	10.7	0.0			0.0		
Approach LOS	B						

Intersection Summary				
Average Delay	0.4			
Intersection Capacity Utilization	52.2%	ICU Level of Service		A
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	91	0	158	267	0	132	212	1043	92	94	1228	177
Future Volume (vph)	91	0	158	267	0	132	212	1043	92	94	1228	177
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.850			0.850				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1583	0	3433	1583	0	1770	3406	1583	1770	3471	1583
Flt Permitted	0.950			0.950			0.147			0.217		
Satd. Flow (perm)	1770	1583	0	3433	1583	0	274	3406	1583	404	3471	1583
Satd. Flow (RTOR)		252			224				97			168
Adj. Flow (vph)	96	0	166	281	0	139	223	1098	97	99	1293	186
Lane Group Flow (vph)	96	166	0	281	139	0	223	1098	97	99	1293	186
Turn Type	Prot	NA		Prot	NA		D.P+P	NA	Perm	D.P+P	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases							6		2	2		6
Total Split (s)	17.0	23.0		19.0	25.0		30.0	87.0	87.0	16.0	73.0	73.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Act Effct Green (s)	11.6	5.5		14.6	8.5		108.9	101.5	101.5	108.9	91.5	91.5
Actuated g/C Ratio	0.08	0.04		0.10	0.06		0.75	0.70	0.70	0.75	0.63	0.63
v/c Ratio	0.68	0.55		0.81	0.46		0.58	0.46	0.09	0.27	0.59	0.18
Control Delay	88.0	7.0		82.4	4.9		13.7	10.5	1.5	6.0	35.7	11.2
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	88.0	7.0		82.4	4.9		13.7	10.5	1.5	6.0	35.7	11.2
LOS	F	A		F	A		B	B	A	A	D	B
Approach Delay		36.7			56.8			10.4			30.9	
Approach LOS		D			E			B			C	

Intersection Summary			
Cycle Length: 145			
Actuated Cycle Length: 145			
Offset: 0 (0%), Referenced to phase 2:NBSB and 6:NBSB, Start of Yellow			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.81			
Intersection Signal Delay: 26.4		Intersection LOS: C	
Intersection Capacity Utilization 76.4%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 7: Benns Church Boulevard & Site Driveway #3



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	91	0	158	267	0	132	212	1043	92	94	1228	177
Future Volume (vph)	91	0	158	267	0	132	212	1043	92	94	1228	177
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		0.97	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.85		1.00	0.85		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1583		3433	1583		1770	3406	1583	1770	3471	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.15	1.00	1.00	0.22	1.00	1.00
Satd. Flow (perm)	1770	1583		3433	1583		274	3406	1583	405	3471	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	96	0	166	281	0	139	223	1098	97	99	1293	186
RTOR Reduction (vph)	0	160	0	0	131	0	0	0	29	0	0	62
Lane Group Flow (vph)	96	6	0	281	8	0	223	1098	68	99	1293	124
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	6%	2%	2%	4%	2%
Turn Type	Prot	NA		Prot	NA		D.P+P	NA	Perm	D.P+P	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases							6		2	2		6
Actuated Green, G (s)	11.6	5.5		14.6	8.5		108.9	101.5	101.5	108.9	91.5	91.5
Effective Green, g (s)	11.6	5.5		14.6	8.5		108.9	101.5	101.5	108.9	91.5	91.5
Actuated g/C Ratio	0.08	0.04		0.10	0.06		0.75	0.70	0.70	0.75	0.63	0.63
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	141	60		345	92		385	2384	1108	373	2190	998
v/s Ratio Prot	0.05	0.00		c0.08	c0.01		c0.07	0.32		0.01	c0.37	
v/s Ratio Perm							0.37		0.04	0.19		0.08
v/c Ratio	0.68	0.10		0.81	0.09		0.58	0.46	0.06	0.27	0.59	0.12
Uniform Delay, d1	64.9	67.4		63.9	64.6		11.5	9.6	6.8	6.0	15.7	10.7
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.26	2.08	4.47
Incremental Delay, d2	12.7	0.8		13.7	0.4		2.1	0.6	0.1	0.2	0.7	0.2
Delay (s)	77.6	68.1		77.6	65.0		13.6	10.3	6.9	7.7	33.4	48.0
Level of Service	E	E		E	E		B	B	A	A	C	D
Approach Delay (s)		71.6			73.4			10.6			33.5	
Approach LOS		E			E			B			C	

Intersection Summary					
HCM 2000 Control Delay	31.9	HCM 2000 Level of Service	C		
HCM 2000 Volume to Capacity ratio	0.59				
Actuated Cycle Length (s)	145.0	Sum of lost time (s)	16.0		
Intersection Capacity Utilization	76.4%	ICU Level of Service	D		
Analysis Period (min)	15				
c Critical Lane Group					

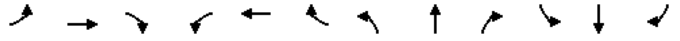
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	12	12	73	9	5	57
Future Volume (vph)	12	12	73	9	5	57
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.932				0.875	
Flt Protected				0.958	0.996	
Satd. Flow (prot)	1736	0	0	1785	1623	0
Flt Permitted				0.958	0.996	
Satd. Flow (perm)	1736	0	0	1785	1623	0
Adj. Flow (vph)	13	13	79	10	5	62
Lane Group Flow (vph)	26	0	0	89	67	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 21.7%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	12	12	73	9	5	57
Future Volume (Veh/h)	12	12	73	9	5	57
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	13	13	79	10	5	62
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			26		188	20
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			26		188	20
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			95		99	94
cM capacity (veh/h)			1588		762	1058

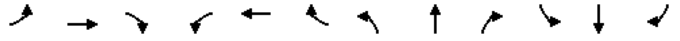
Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	26	89	67
Volume Left	0	79	5
Volume Right	13	0	62
cSH	1700	1588	1029
Volume to Capacity	0.02	0.05	0.07
Queue Length 95th (ft)	0	4	5
Control Delay (s)	0.0	6.6	8.7
Lane LOS		A	A
Approach Delay (s)	0.0	6.6	8.7
Approach LOS			A

Intersection Summary				
Average Delay		6.4		
Intersection Capacity Utilization		21.7%	ICU Level of Service	A
Analysis Period (min)		15		



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	668	113	158	561	53	42	21	144	83	10	33
Future Volume (vph)	30	668	113	158	561	53	42	21	144	83	10	33
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.987				0.850		0.885	
Flt Protected		0.998		0.950				0.968		0.950		
Satd. Flow (prot)	0	1859	1583	1770	1839	0	0	1803	1583	1770	1649	0
Flt Permitted		0.998		0.950				0.968		0.950		
Satd. Flow (perm)	0	1859	1583	1770	1839	0	0	1803	1583	1770	1649	0
Adj. Flow (vph)	33	726	123	172	610	58	46	23	157	90	11	36
Lane Group Flow (vph)	0	759	123	172	668	0	0	69	157	90	47	0
Sign Control		Free			Free			Stop			Stop	

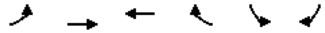
Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 90.8%		ICU Level of Service E	
Analysis Period (min) 15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	668	113	158	561	53	42	21	144	83	10	33
Future Volume (Veh/h)	30	668	113	158	561	53	42	21	144	83	10	33
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	726	123	172	610	58	46	23	157	90	11	36
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									8			
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					504							
pX, platoon unblocked	0.88						0.88	0.88		0.88	0.88	0.88
vC, conflicting volume	668			849			1788	1804	726	1865	1898	639
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	555			849			1827	1845	726	1915	1952	522
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			78			0	54	63	0	74	93
cM capacity (veh/h)	894			789			32	50	425	15	43	488

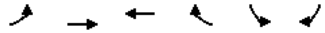
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2
Volume Total	759	123	172	668	226	90	47
Volume Left	33	0	172	0	46	90	0
Volume Right	0	123	0	58	157	0	36
cSH	894	1700	789	1700	114	15	141
Volume to Capacity	0.04	0.07	0.22	0.39	1.99	6.02	0.33
Queue Length 95th (ft)	3	0	21	0	465	Err	34
Control Delay (s)	1.0	0.0	10.8	0.0	537.6	Err	42.6
Lane LOS	A		B		F	F	E
Approach Delay (s)	0.8		2.2		537.6	6583.3	
Approach LOS					F	F	

Intersection Summary					
Average Delay	492.1				
Intersection Capacity Utilization	90.8%	ICU Level of Service		E	
Analysis Period (min)	15				



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	14	23	0
Future Volume (vph)	0	0	0	14	23	0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.865			
Flt Protected					0.950	
Satd. Flow (prot)	0	1863	1611	0	1770	0
Flt Permitted					0.950	
Satd. Flow (perm)	0	1863	1611	0	1770	0
Adj. Flow (vph)	0	0	0	15	25	0
Lane Group Flow (vph)	0	0	15	0	25	0
Sign Control		Free	Free		Stop	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 13.3%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	0	14	23	0
Future Volume (Veh/h)	0	0	0	14	23	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	15	25	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	15				8	8
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	15				8	8
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				98	100
cM capacity (veh/h)	1603				1013	1075

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	0	15	25
Volume Left	0	0	25
Volume Right	0	15	0
cSH	1700	1700	1013
Volume to Capacity	0.00	0.01	0.02
Queue Length 95th (ft)	0	0	2
Control Delay (s)	0.0	0.0	8.6
Lane LOS			A
Approach Delay (s)	0.0	0.0	8.6
Approach LOS			A

Intersection Summary			
Average Delay	5.4		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	24	0	7	163	63	0	0	0	135	0	29
Future Volume (vph)	0	24	0	7	163	63	0	0	0	135	0	29
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.964						0.976	
Flt Protected					0.998						0.961	
Satd. Flow (prot)	0	1863	0	0	1792	0	0	1863	0	0	1747	0
Flt Permitted					0.998						0.961	
Satd. Flow (perm)	0	1863	0	0	1792	0	0	1863	0	0	1747	0
Adj. Flow (vph)	0	26	0	8	177	68	0	0	0	147	0	32
Lane Group Flow (vph)	0	26	0	0	253	0	0	0	0	0	179	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 34.2%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	24	0	7	163	63	0	0	0	135	0	29
Future Volume (Veh/h)	0	24	0	7	163	63	0	0	0	135	0	29
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	26	0	8	177	68	0	0	0	147	0	32
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					837							
pX, platoon unblocked												
vC, conflicting volume	245			26			285	287	26	253	253	211
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	245			26			285	287	26	253	253	211
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			100	100	100	79	100	96
cM capacity (veh/h)	1321			1588			639	620	1050	698	647	829

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	26	253	0	179
Volume Left	0	8	0	147
Volume Right	0	68	0	32
cSH	1321	1588	1700	718
Volume to Capacity	0.00	0.01	0.00	0.25
Queue Length 95th (ft)	0	0	0	25
Control Delay (s)	0.0	0.3	0.0	11.7
Lane LOS		A	A	B
Approach Delay (s)	0.0	0.3	0.0	11.7
Approach LOS			A	B

Intersection Summary					
Average Delay			4.7		
Intersection Capacity Utilization		34.2%	ICU Level of Service		A
Analysis Period (min)		15			

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	33	997	37	0	1356
Future Volume (vph)	0	33	997	37	0	1356
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt		0.865		0.850		
Flt Protected						
Satd. Flow (prot)	0	1611	3539	1583	0	3539
Flt Permitted						
Satd. Flow (perm)	0	1611	3539	1583	0	3539
Adj. Flow (vph)	0	36	1084	40	0	1474
Lane Group Flow (vph)	0	36	1084	40	0	1474
Sign Control	Stop		Free			Free

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization	40.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	33	997	37	0	1356
Future Volume (Veh/h)	0	33	997	37	0	1356
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	36	1084	40	0	1474
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						315
pX, platoon unblocked	0.79					
vC, conflicting volume	1821	542			1124	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1500	542			1124	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	93			100	
cM capacity (veh/h)	89	485			617	

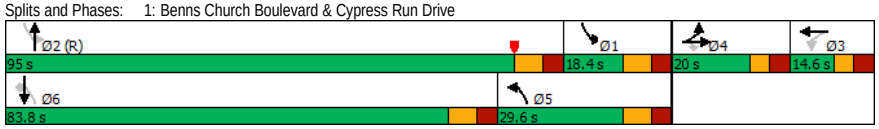
Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	36	542	542	40	737	737
Volume Left	0	0	0	0	0	0
Volume Right	36	0	0	40	0	0
cSH	485	1700	1700	1700	1700	1700
Volume to Capacity	0.07	0.32	0.32	0.02	0.43	0.43
Queue Length 95th (ft)	6	0	0	0	0	0
Control Delay (s)	13.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B					
Approach Delay (s)	13.0	0.0			0.0	
Approach LOS	B					

Intersection Summary				
Average Delay	0.2			
Intersection Capacity Utilization	40.8%	ICU Level of Service		A
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	136	0	132	50	4	76	283	1515	0	62	1551	147
Future Volume (vph)	136	0	132	50	4	76	283	1515	0	62	1551	147
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt			0.850		0.921							0.850
Flt Protected		0.950			0.981		0.950			0.950		
Satd. Flow (prot)	0	1805	1615	0	1717	0	1805	3539	0	1805	3471	1553
Flt Permitted		0.950			0.815		0.054			0.088		
Satd. Flow (perm)	0	1805	1615	0	1426	0	103	3539	0	167	3471	1553
Satd. Flow (RTOR)			216		36							204
Adj. Flow (vph)	139	0	135	51	4	78	289	1546	0	63	1583	150
Lane Group Flow (vph)	0	139	135	0	133	0	289	1546	0	63	1583	150
Turn Type	Split	NA	Perm	Perm	NA		D.P+P	NA		D.P+P	NA	Perm
Protected Phases	4	4			3		5	2		1	6	
Permitted Phases			4	3			6			2		6
Total Split (s)	20.0	20.0	20.0	14.6	14.6		29.6	95.0		18.4	83.8	83.8
Total Lost Time (s)		6.8	6.8		7.1		8.4	8.4		8.4	8.4	8.4
Act Effct Green (s)		13.0	13.0		8.2		96.1	89.8		97.8	75.4	75.4
Actuated g/C Ratio		0.09	0.09		0.06		0.65	0.61		0.66	0.51	0.51
v/c Ratio		0.88	0.40		1.19		0.95	0.72		0.30	0.90	0.17
Control Delay		111.0	3.5		183.1		80.0	34.6		17.6	40.7	1.0
Queue Delay		0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		111.0	3.5		183.1		80.0	34.6		17.6	40.7	1.0
LOS		F	A		F		F	C		B	D	A
Approach Delay		58.0			183.1			41.8			36.6	
Approach LOS		E			F			D			D	

Intersection Summary			
Cycle Length: 148			
Actuated Cycle Length: 148			
Offset: 0 (0%), Referenced to phase 2:NBSB, Start of Yellow			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.19			
Intersection Signal Delay: 45.2		Intersection LOS: D	
Intersection Capacity Utilization 92.8%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 1: Benns Church Boulevard & Cypress Run Drive



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	136	0	132	50	4	76	283	1515	0	62	1551	147
Future Volume (vph)	136	0	132	50	4	76	283	1515	0	62	1551	147
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.8	6.8		7.1		8.4	8.4		8.4	8.4	8.4
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	1.00
Frt		1.00	0.85		0.92		1.00	1.00		1.00	1.00	0.85
Flt Protected		0.95	1.00		0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1805	1615		1717		1805	3539		1805	3471	1553
Flt Permitted		0.95	1.00		0.81		0.05	1.00		0.09	1.00	1.00
Satd. Flow (perm)		1805	1615		1425		103	3539		168	3471	1553
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	139	0	135	51	4	78	289	1546	0	63	1583	150
RTOR Reduction (vph)	0	0	123	0	34	0	0	0	0	0	0	75
Lane Group Flow (vph)	0	139	12	0	99	0	289	1546	0	63	1583	75
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	4%	4%
Turn Type	Split	NA	Perm	Perm	NA		D.P+P	NA		D.P+P	NA	Perm
Protected Phases	4	4			3		5	2		1	6	
Permitted Phases			4	3			6			2		6
Actuated Green, G (s)		13.0	13.0		8.2		96.1	88.1		96.1	73.7	73.7
Effective Green, g (s)		13.0	13.0		8.2		96.1	88.1		96.1	73.7	73.7
Actuated g/C Ratio		0.09	0.09		0.06		0.65	0.60		0.65	0.50	0.50
Clearance Time (s)		6.8	6.8		7.1		8.4	8.4		8.4	8.4	8.4
Vehicle Extension (s)		3.0	3.0		3.0		2.0	5.0		2.0	5.0	5.0
Lane Grp Cap (vph)		158	141		78		324	2106		197	1728	773
v/s Ratio Prot		c0.08					c0.13	0.44		0.02	c0.46	
v/s Ratio Perm			0.01		c0.07		0.44			0.19		0.05
v/c Ratio		0.88	0.08		1.27		0.89	0.73		0.32	0.92	0.10
Uniform Delay, d1		66.7	62.0		69.9		52.0	21.5		36.5	34.3	19.6
Progression Factor		1.00	1.00		1.00		0.95	1.55		1.00	1.00	1.00
Incremental Delay, d2		38.5	0.3		190.4		17.3	1.5		0.3	9.2	0.2
Delay (s)		105.3	62.3		260.3		66.7	34.8		36.8	43.4	19.8
Level of Service		F	E		F		E	C		D	D	B
Approach Delay (s)		84.1			260.3			39.9			41.2	
Approach LOS		F			F			D			D	

Intersection Summary					
HCM 2000 Control Delay		50.7	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio		0.93			
Actuated Cycle Length (s)		148.0	Sum of lost time (s)		30.7
Intersection Capacity Utilization		92.8%	ICU Level of Service		F
Analysis Period (min)		15			
c Critical Lane Group					



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	71	0	1798	1628	106
Future Volume (vph)	0	71	0	1798	1628	106
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.865				0.850
Flt Protected						
Satd. Flow (prot)	0	1611	0	3539	3471	1583
Flt Permitted						
Satd. Flow (perm)	0	1611	0	3539	3471	1583
Adj. Flow (vph)	0	77	0	1954	1770	115
Lane Group Flow (vph)	0	77	0	1954	1770	115
Sign Control	Stop			Free	Free	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization	56.1%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	71	0	1798	1628	106
Future Volume (Veh/h)	0	71	0	1798	1628	106
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	77	0	1954	1770	115
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				Raised	Raised	
Median storage veh)				1	1	
Upstream signal (ft)					870	
pX, platoon unblocked	0.57	0.57	0.57			
vC, conflicting volume	2747	885	1885			
vC1, stage 1 conf vol	1770					
vC2, stage 2 conf vol	977					
vCu, unblocked vol	2557	0	1049			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	88	100			
cM capacity (veh/h)	124	620	377			

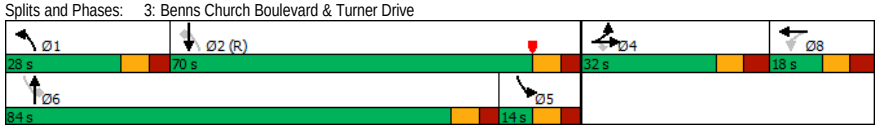
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	77	977	977	885	885	115
Volume Left	0	0	0	0	0	0
Volume Right	77	0	0	0	0	115
cSH	620	1700	1700	1700	1700	1700
Volume to Capacity	0.12	0.57	0.57	0.52	0.52	0.07
Queue Length 95th (ft)	11	0	0	0	0	0
Control Delay (s)	11.6	0.0	0.0	0.0	0.0	0.0
Lane LOS	B					
Approach Delay (s)	11.6	0.0		0.0		
Approach LOS	B					

Intersection Summary				
Average Delay	0.2			
Intersection Capacity Utilization	56.1%	ICU Level of Service		B
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	238	9	101	46	22	9	373	1566	18	30	1408	252
Future Volume (vph)	238	9	101	46	22	9	373	1566	18	30	1408	252
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Frt			0.850		0.985				0.850			0.850
Flt Protected	0.950	0.956			0.971		0.950			0.950		
Satd. Flow (prot)	1698	1710	1599	0	1817	0	3335	3539	1615	1805	3539	1615
Flt Permitted	0.950	0.956			0.739		0.061			0.050		
Satd. Flow (perm)	1698	1710	1599	0	1383	0	214	3539	1615	95	3539	1615
Satd. Flow (RTOR)			228		3				172			173
Adj. Flow (vph)	251	9	106	48	23	9	393	1648	19	32	1482	265
Lane Group Flow (vph)	131	129	106	0	80	0	393	1648	19	32	1482	265
Turn Type	Split	NA	Perm	Perm	NA		D.P+P	NA	Perm	D.P+P	NA	Perm
Protected Phases	4	4			8		1	6		5	2	
Permitted Phases			4	8			2		6	6		2
Total Split (s)	32.0	32.0	32.0	18.0	18.0		28.0	84.0	84.0	14.0	70.0	70.0
Total Lost Time (s)	9.0	9.0	9.0		9.0		8.3	8.3	8.3	8.3	8.3	8.3
Act Effct Green (s)	18.4	18.4	18.4		11.6		83.4	83.3	83.3	86.7	65.5	65.5
Actuated g/C Ratio	0.12	0.12	0.12		0.08		0.56	0.56	0.56	0.59	0.44	0.44
v/c Ratio	0.62	0.61	0.27		0.72		0.79	0.83	0.02	0.27	0.95	0.33
Control Delay	74.0	73.1	1.6		96.6		52.7	17.9	0.0	14.6	36.5	4.8
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	74.0	73.1	1.6		96.6		52.7	17.9	0.0	14.6	36.5	4.8
LOS	E	E	A		F		D	B	A	B	D	A
Approach Delay		52.7			96.6			24.3			31.4	
Approach LOS		D			F			C			C	

Intersection Summary			
Cycle Length: 148			
Actuated Cycle Length: 148			
Offset: 38 (26%), Referenced to phase 2:NBSB, Start of Yellow			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.95			
Intersection Signal Delay: 31.1		Intersection LOS: C	
Intersection Capacity Utilization 81.8%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 3: Benns Church Boulevard & Turner Drive



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	238	9	101	46	22	9	373	1566	18	30	1408	252
Future Volume (vph)	238	9	101	46	22	9	373	1566	18	30	1408	252
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	9.0	9.0	9.0		9.0		8.3	8.3	8.3	8.3	8.3	8.3
Lane Util. Factor	0.95	0.95	1.00		1.00		0.97	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85		0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00		0.97		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1698	1709	1599		1817		3335	3539	1615	1805	3539	1615
Flt Permitted	0.95	0.96	1.00		0.74		0.06	1.00	1.00	0.05	1.00	1.00
Satd. Flow (perm)	1698	1709	1599		1383		214	3539	1615	95	3539	1615
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	251	9	106	48	23	9	393	1648	19	32	1482	265
RTOR Reduction (vph)	0	0	93	0	3	0	0	0	9	0	0	96
Lane Group Flow (vph)	131	129	13	0	77	0	393	1648	10	32	1482	169
Heavy Vehicles (%)	1%	0%	1%	0%	0%	0%	5%	2%	0%	0%	2%	0%
Turn Type	Split	NA	Perm	Perm	NA		D.P+P	NA	Perm	D.P+P	NA	Perm
Protected Phases	4	4			8		1	6		5	2	
Permitted Phases			4	8			2		6	6		2
Actuated Green, G (s)	18.4	18.4	18.4		11.6		83.4	80.0	80.0	83.4	65.5	65.5
Effective Green, g (s)	18.4	18.4	18.4		11.6		83.4	80.0	80.0	83.4	65.5	65.5
Actuated g/C Ratio	0.12	0.12	0.12		0.08		0.56	0.54	0.54	0.56	0.44	0.44
Clearance Time (s)	9.0	9.0	9.0		9.0		8.3	8.3	8.3	8.3	8.3	8.3
Vehicle Extension (s)	5.0	5.0	5.0		3.0		4.0	6.0	6.0	2.0	6.0	6.0
Lane Grp Cap (vph)	211	212	198		108		498	1912	872	92	1566	714
v/s Ratio Prot	c0.08	0.08					0.10	c0.47		0.01	c0.42	
v/s Ratio Perm			0.01		c0.06		0.35		0.01	0.19		0.10
v/c Ratio	0.62	0.61	0.07		0.72		0.79	0.86	0.01	0.35	0.95	0.24
Uniform Delay, d1	61.5	61.4	57.2		66.6		44.3	29.2	15.7	54.0	39.6	25.7
Progression Factor	1.00	1.00	1.00		1.00		1.15	0.53	1.00	0.42	0.65	0.42
Incremental Delay, d2	7.8	7.1	0.3		20.0		4.9	3.1	0.0	0.5	9.4	0.5
Delay (s)	69.3	68.5	57.5		86.6		55.9	18.6	15.7	23.3	35.2	11.2
Level of Service	E	E	E		F		E	B	B	C	D	B
Approach Delay (s)		65.6			86.6			25.7			31.4	
Approach LOS		E			F			C			C	

Intersection Summary					
HCM 2000 Control Delay		32.6	HCM 2000 Level of Service		C
HCM 2000 Volume to Capacity ratio		0.90			
Actuated Cycle Length (s)		148.0	Sum of lost time (s)		34.6
Intersection Capacity Utilization		81.8%	ICU Level of Service		D
Analysis Period (min)		15			
c Critical Lane Group					

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	10	16	30	1930	1688	23
Future Volume (vph)	10	16	30	1930	1688	23
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	0.915					0.850
Flt Protected	0.982		0.950			
Satd. Flow (prot)	1707	0	1736	3539	3505	1615
Flt Permitted	0.982		0.950			
Satd. Flow (perm)	1707	0	1736	3539	3505	1615
Adj. Flow (vph)	10	17	31	2010	1758	24
Lane Group Flow (vph)	27	0	31	2010	1758	24
Sign Control	Stop			Free	Free	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 63.4%		ICU Level of Service B	
Analysis Period (min) 15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	10	16	30	1930	1688	23
Future Volume (Veh/h)	10	16	30	1930	1688	23
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	10	17	31	2010	1758	24
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)					932	
pX, platoon unblocked	0.80	0.80	0.80			
vC, conflicting volume	2825	879	1782			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2781	344	1475			
tC, single (s)	6.8	6.9	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	12	97	91			
cM capacity (veh/h)	11	525	354			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	27	31	1005	1005	879	879	24
Volume Left	10	31	0	0	0	0	0
Volume Right	17	0	0	0	0	0	24
cSH	30	354	1700	1700	1700	1700	1700
Volume to Capacity	0.91	0.09	0.59	0.59	0.52	0.52	0.01
Queue Length 95th (ft)	76	7	0	0	0	0	0
Control Delay (s)	331.2	16.1	0.0	0.0	0.0	0.0	0.0
Lane LOS	F	C					
Approach Delay (s)	331.2	0.2			0.0		
Approach LOS	F						

Intersection Summary				
Average Delay	2.5			
Intersection Capacity Utilization	63.4%	ICU Level of Service		B
Analysis Period (min)	15			

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	23	0	1792	1619	41
Future Volume (vph)	0	23	0	1792	1619	41
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.865				0.850
Flt Protected						
Satd. Flow (prot)	0	1611	0	3539	3539	1583
Flt Permitted						
Satd. Flow (perm)	0	1611	0	3539	3539	1583
Adj. Flow (vph)	0	24	0	1886	1704	43
Lane Group Flow (vph)	0	24	0	1886	1704	43
Sign Control	Stop			Free	Free	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization	54.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	23	0	1792	1619	41
Future Volume (Veh/h)	0	23	0	1792	1619	41
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	24	0	1886	1704	43
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				Raised	Raised	
Median storage veh)				2	2	
Upstream signal (ft)				844		
pX, platoon unblocked	0.58					
vC, conflicting volume	2647	852	1747			
vC1, stage 1 conf vol	1704					
vC2, stage 2 conf vol	943					
vCu, unblocked vol	2391	852	1747			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	92	100			
cM capacity (veh/h)	126	303	355			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	24	943	943	852	852	43
Volume Left	0	0	0	0	0	0
Volume Right	24	0	0	0	0	43
cSH	303	1700	1700	1700	1700	1700
Volume to Capacity	0.08	0.55	0.55	0.50	0.50	0.03
Queue Length 95th (ft)	6	0	0	0	0	0
Control Delay (s)	17.9	0.0	0.0	0.0	0.0	0.0
Lane LOS	C					
Approach Delay (s)	17.9	0.0		0.0		
Approach LOS	C					

Intersection Summary				
Average Delay	0.1			
Intersection Capacity Utilization	54.8%	ICU Level of Service		A
Analysis Period (min)	15			

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	58	0	1920	1515	49
Future Volume (vph)	0	58	0	1920	1515	49
Lane Util. Factor	1.00	1.00	1.00	0.91	0.95	1.00
Frt		0.865				0.850
Flt Protected						
Satd. Flow (prot)	0	1611	0	5085	3539	1583
Flt Permitted						
Satd. Flow (perm)	0	1611	0	5085	3539	1583
Adj. Flow (vph)	0	61	0	2021	1595	52
Lane Group Flow (vph)	0	61	0	2021	1595	52
Sign Control	Stop			Free	Free	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization	52.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	58	0	1920	1515	49
Future Volume (Veh/h)	0	58	0	1920	1515	49
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	61	0	2021	1595	52
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				Raised	Raised	
Median storage veh)				2	2	
Upstream signal (ft)				1022	428	
pX, platoon unblocked	0.76	0.59	0.59			
vC, conflicting volume	2269	798	1647			
vC1, stage 1 conf vol	1595					
vC2, stage 2 conf vol	674					
vCu, unblocked vol	0	0	718			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	91	100			
cM capacity (veh/h)	781	643	521			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	61	674	674	674	798	798	52
Volume Left	0	0	0	0	0	0	0
Volume Right	61	0	0	0	0	0	52
cSH	643	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.09	0.40	0.40	0.40	0.47	0.47	0.03
Queue Length 95th (ft)	8	0	0	0	0	0	0
Control Delay (s)	11.2	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B						
Approach Delay (s)	11.2	0.0			0.0		
Approach LOS	B						

Intersection Summary				
Average Delay	0.2			
Intersection Capacity Utilization	52.1%	ICU Level of Service		A
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	188	0	234	227	0	145	106	1625	208	231	1247	101
Future Volume (vph)	188	0	234	227	0	145	106	1625	208	231	1247	101
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.850			0.850				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1583	0	3433	1583	0	1770	3539	1583	1770	3539	1583
Flt Permitted	0.950			0.950			0.148			0.047		
Satd. Flow (perm)	1770	1583	0	3433	1583	0	276	3539	1583	88	3539	1583
Satd. Flow (RTOR)		160			142				181			106
Adj. Flow (vph)	198	0	246	239	0	153	112	1711	219	243	1313	106
Lane Group Flow (vph)	198	246	0	239	153	0	112	1711	219	243	1313	106
Turn Type	Prot	NA		Prot	NA		D.P+P	NA	Perm	D.P+P	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases							6		2	2		6
Total Split (s)	19.0	20.0		19.0	20.0		15.0	89.0	89.0	20.0	94.0	94.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Act Effct Green (s)	15.0	13.4		14.1	12.5		104.5	85.9	85.9	104.5	96.3	96.3
Actuated g/C Ratio	0.10	0.09		0.10	0.08		0.71	0.58	0.58	0.71	0.65	0.65
v/c Ratio	1.11	0.85		0.74	0.58		0.40	0.83	0.22	0.89	0.57	0.10
Control Delay	157.2	49.3		78.9	20.6		10.6	30.1	3.8	46.5	41.8	14.7
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	157.2	49.3		78.9	20.6		10.6	30.1	3.8	46.5	41.8	14.7
LOS	F	D		E	C		B	C	A	D	D	B
Approach Delay		97.4			56.2			26.2			40.8	
Approach LOS		F			E			C			D	

Intersection Summary			
Cycle Length: 148			
Actuated Cycle Length: 148			
Offset: 0 (0%), Referenced to phase 2:NBSB and 6:NBSB, Start of Yellow			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.11			
Intersection Signal Delay: 41.1		Intersection LOS: D	
Intersection Capacity Utilization 92.0%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 7: Benns Church Boulevard & Site Driveway #3



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	188	0	234	227	0	145	106	1625	208	231	1247	101
Future Volume (vph)	188	0	234	227	0	145	106	1625	208	231	1247	101
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		0.97	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.85		1.00	0.85		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1583		3433	1583		1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.15	1.00	1.00	0.05	1.00	1.00
Satd. Flow (perm)	1770	1583		3433	1583		276	3539	1583	87	3539	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	198	0	246	239	0	153	112	1711	219	243	1313	106
RTOR Reduction (vph)	0	146	0	0	130	0	0	0	76	0	0	37
Lane Group Flow (vph)	198	100	0	239	23	0	112	1711	143	243	1313	69
Turn Type	Prot	NA		Prot	NA		D.P+P	NA	Perm	D.P+P	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases							6		2	2		6
Actuated Green, G (s)	15.0	13.4		14.1	12.5		104.5	85.9	85.9	104.5	96.2	96.2
Effective Green, g (s)	15.0	13.4		14.1	12.5		104.5	85.9	85.9	104.5	96.2	96.2
Actuated g/C Ratio	0.10	0.09		0.10	0.08		0.71	0.58	0.58	0.71	0.65	0.65
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	179	143		327	133		278	2054	918	272	2300	1028
v/s Ratio Prot	c0.11	c0.06		0.07	0.01		0.02	0.48		c0.11	0.37	
v/s Ratio Perm							0.26		0.09	c0.52		0.04
v/c Ratio	1.11	0.70		0.73	0.17		0.40	0.83	0.16	0.89	0.57	0.07
Uniform Delay, d1	66.5	65.4		65.1	62.9		10.6	25.2	14.3	49.9	14.4	9.5
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	0.55	2.71	7.42
Incremental Delay, d2	98.6	14.5		8.2	0.6		1.0	4.1	0.4	16.8	0.5	0.1
Delay (s)	165.1	79.9		73.3	63.6		11.6	29.4	14.7	44.3	39.5	70.4
Level of Service	F	E		E	E		B	C	B	D	D	E
Approach Delay (s)		117.9			69.5			26.8			42.2	
Approach LOS		F			E			C			D	

Intersection Summary					
HCM 2000 Control Delay	45.0	HCM 2000 Level of Service	D		
HCM 2000 Volume to Capacity ratio	0.90				
Actuated Cycle Length (s)	148.0	Sum of lost time (s)	16.0		
Intersection Capacity Utilization	92.0%	ICU Level of Service	F		
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	8	8	67	26	13	49
Future Volume (vph)	8	8	67	26	13	49
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.932				0.893	
Flt Protected				0.965	0.990	
Satd. Flow (prot)	1736	0	0	1798	1647	0
Flt Permitted				0.965	0.990	
Satd. Flow (perm)	1736	0	0	1798	1647	0
Adj. Flow (vph)	9	9	73	28	14	53
Lane Group Flow (vph)	18	0	0	101	67	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization	22.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	8	8	67	26	13	49
Future Volume (Veh/h)	8	8	67	26	13	49
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	9	9	73	28	14	53
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			18		188	14
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			18		188	14
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			95		98	95
cM capacity (veh/h)			1599		765	1067

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	18	101	67
Volume Left	0	73	14
Volume Right	9	0	53
cSH	1700	1599	985
Volume to Capacity	0.01	0.05	0.07
Queue Length 95th (ft)	0	4	5
Control Delay (s)	0.0	5.4	8.9
Lane LOS		A	A
Approach Delay (s)	0.0	5.4	8.9
Approach LOS			A

Intersection Summary				
Average Delay		6.2		
Intersection Capacity Utilization		22.2%	ICU Level of Service	A
Analysis Period (min)		15		

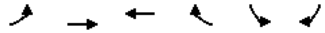
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	44	145	69	104	446	64	38	19	110	106	11	31
Future Volume (vph)	44	145	69	104	446	64	38	19	110	106	11	31
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.981				0.850		0.889	
Flt Protected		0.988		0.950				0.968		0.950		
Satd. Flow (prot)	0	1840	1583	1770	1827	0	0	1803	1583	1770	1656	0
Flt Permitted		0.988		0.950				0.968		0.950		
Satd. Flow (perm)	0	1840	1583	1770	1827	0	0	1803	1583	1770	1656	0
Adj. Flow (vph)	48	158	75	113	485	70	41	21	120	115	12	34
Lane Group Flow (vph)	0	206	75	113	555	0	0	62	120	115	46	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 60.0%		ICU Level of Service B	
Analysis Period (min) 15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	44	145	69	104	446	64	38	19	110	106	11	31
Future Volume (Veh/h)	44	145	69	104	446	64	38	19	110	106	11	31
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	48	158	75	113	485	70	41	21	120	115	12	34
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									8			
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					504							
pX, platoon unblocked	0.91						0.91	0.91		0.91	0.91	0.91
vC, conflicting volume	555			233			1005	1035	158	1070	1075	520
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	462			233			956	989	158	1028	1033	423
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	95			92			77	89	86	17	93	94
cM capacity (veh/h)	1001			1335			175	196	887	139	184	574

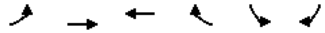
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2
Volume Total	206	75	113	555	182	115	46
Volume Left	48	0	113	0	41	115	0
Volume Right	0	75	0	70	120	0	34
cSH	1001	1700	1335	1700	533	139	370
Volume to Capacity	0.05	0.04	0.08	0.33	0.34	0.83	0.12
Queue Length 95th (ft)	4	0	7	0	38	131	11
Control Delay (s)	2.4	0.0	7.9	0.0	18.2	98.5	16.1
Lane LOS	A		A		C	F	C
Approach Delay (s)	1.8		1.3		18.2	74.9	
Approach LOS					C	F	

Intersection Summary					
Average Delay	13.0				
Intersection Capacity Utilization	60.0%	ICU Level of Service		B	
Analysis Period (min)	15				



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	39	16	0
Future Volume (vph)	0	0	0	39	16	0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.865			
Flt Protected					0.950	
Satd. Flow (prot)	0	1863	1611	0	1770	0
Flt Permitted					0.950	
Satd. Flow (perm)	0	1863	1611	0	1770	0
Adj. Flow (vph)	0	0	0	42	17	0
Lane Group Flow (vph)	0	0	42	0	17	0
Sign Control		Free	Free		Stop	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	0	39	16	0
Future Volume (Veh/h)	0	0	0	39	16	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	42	17	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	42				21	21
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	42				21	21
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				98	100
cM capacity (veh/h)	1567				996	1056

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	0	42	17
Volume Left	0	0	17
Volume Right	0	42	0
cSH	1700	1700	996
Volume to Capacity	0.00	0.02	0.02
Queue Length 95th (ft)	0	0	1
Control Delay (s)	0.0	0.0	8.7
Lane LOS			A
Approach Delay (s)	0.0	0.0	8.7
Approach LOS			A

Intersection Summary			
Average Delay	2.5		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	173	0	8	0	1	0	0	0	110	0	0
Future Volume (vph)	19	173	0	8	0	1	0	0	0	110	0	0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.986							
Flt Protected		0.995			0.957						0.950	
Satd. Flow (prot)	0	1853	0	0	1758	0	0	1863	0	0	1770	0
Flt Permitted		0.995			0.957						0.950	
Satd. Flow (perm)	0	1853	0	0	1758	0	0	1863	0	0	1770	0
Adj. Flow (vph)	21	188	0	9	0	1	0	0	0	120	0	0
Lane Group Flow (vph)	0	209	0	0	10	0	0	0	0	0	120	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 22.5%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	19	173	0	8	0	1	0	0	0	110	0	0
Future Volume (Veh/h)	19	173	0	8	0	1	0	0	0	110	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	21	188	0	9	0	1	0	0	0	120	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					837							
pX, platoon unblocked												
vC, conflicting volume	1			188			248	249	188	248	248	0
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1			188			248	249	188	248	248	0
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			100	100	100	83	100	100
cM capacity (veh/h)	1622			1386			695	641	854	695	641	1084

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	209	10	0	120
Volume Left	21	9	0	120
Volume Right	0	1	0	0
cSH	1622	1386	1700	695
Volume to Capacity	0.01	0.01	0.00	0.17
Queue Length 95th (ft)	1	0	0	16
Control Delay (s)	0.8	6.9	0.0	11.3
Lane LOS	A	A	A	B
Approach Delay (s)	0.8	6.9	0.0	11.3
Approach LOS			A	B

Intersection Summary					
Average Delay			4.7		
Intersection Capacity Utilization		22.5%	ICU Level of Service		A
Analysis Period (min)		15			

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	39	1665	116	0	1477
Future Volume (vph)	0	39	1665	116	0	1477
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt		0.865		0.850		
Flt Protected						
Satd. Flow (prot)	0	1611	3539	1583	0	3539
Flt Permitted						
Satd. Flow (perm)	0	1611	3539	1583	0	3539
Adj. Flow (vph)	0	42	1810	126	0	1605
Lane Group Flow (vph)	0	42	1810	126	0	1605
Sign Control	Stop		Free			Free

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization	56.0%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	39	1665	116	0	1477
Future Volume (Veh/h)	0	39	1665	116	0	1477
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	42	1810	126	0	1605
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						315
pX, platoon unblocked	0.80					
vC, conflicting volume	2612	905			1936	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2513	905			1936	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	85			100	
cM capacity (veh/h)	18	279			300	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	42	905	905	126	802	802
Volume Left	0	0	0	0	0	0
Volume Right	42	0	0	126	0	0
cSH	279	1700	1700	1700	1700	1700
Volume to Capacity	0.15	0.53	0.53	0.07	0.47	0.47
Queue Length 95th (ft)	13	0	0	0	0	0
Control Delay (s)	20.2	0.0	0.0	0.0	0.0	0.0
Lane LOS	C					
Approach Delay (s)	20.2	0.0			0.0	
Approach LOS	C					

Intersection Summary					
Average Delay		0.2			
Intersection Capacity Utilization	56.0%	ICU Level of Service			B
Analysis Period (min)	15				

Intersection: 1: Benns Church Boulevard & Cypress Run Drive

Movement	EB	EB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LTR	L	T	TR	L	T	T	R
Maximum Queue (ft)	190	166	254	242	386	386	149	470	501	245
Average Queue (ft)	65	46	103	72	175	185	46	232	252	26
95th Queue (ft)	140	110	206	171	326	332	120	415	440	129
Link Distance (ft)	656		676		798	798		1702	1702	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)		180		255			150			245
Storage Blk Time (%)	0	0		0	3		0	14	9	0
Queuing Penalty (veh)	0	0		0	2		0	8	4	1

Intersection: 2: Benns Church Boulevard & Tractor Supply Entrance

Movement	EB	SB	SB	SB
Directions Served	R	T	T	R
Maximum Queue (ft)	109	98	105	20
Average Queue (ft)	37	10	12	2
95th Queue (ft)	84	126	133	36
Link Distance (ft)	470	798	798	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				200
Storage Blk Time (%)			1	0
Queuing Penalty (veh)			1	0

Intersection: 3: Benns Church Boulevard & Turner Drive

Movement	EB	EB	EB	WB	NB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	LT	R	LTR	L	L	T	T	R	L	T	T
Maximum Queue (ft)	390	304	290	50	325	384	242	252	129	28	599	665
Average Queue (ft)	229	200	176	12	188	249	114	122	14	3	321	347
95th Queue (ft)	373	314	289	37	368	410	211	222	74	17	599	647
Link Distance (ft)	385			456		355	355	355			778	778
Upstream Blk Time (%)	2					11					2	2
Queuing Penalty (veh)	16					44					14	15
Storage Bay Dist (ft)		305	305		325				200	140		
Storage Blk Time (%)	3	0	0		1	13		1	0		25	11
Queuing Penalty (veh)	20	1	0		2	30		0	0		1	41

Intersection: 3: Benns Church Boulevard & Turner Drive

Movement	SB
Directions Served	R
Maximum Queue (ft)	280
Average Queue (ft)	179
95th Queue (ft)	350
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	280
Storage Blk Time (%)	1
Queuing Penalty (veh)	4

Intersection: 4: Benns Church Boulevard & Red Oak Drive

Movement	EB	NB	SB
Directions Served	LR	L	R
Maximum Queue (ft)	147	33	4
Average Queue (ft)	44	9	0
95th Queue (ft)	149	30	2
Link Distance (ft)	950		
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		200	140
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 5: Benns Church Boulevard & Site Driveway #1

Movement	EB	SB	SB	SB
Directions Served	R	T	T	R
Maximum Queue (ft)	39	126	125	20
Average Queue (ft)	13	23	23	2
95th Queue (ft)	36	183	186	36
Link Distance (ft)	377	472	472	
Upstream Blk Time (%)		1	1	
Queuing Penalty (veh)		6	7	
Storage Bay Dist (ft)				200
Storage Blk Time (%)			2	0
Queuing Penalty (veh)			1	0

Intersection: 6: Benns Church Boulevard & Site Driveway #2

Movement	EB	NB	NB	NB	SB
Directions Served	R	T	T	T	T
Maximum Queue (ft)	124	390	219	152	4
Average Queue (ft)	42	69	25	11	0
95th Queue (ft)	84	331	221	142	4
Link Distance (ft)	325	937	937	937	355
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 7: Benns Church Boulevard & Site Driveway #3

Movement	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	L	TR	L	T	T	R	L	T	T
Maximum Queue (ft)	154	160	245	275	130	210	252	259	79	283	479	484
Average Queue (ft)	71	72	139	186	54	106	123	144	19	77	236	247
95th Queue (ft)	134	132	236	259	128	177	229	242	56	210	444	460
Link Distance (ft)		736			490		249	249			937	937
Upstream Blk Time (%)						0	0	1	0			
Queuing Penalty (veh)						0	1	3	0			
Storage Bay Dist (ft)	300		300	300		300			300	300		
Storage Blk Time (%)			0	0	0	0	0	1	0	0	4	5
Queuing Penalty (veh)			0	0	0	0	0	0	0	0	4	8

Intersection: 7: Benns Church Boulevard & Site Driveway #3

Movement	SB
Directions Served	R
Maximum Queue (ft)	300
Average Queue (ft)	101
95th Queue (ft)	294
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	300
Storage Blk Time (%)	0
Queuing Penalty (veh)	2

Intersection: 8: Site Driveway #4 & Tractor Supply Entrance

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (ft)	2	29	49
Average Queue (ft)	0	2	27
95th Queue (ft)	2	15	48
Link Distance (ft)	150	470	679
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 9: Site Driveway #5 & Turner Drive

Movement	EB	EB	WB	WB	NB	NB	SB	SB	B22
Directions Served	LT	R	L	TR	LT	R	L	TR	T
Maximum Queue (ft)	413	164	231	20	660	200	200	742	125
Average Queue (ft)	77	14	76	1	344	129	189	465	28
95th Queue (ft)	265	88	162	8	719	259	229	854	152
Link Distance (ft)	1402		385	385	959			712	679
Upstream Blk Time (%)								19	
Queuing Penalty (veh)								17	
Storage Bay Dist (ft)		200				200	200		
Storage Blk Time (%)	2	0			52	6	81	67	
Queuing Penalty (veh)	2	0			76	4	35	56	

Intersection: 10: Tractor Supply Entrance & Site Driveway #6

Movement	SB
Directions Served	LR
Maximum Queue (ft)	42
Average Queue (ft)	17
95th Queue (ft)	43
Link Distance (ft)	938
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 11: Site Driveway #3 & Site Driveway #5

Movement	WB	SB
Directions Served	LTR	LTR
Maximum Queue (ft)	2	93
Average Queue (ft)	0	47
95th Queue (ft)	3	75
Link Distance (ft)	736	959
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 12: Benns Church Boulevard & Site Driveway #7

Movement	WB	NB	NB
Directions Served	R	T	T
Maximum Queue (ft)	56	27	53
Average Queue (ft)	17	1	3
95th Queue (ft)	41	17	27
Link Distance (ft)	245	554	554
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 428

Intersection: 1: Benns Church Boulevard & Cypress Run Drive

Movement	EB	EB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LTR	L	T	TR	L	T	T	R
Maximum Queue (ft)	284	180	261	255	805	824	149	752	762	245
Average Queue (ft)	133	85	120	242	572	576	59	456	470	129
95th Queue (ft)	252	179	237	295	884	895	132	680	700	298
Link Distance (ft)	656		676		798	798		1702	1702	
Upstream Blk Time (%)					5	5				
Queuing Penalty (veh)					46	46				
Storage Bay Dist (ft)		180		255			150			245
Storage Blk Time (%)	6	1		44	41		0	35	27	0
Queuing Penalty (veh)	7	1		332	115		2	22	40	4

Intersection: 2: Benns Church Boulevard & Tractor Supply Entrance

Movement	EB	NB	NB	SB	SB	SB
Directions Served	R	T	T	T	T	R
Maximum Queue (ft)	107	243	251	74	89	20
Average Queue (ft)	41	72	74	10	11	2
95th Queue (ft)	86	324	328	130	133	36
Link Distance (ft)	470	472	472	798	798	
Upstream Blk Time (%)		1	1			
Queuing Penalty (veh)		11	13			
Storage Bay Dist (ft)						200
Storage Blk Time (%)					1	0
Queuing Penalty (veh)					1	0

Intersection: 3: Benns Church Boulevard & Turner Drive

Movement	EB	EB	EB	WB	NB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	LT	R	LTR	L	L	T	T	R	L	T	T
Maximum Queue (ft)	213	196	151	141	312	372	334	352	127	134	759	767
Average Queue (ft)	109	93	48	58	219	278	150	158	8	32	488	504
95th Queue (ft)	172	156	102	121	395	432	288	300	63	95	843	862
Link Distance (ft)	385			456		355	355	355			778	778
Upstream Blk Time (%)						20	0	0			3	3
Queuing Penalty (veh)						132	1	1			23	26
Storage Bay Dist (ft)		305	305		325				200	140		
Storage Blk Time (%)	0				3	25		4	0	0	41	25
Queuing Penalty (veh)	0				5	46		1	0	0	12	63

Intersection: 3: Benns Church Boulevard & Turner Drive

Movement	SB
Directions Served	R
Maximum Queue (ft)	280
Average Queue (ft)	183
95th Queue (ft)	369
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	280
Storage Blk Time (%)	1
Queuing Penalty (veh)	5

Intersection: 4: Benns Church Boulevard & Red Oak Drive

Movement	EB	NB	NB	NB	SB	SB
Directions Served	LR	L	T	T	T	R
Maximum Queue (ft)	393	69	18	20	33	10
Average Queue (ft)	211	21	1	1	1	0
95th Queue (ft)	508	54	20	23	31	5
Link Distance (ft)	950		1134	1134	554	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		200				140
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 5: Benns Church Boulevard & Site Driveway #1

Movement	EB	NB	NB	SB	SB	SB
Directions Served	R	T	T	T	T	R
Maximum Queue (ft)	52	146	156	275	288	80
Average Queue (ft)	16	33	36	57	63	4
95th Queue (ft)	45	208	224	262	276	52
Link Distance (ft)	377	778	778	472	472	
Upstream Blk Time (%)				0	1	
Queuing Penalty (veh)				4	4	
Storage Bay Dist (ft)						200
Storage Blk Time (%)					3	0
Queuing Penalty (veh)					1	0

Intersection: 6: Benns Church Boulevard & Site Driveway #2

Movement	EB	NB	NB	NB	SB
Directions Served	R	T	T	T	T
Maximum Queue (ft)	90	366	295	225	4
Average Queue (ft)	31	89	30	21	0
95th Queue (ft)	65	339	212	182	4
Link Distance (ft)	325	937	937	937	355
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 7: Benns Church Boulevard & Site Driveway #3

Movement	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	L	TR	L	T	T	R	L	T	T
Maximum Queue (ft)	293	650	219	247	198	230	280	304	249	300	550	539
Average Queue (ft)	239	357	117	170	71	57	229	252	97	185	278	289
95th Queue (ft)	368	775	230	242	142	154	306	310	261	325	522	529
Link Distance (ft)		736			490		249	249			937	937
Upstream Blk Time (%)		3				0	7	15	0			
Queuing Penalty (veh)		8				0	58	127	0			
Storage Bay Dist (ft)	300		300	300		300			300	300		
Storage Blk Time (%)	37	23	0	0	0	0	7	15	0	1	5	6
Queuing Penalty (veh)	87	43	0	0	0	0	7	31	3	5	11	6

Intersection: 7: Benns Church Boulevard & Site Driveway #3

Movement	SB
Directions Served	R
Maximum Queue (ft)	300
Average Queue (ft)	72
95th Queue (ft)	253
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	300
Storage Blk Time (%)	0
Queuing Penalty (veh)	2

Intersection: 8: Site Driveway #4 & Tractor Supply Entrance

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	9	58
Average Queue (ft)	1	30
95th Queue (ft)	9	50
Link Distance (ft)	470	679
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 9: Site Driveway #5 & Turner Drive

Movement	EB	WB	WB	NB	NB	SB	SB
Directions Served	LT	L	TR	LT	R	L	TR
Maximum Queue (ft)	80	53	2	66	68	116	55
Average Queue (ft)	18	16	0	26	23	44	18
95th Queue (ft)	56	44	2	53	47	85	42
Link Distance (ft)	1402	385	385	959			712
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)					200	200	
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 10: Tractor Supply Entrance & Site Driveway #6

Movement	SB
Directions Served	LR
Maximum Queue (ft)	33
Average Queue (ft)	14
95th Queue (ft)	39
Link Distance (ft)	938
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 11: Site Driveway #3 & Site Driveway #5

Movement	EB	WB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	33	10	86
Average Queue (ft)	6	1	43
95th Queue (ft)	49	6	79
Link Distance (ft)	226	736	959
Upstream Blk Time (%)	0		
Queuing Penalty (veh)	0		
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 12: Benns Church Boulevard & Site Driveway #7

Movement	WB	NB	NB	NB
Directions Served	R	T	T	R
Maximum Queue (ft)	211	377	400	200
Average Queue (ft)	99	113	163	28
95th Queue (ft)	233	306	360	141
Link Distance (ft)	245	554	554	
Upstream Blk Time (%)	8	0	0	
Queuing Penalty (veh)	0	0	1	
Storage Bay Dist (ft)				200
Storage Blk Time (%)			6	0
Queuing Penalty (veh)			7	1

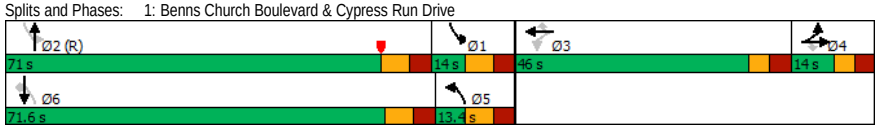
Network Summary

Network wide Queuing Penalty: 1363

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	0	93	105	0	84	85	1299	3	110	1537	45
Future Volume (vph)	65	0	93	105	0	84	85	1299	3	110	1537	45
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.91	0.91	1.00	0.91	1.00
Frt			0.850			0.850						0.850
Flt Protected		0.950		0.950	0.950		0.950			0.950		
Satd. Flow (prot)	0	1492	1495	1143	1143	1615	1641	4848	0	1805	4988	1509
Flt Permitted		0.950		0.103	0.103		0.074			0.119		
Satd. Flow (perm)	0	1492	1495	124	124	1615	128	4848	0	226	4988	1509
Satd. Flow (RTOR)			157			155						145
Adj. Flow (vph)	68	0	97	109	0	88	89	1353	3	115	1601	47
Lane Group Flow (vph)	0	68	97	54	55	88	89	1356	0	115	1601	47
Turn Type	Split	NA	Perm	Perm	NA	Perm	D.P+P	NA		D.P+P	NA	Perm
Protected Phases	4	4			3		5	2		1	6	
Permitted Phases			4	3		3	6			2		6
Total Split (s)	14.0	14.0	14.0	46.0	46.0	46.0	13.4	71.0		14.0	71.6	71.6
Total Lost Time (s)		6.8	6.8	7.1	7.1	7.1	8.4	8.4		8.4	8.4	8.4
Act Effct Green (s)		7.2	7.2	38.9	38.9	38.9	68.2	62.6		68.2	63.2	63.2
Actuated g/C Ratio		0.05	0.05	0.27	0.27	0.27	0.47	0.43		0.47	0.44	0.44
v/c Ratio		0.92	0.43	1.64	1.67	0.16	0.79	0.65		0.69	0.74	0.06
Control Delay		150.6	6.5	423.7	435.4	0.6	74.4	40.7		57.9	36.5	0.2
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay		150.6	6.5	423.7	435.4	0.6	74.4	40.7		57.9	36.5	0.2
LOS		F	A	F	F	A	E	D		E	D	A
Approach Delay		65.9			238.0			42.8			37.0	
Approach LOS		E			F			D			D	

Intersection Summary			
Cycle Length: 145			
Actuated Cycle Length: 145			
Offset: 0 (0%), Referenced to phase 2:NBSB, Start of Yellow			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.67			
Intersection Signal Delay: 51.7		Intersection LOS: D	
Intersection Capacity Utilization 64.3%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 1: Benns Church Boulevard & Cypress Run Drive



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	0	93	105	0	84	85	1299	3	110	1537	45
Future Volume (vph)	65	0	93	105	0	84	85	1299	3	110	1537	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.8	6.8	7.1	7.1	7.1	8.4	8.4		8.4	8.4	8.4
Lane Util. Factor		1.00	1.00	0.95	0.95	1.00	1.00	0.91		1.00	0.91	1.00
Frt		1.00	0.85	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85
Flt Protected		0.95	1.00	0.95	0.95	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1492	1495	1143	1143	1615	1641	4847		1805	4988	1509
Flt Permitted		0.95	1.00	0.10	0.10	1.00	0.07	1.00		0.12	1.00	1.00
Satd. Flow (perm)		1492	1495	124	124	1615	128	4847		227	4988	1509
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	68	0	97	109	0	88	89	1353	3	115	1601	47
RTOR Reduction (vph)	0	0	92	0	0	64	0	0	0	0	0	27
Lane Group Flow (vph)	0	68	5	54	55	24	89	1356	0	115	1601	20
Heavy Vehicles (%)	21%	0%	8%	50%	0%	0%	10%	7%	0%	0%	4%	7%
Turn Type	Split	NA	Perm	Perm	NA	Perm	D.P+P	NA		D.P+P	NA	Perm
Protected Phases	4	4			3		5	2		1	6	
Permitted Phases			4	3		3	6			2		6
Actuated Green, G (s)		7.2	7.2	38.9	38.9	38.9	68.2	62.6		68.2	63.2	63.2
Effective Green, g (s)		7.2	7.2	38.9	38.9	38.9	68.2	62.6		68.2	63.2	63.2
Actuated g/C Ratio		0.05	0.05	0.27	0.27	0.27	0.47	0.43		0.47	0.44	0.44
Clearance Time (s)		6.8	6.8	7.1	7.1	7.1	8.4	8.4		8.4	8.4	8.4
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0	2.0	5.0		2.0	5.0	5.0
Lane Grp Cap (vph)		74	74	33	33	433	112	2092		167	2174	657
v/s Ratio Prot		c0.05					c0.03	0.28		0.03	0.32	
v/s Ratio Perm			0.00	0.44	c0.44	0.01	c0.35			0.30		0.01
v/c Ratio		0.92	0.07	1.64	1.67	0.05	0.79	0.65		0.69	0.74	0.03
Uniform Delay, d1		68.6	65.7	53.0	53.0	39.4	52.7	32.5		48.2	34.0	23.4
Progression Factor		1.00	1.00	1.00	1.00	1.00	0.80	1.20		1.00	1.00	1.00
Incremental Delay, d2		76.3	0.4	389.5	401.8	0.1	25.6	1.3		9.0	2.3	0.1
Delay (s)		144.9	66.1	442.5	454.9	39.4	68.0	40.4		57.2	36.3	23.5
Level of Service		F	E	F	F	D	E	D		E	D	C
Approach Delay (s)		98.6			265.9			42.1			37.3	
Approach LOS		F			F			D			D	

Intersection Summary					
HCM 2000 Control Delay		54.7	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio		1.09			
Actuated Cycle Length (s)		145.0	Sum of lost time (s)	30.7	
Intersection Capacity Utilization		64.3%	ICU Level of Service	C	
Analysis Period (min)		15			
c Critical Lane Group					



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	83	0	1387	1623	111
Future Volume (vph)	0	83	0	1387	1623	111
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	1.00
Frt		0.865				0.850
Flt Protected						
Satd. Flow (prot)	0	1611	0	4848	4988	1583
Flt Permitted						
Satd. Flow (perm)	0	1611	0	4848	4988	1583
Adj. Flow (vph)	0	90	0	1508	1764	121
Lane Group Flow (vph)	0	90	0	1508	1764	121
Sign Control	Stop			Free	Free	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 43.2%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	83	0	1387	1623	111
Future Volume (Veh/h)	0	83	0	1387	1623	111
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	90	0	1508	1764	121
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				Raised	Raised	
Median storage veh)				1	1	
Upstream signal (ft)					870	
pX, platoon unblocked	0.74	0.74	0.74			
vC, conflicting volume	2267	588	1885			
vC1, stage 1 conf vol	1764					
vC2, stage 2 conf vol	503					
vCu, unblocked vol	1486	0	971			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	89	100			
cM capacity (veh/h)	212	803	523			

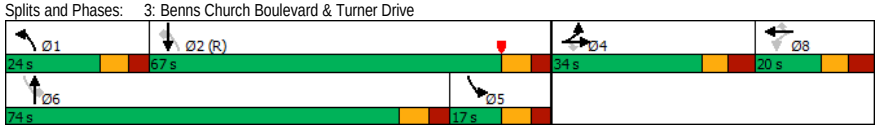
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	90	503	503	503	588	588	588	121
Volume Left	0	0	0	0	0	0	0	0
Volume Right	90	0	0	0	0	0	0	121
cSH	803	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.11	0.30	0.30	0.30	0.35	0.35	0.35	0.07
Queue Length 95th (ft)	9	0	0	0	0	0	0	0
Control Delay (s)	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B							
Approach Delay (s)	10.0	0.0			0.0			
Approach LOS	B							

Intersection Summary				
Average Delay		0.3		
Intersection Capacity Utilization		43.2%	ICU Level of Service	A
Analysis Period (min)		15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	439	40	469	19	8	3	486	902	80	5	1273	418
Future Volume (vph)	439	40	469	19	8	3	486	902	80	5	1273	418
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95	1.00	0.97	0.91	1.00	1.00	0.91	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950	0.960		0.950	0.979		0.950			0.950		
Satd. Flow (prot)	1531	1575	1524	1715	1767	1615	3335	4940	1615	1805	5036	1538
Flt Permitted	0.950	0.960		0.741	0.726		0.084			0.236		
Satd. Flow (perm)	1531	1575	1524	1338	1310	1615	295	4940	1615	448	5036	1538
Satd. Flow (RTOR)			335			232			175			456
Adj. Flow (vph)	499	45	533	22	9	3	552	1025	91	6	1447	475
Lane Group Flow (vph)	269	275	533	15	16	3	552	1025	91	6	1447	475
Turn Type	Split	NA	Perm	Perm	NA	Perm	D.P+P	NA	Perm	D.P+P	NA	Perm
Protected Phases	4	4			8		1	6		5	2	
Permitted Phases			4	8		8	2		6	6		2
Total Split (s)	34.0	34.0	34.0	20.0	20.0	20.0	24.0	74.0	74.0	17.0	67.0	67.0
Total Lost Time (s)	9.0	9.0	9.0	9.0	9.0	9.0	8.3	8.3	8.3	8.3	8.3	8.3
Act Effct Green (s)	25.0	25.0	25.0	8.2	8.2	8.2	83.6	88.5	88.5	90.2	60.0	60.0
Actuated g/C Ratio	0.17	0.17	0.17	0.06	0.06	0.06	0.58	0.61	0.61	0.62	0.41	0.41
v/c Ratio	1.02	1.01	0.99	0.20	0.22	0.01	0.83	0.34	0.09	0.02	0.69	0.53
Control Delay	119.3	116.8	57.6	70.5	71.4	0.0	44.3	19.0	4.1	5.2	24.1	6.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	119.3	116.8	57.6	70.5	71.4	0.0	44.3	19.0	4.1	5.2	24.1	6.5
LOS	F	F	E	E	E	A	D	B	A	A	C	A
Approach Delay		88.1			64.7			26.6			19.7	
Approach LOS		F			E			C			B	

Intersection Summary			
Cycle Length: 145			
Actuated Cycle Length: 145			
Offset: 49 (34%), Referenced to phase 2:NBSB, Start of Yellow			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.02			
Intersection Signal Delay: 38.1		Intersection LOS: D	
Intersection Capacity Utilization 81.4%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 3: Benns Church Boulevard & Turner Drive



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	439	40	469	19	8	3	486	902	80	5	1273	418
Future Volume (vph)	439	40	469	19	8	3	486	902	80	5	1273	418
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	9.0	9.0	9.0	9.0	9.0	9.0	8.3	8.3	8.3	8.3	8.3	8.3
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95	1.00	0.97	0.91	1.00	1.00	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00	0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1531	1575	1524	1715	1766	1615	3335	4940	1615	1805	5036	1538
Flt Permitted	0.95	0.96	1.00	0.74	0.73	1.00	0.08	1.00	1.00	0.24	1.00	1.00
Satd. Flow (perm)	1531	1575	1524	1337	1311	1615	296	4940	1615	448	5036	1538
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	499	45	533	22	9	3	552	1025	91	6	1447	475
RTOR Reduction (vph)	0	0	277	0	0	3	0	0	42	0	0	279
Lane Group Flow (vph)	269	275	256	15	16	0	552	1025	49	6	1447	196
Heavy Vehicles (%)	12%	0%	6%	0%	0%	0%	5%	5%	0%	0%	3%	5%
Turn Type	Split	NA	Perm	Perm	NA	Perm	D.P+P	NA	Perm	D.P+P	NA	Perm
Protected Phases	4	4			8		1	6		5	2	
Permitted Phases			4	8		8	2		6	6		2
Actuated Green, G (s)	25.0	25.0	25.0	5.4	5.4	5.4	80.0	78.3	78.3	80.0	56.4	56.4
Effective Green, g (s)	25.0	25.0	25.0	5.4	5.4	5.4	80.0	78.3	78.3	80.0	56.4	56.4
Actuated g/C Ratio	0.17	0.17	0.17	0.04	0.04	0.04	0.55	0.54	0.54	0.55	0.39	0.39
Clearance Time (s)	9.0	9.0	9.0	9.0	9.0	9.0	8.3	8.3	8.3	8.3	8.3	8.3
Vehicle Extension (s)	5.0	5.0	5.0	3.0	3.0	3.0	4.0	6.0	6.0	2.0	6.0	6.0
Lane Grp Cap (vph)	263	271	262	49	48	60	657	2667	872	263	1958	598
v/s Ratio Prot	c0.18	0.17					c0.14	0.21		0.00	0.29	
v/s Ratio Perm			0.17	0.01	c0.01	0.00	c0.33		0.03	0.01		0.13
v/c Ratio	1.02	1.01	0.98	0.31	0.33	0.00	0.84	0.38	0.06	0.02	0.74	0.33
Uniform Delay, d1	60.0	60.0	59.7	68.0	68.0	67.2	40.1	19.4	15.8	19.3	38.0	31.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.84	1.17	1.00	0.38	0.64	1.54
Incremental Delay, d2	61.5	58.5	49.0	3.5	4.1	0.0	9.4	0.4	0.1	0.0	2.0	1.1
Delay (s)	121.5	118.5	108.7	71.5	72.1	67.2	43.0	23.1	15.9	7.3	26.3	49.0
Level of Service	F	F	F	E	E	E	D	C	B	A	C	D
Approach Delay (s)		114.4			71.4			29.3			31.8	
Approach LOS		F			E			C			C	

Intersection Summary					
HCM 2000 Control Delay	50.1	HCM 2000 Level of Service	D		
HCM 2000 Volume to Capacity ratio	0.85				
Actuated Cycle Length (s)	145.0	Sum of lost time (s)	34.6		
Intersection Capacity Utilization	81.4%	ICU Level of Service	D		
Analysis Period (min)	15				
c Critical Lane Group					

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	14	24	15	1547	1854	23
Future Volume (vph)	14	24	15	1547	1854	23
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	0.914					0.850
Flt Protected	0.982		0.950			
Satd. Flow (prot)	1695	0	1787	3406	3471	1599
Flt Permitted	0.982		0.950			
Satd. Flow (perm)	1695	0	1787	3406	3471	1599
Adj. Flow (vph)	15	26	16	1700	2037	25
Lane Group Flow (vph)	41	0	16	1700	2037	25
Sign Control	Stop			Free	Free	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 61.2%		ICU Level of Service B	
Analysis Period (min) 15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	14	24	15	1547	1854	23
Future Volume (Veh/h)	14	24	15	1547	1854	23
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	15	26	16	1700	2037	25
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)					932	
pX, platoon unblocked	0.81	0.81	0.81			
vC, conflicting volume	2919	1018	2062			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2900	547	1839			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	93	94			
cM capacity (veh/h)	10	391	268			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	41	16	850	850	1018	1018	25
Volume Left	15	16	0	0	0	0	0
Volume Right	26	0	0	0	0	0	25
cSH	26	268	1700	1700	1700	1700	1700
Volume to Capacity	1.60	0.06	0.50	0.50	0.60	0.60	0.01
Queue Length 95th (ft)	125	5	0	0	0	0	0
Control Delay (s)	625.1	19.3	0.0	0.0	0.0	0.0	0.0
Lane LOS	F	C					
Approach Delay (s)	625.1	0.2			0.0		
Approach LOS	F						

Intersection Summary				
Average Delay	6.8			
Intersection Capacity Utilization	61.2%	ICU Level of Service		B
Analysis Period (min)	15			



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	22	0	1386	1609	36
Future Volume (vph)	0	22	0	1386	1609	36
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	1.00
Frt		0.865				0.850
Flt Protected						
Satd. Flow (prot)	0	1611	0	4848	4940	1583
Flt Permitted						
Satd. Flow (perm)	0	1611	0	4848	4940	1583
Adj. Flow (vph)	0	23	0	1459	1694	38
Lane Group Flow (vph)	0	23	0	1459	1694	38
Sign Control	Stop			Free	Free	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization	41.1%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	22	0	1386	1609	36
Future Volume (Veh/h)	0	22	0	1386	1609	36
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	23	0	1459	1694	38
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				Raised	Raised	
Median storage veh)				2	2	
Upstream signal (ft)				844		
pX, platoon unblocked	0.89					
vC, conflicting volume	2180	565	1732			
vC1, stage 1 conf vol	1694					
vC2, stage 2 conf vol	486					
vCu, unblocked vol	1894	565	1732			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	95	100			
cM capacity (veh/h)	130	468	360			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	23	486	486	486	565	565	565	38
Volume Left	0	0	0	0	0	0	0	0
Volume Right	23	0	0	0	0	0	0	38
cSH	468	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.05	0.29	0.29	0.29	0.33	0.33	0.33	0.02
Queue Length 95th (ft)	4	0	0	0	0	0	0	0
Control Delay (s)	13.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B							
Approach Delay (s)	13.1	0.0			0.0			
Approach LOS	B							

Intersection Summary				
Average Delay	0.1			
Intersection Capacity Utilization	41.1%	ICU Level of Service		A
Analysis Period (min)	15			



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	93	0	1426	1701	73
Future Volume (vph)	0	93	0	1426	1701	73
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	1.00
Frt		0.865				0.850
Flt Protected						
Satd. Flow (prot)	0	1611	0	4893	4988	1583
Flt Permitted						
Satd. Flow (perm)	0	1611	0	4893	4988	1583
Adj. Flow (vph)	0	98	0	1501	1791	77
Lane Group Flow (vph)	0	98	0	1501	1791	77
Sign Control	Stop			Free	Free	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 45.3%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	93	0	1426	1701	73
Future Volume (Veh/h)	0	93	0	1426	1701	73
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	98	0	1501	1791	77
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				Raised	Raised	
Median storage veh)				2	2	
Upstream signal (ft)				1022	428	
pX, platoon unblocked	0.81	0.76	0.76			
vC, conflicting volume	2291	597	1868			
vC1, stage 1 conf vol	1791					
vC2, stage 2 conf vol	500					
vCu, unblocked vol	937	0	1039			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	88	100			
cM capacity (veh/h)	253	825	506			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	98	500	500	500	597	597	597	77
Volume Left	0	0	0	0	0	0	0	0
Volume Right	98	0	0	0	0	0	0	77
cSH	825	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.12	0.29	0.29	0.29	0.35	0.35	0.35	0.05
Queue Length 95th (ft)	10	0	0	0	0	0	0	0
Control Delay (s)	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	A							
Approach Delay (s)	10.0	0.0			0.0			
Approach LOS	A							

Intersection Summary				
Average Delay		0.3		
Intersection Capacity Utilization	45.3%	ICU Level of Service		A
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	79	0	117	267	0	132	212	1256	92	94	1490	177
Future Volume (vph)	79	0	117	267	0	132	212	1256	92	94	1490	177
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frt		0.850			0.850				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1583	0	3433	1583	0	1770	4893	1583	1770	4988	1583
Flt Permitted	0.950			0.950			0.116			0.173		
Satd. Flow (perm)	1770	1583	0	3433	1583	0	216	4893	1583	322	4988	1583
Satd. Flow (RTOR)		242			204				97			186
Adj. Flow (vph)	83	0	123	281	0	139	223	1322	97	99	1568	186
Lane Group Flow (vph)	83	123	0	281	139	0	223	1322	97	99	1568	186
Turn Type	Prot	NA		Prot	NA		D.P+P	NA	Perm	D.P+P	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases							6		2	2		6
Total Split (s)	17.0	23.0		19.0	25.0		30.0	87.0	87.0	16.0	73.0	73.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Act Effct Green (s)	11.2	5.5		14.6	8.9		108.9	101.5	101.5	108.9	91.4	91.4
Actuated g/C Ratio	0.08	0.04		0.10	0.06		0.75	0.70	0.70	0.75	0.63	0.63
v/c Ratio	0.61	0.42		0.81	0.48		0.64	0.39	0.09	0.31	0.50	0.17
Control Delay	83.5	4.4		82.4	6.6		22.3	9.4	1.5	7.9	33.0	13.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	83.5	4.4		82.4	6.6		22.3	9.4	1.5	7.9	33.0	13.0
LOS	F	A		F	A		C	A	A	A	C	B
Approach Delay		36.3			57.3			10.7			29.7	
Approach LOS		D			E			B			C	

Intersection Summary			
Cycle Length: 145			
Actuated Cycle Length: 145			
Offset: 0 (0%), Referenced to phase 2:NBSB and 6:NBSB, Start of Yellow			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.81			
Intersection Signal Delay: 25.3		Intersection LOS: C	
Intersection Capacity Utilization 68.7%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 7: Benns Church Boulevard & Site Driveway #3



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	79	0	117	267	0	132	212	1256	92	94	1490	177
Future Volume (vph)	79	0	117	267	0	132	212	1256	92	94	1490	177
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		0.97	1.00		1.00	0.91	1.00	1.00	0.91	1.00
Frt	1.00	0.85		1.00	0.85		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1583		3433	1583		1770	4893	1583	1770	4988	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.12	1.00	1.00	0.17	1.00	1.00
Satd. Flow (perm)	1770	1583		3433	1583		216	4893	1583	322	4988	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	83	0	123	281	0	139	223	1322	97	99	1568	186
RTOR Reduction (vph)	0	118	0	0	130	0	0	0	29	0	0	69
Lane Group Flow (vph)	83	5	0	281	9	0	223	1322	68	99	1568	117
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	6%	2%	2%	4%	2%
Turn Type	Prot	NA		Prot	NA		D.P+P	NA	Perm	D.P+P	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases							6		2	2		6
Actuated Green, G (s)	11.2	5.5		14.6	8.9		108.9	101.5	101.5	108.9	91.4	91.4
Effective Green, g (s)	11.2	5.5		14.6	8.9		108.9	101.5	101.5	108.9	91.4	91.4
Actuated g/C Ratio	0.08	0.04		0.10	0.06		0.75	0.70	0.70	0.75	0.63	0.63
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	136	60		345	97		349	3425	1108	315	3144	997
v/s Ratio Prot	0.05	0.00		c0.08	c0.01		c0.08	0.27		0.02	0.31	
v/s Ratio Perm							c0.40		0.04	0.22		0.07
v/c Ratio	0.61	0.08		0.81	0.09		0.64	0.39	0.06	0.31	0.50	0.12
Uniform Delay, d1	64.8	67.3		63.9	64.2		13.3	8.9	6.8	5.4	14.4	10.7
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.54	2.14	7.27
Incremental Delay, d2	7.9	0.6		13.7	0.4		3.8	0.3	0.1	0.4	0.4	0.2
Delay (s)	72.6	67.9		77.6	64.6		17.1	9.3	6.9	8.8	31.3	77.9
Level of Service	E	E		E	E		B	A	A	A	C	E
Approach Delay (s)		69.8			73.3			10.2			34.8	
Approach LOS		E			E			B			C	

Intersection Summary				
HCM 2000 Control Delay	30.7	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.62			
Actuated Cycle Length (s)	145.0	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	68.7%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	12	12	73	9	5	57
Future Volume (vph)	12	12	73	9	5	57
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.932				0.875	
Flt Protected				0.958	0.996	
Satd. Flow (prot)	1736	0	0	1785	1623	0
Flt Permitted				0.958	0.996	
Satd. Flow (perm)	1736	0	0	1785	1623	0
Adj. Flow (vph)	13	13	79	10	5	62
Lane Group Flow (vph)	26	0	0	89	67	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 21.7%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	12	12	73	9	5	57
Future Volume (Veh/h)	12	12	73	9	5	57
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	13	13	79	10	5	62
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			26		188	20
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			26		188	20
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			95		99	94
cM capacity (veh/h)			1588		762	1058

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	26	89	67
Volume Left	0	79	5
Volume Right	13	0	62
cSH	1700	1588	1029
Volume to Capacity	0.02	0.05	0.07
Queue Length 95th (ft)	0	4	5
Control Delay (s)	0.0	6.6	8.7
Lane LOS		A	A
Approach Delay (s)	0.0	6.6	8.7
Approach LOS			A

Intersection Summary				
Average Delay		6.4		
Intersection Capacity Utilization		21.7%	ICU Level of Service	A
Analysis Period (min)		15		

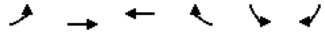
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	777	84	158	670	53	42	21	144	83	10	33
Future Volume (vph)	30	777	84	158	670	53	42	21	144	83	10	33
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.989				0.850		0.885	
Flt Protected		0.998		0.950				0.968		0.950		
Satd. Flow (prot)	0	1859	1583	1770	1842	0	0	1803	1583	1770	1649	0
Flt Permitted		0.998		0.950				0.968		0.950		
Satd. Flow (perm)	0	1859	1583	1770	1842	0	0	1803	1583	1770	1649	0
Adj. Flow (vph)	33	845	91	172	728	58	46	23	157	90	11	36
Lane Group Flow (vph)	0	878	91	172	786	0	0	69	157	90	47	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 102.3%		ICU Level of Service G	
Analysis Period (min) 15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	777	84	158	670	53	42	21	144	83	10	33
Future Volume (Veh/h)	30	777	84	158	670	53	42	21	144	83	10	33
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	845	91	172	728	58	46	23	157	90	11	36
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									8			
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					504							
pX, platoon unblocked	0.86						0.86	0.86		0.86	0.86	0.86
vC, conflicting volume	786			936			2024	2041	845	2102	2103	757
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	673			936			2108	2127	845	2198	2199	639
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			76			0	27	57	0	61	91
cM capacity (veh/h)	792			732			17	32	363	5	28	411

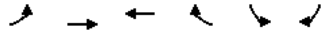
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2
Volume Total	878	91	172	786	226	90	47
Volume Left	33	0	172	0	46	90	0
Volume Right	0	91	0	58	157	0	36
cSH	792	1700	732	1700	61	5	99
Volume to Capacity	0.04	0.05	0.24	0.46	3.69	17.10	0.48
Queue Length 95th (ft)	3	0	23	0	Err	Err	52
Control Delay (s)	1.1	0.0	11.4	0.0	Err	Err	70.7
Lane LOS	A		B		F	F	F
Approach Delay (s)	1.0		2.1		Err	6593.0	
Approach LOS					F	F	

Intersection Summary					
Average Delay	1382.5				
Intersection Capacity Utilization	102.3%	ICU Level of Service		G	
Analysis Period (min)	15				



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	14	23	0
Future Volume (vph)	0	0	0	14	23	0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.865			
Flt Protected					0.950	
Satd. Flow (prot)	0	1863	1611	0	1770	0
Flt Permitted					0.950	
Satd. Flow (perm)	0	1863	1611	0	1770	0
Adj. Flow (vph)	0	0	0	15	25	0
Lane Group Flow (vph)	0	0	15	0	25	0
Sign Control		Free	Free		Stop	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 13.3%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	0	14	23	0
Future Volume (Veh/h)	0	0	0	14	23	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	15	25	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	15				8	8
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	15				8	8
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				98	100
cM capacity (veh/h)	1603				1013	1075

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	0	15	25
Volume Left	0	0	25
Volume Right	0	15	0
cSH	1700	1700	1013
Volume to Capacity	0.00	0.01	0.02
Queue Length 95th (ft)	0	0	2
Control Delay (s)	0.0	0.0	8.6
Lane LOS			A
Approach Delay (s)	0.0	0.0	8.6
Approach LOS			A

Intersection Summary				
Average Delay		5.4		
Intersection Capacity Utilization		13.3%	ICU Level of Service	A
Analysis Period (min)		15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	7	163	63	0	0	0	106	0	29
Future Volume (vph)	0	0	0	7	163	63	0	0	0	106	0	29
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.964						0.971	
Flt Protected					0.998						0.962	
Satd. Flow (prot)	0	1863	0	0	1792	0	0	1863	0	0	1740	0
Flt Permitted					0.998						0.962	
Satd. Flow (perm)	0	1863	0	0	1792	0	0	1863	0	0	1740	0
Adj. Flow (vph)	0	0	0	8	177	68	0	0	0	115	0	32
Lane Group Flow (vph)	0	0	0	0	253	0	0	0	0	0	147	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 27.1%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	7	163	63	0	0	0	106	0	29
Future Volume (Veh/h)	0	0	0	7	163	63	0	0	0	106	0	29
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	8	177	68	0	0	0	115	0	32
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					837							
pX, platoon unblocked												
vC, conflicting volume	245			0			259	261	0	227	227	211
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	245			0			259	261	0	227	227	211
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	84	100	96
cM capacity (veh/h)	1321			1623			665	641	1085	726	669	829

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	0	253	0	147
Volume Left	0	8	0	115
Volume Right	0	68	0	32
cSH	1700	1623	1700	746
Volume to Capacity	0.00	0.00	0.00	0.20
Queue Length 95th (ft)	0	0	0	18
Control Delay (s)	0.0	0.3	0.0	11.0
Lane LOS		A	A	B
Approach Delay (s)	0.0	0.3	0.0	11.0
Approach LOS			A	B

Intersection Summary					
Average Delay			4.2		
Intersection Capacity Utilization		27.1%	ICU Level of Service		A
Analysis Period (min)		15			



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	33	1157	37	0	1547
Future Volume (vph)	0	33	1157	37	0	1547
Lane Util. Factor	1.00	1.00	0.91	1.00	1.00	0.91
Frt		0.865		0.850		
Flt Protected						
Satd. Flow (prot)	0	1611	5085	1583	0	5085
Flt Permitted						
Satd. Flow (perm)	0	1611	5085	1583	0	5085
Adj. Flow (vph)	0	36	1258	40	0	1682
Lane Group Flow (vph)	0	36	1258	40	0	1682
Sign Control	Stop		Free			Free

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization	33.2%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	33	1157	37	0	1547
Future Volume (Veh/h)	0	33	1157	37	0	1547
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	36	1258	40	0	1682
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						315
pX, platoon unblocked	0.84					
vC, conflicting volume	1819	419			1298	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1301	419			1298	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	94			100	
cM capacity (veh/h)	128	583			530	

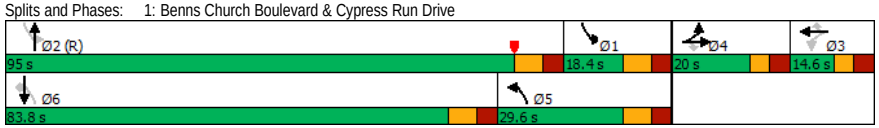
Direction, Lane #	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3
Volume Total	36	419	419	419	40	561	561	561
Volume Left	0	0	0	0	0	0	0	0
Volume Right	36	0	0	0	40	0	0	0
cSH	583	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.06	0.25	0.25	0.25	0.02	0.33	0.33	0.33
Queue Length 95th (ft)	5	0	0	0	0	0	0	0
Control Delay (s)	11.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B							
Approach Delay (s)	11.6	0.0				0.0		
Approach LOS	B							

Intersection Summary				
Average Delay	0.1			
Intersection Capacity Utilization	33.2%	ICU Level of Service		A
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	154	0	149	99	5	152	317	1793	0	122	1764	168
Future Volume (vph)	154	0	149	99	5	152	317	1793	0	122	1764	168
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.91	0.91	1.00	0.91	1.00
Frt			0.850			0.850						0.850
Flt Protected		0.950		0.950	0.957		0.950			0.950		
Satd. Flow (prot)	0	1805	1615	1715	1727	1615	1805	5085	0	1805	4988	1553
Flt Permitted		0.950		0.657	0.639		0.065			0.077		
Satd. Flow (perm)	0	1805	1615	1186	1153	1615	124	5085	0	146	4988	1553
Satd. Flow (RTOR)			216			214						204
Adj. Flow (vph)	157	0	152	101	5	155	323	1830	0	124	1800	171
Lane Group Flow (vph)	0	157	152	53	53	155	323	1830	0	124	1800	171
Turn Type	Split	NA	Perm	Perm	NA	Perm	D.P+P	NA		D.P+P	NA	Perm
Protected Phases	4	4			3		5	2		1	6	
Permitted Phases			4	3		3	6			2		6
Total Split (s)	20.0	20.0	20.0	14.6	14.6	14.6	29.6	95.0		18.4	83.8	83.8
Total Lost Time (s)		6.8	6.8	7.1	7.1	7.1	8.4	8.4		8.4	8.4	8.4
Act Effct Green (s)		13.2	13.2	7.5	7.5	7.5	96.6	86.6		96.6	75.4	75.4
Actuated g/C Ratio		0.09	0.09	0.05	0.05	0.05	0.65	0.59		0.65	0.51	0.51
v/c Ratio		0.98	0.45	0.88	0.91	0.55	1.01	0.62		0.60	0.71	0.19
Control Delay		132.2	5.3	153.9	163.0	9.1	86.7	32.6		44.3	29.8	1.6
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay		132.2	5.3	153.9	163.0	9.1	86.7	32.6		44.3	29.8	1.6
LOS		F	A	F	F	A	F	C		D	C	A
Approach Delay		69.8			69.8			40.7			28.4	
Approach LOS		E			E			D			C	

Intersection Summary			
Cycle Length: 148			
Actuated Cycle Length: 148			
Offset: 0 (0%), Referenced to phase 2:NBSB, Start of Yellow			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.01			
Intersection Signal Delay: 38.8		Intersection LOS: D	
Intersection Capacity Utilization 86.5%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 1: Benns Church Boulevard & Cypress Run Drive



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	154	0	149	99	5	152	317	1793	0	122	1764	168
Future Volume (vph)	154	0	149	99	5	152	317	1793	0	122	1764	168
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.8	6.8	7.1	7.1	7.1	8.4	8.4		8.4	8.4	8.4
Lane Util. Factor		1.00	1.00	0.95	0.95	1.00	1.00	0.91		1.00	0.91	1.00
Frt		1.00	0.85	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85
Flt Protected		0.95	1.00	0.95	0.96	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1805	1615	1715	1727	1615	1805	5085		1805	4988	1553
Flt Permitted		0.95	1.00	0.66	0.64	1.00	0.07	1.00		0.08	1.00	1.00
Satd. Flow (perm)		1805	1615	1187	1153	1615	124	5085		146	4988	1553
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	157	0	152	101	5	155	323	1830	0	124	1800	171
RTOR Reduction (vph)	0	0	138	0	0	147	0	0	0	0	0	84
Lane Group Flow (vph)	0	157	14	53	53	8	323	1830	0	124	1800	87
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	4%	4%
Turn Type	Split	NA	Perm	Perm	NA	Perm	D.P+P	NA		D.P+P	NA	Perm
Protected Phases	4	4			3		5	2		1	6	
Permitted Phases			4	3		3	6			2		6
Actuated Green, G (s)		13.2	13.2	7.5	7.5	7.5	96.6	86.6		96.6	75.4	75.4
Effective Green, g (s)		13.2	13.2	7.5	7.5	7.5	96.6	86.6		96.6	75.4	75.4
Actuated g/C Ratio		0.09	0.09	0.05	0.05	0.05	0.65	0.59		0.65	0.51	0.51
Clearance Time (s)		6.8	6.8	7.1	7.1	7.1	8.4	8.4		8.4	8.4	8.4
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0	2.0	5.0		2.0	5.0	5.0
Lane Grp Cap (vph)		160	144	60	58	81	321	2975		207	2541	791
v/s Ratio Prot		c0.09					c0.14	0.36		0.04	0.36	
v/s Ratio Perm			0.01	0.04	c0.05	0.00	c0.51			0.35		0.06
v/c Ratio		0.98	0.09	0.88	0.91	0.10	1.01	0.62		0.60	0.71	0.11
Uniform Delay, d1		67.3	61.9	69.8	69.9	67.0	43.5	19.9		37.6	27.9	18.9
Progression Factor		1.00	1.00	1.00	1.00	1.00	0.80	1.59		1.00	1.00	1.00
Incremental Delay, d2		65.3	0.3	75.4	86.9	0.5	44.8	0.7		3.1	1.7	0.3
Delay (s)		132.5	62.2	145.2	156.8	67.5	79.5	32.3		40.6	29.6	19.1
Level of Service		F	E	F	F	E	E	C		D	C	B
Approach Delay (s)		97.9			101.4			39.4			29.4	
Approach LOS		F			F			D			C	

Intersection Summary					
HCM 2000 Control Delay		42.1	HCM 2000 Level of Service		D
HCM 2000 Volume to Capacity ratio		0.99			
Actuated Cycle Length (s)		148.0	Sum of lost time (s)		30.7
Intersection Capacity Utilization		86.5%	ICU Level of Service		E
Analysis Period (min)		15			
c Critical Lane Group					

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	73	0	2111	1905	108
Future Volume (vph)	0	73	0	2111	1905	108
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	1.00
Frt		0.865				0.850
Flt Protected						
Satd. Flow (prot)	0	1611	0	5085	4988	1583
Flt Permitted						
Satd. Flow (perm)	0	1611	0	5085	4988	1583
Adj. Flow (vph)	0	79	0	2295	2071	117
Lane Group Flow (vph)	0	79	0	2295	2071	117
Sign Control	Stop			Free	Free	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization	48.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	73	0	2111	1905	108
Future Volume (Veh/h)	0	73	0	2111	1905	108
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	79	0	2295	2071	117
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				Raised	Raised	
Median storage veh)				1	1	
Upstream signal (ft)					870	
pX, platoon unblocked	0.73	0.73	0.73			
vC, conflicting volume	2836	690	2188			
vC1, stage 1 conf vol	2071					
vC2, stage 2 conf vol	765					
vCu, unblocked vol	2212	0	1321			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	90	100			
cM capacity (veh/h)	130	789	377			

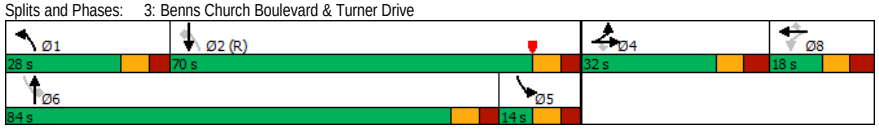
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	79	765	765	765	690	690	690	117
Volume Left	0	0	0	0	0	0	0	0
Volume Right	79	0	0	0	0	0	0	117
cSH	789	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.10	0.45	0.45	0.45	0.41	0.41	0.41	0.07
Queue Length 95th (ft)	8	0	0	0	0	0	0	0
Control Delay (s)	10.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B							
Approach Delay (s)	10.1	0.0			0.0			
Approach LOS	B							

Intersection Summary				
Average Delay	0.2			
Intersection Capacity Utilization	48.0%	ICU Level of Service		A
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	283	17	139	90	43	10	410	1832	33	35	1637	296
Future Volume (vph)	283	17	139	90	43	10	410	1832	33	35	1637	296
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95	1.00	0.97	0.91	1.00	1.00	0.91	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950	0.958		0.950	0.982		0.950			0.950		
Satd. Flow (prot)	1698	1714	1599	1715	1773	1615	3335	5085	1615	1805	5085	1615
Flt Permitted	0.950	0.958		0.652	0.806		0.063			0.054		
Satd. Flow (perm)	1698	1714	1599	1177	1455	1615	221	5085	1615	103	5085	1615
Satd. Flow (RTOR)			228			228			172			252
Adj. Flow (vph)	298	18	146	95	45	11	432	1928	35	37	1723	312
Lane Group Flow (vph)	158	158	146	68	72	11	432	1928	35	37	1723	312
Turn Type	Split	NA	Perm	Perm	NA	Perm	D.P+P	NA	Perm	D.P+P	NA	Perm
Protected Phases	4	4			8		1	6		5	2	
Permitted Phases			4	8		8	2		6	6		2
Total Split (s)	32.0	32.0	32.0	18.0	18.0	18.0	28.0	84.0	84.0	14.0	70.0	70.0
Total Lost Time (s)	9.0	9.0	9.0	9.0	9.0	9.0	8.3	8.3	8.3	8.3	8.3	8.3
Act Effct Green (s)	20.0	20.0	20.0	11.0	11.0	11.0	82.5	79.6	79.6	84.1	63.8	63.8
Actuated g/C Ratio	0.14	0.14	0.14	0.07	0.07	0.07	0.56	0.54	0.54	0.57	0.43	0.43
v/c Ratio	0.69	0.68	0.35	0.78	0.67	0.03	0.84	0.71	0.04	0.30	0.79	0.37
Control Delay	76.7	76.0	2.4	116.2	95.4	0.2	49.8	16.1	0.1	21.2	30.0	7.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	76.7	76.0	2.4	116.2	95.4	0.2	49.8	16.1	0.1	21.2	30.0	7.3
LOS	E	E	A	F	F	A	D	B	A	C	C	A
Approach Delay		52.9			97.8			21.9			26.4	
Approach LOS		D			F			C			C	

Intersection Summary			
Cycle Length: 148			
Actuated Cycle Length: 148			
Offset: 38 (26%), Referenced to phase 2:NBSB, Start of Yellow			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.84			
Intersection Signal Delay: 28.8		Intersection LOS: C	
Intersection Capacity Utilization 79.6%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 3: Benns Church Boulevard & Turner Drive



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	283	17	139	90	43	10	410	1832	33	35	1637	296
Future Volume (vph)	283	17	139	90	43	10	410	1832	33	35	1637	296
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	9.0	9.0	9.0	9.0	9.0	9.0	8.3	8.3	8.3	8.3	8.3	8.3
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95	1.00	0.97	0.91	1.00	1.00	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00	0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1698	1713	1599	1715	1772	1615	3335	5085	1615	1805	5085	1615
Flt Permitted	0.95	0.96	1.00	0.65	0.81	1.00	0.06	1.00	1.00	0.05	1.00	1.00
Satd. Flow (perm)	1698	1713	1599	1177	1456	1615	220	5085	1615	102	5085	1615
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	298	18	146	95	45	11	432	1928	35	37	1723	312
RTOR Reduction (vph)	0	0	126	0	0	10	0	0	17	0	0	144
Lane Group Flow (vph)	158	158	20	68	72	1	432	1928	18	37	1723	168
Heavy Vehicles (%)	1%	0%	1%	0%	0%	0%	5%	2%	0%	0%	2%	0%
Turn Type	Split	NA	Perm	Perm	NA	Perm	D.P+P	NA	Perm	D.P+P	NA	Perm
Protected Phases	4	4			8		1	6		5	2	
Permitted Phases			4	8		8	2		6	6		2
Actuated Green, G (s)	20.0	20.0	20.0	11.0	11.0	11.0	82.4	77.8	77.8	82.4	63.7	63.7
Effective Green, g (s)	20.0	20.0	20.0	11.0	11.0	11.0	82.4	77.8	77.8	82.4	63.7	63.7
Actuated g/C Ratio	0.14	0.14	0.14	0.07	0.07	0.07	0.56	0.53	0.53	0.56	0.43	0.43
Clearance Time (s)	9.0	9.0	9.0	9.0	9.0	9.0	8.3	8.3	8.3	8.3	8.3	8.3
Vehicle Extension (s)	5.0	5.0	5.0	3.0	3.0	3.0	4.0	6.0	6.0	2.0	6.0	6.0
Lane Grp Cap (vph)	229	231	216	87	108	120	516	2673	848	109	2188	695
v/s Ratio Prot	c0.09	0.09					0.11	c0.38		0.01	0.34	
v/s Ratio Perm			0.01	c0.06	0.05	0.00	c0.36		0.01	0.18		0.10
v/c Ratio	0.69	0.68	0.09	0.78	0.67	0.01	0.84	0.72	0.02	0.34	0.79	0.24
Uniform Delay, d1	61.0	61.0	56.0	67.3	66.7	63.4	43.9	26.8	16.8	43.9	36.3	26.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.94	0.56	1.00	0.61	0.75	1.00
Incremental Delay, d2	10.7	10.3	0.4	35.5	14.5	0.0	8.5	1.2	0.0	0.5	2.4	0.7
Delay (s)	71.7	71.3	56.4	102.8	81.2	63.5	49.7	16.3	16.9	27.2	29.5	27.6
Level of Service	E	E	E	F	F	E	D	B	B	C	C	C
Approach Delay (s)		66.7			89.6			22.3			29.2	
Approach LOS		E			F			C			C	

Intersection Summary					
HCM 2000 Control Delay	31.2	HCM 2000 Level of Service	C		
HCM 2000 Volume to Capacity ratio	0.82				
Actuated Cycle Length (s)	148.0	Sum of lost time (s)	34.6		
Intersection Capacity Utilization	79.6%	ICU Level of Service	D		
Analysis Period (min)	15				
c Critical Lane Group					



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	11	19	35	2246	1981	26
Future Volume (vph)	11	19	35	2246	1981	26
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	0.913					0.850
Flt Protected	0.983		0.950			
Satd. Flow (prot)	1705	0	1736	3539	3505	1615
Flt Permitted	0.983		0.950			
Satd. Flow (perm)	1705	0	1736	3539	3505	1615
Adj. Flow (vph)	11	20	36	2340	2064	27
Lane Group Flow (vph)	31	0	36	2340	2064	27
Sign Control	Stop			Free	Free	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 72.1%		ICU Level of Service C	
Analysis Period (min) 15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	11	19	35	2246	1981	26
Future Volume (Veh/h)	11	19	35	2246	1981	26
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	11	20	36	2340	2064	27
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)					932	
pX, platoon unblocked	0.80	0.80	0.80			
vC, conflicting volume	3306	1032	2091			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	3381	549	1868			
tC, single (s)	6.8	6.9	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	95	86			
cM capacity (veh/h)	4	389	249			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	31	36	1170	1170	1032	1032	27
Volume Left	11	36	0	0	0	0	0
Volume Right	20	0	0	0	0	0	27
cSH	11	249	1700	1700	1700	1700	1700
Volume to Capacity	2.76	0.14	0.69	0.69	0.61	0.61	0.02
Queue Length 95th (ft)	122	12	0	0	0	0	0
Control Delay (s)	1464.6	21.8	0.0	0.0	0.0	0.0	0.0
Lane LOS	F	C					
Approach Delay (s)	1464.6	0.3			0.0		
Approach LOS	F						

Intersection Summary				
Average Delay		10.3		
Intersection Capacity Utilization		72.1%	ICU Level of Service	C
Analysis Period (min)		15		

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	23	0	2105	1898	41
Future Volume (vph)	0	23	0	2105	1898	41
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	1.00
Frt		0.865				0.850
Flt Protected						
Satd. Flow (prot)	0	1611	0	5085	5085	1583
Flt Permitted						
Satd. Flow (perm)	0	1611	0	5085	5085	1583
Adj. Flow (vph)	0	24	0	2216	1998	43
Lane Group Flow (vph)	0	24	0	2216	1998	43
Sign Control	Stop			Free	Free	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 46.7%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	23	0	2105	1898	41
Future Volume (Veh/h)	0	23	0	2105	1898	41
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	24	0	2216	1998	43
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				Raised	Raised	
Median storage veh)				2	2	
Upstream signal (ft)				844		
pX, platoon unblocked	0.71					
vC, conflicting volume	2737	666	2041			
vC1, stage 1 conf vol	1998					
vC2, stage 2 conf vol	739					
vCu, unblocked vol	2004	666	2041			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	94	100			
cM capacity (veh/h)	89	402	273			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	24	739	739	739	666	666	666	43
Volume Left	0	0	0	0	0	0	0	0
Volume Right	24	0	0	0	0	0	0	43
cSH	402	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.06	0.43	0.43	0.43	0.39	0.39	0.39	0.03
Queue Length 95th (ft)	5	0	0	0	0	0	0	0
Control Delay (s)	14.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B							
Approach Delay (s)	14.5	0.0			0.0			
Approach LOS	B							

Intersection Summary				
Average Delay		0.1		
Intersection Capacity Utilization	46.7%	ICU Level of Service		A
Analysis Period (min)	15			

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	58	0	2238	1826	49
Future Volume (vph)	0	58	0	2238	1826	49
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	1.00
Frt		0.865				0.850
Flt Protected						
Satd. Flow (prot)	0	1611	0	5085	5085	1583
Flt Permitted						
Satd. Flow (perm)	0	1611	0	5085	5085	1583
Adj. Flow (vph)	0	61	0	2356	1922	52
Lane Group Flow (vph)	0	61	0	2356	1922	52
Sign Control	Stop			Free	Free	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 46.6%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	58	0	2238	1826	49
Future Volume (Veh/h)	0	58	0	2238	1826	49
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	61	0	2356	1922	52
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				Raised	Raised	
Median storage veh)				2	2	
Upstream signal (ft)				1022	428	
pX, platoon unblocked	0.85	0.71	0.71			
vC, conflicting volume	2707	641	1974			
vC1, stage 1 conf vol	1922					
vC2, stage 2 conf vol	785					
vCu, unblocked vol	114	0	934			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	92	100			
cM capacity (veh/h)	742	768	516			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	61	785	785	785	641	641	641	52
Volume Left	0	0	0	0	0	0	0	0
Volume Right	61	0	0	0	0	0	0	52
cSH	768	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.08	0.46	0.46	0.46	0.38	0.38	0.38	0.03
Queue Length 95th (ft)	6	0	0	0	0	0	0	0
Control Delay (s)	10.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B							
Approach Delay (s)	10.1	0.0			0.0			
Approach LOS	B							

Intersection Summary				
Average Delay		0.1		
Intersection Capacity Utilization		46.6%	ICU Level of Service	A
Analysis Period (min)		15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	188	0	220	227	0	145	106	1943	208	231	1558	101
Future Volume (vph)	188	0	220	227	0	145	106	1943	208	231	1558	101
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frt		0.850			0.850				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1583	0	3433	1583	0	1770	5085	1583	1770	5085	1583
Flt Permitted	0.950			0.950			0.107			0.048		
Satd. Flow (perm)	1770	1583	0	3433	1583	0	199	5085	1583	89	5085	1583
Satd. Flow (RTOR)		135			134				217			106
Adj. Flow (vph)	198	0	232	239	0	153	112	2045	219	243	1640	106
Lane Group Flow (vph)	198	232	0	239	153	0	112	2045	219	243	1640	106
Turn Type	Prot	NA		Prot	NA		D.P+P	NA	Perm	D.P+P	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases							6		2	2		6
Total Split (s)	19.0	20.0		19.0	20.0		15.0	89.0	89.0	20.0	94.0	94.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Act Effct Green (s)	15.0	13.9		14.1	12.9		104.1	85.9	85.9	104.1	95.7	95.7
Actuated g/C Ratio	0.10	0.09		0.10	0.09		0.70	0.58	0.58	0.70	0.65	0.65
v/c Ratio	1.11	0.86		0.74	0.59		0.49	0.69	0.22	0.91	0.50	0.10
Control Delay	157.2	55.0		78.9	23.0		14.0	23.5	2.3	56.4	41.3	17.3
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	157.2	55.0		78.9	23.0		14.0	23.5	2.3	56.4	41.3	17.3
LOS	F	E		E	C		B	C	A	E	D	B
Approach Delay		102.1			57.1			21.1			41.8	
Approach LOS		F			E			C			D	

Intersection Summary			
Cycle Length: 148			
Actuated Cycle Length: 148			
Offset: 0 (0%), Referenced to phase 2:NBSB and 6:NBSB, Start of Yellow			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.11			
Intersection Signal Delay: 38.5		Intersection LOS: D	
Intersection Capacity Utilization 83.8%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 7: Benns Church Boulevard & Site Driveway #3



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	188	0	220	227	0	145	106	1943	208	231	1558	101
Future Volume (vph)	188	0	220	227	0	145	106	1943	208	231	1558	101
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		0.97	1.00		1.00	0.91	1.00	1.00	0.91	1.00
Frt	1.00	0.85		1.00	0.85		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1583		3433	1583		1770	5085	1583	1770	5085	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.11	1.00	1.00	0.05	1.00	1.00
Satd. Flow (perm)	1770	1583		3433	1583		200	5085	1583	89	5085	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	198	0	232	239	0	153	112	2045	219	243	1640	106
RTOR Reduction (vph)	0	122	0	0	122	0	0	0	91	0	0	38
Lane Group Flow (vph)	198	110	0	239	31	0	112	2045	128	243	1640	68
Turn Type	Prot	NA		Prot	NA		D.P+P	NA	Perm	D.P+P	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases							6		2	2		6
Actuated Green, G (s)	15.0	13.9		14.1	13.0		104.0	85.8	85.8	104.0	95.6	95.6
Effective Green, g (s)	15.0	13.9		14.1	13.0		104.0	85.8	85.8	104.0	95.6	95.6
Actuated g/C Ratio	0.10	0.09		0.10	0.09		0.70	0.58	0.58	0.70	0.65	0.65
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	179	148		327	139		229	2947	917	269	3284	1022
v/s Ratio Prot	c0.11	c0.07		0.07	0.02		0.03	0.40		c0.11	0.32	
v/s Ratio Perm							0.32		0.08	c0.52		0.04
v/c Ratio	1.11	0.74		0.73	0.22		0.49	0.69	0.14	0.90	0.50	0.07
Uniform Delay, d1	66.5	65.3		65.1	62.8		9.9	21.9	14.2	47.9	13.7	9.7
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	0.61	2.86	8.65
Incremental Delay, d2	98.6	18.0		8.2	0.8		1.6	1.4	0.3	23.2	0.4	0.1
Delay (s)	165.1	83.3		73.3	63.6		11.6	23.2	14.5	52.6	39.6	83.9
Level of Service	F	F		E	E		B	C	B	D	D	F
Approach Delay (s)		120.9			69.5			21.9			43.5	
Approach LOS		F			E			C			D	

Intersection Summary				
HCM 2000 Control Delay	42.0	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.91			
Actuated Cycle Length (s)	148.0	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	83.8%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	8	8	67	26	13	49
Future Volume (vph)	8	8	67	26	13	49
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.932				0.893	
Flt Protected				0.965	0.990	
Satd. Flow (prot)	1736	0	0	1798	1647	0
Flt Permitted				0.965	0.990	
Satd. Flow (perm)	1736	0	0	1798	1647	0
Adj. Flow (vph)	9	9	73	28	14	53
Lane Group Flow (vph)	18	0	0	101	67	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization	22.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	8	8	67	26	13	49
Future Volume (Veh/h)	8	8	67	26	13	49
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	9	9	73	28	14	53
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			18		188	14
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			18		188	14
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			95		98	95
cM capacity (veh/h)			1599		765	1067

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	18	101	67
Volume Left	0	73	14
Volume Right	9	0	53
cSH	1700	1599	985
Volume to Capacity	0.01	0.05	0.07
Queue Length 95th (ft)	0	4	5
Control Delay (s)	0.0	5.4	8.9
Lane LOS		A	A
Approach Delay (s)	0.0	5.4	8.9
Approach LOS			A

Intersection Summary				
Average Delay		6.2		
Intersection Capacity Utilization		22.2%	ICU Level of Service	A
Analysis Period (min)		15		

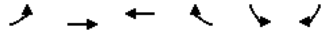
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	44	222	55	104	550	64	38	19	110	106	11	31
Future Volume (vph)	44	222	55	104	550	64	38	19	110	106	11	31
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.984				0.850		0.889	
Flt Protected		0.992		0.950				0.968		0.950		
Satd. Flow (prot)	0	1848	1583	1770	1833	0	0	1803	1583	1770	1656	0
Flt Permitted		0.992		0.950				0.968		0.950		
Satd. Flow (perm)	0	1848	1583	1770	1833	0	0	1803	1583	1770	1656	0
Adj. Flow (vph)	48	241	60	113	598	70	41	21	120	115	12	34
Lane Group Flow (vph)	0	289	60	113	668	0	0	62	120	115	46	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary												
Control Type: Unsignalized												
Intersection Capacity Utilization 69.5%					ICU Level of Service C							
Analysis Period (min) 15												

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	44	222	55	104	550	64	38	19	110	106	11	31
Future Volume (Veh/h)	44	222	55	104	550	64	38	19	110	106	11	31
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	48	241	60	113	598	70	41	21	120	115	12	34
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									8			
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					504							
pX, platoon unblocked	0.90						0.90	0.90		0.90	0.90	0.90
vC, conflicting volume	668			301			1201	1231	241	1266	1256	633
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	573			301			1167	1200	241	1240	1228	534
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	95			91			66	85	85	0	91	93
cM capacity (veh/h)	897			1260			119	143	798	92	138	490

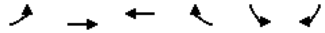
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2
Volume Total	289	60	113	668	182	115	46
Volume Left	48	0	113	0	41	115	0
Volume Right	0	60	0	70	120	0	34
cSH	897	1700	1260	1700	373	92	294
Volume to Capacity	0.05	0.04	0.09	0.39	0.49	1.25	0.16
Queue Length 95th (ft)	4	0	7	0	64	204	14
Control Delay (s)	2.0	0.0	8.1	0.0	26.4	257.8	19.5
Lane LOS	A		A		D	F	C
Approach Delay (s)	1.7		1.2		26.4	189.7	
Approach LOS					D	F	

Intersection Summary							
Average Delay			25.0				
Intersection Capacity Utilization			69.5%		ICU Level of Service		C
Analysis Period (min)			15				



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	39	16	0
Future Volume (vph)	0	0	0	39	16	0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.865			
Flt Protected					0.950	
Satd. Flow (prot)	0	1863	1611	0	1770	0
Flt Permitted					0.950	
Satd. Flow (perm)	0	1863	1611	0	1770	0
Adj. Flow (vph)	0	0	0	42	17	0
Lane Group Flow (vph)	0	0	42	0	17	0
Sign Control		Free	Free		Stop	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	0	39	16	0
Future Volume (Veh/h)	0	0	0	39	16	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	42	17	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	42				21	21
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	42				21	21
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				98	100
cM capacity (veh/h)	1567				996	1056

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	0	42	17
Volume Left	0	0	17
Volume Right	0	42	0
cSH	1700	1700	996
Volume to Capacity	0.00	0.02	0.02
Queue Length 95th (ft)	0	0	1
Control Delay (s)	0.0	0.0	8.7
Lane LOS			A
Approach Delay (s)	0.0	0.0	8.7
Approach LOS			A

Intersection Summary			
Average Delay	2.5		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	173	0	8	0	0	0	0	0	96	0	0
Future Volume (vph)	19	173	0	8	0	0	0	0	0	96	0	0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt												
Flt Protected		0.995			0.950						0.950	
Satd. Flow (prot)	0	1853	0	0	1770	0	0	1863	0	0	1770	0
Flt Permitted		0.995			0.950						0.950	
Satd. Flow (perm)	0	1853	0	0	1770	0	0	1863	0	0	1770	0
Adj. Flow (vph)	21	188	0	9	0	0	0	0	0	104	0	0
Lane Group Flow (vph)	0	209	0	0	9	0	0	0	0	0	104	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 21.7%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	19	173	0	8	0	0	0	0	0	96	0	0
Future Volume (Veh/h)	19	173	0	8	0	0	0	0	0	96	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	21	188	0	9	0	0	0	0	0	104	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					837							
pX, platoon unblocked												
vC, conflicting volume	0			188			248	248	188	248	248	0
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0			188			248	248	188	248	248	0
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			100	100	100	85	100	100
cM capacity (veh/h)	1623			1386			695	642	854	695	642	1085

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	209	9	0	104
Volume Left	21	9	0	104
Volume Right	0	0	0	0
cSH	1623	1386	1700	695
Volume to Capacity	0.01	0.01	0.00	0.15
Queue Length 95th (ft)	1	0	0	13
Control Delay (s)	0.8	7.6	0.0	11.1
Lane LOS	A	A	A	B
Approach Delay (s)	0.8	7.6	0.0	11.1
Approach LOS			A	B

Intersection Summary				
Average Delay			4.3	
Intersection Capacity Utilization		21.7%	ICU Level of Service	A
Analysis Period (min)			15	

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	39	1924	116	0	1698
Future Volume (vph)	0	39	1924	116	0	1698
Lane Util. Factor	1.00	1.00	0.91	1.00	1.00	0.91
Frt		0.865		0.850		
Flt Protected						
Satd. Flow (prot)	0	1611	5085	1583	0	5085
Flt Permitted						
Satd. Flow (perm)	0	1611	5085	1583	0	5085
Adj. Flow (vph)	0	42	2091	126	0	1846
Lane Group Flow (vph)	0	42	2091	126	0	1846
Sign Control	Stop		Free			Free

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 47.2%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	39	1924	116	0	1698
Future Volume (Veh/h)	0	39	1924	116	0	1698
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	42	2091	126	0	1846
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						315
pX, platoon unblocked	0.84					
vC, conflicting volume	2706	697			2217	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2357	697			2217	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	89			100	
cM capacity (veh/h)	25	383			232	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3
Volume Total	42	697	697	697	126	615	615	615
Volume Left	0	0	0	0	0	0	0	0
Volume Right	42	0	0	0	126	0	0	0
cSH	383	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.11	0.41	0.41	0.41	0.07	0.36	0.36	0.36
Queue Length 95th (ft)	9	0	0	0	0	0	0	0
Control Delay (s)	15.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	C							
Approach Delay (s)	15.5	0.0				0.0		
Approach LOS	C							

Intersection Summary				
Average Delay		0.2		
Intersection Capacity Utilization	47.2%	ICU Level of Service		A
Analysis Period (min)	15			

Intersection: 1: Benns Church Boulevard & Cypress Run Drive

Movement	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	LT	R	L	LT	R	L	T	T	TR	L	T	T
Maximum Queue (ft)	206	147	174	175	131	211	331	355	290	150	310	307
Average Queue (ft)	64	40	86	59	31	66	171	197	142	88	172	170
95th Queue (ft)	142	98	157	140	83	154	291	315	256	163	278	274
Link Distance (ft)	646		664	664			789	789	789		834	834
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)		180			150	255				150		
Storage Blk Time (%)	1	0		1	0	0	2			1	8	
Queuing Penalty (veh)	1	0		1	0	0	1			5	9	

Intersection: 1: Benns Church Boulevard & Cypress Run Drive

Movement	SB	SB	B28
Directions Served	T	R	T
Maximum Queue (ft)	355	225	3
Average Queue (ft)	200	26	0
95th Queue (ft)	319	121	3
Link Distance (ft)	834		807
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		245	
Storage Blk Time (%)	3	0	
Queuing Penalty (veh)	1	0	

Intersection: 2: Benns Church Boulevard & Tractor Supply Entrance

Movement	EB
Directions Served	R
Maximum Queue (ft)	93
Average Queue (ft)	33
95th Queue (ft)	67
Link Distance (ft)	458
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: Benns Church Boulevard & Turner Drive

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	NB	NB
Directions Served	L	LT	R	L	LT	R	L	L	T	T	T	R
Maximum Queue (ft)	384	305	294	56	43	19	321	325	433	304	237	138
Average Queue (ft)	247	218	182	17	10	2	286	307	355	136	116	23
95th Queue (ft)	385	330	305	45	32	12	400	382	526	250	205	94
Link Distance (ft)	373			446	446				355	355	355	
Upstream Blk Time (%)	3								54	0		
Queuing Penalty (veh)	30								257	0		
Storage Bay Dist (ft)		305	305			150	325	325				200
Storage Blk Time (%)	4	1	0				3	47	40		1	0
Queuing Penalty (veh)	31	3	1				8	143	197		1	0

Intersection: 3: Benns Church Boulevard & Turner Drive

Movement	SB	SB	SB	SB	SB
Directions Served	L	T	T	T	R
Maximum Queue (ft)	92	510	530	530	280
Average Queue (ft)	6	259	272	242	147
95th Queue (ft)	43	412	432	428	285
Link Distance (ft)		773	773	773	
Upstream Blk Time (%)		0	0	0	
Queuing Penalty (veh)		0	0	2	
Storage Bay Dist (ft)	140				280
Storage Blk Time (%)	0	20		3	1
Queuing Penalty (veh)	0	1		12	2

Intersection: 4: Benns Church Boulevard & Red Oak Drive

Movement	EB	NB	NB	NB
Directions Served	LR	L	T	T
Maximum Queue (ft)	192	108	311	264
Average Queue (ft)	68	14	54	45
95th Queue (ft)	176	58	333	297
Link Distance (ft)	950		1134	1134
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)		200		
Storage Blk Time (%)		0	6	
Queuing Penalty (veh)		0	1	

Intersection: 5: Benns Church Boulevard & Site Driveway #1

Movement	EB	SB	SB	SB
Directions Served	R	T	T	T
Maximum Queue (ft)	42	15	24	88
Average Queue (ft)	12	0	1	4
95th Queue (ft)	33	0	24	58
Link Distance (ft)	365	472	472	472
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				0
Queuing Penalty (veh)				0

Intersection: 6: Benns Church Boulevard & Site Driveway #2

Movement	EB	NB	NB	NB	SB	SB
Directions Served	R	T	T	T	T	T
Maximum Queue (ft)	78	949	939	532	12	6
Average Queue (ft)	34	554	294	41	0	0
95th Queue (ft)	62	1184	879	330	9	4
Link Distance (ft)	312	933	933	933	355	355
Upstream Blk Time (%)		15	0	0		
Queuing Penalty (veh)		74	2	0		
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 7: Benns Church Boulevard & Site Driveway #3

Movement	EB	EB	WB	WB	WB	NB	NB	NB	NB	NB	SB	SB
Directions Served	L	TR	L	L	TR	L	T	T	T	R	L	T
Maximum Queue (ft)	151	94	253	281	178	239	265	246	232	47	265	414
Average Queue (ft)	66	35	136	184	59	130	171	115	73	13	65	168
95th Queue (ft)	128	68	240	259	128	245	297	247	192	38	174	346
Link Distance (ft)		722			479		250	250	250			933
Upstream Blk Time (%)						0	15	2	0			
Queuing Penalty (veh)						0	61	7	1			
Storage Bay Dist (ft)	300		300	300		300				300	300	
Storage Blk Time (%)			0	0		0	15		0		0	1
Queuing Penalty (veh)			0	0		1	32		0		0	1

Intersection: 7: Benns Church Boulevard & Site Driveway #3

Movement	SB	SB	SB
Directions Served	T	T	R
Maximum Queue (ft)	441	376	139
Average Queue (ft)	187	132	34
95th Queue (ft)	385	305	97
Link Distance (ft)	933	933	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			300
Storage Blk Time (%)		0	0
Queuing Penalty (veh)		0	0

Intersection: 8: Site Driveway #4 & Tractor Supply Entrance

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	40	54
Average Queue (ft)	3	28
95th Queue (ft)	27	49
Link Distance (ft)	458	679
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 9: Site Driveway #5 & Turner Drive

Movement	EB	EB	WB	WB	NB	NB	SB	SB	B22
Directions Served	LT	R	L	TR	LT	R	L	TR	T
Maximum Queue (ft)	500	146	190	52	696	200	200	790	462
Average Queue (ft)	111	17	69	2	457	124	190	601	111
95th Queue (ft)	392	102	143	35	806	271	212	935	416
Link Distance (ft)	1402		373	373	959			712	679
Upstream Blk Time (%)					0			40	1
Queuing Penalty (veh)					0			34	1
Storage Bay Dist (ft)		200				200	200		
Storage Blk Time (%)	5	0			67	11	91	83	
Queuing Penalty (veh)	4	1			96	7	39	69	

Intersection: 10: Tractor Supply Entrance & Site Driveway #6

Movement	SB
Directions Served	LR
Maximum Queue (ft)	39
Average Queue (ft)	17
95th Queue (ft)	43
Link Distance (ft)	938
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 11: Site Driveway #3 & Site Driveway #5

Movement	SB
Directions Served	LTR
Maximum Queue (ft)	91
Average Queue (ft)	42
95th Queue (ft)	71
Link Distance (ft)	959
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 12: Benns Church Boulevard & Site Driveway #12

Movement	WB	NB	NB	NB	SB	SB
Directions Served	R	T	T	T	T	T
Maximum Queue (ft)	134	414	373	208	54	13
Average Queue (ft)	34	113	93	16	2	0
95th Queue (ft)	117	452	395	133	40	8
Link Distance (ft)	233	553	553	553	250	250
Upstream Blk Time (%)	3	6	0	0	0	
Queuing Penalty (veh)	0	30	2	0	0	
Storage Bay Dist (ft)						
Storage Blk Time (%)				0		
Queuing Penalty (veh)				0		

Intersection: 28: Bend

Movement	NB	NB
Directions Served	T	T
Maximum Queue (ft)	248	383
Average Queue (ft)	9	16
95th Queue (ft)	150	195
Link Distance (ft)	834	834
Upstream Blk Time (%)	0	0
Queuing Penalty (veh)	0	0
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 1173

Intersection: 1: Benns Church Boulevard & Cypress Run Drive

Movement	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	LT	R	L	LT	R	L	T	T	TR	L	T	T
Maximum Queue (ft)	405	180	126	123	110	255	805	841	801	149	494	468
Average Queue (ft)	188	111	56	40	43	253	678	617	480	115	328	308
95th Queue (ft)	370	215	105	92	89	269	914	878	790	180	446	428
Link Distance (ft)	646		664	664			789	789	789		834	834
Upstream Blk Time (%)							25	1	0			
Queuing Penalty (veh)							182	10	1			
Storage Bay Dist (ft)		180			150	255				150		
Storage Blk Time (%)	15	1		0	0	75	71			6	29	
Queuing Penalty (veh)	23	2		0	0	451	226			33	36	

Intersection: 1: Benns Church Boulevard & Cypress Run Drive

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	455	245
Average Queue (ft)	287	121
95th Queue (ft)	413	291
Link Distance (ft)	834	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		245
Storage Blk Time (%)	10	1
Queuing Penalty (veh)	18	3

Intersection: 2: Benns Church Boulevard & Tractor Supply Entrance

Movement	EB	NB	NB	NB	SB	SB	SB	SB
Directions Served	R	T	T	T	T	T	T	R
Maximum Queue (ft)	82	370	385	319	24	98	29	20
Average Queue (ft)	32	138	117	42	1	4	2	0
95th Queue (ft)	63	439	403	234	25	77	39	0
Link Distance (ft)	458	472	472	472	789	789	789	
Upstream Blk Time (%)		6	0	0				
Queuing Penalty (veh)		39	2	0				
Storage Bay Dist (ft)								200
Storage Blk Time (%)							0	0
Queuing Penalty (veh)							0	0

Intersection: 3: Benns Church Boulevard & Turner Drive

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	NB	NB
Directions Served	L	LT	R	L	LT	R	L	L	T	T	T	R
Maximum Queue (ft)	298	266	168	139	126	29	321	325	428	334	304	178
Average Queue (ft)	145	124	53	68	50	5	291	315	376	155	161	12
95th Queue (ft)	236	210	114	125	106	19	394	366	499	284	279	74
Link Distance (ft)	373			446	446				355	355	355	
Upstream Blk Time (%)	0								59	0	0	
Queuing Penalty (veh)	0								440	0	0	
Storage Bay Dist (ft)		305	305			150	325	325				200
Storage Blk Time (%)	0	0	0		0		3	51	39		3	0
Queuing Penalty (veh)	1	0	0		0		20	315	160		1	0

Intersection: 3: Benns Church Boulevard & Turner Drive

Movement	SB	SB	SB	SB	SB
Directions Served	L	T	T	T	R
Maximum Queue (ft)	133	486	491	474	260
Average Queue (ft)	38	265	277	244	84
95th Queue (ft)	104	531	540	523	218
Link Distance (ft)		773	773	773	
Upstream Blk Time (%)		1	1	1	
Queuing Penalty (veh)		7	7	6	
Storage Bay Dist (ft)	140				280
Storage Blk Time (%)	0	17		5	0
Queuing Penalty (veh)	0	6		14	1

Intersection: 4: Benns Church Boulevard & Red Oak Drive

Movement	EB	NB	NB	NB	SB	SB	SB
Directions Served	LR	L	T	T	T	T	R
Maximum Queue (ft)	402	156	785	778	55	67	2
Average Queue (ft)	206	40	177	169	2	2	0
95th Queue (ft)	438	128	797	779	56	62	2
Link Distance (ft)	950		1134	1134	553	553	553
Upstream Blk Time (%)			7	6	0	0	
Queuing Penalty (veh)			0	0	0	0	
Storage Bay Dist (ft)		200					
Storage Blk Time (%)		0	13				
Queuing Penalty (veh)		0	5				

Intersection: 5: Benns Church Boulevard & Site Driveway #1

Movement	EB	NB	NB	NB	SB	SB	SB	SB
Directions Served	R	T	T	T	T	T	T	R
Maximum Queue (ft)	45	189	125	91	100	104	99	59
Average Queue (ft)	12	32	25	14	14	15	15	3
95th Queue (ft)	35	191	161	118	124	127	123	41
Link Distance (ft)	365	773	773	773	472	472	472	
Upstream Blk Time (%)					0	0	0	
Queuing Penalty (veh)					1	1	1	
Storage Bay Dist (ft)								200
Storage Blk Time (%)							1	0
Queuing Penalty (veh)							0	0

Intersection: 6: Benns Church Boulevard & Site Driveway #2

Movement	EB	NB	NB	NB	SB
Directions Served	R	T	T	T	T
Maximum Queue (ft)	81	961	962	953	116
Average Queue (ft)	28	671	471	255	3
95th Queue (ft)	59	1256	1109	864	55
Link Distance (ft)	312	933	933	933	355
Upstream Blk Time (%)		18	1	0	0
Queuing Penalty (veh)		135	7	3	0
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 7: Benns Church Boulevard & Site Driveway #3

Movement	EB	EB	WB	WB	WB	NB	NB	NB	NB	NB	SB	SB
Directions Served	L	TR	L	L	TR	L	T	T	T	R	L	T
Maximum Queue (ft)	300	639	207	236	170	250	275	290	279	236	300	530
Average Queue (ft)	250	317	100	157	72	90	244	224	188	60	168	244
95th Queue (ft)	367	716	210	228	143	241	310	316	304	177	312	470
Link Distance (ft)		722			479		250	250	250			933
Upstream Blk Time (%)		1				0	30	10	4	0		
Queuing Penalty (veh)		2				0	201	66	27	0		
Storage Bay Dist (ft)	300		300	300		300				300	300	
Storage Blk Time (%)	39	21	0	0		0	30		4	0	1	3
Queuing Penalty (veh)	86	40	0	0		1	33		9	1	4	7

Intersection: 7: Benns Church Boulevard & Site Driveway #3

Movement	SB	SB	SB
Directions Served	T	T	R
Maximum Queue (ft)	581	478	202
Average Queue (ft)	271	191	32
95th Queue (ft)	517	410	118
Link Distance (ft)	933	933	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			300
Storage Blk Time (%)		0	0
Queuing Penalty (veh)		0	0

Intersection: 8: Site Driveway #4 & Tractor Supply Entrance

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	31	59
Average Queue (ft)	1	27
95th Queue (ft)	12	50
Link Distance (ft)	458	679
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 9: Site Driveway #5 & Turner Drive

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LT	L	LT	R	L	TR
Maximum Queue (ft)	82	68	68	79	127	55
Average Queue (ft)	19	19	26	26	50	20
95th Queue (ft)	57	51	54	55	99	43
Link Distance (ft)	1402	373	959			712
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)				200	200	
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 10: Tractor Supply Entrance & Site Driveway #6

Movement	SB
Directions Served	LR
Maximum Queue (ft)	33
Average Queue (ft)	14
95th Queue (ft)	40
Link Distance (ft)	938
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 11: Site Driveway #3 & Site Driveway #5

Movement	EB	WB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	21	18	75
Average Queue (ft)	1	1	35
95th Queue (ft)	21	10	60
Link Distance (ft)	228	722	959
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 12: Benns Church Boulevard & Site Driveway #12

Movement	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	R	T	T	T	R	T	T	T
Maximum Queue (ft)	198	562	552	523	100	94	162	54
Average Queue (ft)	73	227	195	105	6	4	12	2
95th Queue (ft)	212	596	566	392	60	55	100	34
Link Distance (ft)	233	553	553	553		250	250	250
Upstream Blk Time (%)	14	12	2	0		0	0	0
Queuing Penalty (veh)	0	86	16	3		0	1	0
Storage Bay Dist (ft)					200			
Storage Blk Time (%)				1	0			
Queuing Penalty (veh)				2	0			

Intersection: 28: Bend

Movement	NB	NB	NB
Directions Served	T	T	
Maximum Queue (ft)	677	703	144
Average Queue (ft)	56	54	5
95th Queue (ft)	378	369	105
Link Distance (ft)	834	834	834
Upstream Blk Time (%)	0	0	
Queuing Penalty (veh)	0	0	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 2747

MOVEMENT SUMMARY

Site: 101 [Turner Drive at Site Driveway #5 2025 AM (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Site Driveway #5														
3	L2	10	2.0	11	2.0	0.501	8.8	LOS A	3.4	86.5	0.51	0.35	0.51	33.3
8	T1	431	2.0	468	2.0	0.501	8.8	LOS A	3.4	86.5	0.51	0.35	0.51	33.2
18	R2	80	2.0	87	2.0	0.501	8.8	LOS A	3.4	86.5	0.51	0.35	0.51	32.3
Approach		521	2.0	566	2.0	0.501	8.8	LOS A	3.4	86.5	0.51	0.35	0.51	33.1
East: Turner Drive														
1	L2	20	2.0	22	2.0	0.075	4.9	LOS A	0.3	7.1	0.50	0.42	0.50	24.6
6	T1	10	2.0	11	2.0	0.075	4.9	LOS A	0.3	7.1	0.50	0.42	0.50	24.1
16	R2	142	2.0	154	2.0	0.075	1.0	LOS A	0.3	7.1	0.10	0.09	0.10	24.8
Approach		172	2.0	187	2.0	0.075	1.7	LOS A	0.3	7.1	0.17	0.14	0.17	24.7
North: Site Driveway #5														
7	L2	110	2.0	120	2.0	0.362	6.2	LOS A	2.2	57.0	0.21	0.08	0.21	34.0
4	T1	297	2.0	323	2.0	0.362	6.2	LOS A	2.2	57.0	0.21	0.08	0.21	33.9
14	R2	24	2.0	26	2.0	0.362	6.2	LOS A	2.2	57.0	0.21	0.08	0.21	32.9
Approach		431	2.0	468	2.0	0.362	6.2	LOS A	2.2	57.0	0.21	0.08	0.21	33.9
West: Turner Drive														
5	L2	45	2.0	49	2.0	0.074	5.0	LOS A	0.3	7.5	0.51	0.41	0.51	24.0
2	T1	4	2.0	4	2.0	0.074	5.0	LOS A	0.3	7.5	0.51	0.41	0.51	23.5
12	R2	8	2.0	9	2.0	0.074	5.0	LOS A	0.3	7.5	0.51	0.41	0.51	23.0
Approach		57	2.0	62	2.0	0.074	5.0	LOS A	0.3	7.5	0.51	0.41	0.51	23.8
All Vehicles		1181	2.0	1284	2.0	0.501	6.6	LOS A	3.4	86.5	0.35	0.22	0.35	31.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: 101 [Turner Drive at Site Driveway #5 2025 PM (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Site Driveway #5														
3	L2	16	2.0	17	2.0	0.204	5.0	LOS A	1.0	24.9	0.36	0.23	0.36	35.1
8	T1	142	2.0	154	2.0	0.204	5.0	LOS A	1.0	24.9	0.36	0.23	0.36	35.0
18	R2	54	2.0	59	2.0	0.204	5.0	LOS A	1.0	24.9	0.36	0.23	0.36	34.0
Approach		212	2.0	230	2.0	0.204	5.0	LOS A	1.0	24.9	0.36	0.23	0.36	34.7
East: Turner Drive														
1	L2	19	2.0	21	2.0	0.055	3.7	LOS A	0.2	5.4	0.34	0.21	0.34	24.9
6	T1	10	2.0	11	2.0	0.055	3.7	LOS A	0.2	5.4	0.34	0.21	0.34	24.4
16	R2	110	2.0	120	2.0	0.055	0.9	LOS A	0.2	5.4	0.08	0.05	0.08	24.8
Approach		139	2.0	151	2.0	0.055	1.5	LOS A	0.2	5.4	0.14	0.09	0.14	24.8
North: Site Driveway #5														
7	L2	84	2.0	91	2.0	0.412	6.8	LOS A	2.7	69.3	0.24	0.10	0.24	33.9
4	T1	364	2.0	396	2.0	0.412	6.8	LOS A	2.7	69.3	0.24	0.10	0.24	33.8
14	R2	39	2.0	42	2.0	0.412	6.8	LOS A	2.7	69.3	0.24	0.10	0.24	32.9
Approach		487	2.0	529	2.0	0.412	6.8	LOS A	2.7	69.3	0.24	0.10	0.24	33.7
West: Turner Drive														
5	L2	69	2.0	75	2.0	0.119	5.7	LOS A	0.5	12.3	0.54	0.48	0.54	23.8
2	T1	6	2.0	7	2.0	0.119	5.7	LOS A	0.5	12.3	0.54	0.48	0.54	23.4
12	R2	12	2.0	13	2.0	0.119	5.7	LOS A	0.5	12.3	0.54	0.48	0.54	22.8
Approach		87	2.0	95	2.0	0.119	5.7	LOS A	0.5	12.3	0.54	0.48	0.54	23.7
All Vehicles		925	2.0	1005	2.0	0.412	5.5	LOS A	2.7	69.3	0.28	0.16	0.28	31.0

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: 101 [Turner Drive at Site Driveway #5 2029 AM (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Site Driveway #5														
3	L2	30	2.0	33	2.0	0.865	25.5	LOS D	26.8	680.4	1.00	1.44	2.24	26.7
8	T1	668	2.0	726	2.0	0.865	25.5	LOS D	26.8	680.4	1.00	1.44	2.24	26.7
18	R2	113	2.0	123	2.0	0.865	25.5	LOS D	26.8	680.4	1.00	1.44	2.24	26.1
Approach		811	2.0	882	2.0	0.865	25.5	LOS D	26.8	680.4	1.00	1.44	2.24	26.6
East: Turner Drive														
1	L2	42	2.0	46	2.0	0.108	6.9	LOS A	0.4	9.8	0.61	0.61	0.61	23.7
6	T1	21	2.0	23	2.0	0.108	6.9	LOS A	0.4	9.8	0.61	0.61	0.61	23.3
16	R2	144	2.0	157	2.0	0.095	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	25.2
Approach		207	2.0	225	2.0	0.108	2.1	LOS A	0.4	9.8	0.18	0.18	0.18	24.7
North: Site Driveway #5														
7	L2	158	2.0	172	2.0	0.689	12.7	LOS B	7.1	181.0	0.57	0.33	0.57	31.1
4	T1	561	2.0	610	2.0	0.689	12.7	LOS B	7.1	181.0	0.57	0.33	0.57	31.0
14	R2	53	2.0	58	2.0	0.689	12.7	LOS B	7.1	181.0	0.57	0.33	0.57	30.2
Approach		772	2.0	839	2.0	0.689	12.7	LOS B	7.1	181.0	0.57	0.33	0.57	31.0
West: Turner Drive														
5	L2	83	2.0	90	2.0	0.239	9.5	LOS A	1.0	24.3	0.68	0.68	0.68	23.1
2	T1	10	2.0	11	2.0	0.239	9.5	LOS A	1.0	24.3	0.68	0.68	0.68	22.6
12	R2	33	2.0	36	2.0	0.239	9.5	LOS A	1.0	24.3	0.68	0.68	0.68	22.1
Approach		126	2.0	137	2.0	0.239	9.5	LOS A	1.0	24.3	0.68	0.68	0.68	22.8
All Vehicles		1916	2.0	2083	2.0	0.865	16.7	LOS C	26.8	680.4	0.72	0.81	1.24	27.6

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: 101 [Turner Drive at Site Driveway #5 2029 PM (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Site Driveway #5														
3	L2	44	2.0	48	2.0	0.266	6.0	LOS A	1.3	33.6	0.45	0.33	0.45	34.3
8	T1	145	2.0	158	2.0	0.266	6.0	LOS A	1.3	33.6	0.45	0.33	0.45	34.2
18	R2	69	2.0	75	2.0	0.266	6.0	LOS A	1.3	33.6	0.45	0.33	0.45	33.2
Approach		258	2.0	280	2.0	0.266	6.0	LOS A	1.3	33.6	0.45	0.33	0.45	33.9
East: Turner Drive														
1	L2	38	2.0	41	2.0	0.106	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	26.1
6	T1	19	2.0	21	2.0	0.106	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	25.6
16	R2	110	2.0	120	2.0	0.106	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	24.9
Approach		167	2.0	182	2.0	0.106	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	25.3
North: Site Driveway #5														
7	L2	104	2.0	113	2.0	0.553	9.4	LOS A	4.3	110.1	0.45	0.26	0.45	32.6
4	T1	446	2.0	485	2.0	0.553	9.4	LOS A	4.3	110.1	0.45	0.26	0.45	32.6
14	R2	64	2.0	70	2.0	0.553	9.4	LOS A	4.3	110.1	0.45	0.26	0.45	31.7
Approach		614	2.0	667	2.0	0.553	9.4	LOS A	4.3	110.1	0.45	0.26	0.45	32.5
West: Turner Drive														
5	L2	106	2.0	115	2.0	0.231	7.9	LOS A	1.0	24.7	0.63	0.63	0.63	23.4
2	T1	11	2.0	12	2.0	0.231	7.9	LOS A	1.0	24.7	0.63	0.63	0.63	23.0
12	R2	31	2.0	34	2.0	0.231	7.9	LOS A	1.0	24.7	0.63	0.63	0.63	22.4
Approach		148	2.0	161	2.0	0.231	7.9	LOS A	1.0	24.7	0.63	0.63	0.63	23.1
All Vehicles		1187	2.0	1290	2.0	0.553	7.1	LOS A	4.3	110.1	0.41	0.29	0.41	30.0

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: 101 [Turner Drive at Site Driveway #5 2045 AM (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Site Driveway #5														
3	L2	30	2.0	33	2.0	0.951	37.6	LOS E	42.1	1068.8	1.00	1.78	2.96	23.4
8	T1	777	2.0	845	2.0	0.951	37.6	LOS E	42.1	1068.8	1.00	1.78	2.96	23.4
18	R2	84	2.0	91	2.0	0.951	37.6	LOS E	42.1	1068.8	1.00	1.78	2.96	22.9
Approach		891	2.0	968	2.0	0.951	37.6	LOS E	42.1	1068.8	1.00	1.78	2.96	23.3
East: Turner Drive														
1	L2	42	2.0	46	2.0	0.121	7.8	LOS A	0.4	10.8	0.63	0.63	0.63	23.5
6	T1	21	2.0	23	2.0	0.121	7.8	LOS A	0.4	10.8	0.63	0.63	0.63	23.1
16	R2	144	2.0	157	2.0	0.095	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	25.2
Approach		207	2.0	225	2.0	0.121	2.4	LOS A	0.4	10.8	0.19	0.19	0.19	24.6
North: Site Driveway #5														
7	L2	158	2.0	172	2.0	0.786	16.8	LOS C	10.4	264.4	0.73	0.43	0.73	29.5
4	T1	670	2.0	728	2.0	0.786	16.8	LOS C	10.4	264.4	0.73	0.43	0.73	29.5
14	R2	53	2.0	58	2.0	0.786	16.8	LOS C	10.4	264.4	0.73	0.43	0.73	28.7
Approach		881	2.0	958	2.0	0.786	16.8	LOS C	10.4	264.4	0.73	0.43	0.73	29.4
West: Turner Drive														
5	L2	83	2.0	90	2.0	0.271	11.1	LOS B	1.1	27.1	0.71	0.71	0.71	22.7
2	T1	10	2.0	11	2.0	0.271	11.1	LOS B	1.1	27.1	0.71	0.71	0.71	22.3
12	R2	33	2.0	36	2.0	0.271	11.1	LOS B	1.1	27.1	0.71	0.71	0.71	21.8
Approach		126	2.0	137	2.0	0.271	11.1	LOS B	1.1	27.1	0.71	0.71	0.71	22.4
All Vehicles		2105	2.0	2288	2.0	0.951	23.8	LOS C	42.1	1068.8	0.79	0.99	1.62	25.6

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: 101 [Turner Drive at Site Driveway #5 2045 PM (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Site Driveway #5														
3	L2	44	2.0	48	2.0	0.331	6.8	LOS A	1.8	44.6	0.48	0.36	0.48	34.0
8	T1	222	2.0	241	2.0	0.331	6.8	LOS A	1.8	44.6	0.48	0.36	0.48	33.9
18	R2	55	2.0	60	2.0	0.331	6.8	LOS A	1.8	44.6	0.48	0.36	0.48	33.0
Approach		321	2.0	349	2.0	0.331	6.8	LOS A	1.8	44.6	0.48	0.36	0.48	33.8
East: Turner Drive														
1	L2	38	2.0	41	2.0	0.070	4.4	LOS A	0.3	6.7	0.44	0.34	0.44	24.4
6	T1	19	2.0	21	2.0	0.070	4.4	LOS A	0.3	6.7	0.44	0.34	0.44	23.9
16	R2	110	2.0	120	2.0	0.070	0.2	LOS A	0.3	6.7	0.02	0.01	0.02	25.1
Approach		167	2.0	182	2.0	0.070	1.6	LOS A	0.3	6.7	0.16	0.12	0.16	24.8
North: Site Driveway #5														
7	L2	104	2.0	113	2.0	0.647	11.5	LOS B	6.0	153.0	0.54	0.32	0.54	31.7
4	T1	550	2.0	598	2.0	0.647	11.5	LOS B	6.0	153.0	0.54	0.32	0.54	31.7
14	R2	64	2.0	70	2.0	0.647	11.5	LOS B	6.0	153.0	0.54	0.32	0.54	30.8
Approach		718	2.0	780	2.0	0.647	11.5	LOS B	6.0	153.0	0.54	0.32	0.54	31.6
West: Turner Drive														
5	L2	106	2.0	115	2.0	0.260	9.2	LOS A	1.1	27.3	0.67	0.67	0.67	23.1
2	T1	11	2.0	12	2.0	0.260	9.2	LOS A	1.1	27.3	0.67	0.67	0.67	22.7
12	R2	31	2.0	34	2.0	0.260	9.2	LOS A	1.1	27.3	0.67	0.67	0.67	22.2
Approach		148	2.0	161	2.0	0.260	9.2	LOS A	1.1	27.3	0.67	0.67	0.67	22.9
All Vehicles		1354	2.0	1472	2.0	0.647	8.9	LOS A	6.0	153.0	0.49	0.34	0.49	29.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Appendix D
Queuing Results Summary Table

2022 Existing Queueing Summary

ID	Intersection	Maximum Queue per Movement (ft)											
		Eastbound			Westbound			Northbound			Southbound		
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
AM Peak Hour													
1	**Effective Storage Length**		**660**	**180**		**680**		**255**	**800**	**800**	**150**	**1,705**	**245**
	Benns Church Boulevard at Cypress Run		70	65		35		75	140	160	25	195	55
2	**Effective Storage Length**		**-**	**695**		**-**			**1,320**			**800**	**-**
	Benns Church Boulevard at Tractor Supply		-	30		-		-	-	-	-	-	-
3	**Effective Storage Length**		**1,970**	**305**		**475**		**130**	**2,310**	**2,310**	**140**	**1,320**	**280**
	Benns Church Boulevard at Turner Drive		325	265		35		130	370	280	65	315	240
4	**Effective Storage Length**	**950**	**-**	**950**		**-**		**200**	**Cont.**	**-**		**-**	**140**
	Benns Church Boulevard at Red Oak Drive	50	-	50		**-**		35	-	**-**		-	-
PM Peak Hour													
1	**Effective Storage Length**		**660**	**180**		**680**		**255**	**800**	**800**	**150**	**1,705**	**245**
	Benns Church Boulevard at Cypress Run		180	135		30		215	180	185	60	310	210
2	**Effective Storage Length**		**-**	**695**		**-**			**1,320**			**800**	**-**
	Benns Church Boulevard at Tractor Supply		-	35		-		-	-	-	-	-	-
3	**Effective Storage Length**		**1,970**	**305**		**475**		**130**	**2,310**	**2,310**	**140**	**1,320**	**280**
	Benns Church Boulevard at Turner Drive		215	110		40		130	335	300	105	260	130
4	**Effective Storage Length**	**950**	**-**	**950**		**-**		**200**	**Cont.**	**-**		**-**	**140**
	Benns Church Boulevard at Red Oak Drive	50	-	50		**-**		55	-	**-**		-	-

2025 No Build Queueing Summary

ID	Intersection	Level of Service per Movement by Approach (Delay in sec/veh)											
		Eastbound			Westbound			Northbound			Southbound		
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
AM Peak Hour													
1	**Effective Storage Length**		**660**	**180**		**680**		**255**	**800**	**800**	**150**	**1,705**	**245**
	Benns Church Boulevard at Cypress Run		80	65		45		75	120	135	25	160	45
2	**Effective Storage Length**		**-**	**695**		**-**							**-**
	Benns Church Boulevard at Tractor Supply		-	30		-		-	-	-	-	-	-
3	**Effective Storage Length**		**1,970**	**305**		**475**		**130**	**2,310**	**2,310**	**140**	**1,320**	**280**
	Benns Church Boulevard at Turner Drive		325	265		35		130	295	215	65	280	205
4	**Effective Storage Length**	**950**	**-**	**950**		**-**		**200**	**Cont.**	**-**		**-**	**140**
	Benns Church Boulevard at Red Oak Drive	55	-	55		**-**		35	-	**-**		-	-
PM Peak Hour													
1	**Effective Storage Length**		**660**	**180**		**680**		**255**	**800**	**800**	**150**	**1,705**	**245**
	Benns Church Boulevard at Cypress Run		165	120		25		215	190	195	50	300	195
2	**Effective Storage Length**		**-**	**695**		**-**							**-**
	Benns Church Boulevard at Tractor Supply		-	35		-		-	-	-	-	-	-
3	**Effective Storage Length**		**1,970**	**305**		**475**		**130**	**2,310**	**2,310**	**140**	**1,320**	**280**
	Benns Church Boulevard at Turner Drive		195	110		45		130	365	330	135	240	90
4	**Effective Storage Length**	**950**	**-**	**950**		**-**		**200**	**Cont.**	**-**		**-**	**140**
	Benns Church Boulevard at Red Oak Drive	60	-	60		**-**		55	-	**-**		-	5

2025 Build Queueing Summary

ID	Intersection	Maximum Queue per Movement (ft)											
		Eastbound			Westbound			Northbound			Southbound		
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
AM Peak Hour													
1	**Effective Storage Length**		**660**	**180**		**680**		**255**	**800**	**800**	**150**	**1,705**	**245**
	Benns Church Boulevard at Cypress Run Drive		65	55		25		80	100	120	20	175	35
2	**Effective Storage Length**		**-**	**695**		**-**			**535**			**870**	**200**
	Benns Church Boulevard at Tractor Supply Entrance		-	30		-		-	-	-	25	-	-
3	**Effective Storage Length**	**385**	**305**	**305**		**475**		**130**	**260**	**260**	**140**	**780**	**280**
	Benns Church Boulevard at Turner Drive	320	285	255		30		130	245	200	85	405	280
4	**Effective Storage Length**	**950**	**-**	**950**		**-**		**200**	**Cont.**	**-**		**615**	**140**
	Benns Church Boulevard at Red Oak Drive	55	-	55		**-**		35	-	**-**		-	-
5	**Effective Storage Length**		**-**	**380**		**-**			**850**			**535**	
	Benns Church Boulevard at Site Driveway #1		-	25		**-**			-		-	-	-
6	**Effective Storage Length**		**-**	**325**		**-**			**1,039**			**340**	**-**
	Benns Church Boulevard at Site Driveway #2		-	90		-		-	40	-	-	-	-
7	**Effective Storage Length**		**-**	**750**		**-**		**200**	**315**			**1,110**	
	Benns Church Boulevard at Site Driveway #3		-	55		-		125	25			25	40
8	**Effective Storage Length**							**735**		**735**			
	Tractor Supply Entrance at Red Site Driveway #4							35		35			
9	**Effective Storage Length**		**1,450**			**505**			**1,050**			**785**	
	Turner Drive at Site Driveway #5		25			25			90			60	
10	**Effective Storage Length**										**940**		**940**
	Tractor Supply Entrance at Site Driveway #6										35		35
11	**Effective Storage Length**					**750**					**1,050**		**1,050**
	Site Driveway #3 at Site Driveway #5					25					45		45
PM Peak Hour													
1	**Effective Storage Length**		**660**	**180**		**680**		**255**	**800**	**800**	**150**	**1,705**	**245**
	Benns Church Boulevard at Cypress Run Drive		200	140		30		230	215	215	35	385	230
2	**Effective Storage Length**		**-**	**695**		**-**			**535**			**870**	**200**
	Benns Church Boulevard at Tractor Supply Entrance		-	40		-		-	-	-	-	-	25
3	**Effective Storage Length**	**385**	**305**	**305**		**475**		**130**	**260**	**260**	**140**	**780**	**280**
	Benns Church Boulevard at Turner Drive	240	210	85		40		130	290	280	135	425	280
4	**Effective Storage Length**	**950**	**-**	**950**		**-**		**200**	**Cont.**	**-**		**615**	**140**
	Benns Church Boulevard at Red Oak Drive	65	-	65		**-**		55	-	**-**		-	-
5	**Effective Storage Length**		**-**	**380**		**-**			**850**			**535**	
	Benns Church Boulevard at Site Driveway #1		-	45		**-**			-		-	-	-
6	**Effective Storage Length**		**-**	**325**		**-**			**1,039**			**340**	**-**
	Benns Church Boulevard at Site Driveway #2		-	70		-		-	290	-	-	-	-
7	**Effective Storage Length**		**-**	**750**		**-**		**200**	**315**			**1,110**	
	Benns Church Boulevard at Site Driveway #3		-	145		-		50					
8	**Effective Storage Length**							**735**		**735**			
	Tractor Supply Entrance at Red Site Driveway #4							40		40			
9	**Effective Storage Length**		**1,450**			**505**			**1,050**			**785**	
	Turner Drive at Site Driveway #5		25			25			25			70	
10	**Effective Storage Length**										**940**		**940**
	Tractor Supply Entrance at Site Driveway #6												
11	**Effective Storage Length**					**750**					**1,050**		**1,050**
	Site Driveway #3 at Site Driveway #5					25					35		35

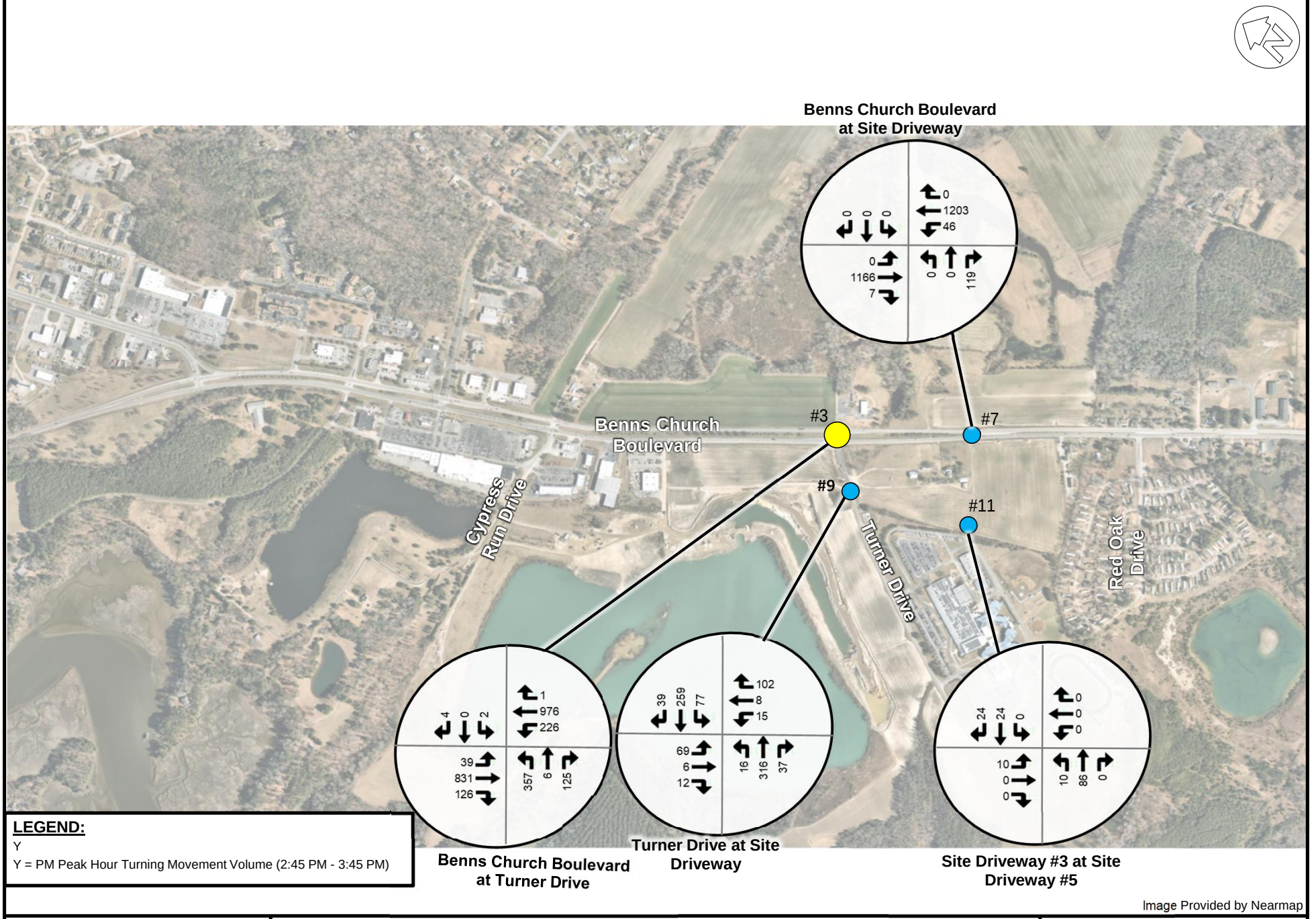
2029 Build Queueing Summary

ID	Intersection	Maximum Queue per Movement (ft)											
		Eastbound			Westbound			Northbound			Southbound		
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
AM Peak Hour													
1	**Effective Storage Length**		**660**	**180**		**680**		**255**	**800**	**800**	**150**	**1,705**	**245**
	Benns Church Boulevard at Cypress Run Drive		190	170		255		245	390	390	150	505	245
2	**Effective Storage Length**	**-**		**695**	**-**				**535**			**870**	**200**
	Benns Church Boulevard at Tractor Supply Entrance	-		110	-			-	-	-	-	105	25
3	**Effective Storage Length**	**385**	**305**	**305**	**475**			**325**	**260**	**260**	**140**	**780**	**280**
	Benns Church Boulevard at Turner Drive	390	305	290	50			385	255	130	30	665	280
4	**Effective Storage Length**	**950**	**-**	**950**	**-**			**200**	**Cont.**	**-**		**615**	**140**
	Benns Church Boulevard at Red Oak Drive	150	-	150	**-**			35	-	**-**		-	-
5	**Effective Storage Length**	**-**		**380**	**-**				**850**			**535**	
	Benns Church Boulevard at Site Driveway #1	-		40	**-**				-		-	130	25
6	**Effective Storage Length**	**-**		**325**	**-**				**1,039**			**340**	**-**
	Benns Church Boulevard at Site Driveway #2	-		125	-			-	390	-	-	-	-
7	**Effective Storage Length**	**300**	**840**		**300**	**550**		**300**	**315**	**300**	**300**	**1,025**	**300**
	Benns Church Boulevard at Site Driveway #3	155	160		275	130		210	260	80	285	485	300
8	**Effective Storage Length**					**470**		**735**		**735**			
	Tractor Supply Entrance at Site Driveway #4					30		50		50			
9	**Effective Storage Length**		**1,450**			**505**			**1,050**			**785**	
	Turner Drive at Site Driveway #5		25			25			680			185	
10	**Effective Storage Length**										**940**		**940**
	Tractor Supply Entrance at Site Driveway #6										45		45
11	**Effective Storage Length**										**1,050**		**1,050**
	Site Driveway #3 at Site Driveway #5										95		95
12	**Effective Storage Length**					**310**			**620**	**200**	**-**	**315**	**-**
						60			55	-	-	-	-
PM Peak Hour													
1	**Effective Storage Length**		**660**	**180**		**680**		**255**	**800**	**800**	**150**	**1,705**	**245**
	Benns Church Boulevard at Cypress Run Drive		285	180		265		255	805	825	150	765	245
2	**Effective Storage Length**	**-**		**695**	**-**				**535**			**870**	**200**
	Benns Church Boulevard at Tractor Supply Entrance	-		110	-			-	255	-	-	90	25
3	**Effective Storage Length**	**385**	**305**	**305**	**475**			**325**	**260**	**260**	**140**	**780**	**280**
	Benns Church Boulevard at Turner Drive	215	200	155	145			375	355	130	135	770	280
4	**Effective Storage Length**	**950**	**-**	**950**	**-**			**200**	**Cont.**	**-**		**615**	**140**
	Benns Church Boulevard at Red Oak Drive	395	-	395	**-**			70	25	**-**		35	-
5	**Effective Storage Length**	**-**		**380**	**-**				**850**			**535**	**200**
	Benns Church Boulevard at Site Driveway #1	-		55	**-**				160		-	290	80
6	**Effective Storage Length**	**-**		**325**	**-**				**1,039**			**340**	**-**
	Benns Church Boulevard at Site Driveway #2	-		90	-			-	370	-	-	-	-
7	**Effective Storage Length**	**300**	**840**		**300**	**550**		**300**	**315**	**300**	**300**	**1,025**	**300**
	Benns Church Boulevard at Site Driveway #3	295	650		250	200		230	305	250	300	550	300
8	**Effective Storage Length**					**470**		**735**		**735**			
	Tractor Supply Entrance at Red Site Driveway #4					25		60		60			
9	**Effective Storage Length**		**1,450**			**505**			**1,050**			**785**	
	Turner Drive at Site Driveway #5		25			-			35			110	
10	**Effective Storage Length**										**940**		**940**
	Tractor Supply Entrance at Site Driveway #6										35		35
11	**Effective Storage Length**		**230**			**740**					**1,050**		**1,050**
	Site Driveway #3 at Site Driveway #5		35			25					90		90
12	**Effective Storage Length**					**310**			**620**	**200**	**-**	**315**	**-**
						215			400	200	-	-	-

2045 Build Queueing Summary

ID	Intersection	Maximum Queue per Movement (ft)											
		Eastbound			Westbound			Northbound			Southbound		
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
AM Peak Hour													
1	**Effective Storage Length**		**660**	**180**	**680**	**680**	**150**	**255**	**800**	**800**	**150**	**1,705**	**245**
	Benns Church Boulevard at Cypress Run Drive		210	150	175	175	135	215	355	290	150	355	225
2	**Effective Storage Length**	**-**		**695**		**-**			**535**			**870**	**200**
	Benns Church Boulevard at Tractor Supply Entrance	-		95		-		-	-	-	-	-	-
3	**Effective Storage Length**	**385**	**305**	**305**	**450**	**450**	**150**	**325**	**260**	**260**	**140**	**780**	**280**
	Benns Church Boulevard at Turner Drive	385	305	295	60	45	25	325	435	140	95	530	280
4	**Effective Storage Length**	**950**	**-**	**950**	**-**			**200**	**Cont.**	**-**		**615**	**140**
	Benns Church Boulevard at Red Oak Drive	195	-	195	**-**			110	315	**-**		75	-
5	**Effective Storage Length**	**-**		**380**	**-**				**850**			**535**	
	Benns Church Boulevard at Site Driveway #1	-		45	**-**				-		-	90	-
6	**Effective Storage Length**	**-**		**325**	**-**				**1,039**			**340**	**-**
	Benns Church Boulevard at Site Driveway #2	-		80	-			-	950	-	-	25	-
7	**Effective Storage Length**	**300**	**840**		**300**	**550**		**300**	**315**	**300**	**300**	**1,025**	**300**
	Benns Church Boulevard at Site Driveway #3	155	95		285	180		240	265	50	265	445	140
8	**Effective Storage Length**			**150**		**470**		**735**		**735**			
	Tractor Supply Entrance at Site Driveway #4			-		40		55		55			
9	**Effective Storage Length**		**1,450**			**505**			**1,050**			**785**	
	Turner Drive at Site Driveway #5		30			25			1,070			265	
10	**Effective Storage Length**										**940**		**940**
	Tractor Supply Entrance at Site Driveway #6										40		40
11	**Effective Storage Length**										**1,050**		**1,050**
	Site Driveway #3 at Site Driveway #5										95		95
12	**Effective Storage Length**						**310**		**620**	**200**	**-**	**315**	**-**
							135		415	-	-	55	-
PM Peak Hour													
1	**Effective Storage Length**		**660**	**180**	**680**	**680**	**150**	**255**	**800**	**800**	**150**	**1,705**	**245**
	Benns Church Boulevard at Cypress Run Drive		405	180	130	125	110	255	845	805	150	495	245
2	**Effective Storage Length**	**-**		**695**		**-**			**535**			**870**	**200**
	Benns Church Boulevard at Tractor Supply Entrance	-		85		-		-	385	-	-	100	-
3	**Effective Storage Length**	**385**	**305**	**305**	**450**	**450**	**150**	**325**	**260**	**260**	**140**	**780**	**280**
	Benns Church Boulevard at Turner Drive	300	270	170	140	130	30	325	430	180	135	495	260
4	**Effective Storage Length**	**950**	**-**	**950**	**-**			**200**	**Cont.**	**-**		**615**	**140**
	Benns Church Boulevard at Red Oak Drive	405	-	405	**-**			160	785	**-**		70	-
5	**Effective Storage Length**	**-**		**380**	**-**				**850**			**535**	
	Benns Church Boulevard at Site Driveway #1	-		45	**-**				190		-	105	-
6	**Effective Storage Length**	**-**		**325**	**-**				**1,039**			**340**	**-**
	Benns Church Boulevard at Site Driveway #2	-		85	-			-	965	-	-	120	-
7	**Effective Storage Length**	**300**	**840**		**300**	**550**		**300**	**315**	**300**	**300**	**1,025**	**300**
	Benns Church Boulevard at Site Driveway #3	300	640		240	170		250	290	240	300	585	205
8	**Effective Storage Length**					**470**		**735**		**735**			
	Tractor Supply Entrance at Site Driveway #4					35		60		60			
9	**Effective Storage Length**		**1,450**			**505**			**1,050**			**785**	
	Turner Drive at Site Driveway #5		30			25			45			155	
10	**Effective Storage Length**										**940**		**940**
	Tractor Supply Entrance at Site Driveway #6										35		35
11	**Effective Storage Length**										**1,050**		**1,050**
	Site Driveway #3 at Site Driveway #5										75		75
12	**Effective Storage Length**						**310**		**620**	**200**	**-**	**315**	**-**
							200		565	100	-	165	-

Appendix E
Supplemental 2025 PM Build Analysis Outputs



Kimley»Horn

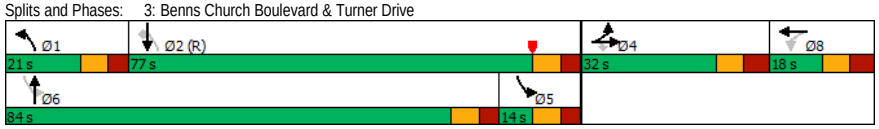
2025 PM Build Supplemental Analysis Volumes

Appendix E

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	357	6	125	2	0	4	226	976	1	39	831	126
Future Volume (vph)	357	6	125	2	0	4	226	976	1	39	831	126
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt			0.850		0.910							0.850
Flt Protected	0.950	0.954			0.984		0.950			0.950		
Satd. Flow (prot)	1649	1658	1568	0	1701	0	1719	3539	0	1805	3471	1599
Flt Permitted	0.950	0.954					0.241			0.203		
Satd. Flow (perm)	1649	1658	1568	0	1729	0	436	3539	0	386	3471	1599
Satd. Flow (RTOR)			228		228							172
Adj. Flow (vph)	392	7	137	2	0	4	248	1073	1	43	913	138
Lane Group Flow (vph)	200	199	137	0	6	0	248	1074	0	43	913	138
Turn Type	Split	NA	Perm	Perm	NA		D.P+P	NA		D.P+P	NA	Perm
Protected Phases	4	4			8		1	6		5	2	
Permitted Phases			4	8			2			6		2
Total Split (s)	32.0	32.0	32.0	18.0	18.0		21.0	84.0		14.0	77.0	77.0
Total Lost Time (s)	9.0	9.0	9.0		9.0		8.3	8.3		8.3	8.3	8.3
Act Effct Green (s)	22.0	22.0	22.0		7.0		97.2	94.3		98.9	84.0	84.0
Actuated g/C Ratio	0.15	0.15	0.15		0.05		0.66	0.64		0.67	0.57	0.57
v/c Ratio	0.82	0.81	0.32		0.02		0.62	0.48		0.14	0.46	0.14
Control Delay	86.3	85.3	2.0		0.2		15.9	16.4		10.3	21.0	1.6
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	86.3	85.3	2.0		0.2		15.9	16.4		10.3	21.0	1.6
LOS	F	F	A		A		B	B		B	C	A
Approach Delay		64.4			0.2			16.3			18.1	
Approach LOS		E			A			B			B	

Intersection Summary			
Cycle Length: 148			
Actuated Cycle Length: 148			
Offset: 38 (26%), Referenced to phase 2:NBSB, Start of Yellow			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.82			
Intersection Signal Delay: 25.7		Intersection LOS: C	
Intersection Capacity Utilization 73.5%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 3: Benns Church Boulevard & Turner Drive



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	357	6	125	2	0	4	226	976	1	39	831	126
Future Volume (vph)	357	6	125	2	0	4	226	976	1	39	831	126
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	9.0	9.0	9.0		9.0		8.3	8.3		8.3	8.3	8.3
Lane Util. Factor	0.95	0.95	1.00		1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85		0.91		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	0.95	1.00		0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1649	1658	1568		1701		1719	3539		1805	3471	1599
Flt Permitted	0.95	0.95	1.00		1.00		0.24	1.00		0.20	1.00	1.00
Satd. Flow (perm)	1649	1658	1568		1729		436	3539		385	3471	1599
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	392	7	137	2	0	4	248	1073	1	43	913	138
RTOR Reduction (vph)	0	0	117	0	6	0	0	0	0	0	0	66
Lane Group Flow (vph)	200	199	20	0	0	0	248	1074	0	43	913	72
Heavy Vehicles (%)	4%	0%	3%	0%	0%	0%	5%	2%	0%	0%	4%	1%
Turn Type	Split	NA	Perm	Perm	NA		D.P+P	NA		D.P+P	NA	Perm
Protected Phases	4	4			8		1	6		5	2	
Permitted Phases			4	8			2			6		2
Actuated Green, G (s)	22.0	22.0	22.0		1.4		90.0	85.4		90.0	76.8	76.8
Effective Green, g (s)	22.0	22.0	22.0		1.4		90.0	85.4		90.0	76.8	76.8
Actuated g/C Ratio	0.15	0.15	0.15		0.01		0.61	0.58		0.61	0.52	0.52
Clearance Time (s)	9.0	9.0	9.0		9.0		8.3	8.3		8.3	8.3	8.3
Vehicle Extension (s)	5.0	5.0	5.0		3.0		4.0	6.0		2.0	6.0	6.0
Lane Grp Cap (vph)	245	246	233		16		379	2042		278	1801	829
v/s Ratio Prot	c0.12	0.12					0.06	c0.30		0.00	0.26	
v/s Ratio Perm			0.01		c0.00		c0.34			0.09		0.04
v/c Ratio	0.82	0.81	0.09		0.00		0.65	0.53		0.15	0.51	0.09
Uniform Delay, d1	61.0	61.0	54.3		72.6		15.2	19.0		22.7	23.2	17.9
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	20.7	19.7	0.3		0.1		4.5	1.0		0.1	1.0	0.2
Delay (s)	81.7	80.6	54.7		72.7		19.6	20.0		22.8	24.3	18.1
Level of Service	F	F	D		E		B	B		C	C	B
Approach Delay (s)		74.4			72.7			19.9			23.4	
Approach LOS		E			E			B			C	

Intersection Summary					
HCM 2000 Control Delay		31.2	HCM 2000 Level of Service		C
HCM 2000 Volume to Capacity ratio		0.69			
Actuated Cycle Length (s)		148.0	Sum of lost time (s)		34.6
Intersection Capacity Utilization		73.5%	ICU Level of Service		D
Analysis Period (min)		15			
c Critical Lane Group					

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	119	0	0	0	46	1203	0	0	1166	7
Future Volume (vph)	0	0	119	0	0	0	46	1203	0	0	1166	7
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Frt			0.865								0.999	
Flt Protected								0.998				
Satd. Flow (prot)	0	0	1611	0	0	1863	0	3532	0	0	3536	0
Flt Permitted								0.998				
Satd. Flow (perm)	0	0	1611	0	0	1863	0	3532	0	0	3536	0
Adj. Flow (vph)	0	0	125	0	0	0	48	1266	0	0	1227	7
Lane Group Flow (vph)	0	0	125	0	0	0	0	1314	0	0	1234	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 70.2%		ICU Level of Service C	
Analysis Period (min) 15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	119	0	0	0	46	1203	0	0	1166	7
Future Volume (Veh/h)	0	0	119	0	0	0	46	1203	0	0	1166	7
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	125	0	0	0	48	1266	0	0	1227	7
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1960	2592	617	2100	2596	633	1234			1266		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1960	2592	617	2100	2596	633	1234			1266		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	71	100	100	100	91			100		
cM capacity (veh/h)	35	23	433	20	22	422	560			545		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	125	0	681	633	614	620
Volume Left	0	0	48	0	0	0
Volume Right	125	0	0	0	0	7
cSH	433	1700	560	1700	545	1700
Volume to Capacity	0.29	0.00	0.09	0.37	0.00	0.36
Queue Length 95th (ft)	30	0	7	0	0	0
Control Delay (s)	16.7	0.0	2.4	0.0	0.0	0.0
Lane LOS	C	A	A			
Approach Delay (s)	16.7	0.0	1.2		0.0	
Approach LOS	C	A				

Intersection Summary					
Average Delay		1.4			
Intersection Capacity Utilization		70.2%	ICU Level of Service		C
Analysis Period (min)		15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	316	37	77	259	39	15	8	102	69	6	12
Future Volume (vph)	16	316	37	77	259	39	15	8	102	69	6	12
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.981				0.850		0.902	
Flt Protected		0.998		0.950				0.969		0.950		
Satd. Flow (prot)	0	1859	1583	1770	1827	0	0	1805	1583	1770	1680	0
Flt Permitted		0.998		0.950				0.969		0.950		
Satd. Flow (perm)	0	1859	1583	1770	1827	0	0	1805	1583	1770	1680	0
Adj. Flow (vph)	17	343	40	84	282	42	16	9	111	75	7	13
Lane Group Flow (vph)	0	360	40	84	324	0	0	25	111	75	20	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 54.0%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	316	37	77	259	39	15	8	102	69	6	12
Future Volume (Veh/h)	16	316	37	77	259	39	15	8	102	69	6	12
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	17	343	40	84	282	42	16	9	111	75	7	13
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									8			
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					504							
pX, platoon unblocked	0.94						0.94	0.94		0.94	0.94	0.94
vC, conflicting volume	324			383			844	869	343	908	888	303
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	246			383			800	827	343	869	848	224
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			93			94	97	84	62	97	98
cM capacity (veh/h)	1238			1175			256	263	700	196	256	765

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2
Volume Total	360	40	84	324	136	75	20
Volume Left	17	0	84	0	16	75	0
Volume Right	0	40	0	42	111	0	13
cSH	1238	1700	1175	1700	857	196	452
Volume to Capacity	0.01	0.02	0.07	0.19	0.16	0.38	0.04
Queue Length 95th (ft)	1	0	6	0	14	42	3
Control Delay (s)	0.5	0.0	8.3	0.0	12.8	34.3	13.3
Lane LOS	A		A		B	D	B
Approach Delay (s)	0.5		1.7		12.8	29.9	
Approach LOS					B	D	

Intersection Summary				
Average Delay		5.3		
Intersection Capacity Utilization		54.0%	ICU Level of Service	A
Analysis Period (min)		15		

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	10	86	24	24	10	0
Future Volume (vph)	10	86	24	24	10	0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.932			
Flt Protected		0.995			0.950	
Satd. Flow (prot)	0	1853	1736	0	1770	0
Flt Permitted		0.995			0.950	
Satd. Flow (perm)	0	1853	1736	0	1770	0
Adj. Flow (vph)	11	93	26	26	11	0
Lane Group Flow (vph)	0	104	52	0	11	0
Sign Control		Free	Free		Stop	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 21.7%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	10	86	24	24	10	0
Future Volume (Veh/h)	10	86	24	24	10	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	93	26	26	11	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	52				154	39
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	52				154	39
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				99	100
cM capacity (veh/h)	1554				832	1033

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	104	52	11
Volume Left	11	0	11
Volume Right	0	26	0
cSH	1554	1700	832
Volume to Capacity	0.01	0.03	0.01
Queue Length 95th (ft)	1	0	1
Control Delay (s)	0.8	0.0	9.4
Lane LOS	A		A
Approach Delay (s)	0.8	0.0	9.4
Approach LOS			A

Intersection Summary				
Average Delay		1.1		
Intersection Capacity Utilization		21.7%	ICU Level of Service	A
Analysis Period (min)		15		

MOVEMENT SUMMARY

Site: 101 [Turner Drive at Site Driveway #9 2045 AM (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

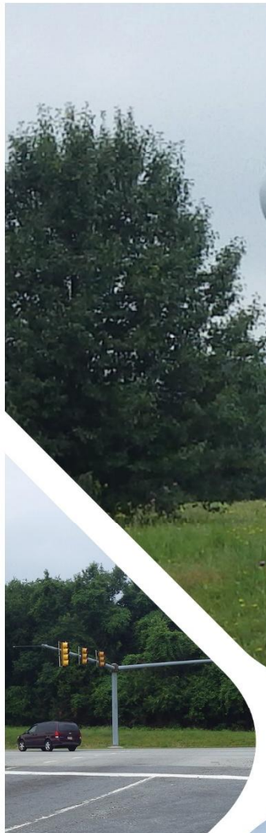
Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Site Driveway #5														
3	L2	15	2.0	16	2.0	0.158	5.8	LOS A	0.7	17.1	0.53	0.45	0.53	34.5
8	T1	8	2.0	9	2.0	0.158	5.8	LOS A	0.7	17.1	0.53	0.45	0.53	34.4
18	R2	102	2.0	111	2.0	0.158	5.8	LOS A	0.7	17.1	0.53	0.45	0.53	33.4
Approach		125	2.0	136	2.0	0.158	5.8	LOS A	0.7	17.1	0.53	0.45	0.53	33.6
East: Turner Drive														
1	L2	77	2.0	84	2.0	0.273	5.1	LOS A	1.4	35.1	0.16	0.06	0.16	24.8
6	T1	259	2.0	282	2.0	0.273	5.1	LOS A	1.4	35.1	0.16	0.06	0.16	24.3
16	R2	39	2.0	42	2.0	0.026	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	25.2
Approach		375	2.0	408	2.0	0.273	4.5	LOS A	1.4	35.1	0.15	0.05	0.15	24.5
North: Site Driveway #5														
7	L2	69	2.0	75	2.0	0.104	4.9	LOS A	0.4	11.0	0.48	0.38	0.48	33.1
4	T1	6	2.0	7	2.0	0.104	4.9	LOS A	0.4	11.0	0.48	0.38	0.48	33.0
14	R2	12	2.0	13	2.0	0.104	4.9	LOS A	0.4	11.0	0.48	0.38	0.48	32.1
Approach		87	2.0	95	2.0	0.104	4.9	LOS A	0.4	11.0	0.48	0.38	0.48	32.9
West: Turner Drive														
5	L2	16	2.0	17	2.0	0.352	6.6	LOS A	2.0	50.6	0.41	0.27	0.41	24.6
2	T1	316	2.0	343	2.0	0.352	6.6	LOS A	2.0	50.6	0.41	0.27	0.41	24.1
12	R2	37	2.0	40	2.0	0.352	6.6	LOS A	2.0	50.6	0.41	0.27	0.41	23.5
Approach		369	2.0	401	2.0	0.352	6.6	LOS A	2.0	50.6	0.41	0.27	0.41	24.1
All Vehicles		956	2.0	1039	2.0	0.352	5.5	LOS A	2.0	50.6	0.33	0.22	0.33	25.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Appendix F
Background Development Studies













PREPARED FOR:

PREPARED BY: Kimley»Horn

DATE: February 11, 2019

TOWN OF SMITHFIELD
INTERSECTION IMPROVEMENT ALTERNATIVES ANALYSIS

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1.0 Executive Summary

Benns Church Boulevard (U.S. Route 258/State Route 10) serves as one of the primary gateways into the Town of Smithfield, VA. The study area segment of Benns Church Boulevard is located to the south of the Town and carries approximately 20,000 to 29,000 vehicles per day (vpd). The signalized intersection at S. Church Street is where Benns Church Boulevard transitions from a traditional 4-lane divided minor arterial providing access to/from various businesses, shopping centers, and residential communities, to a limited access facility with higher speeds as part of the U.S. Route 258/State Route 10 "Bypass". When the Virginia Department of Transportation (VDOT) constructed the Bypass portion of the highway, it had anticipated the need to eventually construct grade-separated intersections (i.e., interchanges) to limit the amount of interruptions that occur in the flow of traffic. As part of this effort, VDOT pro-actively acquired the necessary right-of-way (ROW) in the vicinity of the S. Church Street and the Benns Church Boulevard/U.S. Route 258/State Route 10 Bypass intersection to someday accommodate an interchange.

The Town of Smithfield had expressed an interest in reacquiring this land from VDOT in an effort to accommodate potential economic development opportunities and still be able to accommodate future traffic volumes by developing an alternative to an interchange. Therefore, the Town of Smithfield initiated this study to evaluate alternative, at-grade intersection concepts that could best meet the immediate and future needs of the Town's anticipated growth, review current design standards for interchanges concepts that may or may not "fit" within the existing ROW, develop and assess alternative interchange configurations that could best accommodate potential future traffic volume demand, and provide transportation infrastructure improvement recommendations for this area to accommodate the development potential envisioned by the Town of Smithfield.

The purpose of this study is to serve as a planning level document that includes technical review and analysis of the design and traffic characteristics along the study area, specifically in the vicinity of the Benns Church Boulevard at S. Church Street intersection. The main goal of this study is to examine the operational conditions of the Benns Church Boulevard at S. Church Street intersection to determine if an alternative intersection concept could be implemented that eliminates the need for an interchange. To accomplish this goal, following elements were reviewed and are presented in this study:

- Existing Conditions Analysis
- Environmental Assessment along the Corridor
- Future Land Use Evaluation and Trip Generation
- Future Traffic Volume Projections
- Traffic Operations and Model Simulations
- Intersection Concepts
- Design Criteria for current VDOT and/or Federal Highway Administration (FHWA) standards
- Planning Level Cost Estimates

This technical report is being submitted to the Town of Smithfield and VDOT for their review and concurrence. It is expected that the adopted study and the identification of a final preferred concept will position the Town well for getting the project in VDOT'S Six Year Improvement Program (SYIP) and ultimately securing the funding necessary to take the project through preliminary engineering (PE)/design, ROW or (RW), and construction (CN). The study area consists of approximately 1.5 miles along a combination of roadways including Benns Church Boulevard and S. Church Street (i.e., Business (BUS) U.S. Route 258/State Route 10) located within the Town of Smithfield, VA for the following:

Roadways

- Benns Church Boulevard (U.S. Route 258/State Route 10/Bypass)
- S. Church Street (BUS U.S. Route 258/State Route 10)

Intersections

1. S. Church Street at Benns Church Boulevard (Signalized)
2. S. Church Street at Smithfield Square Shopping Center (Unsignalized)
3. S. Church Street at Moore Avenue (Unsignalized)
4. S. Church Street at Smithfield Volunteer Fire Department/McDonald's (Unsignalized)
5. S. Church Street at Heptinstall Avenue/Smithfield Boulevard (Unsignalized)
6. Benns Church Boulevard at Cypress Crossing/Gumwood Drive (Unsignalized)
7. Benns Church Boulevard at Canteberry Drive (Signalized)
8. Benns Church Boulevard at Cypress Run Drive (Signalized)
9. Benns Church Boulevard at Turner Drive (Signalized)

A preliminary environmental review using select National Environmental Policy Act (NEPA) process criteria was conducted for this project to determine if sensitive sites may be present or potentially impacted by the construction of improvements at the S. Church Street/Benns Church Boulevard intersection as well as the Cypress Crossing/Gumwood Drive at Benns Church Boulevard intersection. This preliminary environmental review identifies and assesses potential social and environmental impacts from the proposed conceptual improvements under consideration. Based on this preliminary environmental review, no environmental fatal flaws or items that would prohibit the construction of proposed intersection improvements were identified.

Future traffic volumes were developed for the study horizon years of 2025 and 2045. These volumes represent the projected growth that will occur within and around the study area. Based on the future operational analysis of the study area, it was found that many of the intersections are projected to experience significant delays and queues. Under future 2025 "No Build" conditions, the existing configuration of many of the study area intersections will continue to experience vehicle delays that result in operations of level of service (LOS) E or worse, and extensive queue lengths. To address these deficiencies, improvements and alternatives were considered for the study area intersections. These alternatives were divided into two categories based on the scale of improvement necessary to address the deficient operational conditions.

Recommendations for specific improvements to the study area intersections have been split into short-term (zero to five years), mid-term (five to fifteen years), and long-term (fifteen to twenty-five plus years) categories based primarily on their scale as well as the time frame in which they will be needed. This approach allows communities to prioritize larger scale projects over time while also being able to implement shorter term projects that mitigate immediate needs at relatively lower costs.

Short-term recommendations were identified for the study area intersections to help address existing and future deficient operational conditions. These recommendations generally represent improvements to signalized intersection that allow for more efficient operational conditions as traffic flows increase. While classified as "short-term" improvements, they could also be tied to future development that occur outside of this timeframe.

- Benns Church Boulevard at Canteberry Drive (Signalized)
  - Remove split-phasing for northbound/southbound approaches and convert to Protected + Permissive phasing with flashing yellow arrows (FYA)
  - Northbound/Southbound approaches should be modified to provide for a dedicated left-turn lane, single through-lane, and dedicated right turn lane
    - Widen the southbound approach into the existing median to provide a dedicated left-turn lane
    - Convert one of the existing inbound lanes on the northbound approach to a dedicated left-turn lane
  - Add right-turn overlap phases for the eastbound and westbound approaches
  - Extend the westbound left-turn lane to meet current VDOT standards (i.e., 200 feet of storage with a 200-foot taper)
- Benns Church Boulevard at Cypress Run Drive (Signalized)
  - Add right-turn overlap phases for the eastbound and westbound approaches
- Benns Church Boulevard at Turner Drive (Signalized)
  - Coordinate traffic signal and implement "school" time of day plans with the other signalized intersections along the corridor
  - Add right-turn overlap phases for the eastbound and westbound approaches
  - Improve/widen the northbound approach of Turner Drive to include a shared through/left-turn lane and an exclusive right-turn lane consisting of 200 feet of storage and a 200-foot taper
  - Extend the westbound left-turn lane to meet current VDOT standards (i.e., 200 feet of storage with a 200-foot taper)

The mid-term recommendations identified have some additional challenges expected for implementation that would place them outside the time period for the short-term improvements. These challenges include the additional coordination between existing property owners, funding considerations, limited access boundary, and future developments.

Based on the alternative analysis conducted for the intersection of S. Church Street at Benns Church Boulevard, the preferred mid-term recommendations include the following improvements:

- S. Church Street at Benns Church Boulevard
  - Modify the existing limited access boundary to allow for a new leg to be added to the intersection
  - Construct a northbound (i.e., southern leg/stub) to the intersection
    - Proposed laneage should be determined and confirmed as part of the future proposed Gwaltney Pointe development
  - Widen the southbound approach to provide a through lane
  - Construct a dedicated eastbound right-turn lane (i.e., 200 feet storage with a 200-foot taper)
  - Extend the eastbound left-turn lane to meet current VDOT standards (i.e., 200 feet of storage with a 200-foot taper)
  - Extend the westbound left-turn lane to meet current VDOT standards (i.e., 200 feet of storage with a 200-foot taper)
  - Modify and replace the existing traffic signal equipment to accommodate the new leg and/or phases
- Cypress Crossing/Gumwood Drive at Benns Church Boulevard
  - Construct two-lane roundabout

Like the mid-term recommendations, the specific long-term recommendation identified for the corridor address significant increases in traffic flows in response to the potential for development in this area. However, the long-term recommendations have additional challenges expected for implementation that would place them outside the time period for the mid-term improvements. These challenges include the scale of the project, funding considerations, construction efforts, and continual project support.

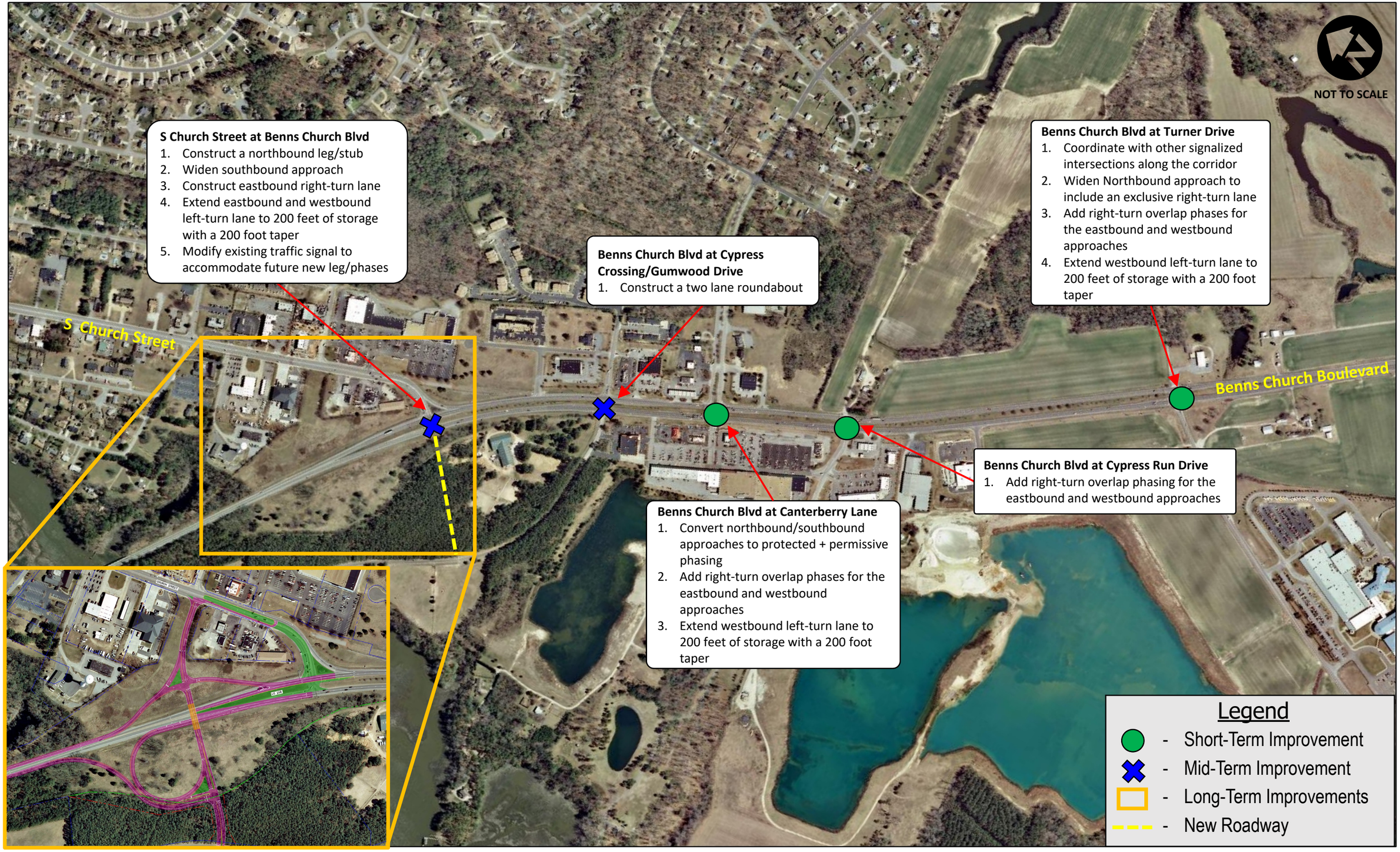
Based on the alternatives analysis conducted for the intersection of S. Church Street at Benns Church Boulevard, the preferred long-term recommendation includes maintaining the existing VDOT ROW in anticipation for a future grade-separated interchange. The preferred long-term recommendation represents a full diamond interchange with a quadrant loop (i.e., Alternative 2) that will replace the signalized, at-grade intersection of Benns Church Boulevard and S. Church Street identified under the mid-term recommendations.

This interchange concept will provide a free-flow loop ramp to address the heavy southbound left-turn movement that exists and will continue to travel from S. Church Street to eastbound Benns Church Boulevard. This interchange concept will continue to provide access to/from the proposed future Gwaltney Pointe development.

Due to spacing limitations, the Cypress Crossing/Gumwood Drive at Benns Church Boulevard will remain as a two-lane roundabout as identified under the mid-term recommendations. This will also serve as a transition point from the freeway-like conditions along Benn Church Boulevard as vehicles travel from the north the more commercial area located to the south of Smithfield. The recommendations and planning-level cost estimates, expressed in year 2018 dollars, are summarized in Table ES 1 and are illustrated in Figure ES 1.

Table ES 1: Summary of Recommended Improvements and Opinions of Probable Costs

Improvement	Planning Level Costs			
	PE/Design	ROW/Utility Relocations	Construction	Total
Short-Term (0-5 years) Improvements				
Benns Church Boulevard at Canteberry Drive Operational Improvements	$ 108,000	$ 0	$ 722,000	$ 830,000
◆ Remove split-phasing for northbound/southbound approaches and convert to Protected + Permissive phasing with flashing yellow arrows (FYA) ◆ Northbound/Southbound approaches should be modified to provide for a dedicated left-turn lane, single through-lane, and dedicated right-turn lane ◆ Widen the southbound approach into the existing median to provide a dedicated left-turn lane ◆ Convert one of the existing inbound lanes on the northbound approach to a dedicated left-turn lane ◆ Add right-turn overlap phases for the eastbound and westbound approaches ◆ Extend westbound left-turn lane to meet current VDOT standards (i.e., 200 feet of storage with a 200-foot taper)				
Benns Church Boulevard at Cypress Run Drive Operational Improvements	$ 7,000	$ 0	$ 3,000	$ 10,000
◆ Add right-turn overlap phases for the eastbound and westbound approaches				
Benns Church Boulevard at Turner Drive Safety and Operational Improvements	$ 142,000	$ 175,000	$ 839,000	$ 1,156,000
◆ Coordinate traffic signal and implement “school” time of day plans with the other signalized intersections along the corridor ◆ Add right-turn overlap phases for the eastbound and westbound approaches ◆ Improve/widen the northbound approach of Turner Drive to include a shared through/left-turn lane and an exclusive right-turn lane consisting of 200 feet of storage and a 200-foot taper ◆ Extend westbound left-turn lane to meet current VDOT standards (i.e., 200 feet of storage with a 200-foot taper)				
Mid-Term (5-15 years) Improvements				
S. Church Street at Benns Church Boulevard and Forth Leg Stub	$ 437,000	$ 307,500	$ 3,375,000	$ 4,119,500
◆ Modify the existing limited access boundary to allow for a new leg to the intersection ◆ Construct a northbound (i.e., southern leg “stub”) to the intersection ◆ Proposed roadway laneage should be determined and confirmed as part of the future Gwaltney Pointe development ◆ Widened southbound S. Church Street approach to provide for a through lane ◆ Construct dedicated eastbound right-turn lane (i.e., 200 feet storage with a 200-foot taper) ◆ Extend eastbound left-turn lane to meet current VDOT standards (i.e., 200 feet storage with a 200-foot taper) ◆ Extend westbound left-turn lane to meet current VDOT standards (i.e., 200 feet storage with a 200-foot taper) ◆ Modify and replace existing traffic signal equipment to accommodate new leg/phases				
Cypress Crossing/Gumwood Drive at Benns Church Boulevard Roundabout	$ 762,000	$ 532,500	$ 6,024,000	$ 7,318,500
◆ Construct two-lane roundabout				
Long-Term (15-25 years) Improvements				
Preferred Alternative: Conventional at-grade Intersection and Roundabout	$ 15,275,000	$ 11,300,000	$ 117,075,000	$ 143,650,000
◆ Remove at grade intersection at S. Church Street at Benns Church Boulevard ◆ Construct a diamond interchange with quadrant loop				



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Intersection Improvement Alternatives Analysis
Smithfield, Virginia

Summary of Proposed Recommendations

Figure ES-1

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2.0 INTRODUCTION

2.1 Background

Benns Church Boulevard (U.S. Route 258/State Route 10) serves as one of the primary gateways into the Town of Smithfield, VA. The study area segment of Benns Church Boulevard is located to the south of the Town and carries approximately 20,000 to 29,000 vehicles per day (vpd). As part of this gateway into the Town, the signalized intersection at S. Church Street is in the area where Benns Church Boulevard transitions from a traditional 4-lane divided minor arterial providing access to/from various businesses, shopping centers, and residential communities to a limited access facility with higher speeds as part of the U.S. Route 258/State Route 10 "Bypass". When the Virginia Department of Transportation (VDOT) constructed the Bypass portion of the highway, it had anticipated the need to eventually construct grade-separated intersections (i.e., interchanges) to better accommodate the flow of traffic around the Town's S. Church Street commercial corridor. As part of this effort, VDOT pro-actively acquired the necessary right-of-way (ROW) in the vicinity of the S. Church Street and the Benns Church Boulevard/U.S. Route 258/State Route 10 Bypass intersection to ultimately accommodate an interchange.

The Town of Smithfield recently expressed an interest in acquiring this land from VDOT in an effort to accommodate potential economic development opportunities while still being able to support future traffic volumes. Therefore, the Town of Smithfield initiated this study to evaluate alternative, at-grade intersection concepts that could best meet the immediate and future needs of the Town's anticipated growth, review current design standards for interchange concepts that may or may not "fit" within the existing ROW, develop and assess alternative interchange configurations that could best accommodate potential future traffic volume demand, and provide transportation infrastructure improvement recommendations for this area to accommodate the development potential envisioned by the Town of Smithfield.

2.2 Study Area

The study area consists of approximately 1.5 miles along a combination of roadways including Benns Church Boulevard and S. Church Street (i.e., Business (BUS) U.S. Route 258/State Route 10) located within the Town of Smithfield, VA. The study area for this analysis, as illustrated in Figure 1, includes the following roadways and intersections (with IDs):

Roadways

- Benns Church Boulevard (U.S. Route 258/State Route 10/Bypass)
- S. Church Street (BUS U.S. Route 258/State Route 10)

Intersections

1. S. Church Street at Benns Church Boulevard (Signalized)
2. S. Church Street at Smithfield Square Shopping Center (Unsignalized)
3. S. Church Street at Moore Avenue (Unsignalized)
4. S. Church Street at Smithfield Volunteer Fire Department/McDonald's (Unsignalized)
5. S. Church Street at Heptinstall Avenue/Smithfield Boulevard (Unsignalized)
6. Benns Church Boulevard at Cypress Crossing/Gumwood Drive (Unsignalized)
7. Benns Church Boulevard at Canteberry Drive (Signalized)
8. Benns Church Boulevard at Cypress Run Drive (Signalized)
9. Benns Church Boulevard at Turner Drive (Signalized)

It should be noted that Benns Church Boulevard and S. Church Street are both generally oriented in a north-south cardinal direction within the study area. For the purposes of this study, Benns Church Boulevard will be referenced as eastbound and westbound, while S. Church Street will be referenced as northbound and southbound.

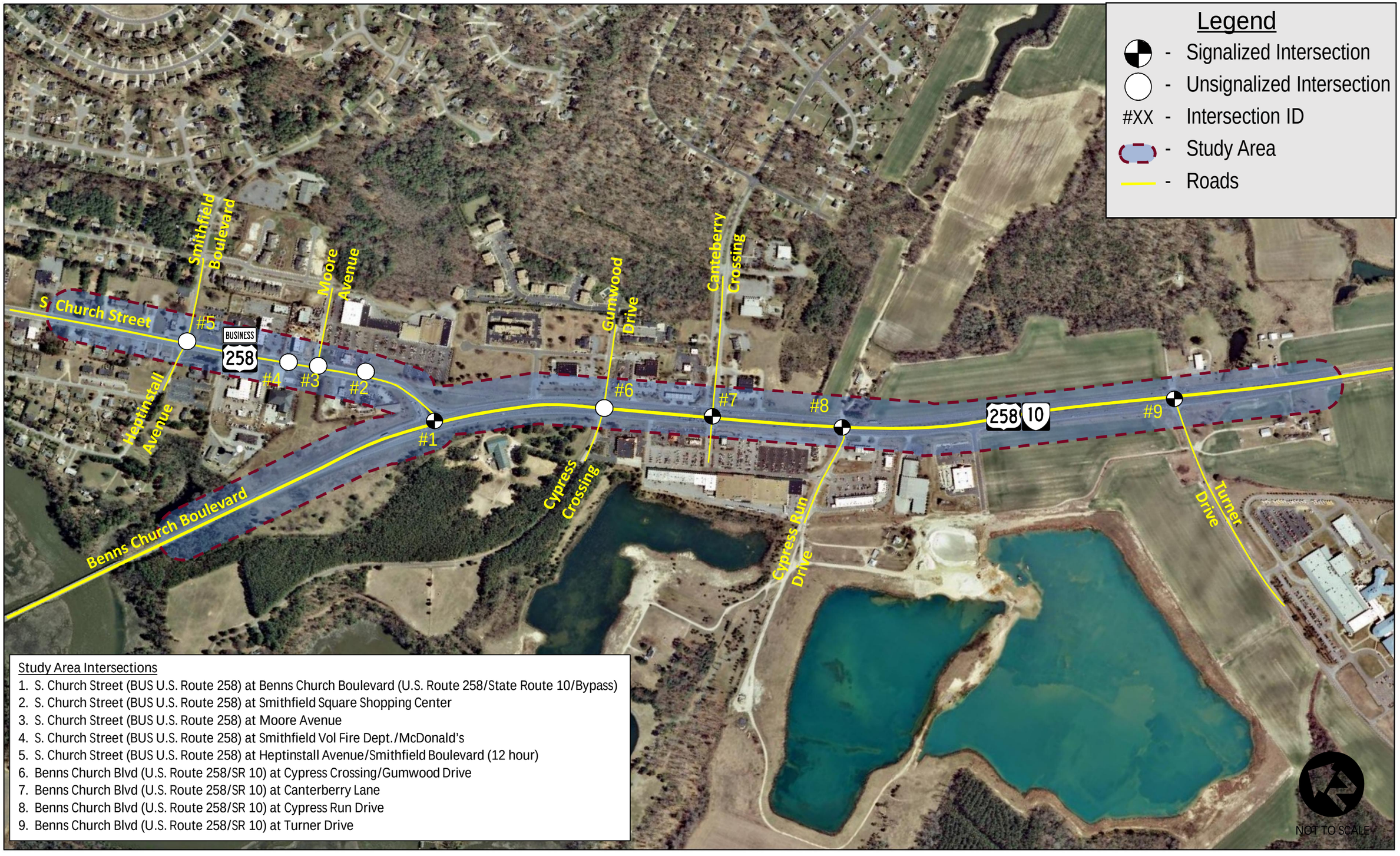
2.3 Study Purpose and Goals

The purpose of this study is to serve as a planning level document that includes technical review and analysis of the design and traffic characteristics within the study area, specifically in the area of the Benns Church Boulevard at S. Church Street intersection. The main goal of this study is to examine the operational conditions of the Benns Church Boulevard at S. Church Street intersection to determine if an alternative intersection concept could be implemented that supports future traffic demand and economic growth and eliminates the need for an interchange. To accomplish this goal, the following elements were reviewed and are presented in this study:

- Existing Conditions Analysis
- Environmental Assessment along the Corridor
- Future Land Use Evaluation and Trip Generation
- Future Traffic Volume Projections
- Traffic Operations and Model Simulations
- Intersection Concepts
- Design Criteria for current VDOT and/or Federal Highway Administration (FHWA) standards
- Planning Level Cost Estimates

This technical report is being submitted to the Town of Smithfield and VDOT for their review and concurrence. It is expected that the adopted study and the identification of a final preferred intersection improvement concept will ultimately result in the project be programmed into the VDOT's Six-Year Improvement Program (SYIP), and/or allow the Town to apply for alternative funding sources through such programs as SMART Scale or Revenue Sharing.

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Study Area Intersections

1. S. Church Street (BUS U.S. Route 258) at Benns Church Boulevard (U.S. Route 258/State Route 10/Bypass)
2. S. Church Street (BUS U.S. Route 258) at Smithfield Square Shopping Center
3. S. Church Street (BUS U.S. Route 258) at Moore Avenue
4. S. Church Street (BUS U.S. Route 258) at Smithfield Vol Fire Dept./McDonald's
5. S. Church Street (BUS U.S. Route 258) at Heptinstall Avenue/Smithfield Boulevard (12 hour)
6. Benns Church Blvd (U.S. Route 258/SR 10) at Cypress Crossing/Gumwood Drive
7. Benns Church Blvd (U.S. Route 258/SR 10) at Canterberry Lane
8. Benns Church Blvd (U.S. Route 258/SR 10) at Cypress Run Drive
9. Benns Church Blvd (U.S. Route 258/SR 10) at Turner Drive

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Smithfield, Virginia

Study Area

Figure 1

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2.4 Methodology

The process to develop the intersection improvement alternatives analysis study, recommendations, and implementation strategy consisted of the following efforts:

- Project Team - Kimley-Horn coordinated closely with the Town of Smithfield and VDOT staff throughout the study process. The project team worked together to guide and assisted the development of the study to the identification of the study recommendations.
- Data Collection and Baseline Conditions - This effort involved collecting and evaluating background information that consisted of existing traffic volume data, land use plans, traffic impact studies, geographic information system (GIS) data, future development plans, historical crash data, environmental/natural resources data, and other necessary information further establishing the baseline conditions. All analyses were conducted in accordance with the Highway Capacity Manual (2010/2016 Edition) and the VDOT Traffic Operations and Safety Analysis Manual (TOSAM).
- Future Traffic Volume Projections - Based on the data collection efforts, traffic volumes were projected to future years to analyze these conditions to see how future growth and development will impact the operations of the corridor.
- Development of Improvement Concepts - Following the analysis of the existing and future traffic conditions, several intersection alternatives were developed to address the goals of the study.
- Traffic Study Recommendations - Using input from the project team, traffic study recommendations were developed to improve safety, traffic operations along the corridors. Proposed improvements are packaged into the form of short-, mid-, and long-term recommendations.
- Implementation - Implementation of the proposed transportation improvements begins with approval and support from Town of Smithfield officials and VDOT staff.

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3.0 Existing Conditions

3.1 Data Collection

Data obtained for this analysis was either provided by the Town of Smithfield (i.e., land use, zoning, other studies, approved developments, etc.) or VDOT (i.e., traffic counts, signal timings, etc.). Data not provided from these sources were obtained directly by Kimley-Horn for use in this study and includes the traffic counts, speed observations, and environmental databases.

As part of the data collection effort, field visits to the area were conducted on June 15, 2017 and September 15, 2017. The intent of the field investigation conducted in June was to document existing traffic operations, existing roadway geometric conditions, and to compile an inventory of digital still photographs within the study area that captured elements of interest, such as signalized intersections, posted speed limits, roadway and intersection geometrics, geometric deficiencies, sight distance constraints, bike and pedestrian accessibility, potential safety concerns, utilities, and general operational deficiencies. The objective of the field investigation conducted in September was to review local existing conditions, verify the results of the environmental database review and collect data for sites not identified/or available in the environmental database review but observed in the field.

3.2 Existing Land Use

Figure 2 illustrates the existing zoning for the Town of Smithfield in the vicinity of the study area. Land uses adjacent to the Benns Church Boulevard and S. Church Street corridors consists primarily of retail, commercial, and planned shopping center developments. Commercial land uses located immediately adjacent to the corridor include gas stations, various chains of sit-down/fast-food restaurants, grocery stores, and other small retail businesses. Several low density residential and multifamily/retirement neighborhood developments are also located behind or in close proximity to the identified retail and commercial land uses. Additional land uses within the study area include a church which is located on Benns Church Boulevard and a fire station on S. Church Street.

3.3 Existing Roadway Geometry

Posted speed limits, effect storage lengths, lane lengths, and lane designations for the study area are illustrated in Figure 3. The following provides a brief description of existing roadway characteristics of each facility:

- Benns Church Boulevard (U.S. Route 258/State Route 10/Bypass) is the major east-west corridor in the study area. It is a four-lane, divided highway that forms into a two-lane Bypass around the Town of Smithfield. U.S. Route 258/State Route 10 continues west towards Main Street where it then splits with U.S. Route 258 serving traffic to/from Windsor, Franklin and the North Carolina Border and State Route 10 accommodating traffic to/from Surry, Hopewell, and points west. The eastward orientation of U.S. Route 258/State Route 10 accommodates traffic towards Newport News and Suffolk. The portion of Benns Church Boulevard to the west of Cypress Crossing/Gumwood Drive is a limited access highway as defined by VDOT. Traffic counts collected in 2017 as part of this study indicate that it carries approximately 20,100 to 27,600 vehicles per day (vpd). The posted speed limit is 45 mph and increases to 55 mph to the west of S. Church Street.
- S. Church Street (BUS U.S. Route 258/State Route 10) is a primary arterial for the Town of Smithfield. The segment with the project study area is a five-lane, undivided highway with a center two-way left-turn lane (TWLTL). S. Church Street continues into Smithfield, follows Main Street to the north and intersects with Benns Church Boulevard north and west of the study area. Traffic counts collected in 2017 as part of this study indicate that it carries approximately 15,000 vpd in the study area. The posted speed limit is 35 mph.

3.4 Existing Traffic Volumes

Based on discussions with the Town of Smithfield and VDOT, AM and PM peak conditions were analyzed to evaluate potential impacts of the proposed development. To coincide with these times, turning movement counts (TMC) were obtained and collected for the study area intersections. AM and PM TMC were collected at the study area intersections #1 through #8 on May 9, 2017. VDOT provided count data for intersection #9-Benns Church Boulevard at Turner Drive, which was originally collected December 13, 2016. These additional counts were reviewed and adjusted to balance with the 2017 counts collected for Benns Church Boulevard.

Daily traffic counts were also collected at the following three (3) locations within the study area between May 9 - 11, 2017:

- Benns Church Boulevard, west of S. Church St
- Benns Church Boulevard, west of Turner Drive
- S. Church Street, North of Heptinstall Avenue

The uniform peak periods for the analysis were generally found to be 7:00 AM to 8:00 AM and 4:30 PM to 5:30 PM for the AM and PM peak hours, respectively. Daily, AM and PM peak hour volumes from the abovementioned counts used for this analysis are shown in Figure 4. Detailed count data is also provided in Appendix A.

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Smithfield Corporate Limits

Existing Zoning

- Mobile Home Park
- Planned Shopping Center
- Downtown Residential
- Environmental Conserv.
- Community Conservation
- Low Density Residential
- Suburban Residential
- Attached Residential
- Multifamily/Retirement
- Residential Office
- Retail Commercial
- Downtown Commercial
- Mixed Use
- Light Industry
- Heavy Industry
- Parks and Recreation
- Public and Semi-Public

0 ¼ ½ Miles

N

Benns Church Boulevard

258 10

BUSINESS 258

S Church Street

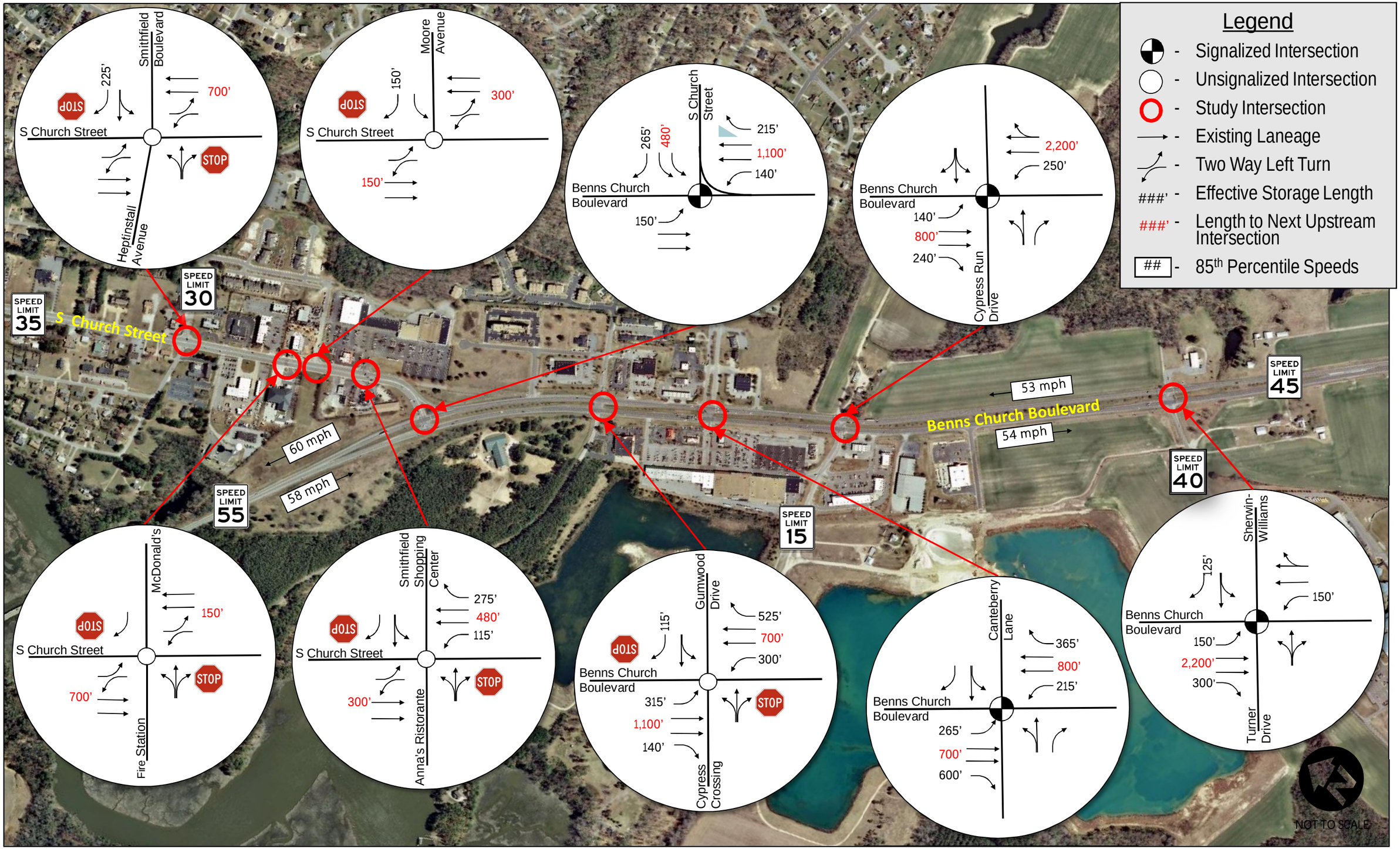
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Smithfield, Virginia

Existing Land Use

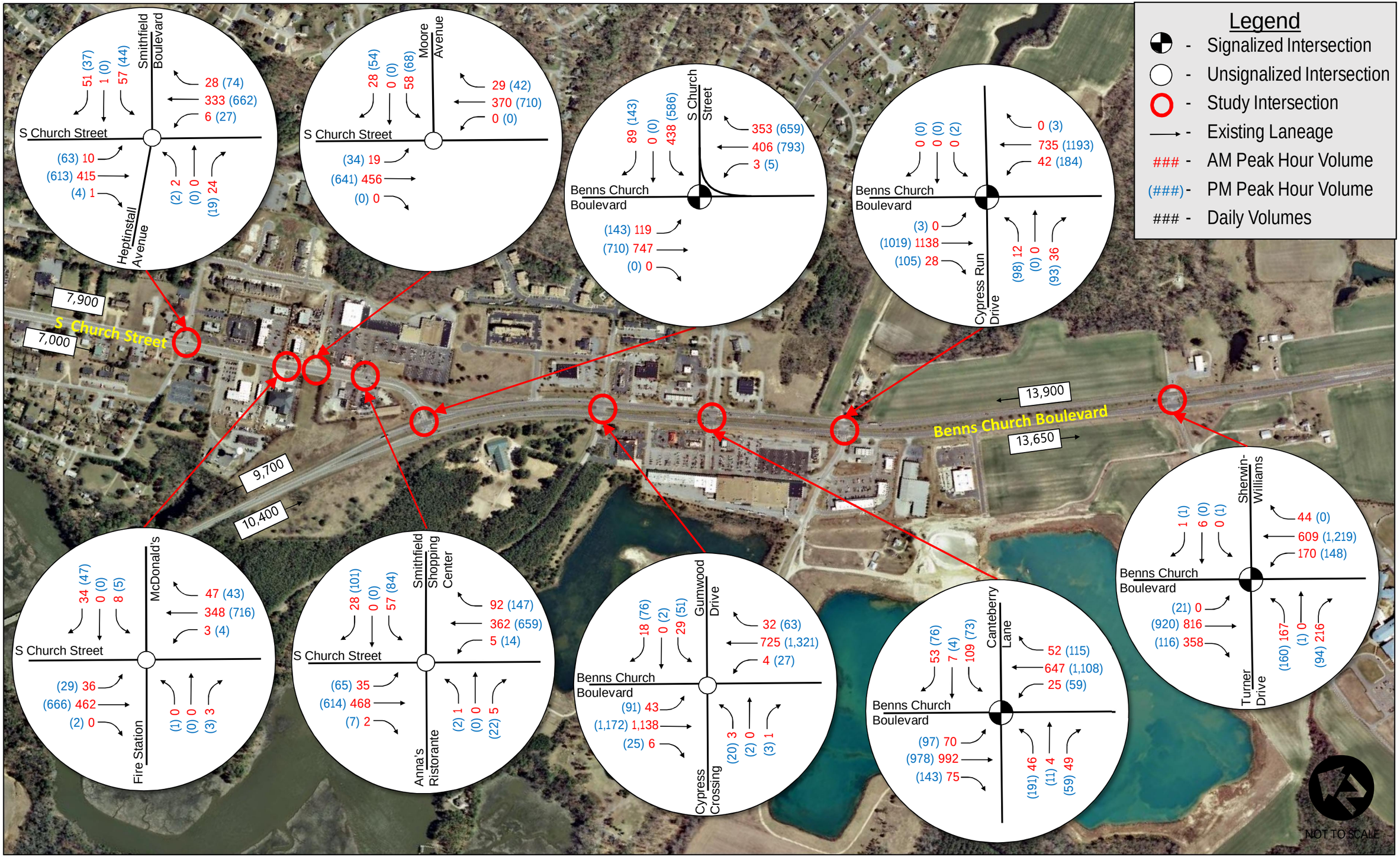
Figure 2

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Kimley»Horn	Intersection Improvement Alternatives Analysis Smithfield, Virginia	Existing Conditions	Figure 3

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Smithfield, Virginia

2017 Existing Traffic Volumes

Figure 4

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3.4.1 Existing Speeds

Posted speed limits along the study area range between 35 and 55 mph. Posted speeds limits are shown in Figure 3. Vehicle travel speeds were collected along Benns Church Boulevard on the western and eastern limits of the study corridor. The 85th percentile speeds were calculated and are shown with the corresponding posted speeds limits in Table 1. The 85th percentile speeds represent the speed at or below which 85% of vehicles travel and is used as a measure of a roadway's operating speed. At these observed locations, the travel speeds are consistently higher (3 to 9 mph) than the posted speed limit. While the speeds measured west of S. Church Street were only slightly higher than the posted speed limits. This is due to the change in the posted speed limit. Vehicles traveling in the eastbound direction are slowing down as they approach the signalized S. Church Street. Vehicles traveling in the westbound direction are speeding up as the speed limit increases and access to Benns Church Boulevard becomes more limited. In the middle of the corridor, speeds reach over 50 mph due to the distance between signalized intersections and the roadway being a 4-lane divided facility. It is noted that average speeds for the corridor were observed to be more comparable to the posted speed limits.

Table 1: Existing Travel Speeds

Benns Church Boulevard Location	Posted Speed Limit (mph)	85th Percentile Speeds (mph)		Average Speeds (mph)	
		EB	WB	EB	WB
West of S. Church St	55	58	60	55.9	57.0
West of Turner Drive	45	54	53	48.8	49.3

3.5 Historic Crash Data

A qualitative safety analysis was conducted by reviewing the historic crash patterns on Benns Church Boulevard and along S. Church Boulevard within the study area. The latest five (5) years of crash data, collected between January 1, 2013, and December 31, 2017, was compiled and summarized within the study area. Figure 5 and Figure 6 illustrate the location, severity, and crash type within the study area.

3.5.1 Crashes by Severity

Table 2 summarizes a breakdown of crash severity (i.e., proportion of the crashes involving an injury, fatality, or property damage only). During the five-year period, a total of 168 crashes occurred on the roadway corridors within the study area. Eighty-two percent of the total crashes occurred at intersections. The majority of crashes by severity were property damage only (PDO), making up 70 percent of the total crashes. Thirty percent of the crashes resulted in an injury and no fatalities occur during the five-year period.

Table 2: Crash Severity

ID	Intersection	Ambulatory Injury		Visible Injury		Non-visible Injury		Property Damage Only		Total Crashes
1	S. Church St at Benns Church Blvd	0	0%	9	33%	1	4%	17	63%	27
2	S. Church St at Smithfield Square Shopping Center	0	0%	1	25%	0	0%	3	75%	4
3	S. Church St at Moore Ave	0	0%	1	20%	0	0%	4	80%	5
4	S. Church St at Smithfield Vol Fire Dept./McDonalds	0	0%	1	33%	0	0%	2	67%	3
5	S. Church St at Heptinstall Ave/Smithfield Blvd	0	0%	1	14%	0	0%	6	86%	7
6	Benns Church Blvd at Cypress Crossing/Gumwood Dr	2	8%	5	19%	1	4%	18	69%	26
7	Benns Church Blvd at Canteberry Lane	0	0%	3	14%	3	14%	16	73%	22
8	Benns Church Blvd at Cypress Run Dr	1	6%	3	19%	0	0%	12	75%	16
9	Benns Church Blvd at Turner Dr	3	11%	4	14%	2	7%	19	68%	28
Non-Intersection		2	7%	6	20%	1	3%	21	70%	30
Overall Study Corridor		8	5%	34	20%	8	5%	118	70%	168

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3.5.2 Crashes by Type

Table 3 summarizes crash type percentages throughout the study corridor. The predominant crash type in intersections within the study section were “angle collisions”, consisting of approximately 46 percent of the crashes on the corridor. Rear end crashes were the second most prevalent crash type with 34 percent of the crashes in the corridor. Angle collisions occur most frequently at the unsignalized intersections within the corridor. 100% of the crashes that occurred at the intersection of S. Church Street at Smithfield Square Shopping Center and S. Church Street at Heptinstall Avenue/Smithfield Boulevard were angle collisions. S. Church Street accommodates turning movements via the TWLTL configuration. Additionally, there are many access points along S. Church Street. Due to the lane configuration and number of access points along S. Church Street, vehicles are not able to safely follow the access control, and are colliding with other vehicles. The rear end crashes occur most frequently at the four signalized intersections in the study area. Signalized intersections cause traffic to stop and go which increases the chance of rear end collisions. Based on the crash data, the majority of rear end crashes are property damage only or non-visible injuries.

Table 3: Crash Type

ID	Intersection	Head On		Angle		Rear End		Sideswipe -Same Direction		Fixed Object – Off Road		Deer		Other		Total
1	S. Church St at Benns Church Blvd	1	4%	17	63%	7	26%	1	4%	0	0%	0	0%	1	4%	27
2	S. Church St at Smithfield Square Shopping Center	0	0%	4	100%	0	0%	0	0%	0	0%	0	0%	0	0%	4
3	S. Church St at Moore Ave	0	0%	2	40%	0	0%	1	20%	1	20%	0	0%	1	20%	5
4	S. Church St at Smithfield Vol Fire Dept./McDonalds	0	0%	2	67%	0	0%	1	33%	0	0%	0	0%	0	0%	3
5	S. Church St at Heptinstall Ave/Smithfield Blvd	0	0%	7	100%	0	0%	0	0%	0	0%	0	0%	0	0%	7
6	Benns Church Blvd at Cypress Crossing/Gumwood Dr	0	0%	22	85%	0	0%	3	12%	0	0%	0	0%	1	4%	26
7	Benns Church Blvd at Canteberry Lane	0	0%	10	45%	10	45%	1	5%	0	0%	0	0%	1	5%	22
8	Benns Church Blvd at Cypress Run Dr	0	0%	5	31%	11	69%	0	0%	0	0%	0	0%	0	0%	16
9	Benns Church Blvd at Turner Dr	0	0%	6	21%	20	71%	1	4%	0	0%	0	0%	1	4%	28
Non-Intersection		1	3%	2	7%	9	30%	4	13%	6	20%	2	7%	6	20%	30
Overall Study Corridor		2	1%	77	46%	57	34%	12	7%	7	4%	2	1%	11	7%	168

3.5.3 Crash Conditions

Table 4, Table 5, and Table 6 summarize crash trends given weather, lighting, and time-of-day conditions, respectively. The following conclusions are noted from this data for the study area:

- Poor weather does not appear to be a major contributing factor with 85 percent of the overall crashes occurring under clear conditions for the study corridor.
  - However, approximately 50% of the documented crashes at the S. Church Street/Smithfield Square Shopping Center did occur during rainy conditions.
- The majority of crashes (i.e., 76 percent) occurred during daylight hours with 20 percent of crashes occurring during dark/night time conditions. Only 4 percent of the crashes occurred during dawn/dusk. Street lighting is provided along Benns Church Boulevard and S. Church Street.
- Approximately 15 percent of the crashes occurred during the AM (6:00 am to 10:00 am) and 36 percent during the PM (3:00 pm to 6:00 pm) peak periods, respectively.
  - The PM peak period has more traffic, which increases the risks for crashes to occur.

Table 4: Crash Summary – Weather Condition

ID	Intersection	No Adverse Condition		Mist		Rain		Snow		Sleet/Hail		Total
1	S. Church St at Benns Church Blvd	22	81%	0	0%	4	15%	1	4%	0	0%	27
2	S. Church St at Smithfield Square Shopping Center	2	50%	0	0%	2	50%	0	0%	0	0%	4
3	S. Church St at Moore Ave	5	100%	0	0%	0	0%	0	0%	0	0%	5
4	S. Church St at Smithfield Vol Fire Dept./McDonalds	3	100%	0	0%	0	0%	0	0%	0	0%	3
5	S. Church St at Heptinstall Ave/Smithfield Blvd	5	71%	0	0%	1	14%	1	14%	0	0%	7
6	Benns Church Blvd at Cypress Crossing/Gumwood Dr	21	81%	0	0%	4	15%	1	4%	0	0%	26
7	Benns Church Blvd at Canteberry Lane	20	91%	0	0%	2	9%	0	0%	0	0%	22
8	Benns Church Blvd at Cypress Run Dr	15	94%	0	0%	1	6%	0	0%	0	0%	16
9	Benns Church Blvd at Turner Dr	25	89%	1	4%	2	7%	0	0%	0	0%	28
Non-Intersection		24	80%	0	0%	5	17%	0	0%	1	3%	30
Overall Study Corridor		142	85%	1	1%	21	13%	3	2%	1	1%	168

Table 5: Crash Summary – Lighting Condition

ID	Intersection	Dawn		Daylight		Dusk		Darkness - Road Lighted		Darkness - Road Not Lighted		Total
1	S. Church St at Benns Church Blvd	0	0%	18	67%	2	7%	3	11%	4	15%	27
2	S. Church St at Smithfield Square Shopping Center	0	0%	2	50%	0	0%	2	50%	0	0%	4
3	S. Church St at Moore Ave	1	20%	3	60%	0	0%	1	20%	0	0%	5
4	S. Church St at Smithfield Vol Fire Dept./McDonalds	0	0%	2	67%	0	0%	1	33%	0	0%	3
5	S. Church St at Heptinstall Ave/Smithfield Blvd	0	0%	7	100%	0	0%	0	0%	0	0%	7
6	Benns Church Blvd at Cypress Crossing/Gumwood Dr	0	0%	24	92%	0	0%	1	4%	1	4%	26
7	Benns Church Blvd at Canteberry Lane	0	0%	20	91%	0	0%	2	9%	0	0%	22
8	Benns Church Blvd at Cypress Run Dr	0	0%	11	69%	0	0%	3	19%	2	13%	16
9	Benns Church Blvd at Turner Dr	1	4%	19	68%	3	11%	1	4%	4	14%	28
Non-Intersection		0	0%	21	70%	0	0%	3	10%	6	20%	30
Overall Study Corridor		2	1%	127	76%	5	3%	17	10%	17	10%	168

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Table 6: Crash Summary – Time of Day Conditions

ID	Intersection	AM Peak (6:00 - 9:00)		PM Peak (3:00 - 6:00)		Off Peak		Total
1	S. Church St at Benns Church Blvd	5	19%	9	33%	13	48%	27
2	S. Church St at Smithfield Square Shopping Center	0	0%	2	50%	2	50%	4
3	S. Church St at Moore Ave	1	20%	1	20%	3	60%	5
4	S. Church St at Smithfield Vol Fire Dept./McDonalds	1	33%	2	67%	0	0%	3
5	S. Church St at Heptinstall Ave/Smithfield Blvd	1	14%	3	43%	3	43%	7
6	Benns Church Blvd at Cypress Crossing/Gumwood Dr	2	8%	15	58%	9	35%	26
7	Benns Church Blvd at Canteberry Lane	3	14%	4	18%	15	68%	22
8	Benns Church Blvd at Cypress Run Dr	2	13%	3	19%	11	69%	16
9	Benns Church Blvd at Turner Dr	6	21%	11	39%	11	39%	28
Non-Intersection		4	13%	10	33%	16	53%	30
Overall Study Corridor		25	15%	60	36%	83	49%	168

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Kimley»Horn	Intersection Improvement Alternatives Analysis Smithfield, Virginia	2013 – 2017 Historic Crash Data (West Side)	Figure 5

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Kimley»Horn

Intersection Improvement Alternatives Analysis
Smithfield, Virginia

2013 – 2017 Historic Crash Data
(East Side)

Figure
6

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3.6 Existing Operational Analysis

The existing traffic operations for this report consists of the analysis of the intersections under AM and PM peak hour conditions. Study area intersections were analyzed using *Synchro Professional (Version 9.2, Build 914, Revision 6)* and *SimTraffic*, which is the microsimulation companion tool of *Synchro*.

Existing intersection turning movement counts were used in conjunction with existing geometric data (i.e., number of lanes, turn-lane storage lengths, intersection traffic control, etc.) and traffic signal timings/phasings to determine the existing vehicle delays, levels of service (LOS), and queue lengths at each study area intersection. "Effective storage length" distances are included with the queue length results in this section. For exclusive turn lanes, the modeled storage length distances reflect effective storage lengths as shown in Figure 3. For intersection movements without dedicated turn lanes, aerial imagery was used to obtain a distance to the next upstream intersection where queued vehicles would likely impede operations.

3.6.1 Model Validation and Calibration

For the operational analysis, inputs and analysis methodologies were kept consistent with VDOT's TOSAM. Four (4) main steps were completed for each of the AM and PM model simulations used in this study:

1. Network Development, Coding, and Model Inspection
2. Network Calibration
3. Inspection and Sample Size Determination
4. Analysis and Reporting

To calibrate the existing models, simulated volumes and speeds were compared with counted volumes (i.e., all intersection turning movements) and average vehicle speeds (i.e., at the two locations where speed data were collected). Detailed summary sheets of the simulated volume and speed calibration process are provided in Appendix B. For the calibration process, 85% of the network links (based on volume) must meet the following threshold:

- Simulated average speed needs to be within:
  - ± 5 mph (for arterials) of observed speeds
- Simulated volumes must be within:
  - ± 20% for < 100 vph
  - ± 15% for ≥ 100 vph to < 300 vph
  - ± 10% for ≥ 300 vph to < 1,000 vph
  - ± 5% for ≥ 1,000 vph

The results of the calibration effort indicate that the existing traffic models were validated and are able to simulate the study areas volumes and speeds adequately to meet the criteria set forth by the TOSAM. Any differences within the calibration results were minor and justification of these discrepancies are also provided in Appendix B.

3.6.2 Sample Size Determination

Per the TOSAM, an initial sample size of 10 simulation runs for the SimTraffic models were conducted before VDOT's Sample Size Determination process was performed. This ensures that an appropriate number of runs have been conducted and that simulation results are reasonable. For this analysis, simulated speeds were used from a critical link (i.e., Benns Church Boulevard, west of S. Church Street) to validate the number of model simulations analyzed. Based on the sample size evaluation, a 10-simulation run sample size was verified as adequate for all models and scenarios analyzed in this study. The complete sample size evaluation results for the existing condition model simulation results are contained in Appendix B.

3.6.3 Intersection Level of Service and Queues

Level of service (LOS) and maximum queue lengths were reported for each of the study area intersections. LOS describes the amount of traffic congestion at an intersection or on a roadway and ranges from A to F (e.g., 'A' indicating a condition of little to no congestion and 'F' a condition with severe congestion, unstable traffic flow, and stop-and-go conditions). Delay and associated LOS for both signalized and unsignalized intersections are reported from the Synchro analysis. Table 7 shows the corresponding thresholds in delay for unsignalized and signalized intersections. In the following LOS/delay tables, values highlighted in "bold" represent movements operating at LOS E or worse.

The queuing tables summarize the maximum simulated queues for each movement during the AM and PM peak hours as they compare to the effective storage lengths. Effective storage lengths represent the amount of distance available for vehicles to queue without generally impacting the adjacent lanes and consist of the full width storage, plus half of the taper distance. Values highlighted as "bold" represent queue lengths that exceed the available storage lengths/spill back to an upstream intersection.

As part of the queuing analysis, "percent blocking" was noted in instances where significant queues impact adjacent turn- and/or through-lanes. This percentage represents the approximate amount of time during the peak hour when a lane was observed to be blocked (i.e., 10% blocking on a left-turn lane with 100 turning vehicles means that 10 vehicles were blocked from entering that turn lane during the peak hour). Detailed capacity summary data sheets are provided in Appendix C of this report.

Table 8 and Table 9 summarize the existing (2017) AM and PM peak hour vehicular delay/LOS and queuing results for each movement, approach, and overall intersection operations for the study area.

Table 7: Intersection Level of Service (LOS) Thresholds

LOS	Signalized Intersections Control Delay Per Vehicle [sec/veh]	Unsignalized Intersections Average Control Delay [sec/veh]	Relative Delay
A	≤ 10	≤ 10	Short Delays
	Free-flow traffic operations at average travel speeds. Vehicles completely unimpeded in ability to maneuver. Minimal delay at signalized intersections.		
B	> 10 – 20	> 10 – 15	
	Reasonably unimpeded traffic operations at average travel speeds. Vehicle maneuverability slightly restricted. Low traffic delays.		
C	> 20 – 35	> 15 – 25	
	Stable traffic operations. Lane changes becoming more restricted. Travel speeds reduced to half of average free flow travel speeds. Longer intersection delays.		
D	>35 – 55	> 25 – 35	Moderate Delays
	Stable traffic operations. Lane changes becoming more restricted. Travel speeds reduced to half of average free flow travel speeds. Longer intersection delays.		
E	>55 – 80	> 35 – 50	
	Significant delays. Travel speeds reduced to one third of average free flow travel speed.		
F	> 80	> 50	Long Delays
	Extremely low speeds. Intersection congestion. Long delays. Extensive traffic queues at intersections.		

Source: Highway Capacity Manual, Transportation Research Board, Washington, D.C., 2010

Based on the LOS results of the existing conditions analysis (Table 8), all movements and approaches currently operate at a LOS D or better. The only instances of a movement or approach experiencing LOS E or worse were noted to occur at the following locations:

- Westbound U-Turn movement from Benns Church Boulevard at S. Church Street
  - LOS F (84.1sec/vehicle) during the AM peak hour and LOS E (67.9sec/vehicle) during the PM peak hour
  - This is a low volume (i.e., less than 5 vehicles) movement and does not significantly impact overall operations at this intersection
- Southbound Left-Turn movement from Canteberry Drive at Benns Church Boulevard
  - LOS E (64.8 sec/vehicle) during the AM peak hour
  - Northbound/Southbound approaches operate in "split phase" (i.e., movements do not run concurrently) and the existing signal timing priority is given to Benns Church Boulevard. These conditions, in addition to the left-turn movement experiencing relatively heavy volumes (i.e., over 100 vehicles) exiting the residential neighborhood during the AM peak hour, results in this movement operating at LOS E.
- Northbound Left-Turn movement from Canteberry Drive at Benns Church Boulevard
  - LOS E (59.1 sec/vehicle) during the PM peak hour
  - Northbound/Southbound approaches operate in "split phase" (i.e., movements do not run concurrently) and the existing signal timing priority is given to Benns Church Boulevard. These conditions, in addition to the left-turn movement experiencing relatively heavy volumes (i.e., over 190 vehicles) exiting the shopping center during the PM peak hour, results in this movement operating at LOS E.
- Northbound Approach for Benns Church Boulevard at Turner Drive
  - LOS E (63.5 sec/vehicle) during the AM peak hour
  - High volume of vehicles attributing to the deficient conditions for this approach due to the school operations during the AM peak hour and no dedicated turn lanes.
- Northbound Approach for Benns Church Boulevard at Cypress Crossing/Gumwood Drive
  - LOS E (42.4sec/vehicle) during the PM peak hour
  - Relatively low volume (i.e., 25 vehicles) at an unsignalized intersection with insufficient gaps along Benns Church Boulevard for the turning vehicles to exit.

The intersections with movements experiencing instances of queues exceeding their effective storage or situations with vehicles being blocked are denoted in Table 9. Generally, the majority of movements for the study area intersections do not experience significant queues or blocking conditions during the AM and PM peak hours, with the exception of the following intersections:

- S. Church Street at Benns Church Boulevard
  - Southbound left-turning vehicles queue up and can block the adjacent right-turn lane during the AM and PM peak hours
- Benns Church Boulevard at Turner Drive
  - Traffic associated with the school results in significant queues forming for the northbound approach during the AM peak
    - There is only one lane for this approach and the signal operates with permissive phasing only
  - Westbound through traffic can queue up and block vehicles from entering the adjacent left-turn lane into the school during the AM and PM peak hours
    - The existing westbound left-turn lane does not meet current VDOT storage and taper length standards

- Benns Church Boulevard at Cypress Crossing/Gumwood Drive
  - Southbound shared through-left-turn lane queues up and significantly blocks the adjacent through lane during the PM peak hour
- Benns Church Boulevard at Canteberry Drive
  - Westbound through traffic can queue up and block vehicles from entering the adjacent left-turn lane into the shopping center during the AM peak hour
    - The existing westbound left-turn lane does not meet current VDOT storage and taper length standards

Table 8: Existing LOS Summary

ID	Intersection	Traffic Control	Overall LOS	Level of Service per Movement by Approach (Delay in sec/veh)											
				Eastbound			Westbound			Northbound			Southbound		
				LT	TH	RT	LT/U	TH	RT	LT	TH	RT	LT	TH	RT
AM Peak Hour															
1	S. Church Street at Benns Church Boulevard	Signal	B (17.9)	A (6.5)	B (11.2)	-	**F (84.1)**	A (10.4)	A (0.4)	-	-	-	D (48.7)	-	D (37.9)
				B (10.6)			A (6.0)			-			D (46.9)		
2	S. Church Street at Smithfield Square Shopping	TWSC	A (1.4)	B (10.6)			B (14.2)		A (9.8)	A (9.0)	A (0.0)	A (0.0)	A (8.7)	A (0.0)	A (0.0)
							B (12.7)			A (0.1)			A (0.6)		
3	S. Church Street at Moore Avenue	TWSC	A (1.2)	-	-	-	B (12.0)	-	A (0.0)	A (0.0)	A (0.0)	A (0.0)	A (8.5)	A (0.0)	A (0.0)
				-			B (12.0)			A (0.0)			A (0.3)		
4	S. Church Street at Smithfield Volunteer Fire Department/McDonald's	TWSC	A (0.9)	A (10.0)			B (10.7)			A (8.5)	A (0.0)	A (0.0)	A (8.4)	A (0.0)	A (0.0)
										A (0.1)			A (0.6)		
5	S. Church Street at Heptinstall Avenue/Smithfield Boulevard	TWSC	A (1.8)	B (10.3)			B (12.0)		A (0.0)	A (8.4)	A (0.0)	A (0.0)	A (8.2)	A (0.0)	A (0.0)
							B (12.0)			A (0.1)			A (0.2)		
6	Benns Church Boulevard at Cypress Crossing/Gumwood Drive	TWSC	A (0.6)	A (9.2)	A (0.0)	A (0.0)	B (11.1)	A (0.0)	A (0.0)	C (22.5)			B (13.6)		A (0.0)
				A (0.3)			A (0.1)						B (13.6)		
7	Benns Church Boulevard at Canterberry Drive	Signal	B (18.6)	A (7.6)	B (12.9)	B (12.0)	A (8.9)	B (14.3)	B (12.8)	D (54.3)		D (50.2)	**E (64.8)**		D (46.7)
				B (12.5)			B (14.0)			D (52.3)			**E (59.1)**		
8	Benns Church Boulevard at Cypress Run Drive	Signal	A (5.0)	-	A (3.7)	A (4.0)	A (4.1)	A (4.0)		D (53.1)		D (52.0)	A (0.0)		
				A (3.7)			A (4.0)			D (52.3)					
9	Benns Church Boulevard at Turner Drive	Signal	C (30.6)	-	C (24.8)	D (46.2)	C (21.0)	B (12.6)		**E (63.5)**			C (29.9)		C (29.6)
				C (31.3)			B (14.3)						C (29.9)		
PM Peak Hour															
1	S. Church Street at Benns Church Boulevard	Signal	B (17.8)	B (10.3)	B (13.0)	-	**E (67.9)**	B (10.4)	A (0.7)	-	-	-	D (49.6)	-	D (36.6)
				B (12.6)			A (6.2)			-			D (47.0)		
2	S. Church Street at Smithfield Square Shopping	TWSC	A (2.5)	B (11.7)			C (23.8)		B (11.9)	A (9.1)	A (0.0)	A (0.0)	B (10.3)	A (0.0)	A (0.0)
							C (17.3)			A (0.2)			A (1.0)		
3	S. Church Street at Moore Avenue	TWSC	A (1.4)	-	-	-	B (14.6)	-	A (0.0)	A (0.0)	A (0.0)	A (0.0)	A (9.9)	A (0.0)	A (0.0)
				-			B (14.6)			A (0.0)			A (0.5)		
4	S. Church Street at Smithfield Volunteer Fire Department/McDonald's	TWSC	A (0.7)	B (12.2)			B (12.2)			A (9.0)	A (0.0)	A (0.0)	A (9.5)	A (0.0)	A (0.0)
										A (0.0)			A (0.4)		
5	S. Church Street at Heptinstall Avenue/Smithfield Boulevard	TWSC	A (1.5)	B (11.2)			C (16.0)		A (0.0)	A (9.0)	A (0.0)	A (0.0)	A (9.7)	A (0.0)	A (0.0)
							C (16.0)			A (0.3)			A (0.9)		
6	Benns Church Boulevard at Cypress Crossing/Gumwood Drive	TWSC	A (1.9)	B (13.5)	A (0.0)	A (0.0)	B (11.9)	A (0.0)	A (0.0)	**E (42.4)**			C (22.5)		A (0.0)
				A (0.9)			A (0.2)						C (22.5)		
7	Benns Church Boulevard at Canterberry Drive	Signal	C (31.1)	B (20.0)	C (25.0)	C (32.3)	B (17.3)	C (30.5)	B (19.0)	**E (59.1)**		D (42.8)	D (55.0)		D (50.1)
				C (25.5)			C (28.9)			**E (55.4)**			D (52.5)		
8	Benns Church Boulevard at Cypress Run Drive	Signal	B (16.7)	A (9.7)	B (16.9)	B (11.5)	B (14.2)	B (13.8)		D (39.9)		D (35.9)	D (47.3)		
				B (16.4)			B (13.9)			D (37.9)					
9	Benns Church Boulevard at Turner Drive	Signal	C (23.7)	B (14.2)	C (25.0)	B (17.2)	B (15.9)	C (20.5)		D (42.5)			C (27.5)		C (27.5)
				C (23.9)			B (20.0)						C (27.5)		

Table 9: Existing Maximum Queues Summary

ID	Intersection	Maximum Queue Length by Movement (feet)											
		Eastbound			Westbound			Northbound			Southbound		
		LT	TH	RT	LT/UT	TH	RT	LT	TH	RT	LT	TH	RT
AM Peak Hour													
1	Effective Storage Length	150	Cont.	-	140	1,100	250	-	-	-	480	-	200
	S. Church Street at Benns Church Boulevard	122	177	-	42	208	49	-	-	-	256 **(2%)	-	187
2	Effective Storage Length		Cont.			Cont.		Cont.	TWLTL	490	275	100	300	275
	S. Church Street at Smithfield Square Shopping		30			83		53	< 25	< 25	< 25	47	0	0
3	Effective Storage Length	-	-	-	450	-	150	TWLTL	300	-	TWLTL	100	-	
	S. Church Street at Moore Avenue	-	-	-	88	-	41	-	0	0	43	29	-	
4	Effective Storage Length		160			140		TWLTL	100	100	TWLTL	675	675	
	S. Church Street at Smithfield Volunteer Fire Department/McDonald's		27			47		< 25	< 25	0	36	0	0	
5	Effective Storage Length		Cont.			Cont.	225	100	675		100	Cont.		
	S. Church Street at Heptinstall Avenue/Smithfield Boulevard		47			64	63	25	0		31	0		
6	Effective Storage Length	315	1,100	140	300	700	525	Cont.			Cont.		115	
	Benns Church Boulevard at Cypress Crossing/Gumwood Drive	48	< 25	0	< 25	0	< 25	< 25			75		62	
7	Effective Storage Length	265	650	600	215	800	365	Cont.		Cont.	Cont.		Cont.	
	Benns Church Boulevard at Canterberry Drive	151	298	39	149	254	34	100		60	189		69	
8	Effective Storage Length	140	800	240	250	2,150		Cont.		Cont.	Cont.			
	Benns Church Boulevard at Cypress Run Drive	0	117	< 25	72	70	103	55		76	0			
9	Effective Storage Length	150	2,150	300	150	Cont.	Cont.	Cont.			Cont.		125	
	Benns Church Boulevard at Turner Drive	0	427 **(1%)	**299**	**149** *(1%)	246 **(1%)	220	**399**			73		26	
PM Peak Hour													
1	Effective Storage Length	150	Cont.	-	140	1,100	250	-	-	-	480	-	200	
	S. Church Street at Benns Church Boulevard	149	220 **(1%)	-	65	221	124	-	-	-	345 **(10%)	-	200 *(1%)	
2	Effective Storage Length		Cont.			Cont.		Cont.	TWLTL	490	275	100	300	275
	S. Church Street at Smithfield Square Shopping		40			272		165	26	-	34	82	< 25	-
3	Effective Storage Length	-	-	-	450	-	150	TWLTL	300	-	TWLTL	100	-	
	S. Church Street at Moore Avenue	-	-	-	124	-	74	-	< 25	< 25	56 *(1%)	60	-	
4	Effective Storage Length		160			140		TWLTL	100	100	TWLTL	675	675	
	S. Church Street at Smithfield Volunteer Fire Department/McDonald's		30			70		< 25	0	0	28	0	0	
5	Effective Storage Length		Cont.			Cont.	225	100	675		100	Cont.		
	S. Church Street at Heptinstall Avenue/Smithfield Boulevard		30			71	57	35	< 25		59	0		
6	Effective Storage Length	315	1,100	140	300	700	525	Cont.			Cont.		115	
	Benns Church Boulevard at Cypress Crossing/Gumwood Drive	126	< 25	< 25	60	< 25	< 25	111			344 **(41%)		115 *(2%)	
7	Effective Storage Length	265	650	600	215	800	365	Cont.		Cont.	Cont.		Cont.	
	Benns Church Boulevard at Canterberry Drive	119	268	36	214	474 **(7%)	57	255		67	139		96	
8	Effective Storage Length	140	800	240	250	2,150		Cont.		Cont.	Cont.			
	Benns Church Boulevard at Cypress Run Drive	< 25	305	70	175	199	259	131		101	< 25			
9	Effective Storage Length	150	2,150	300	150	Cont.	Cont.	Cont.			Cont.		125	
	Benns Church Boulevard at Turner Drive	106	351 **(10%)	**274**	**149**	322 **(6%)	318	**237**			< 25		< 25	

Notes:

**(X%) - Maximum queue extends full length of storage bay for X% of the analysis period*

***(Y%) - Queue in lane adjacent to storage bay extends beyond end of storage bay for Y% of the analysis period*

^(Z%) - Maximum queue extends back to upstream intersection for Z% of the analysis period

4.0 Environmental Assessment

A preliminary environmental review using select National Environmental Policy Act (NEPA) process criteria was conducted for this project to determine if sensitive sites may be present or potentially impacted by the construction of improvements at the S. Church Street/Benns Church Boulevard intersection as well as the Cypress Crossing/Gumwood Drive at Benns Church Boulevard intersection. This preliminary environmental review identifies and assesses potential social and environmental impacts from the proposed conceptual improvements under consideration. The environmental review was limited to available database information and a site visit conducted along public thoroughfares. The environmental study area consists of approximately ±148 acres around the S. Church Street/Benns Church Boulevard intersection, generally extending south to Canteberry Lane, west to Cypress Crossing, east to Berkley Street, and north to Smithfield Boulevard.

Figure 7 and Figure 8 reflect the environmental study area boundary graphically over a United States Geological Survey (USGS) Topographic map as well as an aerial photograph. Based on this preliminary environmental review, no environmental fatal flaws or items that would prohibit the construction of proposed intersection improvements (specifically the introduction of a fourth leg to the intersection) were identified.

The following areas were preliminary reviewed to identify potential significant impacts and detailed figures are attached in Appendix D:

- Socio-Economic Impacts
  - Environmental Justice
  - Community Facilities
  - Parks and Recreational Facilities
- Cultural and Historic Resource Impacts
- Section 4(f) and Section 6(f)
- Natural Resources Impacts
  - Floodplain
  - Wetlands and Surface Waters
  - Wildlife and Habitat
- Farmland Impacts
- Hazardous Materials Impacts

The following areas will need to be reviewed for the required NEPA and/or SERP document if/when the proposed request for break in access and the associated intersection improvements have been approved:

- Air Quality
- Noise
- Right-of-way and relocations
- Cumulative and indirect impacts
- Public involvement
- Coordination with state environmental and natural resource agencies to provide comments on potential environmental impacts and recommendations regarding avoidance and minimization opportunities.

4.1 Socio-Economic Impacts

Socio-economic impacts were reviewed in the following areas:

- Environmental justice impacts
- Community facility impacts
- Parks and recreation facility impacts

Potential impacts resulting from the implementation of the intersection modifications are described below.

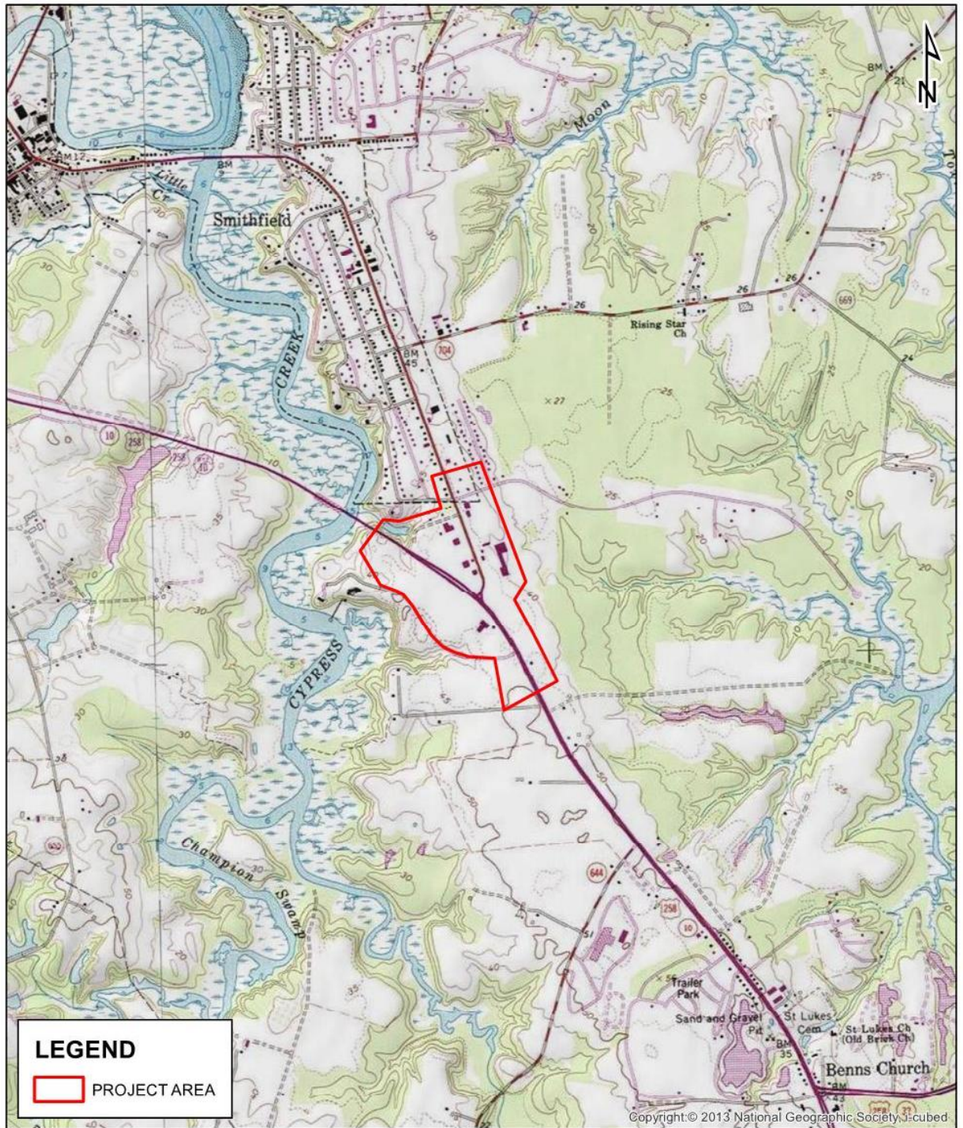
4.1.1 Environmental Justice

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, effective February 11, 1994, directs Federal agencies to take the appropriate and necessary steps to identify and address disproportionately high and adverse effects of Federal projects on the health or environment of minority and low-income populations to the greatest extent practicable and permitted by law.

A minority individual is defined as a person who is nonwhite (Black, Asian American, American Indian/Alaskan Native, Native Hawaiian/Pacific Islander, or a combination including any of these races) and/or identifies as Hispanic or Latino. A minority population is present when the minority population of a block group within the environmental justice study area exceeds 50 percent. If there are no block groups which exceed 50%, then the use of the Environmental Justice (EJ) evaluation factor is used. The EJ factor is determined by multiplying the minority population percentage in the block group with the lowest percentage by 10%. An EJ population exists if any other block group has a percentage higher than this number.

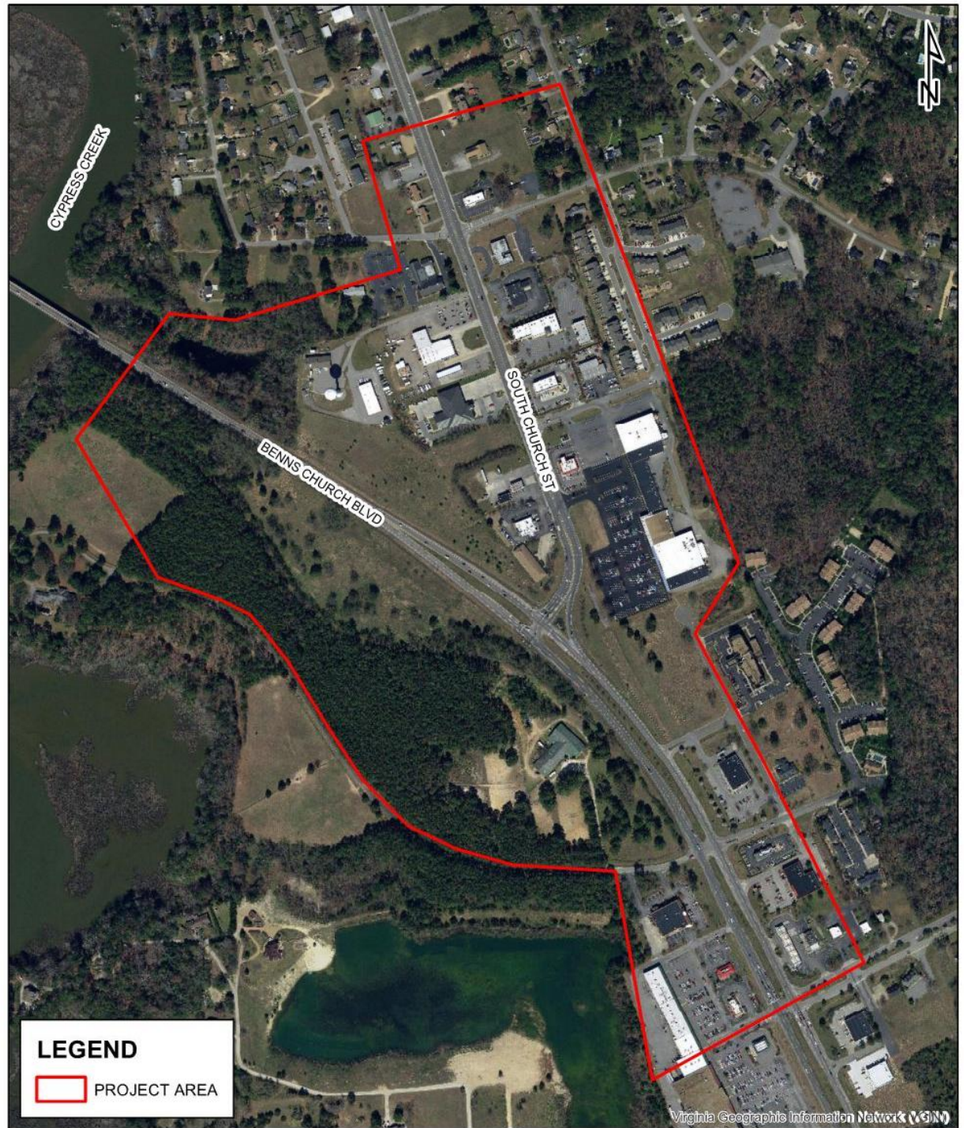
A low-income individual is defined as a person whose median household income is at or below the Department of Health and Human Services poverty guidelines. The 2016 Health and Human Services Guidelines state that a family of four is considered at poverty level if the median household income is $24,300 or below. Census tract data was used for poverty guidelines due to lack of available data at the block group level. Data was obtained from the U.S. Census Bureau 2010 Decennial Census and the 2011-2015 American Community Survey 5-Year Estimates. The study area intersects with two (2) census tracts and three (3) block groups. Table 10 summarizes the minority population data identified within the study area. Table 11 summarizes the low-income population data identified within the study area. Figure 9 depicts the locations of the census tracts and block groups within the study area.

Figure 7: Topographic Map



Kimley»Horn	PROJECT: SMITHFIELD INTERSECTION IMPROVEMENTS SMITHFIELD, VIRGINIA	
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	DATE: 08/10/2017	KHA PROJECT NUMBER: 116499014

Figure 8: Study Area Boundary on Aerial Photograph



Kimley»Horn	PROJECT: SMITHFIELD INTERSECTION IMPROVEMENTS SMITHFIELD, VIRGINIA	
	CREATED BY: E. FOWLER	SCALE: 1 IN = 500 FT
	DATE: 04/30/2018	KHA PROJECT NUMBER: 116499014

Figure 9: Census Tracts and Block Groups

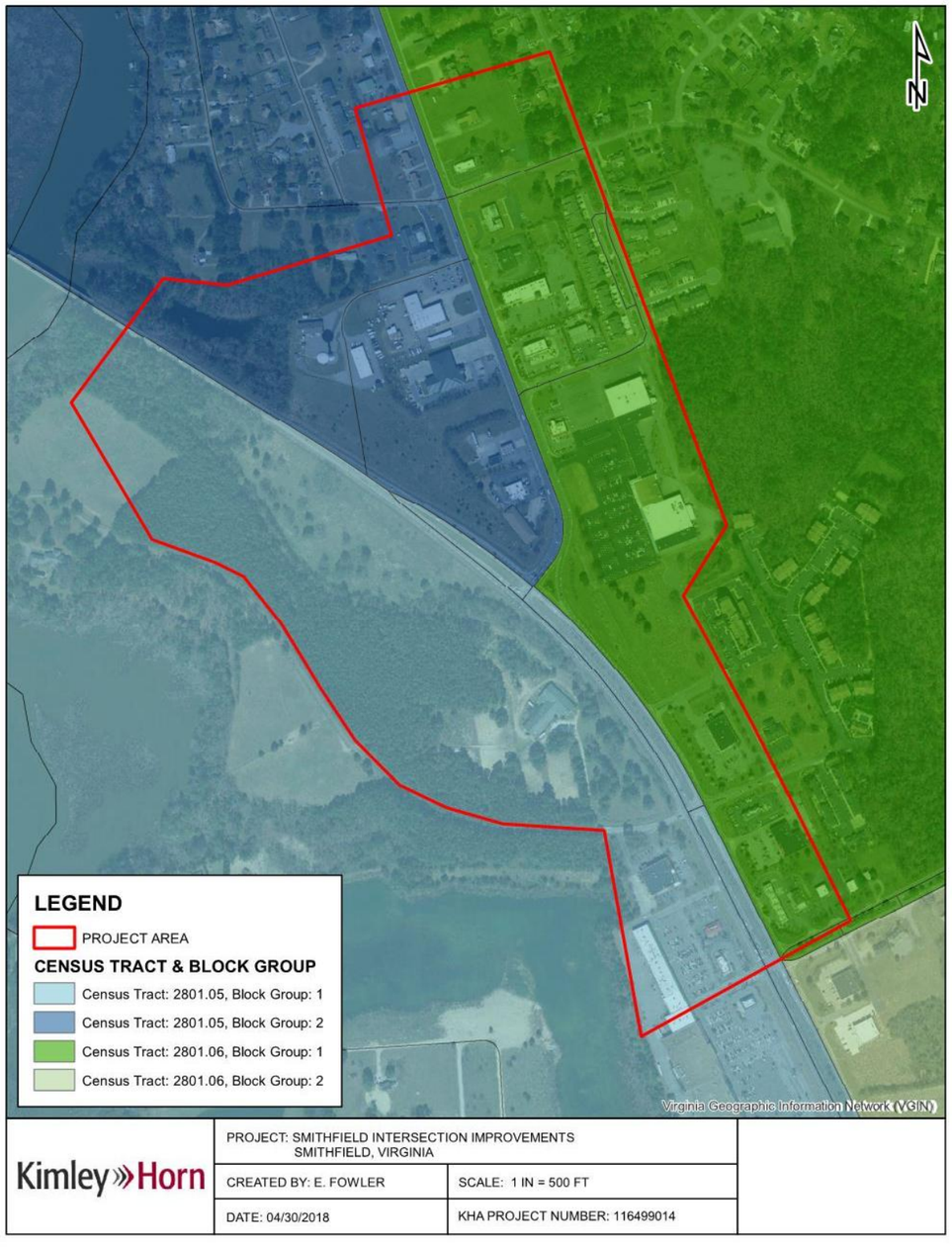


Table 10: Census Block Groups Per 2010 Census Data

Census Tract	Block Group	Total Population	Minority Population	% Minority
2801.05	BG 1	1486	695	47%
2801.05	BG 2	627	144	23%
2801.06	BG 1	2288	716	31%
	Totals	4401	1555	35%
EJ evaluation factor equals 1.1 x greater than lowest				*25%*

Table 11: 2015 Census Tract Median Household Income

Census Tract	Median Income
Census Tract 2801.05	$ 65,750.00
Census Tract 2801.06	$ 88,702.00
Isle of Wight County	$ 65,741.00

The minority population of the environmental justice study area does not exceed 50 percent; however, the percentage of minority population is above the EJ evaluation factor in census tract 2801.05 block group 1 and 2801.06 block group 1. It is expected that neither of the proposed Build alternatives will disproportionally impact these groups. As listed in Table 11, all Census Tracts exceed the median household income of $24,300; therefore, no low-income population is considered to be present.

4.1.2 Community Facilities

Based on a review of GIS data, there are no public schools, hospitals, libraries, community centers, or police stations located within the environmental analysis study area. The Smithfield Volunteer Fire Department Station 50 is located approximately 1,000-feet northwest of the Benns Church Boulevard and S. Church Street intersection. One church, located at 1800 S. Church Street, is approximately 1,200-feet northwest of the S. Church Street and Benns Church Boulevard intersection. The nearest medical center is The Isle of White Health Department and is located at 919 S. Church Street in Smithfield. Other community facilities located near the study area but technically outside of it, consist of the following:

- Good Shepherd Catholic Church, 0.1 mile east
- Hope Presbyterian Church, ±0.3 mile southeast
- Smithfield High School, ±0.8 miles southeast
- Smithfield Middle School, ±0.9 miles southeast

It is not anticipated that any of the proposed intersection improvement alternatives would result in permanent adverse impacts to emergency services or community facilities. Impacts related to construction will be temporary and should be minimized to the maximum extent practicable to maintain emergency access throughout construction.

4.1.3 Parks and Recreational Facilities

Based on a review of GIS data, no local, state, or national parks were identified within the study area.

4.2 Cultural and Historic Resources

Federal agencies are required to consider impacts to cultural and historic resources in the planning and execution of their projects, in accordance with Section 106 of the National Historic Preservation Act, Section 4(f) of the Department of Transportation Act, the National Environmental Policy Act (NEPA), and other provisions of Federal law. The Virginia Department of Historic Resources (VDHR) serves as the State Historic Preservation Officer (SHPO) in Virginia. Under Federal law, a historic property is any district, site, building, structure, or object that is listed in or eligible for listing in the National Register of Historic Places (NRHP). To be eligible for listing, sites must meet at least one of the National Register Criteria for Evaluation, which involves examining the age, integrity, and significance of the site. Historic sites that are eligible for listing on the NRHP and/or are recommended for preservation in place by VDHR are also protected under Section 4(f). Section 4(f) is further discussed in Section 4.3.

VDHR's Virginia Cultural Resource Information System (V-CRIS) and associated GIS data were used to identify existing records of archaeological and architectural resources within the study area that are eligible or potentially eligible for listing on the NRHP. The data identified four (4) archaeological sites within the study area, with locations depicted on Figure 10 and descriptions as follows:

- VDHR ID# 44IOW145, a Native American Camp, is located along Cypress Crossing, approximately 1,200-feet west of the Benns Church Boulevard and S. Church Street Intersection. The property is described as a Native American camp existing between 8500-1201 B.C.E. The resource has not been evaluated for listing on the NRHP.
- VDHR ID# 44IOW148, a transportation and communication resource, is located along Cypress Crossing, approximately 2,000-feet northwest of the Benns Church Boulevard and S. Church Street Intersection. The property is described as a transportation/communication area active between 1600-1699. The resource is eligible for listing on the NRHP.
- VDHR ID# 44IOW161, a single dwelling, is located between Cypress Crossing and Benns Church Boulevard, approximately 1,500-feet northwest of the Benns Church Boulevard and S. Church Street intersection. The resource is not eligible for listing on the NRHP.
- VDHR ID# 44IOW163, a single dwelling, is located between Cypress Crossing and Benns Church Boulevard, approximately 700-feet southeast of the Benns Church Boulevard and S. Church Street intersection. The resource not eligible for listing on the NRHP.

The proposed intersection improvement alternatives do not appear to encroach on any of the identified resources. However, as part of the Section 106 process, a Phase I Cultural Resource Survey may be required to identify, evaluate and determine the eligibility of resources. Further assessment of the project's effects to historic properties and coordination with VDHR will then be necessary for concurrence on an effect determination. If adverse effects are identified, then additional consultation including evaluation of avoidance, minimization and mitigation of impacts would be required.

Figure 10: Cultural and Historical Resources



4.3 Section 4(f) and Section 6(f)

4.3.1 Section 4(f)

Section 4(f) of the Department of Transportation Act of 1966 stipulates that federal agencies cannot approve the use of land from publicly owned parks, recreation areas, wildlife and waterfowl refuges, or historic sites unless there is no prudent and feasible alternative to using that land, and the program or project includes all possible planning to minimize harm to the Section 4(f) resource. A "use" of a Section 4(f) property includes any acquisition of right-of-way (ROW) or a permanent easement, temporary occupancy, or constructive use.

No local, state, or national parks, recreational areas or wildlife and waterfowl refuges that are protected under Section 4(f) were identified within the study area.

Potential historic resources identified within the project's study area were described in Section 4.2. Depending upon the impacts to historic resources and the effect determination, additional coordination regarding Section 4(f) as it pertains to historic resources may be required.

4.4 Natural Resources

Impacts to natural resources were reviewed in the following areas:

- Floodplain
- Wetlands and Surface Waters
- Wildlife and Habitat

4.4.1 Floodplain

Executive Order No. 11988, issued May 24, 1977, directs Federal agencies to avoid adverse impacts associated with the occupancy, modification, and development of floodplains to the extent practicable. The Federal Emergency Management Agency (FEMA) defines the 100-year floodplain as the area that will be inundated by the flood event having a one percent chance of being equaled or exceeded in any given year. According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) for Isle of Wight of Wight County, Virginia, Community Panel Numbers 51093C0153E, dated December 2, 2015, the northwestern portion of the study area lies within Zone X. These are areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

4.4.2 Wetlands and Surface Waters

Tidal and non-tidal wetlands and Waters of the United States (WOUS) are subject to the jurisdiction of the U.S. Army Corps of Engineers (USACE) and the Virginia Department of Environmental Quality (VDEQ). Subaqueous lands, tidal wetlands, and waters with a drainage area greater than five square miles are subject to the jurisdiction of Virginia Marine Resources Commission (VMRC). Permit types and the level of coordination will be determined based on the amount of impact to these jurisdictional areas.

Permit issuance is subject to the level of effort during the design to first avoid, and then minimize impacts to jurisdictional areas. Figure 11 identifies potential wetlands and WOUS within the environmental study area.

GIS data, including topographic, U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) mapping, aerial photography, and U.S. Department of Agriculture (USDA) Natural Resources Conservation (NRCS) soil survey data, were reviewed to identify potential wetlands, water bodies, and streams within the study area. The USFWS NWI mapping shown in Figure 12 identifies a freshwater pond (PUBHh) and a perennial stream (R5UBH) within the northwestern portion of the study area. The freshwater pond identified on USFWS NWI mapping appears to be approximately 1.5-acres with approximately 140 linear feet of associated perennial stream. These systems are also apparent on the topographic, aerial, infrared, and LiDAR mapping. These systems may have connectivity to Cypress Creek, located west of the study area.

A site visit was conducted on September 15, 2017. A non-tidal open water wetland (POW) was observed in the northwest portion of the study area. The POW appears to be non-tidal based on the abundance of *Lemna minor* (lesser duckweed), which grows in freshwater wetlands and slow-moving streams. Cypress Creek, a tidal waterbody, was observed immediately adjacent to the POW identified; however, connectivity between the two features was not apparent.

If encroachment within these wetland areas is proposed, additional coordination with the USACE to determine the jurisdictional status of these features should be conducted. If jurisdictional features located within the limits of proposed improvements are identified during the field delineation, efforts to avoid and minimize impacts to these features to the maximum extent possible should be incorporated during design.

A field delineation of wetlands and WOUS in accordance with the USACE *Wetland Delineation Manual* (1987) and applicable Regional Supplement has not been conducted.

If impacts to wetland and WOUS cannot be avoided, the project must be designed in a way to minimize adverse impacts. For unavoidable adverse impacts to wetland and WOUS features, compensatory mitigation is typically required. Compensatory mitigation requirements may typically be satisfied through the following three mechanisms which are listed in the order of the agency preference for achieving compensatory mitigation:

- Mitigation Banking: The permittee may purchase credits from an agency approved mitigation bank within the same watershed. Mitigation banks are associated with wetlands or streams that have been restored, established, preserved, or enhanced and set aside to compensate for the future conversion of wetlands resulting from development activities.
- In-Lieu Fee Mitigation: Public agencies or non-profit organizations can qualify as in-lieu-fee sponsors. These sponsors collect funds from multiple permittees with impacts to wetlands, and use the fees to construct and maintain a wetland mitigation site. In-lieu fee mitigation is performed off-site and occurs after the permitted impacts have been taken.

- Permittee-responsible mitigation: The permittee may restore, establish, preserve, or enhance wetlands on-site, or off-site within the same watershed. The permittee performs the mitigation following permit issuance and is responsible for the success of the chosen mitigation method.

Impacts to forested wetlands typically require 2 credits of compensatory mitigation per acre of wetland impacted (2:1 ratio). Impacts to emergent wetlands and jurisdictional ditches typically require 1 credit of compensatory mitigation per acre of wetland impacted (1:1 ratio). Impacts to streams require an assessment using DEQ's Unified Stream Methodology (USM) to assess ecological function and value, which determines the required compensatory mitigation credits. The required ratio for stream mitigation typically ranges from 1 to 1.5 credits per linear foot of impact.

The study area is located within the Lower James River Basin (HUC 02080206). In the Lower James River watershed, at this time, non-tidal wetland credits are approximately $50,000 per credit, tidal wetland credits are approximately $500,000 per credit, and stream credits are $500 per credit. The prices of wetland and stream credit fluctuates based on supply and demand. An exact price of wetland and stream credits requires estimates from an agency approved wetland mitigation bank within the same watershed.

4.4.3 Wildlife and Habitat

Section 7 of the Endangered Species Act (ESA) requires federal agencies to ensure that an undertaking is not likely to jeopardize the continued existence of species that are listed as endangered or threatened.

The U.S. Fish and Wildlife Service (USFWS) Information, Planning, and Consultation (IPaC) System, the Department of Game and Inland Fisheries (DGIF) Virginia Fish and Wildlife Information Service (VaFWIS) database, DGIF's Northern Long-Eared Bat (NLEB) Winter Habitat and Roost Trees Application, DGIF's Little Brown Bat (MYLU) and Tri-colored Bat (PESU) Winter Habitat and Roosts Application, the Center for Conservation Biology's (CCB) Eagle Nest Locator, and the Department of Conservation and Recreation (DCR) Natural Heritage Data Explorer interactive map were reviewed to identify known federal or state listed endangered and threatened species and critical habitats within the study area.

The USFWS Official Species List, dated August 9, 2017, identified 1 specie as potentially occurring within the vicinity of the study area. A summary of the species identified on the referenced databases reviewed and a preliminary evaluation of potential habitat within the study area is provided in Table 12. The preliminary evaluation of potential habitat was based on available desktop and site-specific field studies and determinations were not conducted.

Figure 11: Potential Wetlands



Figure 12: USFWS National Wetlands Inventory

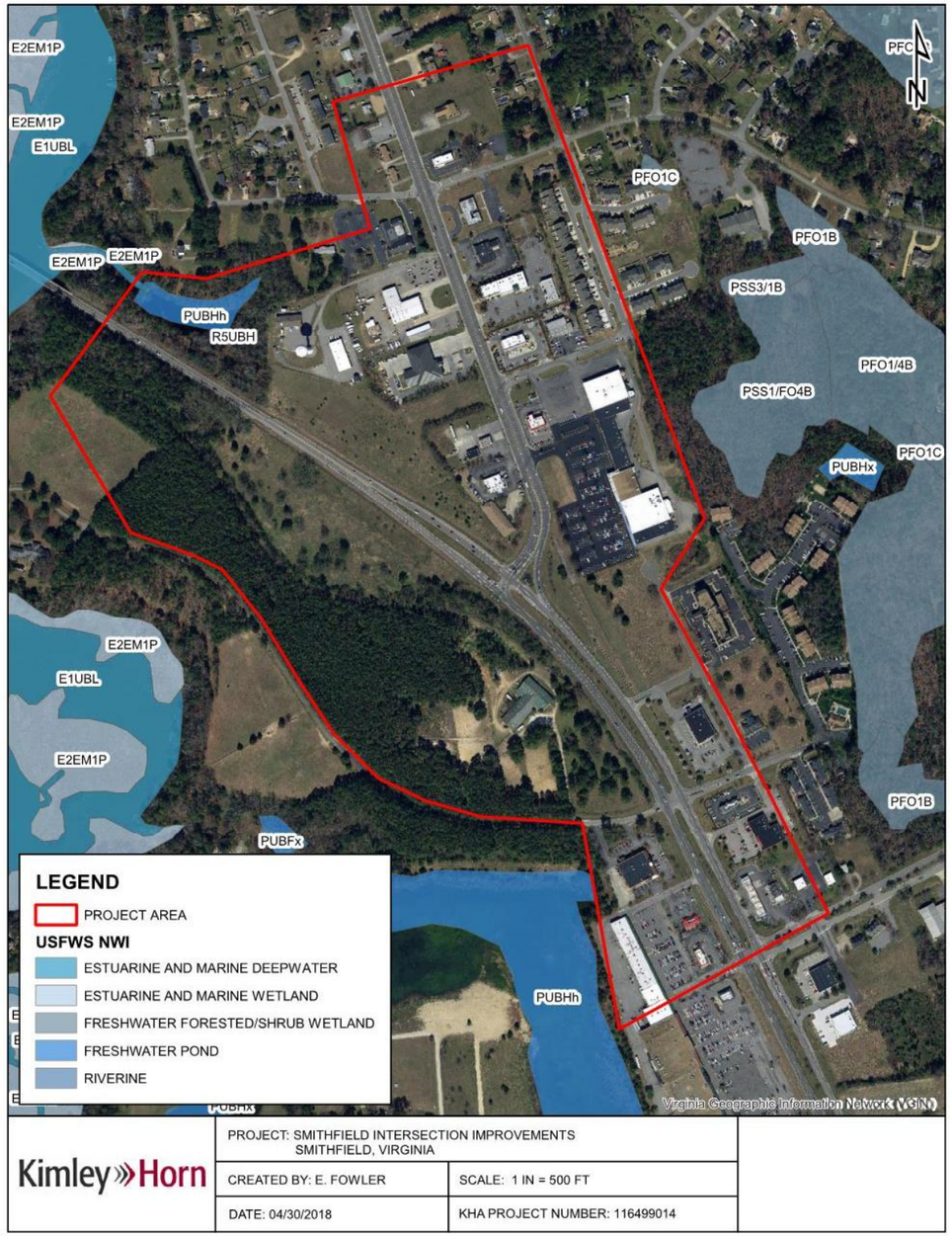


Table 12: Summary of Federal and State Listed Threatened and Endangered Species Database Results

Species & Listing	Agency Identified By	Notes	Preliminary Habitat Conclusions
Northern Long-eared Bat (Myotis septentrionalis) - FT	USFWS	According to the USFWS Fact Sheet, Northern long-eared bats spend winter hibernating in caves and mines, called hibernacula. During the summer, northern long-eared bats roost singly or in colonies underneath bark, in cavities or in crevices of both live trees and snags (dead trees). Maternity roost sites and winter hibernacula were not identified on DGIF's NLEB Winter Habitat and Roost Trees Application. Provided the proposed project relies on the findings of the 1/5/2016 Programmatic Biological Opinion for Final 4(d) Rule on the Northern Long-Eared Bat, it is not anticipated that the proposed project would adversely impact NLEB.	Maternity roost and winter hibernacula likely not present

Note: FE=Federal Endangered; FT=Federal Threatened; SE=State Endangered; ST=State Threatened; FS=Federal Species of Concern

Based on the initial correspondence from VDCR, no conservation sites were identified within the study area. However, Muddy Cross Ponds Conservation Site are located within 2-miles of the study area. Formal comments from DCR will be provided separately upon receipt.

The CCB mapper identified a Bald Eagle nest (Nest Code: IW1501) approximately 2,500-feet northwest of the Benns Church Boulevard and S. Church Street Intersection. The nest was reportedly checked in 2017; however, according to the CCB mapper, it is unknown when the nest was last occupied. The project's study area intersects the 660-foot eagle nest buffer; however, because this project will be focused at the intersection of Benns Church Boulevard and S. Church Street, it is not anticipated this project will have an adverse impact on this nest identified.

It is not anticipated that the any of the proposed intersection improvement alternatives would result in adverse impacts to listed species given the developed nature of the corridor and proposed activity. However, additional coordination with USFWS, DGIF and DCR regarding the identified species, potential habitat and potential impacts from the project will be required during the NEPA process.

4.5 Farmland

NEPA and the Farmland Protection Policy Act of 1981 (FPPA) require federal agencies to consider impacts to important farmlands and to make reasonable efforts to avoid or minimize the permanent conversion of farmland to nonagricultural uses. Important farmland includes all land that is defined as prime, unique, or statewide or locally important based on soil type (FPPA Manual, NRCS, 2013). Farmland is classified independently of land use, but does not include open water or urban built-up land.

FPPA coordination for conversion of farmland related to corridor type projects is conducted through the Natural Resources Conservation Service (NRCS) using Form CPA-106 to determine the Farmland Conversion Impact Rating. If a project scores less than 160 points on Form CPA-106, FPPA does not apply and no further coordination is required.

The NRCS Soil Survey GIS Data was reviewed to identify the presence of important farmlands within the study area. Prime farmland and farmland of statewide importance was not identified within the study area. Given the entire study lies in an area identified as not prime farmland, FPPA is not expected to apply and no significant impacts to important farmlands are anticipated. Figure 13 reflects the farmland areas located within the study area.

4.6 Hazardous Materials

The Virginia Department of Environmental Quality's (VDEQ) GIS datasets and Virginia Environmental Geographic Information Systems (VEGIS) were reviewed for known petroleum releases, tank facilities, and Voluntary Remediation Program (VRP) sites within the study area.

The study area is predominantly developed near the subject intersection with commercial land uses consisting of retail, restaurants, gas stations and hotels. Residential land use is located immediately outside of the commercial development areas. Based on a review of the GIS data, petroleum release sites and registered tank facilities were identified within the study area. No VRP sites were identified within the study area. Specifically, one (1) petroleum release was identified within the study area or immediately adjacent to the study area. Table 13 provides a summary of the identified facilities, Pollution Complaint (PC) Numbers, location and case status.

Table 13: Summary of Petroleum Releases

Facility Name	Facility Address	PC Number	Case Status	Release Status	Release Reported Date	Date Case Closed
Smithfield Amoco	1201 Benns Church Blvd	19992328	Closed	Confirmed	1/14/1999	1/05/2009

In addition to the petroleum releases identified in Table 13, three (3) registered tank facilities were identified within the study area or immediately adjacent to the study area. A summary of the facilities, location and status is provided in Table 14.

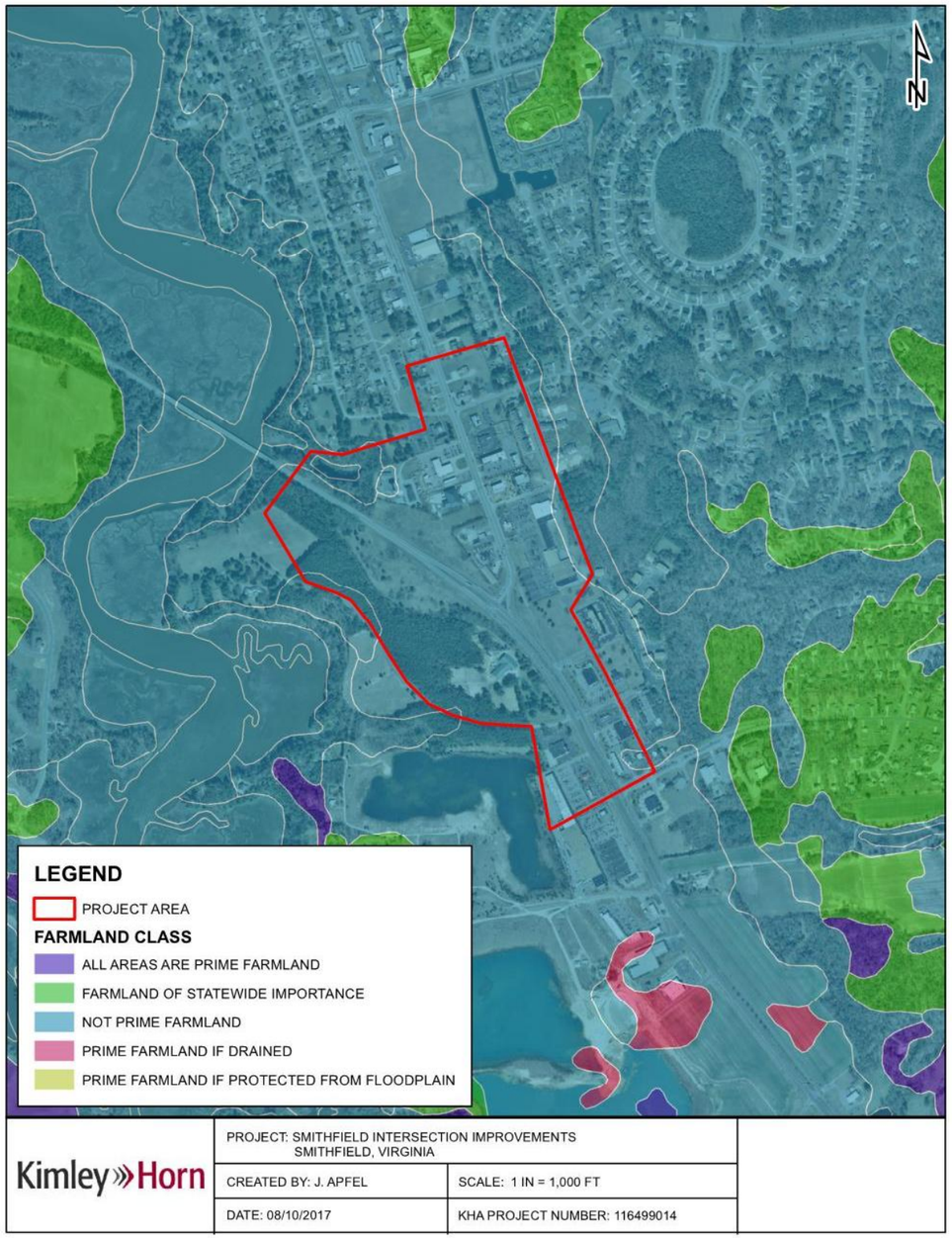
Table 14: Summary of Registered Tank Facilities

Facility Name	Facility Address	Facility ID	Facility Type	Facility Active	Active UST	Inactive UST
BP	1808 S. Church St	5012519	Gas Station	Yes	3	3
7-Eleven	603 W Main St	5014370	Gas Station	Yes	2	3
Miller Mart #25	13458 Benns Church Blvd	5024060	Gas Station	Yes	5	0

In addition to a review of GIS data, a site visit was conducted on September 15, 2017 to review the project corridor and adjacent properties from public thoroughfares. A BP Gas Station (1808 S. Church Street), previously Sunoco Gas Station, was observed approximately 600-feet north of the Benns Church Boulevard and S. Church Street intersection. Keen's Automotive Center (1802 S. Church Street) was observed approximately 1,200-feet northwest of the intersection of interest. Brown's Automotive (101 Moore Avenue) was observed approximately 1,100-feet northeast of the intersection of interest. Activities on site appeared to include used tire storage, typical automotive chemical storage, and typical automotive repair activities. Laundry Land (1258 Smithfield Plaza) was observed approximately 1,600-feet south of the intersection of interest; however, it appeared to be a coin operated laundromat without on-site dry-cleaning operations. Retail shops and fast-food restaurants were observed throughout the study area. Several pole-mounted transformers associated with overhead utilities were observed throughout the study area. Figure 14 shows the identified sites.

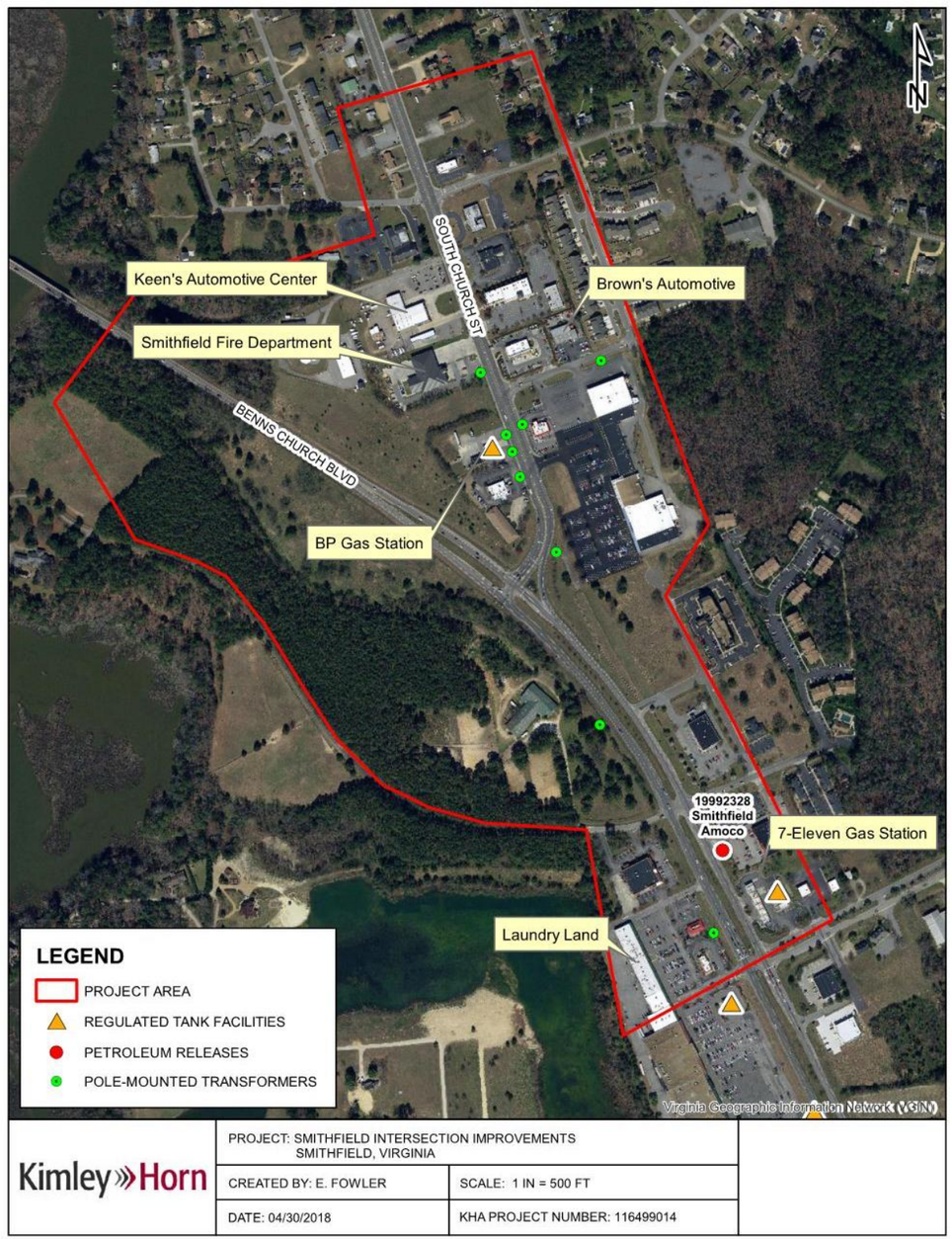
A detailed review to assess and identify the potential for the selected contractor to encounter contamination during construction should be conducted. In addition, if right-of-way acquisition will be required for the proposed intersection modification/improvement, a Phase I Environmental Site Assessments (ESA), conducted in accordance with American Society of Testing and Materials (ASTM) Standard 1527-13, may be required.

Figure 13: Farmland



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Figure 14: Hazardous Materials



Kimley»Horn	PROJECT: SMITHFIELD INTERSECTION IMPROVEMENTS SMITHFIELD, VIRGINIA	
	CREATED BY: E. FOWLER	SCALE: 1 IN = 500 FT
	DATE: 04/30/2018	KHA PROJECT NUMBER: 116499014

5.0 Future Traffic Volumes

Future traffic volumes were developed for the study horizon years of 2025 and 2045. These volumes represent the projected growth that will occur within and around the study area. This section details the methods and process for determining future traffic volumes for the study area corridor and intersections.

5.1 Forecast Methodology

In order to establish 2025 and 2045 horizon year traffic volumes within the study area, several growth and developmental factors were taken into consideration. Anticipated future traffic volumes based on historical trends, previous studies, and future land uses were determined through conversations and information provided by VDOT and Town of Smithfield staff. For the purposes of this study, existing traffic patterns/travel behaviors were assumed to remain consistent through 2045 future planning conditions.

5.2 Projected Growth

5.2.1 Historical VDOT Annual Average Traffic Volume Estimates

Based on historical data from VDOT's daily traffic volume estimates, annual growth rates were calculated for the study corridor to assist in the development of future mainline traffic volume projections. Ten years (2007 – 2016) of historic traffic volume estimates along the Benns Church Boulevard and S. Church Street were obtained from VDOT and are shown in Table 15 and Figure 15. Based on these trends, volumes have varied during the past 10 years, but have stayed generally consistent the past 5 years. The growth rates that were developed based on these historic trends were vetted by VDOT and the Town of Smithfield and are summarized in Table 16. Growth rates were applied annually to the existing traffic counts to derive the background 2025 and 2045 volumes.

Table 15: 10-Year Historic Average Annual Traffic Volumes (2007-2016)

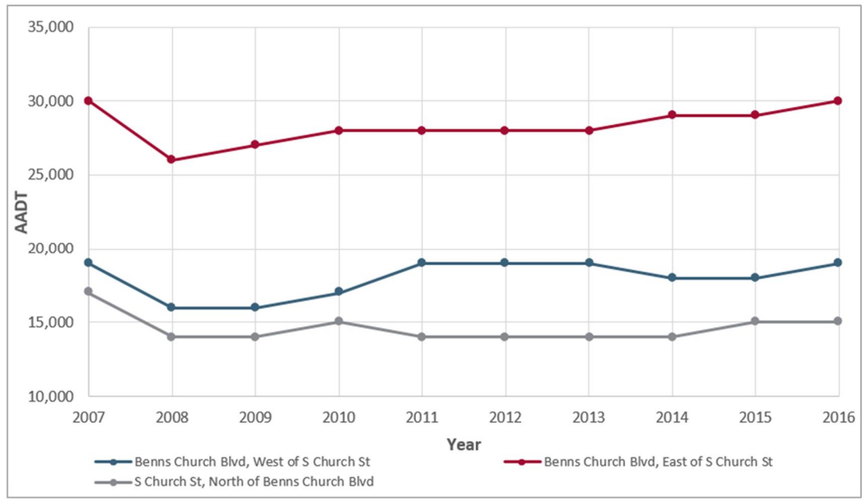
Roadway	Location	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Benns Church Blvd	Main St to South Church St	19,000	16,000	16,000	17,000	19,000	19,000	19,000	18,000	18,000	19,000
	Growth Rate to 2016	*0.0%*	*2.2%*	*2.5%*	*1.9%*	*0.0%*	*0.0%*	*0.0%*	*2.7%*	*5.6%*	-
Benns Church Blvd	South Church St to Old SCL Smithfield	30,000	26,000	27,000	28,000	28,000	28,000	28,000	29,000	29,000	30,000
	Growth Rate to 2016	*0.0%*	*1.8%*	*1.5%*	*1.2%*	*1.4%*	*1.7%*	*2.3%*	*1.7%*	*3.4%*	-
South Church St	Battery Park Rd to Benns Church Blvd	17,000	14,000	14,000	15,000	14,000	14,000	14,000	14,000	15,000	15,000
	Growth Rate to 2016	*-1.4%*	*0.9%*	*1.0%*	*0.0%*	*1.4%*	*1.7%*	*2.3%*	*3.5%*	*0.0%*	-

Source: VDOT Traffic Engineer Division

Table 16: Proposed Corridor Growth Rates

Approved Growth Rates	
Benns Church Blvd	1.50%
S Church St	1.00%

Figure 15: 10-Year Historic Average Annual Traffic Volumes (2007-2016)



Source: VDOT Traffic Engineering Division

5.2.2 Future Land Use Growth Projections

In addition to historic travel pattern, the potential developable land within the study are was considered as part of the future traffic projections. Figure 16 depicts the future land uses within the Town of Smithfield. The areas surrounding the study area were split into 6 different "developable zones and trip generation was performed to determine the maximum trip potential of each area. Additionally, the trips generated in the *Benns Grant Rezoning Updated Traffic Analysis* (October 2017) for the Benns Grant development in Isle of Wight County and the *Mallory Pointe Traffic Impact Analysis* (Sept 2006) were incorporated into these zones, as applicable.

These developable parcels are depicted in Figure 17 and are listed below:

- West of S. Church Street: approx. 3.6 acres of low density residential and 0.7 acres of retail/commercial
- East of S. Church Street: approx. 75.7 acres of low density residential, 16.6 acres of multi-family residential, 11.1 acres of retail commercial, and the Mallory Pointe residential neighborhood (258 single family dwelling units and 98 multi-family dwelling units)
- Gwaltney Pointe: approx. 25.0 acres of retail commercial, 60 single-family dwelling units and 29 multi-family dwelling units
- Canteberry Commercial: approx. 27.6 acres of retail commercial
- Benns Church Retail (North): approx. 28.6 acres of retail commercial
- Benns Church Retail (South): approx. 18.8 acres of retail commercial
- Benns Grant (Isle of Wight): 422 AM trips and 659 PM trips on Benns Church Boulevard

Smithfield Corporate Limits

Future Zoning

- Environmental Conserv.
- Community Conservation
- Low Density Residential
- Suburban Residential
- Attached Residential
- Multifamily/Retirement
- Residential Office
- Retail Commercial
- Downtown Commercial
- Mixed Use
- Light Industry
- Heavy Industry
- Parks and Recreation
- Public and Semi-Public

0 ¼ ½ Miles

N

Benns Church Boulevard

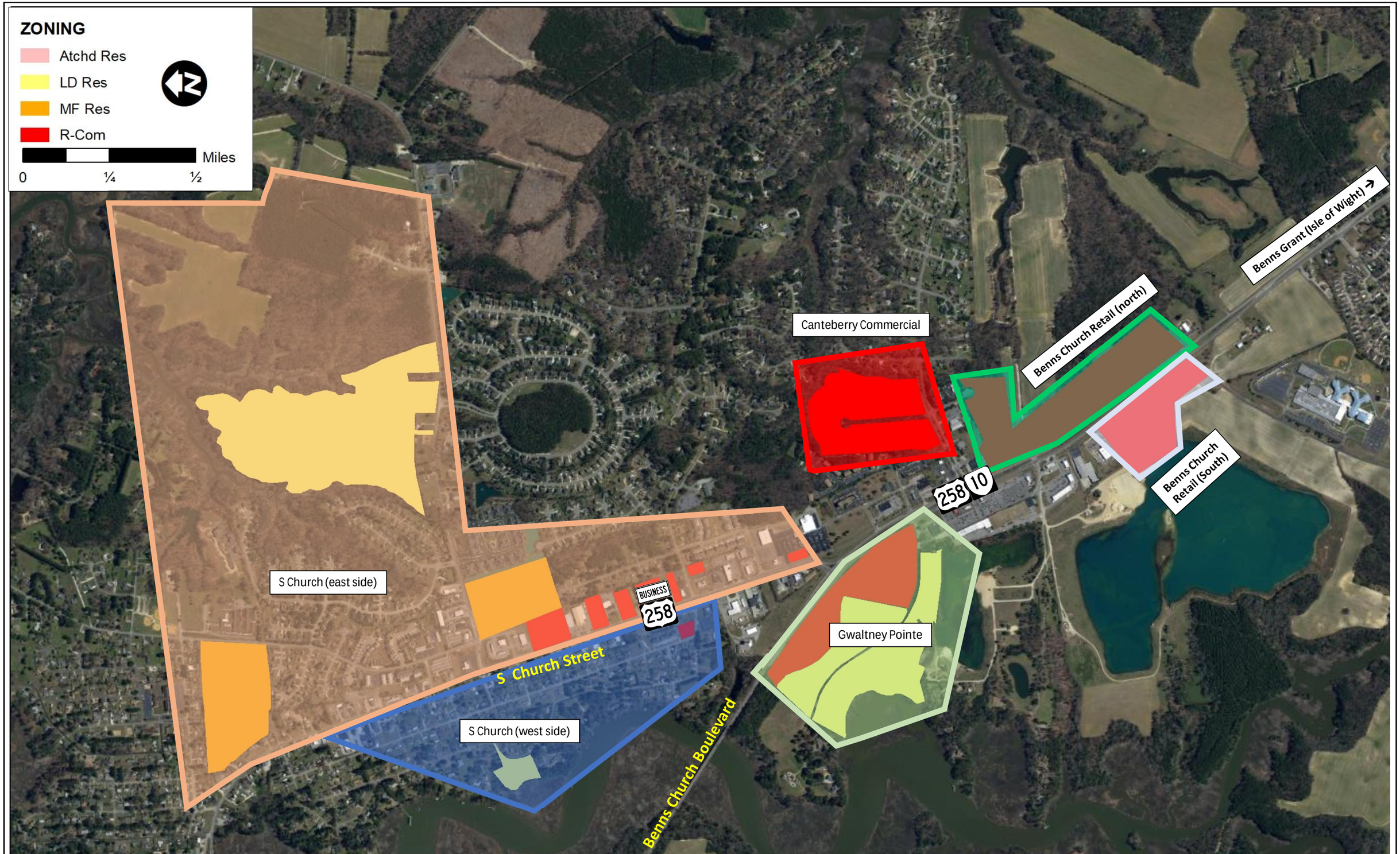
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S Church Street

Kimley»Horn	Intersection Improvement Alternatives Analysis Smithfield, Virginia	Future Land Use	Figure 16

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Intersection Improvement Alternatives Analysis
Smithfield, Virginia

Developable Zones

Figure 17

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To determine the anticipated number of trips generated by the proposed developments, information in the *Trip Generation Manual,* published by the Institute of Transportation Engineers [ITE], 9th Edition, 2012, was considered as part of this study. The assumptions used when determining the available land for development for each zone and the resulting full build out trip generation for all developable parcels was calculated and is shown in Figure 18.

It was determined that it would be unrealistic to expect this level of growth and development by the 2025 horizon year in this study. Therefore, the potential development traffic was applied to the 2025 horizon year based on a linear interpolation between the existing year (i.e., 2017) and the 2045 horizon year. This resulted in approximately 30% of the total developmental potential occurring by the year 2025. These additional trips are also shown in Figure 18.

5.2.3 Future Traffic Volumes

Traffic volumes from the build out potential from the developable zones were individually assigned to the study area network based on an overall/regional distribution. The distribution and assignment of trips generated by the developable zones were estimated based on existing traffic counts, development of the surrounding area, other traffic studies, and an understanding of travel patterns within the study area. Proposed distributions were provided to the Town of Smithfield and VDOT for their review and concurrence. The following traffic distributions were derived for the roadway network with a more detailed schematic of the assignment percentages for each development zone provided in Appendix E:

- 35% from the west on Benns Church Boulevard
- 40% from the east on Benns Church Boulevard
- 25% from the north on S. Church Street

The future AM and PM peak hour volumes for the 2025 and 2045 horizon years are illustrated in Figure 19 through Figure 22.

5.3 Future No Build Operational Analysis

The future traffic volumes were used in conjunction with the existing calibrated models to evaluate projected vehicle delays, LOS, and maximum queues lengths at each study area intersection. In each future condition analysis scenario, existing traffic signal timings were optimized to account for the proposed changes in future volumes and/or roadway geometry (if applicable). This included reviewing each intersection's cycle length, splits, and offsets. In all future analysis models, it was assumed that all signalized study area intersections would be coordinated to best facilitate progression along the study area corridors. These future scenarios represent "No Build" conditions with no other significant operational or capacity enhancements identified.

Per the TOSAM, an initial sample size of 10 simulation runs for the future SimTraffic models were conducted before VDOT's Sample Size Determination process was performed. This ensures that an appropriate number of runs have been conducted and that simulation results are reasonable.

For this analysis, simulated speeds were used from a critical link (i.e., Benns Church Boulevard, west of S. Church Street) to validate the number of model simulations analyzed. Based on the sample size evaluation, a 10-simulation run sample size was verified as adequate for all future models analyzed in this study, with the exception of the 2045 PM Peak hour scenario, which required 30 simulation runs to meet the sample size criteria. The complete sample size evaluation results for the future condition model simulation results are contained in Appendix B.

Table 17 through Table 34 summarize future AM and PM peak hour vehicular delay, LOS, and maximum simulated queue length results for each intersection, movement, and approach. Existing condition results provided in Section 3.6 are shown for each study area intersection for comparison purposes. Delays in "bold" represent movements operating at LOS E or worse, while queue lengths in "bold" represent queues that exceed the effective storage lengths and spill back to an upstream intersection. For the 2045 conditions, it was determined that this amount of development represents a level of "unconstrained" growth for the Town under its current future land use plan. It is unlikely that the Town would realistically experience this level of growth in the next 30 years, so the operational conditions presented for the 2045 scenario is for informational purposes only. Detailed Synchro and SimTraffic outputs are attached in Appendix F.

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Land Use/Development	Description	ITE Code	Total Area Acres	Total Area Square Footage (SF)	Developable Area[4] (SF)	Intensity[1]	Total	Trips						
								Daily	AM			PM		
									Total	Entering	Exiting	Total	Entering	Exiting
S Church (West side)														
Low Density Residential	Single-family detached homes	210	3.60 AC	156,957 SF	109,900 SF	3 Units per Acre	10 DU	95	10	5	5	10	5	5
Retail Commercial	Shopping Center	820	0.74 AC	32,352 SF	22,600 SF	FAR 0.15	3,400 SF	145	5	5	0	15	5	10
S Church (East side)														
Mallory Point[2]	Single-family detached homes	210					258 DU	2,455	195	50	145	260	165	95
Low Density Residential	Single-family detached homes	210	75.67 AC	3,296,001 SF	2,307,200 SF	3 Units per Acre	160 DU	1,525	120	30	90	160	100	60
Multi-family Residential	Townhomes	230	16.60 AC	723,310 SF	506,300 SF	8 Units per Acre	95 DU	550	40	5	35	50	35	15
Multi-family Residential	Townhomes	230					98 DU	570	45	10	35	50	35	15
Retail Commercial	Shopping Center	820	11.14 AC	485,276 SF	339,700 SF	FAR 0.15	51,000 SF	2,180	50	30	20	190	90	100
Gwaltney Pointe														
Low Density Residential	Single-family detached homes	210					60 DU	570	45	10	35	60	40	20
Multi-family Residential	Townhomes	230					29 DU	170	15	5	10	15	10	5
Retail Commercial	Shopping Center	820	25.04 AC	1,090,893 SF	763,600 SF	FAR 0.15	114,500 SF	4,890	110	70	40	425	205	220
Canteberry Commercial														
Retail Commercial	Shopping Center	820	27.61 AC	1,202,556 SF	841,800 SF	FAR 0.15	126,300 SF	5,395	120	75	45	470	225	245
Retail Commercial	Shopping Center	820	28.64 AC	1,247,523 SF	873,300 SF	FAR 0.15	131,000 SF	5,595	125	80	45	485	235	250
Benns Church Retail (South)														
Retail Commercial	Shopping Center	820	18.81 AC	819,321 SF	573,500 SF	FAR 0.15	86,000 SF	3,670	85	55	30	320	155	165
Benn's Grant (IoW)[3]														
Trip Generation Estimates from Updated *Benns Grant Master Plan Traffic Impact Analysis* (All Trips)								16,520	1,035	515	520	1,600	810	790
Benn's Grant Trips assigned onto Benns Church Blvd								5,665	420	240	180	660	315	345
Total Study Area Build Out Trip Potential								30,740	1,300	625	675	2,850	1,450	1,400
Pass-by Trip Reduction (25% Reduction to Commercial Uses)								-	110	70	40	405	195	215
2045 Total Study Area Build Out Trip Potential								30,740	1,190	555	635	2,445	1,255	1,185
2025 Total Study Area Build Out Trip Potential (30% of 2045)								9,220	355	165	190	735	380	355

Notes:
All values rounded to the nearest 5
FAR = Floor to Area Ratio

Sources:
1. *Utility Master Planning - Phase 1* (Jan 2017)
2. *Mallory Pointe Traffic Impact Analysis* (Sept 2006)
3. *Benn's Grant Rezoning Updated Traffic Analysis* (Oct 2017)

Assumptions:
4. Developable Area:
- Flood Plains Removed
- Assume 10% for open space
- Assume 10% for storm water
- Assume 10% for internal roadways

Low Density Residential = Single-family Detached Housing (210)
Multi-family/Attached Residential = Residential condominium/townhome (230)
Retail Commercial = Shopping Center (820)

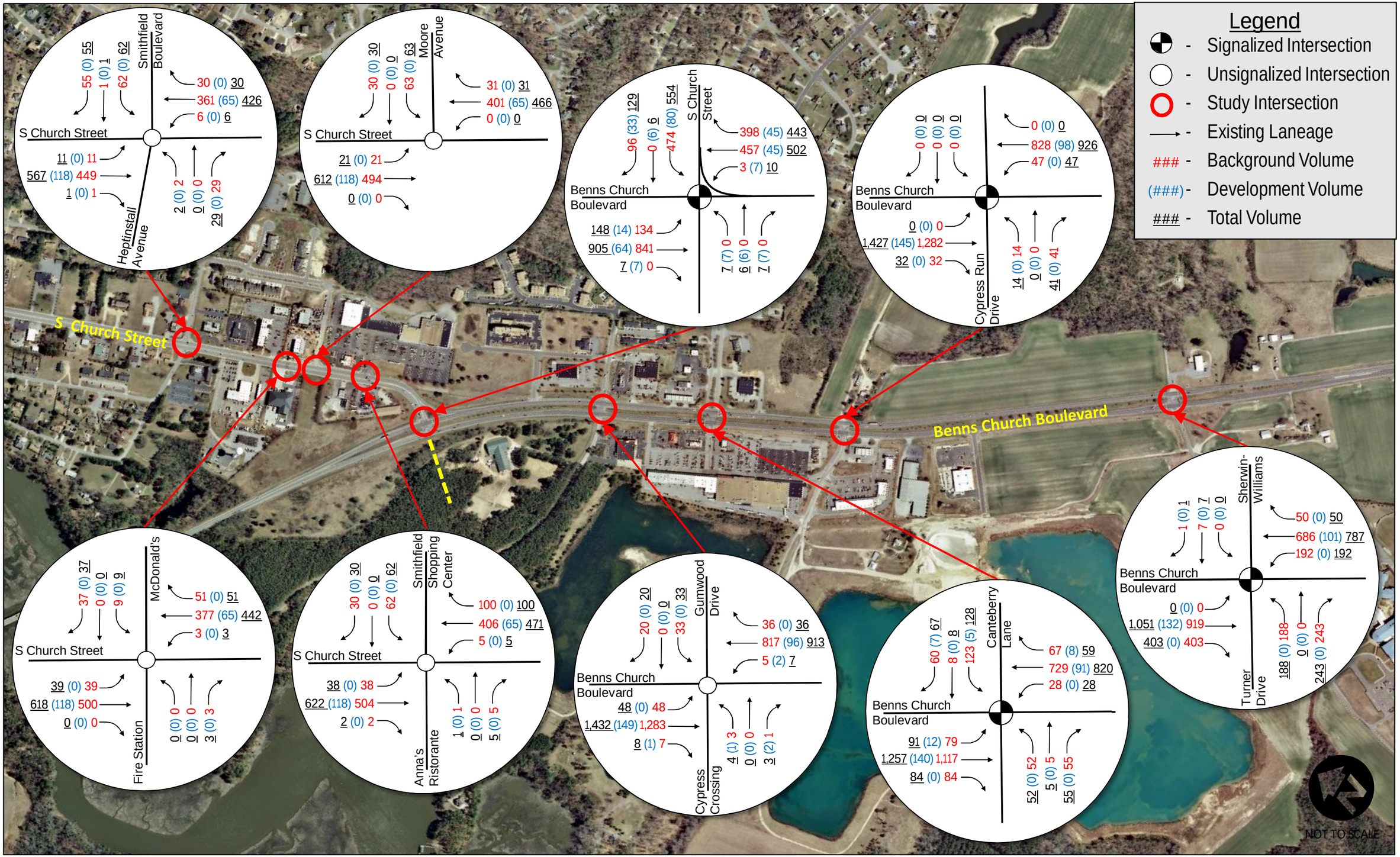
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Intersection Improvement Alternatives Analysis
Smithfield, Virginia

Full Buildout Trip Generation Potential

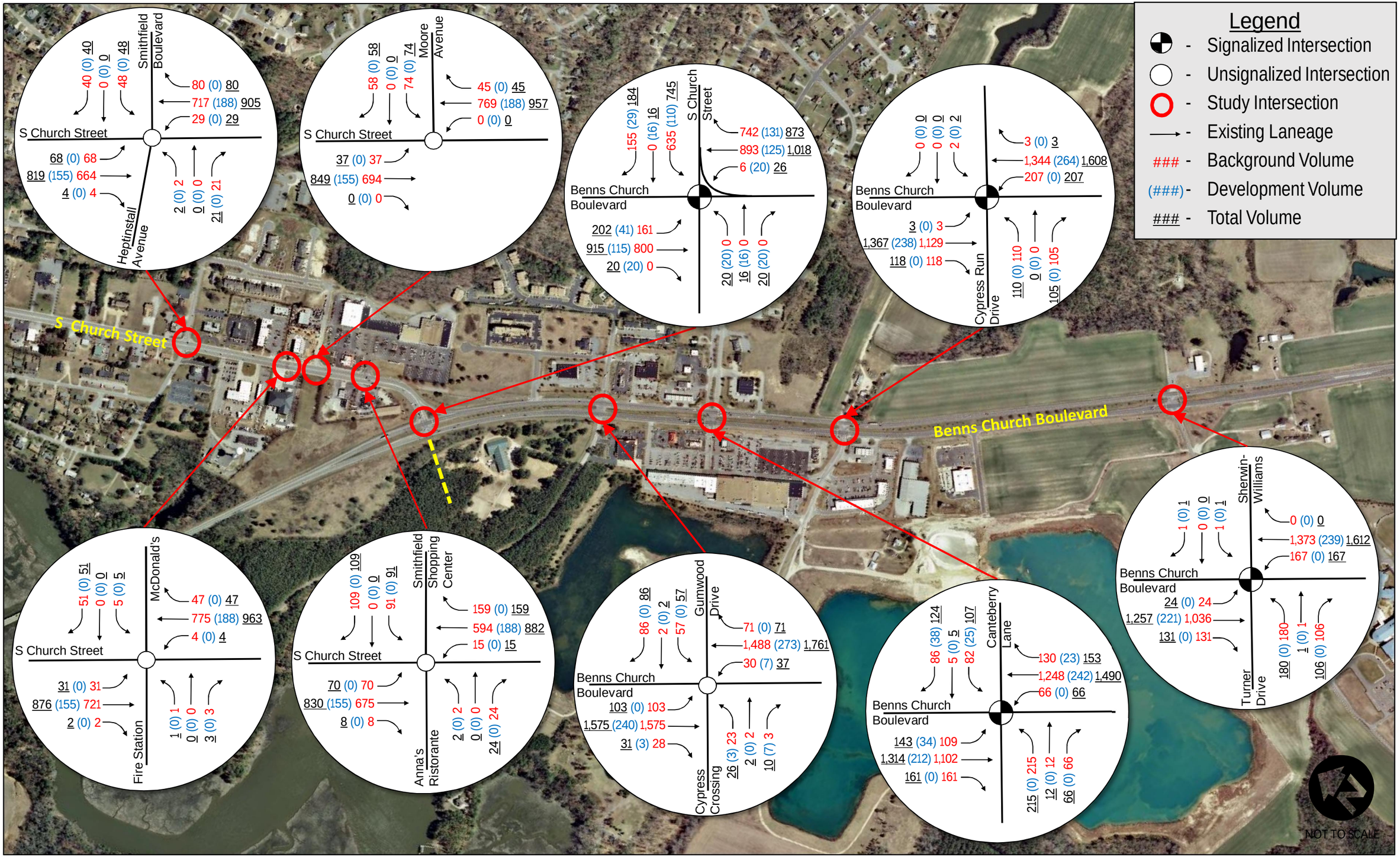
Figure 18

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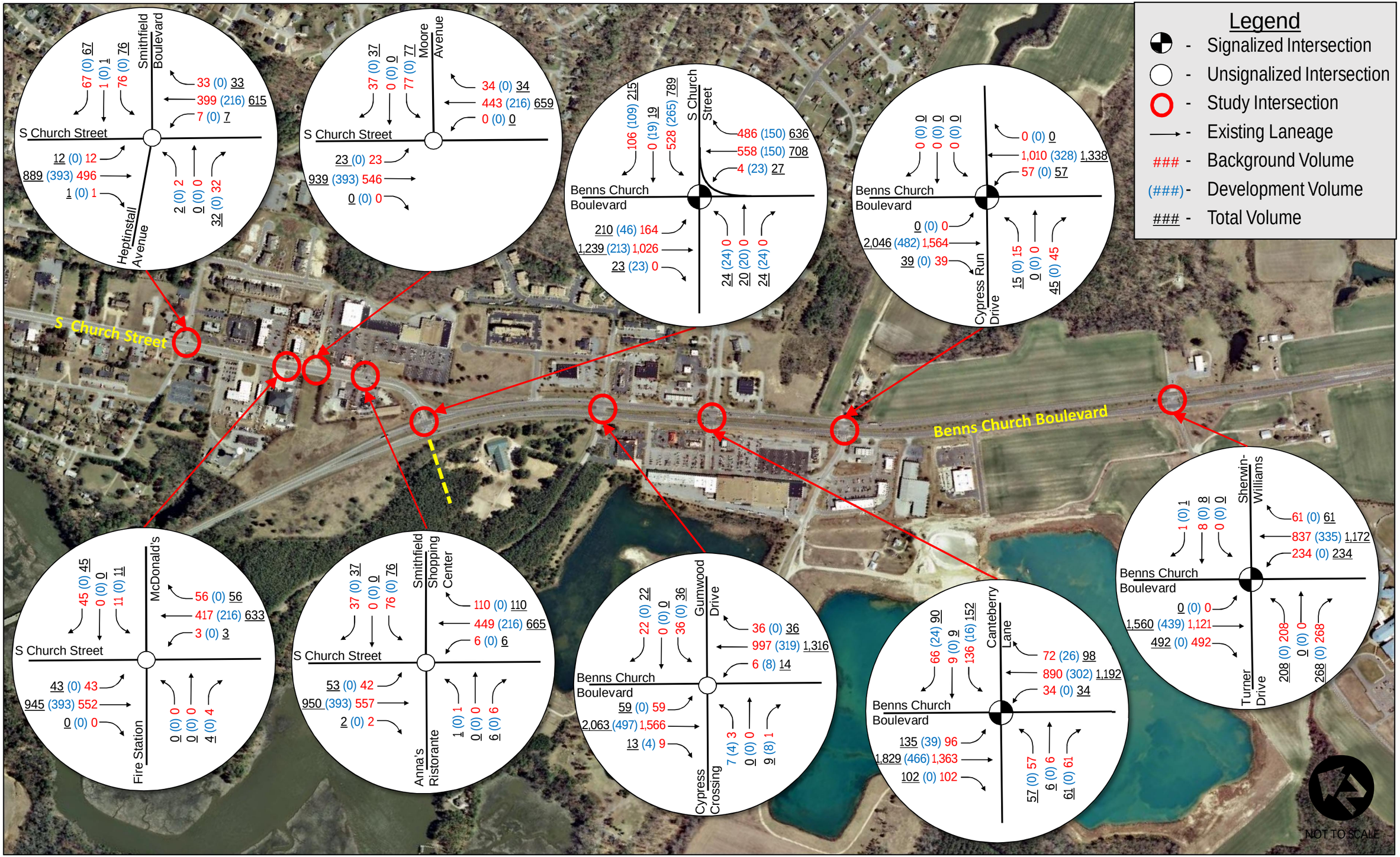
Kimley»Horn	Intersection Improvement Alternatives Analysis Smithfield, Virginia	2025 AM Peak Hour Traffic Volumes	Figure 19

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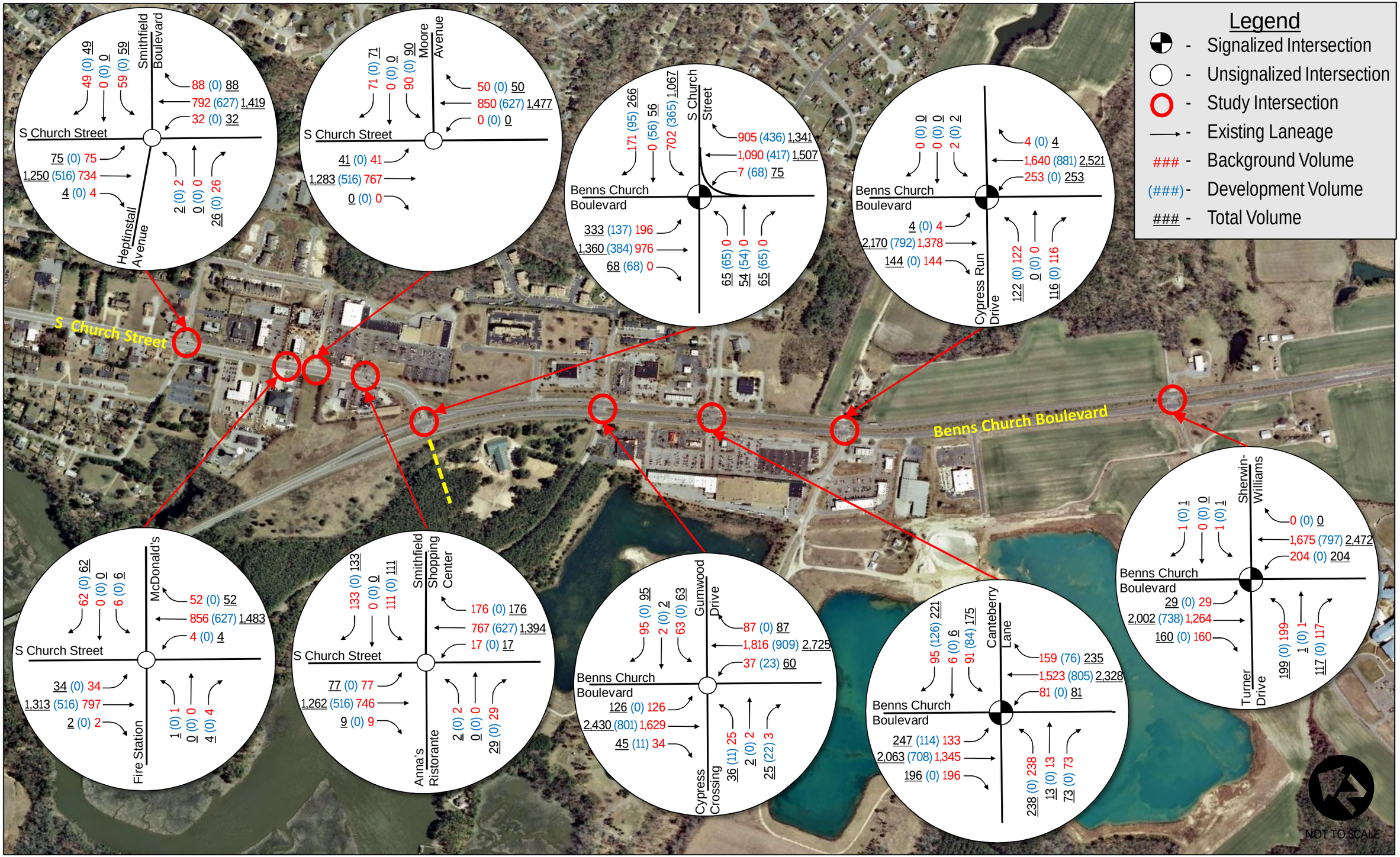
Kimley»Horn	Intersection Improvement Alternatives Analysis Smithfield, Virginia	2025 PM Peak Hour Traffic Volumes	Figure 20

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Kimley»Horn	Intersection Improvement Alternatives Analysis Smithfield, Virginia	2045 AM Peak Hour Traffic Volumes	Figure 21

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Intersection Improvement Alternatives Analysis
Smithfield, Virginia

2045 PM Peak Hour Traffic Volumes

Figure 22

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5.3.1 S. Church Street at Benns Church Boulevard (Signalized)

Future delay/LOS and queue length results for the S. Church Street at Benns Church Boulevard intersection are summarized in Table 17 and Table 18, respectively. Based on discussions with the Town of Smithfield, it is anticipated/being proposed that a northbound (fourth) leg would be added to this intersection in the future as part of the "Gwaltney Pointe" development. Therefore, under the "No Build" Scenario, this intersection will remain signalized with a proposed northbound approach. Additionally, it was assumed that the eastbound left- and right-turn lanes would be brought up to current VDOT standards (i.e., 200 feet of storage, 200-foot tapers) as part of the Gwaltney Pointe development. Other modifications to the laneage at this intersection (e.g., exclusive eastbound right-turn lane, southbound through lane, and exclusive right-turn lane) reflect the changes needed to accommodate a new northbound approach.

This intersection is expected to operate as an overall LOS C under for both the AM and PM peak hour conditions for the 2025 horizon year. The delay in the westbound approach is expected to decrease a total of 4.7 sec/veh as a result of the optimized signal timings and coordination. However, due to the exceptional high volume of traffic making a southbound left-turn during the PM peak hour, the southbound approach is projected to experience LOS E in 2025 and LOS F under 2045 conditions. The northbound approach also is projected to operate at LOS E during the 2025 AM and PM peak hour. However, the volume of traffic is considerably small compared to the other approaches, resulting is less green time being dedicated to serve the northbound movements.

Maximum eastbound queue lengths are expected to extend approximately 500 feet under the 2025 No Build PM peak hour conditions, resulting in instances where the through traffic would block adjacent left-turn lane. The southbound approach is expected to experience queue lengths that extend approximately 525 feet under the 2025 No Build PM peak hour conditions, blocking approximately 75% of traffic in the adjacent lanes and spilling back to the next upstream intersection, blocking approximately 55% of that traffic.

Overall, the S. Church Street at Benns Church Boulevard with the proposed northbound approach and lane modification is anticipated to experience acceptable LOS under 2025 No Build AM and PM peak hour conditions. Under 2045 conditions, the overall LOS for this intersection is "D" and "F" for the AM and PM peak hours, respectively. It should be noted that due to the projected growth assumed under 2045 conditions, this intersection expected to operate with significant vehicle delays and queues.

Table 17: S. Church Street at Benns Church Boulevard No Build LOS Summary

Scenario	Overall LOS	Level of Service per Movement by Approach (Delay in sec/veh)											
		Eastbound			Westbound			Northbound			Southbound		
		LT	TH	RT	LT/U	TH	RT	LT	TH	RT	LT	TH	RT
AM Peak Hour													
2017 Existing	B (17.9)	A (6.5)	B (11.2)	-	**F (84.1)**	A (10.4)	A (0.4)	-	-	-	D (48.7)	-	D (37.9)
			B (10.6)			A (6.0)			-			D (46.9)	
2025 No Build	C (21.2)	B (11.7)	B (18.9)	B (12.7)	A (7.2)	A (8.4)	A (0.5)	**E (63.8)**	D (51.2)	D (50.5)	D (51.6)	C (33.7)	C (34.3)
			B (17.8)			A (4.7)			**E (55.4)**			D (48.2)	
2045 No Build	D (36.4)	C (27.1)	D (41.2)	C (21.4)	D (40.2)	D (35.7)	A (0.7)	D (49.1)	**E (64.3)**	**E (62.6)**	D (54.8)	D (49.7)	D (50.5)
			D (38.9)			B (19.5)			**E (58.4)**			D (53.8)	
PM Peak Hour													
2017 Existing	B (17.8)	B (10.3)	B (13.0)	-	**E (67.9)**	B (10.4)	A (0.7)	-	-	-	D (49.6)	-	D (36.6)
			B (12.6)			A (6.2)			-			D (47.0)	
2025 No Build	C (27.4)	D (44.9)	C (24.5)	B (16.6)	B (12.6)	C (20.1)	A (0.8)	**E (58.8)**	**E (57.4)**	**E (55.4)**	**E (63.5)**	D (35.9)	D (36.7)
			C (28.0)			B (11.2)			**E (57.2)**			**E (57.8)**	
2045 No Build	**F (98.8)**	**F (200.6)**	D (43.9)	C (20.7)	C (25.0)	**F (115.2)**	A (0.9)	**E (75.6)**	**E (64.4)**	**E (60.5)**	**F (269.4)**	D (43.7)	D (44.1)
			E (72.6)			**E (60.4)**			**E (67.0)**			**F (217.0)**	

Table 18: S. Church Street at Benns Church Boulevard No Build Maximum Queue Summary

Scenario	Maximum Queue Length by Movement (feet)											
	Eastbound			Westbound			Northbound			Southbound		
	LT	TH	RT	LT/UT	TH	RT	LT	TH	RT	LT	TH	RT
Effective Storage Length (Existing/No Build)	150 / 300[a]	Cont.	300[a]	140	1,100	250	300[a]	Cont.[a]	300[a]	480	300[a]	200 / 300[a]
AM Peak Hour												
2017 Existing	122	177	-	42	208	49	-	-	-	256 **(2%)	-	187
2025 No Build	116	202	< 25	< 25	108	0	33	29	< 25	381 **(4%)	242	87
2045 No Build	**299**	483 **(7%)	271	124	355 **(2%)	225	70	66	49	**591** **(51%) ^(35%)	**300** *(4%)	145
PM Peak Hour												
2017 Existing	149	220 **(1%)	-	65	221	124	-	-	-	345 **(10%)	-	200 *(1%)
2025 No Build	288 *(12%)	513 **(6%)	48	36	264	100	66	63	39	523 **(75%) ^(55%)	300 *(4%)	183
2045 No Build	**300** *(56%)	2,045 **(51%)	**299**	182	467 **(1%)	**250**	130	129	82	**531** **(82%) ^(72%)	**300** *(4%)	143

Notes:
a. - No Build Scenarios Only
**(X%) - Maximum queue extends full length of storage bay for X% of the analysis period*
***(Y%) - Queue in lane adjacent to storage bay extends beyond end of storage bay for Y% of the analysis period*
^(Z%) - Maximum queue extends back to upstream intersection for Z% of the analysis period

5.3.2 S. Church Street at Smithfield Square Shopping Center (Unsignalized)

Future delay/LOS and queue length results for the S. Church Street at Smithfield Square Shopping Center intersection are summarized in Table 19 and Table 20, respectively. Under future No Build conditions, this intersection will remain unsignalized and is expected to operate at overall LOS B or better during 2025 and 2045 conditions. Under 2025 conditions, the expected overall LOS is "A" during the AM and PM peak hours.

During the PM peak hour under 2025 conditions, the westbound left-turn movement is anticipated to operate at LOS E, but Is just exceeding the LOS D threshold by 1.7 seconds per vehicle. However, all other individual movements and approaches are expected to operate at LOS C or better during the AM and PM peak hours under the 2025 No Build scenario.

This intersection is expected to experience queues in excess of 200 and 300 feet in the eastbound and westbound directions under the 2025 No Build PM peak hour. As these approaches are unsignalized, they are dependent on finding gaps in traffic along S. Church Street. This results in queues that could be expected to back up into the parking lot at the adjacent businesses. The southbound queue lengths are also expected to extend approximately 275 feet under the 2025 No Build PM peak hour, which is attributed to the traffic queuing up and spilling back from the downstream intersection at Benns Church Boulevard.

Overall, this intersection is anticipated to operate under an optimal LOS A for 2025 No Build conditions during the AM and PM peak hours. Under 2045 conditions, the overall LOS for this intersection is "A" and "B" for the AM and PM peak hours, respectively. It should be noted that due to the projected growth assumed under 2045 conditions, this intersection is expected to operate with significant vehicle delays and queues on its side streets (i.e., eastbound and westbound) that would ultimately require substantial capacity enhancements on the network to address these issues.

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Table 19: S. Church Street at Smithfield Square Shopping Center No Build LOS Summary

Scenario	Overall LOS	Level of Service per Movement by Approach (Delay in sec/veh)											
		Eastbound			Westbound			Northbound			Southbound		
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
AM Peak Hour													
2017 Existing	A (1.4)	B (10.6)			B (14.2)		A (9.8)	A (9.0)	A (0.0)	A (0.0)	A (8.7)	A (0.0)	A (0.0)
					B (12.7)			A (0.1)			A (0.6)		
2025 No Build	A (1.3)	B (11.4)			C (15.6)		B (10.1)	A (9.5)	A (0.0)	A (0.0)	A (9.0)	A (0.0)	A (0.0)
					B (13.8)			A (0.1)			A (0.5)		
2045 No Build	A (1.4)	B (13.7)			C (22.7)		B (11.1)	B (11.4)	A (0.0)	A (0.0)	A (9.9)	A (0.0)	A (0.0)
					C (19.0)			A (0.1)			A (0.4)		
PM Peak Hour													
2017 Existing	A (2.5)	B (11.7)			C (23.8)		B (11.9)	A (9.1)	A (0.0)	A (0.0)	B (10.3)	A (0.0)	A (0.0)
					C (17.3)			A (0.2)			A (1.0)		
2025 No Build	A (2.8)	B (13.0)			**E (36.7)**		B (13.6)	A (9.9)	A (0.0)	A (0.0)	B (11.7)	A (0.0)	A (0.0)
					C (24.1)			A (0.1)			A (0.9)		
2045 No Build	B (10.6)	C (18.9)			**F (261.4)**		C (22.0)	B (12.4)	A (0.0)	A (0.0)	C (17.6)	A (0.0)	A (0.0)
					F (130.9)			A (0.1)			A (1.0)		

Table 20: S. Church Street at Smithfield Square Shopping Center No Build Maximum Queue Summary

Scenario	Maximum Queue Length by Movement (feet)											
	Eastbound			Westbound			Northbound			Southbound		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	TH RT
Effective Storage Length (Existing/No Build)	Cont.			Cont.		Cont.	TWLTL	490	275	100	275	275
AM Peak Hour												
2017 Existing	30			83		53	< 25	< 25	< 25	47	0	0
2025 No Build	30			105		50	30	< 25	< 25	45	0	0
2045 No Build	50			**290**		157	29	< 25	< 25	113	238 **(11%) ^(5%)	265 ^(7%)
PM Peak Hour												
2017 Existing	40			272		165	26	-	34	82	< 25	-
2025 No Build	**178**			**304**		**278**	28	< 25	< 25	150	**267** **(50%) ^(26%)	**273** ^(29%)
2045 No Build	**188**			**294**		**173**	< 25	< 25	< 25	150	**273** **(83%) ^(65%)	**272** ^(67%)

Notes:
**(X%) - Maximum queue extends full length of storage bay for X% of the analysis period*
***(Y%) - Queue in lane adjacent to storage bay extends beyond end of storage bay for Y% of the analysis period*
^(Z%) - Maximum queue extends back to upstream intersection for Z% of the analysis period

5.3.3 S. Church Street at Moore Avenue (Unsignalized)

Future delay/LOS and queue length results for the S. Church Street at Moore Avenue intersection are summarized in Table 21 and Table 22, respectively. Under 2025 No Build conditions, the 2025 and 2045 No Build scenarios are expected to operate at an overall LOS A during AM and PM peak hours. The Westbound left turn movement operates at LOS C during the PM peak hour of the 2025 No Build scenario. However, all other individual movements and approaches are anticipated to operate at LOS B or better under the 2025 No Build conditions.

Westbound left-turn queue lengths are expected to extend approximately 450 feet under 2025 No Build PM peak hour conditions, blocking 49% of traffic in the adjacent right-turn lane. The southbound queue lengths are also expected to extend approximately 150 feet under the 2025 No Build PM peak hour, which is attributed to the traffic queuing up and spilling back from the downstream intersections, resulting from conditions at the Benns Church Boulevard intersection.

Overall, S. Church Street at Moore Avenue will perform at LOS A under 2025 and 2045 conditions with limited movements experience poor operational conditions during the AM or PM peak hours. As it was previously noted, due to the projected growth assumed under 2045 conditions, the westbound approach is expected to operate with significant vehicle delays and queues. Signalization may be necessary to mitigate the delays and/or queuing experienced on the side street and the southbound left-turn movement under 2045 conditions.

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Table 21: S. Church Street at Moore Avenue No Build LOS Summary

Scenario	Overall LOS	Level of Service per Movement by Approach (Delay in sec/veh)											
		Eastbound			Westbound			Northbound			Southbound		
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
AM Peak Hour													
2017 Existing	A (1.2)	-	-	-	B (12.0)	-	A (0.0)	A (0.0)	A (0.0)	A (0.0)	A (8.5)	A (0.0)	A (0.0)
		-			B (12.0)			A (0.0)			A (0.3)		
2025 No Build	A (1.1)	-	-	-	B (12.7)	-	A (0.0)	A (0.0)	A (0.0)	A (0.0)	A (8.7)	A (0.0)	A (0.0)
		-			B (12.7)			A (0.0)			A (0.3)		
2045 No Build	A (1.2)	-	-	-	C (16.1)	-	A (0.0)	A (0.0)	A (0.0)	A (0.0)	A (9.5)	A (0.0)	A (0.0)
		-			C (16.1)			A (0.0)			A (0.2)		
PM Peak Hour													
2017 Existing	A (1.4)	-	-	-	B (14.6)	-	A (0.0)	A (0.0)	A (0.0)	A (0.0)	A (9.9)	A (0.0)	A (0.0)
		-			B (14.6)			A (0.0)			A (0.5)		
2025 No Build	A (1.5)	-	-	-	C (19.0)	-	A (0.0)	A (0.0)	A (0.0)	A (0.0)	B (11.3)	A (0.0)	A (0.0)
		-			C (19.0)			A (0.0)			A (0.5)		
2045 No Build	A (2.9)	-	-	-	**E (49.9)**	-	A (0.0)	A (0.0)	A (0.0)	A (0.0)	C (16.2)	A (0.0)	A (0.0)
		-			**E (49.9)**			A (0.0)			A (0.5)		

Table 22: S. Church Street at Moore Avenue No Build Maximum Queue Summary

Scenario	Maximum Queue Length by Movement (feet)											
	Eastbound			Westbound			Northbound			Southbound		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Effective Storage Length (Existing/No Build)	-	-	-	450	-	150	TWLTL	300	-	TWLTL	100	-
AM Peak Hour												
2017 Existing	-	-	-	88	-	41	-	0	0	43	29	-
2025 No Build	-	-	-	105	-	42	-	0	0	38	< 25	-
2045 No Build	-	-	-	282 *(16%)*	-	112	-	0	< 25	42	80 **(3%) ^(3%)	-
PM Peak Hour												
2017 Existing	-	-	-	124	-	74	-	< 25	< 25	56 *(1%)*	60	-
2025 No Build	-	-	-	**450** *(49%)*	-	139	-	< 25	< 25	61 *(2%)*	**142** **(28%) ^(19%)	-
2045 No Build	-	-	-	**469** *(100%)*	-	80	-	< 25	< 25	54 *(1%)*	**152** **(77%) ^(68%)	-

Notes:
**(X%) - Maximum queue extends full length of storage bay for X% of the analysis period*
***(Y%) - Queue in lane adjacent to storage bay extends beyond end of storage bay for Y% of the analysis period*
^(Z%) - Maximum queue extends back to upstream intersection for Z% of the analysis period

5.3.4 S. Church Street at Smithfield Volunteer Fire Department/McDonald's (Unsignalized)

Future delay/LOS and queue length results for the S. Church Street at Smithfield Volunteer Fire Department/McDonald's intersection are summarized in Table 23 and Table 24, respectively. Under future No Build conditions, this intersection will remain unsignalized and is expected to operate at an overall LOS A.

Under 2025 No Build conditions, during the PM peak hour the expected queue in the southbound approach is approximately 330 feet, which is attributed to the traffic queuing up and spilling back from the downstream intersections, resulting from conditions at the Benns Church Boulevard intersection.

Overall, S. Church Street at Smithfield Volunteer Fire Department/McDonald's will perform at LOS A under 2025 and 2045 conditions. Signalization may be necessary to mitigate the queuing experienced by the southbound approach under 2045 conditions.

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Table 23: S. Church Street at Smithfield Volunteer Fire Department/McDonald's No Build LOS Summary

Scenario	Overall LOS	Level of Service per Movement by Approach (Delay in sec/veh)											
		Eastbound			Westbound			Northbound			Southbound		
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
AM Peak Hour													
2017 Existing	A (0.9)	A (10.0)			B (10.7)			A (8.5)	A (0.0)	A (0.0)	A (8.4)	A (0.0)	A (0.0)
								A (0.1)			A (0.6)		
2025 No Build	A (0.7)	B (10.4)			B (11.1)			A (8.9)	A (0.0)	A (0.0)	A (8.6)	A (0.0)	A (0.0)
								A (0.0)			A (0.5)		
2045 No Build	A (0.7)	B (12.1)			B (12.9)			B (10.3)	A (0.0)	A (0.0)	A (9.5)	A (0.0)	A (0.0)
								A (0.0)			A (0.4)		
PM Peak Hour													
2017 Existing	A (0.7)	B (12.2)			B (12.2)			A (9.0)	A (0.0)	A (0.0)	A (9.5)	A (0.0)	A (0.0)
								A (0.0)			A (0.4)		
2025 No Build	A (0.6)	B (14.2)			B (14.3)			A (9.9)	A (0.0)	A (0.0)	B (10.8)	A (0.0)	A (0.0)
								A (0.0)			A (0.4)		
2045 No Build	A (0.7)	C (19.7)			C (22.8)			B (12.3)	A (0.0)	A (0.0)	B (14.8)	A (0.0)	A (0.0)
								A (0.0)			A (0.4)		

Table 24: S. Church Street at Smithfield Volunteer Fire Department/McDonald's No Build Maximum Queue Summary

Scenario	Maximum Queue Length by Movement (feet)											
	Eastbound			Westbound			Northbound			Southbound		
	LT	TH	RT	LT	TH	RT	LT	TH	TH RT	LT	TH	TH RT
Effective Storage Length (Existing/No Build)	160			140			TWLTL	100	100	TWLTL	675	675
AM Peak Hour												
2017 Existing	27			47			< 25	< 25	0	36	0	0
2025 No Build	30			58			< 25	< 25	0	30	0	0
2045 No Build	30			88			< 25	< 25	< 25	33	< 25	27
PM Peak Hour												
2017 Existing	30			70			< 25	0	0	28	0	0
2025 No Build	32			103			< 25	< 25	< 25	127	333 **(13%)*	339
2045 No Build	85			**149**			< 25	< 25	< 25	150	**677** **(81%)* *^(64%)*	**679** *^(68%)*

Notes:
**(X%) - Maximum queue extends full length of storage bay for X% of the analysis period*
***(Y%) - Queue in lane adjacent to storage bay extends beyond end of storage bay for Y% of the analysis period*
^(Z%) - Maximum queue extends back to upstream intersection for Z% of the analysis period

5.3.5 S. Church Street at Heptinstall Avenue/Smithfield Boulevard (Unsignalized)

Future delay/LOS and queue length results for the S. Church Street at Heptinstall Avenue/Smithfield Boulevard intersection are summarized in Table 25 and Table 26, respectively. Under future conditions, this intersection will remain unsignalized and will operate at an overall LOS A during AM and PM peak hours. All individual movements are projected to operate at LOS C or better, except for the westbound left-turn movement under 2045 PM peak hour conditions. No significant queues or blockages are projected to occur under future 2025 conditions at this intersection.

Overall, S. Church Street at Heptinstall Avenue/Smithfield Boulevard will perform at LOS A under 2025 and 2045 conditions. As it was previously noted, due to the projected growth assumed under 2045 conditions, the westbound shared left-through movement is expected to operate with significant delays and queues. Providing an exclusive westbound left-turn lane would significantly improve the operations of this intersection.

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Table 25: S. Church Street at Heptinstall Avenue/Smithfield Boulevard No Build LOS Summary

Scenario	Overall LOS	Level of Service per Movement by Approach (Delay in sec/veh)											
		Eastbound			Westbound			Northbound			Southbound		
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
AM Peak Hour													
2017 Existing	A (1.8)	B (10.3)			B (12.0)		A (0.0)	A (8.4)	A (0.0)	A (0.0)	A (8.2)	A (0.0)	A (0.0)
					B (12.0)			A (0.1)			A (0.2)		
2025 No Build	A (1.6)	B (10.8)			B (12.6)		A (0.0)	A (8.7)	A (0.0)	A (0.0)	A (8.4)	A (0.0)	A (0.0)
					B (12.6)			A (0.1)			A (0.2)		
2045 No Build	A (1.7)	B (12.9)			C (16.4)		A (0.0)	B (10.1)	A (0.0)	A (0.0)	A (9.0)	A (0.0)	A (0.0)
					C (16.4)			A (0.1)			A (0.1)		
PM Peak Hour													
2017 Existing	A (1.5)	B (11.2)			C (16.0)		A (0.0)	A (9.0)	A (0.0)	A (0.0)	A (9.7)	A (0.0)	A (0.0)
					C (16.0)			A (0.3)			A (0.9)		
2025 No Build	A (1.6)	B (12.6)			C (21.9)		A (0.0)	A (9.9)	A (0.0)	A (0.0)	B (11.1)	A (0.0)	A (0.0)
					C (21.9)			A (0.3)			A (0.9)		
2045 No Build	A (3.1)	C (17.0)			**F (65.7)**		A (0.0)	B (12.6)	A (0.0)	A (0.0)	C (16.0)	A (0.0)	A (0.0)
					F (65.7)			A (0.3)			A (0.9)		

Table 26: S. Church Street at Heptinstall Avenue/Smithfield Boulevard No Build Maximum Queue Summary

Scenario	Maximum Queue Length by Movement (feet)											
	Eastbound			Westbound			Northbound			Southbound		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Effective Storage Length (Existing/No Build)	Cont.			Cont.		225	100	675		100	Cont.	
AM Peak Hour												
2017 Existing	47			64		63	25	0		31	0	
2025 No Build	41			71		69	25	< 25		26	0	
2045 No Build	54			121		82	25	0		34	0	
PM Peak Hour												
2017 Existing	30			71		57	35	< 25		59	0	
2025 No Build	33			89		57	35	< 25		70	0	
2045 No Build	**372**			**530** ***(91%)*		205	36	< 25		**150**	**591** ***(84%)*	

Notes:
**(X%) - Maximum queue extends full length of storage bay for X% of the analysis period*
***(Y%) - Queue in lane adjacent to storage bay extends beyond end of storage bay for Y% of the analysis period*
^(Z%) - Maximum queue extends back to upstream intersection for Z% of the analysis period

5.3.6 Benns Church Boulevard at Cypress Crossing/Gumwood Drive (Unsignalized)

Future delay/LOS and queue length results for the Benns Church Boulevard at Cypress Crossing/Gumwood Drive intersection are summarized in Table 27 and Table 28, respectively. Under No Build conditions, this intersection will remain unsignalized and will operate at an overall LOS A under the 2025 scenario for the AM and PM peak hour. All individual movements operate at LOS D or better, with the exception of the northbound and southbound approaches, where certain movements are projected to operate at LOS F. As a result, queues on the northbound and southbound approach will be long, as vehicles will have a hard time finding gaps to turn onto Benns Church Boulevard. Additionally, The Cypress Crossing/Gumwood Drive intersection would serve as another point of access into the proposed Gwaltney Pointe development. Due to the limited distance of spacing between adjacent intersections, an alternative form of traffic control (e.g., roundabout, or restricted crossing U-turn (RCUT)) should be considered at this intersection to address these deficient movements for the 2025 horizon year, as development occurs.

Under 2045 conditions, the overall LOS for this intersection is "A" and "F" for the AM and PM peak hours, respectively. It should be noted that due to the projected growth assumed under 2045 conditions, this intersection is expected to operate with significant vehicle delays and queues. In order to achieve LOS D or better under 2045 conditions, signalization and exclusive turning lanes may be necessary.

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Table 27: Benns Church Boulevard at Cypress Crossing/Gumwood Drive No Build LOS Summary

Scenario	Overall LOS	Level of Service per Movement by Approach (Delay in sec/veh)											
		Eastbound			Westbound			Northbound			Southbound		
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
AM Peak Hour													
2017 Existing	A (0.6)	A (9.2)	A (0.0)	A (0.0)	B (11.1)	A (0.0)	A (0.0)	C (22.5)			B (13.6)		A (0.0)
		A (0.3)			A (0.1)						B (13.6)		
2025 No Build	A (0.6)	A (9.8)	A (0.0)	A (0.0)	B (12.9)	A (0.0)	A (0.0)	D (25.7)			B (14.5)		A (0.0)
		A(0.3)			A (0.1)						B (14.5)		
2045 No Build	A (0.9)	B (12.3)	A (0.0)	A (0.0)	C (23.0)	A (0.0)	A (0.0)	**F (71.2)**			C (20.2)		A (0.0)
		A (0.3)			A (0.2)						C (20.2)		
PM Peak Hour													
2017 Existing	A (1.9)	B (13.5)	A (0.0)	A (0.0)	B (11.9)	A (0.0)	A (0.0)	**E (42.4)**			C (22.5)		A (0.0)
		A (0.9)			A (0.2)						C (22.5)		
2025 No Build	A (6.4)	C (21.9)	A (0.0)	A (0.0)	C (15.5)	A (0.0)	A (0.0)	**F (>300)**			**F (62.9)**		A (0.0)
		A (1.3)			A (0.3)						**F (62.9)**		
2045 No Build	**F (>300)**	**F (>300)**	A (0.0)	A (0.0)	**F (72.8)**	A (0.0)	A (0.0)	**F (>300)**			**F (>300)**		A (0.0)
		E (46.5)			A (1.5)						**F (>300)**		

Table 28: Benns Church Boulevard at Cypress Crossing/Gumwood Drive No Build Maximum Queue Summary

Scenario	Maximum Queue Length by Movement (feet)											
	Eastbound			Westbound			Northbound			Southbound		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Effective Storage Length (Existing/No Build)	315	1,100	140	300	700	525	Cont.			Cont.		115
AM Peak Hour												
2017 Existing	48	< 25	0	< 25	0	< 25	< 25			75		62
2025 No Build	70	< 25	< 25	33	0	< 25	30			82		48
2045 No Build	117	159	< 25	60	0	< 25	97			344 **(60%)*		115
PM Peak Hour												
2017 Existing	126	< 25	< 25	60	< 25	< 25	111			**344** ***(41%)*		**115** **(2%)*
2025 No Build	130	< 25	0	70	107	< 25	**284**			**379** ***(77%)*		**115** **(4%)*
2045 No Build	210 **(1%)*	182 ***(2%)*	< 25	86	< 25	< 25	**309**			**366** ***(100%)*		80

Notes:
**(X%) - Maximum queue extends full length of storage bay for X% of the analysis period*
***(Y%) - Queue in lane adjacent to storage bay extends beyond end of storage bay for Y% of the analysis period*
^(Z%) - Maximum queue extends back to upstream intersection for Z% of the analysis period

5.3.7 Benns Church Boulevard at Canteberry Drive (Signalized)

Future delay/LOS and queue length results for the Benns Church Boulevard at Canteberry Drive intersection are summarized in Table 29 and Table 30, respectively. Under 2025 conditions, this intersection is expected to operate at an overall LOS C for AM peak and LOS D for the PM peak hours.

Currently, this signalized intersection operates as "split-phase", which results in the side streets (i.e., Canteberry Drive) not operating concurrently. This phasing configuration means that the northbound and southbound approaches experience the most delay under future conditions as priority is given to Benns Church Boulevard (i.e., eastbound/westbound). With the projected increases in future volumes, the signal is not expected to efficiently process the southbound and northbound approaches.

Westbound queue lengths are expected to extend approximately 830 feet under 2025 No Build PM peak conditions, blocking 32% of traffic from the adjacent turn lanes. Eastbound queues lengths are also projected to extend past the left-turn lane storage, blocking 3% of the traffic from being able to access this lane.

Under 2045 conditions, the overall LOS for this intersection is "D" and "F" for the AM and PM peak hours, respectively. It should be noted that due to the projected growth assumed under 2045 conditions, this intersection expected to operate with significant vehicle delays and queues. Adding an exclusive left-turn lane in the northbound and southbound approach would improve the operations of this intersection.

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Table 29: Benns Church Boulevard at Canteberry Drive No Build LOS Summary

Scenario	Overall LOS	Level of Service per Movement by Approach (Delay in sec/veh)											
		Eastbound			Westbound			Northbound			Southbound		
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
AM Peak Hour													
2017 Existing	B (18.6)	A (7.6)	B (12.9)	B (12.0)	A (8.9)	B (14.3)	B (12.8)	D (54.3)		D (50.2)	**E (64.8)**		D (46.7)
		B (12.5)			B (14.0)			D (52.3)			**E (59.1)**		
2025 No Build	C (24.5)	B (12.9)	C (23.6)	B (13.6)	B (11.0)	B (19.8)	B (15.2)	D (52.0)		D (47.8)	D (54.0)		D (42.5)
		C (22.3)			B (19.2)			D (49.9)			D (50.2)		
2045 No Build	D (47.2)	C (32.1)	D (55.0)	D (51.8)	D (42.4)	C (30.6)	D (53.3)	**E (64.9)**		**E (60.1)**	**E (74.2)**		D (53.7)
		D (53.3)			C (32.6)			**E (62.5)**			**E (66.9)**		
PM Peak Hour													
2017 Existing	C (31.1)	B (20.0)	C (25.0)	C (32.3)	B (17.3)	C (30.5)	B (19.0)	**E (59.1)**		D (42.8)	D (55.0)		D (50.1)
		C (25.5)			C (28.9)			**E (55.4)**			D (52.5)		
2025 No Build	D (40.8)	D (46.1)	C (24.5)	C (25.0)	C (33.1)	D (51.0)	C (24.5)	**E (69.0)**		D (42.8)	**E (70.1)**		D (50.1)
		C (26.5)			D (48.0)			**E (63.1)**			**E (59.6)**		
2045 No Build	**F (138.6)**	**F (245.8)**	**F (88.4)**	A (6.9)	D (44.4)	**F (188.3)**	B (14.2)	**F (249.0)**		**E (55.8)**	**F (212.6)**		**F (85.4)**
		F (97.6)			**F (168.4)**			**F (205.7)**			**F (142.6)**		

Table 30: Benns Church Boulevard at Canteberry Drive No Build Maximum Queue Summary

Scenario	Maximum Queue Length by Movement (feet)											
	Eastbound			Westbound			Northbound			Southbound		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Effective Storage Length (Existing/No Build)	265	650	600	215	800	365	Cont.		Cont.	Cont.		Cont.
AM Peak Hour												
2017 Existing	151	298	39	149	254	34	100		60	189		69
2025 No Build	131	286	28	173	282	52	108		75	185		81
2045 No Build	264	635 **(10%)* ^(1%)	430	214	458 **(5%)*	52	149		108	254		114
PM Peak Hour												
2017 Existing	119	268	36	**214**	474 **(7%)*	57	255		67	139		96
2025 No Build	253	399 **(3%)*	40	**215** **(1%)*	**829** **(32%)* ^(4%)	143	282		62	263		130
2045 No Build	**262** **(6%)*	484 **(5%)* ^(1%)	130	**214** **(1%)*	**845** **(46%)* ^(15%)	229	289		127	**1,009**		**1,012**

Notes:
**(X%) - Maximum queue extends full length of storage bay for X% of the analysis period*
***(Y%) - Queue in lane adjacent to storage bay extends beyond end of storage bay for Y% of the analysis period*
^(Z%) - Maximum queue extends back to upstream intersection for Z% of the analysis period

5.3.8 Benns Church Boulevard at Cypress Run Drive (Signalized)

Future delay/LOS and queue length results for the Benns Church Boulevard at Cypress Run Drive intersection are summarized in Table 31 and Table 32, respectively. Under 2025 conditions, this intersection is expected to operate at an overall LOS A for AM peak and LOS C for the PM peak hours. Vehicle delay does improve slightly for the intersection between Existing and 2025 conditions during the AM peak hours, but this attributed to the optimized timings and coordination. This signalized intersection also operates as "split-phase", which results in the side streets (i.e., Canteberry Drive) not operating concurrently, given the southbound approach currently only serves a single residential home where volumes and delays associated with the southbound approach is negligible compared to the overall intersection. Therefore, having this signal continue to operate as split-phase is appropriate, given that this approach would be "skipped", resulting in the additional green time to be allocated to the other intersection movements.

No significant queuing issues were noted at this intersection under 2025 conditions. The only instance of blocking is projected to occur due to the westbound through movements, where they were simulated to extend approximately 550 feet under the 2025 No Build PM peak hour, which resulted the adjacent left-turn lane volume to be blocked 2% of the time.

Overall, Benns Church Boulevard at Cypress Run Drive operates at an acceptable level of service during the AM and PM peak hours for the 2025 No Build conditions. Under 2045 conditions, the overall LOS for this intersection is "A" and "F" for the AM and PM peak hours, respectively. It should be noted that due to the projected growth assumed under 2045 conditions, this intersection expected to operate with significant vehicle delays and queues.

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Table 31: Benns Church Boulevard at Cypress Run Drive No Build LOS Summary

Scenario	Overall LOS	Level of Service per Movement by Approach (Delay in sec/veh)											
		Eastbound			Westbound			Northbound			Southbound		
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
AM Peak Hour													
2017 Existing	A (5.0)	-	A (3.7)	A (4.0)	A (4.1)	A (4.0)		D (53.1)		D (52.0)	A (0.0)		
		A (3.7)			A (4.0)			D (52.3)					
2025 No Build	A (4.1)	-	A (2.7)	A (4.2)	B (11.0)	A (3.1)		D (50.6)		D (49.5)	A (0.0)		
		A (2.8)			A (3.5)			D (49.8)					
2045 No Build	A (7.3)	-	A (6.8)	A (3.5)	B (18.6)	A (5.1)		**E (66.2)**		**E (64.3)**	A (0.0)		
		A (6.7)			A (5.7)			**E (64.8)**					
PM Peak Hour													
2017 Existing	B (16.7)	A (9.7)	B (16.9)	B (11.5)	B (14.2)	B (13.8)		D (39.9)		D (35.9)	D (47.3)		
		B (16.4)			B (13.9)			D (37.9)					
2025 No Build	C (21.5)	A (6.9)	A (7.0)	A (0.2)	C (26.8)	C (30.4)		**E (57.9)**		D (48.1)	**E (60.6)**		
		A (6.5)			C (30.0)			D (53.1)					
2045 No Build	**F (100.1)**	C (20.5)	**F (104.0)**	A (0.7)	**E (76.1)**	**F (109.2)**		**E (60.4)**		D (53.2)	**E (71.4)**		
		F (97.4)			**F (106.2)**			**E (56.9)**					

Table 32: Benns Church Boulevard at Cypress Run Drive No Build Maximum Queue Summary

Scenario	Maximum Queue Length by Movement (feet)											
	Eastbound			Westbound			Northbound			Southbound		
	LT	TH	RT	LT	TH	TH RT	LT	TH	RT	LT	TH	RT
Effective Storage Length (Existing/No Build)	140	800	240	250	2,150		Cont.		Cont.	Cont.		
AM Peak Hour												
2017 Existing	0	117	< 25	72	70	103	55		76	0		
2025 No Build	0	119	25	75	115	150	47		94	0		
2045 No Build	0	245	< 25	116	149	210	55		109	0		
PM Peak Hour												
2017 Existing	< 25	305	70	175	199	259	131		101	< 25		
2025 No Build	< 25	183	48	242	505 **(2%)*	550	187		131	< 25		
2045 No Build	24	240	44	**250** **(1%)*	**2,166** **(36%)* ^(1%)	**2,163** ^(1%)	211		159	27		

Notes:
**(X%) - Maximum queue extends full length of storage bay for X% of the analysis period*
***(Y%) - Queue in lane adjacent to storage bay extends beyond end of storage bay for Y% of the analysis period*
^(Z%) - Maximum queue extends back to upstream intersection for Z% of the analysis period

5.3.9 Benns Church Boulevard at Turner Drive (Signalized)

Future delay/LOS and queue length results for the Benns Church Boulevard at Turner Drive intersection are summarized in Table 33 and Table 34, respectively. Under 2025 No Build conditions, this intersection is expected to operate at LOS C during the AM and PM peak hours. Vehicle delay does improve slightly for the intersection between Existing and 2025 conditions during the AM peak hours, but this attributed to the optimized timings and coordination. As noted under the existing conditions analysis of this intersection, the northbound approach currently operates at LOS E as a permissive movement with no dedicated turn lanes. This condition is only expected to get worse as traffic increases within the study area.

Westbound queue lengths are expected to extend approximately 270 feet under the 2025 No Build AM peak hour, blocking 2% of traffic from making a left turn onto southbound Turner Drive. This condition continues to worsen during the PM peak hour, as westbound queues extend approximately 410 feet, blocking 10% of the traffic from the adjacent left-turn lane.

Under 2045 conditions, the overall LOS for this intersection is "E" for the AM and PM peak hours. It should be noted that due to the projected growth assumed under 2045 conditions, this intersection expected to operate with significant vehicle delays and queues.

5.4 Future No Build Operational Analysis Summary

Based on the future operational analysis of the study area, it was found that many of the intersections are projected to experience significant delays and queues. Under future 2025 "No Build" conditions, the existing configuration of many of the study area intersections will continue to experience vehicle delays that result in operations of LOS E or worse, and extensive queue lengths. Therefore, additional "Build" enhancements were considered for the study area intersections to help reduce delays and queues as discussed in Chapter 6.0.

As shown throughout this section, the level of unconstrained growth shown for the 2045 scenario and the resulting operational conditions would ultimately require significant capacity enhancements along Benns Church Boulevard. The Town of Smithfield and VDOT should continue to monitor growth in this region and assess any improvements to address further growth, as needed.

Table 33: Benns Church Boulevard at Turner Drive No Build LOS Summary

Scenario	Overall LOS	Level of Service per Movement by Approach (Delay in sec/veh)											
		Eastbound			Westbound			Northbound			Southbound		
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
AM Peak Hour													
2017 Existing	C (30.6)	-	C (24.8)	D (46.2)	C (21.0)	B (12.6)		**E (63.5)**			C (29.9)		C (29.6)
			C (31.3)		B (14.3)						C (29.9)		
2025 No Build	C (23.3)	-	B (19.1)	B (12.5)	C (34.1)	B (12.8)		**E (58.9)**			C (28.8)		C (28.5)
			B (17.3)		B (16.8)						C (28.7)		
2045 No Build	**E (57.4)**	-	D (50.8)	C (25.0)	**F (111.8)**	B (15.9)		**F (194.0)**			D (38.6)		D (38.3)
			D (44.6)		C (31.2)						D (38.6)		
PM Peak Hour													
2017 Existing	C (23.7)	B (14.2)	C (25.0)	B (17.2)	B (15.9)	C (20.5)		D (42.5)			C (27.5)		C (27.5)
			C (23.9)		B (20.0)						C (27.5)		
2025 No Build	C (23.4)	A (7.8)	A (8.9)	A (1.8)	D (37.4)	C (27.4)		**E (67.2)**			D (35.5)		D (35.5)
			A (8.3)		C (28.3)						D (35.5)		
2045 No Build	**E (78.9)**	D (49.7)	C (28.1)	A (0.1)	**F (138.4)**	**F (105.8)**		**F (194.1)**			D (46.9)		D (46.8)
			C (26.4)		**F (108.2)**						D (46.8)		

Table 34: Benns Church Boulevard at Turner Drive No Build Maximum Queue Summary

Scenario	Maximum Queue Length by Movement (feet)											
	Eastbound			Westbound			Northbound			Southbound		
	LT	TH	RT	LT	TH	TH RT	LT	TH	RT	LT	TH	RT
Effective Storage Length (Existing/No Build)	150	2,150	300	150	Cont.	Cont.		Cont.			Cont.	125
AM Peak Hour												
2017 Existing	0	427 ***(1%)*	299	149 **(1%)*	246 ***(1%)*	220		**399**			73	26
2025 No Build	0	314	255	149 **(2%)*	271 ***(2%)*	260		**400**			72	< 25
2045 No Build	0	1,180 ***(19%)*	300 **(1%)*	150 **(17%)*	491 ***(13%)*	475		**423**			64	< 25
PM Peak Hour												
2017 Existing	106	351 ***(10%)*	274	**149**	322 ***(6%)*	318		**237**			< 25	< 25
2025 No Build	46	213	41	**150** **(3%)*	410 ***(10%)*	413		**350**			< 25	< 25
2045 No Build	56	184	52	**150** **(12%)*	**2,464** ***(38%)*	**2,460**		**380**			< 25	< 25

Notes:
**(X%) - Maximum queue extends full length of storage bay for X% of the analysis period*
***(Y%) - Queue in lane adjacent to storage bay extends beyond end of storage bay for Y% of the analysis period*
^(Z%) - Maximum queue extends back to upstream intersection for Z% of the analysis period

6.0 ALTERNATIVES ANALYSIS

Based on the future operational analysis presented in Section 5.3, various phases and levels of improvements and alternatives were considered for the study area intersections. These alternatives were divided into two categories based on the scale of improvement necessary to address the deficient operational conditions:

- "Small" Scale Alternatives (i.e., adding/extending turn-lanes, traffic signal phasing modifications, etc.)
- "Large" Scale Alternatives (i.e., intersection/interchange construction, innovative intersections, etc.)

This section describes the various improvements and alternatives considered as part of this study and presents the operational benefits/findings, along with planning level cost estimates for the proposed recommendations.

6.1 Small Scale Alternatives

It was determined that minor modifications to many of the study area intersections could be implemented at relatively low cost to help address deficient operational conditions and extend the life-span of the existing traffic control measures. The improvements were identified separately from the larger scale improvements discussed in Section 6.2 for the following study area intersections:

- Benns Church Boulevard at Canteberry Drive (Signalized)
  - Remove split-phasing for northbound/southbound approaches and convert to Protected + Permissive phasing with flashing yellow arrows (FYA)
  - Northbound/Southbound approaches should be modified to provide for a dedicated left-turn lane, single through-lane, and dedicated right-turn lane
    - Widen the southbound approach into the existing median to provide a dedicated left-turn lane
    - Convert one of the existing inbound lanes on the northbound approach to a dedicated left-turn lane
  - Add right-turn overlap phases for the eastbound and westbound approaches
  - Extend westbound left-turn lane to meet current VDOT standards (i.e., 200 feet of storage with a 200-foot taper)
- Benns Church Boulevard at Cypress Run Drive (Signalized)
  - Add right-turn overlap phases for the eastbound and westbound approaches
- Benns Church Boulevard at Turner Drive (Signalized)
  - Coordinate traffic signal and implement "school" time of day plans with the other signalized intersections along the corridor
  - Add right-turn overlap phases for the eastbound and westbound approaches
  - Improve/widen the northbound approach of Turner Drive to include a shared through/left-turn lane and an exclusive right-turn lane consisting of 200 feet of storage and a 200-foot taper
  - Extend westbound left-turn lane to meet current VDOT standards (i.e., 200 feet of storage with a 200-foot taper)

The operational impact of these improvements is further discussed in Section 6.6.

6.2 Large Scale Alternatives

The intersections of S. Church Street at Benns Church Boulevard and Benns Church Boulevard at Cypress Crossing/Gumwood Drive were identified to require more substantial improvements to address future deficiencies. As noted previously, VDOT had anticipated the need to eventually construct an interchange at the intersection of S. Church Street at Benns Church Boulevard to limit the amount of interruptions that occur in the flow of traffic. To this, VDOT acquired the necessary right-of-way (ROW) in the vicinity of the S. Church Street and the Benns Church Boulevard intersection to someday accommodate an interchange in the future and enacted a limited access boundary along Benns Church Boulevard to limit the number of access points near this intersection. As the Town of Smithfield had express an interest in reacquiring this land from VDOT and determine an alternative intersection concept that can accommodate future traffic volumes, this section reviews various "innovative" intersections and how they compare to a potential interchange concept and to request a break in the limited access line to accommodate a fourth leg to the intersection to serve future developments. The general purpose of the innovative intersection concepts is to reroute movements to secondary junctions that ultimately result in reduced delay, travel times, and the number of conflict points. The intersection of Benns Church Boulevard at Cypress Crossing/Gumwood Drive was included as part of this review due to its proximity to the S. Church Street at Benns Church Boulevard and its projected operational conditions.

6.2.1 VJUST

The VDOT Junction Screening Tool (VJuST) was used to aid in assessing these "innovative" intersection concepts that provide alternative means of traffic control measures. VDOT created this tool to help review and narrow down the list of innovative intersections under consideration to feasible options, that are then further analyzed as part of the traffic study. The VJuST tool was used in this analysis to screen and identify innovative intersection concepts that could realistically be considered an alternative traffic control measure to a conventional traffic signal. Detailed results from the VJuST tool are included in Appendix G. The VJuST thresholds for v/c and conflict points are shown in Table 35. Working in conjunction with the Town of Smithfield and VDOT, the following intersections were initially considered and the results shown in Table 36 and Table 37.

Meetings were held with the Town of Smithfield and VDOT to review the results of the VJuST tool findings and to identify which alternative concept(s) would be further analyzed for S. Church Street at Benns Church Boulevard. Based on the result of the VJuST screening, a roundabout for the intersection of S. Church Street at Benns Church Boulevard was ruled out as a viable option.

Additionally, the intersection of Benns Church Boulevard at Cypress Crossing/Gumwood Drive was factored into the discussion of alternative intersections due to its proximity to S. Church Street and how it does not meet current VDOT spacing requirements for potential signalization in the future. Based on these discussions, the following six (6) alternatives were developed for further consideration as part of this study:

- Alternative 1 – Full Diamond Interchange (S. Church Street) and Roundabout (Cypress Crossing)
- Alternative 2 – Diamond Interchange with Quadrant Loop (S. Church Street) and Roundabout (Cypress Crossing)
- Alternative 3 – Diamond Interchange with Quadrant Loop (S. Church Street) and Restricted Crossover U-turn (R-CUT) (Cypress Crossing)
- Alternative 4 – Partial Displaced Left-Turn (S. Church Street) and Roundabout (Cypress Crossing)
- Alternative 5 – Conventional at-grade Intersection (S. Church Street) and Roundabout (Cypress Crossing)
- Alternative 6 – Conventional At-grade Intersection (S. Church Street) and R-CUT (Cypress Crossing)

Table 35: VJuST Thresholds

v/c	Weighted Total Conflict Points	Relative Performance
0.0-0.25	≤ 8	Optimal
0.25-0.65	> 8 – 24	
0.65-0.90	>24 – 32	Moderate
0.90-1.0	>32 – 44	
>1.0	> 44	Poor

Table 36: VJuST 2025 Results for S. Church Street at Benns Church Boulevard Intersection

Type	2025 AM Peak Hour			2025 PM Peak Hour		
	Maximum V/C	Accommodation Compared to Conventional	Weighted Total Conflict Points	Maximum V/C	Accommodation Compared to Conventional	Weighted Total Conflict Points
Intersection Results						
Conventional	0.50		48	0.74		48
Bowtie	1.56	+	24	1.90	+	24
Full Displaced Left Turn	0.48	-	40	0.57	-	40
Median U-Turn	0.78	+	20	0.95	+	20
Partial Displaced Left Turn	0.48	-	44	0.58	-	44
Partial Median U-Turn	0.52	+	28	0.69	+	28
Quadrant Roadway (N-W)	0.48		40	0.71		40
Quadrant Roadway (S-W)	0.65		40	0.78		40
Restricted Crossing U-Turn	0.57		20	0.68		20
Roundabout	0.86		8	1.10		8
Interchange Results						
Traditional Diamond	0.53		28	0.91		28
Contraflow Left	0.48		32	0.65		32
Displaced Left Turn	0.42	-	28	0.72	-	28
Diverging Diamond	0.23	-	20	0.40	-	20
Double Roundabout	0.51	+	16	0.69	+	16
Partial Cloverleaf	0.38		20	0.52		20
Single Point	0.48	-	32	0.72	-	32

Source: VDOT Junction Screening Tool, Version 1.0, September 2017
Note: Bolded rows represent intersection types further developed for analysis

Table 37: VJuST 2045 Results for S. Church Street at Benns Church Boulevard Intersection

Type	2045 AM Peak Hour			2045 PM Peak Hour		
	Maximum V/C	Accommodation Compared to Conventional	Weighted Total Conflict Points	Maximum V/C	Accommodation Compared to Conventional	Weighted Total Conflict Points
Intersection Results						
Conventional	0.71		48	1.15		48
Bowtie	2.21	+	24	2.78	+	24
Full Displaced Left Turn	0.68	-	40	0.84	-	40
Median U-Turn	1.10	+	20	1.39	+	20
Partial Displaced Left Turn	0.68	-	44	0.85	-	44
Partial Median U-Turn	0.63	+	28	1.06	+	28
Quadrant Roadway (N-W)	0.68		40	1.06		40
Quadrant Roadway (S-W)	0.92		40	1.14		40
Restricted Crossing U-Turn	0.80		20	1.02		20
Roundabout	1.45		8	2.32		8
Interchange Results						
Traditional Diamond	0.77		28	1.40		28
Contraflow Left	0.69		32	0.99		32
Displaced Left Turn	0.61	-	28	1.13	-	28
Diverging Diamond	0.33	-	20	0.63	-	20
Double Roundabout	0.74	+	16	1.02	+	16
Partial Cloverleaf	0.55		20	0.77		20
Single Point	0.68	-	32	1.13	-	32

Source: VDOT Junction Screening Tool, Version 1.0, September 2017
Note: Bolded rows represent intersection types further developed for analysis

6.3 Alternative Concepts Considered

This section describes the alternative concepts developed as part of the VJuST analysis. These concepts were developed with design criteria in mind and reflect the necessary geometry to incorporate the improvements. These alternatives concepts were then shared with the Town of Smithfield and VDOT for general review.

6.3.1 Alternative 1 – Full Diamond Interchange and Roundabout

Alternative 1, as illustrated in Figure 23, represents a grade separated, full diamond interchange that will replace the signalized, at-grade intersection of Benns Church Boulevard and S. Church Street. S Church Street will be closed to through traffic and diverted to the new interchange. This interchange concept will also provide access to/from the proposed future Gwaltney Pointe development.

Due to spacing limitations, the Cypress Crossing/Gumwood Drive at Benns Church Boulevard will also be reconfigured from a full access, unsignalized intersection to a two-lane roundabout to improve the operations on the minor side-streets and improve safety on all four approaches at this intersection. This will also serve as a transition point from the highway-like conditions along Benn Church Boulevard (i.e., the Bypass) as vehicles travel from the north/west to the more commercial area located to the south/east of Smithfield.

6.3.2 Alternative 2 – Diamond Interchange with Quadrant Loop and Roundabout

Alternative 2, as illustrated in Figure 24, represents a grade separated, partial diamond interchange with a quadrant loop that will replace the signalized, at-grade intersection of Benns Church Boulevard and S. Church Street intersection. While similar to Alternative 1, a free-flow loop ramp is proposed to address the heavy southbound left-turn movement that was traveling from S Church Street to eastbound Benns Church Boulevard. By using a loop ramp at this location, what was a heavy left-turn movement is converted to a free-flow right-turn movement under this concept, allowing for more efficient flows of traffic through the interchange. This interchange concept will also provide access to the proposed future Gwaltney Pointe development.

Due to spacing limitations, the Cypress Crossing/Gumwood Drive at Benns Church Boulevard will also be reconfigured from a full access, unsignalized intersection to a two-lane roundabout to improve the operations on the minor street and improve safety on all four approaches at this intersection. This will also serve as a transition point from the highway-like conditions along Benn Church Boulevard (i.e., the Bypass) as vehicles travel from the north/west to the more commercial area located to the south/east of Smithfield.

6.3.3 Alternative 3 – Diamond Interchange with Quadrant Loop and R-CUT

Alternative 3, as illustrated in Figure 25, represents a grade separated, partial diamond interchange with a quadrant loop that will replace the signalized, at-grade intersection of Benns Church Boulevard and S. Church Street intersection. While similar to Alternative 1, a free-flow loop ramp is proposed to address the heavy southbound left-turn movement that was traveling from S Church Street to eastbound Benns Church Boulevard. By using a loop ramp at this location, what was a heavy left-turn movement is converted to a free-flow right-turn movement under this concept, allowing for more efficient flows of traffic through the interchange. This interchange concept will also provide access to/from the proposed future Gwaltney Pointe development.

Due to spacing limitations the Cypress Crossing/Gumwood Drive at Benns Church Boulevard will be reconfigured from a full access, unsignalized intersection to a R-CUT innovative intersection with restricted movements.

Through and left-turn movements will be restricted on Cypress Crossing/Gumwood Drive. Vehicles wanting to make left/through movements from the minor streets will be required to make a right-turn, followed by a U-turn at the next downstream intersection. U-turn lanes will be added upstream at the existing S. Church Street median crossover and downstream at the Canteberry Lane/Smithfield Plaza intersection.

6.3.4 Alternative 4 – Partial Displaced Left-Turn and Roundabout

Alternative 4, as illustrated in Figure 26, represents an innovative intersection that uses displaced left turns on the eastbound and westbound approaches of Benns Church Boulevard at S. Church Street. This configuration of an intersection allows the signalized operations to function with less phases than what is normally required at a conventional intersection. This concept also includes a new northbound approach to allow for future access to the proposed future Gwaltney Pointe development.

Due to spacing limitations, the Cypress Crossing/Gumwood Drive at Benns Church Boulevard will also be reconfigured from a full access, unsignalized intersection to a two-lane roundabout to improve the operations on the minor street and improve safety on all four approaches at this intersection. This will also serve as a transition point from the highway-like conditions along Benn Church Boulevard (i.e., the Bypass) as vehicles travel from the north/west to the more commercial area located to the south/east of Smithfield.

6.3.5 Alternative 5 – Conventional at-grade Intersection and Roundabout

Alternative 5, as illustrated in Figure 27, represents a conventional signalized option with turn-lane modifications to accommodate a northbound approach to allow for future access to the proposed Gwaltney Pointe development. It was assumed that a new northbound approach would have a dedicated left-turn lane, a through lane, and a dedicated right-turn lane.

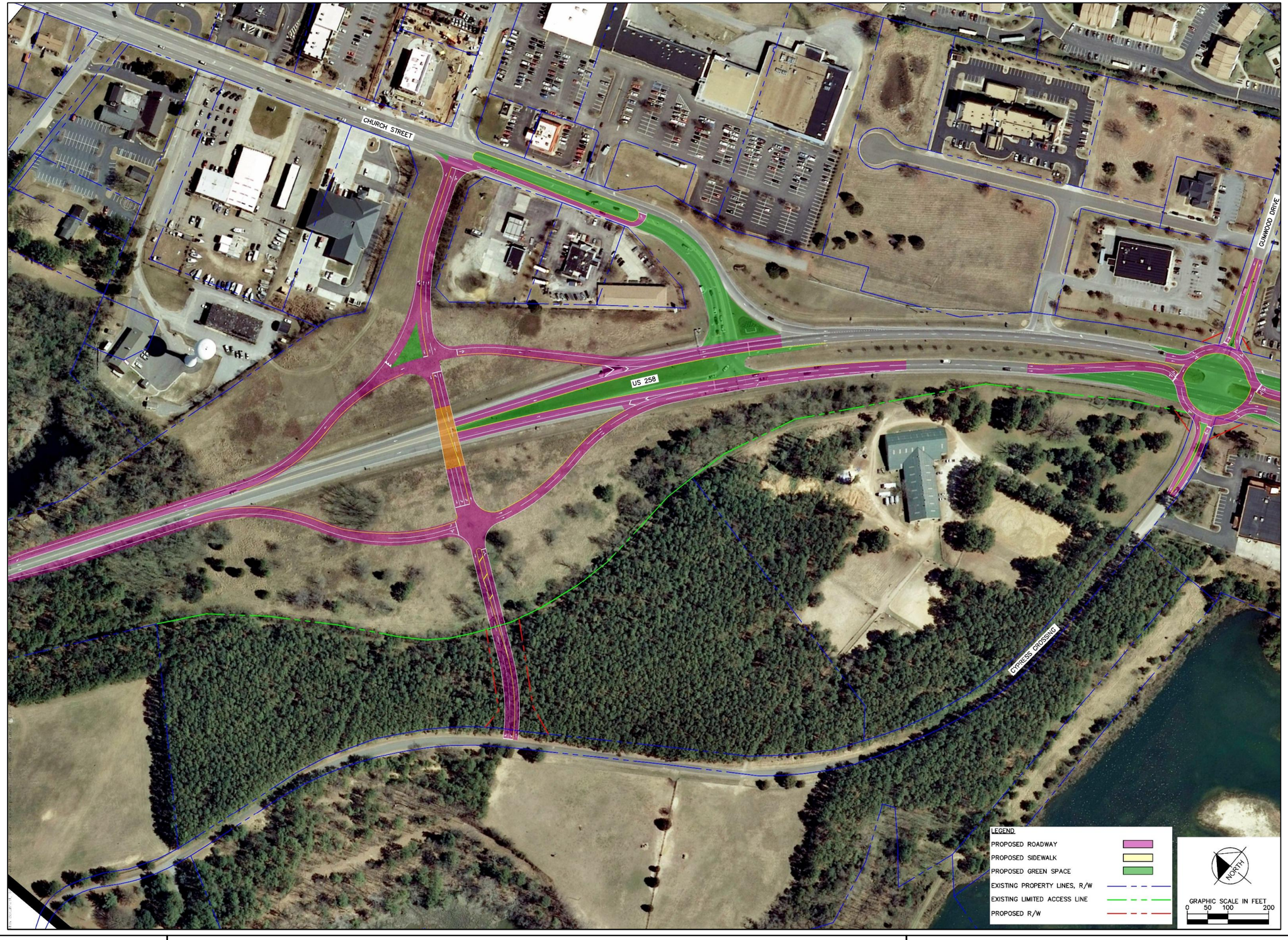
Due to spacing limitations, the Cypress Crossing/Gumwood Drive at Benns Church Boulevard will also be reconfigured from a full access, unsignalized intersection to a two-lane roundabout to improve the operations on the minor street and improve safety on all four approaches at this intersection. This will also serve as a transition point from the highway-like conditions along Benn Church Boulevard (i.e., the Bypass) as vehicles travel from the north/west to the more commercial area located to the south/east of Smithfield.

6.3.6 Alternative 6 – Conventional At-grade Intersection and R-CUT

Alternative 6, as illustrated in Figure 28, represents the same conventional signalized option with turn-lane modifications as shown in Alternative 5. The only difference for this alternative is at the Cypress Crossing/Gumwood Drive at Benns Church Boulevard intersection located to the east.

Due to spacing limitations the Cypress Crossing/Gumwood Drive at Benns Church Boulevard will be reconfigured from a full access, unsignalized intersection to a R-CUT innovative intersection with restricted movements. Through and left-turn movements will be restricted on Cypress Crossing/Gumwood Drive. Vehicles wanting to make left/through movements from the minor streets will be required to make a right-turn, followed by a U-turn at the next downstream intersection.

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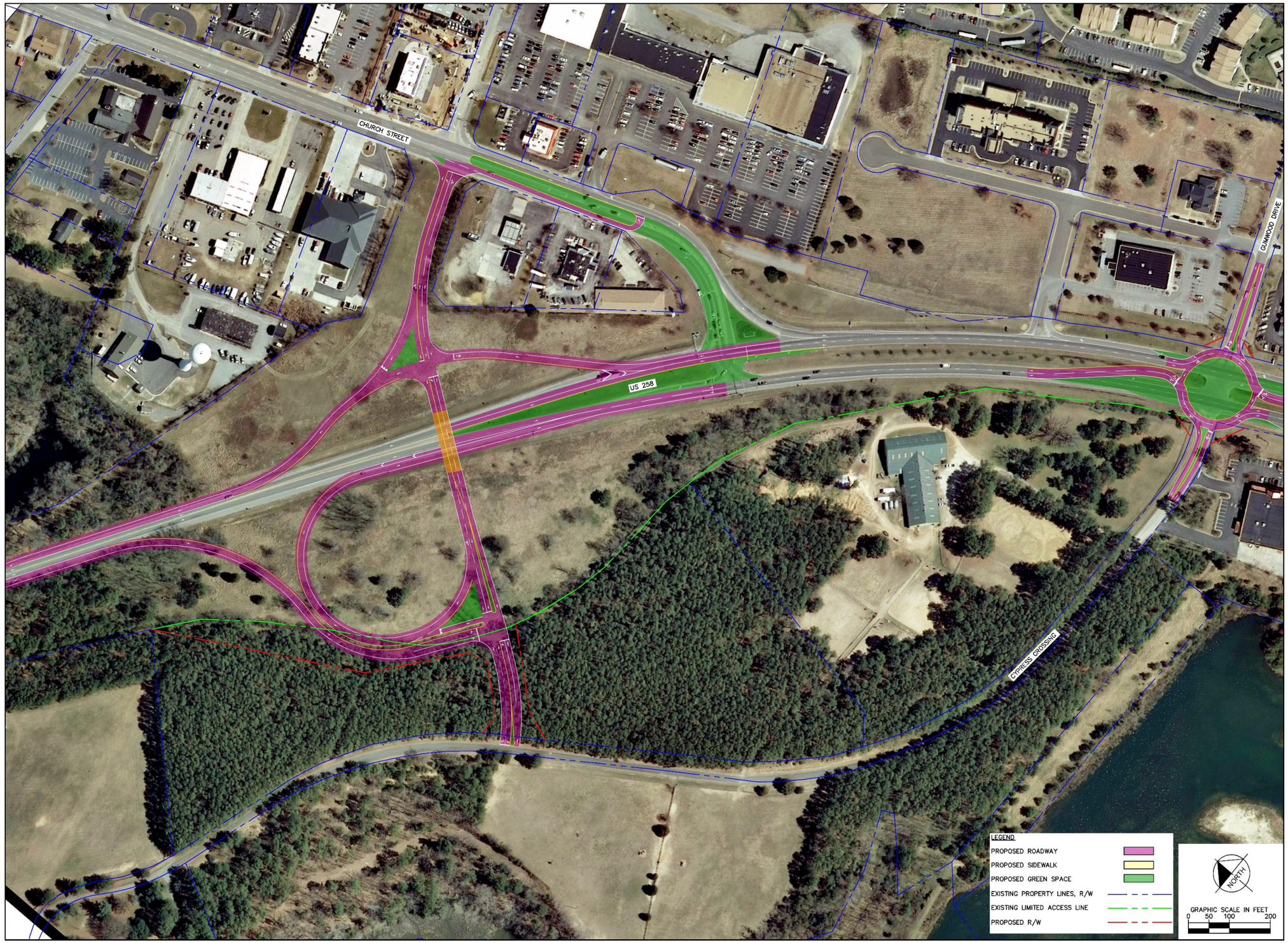
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Intersection Improvement Alternatives Analysis
Smithfield, Virginia

Alternative 1 –
Diamond Interchange and Roundabout

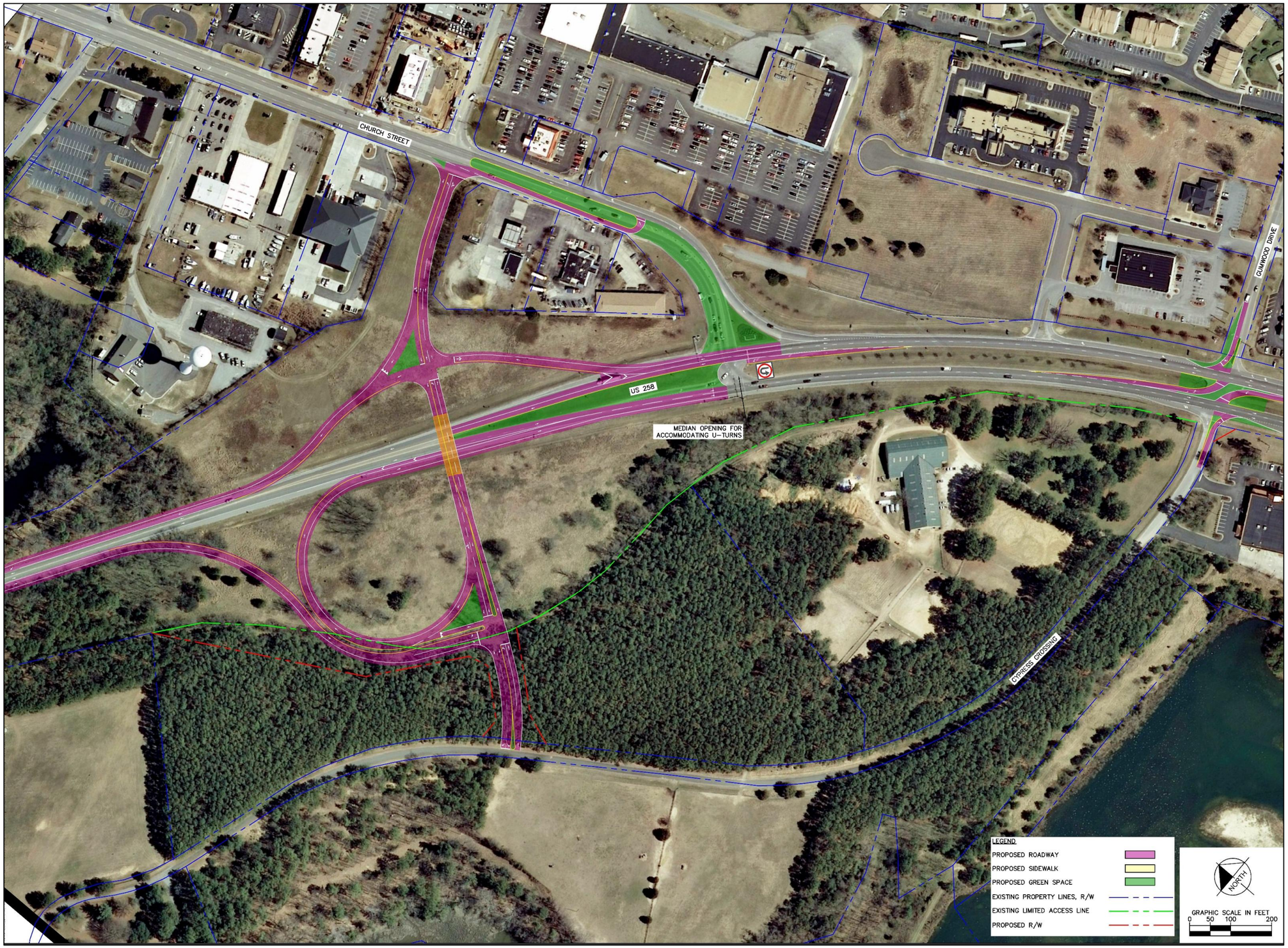
Figure
23

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Kimley»Horn	Intersection Improvement Alternatives Analysis Smithfield, Virginia	Alternative 2 – Diamond Loop and Roundabout	Figure 24

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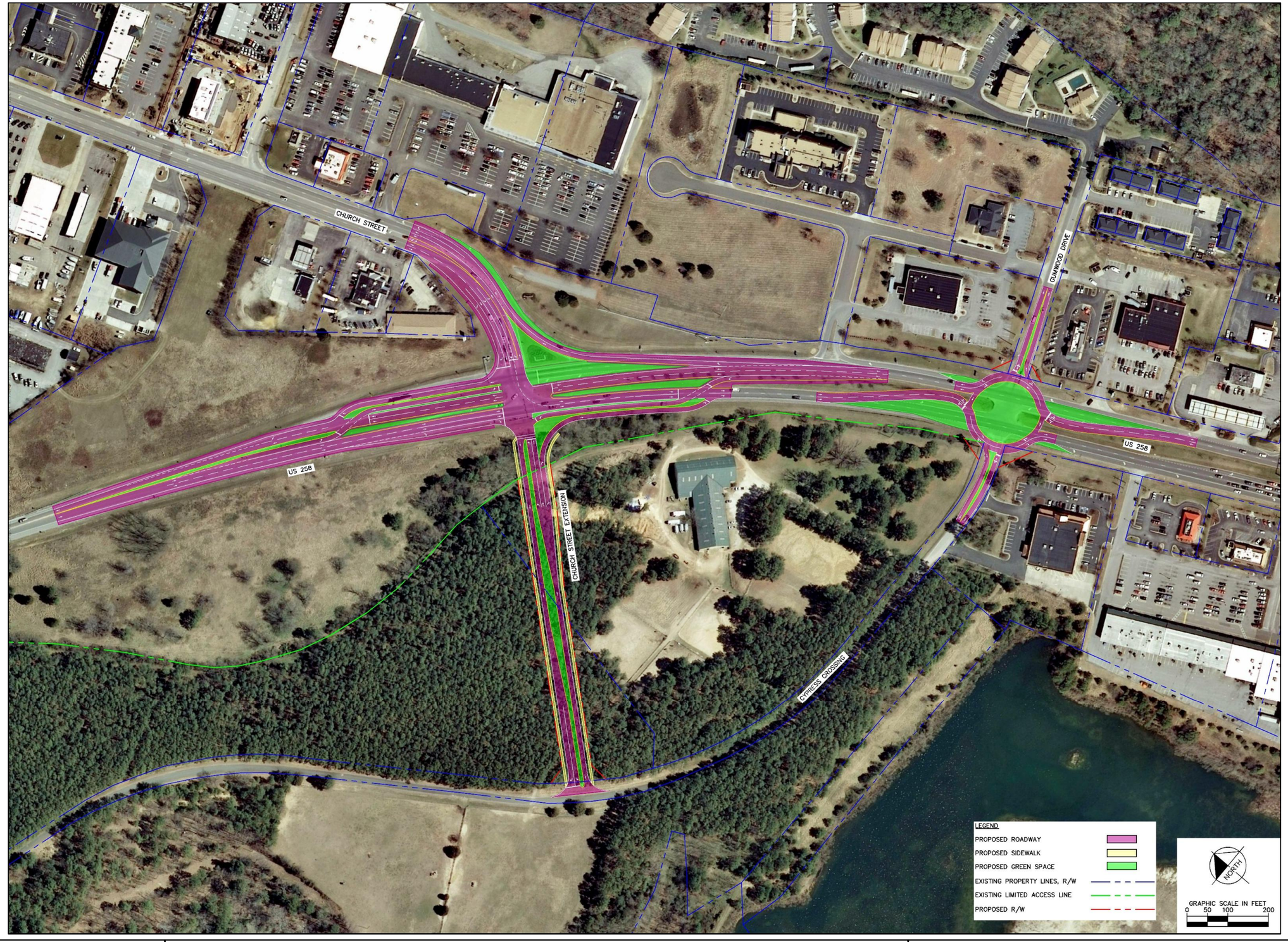
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Intersection Improvement Alternatives Analysis
Smithfield, Virginia

Alternative 3 –
Diamond Loop and R-Cut

Figure
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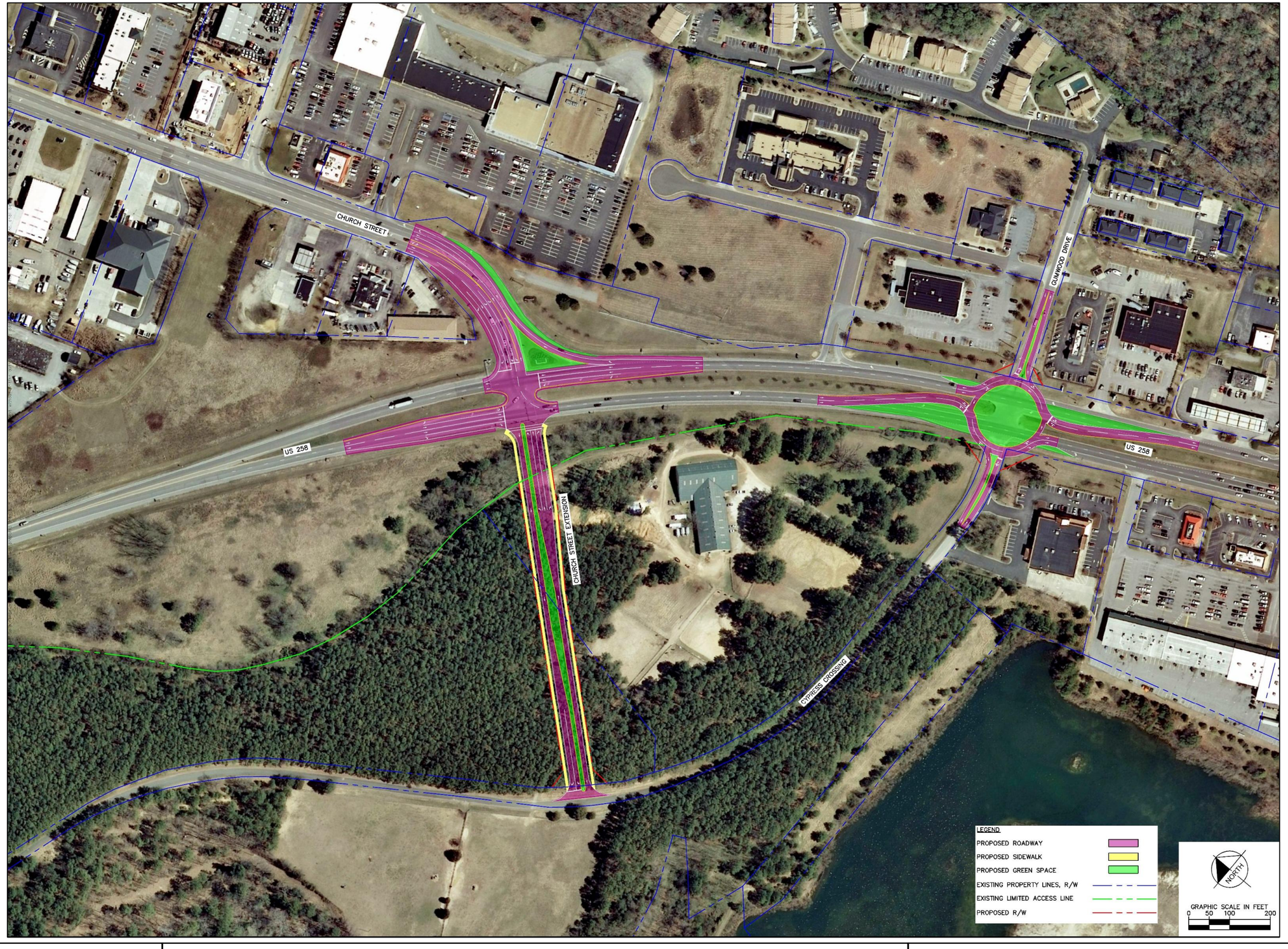
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Intersection Improvement Alternatives Analysis
Smithfield, Virginia

Alternative 4 –
Partial Displaced Lefts

Figure
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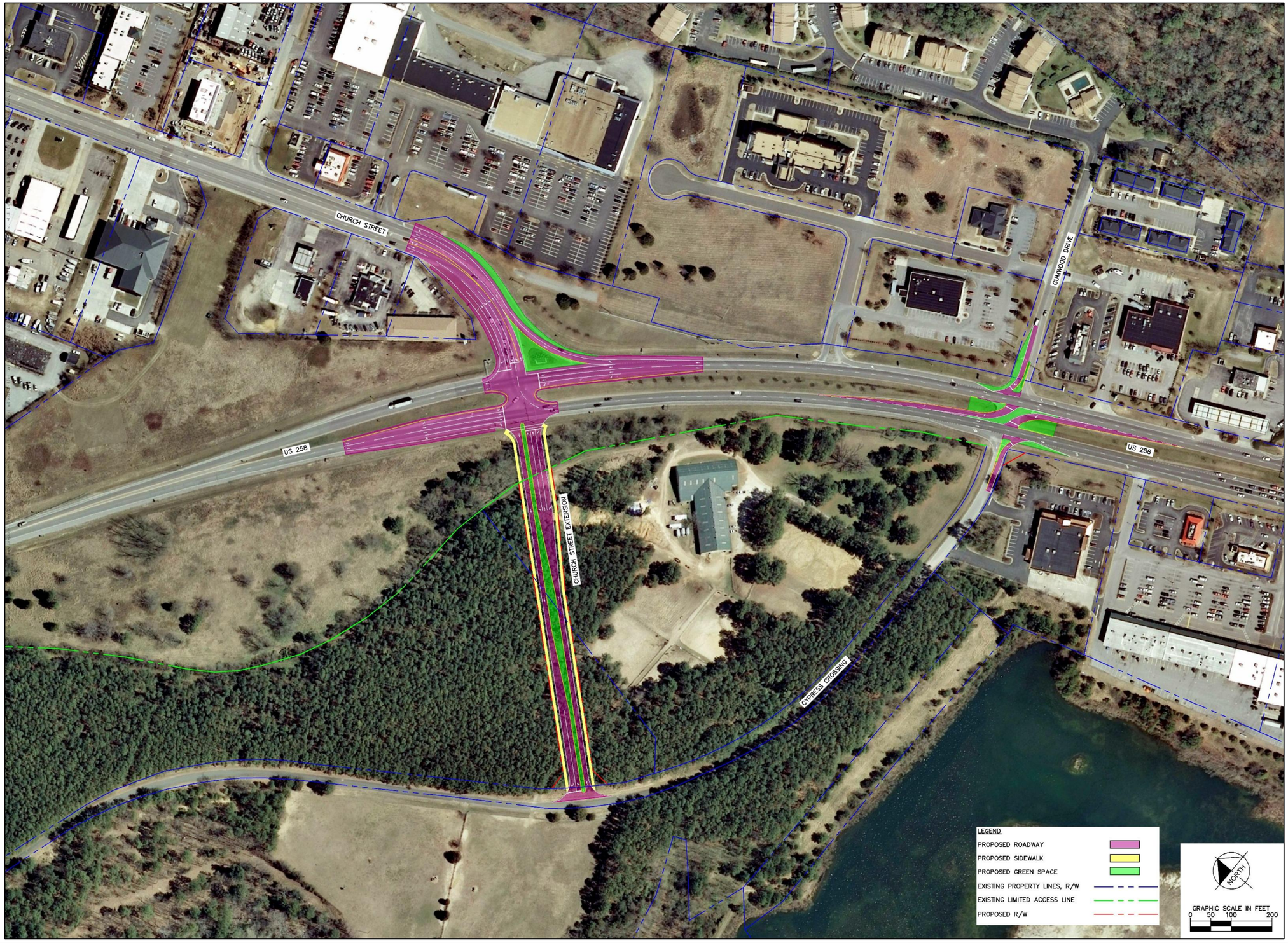
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Intersection Improvement Alternatives Analysis
Smithfield, Virginia

Alternative 5 –
Conventional with Roundabout

Figure
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Intersection Improvement Alternatives Analysis
Smithfield, Virginia

Alternative 6 –
Conventional with R-Cut

Figure
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6.4 Roadway Geometry Design Criteria

6.4.1 Geometric Criteria

Conceptual design plans for interchange improvements at Benns Church Boulevard and S. Church Street, intersection improvements at Benns Church Boulevard and S. Church Street, and intersection improvements at Cypress Crossing/Gumwood Drive at Benns Church Boulevard. Table 38 and

Table 39 provides additional details on the Design Criteria utilized for developing conceptual improvements. Benns Church Boulevard is a partial limited access facility and classified by VDOT as an Urban Minor Arterial Street System. A 60 miles per hour (mph) design speed was considered along Benns Church Boulevard. The VDOT Geometric Design Standard selected for Benns Church Boulevard is GS-6. The side roads intersecting Benns Church Boulevard within the project corridor (Cypress Crossing, Gumwood Drive, and S. Church Street) have been designed utilizing VDOT Geometric Design Standard GS-7 for an Urban Collector Street System. The proposed design criteria of the interchange ramps are in compliance with the Association of State Highway and Transportation Officials (AASHTO) standards and VDOT Geometric Design Standards for Interchange Ramps (GS-R).

As described above, innovative intersection concepts were evaluated and included in the Concept Alternatives. The R-CUT intersections were designed in accordance with the current version of *Appendix A of the VDOT Road Design Manual* and the Restricted Crossing U-Turn (RCUT) Intersection Informational Guide provided by the Federal Highway Administration (FHWA). Roundabouts included in the Concept Alternatives were designed in accordance with the *Roundabout Section of Appendix A of the VDOT Road Design Manual*.

6.4.2 Design Waivers / Exceptions

To the extent possible all conceptual plans were developed in accordance with applicable standards published by the AASHTO, VDOT Road Design Manual, Volume 1 (2011 and 2013 editions), and VDOT Road and Bridge Standards (VDOT 2008). However, in several locations due to physical constraints and/or costs associated with attempting to acquire adjacent properties or active businesses, design waivers will be necessary.

6.4.2.1 Potential Design Waivers

When design features do not meet VDOT minimums, but exceed AASHTO minimums, a design waiver is required and must be requested. Based on the application of appropriate design guidelines, it is not anticipated that any design waivers will be required.

6.4.2.2 Potential Design Exceptions

All conceptual plans developed are in accordance with applicable standard published by the AASHTO and VDOT. Based on the application of appropriate design guidelines, it is not anticipated that any design exceptions will be required.

6.4.2.3 Access Management Waivers

Appendix F – Access Management Design Standards for Entrances and Intersections of the VDOT Road Design Manual details the current access management guidelines provided by VDOT. Table 2-4 in Appendix F provides minimum spacing standards for intersections and commercial entrances near interchange areas on two-lane roads. The minimum access management spacing between the interchange ramp and the first entrance/intersection is 750 feet for a partial access (i.e., right-in/right-out) and 1,320 feet is the minimum spacing distance between the first full-movement and/or signalized intersection. The proposed alternatives that includes a simple diamond or diamond/quadrant loop interchange concept do not meet these requirements and an access management waiver will be required.

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Table 38: VDOT Design Criteria Table (Interchange Alternative)

Criteria	Route 10/258	Connector Road	Interchange Off-Ramp/On-Ramp	References or Remarks
Functional Classification	Urban Minor Arterial	Urban Collector	Interchange Ramp	VDOT Functional Classification Map
VDOT Standard	GS-6	GS-7	GS-R	VDOT Road Design Manual, Appendix A, Pages A-11 thru A-20
Terrain	Level	Level	Level	--
Design Speed	60 mph	40 mph	40 mph	VDOT Road Design Manual, Appendix A, Pages A-11 thru A-20
Exist. Posted Speed	55 mph	N/A	N/A	--
Number of Lanes	1 each direction	1 each direction	1 lane	--
Minimum Width, Travel Lane	12'	11'	16'	VDOT Road Design Manual, Appendix A, Pages A-11 thru A-20
Paved Shoulder Widths	LT: 4' RT: 8'	C&G	LT: 1' RT: 1'	VDOT Road Design Manual, Appendix A, Pages A-11 thru A-20
Minimum Radius	1.204'	536'	446'	VDOT Road Design Manual, Appendix A, Pages A-11 thru A-20
Normal Cross Slope	2%	2%	2%	VDOT Road Design Manual, Appendix A, Pages A-11 thru A-20
Maximum Superelevation	8%	2%	2%	VDOT Road Design Manual, Appendix A, Pages A-11 thru A-20
Minimum Stopping Sight Distance	570'	305'	305'	VDOT Road Design Manual, Appendix A, Pages A-11 thru A-20
Maximum Grade	5%	10%	12%	VDOT Road Design Manual, Appendix A, Pages A-11 thru A-20 and AASHTO Green Book (2011) Page 5-2, Page 6-12, Page 7-29, and Page 8-4.
Minimum Median Width	--	--	--	--
Clear Zone	30'	14'	14'	VDOT Road Design Manual, Appendix A, Page A-27
Minimum Vertical Clearance	16.5'	16.5'	16.5'	Chapter 6 Geometrics from the Manual of the Structure and Bridge Division
Sidewalk Width	--	5'	--	
Sidewalk Buffer Width	--	4'	--	
Width of Ditch Front Slope	10'	--	4'	VDOT Road Design Manual, Appendix A, Pages A-11 thru A-20
Existing Traffic Volumes (AADT)	9,500	N/A	N/A	VDOT Permanent County Site (June, 2014), VDOT Historic Counts (2012), Adjusted 12-Hour Turning Movement Counts
Minimum Acceleration Lane Length	Minimum acceleration and deceleration lane lengths will be adjusted during design based on grades greater than 2% and based on truck adjustment factors.			VDOT Road Design Manual, Appendix F, Page F-98, AASHTO Green Book (2011) Page 10-110
Minimum Deceleration Lane Length	Minimum acceleration and deceleration lane lengths will be adjusted during design based on grades greater than 2% and based on truck adjustment factors.			VDOT Road Design Manual, Appendix F, Page F-98, AASHTO Green Book (2011) Page 10-115

Table 39: VDOT Design Criteria Table (Conventional Intersection Alternative)

Criteria	US 258	Church Street	Church Street Extension	Cypress Crossing
VDOT Geometric Design Standard	Urban Minor Arterial (GS-6)	Urban Minor Arterial (GS-6)	Urban Minor Arterial (GS-6)	Urban Collector (GS-7)
Design Speed	50 mph	35 mph	35 mph	30 mph
Minimum Horizontal Radius	929'	408' (ULS)	408' (ULS)	273' (ULS)
Minimum Lane Width	12'	11'	12'	11'
Buffer Strip Width	--	4'	4'	4'
Sidewalk Width	--	5'	5'	5'
Graded Shoulder Width	10'	10'	--	--
Left Paved Shoulder Width	4'	4'	--	--
Right Paved Shoulder Width	8'	8'	--	--

6.5 Evaluation Matrix

An evaluation matrix (Table 40) was created for the project team that reviewed different elements for each alternative that included:

- Safety enhancements
- Traffic operations
- Impacts to existing tax base
- Impacts to property owners/Right-of-Way Impacts
- Environmental impacts
- Scope of Construction
- Constructability

Each alternative was considered under these factors to determine their relative impact and to help narrow down and select a preferred alternative.

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Table 40: Alternatives Evaluation Matrix

Alternative	Traffic Operations	Safety	Impacts to Existing Tax Base	Right-of-Way Impacts	Environmental Impacts	Construction Costs	Constructability	General Comments
Alternative 1 Full Diamond Interchange and Roundabout at Benns Church Boulevard/Cypress Crossing/Gumwood Drive Intersection	1. Provides grade separation between Route 10 and Overpass/Moore Avenue Extension. 2. Accommodate heavy northbound right-turn lane with "slip" lane from Route 10 to northbound Old S. Church Street, minimizing off-ramp laneage. 3. Heavy (i.e., greater than 700 vehicles) southbound left-turn movement requires dual left-turn lanes on bridge overpass and two receiving lanes for southbound on-ramp. Creates two merge points (one on ramp, one with Route 10 prior to Cypress Crossing Roundabout. 4. Significant change in operational conditions/roadway character along Route 10 (i.e., grade separated access controlled to at-grade reduced speed to enter/travel through roundabout). 5. Roundabout will enhance operations at the Cypress Crossing/Gumwood Drive intersection to the south.	1. Significant change in operational conditions/roadway character along Route 10 (i.e., grade separated access controlled to at-grade reduced speed to enter/travel through roundabout). 2. Reduces level of conflict between S. Church Street traffic volumes and Benns Church/Bypass traffic volumes. 3. Roundabout will slow down traffic, eliminate/reduce severe angle crashes at currently unsignalized full movement intersection. Significantly reduces number of conflict points compared to conventional intersection (i.e., 8 vs. 48).	1. Grade separated interchange limits/restricts opportunity for economic development in vicinity of residual right-of-way. 2. Cul de sac of S. Church Street and impacts to access may adversely impact businesses along this segment.	1. ROW needed to accommodate proposed new fourth leg to interchange/intersection. 2. Minor impacts/need for additional right-of-way (ROW) at the Benns Church Boulevard/Cypress Crossing/Gumwood Drive.	1. None	1. Grade Separated Interchange 2. Fourth leg connection to Cypress Crossing 3. Northbound right-turn "slip" lane from Benns Church Boulevard to S. Church Street 4. Roundabout at Cypress Crossing/Gumwood Drive 5. Demolition and closure of southern portion of existing S. Church Street	1. Interchange construction can be done ROW with minimal impact to existing traffic operations along Route 10 or at the S. Church Street/Benns Church intersection. 2. Construction of Roundabout at Cypress Crossing/Gumwood Drive intersection will require relatively creative MOT plan. More impactful to existing operations.	1. Roundabout seems to be the right solution at Cypress Crossing / Gumwood Drive intersection but some concern over community appetite for another "innovative intersection concept" on the relative heels of the Benns Grant Quadrant Intersection project.
Alternative 2 Diamond Interchange with Quadrant Loop and Roundabout at Benns Church Boulevard/Cypress Crossing/Gumwood Drive Intersection	1. Provides grade separation between Route 10 and Overpass/Moore Avenue Extension 2. Accommodate heavy northbound right-turn lane with "slip" lane from Route 10 to northbound Old S. Church Street, minimizing off-ramp laneage. 3. Heavy (i.e., greater than 700 vehicles) southbound left-turn movement will be accommodated with a quadrant loop ramp to access southbound Route 10/Benns Church Boulevard. Will result in significantly less congested westbound to southbound left-turn movement on ramp. 4. Results in one merge points along Route 10. 5. Eastbound approach from Cypress Crossing would make left-turn to access on-loop. Significant change in operational conditions/roadway character along Route 10 (i.e., grade separated access controlled to at-grade reduced speed to enter/travel through roundabout). 6. Roundabout will enhance operations at the Cypress Crossing/Gumwood Drive intersection to the south.	1. Significant change in operational conditions/roadway character along Route 10 (i.e., grade separated access controlled to at-grade reduced speed to enter/travel through roundabout). 2. Reduces level of conflict between S. Church Street traffic volume and Benns Church/Bypass traffic volumes 3. Roundabout will slow down traffic, eliminate/reduce severe angle crashes at currently unsignalized full movement intersection. Significantly reduces number of conflict points compared to conventional intersection (i.e., 8 vs. 48).	1. Grade separated interchange limits/restricts opportunity for economic development in vicinity of residual right-of-way. 2. Cul de sac of S. Church Street and impacts to access may adversely impact businesses along this segment.	1. ROW needed to accommodate proposed new fourth leg to interchange/intersection. 2. Minor impacts/need for additional ROW at the Benns Church Boulevard/Cypress Crossing/Gumwood Drive to accommodate the proposed roundabout. 3. Quadrant Loop On-Ramp with 30MPH Design speed and alignment of southbound Off-Ramp will result in the need for additional ROW.	1. None	1. Grade Separated Interchange 2. Fourth leg connection to Cypress Crossing 3. Northbound right-turn "slip" lane from Benns Church Boulevard to S. Church Street 4. Roundabout at Cypress Crossing/Gumwood Drive 5. Demolition and closure of southern portion of existing S. Church Street	1. Interchange construction can be done ROW with minimal impact to existing traffic operations along Route 10 or at the S. Church Street/Benns Church intersection. 2. Construction of Roundabout at Cypress Crossing/Gumwood Drive intersection will require relatively creative MOT plan. More impactful to existing operations.	1. Roundabout seems to be the right solution at Cypress Crossing / Gumwood Drive intersection but some concern over community appetite for another "innovative intersection concept" on the relative heels of the Benns Grant Quadrant Intersection project.

Table 40: Alternatives Evaluation Matrix

Alternative	Traffic Operations	Safety	Impacts to Existing Tax Base	Right-of-Way Impacts	Environmental Impacts	Construction Costs	Constructability	General Comments
Alternative 3 Diamond Interchange with Quadrant Loop and R-CUT at Benns Church Boulevard/Cypress Crossing/Gumwood Drive Intersection	1. Provides grade separation between Route 10 and Overpass/Moore Avenue Extension 2. Accommodate heavy northbound right-turn lane with "slip" lane from Route 10 to northbound Old S. Church Street, minimizing off-ramp laneage. 3. Heavy (i.e., greater than 700 vehicles) southbound left-turn movement will be accommodated with a quadrant loop ramp to access southbound Route 10/Benns Church Boulevard. Results in one merge points along Route 10. 4. Eastbound approach from Overpass/Moore Avenue Extension would make left-turn to access on-loop. 5. Significant change in operational conditions/roadway character along Route 10 (i.e., grade separated access controlled to at-grade reduced speed to enter/travel through roundabout). 6. R-CUT would create need to accommodate U-Turn movements at old S. Church Street median crossover and Canteberry Lane/Smithfield Plaza signalized intersection.	1. Significant change in operational conditions/roadway character along Route 10 (i.e., grade separated access controlled to at-grade reduced speed to enter/travel through roundabout). 2. Reduces level of conflict between S. Church Street traffic volume and Benns Church/Bypass traffic volumes 3. U-Turn movements being accommodated at old S. Church Street median break could create safety issue as a result of relatively slow movement occurring along a segment of Route 10 where vehicle speeds are transitioning from 55/60 MPH to 45/50MPH. Also within area where on-loop/traffic is merging in with mainline travel lanes.	1. Grade separated interchange limits/restricts opportunity for economic development in vicinity of residual ROW. 2. Cul de sac of S. Church Street and impacts to access may adversely impact businesses along this segment.	1. ROW needed to accommodate proposed new fourth leg to interchange/intersection. 2. Minor impacts/need for additional ROW in the southwest quadrant of the Benns Church Boulevard/Cypress Crossing/Gumwood Drive intersection to accommodate the proposed R-CUT. 3. Quadrant Loop On-Ramp with 30MPH Design speed and alignment of southbound Off-Ramp will result in the need for additional ROW.	1. None	1. Grade Separated Interchange 2. Fourth leg connection to Cypress Crossing 3. Northbound right-turn "slip" lane from Benns Church Boulevard to S. Church Street 4. R-CUT (median modification/left-turn channelization) at Cypress Crossing/Gumwood Drive 5. Demolition and closure of southern portion of existing S. Church Street	1. Interchange construction can be done ROW with minimal impact to existing traffic operations along Route 10 or at the S. Church Street/Benns Church intersection. 2. Construction of R-CUT at Cypress Crossing /Gumwood Drive intersection will require relatively creative MOT plan. However not as disruptive to traffic operations as construction of the Roundabout.	1. Concern over community appetite for another "innovative intersection concept" on the relative heels of the Benns Grant Quadrant Intersection project. Although a relatively small sample, citizens may not be initially happy about making U-Turns.
Alternative 4 Partial Displaced Left-Turn (Benns Church Boulevard) and Roundabout at Benns Church Boulevard/Cypress Crossing/Gumwood Drive Intersection	1. Partial Displaced Left-Turn along Route 10 creates opportunity to reduce number of signal phases concentrated at the main intersection may result in green time being reallocated to better accommodate side street demand. 2. Heavy southbound left-turn movement experiences relatively significant or comparable delay to that experienced at a conventional intersection. 3. Eastbound and Westbound Route 10 left-turn movements encounter relatively more delay in comparison to conventional intersection concepts. 4. Accommodate heavy northbound right-turn lane with "slip" lane from Route 10 to northbound Old S. Church Street, minimizing off-ramp laneage. 5. Roundabout will enhance operations at the Cypress Crossing/Gumwood Drive intersection to the south.	1. Only reduces the number of conflict points from 48 (conventional intersection) to 44. 2. May be a potential need to accommodate pedestrians through the intersection/across Route 10. 3. Roundabout will slow down traffic, eliminate/reduce severe angle crashes at currently unsignalized full movement intersection. Significantly reduces number of conflict points compared to conventional intersection (i.e., 8 vs. 48).	1. Minimal to none. 2. Roadway/intersection improvements primarily fit well within existing ROW without adverse impacts to existing businesses.	1. ROW needed to accommodate proposed new fourth leg to intersection. 2. Minor impacts/need for additional (ROW) at the Benns Church Boulevard/Cypress Crossing/Gumwood Drive to accommodate the proposed Roundabout.	1. None	1. Partial Displaced Left-Turn intersection improvements. New traffic signals to accommodate associated movements/phasing. 2. Fourth leg connection to Cypress Crossing 3. Roundabout at Cypress Crossing/Gumwood Drive	1. Construction of displaced left-turn intersection and maintaining operations at existing intersection will lengthen project schedule and likely increase extent of MOT and MOT costs to the project. 2. Construction of Roundabout at Cypress Crossing/Gumwood Drive intersection will require relatively creative MOT plan. More impactful to existing operations.	1. Driver/operational learning curve could present challenges with Partial Displaced Left-Turn intersection located immediately adjacent to roundabout. 2. Concern over community appetite for another "innovative intersection concept" on the relative heels of the Benns Grant Quadrant Intersection project.

Table 40: Alternatives Evaluation Matrix

Alternative	Traffic Operations	Safety	Impacts to Existing Tax Base	Right-of-Way Impacts	Environmental Impacts	Construction Costs	Constructability	General Comments
Alternative 5 Conventional At-grade Intersection (S. Church Street at Benns Church Boulevard) and Roundabout at Benns Church Boulevard/Cypress Crossing/Gumwood Drive Intersection	1. Conventional intersection concept consists of adding fourth leg to intersection, dedicated southbound through lane, new/replaced exclusive southbound right-turn lane, and refined signal timings. 2. Heavy southbound left-turn movement experiences less delay/shorter travel time during PM peak when compared to displaced left-turn alternative. AM peak operations are comparable. 3. Eastbound Route 10 through and left-turn movements encounter relatively comparable delay/travel times under AM and PM peak hour conditions when compared to displaced left-turn concept. Westbound Route 10 through is comparable during AM peak hour but through movement encounters a slightly longer travel time during the PM peak due to need to accommodate the heavy southbound left-turn lane. 4. Accommodate heavy northbound right-turn lane with “slip” lane from Route 10 to northbound Old S. Church Street, minimizing off-ramp laneage. 5. Roundabout will enhance operations at the Cypress Crossing/Gumwood Drive intersection to the south.	1. Conventional intersection conflict points is 48 compared to displaced left-turn concept of 44. Other than the addition of a fourth leg, there is no significant change to safety. 2. May be a potential need to accommodate pedestrians through the intersection/across Route 10. 3. Roundabout will slow down traffic, eliminate/reduce severe angle crashes at currently unsignalized full movement intersection. Significantly reduces number of conflict points compared to conventional intersection (i.e., 8 vs. 48).	1. Minimal to none. 2. Meets proposed goal of Town to be able to expand economic development opportunity and enhance tax base. 3. Roadway/intersection improvements primarily fit well within existing ROW without adverse impacts to existing businesses.	1. ROW needed to accommodate proposed new fourth leg to intersection. 2. Minor impacts/need for additional (ROW) at the Benns Church Boulevard/Cypress Crossing/Gumwood Drive to accommodate the proposed Roundabout.	1. None	1. Conventional intersection modifications (new southbound through lane, new exclusive right-turn lane upgraded exclusive turn lanes, and signal equipment). 2. New traffic signal to accommodate associated movements/phasing. 3. Fourth leg connection to Cypress Crossing 4. Roundabout at Cypress Crossing/Gumwood Drive	1. Proposed improvements include minimal impacts to traffic operations at existing intersection reducing MOT costs. 2. Construction of Roundabout at Cypress Crossing/Gumwood Drive intersection will require relatively creative MOT plan. More impactful to existing operations.	1. Driver/operational learning curve would be significantly reduced/eliminated with conventional intersection. 2. Roundabout seems to be the right solution at Cypress Crossing / Gumwood Drive intersection but some concern over community appetite for another “innovative intersection concept” on the relative heels of the Benns Grant Quadrant Intersection project.
Alternative 6 Conventional At-grade Intersection (S. Church Street at Benns Church Boulevard) and R-CUT at Benns Church Boulevard/Cypress Crossing/Gumwood Drive Intersection	1. Conventional intersection concept consists of adding fourth leg to intersection, dedicated southbound through lane, new/replaced exclusive southbound right-turn lane, and refined signal timings. 2. Heavy southbound left-turn movement experiences less delay/shorter travel time during PM peak when compared to displaced left-turn alternative. AM peak operations are comparable. 3. Eastbound Route 10 through and left-turn movements encounter significant increase in delay/travel times during PM peak hour conditions when compared to displaced left-turn and Alternative 5 concept due to need accommodate additional U-Turn traffic volumes associated with R-CUT. 4. Accommodate heavy northbound right-turn lane with “slip” lane from Route 10 to northbound Old S. Church Street, minimizing off-ramp laneage. 5. R-CUT would create need to accommodate U-Turn movements at S. Church Street and Canteberry Lane/Smithfield Plaza signalized intersections.	1. Conventional intersection conflict points is 48 compared to displaced left-turn concept of 44. Other than the addition of a fourth leg, there is no significant change to safety. 2. May be a potential need to accommodate pedestrians through the intersection/across Route 10. 3. R-CUT will reduce number of conflict points compared to conventional unsignalized intersection from 48 to 20.	1. Minimal to none. 2. Meets proposed goal of Town to be able to expand economic development opportunity and enhance tax base. 3. Roadway/intersection improvements primarily fit well within existing ROW without adverse impacts to existing businesses.	1. ROW needed to accommodate proposed new fourth leg to intersection. 2. Minor impacts/need for additional (ROW) at the Benns Church Boulevard/Cypress Crossing/Gumwood Drive to accommodate the proposed Roundabout.	1. None	1. Conventional intersection modifications (new southbound through lane, new exclusive right-turn lane upgraded exclusive turn lanes, and signal equipment). 2. New traffic signal to accommodate associated movements/phasing. 3. Fourth leg connection to Cypress Crossing 4. R-CUT (median modification/left-turn channelization) at Cypress Crossing/Gumwood Drive	1. Proposed improvements include minimal impacts to traffic operations at existing intersection reducing MOT costs. 2. Construction of R-CUT at Cypress Crossing /Gumwood Drive intersection will require relatively creative MOT plan. However not as disruptive to traffic operations as construction of the Roundabout.	1. Driver/operational learning curve would be significantly reduced/eliminated with conventional intersection. 2. Concern over community appetite for another “innovative intersection concept” on the relative heels of the Benns Grant Quadrant Intersection project. Although a relatively small sample, citizens may not be initially happy about making U-Turns.

6.6 Future Build Conditions Operational Analysis

The small- and large-scale alternatives were analyzed to evaluate their operational conditions and compare the differences between the improvements. This section describes the methods and results of the operational analysis.

6.6.1 Travel Times

Alternative analytical methods are needed to evaluate and compare the operational conditions of different innovative intersections. The 2016 *Highway Capacity Manual*, provides guidance for analyzing intersections that consist of multiple junctions, rather than just a single point/node (i.e., conventional intersection). Typically, when analyzing intersection operations, control delay (i.e., LOS) is one of the methods used to assess conditions; however, this method is not appropriate for many innovative intersections as it does not capture the impact of the "diverted-path delays" that can be present as some movements are removed or required to travel another route. Therefore, to analyze an innovative intersection, all of the diverted-paths delays are accounted for by defining the spatial limits of the innovative intersection and comparing the "experienced travel times" (ETT), as described by Equation 1.

Equation 1: Experienced Travel Times

$$ETT = \sum d_i + \sum EDTT$$

Where,
ETT = experienced travel time
d_i = control delay at each junction encountered on the path
EDTT = extra distance travel time between junctions

The spatial limits of the S. Church Street at Benns Church Boulevard intersection and the operational boundaries of the various innovative intersections were defined by the area shown in Figure 29. This boundary, also referred to as a "cordon area", was consistent between all the travel time analyses and captures the operational limits of each proposed alternative. The proposed intersection alternatives were analyzed using the calibrated *Synchro* models and travel times generated from *SimTraffic* microsimulations. The comparative network diverted paths were determined for each intersection alternative and its corresponding movements are included in Appendix H.

The resulting experienced travel times for the 2025 AM and PM peak hour scenarios for the intersection alternatives are shown in Table 41.

Figure 29: Intersection Cordon Study Area

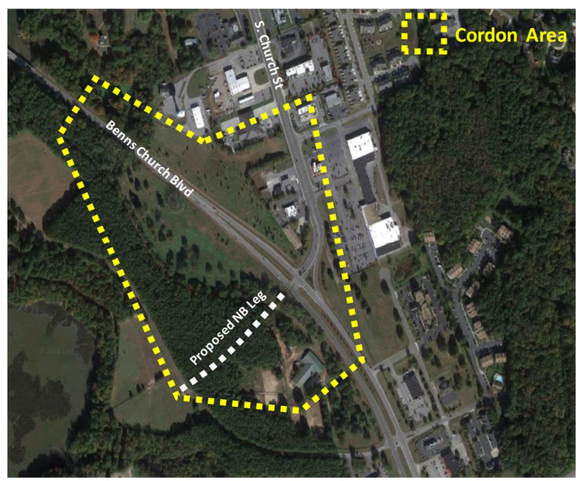


Table 41: Comparison of Alternatives Based on Travel Times

Alt	Intersection Treatment: S Church @ Benns Church	Intersection Treatment: Cypress Crossing @	2025 Volumes	Experienced Travel Times (sec/veh): EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Overall Travel Time (S/Veh)
				148	905	7	10	502	443	7	6	7	554	6	129	
2025 AM Peak Hour																
1	Diamond Interchange	Roundabout		102.2	40.4	15.7	76.2	47.2	47.9	31.4	30.2	22.2	58.8	40.0	48.2	50.3
2	Loop Interchange	Roundabout		100.6	41.4	25.6	60.9	48.3	39.2	44.8	32.2	92.5	80.6	24.6	47.8	53.9
3	Loop Interchange	R-Cut		102.1	41.4	27.4	49.3	42.5	43.9	43.9	31.2	92.9	79.6	24.2	46.9	53.4
4	Partial Displaced Lefts	Roundabout		145.5	68.2	40.3	65.5	70.5	61.6	99.1	95.2	0.0	77.9	46.2	114.1	75.7
5	Conventional	Roundabout		122.3	64.6	89.4	60.0	79.5	42.9	83.9	65.0	40.0	79.0	50.4	65.9	69.9
6	Conventional	R-Cut		127.7	67.2	84.2	76.4	84.8	50.4	43.8	80.1	60.0	61.8	111.0	75.2	70.4
	Intersection Treatment: S Church @ Benns Church	Intersection Treatment: Cypress Crossing @	2025 Volumes	Experienced Travel Times (sec/veh): EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Overall Travel Time (S/Veh)
				202	915	20	26	1,018	873	20	16	20	745	17	184	
2025 PM Peak Hour																
1	Diamond Interchange	Roundabout		113.1	42.4	17.9	73.2	55.8	187.5	69.4	49.7	39.0	68.4	41.6	49.5	85.8
2	Loop Interchange	Roundabout		104.7	44.4	28.1	130.3	83.1	180.2	104.3	54.1	95.9	90.2	38.6	69.5	96.9
3	Loop Interchange	R-Cut		103.7	44.4	27.7	102.0	52.7	237.4	76.7	51.3	95.5	89.6	38.0	49.0	100.2
4	Partial Displaced Lefts	Roundabout		153.3	74.8	56.3	141.8	84.8	69.0	112.7	104.3	37.9	78.1	55.2	113.4	82.7
5	Conventional	Roundabout		178.2	77.2	68.5	113.7	111.1	67.1	121.0	110.4	42.4	66.6	49.9	69.4	86.5
6	Conventional	R-Cut		232.5	136.8	113.1	100.8	128.7	95.9	72.0	110.8	94.7	73.0	75.5	92.3	115.8

When comparing the experienced travel times between the alternatives, it was determined that the interchange concepts were still able to provide significant improvements to the overall weighted travel times when compared to the "at-grade" intersection concepts during the 2025 AM peak hour. However, during the PM peak hour, there was not much difference noted in the overall experienced travel time between the interchanges and the conventional at grade intersections, with the exceptions of the R-Cut option at Cypress Crossing (i.e., Alternative 6). As noted previously, the R-Cut options requires the adjacent intersection to accommodate additional U-turn movements, which contribute to the increases in intersection delay. Based on these results, the conventional intersection with a roundabout at Cypress Crossing (i.e., Alternative 5) can operate comparable to the innovative intersections with minimal improvements required to implement in the near future.

However, given the projected operational conditions at the signalized intersection of S. Church Street at Benns Church Boulevard in the future, an interchange concept remains viable as it provides significant benefits and could accommodate a higher volume of traffic, such as what is shown in the Town's "unconstrained" development growth based on future land uses discussed previously.

6.7 2025 Horizon Year Build Scenario

The proposed improvements for the study area intersections were combined into a 2025 "Build Scenario" and were analyzed using Synchro and SimTraffic models. The Build scenario includes the small-scale improvements discussed in Section 6.1 and the "Alternative 5" concept (i.e., conventional signalized intersection at S. Church Street at Benns Church Boulevard with a roundabout at Benns Church Boulevard and Cypress Crossing/Gumwood Drive). The LOS and maximum queues results for the 2025 No Build and Build scenarios are shown in Table 42 and Table 43, respectively.

- S. Church Street at Benns Church Boulevard
  - Under 2025 Build conditions, the northbound and southbound approaches are improved to operate at LOS D during the AM peak hour. During the PM peak hour, the southbound approach improves from LOS E to LOS D.
  - During the PM peak hour, the southbound left-turn maximum queue reduces from 523 feet to 497 feet with 50% less traffic being blocked from entering the storage lane. During the AM peak hour, the southbound left turn movement reduces its maximum queue from 381 to 316 feet.
- S. Church Street at Smithfield Square Shopping
  - Under 2025 Build conditions during the PM peak hour, the southbound through queue reduces from 267 to 144 feet. Under no build conditions, 26% of traffic extends back to the upstream intersection; this upstream queue is eliminated under the 2025 build conditions.
- S. Church Street at Moore Avenue
  - Under 2025 Build conditions during the PM peak hour, the westbound left turn queue reduces from 450 feet to 243 feet. The percentage of time the maximum queue extends the full length of the storage lane reduces from 49% to 10%. The southbound through lane reduces its maximum queue from 142 feet to 68 feet with no vehicles queueing back to upstream intersection.
- S. Church Street at Smithfield Volunteer Fire Department/McDonald's
  - Under 2025 Build conditions, the southbound through movement reduces its maximum queue from 333 feet to less than 25 feet during the PM peak hour. Under the build improvements, 0% of traffic are expected to be blocked from entering the adjacent storage lane.
- Benns Church Boulevard at Cypress Crossing/Gumwood Drive
  - By reconfiguring this intersection as a roundabout, the northbound and southbound approach are anticipated to improve from LOS F to LOS C or better during the PM peak hour. The roundabout allows each approach to be served with minimal delays.
  - During the PM peak hour, the northbound maximum queue is expected to be significantly reduced from 284 feet to 11 feet. Under the Build condition, it is anticipated that minimal to no traffic will be blocked from the adjacent storage lane.
- Benns Church Boulevard at Canteberry Drive
  - Under 2025 Build conditions, the overall intersection improves from 24.5 seconds to 20.5 seconds of delay for the AM peak hour. During the AM peak hour, the Eastbound approach improves from LOS C to LOS B, the other approaches have improved operations with less delay. This intersection improves from 40.8 seconds to 31.9 seconds during the PM peak hour.
  - During the PM peak hour, the through movement in the westbound approach reduces its maximum queue length from 829 feet to 782 feet. 12% less vehicles in the westbound approach are blocked from entering the adjacent storage lane.
- Benns Church Boulevard at Cypress Run Drive
  - Under 2025 Build conditions, the northbound approach improves from 53.1 seconds of delay to 42.6 seconds.
- Benns Church Boulevard at Turner Drive
  - Under 2025 Build conditions, the westbound through movement has a reduction in maximum queue length from 410 feet to 317 feet. Under No Build conditions 10% of the westbound through traffic is blocked, this reduces to 0% under the build conditions.

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Table 42: Comparison of 2025 No-Build to Build LOS Results

ID	Intersection	Level of Service per Movement by Approach (Delay in sec/veh)																								
		2025 No Build														2025 Build										
		Traffic Control	Overall LOS	Eastbound			Westbound			Northbound			Southbound			Traffic Control	Overall LOS	Eastbound			Westbound			Northbound			Southbound		
				LT	TH	RT	LT/U	TH	RT	LT	TH	RT	LT	TH	RT			LT	TH	RT	LT/U	TH	RT	LT	TH	RT	LT	TH	RT
AM Peak Hour																													
1	S. Church Street at Benns Church Boulevard	Signal	C (21.2)	B (11.7)	B (18.9)	B (12.7)	A (7.2)	A (8.4)	A (0.5)	**E (63.8)**	D (51.2)	D (50.5)	D (51.6)	C (33.7)	C (34.3)	Signal	C (23.0)	B (11.9)	B (19.2)	B (12.9)	B (16.8)	C (21.1)	A (0.5)	D (52.2)	D (52.0)	D (51.1)	D (47.9)	D (35.4)	D (36.0)
				B (17.8)			A (4.7)			**E (55.4)**			D (48.2)					B (18.1)			B (11.5)			D (51.7)			D (45.6)		
2	S. Church Street at Smithfield Square Shopping	TWSC	A (1.3)	B (11.4)			C (15.6)		B (10.1)	A (9.5)	A (0.0)	A (0.0)	A (9.0)	A (0.0)	A (0.0)	TWSC	A (1.3)	B (11.4)			C (15.6)		B (10.1)	A (9.5)	A (0.0)	A (0.0)	A (9.0)	A (0.0)	A (0.0)
							B (13.8)			A (0.1)			A (0.5)								B (13.8)			A (0.1)			A (0.5)		
3	S. Church Street at Moore Avenue	TWSC	A (1.1)	-	-	-	B (12.7)	-	A (0.0)	A (0.0)	A (0.0)	A (0.0)	A (8.7)	A (0.0)	A (0.0)	TWSC	A (1.1)	-	-	-	B (12.7)	-	A (0.0)	A (0.0)	A (0.0)	A (0.0)	A (8.7)	A (0.0)	A (0.0)
				-			B (12.7)			A (0.0)			A (0.3)					-			B (12.7)			A (0.0)			A (0.3)		
4	S. Church Street at Smithfield Volunteer Fire Department/McDonald's	TWSC	A (0.7)	B (10.4)			B (11.1)			A (8.9)	A (0.0)	A (0.0)	A (8.6)	A (0.0)	A (0.0)	TWSC	A (0.7)	B (10.4)			B (11.1)			A (8.9)	A (0.0)	A (0.0)	A (8.6)	A (0.0)	A (0.0)
										A (0.0)			A (0.5)											A (0.0)			A (0.5)		
5	S. Church Street at Heptinstall Avenue/Smithfield Boulevard	TWSC	A (1.6)	B (10.8)			B (12.6)		A (0.0)	A (8.7)	A (0.0)	A (0.0)	A (8.4)	A (0.0)	A (0.0)	TWSC	A (1.6)	B (10.8)			B (12.6)		A (0.0)	A (8.7)	A (0.0)	A (0.0)	A (8.4)	A (0.0)	A (0.0)
							B (12.6)			A (0.1)			A (0.2)								B (12.6)			A (0.1)			A (0.2)		
6	Benns Church Boulevard at Cypress Crossing/Gumwood Drive	TWSC	A (0.6)	A (9.8)	A (0.0)	A (0.0)	B (12.9)	A (0.0)	A (0.0)	D (25.7)			B (14.5)		A (0.0)	Roundabout	A (7.1)	A (8.5)	A (8.0)	A (7.3)	A (5.6)	A (5.7)	A (5.4)	A (7.3)	A (7.3)	A (7.3)	A (6.8)	A (6.2)	A (6.7)
				A(0.3)			A (0.1)						B (14.5)					A (8.0)			A (5.7)			A (7.3)			A (6.7)		
7	Benns Church Boulevard at Canterberry Drive	Signal	C (24.5)	B (12.9)	C (23.6)	B (13.6)	B (11.0)	B (19.8)	B (15.2)	D (52.0)		D (47.8)	D (54.0)		D (42.5)	Signal	C (20.5)	A (9.2)	B (18.5)	A (5.7)	A (9.1)	B (14.2)	D (48.3)	D (46.0)	D (49.9)	D (49.9)	D (47.2)	D (47.1)	D (47.1)
				C (22.3)			B (19.2)			D (49.9)			D (50.2)					B (17.2)			B (16.5)			D (48.1)			D (47.1)		
8	Benns Church Boulevard at Cypress Run Drive	Signal	A (4.1)	-	A (2.7)	A (4.2)	B (11.0)	A (3.1)		D (50.6)		D (49.5)	A (0.0)			Signal	A (3.8)	-	A (2.3)	A (1.5)	A (9.5)	A (3.6)		D (50.6)		D (39.6)	A (0.0)		
				A (2.8)			A (3.5)			D (49.8)								A (2.3)			A (3.9)			D (42.4)					
9	Benns Church Boulevard at Turner Drive	Signal	C (23.3)	-	B (19.1)	B (12.5)	C (34.1)	B (12.8)		**E (58.9)**			C (28.8)		C (28.5)	Signal	C (20.6)	-	C (20.1)	B (15.7)	C (30.6)	B (12.2)		D (48.5)	A (0.0)	C (28.6)	**E (76.3)**		D (53.4)
				B (17.3)			B (16.8)						C (28.7)					B (18.9)			B (15.6)			D (37.3)			**E (73.8)**		
PM Peak Hour																													
1	S. Church Street at Benns Church Boulevard	Signal	C (27.4)	D (44.9)	C (24.5)	B (16.6)	B (12.6)	C (20.1)	A (0.8)	**E (58.8)**	**E (57.4)**	**E (55.4)**	**E (63.5)**	D (35.9)	D (36.7)	Signal	C (30.6)	D (50.5)	C (26.0)	B (17.5)	C (21.4)	D (38.5)	A (1.6)	**E (58.8)**	**E (58.1)**	**E (55.8)**	D (51.8)	C (34.4)	D (35.3)
				C (28.0)			B (11.2)			**E (57.2)**			**E (57.8)**					C (30.2)			C (21.4)			**E (57.5)**			D (48.3)		
2	S. Church Street at Smithfield Square Shopping	TWSC	A (2.8)	B (13.0)			**E (36.7)**		B (13.6)	A (9.9)	A (0.0)	A (0.0)	B (11.7)	A (0.0)	A (0.0)	TWSC	A (2.8)	B (13.0)			**E (36.7)**		B (13.6)	A (9.9)	A (0.0)	A (0.0)	B (11.7)	A (0.0)	A (0.0)
							C (24.1)			A (0.1)			A (0.9)								C (24.1)			A (0.1)			A (0.9)		
3	S. Church Street at Moore Avenue	TWSC	A (1.5)	-	-	-	C (19.0)	-	A (0.0)	A (0.0)	A (0.0)	A (0.0)	B (11.3)	A (0.0)	A (0.0)	TWSC	A (1.5)	-	-	-	C (19.0)	-	A (0.0)	A (0.0)	A (0.0)	A (0.0)	B (11.3)	A (0.0)	A (0.0)
				-			C (19.0)			A (0.0)			A (0.5)					-			C (19.0)			A (0.0)			A (0.5)		
4	S. Church Street at Smithfield Volunteer Fire Department/McDonald's	TWSC	A (0.6)	B (14.2)			B (14.3)			A (9.9)	A (0.0)	A (0.0)	B (10.8)	A (0.0)	A (0.0)	TWSC	A (0.6)	B (14.2)			B (14.3)			A (9.9)	A (0.0)	A (0.0)	B (10.8)	A (0.0)	A (0.0)
										A (0.0)			A (0.4)											A (0.0)			A (0.4)		
5	S. Church Street at Heptinstall Avenue/Smithfield Boulevard	TWSC	A (1.6)	B (12.6)			C (21.9)		A (0.0)	A (9.9)	A (0.0)	A (0.0)	B (11.1)	A (0.0)	A (0.0)	TWSC	A (1.6)	B (12.6)			C (21.9)		A (0.0)	A (9.9)	A (0.0)	A (0.0)	B (11.1)	A (0.0)	A (0.0)
							C (21.9)			A (0.3)			A (0.9)								C (21.9)			A (0.3)			A (0.9)		
6	Benns Church Boulevard at Cypress Crossing/Gumwood Drive	TWSC	A (6.4)	C (21.9)	A (0.0)	A (0.0)	C (15.5)	A (0.0)	A (0.0)	**F (>300)**			**F (62.9)**		A (0.0)	Roundabout	B (11.9)	B (10.8)	B (10.4)	A (9.8)	B (13.5)	B (12.7)	B (12.1)	B (10.5)	B (10.5)	B (10.5)	C (20.6)	C (20.6)	C (20.4)
				A (1.3)			A (0.3)						**F (62.9)**					B (10.4)			B (12.7)			B (10.5)			C (20.5)		
7	Benns Church Boulevard at Canterberry Drive	Signal	D (40.8)	D (46.1)	C (24.5)	C (25.0)	C (33.1)	D (51.0)	C (24.5)	**E (69.0)**		D (42.8)	**E (70.1)**		D (50.1)	Signal	C (31.9)	D (43.5)	C (27.9)	A (6.1)	C (31.9)	C (34.3)	A (2.2)	D (48.5)	D (52.0)	D (51.7)	D (41.4)	D (51.8)	D (52.1)
				C (26.5)			D (48.0)			**E (63.1)**			**E (59.6)**					C (27.2)			C (31.3)			D (49.4)			D (47.3)		
8	Benns Church Boulevard at Cypress Run Drive	Signal	C (21.5)	A (6.9)	A (7.0)	A (0.2)	C (26.8)	C (30.4)		**E (57.9)**		D (48.1)	**E (60.6)**			Signal	C (21.1)	A (6.9)	A (8.9)	A (1.7)	C (24.1)	C (29.6)		D (54.7)		C (29.9)	**E (60.6)**		
				A (6.5)			C (30.0)			D (53.1)								A (8.4)			C (29.0)			D (42.6)					
9	Benns Church Boulevard at Turner Drive	Signal	C (23.4)	A (7.8)	A (8.9)	A (1.8)	D (37.4)	C (27.4)		**E (67.2)**			D (35.5)		D (35.5)	Signal	C (24.2)	B (15.9)	B (11.5)	A (2.7)	D (39.7)	C (30.8)		D (51.3)	D (40.9)	C (30.8)	**E (59.6)**		**E (58.6)**
				A (8.3)			C (28.3)						D (35.5)					B (10.7)			C (31.7)			D (43.7)			**E (59.1)**		

Table 43: Comparison of 2025 No-Build to Build Maximum Queue Results

ID	Intersection	Maximum Queue Length by Movement (feet)																								
		2025 No Build													2025 Build											
		Traffic Control	Eastbound			Westbound			Northbound			Southbound			Traffic Control	Eastbound			Westbound			Northbound			Southbound		
			LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
AM Peak Hour																										
1	Effective Storage Length	Signal	300	Cont.	300	140	1,100	250	300	Cont	300	480	300	300	Signal	300	Cont.	300	140	1,100	250	300	Cont	300	480	300	300
	S. Church Street at Benns Church Boulevard		116	202	< 25	< 25	108	0	33	29	< 25	381 **(4%)	242	87		124	218	< 25	< 25	171	0	41	38	< 25	316	165	84
2	Effective Storage Length	TWSC	Cont.			Cont.		Cont.	TWLTL	490	275	100	275	275	TWSC	Cont.			Cont.		Cont.	TWLTL	490	275	100	275	275
	S. Church Street at Smithfield Square Shopping		30			105		50	30	< 25	< 25	45	0	0		34			96		59	26	< 25	< 25	48	0	0
3	Effective Storage Length	TWSC	-	-	-	450	-	150	TWLTL	300	-	TWLTL	100	-	TWSC	-	-	-	450	-	150	TWLTL	300	-	TWLTL	100	-
	S. Church Street at Moore Avenue		-	-	-	105	-	42	-	0	0	38	< 25	-		-	-	-	92	-	43	-	0	< 25	40	28	-
4	Effective Storage Length	TWSC	160			140			TWLTL	100	100	TWLTL	675	675	TWSC	160			140			TWLTL	100	100	TWLTL	675	675
	S. Church Street at Smithfield Volunteer Fire Department/McDonald's		30			58			< 25	< 25	0	30	0	0		27			58			< 25	< 25	< 25	30	0	0
5	Effective Storage Length	TWSC	Cont.			Cont.		225	100	675		100	Cont.		TWSC	Cont.			Cont.		225	100	675		100	Cont.	
	S. Church Street at Heptinstall Avenue/Smithfield Boulevard		41			71		69	25	< 25		26	0			53			59		59	25	0		31	0	
6	Effective Storage Length	TWSC	315	1,100	140	300	700	525	Cont.			Cont.		115	Roundabout	-	1,100	-	-	700	-	Cont.			Cont.		-
	Benns Church Boulevard at Cypress Crossing/Gumwood Drive		70	< 25	< 25	33	0	< 25	30			82		48		136	137		65	66		2			9		
7	Effective Storage Length	Signal	265	650	600	215	800	365	275	275	275	Cont.	Cont.	Cont.	Signal	265	650	600	300	800	365	275	275	275	200	Cont.	Cont.
	Benns Church Boulevard at Canterberry Drive		131	286	28	173	282	52	108		75	185		81		102	283	30	123	252	59	114	33	80	179	86	83
8	Effective Storage Length	Signal	140	800	240	250	2,150		Cont.		Cont.	Cont.			Signal	140	800	240	250	2,150		Cont.		Cont.	Cont.		
	Benns Church Boulevard at Cypress Run Drive		0	119	25	75	115	150	47		94	0				0	204	< 25	113	152	185	51		116	0		
9	Effective Storage Length	Signal	150	2,150	300	150	Cont.	Cont.	Cont.	Cont.	Cont.	Cont.		125	Signal	150	2,150	300	300	Cont.	Cont.	300	Cont.	300	Cont.		125
	Benns Church Boulevard at Turner Drive		0	314	255	149 *(2%)	271 **(2%)	260	**400**			72		< 25		0	384 **(1%)	300	208	173	200	255	108	230	74		< 25
PM Peak Hour																										
1	Effective Storage Length	Signal	300	Cont.	300	140	1,100	250	300	Cont	300	480	300	300	Signal	300	Cont.	300	140	1,100	250	300	Cont	300	480	300	300
	S. Church Street at Benns Church Boulevard		288 *(12%)	513 **(6%)	48	36	264	100	66	63	39	523 **(75%) ^(55%	300 *(4%)	183		219	274	<25	86	506 **(3%)	250 *(1%)	66	55	52	497 **(25%) ^(8%)	300 *(2%)	147
2	Effective Storage Length	TWSC	Cont.			Cont.		Cont.	TWLTL	490	275	100	275	275	TWSC	Cont.			Cont.		Cont.	TWLTL	490	275	100	275	275
	S. Church Street at Smithfield Square Shopping		**178**			**304**		**278**	28	< 25	< 25	**150**	**267** **(50%) ^(26%)	**273** ^(29%)		78			**309**		**305**	35	< 25	28	**119** *(1%)	**144** **(2%)	**135**
3	Effective Storage Length	TWSC	-	-	-	450	-	150	TWLTL	300	-	TWLTL	100	-	TWSC	-	-	-	450	-	150	TWLTL	300	-	TWLTL	100	-
	S. Church Street at Moore Avenue		-	-	-	**450** *(49%)	-	139	-	< 25	< 25	61 *(2%)	**142** **(28%) ^(19%)	-		-	-	-	243 *(10%)	-	118	-	0	< 25	50 *(1%)	68	-
4	Effective Storage Length	TWSC	160			140			TWLTL	100	100	TWLTL	675	675	TWSC	160			140			TWLTL	100	100	TWLTL	675	675
	S. Church Street at Smithfield Volunteer Fire Department/McDonald's		32			103			< 25	< 25	< 25	127	333 **(13%)	339		26			85			< 25	< 25	< 25	26	< 25	0
5	Effective Storage Length	TWSC	Cont.			Cont.		225	100	675		100	Cont.		TWSC	Cont.			Cont.		225	100	675		100	Cont.	
	S. Church Street at Heptinstall Avenue/Smithfield Boulevard		33			89		57	35	< 25		70	0			38			111		66	36	< 25		74	0	
6	Effective Storage Length	TWSC	315	1,100	140	300	700	525	Cont.			Cont.		115	Roundabout	-	1,100	-	-	700	-	Cont.			Cont.		-
	Benns Church Boulevard at Cypress Crossing/Gumwood Drive		130	< 25	0	70	107	< 25	**284**			**379** **(77%)		**115** *(4%)		183	186		217	220		11			60		
7	Effective Storage Length	Signal	265	650	600	215	800	365	275	275	275	Cont.	Cont.	Cont.	Signal	265	650	600	300	800	365	275	275	275	200	Cont.	Cont.
	Benns Church Boulevard at Canterberry Drive		253	399 **(3%)	40	**215** *(1%)	**829** **(32%) ^(4%)	143	**282**		62	**263**		130		**264**	416 **(4%)	85	**300**	782 **(20%) ^(3%)	**365** *(1%)	284	65	78	146	29	158
8	Effective Storage Length	Signal	140	800	240	250	2,150		Cont.		Cont.	Cont.			Signal	140	800	240	250	2,150		Cont.		Cont.	Cont.		
	Benns Church Boulevard at Cypress Run Drive		< 25	183	48	242	505 **(2%)	550	187		131	< 25				< 25	317	161	249	565 **(5%)	614	180		164	< 25		
9	Effective Storage Length	Signal	150	2,150	300	150	Cont.	Cont.	Cont.	Cont.	Cont.	Cont.		125	Signal	150	2,150	300	300	Cont.	Cont.	300	Cont.	300	Cont.		125
	Benns Church Boulevard at Turner Drive		46	213	41	**150** *(3%)	**410** **(10%)	**413**	**350**			< 25		< 25		83	239	56	201	317	310	249	38	143	< 25		25

Notes:

**(X%) - Maximum queue extends full length of storage bay for X% of the analysis period*

***(Y%) - Queue in lane adjacent to storage bay extends beyond end of storage bay for Y% of the analysis period*

^(Z%) - Maximum queue extends back to upstream intersection for Z% of the analysis period

7.0 Conclusions and Recommendations

The recommended improvements are a reflection of the feedback received during the study process as well as coordination with the Town of Smithfield and VDOT. This includes consideration of the operational benefits of the proposed improvements, feasibility of construction, and estimated implementation costs. Recommendations for specific improvements to the study area intersections have been split into short-term (zero to five years), mid-term (five to fifteen years), and long-term (fifteen to twenty-five plus years) categories based primarily on their scale as well as the time frame in which they will be needed. This approach allows communities to prioritize larger scale projects over time while also being able to implement shorter term projects that mitigate immediate needs at relatively lower costs.

7.1 Opinions of Probable Construction Cost

Planning-level cost estimates, expressed in year 2018 dollars, were determined for all improvement alternatives considered as part of this analysis. These planning-level cost estimates have been based on VDOT's statewide two-year cost averages for 2014, the VDOT Transportation & Mobility Planning Division's "Statewide Planning Level Cost Estimates" worksheet from 2009, and familiarity with similar projects and improvements throughout Virginia. Due to fluctuations in the costs of labor, materials, and equipment, fluctuations in the market, and the outcome of competitive bidding as well as the general planning-level nature of the recommendations, these estimated costs are neither exact nor guaranteed.

Variation between actual and estimated costs will change as time passes, and the time value of money has not been taken into account. Cost estimations performed using the "Statewide Planning Level Cost Estimates" worksheet include right-of-way acquisition cost estimates developed with the sheet's methodology. The stormwater collection and conveyance cost estimates included in this report assume the use of standard VDOT design specifications for roadway drainage including the use of concrete curb and gutter and concrete pipe for conveying stormwater to the treatment locations. The costs for specific stormwater management features are not included in this corridor study because of the large variability in the type of stormwater treatment facilities contained in the Virginia Stormwater Management Clearinghouse and the uncertainty in the amount of additional right of way that the County may need to purchase to accommodate such features. Overall stormwater management costs will ultimately be dictated by the combination and number of total number of stormwater management measures determined necessary as a part of the roadway design. The cost breakdown per scenario includes engineering/design costs, roadway/intersection improvement costs (e.g., cost per mile for a particular roadway typical section, turn-lane improvements, roundabout, bridges/box culverts, milling, overlay, sidewalks, multi-use paths, channelization, stormwater collection and conveyance, landscaping (e.g., trees, seeding), etc.), traffic signal equipment improvement costs (e.g., poles, mast arms, signal heads, pedestrian signal head equipment and construction), construction engineering and inspection (CEI) costs, right-of-way (ROW) acquisition, and utility relocation costs as well as miscellaneous costs which includes, mobilization, sediment and erosion control, traffic control (i.e., maintenance of traffic (MOT) during construction). Furthermore, a 15% contingency was applied to construction cost.

7.2 Short-Term Recommendations (0 to 5 years)

The following short-term recommendations were identified for the study area intersections to help address existing and future deficient operational conditions. These recommendations generally represent improvements to signalized intersections that allow for more efficient operational conditions as traffic volumes increase. While classified as "short-term" improvements, they could also be tied to future development that occurs outside of this timeframe.

- Benns Church Boulevard at Canteberry Drive (Signalized)
  - Remove split-phasing for northbound/southbound approaches and convert to Protected + Permissive phasing with flashing yellow arrows (FYA)
  - Northbound/Southbound approaches should be modified to provide for a dedicated left-turn lane, single through-lane, and dedicated right-turn lane
    - Widen the southbound approach into the existing median to provide a dedicated left-turn lane
    - Convert one of the existing inbound lanes on the northbound approach to a dedicated left-turn lane
  - Add right-turn overlap phases for the eastbound and westbound approaches
  - Extend the westbound left-turn lane to meet current VDOT standards (i.e., 200 feet of storage with a 200-foot taper)
- Benns Church Boulevard at Cypress Run Drive (Signalized)
  - Add right-turn overlap phases for the eastbound and westbound approaches
- Benns Church Boulevard at Turner Drive (Signalized)
  - Coordinate traffic signal and implement "school" time of day plans with the other signalized intersections along the corridor
  - Add right-turn overlap phases for the eastbound and westbound approaches
  - Improve/widen the northbound approach of Turner Drive to include a shared through/left-turn lane and an exclusive right-turn lane consisting of 200 feet of storage and a 200-foot taper
  - Extend the westbound left-turn lane to meet current VDOT standards (i.e., 200 feet of storage with a 200-foot taper)

Table 44: Short-Term Recommendations Cost Estimate

Improvement	Planning Level Costs		
	PE/Design	ROW/Utility Relocations	Construction
Benns Church Boulevard at Canteberry Drive Operational Improvements	$ 108,000	$ 0	$ 722,000
	$ 830,000		
Benns Church Boulevard at Cypress Run Drive Operational Improvements	$ 7,000	$ 0	$ 3,000
	$ 10,000		
Benns Church Boulevard at Turner Drive Safety and Operational Improvements	$ 142,000	$ 175,000	$ 839,000
	$ 1,156,000		

7.3 Mid-Term Recommendations (5 to 15 years)

The mid-term recommendations identified have some additional challenges expected for implementation that would place them outside the time period for the short-term improvements. These challenges include the additional coordination between existing property owners, funding considerations, limited access boundary, and future developments.

Based on the alternative analysis conducted for the intersection of S. Church Street at Benns Church Boulevard, the preferred mid-term recommendations include the following improvements:

- S. Church Street at Benns Church Boulevard
  - Modify the existing limited access boundary to allow for a new leg to be added the intersection
  - Construct a northbound (i.e., southern leg/stub) to the intersection
    - Proposed new roadway and associated laneage should be determined and confirmed as part of the future Gwaltney Pointe development
  - Widen the southbound approach to provide a through lane
  - Construct a dedicated eastbound right-turn lane (i.e., 200 feet storage with a 200-foot taper)
  - Extend the eastbound left-turn lane to meet current VDOT standards (i.e., 200 feet storage with a 200-foot taper)
  - Extend the westbound left-turn lane to meet current VDOT standards (i.e., 200 feet storage with a 200-foot taper)
  - Modify and replace existing traffic signal equipment to accommodate the new leg and/or phases
- Cypress Crossing/Gumwood Drive at Benns Church Boulevard
  - Construct a two-lane roundabout

Table 45: Mid-Term Recommendations and Cost Estimate

Improvement	Planning Level Costs		
	PE/Design	ROW/Utility Relocations	Construction
S. Church Street at Benns Church Boulevard Forth Leg Stub	$ 437,000	$ 307,500	$ 3,375,000
	$ 4,119,500		
Cypress Crossing/Gumwood Drive at Benns Church Boulevard Roundabout	$ 762,000	$ 532,500	$ 6,024,000
	$ 7,318,500		

7.4 Long-Term Recommendation (15 to 25 years)

Similar to the mid-term recommendations, the specific long-term recommendation identified for the corridor address significant increases in traffic flows in response to the potential for development in this area. However, the long-term recommendations have additional challenges expected for implementation that would place them outside the time period for the mid-term improvements.

These challenges include the scale of the project, funding considerations, construction efforts, and continual project support.

Based on the alternatives analysis conducted for the intersection of S. Church Street at Benns Church Boulevard, the preferred long-term recommendation includes maintaining the existing VDOT ROW in anticipation for a future grade-separated interchange. The preferred long-term recommendation represents a full diamond interchange with a quadrant loop (i.e., Alternative 2) that will replace the signalized, at-grade intersection of Benns Church Boulevard and S. Church Street identified under the mid-term recommendations.

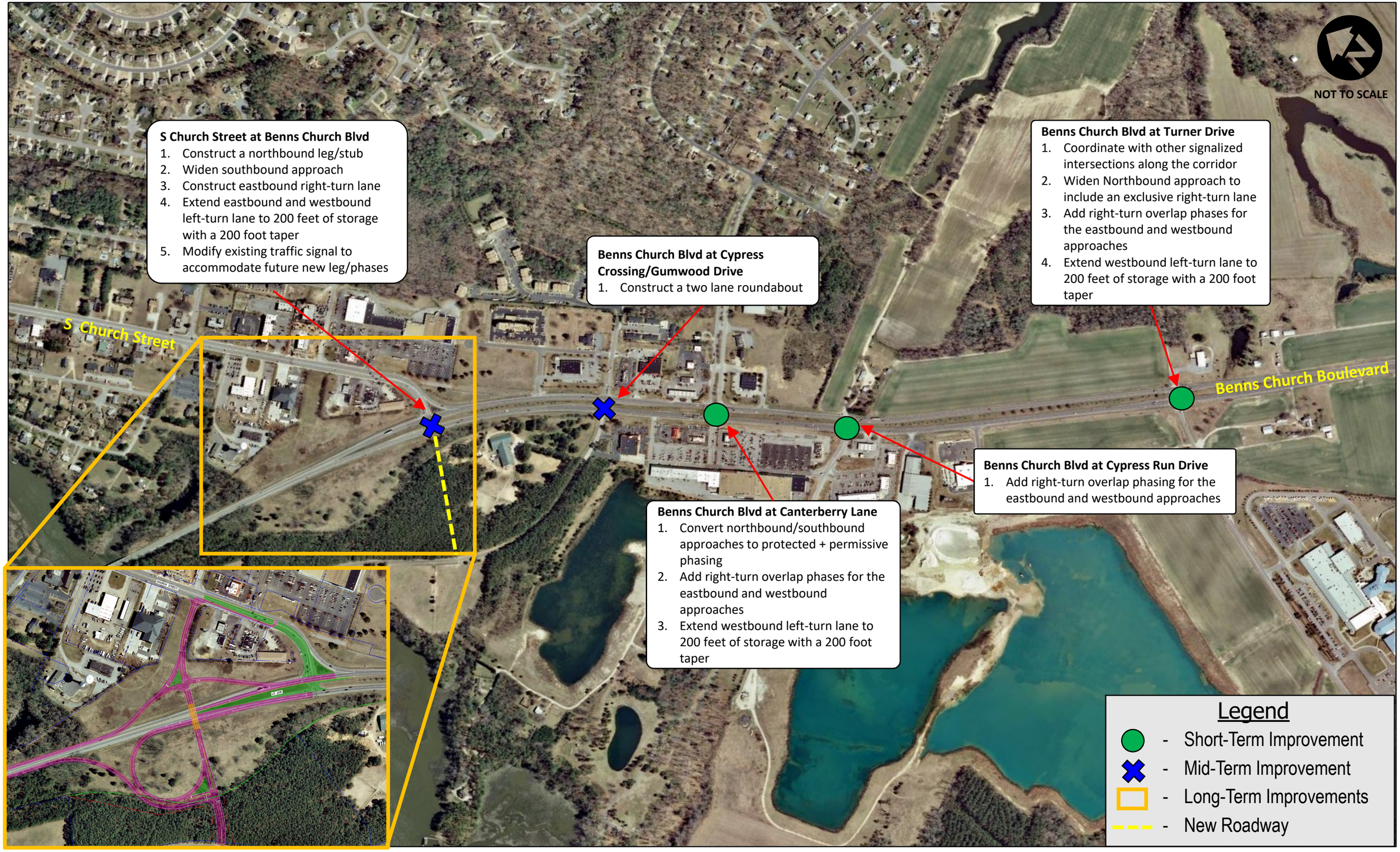
This interchange concept will provide a free-flow loop ramp to address the heavy southbound left-turn movement that exists and will continue to travel from S. Church Street to eastbound Benns Church Boulevard. This interchange concept will continue to provide access to/from the proposed future Gwaltney Pointe development.

Due to spacing limitations, the Cypress Crossing/Gumwood Drive at Benns Church Boulevard will remain as a proposed two-lane roundabout as identified under the mid-term recommendations. This will also serve as a transition point from the freeway-like conditions along Benn Church Boulevard as vehicles travel from the north the more commercial area located to the south of Smithfield.

Table 46: Long-Term Recommendations and Cost Estimate

Improvement	Planning Level Costs		
	PE/Design	ROW/Utility Relocations	Construction
Preferred Alternative 2: Diamond Interchange with Quadrant Loop and Roundabout	$ 15,275,000	$ 11,300,000	$ 117,075,000
	$ 143,650,000		

The short-, mid-, and long-term recommendations are summarized in Figure 30.



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Intersection Improvement Alternatives Analysis
Smithfield, Virginia

Summary of Recommendations

Figure 30

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7.5 Limited Access Boundary

Under future build conditions, it is anticipated that the intersection of S. Church Street at Benns Church Boulevard will have a new northbound approach to serve future developments. In order to accommodate this addition, a request for break in the limited access line on Benns Church Boulevard will be required. Actions regarding limited access control, including changes in control, require the Commonwealth Transportation Board (CTB) approval. These changes typically include shifting, moving, or breaking control, or any combination of these, after a project is completed, finalized and serving in its intended capacity (24VAC30-401-10).

The recommended S. Church Street at Benns Church Boulevard intersection modifications will result in the Town of Smithfield requesting a modification to the existing the Limited Access (LA) designation on Benns Church Boulevard. The LA boundary is proposed to be modified for a length or width of approximately 110 feet as shown on Figure 31. No changes are proposed for the LA designation line along the north side of Benns Church Boulevard.

In order to achieve this proposed change in the limited access boundary, the Town of Smithfield will need to coordinate with the local VDOT District (i.e., Hampton Roads District) initially and will be required to submit the following items:

- Resolutions from Locality
- Letter of support and/or formal Request
- Global Traffic Analysis (i.e., this report)
- Environmental Analysis (i.e., this report)

Following a review from VDOT at both the District level and Central Office, the request will be presented to the CTB for approval. A flow chart and checklist describing the change in limited access process is provided in Appendix I.

7.6 Implementation

The next key step in the planning process is to determine how the recommended improvements will be implemented. Both the Town of Smithfield, Isle of Wight County, and VDOT officials will need to determine implementation strategies as well as establish project priorities. Implementation strategies to consider include seeking and identifying funding streams, both public and private, to construct the proposed improvements. There are several potential public programs that may assist with funding these projects. At the federal level there are earmarks, National Highway System funds, bridge funds, Regional Surface Transportation Program (RSTP) funds, Highway Safety Improvement Program (HSIP) funds, and Transportation Alternatives (TA) funds, to name a few.

At the state level there is VDOT's SMART Scale program. The program evaluates projects based on a quantitative review and is intended to result in funding decisions for transportation improvement projects within the six-year improvement program (SYIP) being based on a scoring and prioritization process.

The SYIP can also help define which alternative funding sources the project may qualify for such as; the Recreational Access Program, the Economic Development Access Program, or the Revenue Sharing Program. It is recommended that proposed improvements be prioritized into projects with Town, County, HRTPO, and VDOT input/support. Each project should be thoroughly evaluated then identified for priority order, time frame from implementation, and potential funding sources.

The following sections describe some of potential sources of funding for the recommended improvements identified for the study area.

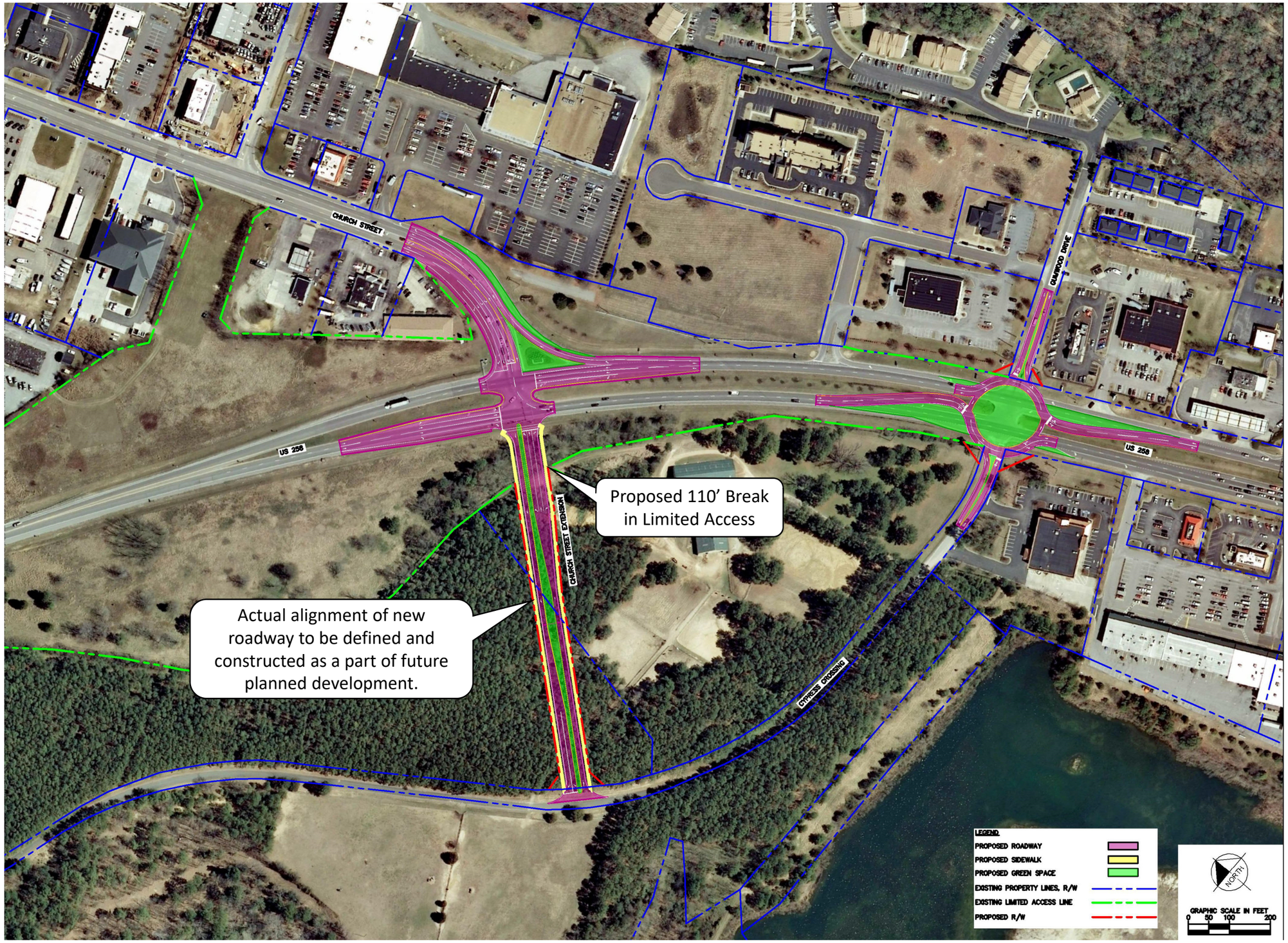
7.6.1 Federal Funding Source Alternatives

Highway Safety Improvement Program (HSIP)

Safety throughout all transportation programs remains VDOT's number one priority. Federal legislation, "Fixing America's Surface Transportation Act'' (FAST Act), authorizes the Federal surface transportation programs for highways, highway safety, and transit. The Highway Safety Improvement Program (HSIP) is a core program administered at the federal level by the U.S. Department of Transportation's (USDOT) FHWA Office of Safety. HSIP's purpose is to make significant progress in reducing highway fatalities and serious injuries on all public roadways. The Federal FAST Act continues the successful HSIP, with an estimated 2018 annual funding of $2.318 billion, including $235 million per year for the Rail-Highway Crossings program. Annually, Virginia expects to receive approximately $66M for roadway safety improvements.

The HSIP emphasizes a data-driven, strategic approach to improving highway safety on all public roads that focuses on performance. The foundation for this approach is a safety data system, which each state is required to have to identify key safety problems, establish their relative severity, and then adopt strategic and performance based goals to maximize safety. Every state is required to develop a Strategic Highway Safety Plan (SHSP) that lays out strategies to address these key safety problems. Every state now has an SHSP in place, and the FAST Act ensures ongoing progress toward achieving safety targets by requiring regular plan updates and defining a clear linkage between behavioral (NHTSA funded) state safety programs and the SHSP. Virginia's 2017-2021 SHSP identified eight emphasis areas for the updated plan including impaired driving, intersections, speeding, young drivers, occupant protection, bicycles, roadway departure, and pedestrians. The updated SHSP also initiates a comprehensive evaluation plan to track progress and effectiveness towards the plan's goal of reducing deaths and severe injuries by half by 2030.

The federal share for HSIP projects is 90%, with the remaining 10% typically being covered by VDOT. Where VDOT funding is limited, however, the locality could be required to cover this 10%.



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Intersection Improvement Alternatives Analysis
Smithfield, Virginia

Proposed Break in the Existing Limited Access Boundary

Figure 31

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Surface Transportation Block Grant Program

The Surface Transportation Block (STP) Grant Program provides flexible funding that may be used by States and localities for projects to preserve and improve the conditions and performance on any Federal-aid highway, bridge and tunnel projects on any public road, pedestrian and bicycle infrastructure, and transit capital projects, including intercity bus terminals. Federal-aid highways are defined as those highways on the Federal-aid highway systems and all other public roads not classified as local roads or rural minor collectors. The Federal-aid highway systems consist of the National Highway System (NHS) and the Dwight D. Eisenhower National System of Interstate and Defense Highways (the "Interstate System"). Benns Church Boulevard (U.S. Route 258/State Route 10) is located on the NHS as a principal arterial.

The typical split for STP projects between federal funding and the project sponsor is 80% federal and 20% state and/or local match.

Transportation Alternatives (TA)

Transportation Alternatives (TA) redefines the former Transportation Alternatives Program (TAP) and consolidates these eligibilities with the Safe Routes to School (SRTS) and Recreational Trails program eligibilities. The program is intended to help local sponsors fund community based projects that expand travel choices and enhance the transportation experience by improving the cultural, historical, and environmental aspects of the transportation infrastructure. TA is part of the Federal-aid Highway program. It is not a traditional grant program and funds are only available on a reimbursement basis. This means the project sponsor must first incur project expenses and then request reimbursement.

The program does not fund traditional roadway projects or provide maintenance for these facilities. Instead it focuses on providing for pedestrian and bicycle facilities, community improvements and mitigating the negative impacts of the highway system.

The split for TAP projects allow for a maximum federal reimbursement of 80% of the eligible project costs and requires a minimum 20% local match. The 2018 estimated annual funding is $850 million.

7.6.2 State Funding Sources Alternatives

SMART Scale

Virginia uses the SMART Scale funding program to review and score which transportation projects should be funded into the Six-Year Improvement Plan (SYIP). The program is intended to improve the transparency and accountability of project selection, as well as provide improved stability in the SYIP by ensuring that all projects are fully funded through all phases. The process scores projects based on an objective and fair analysis that is applied statewide. This process will help the CTB select projects that provide the maximum benefits for tax dollars spent.

The prioritization process will evaluate projects in the following factor areas: congestion mitigation, economic development, accessibility, safety, environmental quality, and land use coordination. Factor areas are weighted in each highway construction district, and may be weighted differently within each highway construction district.

Within the SMART Scale process, there are several types of projects that are eligible for funding. Highway, transit, rail, and secondary roadway improvements expected to result in enhanced safety and traffic operations as well as select transportation demand management projects and strategies. However, projects must meet a need identified in VTrans 2040 for a Corridor of Statewide Significance (CoSS), Regional Network, or Urban Development Area (UDA). Projects seeking funding from most state and Federal discretionary fund categories are required to go through the SMART Scale program. However, the following funding categories are exempt from the SMART Scale program: Congestion Mitigation and Air Quality (CMAQ), Highway Safety Improvement Program (HSIP), Transportation Alternatives (TA), Revenue Sharing, and secondary/urban formula funds.

Revenue Sharing

The “Revenue Sharing Program” provides additional funding for use by a county, city, or town to construct, reconstruct, or improve the local highway systems. Locality funds are matched on a dollar-for-dollar basis with state funds, with statutory limitations on the amount of state funds authorized per locality. A locality may apply for up to a maximum of $10 million in matching allocations per fiscal year, with up to $5 million of these requested funds being utilized for maintenance projects. There is no limit to the amount of additional funds the locality may contribute. Priority will be given first to allocations that accelerate construction projects in the Commonwealth Six-Year Improvement Program or the locality’s capital plan. Locality requests up to a total of $1 million will be evaluated first and funded first.

The Revenue Sharing Program is administered by VDOT, in cooperation with the participating localities, under the authority of Section 33.1-23.05 of the Code of Virginia and the Commonwealth Transportation Board’s (CTB) Revenue Sharing Program Policy. Application for program funding must be made by resolution of the governing body of the jurisdiction requesting the funds. Applications for program funding are typically due by November for funding under the next fiscal year. Localities are typically notified by June prior to the effective fiscal year of application approvals.

The Revenue Sharing Program is intended to provide funding for immediately needed improvements or to supplement funding for existing projects. Larger new projects may also be considered, provided the locality identifies any additional funding needed to implement the project. Revenue Sharing Program funds are generally expected to be used to finance project costs in the same fiscal year and projects should be in active development that is leading to their completion within the near term.

The total funds available each fiscal year will be determined by the CTB. The maximum allocation the CTB may make to the Revenue Sharing Program is $200 million annually. The minimum allocation the CTB may make to the Revenue Sharing Program is $15 million annually.

Economic Development Access Program

The Economic Development Access Program is a state-funded incentive designed to assist Virginia localities in attracting sustainable businesses that create jobs and generate tax revenues within the locality. The program makes funds available to localities for road improvements needed to provide adequate access for new or substantially expanding qualifying establishments. These qualifying investments represent the cost of land, building and any manufacturing/processing equipment by an incoming establishment, including manufacturing, processing, research and development, distribution centers, regional service centers and corporate headquarters. Economic Development Access funds are allocated by the CTB. These funds may be used for financing the construction or improvement of secondary or local system roads within all counties and cities, and certain towns that are part of the Urban System. Ancillary improvements, such as turn lanes or intersection modifications may also be warranted as part of the access project, but are not to be considered as the primary objective of the project. The program is administered by VDOT, Local Assistance Division. Subject to available funding, the maximum unmatched allocation to a locality within any one fiscal year is $500,000, which may be used for one or more projects. The maximum allocation to any one project is limited to the lesser of either the access road construction cost or 20% of the qualifying investment made.

Recreational Access Program

The Recreational Access Program is a state-funded program intended to assist in providing adequate access to or within public recreational areas and historic sites operated by the Commonwealth of Virginia, or by a local government or authority. Federal sites are not eligible. Recreational Access funds, with the appropriate designation and concurrence of the Director of Conservation and Recreation or the Director of Historic Resources, are allocated by the CTB in accordance with its policy, revised February 20, 2008. While projects may qualify under either recreational or historic categories, the area may have both recreational and historic qualities.

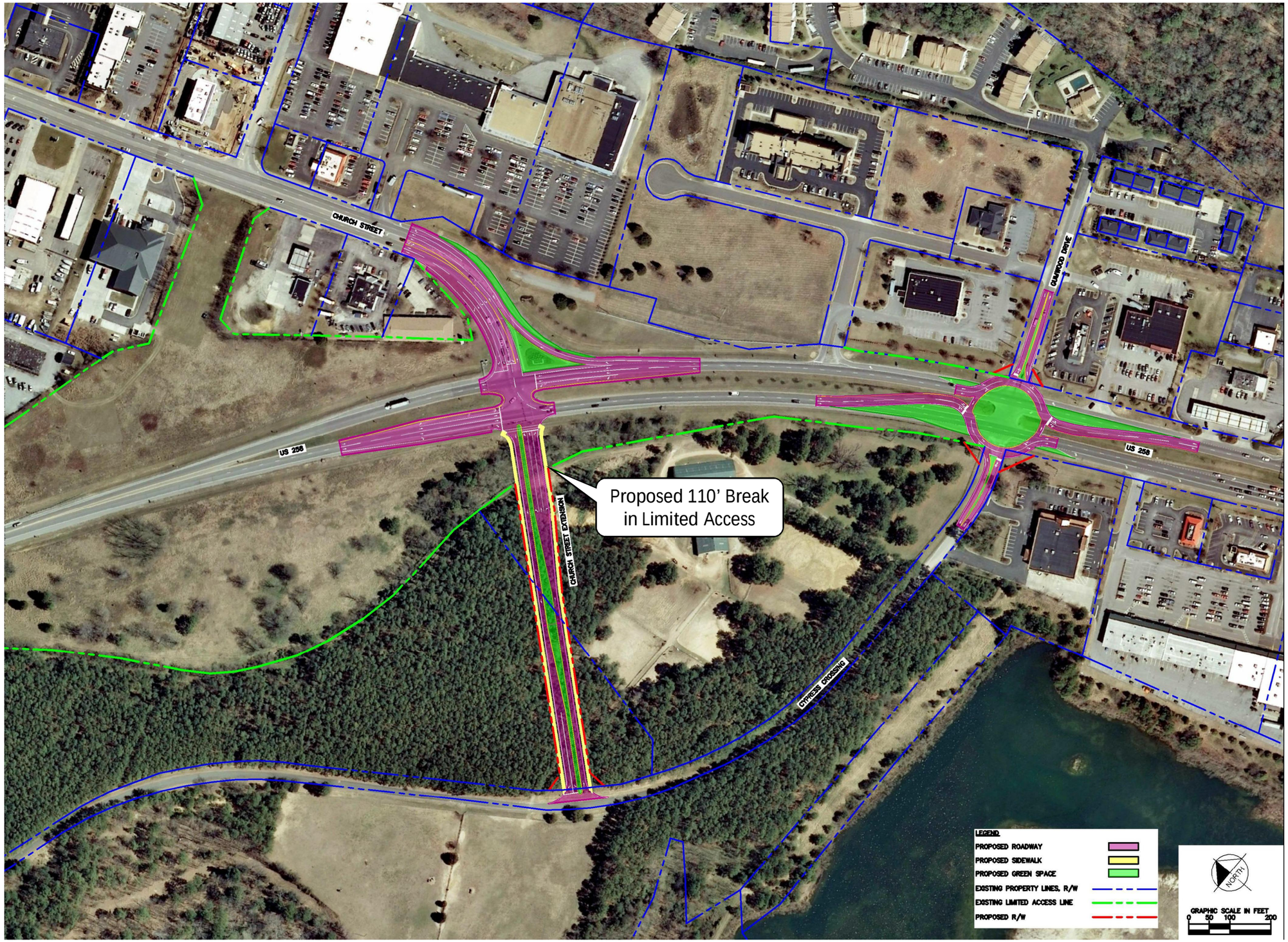
It is recommended that localities consult with both DCR and DHR to ensure the design of the access project takes all values into account when requesting funding under this program. These funds may be used for financing the construction or improvement of secondary or local system roads within all counties and cities and certain towns that are part of the Urban System. The Recreational Access Program is funded through an annual appropriation, with up to $3 million available for the program. Applications are considered on a first come, first served basis. Limitations to this funding specify that not more than $400,000 may be allocated for an access road or $75,000 for a bikeway project for any facility operated by a state agency. Additionally, not more than $250,000 may be allocated for an access road or $60,000 for a bikeway project to any facility operated by a locality, with an additional $100,000 available for the access road or $15,000 for the bikeway if matched dollar-for-dollar by the locality.

7.6.3 Other Funding Sources

At the local level, the Town of Smithfield is a part of the Smithfield Planning Commission. The Smithfield Planning Commission can assist with local planning efforts by providing services and guidance on funding strategies/coordination with VDOT.

Private funds can also be realized through rezoning action and proffer contributions, as well as the dedication of right-of-way (ROW). All the referenced funding programs and strategies require some portion of commitment and/or match at the local level but serve as a means for communities to increase the effectiveness of their budgetary dollars toward priority projects. One source of local match funding could be the inclusion of specific transportation-match funds in Smithfield's Capital Improvement Program (CIP), or another dedicated local fund.

Local fund matches or the use of additional local funds for some components may be necessary if it is determined their inclusion in the roadway project is cost prohibitive, a significant addition to anticipated costs, or inconsistent with the intent of the project.



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Intersection Improvement Alternatives Analysis
Smithfield, Virginia

Proposed Break in the Existing Limited Access Boundary

Figure 31

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Virginia Department of Transportation

TIA REGULATION SUBMITTAL INFORMATION SHEET

This sheet is a summary of information on a Chapter 527 submittal for entering into the LandTrack data base.

Submission Details

Project Name	Yeoman Tract TIA	Locality's Project ID	
VDOT District	Hampton Roads	Jurisdiction	Isle of Wight
Locality Contact		TIA Preparer	Lisa Simpson

Location

Route Number	Address	Principal Rte	ADT
10	14096 Benns Church Bl	☒	25000
		☐	
		☐	
		☐	
		☐	
		☐	
		☐	
		☐	
		☐	

Site Details

Submission Type	Zoning TIA Review		
Facility Type	Mixed Use - Commercial / Residential	Acreage	0
Residential Units	685	Commercial SqFt	35000
VPH (net)	809	VPD (net)	8962
Principal Parcel ID	32-01-009	Doubles Road VPD	NO
Other Parcel ID(s)			

Payment

Fee Waived	NO	Reason for Waiver	-- Select --
Payment Included	YES	Payment Type	Check
Check #		Check Holder	
Payment Amount		Received From	

Tracking

Date Received by Locality	Locality's Requested Due Date

Comments

December 2019

YEOMAN'S TRACT

Isle of Wight County, Virginia

Traffic Impact Study



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Introduction and Summary

Purpose

Yeoman's Tract is an undeveloped parcel located at 14096 Benns Church Boulevard in Isle of Wight County. The parcel is on the northeast side US 258/Rt (Benns Church Boulevard) between US 258/Rt 32 (Brewers Neck Boulevard) and Canteberry Lane. Ryan Homes is planning a development of single family, and multi-family living residential units as well as, a public park, a shopping center and a fast food restaurant on this parcel. The developer is in the process of rezoning the property. This development is expected to be in full operation in 2026.

The site is estimated to generate 8,962 new daily trips with 548 trips in the morning peak hour and 809 trips during the evening peak hour.

The Virginia Department of Transportation (VDOT) and Isle of Wight County require a traffic study in compliance with Chapter 527 Regulations. A scoping meeting was held with VDOT and Isle of Wight County on April 23, 2018. A copy of the approved Pre-Scoping Form is included in Appendix A.

Executive Summary

In order to project the expected impact of the proposed development, trips were generated base on the Institute of Transportation Engineers Trip Generation Manual and distributed to the adjacent roadway network based on anticipated travel patterns. The development plan for the site consists of:

- 400 Single-family Detached Homes
- 285 Multi-family Detached Homes
- 4-acre Public Park
- 30,000 sf Shopping Center
- 5,000 sf Fast Food with Drive-Thru

This development plan is estimated to generate 8,962 new daily trips with 380 trips in the morning peak hour and 809 trips during the evening peak hour. Based on the results of the auxiliary lane, capacity and queuing analyses performed in this study, the following improvements are recommended:

<u>2018 Existing:</u>

- VDOT to construct eastbound right turn lane at US 258/Rt 10 (Benns Church Boulevard) and Turner Lane as planned.

2026 No Build:

- VDOT should review and optimize signal timings along the corridor, if necessary.

2026 Build:

- Construct northbound right turn lane (200' storage plus 200' taper) into right in/right out Proposed Secondary Entrance off of US 258/Rt 10 (Benns Church Boulevard).
- Construct northbound right turn lane (200' storage plus 200' taper) into Proposed Main Entrance off of US 258/Rt 10 (Benns Church Boulevard).
- Lengthen southbound left turn lane to provide 200' storage plus 200' taper into Proposed Main Entrance off of US 258/Rt 10 (Benns Church Boulevard).
- Install traffic signal at intersection of US 258/Rt 10 (Benns Church Boulevard) and Proposed Main Entrance.
- Install signal infrastructure to provide a protected eastbound right-turn overlap at US 258/Rt 10 (Benns Church Boulevard) and Turner Lane.
- Install flashing yellow arrows for the northbound and southbound left turn lanes at the intersection of US 258/Rt 10 (Benns Church Boulevard) at Canterberry Lane, Cypress Run Drive, Turner Drive and the Proposed Main Entrance to allow lead/lag operation.
- Optimize signal timings along the corridor.

2032 No Build:

- No additional improvements required.

2032 Build:

- Install signal infrastructure to provide a protected southbound right-turn overlap at US 258/Rt 10 (Benns Church Boulevard) and Turner Lane.
- Optimize signal timings along the corridor.

Background Information

The intersections included in the study area are:

- US 258/Rt 10 (Benns Church Boulevard) and US 258/Rt 32 (Brewers Neck Boulevard) – signalized;
- US 258/Rt 32 (Brewers Neck Boulevard) and Queen Annes Court – signalized;
- US 258/Rt 10 (Benns Church Boulevard) and Cypress Run Drive – signalized;

- US 258/Rt 10 (Benns Church Boulevard) and Turner Drive – signalized;
- US 258/Rt 10 (Benns Church Boulevard) and Canteberry Lane – signalized;
- US 258/Rt 10 (Benns Church Boulevard) and the Proposed Main Entrance (unsignalized); and,
- US 258/Rt 10 (Benns Church Boulevard) and the Proposed Secondary Entrance (unsignalized).

The vicinity map is shown in Figure 1. Figure 2 shows the site location, study intersections and the street network serving the site. Figure 3 shows the existing lane configurations at each of the intersections.

Study Area Roadways – Existing and Programmed Conditions

US 258/Rt 10 (Benns Church Boulevard)
Benns Church Boulevard is a four-lane divided Minor Arterial which traverses in a north-south direction west of the study site. The posted speed limit in the vicinity of the site is 45 miles per hour (mph). The corridor includes retail and residential land uses.

US 258/Rt 32 (Brewers Neck Boulevard)
Brewers Neck Boulevards is a four-lane divided Principal Arterial south of the study site. It has a posted speed limit of 55 mph. US 258/Rt 32 (Brewers Neck Boulevard) runs east-west and intersects with US 258/Rt 10 (Benns Church Boulevard). Westbound left turns from Brewers Neck Boulevard onto US 258/RT 10 (Benns Church Boulevard) are restricted. South of the site, the corridor contains residential and civic land uses.

Canteberry Lane
Canteberry Lane is a four-lane divided local roadway. It provides access to residential land uses as well as commercial developments. The posted speed limit is 25 mph.

Turner Drive
Turner Drive is a two-lane Major Collector. It provides access to commercial land uses and Smithfield Middle School. A project is planned for summer 2018 to construct an eastbound right turn lane at US 258/Rt 10 (Benns Church Boulevard). The posted speed limit is 40 mph.

Cypress Run Drive
Cypress Run Drive is a two-lane local road with turn lanes. It provides access to commercial land uses. The posted speed limit is 15 mph.

Existing Traffic Volumes

The project area is within the Isle of Wight County. Traffic counts taken by VDOT in 2017 show the following average daily traffic volumes:

- US 258/Rt 10 (Benns Church Boulevard) – 25,000 vpd
- US 258/Rt 32 (Brewers Neck Boulevard) – 24,000 vpd
- Canteberry Lane – 1,300 vpd
- Turner Drive – 3,100 vpd
- Cypress Run Drive – 880 vpd

Historical data shows little or no traffic growth on US 258/Rt 10 or US 258/Rt 32 in the last 10 years.

Peak hour turning movement counts were taken on Tuesday, April 24th, Wednesday, April 25th and Thursday, April 26th, 2018 from 6:00 am to 8:00 am and from 2:30pm to 5:30pm at each intersection in the study area. Detailed count data is provided in Appendix B.

Actual AM and PM peak hour volumes were used in the capacity analysis to model existing traffic conditions.

Existing Pedestrian and Transit Services

The roadways within project area have paved shoulders, but the roadways within the project area do not have pedestrian facilities.

Senior Services of Southeastern Virginia provides transit access along the corridor on I-Ride. The I-Ride is a fixed route system, open to all, that provides access around Smithfield and connects to Hampton Roads Transit (HRT) in Newport News. The closest stop is at the Red Oak Mobile Homes on Benns Church Boulevard. The bus routes are shown on Figure 4.

Proposed Development

The Yeoman's Tract development includes a mixture of residential and commercial uses. The conceptual plan includes:

- 400 Single-family Detached Homes
- 285 Multi-family Detached Homes
- 4-acre Public Park
- 30,000 sf Shopping Center
- 5,000 sf Fast Food with Drive-Thru

Figure 5 shows the proposed site plan.

Currently the property is zoned for Rural Agricultural Conservation (RAC). However, it is being rezoned for Mixed Use Areas (PD-MX). This requires an amendment to Isle of Wight's Comprehensive Plan. In the Comprehensive Plan, the corridor is proposed to be a combination of mixed use areas and business and employment centers. Figure 6 shows the land use zoning for the project.

Site Access

There are two (2) planned access points to the proposed site. One right in/right out entrance off US 258/Rt 10 (Benns Church Boulevard) and one full access intersection at the existing median opening on US 258/Rt 10 (Benns Church Boulevard) south of Turner Drive as shown in Figure 5.

Proposed Pedestrian and Transit Services

Multipurpose trails will be provided within the development and along the US 258/Rt 10 (Benns Church Boulevard) street frontage. There will be no changes to transit services.

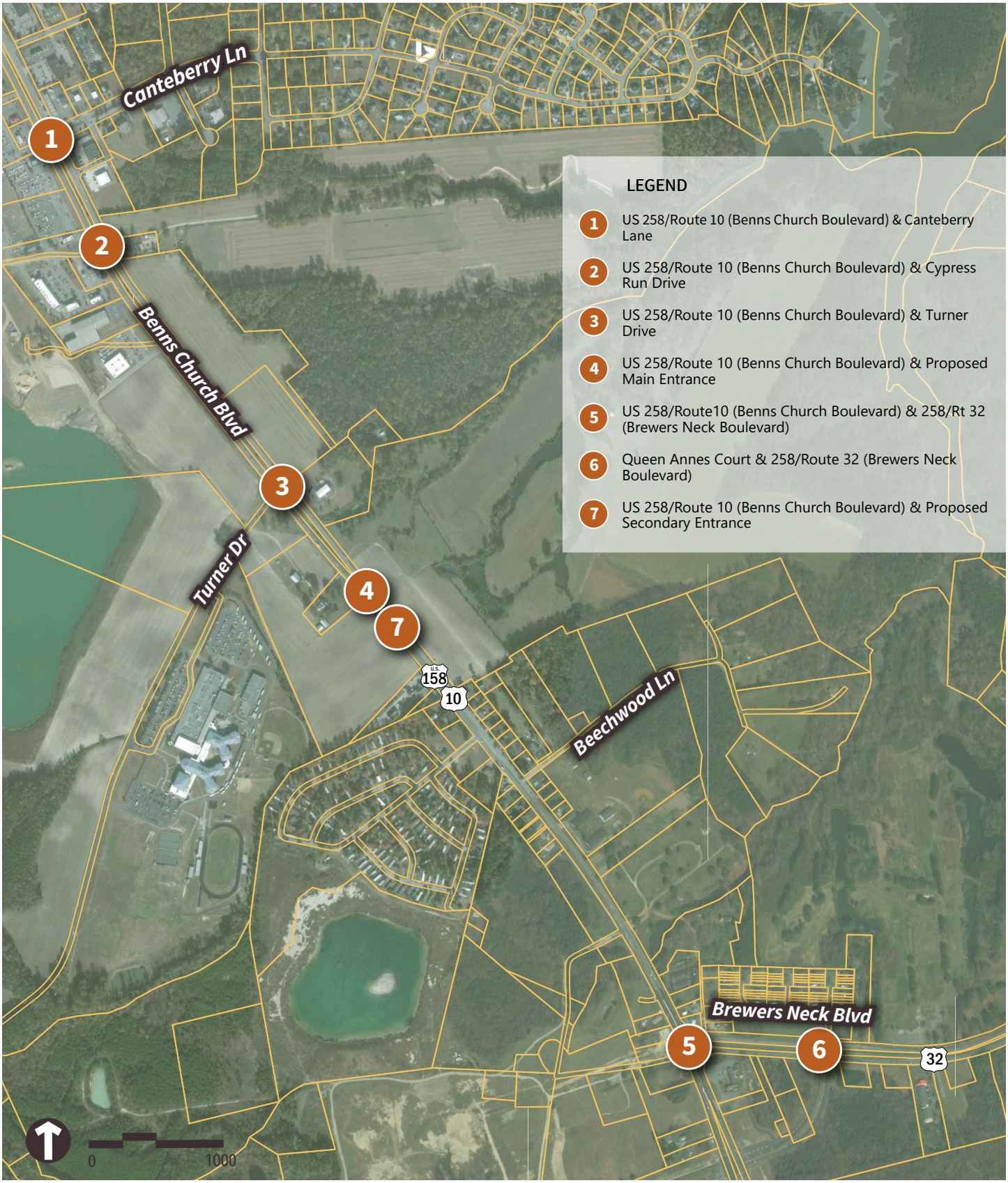


SOURCE: BING, (c) 2015 Microsoft Corporation and its data suppliers.

FIGURE 1

Vicinity Map

Yeoman Tract Traffic Impact Study
Isle of Wight County, Virginia

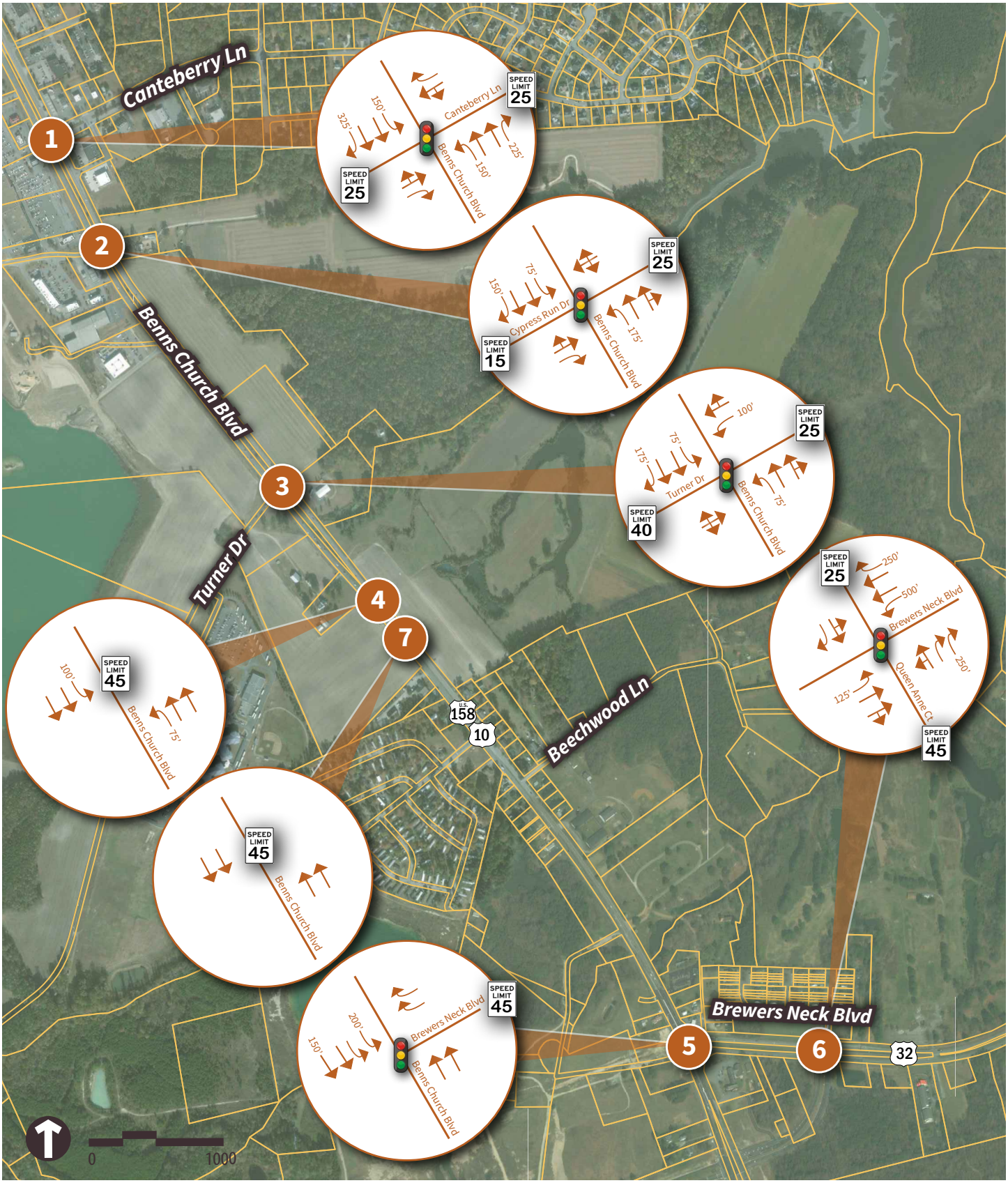


SOURCE: BING, (c) 2015 Microsoft Corporation and its data suppliers.

FIGURE 2

Study Area Map

Yeoman Tract Traffic Impact Study
Isle of Wight County, Virginia



SOURCE: BING, (c) 2015 Microsoft Corporation and its data suppliers.

FIGURE 3

Existing Lane Configuration

Yeoman Tract Traffic Impact Study
Isle of Wight County, Virginia



SOURCE: BING, (c) 2015 Microsoft Corporation and its data suppliers.

FIGURE 4

Bus Routes for Existing and No Build Conditions

Yeoman Tract Traffic Impact Study
Isle of Wight County, Virginia

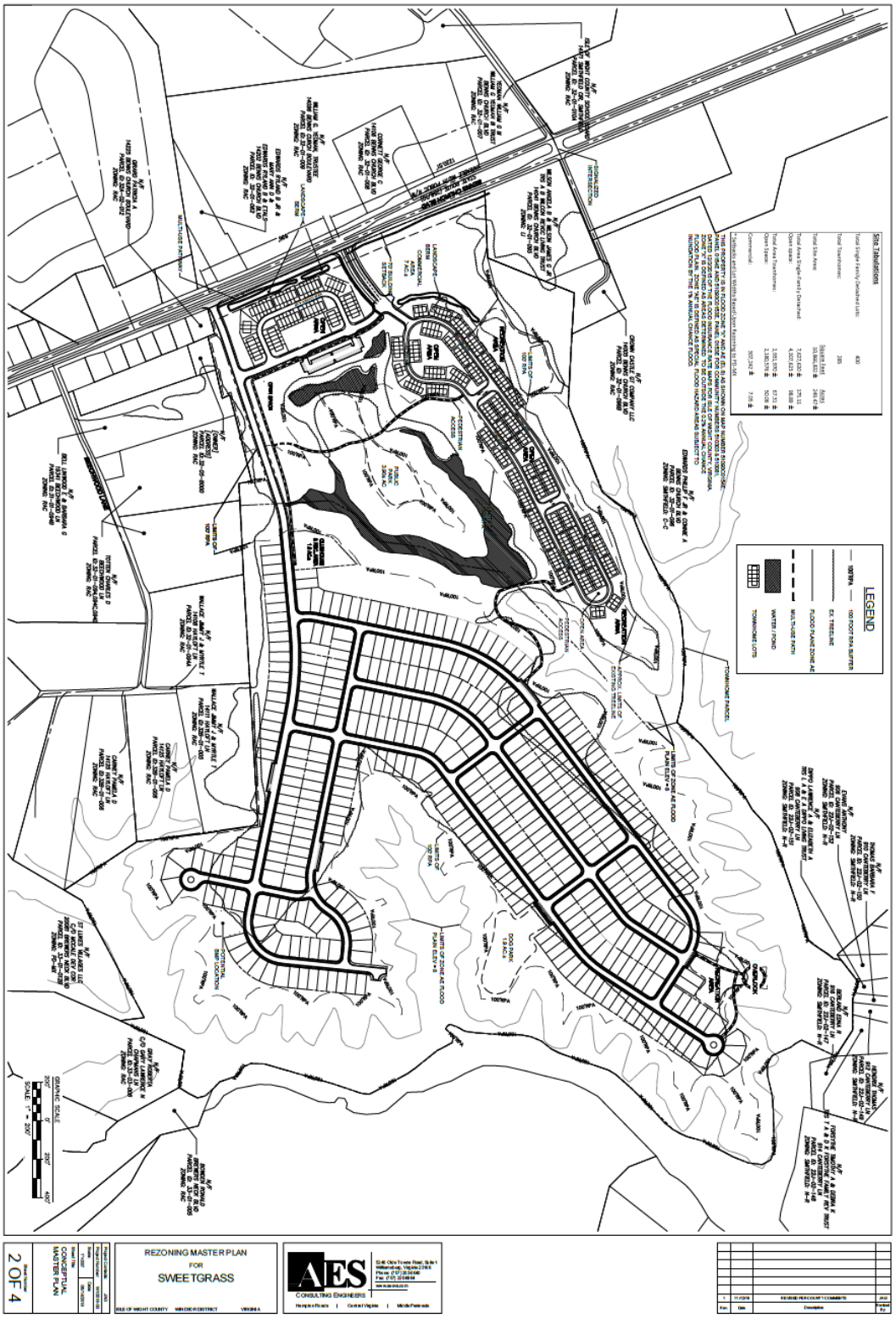


Figure 5. Conceptual Site Plan

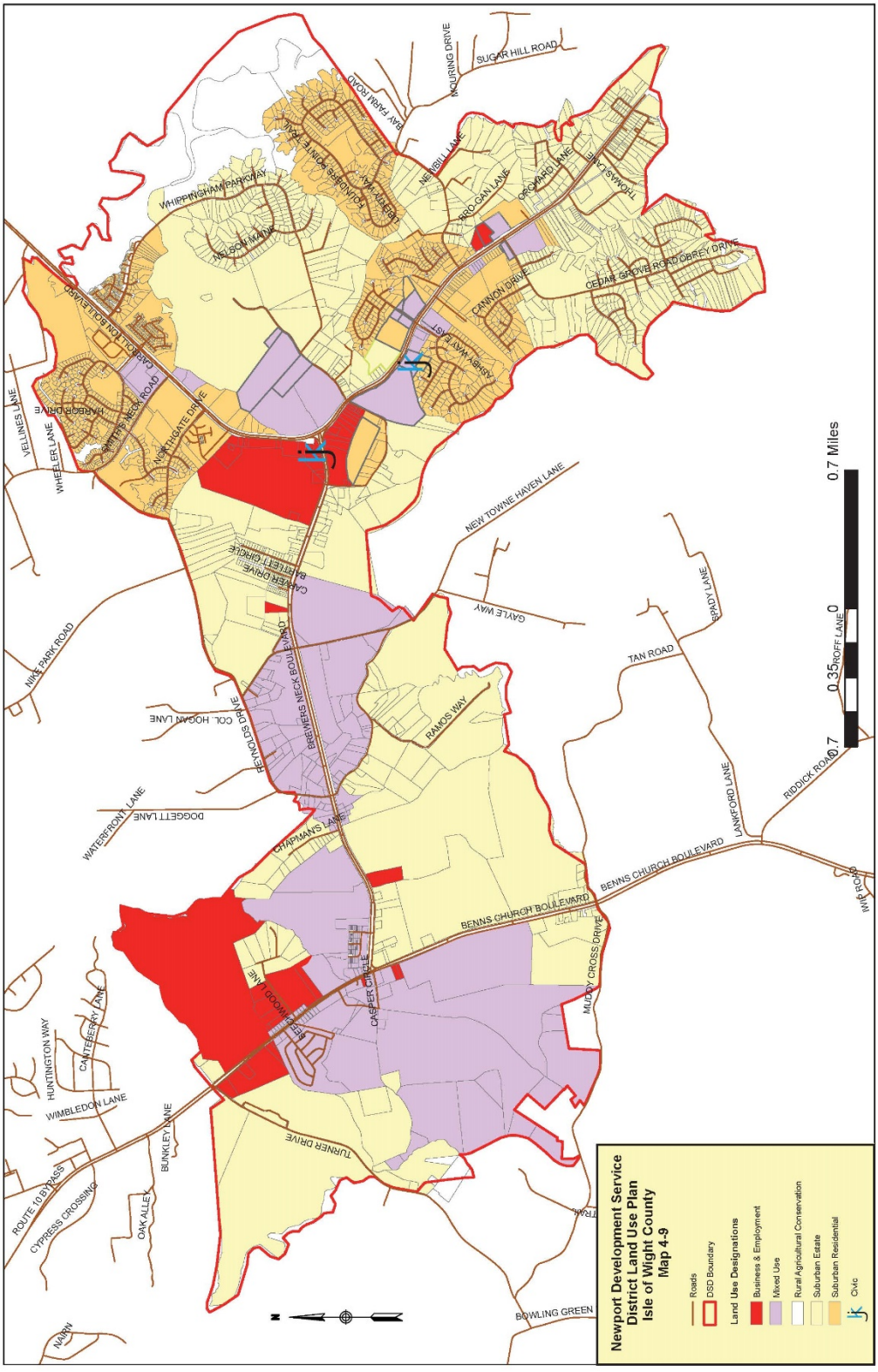


Figure 6. Existing and Proposed Land Use.

Analysis of Existing Conditions

Capacity Analysis

Capacity analysis results are expressed in terms of Level of Service (LOS). LOS is a qualitative measurement of traffic operations. It is translated from a measure of delay to drivers in units of time, seconds per vehicle. The Transportation Research Board's Highway Capacity Manual (HCM) defines six levels of service for intersections with LOS "A" representing operating conditions with minimal constraints on traffic movements and LOS "F" representing extremely congested operating conditions. LOS "D" is considered the threshold of acceptable operations for an overall intersection. Exhibit 18-4 of the HCM gives the criteria for signal controlled intersections, while HCM Exhibit 19-1 gives the criteria for unsignalized intersections.

HCM Exhibit 18-4: Level of Service Criteria

Signalized Level of Service	Signal Delay per Vehicle (sec/veh)
A	≤ 10.0
B	> 10.0 and ≤ 20.0
C	> 20.0 and ≤ 35.0
D	> 35.0 and ≤ 55.0
E	> 55.0 and ≤ 80.0
F	> 80.0

HCM Exhibit 19-1: Level of Service Criteria

Unsignalized Level of Service	Stopped Delay per Vehicle (sec/veh)
A	≤ 10.0
B	> 10.0 and ≤ 15.0
C	> 15.0 and ≤ 25.0
D	> 25.0 and ≤ 35.0
E	> 35.0 and ≤ 50.0
F	> 50.0

Synchro 9.1 was the software tool used in determining the delay, capacity and corresponding LOS of the study intersections. The delay and LOS information calculated in the analysis are presented in Table 1. Appendix C includes the Synchro reports for the 2018 Existing conditions.

Based on the existing conditions analyses, most of the corridor operates acceptably at LOS C or better, with the exception of the intersection of US 258/Rt 10 (Benns Church Boulevard) & Turner Drive. Currently, during morning peak hour, LOS at this intersection experiences an unacceptable LOS F with over 108 seconds per vehicle (sec/veh) in delay. Improvements are planned to improve operations at this intersection. Current plans were provided to VHB by VDOT and the future lane configuration was taken into the account in the future year No Build and Build analyses. Based on the planned improvements, no interim improvements are recommended.

Table 1. 2018 Existing Measures of Effectiveness.

Intersection and Approach	Control	2018 Existing	
		AM	PM
US 258/Rt 10 (Benns Church Boulevard) & Canteberry Lane	Signalized	**C (21.4 sec/veh)**	**C (25.4 sec/veh)**
Eastbound		C-28.2	D-43.3
Westbound		D-52.6	D-35
Northbound		B-13	C-23.4
Southbound		C-22.3	C-23.1
US 258/Rt 10 (Benns Church Boulevard) & Cypress Run Drive	Signalized	**A (3 sec/veh)**	**A (9.2 sec/veh)**
Eastbound		B-11.5	C-33.9
Westbound		---	---
Northbound		A-2.8	A-7.4
Southbound		A-2.8	A-6.1
US 258/Rt 10 (Benns Church Boulevard) & Turner Drive	Signalized	**F (108.1 sec/veh)**	**B (16.9 sec/veh)**
Eastbound		F-131.1	C-26.3
Westbound		C-33.1	C-28.3
Northbound		D-40.8	B-15.6
Southbound		F-152.7	B-16.5
US 258/Rt 10 (Benns Church Boulevard) & Proposed Main Entrance	Unsignalized	**-**	**-**
Eastbound		---	---
Westbound		---	---
Northbound		---	---
Southbound		---	---
US 258/Rt 10 (Benns Church Boulevard) & 258/Rt 32 (Brewers Neck Boulevard)	Signalized	**A (6.3 sec/veh)**	**A (7 sec/veh)**
Eastbound		---	---
Westbound		A-2.1	A-6.1
Northbound		C-21.8	C-20.6
Southbound		A-6.8	A-5
Queen Annes Court & 258/Rt 32 (Brewers Neck Boulevard)	Signalized	**B (18.1 sec/veh)**	**B (18.1 sec/veh)**
Eastbound		C-26.3	C-28.1
Westbound		B-15.6	B-16.2
Northbound		A-4	A-4.6
Southbound		C-20.7	C-22.8

Analysis of Future No Build Conditions

Background Traffic

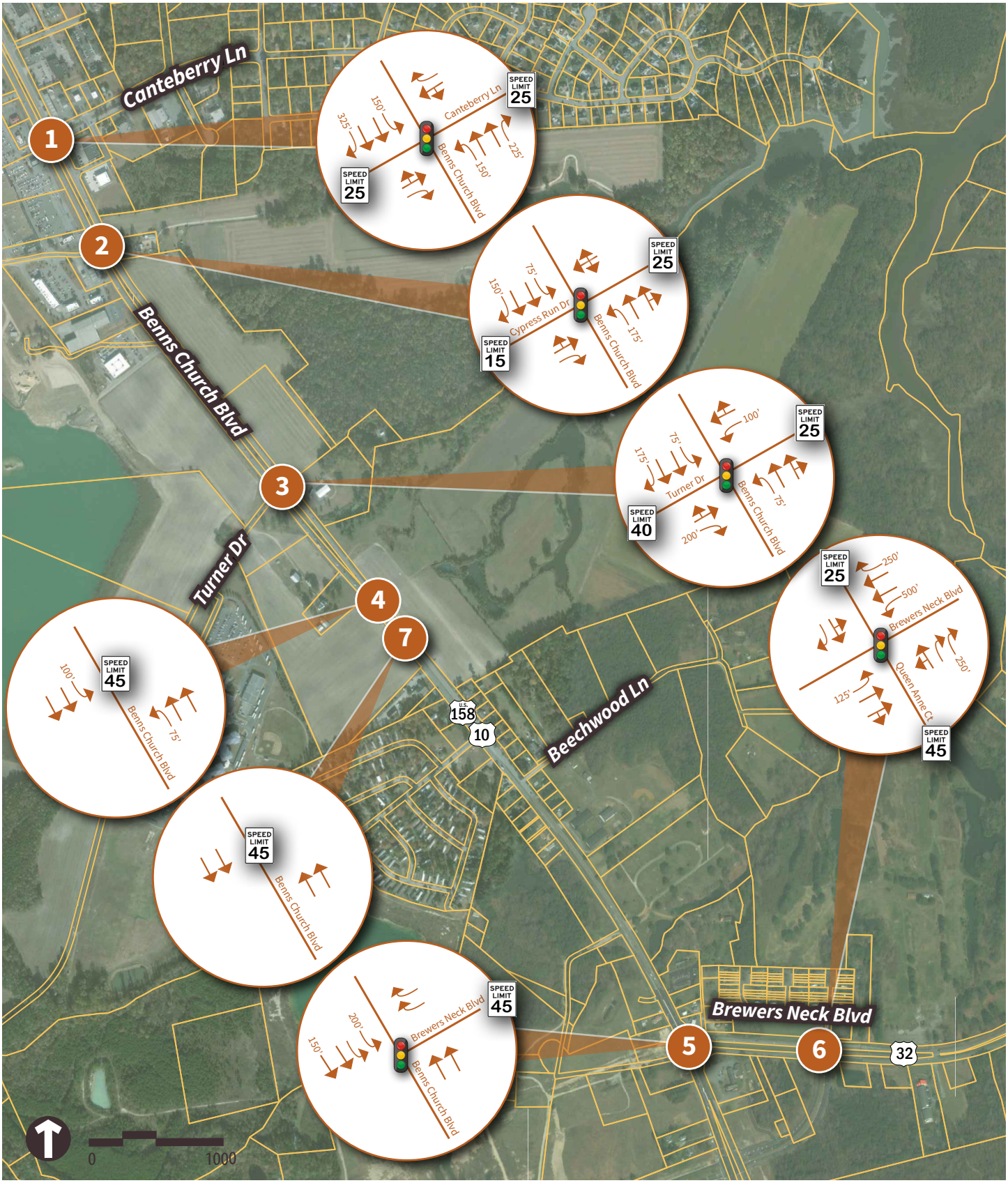
The 2018 am and pm peak hour volumes were projected to horizon years 2026 and 2032 using a growth factor approved by VDOT and Isle of Wight County. One and a half percent (1.5%) growth was used for all intersections within the study area.

Planned Transportation System Improvements

As mentioned earlier in the report, there are improvements planned for the intersection of US 258/Rt 10 (Benns Church Boulevard) & Turner Drive. An exclusive right turn lane, with 200 feet of storage, will be added to eastbound approach. Figure 7 shows the lane configurations for future 2026 and 2032 No Build and Build scenarios. The two (2) site entrances shown in Figure 7 apply to the Build conditions only. The lane configurations at all other intersections used in future conditions analyses are identical to those shown for the existing conditions.

Capacity Analysis

Synchro 9.1 was the software tool used in determining the delay, capacity and corresponding level of service of the study intersections using the projected traffic volumes. The results indicate that all intersections operate at an overall LOS C with the exception of US 258/Rt 10 (Benns Church Boulevard) & Turner Drive is expected to be E during morning peak hour with the constructed eastbound right turn lane. Tables 2 and 3 present the delay and LOS information calculated in the analysis for these conditions. Even though the overall LOS at the intersection of US 258/Rt 10 (Benns Church Boulevard) & Turner Drive is expected to be E during morning peak hour, the eastbound approach will continue to operate at unacceptable LOS F with almost 96 sec/veh in delay in 2026. With signal optimization the delay to the eastbound movement is reduced to 74 seconds (LOS F) in the 2032 AM No Build condition, however the northbound and southbound movements are reduced to a LOS E. Figures 8 and 9 show the projected traffic volumes for 2026 and 2032 No Build Conditions, respectively. The network signal cycle lengths and splits were optimized for the 2026 and 2032 No Build analyses. Appendix D includes the Synchro reports for the 2026 No Build conditions and Appendix E includes the Synchro reports for the 2032 No Build conditions.



SOURCE: BING, (c) 2015 Microsoft Corporation and its data suppliers.

FIGURE 7

2026 and 2032 Future No Build Lane Configuration

Yeoman Tract Traffic Impact Study
Isle of Wight County, Virginia

LEGEND	
——	Existing Roadway
- -	Future Roadway
STOP	Existing Stop Controlled Approach
⟶	Turning Movement
XX	AM Peak Hour Turning Movement Volume
(XX)	PM Peak Hour Turning Movement Volume

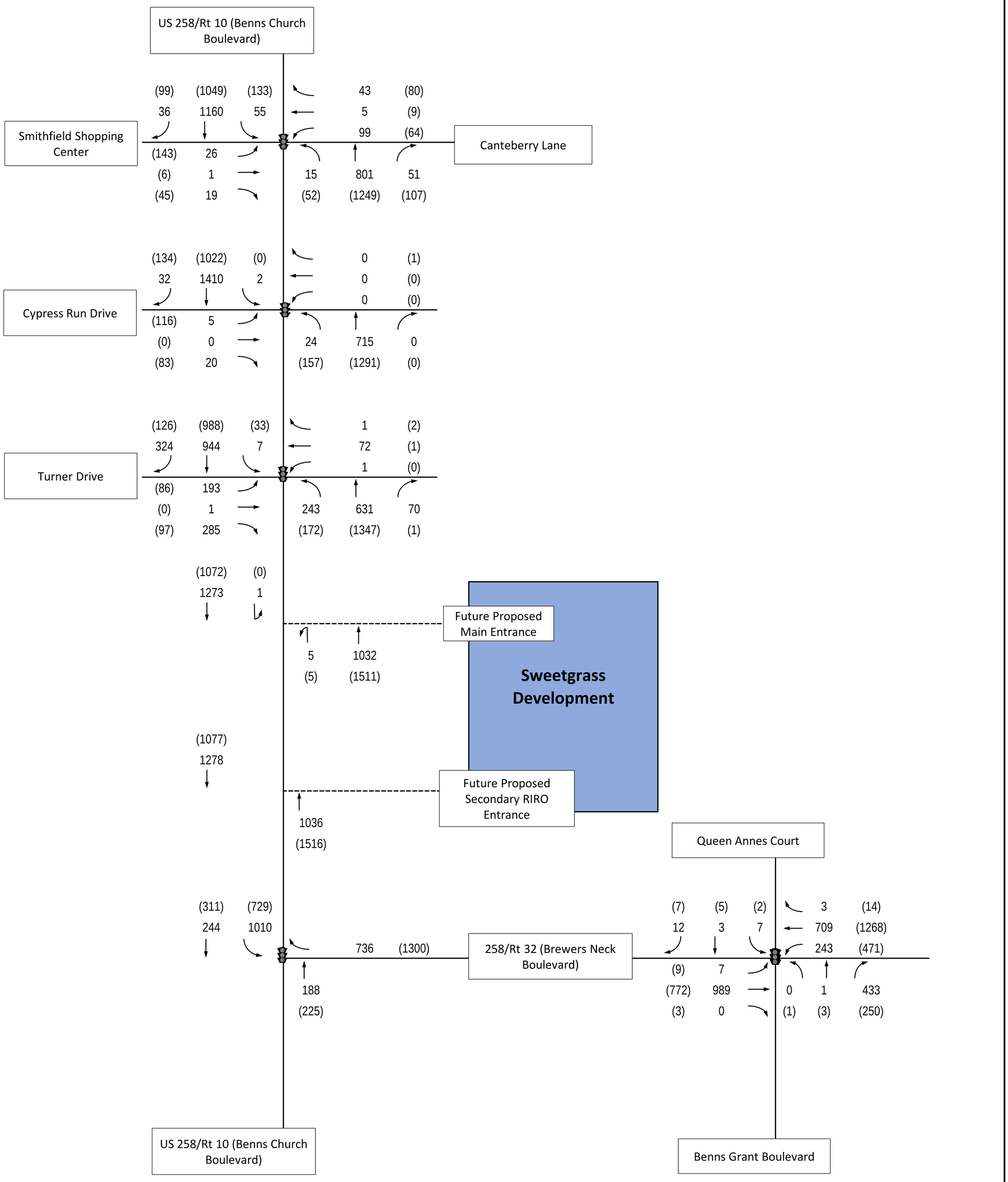


Figure 8
2026 No Build AM and PM Peak Hour Traffic Volumes

Sweetgrass
Isle of Wight County, VA

LEGEND	
——	Existing Roadway
- -	Future Roadway
STOP	Existing Stop Controlled Approach
→	Turning Movement
XX	AM Peak Hour Turning Movement Volume
(XX)	PM Peak Hour Turning Movement Volume

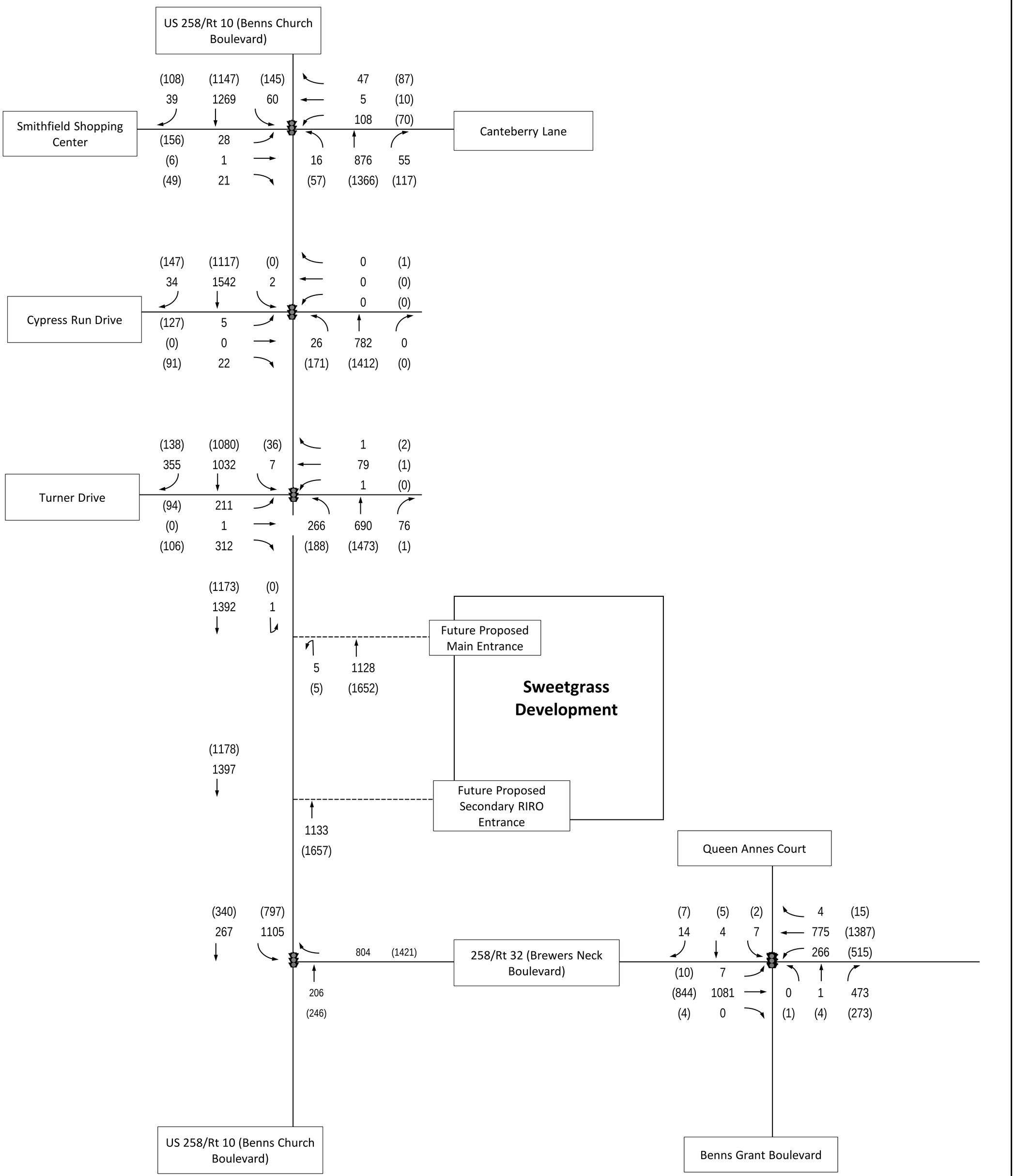


Figure 9
2032 No Build AM and PM Peak Hour Traffic Volumes

Sweetgrass, Isle of Wight County, VA

Table 2. 2026 No-Build Measures of Effectiveness.

Intersection and Approach	Control	2026 No-Build	
		AM	PM
US 258/Rt 10 (Benns Church Boulevard) & Canteberry Lane	Signalized	**C (25.3 sec/veh)**	**C (31.3 sec/veh)**
Eastbound		C-28.5	D-43.2
Westbound		E-57	D-35.6
Northbound		B-14.2	C-28
Southbound		C-27.5	C-32.4
US 258/Rt 10 (Benns Church Boulevard) & Cypress Run Drive	Signalized	**A (4.8 sec/veh)**	**A (9.9 sec/veh)**
Eastbound		B-12.5	C-34.4
Westbound		---	---
Northbound		A-3.1	A-8.9
Southbound		A-5.4	A-5.8
US 258/Rt 10 (Benns Church Boulevard) & Turner Drive	Signalized	**E (58.4 sec/veh)**	**B (18.4 sec/veh)**
Eastbound		F-95.9	C-26.8
Westbound		D-38.6	C-26.7
Northbound		D-47.4	B-17.8
Southbound		D-54.5	B-17.5
US 258/Rt 10 (Benns Church Boulevard) & Proposed Main Entrance	Unsignalized	**-**	**-**
Eastbound		---	---
Westbound		---	---
Northbound		---	---
Southbound		---	---
US 258/Rt 10 (Benns Church Boulevard) & 258/Rt 32 (Brewers Neck Boulevard)	Signalized	**A (7.1 sec/veh)**	**A (8.4 sec/veh)**
Eastbound		---	---
Westbound		A-3.4	A-8.5
Northbound		C-24	C-23.7
Southbound		A-7.1	A-4.8
Queen Annes Court & 258/Rt 32 (Brewers Neck Boulevard)	Signalized	**B (20 sec/veh)**	**B (19.9 sec/veh)**
Eastbound		C-31.1	C-28.6
Westbound		B-15.7	B-18.8
Northbound		A-3.7	A-4.4
Southbound		C-20.7	C-23.2

Table 3. 2032 No Build Measures of Effectiveness.

Intersection and Approach	Control	2032 No-Build	
		AM	PM
US 258/Rt 10 (Benns Church Boulevard) & Canteberry Lane	Signalized	**C (26.4 sec/veh)**	**D (36.9 sec/veh)**
Eastbound		D-44.3	D-43
Westbound		E-70.4	D-36.4
Northbound		B-15.3	D-35.2
Southbound		C-26.8	D-37.9
US 258/Rt 10 (Benns Church Boulevard) & Cypress Run Drive	Signalized	**A (2.8 sec/veh)**	**B (11.1 sec/veh)**
Eastbound		B-16.8	D-35.8
Westbound		---	---
Northbound		A-2.2	B-10.9
Southbound		A-2.7	A-5.8
US 258/Rt 10 (Benns Church Boulevard) & Turner Drive	Signalized	**E (73.9 sec/veh)**	**C (22.2 sec/veh)**
Eastbound		F-88.1	C-28.8
Westbound		D-45.2	C-29.7
Northbound		E-71.5	C-21.4
Southbound		E-73.4	C-21.7
US 258/Rt 10 (Benns Church Boulevard) & Proposed Main Entrance	Unsignalized	**-**	**-**
Eastbound		---	---
Westbound		---	---
Northbound		---	---
Southbound		---	---
US 258/Rt 10 (Benns Church Boulevard) & 258/Rt 32 (Brewers Neck Boulevard)	Signalized	**A (9.5 sec/veh)**	**A (9.8 sec/veh)**
Eastbound		---	---
Westbound		A-7.9	B-10.9
Northbound		B-19.2	C-25.8
Southbound		A-9.1	A-4.7
Queen Annes Court & 258/Rt 32 (Brewers Neck Boulevard)	Signalized	**C (21.6 sec/veh)**	**C (26.6 sec/veh)**
Eastbound		C-29	C-31
Westbound		B-19.5	C-28.6
Northbound		A-8.1	A-4.5
Southbound		C-25.9	C-24.9

Analysis of Build Conditions

Trip Generation

Traffic that may be generated by the proposed development was established using equations and rates available through the Institute of Transportation Engineer's (ITE) Trip Generation Manual, 10th Edition.

Trip generation for the site was prepared for each individual land use. ITE provides information for single-family detached housing (Land Use 210), low-rise multi-family housing (Land Use 220), public park (Land Use 411), shopping center (Land Use Code 820) and fast food with drive-through (Land Use 934).

The types of commercial development are unknown at this time, so shopping center was used. Pass-by trips to/from fast food restaurant were considered at a 49% rate and to/from the shopping center were considered at a 34% rate. Summary of all future site trips are presented in Table 4 below.

Table 4. Trip Generation.

Land Use	ITE Code	Size	Units	Daily	AM Peak Hour			PM Peak Hour		
					Enter	Exit	Total	Enter	Exit	Total
Conceptual Site Plan										
Single-Family Detached Housing	210	400	Dwelling Units	3,776	74	222	296	249	147	396
Multifamily Housing (Low-Rise)	220	285	Dwelling Units	2,144	30	101	131	101	59	160
Public Park	411	4	Acres	91	0	0	0	13	10	23
Shopping Center	820	30	1000 Sq. Ft. GLA	2,651	17	11	28	107	116	223
Fast Food with Drive-Thru	934	5	1000 Sq. Ft. GLA	2,355	102	99	201	85	78	163
Subtotal				**11,017**	**223**	**433**	**656**	**555**	**410**	**965**
Pass-by Trips (Fast Food only)	49%		% Pass-by	1,154	50	49	98	42	38	80
Pass-by Trips (Shopping Center)	34%		% Pass-by	901	6	4	10	36	39	76
Total New Trips				**8,962**	**167**	**380**	**548**	**477**	**333**	**809**

Reference: Trip Generation, 10th Edition, Institute of Transportation Engineers, Washington, DC. 2017.
Note: Used highest total between average rate and fitted curve unless R2<0.75

The site is estimated to generate 8,962 new daily trips with 548 trips in the morning peak hour and 809 trips during the evening peak hour.

Trip Distribution

Trip distribution was based on the existing traffic patterns and the understanding of the land uses within the surrounding area.

The site traffic distribution for the residential uses assumes 70% will enter from and exit to the south during the AM peak and 60% will enter from and exit to the south during the PM peak. For the shopping and fast-food used it is assumed that 55% will enter from and exit to the

south during AM peak hour and 55% will enter from and exit to the south during PM peak hour. Trip distribution percentages and traffic volumes for each land use are shown in Appendix F. Combined AM and PM peak hour site trips for all land uses are shown on Figure 10.

The resulting 2026 Build AM and PM traffic volumes are provided in Figure 11, while the 2032 Build AM and PM traffic volumes are provided in Figure 12.

LEGEND	
——	Existing Roadway
- -	Future Roadway
STOP	Existing Stop Controlled Approach
	Existing Signalized Intersection
⟶	Turning Movement
XX(XX)	Weekday AM (PM) Entering Site Trips
XX(XX)	Weekday AM (PM) Exiting Site Trips
STOP	Future Stop Controlled Approach

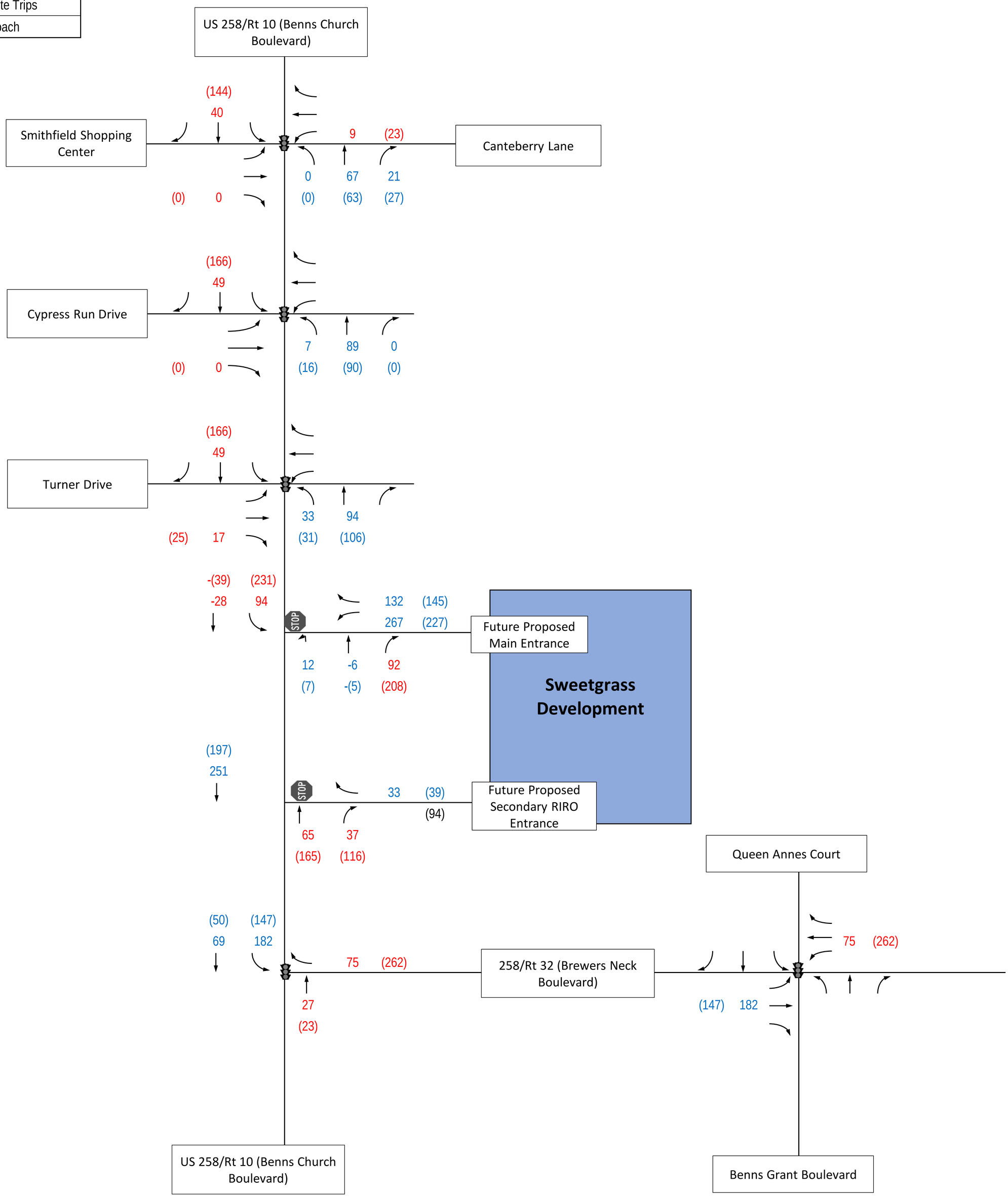


Figure 10
Combined AM and PM Peak Hour Site Trips

Sweetgrass
Isle of Wight County, VA

LEGEND	
——	Existing Roadway
- -	Future Roadway
STOP	Existing Stop Controlled Approach
→	Turning Movement
XX	AM Peak Hour Turning Movement Volume
(XX)	PM Peak Hour Turning Movement Volume

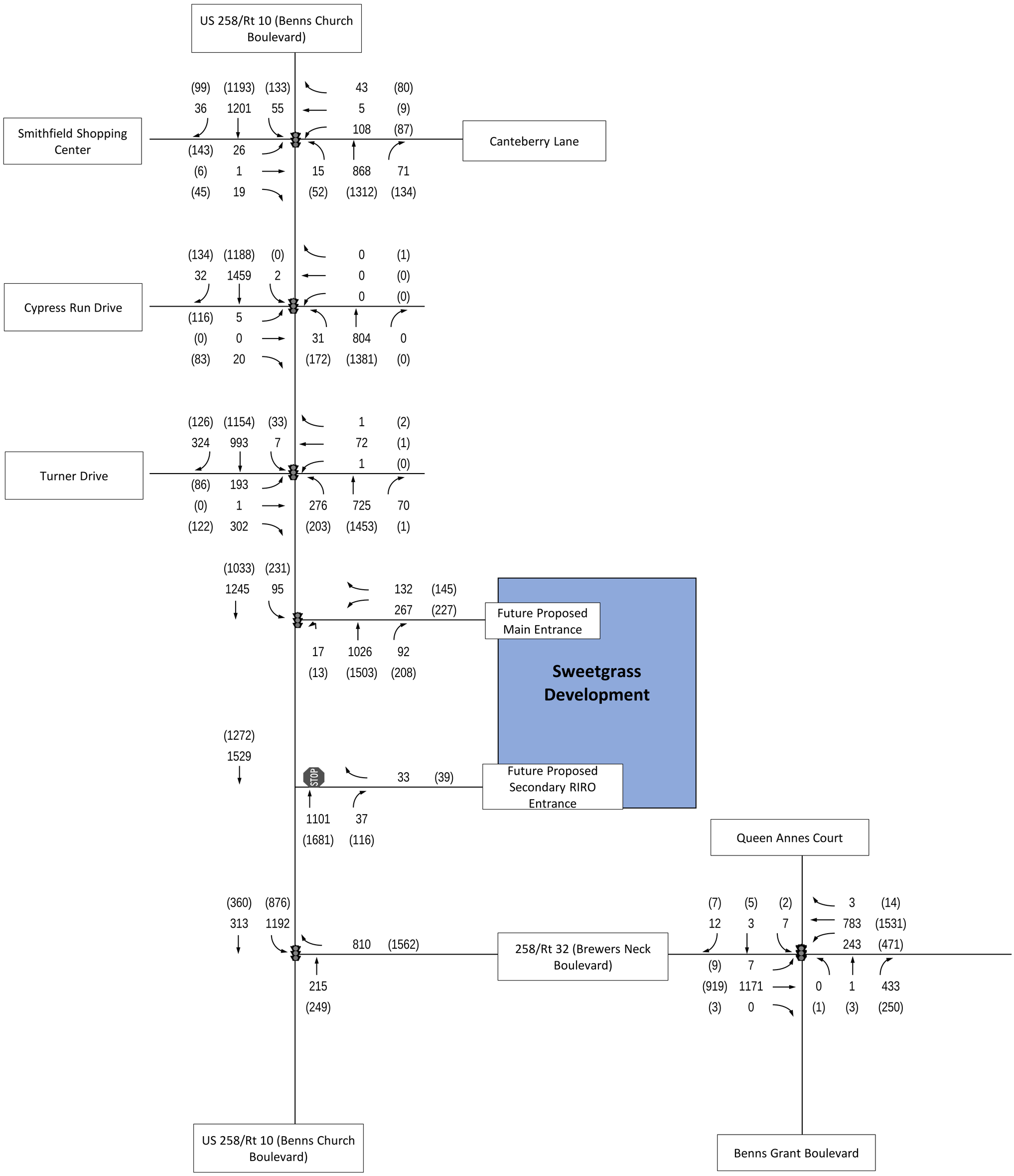


Figure 11
2026 Build AM and PM Peak Hour Traffic Volumes

Sweetgrass, Isle of Wight County, VA

LEGEND	
——	Existing Roadway
- -	Future Roadway
STOP	Existing Stop Controlled Approach
→	Turning Movement
XX	AM Peak Hour Turning Movement Volume
(XX)	PM Peak Hour Turning Movement Volume

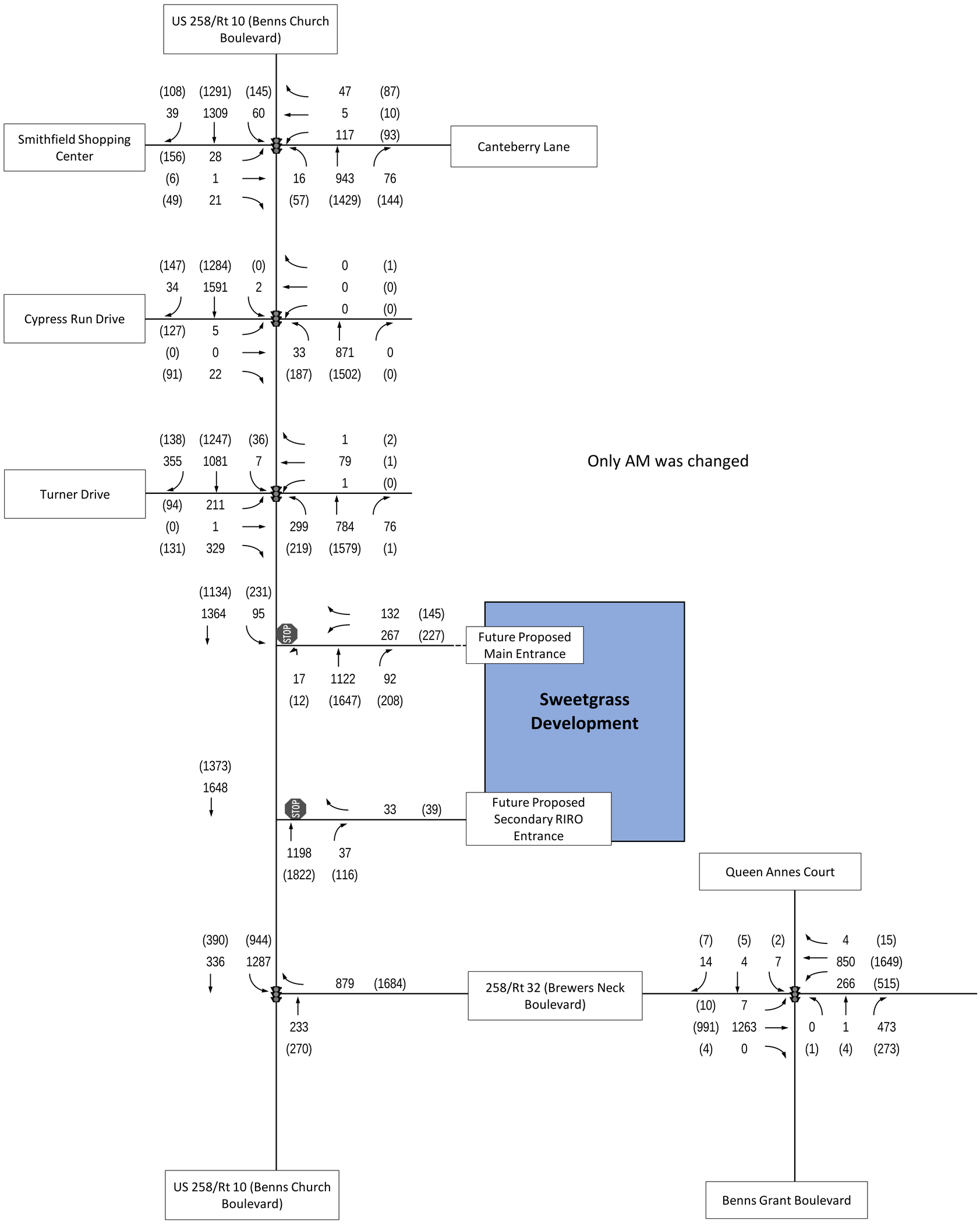


Figure 12
2032 Build AM and PM Peak Hour Traffic Volumes

Sweetgrass,
Isle of Wight County, VA

Auxiliary Lanes

There are two (2) entrances into the proposed site. The future Proposed Main Entrance allows all turning movements on to and off of US 258/Rt.10 (Benns Church Boulevard). The Proposed Secondary Entrance is right-in/right-out and allows limited ingress and egress from the development. Based on VDOT Road Design Manual and forecasted volumes, a 200-foot right turn lane with 200-foot taper is required for the northbound right turn lane at the Proposed Main Entrance. In addition, the southbound left turn lane at this intersection should be lengthened to provide 200' storage and a 200-foot taper. At the Proposed Secondary Entrance, a 200-foot right turn lane with a 200' taper is required. For the purpose of the Build analysis, the proposed left turn and right turn lanes at each entrance were taken into account. More detailed turn lane warrant analysis is shown in Appendix G.

Signal Warrant Analysis

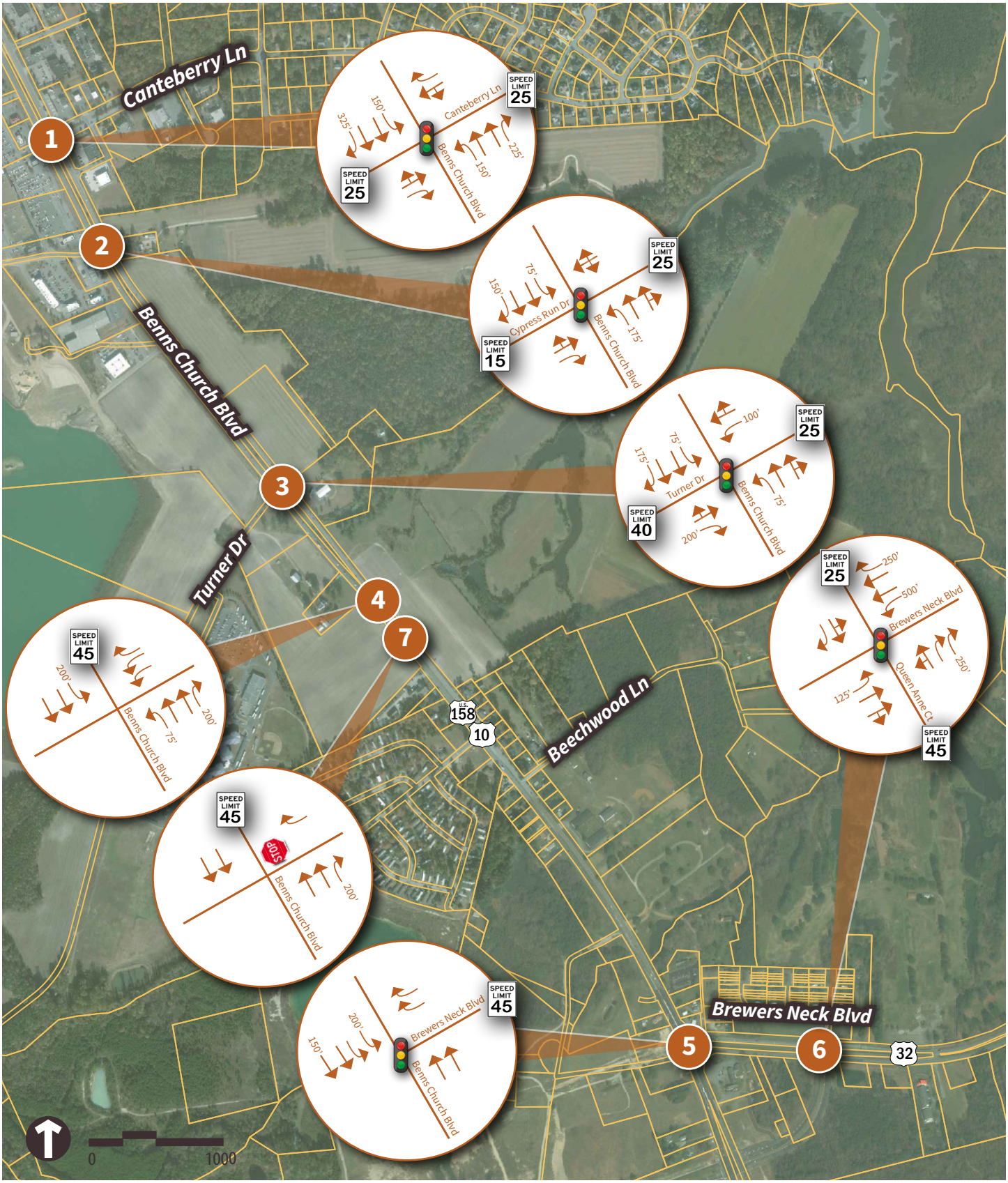
A Manual of Uniform Traffic Control Devices (MUTCD) signal warrant screening was performed based on projected volumes at the intersection of US 258 /Rt.10 (Benns Church Boulevard) and the future proposed main entrance to the development. Chapter 4C (Traffic Control Signal Needs Studies) of the MUTCD identifies nine (9) warrants. All nine warrants were analyzed as a part of this study and detailed results are presented in Appendix H.

The MUTCD allows some, or all, right turns to be combined with the left turns for the purpose of conducting the signal warrants. Engineering judgement should be applied based on the level of conflict and delay expected for the right turning traffic entering the roadway network.

Analysis was conducted based on the projected volumes and current posted speed limit on US 258/Rt 10 (Benns Church Boulevard) of 45 mph. Based on the available data and the signal warrant requirements included in the Virginia Supplement to the MUTCD, the analysis indicates that the eight-hour, four-hour, and peak hour vehicular volume warrants (Warrants 1, 2 and 3) were satisfied.

A signal is recommended at the subject intersection at full build out. A Signal Justification Report (SJR) has been generated and has been submitted to VDOT for review and approval.

For the purpose of this study, a signal at the Proposed Main Entrance and US 258/Rt.10 (Benns Church Boulevard) was assumed and incorporated into all Build scenarios.



SOURCE: BING, (c) 2015 Microsoft Corporation and its data suppliers.

FIGURE 13

2026 and 2032 Future Build Lane Configuration

Yeoman Tract Traffic Impact Study
Isle of Wight County, Virginia

Capacity Analysis

The 2026 and 2032 Build Condition volumes were analyzed using the Synchro 9.1 software. The network signal timings were optimized along with offsets and cycle lengths for the 2026 and 2032 Build analyses. Appendix I includes the Synchro reports for the 2026 Build conditions and Appendix J includes the Synchro reports for the 2032 Build conditions.

There are two (2) entrances into the proposed site. The Proposed Main Entrance is a full entrance on US 258/Rt 10 (Benns Church Boulevard). The Proposed Secondary Entrance is a right-in/right out entrance onto US 258/Rt 10 (Benns Church Boulevard) south of the Proposed Main Entrance.

At the intersection at the Proposed Main Entrance, signal control was assumed for the purpose of this analysis. In addition, the lengthened left turn lane on southbound approach with 200-foot storage and 200-foot taper along as well as the proposed 200-foot right turn storage lane and 200-foot taper on the northbound approach were also included. At the Proposed Secondary Entrance, stop control was assumed on the westbound approach and a 200-foot right turn storage lane with 200-foot taper on the northbound approach was included. Projected LOS and delay results at each intersection for 2026 and 2032 Build scenario are presented in Table 5 and 6 respectively.

Table 5. 2026 Build Measures of Effectiveness.

Intersection and Approach	Control	2026 Build	
		AM	PM
US 258/Rt 10 (Benns Church Boulevard) & Canteberry Lane	Signalized	**C (32.1 sec/veh)**	**C (32.1 sec/veh)**
Eastbound		D-45.3	D-45.3
Westbound		D-38.2	D-38.2
Northbound		C-33.3	C-33.3
Southbound		C-28.4	C-28.4
US 258/Rt 10 (Benns Church Boulevard) & Cypress Run Drive	Signalized	**A (9.3 sec/veh)**	**A (9.3 sec/veh)**
Eastbound		D-36.6	D-36.6
Westbound		---	---
Northbound		A-9.4	A-9.4
Southbound		A-5.1	A-5.1
US 258/Rt 10 (Benns Church Boulevard) & Turner Drive	Signalized	**C (21.1 sec/veh)**	**C (21.1 sec/veh)**
Eastbound		B-19.6	B-19.6
Westbound		C-22.7	C-22.7
Northbound		C-20.3	C-20.3
Southbound		C-22.5	C-22.5
US 258/Rt 10 (Benns Church Boulevard) & Proposed Main Entrance	Signalized	**B (15.1 sec/veh)**	**B (15.1 sec/veh)**
Eastbound		---	---
Westbound		C-29.2	C-29.2
Northbound		B-17.8	B-17.8
Southbound		A-7.4	A-7.4
US 258/Rt 10 (Benns Church Boulevard) & 258/Rt 32 (Brewers Neck Boulevard)	Signalized	**B (12.7 sec/veh)**	**B (12.7 sec/veh)**
Eastbound		---	---
Westbound		B-15.5	B-15.5
Northbound		D-36.7	D-36.7
Southbound		A-4.2	A-4.2
Queen Annes Court & 258/Rt 32 (Brewers Neck Boulevard)	Signalized	**B (19.9 sec/veh)**	**B (19.9 sec/veh)**
Eastbound		C-33.6	C-33.6
Westbound		B-15.5	B-15.5
Northbound		A-3.7	A-3.7
Southbound		C-26.1	C-26.1
US 258/Rt 10 (Benns Church Boulevard) & Proposed Secondary Entrance	Unsignalized	**B (13.8 sec/veh)**	**C (20.5 sec/veh)**
Eastbound		---	---
Westbound		B-13.8	C-20.5
Northbound		A-0	A-0
Southbound		A-0	A-0

Table 6. 2032 Build Measures of Effectiveness.

Intersection and Approach	Control	2032 Build	
		AM	PM
US 258/Rt 10 (Benns Church Boulevard) & Canteberry Lane	Signalized	**B (18.5 sec/veh)**	**D (42.5 sec/veh)**
Eastbound		D-38.8	D-49.5
Westbound		D-51.7	D-39.6
Northbound		B-14.7	D-49.6
Southbound		B-16.6	C-34.5
US 258/Rt 10 (Benns Church Boulevard) & Cypress Run Drive	Signalized	**A (2.4 sec/veh)**	**A (8.1 sec/veh)**
Eastbound		B-11.2	D-45.2
Westbound		---	---
Northbound		A-1.2	A-7.3
Southbound		A-2.9	A-3.5
US 258/Rt 10 (Benns Church Boulevard) & Turner Drive	Signalized	**C (32.1 sec/veh)**	**A (9.1 sec/veh)**
Eastbound		C-30.7	B-19.7
Westbound		D-43.1	C-26.3
Northbound		C-29.8	A-9.4
Southbound		C-33.9	A-7
US 258/Rt 10 (Benns Church Boulevard) & Proposed Main Entrance	Signalized	**B (11.6 sec/veh)**	**B (16.9 sec/veh)**
Eastbound		---	---
Westbound		C-24.4	C-33.6
Northbound		B-13.5	B-19.3
Southbound		A-6.6	A-8.9
US 258/Rt 10 (Benns Church Boulevard) & 258/Rt 32 (Brewers Neck Boulevard)	Signalized	**A (9.5 sec/veh)**	**B (19 sec/veh)**
Eastbound		---	---
Westbound		A-8.1	C-28.1
Northbound		C-24	C-33.6
Southbound		A-8.2	A-4.6
Queen Annes Court & 258/Rt 32 (Brewers Neck Boulevard)	Signalized	**C (21.1 sec/veh)**	**C (21.4 sec/veh)**
Eastbound		B-10.1	D-35.5
Westbound		D-39.8	B-17.1
Northbound		A-5.9	A-3.7
Southbound		C-27.8	C-26.1
US 258/Rt 10 (Benns Church Boulevard) & Proposed Secondary Entrance	Unsignalized	**B (14.6 sec/veh)**	**C (22.8 sec/veh)**
Eastbound		---	---
Westbound		B-14.6	C-22.8
Northbound		A-0	A-0
Southbound		A-0	A-0

All the intersections in the study area are expected to continue to operate under the acceptable LOS D or better under both 2026 and 2032 Build Conditions.

The network signal cycle lengths and splits were optimized for the 2026 and 2032 Build analyses, including a change to provide a protected/permissive eastbound left at the intersection of US 258/Rt 10 (Benns Church Boulevard) & Turner Drive. A flashing yellow arrow was included in the signal design for the northbound and southbound lefts to improve the efficiency of the intersection operation. Additional improvements to this intersection include an eastbound right turn overlap with the northbound left movement in the 2026 build condition and a southbound right turn overlap with the eastbound left movement in 2032 AM condition. With these improvements, the eastbound approach at the intersection of US 258/Rt 10 (Benns Church Boulevard) & Turner Drive is expected to operate at LOS C under 2026 Build Conditions 2032 during the morning peak. A LOS B I anticipated in the eastbound under 2032 Build Conditions during the evening peak hour. This is better than the expected No Build conditions.

Queue Analysis

SimTraffic was used to estimate the queues at the six (6) signalized intersections included in the project area. SimTraffic uses a hot spot, 20 feet in length, at the top of each lane or approach just prior to the adjacent intersection to help to identify possible queuing or spillback issues on adjacent intersections. If a vehicle is in that hot spot and is traveling less than 10 mph, it is assumed to be queued. The queuing and blocking reports are a result of the average of 10 runs.

Table 7 presents the estimated 95th percentile queue lengths for the 2018 Existing, 2026 No Build, 2026 Build, 2032 No Build and 2032 Build PM peak. The full Synchro queue reports can be found in Appendix K. Results and observations of queuing simulations show that most of the intersections are expected to queue within their storage capacities. However, the analysis of 2018 Existing Conditions has shown that at the intersection of US 258/Rt 10 (Benns Church Boulevard) & Turner Drive, the left turn queue on the northbound approach is currently 207 feet during morning peak hour and 148 feet during evening peak hour, exceeding existing storage capacity of 75 feet. Since this queuing issue is an existing condition and not a result of the proposed development, no changes to the existing storage lengths are proposed at this intersection.

The southbound right at the intersection of US 258/Rt 10 (Benns Church Boulevard) & Turner Drive is also anticipated to exceed the existing storage length in the 2032 AM peak hour. However, this movement is anticipated to operate at a LOS B with just over 10 seconds of delay. Therefore, it is anticipated this queue is the result of through vehicles blocking vehicles

from entering the right turn lane and is not an issue of available storage.

Table 7. Queue Analysis

Queuing Analysis - 95th Percentile Queue										
Intersection	Movement	Link Distance	Storage Length	Existing (AM/PM Peak)	2026 No Build (AM/PM Peak)	2032 No Build (AM/PM Peak)	Link Distance	Storage Length	2026 Build (AM/PM Peak)	2032 Build (AM/PM Peak)
US 258/Rt 10 (Benns Church Boulevard) & Canteberry Lane	EBLT	277		49/158	51/179	66/181	277		49/152	60/200
	EBR	277		39/59	42/63	46/74	277		37/60	50/64
	WBLT	1172		125/98	145/104	194/107	1172		134/158	173/131
	WBR	1172		59/112	67/113	86/116	1172		68/114	77/110
	NBL		150	31/108	35/167	51/222		150	38/108	53/190
	NBT	663		160/349	181/439	244/555	663		136/325	243/500
	NBT	663		168/364	186/445	249/563	663		145/335	258/509
	NBR		225	36/46	35/51	38/173		225	36/58	62/176
	SBL		150	52/119	59/144	60/176		150	62/141	75/164
	SBT	1895		187/235	209/275	248/330	1895		210/262	247/425
	SBT	1895		190/242	220/288	265/347	1895		230/268	267/341
	SBR		325	22/40	22/39	24/43		325	24/41	45/42
US 258/Rt 10 (Benns Church Boulevard) & Cypress Run Drive	EBLT	1824		10/131	11/146	9/141	1824		11/126	15/212
	EBR	1824		29/93	34/99	35/116	1824		28/91	28/101
	WBLTR	1402		-/8	-/8	/9	1402		-/9	-/13
	NBL		175	49/111	37/125	43/130		175	48/122	50/156
	NBT	1913		59/143	56/171	63/214	1913		35/142	62/97
	NBTR	1913		1/159	75/185	86/231	1913		51/163	89/110
	SBL		75	47/-	4/-	2/-		75	3/-	2/-
	SBT	663		62/90	62/91	103/92	663		58/90	95/128
	SBT	663		10/108	69/109	123/112	633		78/100	119/134
	SBR		150	9/44	12/44	13/46		150	12/42	12/61
US 258/Rt 10 (Benns Church Boulevard) & Turner Drive	EBLTR	1442		326/121	-	-			-	-
	EBLT	1440		-	195/89	269/100	1442		242/105	277/111
	EBR		200	-	149/68	219/71		200	158/84	231/93
	WBLTR	648		88/22	97/18	119/20	648		102/20	130/22
	NBL		75	207/148	205/139	251/180		75	222/161	135/192
	NBT	1098		238/258	199/212	329/280	1065		200/239	427/234
	NBTR	1098		233/264	178/220	266/295	1065		157/251	351/230
	SBL		75	59/69	39/80	57/81		75	19/88	41/62
	SBT	1913		366/243	302/226	414/319	1913		252/274	344/159
	SBT	1913		383/253	311/241	423/328	1913		257/283	361/162
	SBR		175	140/64	137/58	178/91		175	131/60	269/57
US 258/Rt 10 (Benns Church Boulevard) & Proposed Main Entrance	WBL			-	-	-	816		167/170	154/193
	WBL			-	-	-	816		132/138	114/175
	WBR			-	-	-	816		78/121	120/151
	NBU		75	10/11	13/15	14/12		200	50/61	63/54
	NBT	3868	-	-	-/-	-	470		206/340	197/412
	NBT								202/336	187/405
	NBR							200	42/83	49/129
	SBU		100	5/-	6/-	6/-			-	-
	SBL							200	98/167	87/181
	SBT						1065		181/99	155/151
	SBT	1086		-	-	-/-	1065		204/120	177/165
US 258/Rt 10 (Benns Church Boulevard) & 258/Rt 32 (Brewers Neck Boulevard)	WBR	1008		109/222	140/286	172/372	1008		104/451	118/531
	WBR	1008		109/225	141/291	172/373	1008		101/451	109/551
	NBT	2766		67/73	71/81	64/88	2766		66/109	84/104
	NBT	2766		70/80	74/86	72/99	2766		77/111	87/119
	SBL		200	149/116	152/128	169/138		200	150/155	196/146
	SBL	3868		175/135	177/150	193/160	3191		173/155	233/146
	SBT	3868		4/2	8/1	-/7	3191		5/-	-/6
Queen Annes Court & 258/Rt 32 (Brewers Neck Boulevard)	EBL		125	21/25	27/29	23/25		125	27/27	44/31
	EBT	1008		246/192	259/240	294/251	1008		267/304	308/315
	EBTR	1008		261/208	272/249	302/263	1008		277/314	318/319
	WBL		500	145/244	169/296	215/347		500	188/407	191/406
	WBT	785		236/344	283/406	318/471	785		135/568	147/630
	WBT	785		205/334	246/408	297/481	785		121/588	129/673
	WBR		250	4/12	5/16	4/81		250	4/115	4/152
	NBLT	858		9/14	8/15	12/17	858		9/11	7/21
	NBR		250	162/91	185/108	224/116		250	204/120	208/134
	NBR		250	99/38	137/43	191/45		250	163/56	174/64
	SBLT	565		26/21	32/26	31/22	565		31/25	34/30
	SBR	565		30/26	32/34	39/31	565		40/24	37/30
US 258/Rt 10 (Benns Church Boulevard) & Proposed Secondary Entrance	WBR			-	-	-	1244		43/71	39/72
	SBT			-	-	-	3191		-/-	3/-
	NBT			-	-	-	3191		-/1	-/-
	NBR			-	-	-		100	-/-	-/-

Recommended Improvements

Based on the results of the auxiliary lane, capacity and queuing analyses performed in this study, the following improvements are recommended:

2018 Existing:

- VDOT to construct eastbound right turn lane at US 258/Rt 10 (Benns Church Boulevard) and Turner Lane as planned.

2026 No Build:

- VDOT should review and optimize signal timings along the corridor, if necessary.

2026 Build:

- Construct northbound right turn lane (200' storage plus 200' taper) into right in/right out Proposed Secondary Entrance off of US 258/Rt 10 (Benns Church Boulevard).
- Construct northbound right turn lane (200' storage plus 200' taper) into Proposed Main Entrance off of US 258/Rt 10 (Benns Church Boulevard).
- Lengthen southbound left turn lane to provide 200' storage plus 200' taper into Proposed Main Entrance off of US 258/Rt 10 (Benns Church Boulevard).
- Install traffic signal at intersection of US 258/Rt 10 (Benns Church Boulevard) and Proposed Main Entrance.
- Install signal infrastructure to provide a protected eastbound right-turn overlap at US 258/Rt 10 (Benns Church Boulevard) and Turner Lane.
- Install flashing yellow arrows for the northbound and southbound left turn lanes at the intersection of US 258/Rt 10 (Benns Church Boulevard) at Canterberry Lane, Cypress Run Drive, Turner Drive and the Proposed Main Entrance to allow lead/lag operation.
- Optimize signal timings along the corridor.

2032 No Build:

- No additional improvements required.

2032 Build:

- Install signal infrastructure to provide a protected southbound right-turn overlap at US 258/Rt 10 (Benns Church Boulevard) and Turner Lane.
- Optimize signal timings along the corridor.

Summary and Conclusions

This study performed an evaluation of the 2018 Existing as well as No Build and Build scenarios for the future years of 2026 and 2032 peak hours. The study intersections included in the analyses were:

- US 258/Rt 10 (Benns Church Boulevard) and US 258/Rt 32 (Brewers Neck Boulevard) - signalized;
- US 258/Rt 32 (Brewers Neck Boulevard) and Queen Annes Court - signalized;
- US 258/Rt 10 (Benns Church Boulevard) and Cypress Run Drive - signalize;
- US 258/Rt 10 (Benns Church Boulevard) and Turner Drive - signalized;
- US 258/Rt 10 (Benns Church Boulevard) and Canteberry Lane - signalized;
- US 258/Rt 10 (Benns Church Boulevard) and the Proposed Main Entrance (unsignalized); and,
- US 258/Rt 10 (Benns Church Boulevard) and the Proposed Secondary Entrance (unsignalized).

The site is estimated to generate 8,962 new daily trips with 548 trips in the morning peak hour and 809 trips during the evening peak hour.

Under 2018 Existing Conditions, most of the corridor operates acceptably at LOS C or better, with the exception of the intersection of US 258/Rt 10 (Benns Church Boulevard) & Turner Drive. Currently, during morning peak hour, LOS at this intersection experiences an unacceptable LOS F with over 108 seconds per vehicle (sec/veh) in delay. Improvements are planned to improve operations at this intersection. Current plans were provided to VHB by VDOT and the future lane configuration was taken into the account in the future year No Build and Build analyses. Based on the planned improvements, no interim improvements are recommended.

The 2026 and 2032 No Build analyses showed that most of the intersections in the network are expected to continue to operate at an acceptable LOS D or better with the exception of US 258/Rt 10 (Benns Church Boulevard) & Turner Drive. Even though the overall LOS at this intersection is expected to be E during morning peak hour, the eastbound approach will continue to operate at unacceptable LOS F under 2026 and 2032 No Build conditions.

The Proposed Main Entrance allows all turning movements onto and off of US 258/Rt.10 (Benns Church Boulevard). The Proposed Secondary Entrance is right-in/right-out and allows limited access/exit to/from the development. Turn lane warrant analysis was performed to identify turn

lane storage lengths and tapers. For the purpose of the Build analysis, the proposed left turn and right turn lanes at each entrance were taken into account.

A signal warrant analysis was performed at the Proposed Main Entrance and a signal is recommended at this intersection. Signalized traffic control at this intersection was assumed for all Build Conditions.

The 2026 and 2032 Build analyses show that all intersections in the network are expected to continue to operate at an acceptable LOS D or better.

Results and observations of queuing simulations show that most of the intersections are expected to queue within their storage capacities. However, the analysis of 2018 Existing Conditions has shown that at the intersection of US 258/Rt 10 (Benns Church Boulevard) & Turner Drive, left turn queue on northbound approach is currently longer than the existing storage lane. Since this is an existing condition, no change to the storage length is proposed.

In conclusion, the results of the analyses indicate that the development of the site as proposed will have modest impact on the intersections within the study area.

Table 8. 2018 Existing, 2026 No Build and 2032 No Build LOS Summary

Intersection and Approach	Control	2018 Existing		2026 No-Build		2032 No-Build	
		AM	PM	AM	PM	AM	PM
US 258/Rt 10 (Benns Church Boulevard) & Canteberry Lane	Signalized	C (WB-D)	C (EB-D)	C (WB-E)	C (EB-D)	C (WB-E)	D (EB-D)
US 258/Rt 10 (Benns Church Boulevard) & Cypress Run Drive	Signalized	A (EB-B)	A (EB-C)	A (EB-B)	A (EB-C)	A (EB-B)	B (EB-D)
US 258/Rt 10 (Benns Church Boulevard) & Turner Drive	Signalized	F (SB-F)	B (WB-C)	E (EB-F)	B (EB-C)	E (EB-F)	C (WB-C)
US 258/Rt 10 (Benns Church Boulevard) & Proposed Main Entrance	Unsignalized	N/A	N/A	N/A	N/A	N/A	N/A
US 258/Rt 10 (Benns Church Boulevard) & 258/Rt 32 (Brewers Neck Boulevard)	Signalized	A (NB-C)	A (NB-C)	A (NB-C)	A (NB-C)	A (NB-B)	A (NB-C)
Queen Annes Court & 258/Rt 32 (Brewers Neck Boulevard)	Signalized	B (EB-C)	B (EB-C)	B (EB-C)	B (EB-C)	C (EB-C)	C (EB-C)

Table 9. 2026 Build and 2032 Build LOS Summary

Intersection Name	Control	2026 Build		2032 Build	
		AM	PM	AM	PM
US 258/Rt 10 (Benns Church Boulevard) & Canteberry Lane	Signalized	B (WB-D)	C (EB-D)	B (WB-D)	D (NB-D)
US 258/Rt 10 (Benns Church Boulevard) & Cypress Run Drive	Signalized	A (EB-A)	A (EB-D)	A (EB-B)	A (EB-D)
US 258/Rt 10 (Benns Church Boulevard) & Turner Drive	Signalized	B (EB-C)	C (WB-C)	C (WB-D)	A (WB-C)
US 258/Rt 10 (Benns Church Boulevard) & Proposed Main Entrance	Signalized	A (WB-C)	B (WB-C)	B (WB-C)	B (WB-C)
US 258/Rt 10 (Benns Church Boulevard) & 258/Rt 32 (Brewers Neck Boulevard)	Signalized	A (NB-B)	B (NB-D)	A (NB-C)	B (NB-C)
Queen Annes Court & 258/Rt 32 (Brewers Neck Boulevard)	Signalized	B (SB-C)	B (EB-C)	C (WB-D)	C (EB-D)
US 258/Rt 10 (Benns Church Boulevard) & Proposed Secondary Entrance	Unsignalized	(WB-B)	(WB-C)	(WB-C)	(WB-C)

APPENDIX A

Approved Pre-Scoping Data

PRE-SCOPE OF WORK MEETING FORM

Information on the Project
Traffic Impact Analysis Base Assumptions

The applicant is responsible for entering the relevant information and submitting the form to VDOT and the locality no less than three (3) business days prior to the meeting. If a form is not received by this deadline, the scope of work meeting may be postponed.

Contact Information				
Consultant Name: Tele: E-mail:	VHB 757.233.3223 ktynch@vhb.com			
Developer/Owner Name: Tele: E-mail:	Ryan Homes 757.905.5298 eshirey@nvrinc.com			
Project Information				
Project Name:	Yeoman Tract		Locality/County:	Isle of Wight
Project Location: (Attach regional and site specific location map)	Located off of Rt 10 between Rt 614 and Rt 32 (Brewers Neck Blvd)			
Submission Type	Comp Plan ☐	Rezoning ☒	Site Plan ☐	Subd Plat ☐
Project Description: (Including details on the land use, acreage, phasing, access location, etc. Attach additional sheet if necessary)	343 single family homes, 165 townhomes. 125 attached senior living residences, 20k sf general office, 20k sf shopping center, 5k sf fast food restaurant with drive thru and 4 ac public park.			
Proposed Use(s): (Check all that apply; attach additional pages as necessary)	Residential ☒	Commercial ☒	Mixed Use ☐	Other ☐
	Residential Uses(s) Number of Units: 633 ITE LU Code(s): 210 220 252 **Commercial Use(s)** ITE LU Code(s): 820 710 934 Square Ft or Other Variable:		**Other Use(s)** ITE LU Code(s): 411 Independent Variable(s):	
Total Peak Hour Trip Projection:	Less than 100 ☐	100 – 499 ☐	500 – 999 ☒	1,000 or more ☐

It is important for the applicant to provide sufficient information to county and VDOT staff so that questions regarding geographic scope, alternate methodology, or other issues can be answered at the scoping meeting.

Traffic Impact Analysis Assumptions			
Study Period	Existing Year: 2018	Build-out Year: 2026	Design Year: 2032
Study Area Boundaries (Attach map)	North: Canteberry Lane	South: Brewers Neck Blvd	
	East: N/A	West: Rt 10	
External Factors That Could Affect Project (Planned road improvements, other nearby developments)	New turn lane from high school (200' turn lane + 200' taper)		
Consistency With Comprehensive Plan (Land use, transportation plan)	No		
Available Traffic Data (Historical, forecasts)	2017 VDOT count 25,000 vpd, taking intersection counts with project		
Trip Distribution (Attach sketch)	Road Name: Rt 10 (distribution will be based on counts)	Road Name:	
	Road Name:	Road Name:	
Annual Vehicle Trip Growth Rate:	1.5%	Peak Period for Study (check all that apply)	☒ AM ☒ PM ☐ SAT
		Peak Hour of the Generator	4-5 pm
Study Intersections and/or Road Segments (Attach additional sheets as necessary)	1.Brewers Neck Blvd and Rt 10	6.Benns Neck Blvd and Benns Grant Blvd	
	2.Benns Church Blvd and Main Access to Site	7.	
	3.Benns Church Blvd and Canteberry Lane	8.	
	4.Benns Chuch Blvd and Secondary Access to Site	9.	
	5.Benns Church Blvd and Turner Dr	10.	
Trip Adjustment Factors	Internal allowance: ☐ Yes ☒ No Reduction: _____% trips	Pass-by allowance: ☒ Yes ☐ No Reduction: 49% trips	
Software Methodology	☒ Synchro ☐ HCS (v.2000/+) ☐ aaSIDRA ☐ CORSIM ☐ Other _____		
Traffic Signal Proposed or Affected (Analysis software to be used, progression speed, cycle length)	TBD		

It is important for the applicant to provide sufficient information to county and VDOT staff so that questions regarding geographic scope, alternate methodology, or other issues can be answered at the scoping meeting.

Improvement(s) Assumed or to be Considered	Signal, turn lanes
Background Traffic Studies Considered	None
Plan Submission	☐ Master Development Plan (MDP) ☐ Generalized Development Plan (GDP) ☒ Preliminary/Sketch Plan ☐ Other Plan type (Final Site, Subd. Plan)
Additional Issues to be Addressed	☒ Queuing analysis ☐ Actuation/Coordination ☐ Weaving analysis ☐ Merge analysis ☒ Bike/Ped Accommodations ☒ Intersection(s) ☐ TDM Measures ☐ Other _____

NOTES on ASSUMPTIONS: Developed as 1 phase. Recreational areas and club house serve rsidential community only, and will not generate additional traffic.

SIGNED: Kirsten B. Tynch DATE: 4/23/18
Applicant or Consultant

PRINT NAME: Kirsten B. Tynch
Applicant or Consultant

It is important for the applicant to provide sufficient information to county and VDOT staff so that questions regarding geographic scope, alternate methodology, or other issues can be answered at the scoping meeting.

Rezoning Package Checklist

Traffic Impact Analysis Regulations: 24 VAC 30-155-40

☑ **A COVER SHEET** containing:

- ☑ **Contact Information** for the
  - ☑ Locality,
  - ☑ Developer (or owner), if applicable;
- ☑ **Site Information**
  - ☑ Rezoning location,
  - ☑ Highways adjacent to the site,
  - ☑ Parcel number or numbers;
- ☑ **Proposal Summary** with the
  - ☑ Development's name,
  - ☑ Size (acreage),
  - ☑ Proposed zoning;
  - ☑ Proposed types of land uses, including maximum number of lots or maximum business square feet, and
- ☑ **A Statement** regarding the proposal's compliance with the comprehensive plan.

☑ **A TRAFFIC IMPACT ANALYSIS** prepared in accordance with 24-VAC-30-155-60.

☑ **A CONCEPT PLAN** of the proposed development.

☐ **ANY PROFFERED CONDITIONS** submitted by the applicant.

☑ **FEES** -

- ☑ **For the initial or second review** of a rezoning proposal, a single fee for both reviews will be determined by the number of vehicle trips generated per peak hour of the generator, as follows:
  - ☐ Low volume road submission 24VAC30-155-40 A 3 - $250
  - ☑ All other submissions - $1,000
- ☐ **For a third or subsequent submission** of a rezoning proposal that is requested by VDOT on the basis of the failure of the applicant to address deficiencies previously identified by VDOT, the fee is equal to the initial fee paid.

Site Tabulations

Total Single Family Detached Lots:	400	
Total Townhomes:	285	
	Square Feet	Acres
Total Site Area:	10,866,832 ±	249.47 ±
Total Area Single-Family Detached:	7,627,620 ±	175.11
Open space:	4,307,625 ±	98.89 ±
Total Area Townhomes:	2,931,970 ±	67.31 ±
Open Space:	2,180,576 ±	50.06 ±
Commercial:	307,242 ±	7.05 ±

* Setbacks and Lot Widths Based Upon Rezoning to PD-MX

THIS PROPERTY IS IN FLOOD ZONE "X" AND AE (EL 8) AS SHOWN ON MAP NUMBER 51093C0154E, PANEL 0154E AND 51093C0153E, PANEL 0153E FOR COMMUNITY NUMBERS 510303 & 510081, DATED 12/2/2015 OF THE FLOOD INSURANCE RATE MAPS FOR ISLE OF WIGHT COUNTY, VIRGINIA. ZONE "X" IS DEFINED AS AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOOD PLAIN. ZONE "AE" IS DEFINED AS SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD.

LEGEND

- 100'RPA — 100 FOOT RPA BUFFER
- EX. TREELINE
- FLOOD PLANE ZONE AE
- MULTI-USE PATH
- WATER / POND
- TOWNHOME LOTS

N/F
THOMAS BARBARA F
910 CANTEBERRY LN
PARCEL ID: 22J-02-150
ZONING: SMITHFIELD: N-R

N/F
EVANS ANTHONY
906 CANTEBERRY LN
PARCEL ID: 22J-02-152
ZONING: SMITHFIELD: N-R

N/F
DIPPO LAWRENCE A & ELIZABETH A
TRS L A & E A DIPPO LIVING TRUST
908 CANTEBERRY LN
PARCEL ID: 22J-02-151
ZONING: SMITHFIELD: N-R

N/F
BERLAND EDNA R
916 CANTEBERRY LN
PARCEL ID: 22J-02-147
ZONING: SMITHFIELD: N-R

N/F
HENDRIX THOMAS
912 CANTEBERRY LN
PARCEL ID: 22J-02-149
ZONING: SMITHFIELD: N-R

N/F
FORSYTHE TIMOTHY A & DEBRA K
TRS T A & D K FORSYTHE FAMILY REV TRUST
914 CANTEBERRY LN
PARCEL ID: 22J-02-148
ZONING: SMITHFIELD: N-R

N/F
EDWARDS PHILLIP F JR & CONNIE A
BENNS CHURCH BLVD
PARCEL ID: 32-01-096
ZONING: SMITHFIELD: C-C

N/F
CROWN CASTLE GT COMPANY LLC
14005 BENNS CHURCH BLVD
PARCEL ID: 32-01-096B
ZONING: RAC

N/F
ISLE OF WIGHT COUNTY SCHOOL BOARD
14101 SMITHFIELD CIR, SMITHFIELD
PARCEL ID: 32-01-010A
ZONING: RAC

N/F
WILSON ANGELA B & WILSON JAMES G JR
TRS A B WILCON REVOC LIVING TRUST
14041 BENNS CHURCH BLVD
PARCEL ID: 32-01-095
ZONING: LI

N/F
YEOMAN WILLIAM G III
WILLIAM G YEOMAN III TRUST
BENNS CHURCH BLVD
PARCEL ID: 32-01-007
ZONING: RAC

N/F
CORNETT GEORGE C
14106 BENNS CHURCH BLVD
PARCEL ID: 32-01-008
ZONING: RAC

N/F
WILLIAM G. YEOMAN, TRUSTEE
14096 BENNS CURCH BOULEVARD
PARCEL ID: 32-01-009
ZONING: RAC

N/F
EDWARDS RYLAND B JR &
MARY ANN D &
EDWARDS RYLAND B & ETALS
14202 BENNS CHURCH BLVD
PARCEL ID: 32-01-062
ZONING: RAC

N/F
GIRARD PATRICIA A
14225 BENNS CHURCH BOULEVARD
PARCEL ID: 32A-02-012
ZONING: RAC

N/F
[OWNER]
[ADDRESS]
PARCEL ID: 32-05-B000
ZONING: RAC

N/F
WALLACE JIMMY J & MYRTLE T
14108 HAYLOFT LN
PARCEL ID: 32-01-094A
ZONING: RAC

N/F
WALLACE JIMMY J & MYRTLE T
14111 HAYLOFT LN
PARCEL ID: 32B-01-005
ZONING: RAC

N/F
CARNEY PAMELA D
14125 HAYLOFT LN
PARCEL ID: 32B-01-006
ZONING: RAC

N/F
TOTTEN CHARLES D
BEECHWOOD LN
PARCEL ID: 32-01-094,094C,094D
ZONING: RAC

N/F
BELL LINWOOD E & BARBARA G
19341 BEECHWOOD LN
PARCEL ID: 31-01-094B
ZONING: RAC

N/F
ST LUKES VILLAGES LLC
C/O MCCALE DEV COR
20081 BREWERS NECK BLVD
PARCEL ID: 33-01-012B
ZONING: PD-MX

N/F
BOWDEN RONALD
BREWERS NECK BLVD
PARCEL ID: 33-01-005
ZONING: RAC

N/F
GRAY ROBERTA
C/O GARY LAWRENCE N
CHAPMANS LN
PARCEL ID: 33-03-006
ZONING: RAC

BENNS CHURCH BLVD
(VARIABLE WIDTH PUBLIC R/W)
1220.51'
696'

SIGNALIZED INTERSECTION
LANDSCAPE BERM
COMMERCIAL AREA 7 AC.±
70' BUILDING SETBACK
LANDSCAPE BERM
MULTI-USE PATHWAY
LIMITS OF 100' RPA
RECREATION AREA
OPEN AREA
PEDESTRIAN ACCESS
PUBLIC PARK 3.90± AC
OPEN SPACE
CLUBHOUSE & REC. AREA 1.0 AC.±
TOWNHOME PARCEL
LIMITS OF ZONE AE FLOOD PLAIN ELEV = 8
APPROX. LIMITS OF EXISTING TREELINE
OVERLOOK
DOG PARK 1.9 AC.±
POTENTIAL BMP LOCATION
BEECHWOOD LANE

GRAPHIC SCALE
200' 0' 200' 400'
SCALE: 1" = 200'

No.	Rev.	Date	Description	Reviewed By
1		11/1/2019	REVISED PER COUNTY COMMENTS	JAG

AES CONSULTING ENGINEERS
5248 Olde Towne Road, Suite 1
Williamsburg, Virginia 23188
Phone: (757) 253-0040
Fax: (757) 220-8994
www.aesva.com
Hampton Roads | Central Virginia | Middle Peninsula

REZONING MASTER PLAN
FOR
SWEETGRASS
ISLE OF WIGHT COUNTY VIRGINIA
WINDSOR DISTRICT

Project Contacts:	JAG
Project Number:	W10516-00
Scale: 1"=200'	Date: 06/14/2019

Sheet Title:
CONCEPTUAL MASTER PLAN

Sheet Number
2 OF 4


Ponderosa Ln
Doggett Ln
Waterfront Ln
Chapmans Ln
Beechwood Ln
Casper Cir
Black Oak Dr
Jakes Ln
Sherwood Ln
Smithfield Cir
Cypress Run Dr
Oak Al
665
32
10
644
1
2
3
4
5
6
© 2018 Google

APPENDIX B

Traffic Data

4500 Main Street
Suite 400
Virginia Beach, VA 23462-3361
757.490.0132

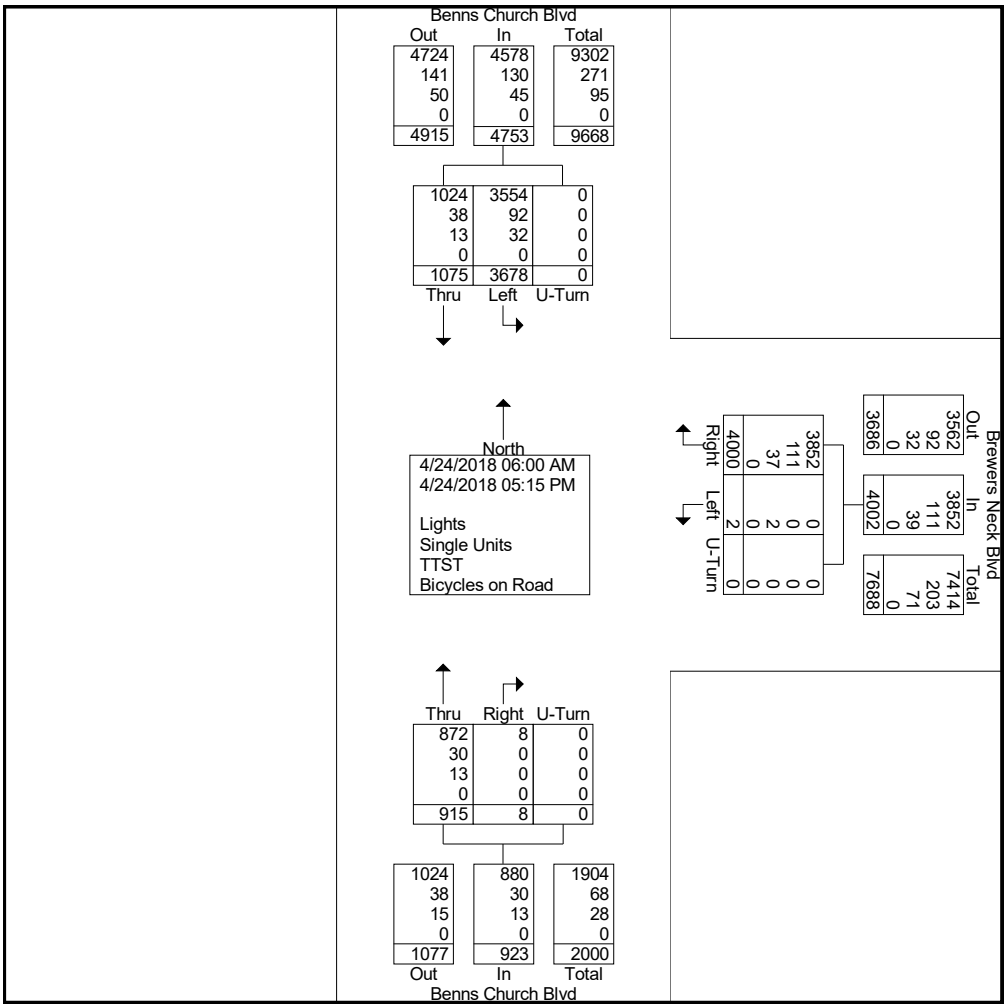
File Name : Benns_Church_and_Brewers_Neck_514974_04-24-2018
Site Code :
Start Date : 4/24/2018
Page No : 1

Groups Printed- Lights - Single Units - TTST - Bicycles on Road

	Benns Church Blvd Southbound			Brewers Neck Blvd Westbound			Benns Church Blvd Northbound			
Start Time	Left	Thru	U-Turn	Left	Right	U-Turn	Thru	Right	U-Turn	Int. Total
06:00 AM	211	34	0	0	103	0	43	0	0	391
06:15 AM	225	32	0	0	117	0	34	0	0	408
06:30 AM	238	34	0	0	121	0	37	0	0	430
06:45 AM	191	39	0	0	140	0	34	0	0	404
Total	865	139	0	0	481	0	148	0	0	1633
07:00 AM	211	33	0	0	227	0	47	0	0	518
07:15 AM	224	42	0	0	181	0	29	0	0	476
07:30 AM	269	86	0	0	125	0	41	0	0	521
07:45 AM	193	56	0	0	120	0	49	1	0	419
Total	897	217	0	0	653	0	166	1	0	1934
02:30 PM	139	43	0	0	155	0	55	0	0	392
02:45 PM	167	35	0	0	185	0	36	0	0	423
Total	306	78	0	0	340	0	91	0	0	815
03:00 PM	182	50	0	2	189	0	44	0	0	467
03:15 PM	151	54	0	0	233	0	48	0	0	486
03:30 PM	109	58	0	0	228	0	49	1	0	445
03:45 PM	175	65	0	0	221	0	45	0	0	506
Total	617	227	0	2	871	0	186	1	0	1904
04:00 PM	163	62	0	0	311	0	51	2	0	589
04:15 PM	164	66	0	0	286	0	42	2	0	560
04:30 PM	162	81	0	0	278	0	47	1	0	569
04:45 PM	158	67	0	0	279	0	55	0	0	559
Total	647	276	0	0	1154	0	195	5	0	2277
05:00 PM	172	62	0	0	241	0	64	1	0	540
05:15 PM	174	76	0	0	260	0	65	0	0	575
Grand Total	3678	1075	0	2	4000	0	915	8	0	9678
Apprch %	77.4	22.6	0	0	100	0	99.1	0.9	0	
Total %	38	11.1	0	0	41.3	0	9.5	0.1	0	
Lights	3554	1024	0	0	3852	0	872	8	0	9310
% Lights	96.6	95.3	0	0	96.3	0	95.3	100	0	96.2
Single Units	92	38	0	0	111	0	30	0	0	271
% Single Units	2.5	3.5	0	0	2.8	0	3.3	0	0	2.8
TTST	32	13	0	2	37	0	13	0	0	97
% TTST	0.9	1.2	0	100	0.9	0	1.4	0	0	1
Bicycles on Road	0	0	0	0	0	0	0	0	0	0
% Bicycles on Road	0	0	0	0	0	0	0	0	0	0

4500 Main Street
Suite 400
Virginia Beach, VA 23462-3361
757.490.0132

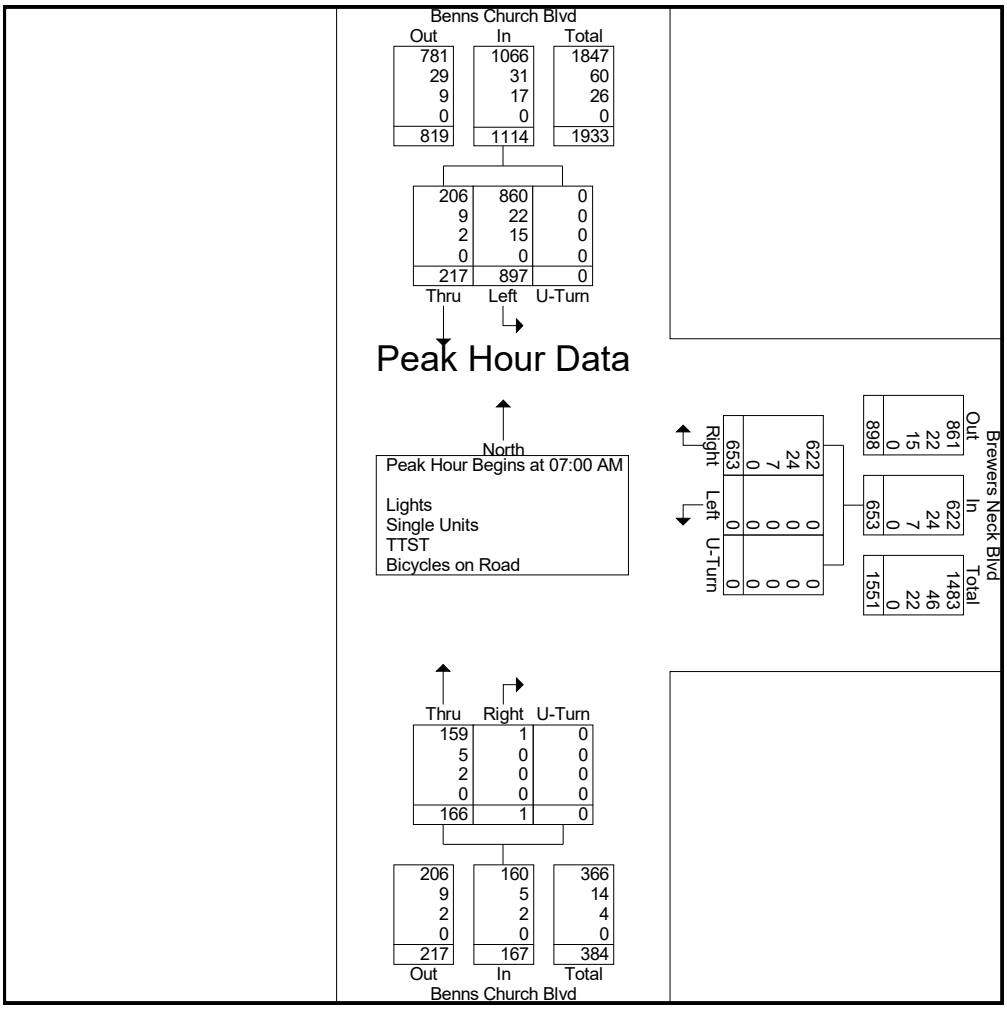
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Site Code :
Start Date : 4/24/2018
Page No : 2



4500 Main Street
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File Name : Benns_Church_and_Brewers_Neck_514974_04-24-2018
Site Code :
Start Date : 4/24/2018
Page No : 3

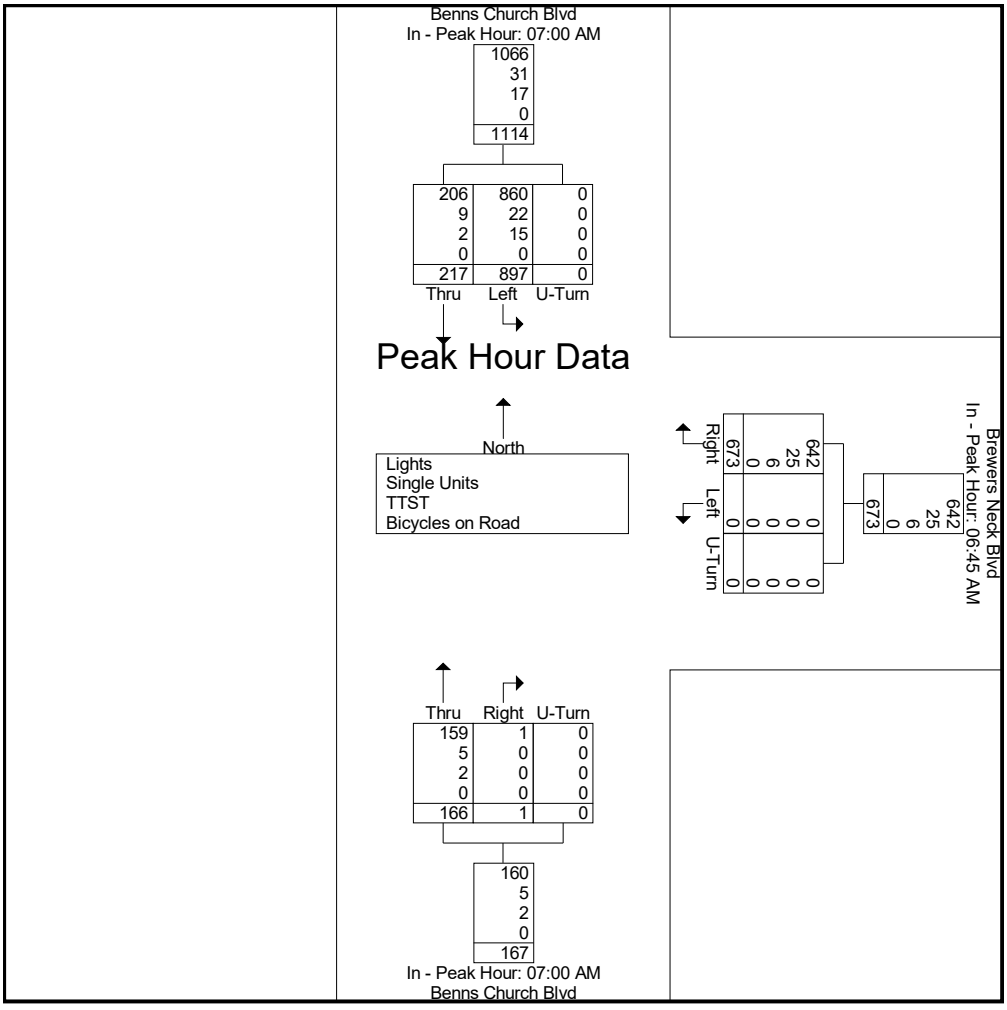
	Benns Church Blvd Southbound				Brewers Neck Blvd Westbound				Benns Church Blvd Northbound				
Start Time	Left	Thru	U-Turn	App. Total	Left	Right	U-Turn	App. Total	Thru	Right	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 11:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:00 AM													
07:00 AM	211	33	0	244	0	227	0	227	47	0	0	47	518
07:15 AM	224	42	0	266	0	181	0	181	29	0	0	29	476
07:30 AM	269	86	0	355	0	125	0	125	41	0	0	41	521
07:45 AM	193	56	0	249	0	120	0	120	49	1	0	50	419
Total Volume	897	217	0	1114	0	653	0	653	166	1	0	167	1934
% App. Total	80.5	19.5	0		0	100	0		99.4	0.6	0		
PHF	.834	.631	.000	.785	.000	.719	.000	.719	.847	.250	.000	.835	.928
Lights	860	206	0	1066	0	622	0	622	159	1	0	160	1848
% Lights	95.9	94.9	0	95.7	0	95.3	0	95.3	95.8	100	0	95.8	95.6
Single Units	22	9	0	31	0	24	0	24	5	0	0	5	60
% Single Units	2.5	4.1	0	2.8	0	3.7	0	3.7	3.0	0	0	3.0	3.1
TTST	15	2	0	17	0	7	0	7	2	0	0	2	26
% TTST	1.7	0.9	0	1.5	0	1.1	0	1.1	1.2	0	0	1.2	1.3
Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0



4500 Main Street
Suite 400
Virginia Beach, VA 23462-3361
757.490.0132

File Name : Benns_Church_and_Brewers_Neck_514974_04-24-2018
Site Code :
Start Date : 4/24/2018
Page No : 4

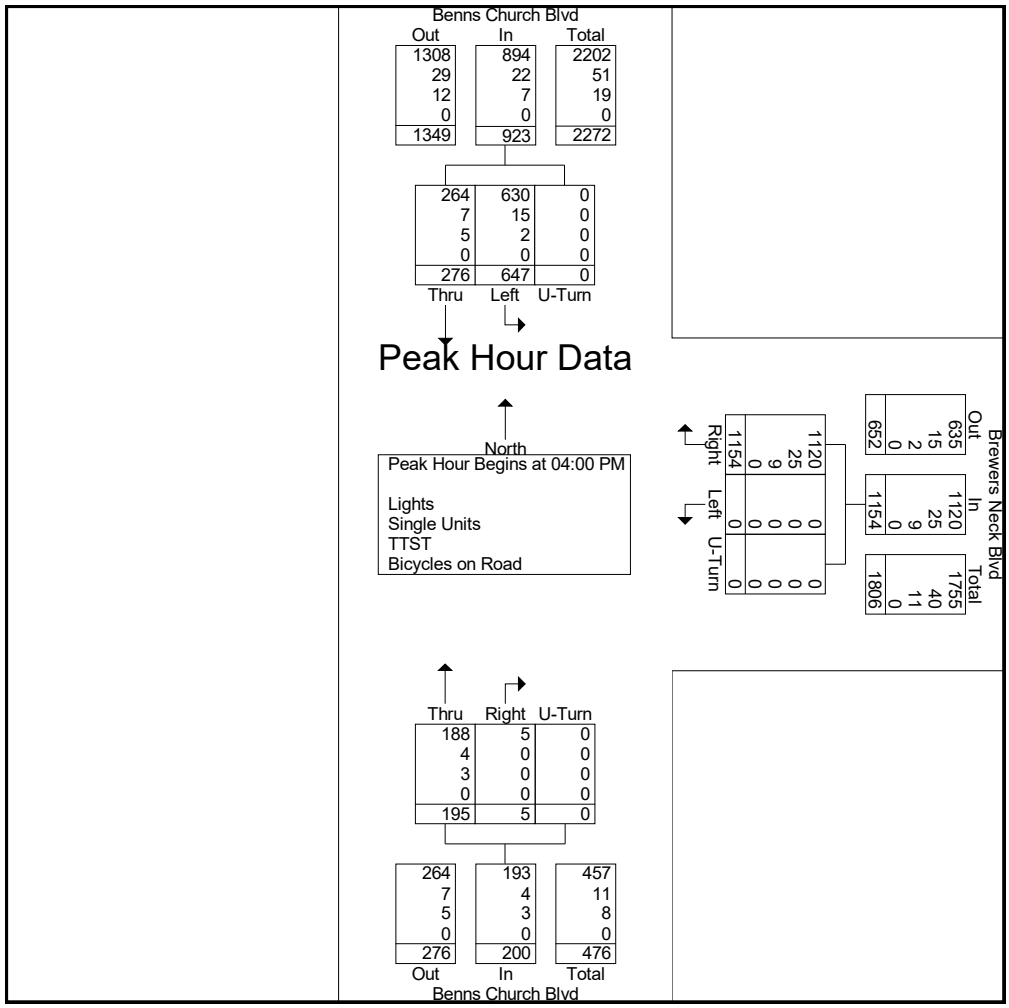
	Benns Church Blvd Southbound				Brewers Neck Blvd Westbound				Benns Church Blvd Northbound				
Start Time	Left	Thru	U-Turn	App. Total	Left	Right	U-Turn	App. Total	Thru	Right	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 11:45 AM - Peak 1 of 1													
Peak Hour for Each Approach Begins at:													
	07:00 AM				06:45 AM				07:00 AM				
+0 mins.	211	33	0	244	0	140	0	140	47	0	0	47	
+15 mins.	224	42	0	266	0	227	0	227	29	0	0	29	
+30 mins.	269	86	0	355	0	181	0	181	41	0	0	41	
+45 mins.	193	56	0	249	0	125	0	125	49	1	0	50	
Total Volume	897	217	0	1114	0	673	0	673	166	1	0	167	
% App. Total	80.5	19.5	0		0	100	0		99.4	0.6	0		
PHF	.834	.631	.000	.785	.000	.741	.000	.741	.847	.250	.000	.835	
Lights	860	206	0	1066	0	642	0	642	159	1	0	160	
% Lights	95.9	94.9	0	95.7	0	95.4	0	95.4	95.8	100	0	95.8	
Single Units	22	9	0	31	0	25	0	25	5	0	0	5	
% Single Units	2.5	4.1	0	2.8	0	3.7	0	3.7	3	0	0	3	
TTST	15	2	0	17	0	6	0	6	2	0	0	2	
% TTST	1.7	0.9	0	1.5	0	0.9	0	0.9	1.2	0	0	1.2	
Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	
% Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	



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File Name : Benns_Church_and_Brewers_Neck_514974_04-24-2018
Site Code :
Start Date : 4/24/2018
Page No : 5

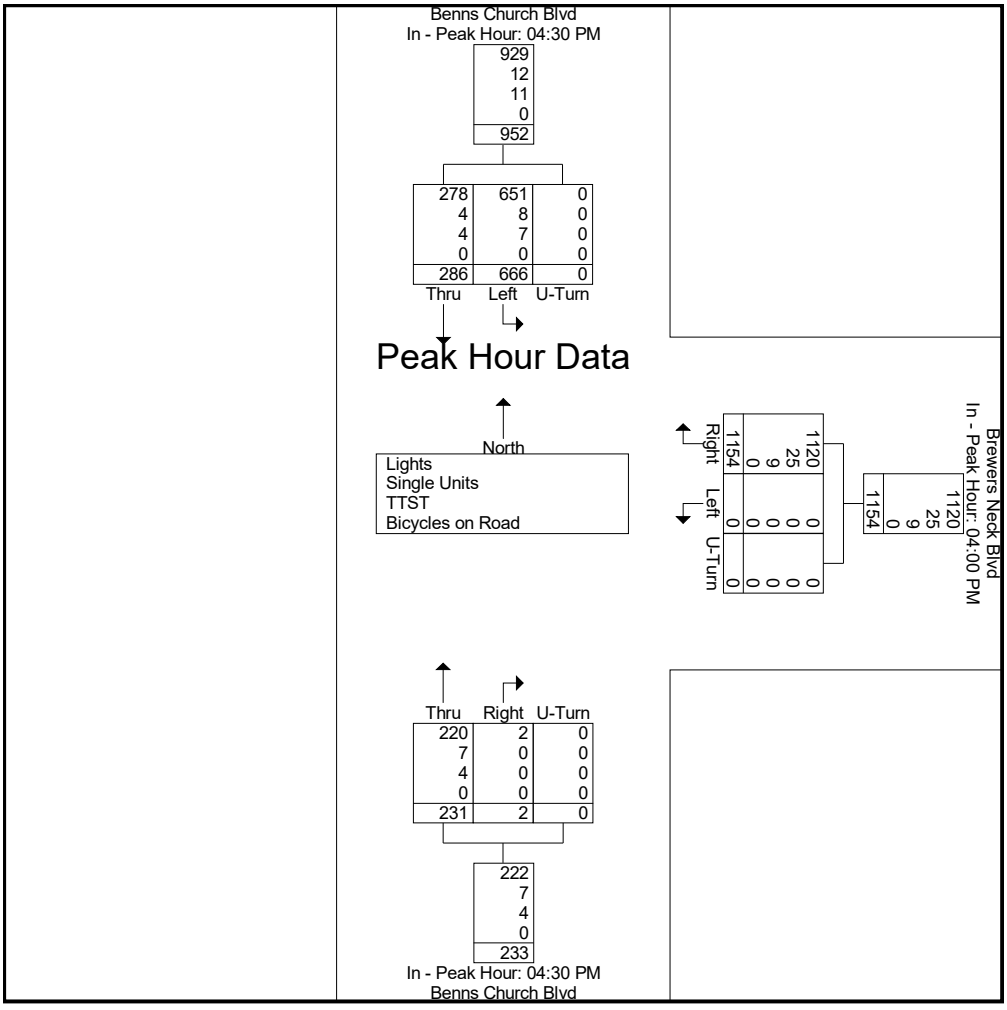
	Benns Church Blvd Southbound				Brewers Neck Blvd Westbound				Benns Church Blvd Northbound				
Start Time	Left	Thru	U-Turn	App. Total	Left	Right	U-Turn	App. Total	Thru	Right	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 05:15 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 04:00 PM													
04:00 PM	163	62	0	225	0	311	0	311	51	2	0	53	589
04:15 PM	164	66	0	230	0	286	0	286	42	2	0	44	560
04:30 PM	162	81	0	243	0	278	0	278	47	1	0	48	569
04:45 PM	158	67	0	225	0	279	0	279	55	0	0	55	559
Total Volume	647	276	0	923	0	1154	0	1154	195	5	0	200	2277
% App. Total	70.1	29.9	0		0	100	0		97.5	2.5	0		
PHF	.986	.852	.000	.950	.000	.928	.000	.928	.886	.625	.000	.909	.966
Lights	630	264	0	894	0	1120	0	1120	188	5	0	193	2207
% Lights	97.4	95.7	0	96.9	0	97.1	0	97.1	96.4	100	0	96.5	96.9
Single Units	15	7	0	22	0	25	0	25	4	0	0	4	51
% Single Units	2.3	2.5	0	2.4	0	2.2	0	2.2	2.1	0	0	2.0	2.2
TTST	2	5	0	7	0	9	0	9	3	0	0	3	19
% TTST	0.3	1.8	0	0.8	0	0.8	0	0.8	1.5	0	0	1.5	0.8
Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0



4500 Main Street
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757.490.0132

File Name : Benns_Church_and_Brewers_Neck_514974_04-24-2018
Site Code :
Start Date : 4/24/2018
Page No : 6

	Benns Church Blvd Southbound				Brewers Neck Blvd Westbound				Benns Church Blvd Northbound				
Start Time	Left	Thru	U-Turn	App. Total	Left	Right	U-Turn	App. Total	Thru	Right	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 05:15 PM - Peak 1 of 1													
Peak Hour for Each Approach Begins at:													
	04:30 PM				04:00 PM				04:30 PM				
+0 mins.	162	81	0	243	0	311	0	311	47	1	0	48	
+15 mins.	158	67	0	225	0	286	0	286	55	0	0	55	
+30 mins.	172	62	0	234	0	278	0	278	64	1	0	65	
+45 mins.	174	76	0	250	0	279	0	279	65	0	0	65	
Total Volume	666	286	0	952	0	1154	0	1154	231	2	0	233	
% App. Total	70	30	0		0	100	0		99.1	0.9	0		
PHF	.957	.883	.000	.952	.000	.928	.000	.928	.888	.500	.000	.896	
Lights	651	278	0	929	0	1120	0	1120	220	2	0	222	
% Lights	97.7	97.2	0	97.6	0	97.1	0	97.1	95.2	100	0	95.3	
Single Units	8	4	0	12	0	25	0	25	7	0	0	7	
% Single Units	1.2	1.4	0	1.3	0	2.2	0	2.2	3	0	0	3	
TTST	7	4	0	11	0	9	0	9	4	0	0	4	
% TTST	1.1	1.4	0	1.2	0	0.8	0	0.8	1.7	0	0	1.7	
Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	
% Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	



4500 Main Street
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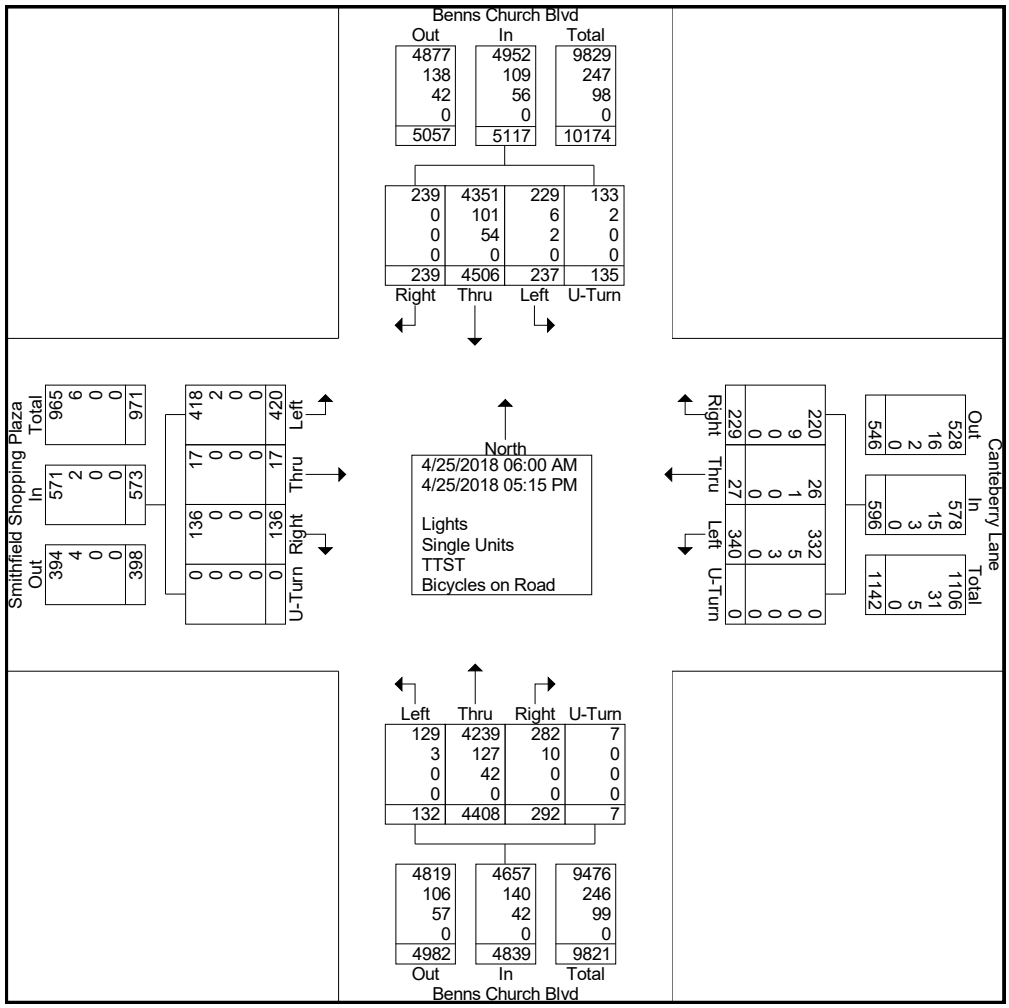
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Site Code :
Start Date : 4/25/2018
Page No : 1

Groups Printed- Lights - Single Units - TTST - Bicycles on Road

	Benns Church Blvd Southbound				Canteberry Lane Westbound				Benns Church Blvd Northbound				Smithfield Shopping Plaza Eastbound				
Start Time	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Int. Total
06:00 AM	1	204	3	4	7	2	5	0	1	146	2	0	0	0	4	0	379
06:15 AM	7	211	2	3	20	1	3	0	0	164	4	0	0	0	1	0	416
06:30 AM	11	260	2	6	20	0	7	0	4	126	8	0	4	0	3	0	451
06:45 AM	9	242	7	3	23	1	10	0	6	105	9	0	5	0	5	0	425
Total	28	917	14	16	70	4	25	0	11	541	23	0	9	0	13	0	1671
07:00 AM	7	408	7	1	29	2	9	0	5	140	9	0	3	0	4	0	624
07:15 AM	12	245	10	6	15	0	12	0	1	194	15	0	6	0	8	0	524
07:30 AM	9	192	7	3	25	1	5	0	0	192	13	0	7	0	4	0	458
07:45 AM	7	185	8	4	19	1	12	0	7	185	8	0	7	1	1	0	445
Total	35	1030	32	14	88	4	38	0	13	711	45	0	23	1	17	0	2051
02:30 PM	9	200	13	4	19	1	8	0	7	197	7	0	37	1	6	0	509
02:45 PM	12	182	10	6	13	4	8	0	5	246	18	2	25	1	12	0	544
Total	21	382	23	10	32	5	16	0	12	443	25	2	62	2	18	0	1053
03:00 PM	7	189	13	7	13	1	5	0	13	278	15	1	24	0	11	0	577
03:15 PM	11	205	13	7	9	0	13	0	8	248	19	0	37	1	8	0	579
03:30 PM	10	170	14	10	18	2	11	0	4	263	12	0	25	4	8	0	551
03:45 PM	22	218	11	6	23	1	11	0	8	264	18	1	32	2	14	0	631
Total	50	782	51	30	63	4	40	0	33	1053	64	2	118	7	41	0	2338
04:00 PM	15	244	31	7	16	3	17	0	11	269	28	2	31	2	6	0	682
04:15 PM	15	206	15	15	13	2	18	0	6	281	19	0	28	3	18	0	639
04:30 PM	21	233	20	7	19	2	19	0	18	265	11	0	35	0	5	0	655
04:45 PM	25	248	22	13	9	1	17	0	8	294	37	1	33	0	11	0	719
Total	76	931	88	42	57	8	71	0	43	1109	95	3	127	5	40	0	2695
05:00 PM	12	223	13	11	20	2	25	0	9	268	20	0	48	1	1	0	653
05:15 PM	15	241	18	12	10	0	14	0	11	283	20	0	33	1	6	0	664
Grand Total	237	4506	239	135	340	27	229	0	132	4408	292	7	420	17	136	0	11125
Apprch %	4.6	88.1	4.7	2.6	57	4.5	38.4	0	2.7	91.1	6	0.1	73.3	3	23.7	0	
Total %	2.1	40.5	2.1	1.2	3.1	0.2	2.1	0	1.2	39.6	2.6	0.1	3.8	0.2	1.2	0	
Lights	229	4351	239	133	332	26	220	0	129	4239	282	7	418	17	136	0	10758
% Lights	96.6	96.6	100	98.5	97.6	96.3	96.1	0	97.7	96.2	96.6	100	99.5	100	100	0	96.7
Single Units	6	101	0	2	5	1	9	0	3	127	10	0	2	0	0	0	266
% Single Units	2.5	2.2	0	1.5	1.5	3.7	3.9	0	2.3	2.9	3.4	0	0.5	0	0	0	2.4
TTST	2	54	0	0	3	0	0	0	0	42	0	0	0	0	0	0	101
% TTST	0.8	1.2	0	0	0.9	0	0	0	0	1	0	0	0	0	0	0	0.9
Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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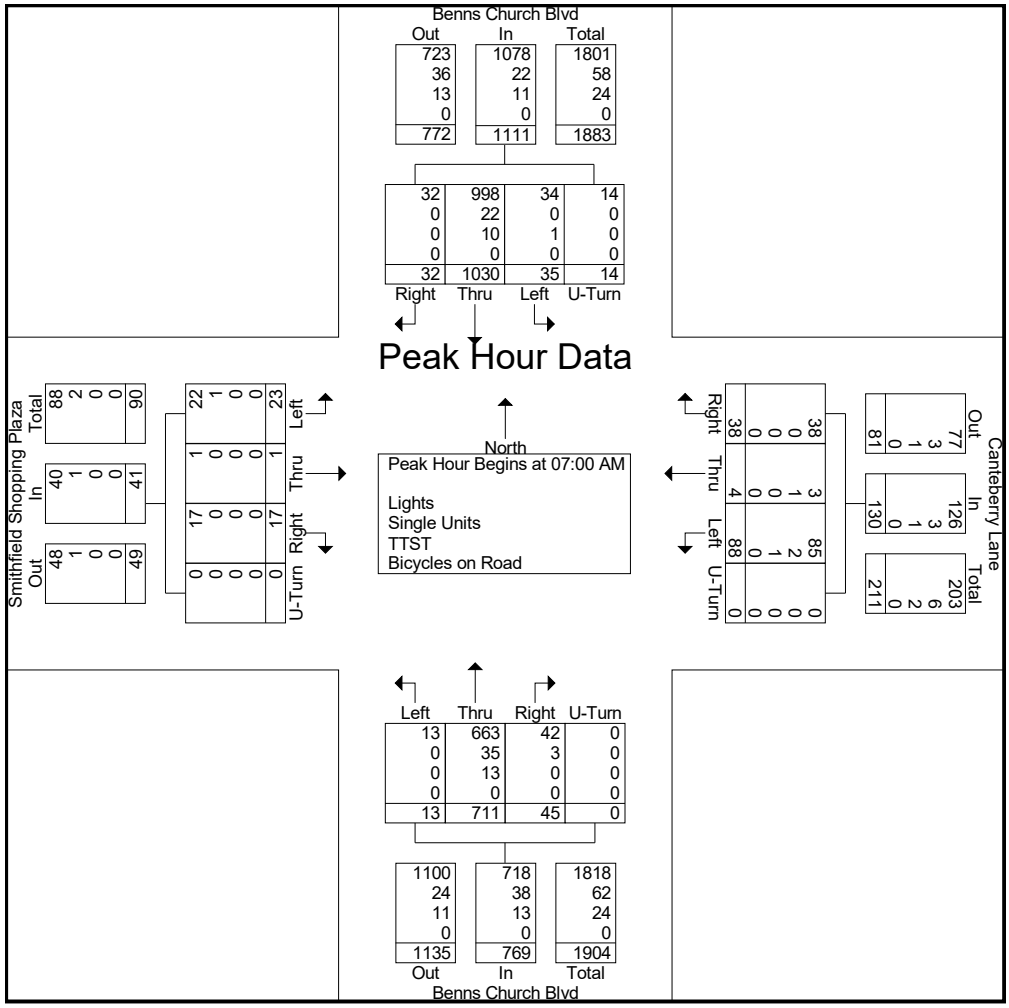
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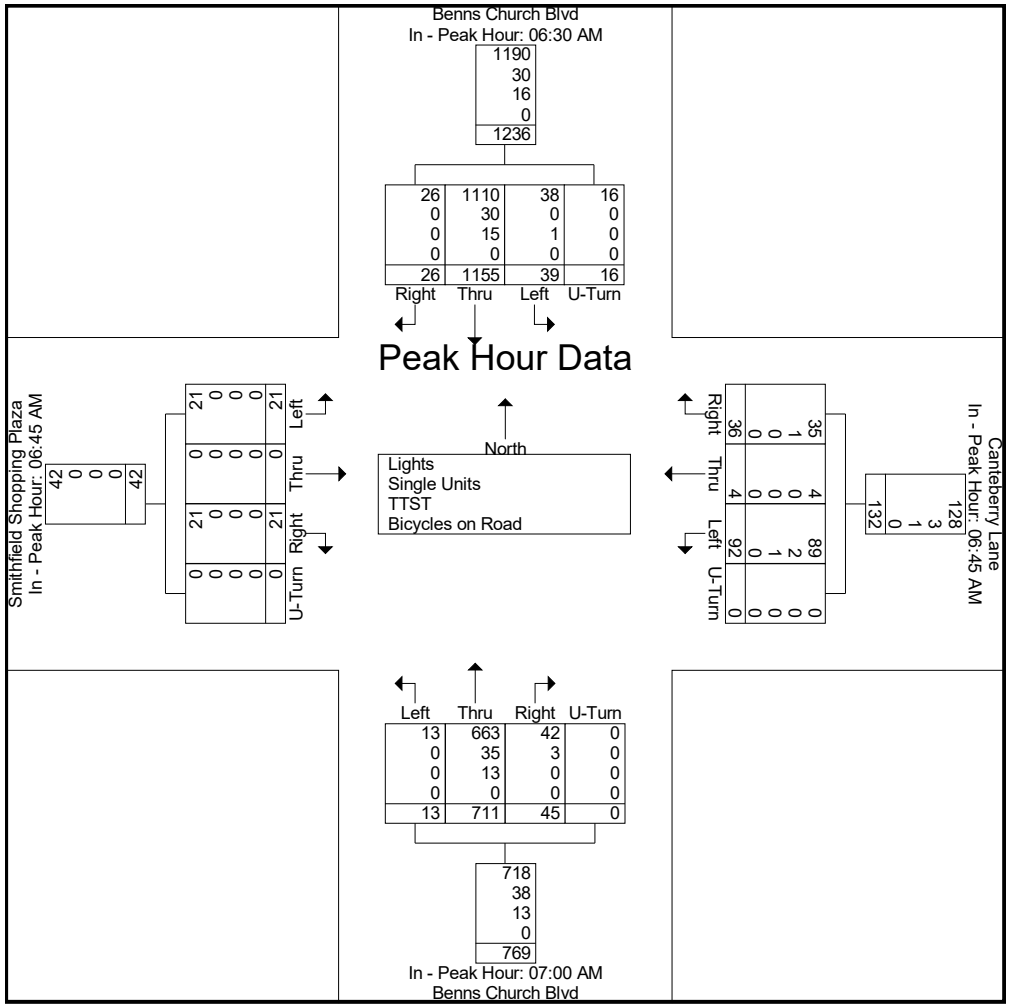
	Benns Church Blvd Southbound					Canteberry Lane Westbound					Benns Church Blvd Northbound					Smithfield Shopping Plaza Eastbound					
Start Time			Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	7	408	7	1	423	29	2	9	0	40	5	140	9	0	154	3	0	4	0	7	624
07:15 AM	12	245	10	6	273	15	0	12	0	27	1	194	15	0	210	6	0	8	0	14	524
07:30 AM	9	192	7	3	211	25	1	5	0	31	0	192	13	0	205	7	0	4	0	11	458
07:45 AM	7	185	8	4	204	19	1	12	0	32	7	185	8	0	200	7	1	1	0	9	445
Total Volume	35	1030	32	14	1111	88	4	38	0	130	13	711	45	0	769	23	1	17	0	41	2051
% App. Total	3.2	92.7	2.9	1.3		67.7	3.1	29.2	0		1.7	92.5	5.9	0		56.1	2.4	41.5	0		
PHF	.729	.631	.800	.583	.657	.759	.500	.792	.000	.813	.464	.916	.750	.000	.915	.821	.250	.531	.000	.732	.822
Lights	34	998	32	14	1078	85	3	38	0	126	13	663	42	0	718	22	1	17	0	40	1962
% Lights	97.1	96.9	100	100	97.0	96.6	75.0	100	0	96.9	100	93.2	93.3	0	93.4	95.7	100	100	0	97.6	95.7
Single Units	0	22	0	0	22	2	1	0	0	3	0	35	3	0	38	1	0	0	0	1	64
% Single Units	0	2.1	0	0	2.0	2.3	25.0	0	0	2.3	0	4.9	6.7	0	4.9	4.3	0	0	0	2.4	3.1
TTST	1	10	0	0	11	1	0	0	0	1	0	13	0	0	13	0	0	0	0	0	25
% TTST	2.9	1.0	0	0	1.0	1.1	0	0	0	0.8	0	1.8	0	0	1.7	0	0	0	0	0	1.2
Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



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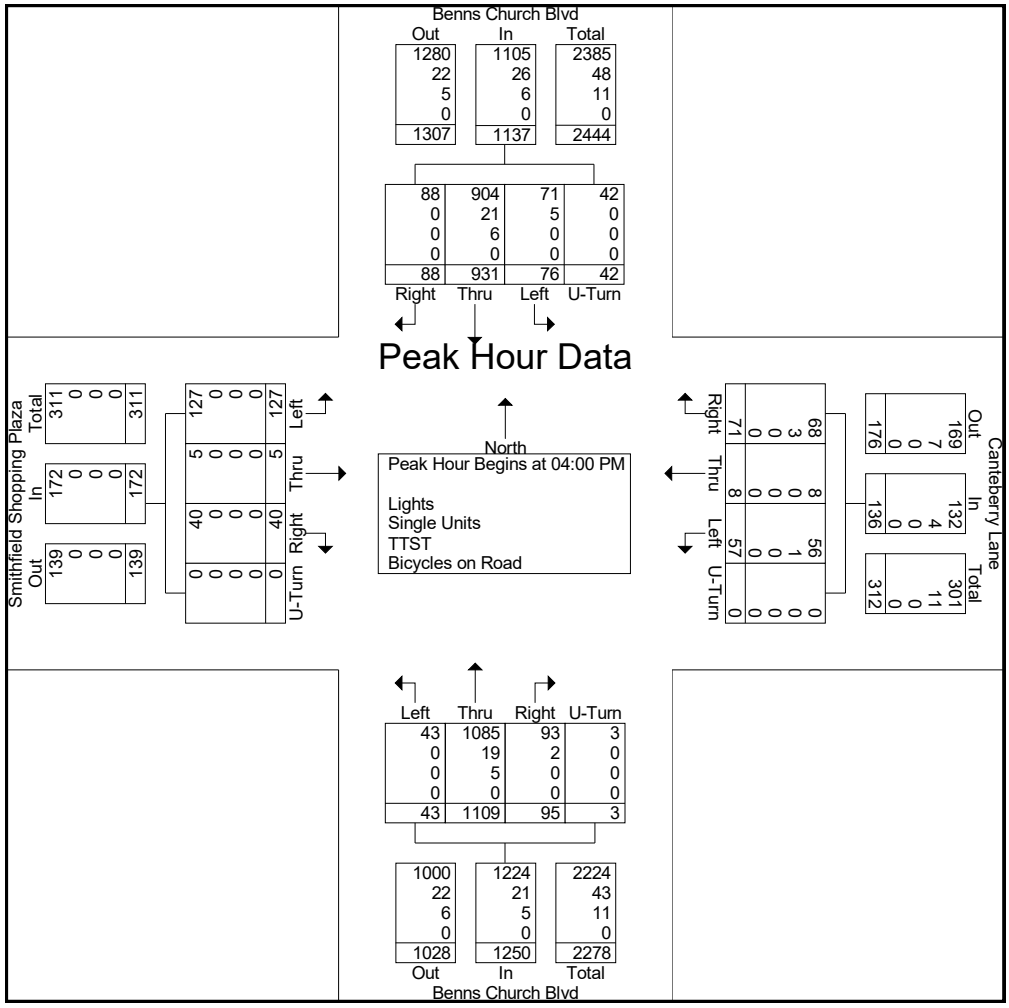
	Benns Church Blvd Southbound					Canteberry Lane Westbound					Benns Church Blvd Northbound					Smithfield Shopping Plaza Eastbound					
Start Time			Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Each Approach Begins at:																					
	06:30 AM					06:45 AM					07:00 AM					06:45 AM					
+0 mins.	11	260	2	6	279	23	1	10	0	34	5	140	9	0	154	5	0	5	0	10	
+15 mins.	9	242	7	3	261	29	2	9	0	40	1	194	15	0	210	3	0	4	0	7	
+30 mins.	7	408	7	1	423	15	0	12	0	27	0	192	13	0	205	6	0	8	0	14	
+45 mins.	12	245	10	6	273	25	1	5	0	31	7	185	8	0	200	7	0	4	0	11	
Total Volume	39	1155	26	16	1236	92	4	36	0	132	13	711	45	0	769	21	0	21	0	42	
% App. Total	3.2	93.4	2.1	1.3		69.7	3	27.3	0		1.7	92.5	5.9	0		50	0	50	0		
PHF	.813	.708	.650	.667	.730	.793	.500	.750	.000	.825	.464	.916	.750	.000	.915	.750	.000	.656	.000	.750	
Lights	38	1110	26	16	1190	89	4	35	0	128	13	663	42	0	718	21	0	21	0	42	
% Lights	97.4	96.1	100	100	96.3	96.7	100	97.2	0	97	100	93.2	93.3	0	93.4	100	0	100	0	100	
Single Units	0	30	0	0	30	2	0	1	0	3	0	35	3	0	38	0	0	0	0	0	
% Single Units	0	2.6	0	0	2.4	2.2	0	2.8	0	2.3	0	4.9	6.7	0	4.9	0	0	0	0	0	
TTST	1	15	0	0	16	1	0	0	0	1	0	13	0	0	13	0	0	0	0	0	
% TTST	2.6	1.3	0	0	1.3	1.1	0	0	0	0.8	0	1.8	0	0	1.7	0	0	0	0	0	
Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
% Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	



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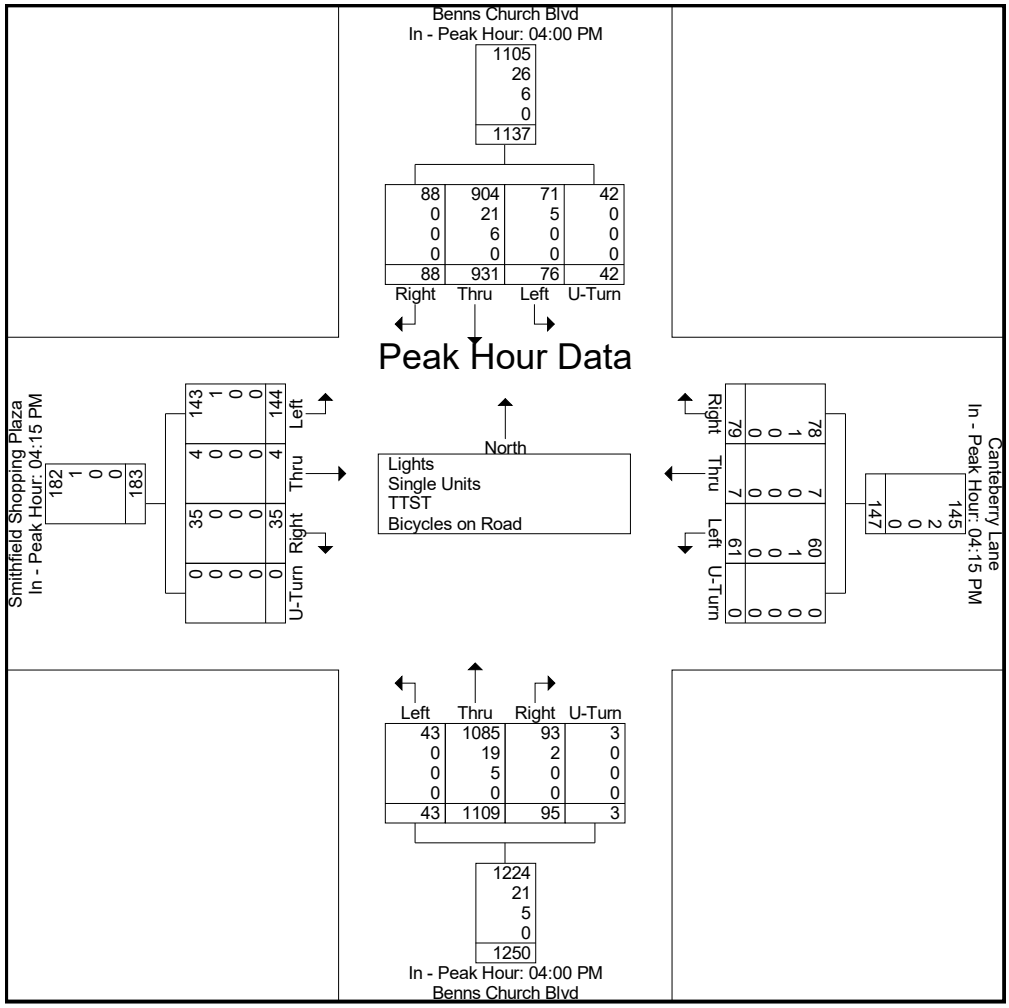
	Benns Church Blvd Southbound					Canteberry Lane Westbound					Benns Church Blvd Northbound					Smithfield Shopping Plaza Eastbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 05:15 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	15	244	31	7	297	16	3	17	0	36	11	269	28	2	310	31	2	6	0	39	682
04:15 PM	15	206	15	15	251	13	2	18	0	33	6	281	19	0	306	28	3	18	0	49	639
04:30 PM	21	233	20	7	281	19	2	19	0	40	18	265	11	0	294	35	0	5	0	40	655
04:45 PM	25	248	22	13	308	9	1	17	0	27	8	294	37	1	340	33	0	11	0	44	719
Total Volume	76	931	88	42	1137	57	8	71	0	136	43	1109	95	3	1250	127	5	40	0	172	2695
% App. Total	6.7	81.9	7.7	3.7		41.9	5.9	52.2	0		3.4	88.7	7.6	0.2		73.8	2.9	23.3	0		
PHF	.760	.939	.710	.700	.923	.750	.667	.934	.000	.850	.597	.943	.642	.375	.919	.907	.417	.556	.000	.878	.937
Lights	71	904	88	42	1105	56	8	68	0	132	43	1085	93	3	1224	127	5	40	0	172	2633
% Lights	93.4	97.1	100	100	97.2	98.2	100	95.8	0	97.1	100	97.8	97.9	100	97.9	100	100	100	0	100	97.7
Single Units	5	21	0	0	26	1	0	3	0	4	0	19	2	0	21	0	0	0	0	0	51
% Single Units	6.6	2.3	0	0	2.3	1.8	0	4.2	0	2.9	0	1.7	2.1	0	1.7	0	0	0	0	0	1.9
TTST	0	6	0	0	6	0	0	0	0	0	0	5	0	0	5	0	0	0	0	0	11
% TTST	0	0.6	0	0	0.5	0	0	0	0	0	0	0.5	0	0	0.4	0	0	0	0	0	0.4
Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



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	Benns Church Blvd Southbound					Canteberry Lane Westbound					Benns Church Blvd Northbound					Smithfield Shopping Plaza Eastbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 05:15 PM - Peak 1 of 1																					
Peak Hour for Each Approach Begins at:																					
	04:00 PM					04:15 PM					04:00 PM					04:15 PM					
+0 mins.	15	244	31	7	297	13	2	18	0	33	11	269	28	2	310	28	3	18	0	49	
+15 mins.	15	206	15	15	251	19	2	19	0	40	6	281	19	0	306	35	0	5	0	40	
+30 mins.	21	233	20	7	281	9	1	17	0	27	18	265	11	0	294	33	0	11	0	44	
+45 mins.	25	248	22	13	308	20	2	25	0	47	8	294	37	1	340	48	1	1	0	50	
Total Volume	76	931	88	42	1137	61	7	79	0	147	43	1109	95	3	1250	144	4	35	0	183	
% App. Total	6.7	81.9	7.7	3.7		41.5	4.8	53.7	0		3.4	88.7	7.6	0.2		78.7	2.2	19.1	0		
PHF	.760	.939	.710	.700	.923	.763	.875	.790	.000	.782	.597	.943	.642	.375	.919	.750	.333	.486	.000	.915	
Lights	71	904	88	42	1105	60	7	78	0	145	43	1085	93	3	1224	143	4	35	0	182	
% Lights	93.4	97.1	100	100	97.2	98.4	100	98.7	0	98.6	100	97.8	97.9	100	97.9	99.3	100	100	0	99.5	
Single Units	5	21	0	0	26	1	0	1	0	2	0	19	2	0	21	1	0	0	0	1	
% Single Units	6.6	2.3	0	0	2.3	1.6	0	1.3	0	1.4	0	1.7	2.1	0	1.7	0.7	0	0	0	0.5	
TTST	0	6	0	0	6	0	0	0	0	0	0	5	0	0	5	0	0	0	0	0	
% TTST	0	0.6	0	0	0.5	0	0	0	0	0	0	0.5	0	0	0.4	0	0	0	0	0	
Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
% Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	



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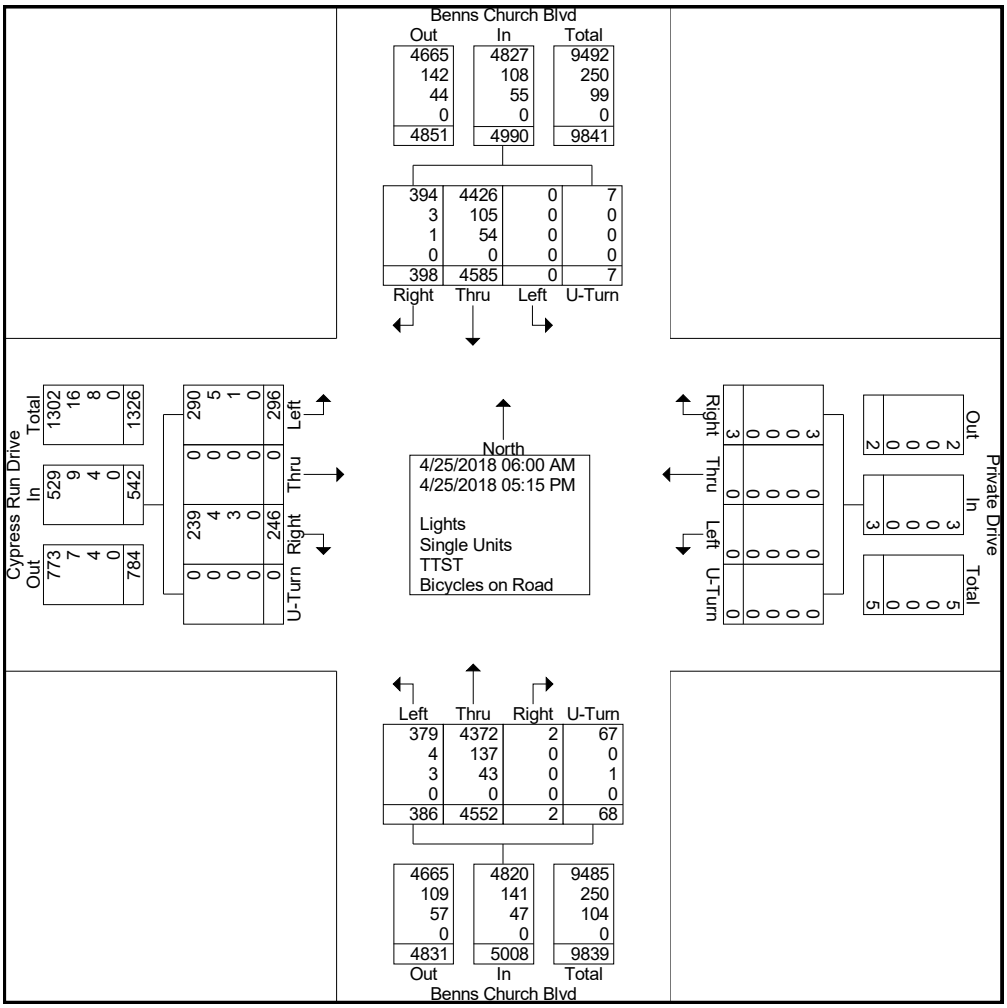
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Groups Printed- Lights - Single Units - TTST - Bicycles on Road

	Benns Church Blvd Southbound				Private Drive Westbound				Benns Church Blvd Northbound				Cypress Run Drive Eastbound				
Start Time	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Int. Total
06:00 AM	0	205	7	0	0	0	0	0	2	136	0	0	1	0	4	0	355
06:15 AM	0	225	4	1	0	0	0	0	1	171	0	0	0	0	3	0	405
06:30 AM	0	278	9	1	0	0	0	0	2	149	0	4	0	0	3	0	446
06:45 AM	0	270	8	0	0	0	0	0	2	118	0	0	2	0	2	0	402
Total	0	978	28	2	0	0	0	0	7	574	0	4	3	0	12	0	1608
07:00 AM	0	433	4	0	0	0	0	0	2	157	0	2	0	0	5	0	603
07:15 AM	0	271	7	1	0	0	0	0	8	211	0	1	2	0	8	0	509
07:30 AM	0	209	9	1	0	0	0	0	3	191	0	2	4	0	3	0	422
07:45 AM	0	202	7	0	0	0	0	0	1	205	0	1	2	0	4	0	422
Total	0	1115	27	2	0	0	0	0	14	764	0	6	8	0	20	0	1956
02:30 PM	0	192	23	1	0	0	0	0	25	195	0	5	19	0	23	0	483
02:45 PM	0	179	33	0	0	0	1	0	31	256	1	2	21	0	22	0	546
Total	0	371	56	1	0	0	1	0	56	451	1	7	40	0	45	0	1029
03:00 PM	0	176	40	1	0	0	0	0	33	283	0	3	19	0	19	0	574
03:15 PM	0	197	29	0	0	0	1	0	26	244	1	6	28	0	13	0	545
03:30 PM	0	178	16	1	0	0	0	0	33	259	0	6	23	0	15	0	531
03:45 PM	0	234	16	0	0	0	0	0	36	264	0	8	22	0	18	0	598
Total	0	785	101	2	0	0	1	0	128	1050	1	23	92	0	65	0	2248
04:00 PM	0	230	40	0	0	0	0	0	40	284	0	4	26	0	17	0	641
04:15 PM	0	199	27	0	0	0	0	0	22	283	0	4	24	0	13	0	572
04:30 PM	0	240	27	0	0	0	0	0	25	269	0	4	25	0	11	0	601
04:45 PM	0	218	37	0	0	0	0	0	44	308	0	8	24	0	30	0	669
Total	0	887	131	0	0	0	0	0	131	1144	0	20	99	0	71	0	2483
05:00 PM	0	234	21	0	0	0	0	0	25	277	0	5	32	0	14	0	608
05:15 PM	0	215	34	0	0	0	1	0	25	292	0	3	22	0	19	0	611
Grand Total	0	4585	398	7	0	0	3	0	386	4552	2	68	296	0	246	0	10543
Apprch %	0	91.9	8	0.1	0	0	100	0	7.7	90.9	0	1.4	54.6	0	45.4	0	
Total %	0	43.5	3.8	0.1	0	0	0	0	3.7	43.2	0	0.6	2.8	0	2.3	0	
Lights	0	4426	394	7	0	0	3	0	379	4372	2	67	290	0	239	0	10179
% Lights	0	96.5	99	100	0	0	100	0	98.2	96	100	98.5	98	0	97.2	0	96.5
Single Units	0	105	3	0	0	0	0	0	4	137	0	0	5	0	4	0	258
% Single Units	0	2.3	0.8	0	0	0	0	0	1	3	0	0	1.7	0	1.6	0	2.4
TTST	0	54	1	0	0	0	0	0	3	43	0	1	1	0	3	0	106
% TTST	0	1.2	0.3	0	0	0	0	0	0.8	0.9	0	1.5	0.3	0	1.2	0	1
Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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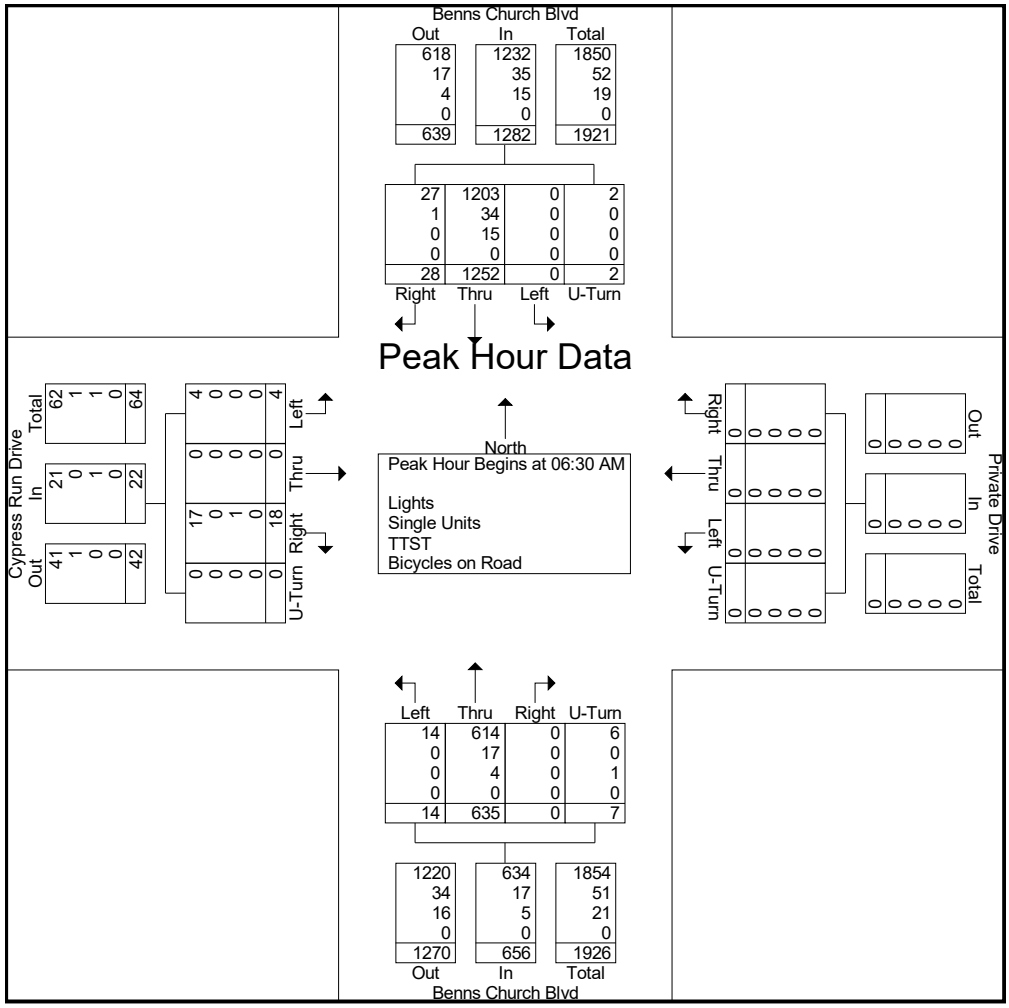
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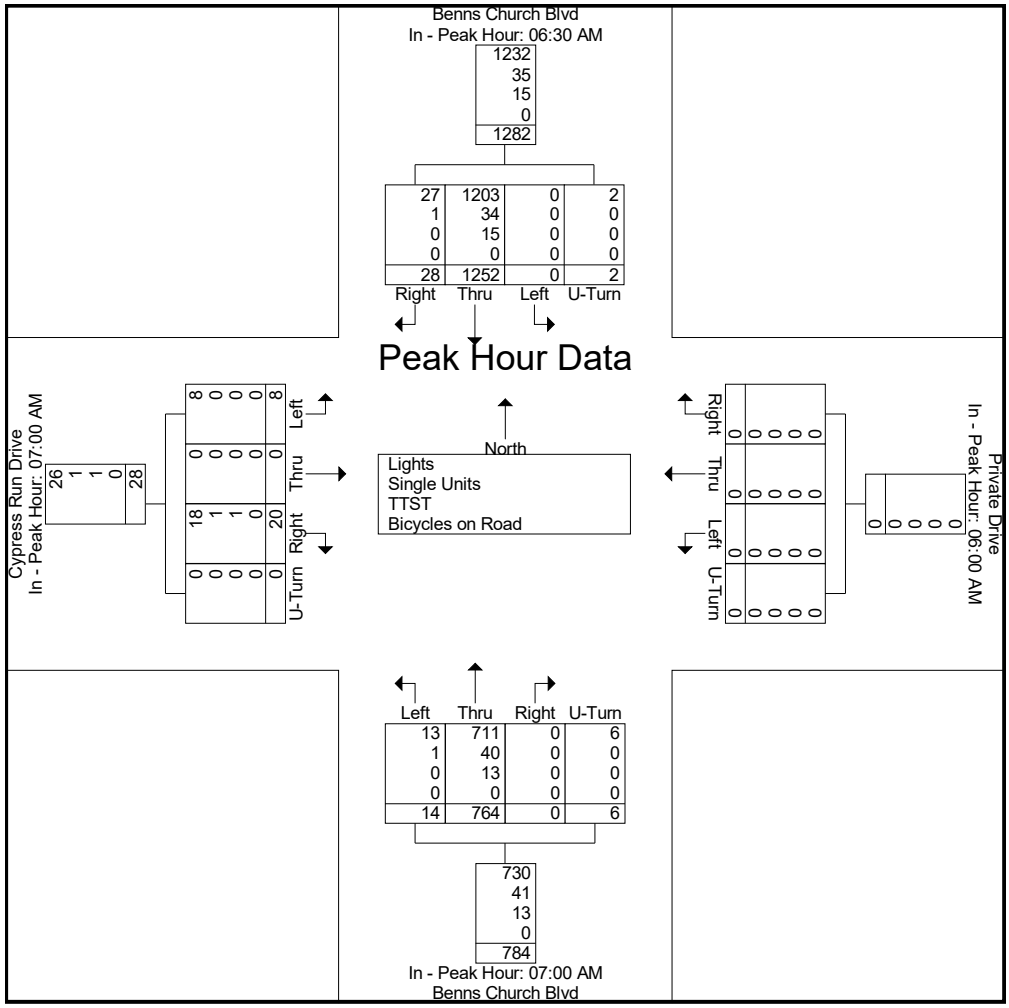
	Benns Church Blvd Southbound					Private Drive Westbound					Benns Church Blvd Northbound					Cypress Run Drive Eastbound					
Start Time			Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 06:30 AM																					
06:30 AM	0	278	9	1	288	0	0	0	0	0	2	149	0	4	155	0	0	3	0	3	446
06:45 AM	0	270	8	0	278	0	0	0	0	0	2	118	0	0	120	2	0	2	0	4	402
07:00 AM	0	433	4	0	437	0	0	0	0	0	2	157	0	2	161	0	0	5	0	5	603
07:15 AM	0	271	7	1	279	0	0	0	0	0	8	211	0	1	220	2	0	8	0	10	509
Total Volume	0	1252	28	2	1282	0	0	0	0	0	14	635	0	7	656	4	0	18	0	22	1960
% App. Total	0	97.7	2.2	0.2		0	0	0	0		2.1	96.8	0	1.1		18.2	0	81.8	0		
PHF	.000	.723	.778	.500	.733	.000	.000	.000	.000	.000	.438	.752	.000	.438	.745	.500	.000	.563	.000	.550	.813
Lights	0	1203	27	2	1232	0	0	0	0	0	14	614	0	6	634	4	0	17	0	21	1887
% Lights	0	96.1	96.4	100	96.1	0	0	0	0	0	100	96.7	0	85.7	96.6	100	0	94.4	0	95.5	96.3
Single Units	0	34	1	0	35	0	0	0	0	0	0	17	0	0	17	0	0	0	0	0	52
% Single Units	0	2.7	3.6	0	2.7	0	0	0	0	0	0	2.7	0	0	2.6	0	0	0	0	0	2.7
TTST	0	15	0	0	15	0	0	0	0	0	0	4	0	1	5	0	0	1	0	1	21
% TTST	0	1.2	0	0	1.2	0	0	0	0	0	0	0.6	0	14.3	0.8	0	0	5.6	0	4.5	1.1
Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



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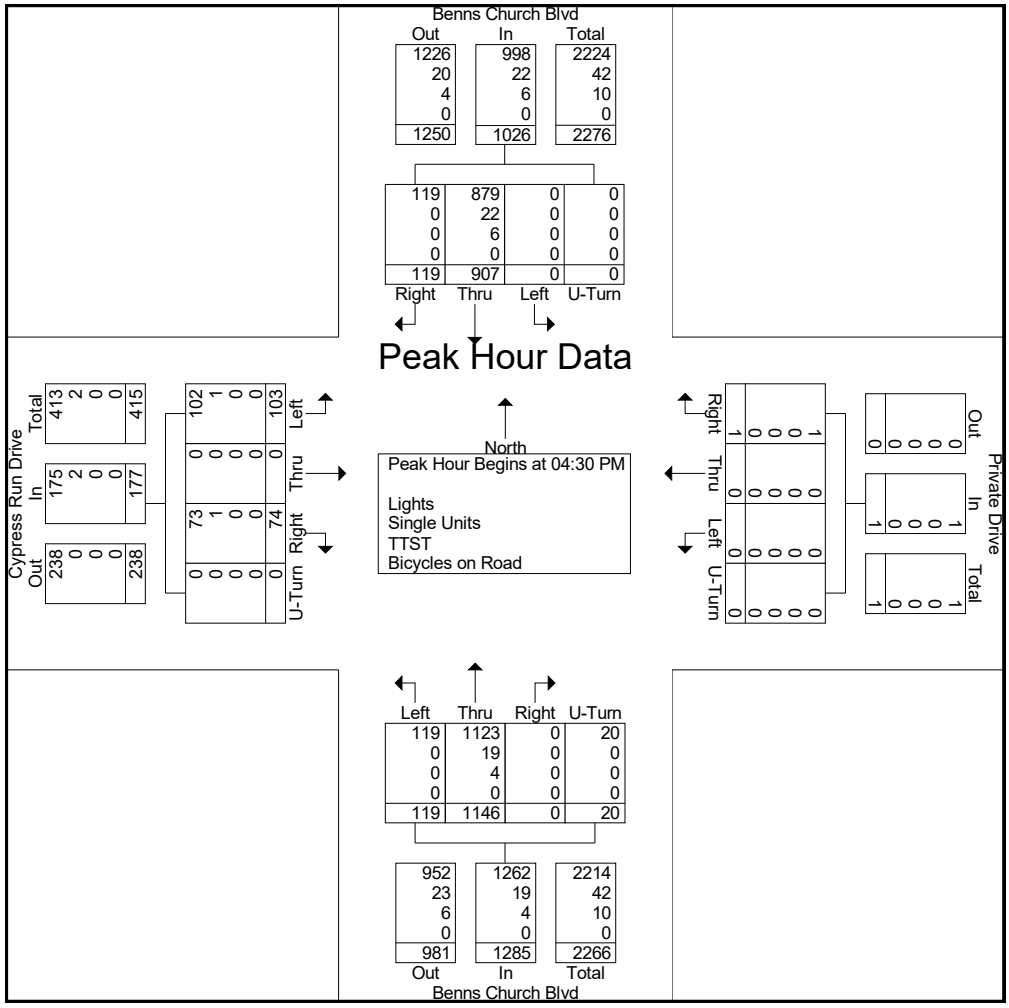
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Start Time			Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Each Approach Begins at:																					
	06:30 AM					06:00 AM					07:00 AM					07:00 AM					
+0 mins.	0	278	9	1	288	0	0	0	0	0	2	157	0	2	161	0	0	5	0	5	
+15 mins.	0	270	8	0	278	0	0	0	0	0	8	211	0	1	220	2	0	8	0	10	
+30 mins.	0	433	4	0	437	0	0	0	0	0	3	191	0	2	196	4	0	3	0	7	
+45 mins.	0	271	7	1	279	0	0	0	0	0	1	205	0	1	207	2	0	4	0	6	
Total Volume	0	1252	28	2	1282	0	0	0	0	0	14	764	0	6	784	8	0	20	0	28	
% App. Total	0	97.7	2.2	0.2		0	0	0	0		1.8	97.4	0	0.8		28.6	0	71.4	0		
PHF	.000	.723	.778	.500	.733	.000	.000	.000	.000	.000	.438	.905	.000	.750	.891	.500	.000	.625	.000	.700	
Lights	0	1203	27	2	1232	0	0	0	0	0	13	711	0	6	730	8	0	18	0	26	
% Lights	0	96.1	96.4	100	96.1	0	0	0	0	0	92.9	93.1	0	100	93.1	100	0	90	0	92.9	
Single Units	0	34	1	0	35	0	0	0	0	0	1	40	0	0	41	0	0	1	0	1	
% Single Units	0	2.7	3.6	0	2.7	0	0	0	0	0	7.1	5.2	0	0	5.2	0	0	5	0	3.6	
TTST	0	15	0	0	15	0	0	0	0	0	0	13	0	0	13	0	0	1	0	1	
% TTST	0	1.2	0	0	1.2	0	0	0	0	0	0	1.7	0	0	1.7	0	0	5	0	3.6	
Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
% Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	



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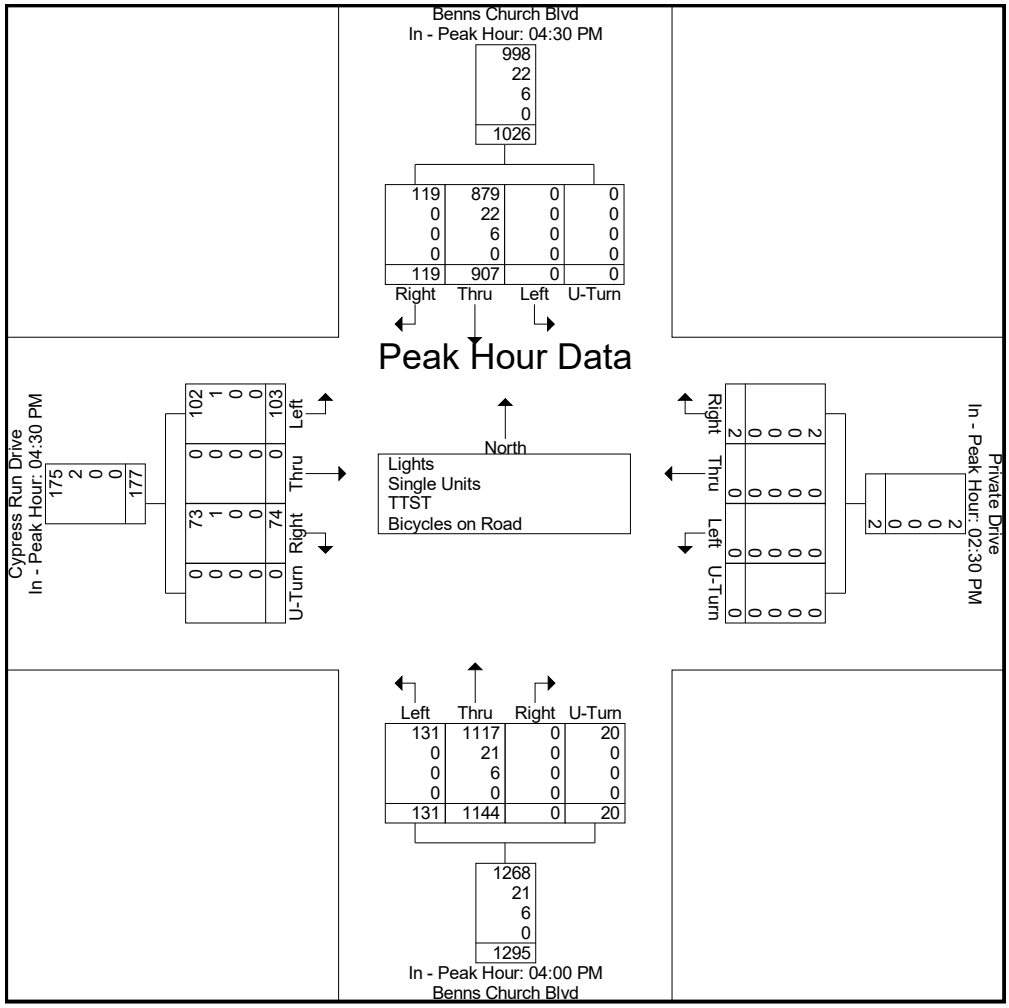
	Benns Church Blvd Southbound					Private Drive Westbound					Benns Church Blvd Northbound					Cypress Run Drive Eastbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 05:15 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	0	240	27	0	267	0	0	0	0	0	25	269	0	4	298	25	0	11	0	36	601
04:45 PM	0	218	37	0	255	0	0	0	0	0	44	308	0	8	360	24	0	30	0	54	669
05:00 PM	0	234	21	0	255	0	0	0	0	0	25	277	0	5	307	32	0	14	0	46	608
05:15 PM	0	215	34	0	249	0	0	1	0	1	25	292	0	3	320	22	0	19	0	41	611
Total Volume	0	907	119	0	1026	0	0	1	0	1	119	1146	0	20	1285	103	0	74	0	177	2489
% App. Total	0	88.4	11.6	0		0	0	100	0		9.3	89.2	0	1.6		58.2	0	41.8	0		
PHF	.000	.945	.804	.000	.961	.000	.000	.250	.000	.250	.676	.930	.000	.625	.892	.805	.000	.617	.000	.819	.930
Lights	0	879	119	0	998	0	0	1	0	1	119	1123	0	20	1262	102	0	73	0	175	2436
% Lights	0	96.9	100	0	97.3	0	0	100	0	100	100	98.0	0	100	98.2	99.0	0	98.6	0	98.9	97.9
Single Units	0	22	0	0	22	0	0	0	0	0	0	19	0	0	19	1	0	1	0	2	43
% Single Units	0	2.4	0	0	2.1	0	0	0	0	0	0	1.7	0	0	1.5	1.0	0	1.4	0	1.1	1.7
TTST	0	6	0	0	6	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	10
% TTST	0	0.7	0	0	0.6	0	0	0	0	0	0	0.3	0	0	0.3	0	0	0	0	0	0.4
Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



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	Benns Church Blvd Southbound					Private Drive Westbound					Benns Church Blvd Northbound					Cypress Run Drive Eastbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 05:15 PM - Peak 1 of 1																					
Peak Hour for Each Approach Begins at:																					
	04:30 PM					02:30 PM					04:00 PM					04:30 PM					
+0 mins.	0	240	27	0	267	0	0	0	0	0	40	284	0	4	328	25	0	11	0	36	
+15 mins.	0	218	37	0	255	0	0	1	0	1	22	283	0	4	309	24	0	30	0	54	
+30 mins.	0	234	21	0	255	0	0	0	0	0	25	269	0	4	298	32	0	14	0	46	
+45 mins.	0	215	34	0	249	0	0	1	0	1	44	308	0	8	360	22	0	19	0	41	
Total Volume	0	907	119	0	1026	0	0	2	0	2	131	1144	0	20	1295	103	0	74	0	177	
% App. Total	0	88.4	11.6	0		0	0	100	0		10.1	88.3	0	1.5		58.2	0	41.8	0		
PHF	.000	.945	.804	.000	.961	.000	.000	.500	.000	.500	.744	.929	.000	.625	.899	.805	.000	.617	.000	.819	
Lights	0	879	119	0	998	0	0	2	0	2	131	1117	0	20	1268	102	0	73	0	175	
% Lights	0	96.9	100	0	97.3	0	0	100	0	100	100	97.6	0	100	97.9	99	0	98.6	0	98.9	
Single Units	0	22	0	0	22	0	0	0	0	0	0	21	0	0	21	1	0	1	0	2	
% Single Units	0	2.4	0	0	2.1	0	0	0	0	0	0	1.8	0	0	1.6	1	0	1.4	0	1.1	
TTST	0	6	0	0	6	0	0	0	0	0	0	6	0	0	6	0	0	0	0	0	
% TTST	0	0.7	0	0	0.6	0	0	0	0	0	0	0.5	0	0	0.5	0	0	0	0	0	
Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
% Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	



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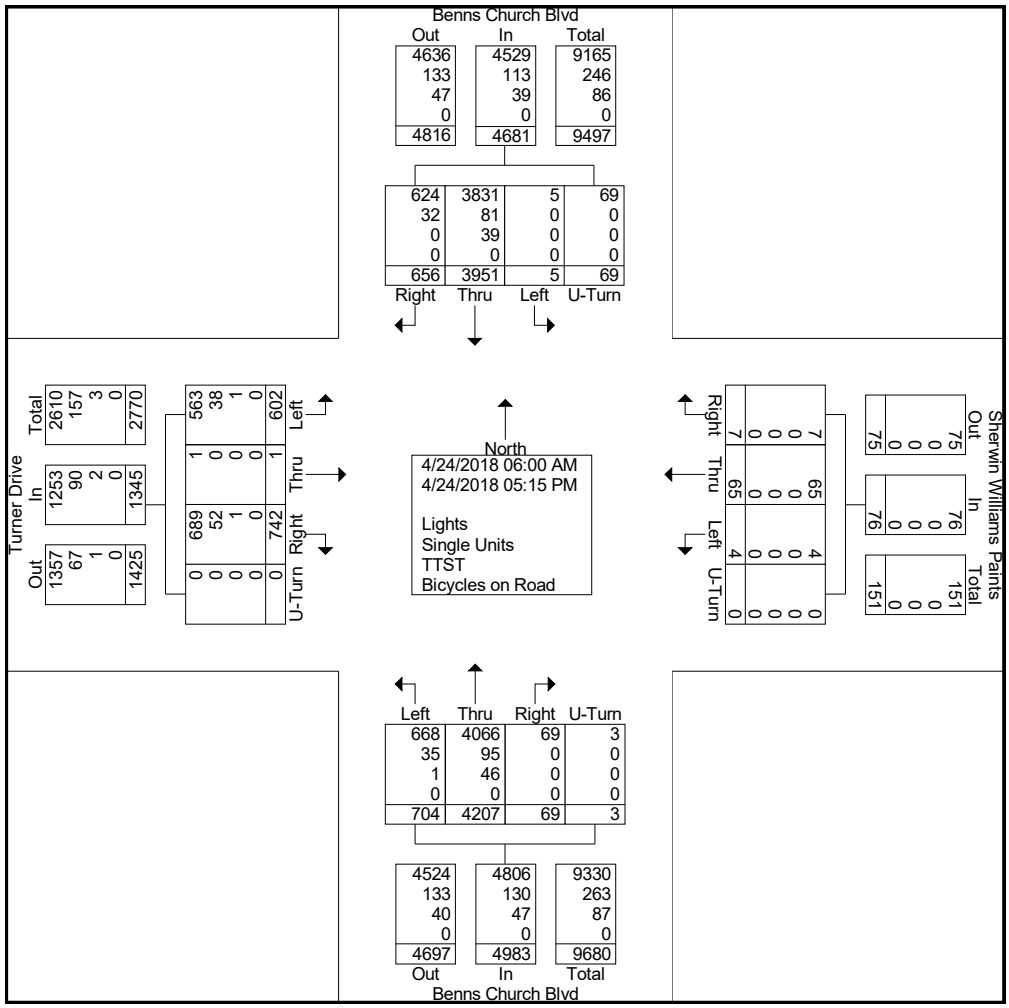
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Groups Printed- Lights - Single Units - TTST - Bicycles on Road

	Benns Church Blvd Southbound				Sherwin Williams Paints Westbound				Benns Church Blvd Northbound				Turner Drive Eastbound				
Start Time	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Int. Total
06:00 AM	0	216	8	0	0	0	0	0	7	134	0	0	3	0	30	0	398
06:15 AM	0	228	10	0	0	0	0	0	7	144	0	0	7	0	30	0	426
06:30 AM	0	233	16	0	0	0	0	0	19	150	1	0	10	0	21	0	450
06:45 AM	0	186	37	0	0	0	0	0	50	130	1	0	5	0	23	0	432
Total	0	863	71	0	0	0	0	0	83	558	2	0	25	0	104	0	1706
07:00 AM	0	192	142	1	0	23	1	0	103	104	34	0	30	0	56	0	686
07:15 AM	0	168	120	2	0	41	0	0	72	148	28	0	60	1	87	0	727
07:30 AM	0	288	13	0	0	0	0	0	18	152	0	1	67	0	74	0	613
07:45 AM	1	190	13	2	1	0	0	0	22	156	0	0	14	0	36	0	435
Total	1	838	288	5	1	64	1	0	215	560	62	1	171	1	253	0	2461
02:30 PM	0	170	44	0	1	0	1	0	32	179	0	1	26	0	23	0	477
02:45 PM	1	119	22	5	1	0	0	0	21	193	0	0	124	0	70	0	556
Total	1	289	66	5	2	0	1	0	53	372	0	1	150	0	93	0	1033
03:00 PM	1	168	18	4	0	0	0	0	18	208	0	1	83	0	70	0	571
03:15 PM	0	165	16	4	0	0	1	0	28	260	1	0	30	0	35	0	540
03:30 PM	0	150	26	4	0	0	0	0	31	258	0	0	19	0	19	0	507
03:45 PM	0	197	23	9	1	0	1	0	31	204	3	0	19	0	39	0	527
Total	1	680	83	21	1	0	2	0	108	930	4	1	151	0	163	0	2145
04:00 PM	0	207	21	5	0	0	0	0	38	330	0	0	21	0	19	0	641
04:15 PM	0	197	15	6	0	0	1	0	54	261	0	0	8	0	24	0	566
04:30 PM	0	223	18	2	0	0	0	0	32	317	1	0	2	0	20	0	615
04:45 PM	0	217	31	2	0	1	0	0	43	292	0	0	23	0	27	0	636
Total	0	844	85	15	0	1	1	0	167	1200	1	0	54	0	90	0	2458
05:00 PM	1	215	30	9	0	0	1	0	40	271	0	0	30	0	14	0	611
05:15 PM	1	222	33	14	0	0	1	0	38	316	0	0	21	0	25	0	671
Grand Total	5	3951	656	69	4	65	7	0	704	4207	69	3	602	1	742	0	11085
Apprch %	0.1	84.4	14	1.5	5.3	85.5	9.2	0	14.1	84.4	1.4	0.1	44.8	0.1	55.2	0	
Total %	0	35.6	5.9	0.6	0	0.6	0.1	0	6.4	38	0.6	0	5.4	0	6.7	0	
Lights	5	3831	624	69	4	65	7	0	668	4066	69	3	563	1	689	0	10664
% Lights	100	97	95.1	100	100	100	100	0	94.9	96.6	100	100	93.5	100	92.9	0	96.2
Single Units	0	81	32	0	0	0	0	0	35	95	0	0	38	0	52	0	333
% Single Units	0	2.1	4.9	0	0	0	0	0	5	2.3	0	0	6.3	0	7	0	3
TTST	0	39	0	0	0	0	0	0	1	46	0	0	1	0	1	0	88
% TTST	0	1	0	0	0	0	0	0	0.1	1.1	0	0	0.2	0	0.1	0	0.8
Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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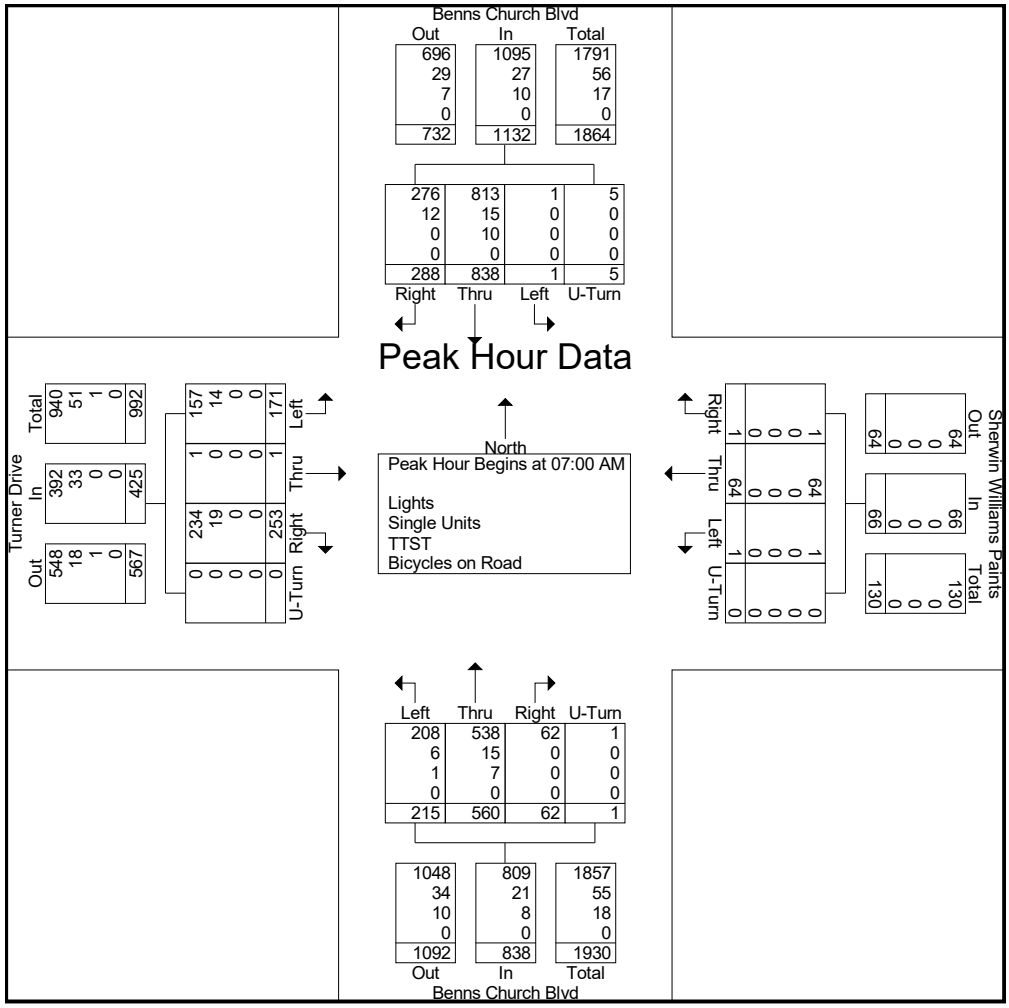
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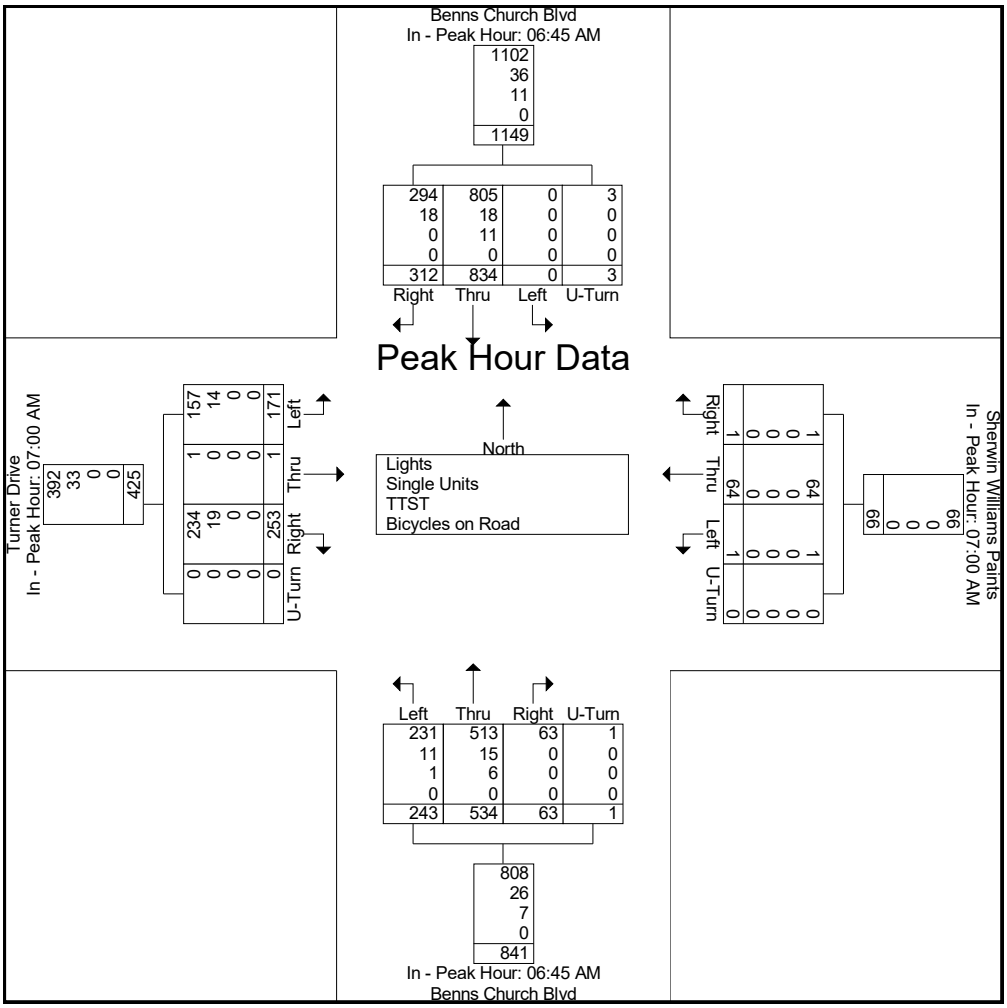
	Benns Church Blvd Southbound					Sherwin Williams Paints Westbound					Benns Church Blvd Northbound					Turner Drive Eastbound					
Start Time			Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	0	192	142	1	335	0	23	1	0	24	103	104	34	0	241	30	0	56	0	86	686
07:15 AM	0	168	120	2	290	0	41	0	0	41	72	148	28	0	248	60	1	87	0	148	727
07:30 AM	0	288	13	0	301	0	0	0	0	0	18	152	0	1	171	67	0	74	0	141	613
07:45 AM	1	190	13	2	206	1	0	0	0	1	22	156	0	0	178	14	0	36	0	50	435
Total Volume	1	838	288	5	1132	1	64	1	0	66	215	560	62	1	838	171	1	253	0	425	2461
% App. Total	0.1	74	25.4	0.4		1.5	97	1.5	0		25.7	66.8	7.4	0.1		40.2	0.2	59.5	0		
PHF	.250	.727	.507	.625	.845	.250	.390	.250	.000	.402	.522	.897	.456	.250	.845	.638	.250	.727	.000	.718	.846
Lights	1	813	276	5	1095	1	64	1	0	66	208	538	62	1	809	157	1	234	0	392	2362
% Lights	100	97.0	95.8	100	96.7	100	100	100	0	100	96.7	96.1	100	100	96.5	91.8	100	92.5	0	92.2	96.0
Single Units	0	15	12	0	27	0	0	0	0	0	6	15	0	0	21	14	0	19	0	33	81
% Single Units	0	1.8	4.2	0	2.4	0	0	0	0	0	2.8	2.7	0	0	2.5	8.2	0	7.5	0	7.8	3.3
TTST	0	10	0	0	10	0	0	0	0	0	1	7	0	0	8	0	0	0	0	0	18
% TTST	0	1.2	0	0	0.9	0	0	0	0	0	0.5	1.3	0	0	1.0	0	0	0	0	0	0.7
Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



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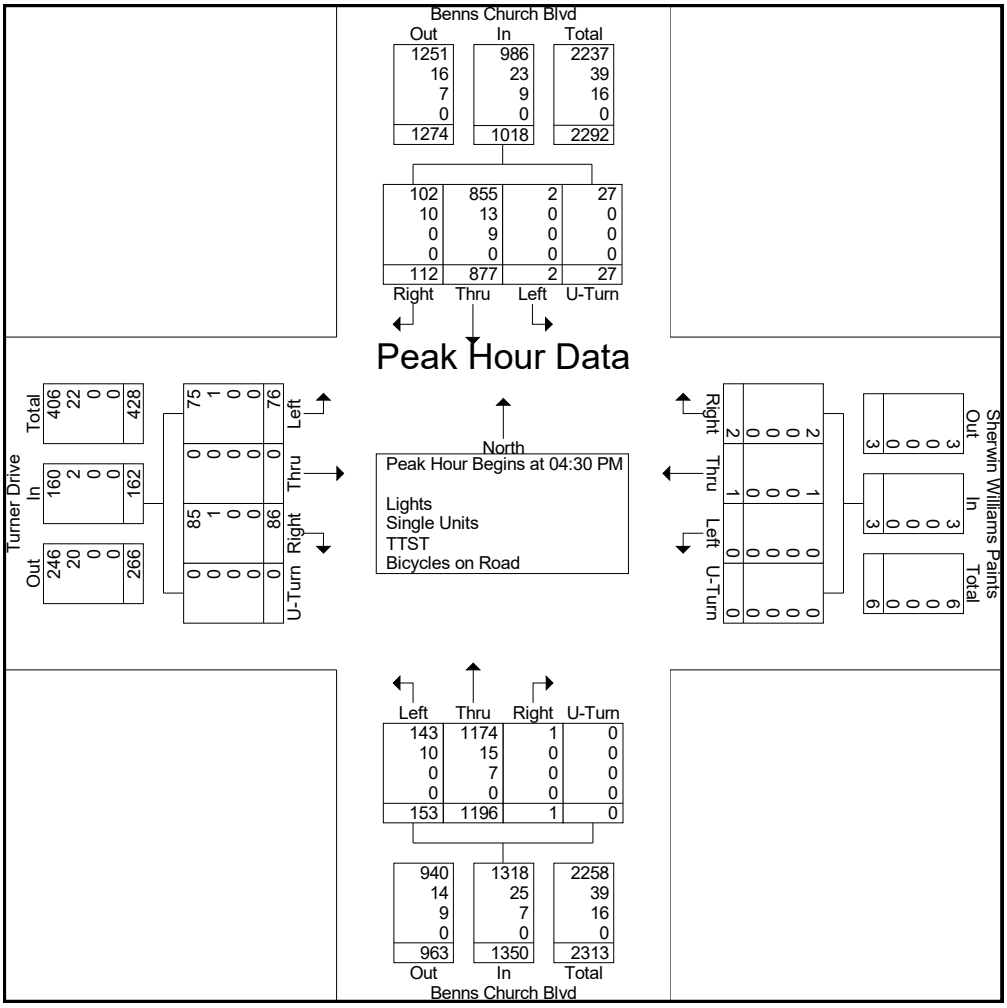
	Benns Church Blvd Southbound					Sherwin Williams Paints Westbound					Benns Church Blvd Northbound					Turner Drive Eastbound					
Start Time			Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Each Approach Begins at:																					
	06:45 AM					07:00 AM					06:45 AM					07:00 AM					
+0 mins.	0	186	37	0	223	0	23	1	0	24	50	130	1	0	181	30	0	56	0	86	
+15 mins.	0	192	142	1	335	0	41	0	0	41	103	104	34	0	241	60	1	87	0	148	
+30 mins.	0	168	120	2	290	0	0	0	0	0	72	148	28	0	248	67	0	74	0	141	
+45 mins.	0	288	13	0	301	1	0	0	0	1	18	152	0	1	171	14	0	36	0	50	
Total Volume	0	834	312	3	1149	1	64	1	0	66	243	534	63	1	841	171	1	253	0	425	
% App. Total	0	72.6	27.2	0.3		1.5	97	1.5	0		28.9	63.5	7.5	0.1		40.2	0.2	59.5	0		
PHF	.000	.724	.549	.375	.857	.250	.390	.250	.000	.402	.590	.878	.463	.250	.848	.638	.250	.727	.000	.718	
Lights	0	805	294	3	1102	1	64	1	0	66	231	513	63	1	808	157	1	234	0	392	
% Lights	0	96.5	94.2	100	95.9	100	100	100	0	100	95.1	96.1	100	100	96.1	91.8	100	92.5	0	92.2	
Single Units	0	18	18	0	36	0	0	0	0	0	11	15	0	0	26	14	0	19	0	33	
% Single Units	0	2.2	5.8	0	3.1	0	0	0	0	0	4.5	2.8	0	0	3.1	8.2	0	7.5	0	7.8	
TTST	0	11	0	0	11	0	0	0	0	0	1	6	0	0	7	0	0	0	0	0	
% TTST	0	1.3	0	0	1	0	0	0	0	0	0.4	1.1	0	0	0.8	0	0	0	0	0	
Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
% Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	



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File Name : Benns_Church_and_Turner_Drive_514980_04-24-2018
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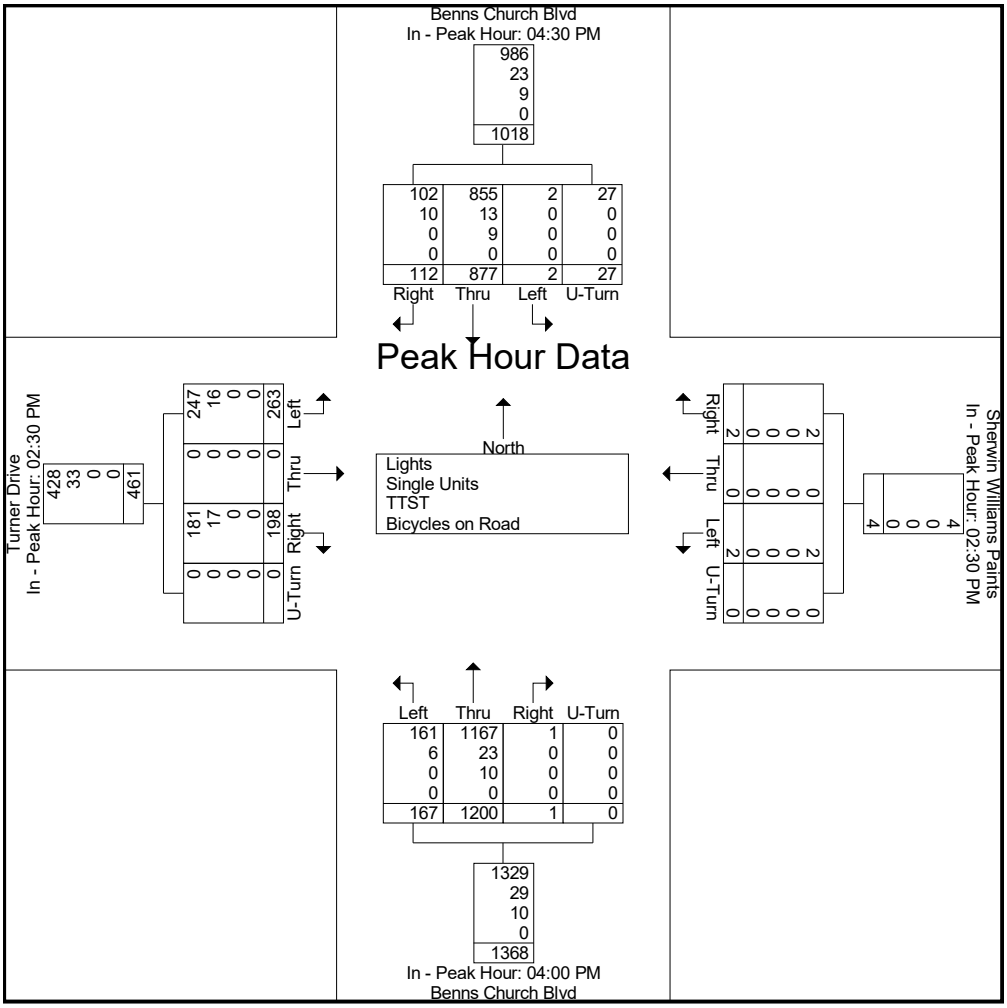
	Benns Church Blvd Southbound					Sherwin Williams Paints Westbound					Benns Church Blvd Northbound					Turner Drive Eastbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 05:15 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	0	223	18	2	243	0	0	0	0	0	32	317	1	0	350	2	0	20	0	22	615
04:45 PM	0	217	31	2	250	0	1	0	0	1	43	292	0	0	335	23	0	27	0	50	636
05:00 PM	1	215	30	9	255	0	0	1	0	1	40	271	0	0	311	30	0	14	0	44	611
05:15 PM	1	222	33	14	270	0	0	1	0	1	38	316	0	0	354	21	0	25	0	46	671
Total Volume	2	877	112	27	1018	0	1	2	0	3	153	1196	1	0	1350	76	0	86	0	162	2533
% App. Total	0.2	86.1	11	2.7		0	33.3	66.7	0		11.3	88.6	0.1	0		46.9	0	53.1	0		
PHF	.500	.983	.848	.482	.943	.000	.250	.500	.000	.750	.890	.943	.250	.000	.953	.633	.000	.796	.000	.810	.944
Lights	2	855	102	27	986	0	1	2	0	3	143	1174	1	0	1318	75	0	85	0	160	2467
% Lights	100	97.5	91.1	100	96.9	0	100	100	0	100	93.5	98.2	100	0	97.6	98.7	0	98.8	0	98.8	97.4
Single Units	0	13	10	0	23	0	0	0	0	0	10	15	0	0	25	1	0	1	0	2	50
% Single Units	0	1.5	8.9	0	2.3	0	0	0	0	0	6.5	1.3	0	0	1.9	1.3	0	1.2	0	1.2	2.0
TTST	0	9	0	0	9	0	0	0	0	0	0	7	0	0	7	0	0	0	0	0	16
% TTST	0	1.0	0	0	0.9	0	0	0	0	0	0	0.6	0	0	0.5	0	0	0	0	0	0.6
Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



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	Benns Church Blvd Southbound					Sherwin Williams Paints Westbound					Benns Church Blvd Northbound					Turner Drive Eastbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 05:15 PM - Peak 1 of 1																					
Peak Hour for Each Approach Begins at:																					
	04:30 PM					02:30 PM					04:00 PM					02:30 PM					
+0 mins.	0	223	18	2	243	1	0	1	0	2	38	330	0	0	368	26	0	23	0	49	
+15 mins.	0	217	31	2	250	1	0	0	0	1	54	261	0	0	315	124	0	70	0	194	
+30 mins.	1	215	30	9	255	0	0	0	0	0	32	317	1	0	350	83	0	70	0	153	
+45 mins.	1	222	33	14	270	0	0	1	0	1	43	292	0	0	335	30	0	35	0	65	
Total Volume	2	877	112	27	1018	2	0	2	0	4	167	1200	1	0	1368	263	0	198	0	461	
% App. Total	0.2	86.1	11	2.7		50	0	50	0		12.2	87.7	0.1	0		57	0	43	0		
PHF	.500	.983	.848	.482	.943	.500	.000	.500	.000	.500	.773	.909	.250	.000	.929	.530	.000	.707	.000	.594	
Lights	2	855	102	27	986	2	0	2	0	4	161	1167	1	0	1329	247	0	181	0	428	
% Lights	100	97.5	91.1	100	96.9	100	0	100	0	100	96.4	97.2	100	0	97.1	93.9	0	91.4	0	92.8	
Single Units	0	13	10	0	23	0	0	0	0	0	6	23	0	0	29	16	0	17	0	33	
% Single Units	0	1.5	8.9	0	2.3	0	0	0	0	0	3.6	1.9	0	0	2.1	6.1	0	8.6	0	7.2	
TTST	0	9	0	0	9	0	0	0	0	0	0	10	0	0	10	0	0	0	0	0	
% TTST	0	1	0	0	0.9	0	0	0	0	0	0	0.8	0	0	0.7	0	0	0	0	0	
Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
% Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	



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Groups Printed- Lights - Single Units - TTST

	Benns Church Blvd Southbound		Benns Church Blvd Northbound		
Start Time	Thru	U-Turn	Thru	U-Turn	Int. Total
06:00 AM	255	0	135	0	390
06:15 AM	263	0	174	0	437
06:30 AM	283	0	164	0	447
06:45 AM	265	0	167	0	432
Total	1066	0	640	0	1706
07:00 AM	246	0	268	0	514
07:15 AM	322	0	241	1	564
07:30 AM	314	1	213	3	531
07:45 AM	248	0	194	0	442
Total	1130	1	916	4	2051
08:00 AM	221	0	176	3	400
08:15 AM	187	0	190	1	378
08:30 AM	227	0	199	0	426
08:45 AM	194	0	194	0	388
Total	829	0	759	4	1592
09:00 AM	227	0	143	1	371
09:15 AM	188	0	159	2	349
09:30 AM	159	0	148	0	307
09:45 AM	160	0	140	3	303
Total	734	0	590	6	1330
10:00 AM	153	3	149	1	306
10:15 AM	174	0	155	0	329
10:30 AM	170	0	175	0	345
10:45 AM	152	0	171	2	325
Total	649	3	650	3	1305
11:00 AM	138	0	129	2	269
11:15 AM	175	0	179	0	354
11:30 AM	174	0	163	1	338
11:45 AM	167	0	182	0	349
Total	654	0	653	3	1310
12:00 PM	165	0	159	0	324
12:15 PM	194	1	195	2	392
12:30 PM	195	0	214	0	409
12:45 PM	181	0	200	2	383
Total	735	1	768	4	1508
01:00 PM	176	1	172	1	350
01:15 PM	211	0	195	1	407
01:30 PM	165	0	189	1	355
01:45 PM	185	1	210	3	399
Total	737	2	766	6	1511
02:00 PM	165	0	195	1	361
02:15 PM	170	0	210	0	380
02:30 PM	186	0	223	1	410
02:45 PM	230	1	241	0	472
Total	751	1	869	2	1623
03:00 PM	264	0	245	2	511
03:15 PM	229	1	294	3	527

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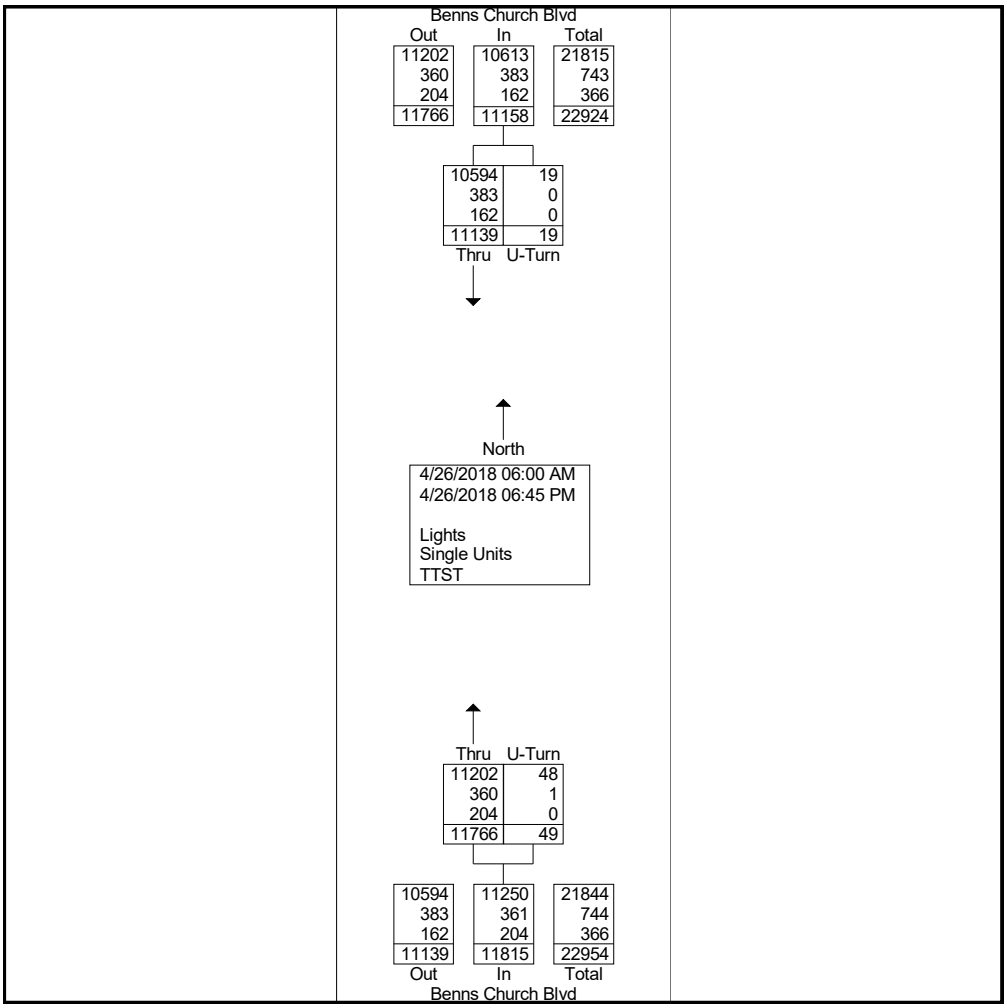
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Groups Printed- Lights - Single Units - TTST

	Benns Church Blvd Southbound		Benns Church Blvd Northbound		
Start Time	Thru	U-Turn	Thru	U-Turn	Int. Total
03:30 PM	234	0	280	0	514
03:45 PM	218	2	298	0	518
Total	945	3	1117	5	2070
04:00 PM	245	1	408	2	656
04:15 PM	239	2	338	1	580
04:30 PM	272	0	364	3	639
04:45 PM	282	1	376	0	659
Total	1038	4	1486	6	2534
05:00 PM	267	0	391	2	660
05:15 PM	270	0	361	1	632
05:30 PM	204	2	370	0	576
05:45 PM	213	1	403	0	617
Total	954	3	1525	3	2485
06:00 PM	219	0	342	0	561
06:15 PM	261	1	243	1	506
06:30 PM	251	0	236	1	488
06:45 PM	186	0	206	1	393
Total	917	1	1027	3	1948
Grand Total	11139	19	11766	49	22973
Apprch %	99.8	0.2	99.6	0.4	
Total %	48.5	0.1	51.2	0.2	
Lights	10594	19	11202	48	21863
% Lights	95.1	100	95.2	98	95.2
Single Units	383	0	360	1	744
% Single Units	3.4	0	3.1	2	3.2
TTST	162	0	204	0	366
% TTST	1.5	0	1.7	0	1.6

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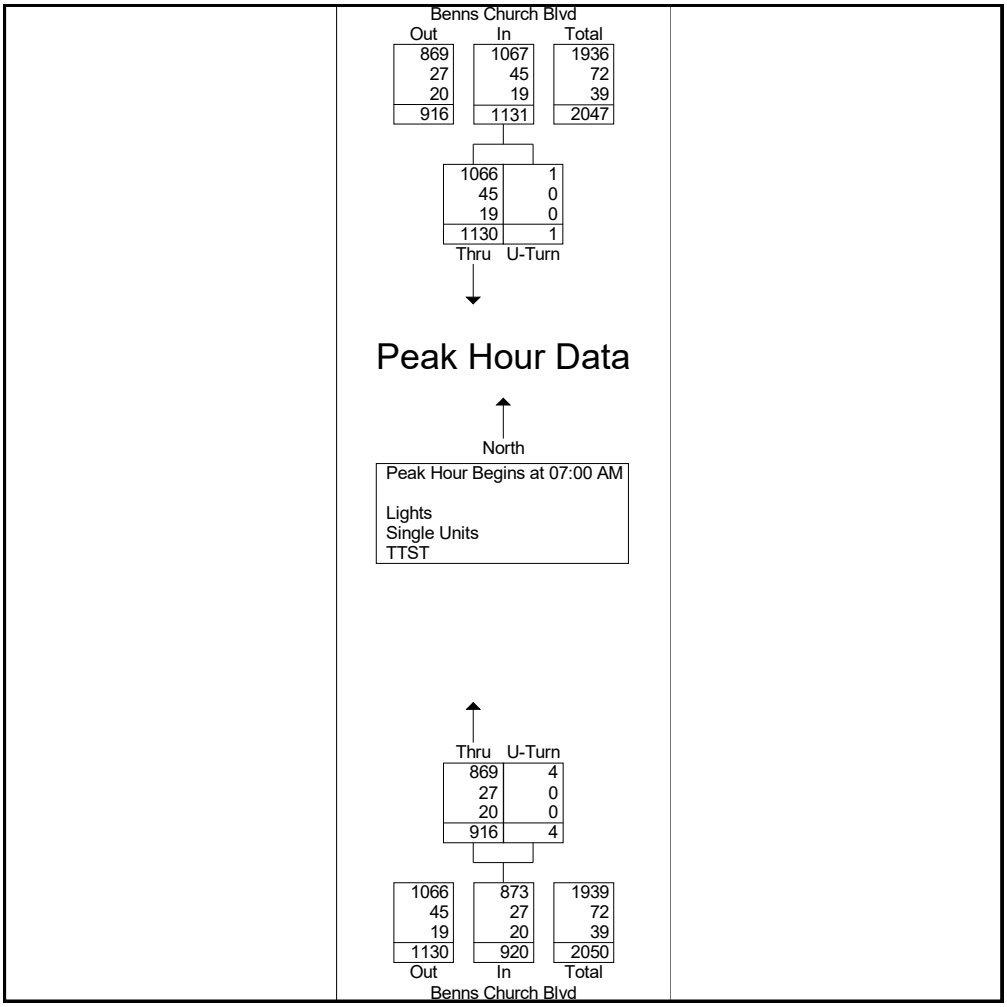
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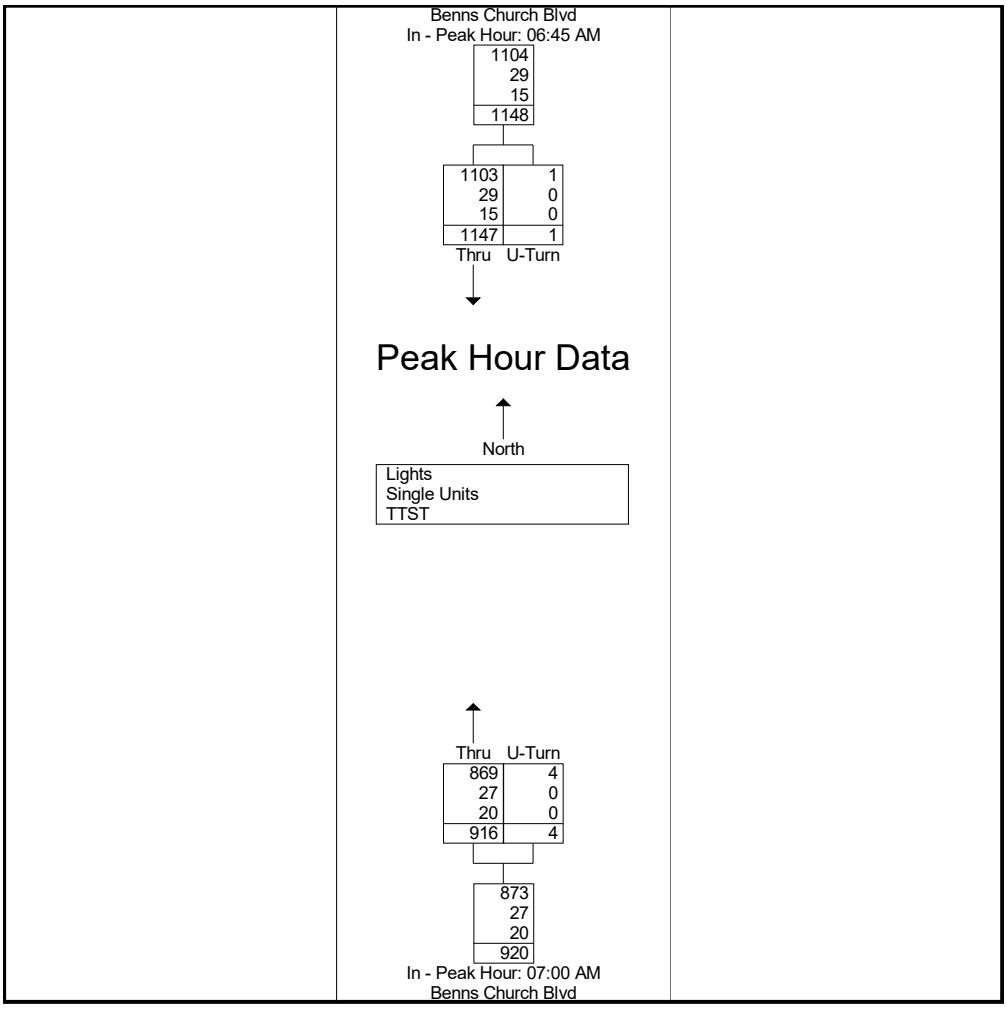
	Benns Church Blvd Southbound			Benns Church Blvd Northbound			
Start Time	Thru	U-Turn	App. Total	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 09:45 AM - Peak 1 of 1							
Peak Hour for Entire Intersection Begins at 07:00 AM							
07:00 AM	246	0	246	268	0	268	514
07:15 AM	322	0	322	241	1	242	564
07:30 AM	314	1	315	213	3	216	531
07:45 AM	248	0	248	194	0	194	442
Total Volume	1130	1	1131	916	4	920	2051
% App. Total	99.9	0.1		99.6	0.4		
PHF	.877	.250	.878	.854	.333	.858	.909
Lights	1066	1	1067	869	4	873	1940
% Lights	94.3	100	94.3	94.9	100	94.9	94.6
Single Units	45	0	45	27	0	27	72
% Single Units	4.0	0	4.0	2.9	0	2.9	3.5
TTST	19	0	19	20	0	20	39
% TTST	1.7	0	1.7	2.2	0	2.2	1.9



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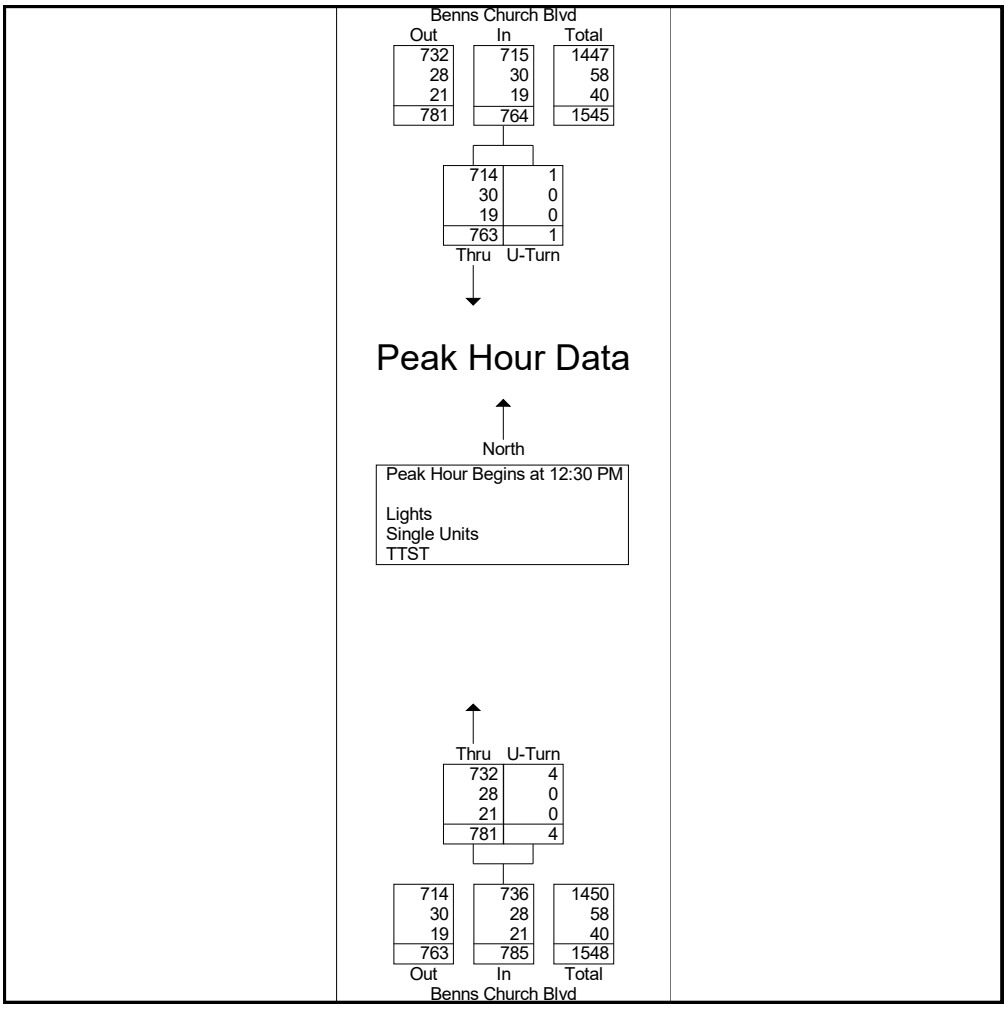
	Benns Church Blvd Southbound			Benns Church Blvd Northbound			
Start Time	Thru	U-Turn	App. Total	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 09:45 AM - Peak 1 of 1							
Peak Hour for Each Approach Begins at:							
	06:45 AM			07:00 AM			
+0 mins.	265	0	265	268	0	268	
+15 mins.	246	0	246	241	1	242	
+30 mins.	322	0	322	213	3	216	
+45 mins.	314	1	315	194	0	194	
Total Volume	1147	1	1148	916	4	920	
% App. Total	99.9	0.1		99.6	0.4		
PHF	.891	.250	.891	.854	.333	.858	
Lights	1103	1	1104	869	4	873	
% Lights	96.2	100	96.2	94.9	100	94.9	
Single Units	29	0	29	27	0	27	
% Single Units	2.5	0	2.5	2.9	0	2.9	
TTST	15	0	15	20	0	20	
% TTST	1.3	0	1.3	2.2	0	2.2	



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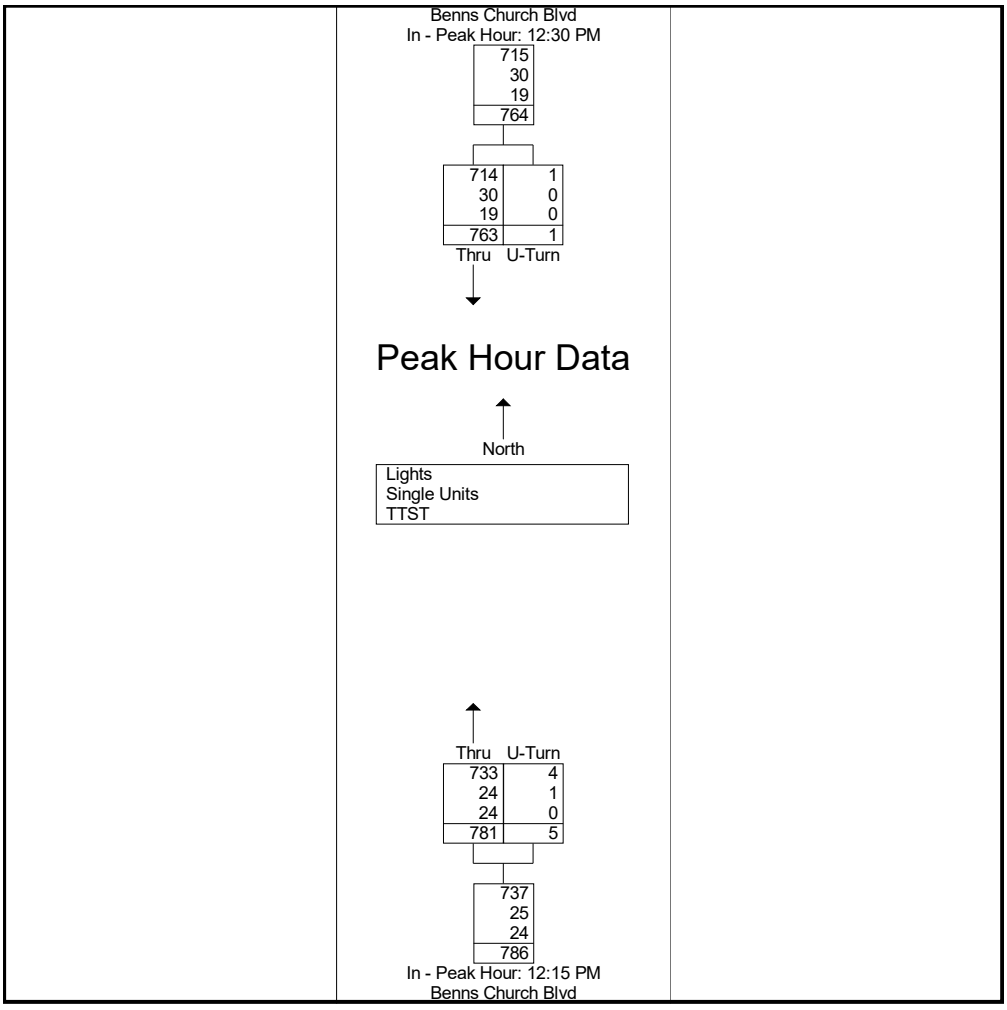
	Benns Church Blvd Southbound			Benns Church Blvd Northbound			
Start Time	Thru	U-Turn	App. Total	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 10:00 AM to 01:45 PM - Peak 1 of 1							
Peak Hour for Entire Intersection Begins at 12:30 PM							
12:30 PM	195	0	195	214	0	214	409
12:45 PM	181	0	181	200	2	202	383
01:00 PM	176	1	177	172	1	173	350
01:15 PM	211	0	211	195	1	196	407
Total Volume	763	1	764	781	4	785	1549
% App. Total	99.9	0.1		99.5	0.5		
PHF	.904	.250	.905	.912	.500	.917	.947
Lights	714	1	715	732	4	736	1451
% Lights	93.6	100	93.6	93.7	100	93.8	93.7
Single Units	30	0	30	28	0	28	58
% Single Units	3.9	0	3.9	3.6	0	3.6	3.7
TTST	19	0	19	21	0	21	40
% TTST	2.5	0	2.5	2.7	0	2.7	2.6



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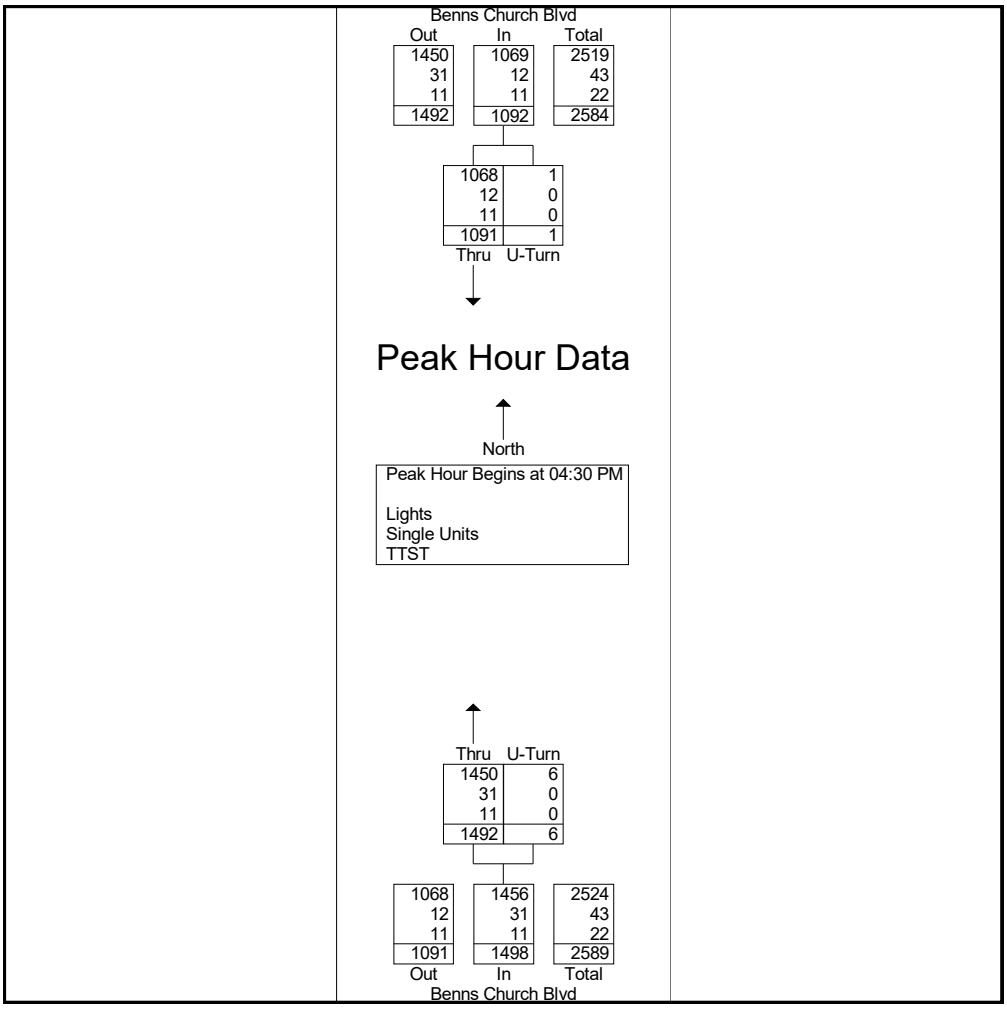
	Benns Church Blvd Southbound			Benns Church Blvd Northbound			
Start Time	Thru	U-Turn	App. Total	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 10:00 AM to 01:45 PM - Peak 1 of 1							
Peak Hour for Each Approach Begins at:							
	12:30 PM			12:15 PM			
+0 mins.	195	0	195	195	2	197	
+15 mins.	181	0	181	214	0	214	
+30 mins.	176	1	177	200	2	202	
+45 mins.	211	0	211	172	1	173	
Total Volume	763	1	764	781	5	786	
% App. Total	99.9	0.1		99.4	0.6		
PHF	.904	.250	.905	.912	.625	.918	
Lights	714	1	715	733	4	737	
% Lights	93.6	100	93.6	93.9	80	93.8	
Single Units	30	0	30	24	1	25	
% Single Units	3.9	0	3.9	3.1	20	3.2	
TTST	19	0	19	24	0	24	
% TTST	2.5	0	2.5	3.1	0	3.1	



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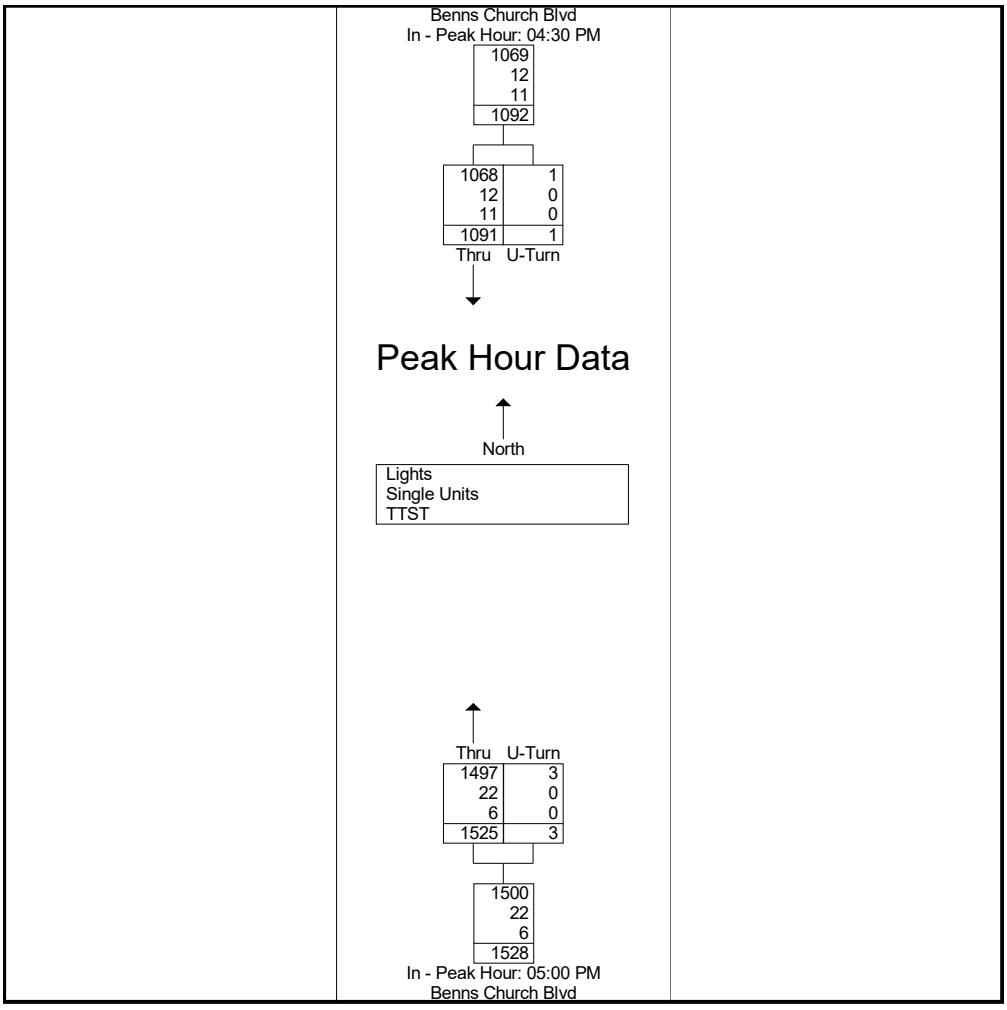
	Benns Church Blvd Southbound			Benns Church Blvd Northbound			
Start Time	Thru	U-Turn	App. Total	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 02:00 PM to 06:45 PM - Peak 1 of 1							
Peak Hour for Entire Intersection Begins at 04:30 PM							
04:30 PM	272	0	272	364	3	367	639
04:45 PM	282	1	283	376	0	376	659
05:00 PM	267	0	267	391	2	393	660
05:15 PM	270	0	270	361	1	362	632
Total Volume	1091	1	1092	1492	6	1498	2590
% App. Total	99.9	0.1		99.6	0.4		
PHF	.967	.250	.965	.954	.500	.953	.981
Lights	1068	1	1069	1450	6	1456	2525
% Lights	97.9	100	97.9	97.2	100	97.2	97.5
Single Units	12	0	12	31	0	31	43
% Single Units	1.1	0	1.1	2.1	0	2.1	1.7
TTST	11	0	11	11	0	11	22
% TTST	1.0	0	1.0	0.7	0	0.7	0.8



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	Benns Church Blvd Southbound			Benns Church Blvd Northbound			
Start Time	Thru	U-Turn	App. Total	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 02:00 PM to 06:45 PM - Peak 1 of 1							
Peak Hour for Each Approach Begins at:							
	04:30 PM			05:00 PM			
+0 mins.	272	0	272	391	2	393	
+15 mins.	282	1	283	361	1	362	
+30 mins.	267	0	267	370	0	370	
+45 mins.	270	0	270	403	0	403	
Total Volume	1091	1	1092	1525	3	1528	
% App. Total	99.9	0.1		99.8	0.2		
PHF	.967	.250	.965	.946	.375	.948	
Lights	1068	1	1069	1497	3	1500	
% Lights	97.9	100	97.9	98.2	100	98.2	
Single Units	12	0	12	22	0	22	
% Single Units	1.1	0	1.1	1.4	0	1.4	
TTST	11	0	11	6	0	6	
% TTST	1	0	1	0.4	0	0.4	

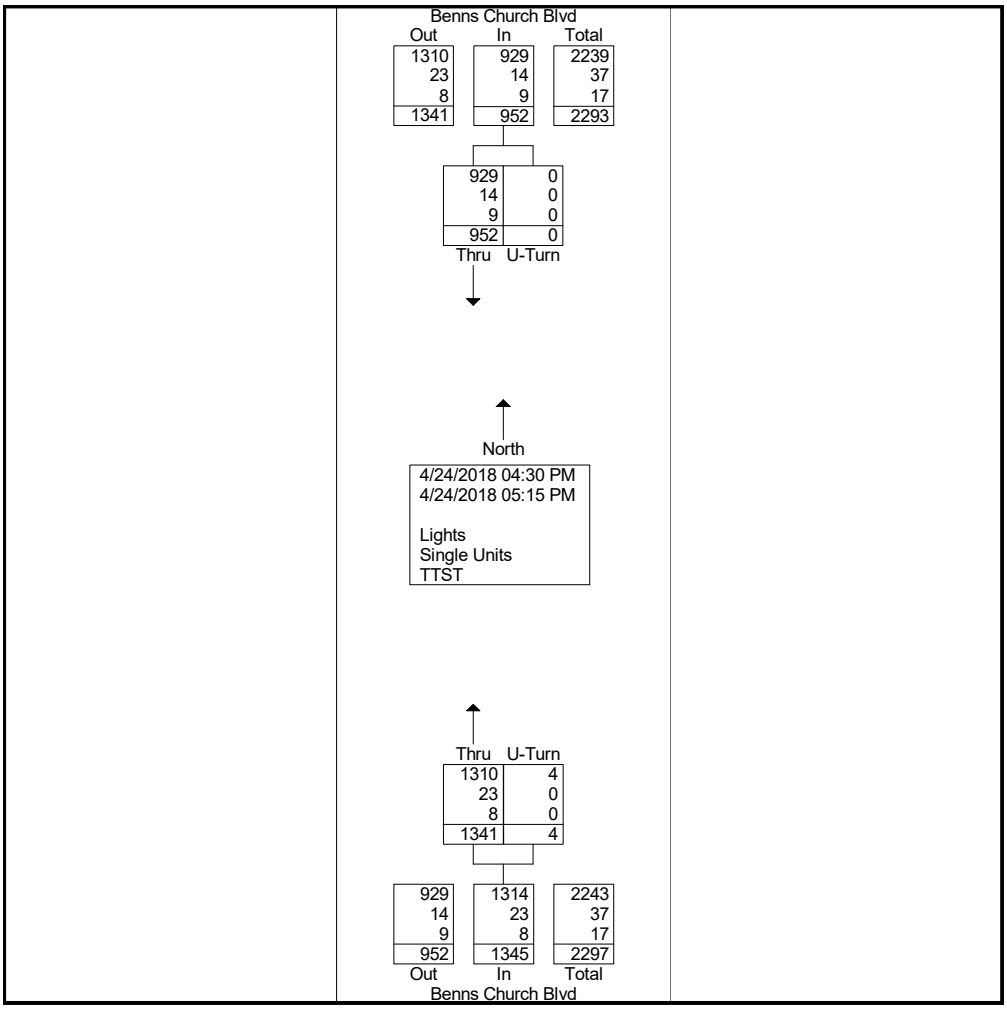


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File Name : Benns Church with Median Break Day 1
Site Code :
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Groups Printed- Lights - Single Units - TTST

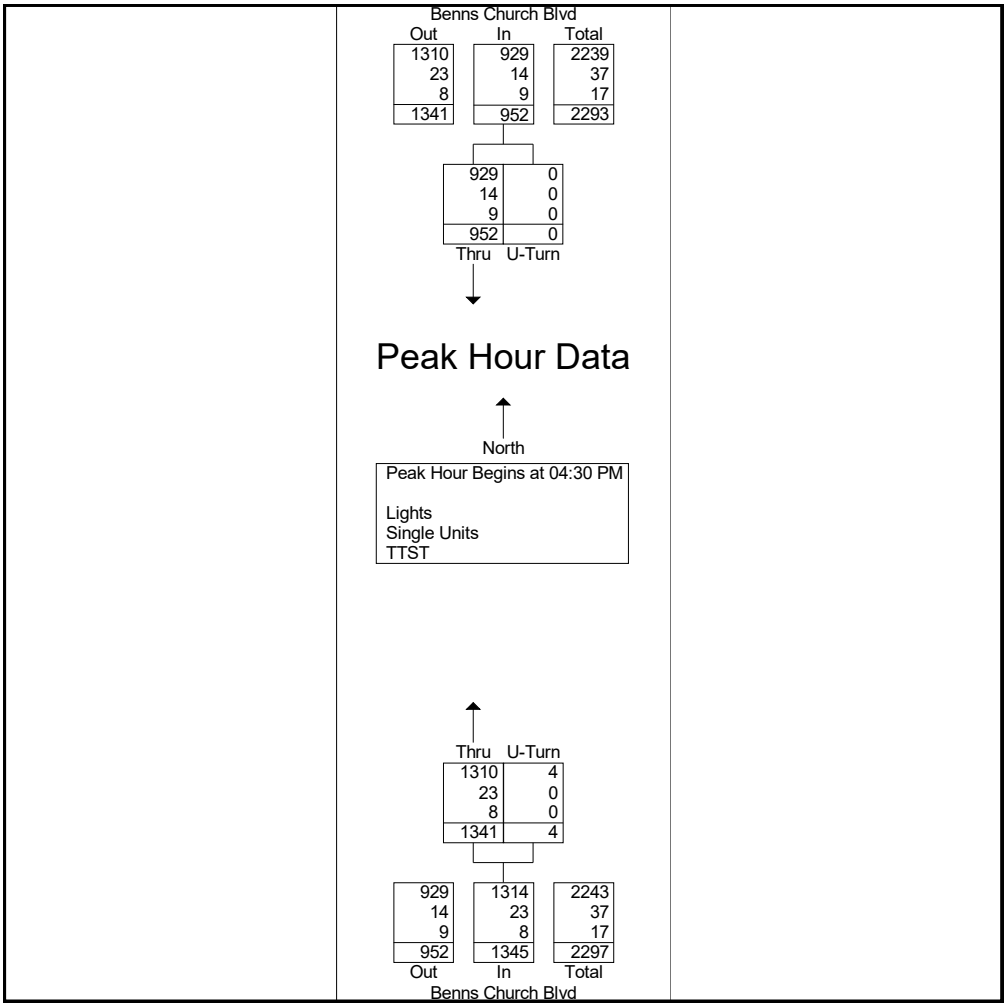
	Benns Church Blvd Southbound		Benns Church Blvd Northbound		
Start Time	Thru	U-Turn	Thru	U-Turn	Int. Total
04:30 PM	241	0	347	0	588
04:45 PM	236	0	347	1	584
Total	477	0	694	1	1172
05:00 PM	235	0	312	1	548
05:15 PM	240	0	335	2	577
Grand Total	952	0	1341	4	2297
Apprch %	100	0	99.7	0.3	
Total %	41.4	0	58.4	0.2	
Lights	929	0	1310	4	2243
% Lights	97.6	0	97.7	100	97.6
Single Units	14	0	23	0	37
% Single Units	1.5	0	1.7	0	1.6
TTST	9	0	8	0	17
% TTST	0.9	0	0.6	0	0.7



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File Name : Benns Church with Median Break Day 1
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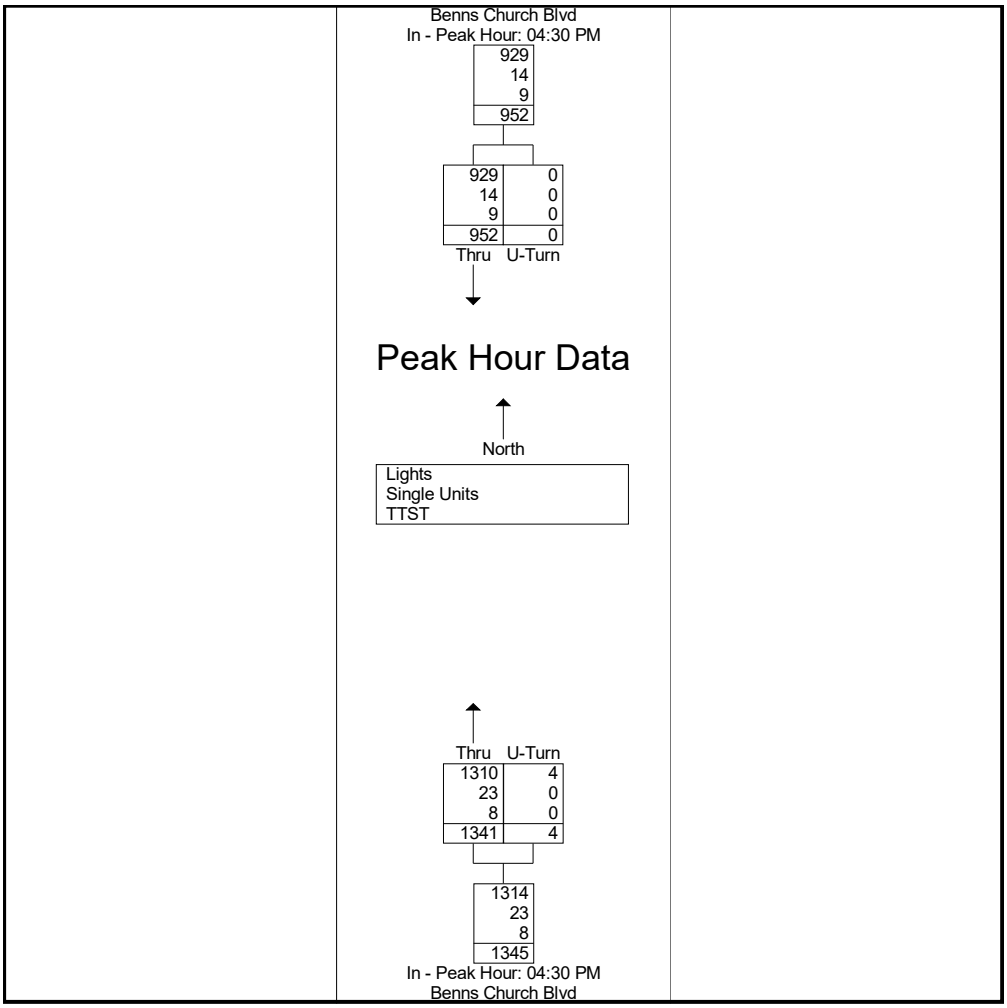
	Benns Church Blvd Southbound			Benns Church Blvd Northbound			
Start Time	Thru	U-Turn	App. Total	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1							
Peak Hour for Entire Intersection Begins at 04:30 PM							
04:30 PM	241	0	241	347	0	347	588
04:45 PM	236	0	236	347	1	348	584
05:00 PM	235	0	235	312	1	313	548
05:15 PM	240	0	240	335	2	337	577
Total Volume	952	0	952	1341	4	1345	2297
% App. Total	100	0		99.7	0.3		
PHF	.988	.000	.988	.966	.500	.966	.977
Lights	929	0	929	1310	4	1314	2243
% Lights	97.6	0	97.6	97.7	100	97.7	97.6
Single Units	14	0	14	23	0	23	37
% Single Units	1.5	0	1.5	1.7	0	1.7	1.6
TTST	9	0	9	8	0	8	17
% TTST	0.9	0	0.9	0.6	0	0.6	0.7



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File Name : Benns Church with Median Break Day 1
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	Benns Church Blvd Southbound			Benns Church Blvd Northbound			
Start Time	Thru	U-Turn	App. Total	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1							
Peak Hour for Each Approach Begins at:							
	04:30 PM			04:30 PM			
+0 mins.	241	0	241	347	0	347	
+15 mins.	236	0	236	347	1	348	
+30 mins.	235	0	235	312	1	313	
+45 mins.	240	0	240	335	2	337	
Total Volume	952	0	952	1341	4	1345	
% App. Total	100	0		99.7	0.3		
PHF	.988	.000	.988	.966	.500	.966	
Lights	929	0	929	1310	4	1314	
% Lights	97.6	0	97.6	97.7	100	97.7	
Single Units	14	0	14	23	0	23	
% Single Units	1.5	0	1.5	1.7	0	1.7	
TTST	9	0	9	8	0	8	
% TTST	0.9	0	0.9	0.6	0	0.6	



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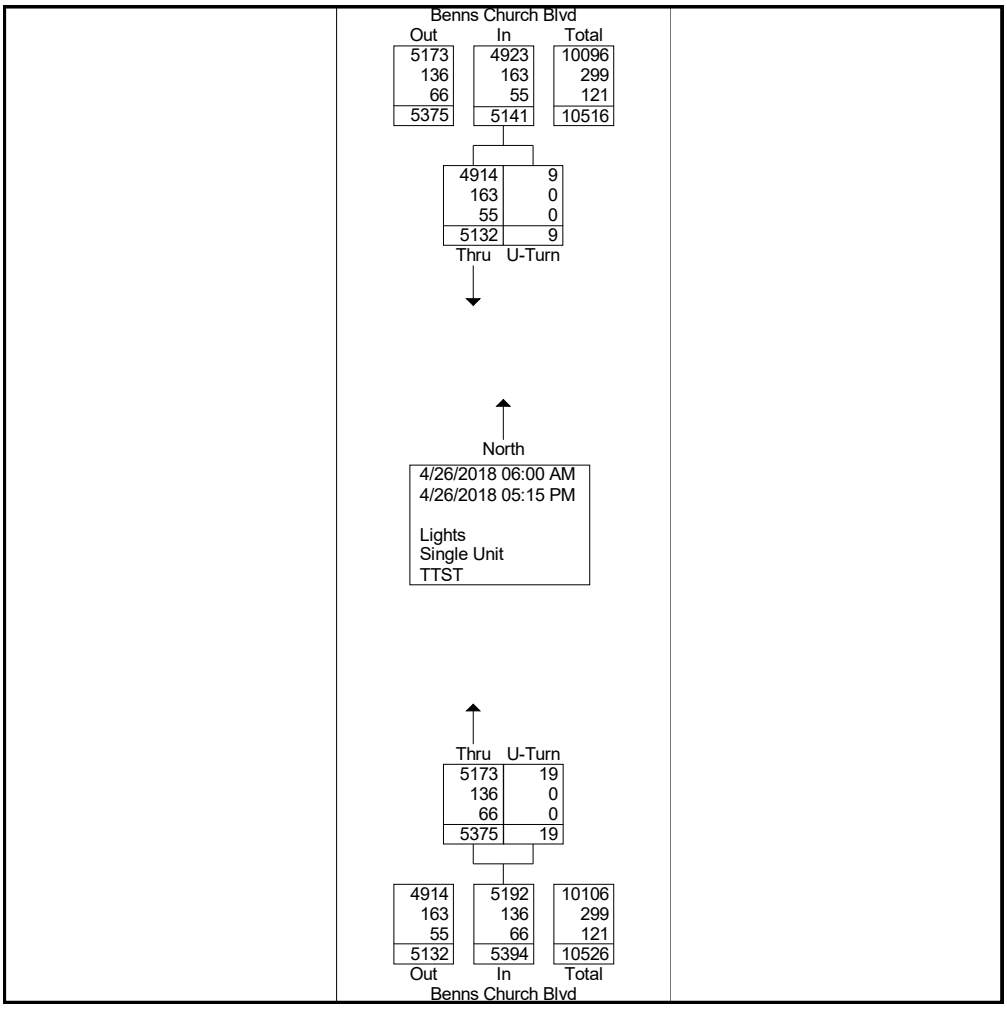
File Name : Benns Church with Median Break
Site Code :
Start Date : 4/26/2018
Page No : 1

Groups Printed- Lights - Single Unit - TTST

	Benns Church Blvd Southbound		Benns Church Blvd Northbound		
Start Time	Thru	U-Turn	Thru	U-Turn	Int. Total
06:00 AM	255	0	135	0	390
06:15 AM	263	0	174	0	437
06:30 AM	283	0	164	0	447
06:45 AM	265	0	167	0	432
Total	1066	0	640	0	1706
07:00 AM	246	0	268	0	514
07:15 AM	322	0	241	1	564
07:30 AM	314	1	213	3	531
07:45 AM	248	0	194	0	442
Total	1130	1	916	4	2051
02:30 PM	186	0	223	1	410
02:45 PM	230	1	241	0	472
Total	416	1	464	1	882
03:00 PM	264	0	245	2	511
03:15 PM	229	1	294	3	527
03:30 PM	234	0	280	0	514
03:45 PM	218	2	298	0	518
Total	945	3	1117	5	2070
04:00 PM	245	1	408	2	656
04:15 PM	239	2	338	1	580
04:30 PM	272	0	364	3	639
04:45 PM	282	1	376	0	659
Total	1038	4	1486	6	2534
05:00 PM	267	0	391	2	660
05:15 PM	270	0	361	1	632
Grand Total	5132	9	5375	19	10535
Apprch %	99.8	0.2	99.6	0.4	
Total %	48.7	0.1	51	0.2	
Lights	4914	9	5173	19	10115
% Lights	95.8	100	96.2	100	96
Single Unit	163	0	136	0	299
% Single Unit	3.2	0	2.5	0	2.8
TTST	55	0	66	0	121
% TTST	1.1	0	1.2	0	1.1

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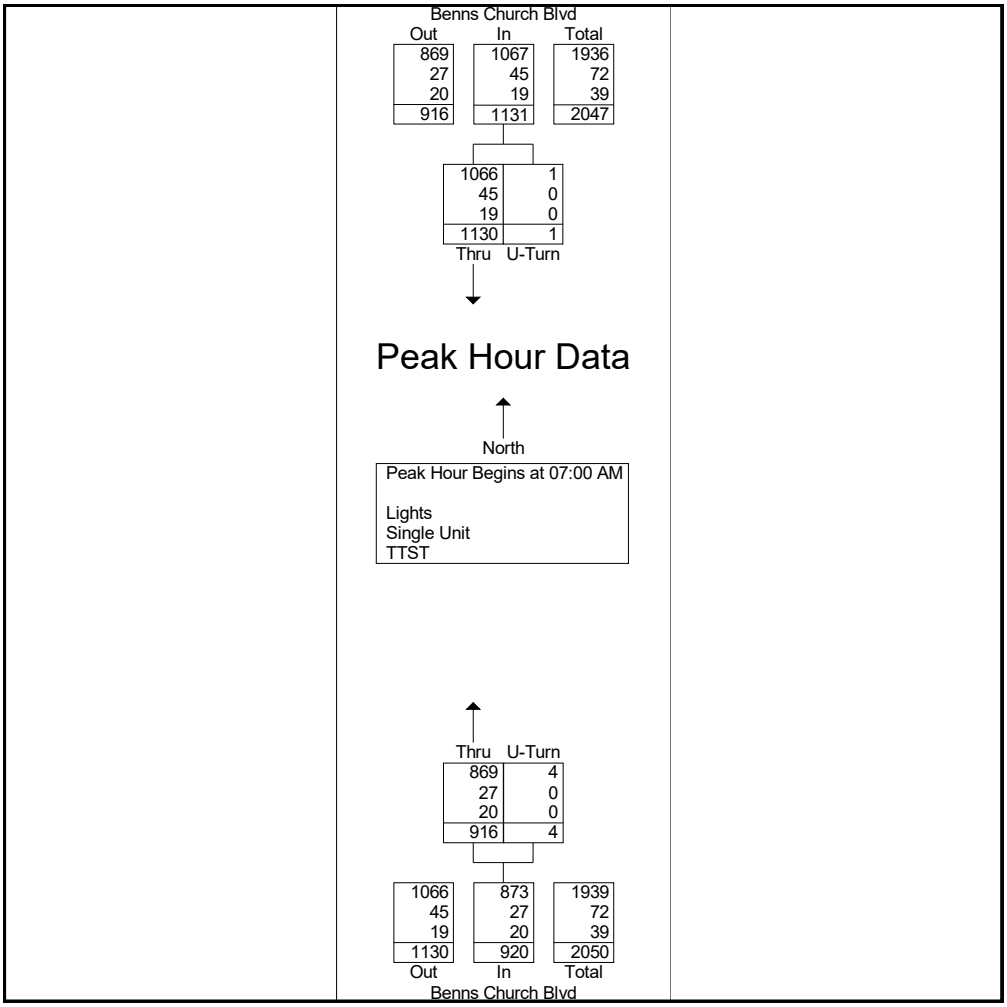
File Name : Benns Church with Median Break
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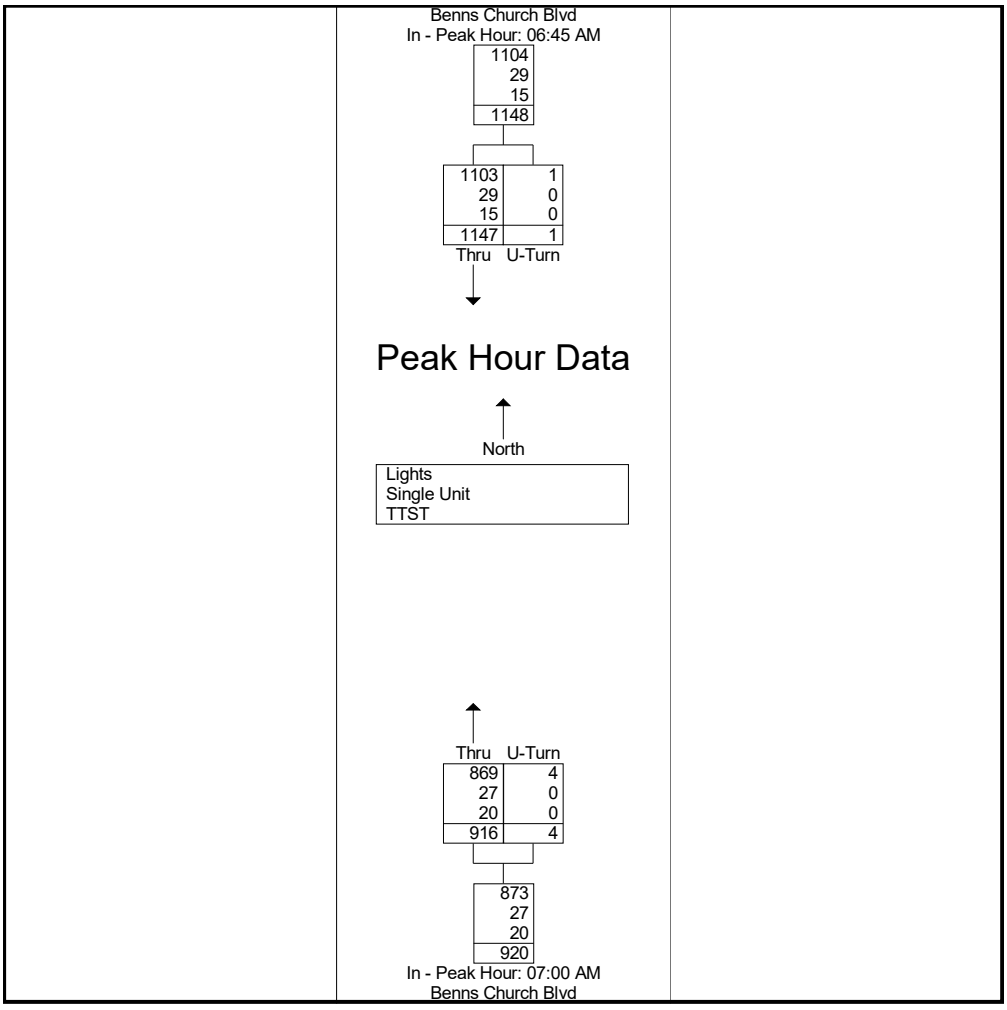
	Benns Church Blvd Southbound			Benns Church Blvd Northbound			
Start Time	Thru	U-Turn	App. Total	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 11:45 AM - Peak 1 of 1							
Peak Hour for Entire Intersection Begins at 07:00 AM							
07:00 AM	246	0	246	268	0	268	514
07:15 AM	322	0	322	241	1	242	564
07:30 AM	314	1	315	213	3	216	531
07:45 AM	248	0	248	194	0	194	442
Total Volume	1130	1	1131	916	4	920	2051
% App. Total	99.9	0.1		99.6	0.4		
PHF	.877	.250	.878	.854	.333	.858	.909
Lights	1066	1	1067	869	4	873	1940
% Lights	94.3	100	94.3	94.9	100	94.9	94.6
Single Unit	45	0	45	27	0	27	72
% Single Unit	4.0	0	4.0	2.9	0	2.9	3.5
TTST	19	0	19	20	0	20	39
% TTST	1.7	0	1.7	2.2	0	2.2	1.9



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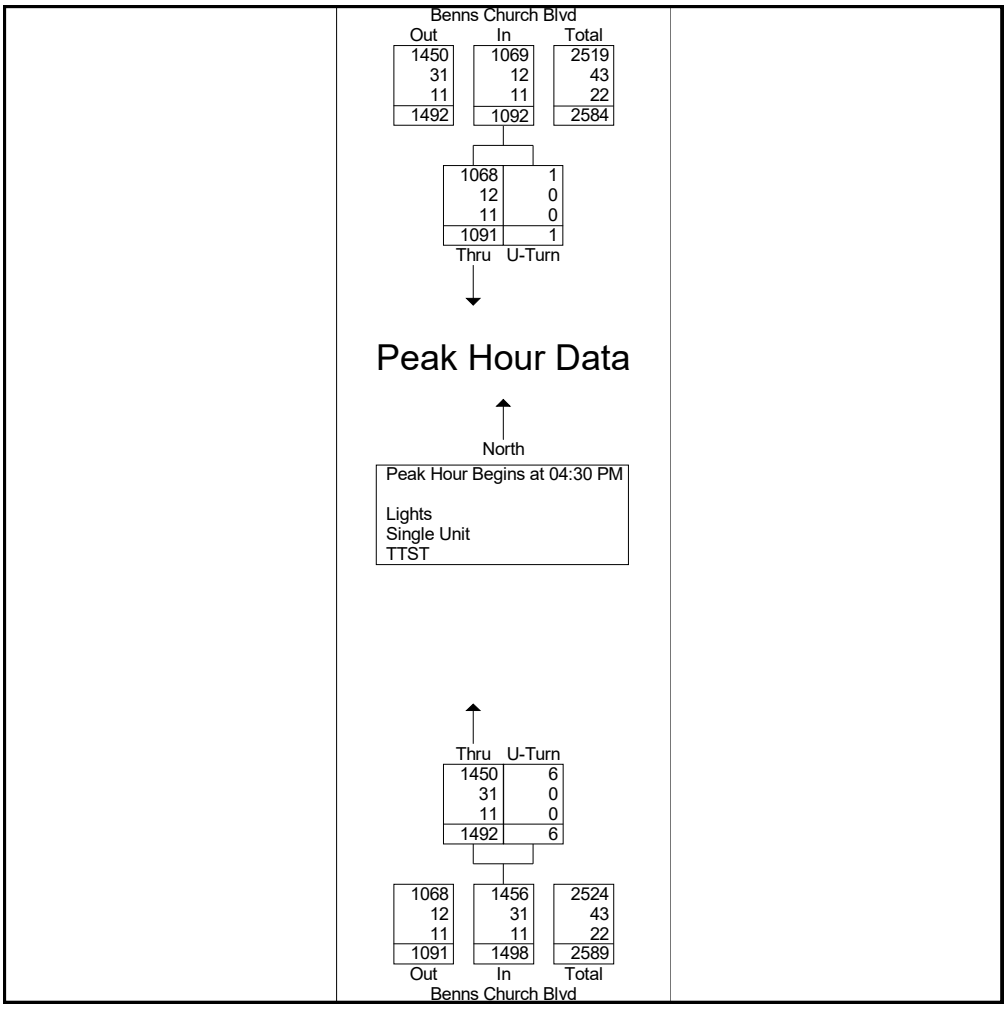
	Benns Church Blvd Southbound			Benns Church Blvd Northbound			
Start Time	Thru	U-Turn	App. Total	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 11:45 AM - Peak 1 of 1							
Peak Hour for Each Approach Begins at:							
	06:45 AM			07:00 AM			
+0 mins.	265	0	265	268	0	268	
+15 mins.	246	0	246	241	1	242	
+30 mins.	322	0	322	213	3	216	
+45 mins.	314	1	315	194	0	194	
Total Volume	1147	1	1148	916	4	920	
% App. Total	99.9	0.1		99.6	0.4		
PHF	.891	.250	.891	.854	.333	.858	
Lights	1103	1	1104	869	4	873	
% Lights	96.2	100	96.2	94.9	100	94.9	
Single Unit	29	0	29	27	0	27	
% Single Unit	2.5	0	2.5	2.9	0	2.9	
TTST	15	0	15	20	0	20	
% TTST	1.3	0	1.3	2.2	0	2.2	



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File Name : Benns Church with Median Break
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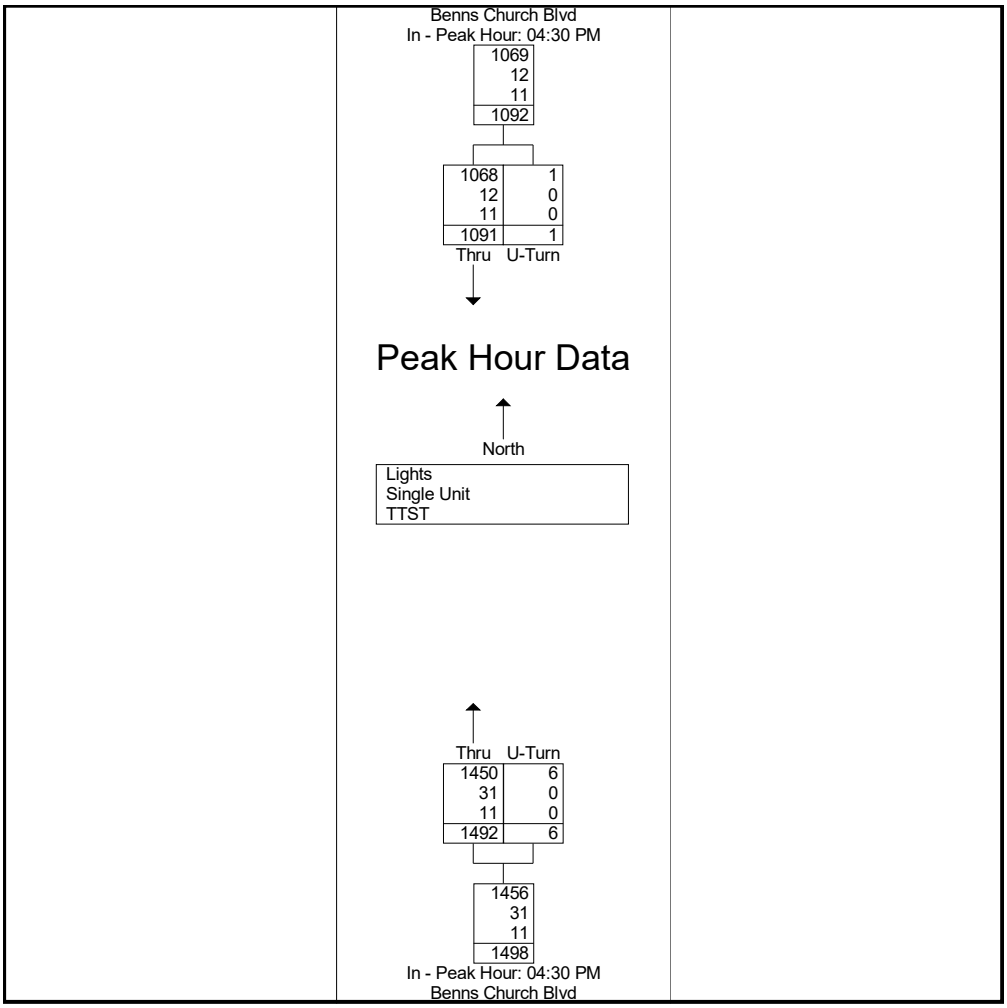
	Benns Church Blvd Southbound			Benns Church Blvd Northbound			
Start Time	Thru	U-Turn	App. Total	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 05:15 PM - Peak 1 of 1							
Peak Hour for Entire Intersection Begins at 04:30 PM							
04:30 PM	272	0	272	364	3	367	639
04:45 PM	282	1	283	376	0	376	659
05:00 PM	267	0	267	391	2	393	660
05:15 PM	270	0	270	361	1	362	632
Total Volume	1091	1	1092	1492	6	1498	2590
% App. Total	99.9	0.1		99.6	0.4		
PHF	.967	.250	.965	.954	.500	.953	.981
Lights	1068	1	1069	1450	6	1456	2525
% Lights	97.9	100	97.9	97.2	100	97.2	97.5
Single Unit	12	0	12	31	0	31	43
% Single Unit	1.1	0	1.1	2.1	0	2.1	1.7
TTST	11	0	11	11	0	11	22
% TTST	1.0	0	1.0	0.7	0	0.7	0.8



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	Benns Church Blvd Southbound			Benns Church Blvd Northbound			
Start Time	Thru	U-Turn	App. Total	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 05:15 PM - Peak 1 of 1							
Peak Hour for Each Approach Begins at:							
	04:30 PM			04:30 PM			
+0 mins.	272	0	272	364	3	367	
+15 mins.	282	1	283	376	0	376	
+30 mins.	267	0	267	391	2	393	
+45 mins.	270	0	270	361	1	362	
Total Volume	1091	1	1092	1492	6	1498	
% App. Total	99.9	0.1		99.6	0.4		
PHF	.967	.250	.965	.954	.500	.953	
Lights	1068	1	1069	1450	6	1456	
% Lights	97.9	100	97.9	97.2	100	97.2	
Single Unit	12	0	12	31	0	31	
% Single Unit	1.1	0	1.1	2.1	0	2.1	
TTST	11	0	11	11	0	11	
% TTST	1	0	1	0.7	0	0.7	



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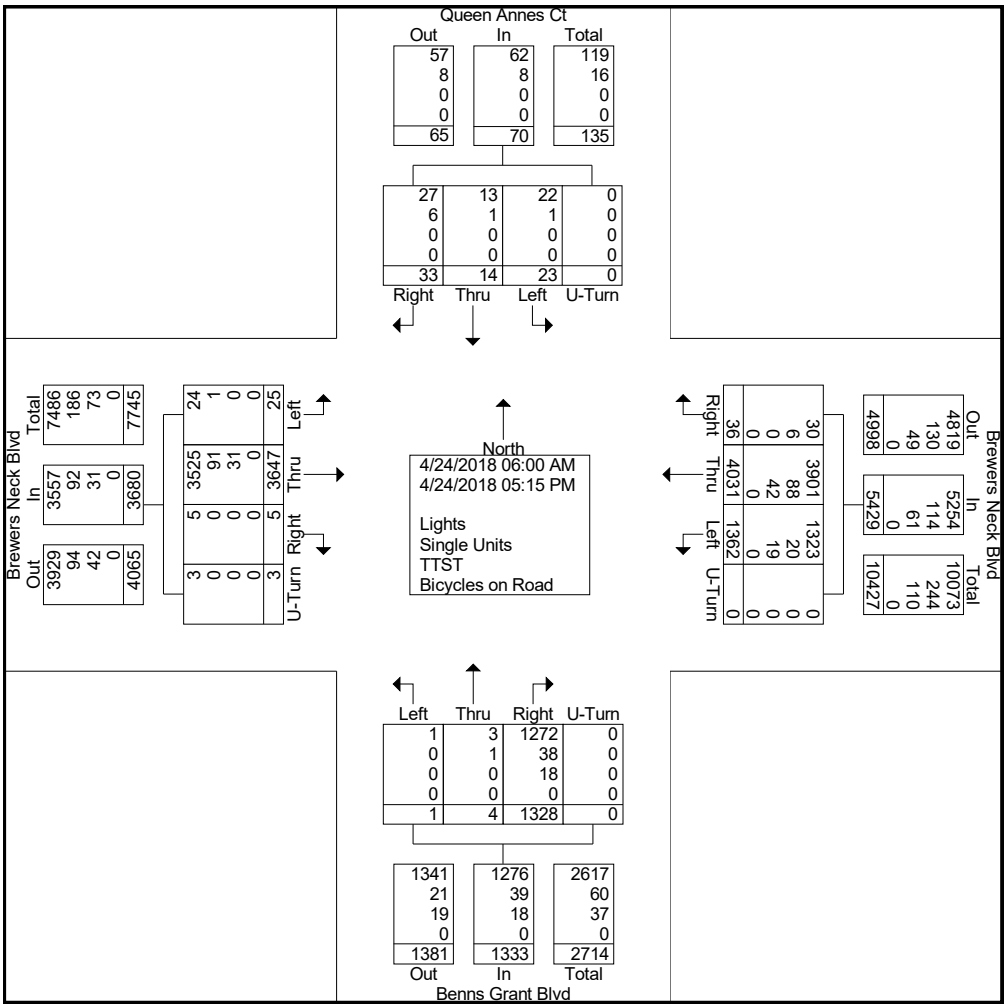
File Name : Brewers Neck and Benns Grant Blvd
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Groups Printed- Lights - Single Units - TTST - Bicycles on Road

	Queen Annes Ct Southbound				Brewers Neck Blvd Westbound				Benns Grant Blvd Northbound				Brewers Neck Blvd Eastbound				
Start Time	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Int. Total
06:00 AM	2	1	0	0	25	108	0	0	0	0	74	0	0	211	0	0	421
06:15 AM	1	0	1	0	30	122	0	0	0	0	90	0	1	224	0	0	469
06:30 AM	0	1	1	0	32	120	0	0	0	0	100	0	0	236	0	0	490
06:45 AM	1	0	3	0	33	132	3	0	0	0	95	0	0	190	0	0	457
Total	4	2	5	0	120	482	3	0	0	0	359	0	1	861	0	0	1837
07:00 AM	1	0	5	0	35	219	0	0	0	1	96	0	1	209	0	0	567
07:15 AM	2	0	3	0	59	161	1	0	0	0	108	0	0	203	0	0	537
07:30 AM	1	1	2	0	69	124	0	0	0	0	94	0	2	268	0	1	562
07:45 AM	2	2	1	0	53	125	2	0	0	0	86	0	1	198	0	1	471
Total	6	3	11	0	216	629	3	0	0	1	384	0	4	878	0	2	2137
02:30 PM	3	2	1	0	46	165	1	0	0	0	33	0	0	140	0	0	391
02:45 PM	2	1	2	0	57	179	1	0	0	0	33	0	5	153	0	0	433
Total	5	3	3	0	103	344	2	0	0	0	66	0	5	293	0	0	824
03:00 PM	1	0	0	0	51	196	0	0	0	0	55	0	2	193	0	0	498
03:15 PM	1	2	2	0	61	225	4	0	0	0	43	0	2	145	0	0	485
03:30 PM	0	0	1	0	75	241	2	0	0	0	51	0	0	110	1	0	481
03:45 PM	0	0	0	0	100	212	1	0	0	0	50	0	2	167	0	0	532
Total	2	2	3	0	287	874	7	0	0	0	199	0	6	615	1	0	1996
04:00 PM	3	0	4	0	109	303	4	0	0	0	48	0	1	160	1	0	633
04:15 PM	1	0	1	0	109	273	5	0	0	0	50	0	1	155	0	0	595
04:30 PM	0	1	2	0	94	294	2	0	0	0	41	0	1	172	2	0	609
04:45 PM	0	1	2	0	121	293	3	0	0	0	48	0	1	168	0	0	637
Total	4	2	9	0	433	1163	14	0	0	0	187	0	4	655	3	0	2474
05:00 PM	1	1	1	0	103	255	2	0	0	1	62	0	5	171	0	1	603
05:15 PM	1	1	1	0	100	284	5	0	1	2	71	0	0	174	1	0	641
Grand Total	23	14	33	0	1362	4031	36	0	1	4	1328	0	25	3647	5	3	10512
Apprch %	32.9	20	47.1	0	25.1	74.2	0.7	0	0.1	0.3	99.6	0	0.7	99.1	0.1	0.1	
Total %	0.2	0.1	0.3	0	13	38.3	0.3	0	0	0	12.6	0	0.2	34.7	0	0	
Lights	22	13	27	0	1323	3901	30	0	1	3	1272	0	24	3525	5	3	10149
% Lights	95.7	92.9	81.8	0	97.1	96.8	83.3	0	100	75	95.8	0	96	96.7	100	100	96.5
Single Units	1	1	6	0	20	88	6	0	0	1	38	0	1	91	0	0	253
% Single Units	4.3	7.1	18.2	0	1.5	2.2	16.7	0	0	25	2.9	0	4	2.5	0	0	2.4
TTST	0	0	0	0	19	42	0	0	0	0	18	0	0	31	0	0	110
% TTST	0	0	0	0	1.4	1	0	0	0	0	1.4	0	0	0.9	0	0	1
Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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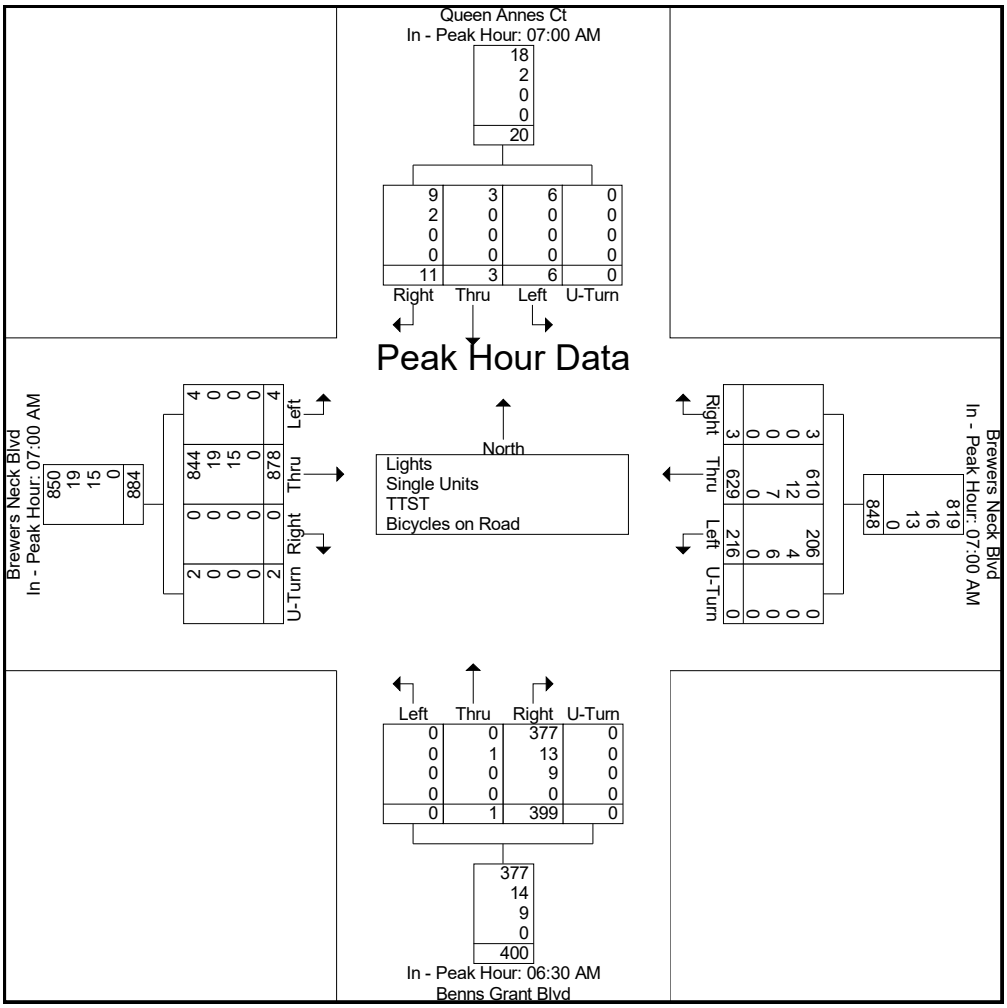
	Queen Annes Ct Southbound					Brewers Neck Blvd Westbound					Benns Grant Blvd Northbound					Brewers Neck Blvd Eastbound					
Start Time			Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	1	0	5	0	6	35	219	0	0	254	0	1	96	0	97	1	209	0	0	210	567
07:15 AM	2	0	3	0	5	59	161	1	0	221	0	0	108	0	108	0	203	0	0	203	537
07:30 AM	1	1	2	0	4	69	124	0	0	193	0	0	94	0	94	2	268	0	1	271	562
07:45 AM	2	2	1	0	5	53	125	2	0	180	0	0	86	0	86	1	198	0	1	200	471
Total Volume	6	3	11	0	20	216	629	3	0	848	0	1	384	0	385	4	878	0	2	884	2137
% App. Total	30	15	55	0		25.5	74.2	0.4	0		0	0.3	99.7	0		0.5	99.3	0	0.2		
PHF	.750	.375	.550	.000	.833	.783	.718	.375	.000	.835	.000	.250	.889	.000	.891	.500	.819	.000	.500	.815	.942
Lights	6	3	9	0	18	206	610	3	0	819	0	0	361	0	361	4	844	0	2	850	2048
% Lights	100	100	81.8	0	90.0	95.4	97.0	100	0	96.6	0	0	94.0	0	93.8	100	96.1	0	100	96.2	95.8
Single Units	0	0	2	0	2	4	12	0	0	16	0	1	19	0	20	0	19	0	0	19	57
% Single Units	0	0	18.2	0	10.0	1.9	1.9	0	0	1.9	0	100	4.9	0	5.2	0	2.2	0	0	2.1	2.7
TTST	0	0	0	0	0	6	7	0	0	13	0	0	4	0	4	0	15	0	0	15	32
% TTST	0	0	0	0	0	2.8	1.1	0	0	1.5	0	0	1.0	0	1.0	0	1.7	0	0	1.7	1.5
Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



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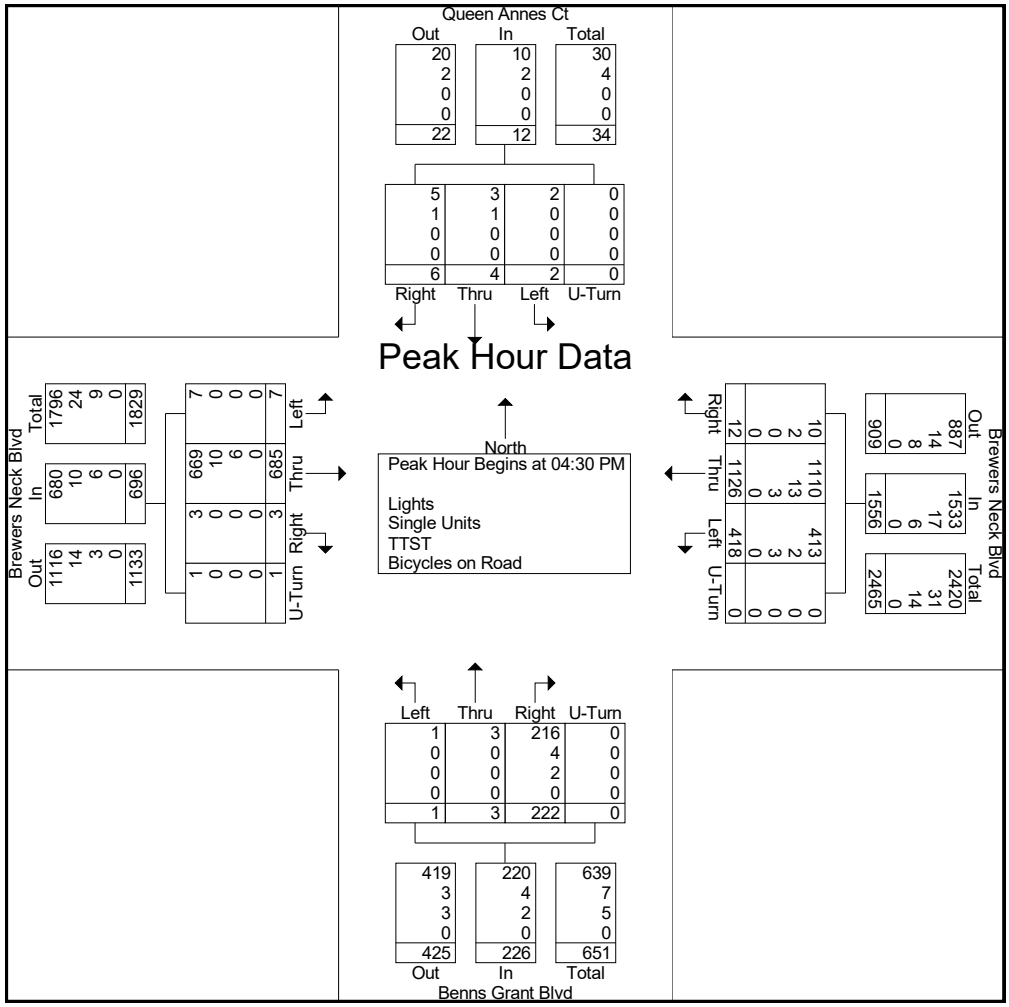
	Queen Annes Ct Southbound					Brewers Neck Blvd Westbound					Benns Grant Blvd Northbound					Brewers Neck Blvd Eastbound					
Start Time			Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Each Approach Begins at:																					
	07:00 AM					07:00 AM					06:30 AM					07:00 AM					
+0 mins.	1	0	5	0	6	35	219	0	0	254	0	0	100	0	100	1	209	0	0	210	
+15 mins.	2	0	3	0	5	59	161	1	0	221	0	0	95	0	95	0	203	0	0	203	
+30 mins.	1	1	2	0	4	69	124	0	0	193	0	1	96	0	97	2	268	0	1	271	
+45 mins.	2	2	1	0	5	53	125	2	0	180	0	0	108	0	108	1	198	0	1	200	
Total Volume	6	3	11	0	20	216	629	3	0	848	0	1	399	0	400	4	878	0	2	884	
% App. Total	30	15	55	0		25.5	74.2	0.4	0		0	0.2	99.8	0		0.5	99.3	0	0.2		
PHF	.750	.375	.550	.000	.833	.783	.718	.375	.000	.835	.000	.250	.924	.000	.926	.500	.819	.000	.500	.815	
Lights	6	3	9	0	18	206	610	3	0	819	0	0	377	0	377	4	844	0	2	850	
% Lights	100	100	81.8	0	90	95.4	97	100	0	96.6	0	0	94.5	0	94.2	100	96.1	0	100	96.2	
Single Units	0	0	2	0	2	4	12	0	0	16	0	1	13	0	14	0	19	0	0	19	
% Single Units	0	0	18.2	0	10	1.9	1.9	0	0	1.9	0	100	3.3	0	3.5	0	2.2	0	0	2.1	
TTST	0	0	0	0	0	6	7	0	0	13	0	0	9	0	9	0	15	0	0	15	
% TTST	0	0	0	0	0	2.8	1.1	0	0	1.5	0	0	2.3	0	2.2	0	1.7	0	0	1.7	
Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
% Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	



4500 Main Street
Suite 400
Virginia Beach, VA 23462-3361
757.490.0132

File Name : Brewers Neck and Benns Grant Blvd
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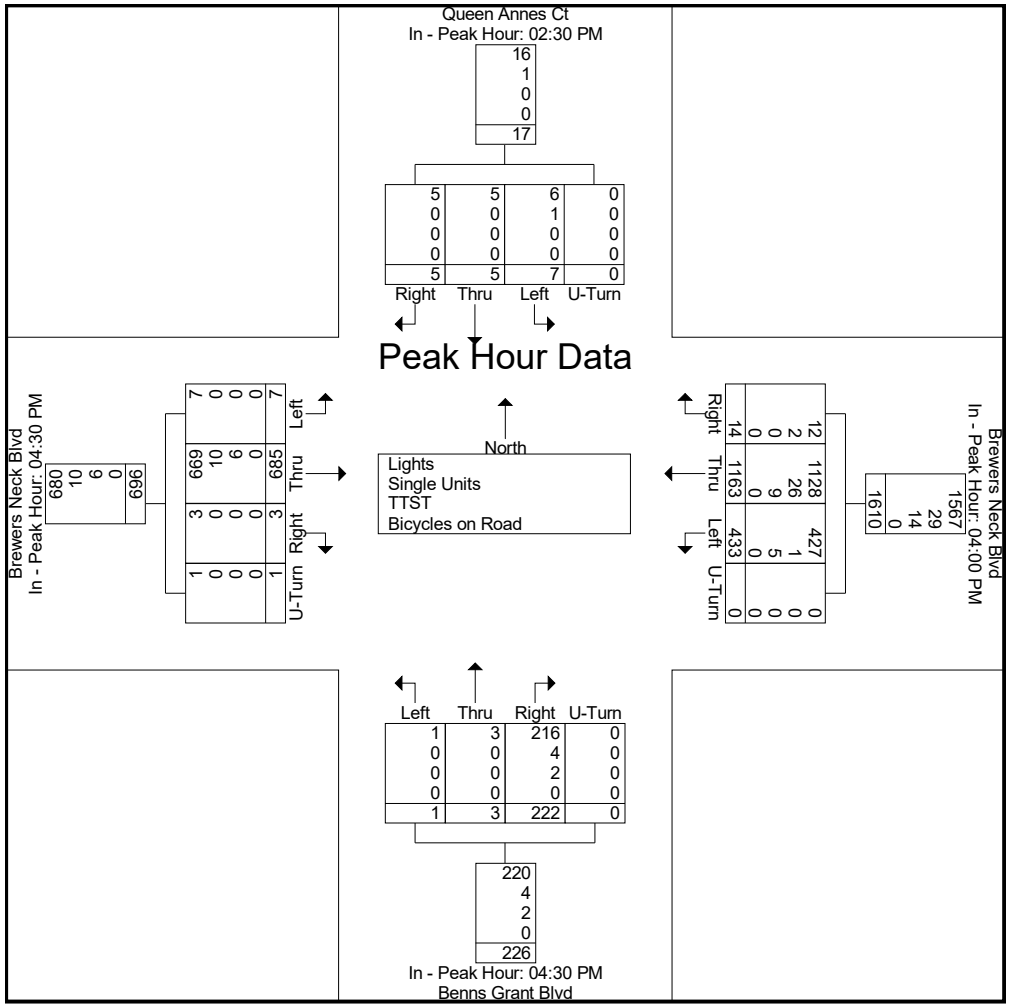
	Queen Annes Ct Southbound					Brewers Neck Blvd Westbound					Benns Grant Blvd Northbound					Brewers Neck Blvd Eastbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 05:15 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	0	1	2	0	3	94	294	2	0	390	0	0	41	0	41	1	172	2	0	175	609
04:45 PM	0	1	2	0	3	121	293	3	0	417	0	0	48	0	48	1	168	0	0	169	637
05:00 PM	1	1	1	0	3	103	255	2	0	360	0	1	62	0	63	5	171	0	1	177	603
05:15 PM	1	1	1	0	3	100	284	5	0	389	1	2	71	0	74	0	174	1	0	175	641
Total Volume	2	4	6	0	12	418	1126	12	0	1556	1	3	222	0	226	7	685	3	1	696	2490
% App. Total	16.7	33.3	50	0		26.9	72.4	0.8	0		0.4	1.3	98.2	0		1	98.4	0.4	0.1		
PHF	.500	1.00	.750	.000	1.00	.864	.957	.600	.000	.933	.250	.375	.782	.000	.764	.350	.984	.375	.250	.983	.971
Lights	2	3	5	0	10	413	1110	10	0	1533	1	3	216	0	220	7	669	3	1	680	2443
% Lights	100	75.0	83.3	0	83.3	98.8	98.6	83.3	0	98.5	100	100	97.3	0	97.3	100	97.7	100	100	97.7	98.1
Single Units	0	1	1	0	2	2	13	2	0	17	0	0	4	0	4	0	10	0	0	10	33
% Single Units	0	25.0	16.7	0	16.7	0.5	1.2	16.7	0	1.1	0	0	1.8	0	1.8	0	1.5	0	0	1.4	1.3
TTST	0	0	0	0	0	3	3	0	0	6	0	0	2	0	2	0	6	0	0	6	14
% TTST	0	0	0	0	0	0.7	0.3	0	0	0.4	0	0	0.9	0	0.9	0	0.9	0	0	0.9	0.6
Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



4500 Main Street
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757.490.0132

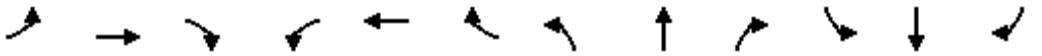
File Name : Brewers Neck and Benns Grant Blvd
Site Code :
Start Date : 4/24/2018
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	Queen Annes Ct Southbound					Brewers Neck Blvd Westbound					Benns Grant Blvd Northbound					Brewers Neck Blvd Eastbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 05:15 PM - Peak 1 of 1																					
Peak Hour for Each Approach Begins at:																					
	02:30 PM					04:00 PM					04:30 PM					04:30 PM					
+0 mins.	3	2	1	0	6	109	303	4	0	416	0	0	41	0	41	1	172	2	0	175	
+15 mins.	2	1	2	0	5	109	273	5	0	387	0	0	48	0	48	1	168	0	0	169	
+30 mins.	1	0	0	0	1	94	294	2	0	390	0	1	62	0	63	5	171	0	1	177	
+45 mins.	1	2	2	0	5	121	293	3	0	417	1	2	71	0	74	0	174	1	0	175	
Total Volume	7	5	5	0	17	433	1163	14	0	1610	1	3	222	0	226	7	685	3	1	696	
% App. Total	41.2	29.4	29.4	0		26.9	72.2	0.9	0		0.4	1.3	98.2	0		1	98.4	0.4	0.1		
PHF	.583	.625	.625	.000	.708	.895	.960	.700	.000	.965	.250	.375	.782	.000	.764	.350	.984	.375	.250	.983	
Lights	6	5	5	0	16	427	1128	12	0	1567	1	3	216	0	220	7	669	3	1	680	
% Lights	85.7	100	100	0	94.1	98.6	97	85.7	0	97.3	100	100	97.3	0	97.3	100	97.7	100	100	97.7	
Single Units	1	0	0	0	1	1	26	2	0	29	0	0	4	0	4	0	10	0	0	10	
% Single Units	14.3	0	0	0	5.9	0.2	2.2	14.3	0	1.8	0	0	1.8	0	1.8	0	1.5	0	0	1.4	
TTST	0	0	0	0	0	5	9	0	0	14	0	0	2	0	2	0	6	0	0	6	
% TTST	0	0	0	0	0	1.2	0.8	0	0	0.9	0	0	0.9	0	0.9	0	0.9	0	0	0.9	
Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
% Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	



APPENDIX C

2018 Existing Synchro Reports



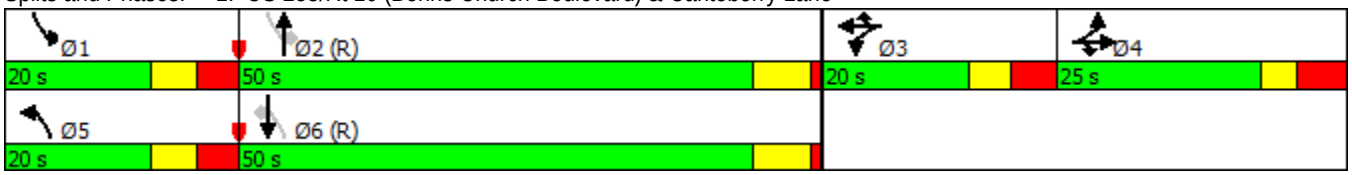
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	1	17	88	4	38	13	711	45	49	1030	32
Future Volume (vph)	23	1	17	88	4	38	13	711	45	49	1030	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	200		350	275		325
Storage Lanes	0		1	0		1	1		1	1		1
Taper Length (ft)	25			25			125			225		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected		0.958			0.955		0.950			0.950		
Satd. Flow (prot)	0	1759	1615	0	1738	1615	1805	3374	1509	1752	3505	1615
Flt Permitted		0.958			0.955		0.062			0.307		
Satd. Flow (perm)	0	1759	1615	0	1738	1615	118	3374	1509	566	3505	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			171			171			185			185
Link Speed (mph)		25			25			45			45	
Link Distance (ft)		335			1232			773			1937	
Travel Time (s)		9.1			33.6			11.7			29.3	
Peak Hour Factor	0.82	0.25	0.53	0.76	0.50	0.79	0.46	0.92	0.75	0.73	0.63	0.80
Heavy Vehicles (%)	4%	0%	0%	3%	25%	0%	0%	7%	7%	3%	3%	0%
Adj. Flow (vph)	28	4	32	116	8	48	28	773	60	67	1635	40
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	32	32	0	124	48	28	773	60	67	1635	40
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Split	NA	Prot	Split	NA	Prot	D.P+P	NA	Perm	D.P+P	NA	Perm
Protected Phases	4	4	4	3	3	3	5	2		1	6	

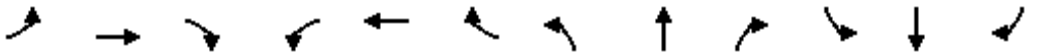
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases							6		2	2		6
Detector Phase	4	4	4	3	3	3	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	5.0	15.0	15.0	5.0	15.0	15.0
Minimum Split (s)	14.5	14.5	14.5	14.5	14.5	14.5	12.5	21.0	21.0	12.5	21.0	21.0
Total Split (s)	25.0	25.0	25.0	20.0	20.0	20.0	20.0	50.0	50.0	20.0	50.0	50.0
Total Split (%)	21.7%	21.7%	21.7%	17.4%	17.4%	17.4%	17.4%	43.5%	43.5%	17.4%	43.5%	43.5%
Maximum Green (s)	17.5	17.5	17.5	12.5	12.5	12.5	12.5	44.0	44.0	12.5	44.0	44.0
Yellow Time (s)	3.0	3.0	3.0	3.5	3.5	3.5	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	4.5	4.5	4.5	4.0	4.0	4.0	3.5	1.0	1.0	3.5	1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		7.5	7.5		7.5	7.5	7.5	6.0	6.0	7.5	6.0	6.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	2.0	6.0	6.0	2.0	6.0	6.0
Minimum Gap (s)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	3.5	3.5	0.2	3.5	3.5
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	20.0	0.0	20.0	20.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0	15.0	0.0	15.0	15.0
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)		8.0	8.0		11.5	11.5	71.3	66.1	66.1	69.8	69.5	69.5
Actuated g/C Ratio		0.07	0.07		0.10	0.10	0.62	0.57	0.57	0.61	0.60	0.60
v/c Ratio		0.26	0.12		0.71	0.15	0.19	0.40	0.06	0.16	0.77	0.04
Control Delay		55.5	0.9		72.5	1.0	12.5	14.0	0.4	9.8	23.3	0.1
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		55.5	0.9		72.5	1.0	12.5	14.0	0.4	9.8	23.3	0.1
LOS		E	A		E	A	B	B	A	A	C	A
Approach Delay		28.2			52.6			13.0			22.3	
Approach LOS		C			D			B			C	

Intersection Summary

Area Type: Other
Cycle Length: 115
Actuated Cycle Length: 115
Offset: 0 (0%), Referenced to phase 2:NBSB and 6:NBSB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.77
Intersection Signal Delay: 21.4 Intersection LOS: C
Intersection Capacity Utilization 61.9% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 1: US 258/Rt 10 (Benns Church Boulevard) & Canteberry Lane





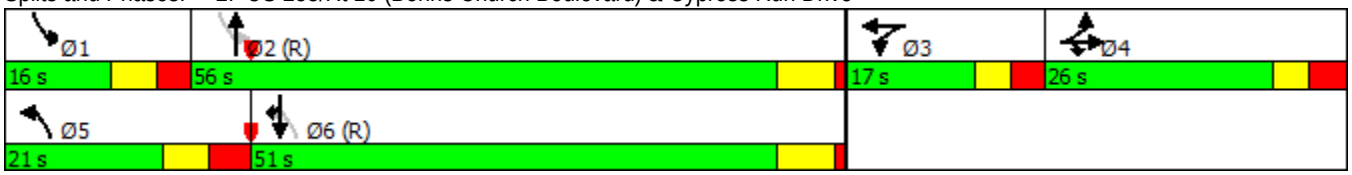
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	0	18	0	0	0	21	635	0	2	1252	28
Future Volume (vph)	4	0	18	0	0	0	21	635	0	2	1252	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	250		0	150		235
Storage Lanes	0		1	0		0	1		0	1		1
Taper Length (ft)	25			25			150			125		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt			0.850									0.850
Flt Protected		0.950					0.950			0.950		
Satd. Flow (prot)	0	1805	1524	0	1900	0	1805	3505	0	1805	3471	1553
Flt Permitted		0.950					0.099			0.326		
Satd. Flow (perm)	0	1805	1524	0	1900	0	188	3505	0	619	3471	1553
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			152									157
Link Speed (mph)		15			25			45			45	
Link Distance (ft)		1905			1451			1986			773	
Travel Time (s)		86.6			39.6			30.1			11.7	
Peak Hour Factor	0.50	0.25	0.56	0.25	0.25	0.25	0.44	0.75	0.44	0.50	0.72	0.78
Heavy Vehicles (%)	0%	0%	6%	0%	0%	0%	0%	3%	14%	0%	4%	4%
Adj. Flow (vph)	8	0	32	0	0	0	48	847	0	4	1739	36
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	8	32	0	0	0	48	847	0	4	1739	36
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	20
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Split	NA	Prot				D.P+P	NA		D.P+P	NA	Prot
Protected Phases	4	4	4	3	3		5	2		1	6	6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases							6			2		
Detector Phase	4	4	4	3	3		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		5.0	14.0		5.0	14.0	14.0
Minimum Split (s)	13.5	13.5	13.5	13.0	13.0		12.5	20.0		12.0	20.0	20.0
Total Split (s)	26.0	26.0	26.0	17.0	17.0		21.0	56.0		16.0	51.0	51.0
Total Split (%)	22.6%	22.6%	22.6%	14.8%	14.8%		18.3%	48.7%		13.9%	44.3%	44.3%
Maximum Green (s)	19.5	19.5	19.5	11.0	11.0		13.5	50.0		9.0	45.0	45.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		4.0	5.0		4.0	5.0	5.0
All-Red Time (s)	3.5	3.5	3.5	3.0	3.0		3.5	1.0		3.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		6.5	6.5		6.0		7.5	6.0		7.0	6.0	6.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		2.0	5.0		2.0	5.0	5.0
Minimum Gap (s)	0.2	0.2	0.2	0.2	0.2		0.2	3.5		0.2	3.5	3.5
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0		0.0	18.0		0.0	18.0	18.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0		0.0	15.0		0.0	15.0	15.0
Recall Mode	None	None	None	None	None		None	C-Min		None	C-Min	C-Min
Act Effct Green (s)		7.0	7.0				93.4	100.9		98.5	91.7	91.7
Actuated g/C Ratio		0.06	0.06				0.81	0.88		0.86	0.80	0.80
v/c Ratio		0.07	0.14				0.21	0.28		0.01	0.63	0.03
Control Delay		52.5	1.2				4.3	2.7		0.5	2.9	0.0
Queue Delay		0.0	0.0				0.0	0.0		0.0	0.0	0.0
Total Delay		52.5	1.2				4.3	2.7		0.5	2.9	0.0
LOS		D	A				A	A		A	A	A
Approach Delay		11.5						2.8			2.8	
Approach LOS		B						A			A	

Intersection Summary

Area Type: Other
Cycle Length: 115
Actuated Cycle Length: 115
Offset: 13 (11%), Referenced to phase 2:NBSB and 6:NBSB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.63
Intersection Signal Delay: 3.0 Intersection LOS: A
Intersection Capacity Utilization 50.9% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 2: US 258/Rt 10 (Benns Church Boulevard) & Cypress Run Drive



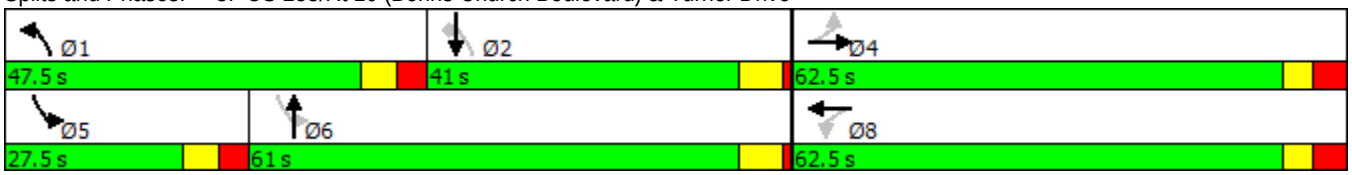
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	171	1	253	1	64	1	216	560	62	6	838	288
Future Volume (vph)	171	1	253	1	64	1	216	560	62	6	838	288
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	125		0	125		275
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (ft)	25			25			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.924			0.997			0.973				0.850
Flt Protected		0.979			0.999		0.950			0.950		
Satd. Flow (prot)	0	1719	0	0	1892	0	1752	3401	0	1805	3505	1553
Flt Permitted		0.755			0.987		0.105			0.277		
Satd. Flow (perm)	0	1325	0	0	1870	0	194	3401	0	526	3505	1553
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		48			1			19				348
Link Speed (mph)		40			25			45			45	
Link Distance (ft)		1498			695			1153			1986	
Travel Time (s)		25.5			19.0			17.5			30.1	
Peak Hour Factor	0.64	0.25	0.73	0.25	0.39	0.25	0.52	0.90	0.46	0.25	0.73	0.51
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	3%	4%	0%	0%	3%	4%
Adj. Flow (vph)	267	4	347	4	164	4	415	622	135	24	1148	565
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	618	0	0	172	0	415	757	0	24	1148	565
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100		20	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		D.P+P	NA		D.P+P	NA	Perm
Protected Phases		4			8		1	6		5	2	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		2
Detector Phase	4	4		8	8		1	6		5	2	2
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		5.0	15.0		5.0	15.0	15.0
Minimum Split (s)	15.0	15.0		14.5	14.5		12.5	21.0		12.5	21.0	21.0
Total Split (s)	62.5	62.5		62.5	62.5		47.5	61.0		27.5	41.0	41.0
Total Split (%)	41.4%	41.4%		41.4%	41.4%		31.5%	40.4%		18.2%	27.2%	27.2%
Maximum Green (s)	55.0	55.0		55.0	55.0		40.0	55.0		20.0	35.0	35.0
Yellow Time (s)	3.5	3.5		3.5	3.5		4.0	5.0		4.0	5.0	5.0
All-Red Time (s)	4.0	4.0		4.0	4.0		3.5	1.0		3.5	1.0	1.0
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		7.5			7.5		7.5	6.0		7.5	6.0	6.0
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0	5.0		3.0	3.0		4.0	6.0		2.0	6.0	6.0
Minimum Gap (s)	3.5	3.5		0.2	0.2		0.2	3.5		0.2	3.5	3.5
Time Before Reduce (s)	20.0	20.0		0.0	0.0		0.0	20.0		0.0	20.0	20.0
Time To Reduce (s)	10.0	10.0		0.0	0.0		0.0	15.0		0.0	15.0	15.0
Recall Mode	None	None		None	None		None	Min		None	Min	Min
Act Effct Green (s)		55.1			55.1		68.2	69.3		71.3	35.1	35.1
Actuated g/C Ratio		0.38			0.38		0.47	0.48		0.49	0.24	0.24
v/c Ratio		1.17			0.24		0.90	0.47		0.08	1.36	0.89
Control Delay		131.1			33.1		66.2	26.9		17.3	212.2	37.4
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		131.1			33.1		66.2	26.9		17.3	212.2	37.4
LOS		F			C		E	C		B	F	D
Approach Delay		131.1			33.1			40.8			152.7	
Approach LOS		F			C			D			F	

Intersection Summary

Area Type: Other
Cycle Length: 151
Actuated Cycle Length: 145.8
Natural Cycle: 120
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.36
Intersection Signal Delay: 108.1 Intersection LOS: F
Intersection Capacity Utilization 84.4% ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 3: US 258/Rt 10 (Benns Church Boulevard) & Turner Drive



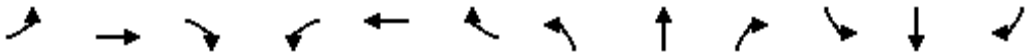


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	4	0	916	0	1	0
Future Volume (vph)	0	0	0	0	0	0	4	0	916	0	1	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0		125		0		140
Storage Lanes	0		0	0		0		1		0		1
Taper Length (ft)	25			25				25				75
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00
Frt												
Flt Protected							0.950				0.950	
Satd. Flow (prot)	0	0	0	0	0	0	1805	0	3438	0	1805	0
Flt Permitted							0.950				0.950	
Satd. Flow (perm)	0	0	0	0	0	0	1805	0	3438	0	1805	0
Link Speed (mph)		30			30				45			
Link Distance (ft)		810			872				3921			
Travel Time (s)		18.4			19.8				59.4			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.33	0.25	0.85	0.25	0.25	0.25
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	5%	0%	0%	0%
Adj. Flow (vph)	0	0	0	0	0	0	12	0	1078	0	4	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	0	12	0	1078	0	4	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	R NA	Left	Left	Right	R NA	Left
Median Width(ft)		0			0				12			
Link Offset(ft)		0			0				0			
Crosswalk Width(ft)		16			16				16			
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	9	15		9	9	15
Sign Control		Stop			Stop				Free			

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 34.6%		ICU Level of Service A	
Analysis Period (min) 15			

Lane Group	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	1130	0
Future Volume (vph)	1130	0
Ideal Flow (vphpl)	1900	1900
Storage Length (ft)		0
Storage Lanes		0
Taper Length (ft)		
Lane Util. Factor	0.95	1.00
Frt		
Flt Protected		
Satd. Flow (prot)	3406	0
Flt Permitted		
Satd. Flow (perm)	3406	0
Link Speed (mph)	45	
Link Distance (ft)	1153	
Travel Time (s)	17.5	
Peak Hour Factor	0.88	0.25
Heavy Vehicles (%)	6%	0%
Adj. Flow (vph)	1284	0
Shared Lane Traffic (%)		
Lane Group Flow (vph)	1284	0
Enter Blocked Intersection	No	No
Lane Alignment	Left	Right
Median Width(ft)	12	
Link Offset(ft)	0	
Crosswalk Width(ft)	16	
Two way Left Turn Lane		
Headway Factor	1.00	1.00
Turning Speed (mph)		9
Sign Control	Free	

Intersection Summary

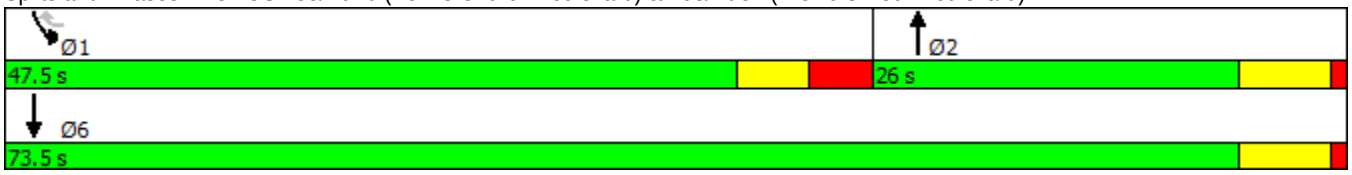


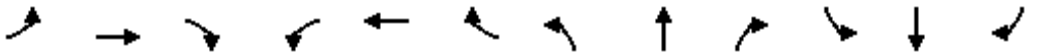
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	653	0	167	0	897	217	0
Future Volume (vph)	0	0	0	0	0	653	0	167	0	897	217	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		0	300		0
Storage Lanes	0		0	0		2	0		0	1		0
Taper Length (ft)	25			25			100			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	0.88	1.00	0.95	1.00	0.97	0.95	1.00
Frt						0.850						
Flt Protected										0.950		
Satd. Flow (prot)	0	0	0	0	0	2707	0	3471	0	3367	3438	0
Flt Permitted										0.950		
Satd. Flow (perm)	0	0	0	0	0	2707	0	3471	0	3367	3438	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						747						
Link Speed (mph)		30			45			45			45	
Link Distance (ft)		963			1126			2837			3921	
Travel Time (s)		21.9			17.1			43.0			59.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.72	0.92	0.84	0.25	0.83	0.63	0.25
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	0%	4%	0%	4%	5%	0%
Adj. Flow (vph)	0	0	0	0	0	907	0	199	0	1081	344	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	907	0	199	0	1081	344	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors						1		2		1	2	
Detector Template						Right		Thru		Left	Thru	
Leading Detector (ft)						20		100		20	100	
Trailing Detector (ft)						0		0		0	0	
Detector 1 Position(ft)						0		0		0	0	
Detector 1 Size(ft)						20		6		20	6	
Detector 1 Type						Cl+Ex		Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)						0.0		0.0		0.0	0.0	
Detector 1 Queue (s)						0.0		0.0		0.0	0.0	
Detector 1 Delay (s)						0.0		0.0		0.0	0.0	
Detector 2 Position(ft)								94			94	
Detector 2 Size(ft)								6			6	
Detector 2 Type								Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)								0.0			0.0	
Turn Type						Perm		NA		Prot	NA	
Protected Phases								2		1	6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases						1						
Detector Phase						1		2		1	6	
Switch Phase												
Minimum Initial (s)						15.0		10.0		15.0	15.0	
Minimum Split (s)						22.5		16.0		22.5	21.0	
Total Split (s)						47.5		26.0		47.5	73.5	
Total Split (%)						64.6%		35.4%		64.6%	100.0%	
Maximum Green (s)						40.0		20.0		40.0	67.5	
Yellow Time (s)						4.0		5.0		4.0	5.0	
All-Red Time (s)						3.5		1.0		3.5	1.0	
Lost Time Adjust (s)						0.0		0.0		0.0	0.0	
Total Lost Time (s)						7.5		6.0		7.5	6.0	
Lead/Lag						Lead		Lag		Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)						3.5		2.5		3.5	5.0	
Recall Mode						Min		None		Min	Min	
Act Effct Green (s)						30.7		10.2		30.7	54.6	
Actuated g/C Ratio						0.56		0.19		0.56	1.00	
v/c Ratio						0.49		0.31		0.57	0.10	
Control Delay						2.1		21.8		8.9	0.1	
Queue Delay						0.0		0.0		0.0	0.0	
Total Delay						2.1		21.8		8.9	0.1	
LOS						A		C		A	A	
Approach Delay					2.1			21.8			6.8	
Approach LOS					A			C			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 73.5			
Actuated Cycle Length: 54.6			
Natural Cycle: 45			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.57			
Intersection Signal Delay: 6.3		Intersection LOS: A	
Intersection Capacity Utilization 43.9%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 5: US 258/Rt 10 (Benns Church Boulevard) & 258/Rt 32 (Brewers Neck Boulevard)





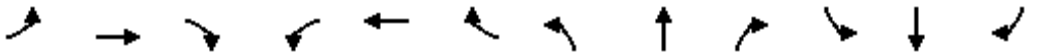
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	878	0	216	629	3	0	1	384	6	3	11
Future Volume (vph)	6	878	0	216	629	3	0	1	384	6	3	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		0	600		325	0		350	0		0
Storage Lanes	1		0	1		1	0		2	0		1
Taper Length (ft)	200			200			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	0.88	1.00	1.00	1.00
Frt						0.850			0.850			0.850
Flt Protected	0.950			0.950							0.976	
Satd. Flow (prot)	1805	3471	0	1719	3505	1615	0	950	2682	0	1854	1369
Flt Permitted	0.950			0.950							0.976	
Satd. Flow (perm)	1805	3471	0	1719	3505	1615	0	950	2682	0	1854	1369
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						171			431			160
Link Speed (mph)		45			45			45			25	
Link Distance (ft)		1126			846			914			623	
Travel Time (s)		17.1			12.8			13.8			17.0	
Peak Hour Factor	0.50	0.82	0.25	0.78	0.72	0.38	0.25	0.25	0.89	0.75	0.38	0.55
Heavy Vehicles (%)	0%	4%	0%	5%	3%	0%	0%	100%	6%	0%	0%	18%
Adj. Flow (vph)	12	1071	0	277	874	8	0	4	431	8	8	20
Shared Lane Traffic (%)												
Lane Group Flow (vph)	12	1071	0	277	874	8	0	4	431	0	16	20
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm		NA	pm+ov	Split	NA	Perm
Protected Phases	1	6		5	2		4	4	5	3	3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases						2			4			3
Detector Phase	1	6		5	2	2	4	4	5	3	3	3
Switch Phase												
Minimum Initial (s)	10.0	15.0		10.0	15.0	15.0	10.0	10.0	10.0	5.0	5.0	5.0
Minimum Split (s)	19.0	24.5		19.5	24.5	24.5	26.0	26.0	19.5	26.0	26.0	26.0
Total Split (s)	34.0	41.5		39.5	47.0	47.0	26.0	26.0	39.5	33.0	33.0	33.0
Total Split (%)	24.3%	29.6%		28.2%	33.6%	33.6%	18.6%	18.6%	28.2%	23.6%	23.6%	23.6%
Maximum Green (s)	25.0	35.0		30.0	40.5	40.5	18.0	18.0	30.0	25.0	25.0	25.0
Yellow Time (s)	5.0	5.5		5.0	5.5	5.5	4.0	4.0	5.0	3.5	3.5	3.5
All-Red Time (s)	4.0	1.0		4.5	1.0	1.0	4.0	4.0	4.5	4.5	4.5	4.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	9.0	6.5		9.5	6.5	6.5		8.0	9.5		8.0	8.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	5.0		3.0	5.0	5.0	3.5	3.5	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None	None	None	None	None	None	None	None
Act Effct Green (s)	10.5	36.7		19.1	66.4	66.4		10.5	21.7		6.5	6.5
Actuated g/C Ratio	0.13	0.44		0.23	0.80	0.80		0.13	0.26		0.08	0.08
v/c Ratio	0.05	0.70		0.70	0.31	0.01		0.03	0.42		0.11	0.08
Control Delay	42.2	26.1		41.6	7.4	0.0		43.0	3.6		45.8	0.6
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	42.2	26.1		41.6	7.4	0.0		43.0	3.6		45.8	0.6
LOS	D	C		D	A	A		D	A		D	A
Approach Delay		26.3			15.6			4.0			20.7	
Approach LOS		C			B			A			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 83.1			
Natural Cycle: 130			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.70			
Intersection Signal Delay: 18.1		Intersection LOS: B	
Intersection Capacity Utilization 64.6%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 6: Queen Annes Court & 258/Rt 32 (Brewers Neck Boulevard)





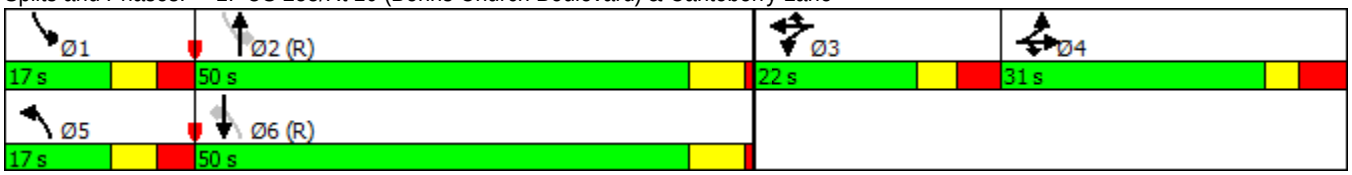
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	127	5	40	57	8	71	46	1109	95	118	931	88
Future Volume (vph)	127	5	40	57	8	71	46	1109	95	118	931	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	200		350	275		325
Storage Lanes	0		1	0		1	1		1	1		1
Taper Length (ft)	25			25			125			225		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected		0.956			0.959		0.950			0.950		
Satd. Flow (prot)	0	1816	1615	0	1791	1553	1805	3539	1583	1687	3505	1615
Flt Permitted		0.956			0.959		0.198			0.121		
Satd. Flow (perm)	0	1816	1615	0	1791	1553	376	3539	1583	215	3505	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			164			164			177			177
Link Speed (mph)		25			25			45			45	
Link Distance (ft)		335			1232			773			1937	
Travel Time (s)		9.1			33.6			11.7			29.3	
Peak Hour Factor	0.91	0.42	0.56	0.75	0.67	0.93	0.60	0.94	0.64	0.76	0.94	0.71
Heavy Vehicles (%)	0%	0%	0%	2%	0%	4%	0%	2%	2%	7%	3%	0%
Adj. Flow (vph)	140	12	71	76	12	76	77	1180	148	155	990	124
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	152	71	0	88	76	77	1180	148	155	990	124
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Split	NA	Prot	Split	NA	Prot	D.P+P	NA	Perm	D.P+P	NA	Perm
Protected Phases	4	4	4	3	3	3	5	2		1	6	

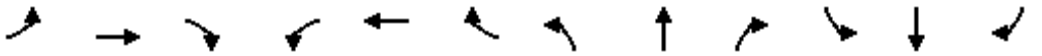
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases							6		2	2		6
Detector Phase	4	4	4	3	3	3	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	5.0	15.0	15.0	5.0	15.0	15.0
Minimum Split (s)	14.5	14.5	14.5	14.5	14.5	14.5	12.5	21.0	21.0	12.5	21.0	21.0
Total Split (s)	31.0	31.0	31.0	22.0	22.0	22.0	17.0	50.0	50.0	17.0	50.0	50.0
Total Split (%)	25.8%	25.8%	25.8%	18.3%	18.3%	18.3%	14.2%	41.7%	41.7%	14.2%	41.7%	41.7%
Maximum Green (s)	23.5	23.5	23.5	14.5	14.5	14.5	9.5	44.0	44.0	9.5	44.0	44.0
Yellow Time (s)	3.0	3.0	3.0	3.5	3.5	3.5	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	4.5	4.5	4.5	4.0	4.0	4.0	3.5	1.0	1.0	3.5	1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		7.5	7.5		7.5	7.5	7.5	6.0	6.0	7.5	6.0	6.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	2.0	6.0	6.0	2.0	6.0	6.0
Minimum Gap (s)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	3.5	3.5	0.2	3.5	3.5
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	20.0	0.0	20.0	20.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0	15.0	0.0	15.0	15.0
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)		15.3	15.3		11.0	11.0	65.2	56.1	56.1	63.7	60.8	60.8
Actuated g/C Ratio		0.13	0.13		0.09	0.09	0.54	0.47	0.47	0.53	0.51	0.51
v/c Ratio		0.66	0.20		0.54	0.26	0.27	0.71	0.18	0.69	0.56	0.14
Control Delay		62.9	1.3		63.4	2.2	11.6	26.8	2.6	32.8	24.3	1.2
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		62.9	1.3		63.4	2.2	11.6	26.8	2.6	32.8	24.3	1.2
LOS		E	A		E	A	B	C	A	C	C	A
Approach Delay		43.3			35.0			23.4			23.1	
Approach LOS		D			D			C			C	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBSB and 6:NBSB, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.71
Intersection Signal Delay: 25.4 Intersection LOS: C
Intersection Capacity Utilization 68.7% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 1: US 258/Rt 10 (Benns Church Boulevard) & Canteberry Lane





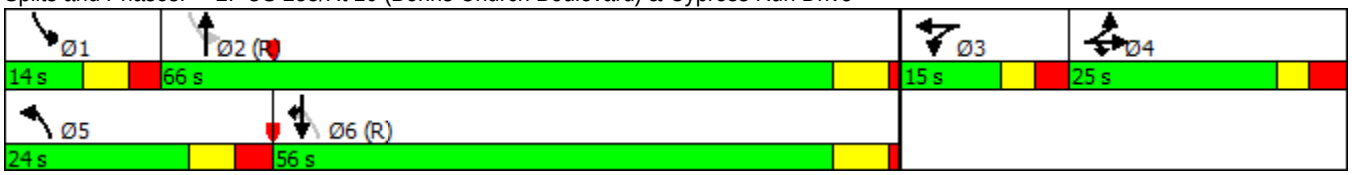
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	103	0	74	0	0	1	139	1146	0	0	907	119
Future Volume (vph)	103	0	74	0	0	1	139	1146	0	0	907	119
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	250		0	150		235
Storage Lanes	0		1	0		0	1		0	1		1
Taper Length (ft)	25			25			150			125		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt			0.850		0.865							0.850
Flt Protected		0.950					0.950					
Satd. Flow (prot)	0	1787	1599	0	1644	0	1805	3539	0	1900	3505	1615
Flt Permitted		0.950					0.232					
Satd. Flow (perm)	0	1787	1599	0	1644	0	441	3539	0	1900	3505	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			214		218							218
Link Speed (mph)		15			25			45			45	
Link Distance (ft)		1905			1451			1986			773	
Travel Time (s)		86.6			39.6			30.1			11.7	
Peak Hour Factor	0.81	0.25	0.62	0.25	0.25	0.25	0.67	0.93	0.25	0.25	0.95	0.80
Heavy Vehicles (%)	1%	0%	1%	0%	0%	0%	0%	2%	0%	0%	3%	0%
Adj. Flow (vph)	127	0	119	0	0	4	207	1232	0	0	955	149
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	127	119	0	4	0	207	1232	0	0	955	149
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	20
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Split	NA	Prot		NA		D.P+P	NA		D.P+P	NA	Prot
Protected Phases	4	4	4	3	3		5	2		1	6	6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases							6			2		
Detector Phase	4	4	4	3	3		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		5.0	14.0		5.0	14.0	14.0
Minimum Split (s)	13.5	13.5	13.5	13.0	13.0		12.5	20.0		12.0	20.0	20.0
Total Split (s)	25.0	25.0	25.0	15.0	15.0		24.0	66.0		14.0	56.0	56.0
Total Split (%)	20.8%	20.8%	20.8%	12.5%	12.5%		20.0%	55.0%		11.7%	46.7%	46.7%
Maximum Green (s)	18.5	18.5	18.5	9.0	9.0		16.5	60.0		7.0	50.0	50.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		4.0	5.0		4.0	5.0	5.0
All-Red Time (s)	3.5	3.5	3.5	3.0	3.0		3.5	1.0		3.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		6.5	6.5		6.0		7.5	6.0		7.0	6.0	6.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		2.0	5.0		2.0	5.0	5.0
Minimum Gap (s)	0.2	0.2	0.2	0.2	0.2		0.2	3.5		0.2	3.5	3.5
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0		0.0	18.0		0.0	18.0	18.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0		0.0	15.0		0.0	15.0	15.0
Recall Mode	None	None	None	None	None		None	C-Min		None	C-Min	C-Min
Act Effct Green (s)		13.7	13.7		7.0		82.2	91.2			70.9	70.9
Actuated g/C Ratio		0.11	0.11		0.06		0.68	0.76			0.59	0.59
v/c Ratio		0.62	0.32		0.01		0.46	0.46			0.46	0.14
Control Delay		63.6	2.3		0.0		9.5	7.0			7.1	0.3
Queue Delay		0.0	0.0		0.0		0.0	0.0			0.0	0.0
Total Delay		63.6	2.3		0.0		9.5	7.0			7.1	0.3
LOS		E	A		A		A	A			A	A
Approach Delay		33.9						7.4			6.1	
Approach LOS		C						A			A	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 12 (10%), Referenced to phase 2:NBSB and 6:NBSB, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.62
Intersection Signal Delay: 9.2 Intersection LOS: A
Intersection Capacity Utilization 64.5% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 2: US 258/Rt 10 (Benns Church Boulevard) & Cypress Run Drive



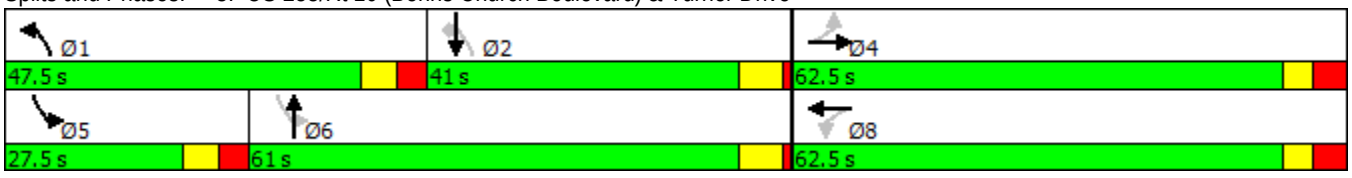
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	76	0	86	0	1	2	153	1196	1	29	877	112
Future Volume (vph)	76	0	86	0	1	2	153	1196	1	29	877	112
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	125		0	125		275
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (ft)	25			25			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.936			0.932							0.850
Flt Protected		0.974					0.950			0.950		
Satd. Flow (prot)	0	1715	0	0	1771	0	1687	3539	0	1805	3505	1482
Flt Permitted		0.830					0.243			0.141		
Satd. Flow (perm)	0	1461	0	0	1771	0	431	3539	0	268	3505	1482
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		130			4							141
Link Speed (mph)		40			25			45			45	
Link Distance (ft)		1501			695			1153			1986	
Travel Time (s)		25.6			19.0			17.5			30.1	
Peak Hour Factor	0.63	0.25	0.80	0.25	0.25	0.50	0.90	0.94	0.25	0.50	0.98	0.85
Heavy Vehicles (%)	1%	0%	1%	0%	0%	0%	7%	2%	0%	0%	3%	9%
Adj. Flow (vph)	121	0	108	0	4	4	170	1272	4	58	895	132
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	229	0	0	8	0	170	1276	0	58	895	132
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100		20	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA			NA		D.P+P	NA		D.P+P	NA	Perm
Protected Phases		4			8		1	6		5	2	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		2
Detector Phase	4	4		8	8		1	6		5	2	2
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		5.0	15.0		5.0	15.0	15.0
Minimum Split (s)	14.5	14.5		14.5	14.5		12.5	21.0		12.5	21.0	21.0
Total Split (s)	62.5	62.5		62.5	62.5		47.5	61.0		27.5	41.0	41.0
Total Split (%)	41.4%	41.4%		41.4%	41.4%		31.5%	40.4%		18.2%	27.2%	27.2%
Maximum Green (s)	55.0	55.0		55.0	55.0		40.0	55.0		20.0	35.0	35.0
Yellow Time (s)	3.5	3.5		3.5	3.5		4.0	5.0		4.0	5.0	5.0
All-Red Time (s)	4.0	4.0		4.0	4.0		3.5	1.0		3.5	1.0	1.0
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		7.5			7.5		7.5	6.0		7.5	6.0	6.0
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0	5.0		3.0	3.0		4.0	6.0		2.0	6.0	6.0
Minimum Gap (s)	3.5	3.5		0.2	0.2		0.2	3.5		0.2	3.5	3.5
Time Before Reduce (s)	20.0	20.0		0.0	0.0		0.0	20.0		0.0	20.0	20.0
Time To Reduce (s)	10.0	10.0		0.0	0.0		0.0	15.0		0.0	15.0	15.0
Recall Mode	None	None		None	None		None	Min		None	Min	Min
Act Effct Green (s)		14.2			9.7		51.4	50.3		53.3	42.0	42.0
Actuated g/C Ratio		0.16			0.11		0.58	0.57		0.60	0.47	0.47
v/c Ratio		0.67			0.04		0.42	0.63		0.22	0.54	0.17
Control Delay		26.3			28.3		10.0	16.4		8.4	18.9	3.2
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		26.3			28.3		10.0	16.4		8.4	18.9	3.2
LOS		C			C		A	B		A	B	A
Approach Delay		26.3			28.3			15.6			16.5	
Approach LOS		C			C			B			B	

Intersection Summary

Area Type: Other
Cycle Length: 151
Actuated Cycle Length: 88.5
Natural Cycle: 60
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.67
Intersection Signal Delay: 16.9 Intersection LOS: B
Intersection Capacity Utilization 70.9% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 3: US 258/Rt 10 (Benns Church Boulevard) & Turner Drive



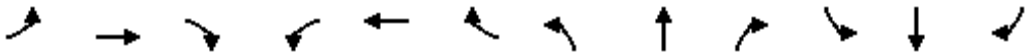


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	4	0	1341	0	0	0
Future Volume (vph)	0	0	0	0	0	0	4	0	1341	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0		125		0		140
Storage Lanes	0		0	0		0		1		0		1
Taper Length (ft)	25			25				25				75
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00
Frt												
Flt Protected							0.950					
Satd. Flow (prot)	0	0	0	0	0	0	1805	0	3505	0	1900	0
Flt Permitted							0.950					
Satd. Flow (perm)	0	0	0	0	0	0	1805	0	3505	0	1900	0
Link Speed (mph)		30			30				45			
Link Distance (ft)		810			872				3921			
Travel Time (s)		18.4			19.8				59.4			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.25	0.25	0.97	0.25	0.50	0.25
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	0%
Adj. Flow (vph)	0	0	0	0	0	0	16	0	1382	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	0	16	0	1382	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	R NA	Left	Left	Right	R NA	Left
Median Width(ft)		0			0				12			
Link Offset(ft)		0			0				0			
Crosswalk Width(ft)		16			16				16			
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	9	15		9	9	15
Sign Control		Stop			Stop				Free			

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 40.4%		ICU Level of Service A	
Analysis Period (min) 15			

Lane Group	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	952	0
Future Volume (vph)	952	0
Ideal Flow (vphpl)	1900	1900
Storage Length (ft)		0
Storage Lanes		0
Taper Length (ft)		
Lane Util. Factor	0.95	1.00
Frt		
Flt Protected		
Satd. Flow (prot)	3539	0
Flt Permitted		
Satd. Flow (perm)	3539	0
Link Speed (mph)	45	
Link Distance (ft)	1153	
Travel Time (s)	17.5	
Peak Hour Factor	0.95	0.25
Heavy Vehicles (%)	2%	0%
Adj. Flow (vph)	1002	0
Shared Lane Traffic (%)		
Lane Group Flow (vph)	1002	0
Enter Blocked Intersection	No	No
Lane Alignment	Left	Right
Median Width(ft)	12	
Link Offset(ft)	0	
Crosswalk Width(ft)	16	
Two way Left Turn Lane		
Headway Factor	1.00	1.00
Turning Speed (mph)		9
Sign Control	Free	

Intersection Summary

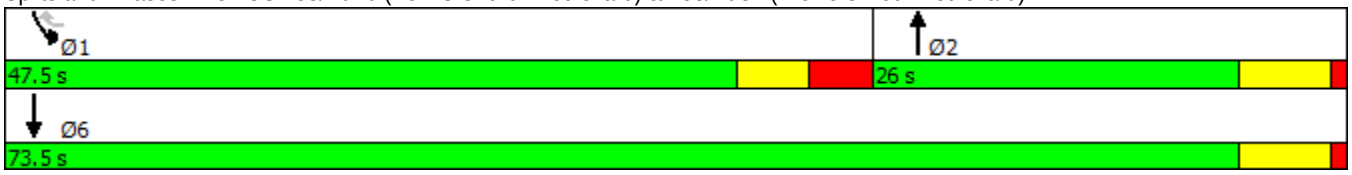


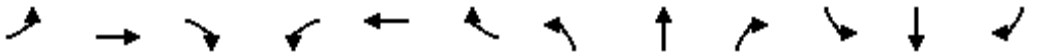
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	1154	0	200	0	647	276	0
Future Volume (vph)	0	0	0	0	0	1154	0	200	0	647	276	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		0	300		0
Storage Lanes	0		0	0		2	0		0	1		0
Taper Length (ft)	25			25			100			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	0.88	1.00	0.95	1.00	0.97	0.95	1.00
Frt						0.850						
Flt Protected										0.950		
Satd. Flow (prot)	0	0	0	0	0	2760	0	3471	0	3400	3471	0
Flt Permitted										0.950		
Satd. Flow (perm)	0	0	0	0	0	2760	0	3471	0	3400	3471	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						659						
Link Speed (mph)		30			45			45			45	
Link Distance (ft)		963			1126			2837			3921	
Travel Time (s)		21.9			17.1			43.0			59.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.93	0.25	0.89	0.25	0.99	0.85	0.25
Heavy Vehicles (%)	0%	0%	0%	0%	0%	3%	0%	4%	0%	3%	4%	0%
Adj. Flow (vph)	0	0	0	0	0	1241	0	225	0	654	325	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	1241	0	225	0	654	325	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors						1		2		1	2	
Detector Template						Right		Thru		Left	Thru	
Leading Detector (ft)						20		100		20	100	
Trailing Detector (ft)						0		0		0	0	
Detector 1 Position(ft)						0		0		0	0	
Detector 1 Size(ft)						20		6		20	6	
Detector 1 Type						Cl+Ex		Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)						0.0		0.0		0.0	0.0	
Detector 1 Queue (s)						0.0		0.0		0.0	0.0	
Detector 1 Delay (s)						0.0		0.0		0.0	0.0	
Detector 2 Position(ft)								94			94	
Detector 2 Size(ft)								6			6	
Detector 2 Type								Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)								0.0			0.0	
Turn Type						Perm		NA		Prot	NA	
Protected Phases								2		1	6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases						1						
Detector Phase						1		2		1	6	
Switch Phase												
Minimum Initial (s)						15.0		10.0		15.0	15.0	
Minimum Split (s)						22.5		16.0		22.5	21.0	
Total Split (s)						47.5		26.0		47.5	73.5	
Total Split (%)						64.6%		35.4%		64.6%	100.0%	
Maximum Green (s)						40.0		20.0		40.0	67.5	
Yellow Time (s)						4.0		5.0		4.0	5.0	
All-Red Time (s)						3.5		1.0		3.5	1.0	
Lost Time Adjust (s)						0.0		0.0		0.0	0.0	
Total Lost Time (s)						7.5		6.0		7.5	6.0	
Lead/Lag						Lead		Lag		Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)						3.5		2.5		3.5	5.0	
Recall Mode						Min		None		Min	Min	
Act Effct Green (s)						26.5		10.5		26.5	50.8	
Actuated g/C Ratio						0.52		0.21		0.52	1.00	
v/c Ratio						0.71		0.32		0.37	0.09	
Control Delay						6.1		20.6		7.5	0.1	
Queue Delay						0.0		0.0		0.0	0.0	
Total Delay						6.1		20.6		7.5	0.1	
LOS						A		C		A	A	
Approach Delay					6.1			20.6			5.0	
Approach LOS					A			C			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 73.5			
Actuated Cycle Length: 50.8			
Natural Cycle: 50			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.71			
Intersection Signal Delay: 7.0		Intersection LOS: A	
Intersection Capacity Utilization 60.0%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 5: US 258/Rt 10 (Benns Church Boulevard) & 258/Rt 32 (Brewers Neck Boulevard)





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	8	685	3	418	1126	12	1	3	222	2	4	6
Future Volume (vph)	8	685	3	418	1126	12	1	3	222	2	4	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		0	600		325	0		350	0		0
Storage Lanes	1		0	1		1	0		2	0		1
Taper Length (ft)	200			200			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	0.88	1.00	1.00	1.00
Frt		0.999				0.850			0.850			0.850
Flt Protected	0.950			0.950				0.984			0.976	
Satd. Flow (prot)	1805	3536	0	1787	3539	1380	0	1870	2787	0	1648	1380
Flt Permitted	0.950			0.950				0.984			0.976	
Satd. Flow (perm)	1805	3536	0	1787	3539	1380	0	1870	2787	0	1648	1380
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						171			285			160
Link Speed (mph)		45			45			45			25	
Link Distance (ft)		1126			846			914			623	
Travel Time (s)		17.1			12.8			13.8			17.0	
Peak Hour Factor	0.35	0.98	1.00	0.86	0.96	0.60	0.25	0.38	0.78	0.50	1.00	0.75
Heavy Vehicles (%)	0%	2%	0%	1%	2%	17%	0%	0%	2%	0%	25%	17%
Adj. Flow (vph)	23	699	3	486	1173	20	4	8	285	4	4	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	23	702	0	486	1173	20	0	12	285	0	8	8
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA	pm+ov	Split	NA	Perm
Protected Phases	1	6		5	2		4	4	5	3	3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases						2			4			3
Detector Phase	1	6		5	2	2	4	4	5	3	3	3
Switch Phase												
Minimum Initial (s)	10.0	15.0		10.0	15.0	15.0	10.0	10.0	10.0	5.0	5.0	5.0
Minimum Split (s)	19.0	24.5		19.5	24.5	24.5	26.0	26.0	19.5	26.0	26.0	26.0
Total Split (s)	34.0	41.5		39.5	47.0	47.0	26.0	26.0	39.5	33.0	33.0	33.0
Total Split (%)	24.3%	29.6%		28.2%	33.6%	33.6%	18.6%	18.6%	28.2%	23.6%	23.6%	23.6%
Maximum Green (s)	25.0	35.0		30.0	40.5	40.5	18.0	18.0	30.0	25.0	25.0	25.0
Yellow Time (s)	5.0	5.5		5.0	5.5	5.5	4.0	4.0	5.0	3.5	3.5	3.5
All-Red Time (s)	4.0	1.0		4.5	1.0	1.0	4.0	4.0	4.5	4.5	4.5	4.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	9.0	6.5		9.5	6.5	6.5		8.0	9.5		8.0	8.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	5.0		3.0	5.0	5.0	3.5	3.5	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None	None	None	None	None	None	None	None
Act Effct Green (s)	10.5	26.0		31.6	66.4	66.4		10.5	34.2		6.3	6.3
Actuated g/C Ratio	0.13	0.32		0.39	0.81	0.81		0.13	0.42		0.08	0.08
v/c Ratio	0.10	0.62		0.70	0.41	0.02		0.05	0.21		0.06	0.03
Control Delay	41.2	27.6		32.8	9.6	0.0		41.8	3.1		45.5	0.2
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	41.2	27.6		32.8	9.6	0.0		41.8	3.1		45.5	0.2
LOS	D	C		C	A	A		D	A		D	A
Approach Delay		28.1			16.2			4.6			22.8	
Approach LOS		C			B			A			C	

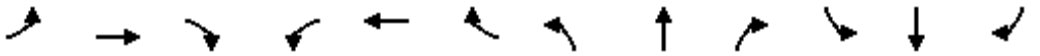
Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 81.7			
Natural Cycle: 130			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.70			
Intersection Signal Delay: 18.1		Intersection LOS: B	
Intersection Capacity Utilization 70.5%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 6: Queen Annes Court & 258/Rt 32 (Brewers Neck Boulevard)



APPENDIX D

2026 No Build Synchro Reports



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	1	19	99	5	43	15	801	51	55	1160	36
Future Volume (vph)	26	1	19	99	5	43	15	801	51	55	1160	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	200		350	275		325
Storage Lanes	0		1	0		1	1		1	1		1
Taper Length (ft)	25			25			125			225		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected		0.957			0.956		0.950			0.950		
Satd. Flow (prot)	0	1756	1615	0	1737	1615	1805	3374	1509	1752	3505	1615
Flt Permitted		0.957			0.956		0.062			0.263		
Satd. Flow (perm)	0	1756	1615	0	1737	1615	118	3374	1509	485	3505	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			171			171			185			185
Link Speed (mph)		25			25			45			45	
Link Distance (ft)		335			1232			773			1937	
Travel Time (s)		9.1			33.6			11.7			29.3	
Peak Hour Factor	0.82	0.25	0.53	0.76	0.50	0.79	0.46	0.92	0.75	0.73	0.63	0.80
Heavy Vehicles (%)	4%	0%	0%	3%	25%	0%	0%	7%	7%	3%	3%	0%
Adj. Flow (vph)	32	4	36	130	10	54	33	871	68	75	1841	45
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	36	36	0	140	54	33	871	68	75	1841	45
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Split	NA	Prot	Split	NA	Prot	D.P+P	NA	Perm	D.P+P	NA	Perm
Protected Phases	4	4	4	3	3	3	5	2		1	6	

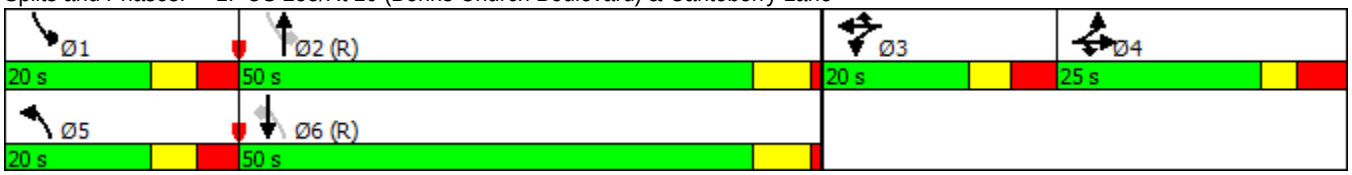
1: US 258/Rt 10 (Benns Church Boulevard) & Canteberry Lane

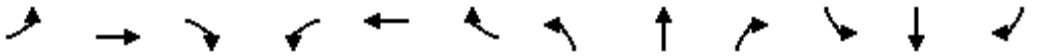
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases							6		2	2		6
Detector Phase	4	4	4	3	3	3	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	5.0	15.0	15.0	5.0	15.0	15.0
Minimum Split (s)	14.5	14.5	14.5	14.5	14.5	14.5	12.5	21.0	21.0	12.5	21.0	21.0
Total Split (s)	25.0	25.0	25.0	20.0	20.0	20.0	20.0	50.0	50.0	20.0	50.0	50.0
Total Split (%)	21.7%	21.7%	21.7%	17.4%	17.4%	17.4%	17.4%	43.5%	43.5%	17.4%	43.5%	43.5%
Maximum Green (s)	17.5	17.5	17.5	12.5	12.5	12.5	12.5	44.0	44.0	12.5	44.0	44.0
Yellow Time (s)	3.0	3.0	3.0	3.5	3.5	3.5	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	4.5	4.5	4.5	4.0	4.0	4.0	3.5	1.0	1.0	3.5	1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		7.5	7.5		7.5	7.5	7.5	6.0	6.0	7.5	6.0	6.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	2.0	6.0	6.0	2.0	6.0	6.0
Minimum Gap (s)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	3.5	3.5	0.2	3.5	3.5
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	20.0	0.0	20.0	20.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0	15.0	0.0	15.0	15.0
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)		8.2	8.2		11.9	11.9	70.7	65.2	65.2	69.2	68.8	68.8
Actuated g/C Ratio		0.07	0.07		0.10	0.10	0.61	0.57	0.57	0.60	0.60	0.60
v/c Ratio		0.29	0.13		0.78	0.17	0.22	0.46	0.07	0.21	0.88	0.04
Control Delay		56.0	1.0		78.6	1.1	13.8	15.3	0.4	10.3	28.9	0.1
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		56.0	1.0		78.6	1.1	13.8	15.3	0.4	10.3	28.9	0.1
LOS		E	A		E	A	B	B	A	B	C	A
Approach Delay		28.5			57.0			14.2			27.5	
Approach LOS		C			E			B			C	

Intersection Summary

Area Type: Other
Cycle Length: 115
Actuated Cycle Length: 115
Offset: 0 (0%), Referenced to phase 2:NBSB and 6:NBSB, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.88
Intersection Signal Delay: 25.3 Intersection LOS: C
Intersection Capacity Utilization 66.1% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 1: US 258/Rt 10 (Benns Church Boulevard) & Canteberry Lane





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	0	20	0	0	0	24	715	0	2	1410	32
Future Volume (vph)	5	0	20	0	0	0	24	715	0	2	1410	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	250		0	150		235
Storage Lanes	0		1	0		0	1		0	1		1
Taper Length (ft)	25			25			150			125		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt			0.850									0.850
Flt Protected		0.950					0.950			0.950		
Satd. Flow (prot)	0	1805	1524	0	1900	0	1805	3505	0	1805	3471	1553
Flt Permitted		0.950					0.067			0.288		
Satd. Flow (perm)	0	1805	1524	0	1900	0	127	3505	0	547	3471	1553
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			152									157
Link Speed (mph)		15			25			45			45	
Link Distance (ft)		1905			1451			1986			773	
Travel Time (s)		86.6			39.6			30.1			11.7	
Peak Hour Factor	0.50	0.25	0.56	0.25	0.25	0.25	0.44	0.75	0.44	0.50	0.72	0.78
Heavy Vehicles (%)	0%	0%	6%	0%	0%	0%	0%	3%	14%	0%	4%	4%
Adj. Flow (vph)	10	0	36	0	0	0	55	953	0	4	1958	41
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	10	36	0	0	0	55	953	0	4	1958	41
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	20
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Split	NA	Prot				D.P+P	NA		D.P+P	NA	Prot
Protected Phases	4	4	4	3	3		5	2		1	6	6

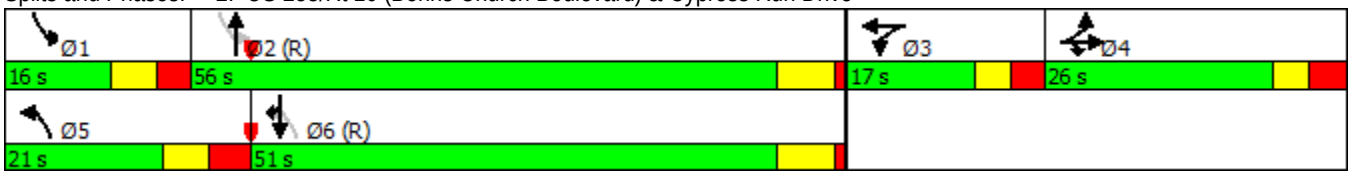
2: US 258/Rt 10 (Benns Church Boulevard) & Cypress Run Drive

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases							6			2		
Detector Phase	4	4	4	3	3		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		5.0	14.0		5.0	14.0	14.0
Minimum Split (s)	13.5	13.5	13.5	13.0	13.0		12.5	20.0		12.0	20.0	20.0
Total Split (s)	26.0	26.0	26.0	17.0	17.0		21.0	56.0		16.0	51.0	51.0
Total Split (%)	22.6%	22.6%	22.6%	14.8%	14.8%		18.3%	48.7%		13.9%	44.3%	44.3%
Maximum Green (s)	19.5	19.5	19.5	11.0	11.0		13.5	50.0		9.0	45.0	45.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		4.0	5.0		4.0	5.0	5.0
All-Red Time (s)	3.5	3.5	3.5	3.0	3.0		3.5	1.0		3.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		6.5	6.5		6.0		7.5	6.0		7.0	6.0	6.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		2.0	5.0		2.0	5.0	5.0
Minimum Gap (s)	0.2	0.2	0.2	0.2	0.2		0.2	3.5		0.2	3.5	3.5
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0		0.0	18.0		0.0	18.0	18.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0		0.0	15.0		0.0	15.0	15.0
Recall Mode	None	None	None	None	None		None	C-Min		None	C-Min	C-Min
Act Effct Green (s)		7.1	7.1				93.3	100.8		98.4	91.5	91.5
Actuated g/C Ratio		0.06	0.06				0.81	0.88		0.86	0.80	0.80
v/c Ratio		0.09	0.15				0.30	0.31		0.01	0.71	0.03
Control Delay		52.8	1.4				6.9	2.9		1.0	5.5	0.0
Queue Delay		0.0	0.0				0.0	0.0		0.0	0.0	0.0
Total Delay		52.8	1.4				6.9	2.9		1.0	5.5	0.0
LOS		D	A				A	A		A	A	A
Approach Delay		12.5						3.1			5.4	
Approach LOS		B						A			A	

Intersection Summary

Area Type: Other
Cycle Length: 115
Actuated Cycle Length: 115
Offset: 13 (11%), Referenced to phase 2:NBSB and 6:NBSB, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.71
Intersection Signal Delay: 4.8 Intersection LOS: A
Intersection Capacity Utilization 55.2% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 2: US 258/Rt 10 (Benns Church Boulevard) & Cypress Run Drive



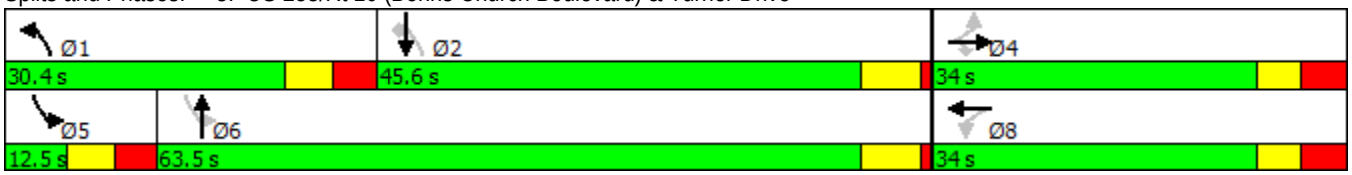
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	193	1	285	1	72	1	243	631	70	7	944	324
Future Volume (vph)	193	1	285	1	72	1	243	631	70	7	944	324
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		300	0		0	125		0	125		275
Storage Lanes	0		1	0		0	1		0	1		1
Taper Length (ft)	200			25			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt			0.850		0.997			0.973				0.850
Flt Protected		0.953			0.999		0.950			0.950		
Satd. Flow (prot)	0	1811	1615	0	1892	0	1752	3401	0	1805	3505	1553
Flt Permitted		0.513			0.991		0.094			0.274		
Satd. Flow (perm)	0	975	1615	0	1877	0	173	3401	0	521	3505	1553
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			311		1			35				287
Link Speed (mph)		40			25			45			45	
Link Distance (ft)		1497			695			1153			1986	
Travel Time (s)		25.5			19.0			17.5			30.1	
Peak Hour Factor	0.64	0.25	0.73	0.25	0.39	0.25	0.52	0.90	0.46	0.25	0.73	0.51
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	3%	4%	0%	0%	3%	4%
Adj. Flow (vph)	302	4	390	4	185	4	467	701	152	28	1293	635
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	306	390	0	193	0	467	853	0	28	1293	635
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	20
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA		D.P+P	NA		D.P+P	NA	Perm
Protected Phases		4			8		1	6		5	2	

3: US 258/Rt 10 (Benns Church Boulevard) & Turner Drive

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8			2			6		2
Detector Phase	4	4	4	8	8		1	6		5	2	2
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		5.0	15.0		5.0	15.0	15.0
Minimum Split (s)	15.0	15.0	15.0	14.5	14.5		12.5	21.0		12.5	21.0	21.0
Total Split (s)	34.0	34.0	34.0	34.0	34.0		30.4	63.5		12.5	45.6	45.6
Total Split (%)	30.9%	30.9%	30.9%	30.9%	30.9%		27.6%	57.7%		11.4%	41.5%	41.5%
Maximum Green (s)	26.5	26.5	26.5	26.5	26.5		22.9	57.5		5.0	39.6	39.6
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		4.0	5.0		4.0	5.0	5.0
All-Red Time (s)	4.0	4.0	4.0	4.0	4.0		3.5	1.0		3.5	1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		7.5	7.5		7.5		7.5	6.0		7.5	6.0	6.0
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0	5.0	5.0	3.0	3.0		4.0	6.0		2.0	6.0	6.0
Minimum Gap (s)	3.5	3.5	3.5	0.2	0.2		0.2	3.5		0.2	3.5	3.5
Time Before Reduce (s)	20.0	20.0	20.0	0.0	0.0		0.0	20.0		0.0	20.0	20.0
Time To Reduce (s)	10.0	10.0	10.0	0.0	0.0		0.0	15.0		0.0	15.0	15.0
Recall Mode	None	None	None	None	None		None	Min		None	Min	Min
Act Effct Green (s)		26.5	26.5		26.5		61.0	62.5		64.0	39.6	39.6
Actuated g/C Ratio		0.24	0.24		0.24		0.55	0.57		0.58	0.36	0.36
v/c Ratio		1.31	0.62		0.43		1.10	0.44		0.08	1.03	0.86
Control Delay		201.2	13.2		38.6		107.0	14.7		8.7	67.3	30.3
Queue Delay		0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		201.2	13.2		38.6		107.0	14.7		8.7	67.3	30.3
LOS		F	B		D		F	B		A	E	C
Approach Delay		95.9			38.6			47.4			54.5	
Approach LOS		F			D			D			D	

Intersection Summary			
Area Type:	Other		
Cycle Length: 110			
Actuated Cycle Length: 110			
Natural Cycle: 100			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.31			
Intersection Signal Delay: 58.4		Intersection LOS: E	
Intersection Capacity Utilization 74.5%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 3: US 258/Rt 10 (Benns Church Boulevard) & Turner Drive



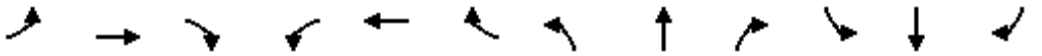


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	5	0	1032	0	1	0
Future Volume (vph)	0	0	0	0	0	0	5	0	1032	0	1	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0		125		0		140
Storage Lanes	0		0	0		0		1		0		1
Taper Length (ft)	25			25				25				75
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00
Frt												
Flt Protected							0.950				0.950	
Satd. Flow (prot)	0	0	0	0	0	0	1805	0	3438	0	1805	0
Flt Permitted							0.950				0.950	
Satd. Flow (perm)	0	0	0	0	0	0	1805	0	3438	0	1805	0
Link Speed (mph)		30			30				45			
Link Distance (ft)		810			872				3921			
Travel Time (s)		18.4			19.8				59.4			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.33	0.25	0.85	0.25	0.25	0.25
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	5%	0%	0%	0%
Adj. Flow (vph)	0	0	0	0	0	0	15	0	1214	0	4	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	0	15	0	1214	0	4	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	R NA	Left	Left	Right	R NA	Left
Median Width(ft)		0			0				12			
Link Offset(ft)		0			0				0			
Crosswalk Width(ft)		16			16				16			
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	9	15		9	9	15
Sign Control		Stop			Stop				Free			

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 38.5%		ICU Level of Service A	
Analysis Period (min) 15			

Lane Group	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	1273	0
Future Volume (vph)	1273	0
Ideal Flow (vphpl)	1900	1900
Storage Length (ft)		0
Storage Lanes		0
Taper Length (ft)		
Lane Util. Factor	0.95	1.00
Frt		
Flt Protected		
Satd. Flow (prot)	3406	0
Flt Permitted		
Satd. Flow (perm)	3406	0
Link Speed (mph)	45	
Link Distance (ft)	1153	
Travel Time (s)	17.5	
Peak Hour Factor	0.88	0.25
Heavy Vehicles (%)	6%	0%
Adj. Flow (vph)	1447	0
Shared Lane Traffic (%)		
Lane Group Flow (vph)	1447	0
Enter Blocked Intersection	No	No
Lane Alignment	Left	Right
Median Width(ft)	12	
Link Offset(ft)	0	
Crosswalk Width(ft)	16	
Two way Left Turn Lane		
Headway Factor	1.00	1.00
Turning Speed (mph)		9
Sign Control	Free	

Intersection Summary



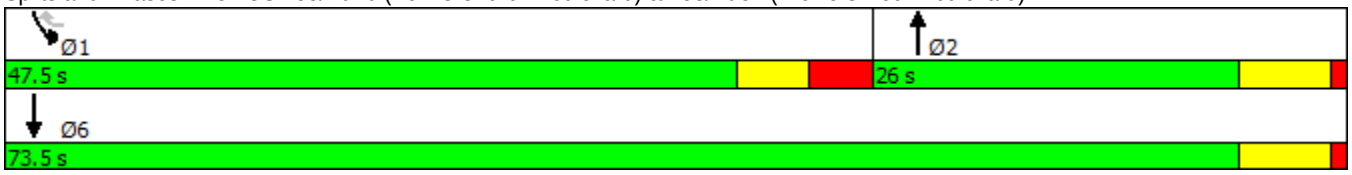
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	736	0	188	0	1010	244	0
Future Volume (vph)	0	0	0	0	0	736	0	188	0	1010	244	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		0	300		0
Storage Lanes	0		0	0		2	0		0	1		0
Taper Length (ft)	25			25			100			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	0.88	1.00	0.95	1.00	0.97	0.95	1.00
Frt						0.850						
Flt Protected										0.950		
Satd. Flow (prot)	0	0	0	0	0	2707	0	3471	0	3367	3438	0
Flt Permitted										0.950		
Satd. Flow (perm)	0	0	0	0	0	2707	0	3471	0	3367	3438	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						662						
Link Speed (mph)		30			45			45			45	
Link Distance (ft)		963			1126			2837			3921	
Travel Time (s)		21.9			17.1			43.0			59.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.72	0.92	0.84	0.25	0.83	0.63	0.25
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	0%	4%	0%	4%	5%	0%
Adj. Flow (vph)	0	0	0	0	0	1022	0	224	0	1217	387	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	1022	0	224	0	1217	387	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors						1		2		1	2	
Detector Template						Right		Thru		Left	Thru	
Leading Detector (ft)						20		100		20	100	
Trailing Detector (ft)						0		0		0	0	
Detector 1 Position(ft)						0		0		0	0	
Detector 1 Size(ft)						20		6		20	6	
Detector 1 Type						Cl+Ex		Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)						0.0		0.0		0.0	0.0	
Detector 1 Queue (s)						0.0		0.0		0.0	0.0	
Detector 1 Delay (s)						0.0		0.0		0.0	0.0	
Detector 2 Position(ft)								94			94	
Detector 2 Size(ft)								6			6	
Detector 2 Type								Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)								0.0			0.0	
Turn Type						Perm		NA		Prot	NA	
Protected Phases								2		1	6	

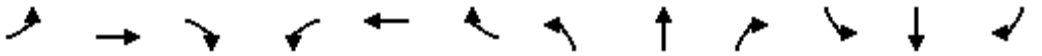
5: US 258/Rt 10 (Benns Church Boulevard) & 258/Rt 32 (Brewers Neck Boulevard)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases						1						
Detector Phase						1		2		1	6	
Switch Phase												
Minimum Initial (s)						15.0		10.0		15.0	15.0	
Minimum Split (s)						22.5		16.0		22.5	21.0	
Total Split (s)						47.5		26.0		47.5	73.5	
Total Split (%)						64.6%		35.4%		64.6%	100.0%	
Maximum Green (s)						40.0		20.0		40.0	67.5	
Yellow Time (s)						4.0		5.0		4.0	5.0	
All-Red Time (s)						3.5		1.0		3.5	1.0	
Lost Time Adjust (s)						0.0		0.0		0.0	0.0	
Total Lost Time (s)						7.5		6.0		7.5	6.0	
Lead/Lag						Lead		Lag		Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)						3.5		2.5		3.5	5.0	
Recall Mode						Min		None		Min	Min	
Act Effct Green (s)						33.5		10.4		33.5	57.5	
Actuated g/C Ratio						0.58		0.18		0.58	1.00	
v/c Ratio						0.55		0.36		0.62	0.11	
Control Delay						3.4		24.0		9.3	0.1	
Queue Delay						0.0		0.0		0.0	0.0	
Total Delay						3.4		24.0		9.3	0.1	
LOS						A		C		A	A	
Approach Delay					3.4			24.0			7.1	
Approach LOS					A			C			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 73.5			
Actuated Cycle Length: 57.5			
Natural Cycle: 45			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.62			
Intersection Signal Delay: 7.1		Intersection LOS: A	
Intersection Capacity Utilization 47.1%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 5: US 258/Rt 10 (Benns Church Boulevard) & 258/Rt 32 (Brewers Neck Boulevard)





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	989	0	243	709	3	0	1	433	7	3	12
Future Volume (vph)	7	989	0	243	709	3	0	1	433	7	3	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		0	600		325	0		350	0		0
Storage Lanes	1		0	1		1	0		2	0		1
Taper Length (ft)	200			200			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	0.88	1.00	1.00	1.00
Frt						0.850			0.850			0.850
Flt Protected	0.950			0.950							0.974	
Satd. Flow (prot)	1805	3471	0	1719	3505	1615	0	950	2682	0	1851	1369
Flt Permitted	0.950			0.950							0.974	
Satd. Flow (perm)	1805	3471	0	1719	3505	1615	0	950	2682	0	1851	1369
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						171			487			160
Link Speed (mph)		45			45			45			25	
Link Distance (ft)		1126			846			914			623	
Travel Time (s)		17.1			12.8			13.8			17.0	
Peak Hour Factor	0.50	0.82	0.25	0.78	0.72	0.38	0.25	0.25	0.89	0.75	0.38	0.55
Heavy Vehicles (%)	0%	4%	0%	5%	3%	0%	0%	100%	6%	0%	0%	18%
Adj. Flow (vph)	14	1206	0	312	985	8	0	4	487	9	8	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	14	1206	0	312	985	8	0	4	487	0	17	22
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm		NA	pm+ov	Split	NA	Perm
Protected Phases	1	6		5	2		4	4	5	3	3	

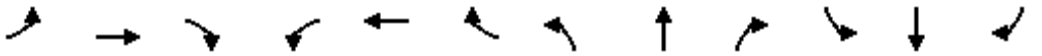
6: Queen Annes Court & 258/Rt 32 (Brewers Neck Boulevard)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases						2			4			3
Detector Phase	1	6		5	2	2	4	4	5	3	3	3
Switch Phase												
Minimum Initial (s)	10.0	15.0		10.0	15.0	15.0	10.0	10.0	10.0	5.0	5.0	5.0
Minimum Split (s)	19.0	24.5		19.5	24.5	24.5	26.0	26.0	19.5	26.0	26.0	26.0
Total Split (s)	34.0	41.5		39.5	47.0	47.0	26.0	26.0	39.5	33.0	33.0	33.0
Total Split (%)	24.3%	29.6%		28.2%	33.6%	33.6%	18.6%	18.6%	28.2%	23.6%	23.6%	23.6%
Maximum Green (s)	25.0	35.0		30.0	40.5	40.5	18.0	18.0	30.0	25.0	25.0	25.0
Yellow Time (s)	5.0	5.5		5.0	5.5	5.5	4.0	4.0	5.0	3.5	3.5	3.5
All-Red Time (s)	4.0	1.0		4.5	1.0	1.0	4.0	4.0	4.5	4.5	4.5	4.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	9.0	6.5		9.5	6.5	6.5		8.0	9.5		8.0	8.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	5.0		3.0	5.0	5.0	3.5	3.5	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None	None	None	None	None	None	None	None
Act Effct Green (s)	10.5	36.6		21.7	68.8	68.8		10.5	24.4		6.6	6.6
Actuated g/C Ratio	0.12	0.43		0.25	0.80	0.80		0.12	0.28		0.08	0.08
v/c Ratio	0.06	0.81		0.72	0.35	0.01		0.03	0.44		0.12	0.09
Control Delay	43.3	31.0		41.1	7.7	0.0		44.0	3.4		46.7	0.7
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	43.3	31.0		41.1	7.7	0.0		44.0	3.4		46.7	0.7
LOS	D	C		D	A	A		D	A		D	A
Approach Delay		31.1			15.7			3.7			20.7	
Approach LOS		C			B			A			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 85.7			
Natural Cycle: 140			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.81			
Intersection Signal Delay: 20.0		Intersection LOS: B	
Intersection Capacity Utilization 69.1%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 6: Queen Annes Court & 258/Rt 32 (Brewers Neck Boulevard)





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	143	6	45	64	9	80	52	1249	107	133	1049	99
Future Volume (vph)	143	6	45	64	9	80	52	1249	107	133	1049	99
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	200		350	275		325
Storage Lanes	0		1	0		1	1		1	1		1
Taper Length (ft)	25			25			125			225		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected		0.956			0.958		0.950			0.950		
Satd. Flow (prot)	0	1816	1615	0	1789	1553	1805	3539	1583	1687	3505	1615
Flt Permitted		0.956			0.958		0.143			0.074		
Satd. Flow (perm)	0	1816	1615	0	1789	1553	272	3539	1583	131	3505	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			164			164			177			177
Link Speed (mph)		25			25			45			45	
Link Distance (ft)		335			1232			773			1937	
Travel Time (s)		9.1			33.6			11.7			29.3	
Peak Hour Factor	0.91	0.42	0.56	0.75	0.67	0.93	0.60	0.94	0.64	0.76	0.94	0.71
Heavy Vehicles (%)	0%	0%	0%	2%	0%	4%	0%	2%	2%	7%	3%	0%
Adj. Flow (vph)	157	14	80	85	13	86	87	1329	167	175	1116	139
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	171	80	0	98	86	87	1329	167	175	1116	139
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Split	NA	Prot	Split	NA	Prot	D.P+P	NA	Perm	D.P+P	NA	Perm
Protected Phases	4	4	4	3	3	3	5	2		1	6	

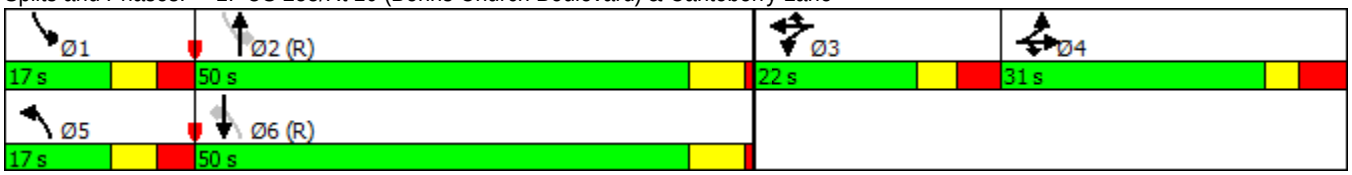
1: US 258/Rt 10 (Benns Church Boulevard) & Canteberry Lane

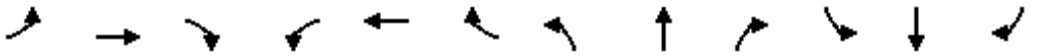
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases							6		2	2		6
Detector Phase	4	4	4	3	3	3	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	5.0	15.0	15.0	5.0	15.0	15.0
Minimum Split (s)	14.5	14.5	14.5	14.5	14.5	14.5	12.5	21.0	21.0	12.5	21.0	21.0
Total Split (s)	31.0	31.0	31.0	22.0	22.0	22.0	17.0	50.0	50.0	17.0	50.0	50.0
Total Split (%)	25.8%	25.8%	25.8%	18.3%	18.3%	18.3%	14.2%	41.7%	41.7%	14.2%	41.7%	41.7%
Maximum Green (s)	23.5	23.5	23.5	14.5	14.5	14.5	9.5	44.0	44.0	9.5	44.0	44.0
Yellow Time (s)	3.0	3.0	3.0	3.5	3.5	3.5	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	4.5	4.5	4.5	4.0	4.0	4.0	3.5	1.0	1.0	3.5	1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		7.5	7.5		7.5	7.5	7.5	6.0	6.0	7.5	6.0	6.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	2.0	6.0	6.0	2.0	6.0	6.0
Minimum Gap (s)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	3.5	3.5	0.2	3.5	3.5
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	20.0	0.0	20.0	20.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0	15.0	0.0	15.0	15.0
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)		16.5	16.5		11.5	11.5	62.0	54.0	54.0	62.0	56.3	56.3
Actuated g/C Ratio		0.14	0.14		0.10	0.10	0.52	0.45	0.45	0.52	0.47	0.47
v/c Ratio		0.68	0.22		0.57	0.29	0.38	0.84	0.21	0.92	0.68	0.16
Control Delay		62.7	1.4		64.7	2.5	15.3	32.0	2.3	77.5	29.2	2.0
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		62.7	1.4		64.7	2.5	15.3	32.0	2.3	77.5	29.2	2.0
LOS		E	A		E	A	B	C	A	E	C	A
Approach Delay		43.2			35.6			28.0			32.4	
Approach LOS		D			D			C			C	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBSB and 6:NBSB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.92
Intersection Signal Delay: 31.3 Intersection LOS: C
Intersection Capacity Utilization 74.3% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 1: US 258/Rt 10 (Benns Church Boulevard) & Canteberry Lane





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	116	0	83	0	0	1	157	1291	0	0	1022	134
Future Volume (vph)	116	0	83	0	0	1	157	1291	0	0	1022	134
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	250		0	150		235
Storage Lanes	0		1	0		0	1		0	1		1
Taper Length (ft)	25			25			150			125		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt			0.850		0.865							0.850
Flt Protected		0.950					0.950					
Satd. Flow (prot)	0	1787	1599	0	1644	0	1805	3539	0	1900	3505	1615
Flt Permitted		0.950					0.183					
Satd. Flow (perm)	0	1787	1599	0	1644	0	348	3539	0	1900	3505	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			214		218							218
Link Speed (mph)		15			25			45			45	
Link Distance (ft)		1905			1451			1986			773	
Travel Time (s)		86.6			39.6			30.1			11.7	
Peak Hour Factor	0.81	0.25	0.62	0.25	0.25	0.25	0.67	0.93	0.25	0.25	0.95	0.80
Heavy Vehicles (%)	1%	0%	1%	0%	0%	0%	0%	2%	0%	0%	3%	0%
Adj. Flow (vph)	143	0	134	0	0	4	234	1388	0	0	1076	168
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	143	134	0	4	0	234	1388	0	0	1076	168
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	20
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Split	NA	Prot		NA		D.P+P	NA		D.P+P	NA	Prot
Protected Phases	4	4	4	3	3		5	2		1	6	6

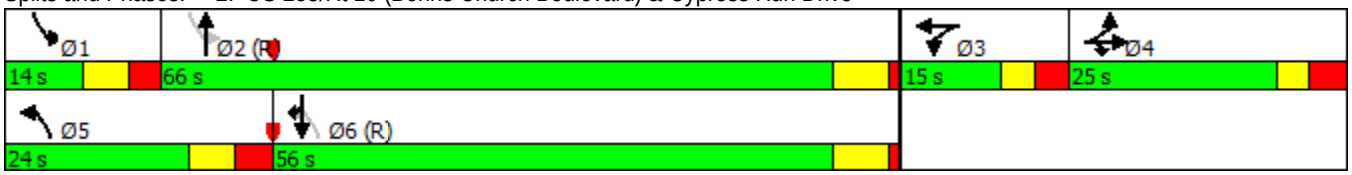
2: US 258/Rt 10 (Benns Church Boulevard) & Cypress Run Drive

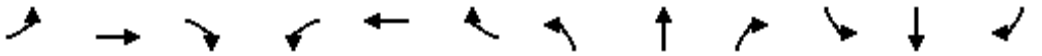
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases							6			2		
Detector Phase	4	4	4	3	3		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		5.0	14.0		5.0	14.0	14.0
Minimum Split (s)	13.5	13.5	13.5	13.0	13.0		12.5	20.0		12.0	20.0	20.0
Total Split (s)	25.0	25.0	25.0	15.0	15.0		24.0	66.0		14.0	56.0	56.0
Total Split (%)	20.8%	20.8%	20.8%	12.5%	12.5%		20.0%	55.0%		11.7%	46.7%	46.7%
Maximum Green (s)	18.5	18.5	18.5	9.0	9.0		16.5	60.0		7.0	50.0	50.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		4.0	5.0		4.0	5.0	5.0
All-Red Time (s)	3.5	3.5	3.5	3.0	3.0		3.5	1.0		3.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		6.5	6.5		6.0		7.5	6.0		7.0	6.0	6.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		2.0	5.0		2.0	5.0	5.0
Minimum Gap (s)	0.2	0.2	0.2	0.2	0.2		0.2	3.5		0.2	3.5	3.5
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0		0.0	18.0		0.0	18.0	18.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0		0.0	15.0		0.0	15.0	15.0
Recall Mode	None	None	None	None	None		None	C-Min		None	C-Min	C-Min
Act Effct Green (s)		14.6	14.6		7.0		81.3	90.3			68.4	68.4
Actuated g/C Ratio		0.12	0.12		0.06		0.68	0.75			0.57	0.57
v/c Ratio		0.66	0.35		0.01		0.57	0.52			0.54	0.17
Control Delay		64.3	2.6		0.0		13.9	8.0			6.7	0.3
Queue Delay		0.0	0.0		0.0		0.0	0.0			0.0	0.0
Total Delay		64.3	2.6		0.0		13.9	8.0			6.7	0.3
LOS		E	A		A		B	A			A	A
Approach Delay		34.4						8.9			5.8	
Approach LOS		C						A			A	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 12 (10%), Referenced to phase 2:NBSB and 6:NBSB, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.66
Intersection Signal Delay: 9.9 Intersection LOS: A
Intersection Capacity Utilization 69.2% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 2: US 258/Rt 10 (Benns Church Boulevard) & Cypress Run Drive



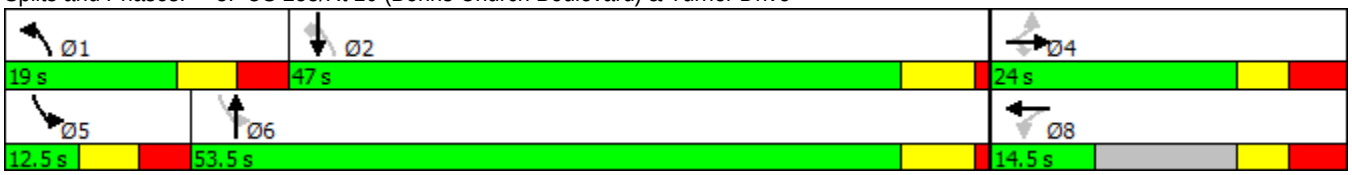


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	86	0	97	0	1	2	172	1347	1	33	988	126
Future Volume (vph)	86	0	97	0	1	2	172	1347	1	33	988	126
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		300	100		0	125		0	125		275
Storage Lanes	0		1	1		0	1		0	1		1
Taper Length (ft)	200			25			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt			0.850		0.925							0.850
Flt Protected		0.950					0.950			0.950		
Satd. Flow (prot)	0	1787	1599	1900	1758	0	1687	3539	0	1805	3505	1482
Flt Permitted		0.752					0.191			0.094		
Satd. Flow (perm)	0	1415	1599	1900	1758	0	339	3539	0	179	3505	1482
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			127		4							148
Link Speed (mph)		40			25			45			45	
Link Distance (ft)		1500			695			1153			1986	
Travel Time (s)		25.6			19.0			17.5			30.1	
Peak Hour Factor	0.63	0.25	0.80	0.25	0.25	0.50	0.90	0.94	0.25	0.50	0.98	0.85
Heavy Vehicles (%)	1%	0%	1%	0%	0%	0%	7%	2%	0%	0%	3%	9%
Adj. Flow (vph)	137	0	121	0	4	4	191	1433	4	66	1008	148
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	137	121	0	8	0	191	1437	0	66	1008	148
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	20
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA		D.P+P	NA		D.P+P	NA	Perm
Protected Phases		4			8		1	6		5	2	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8			2			6		2
Detector Phase	4	4	4	8	8		1	6		5	2	2
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		5.0	15.0		5.0	15.0	15.0
Minimum Split (s)	14.5	14.5	14.5	14.5	14.5		12.5	21.0		12.5	21.0	21.0
Total Split (s)	24.0	24.0	24.0	14.5	14.5		19.0	53.5		12.5	47.0	47.0
Total Split (%)	26.7%	26.7%	26.7%	16.1%	16.1%		21.1%	59.4%		13.9%	52.2%	52.2%
Maximum Green (s)	16.5	16.5	16.5	7.0	7.0		11.5	47.5		5.0	41.0	41.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		4.0	5.0		4.0	5.0	5.0
All-Red Time (s)	4.0	4.0	4.0	4.0	4.0		3.5	1.0		3.5	1.0	1.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		7.5	7.5	7.5	7.5		7.5	6.0		7.5	6.0	6.0
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0	5.0	5.0	3.0	3.0		4.0	6.0		2.0	6.0	6.0
Minimum Gap (s)	3.5	3.5	3.5	0.2	0.2		0.2	3.5		0.2	3.5	3.5
Time Before Reduce (s)	20.0	20.0	20.0	0.0	0.0		0.0	20.0		0.0	20.0	20.0
Time To Reduce (s)	10.0	10.0	10.0	0.0	0.0		0.0	15.0		0.0	15.0	15.0
Recall Mode	None	None	None	None	None		None	Min		None	Min	Min
Act Effct Green (s)		14.0	14.0		8.9		45.4	45.1		47.3	36.9	36.9
Actuated g/C Ratio		0.17	0.17		0.11		0.55	0.55		0.57	0.45	0.45
v/c Ratio		0.57	0.32		0.04		0.54	0.74		0.33	0.64	0.20
Control Delay		43.2	8.4		26.7		13.9	18.3		10.7	20.0	3.3
Queue Delay		0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		43.2	8.4		26.7		13.9	18.3		10.7	20.0	3.3
LOS		D	A		C		B	B		B	B	A
Approach Delay		26.8			26.7			17.8			17.5	
Approach LOS		C			C			B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 82.3			
Natural Cycle: 65			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.74			
Intersection Signal Delay: 18.4		Intersection LOS: B	
Intersection Capacity Utilization 70.4%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 3: US 258/Rt 10 (Benns Church Boulevard) & Turner Drive





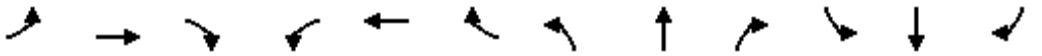
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	5	0	1511	0	0	0
Future Volume (vph)	0	0	0	0	0	0	5	0	1511	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0		125		0		140
Storage Lanes	0		0	0		0		1		0		1
Taper Length (ft)	25			25				25				75
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00
Frt												
Flt Protected							0.950					
Satd. Flow (prot)	0	0	0	0	0	0	1805	0	3505	0	1900	0
Flt Permitted							0.950					
Satd. Flow (perm)	0	0	0	0	0	0	1805	0	3505	0	1900	0
Link Speed (mph)		30			30				45			
Link Distance (ft)		810			872				3921			
Travel Time (s)		18.4			19.8				59.4			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.25	0.25	0.97	0.25	0.50	0.25
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	0%
Adj. Flow (vph)	0	0	0	0	0	0	20	0	1558	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	0	20	0	1558	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	R NA	Left	Left	Right	R NA	Left
Median Width(ft)		0			0				12			
Link Offset(ft)		0			0				0			
Crosswalk Width(ft)		16			16				16			
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	9	15		9	9	15
Sign Control		Stop			Stop				Free			

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 45.1%		ICU Level of Service A	
Analysis Period (min) 15			

Lane Group	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	1072	0
Future Volume (vph)	1072	0
Ideal Flow (vphpl)	1900	1900
Storage Length (ft)		0
Storage Lanes		0
Taper Length (ft)		
Lane Util. Factor	0.95	1.00
Frt		
Flt Protected		
Satd. Flow (prot)	3539	0
Flt Permitted		
Satd. Flow (perm)	3539	0
Link Speed (mph)	45	
Link Distance (ft)	1153	
Travel Time (s)	17.5	
Peak Hour Factor	0.95	0.25
Heavy Vehicles (%)	2%	0%
Adj. Flow (vph)	1128	0
Shared Lane Traffic (%)		
Lane Group Flow (vph)	1128	0
Enter Blocked Intersection	No	No
Lane Alignment	Left	Right
Median Width(ft)	12	
Link Offset(ft)	0	
Crosswalk Width(ft)	16	
Two way Left Turn Lane		
Headway Factor	1.00	1.00
Turning Speed (mph)		9
Sign Control	Free	

Intersection Summary

5: US 258/Rt 10 (Benns Church Boulevard) & 258/Rt 32 (Brewers Neck Boulevard)

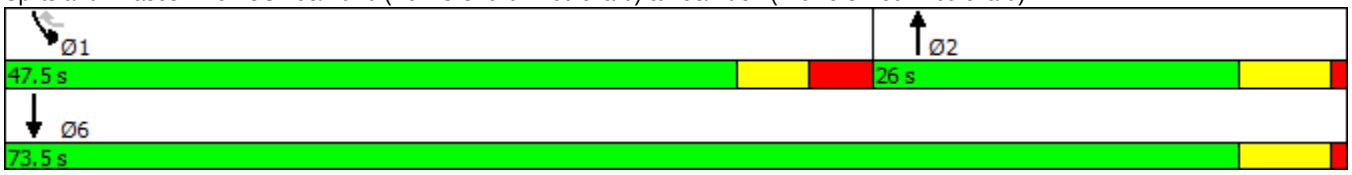


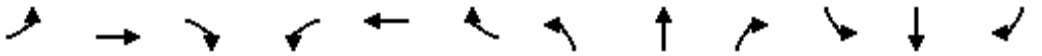
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	1300	0	225	0	729	311	0
Future Volume (vph)	0	0	0	0	0	1300	0	225	0	729	311	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		0	300		0
Storage Lanes	0		0	0		2	0		0	1		0
Taper Length (ft)	25			25			100			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	0.88	1.00	0.95	1.00	0.97	0.95	1.00
Frt						0.850						
Flt Protected										0.950		
Satd. Flow (prot)	0	0	0	0	0	2760	0	3471	0	3400	3471	0
Flt Permitted										0.950		
Satd. Flow (perm)	0	0	0	0	0	2760	0	3471	0	3400	3471	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						575						
Link Speed (mph)		30			45			45			45	
Link Distance (ft)		963			1126			2837			3921	
Travel Time (s)		21.9			17.1			43.0			59.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.93	0.25	0.89	0.25	0.99	0.85	0.25
Heavy Vehicles (%)	0%	0%	0%	0%	0%	3%	0%	4%	0%	3%	4%	0%
Adj. Flow (vph)	0	0	0	0	0	1398	0	253	0	736	366	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	1398	0	253	0	736	366	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors						1		2		1	2	
Detector Template						Right		Thru		Left	Thru	
Leading Detector (ft)						20		100		20	100	
Trailing Detector (ft)						0		0		0	0	
Detector 1 Position(ft)						0		0		0	0	
Detector 1 Size(ft)						20		6		20	6	
Detector 1 Type						Cl+Ex		Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)						0.0		0.0		0.0	0.0	
Detector 1 Queue (s)						0.0		0.0		0.0	0.0	
Detector 1 Delay (s)						0.0		0.0		0.0	0.0	
Detector 2 Position(ft)								94			94	
Detector 2 Size(ft)								6			6	
Detector 2 Type								Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)								0.0			0.0	
Turn Type						Perm		NA		Prot	NA	
Protected Phases								2		1	6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases						1						
Detector Phase						1		2		1	6	
Switch Phase												
Minimum Initial (s)						15.0		10.0		15.0	15.0	
Minimum Split (s)						22.5		16.0		22.5	21.0	
Total Split (s)						47.5		26.0		47.5	73.5	
Total Split (%)						64.6%		35.4%		64.6%	100.0%	
Maximum Green (s)						40.0		20.0		40.0	67.5	
Yellow Time (s)						4.0		5.0		4.0	5.0	
All-Red Time (s)						3.5		1.0		3.5	1.0	
Lost Time Adjust (s)						0.0		0.0		0.0	0.0	
Total Lost Time (s)						7.5		6.0		7.5	6.0	
Lead/Lag						Lead		Lag		Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)						3.5		2.5		3.5	5.0	
Recall Mode						Min		None		Min	Min	
Act Effct Green (s)						31.2		10.7		31.2	55.8	
Actuated g/C Ratio						0.56		0.19		0.56	1.00	
v/c Ratio						0.78		0.38		0.39	0.11	
Control Delay						8.5		23.7		7.2	0.1	
Queue Delay						0.0		0.0		0.0	0.0	
Total Delay						8.5		23.7		7.2	0.1	
LOS						A		C		A	A	
Approach Delay					8.5			23.7			4.8	
Approach LOS					A			C			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 73.5			
Actuated Cycle Length: 55.8			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.78			
Intersection Signal Delay: 8.4		Intersection LOS: A	
Intersection Capacity Utilization 65.1%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 5: US 258/Rt 10 (Benns Church Boulevard) & 258/Rt 32 (Brewers Neck Boulevard)





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	772	3	471	1268	14	1	3	250	2	5	7
Future Volume (vph)	9	772	3	471	1268	14	1	3	250	2	5	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		0	600		325	0		350	0		0
Storage Lanes	1		0	1		1	0		2	0		1
Taper Length (ft)	200			200			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	0.88	1.00	1.00	1.00
Frt		0.999				0.850			0.850			0.850
Flt Protected	0.950			0.950				0.984			0.978	
Satd. Flow (prot)	1805	3536	0	1787	3539	1380	0	1870	2787	0	1632	1380
Flt Permitted	0.950			0.950				0.984			0.978	
Satd. Flow (perm)	1805	3536	0	1787	3539	1380	0	1870	2787	0	1632	1380
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						171			321			160
Link Speed (mph)		45			45			45			25	
Link Distance (ft)		1126			846			914			623	
Travel Time (s)		17.1			12.8			13.8			17.0	
Peak Hour Factor	0.35	0.98	1.00	0.86	0.96	0.60	0.25	0.38	0.78	0.50	1.00	0.75
Heavy Vehicles (%)	0%	2%	0%	1%	2%	17%	0%	0%	2%	0%	25%	17%
Adj. Flow (vph)	26	788	3	548	1321	23	4	8	321	4	5	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	26	791	0	548	1321	23	0	12	321	0	9	9
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA	pm+ov	Split	NA	Perm
Protected Phases	1	6		5	2		4	4	5	3	3	

6: Queen Annes Court & 258/Rt 32 (Brewers Neck Boulevard)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases						2			4			3
Detector Phase	1	6		5	2	2	4	4	5	3	3	3
Switch Phase												
Minimum Initial (s)	10.0	15.0		10.0	15.0	15.0	10.0	10.0	10.0	5.0	5.0	5.0
Minimum Split (s)	19.0	24.5		19.5	24.5	24.5	26.0	26.0	19.5	26.0	26.0	26.0
Total Split (s)	34.0	41.5		39.5	47.0	47.0	26.0	26.0	39.5	33.0	33.0	33.0
Total Split (%)	24.3%	29.6%		28.2%	33.6%	33.6%	18.6%	18.6%	28.2%	23.6%	23.6%	23.6%
Maximum Green (s)	25.0	35.0		30.0	40.5	40.5	18.0	18.0	30.0	25.0	25.0	25.0
Yellow Time (s)	5.0	5.5		5.0	5.5	5.5	4.0	4.0	5.0	3.5	3.5	3.5
All-Red Time (s)	4.0	1.0		4.5	1.0	1.0	4.0	4.0	4.5	4.5	4.5	4.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	9.0	6.5		9.5	6.5	6.5		8.0	9.5		8.0	8.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	5.0		3.0	5.0	5.0	3.5	3.5	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None	None	None	None	None	None	None	None
Act Effct Green (s)	10.4	28.4		31.3	68.2	68.2		10.4	34.0		6.3	6.3
Actuated g/C Ratio	0.12	0.34		0.37	0.81	0.81		0.12	0.41		0.08	0.08
v/c Ratio	0.12	0.66		0.82	0.46	0.02		0.05	0.24		0.07	0.04
Control Delay	42.0	28.2		40.0	10.3	0.0		42.2	3.0		46.1	0.3
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	42.0	28.2		40.0	10.3	0.0		42.2	3.0		46.1	0.3
LOS	D	C		D	B	A		D	A		D	A
Approach Delay		28.6			18.8			4.4			23.2	
Approach LOS		C			B			A			C	

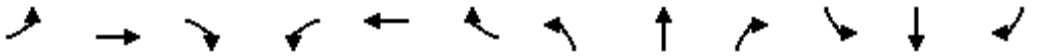
Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 83.9			
Natural Cycle: 140			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.82			
Intersection Signal Delay: 19.9		Intersection LOS: B	
Intersection Capacity Utilization 75.9%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 6: Queen Annes Court & 258/Rt 32 (Brewers Neck Boulevard)

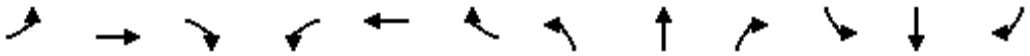


APPENDIX E

2032 No Build Synchro Reports



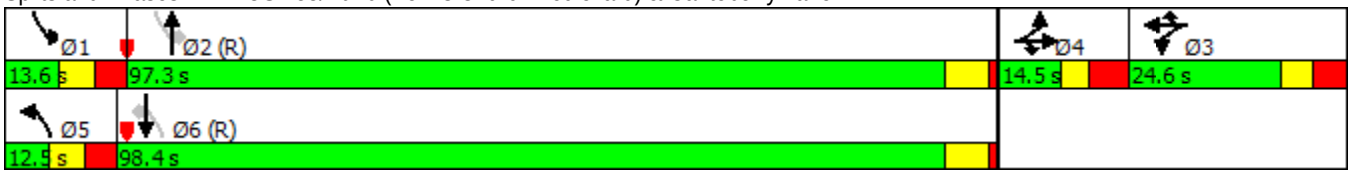
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	28	1	21	108	5	47	16	876	55	60	1269	39
Future Volume (vph)	28	1	21	108	5	47	16	876	55	60	1269	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	200		350	275		325
Storage Lanes	0		1	0		1	1		1	1		1
Taper Length (ft)	25			25			125			225		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected		0.957			0.955		0.950			0.950		
Satd. Flow (prot)	0	1755	1615	0	1737	1615	1805	3374	1509	1752	3505	1615
Flt Permitted		0.957			0.955		0.042			0.251		
Satd. Flow (perm)	0	1755	1615	0	1737	1615	80	3374	1509	463	3505	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			131			131			142			142
Link Speed (mph)		25			25			45			45	
Link Distance (ft)		335			1232			773			1937	
Travel Time (s)		9.1			33.6			11.7			29.3	
Peak Hour Factor	0.82	0.25	0.53	0.76	0.50	0.79	0.46	0.92	0.75	0.73	0.63	0.80
Heavy Vehicles (%)	4%	0%	0%	3%	25%	0%	0%	7%	7%	3%	3%	0%
Adj. Flow (vph)	34	4	40	142	10	59	35	952	73	82	2014	49
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	38	40	0	152	59	35	952	73	82	2014	49
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Split	NA	Prot	Split	NA	Prot	D.P+P	NA	Perm	D.P+P	NA	Perm
Protected Phases	4	4	4	3	3	3	5	2		1	6	



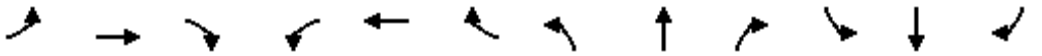
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases							6		2	2		6
Detector Phase	4	4	4	3	3	3	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	5.0	15.0	15.0	5.0	15.0	15.0
Minimum Split (s)	14.5	14.5	14.5	14.5	14.5	14.5	12.5	21.0	21.0	12.5	21.0	21.0
Total Split (s)	14.5	14.5	14.5	24.6	24.6	24.6	12.5	97.3	97.3	13.6	98.4	98.4
Total Split (%)	9.7%	9.7%	9.7%	16.4%	16.4%	16.4%	8.3%	64.9%	64.9%	9.1%	65.6%	65.6%
Maximum Green (s)	7.0	7.0	7.0	17.1	17.1	17.1	5.0	91.3	91.3	6.1	92.4	92.4
Yellow Time (s)	3.0	3.0	3.0	3.5	3.5	3.5	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	4.5	4.5	4.5	4.0	4.0	4.0	3.5	1.0	1.0	3.5	1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		7.5	7.5		7.5	7.5	7.5	6.0	6.0	7.5	6.0	6.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	2.0	6.0	6.0	2.0	6.0	6.0
Minimum Gap (s)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	3.5	3.5	0.2	3.5	3.5
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	20.0	0.0	20.0	20.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0	15.0	0.0	15.0	15.0
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)		7.0	7.0		16.0	16.0	101.4	95.5	95.5	99.9	98.9	98.9
Actuated g/C Ratio		0.05	0.05		0.11	0.11	0.68	0.64	0.64	0.67	0.66	0.66
v/c Ratio		0.47	0.20		0.82	0.20	0.32	0.44	0.07	0.23	0.87	0.04
Control Delay		88.7	2.2		97.1	1.6	23.3	16.1	1.5	9.1	28.2	0.1
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		88.7	2.2		97.1	1.6	23.3	16.1	1.5	9.1	28.2	0.1
LOS		F	A		F	A	C	B	A	A	C	A
Approach Delay		44.3			70.4			15.3			26.8	
Approach LOS		D			E			B			C	
Queue Length 50th (ft)		37	0		147	0	10	219	1	24	894	0
Queue Length 95th (ft)		21	0		120	0	14	306	7	34	493	0
Internal Link Dist (ft)		255			1152			693			1857	
Turn Bay Length (ft)							200		350	275		325
Base Capacity (vph)		81	200		198	300	111	2148	1012	361	2310	1113
Starvation Cap Reductn		0	0		0	0	0	0	0	0	0	0
Spillback Cap Reductn		0	0		0	0	0	0	0	0	0	0
Storage Cap Reductn		0	0		0	0	0	0	0	0	0	0
Reduced v/c Ratio		0.47	0.20		0.77	0.20	0.32	0.44	0.07	0.23	0.87	0.04

Intersection Summary			
Area Type:	Other		
Cycle Length: 150			
Actuated Cycle Length: 150			
Offset: 120 (80%), Referenced to phase 2:NBSB and 6:NBSB, Start of Green			
Natural Cycle: 120			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.87			
Intersection Signal Delay: 26.4		Intersection LOS: C	
Intersection Capacity Utilization 69.7%		ICU Level of Service C	
Analysis Period (min) 15			

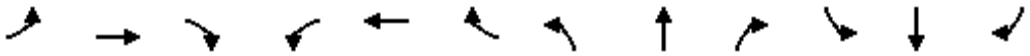
Splits and Phases: 1: US 258/Rt 10 (Benns Church Boulevard) & Canteberry Lane



HCM 2010 analysis expects strict NEMA phasing.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	0	22	0	0	0	26	782	0	2	1542	34
Future Volume (vph)	5	0	22	0	0	0	26	782	0	2	1542	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	250		0	150		235
Storage Lanes	0		1	0		0	1		0	1		1
Taper Length (ft)	25			25			150			125		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt			0.850									0.850
Flt Protected		0.950					0.950			0.950		
Satd. Flow (prot)	0	1805	1524	0	1900	0	1805	3505	0	1805	3471	1553
Flt Permitted		0.950					0.057			0.263		
Satd. Flow (perm)	0	1805	1524	0	1900	0	108	3505	0	500	3471	1553
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			116									120
Link Speed (mph)		15			25			45			45	
Link Distance (ft)		1905			1451			1986			773	
Travel Time (s)		86.6			39.6			30.1			11.7	
Peak Hour Factor	0.50	0.25	0.56	0.25	0.25	0.25	0.44	0.75	0.44	0.50	0.72	0.78
Heavy Vehicles (%)	0%	0%	6%	0%	0%	0%	0%	3%	14%	0%	4%	4%
Adj. Flow (vph)	10	0	39	0	0	0	59	1043	0	4	2142	44
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	10	39	0	0	0	59	1043	0	4	2142	44
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	20
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Split	NA	Prot				D.P+P	NA		D.P+P	NA	Prot
Protected Phases	4	4	4	3	3		5	2		1	6	6

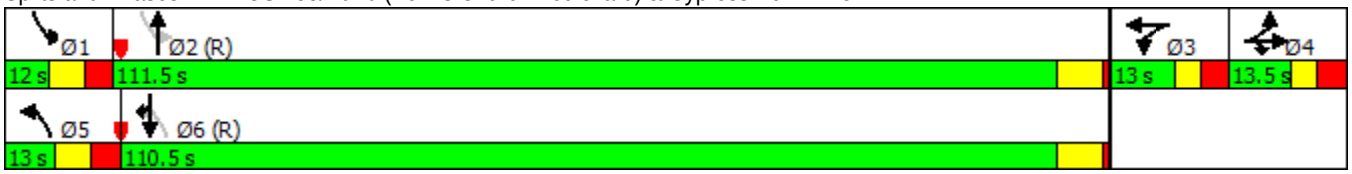


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases							6			2		
Detector Phase	4	4	4	3	3		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		5.0	14.0		5.0	14.0	14.0
Minimum Split (s)	13.5	13.5	13.5	13.0	13.0		12.5	20.0		12.0	20.0	20.0
Total Split (s)	13.5	13.5	13.5	13.0	13.0		13.0	111.5		12.0	110.5	110.5
Total Split (%)	9.0%	9.0%	9.0%	8.7%	8.7%		8.7%	74.3%		8.0%	73.7%	73.7%
Maximum Green (s)	7.0	7.0	7.0	7.0	7.0		5.5	105.5		5.0	104.5	104.5
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		4.0	5.0		4.0	5.0	5.0
All-Red Time (s)	3.5	3.5	3.5	3.0	3.0		3.5	1.0		3.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		6.5	6.5		6.0		7.5	6.0		7.0	6.0	6.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		2.0	5.0		2.0	5.0	5.0
Minimum Gap (s)	0.2	0.2	0.2	0.2	0.2		0.2	3.5		0.2	3.5	3.5
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0		0.0	18.0		0.0	18.0	18.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0		0.0	15.0		0.0	15.0	15.0
Recall Mode	None	None	None	None	None		None	C-Min		None	C-Min	C-Min
Act Effct Green (s)		7.0	7.0				125.7	132.0		130.8	124.1	124.1
Actuated g/C Ratio		0.05	0.05				0.84	0.88		0.87	0.83	0.83
v/c Ratio		0.12	0.22				0.39	0.34		0.01	0.75	0.03
Control Delay		71.8	2.7				13.9	1.6		0.0	2.7	0.0
Queue Delay		0.0	0.0				0.0	0.0		0.0	0.1	0.0
Total Delay		71.8	2.7				13.9	1.6		0.0	2.8	0.0
LOS		E	A				B	A		A	A	A
Approach Delay		16.8						2.2			2.7	
Approach LOS		B						A			A	
Queue Length 50th (ft)		10	0				6	45		0	76	0
Queue Length 95th (ft)		9	0				m4	m75		m0	68	m0
Internal Link Dist (ft)		1825			1371			1906			693	
Turn Bay Length (ft)							250			150		235
Base Capacity (vph)		84	181				152	3084		479	2871	1305
Starvation Cap Reductn		0	0				0	0		0	75	0
Spillback Cap Reductn		0	0				0	0		0	0	0
Storage Cap Reductn		0	0				0	0		0	0	0
Reduced v/c Ratio		0.12	0.22				0.39	0.34		0.01	0.77	0.03

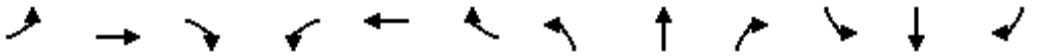
Intersection Summary			
Area Type:	Other		
Cycle Length: 150			
Actuated Cycle Length: 150			
Offset: 128 (85%), Referenced to phase 2:NBSB and 6:NBSB, Start of Green			
Natural Cycle: 110			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.75			
Intersection Signal Delay: 2.8		Intersection LOS: A	
Intersection Capacity Utilization 58.9%		ICU Level of Service B	
Analysis Period (min) 15			

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: US 258/Rt 10 (Benns Church Boulevard) & Cypress Run Drive

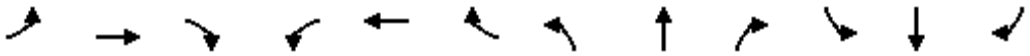


HCM 2010 analysis expects strict NEMA phasing.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	211	1	312	1	79	1	266	690	76	7	1032	355
Future Volume (vph)	211	1	312	1	79	1	266	690	76	7	1032	355
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		300	100		0	125		0	125		275
Storage Lanes	0		1	1		0	1		0	1		1
Taper Length (ft)	200			25			100			100		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt			0.850		0.997			0.973				0.850
Flt Protected		0.953		0.950			0.950			0.950		
Satd. Flow (prot)	0	1811	1615	1715	1800	0	1752	3401	0	1805	3505	1553
Flt Permitted		0.485		0.344			0.074			0.235		
Satd. Flow (perm)	0	922	1615	621	1800	0	137	3401	0	446	3505	1553
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			339		1			26				307
Link Speed (mph)		40			25			45			45	
Link Distance (ft)		1496			695			1155			1986	
Travel Time (s)		25.5			19.0			17.5			30.1	
Peak Hour Factor	0.64	0.25	0.73	0.25	0.39	0.25	0.52	0.90	0.46	0.25	0.73	0.51
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	3%	4%	0%	0%	3%	4%
Adj. Flow (vph)	330	4	427	4	203	4	512	767	165	28	1414	696
Shared Lane Traffic (%)				10%								
Lane Group Flow (vph)	0	334	427	4	207	0	512	932	0	28	1414	696
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	20
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA		D.P+P	NA		D.P+P	NA	Perm
Protected Phases		4			8		1	6		5	2	

3: US 258/Rt 10 (Benns Church Boulevard) & Turner Drive

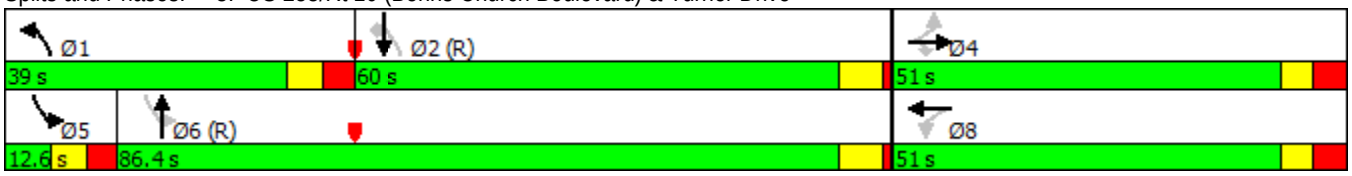


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8			2			6		2
Detector Phase	4	4	4	8	8		1	6		5	2	2
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		5.0	15.0		5.0	15.0	15.0
Minimum Split (s)	15.0	15.0	15.0	14.5	14.5		12.5	21.0		12.5	21.0	21.0
Total Split (s)	51.0	51.0	51.0	51.0	51.0		39.0	86.4		12.6	60.0	60.0
Total Split (%)	34.0%	34.0%	34.0%	34.0%	34.0%		26.0%	57.6%		8.4%	40.0%	40.0%
Maximum Green (s)	43.5	43.5	43.5	43.5	43.5		31.5	80.4		5.1	54.0	54.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		4.0	5.0		4.0	5.0	5.0
All-Red Time (s)	4.0	4.0	4.0	4.0	4.0		3.5	1.0		3.5	1.0	1.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		7.5	7.5	7.5	7.5		7.5	6.0		7.5	6.0	6.0
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0	5.0	5.0	3.0	3.0		4.0	6.0		2.0	6.0	6.0
Minimum Gap (s)	3.5	3.5	3.5	0.2	0.2		0.2	3.5		0.2	3.5	3.5
Time Before Reduce (s)	20.0	20.0	20.0	0.0	0.0		0.0	20.0		0.0	20.0	20.0
Time To Reduce (s)	10.0	10.0	10.0	0.0	0.0		0.0	15.0		0.0	15.0	15.0
Recall Mode	None	None	None	None	None		None	C-Min		None	C-Min	C-Min
Act Effct Green (s)		43.5	43.5	43.5	43.5		84.0	85.4		87.0	54.0	54.0
Actuated g/C Ratio		0.29	0.29	0.29	0.29		0.56	0.57		0.58	0.36	0.36
v/c Ratio		1.25	0.60	0.02	0.40		1.23	0.48		0.09	1.12	0.92
Control Delay		183.4	13.5	39.0	45.3		164.8	20.2		10.3	96.5	29.0
Queue Delay		0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		183.4	13.5	39.0	45.3		164.8	20.2		10.3	96.5	29.0
LOS		F	B	D	D		F	C		B	F	C
Approach Delay		88.1			45.2			71.5			73.4	
Approach LOS		F			D			E			E	
Queue Length 50th (ft)		~406	65	3	170		~569	289		5	~826	230
Queue Length 95th (ft)		96	71	4	98		292	348		4	602	58
Internal Link Dist (ft)		1416			615			1075			1906	
Turn Bay Length (ft)			300	100			125			125		275
Base Capacity (vph)		267	709	180	522		415	1948		304	1261	755
Starvation Cap Reductn		0	0	0	0		0	0		0	0	0
Spillback Cap Reductn		0	0	0	0		0	0		0	0	0
Storage Cap Reductn		0	0	0	0		0	0		0	0	0
Reduced v/c Ratio		1.25	0.60	0.02	0.40		1.23	0.48		0.09	1.12	0.92

Intersection Summary			
Area Type:	Other		
Cycle Length: 150			
Actuated Cycle Length: 150			
Offset: 30 (20%), Referenced to phase 2:NBSB and 6:NBSB, Start of Green			
Natural Cycle: 110			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.25			
Intersection Signal Delay: 73.9		Intersection LOS: E	
Intersection Capacity Utilization 79.2%		ICU Level of Service D	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

Splits and Phases: 3: US 258/Rt 10 (Benns Church Boulevard) & Turner Drive



HCM 2010 Computation does not support turning movement with Shared and Exclusive lanes.

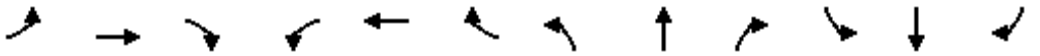


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	5	0	1128	0	1	0
Future Volume (vph)	0	0	0	0	0	0	5	0	1128	0	1	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0		125		0		140
Storage Lanes	0		0	0		0		1		0		1
Taper Length (ft)	25			25				25				75
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00
Frt												
Flt Protected							0.950				0.950	
Satd. Flow (prot)	0	0	0	0	0	0	1805	0	3438	0	1805	0
Flt Permitted							0.950				0.950	
Satd. Flow (perm)	0	0	0	0	0	0	1805	0	3438	0	1805	0
Link Speed (mph)		30			30				45			
Link Distance (ft)		810			872				3921			
Travel Time (s)		18.4			19.8				59.4			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.33	0.25	0.85	0.25	0.25	0.25
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	5%	0%	0%	0%
Adj. Flow (vph)	0	0	0	0	0	0	15	0	1327	0	4	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	0	15	0	1327	0	4	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	R NA	Left	Left	Right	R NA	Left
Median Width(ft)		0			0				12			
Link Offset(ft)		0			0				0			
Crosswalk Width(ft)		16			16				16			
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	9	15		9	9	15
Sign Control		Stop			Stop				Free			

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 41.8%		ICU Level of Service A	
Analysis Period (min) 15			

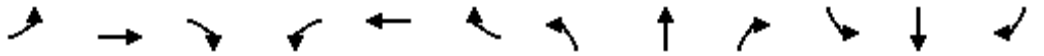
Lane Group	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	1392	0
Future Volume (vph)	1392	0
Ideal Flow (vphpl)	1900	1900
Storage Length (ft)		0
Storage Lanes		0
Taper Length (ft)		
Lane Util. Factor	0.95	1.00
Frt		
Flt Protected		
Satd. Flow (prot)	3406	0
Flt Permitted		
Satd. Flow (perm)	3406	0
Link Speed (mph)	45	
Link Distance (ft)	1155	
Travel Time (s)	17.5	
Peak Hour Factor	0.88	0.25
Heavy Vehicles (%)	6%	0%
Adj. Flow (vph)	1582	0
Shared Lane Traffic (%)		
Lane Group Flow (vph)	1582	0
Enter Blocked Intersection	No	No
Lane Alignment	Left	Right
Median Width(ft)	12	
Link Offset(ft)	0	
Crosswalk Width(ft)	16	
Two way Left Turn Lane		
Headway Factor	1.00	1.00
Turning Speed (mph)		9
Sign Control	Free	

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	804	0	206	0	1105	267	0
Future Volume (vph)	0	0	0	0	0	804	0	206	0	1105	267	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		0	300		0
Storage Lanes	0		0	0		2	0		0	1		0
Taper Length (ft)	25			25			100			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	0.88	1.00	0.95	1.00	0.97	0.95	1.00
Frt						0.850						
Flt Protected										0.950		
Satd. Flow (prot)	0	0	0	0	0	2707	0	3471	0	3367	3438	0
Flt Permitted										0.950		
Satd. Flow (perm)	0	0	0	0	0	2707	0	3471	0	3367	3438	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						388						
Link Speed (mph)		30			45			45			45	
Link Distance (ft)		963			1126			2837			3921	
Travel Time (s)		21.9			17.1			43.0			59.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.72	0.92	0.84	0.25	0.83	0.63	0.25
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	0%	4%	0%	4%	5%	0%
Adj. Flow (vph)	0	0	0	0	0	1117	0	245	0	1331	424	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	1117	0	245	0	1331	424	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors						1		2		1	2	
Detector Template						Right		Thru		Left	Thru	
Leading Detector (ft)						20		100		20	100	
Trailing Detector (ft)						0		0		0	0	
Detector 1 Position(ft)						0		0		0	0	
Detector 1 Size(ft)						20		6		20	6	
Detector 1 Type						Cl+Ex		Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)						0.0		0.0		0.0	0.0	
Detector 1 Queue (s)						0.0		0.0		0.0	0.0	
Detector 1 Delay (s)						0.0		0.0		0.0	0.0	
Detector 2 Position(ft)								94			94	
Detector 2 Size(ft)								6			6	
Detector 2 Type								Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)								0.0			0.0	
Turn Type						Perm		NA		Prot	NA	
Protected Phases								2		1	6	

5: US 258/Rt 10 (Benns Church Boulevard) & 258/Rt 32 (Brewers Neck Boulevard)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases						1						
Detector Phase						1		2		1	6	
Switch Phase												
Minimum Initial (s)						15.0		10.0		15.0	15.0	
Minimum Split (s)						22.5		16.0		22.5	21.0	
Total Split (s)						34.0		16.0		34.0	50.0	
Total Split (%)						68.0%		32.0%		68.0%	100.0%	
Maximum Green (s)						26.5		10.0		26.5	44.0	
Yellow Time (s)						4.0		5.0		4.0	5.0	
All-Red Time (s)						3.5		1.0		3.5	1.0	
Lost Time Adjust (s)						0.0		0.0		0.0	0.0	
Total Lost Time (s)						7.5		6.0		7.5	6.0	
Lead/Lag						Lead		Lag		Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)						3.5		2.5		3.5	5.0	
Recall Mode						Min		None		Min	Min	
Act Effct Green (s)						27.8		10.0		27.8	51.4	
Actuated g/C Ratio						0.54		0.19		0.54	1.00	
v/c Ratio						0.68		0.36		0.73	0.12	
Control Delay						7.9		19.2		12.0	0.1	
Queue Delay						0.0		0.0		0.0	0.0	
Total Delay						7.9		19.2		12.0	0.1	
LOS						A		B		B	A	
Approach Delay					7.9			19.2			9.1	
Approach LOS					A			B			A	
Queue Length 50th (ft)						70		32		138	0	
Queue Length 95th (ft)						73		54		175	0	
Internal Link Dist (ft)		883			1046			2757			3841	
Turn Bay Length (ft)										300		
Base Capacity (vph)						1644		677		1823	3438	
Starvation Cap Reductn						0		0		0	0	
Spillback Cap Reductn						0		0		0	0	
Storage Cap Reductn						0		0		0	0	
Reduced v/c Ratio						0.68		0.36		0.73	0.12	

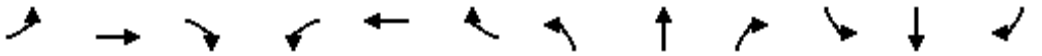
Intersection Summary

Area Type: Other
Cycle Length: 50
Actuated Cycle Length: 51.4
Natural Cycle: 50
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.73
Intersection Signal Delay: 9.5 Intersection LOS: A
Intersection Capacity Utilization 49.9% ICU Level of Service A
Analysis Period (min) 15

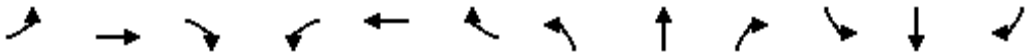
Splits and Phases: 5: US 258/Rt 10 (Benns Church Boulevard) & 258/Rt 32 (Brewers Neck Boulevard)



HCM 2010 Research does not support Non-NEMA phasing.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	1081	0	266	775	4	0	1	473	7	4	14
Future Volume (vph)	7	1081	0	266	775	4	0	1	473	7	4	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		0	600		325	0		350	0		0
Storage Lanes	1		0	1		1	0		2	0		1
Taper Length (ft)	200			200			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	0.88	1.00	1.00	1.00
Frt						0.850			0.850			0.850
Flt Protected	0.950			0.950							0.978	
Satd. Flow (prot)	1805	3471	0	1719	3505	1615	0	950	2682	0	1858	1369
Flt Permitted	0.950			0.950							0.978	
Satd. Flow (perm)	1805	3471	0	1719	3505	1615	0	950	2682	0	1858	1369
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						160			445			218
Link Speed (mph)		45			45			45			25	
Link Distance (ft)		1126			846			914			623	
Travel Time (s)		17.1			12.8			13.8			17.0	
Peak Hour Factor	0.50	0.82	0.25	0.78	0.72	0.38	0.25	0.25	0.89	0.75	0.38	0.55
Heavy Vehicles (%)	0%	4%	0%	5%	3%	0%	0%	100%	6%	0%	0%	18%
Adj. Flow (vph)	14	1318	0	341	1076	11	0	4	531	9	11	25
Shared Lane Traffic (%)												
Lane Group Flow (vph)	14	1318	0	341	1076	11	0	4	531	0	20	25
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm		NA	pm+ov	Split	NA	Perm
Protected Phases	1	6		5	2		4	4	5	3	3	

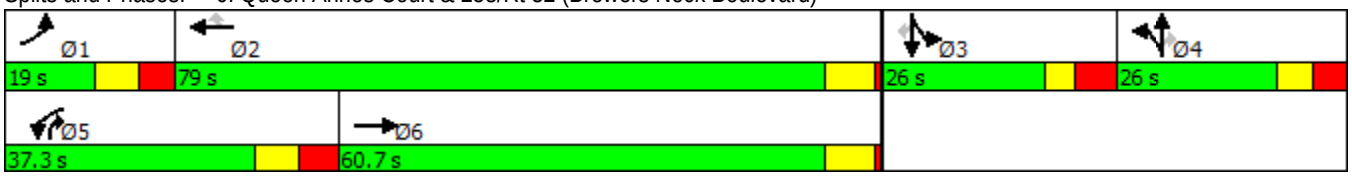


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases						2			4			3
Detector Phase	1	6		5	2	2	4	4	5	3	3	3
Switch Phase												
Minimum Initial (s)	10.0	15.0		10.0	15.0	15.0	10.0	10.0	10.0	5.0	5.0	5.0
Minimum Split (s)	19.0	24.5		19.5	24.5	24.5	26.0	26.0	19.5	26.0	26.0	26.0
Total Split (s)	19.0	60.7		37.3	79.0	79.0	26.0	26.0	37.3	26.0	26.0	26.0
Total Split (%)	12.7%	40.5%		24.9%	52.7%	52.7%	17.3%	17.3%	24.9%	17.3%	17.3%	17.3%
Maximum Green (s)	10.0	54.2		27.8	72.5	72.5	18.0	18.0	27.8	18.0	18.0	18.0
Yellow Time (s)	5.0	5.5		5.0	5.5	5.5	4.0	4.0	5.0	3.5	3.5	3.5
All-Red Time (s)	4.0	1.0		4.5	1.0	1.0	4.0	4.0	4.5	4.5	4.5	4.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	9.0	6.5		9.5	6.5	6.5		8.0	9.5		8.0	8.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	5.0		3.0	5.0	5.0	3.5	3.5	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None	None	None	None	None	None	None	None
Act Effct Green (s)	10.1	54.9		28.2	88.8	88.8		10.1	31.2		6.8	6.8
Actuated g/C Ratio	0.09	0.49		0.25	0.80	0.80		0.09	0.28		0.06	0.06
v/c Ratio	0.09	0.77		0.78	0.38	0.01		0.05	0.49		0.18	0.09
Control Delay	53.4	28.8		54.4	8.7	0.0		54.0	7.8		57.5	0.6
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	53.4	28.8		54.4	8.7	0.0		54.0	7.8		57.5	0.6
LOS	D	C		D	A	A		D	A		E	A
Approach Delay		29.0			19.5			8.1			25.9	
Approach LOS		C			B			A			C	
Queue Length 50th (ft)	9	407		233	85	0		3	27		14	0
Queue Length 95th (ft)	19	576		#374	268	0		4	71		18	0
Internal Link Dist (ft)		1046			766			834			543	
Turn Bay Length (ft)	225			600		325			350			
Base Capacity (vph)	164	1716		436	2802	1323		155	1073		305	407
Starvation Cap Reductn	0	0		0	0	0		0	0		0	0
Spillback Cap Reductn	0	0		0	0	0		0	0		0	0
Storage Cap Reductn	0	0		0	0	0		0	0		0	0
Reduced v/c Ratio	0.09	0.77		0.78	0.38	0.01		0.03	0.49		0.07	0.06

Intersection Summary			
Area Type:	Other		
Cycle Length: 150			
Actuated Cycle Length: 111			
Natural Cycle: 150			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.78			
Intersection Signal Delay: 21.6		Intersection LOS: C	
Intersection Capacity Utilization 73.0%		ICU Level of Service C	
Analysis Period (min) 15			

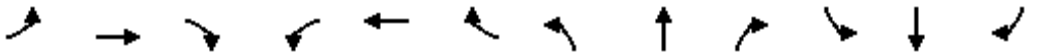
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 6: Queen Annes Court & 258/Rt 32 (Brewers Neck Boulevard)



HCM 2010 analysis expects strict NEMA phasing.

1: US 258/Rt 10 (Benns Church Boulevard) & Canteberry Lane



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	156	6	49	70	10	87	57	1366	117	145	1147	108
Future Volume (vph)	156	6	49	70	10	87	57	1366	117	145	1147	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	200		350	275		325
Storage Lanes	0		1	0		1	1		1	1		1
Taper Length (ft)	25			25			125			225		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected		0.956			0.959		0.950			0.950		
Satd. Flow (prot)	0	1816	1615	0	1791	1553	1805	3539	1583	1687	3505	1615
Flt Permitted		0.956			0.959		0.103			0.076		
Satd. Flow (perm)	0	1816	1615	0	1791	1553	196	3539	1583	135	3505	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			164			164			177			177
Link Speed (mph)		25			25			45			45	
Link Distance (ft)		335			1232			773			1937	
Travel Time (s)		9.1			33.6			11.7			29.3	
Peak Hour Factor	0.91	0.42	0.56	0.75	0.67	0.93	0.60	0.94	0.64	0.76	0.94	0.71
Heavy Vehicles (%)	0%	0%	0%	2%	0%	4%	0%	2%	2%	7%	3%	0%
Adj. Flow (vph)	171	14	88	93	15	94	95	1453	183	191	1220	152
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	185	88	0	108	94	95	1453	183	191	1220	152
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Split	NA	Prot	Split	NA	Prot	D.P+P	NA	Perm	D.P+P	NA	Perm
Protected Phases	4	4	4	3	3	3	5	2		1	6	

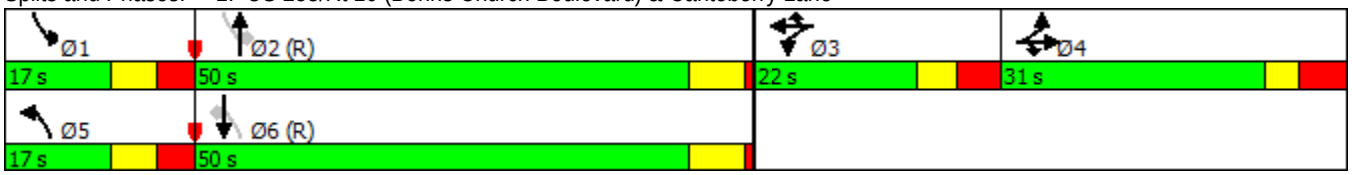
1: US 258/Rt 10 (Benns Church Boulevard) & Canteberry Lane

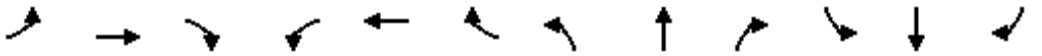
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases							6		2	2		6
Detector Phase	4	4	4	3	3	3	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	5.0	15.0	15.0	5.0	15.0	15.0
Minimum Split (s)	14.5	14.5	14.5	14.5	14.5	14.5	12.5	21.0	21.0	12.5	21.0	21.0
Total Split (s)	31.0	31.0	31.0	22.0	22.0	22.0	17.0	50.0	50.0	17.0	50.0	50.0
Total Split (%)	25.8%	25.8%	25.8%	18.3%	18.3%	18.3%	14.2%	41.7%	41.7%	14.2%	41.7%	41.7%
Maximum Green (s)	23.5	23.5	23.5	14.5	14.5	14.5	9.5	44.0	44.0	9.5	44.0	44.0
Yellow Time (s)	3.0	3.0	3.0	3.5	3.5	3.5	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	4.5	4.5	4.5	4.0	4.0	4.0	3.5	1.0	1.0	3.5	1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		7.5	7.5		7.5	7.5	7.5	6.0	6.0	7.5	6.0	6.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	2.0	6.0	6.0	2.0	6.0	6.0
Minimum Gap (s)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	3.5	3.5	0.2	3.5	3.5
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	20.0	0.0	20.0	20.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0	15.0	0.0	15.0	15.0
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)		17.4	17.4		12.0	12.0	60.6	52.6	52.6	60.6	54.7	54.7
Actuated g/C Ratio		0.14	0.14		0.10	0.10	0.50	0.44	0.44	0.50	0.46	0.46
v/c Ratio		0.70	0.24		0.61	0.31	0.48	0.94	0.23	1.00	0.76	0.18
Control Delay		62.7	1.5		65.8	2.7	26.4	39.9	2.1	97.9	32.9	2.8
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		62.7	1.5		65.8	2.7	26.4	39.9	2.1	97.9	32.9	2.8
LOS		E	A		E	A	C	D	A	F	C	A
Approach Delay		43.0			36.4			35.2			37.9	
Approach LOS		D			D			D			D	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBSB and 6:NBSB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.00
Intersection Signal Delay: 36.9 Intersection LOS: D
Intersection Capacity Utilization 78.9% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 1: US 258/Rt 10 (Benns Church Boulevard) & Canteberry Lane





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	127	0	91	0	0	1	171	1412	0	0	1117	147
Future Volume (vph)	127	0	91	0	0	1	171	1412	0	0	1117	147
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	250		0	150		235
Storage Lanes	0		1	0		0	1		0	1		1
Taper Length (ft)	25			25			150			125		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt			0.850		0.865							0.850
Flt Protected		0.950					0.950					
Satd. Flow (prot)	0	1787	1599	0	1644	0	1805	3539	0	1900	3505	1615
Flt Permitted		0.950					0.145					
Satd. Flow (perm)	0	1787	1599	0	1644	0	276	3539	0	1900	3505	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			214		218							218
Link Speed (mph)		15			25			45			45	
Link Distance (ft)		1905			1451			1986			773	
Travel Time (s)		86.6			39.6			30.1			11.7	
Peak Hour Factor	0.81	0.25	0.62	0.25	0.25	0.25	0.67	0.93	0.25	0.25	0.95	0.80
Heavy Vehicles (%)	1%	0%	1%	0%	0%	0%	0%	2%	0%	0%	3%	0%
Adj. Flow (vph)	157	0	147	0	0	4	255	1518	0	0	1176	184
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	157	147	0	4	0	255	1518	0	0	1176	184
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	20
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Split	NA	Prot		NA		D.P+P	NA		D.P+P	NA	Prot
Protected Phases	4	4	4	3	3		5	2		1	6	6

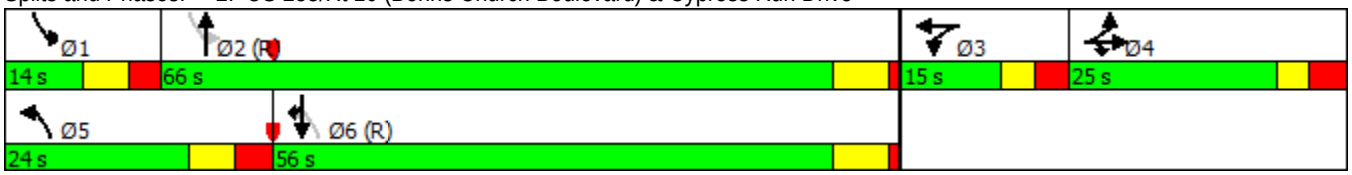
2: US 258/Rt 10 (Benns Church Boulevard) & Cypress Run Drive

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases							6			2		
Detector Phase	4	4	4	3	3		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		5.0	14.0		5.0	14.0	14.0
Minimum Split (s)	13.5	13.5	13.5	13.0	13.0		12.5	20.0		12.0	20.0	20.0
Total Split (s)	25.0	25.0	25.0	15.0	15.0		24.0	66.0		14.0	56.0	56.0
Total Split (%)	20.8%	20.8%	20.8%	12.5%	12.5%		20.0%	55.0%		11.7%	46.7%	46.7%
Maximum Green (s)	18.5	18.5	18.5	9.0	9.0		16.5	60.0		7.0	50.0	50.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		4.0	5.0		4.0	5.0	5.0
All-Red Time (s)	3.5	3.5	3.5	3.0	3.0		3.5	1.0		3.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		6.5	6.5		6.0		7.5	6.0		7.0	6.0	6.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		2.0	5.0		2.0	5.0	5.0
Minimum Gap (s)	0.2	0.2	0.2	0.2	0.2		0.2	3.5		0.2	3.5	3.5
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0		0.0	18.0		0.0	18.0	18.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0		0.0	15.0		0.0	15.0	15.0
Recall Mode	None	None	None	None	None		None	C-Min		None	C-Min	C-Min
Act Effct Green (s)		15.2	15.2		7.0		80.7	89.7			66.7	66.7
Actuated g/C Ratio		0.13	0.13		0.06		0.67	0.75			0.56	0.56
v/c Ratio		0.69	0.38		0.01		0.67	0.57			0.60	0.19
Control Delay		65.8	3.8		0.0		22.8	8.9			6.7	0.3
Queue Delay		0.0	0.0		0.0		0.0	0.0			0.0	0.0
Total Delay		65.8	3.8		0.0		22.8	8.9			6.7	0.3
LOS		E	A		A		C	A			A	A
Approach Delay		35.8						10.9			5.8	
Approach LOS		D						B			A	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 12 (10%), Referenced to phase 2:NBSB and 6:NBSB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.69
Intersection Signal Delay: 11.1 Intersection LOS: B
Intersection Capacity Utilization 73.2% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 2: US 258/Rt 10 (Benns Church Boulevard) & Cypress Run Drive



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	94	0	106	0	1	2	188	1473	1	36	1080	138
Future Volume (vph)	94	0	106	0	1	2	188	1473	1	36	1080	138
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		300	100		0	125		0	125		275
Storage Lanes	0		1	1		0	1		0	1		1
Taper Length (ft)	200			25			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt			0.850		0.925							0.850
Flt Protected		0.950					0.950			0.950		
Satd. Flow (prot)	0	1787	1599	1900	1758	0	1687	3539	0	1805	3505	1482
Flt Permitted		0.752					0.156			0.072		
Satd. Flow (perm)	0	1415	1599	1900	1758	0	277	3539	0	137	3505	1482
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			133		4							141
Link Speed (mph)		40			25			45			45	
Link Distance (ft)		1493			695			1153			1986	
Travel Time (s)		25.4			19.0			17.5			30.1	
Peak Hour Factor	0.63	0.25	0.80	0.25	0.25	0.50	0.90	0.94	0.25	0.50	0.98	0.85
Heavy Vehicles (%)	1%	0%	1%	0%	0%	0%	7%	2%	0%	0%	3%	9%
Adj. Flow (vph)	149	0	133	0	4	4	209	1567	4	72	1102	162
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	149	133	0	8	0	209	1571	0	72	1102	162
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	20
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA		D.P+P	NA		D.P+P	NA	Perm
Protected Phases		4			8		1	6		5	2	

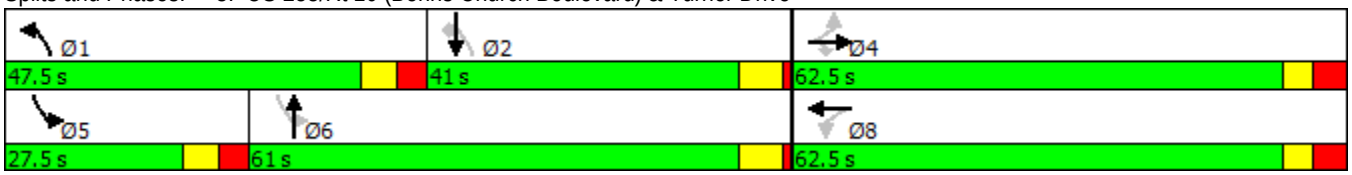
3: US 258/Rt 10 (Benns Church Boulevard) & Turner Drive

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8			2			6		2
Detector Phase	4	4	4	8	8		1	6		5	2	2
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		5.0	15.0		5.0	15.0	15.0
Minimum Split (s)	14.5	14.5	14.5	14.5	14.5		12.5	21.0		12.5	21.0	21.0
Total Split (s)	62.5	62.5	62.5	62.5	62.5		47.5	61.0		27.5	41.0	41.0
Total Split (%)	41.4%	41.4%	41.4%	41.4%	41.4%		31.5%	40.4%		18.2%	27.2%	27.2%
Maximum Green (s)	55.0	55.0	55.0	55.0	55.0		40.0	55.0		20.0	35.0	35.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		4.0	5.0		4.0	5.0	5.0
All-Red Time (s)	4.0	4.0	4.0	4.0	4.0		3.5	1.0		3.5	1.0	1.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		7.5	7.5	7.5	7.5		7.5	6.0		7.5	6.0	6.0
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0	5.0	5.0	3.0	3.0		4.0	6.0		2.0	6.0	6.0
Minimum Gap (s)	3.5	3.5	3.5	0.2	0.2		0.2	3.5		0.2	3.5	3.5
Time Before Reduce (s)	20.0	20.0	20.0	0.0	0.0		0.0	20.0		0.0	20.0	20.0
Time To Reduce (s)	10.0	10.0	10.0	0.0	0.0		0.0	15.0		0.0	15.0	15.0
Recall Mode	None	None	None	None	None		None	Min		None	Min	Min
Act Effct Green (s)		17.8	17.8		10.3		57.1	55.6		58.9	45.3	45.3
Actuated g/C Ratio		0.18	0.18		0.11		0.59	0.57		0.60	0.46	0.46
v/c Ratio		0.58	0.33		0.04		0.59	0.78		0.39	0.68	0.21
Control Delay		46.8	8.6		29.7		18.6	21.8		15.5	24.5	5.4
Queue Delay		0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		46.8	8.6		29.7		18.6	21.8		15.5	24.5	5.4
LOS		D	A		C		B	C		B	C	A
Approach Delay		28.8			29.7			21.4			21.7	
Approach LOS		C			C			C			C	

Intersection Summary

Area Type: Other
Cycle Length: 151
Actuated Cycle Length: 97.6
Natural Cycle: 70
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.78
Intersection Signal Delay: 22.2 Intersection LOS: C
Intersection Capacity Utilization 74.3% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 3: US 258/Rt 10 (Benns Church Boulevard) & Turner Drive



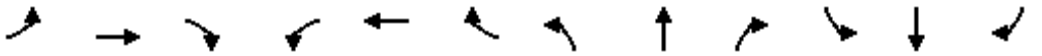


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	5	0	1652	0	0	0
Future Volume (vph)	0	0	0	0	0	0	5	0	1652	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0		125		0		140
Storage Lanes	0		0	0		0		1		0		1
Taper Length (ft)	25			25				25				75
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00
Frt												
Flt Protected							0.950					
Satd. Flow (prot)	0	0	0	0	0	0	1805	0	3505	0	1900	0
Flt Permitted							0.950					
Satd. Flow (perm)	0	0	0	0	0	0	1805	0	3505	0	1900	0
Link Speed (mph)		30			30				45			
Link Distance (ft)		810			872				3921			
Travel Time (s)		18.4			19.8				59.4			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.25	0.25	0.97	0.25	0.50	0.25
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	0%
Adj. Flow (vph)	0	0	0	0	0	0	20	0	1703	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	0	20	0	1703	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	R NA	Left	Left	Right	R NA	Left
Median Width(ft)		0			0				12			
Link Offset(ft)		0			0				0			
Crosswalk Width(ft)		16			16				16			
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	9	15		9	9	15
Sign Control		Stop			Stop				Free			

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 49.0%		ICU Level of Service A	
Analysis Period (min) 15			

Lane Group	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	1173	0
Future Volume (vph)	1173	0
Ideal Flow (vphpl)	1900	1900
Storage Length (ft)		0
Storage Lanes		0
Taper Length (ft)		
Lane Util. Factor	0.95	1.00
Frt		
Flt Protected		
Satd. Flow (prot)	3539	0
Flt Permitted		
Satd. Flow (perm)	3539	0
Link Speed (mph)	45	
Link Distance (ft)	1153	
Travel Time (s)	17.5	
Peak Hour Factor	0.95	0.25
Heavy Vehicles (%)	2%	0%
Adj. Flow (vph)	1235	0
Shared Lane Traffic (%)		
Lane Group Flow (vph)	1235	0
Enter Blocked Intersection	No	No
Lane Alignment	Left	Right
Median Width(ft)	12	
Link Offset(ft)	0	
Crosswalk Width(ft)	16	
Two way Left Turn Lane		
Headway Factor	1.00	1.00
Turning Speed (mph)		9
Sign Control	Free	

Intersection Summary

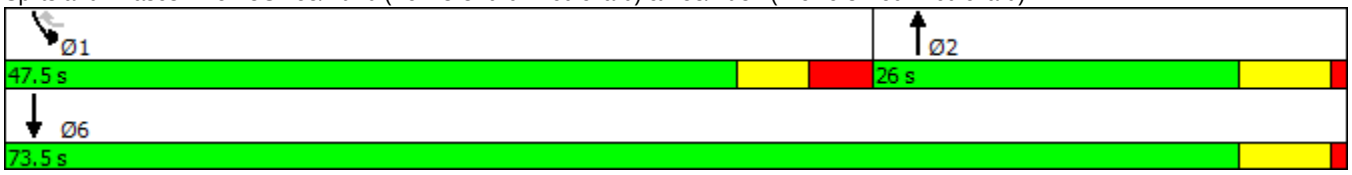


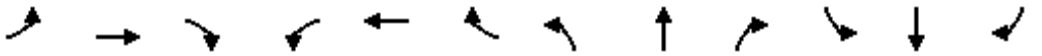
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	1421	0	246	0	797	340	0
Future Volume (vph)	0	0	0	0	0	1421	0	246	0	797	340	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		0	300		0
Storage Lanes	0		0	0		2	0		0	1		0
Taper Length (ft)	25			25			100			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	0.88	1.00	0.95	1.00	0.97	0.95	1.00
Frt						0.850						
Flt Protected										0.950		
Satd. Flow (prot)	0	0	0	0	0	2760	0	3471	0	3400	3471	0
Flt Permitted										0.950		
Satd. Flow (perm)	0	0	0	0	0	2760	0	3471	0	3400	3471	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						514						
Link Speed (mph)		30			45			45			45	
Link Distance (ft)		963			1126			2837			3921	
Travel Time (s)		21.9			17.1			43.0			59.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.93	0.25	0.89	0.25	0.99	0.85	0.25
Heavy Vehicles (%)	0%	0%	0%	0%	0%	3%	0%	4%	0%	3%	4%	0%
Adj. Flow (vph)	0	0	0	0	0	1528	0	276	0	805	400	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	1528	0	276	0	805	400	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors						1		2		1	2	
Detector Template						Right		Thru		Left	Thru	
Leading Detector (ft)						20		100		20	100	
Trailing Detector (ft)						0		0		0	0	
Detector 1 Position(ft)						0		0		0	0	
Detector 1 Size(ft)						20		6		20	6	
Detector 1 Type						Cl+Ex		Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)						0.0		0.0		0.0	0.0	
Detector 1 Queue (s)						0.0		0.0		0.0	0.0	
Detector 1 Delay (s)						0.0		0.0		0.0	0.0	
Detector 2 Position(ft)								94			94	
Detector 2 Size(ft)								6			6	
Detector 2 Type								Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)								0.0			0.0	
Turn Type						Perm		NA		Prot	NA	
Protected Phases								2		1	6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases						1						
Detector Phase						1		2		1	6	
Switch Phase												
Minimum Initial (s)						15.0		10.0		15.0	15.0	
Minimum Split (s)						22.5		16.0		22.5	21.0	
Total Split (s)						47.5		26.0		47.5	73.5	
Total Split (%)						64.6%		35.4%		64.6%	100.0%	
Maximum Green (s)						40.0		20.0		40.0	67.5	
Yellow Time (s)						4.0		5.0		4.0	5.0	
All-Red Time (s)						3.5		1.0		3.5	1.0	
Lost Time Adjust (s)						0.0		0.0		0.0	0.0	
Total Lost Time (s)						7.5		6.0		7.5	6.0	
Lead/Lag						Lead		Lag		Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)						3.5		2.5		3.5	5.0	
Recall Mode						Min		None		Min	Min	
Act Effct Green (s)						35.9		10.8		35.9	60.4	
Actuated g/C Ratio						0.59		0.18		0.59	1.00	
v/c Ratio						0.83		0.44		0.40	0.12	
Control Delay						10.9		25.8		7.1	0.1	
Queue Delay						0.0		0.0		0.0	0.0	
Total Delay						10.9		25.8		7.1	0.1	
LOS						B		C		A	A	
Approach Delay					10.9			25.8			4.7	
Approach LOS					B			C			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 73.5			
Actuated Cycle Length: 60.4			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.83			
Intersection Signal Delay: 9.8		Intersection LOS: A	
Intersection Capacity Utilization 69.3%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 5: US 258/Rt 10 (Benns Church Boulevard) & 258/Rt 32 (Brewers Neck Boulevard)





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	844	4	515	1387	15	1	4	273	2	5	7
Future Volume (vph)	10	844	4	515	1387	15	1	4	273	2	5	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		0	600		325	0		350	0		0
Storage Lanes	1		0	1		1	0		2	0		1
Taper Length (ft)	200			200			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	0.88	1.00	1.00	1.00
Frt		0.999				0.850			0.850			0.850
Flt Protected	0.950			0.950				0.987			0.978	
Satd. Flow (prot)	1805	3536	0	1787	3539	1380	0	1875	2787	0	1632	1380
Flt Permitted	0.950			0.950				0.987			0.978	
Satd. Flow (perm)	1805	3536	0	1787	3539	1380	0	1875	2787	0	1632	1380
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						171			350			160
Link Speed (mph)		45			45			45			25	
Link Distance (ft)		1126			846			914			623	
Travel Time (s)		17.1			12.8			13.8			17.0	
Peak Hour Factor	0.35	0.98	1.00	0.86	0.96	0.60	0.25	0.38	0.78	0.50	1.00	0.75
Heavy Vehicles (%)	0%	2%	0%	1%	2%	17%	0%	0%	2%	0%	25%	17%
Adj. Flow (vph)	29	861	4	599	1445	25	4	11	350	4	5	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	29	865	0	599	1445	25	0	15	350	0	9	9
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA	pm+ov	Split	NA	Perm
Protected Phases	1	6		5	2		4	4	5	3	3	

6: Queen Annes Court & 258/Rt 32 (Brewers Neck Boulevard)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases						2			4			3
Detector Phase	1	6		5	2	2	4	4	5	3	3	3
Switch Phase												
Minimum Initial (s)	10.0	15.0		10.0	15.0	15.0	10.0	10.0	10.0	5.0	5.0	5.0
Minimum Split (s)	19.0	24.5		19.5	24.5	24.5	26.0	26.0	19.5	26.0	26.0	26.0
Total Split (s)	34.0	41.5		39.5	47.0	47.0	26.0	26.0	39.5	33.0	33.0	33.0
Total Split (%)	24.3%	29.6%		28.2%	33.6%	33.6%	18.6%	18.6%	28.2%	23.6%	23.6%	23.6%
Maximum Green (s)	25.0	35.0		30.0	40.5	40.5	18.0	18.0	30.0	25.0	25.0	25.0
Yellow Time (s)	5.0	5.5		5.0	5.5	5.5	4.0	4.0	5.0	3.5	3.5	3.5
All-Red Time (s)	4.0	1.0		4.5	1.0	1.0	4.0	4.0	4.5	4.5	4.5	4.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	9.0	6.5		9.5	6.5	6.5		8.0	9.5		8.0	8.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	5.0		3.0	5.0	5.0	3.5	3.5	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None	None	None	None	None	None	None	None
Act Effct Green (s)	10.4	32.9		31.2	72.6	72.6		10.4	37.0		6.3	6.3
Actuated g/C Ratio	0.11	0.36		0.34	0.80	0.80		0.11	0.41		0.07	0.07
v/c Ratio	0.14	0.68		0.98	0.51	0.02		0.07	0.26		0.08	0.04
Control Delay	45.6	30.5		66.1	13.6	0.1		45.6	2.7		49.6	0.3
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	45.6	30.5		66.1	13.6	0.1		45.6	2.7		49.6	0.3
LOS	D	C		E	B	A		D	A		D	A
Approach Delay		31.0			28.6			4.5			24.9	
Approach LOS		C			C			A			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 91.3			
Natural Cycle: 150			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.98			
Intersection Signal Delay: 26.6		Intersection LOS: C	
Intersection Capacity Utilization 80.3%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 6: Queen Annes Court & 258/Rt 32 (Brewers Neck Boulevard)



APPENDIX F

Trip Distribution Percentages and Volumes

Land Use	ITE Code	Size	Units	Daily	AM Peak Hour			PM Peak Hour		
					Enter	Exit	Total	Enter	Exit	Total
Conceptual Site Plan										
Single-Family Detached Housing	210	400	Dwelling Units	3,776	74	222	296	249	147	396
Multifamily Housing (Low-Rise)	220	285	Dwelling Units	2,144	30	101	131	101	59	160
Public Park	411	4	Acres	91	0	0	0	13	10	23
Shopping Center	820	30	1000 Sq. Ft. GLA	2,651	17	11	28	107	116	223
Fast Food with Drive-Thru	934	5	1000 Sq. Ft. GLA	2,355	102	99	201	85	78	163
Subtotal				**11,017**	**223**	**433**	**656**	**555**	**410**	**965**
Pass-by Trips (Fast Food only)	49%		% Pass-by	1,154	50	49	98	42	38	80
Pass-by Trips (Shopping Center)	34%		% Pass-by	901	6	4	10	36	39	76
Total New Trips				**8,962**	**167**	**380**	**548**	**477**	**333**	**809**

Reference: Trip Generation, 10th Edition, Institute of Transportation Engineers, Washington, DC. 2017.
Note: Used highest total between average rate and fitted curve unless R2<0.75

Fast Food with Drive-Thru	934	5	1000 Sq. Ft. GLA	2,355	103	98	201	85	78	163
Pass-by Trips (Fast Food only)	49%		% Pass-by	1,154	50	48	98	42	38	80
				1,201	53	50	103	43	40	83

Shopping Center	820	30	1000 Sq. Ft. GLA	2,651	17	11	28	107	116	223
Pass-by Trips (Shopping Center Only))	34%		% Pass-by	901	6	4	10	36	39	76
				1,750	11	7	18	71	77	147

LEGEND	
—	Existing Roadway
- -	Future Roadway
STOP	Existing Stop Controlled Approach
	Existing Signalized Intersection
→	Turning Movement
XX%(XX%)	AM (PM) Entering Percentage of Site Trips
XX%(XX%)	AM (PM) Exiting Percentage of Site Trips
STOP	Future Stop Controlled Approach

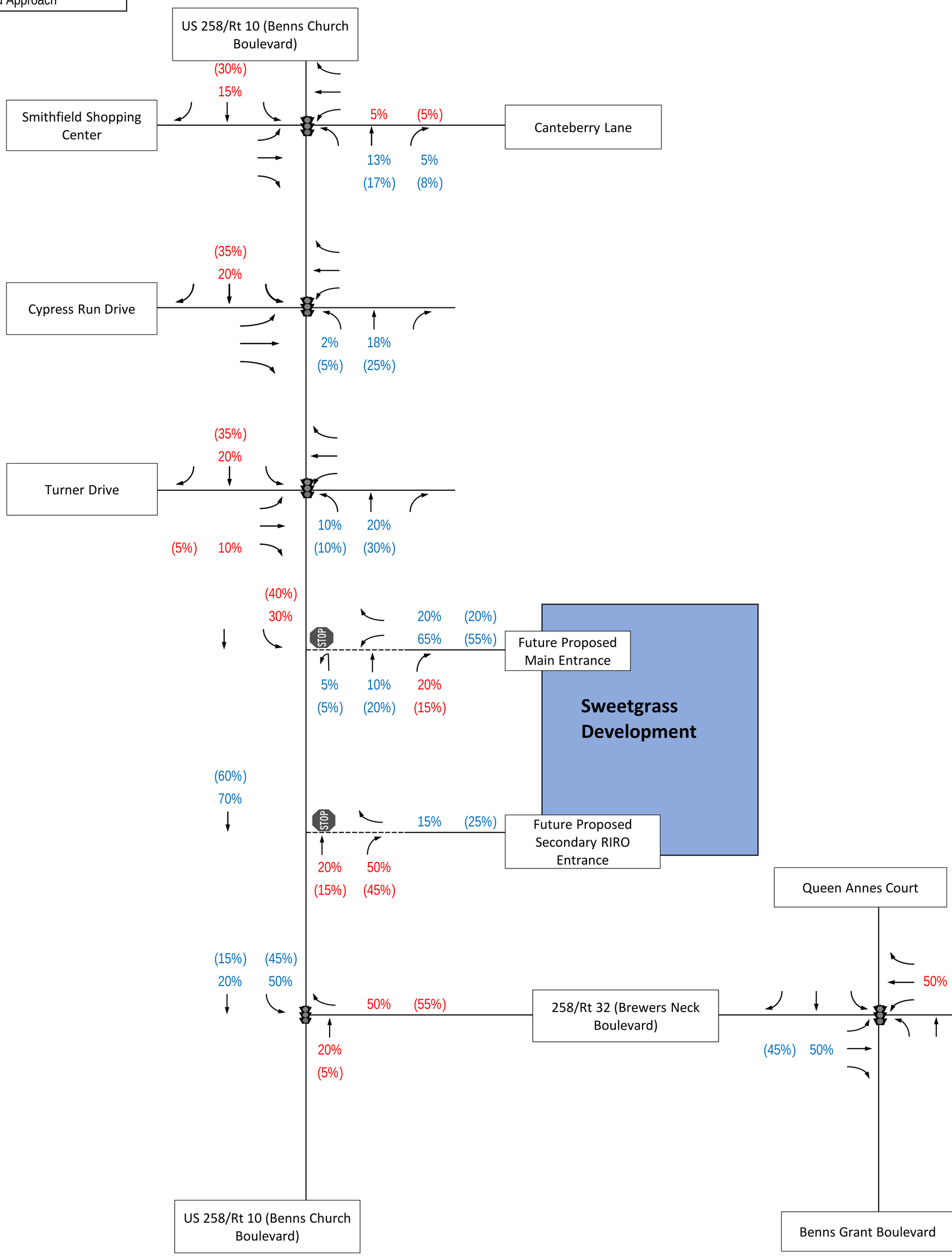


Figure F-1
Single-Family Detached Housing AM and PM Peak Hour Directional Distribution Percentages

Sweetgrass
Isle of Wight County, VA

LEGEND	
—	Existing Roadway
- -	Future Roadway
STOP	Existing Stop Controlled Approach
	Existing Signalized Intersection
→	Turning Movement
XX(XX)	Weekday AM (PM) Entering Site Trips
XX(XX)	Weekday AM (PM) Exiting Site Trips
STOP	Future Stop Controlled Approach

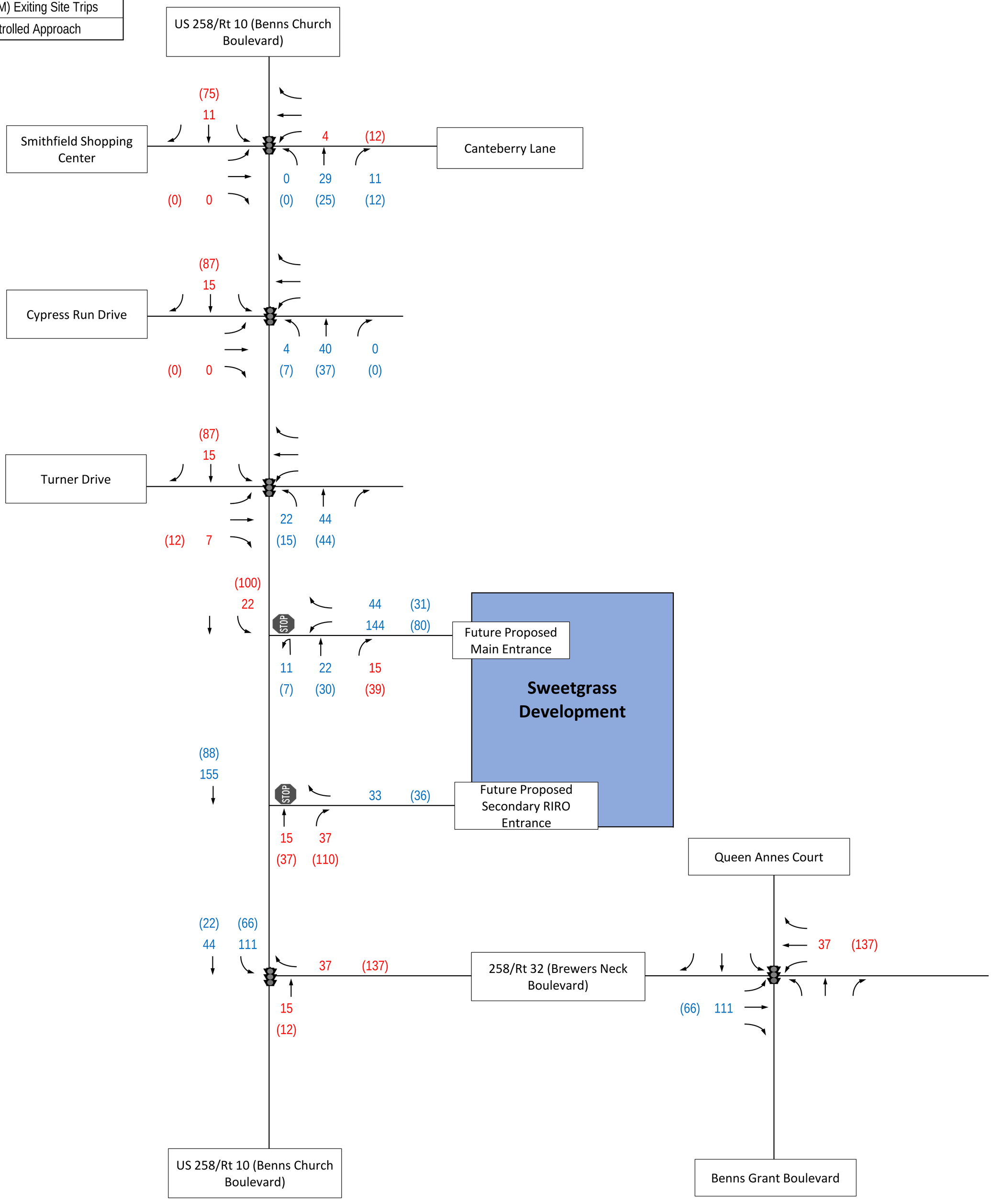


Figure F-2
Single-Family Detached Housing AM and PM Peak Hour Site Trips

Sweetgrass
Isle of Wight County, VA

LEGEND	
——	Existing Roadway
- -	Future Roadway
STOP	Existing Stop Controlled Approach
	Existing Signalized Intersection
⟶	Turning Movement
XX%(XX%)	AM (PM) Entering Percentage of Site Trips
XX%(XX%)	AM (PM) Exiting Percentage of Site Trips
STOP	Future Stop Controlled Approach

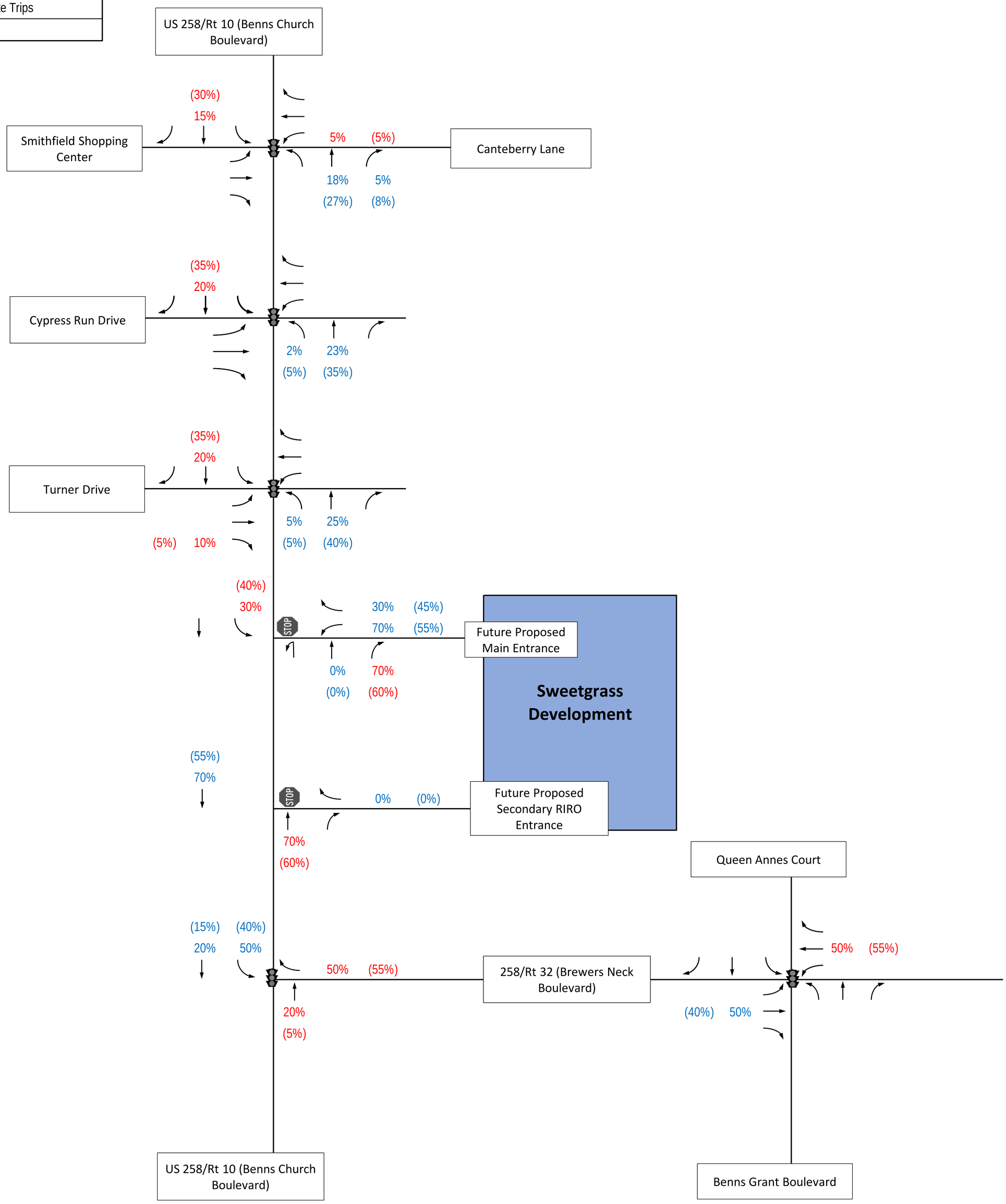


Figure F-3
Multifamily Housing (Low-Rise) AM and PM Peak Hour Directional Distribution Percentages

Sweetgrass
Isle of Wight County, VA

LEGEND	
——	Existing Roadway
- - -	Future Roadway
STOP	Existing Stop Controlled Approach
	Existing Signalized Intersection
——►	Turning Movement
XX(XX)	Weekday AM (PM) Entering Site Trips
XX(XX)	Weekday AM (PM) Exiting Site Trips
STOP	Future Stop Controlled Approach

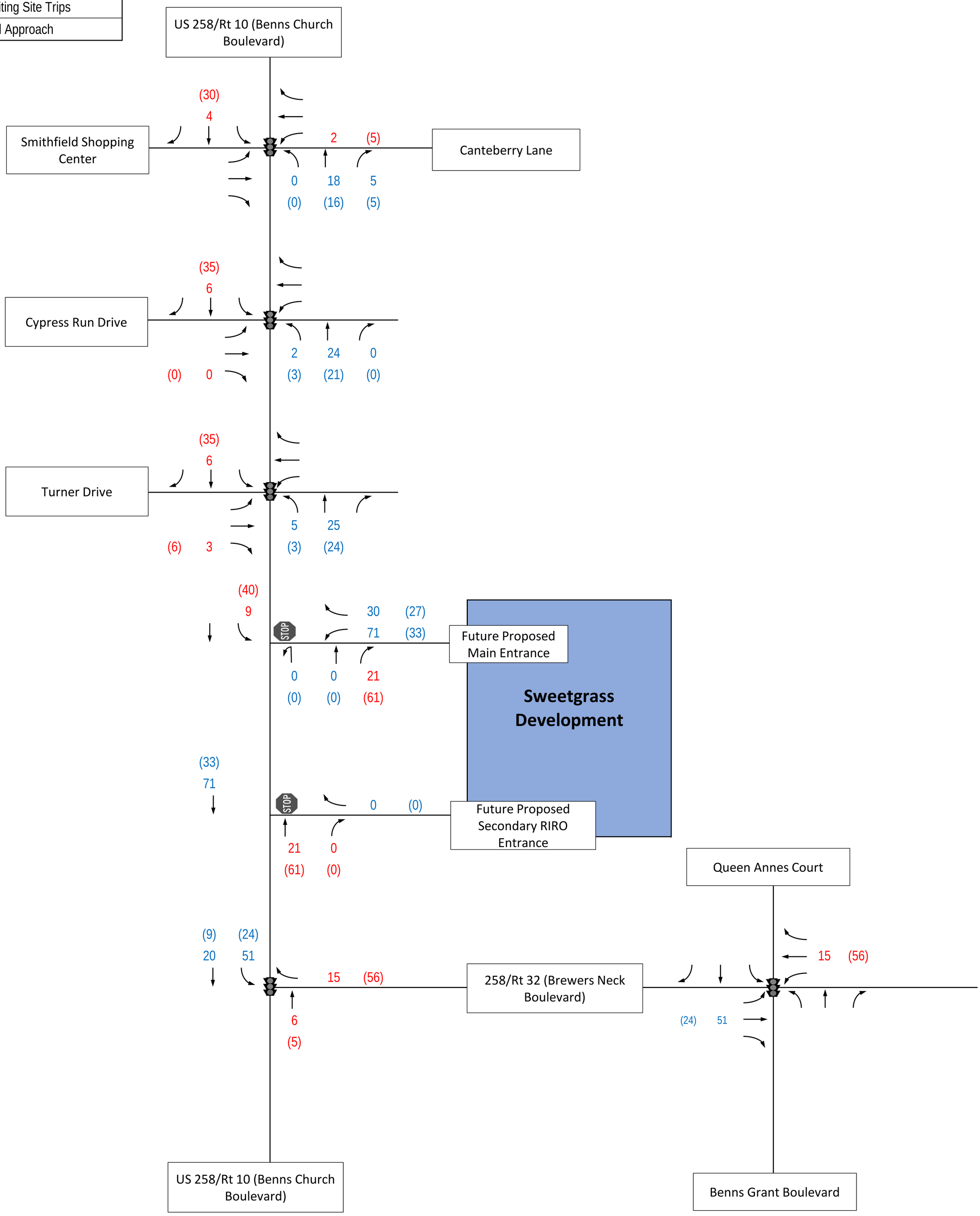


Figure F-4
Multifamily Housing (Low-Rise) AM and PM Peak Hour Site Trips

Sweetgrass
Isle of Wight County, VA

LEGEND	
——	Existing Roadway
- -	Future Roadway
STOP	Existing Stop Controlled Approach
	Existing Signalized Intersection
⟶	Turning Movement
XX%(XX%)	AM (PM) Entering Percentage of Site Trips
XX%(XX%)	AM (PM) Exiting Percentage of Site Trips
STOP	Future Stop Controlled Approach

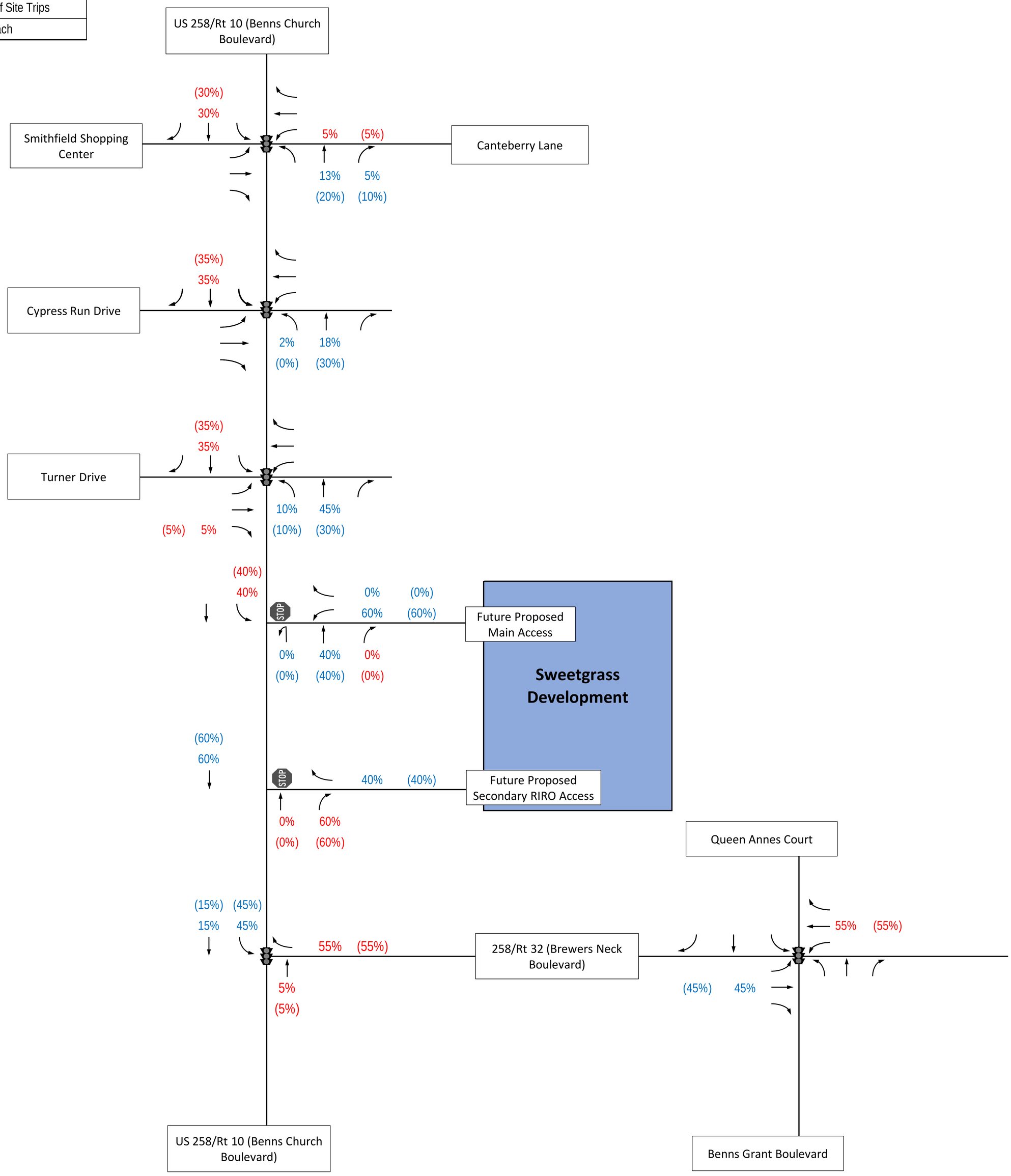


Figure F-5
Public Park AM and PM Peak Hour Directional Distribution Percentages

Sweetgrass,
Isle of Wight County, VA

LEGEND	
——	Existing Roadway
- - -	Future Roadway
STOP	Existing Stop Controlled Approach
	Existing Signalized Intersection
——►	Turning Movement
XX(XX)	Weekday AM (PM) Entering Site Trips
XX(XX)	Weekday AM (PM) Exiting Site Trips
STOP	Future Stop Controlled Approach

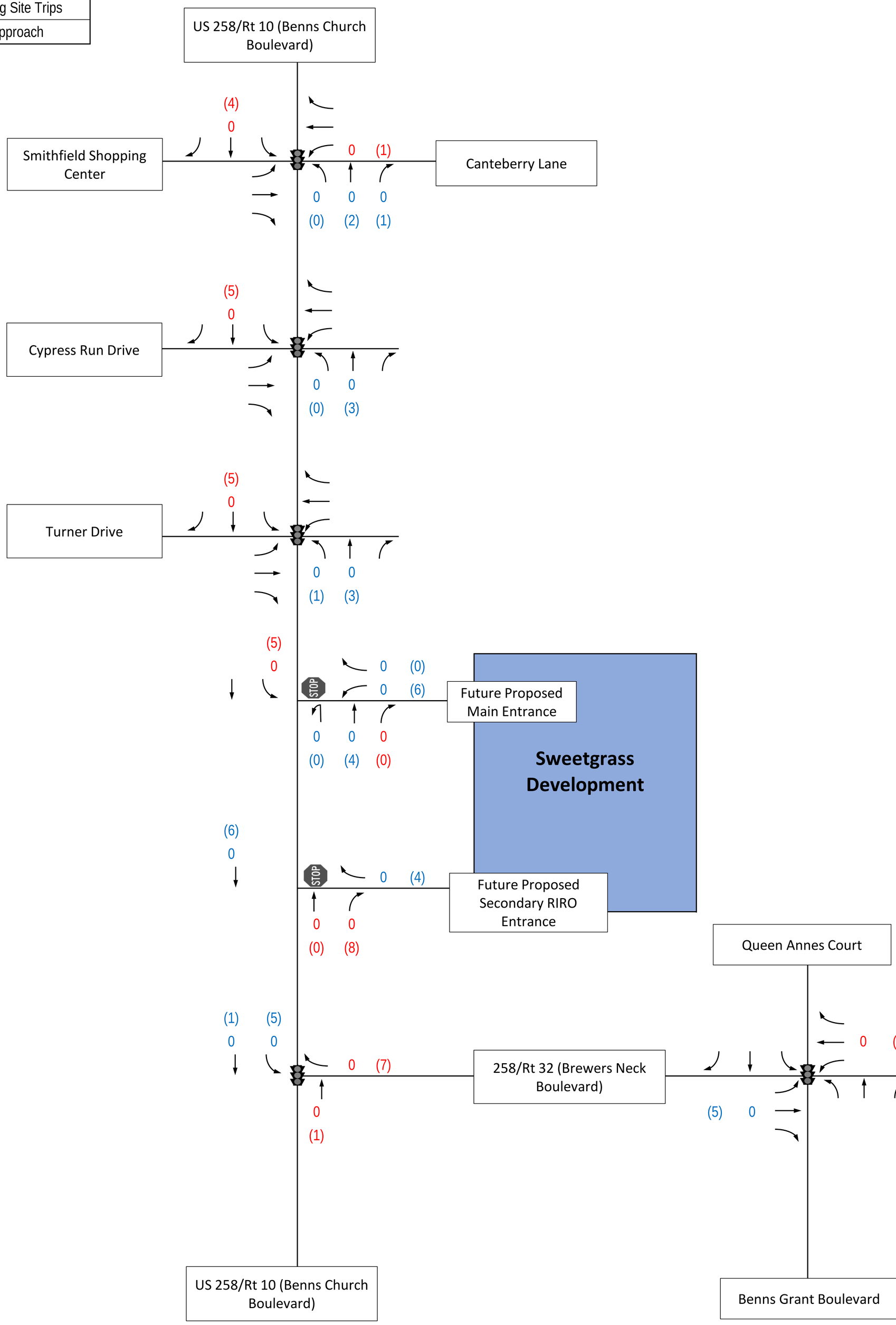


Figure F-6
Public Park AM and PM Peak Hour Site Trips

Sweetgrass
Isle of Wight County, VA

LEGEND	
——	Existing Roadway
- -	Future Roadway
STOP	Existing Stop Controlled Approach
	Existing Signalized Intersection
⟶	Turning Movement
XX%(XX%)	AM (PM) Entering Percentage of Site Trips
XX%(XX%)	AM (PM) Exiting Percentage of Site Trips
STOP	Future Stop Controlled Approach

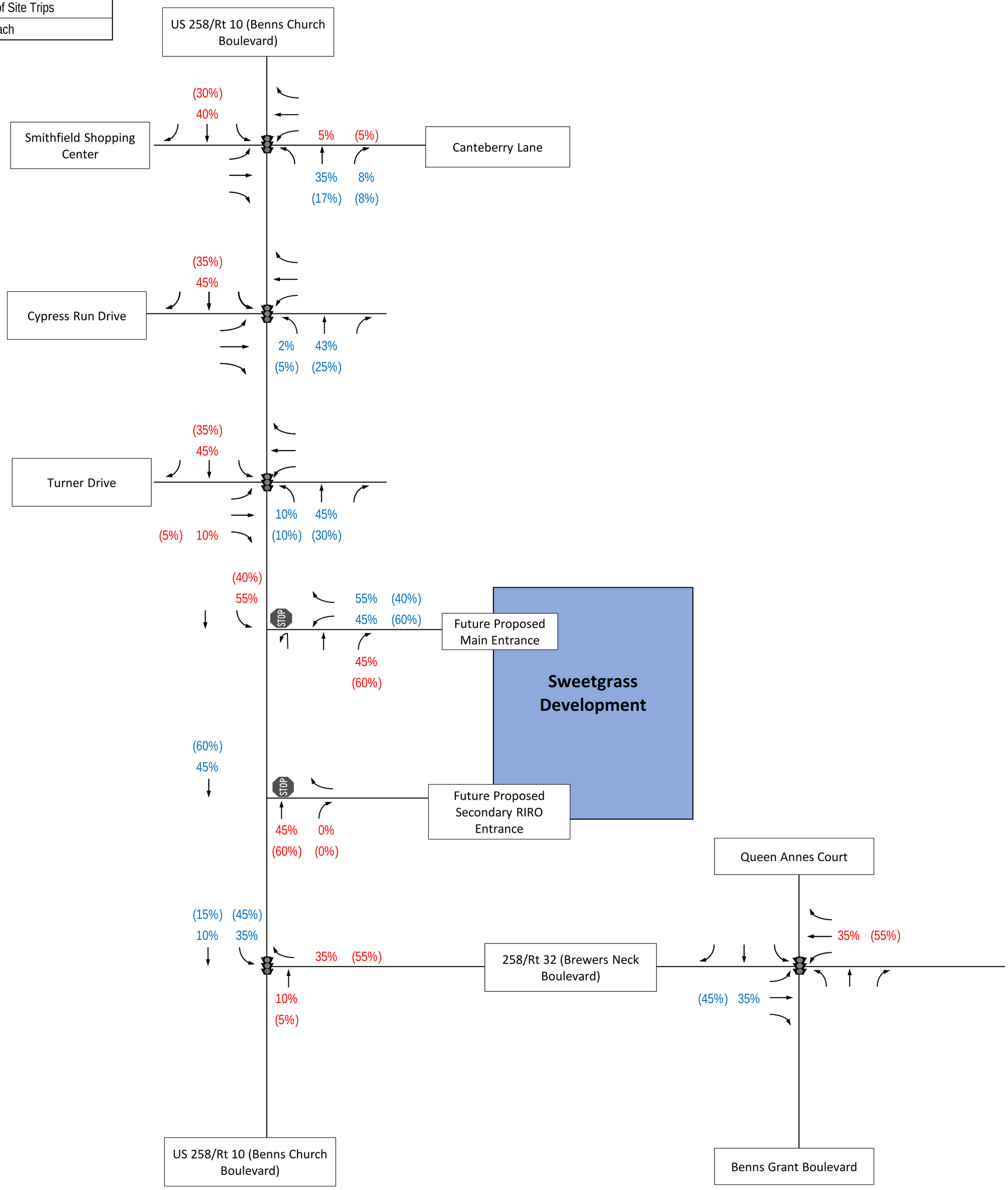


Figure F-7
Shopping Center AM and PM Peak Hour Directional Distribution Percentages

Sweetgrass
Isle of Wight County, VA

LEGEND	
——	Existing Roadway
- -	Future Roadway
STOP	Existing Stop Controlled Approach
	Existing Signalized Intersection
⟶	Turning Movement
XX(XX)	Weekday AM (PM) Entering Site Trips
XX(XX)	Weekday AM (PM) Exiting Site Trips
STOP	Future Stop Controlled Approach

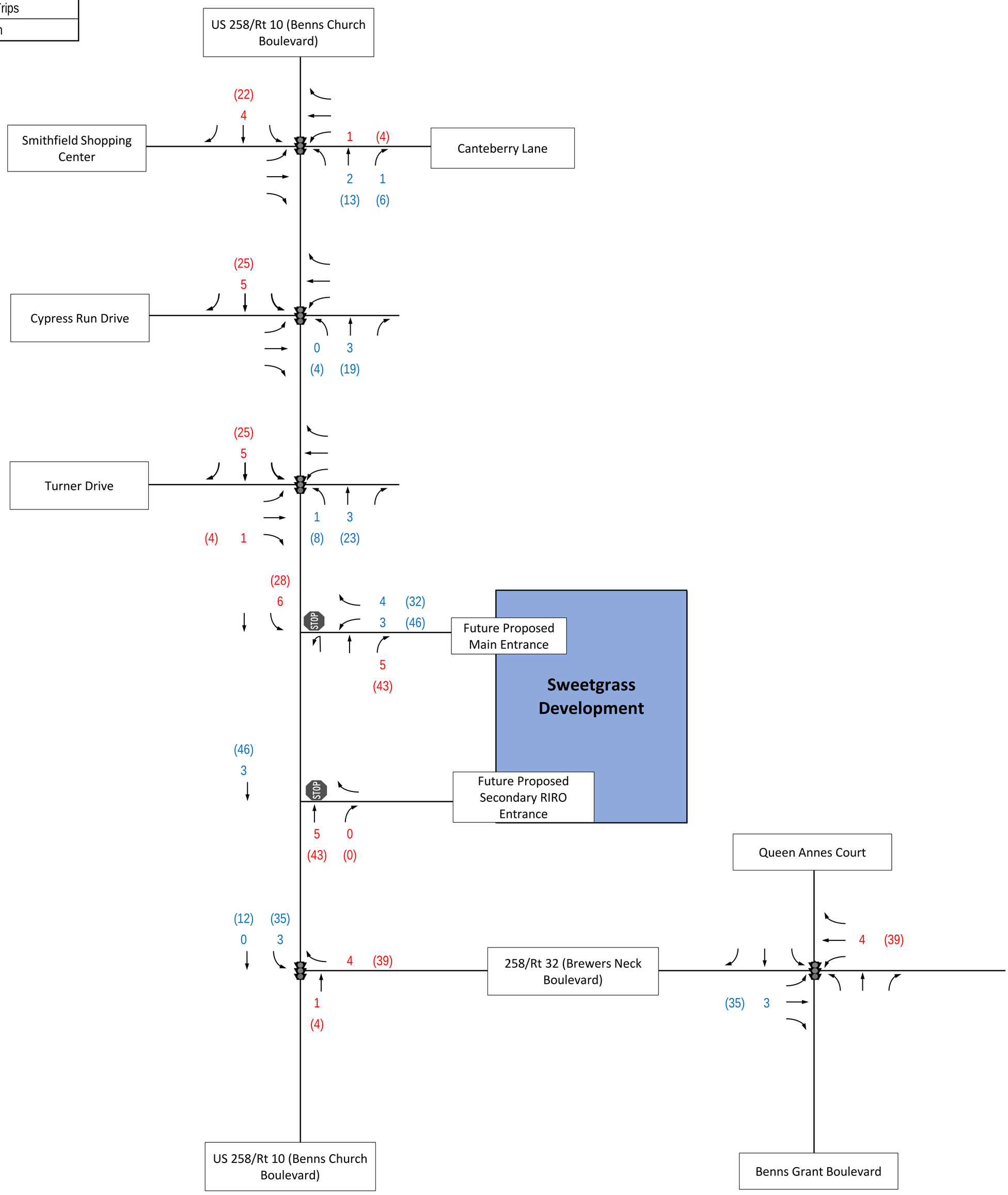


Figure F-8
Shopping Center AM and PM Peak Hour Site Trips

Sweetgrass,
Isle of Wight County, VA

LEGEND	
——	Existing Roadway
- -	Future Roadway
STOP	Existing Stop Controlled Approach
	Existing Signalized Intersection
⟶	Turning Movement
XX%(XX%)	AM (PM) Entering Percentage of Site Trips
XX%(XX%)	AM (PM) Exiting Percentage of Site Trips
STOP	Future Stop Controlled Approach

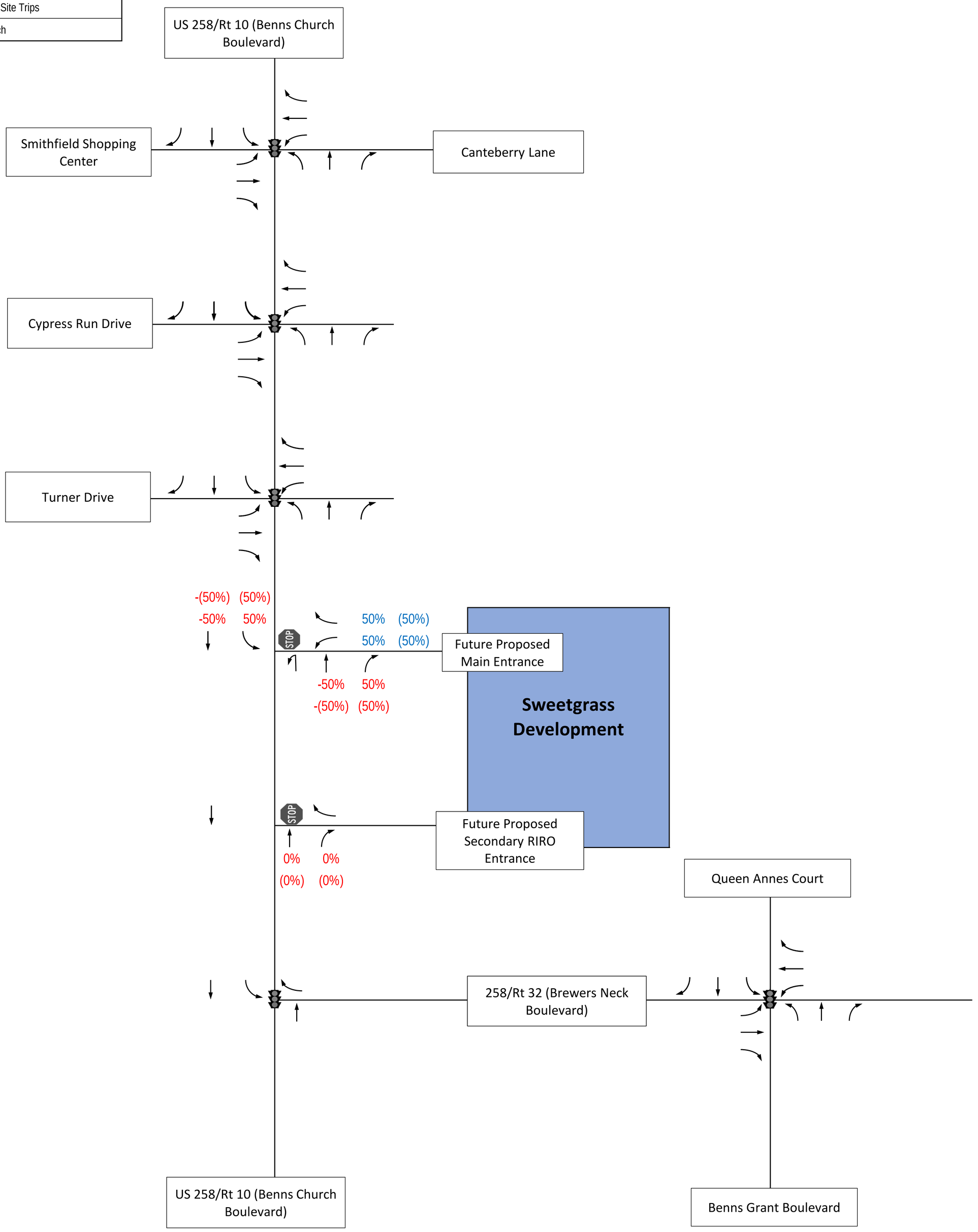


Figure F-9
Shopping Center Pass-by AM and PM Peak Hour Directional Distribution Percentages

Sweetgrass
Isle of Wight County, VA

LEGEND	
——	Existing Roadway
- - -	Future Roadway
STOP	Existing Stop Controlled Approach
	Existing Signalized Intersection
⟶	Turning Movement
XX(XX)	Weekday AM (PM) Entering Site Trips
XX(XX)	Weekday AM (PM) Exiting Site Trips
STOP	Future Stop Controlled Approach

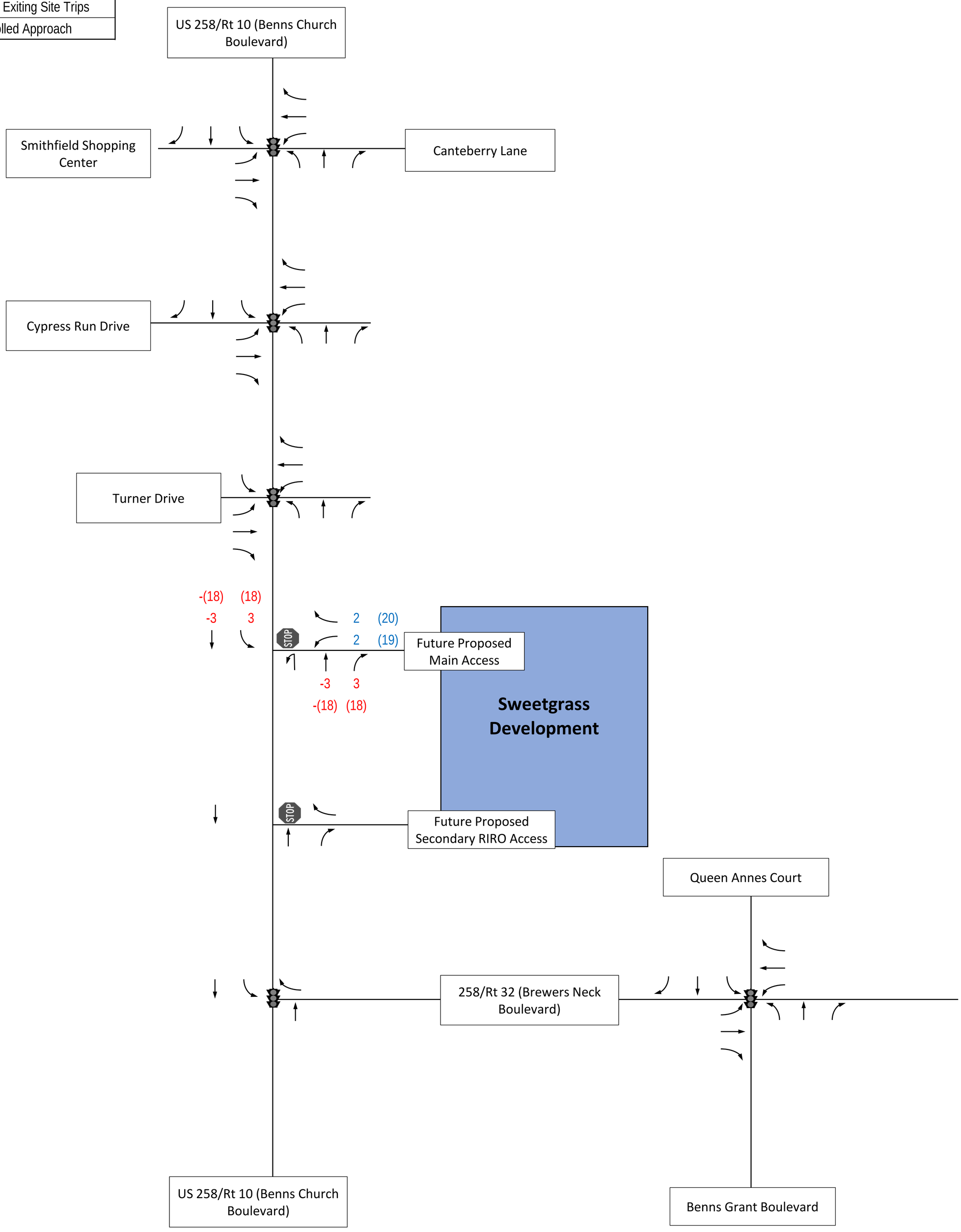


Figure F-10
Shopping Center AM and PM Peak Hour Pass-by Trips

Sweetgrass
Isle of Wight County, VA

LEGEND	
——	Existing Roadway
- -	Future Roadway
STOP	Existing Stop Controlled Approach
	Existing Signalized Intersection
⟶	Turning Movement
XX%(XX%)	AM (PM) Entering Percentage of Site Trips
XX%(XX%)	AM (PM) Exiting Percentage of Site Trips
STOP	Future Stop Controlled Approach

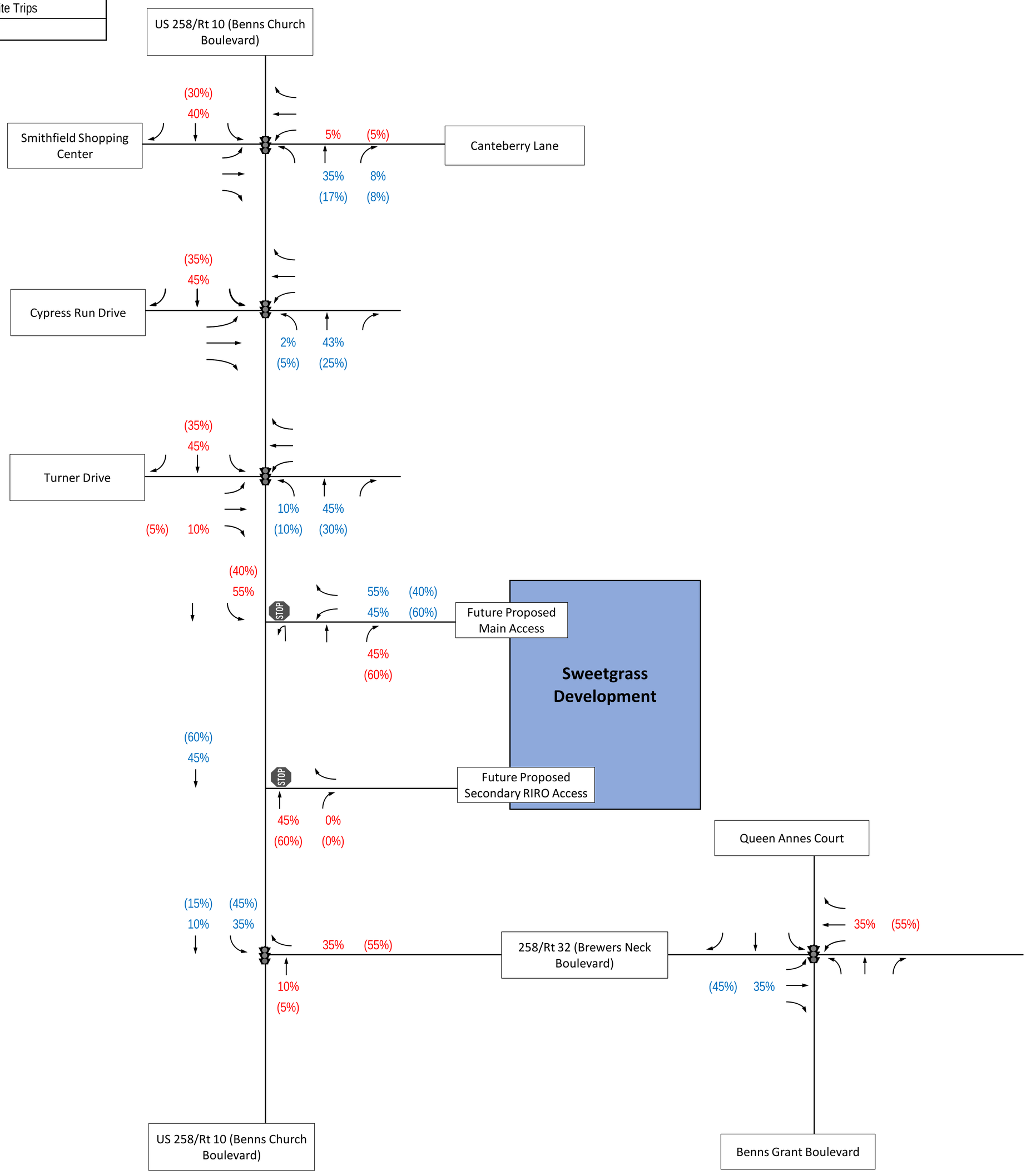


Figure F-11
Fast Food AM and PM Peak Hour Directional Distribution Percentages

Sweetgrass
Isle of Wight County, VA

LEGEND	
——	Existing Roadway
- -	Future Roadway
STOP	Existing Stop Controlled Approach
	Existing Signalized Intersection
⟶	Turning Movement
XX(XX)	Weekday AM (PM) Entering Site Trips
XX(XX)	Weekday AM (PM) Exiting Site Trips
STOP	Future Stop Controlled Approach

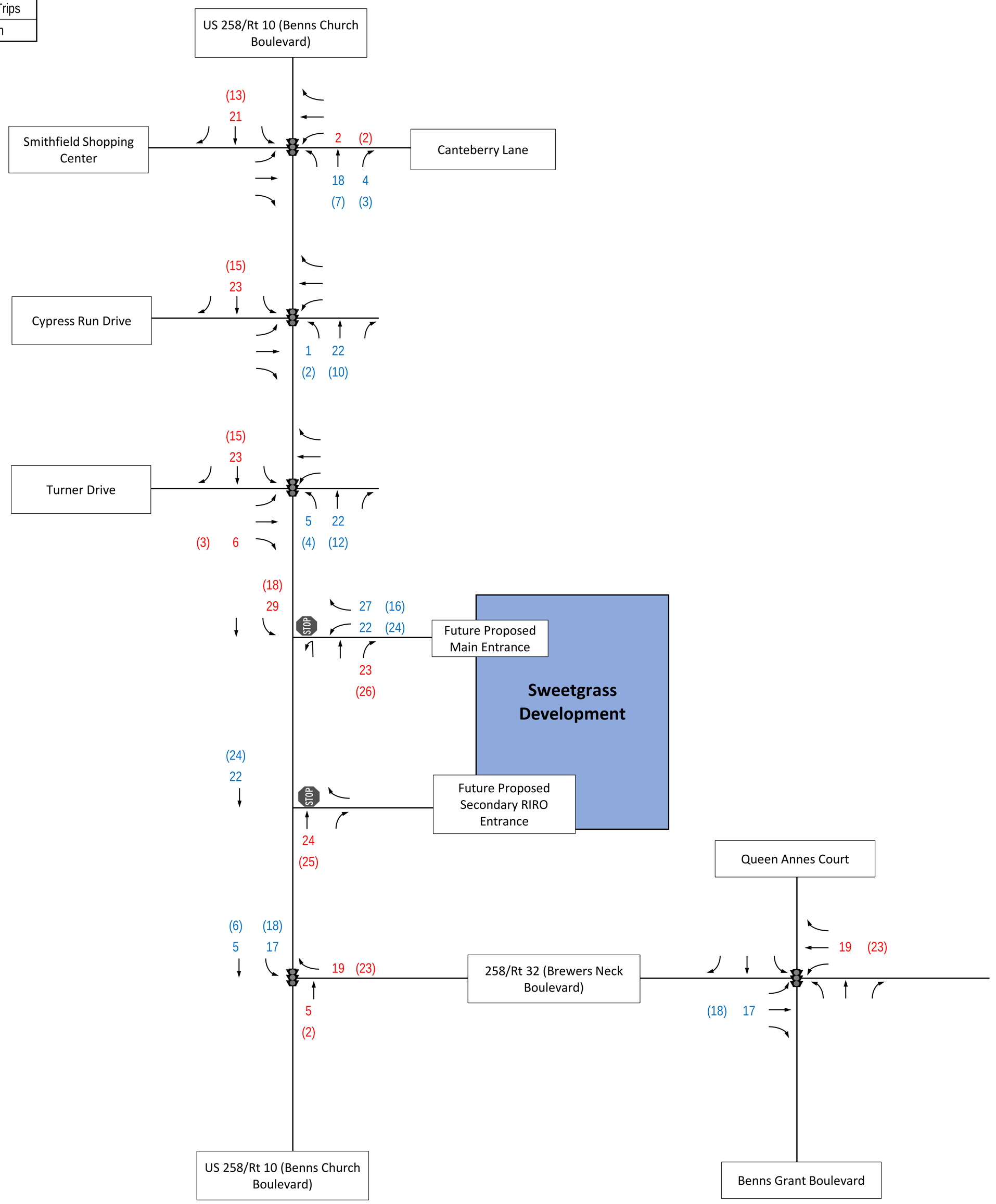


Figure F-12
Fast Food AM and PM Peak Hour New Site Trips

Sweetgrass
Isle of Wight County, VA

LEGEND	
——	Existing Roadway
- -	Future Roadway
STOP	Existing Stop Controlled Approach
	Existing Signalized Intersection
⟶	Turning Movement
XX%(XX%)	AM (PM) Entering Percentage of Site Trips
XX%(XX%)	AM (PM) Exiting Percentage of Site Trips
STOP	Future Stop Controlled Approach

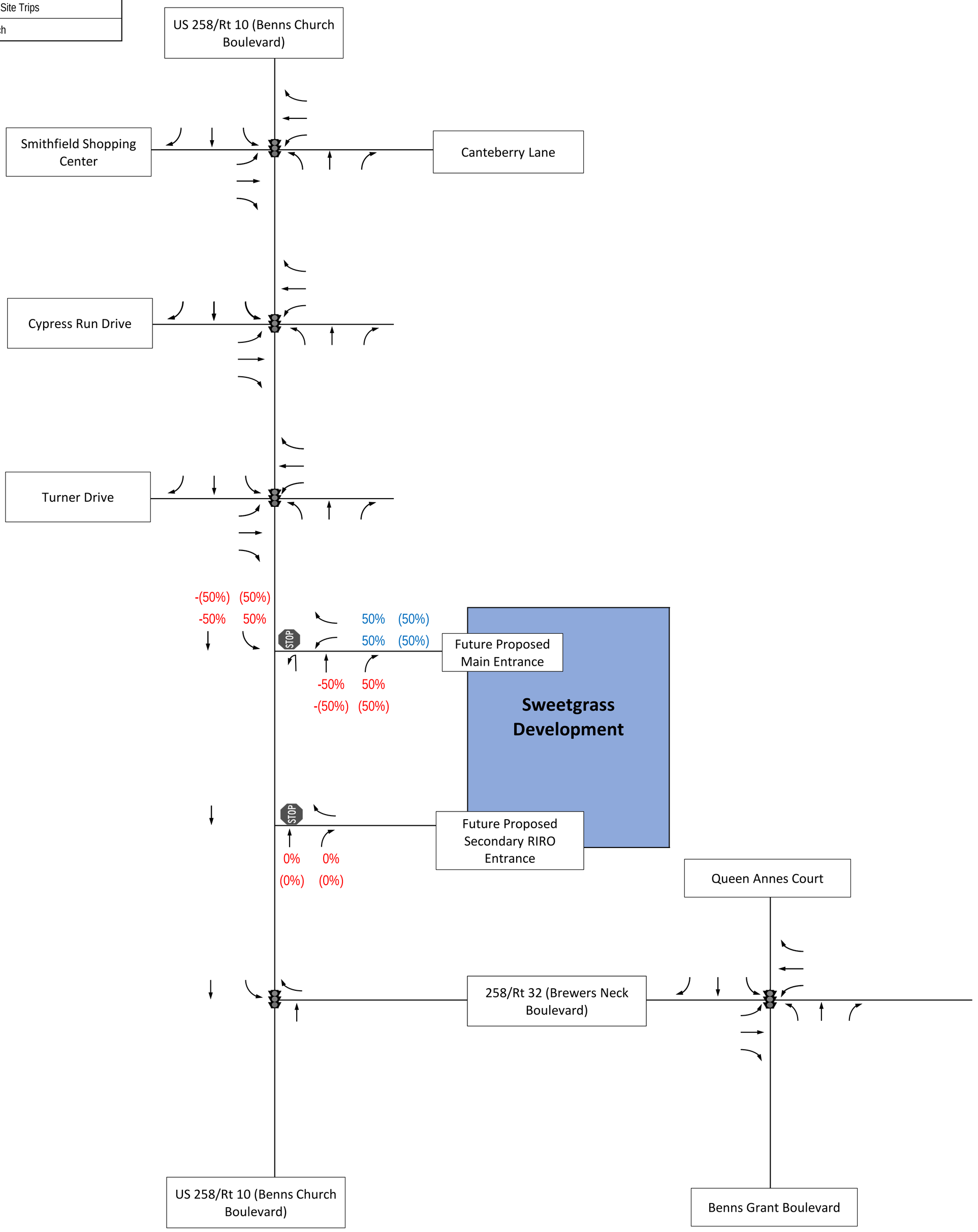


Figure F-15
Fast Food AM and PM Peak Hour Pass-by Directional Distribution Percentages

Sweetgrass
Isle of Wight County, VA

LEGEND	
——	Existing Roadway
- - -	Future Roadway
STOP	Existing Stop Controlled Approach
	Existing Signalized Intersection
⟶	Turning Movement
XX(XX)	Weekday AM (PM) Entering Site Trips
XX(XX)	Weekday AM (PM) Exiting Site Trips
STOP	Future Stop Controlled Approach

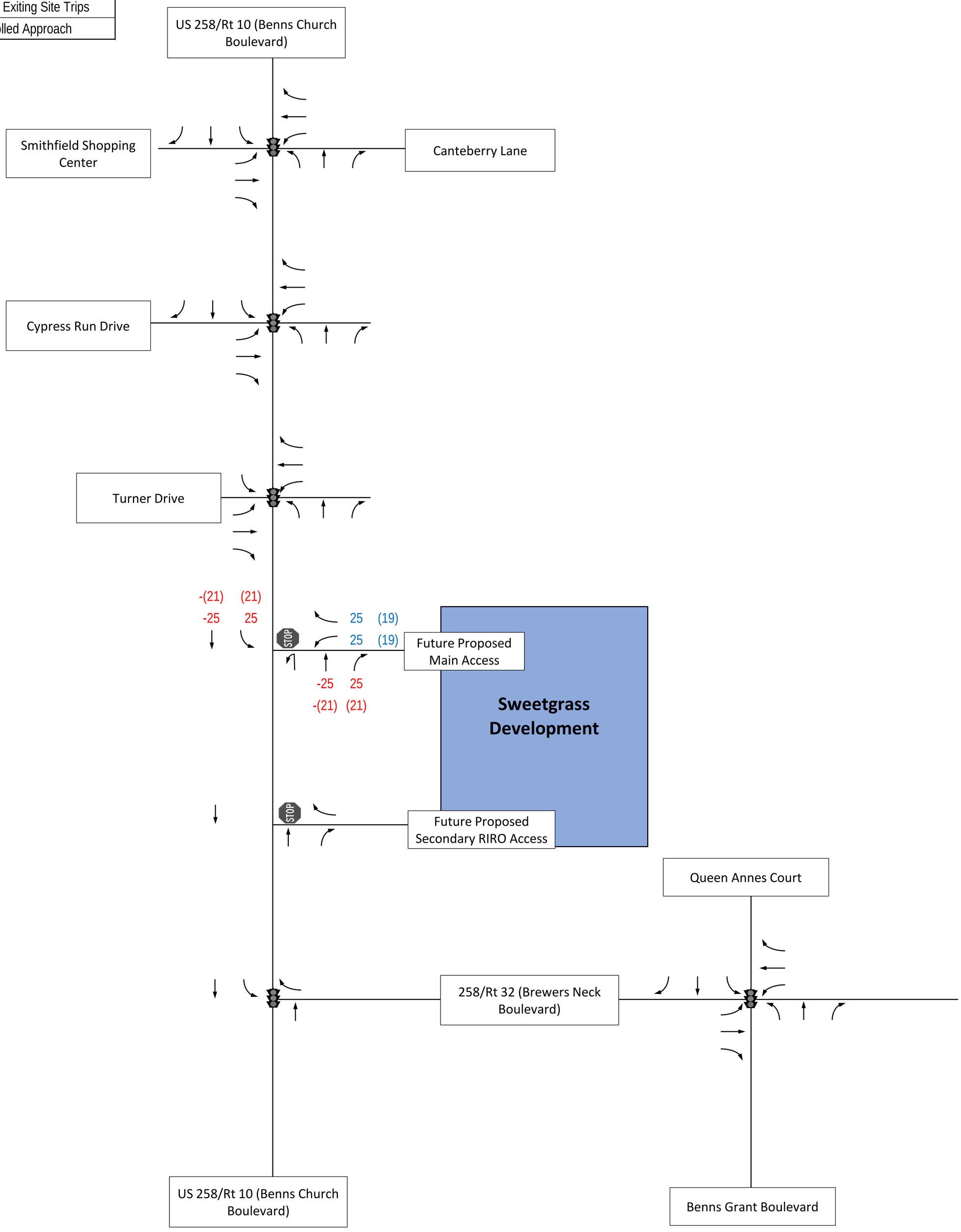


Figure F-16
Fast Food AM and PM Peak Hour Pass-by Trips

Sweetgrass
Isle of Wight County, VA

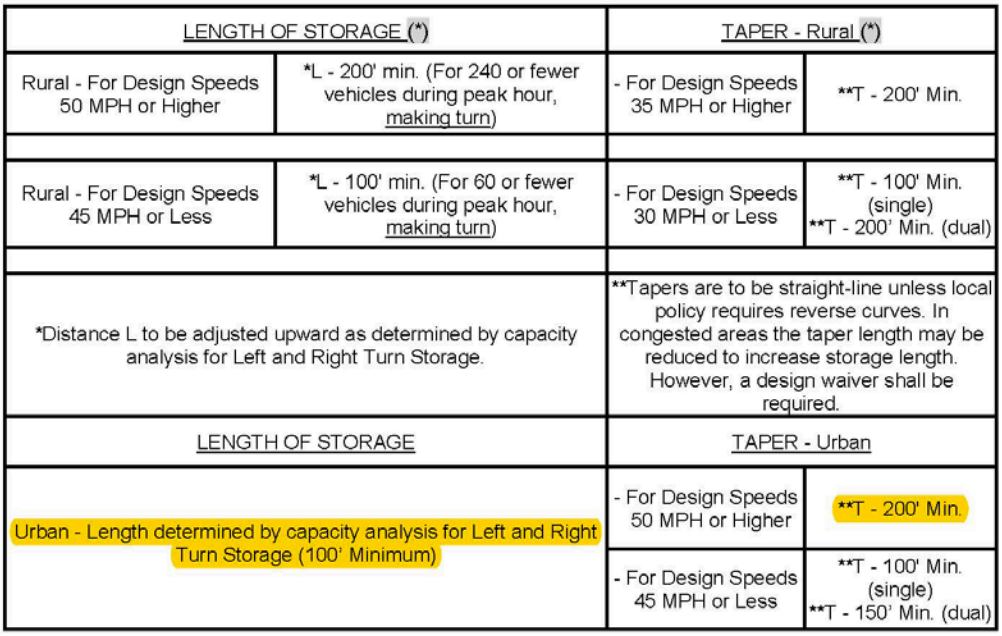
APPENDIX G

Turn Lane Warrant Analysis

Turn Lanes Warrant Analysis

Based on Figure 3-1 from Appendix F of VDOT Road Design Manual, provided below on Figure 1, both proposed entrances into development require right turn lanes. Based on the requirements shown in figure one, along with a capacity analysis, a 200-foot right turn lane with 200-foot storage is recommended at the Proposed Main Entrance and a right turn lane with 200-foot foot storage with a 200-foot taper is recommended at the Proposed Secondary Entrance.

Figure 1. Turn Lane Criteria for Single and Dual Lanes.



LENGTH OF STORAGE (*)		TAPER - Rural (*)	
Rural - For Design Speeds 50 MPH or Higher	*L - 200' min. (For 240 or fewer vehicles during peak hour, making turn)	- For Design Speeds 35 MPH or Higher	**T - 200' Min.
Rural - For Design Speeds 45 MPH or Less	*L - 100' min. (For 60 or fewer vehicles during peak hour, making turn)	- For Design Speeds 30 MPH or Less	**T - 100' Min. (single) **T - 200' Min. (dual)
*Distance L to be adjusted upward as determined by capacity analysis for Left and Right Turn Storage.		**Tapers are to be straight-line unless local policy requires reverse curves. In congested areas the taper length may be reduced to increase storage length. However, a design waiver shall be required.	
LENGTH OF STORAGE		TAPER - Urban	
Urban - Length determined by capacity analysis for Left and Right Turn Storage (100' Minimum)		- For Design Speeds 50 MPH or Higher	**T - 200' Min.
		- For Design Speeds 45 MPH or Less	**T - 100' Min. (single) **T - 150' Min. (dual)

(*) For instructions on selection of design speed, see Appendix A, Section A-1*

FIGURE 3-1 RIGHT AND LEFT TURN LANE CRITERIA FOR SINGLE AND DUAL LANES

Based on the projected volumes in year 2026 at full build-out, the projected peak hour volume right turns and approach totals at both entrances are presented below:

Entrance	Peak Hour Volume Right Turns, Vehicles per Hour	Peak Hour Volume Approach Total, Vehicles per Hour
Proposed Main Entrance	208	1724
Proposed Secondary Entrance	116	1797

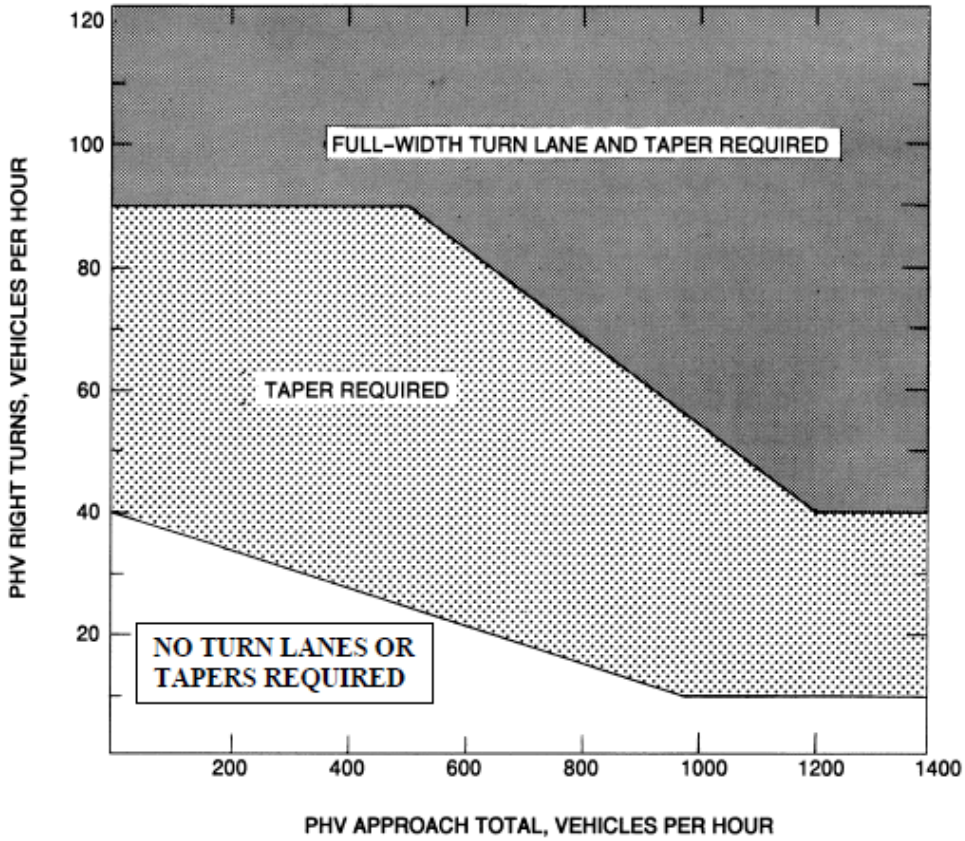
Blue dots on Figure 2 below reflect where the points fall on the graph based on volumes calculations. Full-width right turn lane and a taper is required at both proposed entrances.

Proposed Main Entrance
Approach Total = 1724 vph
Peak Hour Right Turn = 208 vph

Figure 2. Warrants for Right Turn Treatment (4-Lane Highway)

Proposed Secondary Entrance
Approach Total = 1797 vph
Peak Hour Right Turn = 116 vph

F-80



Appropriate Radius required at all Intersections and Entrances (Commercial or Private).

LEGEND

PHV- - Peak Hour Volume (also Design Hourly Volume equivalent)

Adjustment for Right Turns

If PHV is not known use formula: PHV = ADT x K x D

K = the percent of AADT occurring in the peak hour
D = the percent of traffic in the peak direction of flow

Note: An average of 11% for K x D will suffice.

When right turn facilities are warranted, see Figure 3-1 for design criteria.*

FIGURE 3-27 WARRANTS FOR RIGHT TURN TREATMENT (4-LANE HIGHWAY)

* Rev. 1/15

Based on the provided guidance on Figure 2 from Appendix F of VDOT Road Design Manual on the previous page, along with a capacity analysis, a 200-foot right turn lane with 200-foot storage is recommended at the Proposed Main Entrance and a 200-foot foot storage with a 200-foot taper is recommended at the Proposed Secondary Entrance. These right turn lane recommendations were used in the 2026 and 2032 Build analyses.

Furthermore, left turn volumes were evaluated at the proposed future main entrance based on the left turn lane storage warrant from VDOT Road Design Manual presented on Figure 1. Based on the projected queues for 2026 and 2032 Build scenarios, the existing left turn lane at the intersection of US 258/Rt 10 (Benns Church Boulevard) & Future Proposed Main Entrance will need to be lengthened in order to facilitate the projected peak hour queues. A 200-foot left turn storage lane with 200-foot taper is recommended at this location and was assumed for AM and PM 2026 and 2032 Build scenarios in this analysis.

APPENDIX H

Signal Warrant Analysis

Traffic Signal Warrant Analysis

This report details the findings of a traffic signal warrant analysis on the US 258/Rt 10 (Benns Church Boulevard) & Proposed Main Entrance intersection, to determine whether a signal would be warranted for the opening day build year, 2026, of the Sweetgrass Development.

Evaluation of the need for a traffic signal at an intersection requires the examination of various factors such as traffic volumes, traffic flow and progression, and overall safety of the intersection to determine if a traffic signal would be warranted. Each of these elements is described below.

Methodology

Signal warrant analyses were performed following the procedures outlined in the 2009 edition of the Manual of Uniform Traffic Control Devices (MUTCD). Existing peak hour turning movement counts were collected at the study intersection and were used for this warrant analysis.

The traffic conditions of the intersection in the build year, 2026, were derived from a composition of existing turning movement volumes and a distribution of site trips from the Sweetgrass Development. The extent of signal warrant of the future conditions is limited by the data derived from the traffic forecast which includes only morning and evening peak hours and two additional hours, that were selected based on land uses that generate the highest traffic volumes: single-family detached housing, multifamily housing (low-rise) and fast-food restaurant.

Warrant Analysis Results

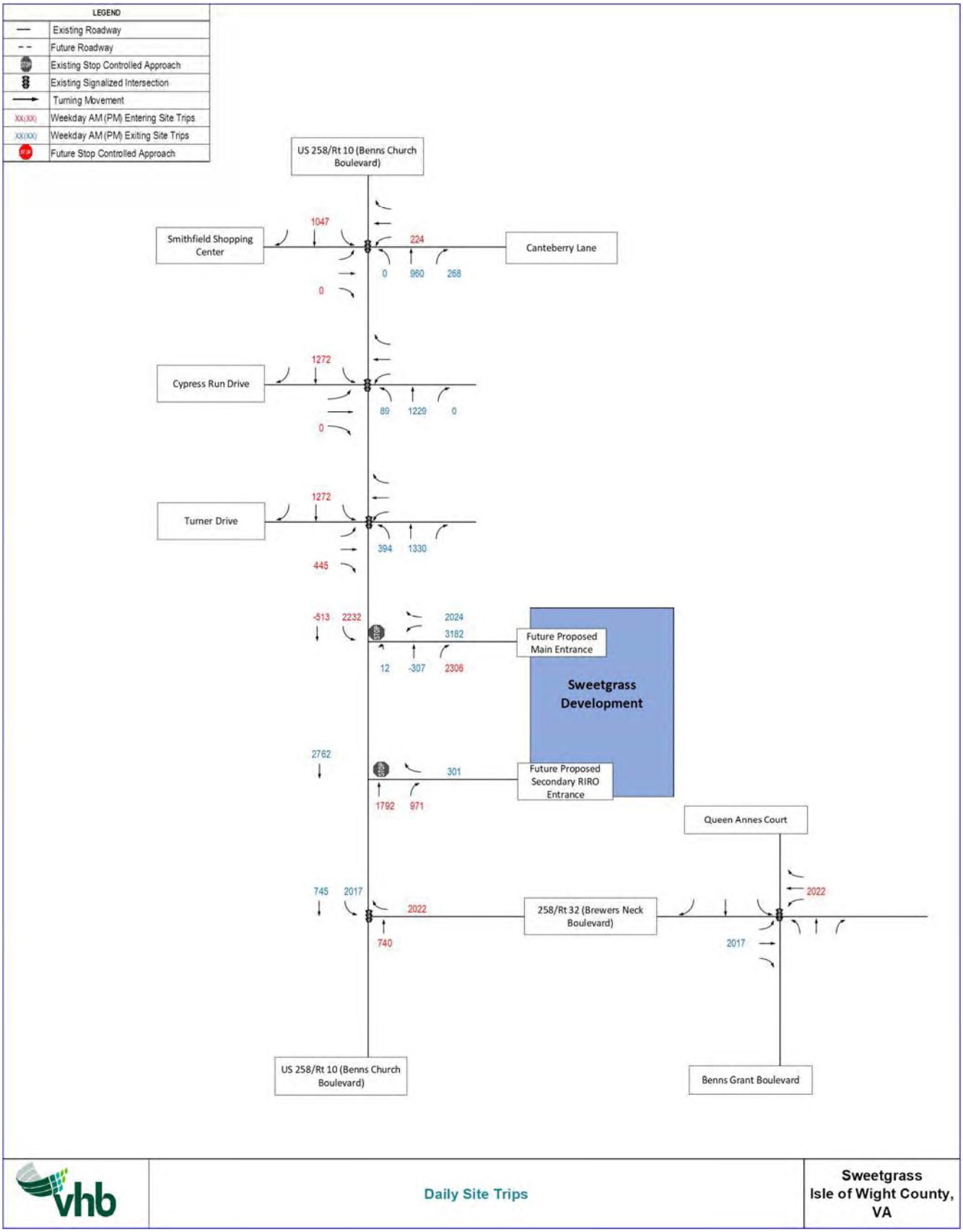
Warrant 1 – Eight Hour Vehicular Volume

Warrant 1, Eight-Hour Vehicular Volume, consists of two separate warrants; Warrant 1A-Minimum Vehicular Volume and Warrant 1B-Interruption of Continuous Traffic. The Minimum Vehicular Volume warrant is intended for use at locations where a large volume of intersecting traffic is the principal reason to consider installing a traffic signal. The Interruption of Continuous Traffic warrant is intended for use at locations where Warrant A is not satisfied and where the volume of traffic on a major street is so heavy that traffic on a minor intersecting street suffers excessive delay when attempting to cross or enter the major street. Warrant 1 is intended to be used as a single warrant; if Warrant A is met and Warrant B is not met, a traffic signal is warranted. Conversely, if Warrant A is not met and Warrant B is met, a traffic signal is still warranted.

Since this is a proposed entrance, VDOT's Traffic Signal Warrant Using Average Daily Traffic Estimate for the Virginia Supplement to the MUTCD was used. The future traffic projections at the US 258/Rt 10 (Benns Church Boulevard) & Proposed Main Entrance intersection were developed using the daily trip generation and distribution patterns shown in the TIA. The daily trip projections and associated site traffic are shown in the following table and figure respectively. For the signal warrant, the projected site trips on US 258/Rt 10 (Benns Church Boulevard) were added to the 2017 VDOT AADT of 25,000 vpd projected to Opening Day 2026 AADT of 28,585 vpd.

Land Use	ITE Code	Size	Units	Daily		
				Enter	Exit	Total
Conceptual Site Plan						
Single-Family Detached Housing	210	400	Dwelling Units	1888	1,888	3,776
Multifamily Housing (Low-Rise)	220	220	Dwelling Units	1072	1,072	2,144
Public Park	411	4	Acres	46	45	91
Shopping Center	820	30	1000 Sq. Ft. GLA	1326	1,325	2,651
Fast Food with Drive-Thru	934	5	1000 Sq. Ft. GLA	1177	1,178	2,355
Subtotal				**5,509**	**5,508**	**11,017**
Pass-by Trips (Fast Food only)	49%		% Pass-by	577	577	1,154
Pass-by Trips (Shopping Center)	34%		% Pass-by	451	450	901
Total New Trips				**4,481**	**4,481**	**8,962**

Reference: Trip Generation, 10th Edition, Institute of Transportation Engineers, Washington, DC. 2017.
Note: Used highest total between average rate and fitted curve unless R2<0.75



vhb

Daily Site Trips

Sweetgrass
Isle of Wight County, VA

Table 1: Future Conditions – Warrant 1 Condition A Summary

Number of Lanes		Vehicles per day on major street (total of both approaches)					Vehicles per day on minor street (total of both approaches)				
Major	Minor	100%	80%	70%	56%	Projected	100%	80%	70%	56%	Projected
2 or more	2 or more	9600	7680	6720	5376	32315	3200	2560	2240	1792	5206

Proposed signal warranted when development is: 43%

Warrant 1 is satisfied. The signal is projected to be warranted when the development is 43% built out with the 70% reduction due to the speed limit along the corridor.

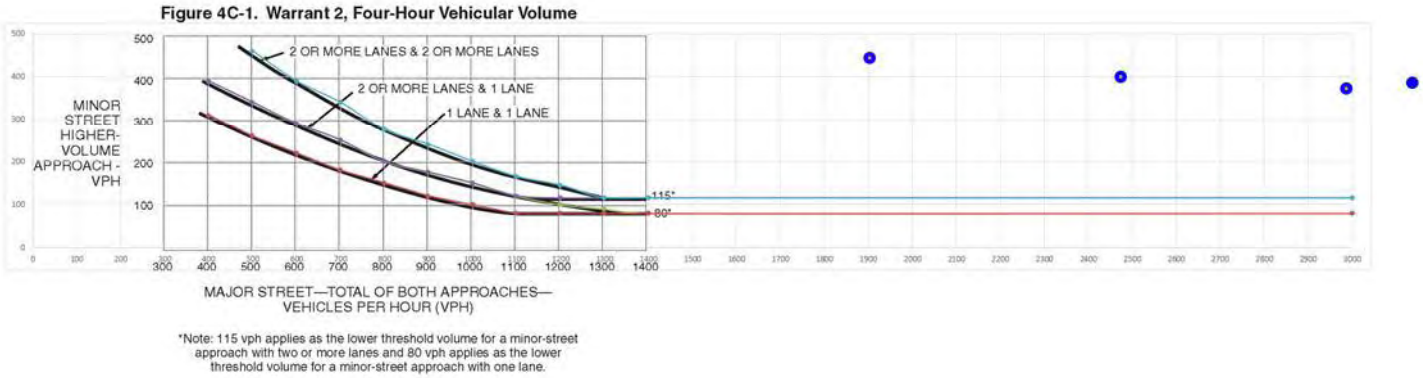
Warrant 2 – Four Hour Vehicular Volume

Warrant 2, Four-Hour Vehicular Volume, is intended for use at locations where a large volume of intersecting traffic is the principal reason to consider installing a traffic signal. A traffic signal is warranted based on Warrant 2 if "the plotted points representing the vehicles per hour on the major street and the minor street fall above the applicable curve."

Considering the two highest peak hours in terms of traffic volume at the study intersection the following figure shows that both, AM and PM peak hours, as well as additional two hours, would exceed the threshold of the Warrant. Based on the future land uses, it is expected that four hours would meet the minimum threshold volumes of the warrant.

Figure 1: 2026 Build Conditions Warrant 2

Time	Major Street (vph)	Minor Street (vph)
7:00 AM to 8:00 AM	2474	399
12:00 PM to 1:00 PM	1903	444
4:00 PM to 5:00 PM	3271	388
4:30 PM to 5:30 PM	2968	372



Warrant 2 is satisfied.

Warrant 3 – Peak Hour

Warrant 3, Peak Hour, "is intended for use at a location where traffic conditions are such that for a minimum of 1 hour of an average day, the minor-street traffic suffers undue delay when entering or crossing the major street." The Peak Hour warrant is met when "the plotted point representing the vehicles per hour on the major street and the minor street for one hour fall above the applicable curve" or based on the following conditions:

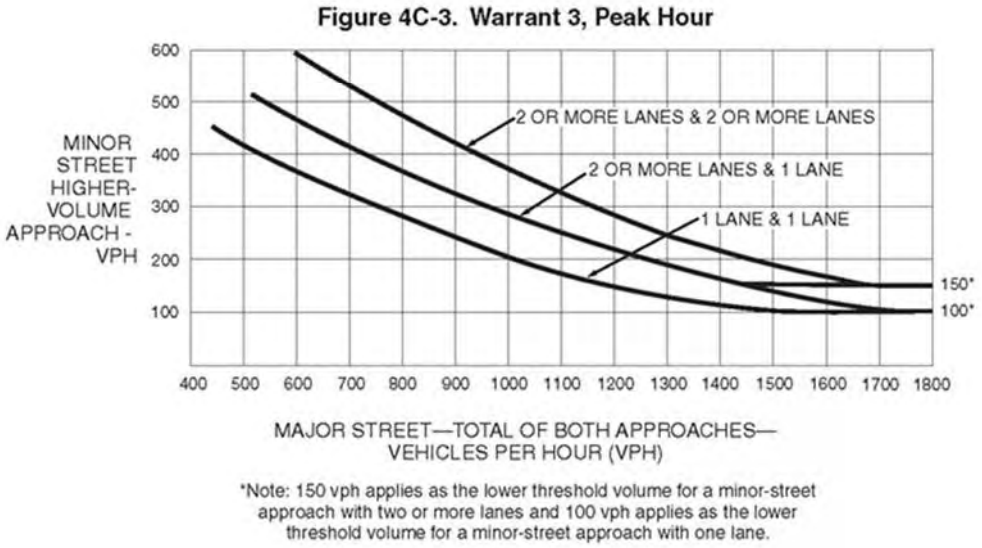
a) The total stopped time delay experienced by the traffic on one minor-street approach controlled by a stop sign equals or exceeds: 4 vehicle-hours for a one-lane approach; or 5 vehicle-hours for a two-lane approach, and

b) The volume on the same minor-street approach equals or exceeds 100 vehicles per hour for one lane or 150 vehicles per hour for two lanes, and

c) The total entering volume during the hour meets or exceeds 650 vehicles per hour for intersections with three approaches or 800 vehicles per hour for intersections with four or more approaches.

Figure 2: 2026 Build Conditions Warrant 3

Time	Major Street (vph)	Minor Street+ (vph)
7:00 AM to 8:00 AM	2474	336
4:30 PM to 8:00 AM	2968	352



As shown in Figure 2, both AM and PM peak hours fall above the curve for the geometric combination of 2 or more lanes on both the major and minor roadways.

Warrant 3 is satisfied.

Warrant 4 – Pedestrian Volume

Warrant 4, Pedestrian Volume, is intended for use at locations where the volume of traffic on the major street is so heavy that pedestrians experience significant delay or conflict when attempting to cross the major street. Warrant 4 is satisfied when "the pedestrian volume crossing the major street at an intersection during an average day is: 100 or more for each of any four hours; or 190 or more during any one hour."

Currently, there are no existing pedestrian sidewalks in the area of the study. It is not expected that the development will generate the pedestrian volumes levels required to satisfy the warrant due to the rural nature of the surrounding area.

Warrant 4 is not satisfied.

Warrant 5 – School Crossing

Warrant 5, School Crossing, is intended for use at locations “where the fact that school children cross the major street is the principal reason to consider installing a traffic control signal.” For the purposes of this warrant, the word "schoolchildren" includes elementary through high school students.

Warrant 5 is not applicable because there are no school crossings near the subject intersection.

Warrant 5 is not satisfied.

Warrant 6 – Coordinated Signal System

Warrant 6, Coordinated Signal System, is satisfied when “on a two-way street, adjacent signals do not provide the necessary degree of platooning and speed control and the proposed and adjacent signals could constitute a progressive signal system.”

A signal at Proposed Main Entrance would not help traffic platooning since the signal located at Turner Road is not coordinated.

Warrant 6 is not satisfied.

Warrant 7 – Crash Experience

Warrant 7, Crash Experience, is intended for use at locations where “the severity and frequency of crashes are the principal reasons to consider installing a traffic control signal.” A traffic signal is warranted based on Warrant 7 if the following criteria are met:

a) Adequate trial of alternatives with satisfactory observance and enforcement has failed to reduce the crash frequency; and
b) Five or more reported crashes, of types susceptible to correction by a traffic signal, have occurred within a 12-month period, each crash involving personal injury or property damage exceeding the applicable requirements for a reportable crash.

Due to the lack of crash data, we were unable to evaluate the severity and frequency of crashes at the intersection.

Warrant 7 is not satisfied.

Warrant 8 – Roadway Network

Warrant 8, Roadway Network, is intended when the proposed traffic signal will encourage concentration and traffic flow organization on a given roadway network. This Warrant is intended for location where two major routes meet or where traffic volumes exceed 1000 vehicles per hour.

Warrant 8 is not applicable because the minor street is an entrance into the development and is not a major roadway.

Warrant 8 is not satisfied.

Warrant 9 – Intersection Near a Grade Crossing

Warrant 9, Intersection Near a Grade Crossing, is intended for "use at a location where none of the conditions described in the other eight traffic signal warrants are met, but the proximity to the intersection of a grade crossing on an intersection approach controlled by a STOP or YIELD sign is the principal reason to consider installing a traffic control signal."

Warrant 9 is not applicable.

Warrant 9 is not satisfied.

Conclusions

Warrant Analysis Conclusions

This engineering study examined traffic signal warrants at the intersection of US 257/Rt 10 (Benns Church Boulevard) and the Proposed Main entrance. The analysis showed that the traffic volume warrants (Warrants 1, 2 and 3) are met at the 70% and 100% thresholds defined by the MUTCD. The warrant is based on projected traffic volumes as well as volumes generated by the development, calculated based on available traffic data from 10th edition of ITE Trip Generation Manual.

APPENDIX I

2026 Build Synchro Reports

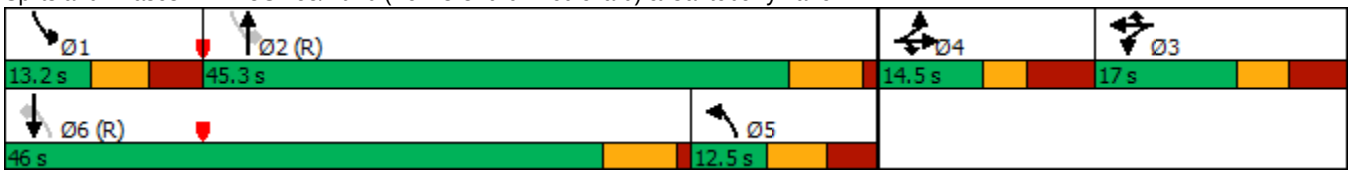
1: US 258/Rt 10 (Benns Church Boulevard) & Canteberry Lane

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	1	19	108	5	43	15	868	71	55	1201	36
Future Volume (vph)	26	1	19	108	5	43	15	868	71	55	1201	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	200		350	275		325
Storage Lanes	0		1	0		1	1		1	1		1
Taper Length (ft)	25			25			125			225		
Satd. Flow (prot)	0	1813	1615	0	1778	1553	1805	3539	1583	1687	3505	1615
Flt Permitted		0.954			0.954		0.120			0.223		
Satd. Flow (perm)	0	1813	1615	0	1778	1553	228	3539	1583	396	3505	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			309			309			236			236
Link Speed (mph)		25			25			45			45	
Link Distance (ft)		335			1232			773			1937	
Travel Time (s)		9.1			33.6			11.7			29.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	2%	0%	4%	0%	2%	2%	7%	3%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	29	21	0	122	47	16	943	77	60	1305	39
Turn Type	Split	NA	Prot	Split	NA	Prot	D.P+P	NA	Perm	D.P+P	NA	Perm
Protected Phases	4	4	4	3	3	3	5	2		1	6	
Permitted Phases							6		2	2		6
Detector Phase	4	4	4	3	3	3	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	5.0	15.0	15.0	5.0	15.0	15.0
Minimum Split (s)	14.5	14.5	14.5	14.5	14.5	14.5	12.5	21.0	21.0	12.5	21.0	21.0
Total Split (s)	14.5	14.5	14.5	17.0	17.0	17.0	12.5	45.3	45.3	13.2	46.0	46.0
Total Split (%)	16.1%	16.1%	16.1%	18.9%	18.9%	18.9%	13.9%	50.3%	50.3%	14.7%	51.1%	51.1%
Maximum Green (s)	7.0	7.0	7.0	9.5	9.5	9.5	5.0	39.3	39.3	5.7	40.0	40.0
Yellow Time (s)	3.0	3.0	3.0	3.5	3.5	3.5	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	4.5	4.5	4.5	4.0	4.0	4.0	3.5	1.0	1.0	3.5	1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		7.5	7.5		7.5	7.5	7.5	6.0	6.0	7.5	6.0	6.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lag	Lag	Lag	Lag	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	2.0	6.0	6.0	2.0	6.0	6.0
Minimum Gap (s)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	3.5	3.5	0.2	3.5	3.5
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	20.0	0.0	20.0	20.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0	15.0	0.0	15.0	15.0
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)		7.0	7.0		9.1	9.1	59.5	48.3	48.3	51.2	56.2	56.2
Actuated g/C Ratio		0.08	0.08		0.10	0.10	0.66	0.54	0.54	0.57	0.62	0.62
v/c Ratio		0.21	0.05		0.69	0.11	0.07	0.50	0.08	0.20	0.60	0.04
Control Delay		42.7	0.3		59.3	0.5	6.7	11.3	0.2	10.2	14.2	0.1
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		42.7	0.3		59.3	0.5	6.7	11.3	0.2	10.2	14.2	0.1
LOS		D	A		E	A	A	B	A	B	B	A
Approach Delay		24.9			43.0			10.4			13.7	
Approach LOS		C			D			B			B	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)		16	0		68	0	3	232	0	14	239	0
Queue Length 95th (ft)		43	0		#142	0	8	88	0	32	428	0
Internal Link Dist (ft)		255			1152			693			1857	
Turn Bay Length (ft)							200		350	275		325
Base Capacity (vph)		141	410		187	440	238	1900	959	308	2190	1097
Starvation Cap Reductn		0	0		0	0	0	0	0	0	0	0
Spillback Cap Reductn		0	0		0	0	0	0	0	0	0	0
Storage Cap Reductn		0	0		0	0	0	0	0	0	0	0
Reduced v/c Ratio		0.21	0.05		0.65	0.11	0.07	0.50	0.08	0.19	0.60	0.04

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 50 (56%), Referenced to phase 2:NBSB and 6:NBSB, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.69			
Intersection Signal Delay: 14.5		Intersection LOS: B	
Intersection Capacity Utilization 67.8%		ICU Level of Service C	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 1: US 258/Rt 10 (Benns Church Boulevard) & Canteberry Lane

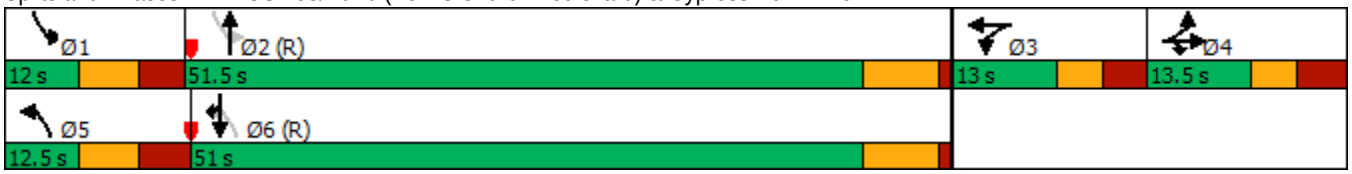


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	0	20	0	0	0	31	804	0	2	1459	32
Future Volume (vph)	5	0	20	0	0	0	31	804	0	2	1459	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	250		0	150		235
Storage Lanes	0		1	0		0	1		0	1		1
Taper Length (ft)	25			25			150			125		
Satd. Flow (prot)	0	1787	1599	0	1900	0	1805	3539	0	1805	3505	1615
Flt Permitted		0.950					0.118			0.315		
Satd. Flow (perm)	0	1787	1599	0	1900	0	224	3539	0	598	3505	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			194									200
Link Speed (mph)		15			25			45			45	
Link Distance (ft)		1905			1451			1986			773	
Travel Time (s)		86.6			39.6			30.1			11.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	1%	0%	0%	0%	0%	2%	0%	0%	3%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	5	22	0	0	0	34	874	0	2	1586	35
Turn Type	Split	NA	Prot				D.P+P	NA		D.P+P	NA	Prot
Protected Phases	4	4	4	3	3		5	2		1	6	6
Permitted Phases							6			2		
Detector Phase	4	4	4	3	3		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		5.0	14.0		5.0	14.0	14.0
Minimum Split (s)	13.5	13.5	13.5	13.0	13.0		12.5	20.0		12.0	20.0	20.0
Total Split (s)	13.5	13.5	13.5	13.0	13.0		12.5	51.5		12.0	51.0	51.0
Total Split (%)	15.0%	15.0%	15.0%	14.4%	14.4%		13.9%	57.2%		13.3%	56.7%	56.7%
Maximum Green (s)	7.0	7.0	7.0	7.0	7.0		5.0	45.5		5.0	45.0	45.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		4.0	5.0		4.0	5.0	5.0
All-Red Time (s)	3.5	3.5	3.5	3.0	3.0		3.5	1.0		3.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		6.5	6.5		6.0		7.5	6.0		7.0	6.0	6.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		2.0	5.0		2.0	5.0	5.0
Minimum Gap (s)	0.2	0.2	0.2	0.2	0.2		0.2	3.5		0.2	3.5	3.5
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0		0.0	18.0		0.0	18.0	18.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0		0.0	15.0		0.0	15.0	15.0
Recall Mode	None	None	None	None	None		None	C-Min		None	C-Min	C-Min
Act Effct Green (s)		7.0	7.0				72.6	79.8		76.2	73.5	73.5
Actuated g/C Ratio		0.08	0.08				0.81	0.89		0.85	0.82	0.82
v/c Ratio		0.04	0.07				0.13	0.28		0.00	0.55	0.03
Control Delay		39.2	0.5				2.8	1.9		0.5	2.0	0.0
Queue Delay		0.0	0.0				0.0	0.0		0.0	0.0	0.0
Total Delay		39.2	0.5				2.8	1.9		0.5	2.0	0.0
LOS		D	A				A	A		A	A	A
Approach Delay		7.6						1.9			1.9	
Approach LOS		A						A			A	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)		3	0				1	0		0	9	0
Queue Length 95th (ft)		14	0				m7	m47		m0	63	m0
Internal Link Dist (ft)		1825			1371			1906			693	
Turn Bay Length (ft)							250			150		235
Base Capacity (vph)		138	303				268	3138		573	2862	1355
Starvation Cap Reductn		0	0				0	0		0	0	0
Spillback Cap Reductn		0	0				0	0		0	0	0
Storage Cap Reductn		0	0				0	0		0	0	0
Reduced v/c Ratio		0.04	0.07				0.13	0.28		0.00	0.55	0.03

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 54 (60%), Referenced to phase 2:NBSB and 6:NBSB, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.55			
Intersection Signal Delay: 2.0		Intersection LOS: A	
Intersection Capacity Utilization 56.6%		ICU Level of Service B	
Analysis Period (min) 15			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 2: US 258/Rt 10 (Benns Church Boulevard) & Cypress Run Drive

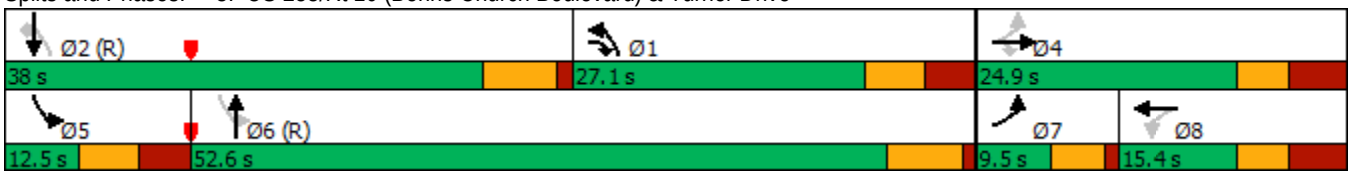


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	193	1	302	1	72	1	276	725	70	7	993	324
Future Volume (vph)	193	1	302	1	72	1	276	725	70	7	993	324
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		300	0		0	125		0	125		275
Storage Lanes	0		1	0		0	1		0	1		1
Taper Length (ft)	200			25			100			100		
Satd. Flow (prot)	0	1793	1599	0	1894	0	1687	3499	0	1805	3505	1482
Flt Permitted		0.669			0.995		0.138			0.281		
Satd. Flow (perm)	0	1259	1599	0	1887	0	245	3499	0	534	3505	1482
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			127		1			17				352
Link Speed (mph)		40			25			45			45	
Link Distance (ft)		1499			695			1153			1986	
Travel Time (s)		25.6			19.0			17.5			30.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	1%	0%	0%	0%	7%	2%	0%	0%	3%	9%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	211	328	0	80	0	300	864	0	8	1079	352
Turn Type	pm+pt	NA	pm+ov	Perm	NA		D.P+P	NA		D.P+P	NA	Perm
Protected Phases	7	4	1		8		1	6		5	2	
Permitted Phases	4		4	8			2			6		2
Detector Phase	7	4	1	8	8		1	6		5	2	2
Switch Phase												
Minimum Initial (s)	5.0	7.0	5.0	7.0	7.0		5.0	15.0		5.0	15.0	15.0
Minimum Split (s)	9.5	15.0	12.5	14.5	14.5		12.5	21.0		12.5	21.0	21.0
Total Split (s)	9.5	24.9	27.1	15.4	15.4		27.1	52.6		12.5	38.0	38.0
Total Split (%)	10.6%	27.7%	30.1%	17.1%	17.1%		30.1%	58.4%		13.9%	42.2%	42.2%
Maximum Green (s)	5.0	17.4	19.6	7.9	7.9		19.6	46.6		5.0	32.0	32.0
Yellow Time (s)	3.5	3.5	4.0	3.5	3.5		4.0	5.0		4.0	5.0	5.0
All-Red Time (s)	1.0	4.0	3.5	4.0	4.0		3.5	1.0		3.5	1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		7.5	7.5		7.5		7.5	6.0		7.5	6.0	6.0
Lead/Lag	Lead		Lag	Lag	Lag		Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	Yes		Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	5.0	4.0	3.0	3.0		4.0	6.0		2.0	6.0	6.0
Minimum Gap (s)	3.0	3.5	0.2	0.2	0.2		0.2	3.5		0.2	3.5	3.5
Time Before Reduce (s)	0.0	20.0	0.0	0.0	0.0		0.0	20.0		0.0	20.0	20.0
Time To Reduce (s)	0.0	10.0	0.0	0.0	0.0		0.0	15.0		0.0	15.0	15.0
Recall Mode	None	None	None	None	None		None	C-Min		None	C-Min	C-Min
Act Effct Green (s)		17.4	41.6		15.3		50.1	56.6		56.1	34.9	34.9
Actuated g/C Ratio		0.19	0.46		0.17		0.56	0.63		0.62	0.39	0.39
v/c Ratio		0.87	0.41		0.25		0.74	0.39		0.02	0.79	0.45
Control Delay		69.3	10.5		32.7		26.8	3.7		3.7	21.0	4.3
Queue Delay		0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		69.3	10.5		32.7		26.8	3.7		3.7	21.0	4.3
LOS		E	B		C		C	A		A	C	A
Approach Delay		33.5			32.7			9.7			16.8	
Approach LOS		C			C			A			B	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)		117	65		38		101	7		2	297	39
Queue Length 95th (ft)		#244	123		78		160	80		m2	#324	44
Internal Link Dist (ft)		1419			615			1073			1906	
Turn Bay Length (ft)			300				125			125		275
Base Capacity (vph)		243	776		325		458	2206		403	1360	790
Starvation Cap Reductn		0	0		0		0	0		0	0	0
Spillback Cap Reductn		0	0		0		0	0		0	0	0
Storage Cap Reductn		0	0		0		0	0		0	0	0
Reduced v/c Ratio		0.87	0.42		0.25		0.66	0.39		0.02	0.79	0.45

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 10 (11%), Referenced to phase 2:NBSB and 6:NBSB, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.87			
Intersection Signal Delay: 17.4		Intersection LOS: B	
Intersection Capacity Utilization 77.7%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 3: US 258/Rt 10 (Benns Church Boulevard) & Turner Drive

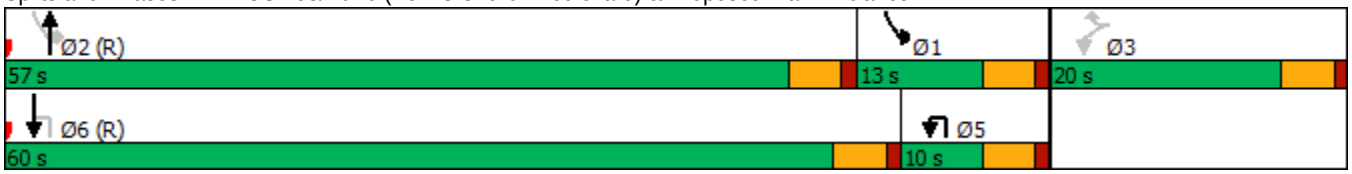


Lane Group	WBL	WBR	NBU	NBT	NBR	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	267	132	16	1026	92	95	1245
Future Volume (vph)	267	132	16	1026	92	95	1245
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	125		300	300	
Storage Lanes	2	1	1		1	1	
Taper Length (ft)	25		25			200	
Satd. Flow (prot)	3502	1615	1805	3505	1615	1805	3539
Flt Permitted	0.950		0.155			0.200	
Satd. Flow (perm)	3502	1615	294	3505	1615	380	3539
Right Turn on Red		Yes			Yes		
Satd. Flow (RTOR)		143			100		
Link Speed (mph)	25			45			45
Link Distance (ft)	872			696			1153
Travel Time (s)	23.8			10.5			17.5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	3%	0%	0%	2%
Shared Lane Traffic (%)							
Lane Group Flow (vph)	290	143	17	1115	100	103	1353
Turn Type	Perm	Perm	D.P+P	NA	Perm	D.P+P	NA
Protected Phases			5	2		1	6
Permitted Phases	3	3	6		2	2	
Detector Phase	3	3	5	2	2	1	6
Switch Phase							
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	9.5	9.5	22.5	22.5	9.5	22.5
Total Split (s)	20.0	20.0	10.0	57.0	57.0	13.0	60.0
Total Split (%)	22.2%	22.2%	11.1%	63.3%	63.3%	14.4%	66.7%
Maximum Green (s)	15.5	15.5	5.5	52.5	52.5	8.5	55.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag			Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?			Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	C-Min	C-Min	None	C-Min
Walk Time (s)				7.0	7.0		7.0
Flash Dont Walk (s)				11.0	11.0		11.0
Pedestrian Calls (#/hr)				0	0		0
Act Effct Green (s)	12.7	12.7	67.6	58.5	58.5	65.8	64.3
Actuated g/C Ratio	0.14	0.14	0.75	0.65	0.65	0.73	0.71
v/c Ratio	0.59	0.41	0.05	0.49	0.09	0.26	0.54
Control Delay	40.9	9.8	4.1	10.3	2.2	2.9	3.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.9	9.8	4.1	10.3	2.2	2.9	3.3
LOS	D	A	A	B	A	A	A
Approach Delay	30.6			9.5			3.3
Approach LOS	C			A			A

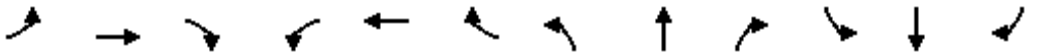
Lane Group	WBL	WBR	NBU	NBT	NBR	SBL	SBT
Queue Length 50th (ft)	80	0	2	155	0	7	54
Queue Length 95th (ft)	115	49	7	261	21	m5	71
Internal Link Dist (ft)	792			616			1073
Turn Bay Length (ft)			125		300	300	
Base Capacity (vph)	608	398	313	2297	1092	428	2533
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.36	0.05	0.49	0.09	0.24	0.53

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 12 (13%), Referenced to phase 2:NBSB and 6:NBSB, Start of Green			
Natural Cycle: 55			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.59			
Intersection Signal Delay: 9.5		Intersection LOS: A	
Intersection Capacity Utilization 57.4%		ICU Level of Service B	
Analysis Period (min) 15			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 4: US 258/Rt 10 (Benns Church Boulevard) & Proposed Main Entrance



5: US 258/Rt 10 (Benns Church Boulevard) & 258/Rt 32 (Brewers Neck Boulevard)



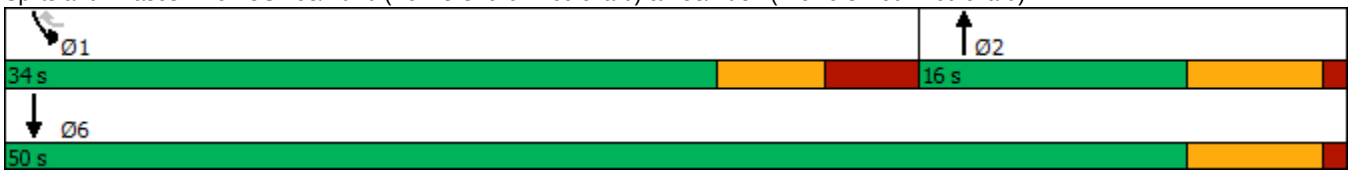
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	810	0	215	0	1192	313	0
Future Volume (vph)	0	0	0	0	0	810	0	215	0	1192	313	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		0	300		0
Storage Lanes	0		0	0		2	0		0	1		0
Taper Length (ft)	25			25			100			75		
Satd. Flow (prot)	0	0	0	0	0	2760	0	3471	0	3400	3471	0
Flt Permitted										0.950		
Satd. Flow (perm)	0	0	0	0	0	2760	0	3471	0	3400	3471	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						417						
Link Speed (mph)		30			45			45			45	
Link Distance (ft)		963			1126			2837			3270	
Travel Time (s)		21.9			17.1			43.0			49.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	3%	0%	4%	0%	3%	4%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	880	0	234	0	1296	340	0
Turn Type						Perm		NA		Prot	NA	
Protected Phases								2		1	6	
Permitted Phases						1						
Detector Phase						1		2		1	6	
Switch Phase												
Minimum Initial (s)						15.0		10.0		15.0	15.0	
Minimum Split (s)						22.5		16.0		22.5	21.0	
Total Split (s)						34.0		16.0		34.0	50.0	
Total Split (%)						68.0%		32.0%		68.0%	100.0%	
Maximum Green (s)						26.5		10.0		26.5	44.0	
Yellow Time (s)						4.0		5.0		4.0	5.0	
All-Red Time (s)						3.5		1.0		3.5	1.0	
Lost Time Adjust (s)						0.0		0.0		0.0	0.0	
Total Lost Time (s)						7.5		6.0		7.5	6.0	
Lead/Lag						Lead		Lag		Lead		
Lead-Lag Optimize?						Yes		Yes		Yes		
Vehicle Extension (s)						3.5		2.5		3.5	5.0	
Recall Mode						Min		Max		Min	Min	
Act Effct Green (s)						25.2		10.0		25.2	48.8	
Actuated g/C Ratio						0.52		0.20		0.52	1.00	
v/c Ratio						0.54		0.33		0.74	0.10	
Control Delay						5.2		18.6		12.2	0.1	
Queue Delay						0.0		0.0		0.0	0.0	
Total Delay						5.2		18.6		12.2	0.1	
LOS						A		B		B	A	
Approach Delay					5.2			18.6			9.7	
Approach LOS					A			B			A	
Queue Length 50th (ft)						38		31		131	0	
Queue Length 95th (ft)						72		56		193	0	
Internal Link Dist (ft)		883			1046			2757			3190	

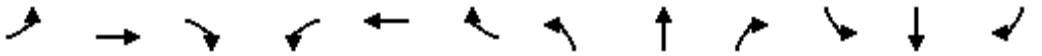
5: US 258/Rt 10 (Benns Church Boulevard) & 258/Rt 32 (Brewers Neck Boulevard)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)										300		
Base Capacity (vph)						1693		713		1852	3471	
Starvation Cap Reductn						0		0		0	0	
Spillback Cap Reductn						0		0		0	0	
Storage Cap Reductn						0		0		0	0	
Reduced v/c Ratio						0.52		0.33		0.70	0.10	

Intersection Summary			
Area Type:	Other		
Cycle Length: 50			
Actuated Cycle Length: 48.8			
Natural Cycle: 50			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.74			
Intersection Signal Delay: 9.0		Intersection LOS: A	
Intersection Capacity Utilization 52.3%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 5: US 258/Rt 10 (Benns Church Boulevard) & 258/Rt 32 (Brewers Neck Boulevard)





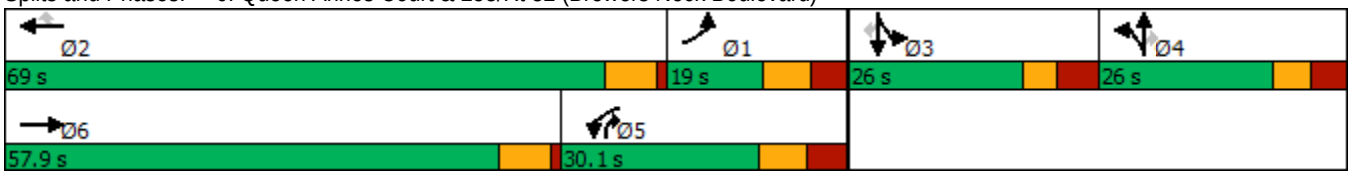
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	1171	0	243	783	3	0	1	433	7	3	12
Future Volume (vph)	7	1171	0	243	783	3	0	1	433	7	3	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		0	600		325	0		350	0		0
Storage Lanes	1		0	1		1	0		2	0		1
Taper Length (ft)	200			200			25			25		
Satd. Flow (prot)	1805	3539	0	1787	3539	1380	0	1900	2787	0	1716	1380
Flt Permitted	0.950			0.950							0.965	
Satd. Flow (perm)	1805	3539	0	1787	3539	1380	0	1900	2787	0	1716	1380
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						175			471			214
Link Speed (mph)		45			45			45			25	
Link Distance (ft)		1126			846			914			623	
Travel Time (s)		17.1			12.8			13.8			17.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	0%	1%	2%	17%	0%	0%	2%	0%	25%	17%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	8	1273	0	264	851	3	0	1	471	0	11	13
Turn Type	Prot	NA		Prot	NA	Perm		NA	pm+ov	Split	NA	Perm
Protected Phases	1	6		5	2		4	4	5	3	3	
Permitted Phases						2			4			3
Detector Phase	1	6		5	2	2	4	4	5	3	3	3
Switch Phase												
Minimum Initial (s)	10.0	15.0		10.0	15.0	15.0	10.0	10.0	10.0	5.0	5.0	5.0
Minimum Split (s)	19.0	24.5		19.5	24.5	24.5	26.0	26.0	19.5	26.0	26.0	26.0
Total Split (s)	19.0	57.9		30.1	69.0	69.0	26.0	26.0	30.1	26.0	26.0	26.0
Total Split (%)	13.6%	41.4%		21.5%	49.3%	49.3%	18.6%	18.6%	21.5%	18.6%	18.6%	18.6%
Maximum Green (s)	10.0	51.4		20.6	62.5	62.5	18.0	18.0	20.6	18.0	18.0	18.0
Yellow Time (s)	5.0	5.5		5.0	5.5	5.5	4.0	4.0	5.0	3.5	3.5	3.5
All-Red Time (s)	4.0	1.0		4.5	1.0	1.0	4.0	4.0	4.5	4.5	4.5	4.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	9.0	6.5		9.5	6.5	6.5		8.0	9.5		8.0	8.0
Lead/Lag	Lag	Lead		Lag	Lead	Lead	Lag	Lag	Lag	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	5.0		3.0	5.0	5.0	3.5	3.5	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	Max	Max	None	None	None	None	None	None
Act Effct Green (s)	10.3	48.4		21.2	80.9	80.9		10.3	22.5		6.3	6.3
Actuated g/C Ratio	0.11	0.52		0.23	0.86	0.86		0.11	0.24		0.07	0.07
v/c Ratio	0.04	0.70		0.66	0.28	0.00		0.00	0.46		0.10	0.04
Control Delay	46.7	21.9		45.6	6.1	0.0		47.0	4.0		50.6	0.2
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	46.7	21.9		45.6	6.1	0.0		47.0	4.0		50.6	0.2
LOS	D	C		D	A	A		D	A		D	A
Approach Delay		22.1			15.4			4.0			23.3	
Approach LOS		C			B			A			C	
Queue Length 50th (ft)	4	222		132	0	0		1	0		6	0
Queue Length 95th (ft)	22	565		#354	271	0		7	32		28	0
Internal Link Dist (ft)		1046			766			834			543	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	225			600		325			350			
Base Capacity (vph)	197	1993		403	3049	1213		374	1026		338	443
Starvation Cap Reductn	0	0		0	0	0		0	0		0	0
Spillback Cap Reductn	0	0		0	0	0		0	0		0	0
Storage Cap Reductn	0	0		0	0	0		0	0		0	0
Reduced v/c Ratio	0.04	0.64		0.66	0.28	0.00		0.00	0.46		0.03	0.03

Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 93.9			
Natural Cycle: 140			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.70			
Intersection Signal Delay: 16.6		Intersection LOS: B	
Intersection Capacity Utilization 74.2%		ICU Level of Service D	
Analysis Period (min) 15			

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 6: Queen Annes Court & 258/Rt 32 (Brewers Neck Boulevard)



Intersection	
Int Delay, s/veh	0.2

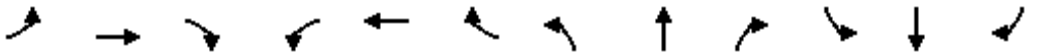
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	0	0	33	0	1101	37	0	1528	0
Future Vol, veh/h	0	0	0	0	0	33	0	1101	37	0	1528	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	-	-	300	-	-	-
Veh in Median Storage, #	-	-	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	0	0	36	0	1197	40	0	1661	0

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	-	-	599	-	0	0	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.94	-	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.32	-	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	445	0	-	-	0	-	0
Stage 1	0	0	-	0	-	-	0	-	0
Stage 2	0	0	-	0	-	-	0	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	-	0	445	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	0	-	-	-	-	-	-	-
Stage 1	-	0	-	-	-	-	-	-	-
Stage 2	-	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.8	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	445	-
HCM Lane V/C Ratio	-	-	0.081	-
HCM Control Delay (s)	-	-	13.8	-
HCM Lane LOS	-	-	B	-
HCM 95th %tile Q(veh)	-	-	0.3	-

1: US 258/Rt 10 (Benns Church Boulevard) & Canteberry Lane



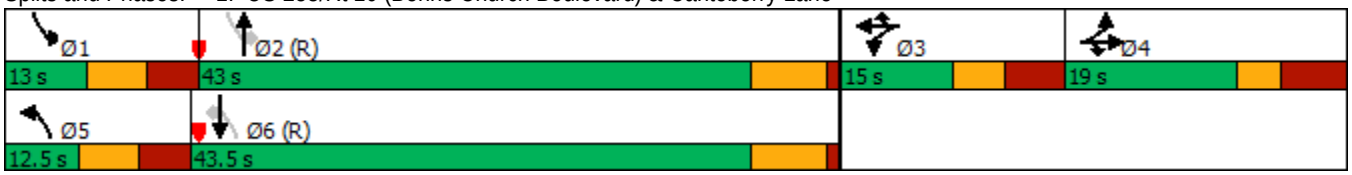
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	143	6	45	87	9	80	52	1312	134	133	1193	99
Future Volume (vph)	143	6	45	87	9	80	52	1312	134	133	1193	99
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	200		350	275		325
Storage Lanes	0		1	0		1	1		1	1		1
Taper Length (ft)	25			25			125			225		
Satd. Flow (prot)	0	1813	1615	0	1786	1553	1805	3539	1583	1687	3505	1615
Flt Permitted		0.954			0.957		0.102			0.106		
Satd. Flow (perm)	0	1813	1615	0	1786	1553	194	3539	1583	188	3505	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			218			218			236			236
Link Speed (mph)		25			25			45			45	
Link Distance (ft)		335			1232			773			1937	
Travel Time (s)		9.1			33.6			11.7			29.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	2%	0%	4%	0%	2%	2%	7%	3%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	162	49	0	105	87	57	1426	146	145	1297	108
Turn Type	Split	NA	Prot	Split	NA	Prot	D.P+P	NA	Perm	D.P+P	NA	Perm
Protected Phases	4	4	4	3	3	3	5	2		1	6	
Permitted Phases							6		2	2		6
Detector Phase	4	4	4	3	3	3	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	5.0	15.0	15.0	5.0	15.0	15.0
Minimum Split (s)	14.5	14.5	14.5	14.5	14.5	14.5	12.5	21.0	21.0	12.5	21.0	21.0
Total Split (s)	19.0	19.0	19.0	15.0	15.0	15.0	12.5	43.0	43.0	13.0	43.5	43.5
Total Split (%)	21.1%	21.1%	21.1%	16.7%	16.7%	16.7%	13.9%	47.8%	47.8%	14.4%	48.3%	48.3%
Yellow Time (s)	3.0	3.0	3.0	3.5	3.5	3.5	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	4.5	4.5	4.5	4.0	4.0	4.0	3.5	1.0	1.0	3.5	1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		7.5	7.5		7.5	7.5	7.5	6.0	6.0	7.5	6.0	6.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)		10.9	10.9		7.4	7.4	43.2	37.7	37.7	41.7	40.7	40.7
Actuated g/C Ratio		0.12	0.12		0.08	0.08	0.48	0.42	0.42	0.46	0.45	0.45
v/c Ratio		0.74	0.13		0.72	0.27	0.31	0.96	0.18	0.81	0.82	0.13
Control Delay		58.8	0.7		68.2	2.0	15.2	37.3	1.0	50.4	28.2	0.3
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		58.8	0.7		68.2	2.0	15.2	37.3	1.0	50.4	28.2	0.3
LOS		E	A		E	A	B	D	A	D	C	A
Approach Delay		45.3			38.2			33.3			28.4	
Approach LOS		D			D			C			C	
Queue Length 50th (ft)		90	0		59	0	11	418	0	39	350	0
Queue Length 95th (ft)		#178	0		#139	0	m23	#556	m3	#140	#487	0
Internal Link Dist (ft)		255			1152			693			1857	
Turn Bay Length (ft)							200		350	275		325
Base Capacity (vph)		231	396		148	329	182	1480	799	178	1583	858

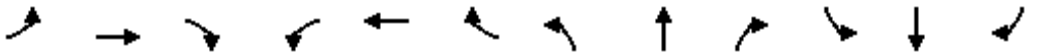
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn		0	0		0	0	0	0	0	0	0	0
Spillback Cap Reductn		0	0		0	0	0	0	0	0	0	0
Storage Cap Reductn		0	0		0	0	0	0	0	0	0	0
Reduced v/c Ratio		0.70	0.12		0.71	0.26	0.31	0.96	0.18	0.81	0.82	0.13

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 55 (61%), Referenced to phase 2:NBSB and 6:NBSB, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.96			
Intersection Signal Delay: 32.1		Intersection LOS: C	
Intersection Capacity Utilization 76.0%		ICU Level of Service D	
Analysis Period (min) 15			

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: US 258/Rt 10 (Benns Church Boulevard) & Canteberry Lane





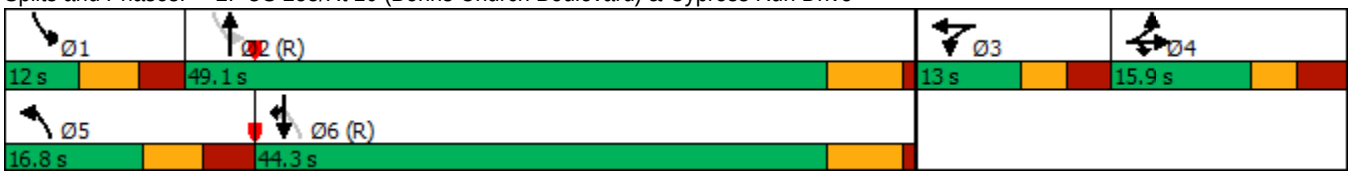
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	116	0	83	0	0	1	172	1381	0	0	1188	134
Future Volume (vph)	116	0	83	0	0	1	172	1381	0	0	1188	134
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	250		0	150		235
Storage Lanes	0		1	0		0	1		0	1		1
Taper Length (ft)	25			25			150			125		
Satd. Flow (prot)	0	1787	1599	0	1644	0	1805	3539	0	1900	3505	1615
Flt Permitted		0.950					0.114					
Satd. Flow (perm)	0	1787	1599	0	1644	0	217	3539	0	1900	3505	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			194		200							200
Link Speed (mph)		15			25			45			45	
Link Distance (ft)		1905			1451			1986			773	
Travel Time (s)		86.6			39.6			30.1			11.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	1%	0%	0%	0%	0%	2%	0%	0%	3%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	126	90	0	1	0	187	1501	0	0	1291	146
Turn Type	Split	NA	Prot		NA		D.P+P	NA		D.P+P	NA	Prot
Protected Phases	4	4	4	3	3		5	2		1	6	6
Permitted Phases							6			2		
Detector Phase	4	4	4	3	3		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		5.0	14.0		5.0	14.0	14.0
Minimum Split (s)	13.5	13.5	13.5	13.0	13.0		12.5	20.0		12.0	20.0	20.0
Total Split (s)	15.9	15.9	15.9	13.0	13.0		16.8	49.1		12.0	44.3	44.3
Total Split (%)	17.7%	17.7%	17.7%	14.4%	14.4%		18.7%	54.6%		13.3%	49.2%	49.2%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		4.0	5.0		4.0	5.0	5.0
All-Red Time (s)	3.5	3.5	3.5	3.0	3.0		3.5	1.0		3.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		6.5	6.5		6.0		7.5	6.0		7.0	6.0	6.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		None	C-Min		None	C-Min	C-Min
Act Effct Green (s)		9.0	9.0		7.0		56.9	65.9			50.0	50.0
Actuated g/C Ratio		0.10	0.10		0.08		0.63	0.73			0.56	0.56
v/c Ratio		0.71	0.27		0.00		0.66	0.58			0.66	0.15
Control Delay		61.3	2.0		0.0		24.1	7.6			5.6	0.2
Queue Delay		0.0	0.0		0.0		0.0	0.0			0.0	0.0
Total Delay		61.3	2.0		0.0		24.1	7.6			5.6	0.2
LOS		E	A		A		C	A			A	A
Approach Delay		36.6						9.4			5.1	
Approach LOS		D						A			A	
Queue Length 50th (ft)		70	0		0		25	152			33	0
Queue Length 95th (ft)		#150	0		0		#134	351			#44	m0
Internal Link Dist (ft)		1825			1371			1906			693	
Turn Bay Length (ft)							250					235
Base Capacity (vph)		186	340		312		303	2590			1947	986

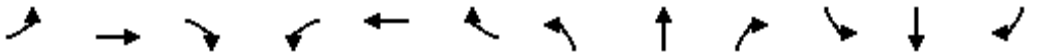
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn		0	0		0		0	0			0	0
Spillback Cap Reductn		0	0		0		0	0			0	0
Storage Cap Reductn		0	0		0		0	0			0	0
Reduced v/c Ratio		0.68	0.26		0.00		0.62	0.58			0.66	0.15

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 68 (76%), Referenced to phase 2:NBSB and 6:NBSB, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.71			
Intersection Signal Delay: 9.3		Intersection LOS: A	
Intersection Capacity Utilization 72.1%		ICU Level of Service C	
Analysis Period (min) 15			

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: US 258/Rt 10 (Benns Church Boulevard) & Cypress Run Drive



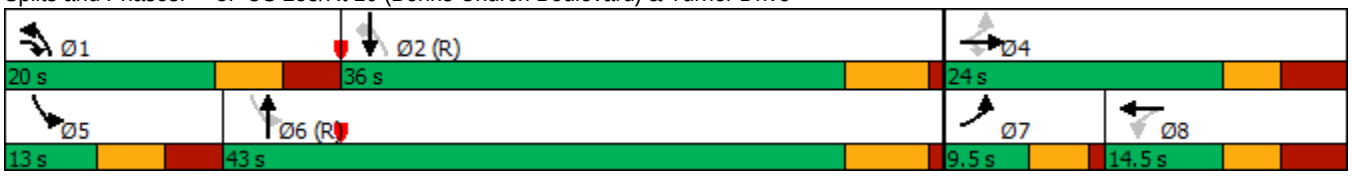


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	86	0	122	0	1	2	203	1453	1	33	1154	126
Future Volume (vph)	86	0	122	0	1	2	203	1453	1	33	1154	126
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		300	0		0	125		0	125		275
Storage Lanes	0		1	0		0	1		0	1		1
Taper Length (ft)	200			25			100			100		
Satd. Flow (prot)	0	1787	1599	0	1729	0	1687	3539	0	1805	3505	1482
Flt Permitted		0.756					0.111			0.092		
Satd. Flow (perm)	0	1422	1599	0	1729	0	197	3539	0	175	3505	1482
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			41		2							225
Link Speed (mph)		40			25			45			45	
Link Distance (ft)		1499			695			1153			1986	
Travel Time (s)		25.6			19.0			17.5			30.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	1%	0%	0%	0%	7%	2%	0%	0%	3%	9%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	93	133	0	3	0	221	1580	0	36	1254	137
Turn Type	pm+pt	NA	pm+ov		NA		D.P+P	NA		D.P+P	NA	Perm
Protected Phases	7	4	1		8		1	6		5	2	
Permitted Phases	4		4	8			2			6		2
Detector Phase	7	4	1	8	8		1	6		5	2	2
Switch Phase												
Minimum Initial (s)	5.0	7.0	5.0	7.0	7.0		5.0	15.0		5.0	15.0	15.0
Minimum Split (s)	9.5	14.5	12.5	14.5	14.5		12.5	21.0		12.5	21.0	21.0
Total Split (s)	9.5	24.0	20.0	14.5	14.5		20.0	43.0		13.0	36.0	36.0
Total Split (%)	11.9%	30.0%	25.0%	18.1%	18.1%		25.0%	53.8%		16.3%	45.0%	45.0%
Yellow Time (s)	3.5	3.5	4.0	3.5	3.5		4.0	5.0		4.0	5.0	5.0
All-Red Time (s)	1.0	4.0	3.5	4.0	4.0		3.5	1.0		3.5	1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		7.5	7.5		7.5		7.5	6.0		7.5	6.0	6.0
Lead/Lag	Lead		Lead	Lag	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes							
Recall Mode	None	None	None	None	None		None	C-Min		None	C-Min	C-Min
Act Effct Green (s)		13.9	29.1		8.9		46.8	49.3		49.8	37.4	37.4
Actuated g/C Ratio		0.17	0.36		0.11		0.58	0.62		0.62	0.47	0.47
v/c Ratio		0.38	0.22		0.02		0.69	0.73		0.17	0.77	0.17
Control Delay		32.8	10.3		22.7		28.8	19.1		8.5	25.3	0.7
Queue Delay		0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		32.8	10.3		22.7		28.8	19.1		8.5	25.3	0.7
LOS		C	B		C		C	B		A	C	A
Approach Delay		19.6			22.7			20.3			22.5	
Approach LOS		B			C			C			C	
Queue Length 50th (ft)		40	26		1		62	371		6	306	0
Queue Length 95th (ft)		82	57		7		#152	#555		17	#457	4
Internal Link Dist (ft)		1419			615			1073			1906	
Turn Bay Length (ft)			300				125			125		275
Base Capacity (vph)		293	639		194		351	2179		220	1637	812

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn		0	0		0		0	0		0	0	0
Spillback Cap Reductn		0	0		0		0	0		0	0	0
Storage Cap Reductn		0	0		0		0	0		0	0	0
Reduced v/c Ratio		0.32	0.21		0.02		0.63	0.73		0.16	0.77	0.17

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 0 (0%), Referenced to phase 2:NBSB and 6:NBSB, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.77			
Intersection Signal Delay: 21.1		Intersection LOS: C	
Intersection Capacity Utilization 73.3%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 3: US 258/Rt 10 (Benns Church Boulevard) & Turner Drive



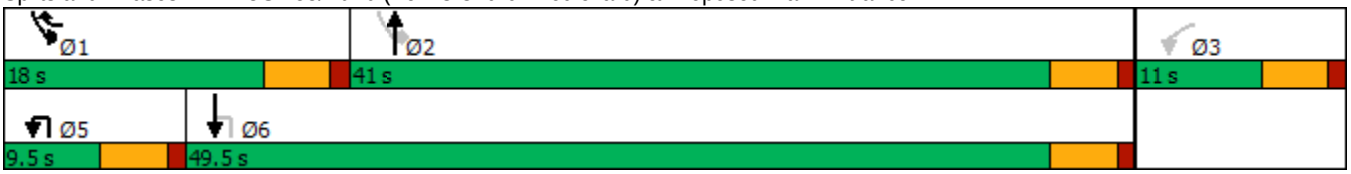
Lane Group	WBL	WBR	NBU	NBT	NBR	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	227	145	13	1503	208	231	1033
Future Volume (vph)	227	145	13	1503	208	231	1033
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	125		300	300	
Storage Lanes	2	1	1		1	1	
Taper Length (ft)	25		25			200	
Satd. Flow (prot)	3502	1615	1805	3505	1615	1805	3539
Flt Permitted	0.950		0.223			0.103	
Satd. Flow (perm)	3502	1615	424	3505	1615	196	3539
Right Turn on Red		Yes			Yes		
Satd. Flow (RTOR)		158			226		
Link Speed (mph)	25			45			45
Link Distance (ft)	872			696			1153
Travel Time (s)	23.8			10.5			17.5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	3%	0%	0%	2%
Shared Lane Traffic (%)							
Lane Group Flow (vph)	247	158	14	1634	226	251	1123
Turn Type	Perm	Over	D.P+P	NA	Perm	D.P+P	NA
Protected Phases		1	5	2		1	6
Permitted Phases	3		6		2	2	
Detector Phase	3	1	5	2	2	1	6
Switch Phase							
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	9.5	9.5	22.5	22.5	9.5	22.5
Total Split (s)	11.0	18.0	9.5	41.0	41.0	18.0	49.5
Total Split (%)	15.7%	25.7%	13.6%	58.6%	58.6%	25.7%	70.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag		Lead	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?			Yes				Yes
Recall Mode	None	None	None	Min	Min	None	Min
Act Effct Green (s)	6.5	9.9	48.6	35.0	35.0	45.0	47.7
Actuated g/C Ratio	0.10	0.15	0.75	0.54	0.54	0.69	0.73
v/c Ratio	0.70	0.42	0.03	0.87	0.23	0.66	0.43
Control Delay	42.4	8.5	2.0	20.1	2.1	20.7	4.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.4	8.5	2.0	20.1	2.1	20.7	4.4
LOS	D	A	A	C	A	C	A
Approach Delay	29.2			17.8			7.4
Approach LOS	C			B			A
Queue Length 50th (ft)	51	0	1	269	0	45	57
Queue Length 95th (ft)	#107	44	4	#476	29	113	155
Internal Link Dist (ft)	792			616			1073
Turn Bay Length (ft)			125		300	300	
Base Capacity (vph)	352	462	423	1979	1010	480	2658

Lane Group	WBL	WBR	NBU	NBT	NBR	SBL	SBT
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.70	0.34	0.03	0.83	0.22	0.52	0.42

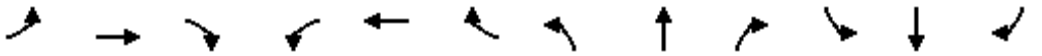
Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 65.1			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.87			
Intersection Signal Delay: 15.1		Intersection LOS: B	
Intersection Capacity Utilization 72.1%		ICU Level of Service C	
Analysis Period (min) 15			

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: US 258/Rt 10 (Benns Church Boulevard) & Proposed Main Entrance



5: US 258/Rt 10 (Benns Church Boulevard) & 258/Rt 32 (Brewers Neck Boulevard)

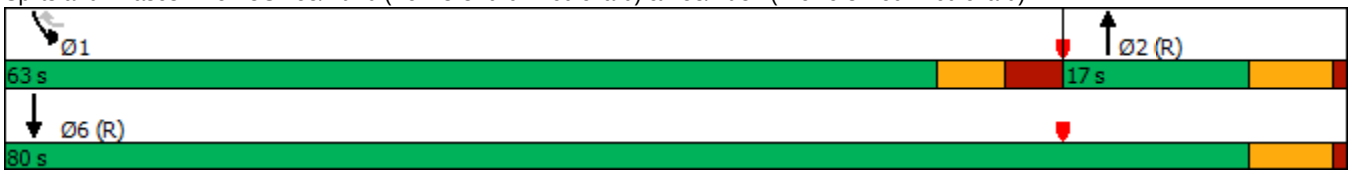


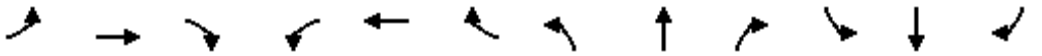
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	1562	0	249	0	876	360	0
Future Volume (vph)	0	0	0	0	0	1562	0	249	0	876	360	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		0	300		0
Storage Lanes	0		0	0		2	0		0	1		0
Taper Length (ft)	25			25			100			75		
Satd. Flow (prot)	0	0	0	0	0	2760	0	3471	0	3400	3471	0
Flt Permitted										0.950		
Satd. Flow (perm)	0	0	0	0	0	2760	0	3471	0	3400	3471	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						139						
Link Speed (mph)		30			45			45			45	
Link Distance (ft)		963			1126			2837			3270	
Travel Time (s)		21.9			17.1			43.0			49.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	3%	0%	4%	0%	3%	4%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	1698	0	271	0	952	391	0
Turn Type						Perm		NA		Prot	NA	
Protected Phases								2		1	6	
Permitted Phases						1						
Detector Phase						1		2		1	6	
Switch Phase												
Minimum Initial (s)						15.0		10.0		15.0	15.0	
Minimum Split (s)						22.5		16.0		22.5	21.0	
Total Split (s)						63.0		17.0		63.0	80.0	
Total Split (%)						78.8%		21.3%		78.8%	100.0%	
Yellow Time (s)						4.0		5.0		4.0	5.0	
All-Red Time (s)						3.5		1.0		3.5	1.0	
Lost Time Adjust (s)						0.0		0.0		0.0	0.0	
Total Lost Time (s)						7.5		6.0		7.5	6.0	
Lead/Lag						Lead		Lag		Lead		
Lead-Lag Optimize?												
Recall Mode						Min		C-Max		Min	C-Min	
Act Effct Green (s)						55.0		11.5		55.0	80.0	
Actuated g/C Ratio						0.69		0.14		0.69	1.00	
v/c Ratio						0.87		0.55		0.41	0.11	
Control Delay						15.5		36.7		6.0	0.1	
Queue Delay						0.0		0.0		0.0	0.0	
Total Delay						15.5		36.7		6.0	0.1	
LOS						B		D		A	A	
Approach Delay					15.5			36.7			4.2	
Approach LOS					B			D			A	
Queue Length 50th (ft)						286		67		87	0	
Queue Length 95th (ft)						430		106		117	0	
Internal Link Dist (ft)		883			1046			2757			3190	
Turn Bay Length (ft)										300		
Base Capacity (vph)						1957		497		2358	3471	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn						0		0		0	0	
Spillback Cap Reductn						0		0		0	0	
Storage Cap Reductn						0		0		0	0	
Reduced v/c Ratio						0.87		0.55		0.40	0.11	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.87			
Intersection Signal Delay: 12.7		Intersection LOS: B	
Intersection Capacity Utilization 74.2%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 5: US 258/Rt 10 (Benns Church Boulevard) & 258/Rt 32 (Brewers Neck Boulevard)



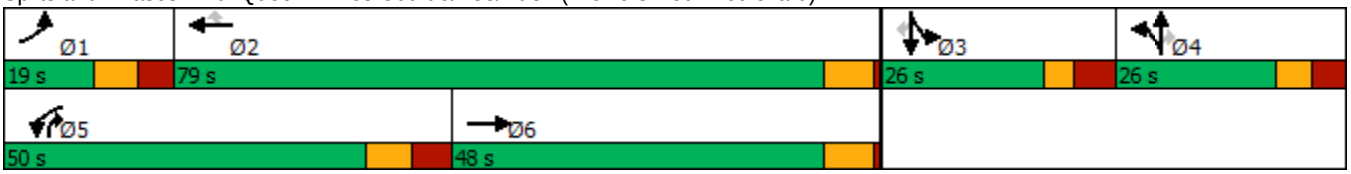


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	919	3	471	1530	14	1	3	250	2	5	7
Future Volume (vph)	9	919	3	471	1530	14	1	3	250	2	5	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		0	600		325	0		350	0		0
Storage Lanes	1		0	1		1	0		2	0		1
Taper Length (ft)	200			200			25			25		
Satd. Flow (prot)	1805	3539	0	1787	3539	1380	0	1877	2787	0	1590	1380
Flt Permitted	0.950			0.950				0.988			0.986	
Satd. Flow (perm)	1805	3539	0	1787	3539	1380	0	1877	2787	0	1590	1380
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						160			272			218
Link Speed (mph)		45			45			45			25	
Link Distance (ft)		1126			846			914			623	
Travel Time (s)		17.1			12.8			13.8			17.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	0%	1%	2%	17%	0%	0%	2%	0%	25%	17%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	10	1002	0	512	1663	15	0	4	272	0	7	8
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA	pm+ov	Split	NA	Perm
Protected Phases	1	6		5	2		4	4	5	3	3	
Permitted Phases						2			4			3
Detector Phase	1	6		5	2	2	4	4	5	3	3	3
Switch Phase												
Minimum Initial (s)	10.0	15.0		10.0	15.0	15.0	10.0	10.0	10.0	5.0	5.0	5.0
Minimum Split (s)	19.0	24.5		19.5	24.5	24.5	26.0	26.0	19.5	26.0	26.0	26.0
Total Split (s)	19.0	48.0		50.0	79.0	79.0	26.0	26.0	50.0	26.0	26.0	26.0
Total Split (%)	12.7%	32.0%		33.3%	52.7%	52.7%	17.3%	17.3%	33.3%	17.3%	17.3%	17.3%
Yellow Time (s)	5.0	5.5		5.0	5.5	5.5	4.0	4.0	5.0	3.5	3.5	3.5
All-Red Time (s)	4.0	1.0		4.5	1.0	1.0	4.0	4.0	4.5	4.5	4.5	4.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	9.0	6.5		9.5	6.5	6.5		8.0	9.5		8.0	8.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lead
Lead-Lag Optimize?												
Recall Mode	None	None		None	None	None	None	None	None	None	None	None
Act Effct Green (s)	10.1	42.1		41.1	94.0	94.0		10.1	44.0		6.1	6.1
Actuated g/C Ratio	0.09	0.39		0.38	0.87	0.87		0.09	0.41		0.06	0.06
v/c Ratio	0.06	0.72		0.75	0.54	0.01		0.02	0.21		0.08	0.03
Control Delay	51.7	33.4		39.3	8.4	0.0		51.5	3.0		55.8	0.1
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	51.7	33.4		39.3	8.4	0.0		51.5	3.0		55.8	0.1
LOS	D	C		D	A	A		D	A		E	A
Approach Delay		33.6			15.5			3.7			26.1	
Approach LOS		C			B			A			C	
Queue Length 50th (ft)	6	258		257	0	0		2	0		4	0
Queue Length 95th (ft)	27	#548		#638	718	0		15	27		23	0
Internal Link Dist (ft)		1046			766			834			543	
Turn Bay Length (ft)	225			600		325			350			
Base Capacity (vph)	170	1383		681	3090	1225		318	1300		269	415

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0	0		0	0		0	0
Spillback Cap Reductn	0	0		0	0	0		0	0		0	0
Storage Cap Reductn	0	0		0	0	0		0	0		0	0
Reduced v/c Ratio	0.06	0.72		0.75	0.54	0.01		0.01	0.21		0.03	0.02

Intersection Summary			
Area Type:	Other		
Cycle Length: 150			
Actuated Cycle Length: 107.6			
Natural Cycle: 150			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.75			
Intersection Signal Delay: 19.9		Intersection LOS: B	
Intersection Capacity Utilization 79.9%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 6: Queen Annes Court & 258/Rt 32 (Brewers Neck Boulevard)



Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	0	0	38	0	1681	116	0	1272	0
Future Vol, veh/h	0	0	0	0	0	38	0	1681	116	0	1272	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	-	-	300	-	-	-
Veh in Median Storage, #	-	-	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	0	0	41	0	1838	126	0	1383	0

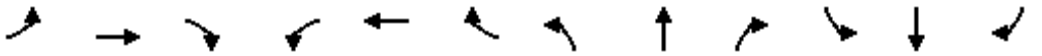
Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	-	-	919	-	0	0	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.94	-	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.32	-	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	273	0	-	-	0	-	0
Stage 1	0	0	-	0	-	-	0	-	0
Stage 2	0	0	-	0	-	-	0	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	-	0	273	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	0	-	-	-	-	-	-	-
Stage 1	-	0	-	-	-	-	-	-	-
Stage 2	-	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	20.5	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	273	-
HCM Lane V/C Ratio	-	-	0.151	-
HCM Control Delay (s)	-	-	20.5	-
HCM Lane LOS	-	-	C	-
HCM 95th %tile Q(veh)	-	-	0.5	-

APPENDIX J

2032 Build Synchro Reports

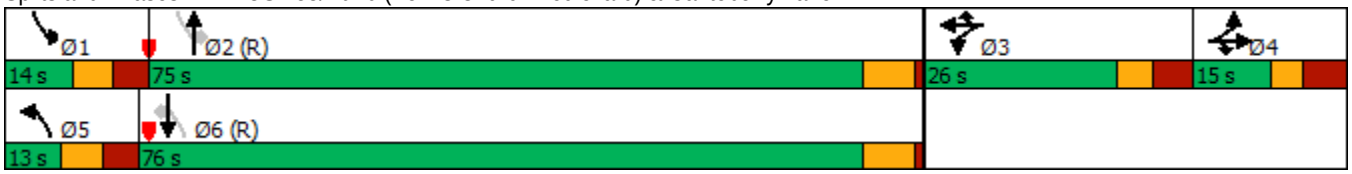


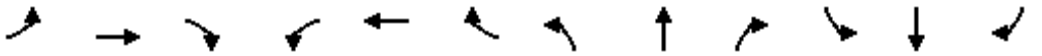
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	28	1	21	117	5	47	16	943	76	60	1309	39
Future Volume (vph)	28	1	21	117	5	47	16	943	76	60	1309	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	200		350	275		325
Storage Lanes	0		1	0		1	1		1	1		1
Taper Length (ft)	0			0			0			0		
Satd. Flow (prot)	0	1813	1615	0	1778	1553	1805	3539	1583	1687	3505	1615
Flt Permitted		0.954			0.954		0.115			0.217		
Satd. Flow (perm)	0	1813	1615	0	1778	1553	218	3539	1583	385	3505	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			151			151			164			164
Link Speed (mph)		25			25			45			45	
Link Distance (ft)		335			1232			773			1937	
Travel Time (s)		9.1			33.6			11.7			29.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	2%	0%	4%	0%	2%	2%	7%	3%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	31	23	0	132	51	17	1025	83	65	1423	42
Turn Type	Split	NA	Prot	Split	NA	Prot	D.P+P	NA	Perm	D.P+P	NA	Perm
Protected Phases	4	4	4	3	3	3	5	2		1	6	
Permitted Phases							6		2	2		6
Detector Phase	4	4	4	3	3	3	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	5.0	15.0	15.0	5.0	15.0	15.0
Minimum Split (s)	14.5	14.5	14.5	14.5	14.5	14.5	12.5	21.0	21.0	12.5	21.0	21.0
Total Split (s)	15.0	15.0	15.0	26.0	26.0	26.0	13.0	75.0	75.0	14.0	76.0	76.0
Total Split (%)	11.5%	11.5%	11.5%	20.0%	20.0%	20.0%	10.0%	57.7%	57.7%	10.8%	58.5%	58.5%
Yellow Time (s)	3.0	3.0	3.0	3.5	3.5	3.5	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	4.5	4.5	4.5	4.0	4.0	4.0	3.5	1.0	1.0	3.5	1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		7.5	7.5		7.5	7.5	7.5	6.0	6.0	7.5	6.0	6.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)		7.3	7.3		14.5	14.5	85.6	79.1	79.1	82.6	85.0	85.0
Actuated g/C Ratio		0.06	0.06		0.11	0.11	0.66	0.61	0.61	0.64	0.65	0.65
v/c Ratio		0.31	0.10		0.67	0.17	0.08	0.48	0.08	0.21	0.62	0.04
Control Delay		67.0	0.9		71.3	1.2	10.4	15.9	1.0	10.5	17.3	0.1
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		67.0	0.9		71.3	1.2	10.4	15.9	1.0	10.5	17.3	0.1
LOS		E	A		E	A	B	B	A	B	B	A
Approach Delay		38.8			51.7			14.7			16.6	
Approach LOS		D			D			B			B	
Queue Length 50th (ft)		26	0		108	0	5	257	2	18	327	0
Queue Length 95th (ft)		60	0		173	0	14	340	11	39	565	0
Internal Link Dist (ft)		255			1152			693			1857	
Turn Bay Length (ft)							200		350	275		325
Base Capacity (vph)		104	235		253	350	210	2154	1027	310	2290	1112

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn		0	0		0	0	0	0	0	0	0	0
Spillback Cap Reductn		0	0		0	0	0	0	0	0	0	0
Storage Cap Reductn		0	0		0	0	0	0	0	0	0	0
Reduced v/c Ratio		0.30	0.10		0.52	0.15	0.08	0.48	0.08	0.21	0.62	0.04

Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 130			
Offset: 112 (86%), Referenced to phase 2:NBSB and 6:NBSB, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.67			
Intersection Signal Delay: 18.5		Intersection LOS: B	
Intersection Capacity Utilization 71.3%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 1: US 258/Rt 10 (Benns Church Boulevard) & Canteberry Lane





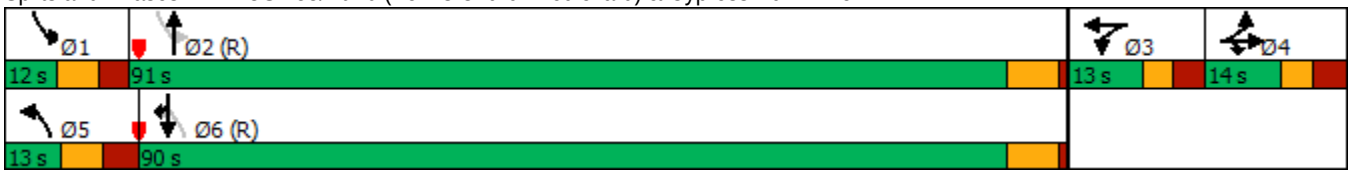
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	0	22	0	0	0	33	871	0	2	1591	34
Future Volume (vph)	5	0	22	0	0	0	33	871	0	2	1591	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	250		0	150		235
Storage Lanes	0		1	0		0	1		0	1		1
Taper Length (ft)	0			0			0			0		
Satd. Flow (prot)	0	1787	1599	0	1900	0	1805	3539	0	1805	3505	1615
Flt Permitted		0.950					0.108			0.292		
Satd. Flow (perm)	0	1787	1599	0	1900	0	205	3539	0	555	3505	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			134									138
Link Speed (mph)		15			25			45			45	
Link Distance (ft)		1905			1451			1986			773	
Travel Time (s)		86.6			39.6			30.1			11.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	1%	0%	0%	0%	0%	2%	0%	0%	3%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	5	24	0	0	0	36	947	0	2	1729	37
Turn Type	Split	NA	Prot				D.P+P	NA		D.P+P	NA	Prot
Protected Phases	4	4	4	3	3		5	2		1	6	6
Permitted Phases							6			2		
Detector Phase	4	4	4	3	3		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		5.0	14.0		5.0	14.0	14.0
Minimum Split (s)	13.5	13.5	13.5	13.0	13.0		12.5	20.0		12.0	20.0	20.0
Total Split (s)	14.0	14.0	14.0	13.0	13.0		13.0	91.0		12.0	90.0	90.0
Total Split (%)	10.8%	10.8%	10.8%	10.0%	10.0%		10.0%	70.0%		9.2%	69.2%	69.2%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		4.0	5.0		4.0	5.0	5.0
All-Red Time (s)	3.5	3.5	3.5	3.0	3.0		3.5	1.0		3.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		6.5	6.5		6.0		7.5	6.0		7.0	6.0	6.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Min		None	C-Min	C-Min
Act Effct Green (s)		7.0	7.0				109.9	115.9		113.5	110.7	110.7
Actuated g/C Ratio		0.05	0.05				0.85	0.89		0.87	0.85	0.85
v/c Ratio		0.05	0.11				0.15	0.30		0.00	0.58	0.03
Control Delay		59.6	1.1				2.2	1.2		1.0	3.0	0.0
Queue Delay		0.0	0.0				0.0	0.0		0.0	0.0	0.0
Total Delay		59.6	1.1				2.2	1.2		1.0	3.0	0.0
LOS		E	A				A	A		A	A	A
Approach Delay		11.2						1.2			2.9	
Approach LOS		B						A			A	
Queue Length 50th (ft)		4	0				0	4		0	84	0
Queue Length 95th (ft)		18	0				m6	102		m0	92	m0
Internal Link Dist (ft)		1825			1371			1906			693	
Turn Bay Length (ft)							250			150		235
Base Capacity (vph)		103	218				241	3155		532	2984	1395

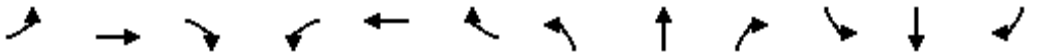
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn		0	0				0	0		0	42	0
Spillback Cap Reductn		0	0				0	0		0	0	0
Storage Cap Reductn		0	0				0	0		0	0	0
Reduced v/c Ratio		0.05	0.11				0.15	0.30		0.00	0.59	0.03

Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 130			
Offset: 116 (89%), Referenced to phase 2:NBSB and 6:NBSB, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.58			
Intersection Signal Delay: 2.4		Intersection LOS: A	
Intersection Capacity Utilization 60.2%		ICU Level of Service B	
Analysis Period (min) 15			

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: US 258/Rt 10 (Benns Church Boulevard) & Cypress Run Drive





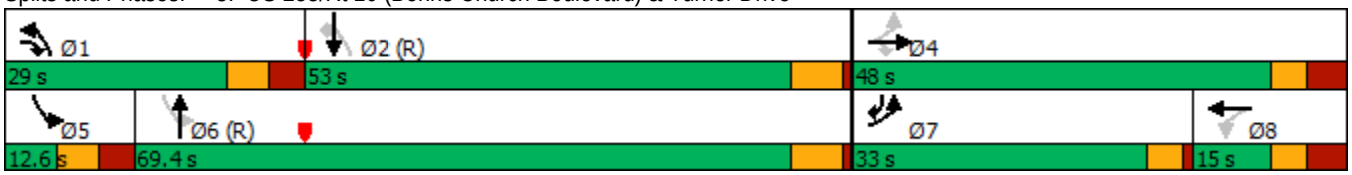
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	211	1	329	1	79	1	299	784	76	7	1081	355
Future Volume (vph)	211	1	329	1	79	1	299	784	76	7	1081	355
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		300	0		0	125		0	125		275
Storage Lanes	0		1	0		0	1		0	1		1
Taper Length (ft)	0			0			0			0		
Satd. Flow (prot)	0	1793	1599	0	1894	0	1687	3499	0	1805	3505	1482
Flt Permitted		0.597			0.997		0.081			0.232		
Satd. Flow (perm)	0	1123	1599	0	1891	0	144	3499	0	441	3505	1482
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			25					11				164
Link Speed (mph)		40			25			45			45	
Link Distance (ft)		1499			695			1153			1986	
Travel Time (s)		25.6			19.0			17.5			30.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	1%	0%	0%	0%	7%	2%	0%	0%	3%	9%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	230	358	0	88	0	325	935	0	8	1175	386
Turn Type	pm+pt	NA	pm+ov	Perm	NA		D.P+P	NA		D.P+P	NA	pm+ov
Protected Phases	7	4	1		8		1	6		5	2	7
Permitted Phases	4		4	8			2			6		2
Detector Phase	7	4	1	8	8		1	6		5	2	7
Switch Phase												
Minimum Initial (s)	5.0	7.0	5.0	7.0	7.0		5.0	15.0		5.0	15.0	5.0
Minimum Split (s)	9.5	14.5	12.5	14.5	14.5		12.5	21.0		12.5	21.0	9.5
Total Split (s)	33.0	48.0	29.0	15.0	15.0		29.0	69.4		12.6	53.0	33.0
Total Split (%)	25.4%	36.9%	22.3%	11.5%	11.5%		22.3%	53.4%		9.7%	40.8%	25.4%
Yellow Time (s)	3.5	3.5	4.0	3.5	3.5		4.0	5.0		4.0	5.0	3.5
All-Red Time (s)	1.0	4.0	3.5	4.0	4.0		3.5	1.0		3.5	1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		7.5	7.5		7.5		7.5	6.0		7.5	6.0	4.5
Lead/Lag	Lead		Lead	Lag	Lag		Lead	Lag		Lead	Lag	Lead
Lead-Lag Optimize?	Yes		Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Min		None	C-Min	None
Act Effct Green (s)		38.4	67.4		27.5		69.1	75.6		75.1	49.1	61.5
Actuated g/C Ratio		0.30	0.52		0.21		0.53	0.58		0.58	0.38	0.47
v/c Ratio		0.66	0.43		0.22		0.98	0.46		0.03	0.89	0.49
Control Delay		48.6	19.3		43.1		74.5	14.3		15.9	41.8	10.2
Queue Delay		0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		48.6	19.3		43.1		74.5	14.3		15.9	41.8	10.2
LOS		D	B		D		E	B		B	D	B
Approach Delay		30.7			43.1			29.8			33.9	
Approach LOS		C			D			C			C	
Queue Length 50th (ft)		153	161		61		207	125		1	503	169
Queue Length 95th (ft)		230	237		109		#414	414		m6	#623	105
Internal Link Dist (ft)		1419			615			1073			1906	
Turn Bay Length (ft)			300				125			125		275
Base Capacity (vph)		367	841		400		331	2038		308	1323	1011

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn		0	0		0		0	0		0	0	0
Spillback Cap Reductn		0	0		0		0	0		0	0	0
Storage Cap Reductn		0	0		0		0	0		0	0	0
Reduced v/c Ratio		0.63	0.43		0.22		0.98	0.46		0.03	0.89	0.38

Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 130			
Offset: 6 (5%), Referenced to phase 2:NBSB and 6:NBSB, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.98			
Intersection Signal Delay: 32.1		Intersection LOS: C	
Intersection Capacity Utilization 82.4%		ICU Level of Service E	
Analysis Period (min) 15			

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: US 258/Rt 10 (Benns Church Boulevard) & Turner Drive



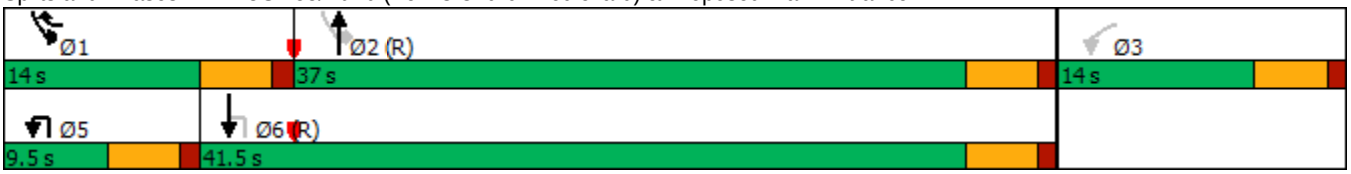
Lane Group	WBL	WBR	NBU	NBT	NBR	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	267	132	16	1122	92	95	1364
Future Volume (vph)	267	132	16	1122	92	95	1364
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	125		300	300	
Storage Lanes	2	1	1		1	1	
Taper Length (ft)	0		0			0	
Satd. Flow (prot)	3502	1615	1805	3505	1615	1805	3539
Flt Permitted	0.950		0.118			0.158	
Satd. Flow (perm)	3502	1615	224	3505	1615	300	3539
Right Turn on Red		Yes			Yes		
Satd. Flow (RTOR)		143			100		
Link Speed (mph)	25			45			45
Link Distance (ft)	872			696			1153
Travel Time (s)	23.8			10.5			17.5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	3%	0%	0%	2%
Shared Lane Traffic (%)							
Lane Group Flow (vph)	290	143	17	1220	100	103	1483
Turn Type	Perm	Over	D.P+P	NA	Perm	D.P+P	NA
Protected Phases		1	5	2		1	6
Permitted Phases	3		6		2	2	
Detector Phase	3	1	5	2	2	1	6
Switch Phase							
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	9.5	9.5	22.5	22.5	9.5	22.5
Total Split (s)	14.0	14.0	9.5	37.0	37.0	14.0	41.5
Total Split (%)	21.5%	21.5%	14.6%	56.9%	56.9%	21.5%	63.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag		Lead	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	C-Min	C-Min	None	C-Min
Act Effct Green (s)	9.3	7.0	45.8	37.1	37.1	43.1	44.8
Actuated g/C Ratio	0.14	0.11	0.70	0.57	0.57	0.66	0.69
v/c Ratio	0.58	0.47	0.06	0.61	0.10	0.29	0.61
Control Delay	30.9	11.1	3.9	14.5	3.1	6.2	6.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.9	11.1	3.9	14.5	3.1	6.2	6.6
LOS	C	B	A	B	A	A	A
Approach Delay	24.4			13.5			6.6
Approach LOS	C			B			A
Queue Length 50th (ft)	54	0	2	269	3	19	186
Queue Length 95th (ft)	91	43	m4	347	17	m23	265
Internal Link Dist (ft)	792			616			1073
Turn Bay Length (ft)			125		300	300	
Base Capacity (vph)	523	358	287	2002	965	426	2436

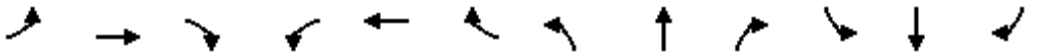
Lane Group	WBL	WBR	NBU	NBT	NBR	SBL	SBT
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.40	0.06	0.61	0.10	0.24	0.61

Intersection Summary			
Area Type:	Other		
Cycle Length: 65			
Actuated Cycle Length: 65			
Offset: 26 (40%), Referenced to phase 2:NBSB and 6:NBSB, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.61			
Intersection Signal Delay: 11.6		Intersection LOS: B	
Intersection Capacity Utilization 60.7%		ICU Level of Service B	
Analysis Period (min) 15			

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: US 258/Rt 10 (Benns Church Boulevard) & Proposed Main Entrance



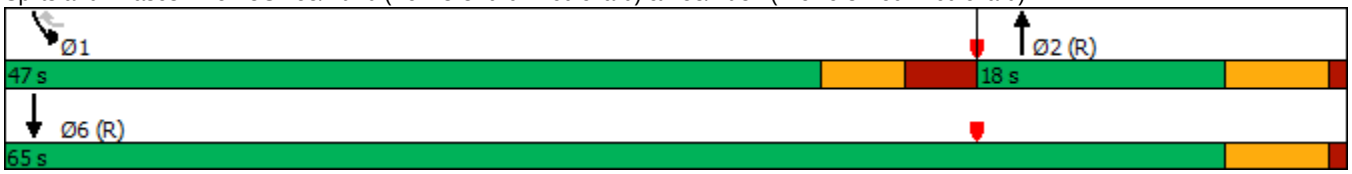


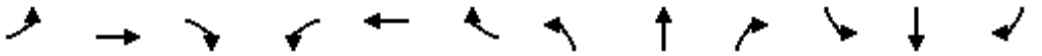
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	879	0	233	0	1287	336	0
Future Volume (vph)	0	0	0	0	0	879	0	233	0	1287	336	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		0	300		0
Storage Lanes	0		0	0		2	0		0	1		0
Taper Length (ft)	0			0			0			0		
Satd. Flow (prot)	0	0	0	0	0	2760	0	3471	0	3400	3471	0
Flt Permitted										0.950		
Satd. Flow (perm)	0	0	0	0	0	2760	0	3471	0	3400	3471	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						318						
Link Speed (mph)		30			45			45			45	
Link Distance (ft)		963			1126			2837			3270	
Travel Time (s)		21.9			17.1			43.0			49.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	3%	0%	4%	0%	3%	4%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	955	0	253	0	1399	365	0
Turn Type						Perm		NA		Prot	NA	
Protected Phases								2		1	6	
Permitted Phases						1						
Detector Phase						1		2		1	6	
Switch Phase												
Minimum Initial (s)						15.0		10.0		15.0	15.0	
Minimum Split (s)						22.5		16.0		22.5	21.0	
Total Split (s)						47.0		18.0		47.0	65.0	
Total Split (%)						72.3%		27.7%		72.3%	100.0%	
Yellow Time (s)						4.0		5.0		4.0	5.0	
All-Red Time (s)						3.5		1.0		3.5	1.0	
Lost Time Adjust (s)						0.0		0.0		0.0	0.0	
Total Lost Time (s)						7.5		6.0		7.5	6.0	
Lead/Lag						Lead		Lag		Lead		
Lead-Lag Optimize?						Yes		Yes		Yes		
Recall Mode						Min		C-Max		Min	C-Min	
Act Effct Green (s)						37.4		14.1		37.4	65.0	
Actuated g/C Ratio						0.58		0.22		0.58	1.00	
v/c Ratio						0.55		0.34		0.72	0.11	
Control Delay						8.1		24.0		10.3	0.1	
Queue Delay						0.0		0.0		0.0	0.0	
Total Delay						8.1		24.0		10.3	0.1	
LOS						A		C		B	A	
Approach Delay					8.1			24.0			8.2	
Approach LOS					A			C			A	
Queue Length 50th (ft)						148		46		228	0	
Queue Length 95th (ft)						97		78		59	0	
Internal Link Dist (ft)		883			1046			2757			3190	
Turn Bay Length (ft)										300		
Base Capacity (vph)						1801		752		2066	3471	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn						0		0		0	0	
Spillback Cap Reductn						0		0		0	0	
Storage Cap Reductn						0		0		0	0	
Reduced v/c Ratio						0.53		0.34		0.68	0.11	

Intersection Summary			
Area Type:	Other		
Cycle Length: 65			
Actuated Cycle Length: 65			
Offset: 64 (98%), Referenced to phase 2:NBT and 6:SBT, Start of Green			
Natural Cycle: 50			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.72			
Intersection Signal Delay: 9.5		Intersection LOS: A	
Intersection Capacity Utilization 55.0%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 5: US 258/Rt 10 (Benns Church Boulevard) & 258/Rt 32 (Brewers Neck Boulevard)





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	1263	0	266	850	4	0	1	473	7	4	14
Future Volume (vph)	7	1263	0	266	850	4	0	1	473	7	4	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		0	600		325	0		350	0		0
Storage Lanes	1		0	1		1	0		2	0		1
Taper Length (ft)	0			0			0			0		
Satd. Flow (prot)	1805	3539	0	1787	3539	1380	0	1900	2787	0	1698	1380
Flt Permitted	0.950			0.950							0.968	
Satd. Flow (perm)	1805	3539	0	1787	3539	1380	0	1900	2787	0	1698	1380
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						189			514			231
Link Speed (mph)		45			45			45			25	
Link Distance (ft)		1126			846			914			623	
Travel Time (s)		17.1			12.8			13.8			17.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	0%	1%	2%	17%	0%	0%	2%	0%	25%	17%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	8	1373	0	289	924	4	0	1	514	0	12	15
Turn Type	Prot	NA		Prot	NA	Perm		NA	pm+ov	Split	NA	Perm
Protected Phases	1	6		5	2		4	4	5	3	3	
Permitted Phases						2			4			3
Detector Phase	1	6		5	2	2	4	4	5	3	3	3
Switch Phase												
Minimum Initial (s)	10.0	15.0		10.0	15.0	15.0	10.0	10.0	10.0	5.0	5.0	5.0
Minimum Split (s)	19.0	24.5		19.5	24.5	24.5	26.0	26.0	19.5	26.0	26.0	26.0
Total Split (s)	19.0	50.0		28.0	59.0	59.0	26.0	26.0	28.0	26.0	26.0	26.0
Total Split (%)	14.6%	38.5%		21.5%	45.4%	45.4%	20.0%	20.0%	21.5%	20.0%	20.0%	20.0%
Yellow Time (s)	5.0	5.5		5.0	5.5	5.5	4.0	4.0	5.0	3.5	3.5	3.5
All-Red Time (s)	4.0	1.0		4.5	1.0	1.0	4.0	4.0	4.5	4.5	4.5	4.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	9.0	6.5		9.5	6.5	6.5		8.0	9.5		8.0	8.0
Lead/Lag	Lag	Lead		Lag	Lead	Lead	Lag	Lag	Lag	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	C-Max	C-Max	None	None	None	None	None	None
Act Effct Green (s)	10.0	82.8		18.5	109.6	109.6		10.0	20.2		6.5	6.5
Actuated g/C Ratio	0.08	0.64		0.14	0.84	0.84		0.08	0.16		0.05	0.05
v/c Ratio	0.06	0.61		1.14	0.31	0.00		0.01	0.59		0.14	0.05
Control Delay	70.3	9.7		148.1	6.2	0.0		56.0	5.8		62.2	0.4
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	70.3	9.7		148.1	6.2	0.0		56.0	5.8		62.2	0.4
LOS	E	A		F	A	A		E	A		E	A
Approach Delay		10.1			39.8			5.9			27.8	
Approach LOS		B			D			A			C	
Queue Length 50th (ft)	7	387		~283	67	0		1	0		10	0
Queue Length 95th (ft)	m11	407		#464	299	0		7	36		31	0
Internal Link Dist (ft)		1046			766			834			543	
Turn Bay Length (ft)	225			600		325			350			
Base Capacity (vph)	138	2253		254	2983	1193		263	867		235	390

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0	0		0	0		0	0
Spillback Cap Reductn	0	0		0	0	0		0	0		0	0
Storage Cap Reductn	0	0		0	0	0		0	0		0	0
Reduced v/c Ratio	0.06	0.61		1.14	0.31	0.00		0.00	0.59		0.05	0.04

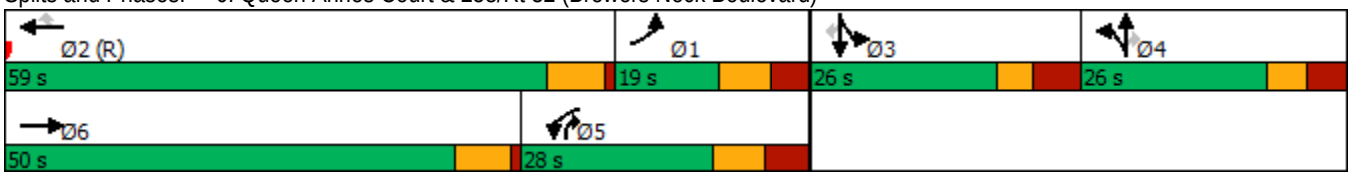
Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 130			
Offset: 20 (15%), Referenced to phase 2:WBT, Start of Green			
Natural Cycle: 150			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.14			
Intersection Signal Delay: 21.1		Intersection LOS: C	
Intersection Capacity Utilization 78.0%		ICU Level of Service D	
Analysis Period (min) 15			

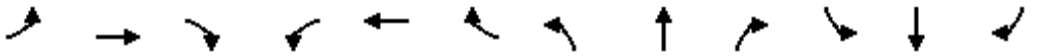
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Queen Annes Court & 258/Rt 32 (Brewers Neck Boulevard)





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	156	6	49	70	10	87	57	1366	117	145	1147	108
Future Volume (vph)	156	6	49	70	10	87	57	1366	117	145	1147	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	200		350	275		325
Storage Lanes	0		1	0		1	1		1	1		1
Taper Length (ft)	25			25			125			225		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected		0.956			0.959		0.950			0.950		
Satd. Flow (prot)	0	1816	1615	0	1791	1553	1805	3539	1583	1687	3505	1615
Flt Permitted		0.956			0.959		0.103			0.076		
Satd. Flow (perm)	0	1816	1615	0	1791	1553	196	3539	1583	135	3505	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			164			164			177			177
Link Speed (mph)		25			25			45			45	
Link Distance (ft)		335			1232			773			1937	
Travel Time (s)		9.1			33.6			11.7			29.3	
Peak Hour Factor	0.91	0.42	0.56	0.75	0.67	0.93	0.60	0.94	0.64	0.76	0.94	0.71
Heavy Vehicles (%)	0%	0%	0%	2%	0%	4%	0%	2%	2%	7%	3%	0%
Adj. Flow (vph)	171	14	88	93	15	94	95	1453	183	191	1220	152
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	185	88	0	108	94	95	1453	183	191	1220	152
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Split	NA	Prot	Split	NA	Prot	D.P+P	NA	Perm	D.P+P	NA	Perm
Protected Phases	4	4	4	3	3	3	5	2		1	6	

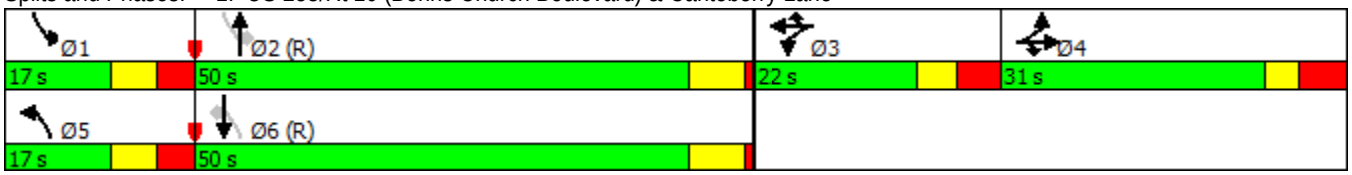
1: US 258/Rt 10 (Benns Church Boulevard) & Canteberry Lane

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases							6		2	2		6
Detector Phase	4	4	4	3	3	3	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	5.0	15.0	15.0	5.0	15.0	15.0
Minimum Split (s)	14.5	14.5	14.5	14.5	14.5	14.5	12.5	21.0	21.0	12.5	21.0	21.0
Total Split (s)	31.0	31.0	31.0	22.0	22.0	22.0	17.0	50.0	50.0	17.0	50.0	50.0
Total Split (%)	25.8%	25.8%	25.8%	18.3%	18.3%	18.3%	14.2%	41.7%	41.7%	14.2%	41.7%	41.7%
Maximum Green (s)	23.5	23.5	23.5	14.5	14.5	14.5	9.5	44.0	44.0	9.5	44.0	44.0
Yellow Time (s)	3.0	3.0	3.0	3.5	3.5	3.5	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	4.5	4.5	4.5	4.0	4.0	4.0	3.5	1.0	1.0	3.5	1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		7.5	7.5		7.5	7.5	7.5	6.0	6.0	7.5	6.0	6.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	2.0	6.0	6.0	2.0	6.0	6.0
Minimum Gap (s)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	3.5	3.5	0.2	3.5	3.5
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	20.0	0.0	20.0	20.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0	15.0	0.0	15.0	15.0
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)		17.4	17.4		12.0	12.0	60.6	52.6	52.6	60.6	54.7	54.7
Actuated g/C Ratio		0.14	0.14		0.10	0.10	0.50	0.44	0.44	0.50	0.46	0.46
v/c Ratio		0.70	0.24		0.61	0.31	0.48	0.94	0.23	1.00	0.76	0.18
Control Delay		62.7	1.5		65.8	2.7	26.4	39.9	2.1	97.9	32.9	2.8
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		62.7	1.5		65.8	2.7	26.4	39.9	2.1	97.9	32.9	2.8
LOS		E	A		E	A	C	D	A	F	C	A
Approach Delay		43.0			36.4			35.2			37.9	
Approach LOS		D			D			D			D	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBSB and 6:NBSB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.00
Intersection Signal Delay: 36.9 Intersection LOS: D
Intersection Capacity Utilization 78.9% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 1: US 258/Rt 10 (Benns Church Boulevard) & Canteberry Lane



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	127	0	91	0	0	1	171	1412	0	0	1117	147
Future Volume (vph)	127	0	91	0	0	1	171	1412	0	0	1117	147
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	250		0	150		235
Storage Lanes	0		1	0		0	1		0	1		1
Taper Length (ft)	25			25			150			125		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt			0.850		0.865							0.850
Flt Protected		0.950					0.950					
Satd. Flow (prot)	0	1787	1599	0	1644	0	1805	3539	0	1900	3505	1615
Flt Permitted		0.950					0.145					
Satd. Flow (perm)	0	1787	1599	0	1644	0	276	3539	0	1900	3505	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			214		218							218
Link Speed (mph)		15			25			45			45	
Link Distance (ft)		1905			1451			1986			773	
Travel Time (s)		86.6			39.6			30.1			11.7	
Peak Hour Factor	0.81	0.25	0.62	0.25	0.25	0.25	0.67	0.93	0.25	0.25	0.95	0.80
Heavy Vehicles (%)	1%	0%	1%	0%	0%	0%	0%	2%	0%	0%	3%	0%
Adj. Flow (vph)	157	0	147	0	0	4	255	1518	0	0	1176	184
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	157	147	0	4	0	255	1518	0	0	1176	184
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	20
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Split	NA	Prot		NA		D.P+P	NA		D.P+P	NA	Prot
Protected Phases	4	4	4	3	3		5	2		1	6	6

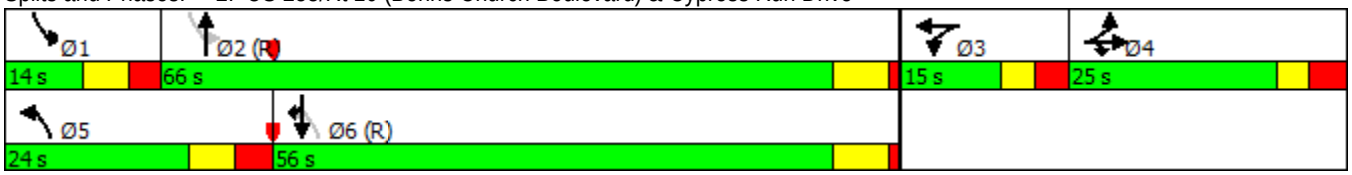
2: US 258/Rt 10 (Benns Church Boulevard) & Cypress Run Drive

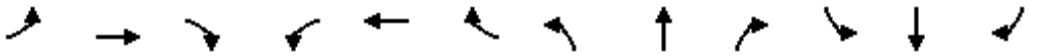
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases							6			2		
Detector Phase	4	4	4	3	3		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		5.0	14.0		5.0	14.0	14.0
Minimum Split (s)	13.5	13.5	13.5	13.0	13.0		12.5	20.0		12.0	20.0	20.0
Total Split (s)	25.0	25.0	25.0	15.0	15.0		24.0	66.0		14.0	56.0	56.0
Total Split (%)	20.8%	20.8%	20.8%	12.5%	12.5%		20.0%	55.0%		11.7%	46.7%	46.7%
Maximum Green (s)	18.5	18.5	18.5	9.0	9.0		16.5	60.0		7.0	50.0	50.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		4.0	5.0		4.0	5.0	5.0
All-Red Time (s)	3.5	3.5	3.5	3.0	3.0		3.5	1.0		3.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		6.5	6.5		6.0		7.5	6.0		7.0	6.0	6.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		2.0	5.0		2.0	5.0	5.0
Minimum Gap (s)	0.2	0.2	0.2	0.2	0.2		0.2	3.5		0.2	3.5	3.5
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0		0.0	18.0		0.0	18.0	18.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0		0.0	15.0		0.0	15.0	15.0
Recall Mode	None	None	None	None	None		None	C-Min		None	C-Min	C-Min
Act Effct Green (s)		15.2	15.2		7.0		80.7	89.7			66.7	66.7
Actuated g/C Ratio		0.13	0.13		0.06		0.67	0.75			0.56	0.56
v/c Ratio		0.69	0.38		0.01		0.67	0.57			0.60	0.19
Control Delay		65.8	3.8		0.0		22.8	8.9			6.7	0.3
Queue Delay		0.0	0.0		0.0		0.0	0.0			0.0	0.0
Total Delay		65.8	3.8		0.0		22.8	8.9			6.7	0.3
LOS		E	A		A		C	A			A	A
Approach Delay		35.8						10.9			5.8	
Approach LOS		D						B			A	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 12 (10%), Referenced to phase 2:NBSB and 6:NBSB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.69
Intersection Signal Delay: 11.1 Intersection LOS: B
Intersection Capacity Utilization 73.2% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 2: US 258/Rt 10 (Benns Church Boulevard) & Cypress Run Drive





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	94	0	106	0	1	2	188	1473	1	36	1080	138
Future Volume (vph)	94	0	106	0	1	2	188	1473	1	36	1080	138
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		300	100		0	125		0	125		275
Storage Lanes	0		1	1		0	1		0	1		1
Taper Length (ft)	200			25			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt			0.850		0.925							0.850
Flt Protected		0.950					0.950			0.950		
Satd. Flow (prot)	0	1787	1599	1900	1758	0	1687	3539	0	1805	3505	1482
Flt Permitted		0.752					0.156			0.072		
Satd. Flow (perm)	0	1415	1599	1900	1758	0	277	3539	0	137	3505	1482
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			133		4							141
Link Speed (mph)		40			25			45			45	
Link Distance (ft)		1493			695			1153			1986	
Travel Time (s)		25.4			19.0			17.5			30.1	
Peak Hour Factor	0.63	0.25	0.80	0.25	0.25	0.50	0.90	0.94	0.25	0.50	0.98	0.85
Heavy Vehicles (%)	1%	0%	1%	0%	0%	0%	7%	2%	0%	0%	3%	9%
Adj. Flow (vph)	149	0	133	0	4	4	209	1567	4	72	1102	162
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	149	133	0	8	0	209	1571	0	72	1102	162
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	20
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA		D.P+P	NA		D.P+P	NA	Perm
Protected Phases		4			8		1	6		5	2	

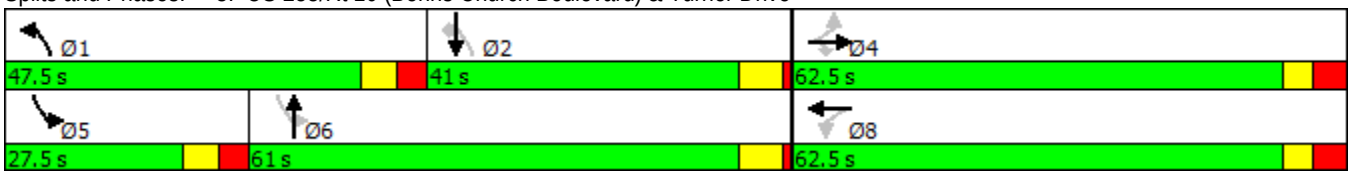
3: US 258/Rt 10 (Benns Church Boulevard) & Turner Drive

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8			2			6		2
Detector Phase	4	4	4	8	8		1	6		5	2	2
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		5.0	15.0		5.0	15.0	15.0
Minimum Split (s)	14.5	14.5	14.5	14.5	14.5		12.5	21.0		12.5	21.0	21.0
Total Split (s)	62.5	62.5	62.5	62.5	62.5		47.5	61.0		27.5	41.0	41.0
Total Split (%)	41.4%	41.4%	41.4%	41.4%	41.4%		31.5%	40.4%		18.2%	27.2%	27.2%
Maximum Green (s)	55.0	55.0	55.0	55.0	55.0		40.0	55.0		20.0	35.0	35.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		4.0	5.0		4.0	5.0	5.0
All-Red Time (s)	4.0	4.0	4.0	4.0	4.0		3.5	1.0		3.5	1.0	1.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		7.5	7.5	7.5	7.5		7.5	6.0		7.5	6.0	6.0
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0	5.0	5.0	3.0	3.0		4.0	6.0		2.0	6.0	6.0
Minimum Gap (s)	3.5	3.5	3.5	0.2	0.2		0.2	3.5		0.2	3.5	3.5
Time Before Reduce (s)	20.0	20.0	20.0	0.0	0.0		0.0	20.0		0.0	20.0	20.0
Time To Reduce (s)	10.0	10.0	10.0	0.0	0.0		0.0	15.0		0.0	15.0	15.0
Recall Mode	None	None	None	None	None		None	Min		None	Min	Min
Act Effct Green (s)		17.8	17.8		10.3		57.1	55.6		58.9	45.3	45.3
Actuated g/C Ratio		0.18	0.18		0.11		0.59	0.57		0.60	0.46	0.46
v/c Ratio		0.58	0.33		0.04		0.59	0.78		0.39	0.68	0.21
Control Delay		46.8	8.6		29.7		18.6	21.8		15.5	24.5	5.4
Queue Delay		0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		46.8	8.6		29.7		18.6	21.8		15.5	24.5	5.4
LOS		D	A		C		B	C		B	C	A
Approach Delay		28.8			29.7			21.4			21.7	
Approach LOS		C			C			C			C	

Intersection Summary

Area Type: Other
Cycle Length: 151
Actuated Cycle Length: 97.6
Natural Cycle: 70
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.78
Intersection Signal Delay: 22.2 Intersection LOS: C
Intersection Capacity Utilization 74.3% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 3: US 258/Rt 10 (Benns Church Boulevard) & Turner Drive





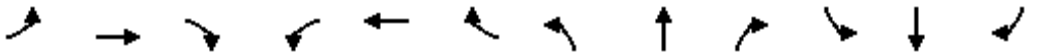
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	5	0	1652	0	0	0
Future Volume (vph)	0	0	0	0	0	0	5	0	1652	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0		125		0		140
Storage Lanes	0		0	0		0		1		0		1
Taper Length (ft)	25			25				25				75
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00
Frt												
Flt Protected							0.950					
Satd. Flow (prot)	0	0	0	0	0	0	1805	0	3505	0	1900	0
Flt Permitted							0.950					
Satd. Flow (perm)	0	0	0	0	0	0	1805	0	3505	0	1900	0
Link Speed (mph)		30			30				45			
Link Distance (ft)		810			872				3921			
Travel Time (s)		18.4			19.8				59.4			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.25	0.25	0.97	0.25	0.50	0.25
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	0%
Adj. Flow (vph)	0	0	0	0	0	0	20	0	1703	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	0	20	0	1703	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	R NA	Left	Left	Right	R NA	Left
Median Width(ft)		0			0				12			
Link Offset(ft)		0			0				0			
Crosswalk Width(ft)		16			16				16			
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	9	15		9	9	15
Sign Control		Stop			Stop				Free			

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 49.0%		ICU Level of Service A	
Analysis Period (min) 15			

Lane Group	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	1173	0
Future Volume (vph)	1173	0
Ideal Flow (vphpl)	1900	1900
Storage Length (ft)		0
Storage Lanes		0
Taper Length (ft)		
Lane Util. Factor	0.95	1.00
Frt		
Flt Protected		
Satd. Flow (prot)	3539	0
Flt Permitted		
Satd. Flow (perm)	3539	0
Link Speed (mph)	45	
Link Distance (ft)	1153	
Travel Time (s)	17.5	
Peak Hour Factor	0.95	0.25
Heavy Vehicles (%)	2%	0%
Adj. Flow (vph)	1235	0
Shared Lane Traffic (%)		
Lane Group Flow (vph)	1235	0
Enter Blocked Intersection	No	No
Lane Alignment	Left	Right
Median Width(ft)	12	
Link Offset(ft)	0	
Crosswalk Width(ft)	16	
Two way Left Turn Lane		
Headway Factor	1.00	1.00
Turning Speed (mph)		9
Sign Control	Free	

Intersection Summary

5: US 258/Rt 10 (Benns Church Boulevard) & 258/Rt 32 (Brewers Neck Boulevard)



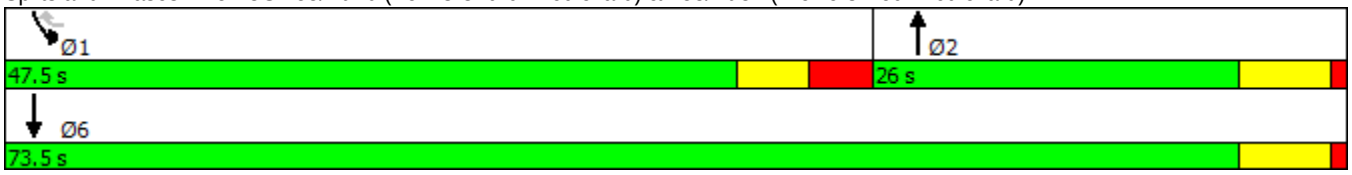
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	1421	0	246	0	797	340	0
Future Volume (vph)	0	0	0	0	0	1421	0	246	0	797	340	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		0	300		0
Storage Lanes	0		0	0		2	0		0	1		0
Taper Length (ft)	25			25			100			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	0.88	1.00	0.95	1.00	0.97	0.95	1.00
Frt						0.850						
Flt Protected										0.950		
Satd. Flow (prot)	0	0	0	0	0	2760	0	3471	0	3400	3471	0
Flt Permitted										0.950		
Satd. Flow (perm)	0	0	0	0	0	2760	0	3471	0	3400	3471	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						514						
Link Speed (mph)		30			45			45			45	
Link Distance (ft)		963			1126			2837			3921	
Travel Time (s)		21.9			17.1			43.0			59.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.93	0.25	0.89	0.25	0.99	0.85	0.25
Heavy Vehicles (%)	0%	0%	0%	0%	0%	3%	0%	4%	0%	3%	4%	0%
Adj. Flow (vph)	0	0	0	0	0	1528	0	276	0	805	400	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	1528	0	276	0	805	400	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors						1		2		1	2	
Detector Template						Right		Thru		Left	Thru	
Leading Detector (ft)						20		100		20	100	
Trailing Detector (ft)						0		0		0	0	
Detector 1 Position(ft)						0		0		0	0	
Detector 1 Size(ft)						20		6		20	6	
Detector 1 Type						Cl+Ex		Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)						0.0		0.0		0.0	0.0	
Detector 1 Queue (s)						0.0		0.0		0.0	0.0	
Detector 1 Delay (s)						0.0		0.0		0.0	0.0	
Detector 2 Position(ft)								94			94	
Detector 2 Size(ft)								6			6	
Detector 2 Type								Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)								0.0			0.0	
Turn Type						Perm		NA		Prot	NA	
Protected Phases								2		1	6	

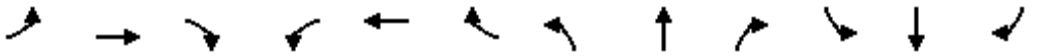
5: US 258/Rt 10 (Benns Church Boulevard) & 258/Rt 32 (Brewers Neck Boulevard)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases						1						
Detector Phase						1		2		1	6	
Switch Phase												
Minimum Initial (s)						15.0		10.0		15.0	15.0	
Minimum Split (s)						22.5		16.0		22.5	21.0	
Total Split (s)						47.5		26.0		47.5	73.5	
Total Split (%)						64.6%		35.4%		64.6%	100.0%	
Maximum Green (s)						40.0		20.0		40.0	67.5	
Yellow Time (s)						4.0		5.0		4.0	5.0	
All-Red Time (s)						3.5		1.0		3.5	1.0	
Lost Time Adjust (s)						0.0		0.0		0.0	0.0	
Total Lost Time (s)						7.5		6.0		7.5	6.0	
Lead/Lag						Lead		Lag		Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)						3.5		2.5		3.5	5.0	
Recall Mode						Min		None		Min	Min	
Act Effct Green (s)						35.9		10.8		35.9	60.4	
Actuated g/C Ratio						0.59		0.18		0.59	1.00	
v/c Ratio						0.83		0.44		0.40	0.12	
Control Delay						10.9		25.8		7.1	0.1	
Queue Delay						0.0		0.0		0.0	0.0	
Total Delay						10.9		25.8		7.1	0.1	
LOS						B		C		A	A	
Approach Delay					10.9			25.8			4.7	
Approach LOS					B			C			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 73.5			
Actuated Cycle Length: 60.4			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.83			
Intersection Signal Delay: 9.8		Intersection LOS: A	
Intersection Capacity Utilization 69.3%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 5: US 258/Rt 10 (Benns Church Boulevard) & 258/Rt 32 (Brewers Neck Boulevard)





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	844	4	515	1387	15	1	4	273	2	5	7
Future Volume (vph)	10	844	4	515	1387	15	1	4	273	2	5	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		0	600		325	0		350	0		0
Storage Lanes	1		0	1		1	0		2	0		1
Taper Length (ft)	200			200			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	0.88	1.00	1.00	1.00
Frt		0.999				0.850			0.850			0.850
Flt Protected	0.950			0.950				0.987			0.978	
Satd. Flow (prot)	1805	3536	0	1787	3539	1380	0	1875	2787	0	1632	1380
Flt Permitted	0.950			0.950				0.987			0.978	
Satd. Flow (perm)	1805	3536	0	1787	3539	1380	0	1875	2787	0	1632	1380
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						171			350			160
Link Speed (mph)		45			45			45			25	
Link Distance (ft)		1126			846			914			623	
Travel Time (s)		17.1			12.8			13.8			17.0	
Peak Hour Factor	0.35	0.98	1.00	0.86	0.96	0.60	0.25	0.38	0.78	0.50	1.00	0.75
Heavy Vehicles (%)	0%	2%	0%	1%	2%	17%	0%	0%	2%	0%	25%	17%
Adj. Flow (vph)	29	861	4	599	1445	25	4	11	350	4	5	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	29	865	0	599	1445	25	0	15	350	0	9	9
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA	pm+ov	Split	NA	Perm
Protected Phases	1	6		5	2		4	4	5	3	3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases						2			4			3
Detector Phase	1	6		5	2	2	4	4	5	3	3	3
Switch Phase												
Minimum Initial (s)	10.0	15.0		10.0	15.0	15.0	10.0	10.0	10.0	5.0	5.0	5.0
Minimum Split (s)	19.0	24.5		19.5	24.5	24.5	26.0	26.0	19.5	26.0	26.0	26.0
Total Split (s)	34.0	41.5		39.5	47.0	47.0	26.0	26.0	39.5	33.0	33.0	33.0
Total Split (%)	24.3%	29.6%		28.2%	33.6%	33.6%	18.6%	18.6%	28.2%	23.6%	23.6%	23.6%
Maximum Green (s)	25.0	35.0		30.0	40.5	40.5	18.0	18.0	30.0	25.0	25.0	25.0
Yellow Time (s)	5.0	5.5		5.0	5.5	5.5	4.0	4.0	5.0	3.5	3.5	3.5
All-Red Time (s)	4.0	1.0		4.5	1.0	1.0	4.0	4.0	4.5	4.5	4.5	4.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	9.0	6.5		9.5	6.5	6.5		8.0	9.5		8.0	8.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	5.0		3.0	5.0	5.0	3.5	3.5	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None	None	None	None	None	None	None	None
Act Effct Green (s)	10.4	32.9		31.2	72.6	72.6		10.4	37.0		6.3	6.3
Actuated g/C Ratio	0.11	0.36		0.34	0.80	0.80		0.11	0.41		0.07	0.07
v/c Ratio	0.14	0.68		0.98	0.51	0.02		0.07	0.26		0.08	0.04
Control Delay	45.6	30.5		66.1	13.6	0.1		45.6	2.7		49.6	0.3
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	45.6	30.5		66.1	13.6	0.1		45.6	2.7		49.6	0.3
LOS	D	C		E	B	A		D	A		D	A
Approach Delay		31.0			28.6			4.5			24.9	
Approach LOS		C			C			A			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 91.3			
Natural Cycle: 150			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.98			
Intersection Signal Delay: 26.6		Intersection LOS: C	
Intersection Capacity Utilization 80.3%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 6: Queen Annes Court & 258/Rt 32 (Brewers Neck Boulevard)



APPENDIX K

Queue Reports

Intersection: 1: US 258/Rt 10 (Benns Church Boulevard) & Canteberry Lane

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LT	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	64	51	144	70	42	217	230	54	74	222	221	25
Average Queue (ft)	18	14	68	25	9	76	75	10	22	105	105	6
95th Queue (ft)	49	39	125	59	31	160	168	36	52	187	190	22
Link Distance (ft)	277	277	1172	1172		663	663			1895	1895	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)					200			350	275			325
Storage Blk Time (%)						0	0					
Queuing Penalty (veh)						0	0					

Intersection: 2: US 258/Rt 10 (Benns Church Boulevard) & Cypress Run Drive

Movement	EB	EB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	L	T	TR	L	T	T	R
Maximum Queue (ft)	18	47	48	86	104	1	79	86	19
Average Queue (ft)	2	7	11	11	14	0	13	18	1
95th Queue (ft)	10	29	35	49	59	1	47	62	10
Link Distance (ft)	1824	1824		1925	1925		663	663	
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)			250			150			235
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 3: US 258/Rt 10 (Benns Church Boulevard) & Turner Drive

Movement	EB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LTR	LTR	L	T	TR	L	T	T	R
Maximum Queue (ft)	374	108	222	304	278	112	392	409	190
Average Queue (ft)	195	44	120	120	131	9	239	249	68
95th Queue (ft)	326	88	207	238	233	59	366	383	140
Link Distance (ft)	1442	648		1098	1098		1925	1925	
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)			125			125			275
Storage Blk Time (%)			9	5			34	8	
Queuing Penalty (veh)			24	12			2	24	

Intersection: 4: US 258/Rt 10 (Benns Church Boulevard) & Proposed Main Entrance

Movement	NB	SB
Directions Served	U	U
Maximum Queue (ft)	21	2
Average Queue (ft)	2	0
95th Queue (ft)	12	2
Link Distance (ft)		
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	125	140
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: US 258/Rt 10 (Benns Church Boulevard) & 258/Rt 32 (Brewers Neck Boulevard)

Movement	WB	WB	NB	NB	SB	SB	SB
Directions Served	R	R	T	T	L	L	T
Maximum Queue (ft)	135	140	78	78	160	182	4
Average Queue (ft)	46	43	35	34	89	111	0
95th Queue (ft)	109	109	67	70	149	175	4
Link Distance (ft)	1008	1008	2766	2766		3866	3866
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)					300		
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 6: Queen Annes Court & 258/Rt 32 (Brewers Neck Boulevard)

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	LT	R	R	LT	R
Maximum Queue (ft)	34	274	298	181	264	237	10	14	192	140	33	39
Average Queue (ft)	5	135	159	82	123	96	0	0	96	34	7	9
95th Queue (ft)	21	246	261	145	236	205	4	9	162	99	26	30
Link Distance (ft)		1008	1008		785	785		858			565	565
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	225			600			325		350	350		
Storage Blk Time (%)		1				0						
Queuing Penalty (veh)		0				0						

Zone Summary

Zone wide Queuing Penalty: 62

Intersection: 1: US 258/Rt 10 (Benns Church Boulevard) & Canteberry Lane

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LT	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	186	74	122	146	175	361	368	60	146	256	264	48
Average Queue (ft)	89	24	48	55	33	185	203	20	65	141	145	17
95th Queue (ft)	158	59	98	112	108	349	364	46	119	235	242	40
Link Distance (ft)	277	277	1172	1172		663	663			1895	1895	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)					200			350	275			325
Storage Blk Time (%)						7	1			0		
Queuing Penalty (veh)						3	1			0		

Intersection: 2: US 258/Rt 10 (Benns Church Boulevard) & Cypress Run Drive

Movement	EB	EB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LT	R	LTR	L	T	TR	T	T	R
Maximum Queue (ft)	171	126	12	139	189	200	132	150	67
Average Queue (ft)	68	41	1	56	54	64	35	44	13
95th Queue (ft)	131	93	8	111	143	159	90	108	44
Link Distance (ft)	1824	1824	1402		1925	1925	663	663	
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)				250					235
Storage Blk Time (%)					0		0	0	
Queuing Penalty (veh)					0		0	0	

Intersection: 3: US 258/Rt 10 (Benns Church Boulevard) & Turner Drive

Movement	EB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LTR	LTR	L	T	TR	L	T	T	R
Maximum Queue (ft)	144	33	194	330	314	108	304	315	82
Average Queue (ft)	68	5	72	128	140	20	126	135	30
95th Queue (ft)	121	22	148	258	264	69	243	253	64
Link Distance (ft)	1442	648		1106	1106		1925	1925	
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)			125			125			275
Storage Blk Time (%)			1	6			8	1	
Queuing Penalty (veh)			5	9			2	1	

Intersection: 4: US 258/Rt 10 (Benns Church Boulevard) & Proposed Main Entrance

Movement	NB
Directions Served	U
Maximum Queue (ft)	24
Average Queue (ft)	2
95th Queue (ft)	11
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	125
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 5: US 258/Rt 10 (Benns Church Boulevard) & 258/Rt 32 (Brewers Neck Boulevard)

Movement	WB	WB	NB	NB	SB	SB	SB
Directions Served	R	R	T	T	L	L	T
Maximum Queue (ft)	305	291	86	101	137	154	2
Average Queue (ft)	103	101	41	42	57	78	0
95th Queue (ft)	222	225	73	80	116	135	2
Link Distance (ft)	1008	1008	2766	2766		3866	3866
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)					300		
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 6: Queen Annes Court & 258/Rt 32 (Brewers Neck Boulevard)

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	LT	R	R	LT	R
Maximum Queue (ft)	34	220	240	282	406	386	21	25	110	53	35	43
Average Queue (ft)	7	107	124	149	169	158	2	3	50	11	4	6
95th Queue (ft)	25	192	208	244	344	334	12	14	91	38	21	26
Link Distance (ft)		1008	1008		785	785		858			565	565
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	225			600			325		350	350		
Storage Blk Time (%)		0				1						
Queuing Penalty (veh)		0				0						

Zone Summary

Zone wide Queuing Penalty: 21

Intersection: 1: US 258/Rt 10 (Benns Church Boulevard) & Canteberry Lane

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LT	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	70	54	168	87	46	229	241	47	72	227	239	28
Average Queue (ft)	21	15	79	28	11	89	87	11	25	120	126	6
95th Queue (ft)	51	42	145	67	35	181	186	35	59	209	220	22
Link Distance (ft)	277	277	1172	1172		663	663			1895	1895	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)					200			350	275			325
Storage Blk Time (%)						0	0			0		
Queuing Penalty (veh)						0	0			0		

Intersection: 2: US 258/Rt 10 (Benns Church Boulevard) & Cypress Run Drive

Movement	EB	EB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	L	T	TR	L	T	T	R
Maximum Queue (ft)	18	55	48	92	114	7	87	100	26
Average Queue (ft)	2	10	14	15	22	0	19	21	2
95th Queue (ft)	11	34	37	56	75	4	62	69	12
Link Distance (ft)	1824	1824		1925	1925		663	663	
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)			250			150			235
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 3: US 258/Rt 10 (Benns Church Boulevard) & Turner Drive

Movement	EB	EB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LTR	L	T	TR	L	T	T	R
Maximum Queue (ft)	228	179	110	216	263	201	67	333	344	174
Average Queue (ft)	113	82	53	120	91	94	6	186	194	73
95th Queue (ft)	195	149	97	205	199	178	39	302	311	137
Link Distance (ft)	1440		648		1093	1093		1925	1925	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)		300		125			125			275
Storage Blk Time (%)	0			10	2			19	2	0
Queuing Penalty (veh)	0			32	5			1	7	0

Intersection: 4: US 258/Rt 10 (Benns Church Boulevard) & Proposed Main Entrance

Movement	NB	SB
Directions Served	U	U
Maximum Queue (ft)	23	8
Average Queue (ft)	2	0
95th Queue (ft)	13	6
Link Distance (ft)		
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	125	140
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: US 258/Rt 10 (Benns Church Boulevard) & 258/Rt 32 (Brewers Neck Boulevard)

Movement	WB	WB	NB	NB	SB	SB	SB
Directions Served	R	R	T	T	L	L	T
Maximum Queue (ft)	184	180	79	92	174	195	11
Average Queue (ft)	56	54	40	36	94	119	0
95th Queue (ft)	140	141	71	74	152	177	8
Link Distance (ft)	1008	1008	2766	2766		3866	3866
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)					300		
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 6: Queen Annes Court & 258/Rt 32 (Brewers Neck Boulevard)

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	LT	R	R	LT	R
Maximum Queue (ft)	41	296	301	210	314	275	11	12	217	182	45	43
Average Queue (ft)	7	150	169	95	146	119	1	1	116	51	9	9
95th Queue (ft)	27	259	272	169	283	246	5	8	185	137	32	32
Link Distance (ft)		1008	1008		785	785		858			565	565
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	225			600			325		350	350		
Storage Blk Time (%)		2				0						
Queuing Penalty (veh)		0				0						

Zone Summary

Zone wide Queuing Penalty: 45

Intersection: 1: US 258/Rt 10 (Benns Church Boulevard) & Canteberry Lane

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LT	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	211	74	118	141	278	457	464	59	176	318	328	44
Average Queue (ft)	101	28	53	58	47	265	277	24	77	171	177	19
95th Queue (ft)	179	63	104	113	167	439	445	51	144	275	288	39
Link Distance (ft)	277	277	1172	1172		663	663			1895	1895	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)					200			350	275			325
Storage Blk Time (%)						12	3			1	0	
Queuing Penalty (veh)						6	3			1	0	

Intersection: 2: US 258/Rt 10 (Benns Church Boulevard) & Cypress Run Drive

Movement	EB	EB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LT	R	LTR	L	T	TR	T	T	R
Maximum Queue (ft)	188	124	15	175	205	232	123	144	58
Average Queue (ft)	77	46	1	61	72	85	38	47	13
95th Queue (ft)	146	99	8	125	171	185	91	109	44
Link Distance (ft)	1824	1824	1402		1919	1919	663	663	
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)				250				235	
Storage Blk Time (%)				0	0		0		
Queuing Penalty (veh)				2	0		0		

Intersection: 3: US 258/Rt 10 (Benns Church Boulevard) & Turner Drive

Movement	EB	EB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	TR	L	T	TR	L	T	T	R
Maximum Queue (ft)	103	91	30	200	285	284	143	272	288	73
Average Queue (ft)	46	34	3	68	106	114	25	115	125	26
95th Queue (ft)	89	68	18	139	212	220	80	226	241	58
Link Distance (ft)	1444		648		1085	1085		1919	1919	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)		300		125			125			275
Storage Blk Time (%)				2	3			6	0	
Queuing Penalty (veh)				11	6			2	0	

Intersection: 4: US 258/Rt 10 (Benns Church Boulevard) & Proposed Main Entrance

Movement	NB
Directions Served	U
Maximum Queue (ft)	27
Average Queue (ft)	3
95th Queue (ft)	15
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	125
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 5: US 258/Rt 10 (Benns Church Boulevard) & 258/Rt 32 (Brewers Neck Boulevard)

Movement	WB	WB	NB	NB	SB	SB	SB
Directions Served	R	R	T	T	L	L	T
Maximum Queue (ft)	354	348	93	105	159	165	1
Average Queue (ft)	136	138	45	47	67	89	0
95th Queue (ft)	286	291	81	86	128	150	1
Link Distance (ft)	1008	1008	2766	2766		3866	3866
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)					300		
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 6: Queen Annes Court & 258/Rt 32 (Brewers Neck Boulevard)

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	LT	R	R	LT	R
Maximum Queue (ft)	47	291	305	331	469	460	33	23	128	64	44	57
Average Queue (ft)	8	132	144	182	182	177	3	3	60	12	6	8
95th Queue (ft)	29	240	249	296	406	408	16	15	108	43	26	34
Link Distance (ft)		1008	1008		785	785		858			565	565
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	225			600			325		350	350		
Storage Blk Time (%)		1				3						
Queuing Penalty (veh)		0				0						

Zone Summary

Zone wide Queuing Penalty: 31

Intersection: 1: US 258/Rt 10 (Benns Church Boulevard) & Canteberry Lane

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LT	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	77	61	230	109	77	278	287	48	73	270	290	26
Average Queue (ft)	28	17	109	38	12	123	125	12	28	138	147	7
95th Queue (ft)	66	46	194	86	51	244	249	38	60	248	265	24
Link Distance (ft)	277	277	1172	1172		663	663			1895	1895	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)					200			350	275			325
Storage Blk Time (%)						2				0	0	
Queuing Penalty (veh)						0				0	0	

Intersection: 2: US 258/Rt 10 (Benns Church Boulevard) & Cypress Run Drive

Movement	EB	EB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	L	T	TR	L	T	T	R
Maximum Queue (ft)	15	57	54	94	115	4	158	175	28
Average Queue (ft)	2	10	15	18	29	0	31	40	2
95th Queue (ft)	9	35	43	63	86	2	103	123	13
Link Distance (ft)	1824	1824		1919	1919		663	663	
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)			250			150			235
Storage Blk Time (%)							0	0	
Queuing Penalty (veh)							0	0	

Intersection: 3: US 258/Rt 10 (Benns Church Boulevard) & Turner Drive

Movement	EB	EB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LTR	L	T	TR	L	T	T	R
Maximum Queue (ft)	293	253	145	224	387	329	106	430	433	251
Average Queue (ft)	167	123	64	160	147	124	8	254	266	81
95th Queue (ft)	269	219	119	251	329	266	57	414	423	178
Link Distance (ft)	1440		648		1080	1080		1919	1919	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)		300		125			125			275
Storage Blk Time (%)	1	0	4	26	5			23	9	
Queuing Penalty (veh)	2	0	0	89	14			2	31	

Intersection: 4: US 258/Rt 10 (Benns Church Boulevard) & Proposed Main Entrance

Movement	NB	SB
Directions Served	U	U
Maximum Queue (ft)	25	13
Average Queue (ft)	3	1
95th Queue (ft)	14	6
Link Distance (ft)		
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	125	140
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: US 258/Rt 10 (Benns Church Boulevard) & 258/Rt 32 (Brewers Neck Boulevard)

Movement	WB	WB	NB	NB	SB	SB
Directions Served	R	R	T	T	L	L
Maximum Queue (ft)	220	240	87	86	196	208
Average Queue (ft)	76	69	33	36	115	140
95th Queue (ft)	172	172	64	72	169	193
Link Distance (ft)	1008	1008	2766	2766		3866
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)					300	
Storage Blk Time (%)					0	
Queuing Penalty (veh)					0	

Intersection: 6: Queen Annes Court & 258/Rt 32 (Brewers Neck Boulevard)

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	LT	R	R	LT	R
Maximum Queue (ft)	34	328	326	254	359	351	8	16	265	222	43	59
Average Queue (ft)	6	175	194	126	158	134	0	1	144	85	9	11
95th Queue (ft)	23	294	302	215	318	297	4	12	224	191	31	39
Link Distance (ft)		1008	1008		785	785		858			565	565
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	225			600			325		350	350		
Storage Blk Time (%)		3				0			0			
Queuing Penalty (veh)		0				0			0			

Zone Summary

Zone wide Queuing Penalty: 139

Intersection: 1: US 258/Rt 10 (Benns Church Boulevard) & Canteberry Lane

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LT	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	209	92	130	143	301	563	581	278	206	346	367	50
Average Queue (ft)	105	33	60	59	67	345	359	38	93	211	220	21
95th Queue (ft)	181	74	107	116	222	555	563	173	176	330	347	43
Link Distance (ft)	277	277	1172	1172		663	663			1895	1895	
Upstream Blk Time (%)						0	0					
Queuing Penalty (veh)						0	0					
Storage Bay Dist (ft)					200			350	275			325
Storage Blk Time (%)						23	9		0	2	1	
Queuing Penalty (veh)						13	11		1	3	1	

Intersection: 2: US 258/Rt 10 (Benns Church Boulevard) & Cypress Run Drive

Movement	EB	EB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LT	R	LTR	L	T	TR	T	T	R
Maximum Queue (ft)	169	151	18	159	250	263	131	146	70
Average Queue (ft)	77	52	1	71	97	110	39	50	15
95th Queue (ft)	141	116	9	130	214	231	92	112	46
Link Distance (ft)	1824	1824	1402		1919	1919	663	663	
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)				250				235	
Storage Blk Time (%)					0		0	0	
Queuing Penalty (veh)					0		0	0	

Intersection: 3: US 258/Rt 10 (Benns Church Boulevard) & Turner Drive

Movement	EB	EB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	TR	L	T	TR	L	T	T	R
Maximum Queue (ft)	129	80	34	216	348	369	144	376	383	129
Average Queue (ft)	53	38	4	92	146	161	25	167	180	33
95th Queue (ft)	100	71	20	180	280	295	81	319	328	91
Link Distance (ft)	1437		648		1084	1084		1919	1919	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)		300		125			125			275
Storage Blk Time (%)				3	7			13	3	
Queuing Penalty (veh)				22	13			5	4	

Intersection: 4: US 258/Rt 10 (Benns Church Boulevard) & Proposed Main Entrance

Movement	NB
Directions Served	U
Maximum Queue (ft)	20
Average Queue (ft)	2
95th Queue (ft)	12
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	125
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 5: US 258/Rt 10 (Benns Church Boulevard) & 258/Rt 32 (Brewers Neck Boulevard)

Movement	WB	WB	NB	NB	SB	SB	SB
Directions Served	R	R	T	T	L	L	T
Maximum Queue (ft)	461	463	106	118	157	181	12
Average Queue (ft)	188	188	50	55	76	97	0
95th Queue (ft)	372	373	88	99	138	160	7
Link Distance (ft)	1008	1008	2766	2766		3866	3866
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)					300		
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 6: Queen Annes Court & 258/Rt 32 (Brewers Neck Boulevard)

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	LT	R	R	LT	R
Maximum Queue (ft)	32	271	281	390	544	546	153	28	135	62	38	49
Average Queue (ft)	7	143	159	212	208	207	6	3	66	14	5	8
95th Queue (ft)	25	251	263	347	471	481	81	17	116	45	22	31
Link Distance (ft)		1008	1008		785	785		858			565	565
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	225			600			325		350	350		
Storage Blk Time (%)		1			0	5						
Queuing Penalty (veh)		0			0	1						

Zone Summary

Zone wide Queuing Penalty: 75

Intersection: 1: US 258/Rt 10 (Benns Church Boulevard) & Canteberry Lane

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LT	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	58	48	164	85	50	163	165	42	72	262	283	31
Average Queue (ft)	19	13	72	29	12	71	75	12	29	115	123	8
95th Queue (ft)	49	37	134	68	38	136	145	36	62	210	230	26
Link Distance (ft)	277	277	1172	1172		663	663			1895	1895	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)					200			350	275			325
Storage Blk Time (%)						0				0	0	
Queuing Penalty (veh)						0				0	0	

Intersection: 2: US 258/Rt 10 (Benns Church Boulevard) & Cypress Run Drive

Movement	EB	EB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	L	T	TR	L	T	T	R
Maximum Queue (ft)	15	47	61	53	71	5	95	127	23
Average Queue (ft)	2	8	20	8	15	0	16	21	2
95th Queue (ft)	11	28	48	35	51	3	58	78	12
Link Distance (ft)	1824	1824		1925	1925		663	663	
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)			250			150			235
Storage Blk Time (%)							0	0	
Queuing Penalty (veh)							0	0	

Intersection: 3: US 258/Rt 10 (Benns Church Boulevard) & Turner Drive

Movement	EB	EB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LTR	L	T	TR	L	T	T	R
Maximum Queue (ft)	275	195	125	223	268	202	28	282	291	178
Average Queue (ft)	139	89	56	135	80	73	4	156	161	66
95th Queue (ft)	242	158	102	222	200	157	19	252	257	131
Link Distance (ft)	1442		648		1065	1065		1925	1925	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)		300		125			125			275
Storage Blk Time (%)	1			13	1			11	0	
Queuing Penalty (veh)	2			49	2			1	1	

Intersection: 4: US 258/Rt 10 (Benns Church Boulevard) & Proposed Main Entrance

Movement	WB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	L	R	U	T	T	R	L	T	T
Maximum Queue (ft)	185	158	98	89	260	257	46	131	257	251
Average Queue (ft)	107	59	42	13	105	101	18	50	79	100
95th Queue (ft)	167	132	78	50	206	202	42	98	181	204
Link Distance (ft)	816	816	816		636	636			1065	1065
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)				125			300	300		
Storage Blk Time (%)					4	0			0	
Queuing Penalty (veh)					1	0			0	

Intersection: 5: US 258/Rt 10 (Benns Church Boulevard) & 258/Rt 32 (Brewers Neck Boulevard)

Movement	WB	WB	NB	NB	SB	SB	SB
Directions Served	R	R	T	T	L	L	T
Maximum Queue (ft)	148	147	77	93	170	184	5
Average Queue (ft)	51	44	35	41	106	129	0
95th Queue (ft)	104	101	66	77	150	173	5
Link Distance (ft)	1008	1008	2766	2766		3192	3192
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)					300		
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 6: Queen Annes Court & 258/Rt 32 (Brewers Neck Boulevard)

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	LT	R	R	LT	R
Maximum Queue (ft)	38	298	319	212	235	208	9	19	223	190	45	61
Average Queue (ft)	6	173	192	110	36	30	0	1	129	64	8	11
95th Queue (ft)	24	267	277	188	135	121	4	9	204	163	31	40
Link Distance (ft)		1008	1008		785	785		858			565	565
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	225			600			325		350	350		
Storage Blk Time (%)		2				0						
Queuing Penalty (veh)		0				0						

Intersection: 7: US 258/Rt 10 (Benns Church Boulevard) & Proposed Secondary Entrance

Movement	WB
Directions Served	R
Maximum Queue (ft)	63
Average Queue (ft)	18
95th Queue (ft)	43
Link Distance (ft)	1244
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Zone Summary

Zone wide Queuing Penalty: 56

Intersection: 1: US 258/Rt 10 (Benns Church Boulevard) & Canteberry Lane

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LT	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	176	73	175	140	175	366	366	78	162	284	286	43
Average Queue (ft)	86	26	78	55	38	186	198	27	76	171	177	20
95th Queue (ft)	152	60	158	114	108	325	335	58	141	262	268	41
Link Distance (ft)	277	277	1172	1172		663	663			1895	1895	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)					200			350	275			325
Storage Blk Time (%)						8	1		0	0	0	
Queuing Penalty (veh)						4	1		0	1	0	

Intersection: 2: US 258/Rt 10 (Benns Church Boulevard) & Cypress Run Drive

Movement	EB	EB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LT	R	LTR	L	T	TR	T	T	R
Maximum Queue (ft)	142	116	21	147	160	180	121	138	52
Average Queue (ft)	66	40	1	71	65	84	40	45	15
95th Queue (ft)	126	91	9	122	142	163	90	100	42
Link Distance (ft)	1824	1824	1402		1925	1925	663	663	
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)				250					235
Storage Blk Time (%)							0	0	
Queuing Penalty (veh)							0	0	

Intersection: 3: US 258/Rt 10 (Benns Church Boulevard) & Turner Drive

Movement	EB	EB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LTR	L	T	TR	L	T	T	R
Maximum Queue (ft)	126	106	32	206	293	292	139	325	328	77
Average Queue (ft)	57	42	4	86	105	116	24	134	140	25
95th Queue (ft)	105	84	20	161	239	251	88	274	283	60
Link Distance (ft)	1442		648		1065	1065		1925	1925	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)		300		125			125			275
Storage Blk Time (%)				2	5			9	1	
Queuing Penalty (veh)				17	10			3	1	

Intersection: 4: US 258/Rt 10 (Benns Church Boulevard) & Proposed Main Entrance

Movement	WB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	L	R	U	T	T	R	L	T	T
Maximum Queue (ft)	184	150	148	103	375	370	110	202	140	142
Average Queue (ft)	111	62	68	14	209	207	44	96	38	57
95th Queue (ft)	170	138	121	61	340	336	83	167	99	120
Link Distance (ft)	816	816	816		636	636			1065	1065
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)				125			300	300		
Storage Blk Time (%)					18	2				
Queuing Penalty (veh)					2	4				

Intersection: 5: US 258/Rt 10 (Benns Church Boulevard) & 258/Rt 32 (Brewers Neck Boulevard)

Movement	WB	WB	NB	NB	SB	SB
Directions Served	R	R	T	T	L	L
Maximum Queue (ft)	577	532	131	124	222	243
Average Queue (ft)	204	210	62	67	75	98
95th Queue (ft)	451	451	109	111	155	177
Link Distance (ft)	1008	1008	2766	2766		3192
Upstream Blk Time (%)	0					
Queuing Penalty (veh)	0					
Storage Bay Dist (ft)					300	
Storage Blk Time (%)					0	0
Queuing Penalty (veh)					0	0

Intersection: 6: Queen Annes Court & 258/Rt 32 (Brewers Neck Boulevard)

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	LT	R	R	LT	R
Maximum Queue (ft)	35	338	349	628	717	736	236	25	148	106	35	41
Average Queue (ft)	7	174	188	219	219	230	10	2	66	15	6	5
95th Queue (ft)	27	304	314	407	568	588	115	11	120	56	25	24
Link Distance (ft)		1008	1008		785	785		858			565	565
Upstream Blk Time (%)				0	0	0						
Queuing Penalty (veh)				0	0	0						
Storage Bay Dist (ft)	225			600			325		350	350		
Storage Blk Time (%)		4			1	9						
Queuing Penalty (veh)		0			5	1						

Intersection: 7: US 258/Rt 10 (Benns Church Boulevard) & Proposed Secondary Entrance

Movement	WB	NB
Directions Served	R	T
Maximum Queue (ft)	92	1
Average Queue (ft)	27	0
95th Queue (ft)	71	1
Link Distance (ft)	1244	3192
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Zone Summary

Zone wide Queuing Penalty: 50

Intersection: 1: US 258/Rt 10 (Benns Church Boulevard) & Canteberry Lane

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LT	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	73	68	201	106	71	292	313	86	105	271	296	64
Average Queue (ft)	25	19	97	33	11	133	141	18	35	143	155	8
95th Queue (ft)	60	50	173	77	53	243	258	62	75	247	267	45
Link Distance (ft)	277	277	1172	1172		663	663			1895	1895	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)					200			350	275			325
Storage Blk Time (%)					0	2	0	0		0	0	0
Queuing Penalty (veh)					0	0	0	0		0	0	0

Intersection: 2: US 258/Rt 10 (Benns Church Boulevard) & Cypress Run Drive

Movement	EB	EB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	L	T	TR	L	T	T	R
Maximum Queue (ft)	28	48	63	99	114	5	148	184	24
Average Queue (ft)	3	8	21	16	29	0	31	40	2
95th Queue (ft)	15	28	50	62	89	2	95	119	12
Link Distance (ft)	1824	1824		1925	1925		663	663	
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)			250			150			235
Storage Blk Time (%)							0	0	
Queuing Penalty (veh)							0	0	

Intersection: 3: US 258/Rt 10 (Benns Church Boulevard) & Turner Drive

Movement	EB	EB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LTR	L	T	TR	L	T	T	R
Maximum Queue (ft)	334	271	160	125	449	404	86	387	408	275
Average Queue (ft)	158	123	66	121	253	194	7	218	221	119
95th Queue (ft)	277	231	130	135	427	351	41	344	361	269
Link Distance (ft)	1442		648		1065	1065		1925	1925	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)		300		125			125			275
Storage Blk Time (%)	0	0		39	25		0	24	3	0
Queuing Penalty (veh)	2	1		155	75		0	2	9	2

Intersection: 4: US 258/Rt 10 (Benns Church Boulevard) & Proposed Main Entrance

Movement	WB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	L	R	U	T	T	R	L	T	T
Maximum Queue (ft)	176	142	144	98	224	217	54	104	185	207
Average Queue (ft)	101	50	67	16	130	119	22	45	78	99
95th Queue (ft)	154	114	120	63	197	184	49	87	155	177
Link Distance (ft)	816	816	816		636	636			1065	1065
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)				125			300	300		
Storage Blk Time (%)				0	5	0				
Queuing Penalty (veh)				0	1	0				

Intersection: 5: US 258/Rt 10 (Benns Church Boulevard) & 258/Rt 32 (Brewers Neck Boulevard)

Movement	WB	WB	NB	NB	SB	SB
Directions Served	R	R	T	T	L	L
Maximum Queue (ft)	170	163	97	101	239	279
Average Queue (ft)	56	47	46	50	125	156
95th Queue (ft)	118	109	84	87	196	233
Link Distance (ft)	1008	1008	2766	2766		3192
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)					300	
Storage Blk Time (%)					0	0
Queuing Penalty (veh)					0	0

Intersection: 6: Queen Annes Court & 258/Rt 32 (Brewers Neck Boulevard)

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	LT	R	R	LT	R
Maximum Queue (ft)	76	346	351	238	237	217	4	14	230	197	47	48
Average Queue (ft)	8	172	193	116	38	31	0	1	139	77	10	12
95th Queue (ft)	44	308	318	191	147	129	4	7	208	174	34	37
Link Distance (ft)		1008	1008		785	785		858			565	565
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	225			600			325		350	350		
Storage Blk Time (%)	0	4				0						
Queuing Penalty (veh)	0	0				0						

Intersection: 7: US 258/Rt 10 (Benns Church Boulevard) & Proposed Secondary Entrance

Movement	WB	SB
Directions Served	R	T
Maximum Queue (ft)	50	3
Average Queue (ft)	16	0
95th Queue (ft)	39	3
Link Distance (ft)	1244	636
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 247

Intersection: 1: US 258/Rt 10 (Benns Church Boulevard) & Canteberry Lane

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LT	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	226	85	156	139	277	532	552	294	201	525	364	52
Average Queue (ft)	108	29	70	57	62	292	304	41	88	219	218	22
95th Queue (ft)	200	64	131	110	190	500	509	176	164	425	341	42
Link Distance (ft)	277	277	1172	1172		663	663			1895	1895	
Upstream Blk Time (%)	0					0	0			0		
Queuing Penalty (veh)	0					0	1			0		
Storage Bay Dist (ft)					200			350	275			325
Storage Blk Time (%)						22	8		0	3	1	
Queuing Penalty (veh)						13	11		0	4	1	

Intersection: 2: US 258/Rt 10 (Benns Church Boulevard) & Cypress Run Drive

Movement	EB	EB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LT	R	LTR	L	T	TR	T	T	R
Maximum Queue (ft)	211	134	24	187	142	152	153	170	86
Average Queue (ft)	104	47	2	89	38	53	51	57	22
95th Queue (ft)	212	101	13	156	97	110	128	134	61
Link Distance (ft)	1824	1824	1402		1925	1925	663	663	
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)				250				235	
Storage Blk Time (%)				0			0		
Queuing Penalty (veh)				0			0		

Intersection: 3: US 258/Rt 10 (Benns Church Boulevard) & Turner Drive

Movement	EB	EB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LTR	L	T	TR	L	T	T	R
Maximum Queue (ft)	132	107	35	217	242	239	84	210	213	78
Average Queue (ft)	60	49	4	109	123	121	25	80	81	21
95th Queue (ft)	111	93	22	192	234	230	62	159	162	57
Link Distance (ft)	1442		648		1065	1065		1925	1925	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)		300		125			125			275
Storage Blk Time (%)				8	6		0	2	0	
Queuing Penalty (veh)				61	14		0	1	0	

Intersection: 4: US 258/Rt 10 (Benns Church Boulevard) & Proposed Main Entrance

Movement	WB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	L	R	U	T	T	R	L	T	T
Maximum Queue (ft)	214	187	183	92	448	445	210	198	192	204
Average Queue (ft)	127	86	85	11	264	258	47	112	76	92
95th Queue (ft)	193	175	151	54	412	405	129	181	151	165
Link Distance (ft)	816	816	816		636	636			1065	1065
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)				125			300	300		
Storage Blk Time (%)					23	5			0	
Queuing Penalty (veh)					3	10			0	

Intersection: 5: US 258/Rt 10 (Benns Church Boulevard) & 258/Rt 32 (Brewers Neck Boulevard)

Movement	WB	WB	NB	NB	SB	SB	SB
Directions Served	R	R	T	T	L	L	T
Maximum Queue (ft)	575	610	122	142	142	159	8
Average Queue (ft)	265	272	59	71	74	96	0
95th Queue (ft)	531	551	104	119	124	146	6
Link Distance (ft)	1008	1008	2766	2766		3192	3192
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)					300		
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 6: Queen Annes Court & 258/Rt 32 (Brewers Neck Boulevard)

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	LT	R	R	LT	R
Maximum Queue (ft)	43	352	356	516	722	768	242	34	164	105	46	50
Average Queue (ft)	9	189	201	247	245	262	17	5	75	18	8	7
95th Queue (ft)	31	315	319	406	630	673	152	21	134	64	30	30
Link Distance (ft)		1008	1008		785	785		858			565	565
Upstream Blk Time (%)				0	0	1						
Queuing Penalty (veh)				0	0	0						
Storage Bay Dist (ft)	225			600			325		350	350		
Storage Blk Time (%)		5			2	10						
Queuing Penalty (veh)		1			11	2						

Intersection: 7: US 258/Rt 10 (Benns Church Boulevard) & Proposed Secondary Entrance

Movement	WB
Directions Served	R
Maximum Queue (ft)	101
Average Queue (ft)	29
95th Queue (ft)	72
Link Distance (ft)	1244
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 132

APPENDIX L

Signal Justification Reports



VHB
Virginia Beach, VA
TRAFFIC ENGINEER

VDOT Signal Justification Report (SJR)
Hampton Roads District

Date: 12/16/2019

I. Study Intersection

Major Street Route # and Name: US 258/Rt 10 (Benns Church Boulevard) **Direction:** North/South
Minor Street Route # and Name: Sweet Grass Main Entrance **Direction:** East/West
County or Locality: Isle of Wight County
Intersection on Arterial Preservation Network (APN)? No
If on APN, type of APN Corridor? N/A
Sketch/Diagram/Aerial of the Intersection Geometry: See Attached.

Describe the Origin and Nature of Request. If this SJR is based on a recommendation from another study (e.g. Traffic Impact Analysis or Safety Study), then note the name/date of the study and attach the study to this SJR.
Sweetgrass is an undeveloped parcel located at 14096 Benns Church Boulevard in Isle of Wight County. The parcel is on the northeast side of Route 10 (Benns Church Boulevard) between Route 32 (Brewers Neck Boulevard) and Canteberry Lane. Ryan Homes is planning a development of single family and multi-family residential units as well as a public park, and shopping center, with a fast food restaurant, on this parcel.
Traffic Impact Analysis has been prepared by VHB, and a traffic signal is recommended at the proposed main entrance into the development. The SJR is required for the proposed signal. The Sweetgrass TIA is attached to this report.

If the origin of this SJR comes from another study, what were the key conclusions from that study that are related to this intersection?
The origin of this SJR came from the attached Sweetgrass TIA. The following conclusions came from the TIA:

- Construct northbound right turn lane (200’ storage plus 200’ taper) into right in/right out Proposed Secondary Entrance off of US 258/Rt 10 (Benns Church Boulevard).
- Construct northbound right turn lane (200’ storage plus 200’ taper) into Proposed Main Entrance off of US 258/Rt 10 (Benns Church Boulevard).
- Lengthen southbound left turn lane to provide 200’ storage plus 200’ taper into Proposed Main Entrance off of US 258/Rt 10 (Benns Church Boulevard).
- Install traffic signal at intersection of US 258/Rt 10 (Benns Church Boulevard) and Proposed Main Entrance.

II. Signal Warrant Analysis Summary

Intersection Approach Information:

Approach Direction	Road Name/Route Number	Approach Speed	Approach Speed Type	Approach Speed Notes[1]	Number of Through Lanes	Annual Average Daily Traffic (AADT)
Northbound	US 258/Rt 10 (Benns Church Boulveard)	45 MPH	Posted Speed Limit	none	2	25,000 vpd[2]
Southbound	US 258/Rt 10 (Benns Church Boulveard)	45 MPH	Posted Speed Limit	none	2	
Eastbound	N/A	N/A	N/A	N/A	N/A	N/A
Westbound	Proposed Main Entrance	25 mph	Proposed Posted Speed Limit	none	0	5,206 vpd[3]

[1] If approach speed type is not the posted/statutory speed limit, explain the reason why the posted/statutory speed limit was not used.
[2] Source: VDOT 2017 Daily Traffic Volume Estimates (AADT) Jurisdiction Report.
[3] Source: Sweetgrass t TIA trip generation.

Summary of Traffic Count Source:
Thirteen-hour turning movement counts (TMC), were collected from 6 AM to 7 PM using Miovision video on a typical, non-holiday weekday (Thursday, April 26th, 2018). These counts consisted of vehicular turning movements and pedestrian crossings at each approach. The 13-hour TMC is summarized in 15-minute intervals and is included in the attached signal warrant analysis.

Summary of MUTCD Signal Warrant Analysis:

MUTCD Signal Warrants	Warrant Satisfied?	Notes / Summary
Warrant 1: Eight-Hour Vehicular Volume	☐ Yes ☐ No ☐ N/A	
Warrant 1: VDOT ADT Option[1]	☒ Yes ☐ No ☐ N/A	Projected volumes: Mainline -32,315 vpd Minor Street (1-direction) – 5,206 vpd (see graphic on page 4 for site generated traffic that was added to existing mainline ADT). See information on following pages.
Warrant 2: Four-Hour Vehicular Volume	☒ Yes ☐ No ☐ N/A	Numerical requirements for Warrant 2 are met. See attached signal warrant analysis for details.
Warrant 3: Peak Hour[2]	☒ Yes ☐ No ☐ N/A	Numerical requirements for Warrant 3 are met. See attached signal warrant analysis for details.
Warrant 4: Pedestrian Volume	☐ Yes ☒ No ☐ N/A	Pedestrian activity is minimal at this study intersection.
Warrant 5: School Crossing	☐ Yes ☐ No ☒ N/A	Click or tap here to enter text.
Warrant 6: Coordinated Signal System	☐ Yes ☒ No ☐ N/A	Upstream signal has no coordination.
Warrant 7: Crash Experience	☐ Yes ☐ No ☒ N/A	Click or tap here to enter text.
Warrant 8: Roadway Network	☐ Yes ☐ No ☒ N/A	Click or tap here to enter text.
Warrant 9: Intersection Near a Grade Crossing	☐ Yes ☐ No ☒ N/A	Click or tap here to enter text.

Are the signal warrant analyses based on current volumes or anticipated future volumes?
☐ Current volumes ☒ Anticipated future volumes/conditions

If the signal warrant is only met under future conditions, provide a summary of trip generation assumptions and anticipated development thresholds that will trigger the signal being justified:
Signal warrants were met based on the forecasted volumes with the development being at full buildout in 2026. Traffic that may be generated by the proposed development was established using equations and rates available through the Institute of Transportation Engineer's (ITE) Trip Generation, 10th Edition.

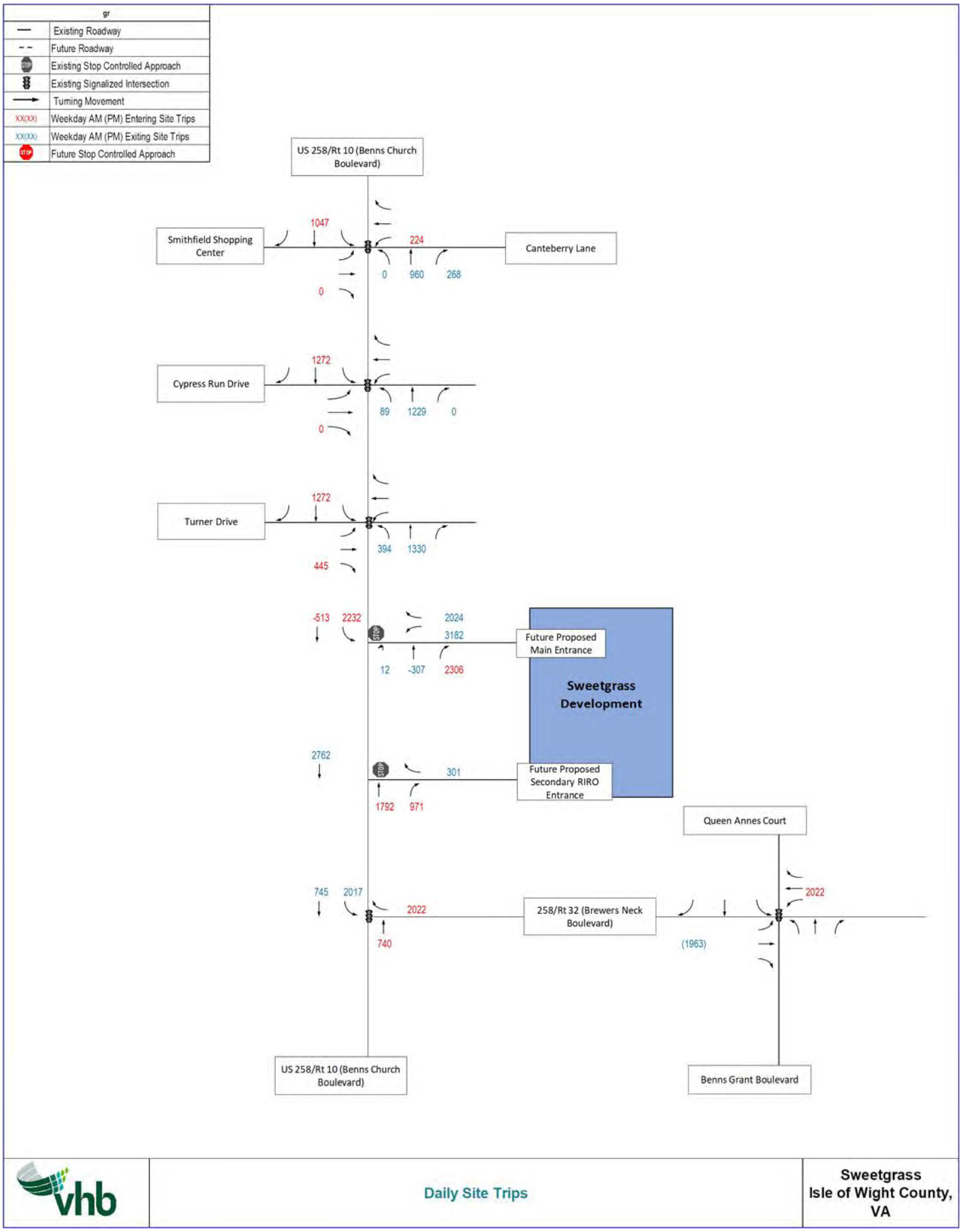
Trip generation for the site was prepared for each individual land use. ITE provides information for single-family detached housing (Land Use 210), low-rise multi-family housing (Land Use 220), public park (Land Use 411), shopping center (Land Use Code 820) and fast food with drive-through (Land Use 934).
The types of commercial development are unknown at this time, so shopping center was used. Pass-by trips to/from fast food restaurant were considered at 49% rate and pass-by trips to/from the shopping center were considered at 34% rate.
Summary of all future site trips are presented in the following tables and graphic.
Based on 70% reduction for speeds over 40 mph, a signal is warranted when the development is 43% complete.

Land Use	ITE Code	Size	Units	Daily	AM Peak Hour			PM Peak Hour		
					Enter	Exit	Total	Enter	Exit	Total
Conceptual Site Plan										
Single-Family Detached Housing	210	400	Dwelling Units	3,776	74	222	296	249	147	396
Multifamily Housing (Low-Rise)	220	285	Dwelling Units	2,144	30	101	131	101	59	160
Public Park	411	4	Acres	91	0	0	0	13	10	23
Shopping Center	820	30	1000 Sq. Ft. GLA	2,651	17	11	28	107	116	223
Fast Food with Drive-Thru	934	5	1000 Sq. Ft. GLA	2,355	102	99	201	85	78	163
Subtotal				**11,017**	**223**	**433**	**656**	**555**	**410**	**965**
Pass-by Trips (Fast Food only)	49%		% Pass-by	1,154	50	49	98	42	38	80
Pass-by Trips (Shopping Center)	34%		% Pass-by	901	6	4	10	36	39	76
Total New Trips				**8,962**	**167**	**380**	**548**	**477**	**333**	**809**

Reference: Trip Generation, 10th Edition, Institute of Transportation Engineers, Washington, DC. 2017.
Note: Used highest total between average rate and fitted curve unless R2<0.75

Land Use	ITE Code	Size	Units	Daily		
				Enter	Exit	Total
Conceptual Site Plan						
Single-Family Detached Housing	210	400	Dwelling Units	1888	1,888	3,776
Multifamily Housing (Low-Rise)	220	220	Dwelling Units	1072	1,072	2,144
Public Park	411	4	Acres	46	45	91
Shopping Center	820	30	1000 Sq. Ft. GLA	1326	1,325	2,651
Fast Food with Drive-Thru	934	5	1000 Sq. Ft. GLA	1177	1,178	2,355
Subtotal				**5,509**	**5,508**	**11,017**
Pass-by Trips (Fast Food only)	49%		% Pass-by	577	577	1,154
Pass-by Trips (Shopping Center)	34%		% Pass-by	451	450	901
Total New Trips				**4,481**	**4,481**	**8,962**

Reference: Trip Generation, 10th Edition, Institute of Transportation Engineers, Washington, DC. 2017.
Note: Used highest total between average rate and fitted curve unless R2<0.75



Daily Site Trips

Sweetgrass
Isle of Wight County, VA

III. VJuST Innovative Intersection Consideration

Summary of Potentially Feasible Innovative Intersections according to VJuST results:

Innovative Intersection Type	Feasibility Decision and Reason
Roundabout	Is a roundabout feasible? ☐ Yes ☒ No Explanation: The roundabout design was found to exceed capacity in both the AM and PM 2026 Build Condition. Additionally, the subject intersection is located on the major roadway (US 258/Rt 10 (Benns Church Boulevard) were the posted speed limit is 45 MPH. The mainline approach speeds would need to be slowed to 25-30mph to facilitate the roundabout. Slowing traffic down on northbound and southbound approaches, roundabout installation would be impractical and can potentially create a bottleneck on US 258/Rt 10.
All Innovative Intersection Designs Example: Median U-Turn	Is this Innovative Intersection type feasible? ☐ Yes ☒ No Explanation: The space needed for a continuous green tee is anticipated to exceed the available median storage width and would require the removal of the northbound U-turn. Additionally it is anticipated the west parcel will be developed soon and a green-t would restrict access to the parcel as well as pedestrian activity between Sweetgrass and the future development. The spacing between Turner Drive and the proposed signal is just over 1,000 feet. The signalized locations of the displaced lefts or median U-turn would be placed with the influence of the intersection at Turner Drive. In the case of the median u-turn the median opening for the displaced southbound lefts would fall within the vicinity of the secondary right in/right out access which would create undesirable weaving movement conflicts.

IV. Intersection Configuration and Control Recommendations and Signal Justification

Intersection Configuration and Control Recommendations:

This engineering study examined traffic signal warrants using existing volumes and Sweetgrass development trip generation at the intersection of US 258/Rt 10 (Benns Church Boulevard) & Proposed Main Entrance into the development in Isle of Wight County, VA. It is important to note that the satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal. Engineering judgement should also be used in the evaluation of the warrants to ensure that a traffic control signal will improve the overall safety and/or operation of the intersection. The analysis showed that the traffic volume warrants (Warrants 1, 2 and 3) are met at the 70% and 100% thresholds defined by the MUTCD.

Left turn lanes (200’ storage with 200’ taper) and right turn lanes (200’ storage with 200’ taper) are required on US 258/Rt 10 (Benns Church Boulevard). The Proposed Main Entrance should have a single-entry lane and three exit lanes (dual lefts and an exclusive right).

Signal Justification:

The signal is recommended in this location based on the projected volumes. US 258/Rt 10 (Benns Church Boulevard) has heavy through volumes with posted speed limit of 45 mph. Left-turns onto the roadway out of the proposed development will be almost impossible without the proposed signal. The capacity analysis has shown that the intersection will operate acceptably with a minimum impact on the adjacent transportation network with signal installation in this location.

V. Approvals

Signal Justification Report Approvals:

District Traffic Engineer (DTE): Required for all SJRs

☐ Concur ☐ Do Not Concur

Name	Signature	Date

Comments:

District Engineer/Administrator (DE/DA): Only required if SJR recommends a proposed signal on the APN

☐ Concur ☐ Do Not Concur

Name	Signature	Date

Comments:

State Traffic Engineer (STE): Only required if SJR recommends a proposed signal on the APN

☐ Approved ☐ Denied

Name	Signature	Date

Comments:

If additional comments are necessary, please attach the comments on another sheet.

Appendix A:
Signal Warrant Analysis

Traffic Signal Warrant Analysis

This report details the findings of a traffic signal warrant analysis on the US 258/Rt 10 (Benns Church Boulevard) & Proposed Main Entrance intersection, to determine whether a signal would be warranted for the opening day build year, 2026, of the Sweetgrass Development.

Evaluation of the need for a traffic signal at an intersection requires the examination of various factors such as traffic volumes, traffic flow and progression, and overall safety of the intersection to determine if a traffic signal would be warranted. Each of these elements is described below.

Methodology

Signal warrant analyses were performed following the procedures outlined in the 2009 edition of the Manual of Uniform Traffic Control Devices (MUTCD). Existing peak hour turning movement counts were collected at the study intersection and were used for this warrant analysis.

The traffic conditions of the intersection in the build year, 2026, were derived from a composition of existing turning movement volumes and a distribution of site trips from the Sweetgrass Development. The extent of signal warrant of the future conditions is limited by the data derived from the traffic forecast which includes only morning and evening peak hours and two additional hours, that were selected based on land uses that generate the highest traffic volumes: single-family detached housing, multifamily housing (low-rise) and fast-food restaurant.

Warrant Analysis Results

Warrant 1 – Eight Hour Vehicular Volume

Warrant 1, Eight-Hour Vehicular Volume, consists of two separate warrants; Warrant 1A-Minimum Vehicular Volume and Warrant 1B-Interruption of Continuous Traffic. The Minimum Vehicular Volume warrant is intended for use at locations where a large volume of intersecting traffic is the principal reason to consider installing a traffic signal. The Interruption of Continuous Traffic warrant is intended for use at locations where Warrant A is not satisfied and where the volume of traffic on a major street is so heavy that traffic on a minor intersecting street suffers excessive delay when attempting to cross or enter the major street. Warrant 1 is intended to be used as a single warrant; if Warrant A is met and Warrant B is not met, a traffic signal is warranted. Conversely, if Warrant A is not met and Warrant B is met, a traffic signal is still warranted.

Since this is a proposed entrance, VDOT's Traffic Signal Warrant Using Average Daily Traffic Estimate for the Virginia Supplement to the MUTCD was used. The future traffic projections at the US 258/Rt 10 (Benns Church Boulevard) & Proposed Main Entrance intersection were developed using the daily trip generation and distribution patterns shown in the TIA. The daily trip projections and associated site traffic are shown in the following table and figure respectively. For the signal warrant, the projected site trips on US 258/Rt 10 (Benns Church Boulevard) were added to the 2017 VDOT AADT of 25,000 vpd projected to Opening Day 2026 AADT of 28,585 vpd.

Land Use	ITE Code	Size	Units	Daily		
				Enter	Exit	Total
Conceptual Site Plan						
Single-Family Detached Housing	210	400	Dwelling Units	1888	1,888	3,776
Multifamily Housing (Low-Rise)	220	220	Dwelling Units	1072	1,072	2,144
Public Park	411	4	Acres	46	45	91
Shopping Center	820	30	1000 Sq. Ft. GLA	1326	1,325	2,651
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Pass-by Trips (Fast Food only)	49%		% Pass-by	577	577	1,154
Pass-by Trips (Shopping Center)	34%		% Pass-by	451	450	901
Total New Trips				**4,481**	**4,481**	**8,962**

Reference: Trip Generation, 10th Edition, Institute of Transportation Engineers, Washington, DC. 2017.
Note: Used highest total between average rate and fitted curve unless R2<0.75

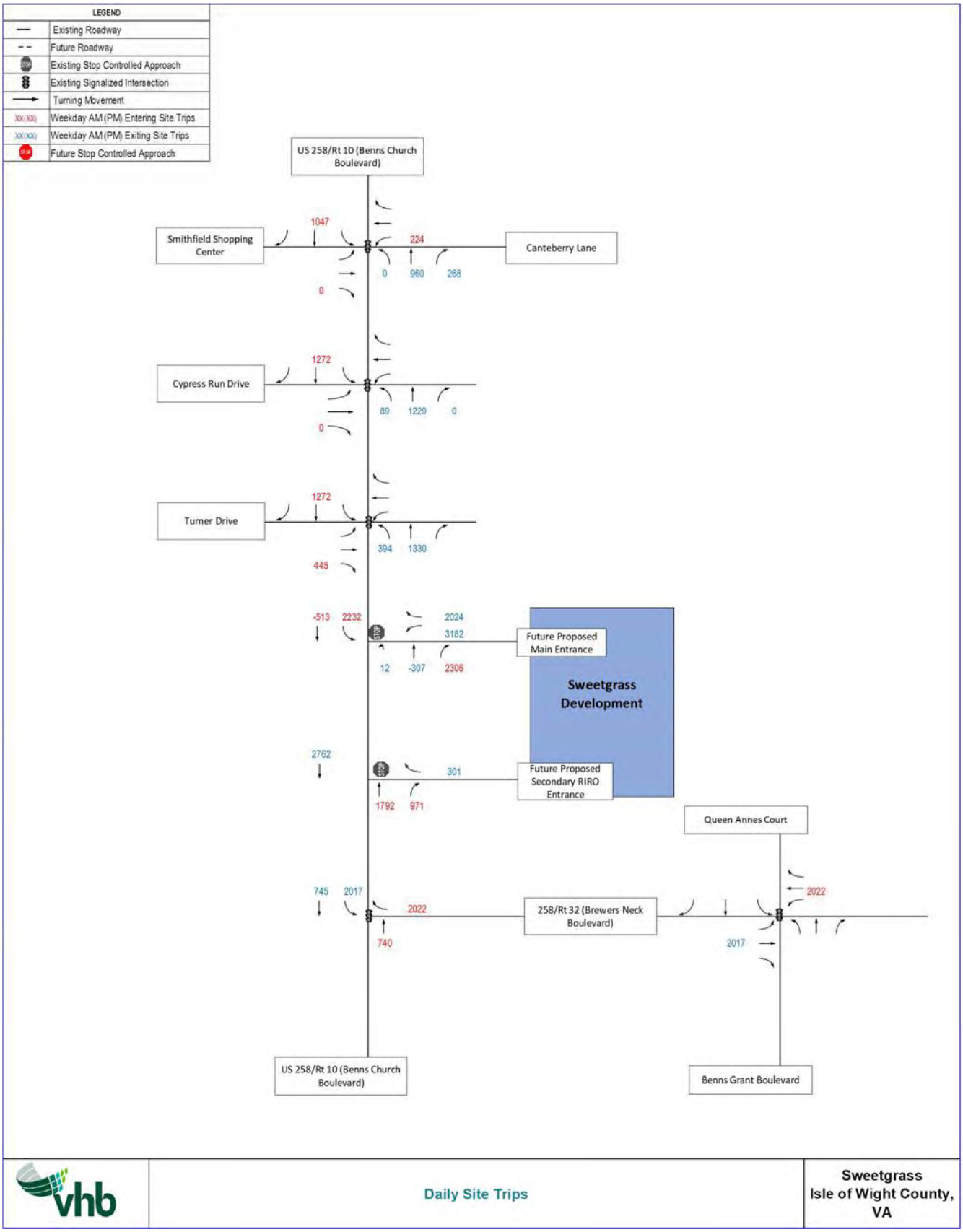

LEGEND
Existing Roadway
Future Roadway
Existing Stop Controlled Approach
Existing Signalized Intersection
Turning Movement
XX(XX) Weekday AM (PM) Entering Site Trips
XX(XX) Weekday AM (PM) Exiting Site Trips
Future Stop Controlled Approach
US 258/Rt 10 (Benns Church Boulevard)
Smithfield Shopping Center
Canteberry Lane
Cypress Run Drive
Turner Drive
Future Proposed Main Entrance
Sweetgrass Development
Future Proposed Secondary RIRO Entrance
Queen Annes Court
258/Rt 32 (Brewers Neck Boulevard)
US 258/Rt 10 (Benns Church Boulevard)
Benns Grant Boulevard
1047
224
0
960
268
0
1272
89
1229
0
0
1272
394
1330
445
-513
2232
2024
3182
12
-307
2306
2762
301
1792
971
745
2017
2022
2022
740
2022
2017
vhb
Daily Site Trips
Sweetgrass
Isle of Wight County, VA

Table 1: Future Conditions – Warrant 1 Condition A Summary

Number of Lanes		Vehicles per day on major street (total of both approaches)					Vehicles per day on minor street (total of both approaches)				
Major	Minor	100%	80%	70%	56%	Projected	100%	80%	70%	56%	Projected
2 or more	2 or more	9600	7680	6720	5376	32315	3200	2560	2240	1792	5206

Proposed signal warranted when development is: 43%

Warrant 1 is satisfied. The signal is projected to be warranted when the development is 43% built out with the 70% reduction due to the speed limit along the corridor.

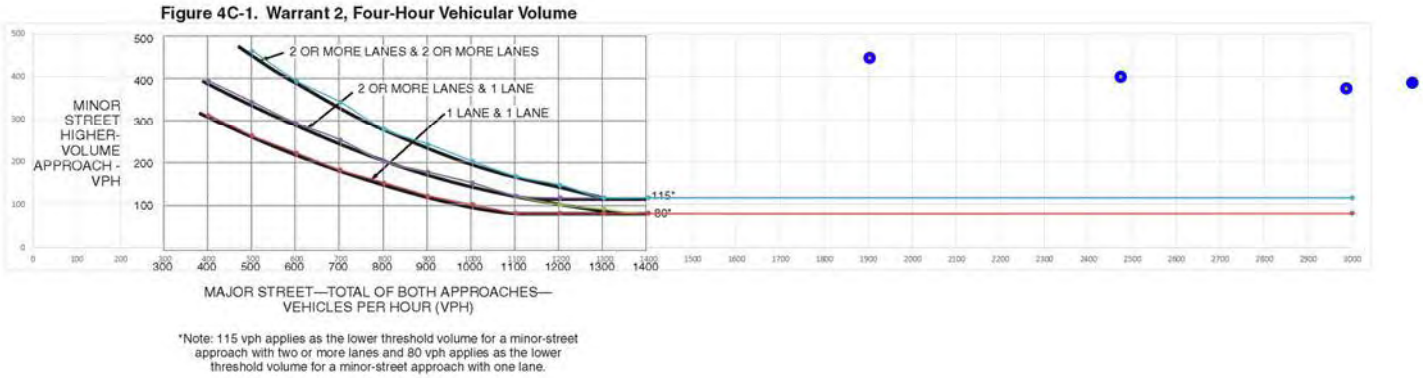
Warrant 2 – Four Hour Vehicular Volume

Warrant 2, Four-Hour Vehicular Volume, is intended for use at locations where a large volume of intersecting traffic is the principal reason to consider installing a traffic signal. A traffic signal is warranted based on Warrant 2 if "the plotted points representing the vehicles per hour on the major street and the minor street fall above the applicable curve."

Considering the two highest peak hours in terms of traffic volume at the study intersection the following figure shows that both, AM and PM peak hours, as well as additional two hours, would exceed the threshold of the Warrant. Based on the future land uses, it is expected that four hours would meet the minimum threshold volumes of the warrant.

Figure 1: 2026 Build Conditions Warrant 2

Time	Major Street (vph)	Minor Street (vph)
7:00 AM to 8:00 AM	2474	399
12:00 PM to 1:00 PM	1903	444
4:00 PM to 5:00 PM	3271	388
4:30 PM to 5:30 PM	2968	372



Warrant 2 is satisfied.

Warrant 3 – Peak Hour

Warrant 3, Peak Hour, "is intended for use at a location where traffic conditions are such that for a minimum of 1 hour of an average day, the minor-street traffic suffers undue delay when entering or crossing the major street." The Peak Hour warrant is met when "the plotted point representing the vehicles per hour on the major street and the minor street for one hour fall above the applicable curve" or based on the following conditions:

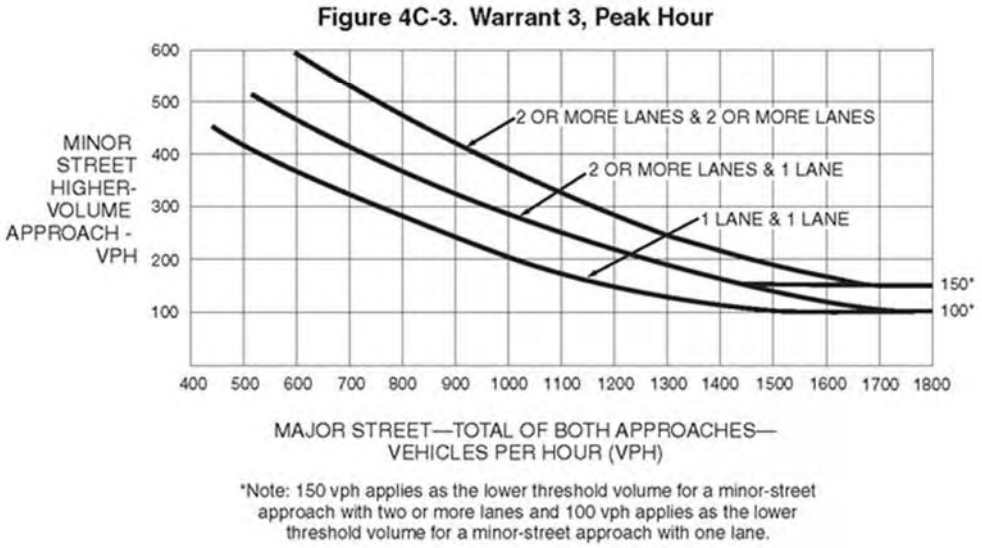
a) The total stopped time delay experienced by the traffic on one minor-street approach controlled by a stop sign equals or exceeds: 4 vehicle-hours for a one-lane approach; or 5 vehicle-hours for a two-lane approach, and

b) The volume on the same minor-street approach equals or exceeds 100 vehicles per hour for one lane or 150 vehicles per hour for two lanes, and

c) The total entering volume during the hour meets or exceeds 650 vehicles per hour for intersections with three approaches or 800 vehicles per hour for intersections with four or more approaches.

Figure 2: 2026 Build Conditions Warrant 3

Time	Major Street (vph)	Minor Street+ (vph)
7:00 AM to 8:00 AM	2474	336
4:30 PM to 8:00 AM	2968	352



As shown in Figure 2, both AM and PM peak hours fall above the curve for the geometric combination of 2 or more lanes on both the major and minor roadways.

Warrant 3 is satisfied.

Warrant 4 – Pedestrian Volume

Warrant 4, Pedestrian Volume, is intended for use at locations where the volume of traffic on the major street is so heavy that pedestrians experience significant delay or conflict when attempting to cross the major street. Warrant 4 is satisfied when "the pedestrian volume crossing the major street at an intersection during an average day is: 100 or more for each of any four hours; or 190 or more during any one hour."

Currently, there are no existing pedestrian sidewalks in the area of the study. It is not expected that the development will generate the pedestrian volumes levels required to satisfy the warrant due to the rural nature of the surrounding area.

Warrant 4 is not satisfied.

Warrant 5 – School Crossing

Warrant 5, School Crossing, is intended for use at locations “where the fact that school children cross the major street is the principal reason to consider installing a traffic control signal.” For the purposes of this warrant, the word "schoolchildren" includes elementary through high school students.

Warrant 5 is not applicable because there are no school crossings near the subject intersection.

Warrant 5 is not satisfied.

Warrant 6 – Coordinated Signal System

Warrant 6, Coordinated Signal System, is satisfied when “on a two-way street, adjacent signals do not provide the necessary degree of platooning and speed control and the proposed and adjacent signals could constitute a progressive signal system.”

A signal at Proposed Main Entrance would not help traffic platooning since the signal located at Turner Road is not coordinated.

Warrant 6 is not satisfied.

Warrant 7 – Crash Experience

Warrant 7, Crash Experience, is intended for use at locations where “the severity and frequency of crashes are the principal reasons to consider installing a traffic control signal.” A traffic signal is warranted based on Warrant 7 if the following criteria are met:

a) Adequate trial of alternatives with satisfactory observance and enforcement has failed to reduce the crash frequency; and
b) Five or more reported crashes, of types susceptible to correction by a traffic signal, have occurred within a 12-month period, each crash involving personal injury or property damage exceeding the applicable requirements for a reportable crash.

Due to the lack of crash data, we were unable to evaluate the severity and frequency of crashes at the intersection.

Warrant 7 is not satisfied.

Warrant 8 – Roadway Network

Warrant 8, Roadway Network, is intended when the proposed traffic signal will encourage concentration and traffic flow organization on a given roadway network. This Warrant is intended for location where two major routes meet or where traffic volumes exceed 1000 vehicles per hour.

Warrant 8 is not applicable because the minor street is an entrance into the development and is not a major roadway.

Warrant 8 is not satisfied.

Warrant 9 – Intersection Near a Grade Crossing

Warrant 9, Intersection Near a Grade Crossing, is intended for "use at a location where none of the conditions described in the other eight traffic signal warrants are met, but the proximity to the intersection of a grade crossing on an intersection approach controlled by a STOP or YIELD sign is the principal reason to consider installing a traffic control signal."

Warrant 9 is not applicable.

Warrant 9 is not satisfied.

Conclusions

Warrant Analysis Conclusions

This engineering study examined traffic signal warrants at the intersection of US 257/Rt 10 (Benns Church Boulevard) and the Proposed Main entrance. The analysis showed that the traffic volume warrants (Warrants 1, 2 and 3) are met at the 70% and 100% thresholds defined by the MUTCD. The warrant is based on projected traffic volumes as well as volumes generated by the development, calculated based on available traffic data from 10th edition of ITE Trip Generation Manual.

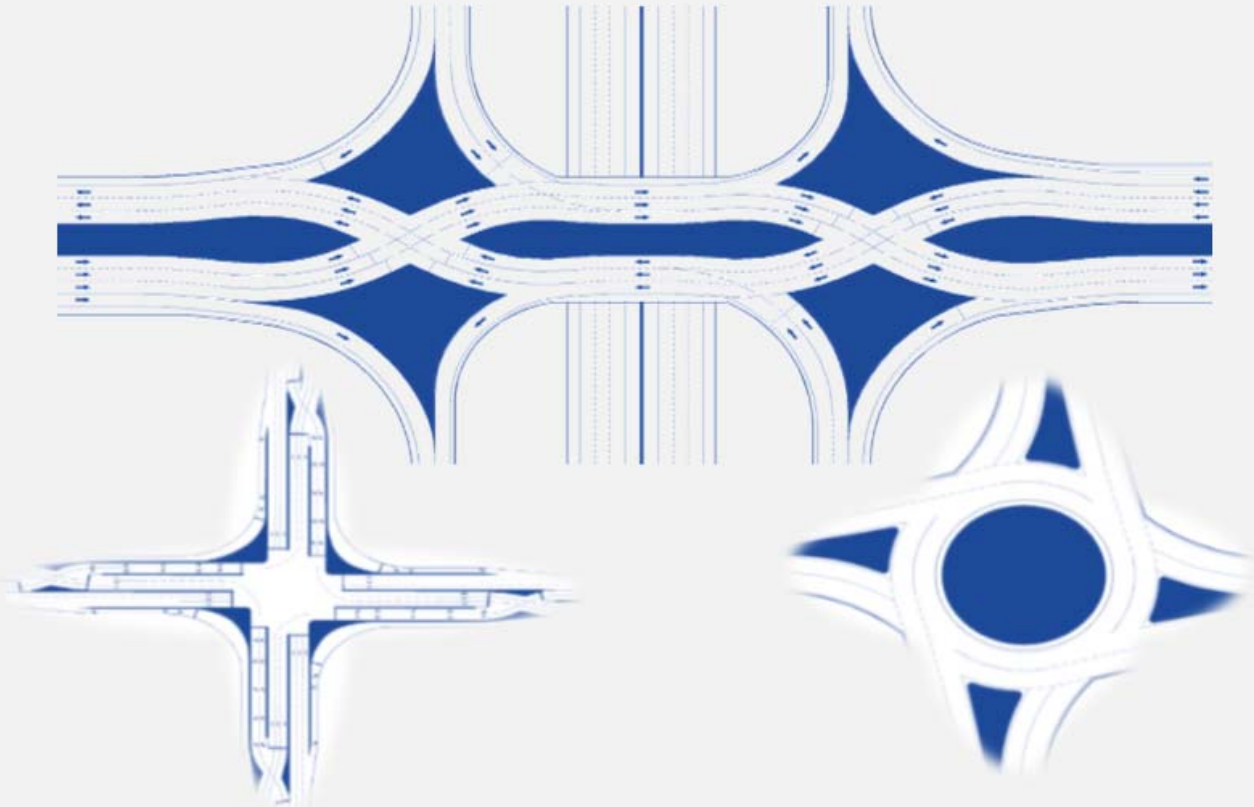
Appendix B:
VJuST Input and Results Worksheets

VJuST

VDOT Junction Screening Tool

Version 1.02
June 2018

View Disclaimer



VDOT

Modified from FHWA's Capacity Analysis for Junctions (CAP-X)

To Download the latest version of VJuST please go to: http://www.virginiadot.org/innovativeintersections
For Technical Support or Help please email: vjustsupport@vdot.virginia.gov

DISCLAIMER & ACKNOWLEDGMENTS

DISCLAIMER ACKNOWLEDGMENT

By indicating below, I acknowledge that I have obtained the most up-to-date version of this tool and that I have reviewed the Disclaimer.

Yes

DISCLAIMER FOR USERS OF THE VDOT JUNCTION SCREENING TOOL

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The VDOT Junction Screening Tool is a modified or altered version of the CAP-X Software developed by the Federal Highway Administration (FHWA). VDOT's alterations to the CAP-X Software include:

- Seven new intersection and four new interchange configurations
- Two additional metrics (other than congestion):
    1. safety - based on weighted vehicle conflict points and
    2. pedestrians - based on the potential to accommodate pedestrians in terms of safety, wayfinding, and delay
- Enhanced congestion metric that includes consideration of shared lanes and/or channelized right-turn lanes

The following Disclaimer, Limited Warranty and Limitations of Remedies, and Notice apply to CAP-X Software elements within the VDOT Junction Screening Tool:

Disclaimer

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The United States Government does not endorse products or manufacturers. Trade and manufacturers' names may appear in this software product only because they are considered essential to the objective of the software product.

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Notice

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DISCLAIMER & ACKNOWLEDGMENTS

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INNOVATIVE INTERSECTION COMMITTEE

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Virginia Transportation Research Council
Justice Appiah

VDOT
Anne Booker (Salem District)
Mark Cole (Central Office Traffic Engineering [Safety])
Mike Corwin (Hampton Roads)
Russell Dudley (Central Office Local Assistance)
Terrell Hughes (Central Office Transportation and Mobility Planning)
Susan Keen (Central Office Location and Design)
Theron Knouse (Central Office Location and Design)
Mena Lockwood (Central Office Traffic Engineering)
Ben Mannell (Central Office Transportation and Mobility Planning)
Bruce McAuliffe (Central Office Project Management Office)
Ritchie Robbins (Central Office Traffic Engineering [Signal])
George Rogerson (Central Office Location and Design)
Robert Vilak (Richmond District)
Allan Yue (Central Office Traffic Engineering)

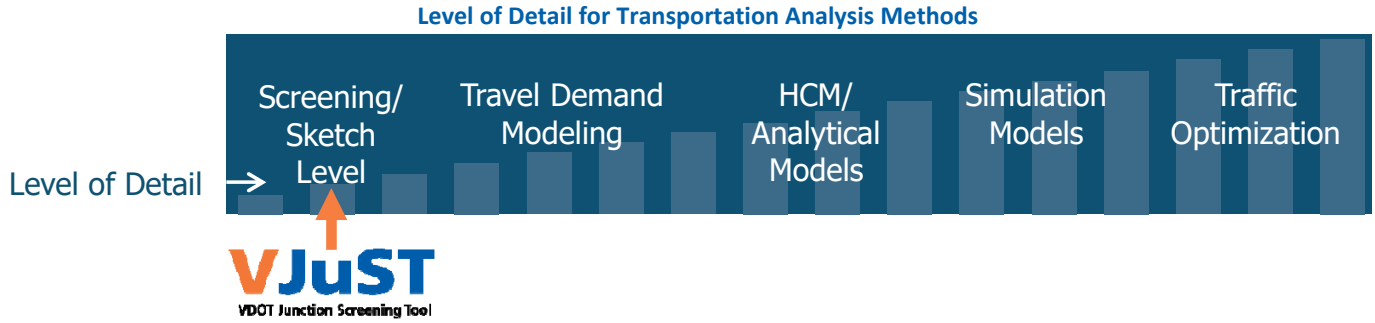
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OVERVIEW OF THE TOOL

BACKGROUND

The Federal Highway Administration (FHWA) Office of Operations Research and Development developed the Capacity Analysis for Planning of Junctions (CAP-X) software to screen innovative intersection and interchange configurations. CAP-X is a sketch-level tool that was created to help users focus on more effective intersection and interchange configurations prior to conducting more demanding traffic simulations. The figure below illustrates the level of detail associated with sketch-level tools in relation to more robust methods.



CAP-X uses the Critical Lane Volume (CLV) method to provide sketch-level capacity assessments for innovative intersection and interchange configurations using peak hour volumes. The CLV method estimates an overall intersection volume-to-capacity ratio assuming the maximum capacity of the intersection is fixed (i.e., no variance in traffic signal timings).

In 2016, the Virginia Department of Transportation (VDOT) altered the CAP-X software for use in determining the congestion component in the SMART SCALE application scoring process. More information about the SMART SCALE process may be found at http://vasmartscale.org/. The VDOT innovative Intersection Committee requested that the CAP-X software tool be modified further for use in screening innovative intersection and interchange configurations in terms of congestion, pedestrians, and safety. Ultimately, the VDOT Innovative Intersection Committee envisions the tool to be useable by local jurisdictions as well as VDOT engineers and planners during the SMART SCALE application process. The tool was renamed to the VDOT Junction Screening Tool and now includes 26 unique intersection and interchange configurations, 15 of which were originally in CAP-X.

PURPOSE

The VDOT Junction Screening Tool is intended to aid transportation engineers and planners in Virginia with considering and screening innovative intersection and interchange configurations that address mobility and safety issues. This sketch-level tool can help identify and screen innovative intersection and interchange configurations to be evaluated for further study, analysis and design. Results are based on user inputs for turning movement volumes and lane configurations. This tool is only applicable to isolated intersections or interchanges; however, the results may be indicative of how an intersection or interchange within a corridor will operate.

The results provided in the VDOT Junction Screening Tool are not meant to replicate the results that would be obtained from more detailed traffic operations, safety, and design analyses. As such, the VDOT Junction Screening Tool is intended to provide information to users that will aid them in the planning, screening, and decision-making processes used to determine which innovative intersection and interchange configurations should move forward to a more detailed analysis.

SCORING SYSTEM

The VDOT Junction Screening Tool provides information to users in three categories: congestion, pedestrians, and safety. Further information on the development of each category is outlined below. This tool does not prioritize any category over another and congestion is the only category dependent on user inputs. It is the user's responsibility to decide how to apply and prioritize the results from this tool.

OVERVIEW OF THE TOOL

Congestion

Volume-to-capacity (V/C) ratio is the primary metric used to reflect congestion when comparing configurations. V/C ratio is calculated using the CLV method with the assumption that the maximum capacity of the intersection is fixed. This calculation is dynamic and is dependent on the volume and lane configuration inputs entered into the VDOT Junction Screening Tool. This calculation does not consider signal timing, geometric, or driver behavior parameters and is not intended to replicate the calculations produced by traffic analysis tools.

The user must verify the number of left-turn, through, and right-turn lanes entered for each innovative intersection or interchange configuration that is considered. Misleading results are possible if lane configurations are inconsistent across similar intersection or interchange configurations. This tool generally does not limit the number of lanes that are assigned to a particular movement. The user should also consider right-of-way (ROW) impacts and/or design requirements for an individual project when assigning lane configurations.

Some of the innovative intersection or interchange configurations are divided into multiple zones, with each zone representing a location with conflicting volumes, such as a signalized intersection or crossover. The CLV method is applied individually for each zone to calculate a V/C ratio. This method determines the maximum volume per lane that must be accommodated during each signal phase and sums the critical phase volumes to determine the overall critical volume that must be accommodated by the zone. A value of 1,600 passenger cars per lane is assumed for the maximum intersection CLV. The calculated CLV for a zone is then divided by the maximum intersection CLV to determine the V/C ratio for that zone. The maximum V/C ratio of all zones that make up an innovative intersection or interchange configuration is summarized in the Results Worksheet. This V/C ratio represents the worst bottleneck in the configuration. The following table from the Highway Capacity Manual (HCM) 2000 may be used to relate the maximum V/C ratio to a description of capacity.

Capacity Description Based on V/C Ratio

V/C Ratio	Description of Capacity
< 0.85	Under capacity
0.85 - 0.95	Near capacity
0.95 - 1.0	At capacity
> 1.0	Over capacity

Source: *Highway Capacity Manual 2010*

Pedestrian

Innovative intersection and interchange configurations were evaluated based on its potential to accommodate pedestrians considering relative impact on pedestrian safety, wayfinding, and delay. The metric developed is a static metric that is not dependent on vehicular volumes, pedestrian volumes, or the number of lanes. The potential to accommodate pedestrians is qualitatively defined as better (+), similar (blank cell), or worse (-) when compared to a conventional intersection or a traditional diamond interchange. The following components were considered in determining this rating:

Safety

- Direction of traffic flow
- Number of vehicle/pedestrian conflicts
- Relative crosswalk lengths

Wayfinding

- Crosswalk alignment

Delay

- Number of crossings for a single movement
- Traffic signal cycle length

OVERVIEW OF THE TOOL

Safety

The relative safety of each innovative intersection or interchange configuration was estimated using a risk analysis based on vehicle conflict points. The three types of conflict points (crossing, merging, and diverging) were weighted based on the calculated average crash cost associated with each conflict point type. The methodology for determining the weighting system is outlined in the Safety Information worksheet. The conflict point diagram, number of conflict points, and the weighted total conflict point metric can be found in the Safety - Conflict Point Diagram section of each lane configuration worksheet.

ASSUMPTIONS

The following assumptions apply to the entire tool. Assumptions for a specific innovative intersection or interchange configuration are listed on the lane configuration worksheet.

- This tool defines an intersection configuration as a junction of two interrupted roadways, regardless of grade separation. This tool defines an interchange configuration as a junction of two roadways where one roadway remains uninterrupted.
- This tool is to be used to screen configurations for isolated intersections only. This tool does not consider adjacent intersections or a series of intersections in a corridor.
- This tool does not assume a base or existing condition. It assumes innovative configurations to be proposed conditions and compares them against each other.

- With the exception of the unsignalized configurations (50 Mini Roundabout, 75 Mini Roundabout, Roundabout, TWSC, Single Roundabout, Double Roundabout), each zone in a configuration is assumed to be signalized.
- Signal timing is not considered as part of CLV methodology.

- The TWSC and roundabout lane configuration worksheets do not use the CLV methodology. These worksheets use the *Highway Capacity Manual* (*HCM*), 6th Edition methodology or methodology established in the article *Determination of Mini-Roundabout Capacity in the United States* to compute the congestion metrics.

- Vehicule volumes, pedestrian volumes, and number of lanes were not considered as part of the pedestrian metric.
- Pedestrian and bicycle conflicts were not considered in the development of the conflict point diagrams.
- The number of lanes was not considered in the development of the conflict point diagrams.
- A default value of 1,600 passenger cars per lane is assumed for the maximum intersection CLV.
- U-turn volumes from the TMCs are treated as left-turns. This tool only analyzes U-turns that are built into an innovative intersection or interchange configuration to remove left-turning traffic from an intersection (e.g., Restricted Crossing U-Turn).
- If a turning movement shares a lane with the through movement, the turning volume is factored by an adjustment factor to convert it to an equivalent through movement. For right turns or left turns with no opposing right-turn and through movements, the turning volume is divided by the left- or right-turn adjustment factor. For left turns with opposing right-turn and through movements, the left-turn volume is instead multiplied by a custom left-turn factor based on the opposing volume.

Custom Left-Turn Factors

Opposing Volume	Custom Factor
< 200	1.1
200 - 599	2
600 - 799	3
800 - 999	4
≥ 1,000	5

Sources: *Guidelines for the Analysis of the Traffic Impact of Development Proposals; City of Frederick - Traffic Impact Study Guidelines*

● If an approach has both a shared through-left lane and an exclusive left-turn lane, this approach and its opposing approach are assumed to operate with split phasing.

● If a movement has both a shared and an exclusive lane, the volume is distributed between the two lanes based on the number of lanes indicated. The proportion of the turning volume that is assigned to the shared lane is divided by the left- or right-turn adjustment factor to convert it to an equivalent through movement. For example, if the northbound movement has a left-turn lane and a shared left-through lane, 50% of the left-turn volume is assigned to each lane.
● If a right-turn movement is channelized with a receiving lane, the right-turn volume is not considered in the CLV calculations for that zone.

● Unless specified with the lane configuration worksheet, right-turn movements are not assumed to be channelized.
● For interchange configurations, it is assumed that no vehicles on the off-ramp make through movements.

LIST OF ABBREVIATIONS

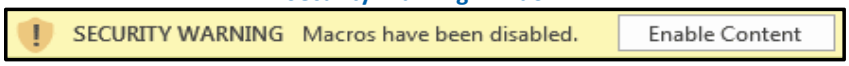
CAP-X	Capacity Analysis of Junctions
CLV	Critical Lane Volume
CGT	Continuous Green-T
DDI	Diverging Diamond Interchange
DLT	Displaced Left Turn
EB	Eastbound
E-W	East-West
FHWA	Federal Highway Administration
HCM	Highway Capacity Manual
Hr	Hour
ICD	Inscribed Circle Diameter
LTAF	Left-Turn Adjustment Factor
MUT	Median U-Turn
MUD	Michigan Urban Diamond
NB	Northbound
N-E	North-East
N-S	North-South
N-W	North-West
Parclo	Partial Cloverleaf
PC/Hr	Passenger Cars Per Hour
PCE	Passenger Car Equivalent
PCPH	Passenger Cars Per Hour
PCL	Partial Cloverleaf
PMUT	Partial Median U-Turn
QR	Quadrant Roadway
RCUT	Restricted Crossing U-Turn
ROW	Right-of-way
RTAF	Right-Turn Adjustment Factor
SB	Southbound
S-E	South-East
S-W	South-West
SPUI	Single Point Urban Interchange
TD	Traditional Diamond
TMC	Turning Movement Count
UTAF	U-Turn Adjustment Factor
V/C	Volume/Capacity
VDOT	Virginia Department of Transportation
Veh/Hr	Vehicles per hour
WB	Westbound

VJuST
VDOT Junction Screening Tool

INSTRUCTIONS

Upon opening the tool, click the Enable Content button as shown in the security warning window.

Security Warning Window



This tool contains the following worksheets to screen innovative intersection and interchange configurations and report results:

- **Input Worksheet** - the user inputs general project information, traffic volumes, and adjustment factors and to select which innovative intersection and interchange configurations should be considered
- **Lane Configuration Worksheets (29)** - the user inputs lane configurations and calculates the congestion metrics using the Critical Lane Volume (CLV) methodology
- **Results Worksheet** - summarizes the congestion, pedestrian, and safety metrics for the innovative intersection and interchange configurations selected for comparison

The following worksheets are also included for reference and guidance in screening innovative intersection and interchange configurations:

- **Overview** - describes the methodologies used to calculate the congestion, pedestrian, and safety metrics
- **Safety Information** - summarized the process used to develop the conflict point weighting factors used to develop the safety metric
- **Design Considerations** - provides a description of the innovative intersection and interchange configurations and provides guidance on when a configuration should be considered

This tool can be used to screen innovative intersection and interchange configurations following the four steps provided below.

Step 1: Enter Volume Inputs
Step 2: Review and Select Intersection and Interchange Configurations for Comparison
Step 3: Enter Lane Configurations (for each selected worksheet)
Step 4: View and Interpret Results

STEP 1: ENTER VOLUME INPUTS

Input the project title and the names of the east-west roadway facility and the north-south roadway facility. This information will be automatically populated on each subsequent worksheet.

This tool requires the user to input turning movement counts (TMCs) into the yellow cells on the **Input Worksheet** to compare innovative intersection and interchange configurations. The traffic counts may be for the current year or may be projected to a future year. If the TMC includes U-turn volumes separately, then add the U-turn volume to the left-turn volume. This tool does not analyze U-turns unless U-turns are built into an innovative intersection configuration to remove left-turning traffic from an intersection (e.g., Restricted Crossing U-Turn).

Traffic Volume Demand Inputs

Traffic Volume Demand				
Direction	Volume (veh/hr)			Truck Percent (%)
	U-Turn / Left	Thru	Right	
Eastbound	251	276	376	2.00%
Westbound	238	377	111	2.00%
Southbound	644	0	196	2.00%
Northbound	202	0	427	2.00%
Adjustment Factor	0.80 / 0.95		0.85	
Suggested	U - 0.8 / L - 0.95		0.85	
Truck to PCE Factor		Suggested = 2.00		2.00
Critical Lane Volume		1600		

INSTRUCTIONS

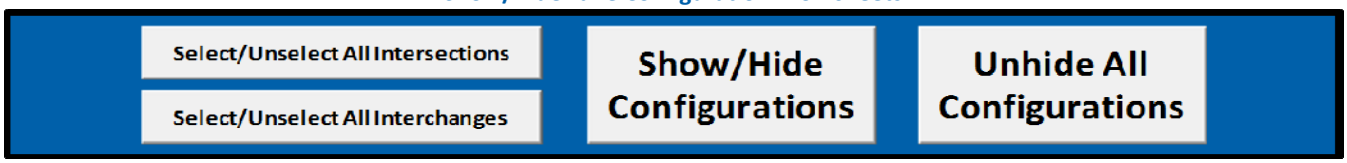
This tool uses adjustment factors to convert turning vehicles to equivalent through vehicles before calculating the CLV. Suggested values for these factors are provided in the tool; however, these values may be changed based on the typical traffic mix, driver behavior, and project location. Input the following factors into the yellow cells:

- Left-turn adjustment factor (LTAF): conversion of protected left- and U-turning vehicles to equivalent through vehicles
- Right-turn adjustment factor (RTAF): conversion of right-turning vehicles to equivalent through vehicles
- U-turn adjustment factor (UTAF): conversion of U-turning vehicles (rerouted through or left-turn movements) to equivalent through vehicles (this factor is only used if U-turns are built into an alternative configuration to remove left-turning traffic from an intersection)
- Truck to passenger car equivalent (PCE) factor: conversion of truck volume to an equivalent passenger car volume. This may be based on the *HCM, 6th Edition* .

STEP 2. REVIEW AND SELECT INTERSECTION AND INTERCHANGE CONFIGURATIONS FOR COMPARISON

Review the list of alternative intersection and interchange configurations included in this tool. Each configuration contains a link to an informational worksheet that provides guidance on when each configuration type should be considered. Indicate with a "Y" any configurations that should be considered. Indicate with an "N" any configurations that should be excluded. Use the **Show/Hide Configurations** button to hide the worksheets for all "N" configurations. The configurations selected for exclusion will also be hidden from the Results Worksheet. The **Unhide All Configurations** button may be used to unhide all worksheets. Additionally, three toggle buttons allow the user to select or unselect all intersections or interchanges. However, these toggle buttons will not hide the respective lane configuration worksheets; the user must still use the **Show/Hide Configurations** button.

Show/Hide Lane Configuration Worksheets



Provide justification by selecting an option in the drop down in the **Input Worksheet** for all alternative intersection and interchange configurations excluded for the screening comparison.

Justification Options

#	Intersections	Information	Consider?	Justification
	Signalized Intersections			
1	Conventional	-	Y	
2	Bowtie	Link	Y	
3	Center Turn Overpass	Link	N	
4	Continuous Green-T	Link	N	
5	Echelon	Link	Y	
6	Full Displaced Left Turn	Link	Y	
7	Median U-Turn	Link	Y	

Not feasible for roadway facility type
Insufficient intersection spacing
Financial constraints identified
Right-of-way restrictions identified
Unable to accommodate traffic patterns
Unable to accommodate magnitude of traffic volumes
Unable to accommodate heavy vehicles
Unable to accommodate alternative transportation modes

STEP 3: ENTER LANE CONFIGURATIONS

Complete the following steps for the intersection and interchange configurations selected for screening in the **Input Worksheet**.

Step 3.1: Answer the directional question (if applicable) **[Input Worksheet]**
Step 3.2: Enter the lane configurations **[Input Worksheet and Lane Configuration Worksheets]**

Step 3.1: Answer the Directional Questions

All asymmetrical configurations contain a question that will associate a direction with a geometric feature in the configuration to correctly reference the TMCs from the **Input Worksheet** to the lane configuration worksheets. These questions are located on the **Input Worksheet** as pictured below.

Example Directional Questions

VDOT Junction Screening Tool

Base Lane Configurations

Before entering a base number of through lanes for each direction, answer the directional question for each intersection or interchange configuration selected for consideration. Navigate to the lane configuration worksheet for example diagrams, if provided.

Intersections	Question	Selection
Bowtie	Select the roadway with the roundabouts from the drop-down list.	EB-WB / NB-SB
Continuous Green-T	Select the direction associated with the "stem" of the T-intersection from the drop-down list. See example diagrams.	
Echelon	Select the approach that shares a zone with the NB approach from the drop-down list. See example diagrams.	

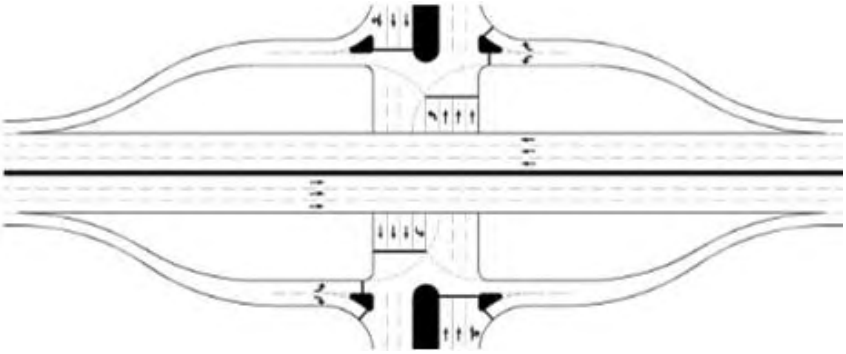
Directional Questions and Options:

- [All interchanges] Select the freeway direction from the drop-down list. EB-WB, NB-SB
- [Continuous Green-T] Select the direction associated with the "stem" of the T-intersection from the drop-down list. NB, SB, EB, WB
- [Partial Displaced Left Turn] Select the roadway with the displaced left turns. EB-WB, NB-SB
- [Multiple] Select the roadway with the U-turns from the drop-down list. EB-WB, NB-SB
- [Bowtie] Select the roadway with the roundabouts from the drop-down list. EB-WB, NB-SB
- [Split Intersection] Select the direction of the "split" roadway from the drop-down list. EB-WB, NB-SB
- [Echelon] Select the approach that shares a zone with the NB approach from the drop-down list. EB, WB
- [Single Loop] Select the quadrant that contains the loop from the drop-down list. N-E, N-W, S-E, S-W

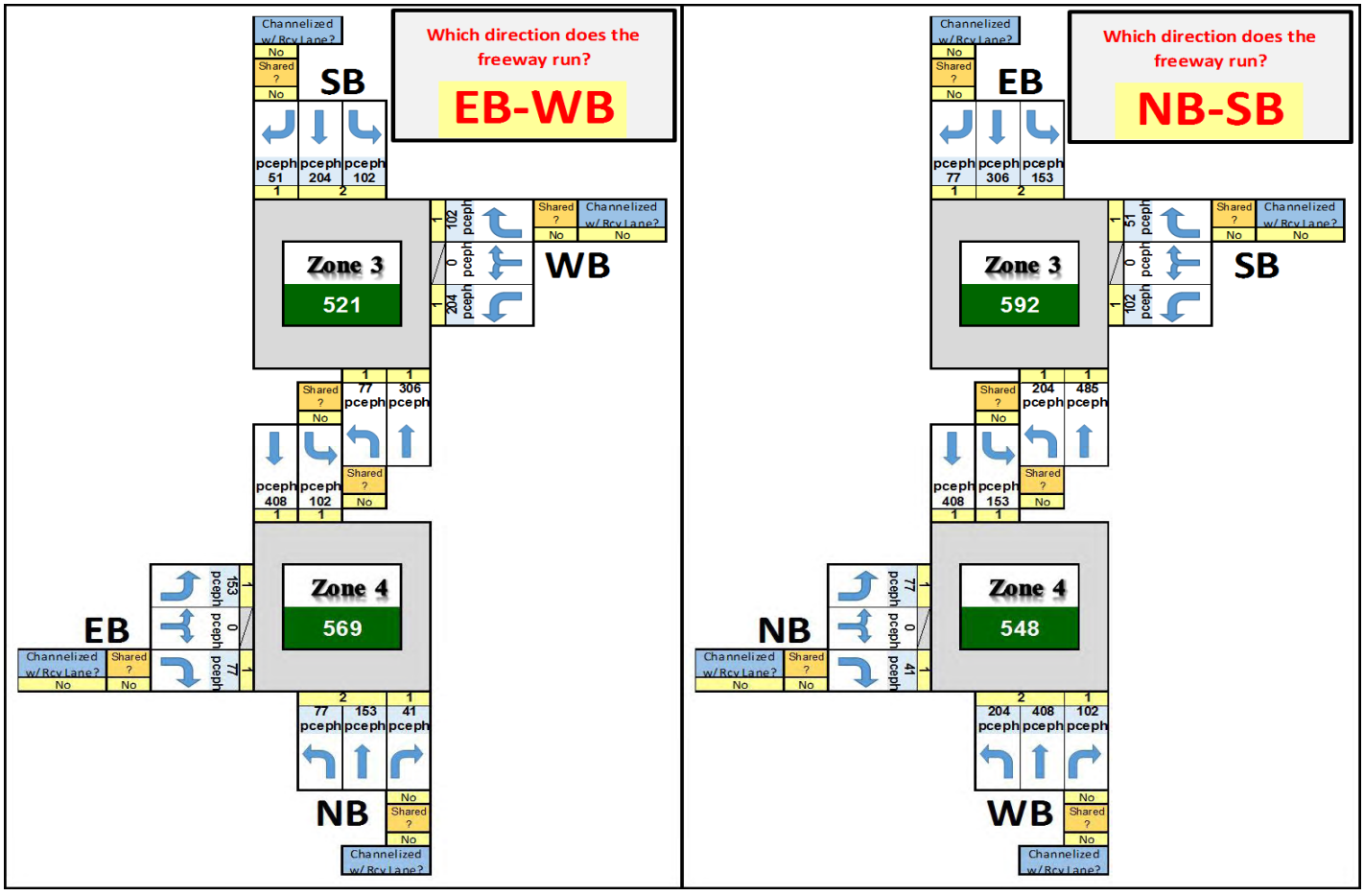
INSTRUCTIONS

Based on the answer provided in the directional question, the directional labels and volumes will update similar to the example figures shown below for a Traditional Diamond Interchange. The example figure and the layout of cells in the **Data Input and Configuration** section will not change.

Example Figure



Example Data Input and Configuration Layout



Step 3.2: Enter the Lane Configurations

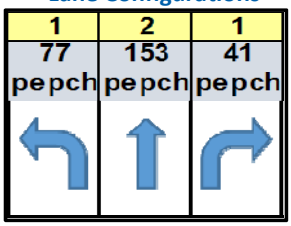
After answering the directional question for all applicable intersection and interchange configurations, enter a base number of through lanes for each travel direction on the **Input Worksheet** as pictured below. The number of through lanes entered here will be applied to each lane configuration worksheet. This base number may be overwritten on individual lane configuration worksheets. Turn lanes, shared lanes, and channelized lanes must still be entered in each lane configuration worksheet.

Base Number of Through Lanes

Base Number of Through Lanes	
If desired, enter a base number of through lanes for each direction. This number of through lanes will populate on each non-roundabout lane configuration worksheet. Although this tool allows the user to enter the number of through lanes for each lane configuration worksheet being compared on this worksheet, the user should still verify the lane configurations for each intersection or interchange configuration being compared.	
Eastbound	1
Westbound	1
Northbound	1
Southbound	1

Then, navigate to each lane configuration worksheet to verify the overall lane configuration for each approach direction. The lane configuration refers to the number of lanes for each left-turn, through, or right-turn movement. Inputs for lane configurations should be made into all yellow cells as shown in the figure below. This step should be followed on each worksheet selected for screening.

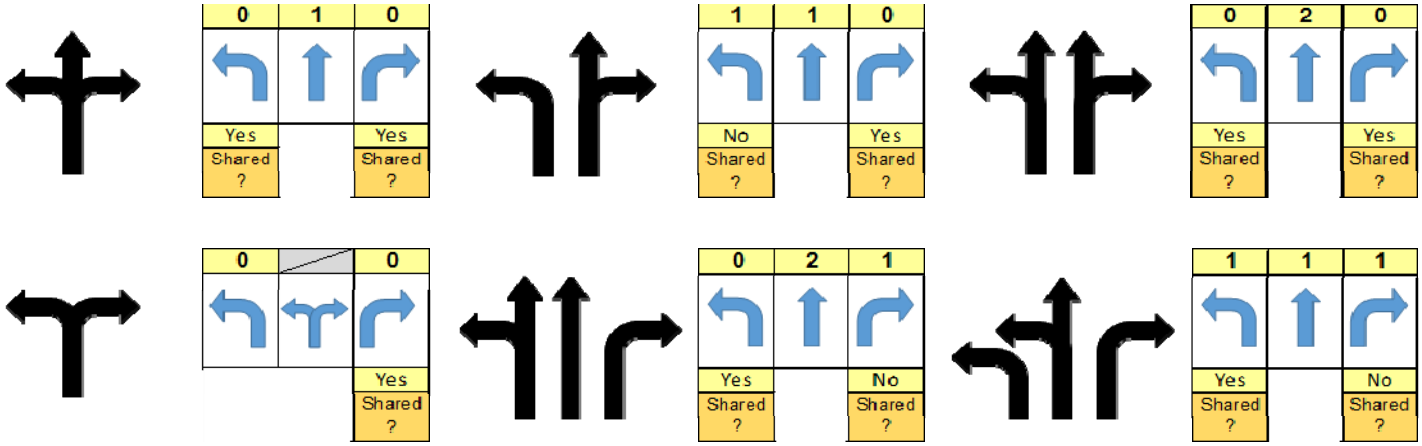
Lane Configurations



Note: This tool does not consider the geometric footprint, available right-of-way (ROW), or design requirements for an individual project. The tool generally does not limit the number of lanes that may be assigned to a particular movement. However, a pop-up box will appear asking the user to confirm the number of lanes if five or more through lanes or three or more turn lanes were entered.

Additionally, indicate if any shared lanes or channelized right-turn lanes are present. A right-turn lane should be identified as channelized only if a receiving lane is present and is at least 500 feet long. If a shared lane is present, count the lane only as a through lane and select "Yes" in the "Shared?" cell next to the appropriate turning movement. If an approach has one lane with a left-through-right movement, select one lane for the through movement and indicate that both the left- and right-turn movements are shared. If an exclusive turn lane is present in addition to the shared lane, enter one lane for the appropriate turning movement. Example shared-lane configurations and their respective inputs are shown below.

Example Shared-Lane Configurations



STEP 4: VIEW AND INTERPRET RESULTS

After completing Step 2, navigate to the **Results Worksheet**. This sheet compares the effectiveness of each alternative intersection and interchange configuration's potential to mitigate congestion, pedestrian, and safety concerns. Only the congestion metric is dependent on the inputs in Steps 1 and 2. The results shall not be interpreted until the user has performed Steps 1 and 2 on each lane configuration worksheet. The other metrics represent static values. Further descriptions of the congestion, pedestrian, and safety metrics are provided in the **Overview** and **Safety Information** tabs. These metrics do not consider signal timing parameters, geometric parameters, driver behavior parameters, available ROW, or design requirements for an individual project. It is the user's responsibility to determine how these factors may affect the results provided and decide how to apply and prioritize the results from this tool.

Descriptions of each alternative intersection and interchange configuration and guidance on when each configuration type should be considered are provided in the **Design Considerations** worksheet. Based on the results provided in the **Results Worksheet** and the information provided in the **Design Considerations** worksheet, the user may select which configurations should be selected for further study and evaluation.

SAFETY INFORMATION

The relative safety of an innovative intersection or interchange configuration was estimated by correlating crash data to assign a relative risk level associated with vehicle conflict points. The conflict points were weighted based on the calculated average crash cost associated with each conflict point type in Virginia. The methodology for determining the weighting system is outlined below. The conflict point diagram, number of conflict points, and the weighted total conflict point metric are included in the **Safety - Conflict Point Diagram** section of each lane configuration worksheet.

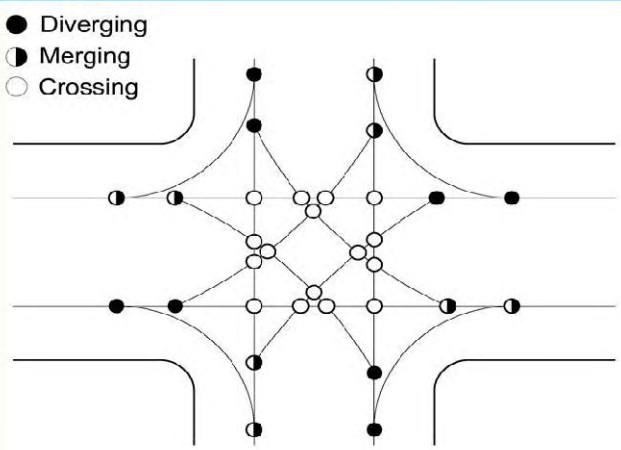
PART 1: CONFLICT POINT DIAGRAM METHODOLOGY

Conflict diagrams were developed for the innovative intersection and interchange configurations. Lines represent possible movements within the configuration. U-turns were only considered for innovative configurations that use U-turns to remove or relocate left-turning traffic from an intersection. Conflict points were defined as crossing, merging, or diverging conflicts at points of intersecting movements. A conflict point diagram is included in each lane configuration worksheet. An example diagram is shown below for a conventional intersection.

The conflict point diagrams and total number of conflict points are independent of the number of lanes, shared lanes, or channelization of movements. Additionally, the conflict point diagrams do not consider traffic signal phasing. Merge and diverge conflicts on the freeway are included for interchange configurations.

Example Conflict Diagram (Conventional Intersection)

Safety - Conflict Point Diagram



Conflict Type	Count
Crossing	16
Merging	8
Diverging	8
Total	**32**

Conflict Type	Weight
Crossing	2
Merging	1
Diverging	1

Weighted Total Conflict Points

48

PART 2: CONFLICT POINT WEIGHTING METHODOLOGY

The type, severities, and quantity of crashes that are likely to occur at each type of conflict point vary. Assumptions related to type and severity for the conflict point types were determined to allow for the comparison of configurations. A weighting system was then developed to produce a single safety metric. Four crash types were assigned to one or more conflict point types based on the likelihood of that crash type occurring. The crash types assigned to each conflict point type were as follows:

Crossing Conflict

- Head on
- Angle
- Sideswipe - opposite direction

Merging Conflict

- Sideswipe - same direction

Diverging Conflict

- Sideswipe - same direction

An average crash cost for an angle, head on, sideswipe - same direction, and sideswipe - opposite direction crash that occurred in Virginia between 2011 and 2015 was computed using the average crash cost by severity values from the Highway Safety Manual, 1st Edition.

Average Crash Cost By Severity

Severity	Crash Cost
Fatal (K)	$4,008,885
Disabling Injury (A)	$216,059
Evident Injury (B)	$79,777
Possible Injury (C)	$44,868
Property Damage (O)	$7,428

Source: *Highway Safety Manual, 1st Edition*

SAFETY INFORMATION

Average Crash Cost in Virginia By Crash Type

Crash Type	Severity	Full Access Control		Partial Access		No Access Control		All Crashes	
		#	Avg Cost	#	Avg Cost	#	Avg Cost	#	Avg Cost
Angle	K	57	$72,195	28	$61,648	501	$55,276	618	$53,406
	A	542		240		6966		8689	
	B	1253		917		20917		26838	
	C	638		858		18433		23381	
	O	4546		2763		71505		94955	
	Total	7036		4806		118322		154481	
Head On	K	25	$242,784	5	$131,358	281	$162,816	331	$146,785
	A	84		33		1729		2075	
	B	91		54		2611		3286	
	C	41		38		1551		2037	
	O	293		130		4975		7135	
	Total	534		260		11147		14864	
Sideswipe - Same Direction	K	26	$34,673	3	$28,098	21	$24,967	51	$26,667
	A	390		23		556		1052	
	B	1320		75		1888		3632	
	C	635		124		2330		3562	
	O	8812		1075		19372		34309	
	Total	11183		1300		24167		42606	
Sideswipe - Opposite Direction	K	2	$108,807	0	$28,527	30	$55,669	32	$49,679
	A	11		1		413		483	
	B	32		11		1241		1450	
	C	7		16		798		1015	
	O	75		48		4273		5818	
	Total	127		76		6755		8798	

The average crash cost per conflict point type was calculated based on the average crash cost per crash type and the frequency of each crash type. These average crash costs per conflict point type were used to derive the weighting system used to assign relative risk to the conflict point types. It was determined that crashes occurring at crossing conflicts were roughly two times more costly, and therefore carry two times the risk, than crashes occurring at merging or diverging conflict points.

Average Crash Cost Per Conflict Point Type Per Facility Type

Conflict Point Type	Full Access Control		Partial Access		No Access Control		All Crashes	
	Avg Cost	Weight	Avg Cost	Weight	Avg Cost	Weight	Avg Cost	Weight
Crossing	$84,634	2.4	$64,683	2.3	$64,096	2.6	$61,014	2.3
Merging/Diverging	$34,673	1.0	$28,098	1.0	$24,967	1.0	$26,667	1.0

Weighting System Based on Risk Factor

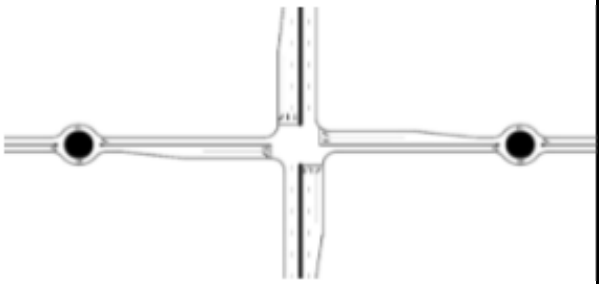
Conflict Point Type	Assigned Weight
Crossing	2
Merging	1
Diverging	1

VJuST
VDOT Junction Screening Tool

DESIGN CONSIDERATIONS

Intersection Designs

Bowtie



Back to Inputs

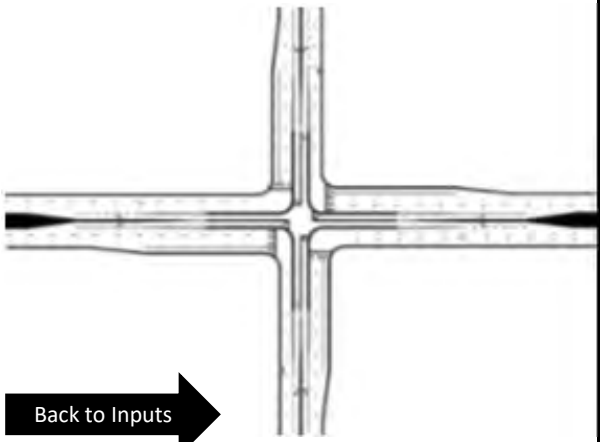
Description

The bowtie intersection is an alternative to the MUT intersection. Left-turn movements from both roadways are removed from the main intersection and are executed via a U-turn at a roundabout on the minor roadway downstream of the main intersection. Removing the left-turn movements allows for two-phase signal control.

When Should This Design Be Considered?

The bowtie intersection should be considered on roadways with high through volumes on the major roadway and low through and left-turn volumes on the minor roadway. Arterials with narrow medians and limited ROW should be considered.

Center Turn Overpass



Back to Inputs

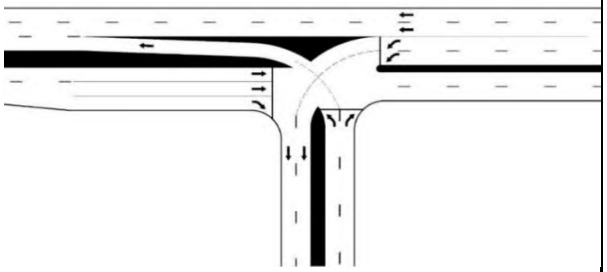
Description

All four left-turn movements are relocated to a grade-separated intersection using narrow ramps within the median. The left-turn traffic then descends back to ground level and merges into through traffic. Both intersections operate under two-phase signal control.

When Should This Design Be Considered?

The center turn overpass intersection should be considered at high-volume urban or suburban intersections where the major and minor roadways have similar left-turn volumes.

Continuous Green-T (CGT)



Back to Inputs

Description

Through traffic on the top side of a T-intersection is allowed to pass through the intersection without stopping. Left-turn volumes from the minor roadway must merge into the continuous lane of through traffic after completing the left turn. This design allows for three-phase signal control. The tool assumes the intersection is signalized. The intersection may be designed as unsignalized.

When Should This Design Be Considered?

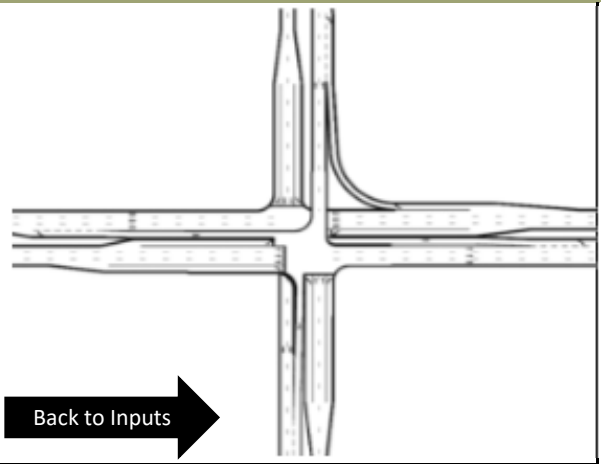
The continuous green-T intersection should be considered at three-leg intersections with moderate to low left-turn volumes on the minor roadway, high through volumes on the major roadway, and few pedestrian crossings.

VJuST
VDOT Junction Screening Tool

DESIGN CONSIDERATIONS

Intersection Designs

Echelon



Back to Inputs

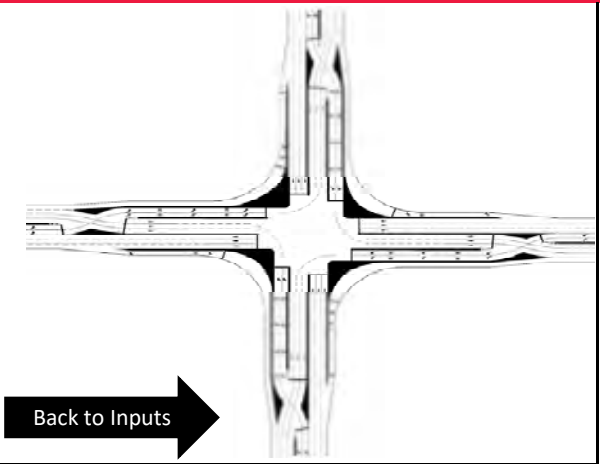
Description

One approach on both the major and minor roadways is elevated to create two grade-separated intersections of two one-way roads. Each intersection operates under two-phase signal control.

When Should This Design Be Considered?

The echelon intersection should be considered at high-volume urban or suburban intersections where the major and minor roadways have similar volumes.

Full/Partial Displaced Left Turn (DLT)



Back to Inputs

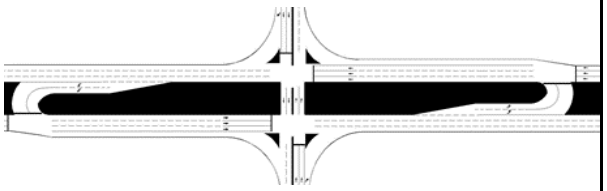
Description

Left-turning vehicles cross over to the other side of the roadway at a signalized intersection several hundred feet in advance of the main intersection. The protected left turns occur simultaneously with the opposing through movements at the main intersection, allowing for two- (full) or three-phase (partial) signal control. This design is also referred to as a Continuous Flow Intersection or Crossover Displaced Left Intersection.

When Should This Design Be Considered?

The displaced left turn intersection should be considered if opposing approaches have high and balanced through and left-turn volumes.

Full/Partial Median U-Turn (MUT)



Back to Inputs

Description

Left-turn movements from the major roadway (partial) or both roadways (full) are removed from the main intersection. These vehicles instead execute a U-turn at a median opening on the major roadway downstream of the main intersection. Removing the left-turn movements allows for two- (full) or three-phase (partial) signal control. This tool assumes all intersections are signalized. However, this intersection can be designed as partially unsignalized.

When Should This Design Be Considered?

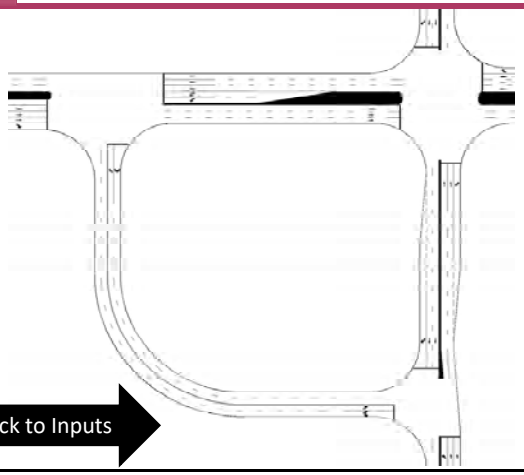
The median U-turn intersection should be considered on high-speed, median-divided highways with moderate left-turn volumes on the major roadway and minor left-turn volumes on the minor roadway.

VJuST
VDOT Junction Screening Tool

DESIGN CONSIDERATIONS

Intersection Designs

Quadrant Roadway (QR)



Back to Inputs

Description

All four left-turn movements are rerouted onto a connector road in one quadrant, allowing for two-phase signal control at the main intersection and three-phase signal control at the intersections with the connector road. This tool assumes all intersections are signalized. However, this intersection can be designed as partially unsignalized.

When Should This Design Be Considered?

The quadrant roadway intersection should be considered if an existing roadway can be used as a connection roadway or there are heavy left-turn and through volumes on the major and minor roadways. The ratio of minor road volume to total intersection volume is typically less than or equal to 0.35.

Restricted Crossing U-Turn (RCUT)



Back to Inputs

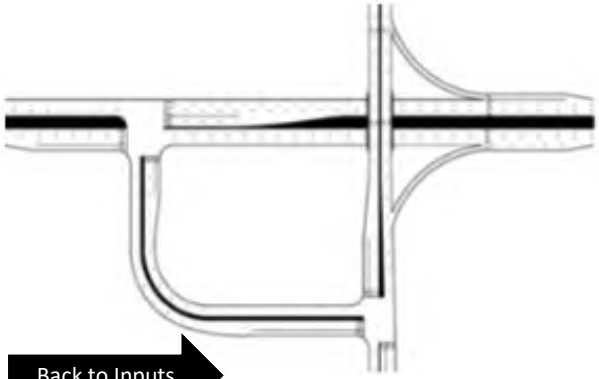
Description

Minor roadway left-turn and through movements are removed from the main intersection. These vehicles turn right onto the major roadway before making a U-turn at a downstream median opening. Removing these movements allows for two-phase signal control at the main intersection. This design is also referred to as a super street intersection. This tool assumes all intersections are signalized. However, this intersection can be designed as partially or fully unsignalized.

When Should This Design Be Considered?

The restricted crossing U-turn intersection should be considered on high-speed, median-divided highways with high through and left-turn volumes on the major roadway and low through volumes on the minor roadway.

Single Loop



Back to Inputs

Description

All four left-turn movements and some right-turn movements are rerouted onto a connector road in one quadrant, while the major and minor roadways are grade-separated. This design allows for three-phase signal control at the intersections with the connector road.This tool assumes all intersections are signalized. However, this intersection can be designed as fully unsignalized.

When Should This Design Be Considered?

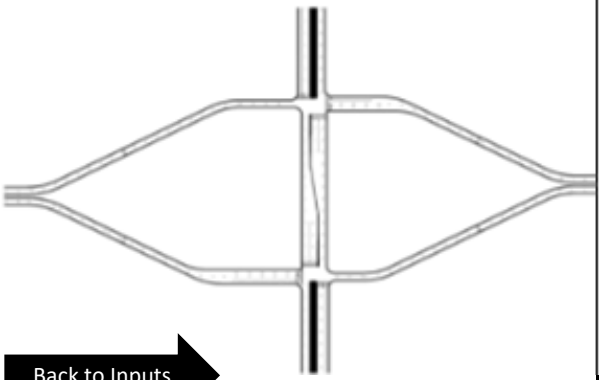
The single loop intersection should be considered for roadways with low to medium left-turn volumes.

VJuST
VDOT Junction Screening Tool

DESIGN CONSIDERATIONS

Intersection Designs

Split Intersection



Back to Inputs

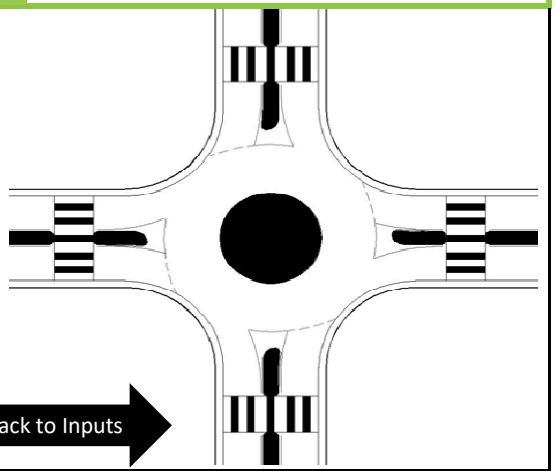
Description

The split intersection separates traffic flow on the major roadway into two one-way roads with separate intersections with the minor roadway. Each intersection may operate using three-phase signal control. This configuration is similar to a traditional diamond interchange without grade separation.

When Should This Design Be Considered?

The split intersection should be considered for isolated, suburban intersections with high left-turn volumes or in urban areas where two-way streets can be converted to one-way streets. The split intersection may also be considered if grade separation may be needed in the future.

Mini Roundabout



Back to Inputs

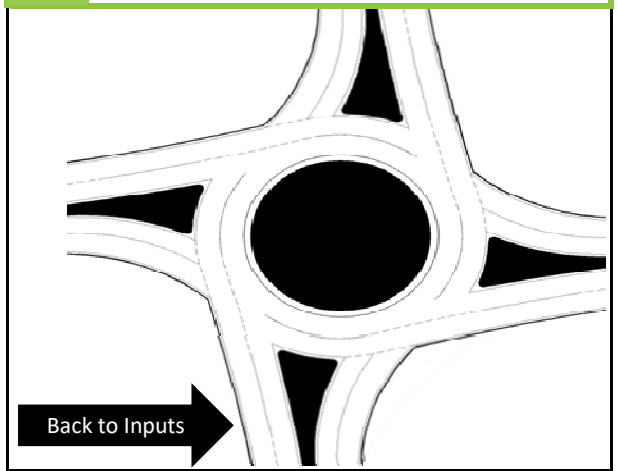
Description

A roundabout is a circular unsignalized intersection in which traffic flows in one direction around a central island. Traffic entering the roundabout must yield to traffic already inside the roundabout. This tool includes mini roundabouts with a 50 foot or 75 foot inscribed diameter.

When Should This Design Be Considered?

The mini roundabout should be considered if the posted speed limit on all four approaches is 30 mph or slower and the 85th percentile speed is 35 mph or slower.

Roundabout



Back to Inputs

Description

A roundabout is a circular unsignalized intersection in which traffic flows in one direction around a central island. Traffic entering the roundabout must yield to traffic already inside the roundabout. This tool can accommodate roundabouts with up to two lanes in each quadrant.

When Should This Design Be Considered?

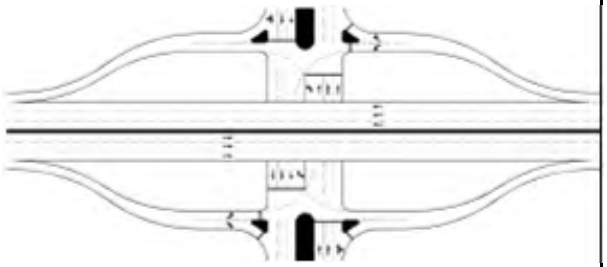
The roundabout should be considered on roadways with a high percentage of turning traffic. Additional information about when roundabouts should be considered may be found on VDOT's website.

VJuST
VDOT Junction Screening Tool

DESIGN CONSIDERATIONS

Interchange Designs

Traditional Diamond (TD)



Back to Inputs

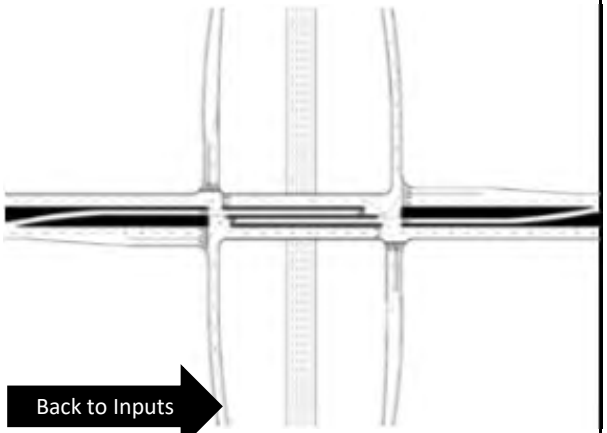
Description

The traditional diamond interchange is a grade-separated interchange with two intersections on the arterial. The intersections may be signalized or unsignalized. Each direction of travel on the freeway has one on-ramp and one off-ramp.

When Should This Design Be Considered?

The traditional diamond interchange should be considered in rural and suburban areas with moderate to low ramp volumes.

Contraflow Left



Back to Inputs

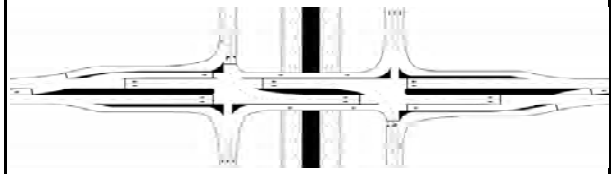
Description

The contraflow left interchange is an alternative to the traditional diamond interchange in which arterial left-turn movements cross over opposing left-turn movements into storage bays prior to the first ramp intersection. These storage bays run in the opposite direction from the adjacent through lanes. This design allows for three-phase signal control.

When Should This Design Be Considered?

The contraflow left interchange should be considered on arterials with high left-turn volumes onto the freeway ramps, especially if the left-turn demand exceeds the storage capacity between the ramps.

Displaced Left Turn (DLT)



Back to Inputs

Description

The arterial left-turning vehicles cross over to the other side of the roadway at a signalized intersection several hundred feet in advance of the first ramp intersection. At both of the ramp intersections, the protected left turns occur simultaneously with the opposing through movements, allowing for two-phase signal control. This design is also referred to as a Continuous Flow Interchange.

When Should This Design Be Considered?

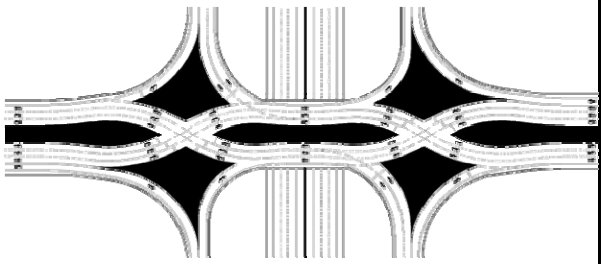
The displaced left turn intersection should be considered if there are high and balanced through volumes on the arterial, moderate to high left-turn volumes to the on-ramps, and low to moderate left-turn volumes from the off-ramps.

VJuST
VDOT Junction Screening Tool

DESIGN CONSIDERATIONS

Interchange Designs

Diverging Diamond (DDI)



Back to Inputs

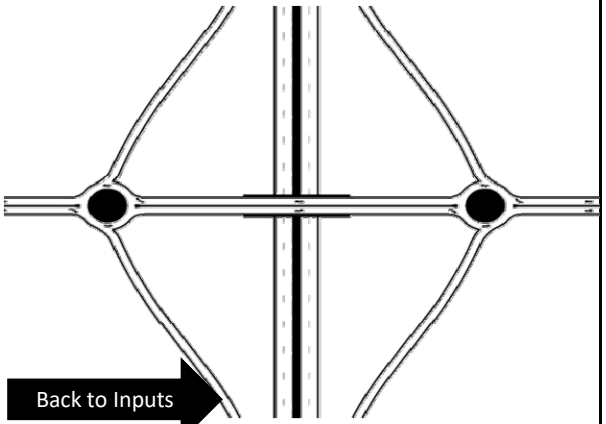
Description

The diverging diamond interchange is an alternative to the traditional diamond interchange where arterial traffic crosses over to the other side of the roadway in between the two ramps. This allows vehicles to turn left onto the on-ramps without crossing over opposing lanes of traffic. This design is also referred to as the double crossover diamond interchange.

When Should This Design Be Considered?

The diverging diamond interchange should be considered if there are high left-turn volumes onto and off of the freeway ramps and moderate but unbalanced arterial volumes.

Double Roundabout



Back to Inputs

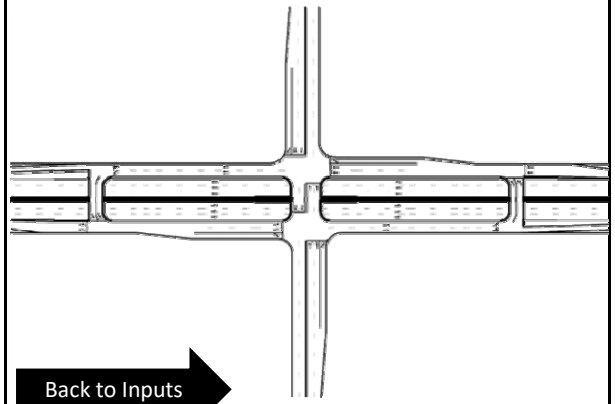
Description

The double roundabout interchange is a grade-separated interchange in which all ramps begin or end at one of two roundabouts on the arterial. This design typically allows for a narrower bridge width than the single roundabout interchange.

When Should This Design Be Considered?

The double roundabout interchange should be considered if there is a high proportion of left-turns onto the freeway ramps or where there is limited queue storage between the ramp intersections.

Michigan Urban Diamond (MUD)



Back to Inputs

Description

The Michigan urban diamond interchange is a variation of the traditional diamond interchange that removes left-turn movements from the arterial intersections. These vehicles instead make U-turns at directional crossovers on frontage roads. The intersections on the arterial operate under two-phase signal control. This design is also referred to as a Median U-Turn (MUT) Interchange. This tool assumes all intersections are signalized. However, this intersection can be designed as partially unsignalized.

When Should This Design Be Considered?

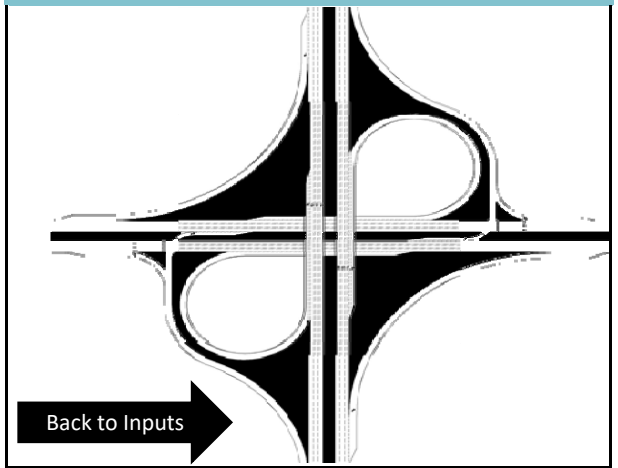
The Michigan urban diamond interchange should be considered for arterials with high through volumes and moderate to low left-turn volumes.

VJuST
VDOT Junction Screening Tool

DESIGN CONSIDERATIONS

Interchange Designs

Partial Cloverleaf (PCL or Parclo)



Back to Inputs

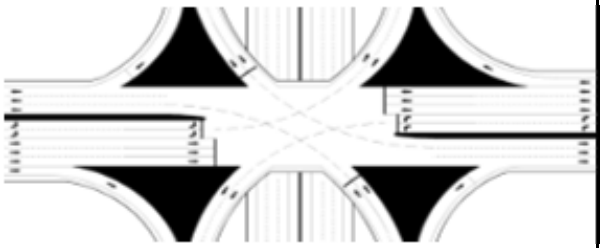
Description

The partial cloverleaf interchange is a grade-separated interchange with a combination of directional ramps and loop ramps. This configuration may include up to two intersections on the arterial. The intersections may be signalized or unsignalized.

When Should This Design Be Considered?

The partial cloverleaf interchange should be considered if a traditional diamond interchange would result in moderate to high left-turn volumes onto or off the ramps.

Single Point Urban (SPUI)



Back to Inputs

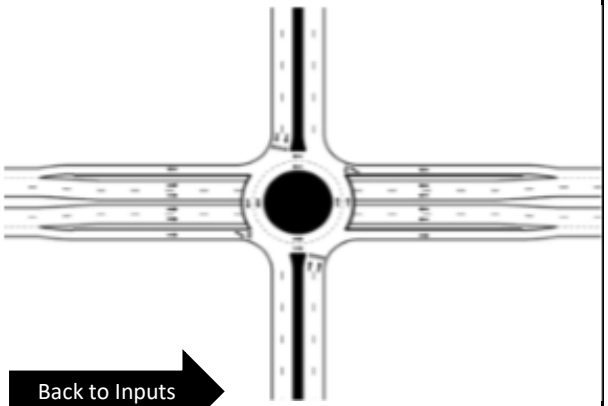
Description

The single point urban interchange is an alternative to the traditional diamond interchange in which all ramps begin or end at a single intersection on the arterial. This configuration allows for three-phase signal control.

When Should This Design Be Considered?

The single point urban interchange should be considered in urban areas with high left-turn volumes onto and off the freeway ramps or when right-of-way limitations are present.

Single Roundabout



Back to Inputs

Description

The single roundabout interchange is a grade-separated interchange in which all ramps begin or end at a single roundabout on the arterial.

When Should This Design Be Considered?

The roundabout interchange should be considered in urban areas with moderate capacity requirements or with right-of-way restrictions.

VDOT Junction Screening Tool

Input Worksheet

Project Title:	*Sweetgrasss*
E-W Facility:	*Primary Entrancd*
N-S Facility:	*Benn's Church Boulevard*
Date:	*December 17, 2019*

Traffic Volume Demand

Direction	Volume (veh/hr) U-Turn / Left		Through	Right	Truck Percent (%)
Eastbound	0		0		0.00%
Westbound	227			145	0.00%
Northbound	13		1503	208	0.00%
Southbound	231		1033	0	0.00%
Adjustment Factor	0.80	0.95		0.85	
Suggested	**U - 0.8**	**L - 0.95**		**0.85**	
Truck to PCE Factor			**Suggested = 2.00**		2.00
Critical Lane Volume			1600		

Equivalent Passenger Car Volume

	Volume (pc/hr) U-Turn / Left	Through	Right	Approach
Eastbound	0	0	0	0
Westbound	227	0	145	372
Northbound	13	1503	208	1724
Southbound	231	1033	0	1264

Notes:

Left-turn Adjustment Factor	*Conversion of left-turning vehicles to equivalent through vehicles*
Right-turn Adjustment Factor	*Conversion of right-turning vehicles to equivalent through vehicles*
U-turn Adjustment Factor	*Conversion of U-turning vehicles to equivalent through vehicles*
Truck to PCE Factor	*1 truck = X Passenger Car Equivalents*
Critical Lane Volume Sum Limit	*Saturation value for critical lane volume sum at an intersection*

VDOT Junction Screening Tool

Possible Configurations

Indicate with a "Y" or "N" if each intersection or interchange configuration should or should not be considered. Use the information links for guidance. Then, click the "Show/Hide Configurations button" to hide the worksheets for the configurations that will not be considered.

#	Intersections	Information	Consider?	Justification
	Signalized Intersections			
1	Conventional	-	Y	
2	Bowtie	Link	Y	
3	Center Turn Overpass	Link	N	Not feasible for roadway facility type
4	Continuous Green-T	Link	Y	
5	Echelon	Link	N	Not feasible for roadway facility type
6	Full Displaced Left Turn	Link	N	Insufficient intersection spacing
7	Median U-Turn	Link	N	Insufficient intersection spacing
8	Partial Displaced Left Turn	Link	Y	
9	Partial Median U-Turn	Link	Y	
10	Quadrant Roadway N-E	Link	N	Not feasible for roadway facility type
11	Quadrant Roadway N-W	Link	N	Not feasible for roadway facility type
12	Quadrant Roadway S-E	Link	N	Not feasible for roadway facility type
13	Quadrant Roadway S-W	Link	N	Not feasible for roadway facility type
14	Restricted Crossing U-Turn	Link	N	Not feasible for roadway facility type
15	Single Loop	Link	N	Not feasible for roadway facility type
16	Split Intersection	Link	N	Not feasible for roadway facility type
	Unsignalized Intersections			
17	50 Mini Roundabout	Link	N	Not feasible for roadway facility type
18	75 Mini Roundabout	Link	N	Not feasible for roadway facility type
19	Roundabout	Link	Y	
20	Two-Way Stop Control	-	N	Not feasible for roadway facility type
#	**Interchanges**	**Information**	**Consider?**	**Justification**
21	Traditional Diamond	Link	N	Not feasible for roadway facility type
22	Contraflow Left	Link	N	Not feasible for roadway facility type
23	Displaced Left Turn	Link	N	Not feasible for roadway facility type
24	Diverging Diamond	Link	N	Not feasible for roadway facility type
25	Double Roundabout	Link	N	Not feasible for roadway facility type
26	Michigan Urban Diamond	Link	N	Not feasible for roadway facility type
27	Partial Cloverleaf	Link	N	Not feasible for roadway facility type
28	Single Point	Link	N	Not feasible for roadway facility type
29	Single Roundabout	Link	N	Not feasible for roadway facility type

VDOT Junction Screening Tool

Directional Questions and Base Lane Configurations

Before entering a base number of through lanes for each direction, answer all applicable directional question for each intersection or interchange configuration selected for consideration. Navigate to the lane configuration worksheet for example diagrams, if provided.

Intersections	Question	Direction
Bowtie	Select the roadway with the roundabouts from the drop-down list.	
Continuous Green-T	Select the direction associated with the "stem" of the T-intersection from the drop-down list. See example diagrams.	WB
Echelon	N/A	
Median U-Turn	N/A	
Partial Displaced Left Turn	Select the roadway with the displaced left turns from the drop-down list.	NB-SB
Partial Median U-Turn	Select the roadway with the U-turns from the drop-down list.	NB-SB
Restricted Crossing U-Turn	N/A	
Single Loop	N/A	
Split Intersection	N/A	
Interchanges	**Question**	**Direction**
All	N/A	

Base Number of Through Lanes

Enter a base number of through lanes for each direction. The number of through lanes entered will populate on each non-roundabout lane configuration worksheet. This tool also allows the user to enter the number of through lanes on the lane configuration worksheets directly. This base number may be overwritten on individual lane configuration worksheets. Turn lanes, shared lanes, and channelized lanes must still be entered in each lane configuration worksheet.

Eastbound	
Westbound	
Northbound	2
Southbound	2

VDOT Junction Screening Tool

Results Worksheet

VJuST
VDOT Junction Screening Tool

General Information	
Project Title:	Sweetgrasss
EW Facility:	Primary Entrancd
NS Facility:	Benn's Church Boulevard
Date:	December 17, 2019

Volumes (veh/hr)	U-Turn / Left	Through	Right
Eastbound	0	0	0
Westbound	227	0	145
Northbound	13	1503	208
Southbound	231	1033	0

General Instructions: All intersection and interchange configurations have a default assumption of one exclusive lane per movement. No results shall be interpreted until the user has verified the lane configurations on each worksheet.

Intersection Results

Type	Dir	Maximum V/C (Congestion)	Accommodation Compared to Conventional (Pedestrian)	Weighted Total Conflict Points (Safety)	Notes
Conventional	-	0.70		48	
Bowtie	-	1.92	+	24	
Center Turn Overpass	-	1.05	+	32	
Continuous Green-T	-	0.70	-	12*	
Echelon	-	1.09	+	28	
Full Displaced Left Turn	-	0.80	-	40	
Median U-Turn	-	1.11	+	20	
Partial Displaced Left Turn	-	0.62	-	44	
Partial Median U-Turn	-	0.72	+	28	
Quadrant Roadway	N-W	1.19		40	
	N-E	1.27		40	
	S-E	1.24		40	
	S-W	1.23		40	
Restricted Crossing U-Turn	-	2.14		20	
Single Loop	-	1.10	-	28	
Split Intersection	-	1.08		36	
50 Mini Roundabout	-	372.00		8	
75 Mini Roundabout	-	372.00		8	
Roundabout	-	1.32		8	
Two-Way Stop Control	-	N/A*		48	

*The continuous green-T is the only three-legged innovative intersection in this tool. To compare the continuous green-T to other innovative intersections, conflicts corresponding with the fourth leg must be removed. This has been done for the conventional intersection. Conflict point diagrams for three-legged and four-legged conventional intersections have been provided on the conventional intersection worksheet for reference.

Interchange Results

Type	Dir	Maximum V/C (Congestion)	Accommodation Compared to Traditional Diamond (Pedestrian)	Weighted Total Conflict Points (Safety)	Notes
Traditional Diamond	-	0.30		28	
Contraflow Left	-	1.09		32	
Displaced Left Turn	-	0.30	-	28	
Diverging Diamond	-	0.30	-	20	
Double Roundabout	-	0.27	+	16	
Michigan Urban Diamond	-	0.60	+	24	
Partial Cloverleaf	-	0.15		20	
Single Point	-	0.30	-	32	
Single Roundabout	-	0.27	+	12	

Information

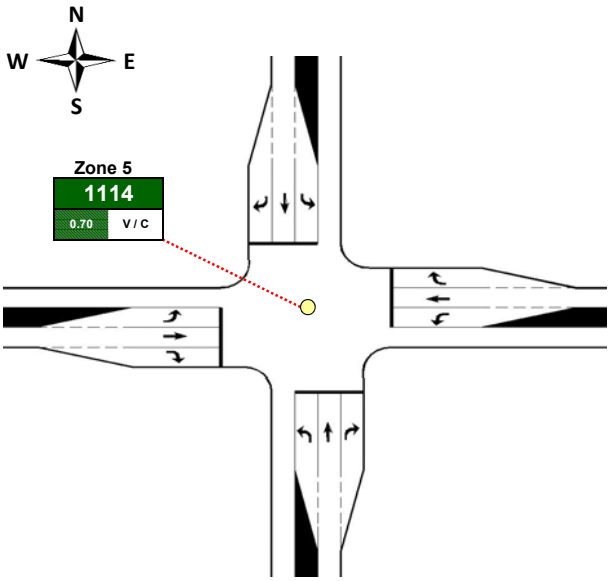
Congestion	The maximum v/c ratio represents the worst v/c of all zones that make up an intersection.
Pedestrian	Compares the potential of each design to accommodate pedestrians based on safety, wayfinding, and delay. Potential is qualitatively defined as better (+), similar (blank cell), or worse (-) than a conventional intersection or traditional diamond interchange.
Safety	Weighted Total = (2 x Crossing Conflicts) + Merging Conflicts + Diverging Conflicts

Conventional

DESIGN AND RESULTS

Project Name:	Sweetgrasss
EW Facility:	Primary Entrancd
NS Facility:	Benn's Church Boulevard
Date:	December 17, 2019

Critical Lane Volume Sum			
< 1200	1200 - 1399	1400 - 1599	≥ 1600
VOLUME / CAPACITY RATIO:			0.70

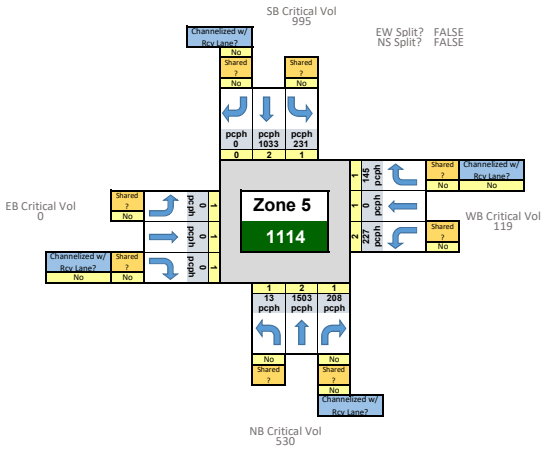


Note: This diagram does not reflect the actual lane configuration of the intersection

Conventional

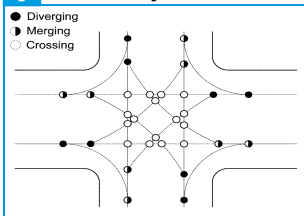
DATA INPUT AND CONFIGURATION

Enter the lane configurations in the yellow cells.



Back to Results

Safety - Conflict Point Diagram



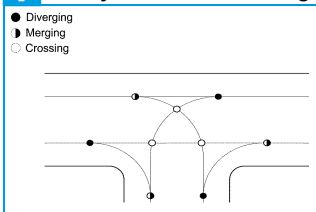
Conflict Type	Count
Crossing	16
Merging	8
Diverging	8
Total	32

Conflict Type	Weight
Crossing	2
Merging	1
Diverging	1

Weighted Total Conflict Points

48

Safety - Conflict Point Diagram (Three Legs)



Conflict Type	Count
Crossing	3
Merging	3
Diverging	3
Total	9

Conflict Type	Weight
Crossing	2
Merging	1
Diverging	1

Weighted Total Conflict Points

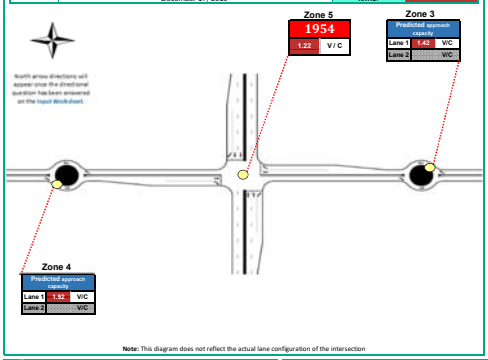
12

Bowtie Intersection

DESIGN AND RESULTS

Project Name:	Sweetgrasss
EW Facility:	Primary Entrancd
NS Facility:	Benn's Church Boulevard
Date:	December 17, 2019

Critical Lane Volume Sum			
< 1200	1200 - 1399	1400 - 1599	≥ 1600
MAXIMUM VOLUME / CAPACITY RATIO:			1.92

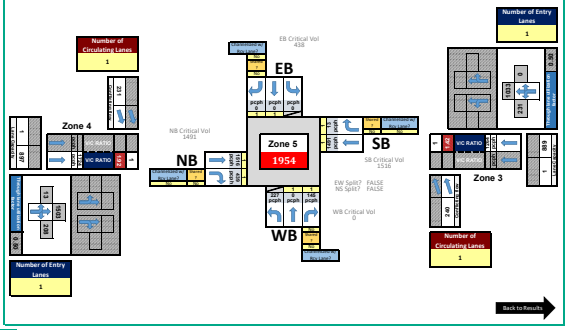


Note: This diagram does not reflect the actual lane configuration of the intersection

Bowtie Intersection

DATA INPUT AND CONFIGURATION

Enter the lane configurations in the yellow cells.

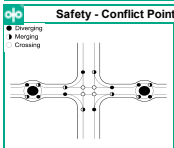


Back to Results

EQUATION: A x exp(-B x Q)

Number of Entry Lanes	Number of Circulating Lanes	Lane	A	B
1	1	--	1130	0.001
1	2	--	1130	0.0007
2	1	Left	1130	0.001
2	1	Right	1130	0.001
2	2	Left	1130	0.00075
2	2	Right	1130	0.0007

Safety - Conflict Point Diagram



Conflict Type	Count
Crossing	4
Merging	8
Diverging	8
Total	20

Conflict Type	Weight
Crossing	2
Merging	1
Diverging	1

Weighted Total Conflict Points

24

Assumptions

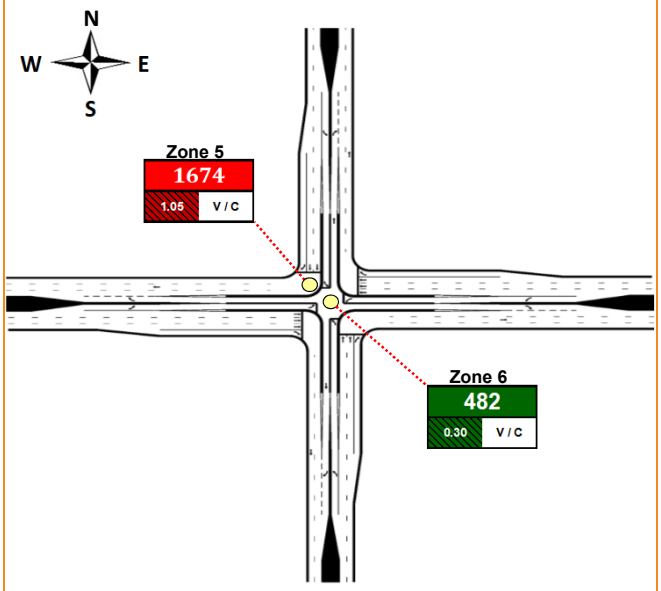
- The roundabouts have only two approaches and exits.
- Since U-turns are not considered, the CUV analysis considers only one location with conflicting volumes for each roundabout.
- The conflict point diagrams include conflict points created by U-turn movements.

Center Turn Overpass Intersection

DESIGN AND RESULTS

Project Name:	Sweetgrasss
EW Facility:	Primary Entrancd
NS Facility:	Benn's Church Boulevard
Date:	December 17, 2019

Critical Lane Volume Sum			
< 1200	1200 - 1399	1400 - 1599	≥ 1600
VOLUME / CAPACITY RATIO:			1.05

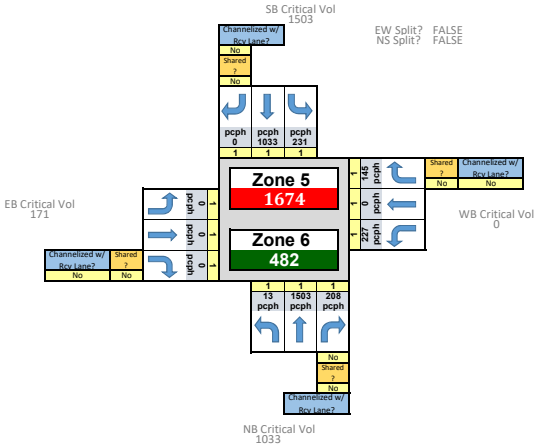


Note: This diagram does not reflect the actual lane configuration of the intersection

Center Turn Overpass Intersection

DATA INPUT AND CONFIGURATION

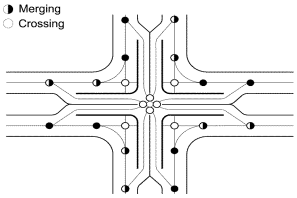
Step 1: Enter the lane configurations in the yellow cells.



Back to Results

Safety - Conflict Point Diagram

Diverging
Merging
Crossing



Conflict Type	Count
Crossing	8
Merging	8
Diverging	8
Total	24

Conflict Type	Weight
Crossing	2
Merging	1
Diverging	1

Weighted Total Conflict Points

32

Continuous Green-T Intersection

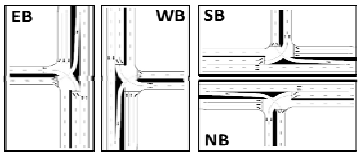
DESIGN AND RESULTS

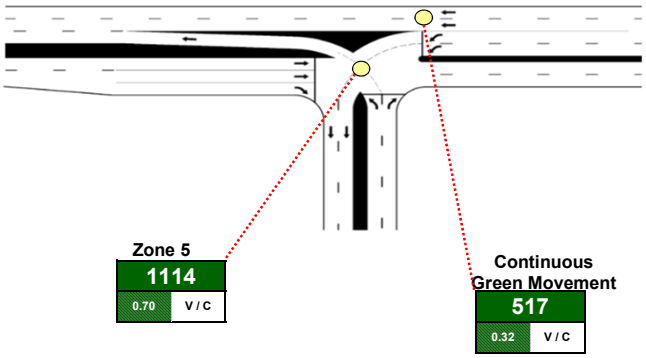
Project Name:	Sweetgrasss
EW Facility:	Primary Entrancd
NS Facility:	Benn's Church Boulevard
Date:	December 17, 2019

Critical Lane Volume Sum			
< 1200	1200 - 1399	1400 - 1599	≥ 1600
VOLUME / CAPACITY RATIO:			0.70

W S N E

North arrow directions will appear once the directional question has been answered on the Input Worksheet.



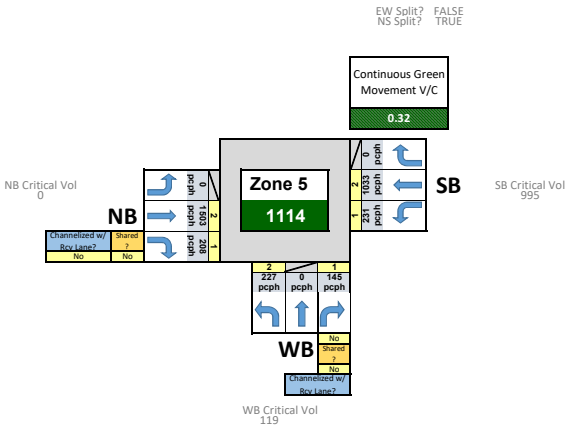


Note: This diagram does not reflect the actual lane configuration of the intersection

Continuous Green-T Intersection

DATA INPUT AND CONFIGURATION

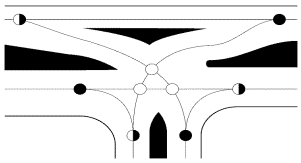
Step 1: Enter the lane configurations in the yellow cells.



Back to Results

Safety - Conflict Point Diagram

Diverging
Merging
Crossing



Conflict Type	Count
Crossing	3
Merging	3
Diverging	3
Total	9

Conflict Type	Weight
Crossing	2
Merging	1
Diverging	1

Weighted Total Conflict Points

12

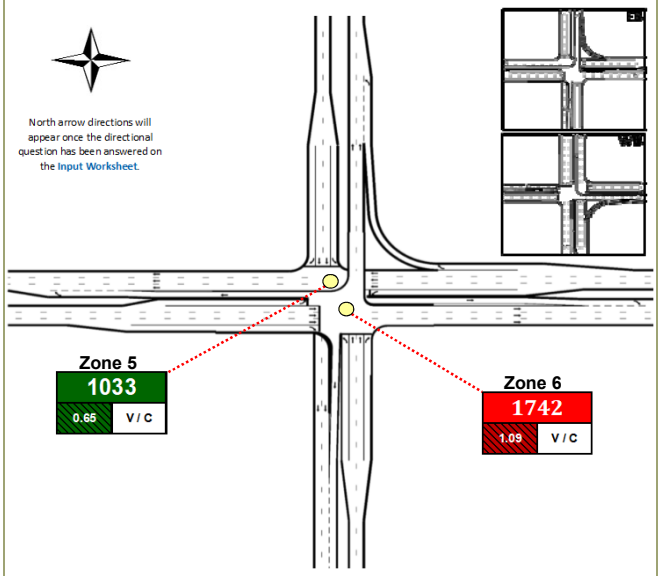
Echelon Intersection

DESIGN AND RESULTS

Project Name:	Sweetgrasss
EW Facility:	Primary Entrancd
NS Facility:	Benn's Church Boulevard
Date:	December 17, 2019

Critical Lane Volume Sum			
< 1200	1200 - 1399	1400 - 1599	≥ 1600
VOLUME / CAPACITY RATIO:			1.09

North arrow directions will appear once the directional question has been answered on the Input Worksheet.

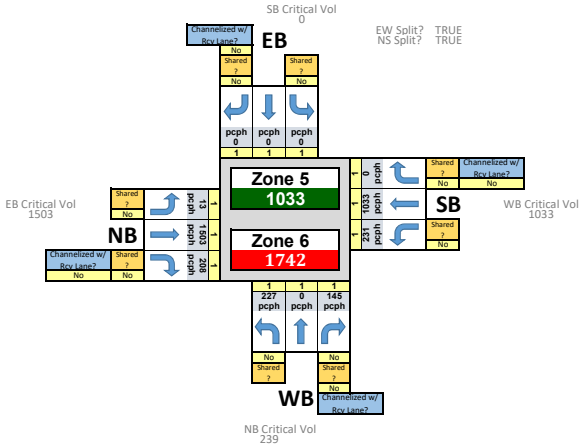


Note: This diagram does not reflect the actual lane configuration of the intersection

Echelon Intersection

DATA INPUT AND CONFIGURATION

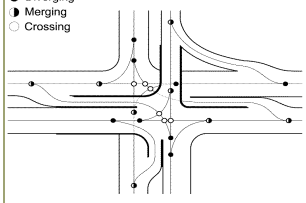
Enter the lane configurations in the yellow cells.



Back to Results

Safety - Conflict Point Diagram

Diverging
Merging
Crossing



Conflict Type	Count
Crossing	6
Merging	8
Diverging	8
Total	22

Conflict Type	Weight
Crossing	2
Merging	1
Diverging	1

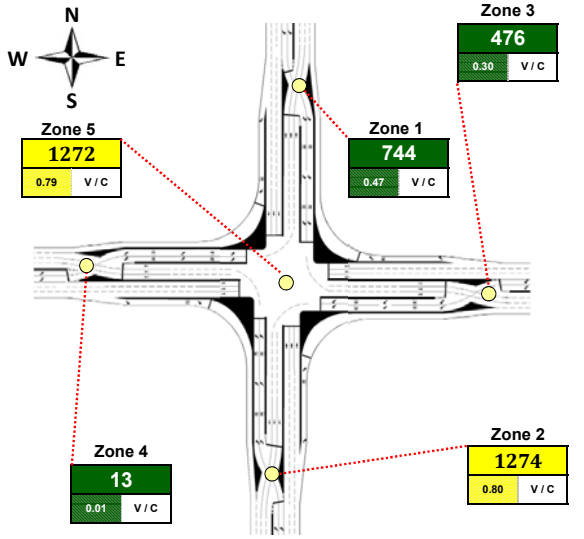
Weighted Total Conflict Points
28

Full Displaced Left Turn Intersection

DESIGN AND RESULTS

Project Name:	Sweetgrasss
EW Facility:	Primary Entrancd
NS Facility:	Benn's Church Boulevard
Date:	December 17, 2019

Critical Lane Volume Sum			
< 1200	1200 - 1399	1400 - 1599	≥ 1600
VOLUME / CAPACITY RATIO:	0.80		

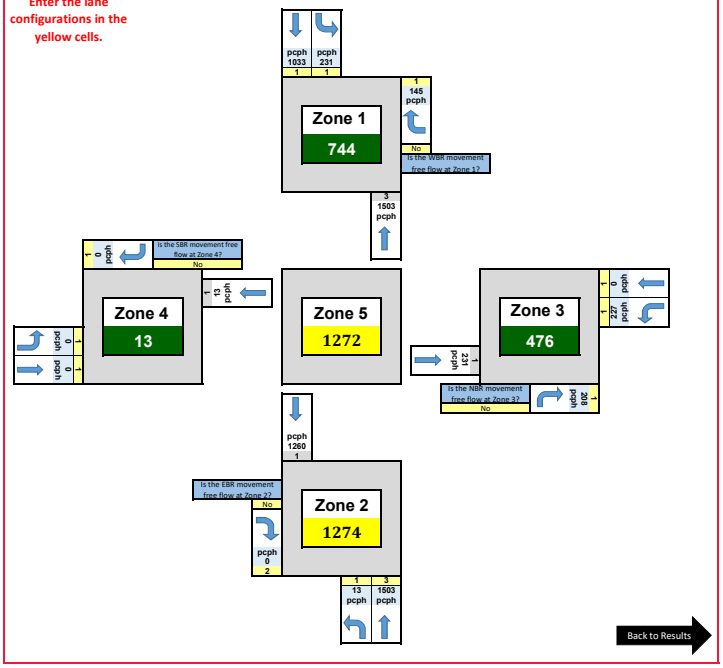


Note: This diagram does not reflect the actual lane configuration of the intersection

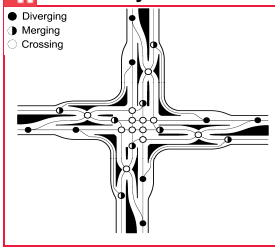
Full Displaced Left Turn Intersection

DATA INPUT AND CONFIGURATION

Enter the lane configurations in the yellow cells.



Safety - Conflict Point Diagram



Conflict Type	Count
Crossing	12
Merging	8
Diverging	8
Total	28

Conflict Type	Weight
Crossing	2
Merging	1
Diverging	1

Weighted Total Conflict Points

40

Assumptions

- CLV calculations at Zone 5 do not include right-turn movements.
- The number of through lanes entered in one zone is assumed to be equal to the number of through lanes in all zones that the movement passes through.

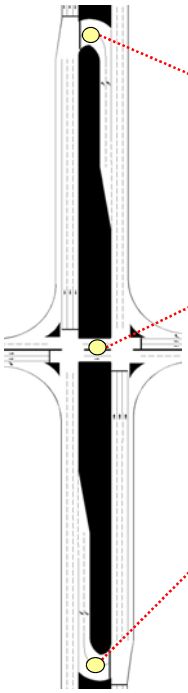
Median U-Turn Intersection

DESIGN AND RESULTS

Project Name:	Sweetgrasss
EW Facility:	Primary Entrancd
NS Facility:	Benn's Church Boulevard
Date:	December 17, 2019

Critical Lane Volume Sum			
< 1200	1200 - 1399	1400 - 1599	≥ 1600
VOLUME / CAPACITY RATIO:			1.11

North arrow directions will appear once the directional question has been answered on the **Input Worksheet**.



Zone 1
573
0.36 V / C

Zone 5
1770
1.11 V / C

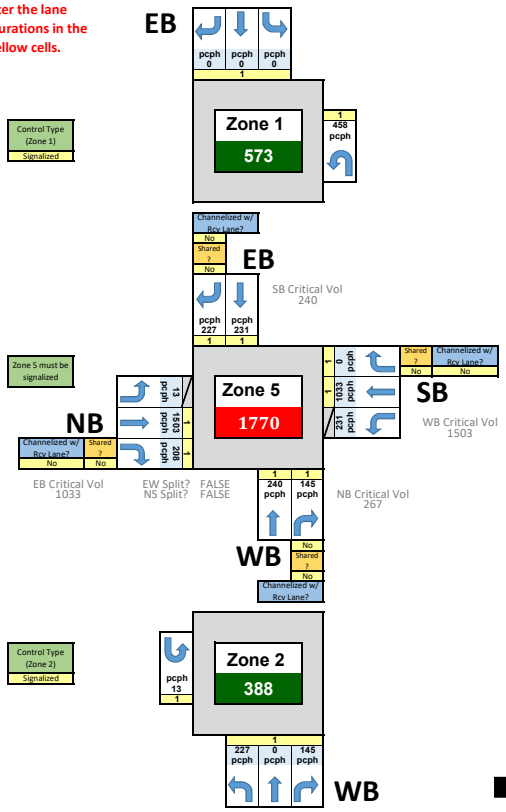
Zone 2
388
0.24 V / C

Note: This diagram does not reflect the actual lane configuration of the intersection

Median U-Turn Intersection

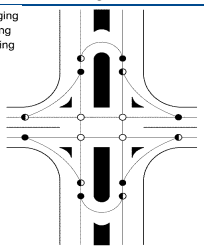
DATA INPUT AND CONFIGURATION

Enter the lane configurations in the yellow cells.



Safety - Conflict Point Diagram

● Diverging
◑ Merging
○ Crossing



Conflict Type	Count
Crossing	4
Merging	6
Diverging	6
Total	**16**

Conflict Type	Weight
Crossing	2
Merging	1
Diverging	1

Weighted Total Conflict Points

20

Assumptions

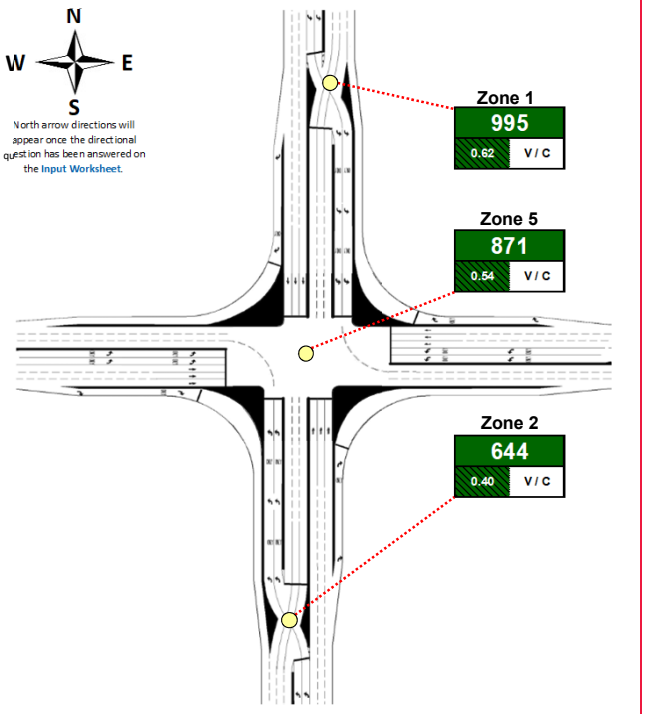
- This worksheet uses the CLV methodology for calculations at signalized zones. These calculations are based on passenger cars per hour.
- This worksheet uses the *HCM, 6th Edition* methodology for calculations at unsignalized zones. These calculations are based on vehicles per hour.

Partial Displaced Left Turn Intersection

DESIGN AND RESULTS

Project Name:	Sweetgrasss
EW Facility:	Primary Entrancd
NS Facility:	Benn's Church Boulevard
Date:	December 17, 2019

Critical Lane Volume Sum			
< 1200	1200 - 1399	1400 - 1599	≥ 1600
VOLUME / CAPACITY RATIO:		0.62	

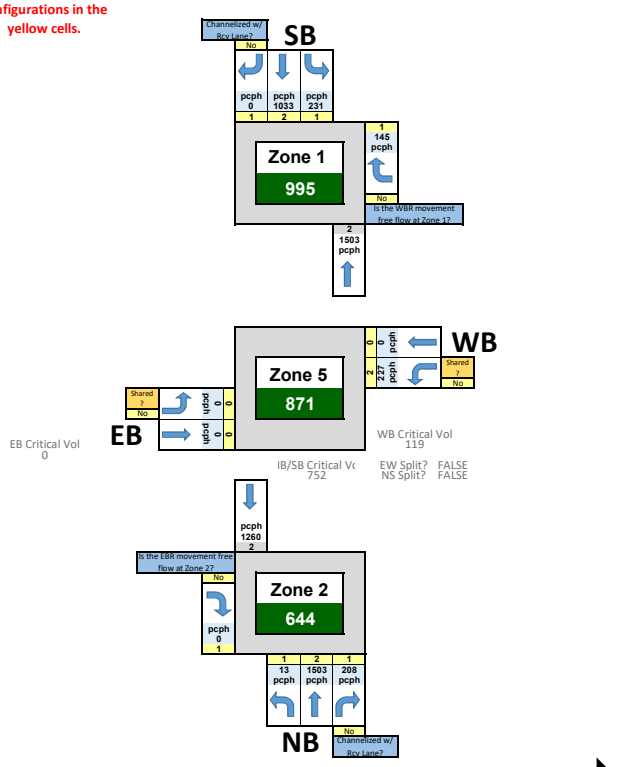


Note: This diagram does not reflect the actual lane configuration of the intersection

Partial Displaced Left Turn Intersection

DATA INPUT AND CONFIGURATION

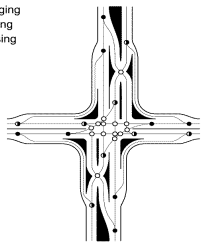
Enter the lane configurations in the yellow cells.



Back to Results

Safety - Conflict Point Diagram

- Diverging
- Merging
- Crossing



Conflict Type	Count
Crossing	14
Merging	8
Diverging	8
Total	30

Conflict Type	Weight
Crossing	2
Merging	1
Diverging	1

Weighted Total Conflict Points

44

Assumptions

- CLV calculations at Zone 5 do not include the right-turn movements from the non-displaced-left approaches.
- The number of through lanes entered in one zone is assumed to be equal to the number of through lanes in all zones that the movement passes through.

Partial Median U-Turn Intersection

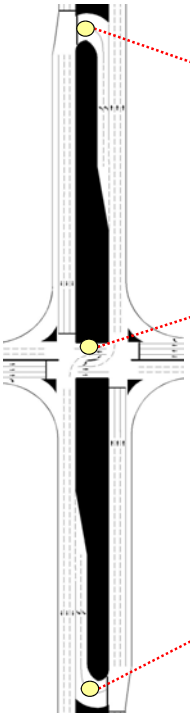
DESIGN AND RESULTS

Project Name:	Sweetgrasss
EW Facility:	Primary Entrancd
NS Facility:	Benn's Church Boulevard
Date:	December 17, 2019

Critical Lane Volume Sum			
< 1200	1200 - 1399	1400 - 1599	≥ 1600
VOLUME / CAPACITY RATIO:			0.72

N W E S

North arrow directions will appear once the directional question has been answered on the **Input Worksheet**.



Zone 1: 648 — 0.41 V / C

Zone 5: 929 — 0.58 V / C

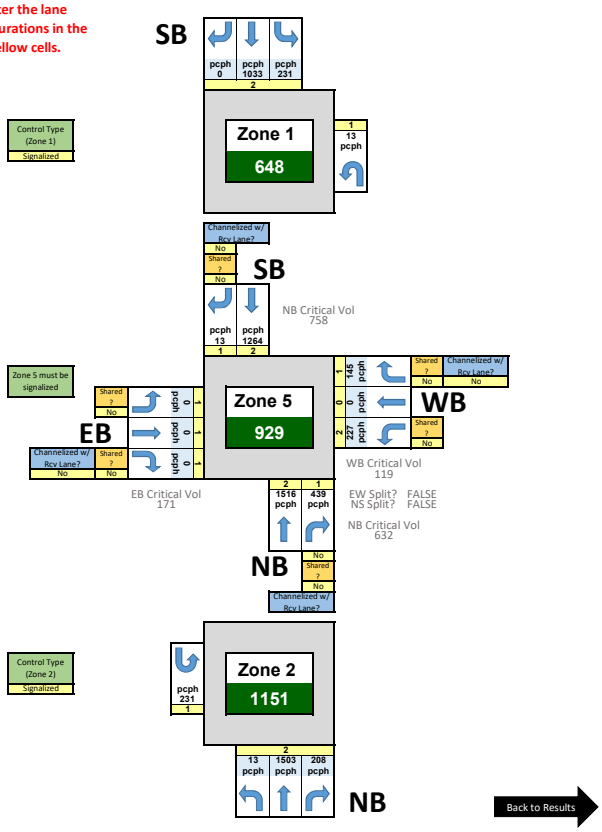
Zone 2: 1151 — 0.72 V / C

Note: This diagram does not reflect the actual lane configuration of the intersection

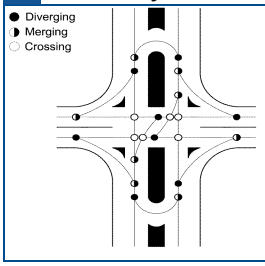
Patrial Median U-Turn Intersection

DATA INPUT AND CONFIGURATION

Enter the lane configurations in the yellow cells.



Safety - Conflict Point Diagram



Conflict Type	Count
Crossing	6
Merging	8
Diverging	8
Total	**22**

Conflict Type	Weight
Crossing	2
Merging	1
Diverging	1

Weighted Total Conflict Points

28

Assumptions

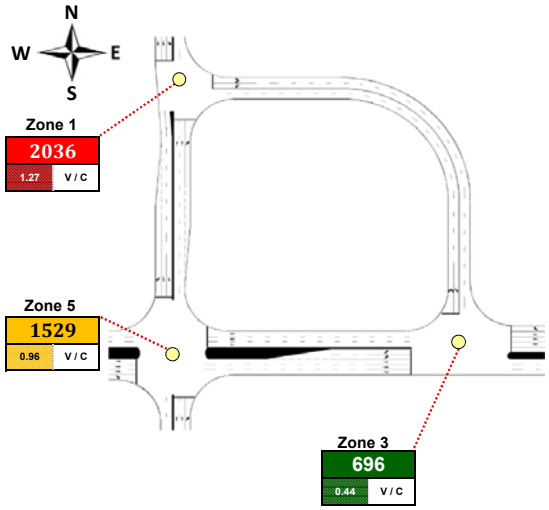
- This worksheet uses the CLV methodology for calculations at signalized zones. These calculations are based on passenger cars per hour.
- This worksheet uses the *HCM, 6th Edition* methodology for calculations at unsignalized zones. These calculations are based on vehicles per hour.

Quadrant Roadway Intersection (N-E)

DESIGN AND RESULTS

Project Name:	Sweetgrasss
EW Facility:	Primary Entrancd
NS Facility:	Benn's Church Boulevard
Date:	December 17, 2019

Critical Lane Volume Sum			
< 1200	1200 - 1399	1400 - 1599	≥ 1600
VOLUME / CAPACITY RATIO:			1.27

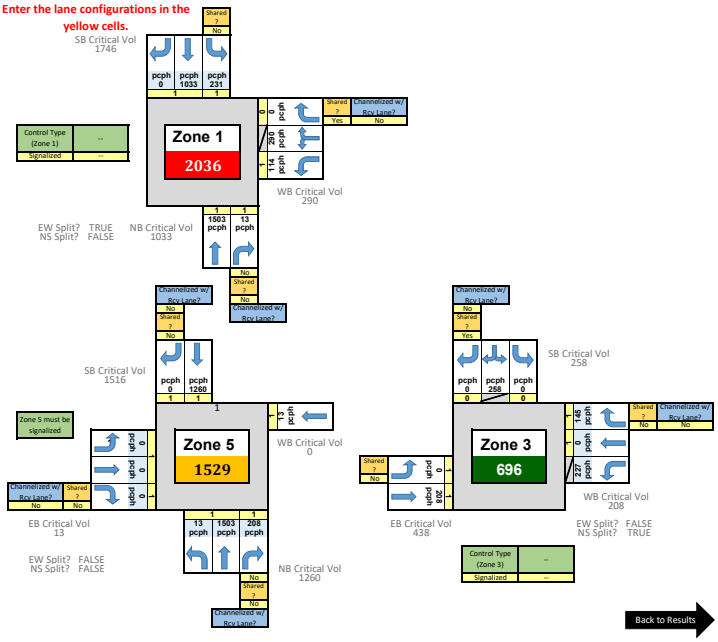


Note: This diagram does not reflect the actual lane configuration of the intersection

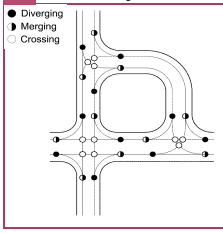
Quadrant Roadway Intersection (N-E)

DATA INPUT AND CONFIGURATION

Enter the lane configurations in the yellow cells.



Safety - Conflict Point Diagram



Conflict Type	Count
Crossing	10
Merging	10
Diverging	10
Total	30

Conflict Type	Weight
Crossing	2
Merging	1
Diverging	1

Weighted Total Conflict Points

40

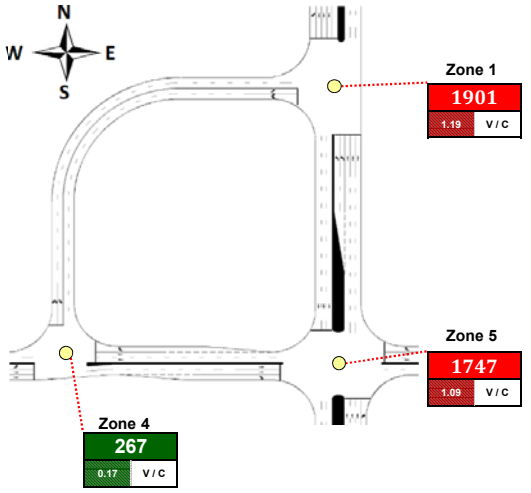
Assumptions

- All right-turning vehicles are assumed to turn right at the first opportunity.
- The northbound left-turning vehicles are assumed to go through Zone 5 and make two right turns before going through Zone 5 again to complete the left-turn movement.
- This worksheet uses the CLV methodology for calculations at signalized zones. These calculations are based on passenger cars per hour.
- This worksheet uses the *HCM, 6th Edition* methodology for calculations at unsignalized zones. These calculations are based on vehicles per hour.

Quadrant Roadway Intersection (N-W)

DESIGN AND RESULTS

		Critical Lane Volume Sum			
Project Name:	Sweetgrasss	< 1200	1200 - 1399	1400 - 1599	≥ 1600
EW Facility:	Primary Entrancd				
NS Facility:	Benn's Church Boulevard	VOLUME / CAPACITY RATIO:			1.19
Date:	December 17, 2019				

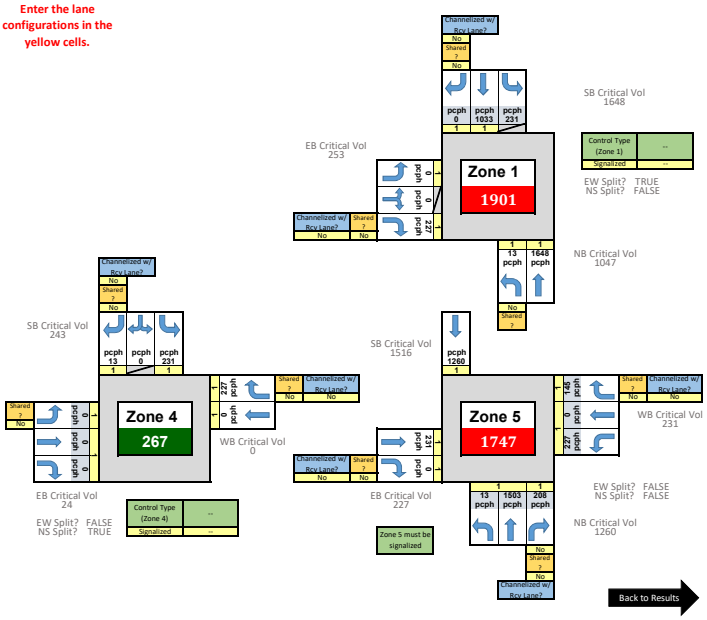


Note: This diagram does not reflect the actual lane configuration of the intersection

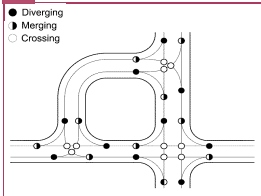
Quadrant Roadway Intersection (N-W)

DATA INPUT AND CONFIGURATION

Enter the lane configurations in the yellow cells.



Safety - Conflict Point Diagram



Conflict Type	Count
Crossing	10
Merging	10
Diverging	10
Total	30

Conflict Type	Weight
Crossing	2
Merging	1
Diverging	1

Weighted Total Conflict Points

40

Assumptions

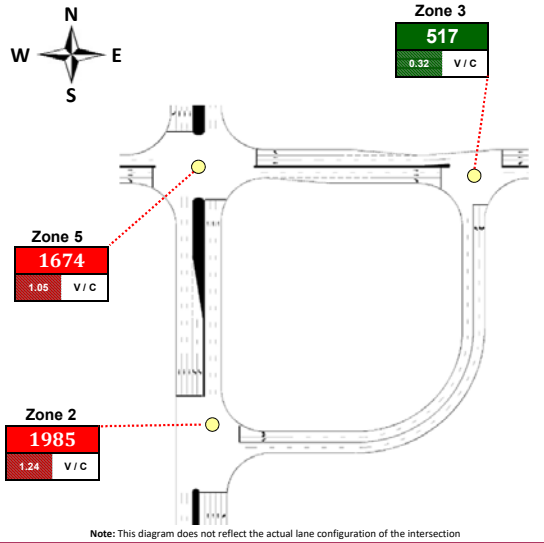
- All right-turning vehicles are assumed to turn right at the first opportunity.
- The westbound left-turning vehicles are assumed to go through Zone 5 and make two right turns before going through Zone 5 again to complete the left-turn movement.
- This worksheet uses the CLV methodology for calculations at signalized zones. These calculations are based on passenger cars per hour.
- This worksheet uses the *HCM, 6th Edition* methodology for calculations at unsignalized zones. These calculations are based on vehicles per hour.

Quadrant Roadway Intersection (S-E)

DESIGN AND RESULTS

Project Name:	Sweetgrasss
EW Facility:	Primary Entrancd
NS Facility:	Benn's Church Boulevard
Date:	December 17, 2019

Critical Lane Volume Sum			
< 1200	1200 - 1399	1400 - 1599	≥ 1600
VOLUME / CAPACITY RATIO:			1.24

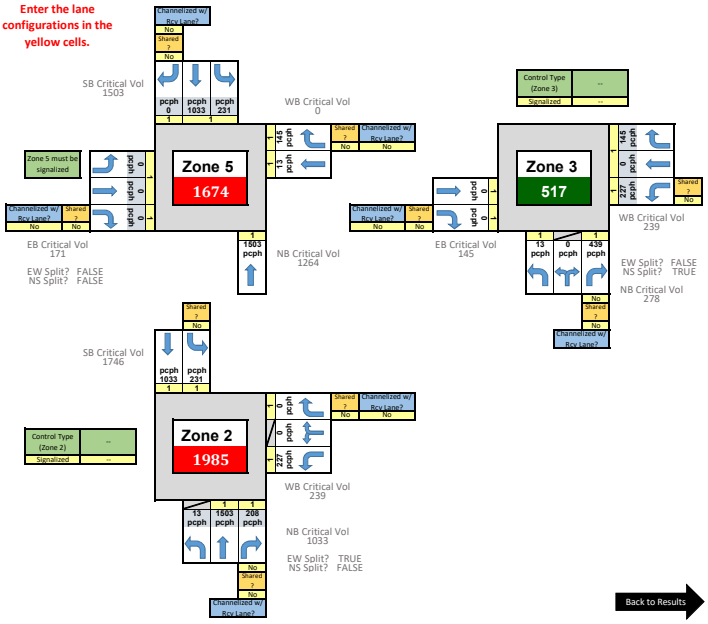


Note: This diagram does not reflect the actual lane configuration of the intersection

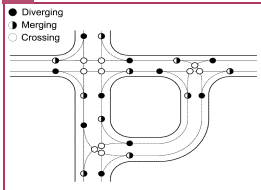
Quadrant Roadway Intersection (S-E)

DATA INPUT AND CONFIGURATION

Enter the lane configurations in the yellow cells.



Safety - Conflict Point Diagram



Conflict Type	Count
Crossing	10
Merging	10
Diverging	10
Total	30

Conflict Type	Weight
Crossing	2
Merging	1
Diverging	1

Weighted Total Conflict Points

40

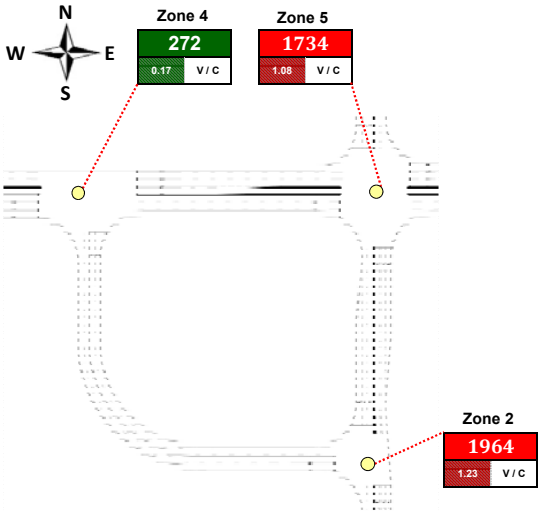
Assumptions

- All right-turning vehicles are assumed to turn right at the first opportunity.
- The eastbound left-turning vehicles are assumed to go through Zone 5 and make two right turns before going through Zone 5 again to complete the left-turn movement.
- This worksheet uses the CLV methodology for calculations at signalized zones. These calculations are based on passenger cars per hour.
- This worksheet uses the *HCM, 6th Edition* methodology for calculations at unsignalized zones. These calculations are based on vehicles per hour.

Quadrant Roadway Intersection (S-W)

DESIGN AND RESULTS

		Critical Lane Volume Sum			
Project Name:	Sweetgrasss	< 1200	1200 - 1399	1400 - 1599	≥ 1600
EW Facility:	Primary Entrancd				
NS Facility:	Benn's Church Boulevard	VOLUME / CAPACITY RATIO:			1.23
Date:	December 17, 2019				

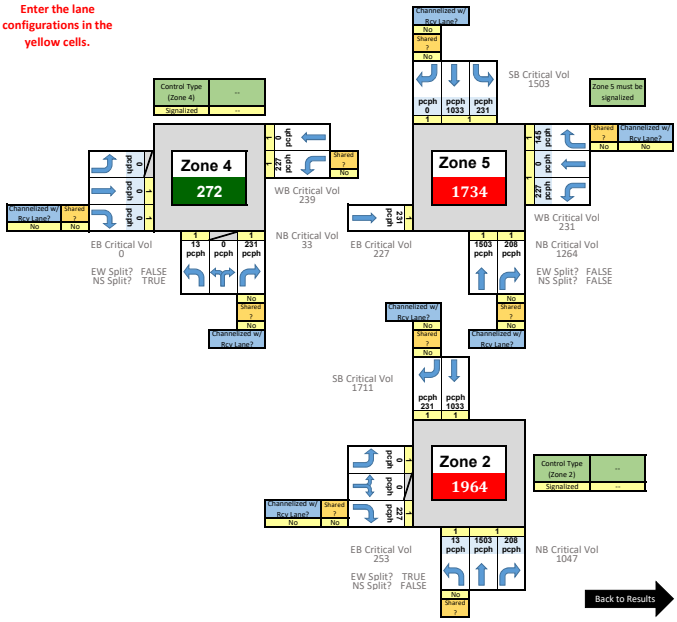


Note: This diagram does not reflect the actual lane configuration of the intersection

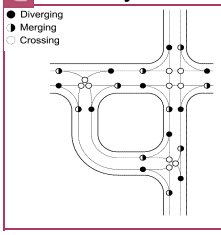
Quadrant Roadway Intersection (S-W)

DATA INPUT AND CONFIGURATION

Enter the lane configurations in the yellow cells.



Safety - Conflict Point Diagram



Conflict Type	Count
Crossing	10
Merging	10
Diverging	10
Total	30

Conflict Type	Weight
Crossing	2
Merging	1
Diverging	1

Weighted Total Conflict Points
40

Assumptions

- All right-turning vehicles are assumed to turn right at the first opportunity.
- The southbound left-turning vehicles are assumed to go through Zone 5 and make two right turns before going through Zone 5 again to complete the left-turn movement.
- This worksheet uses the CLV methodology for calculations at signalized zones. These calculations are based on passenger cars per hour.
- This worksheet uses the *HCM, 6th Edition* methodology for calculations at unsignalized zones. These calculations are based on vehicles per hour.

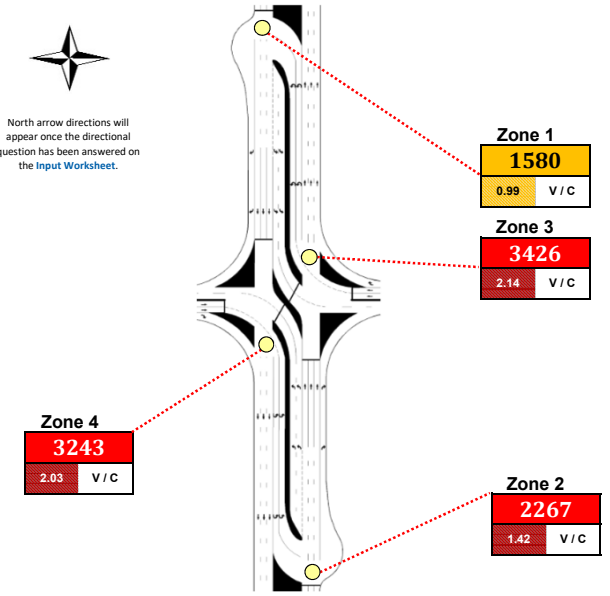
Restricted Crossing U-Turn (RCUT) Intersection

DESIGN AND RESULTS

Project Name:	*Sweetgrasss*
EW Facility:	*Primary Entrancd*
NS Facility:	*Benn's Church Boulevard*
Date:	*December 17, 2019*

Critical Lane Volume Sum			
< 1200	1200 - 1399	1400 - 1599	≥ 1600
VOLUME / CAPACITY RATIO:			**2.14**

North arrow directions will appear once the directional question has been answered on the **Input Worksheet**.

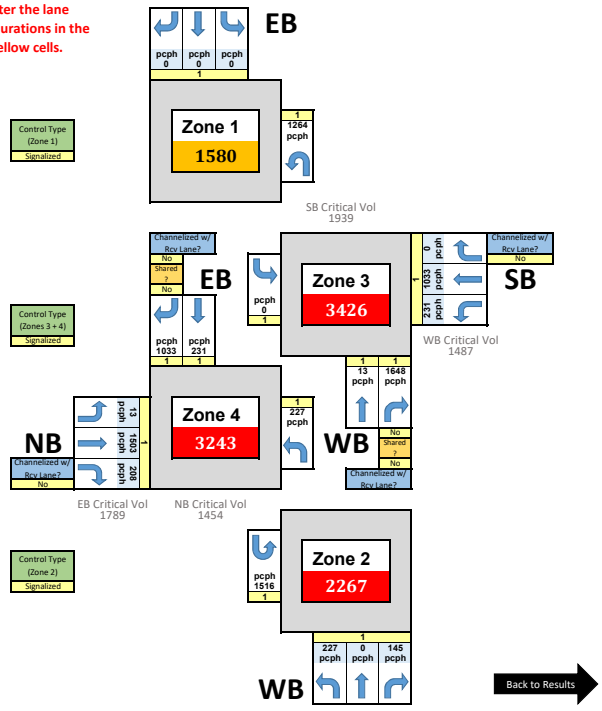


Note: This diagram does not reflect the actual lane configuration of the intersection

Restricted Crossing U-Turn (RCUT) Intersection

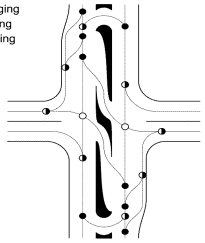
DATA INPUT AND CONFIGURATION

Enter the lane configurations in the yellow cells.



Safety - Conflict Point Diagram

● Diverging
◑ Merging
○ Crossing



Conflict Type	Count
Crossing	2
Merging	8
Diverging	8
Total	**18**

Conflict Type	Weight
Crossing	2
Merging	1
Diverging	1

Weighted Total Conflict Points

20

Assumptions

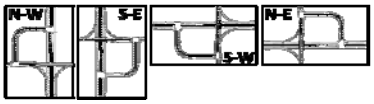
- This worksheet uses the CLV methodology for calculations at signalized zones. These calculations are based on passenger cars per hour.
- This worksheet uses the *HCM, 6th Edition* methodology for calculations at unsignalized zones. These calculations are based on vehicles per hour.

Single Loop Interchange

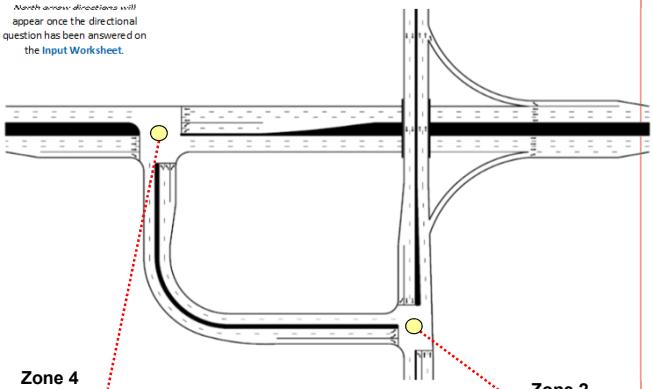
DESIGN AND RESULTS

Project Name:	Sweetgrasss
EW Facility:	Primary Entrancd
NS Facility:	Benn's Church Boulevard
Date:	December 17, 2019

Critical Lane Volume Sum			
< 1200	1200 - 1399	1400 - 1599	≥ 1600
VOLUME / CAPACITY RATIO:			1.10



North arrow directions will appear once the directional question has been answered on the Input Worksheet.



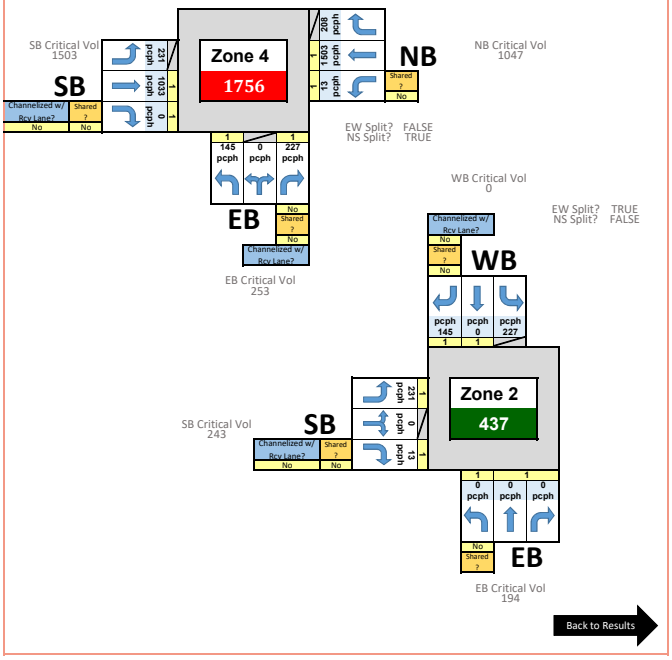
Zone 4
1756
1.10 V / C

Zone 2
437
0.27 V / C

Single Loop Interchange

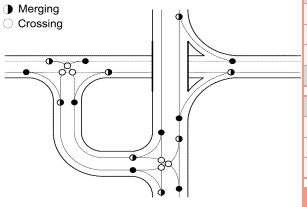
DATA INPUT AND CONFIGURATION

Enter the lane configurations in the yellow cells.



Safety - Conflict Point Diagram

● Diverging
◑ Merging
○ Crossing



Conflict Type	Count
Crossing	6
Merging	8
Diverging	8
Total	22

Conflict Type	Weight
Crossing	2
Merging	1
Diverging	1

Weighted Total Conflict Points

28

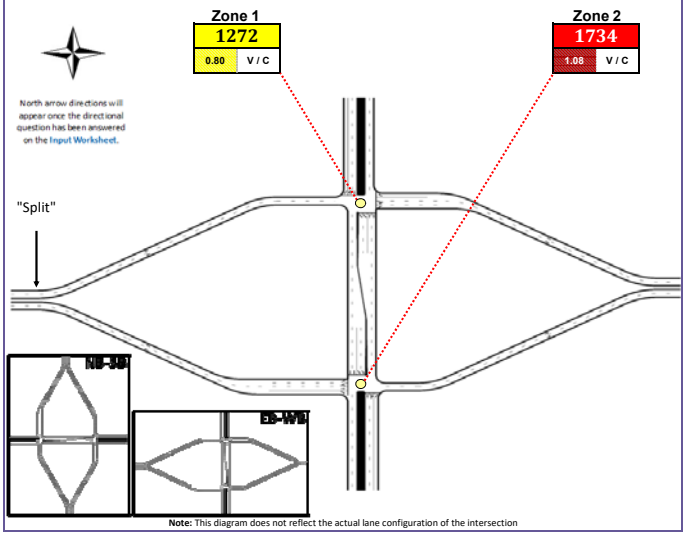
Assumptions

- The NBR movement is assumed to be free flow and is not included in any CLV calculations.

Split Intersection

DESIGN AND RESULTS

		Critical Lane Volume Sum			
Project Name:	Sweetgrasss	< 1200	1200 - 1399	1400 - 1599	≥ 1600
EW Facility:	Primary Entrancd				
NS Facility:	Benn's Church Boulevard	MAXIMUM VOLUME / CAPACITY RATIO:			1.08
Date:	December 17, 2019				

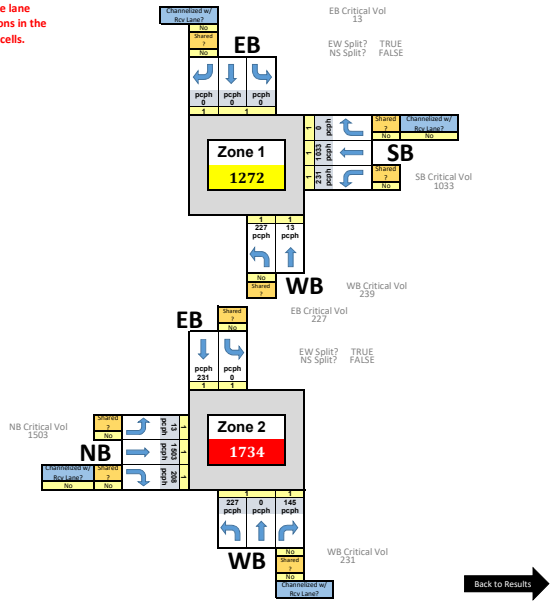


Note: This diagram does not reflect the actual lane configuration of the intersection

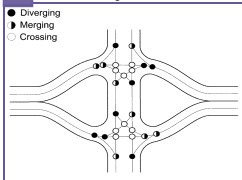
Split Intersection

DATA INPUT AND CONFIGURATION

Enter the lane configurations in the yellow cells.



Safety - Conflict Point Diagram



Conflict Type	Count
Crossing	10
Merging	8
Diverging	8
Total	26

Conflict Type	Weight
Crossing	2
Merging	1
Diverging	1

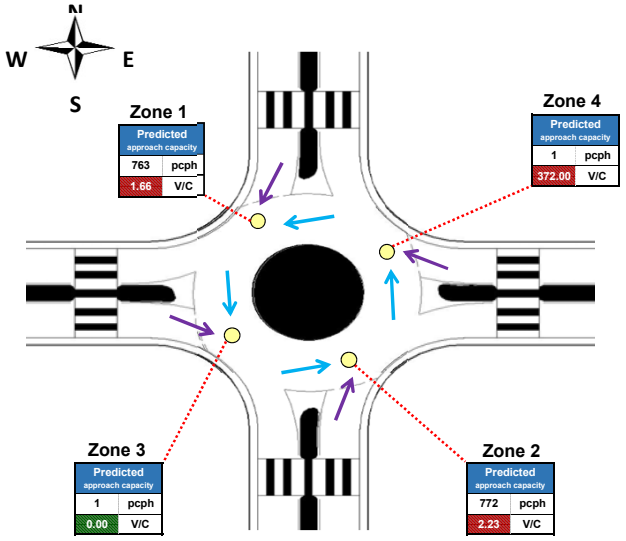
Weighted Total Conflict Points

36

50' ICD Mini-Roundabout

DESIGN AND RESULTS

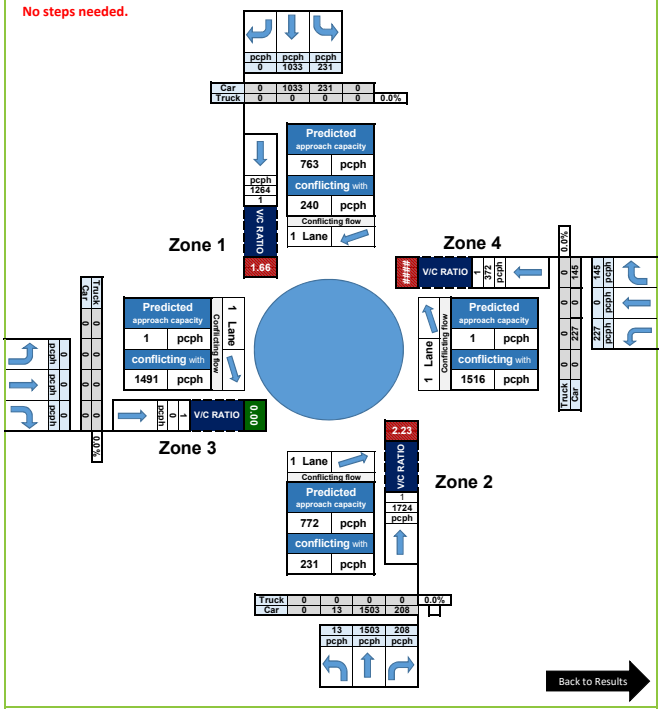
		Critical Lane Volume Sum			
Project Name:	Sweetgrasss	< 1200	1200 - 1399	1400 - 1599	≥ 1600
EW Facility:	Primary Entrancd				
NS Facility:	Benn's Church Boulevard	VOLUME / CAPACITY RATIO:		372.00	
Date:	December 17, 2019				



50' ICD Mini-Roundabout

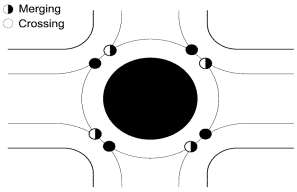
DATA INPUT AND CONFIGURATION

No steps needed.



Safety - Conflict Point Diagram

● Diverging
◑ Merging
○ Crossing



Conflict Type	Count
Crossing	0
Merging	4
Diverging	4
Total	8

Conflict Type	Weight
Crossing	2
Merging	1
Diverging	1

Weighted Total Conflict Points

8

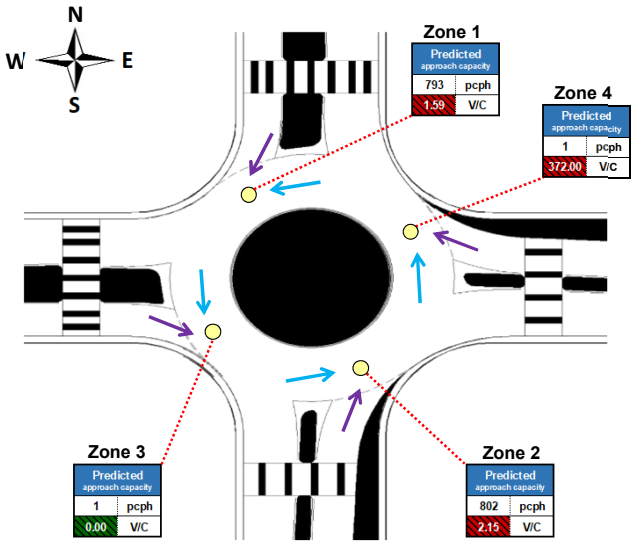
Assumptions

- This worksheet does not use the CLV methodology. The calculations are based on the article *Determination of Mini-Roundabout Capacity in the United States* , published in the *Journal of Transportation Engineering* .

75' ICD Mini-Roundabout

DESIGN AND RESULTS

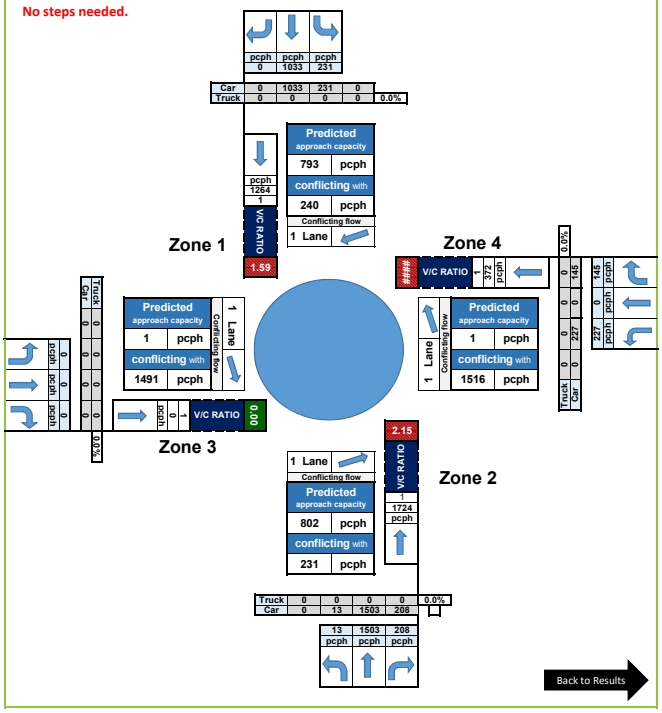
Project Name:	Sweetgrasss	Critical Lane Volume Sum			
EW Facility:	Primary Entrancd	< 1200	1200 - 1399	1400 - 1599	≥ 1600
NS Facility:	Benn's Church Boulevard	VOLUME / CAPACITY RATIO:		372.00	
Date:	December 17, 2019				



75' ICD Mini-Roundabout

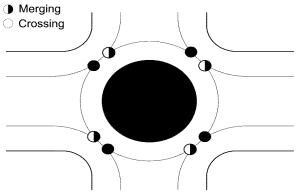
DATA INPUT AND CONFIGURATION

No steps needed.



Safety - Conflict Point Diagram

● Diverging
◑ Merging
○ Crossing



Conflict Type	Count
Crossing	0
Merging	4
Diverging	4
Total	8

Conflict Type	Weight
Crossing	2
Merging	1
Diverging	1

Weighted Total Conflict Points

8

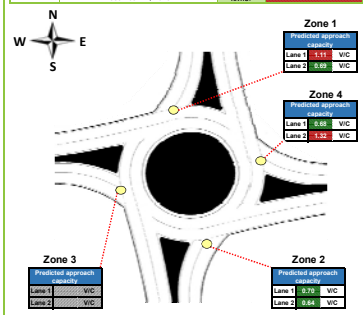
Assumptions

- This worksheet does not use the CLV methodology. The calculations are based on the article *Determination of Mini-Roundabout Capacity in the United States* , published in the *Journal of Transportation Engineering* .

Roundabout

DESIGN AND RESULTS

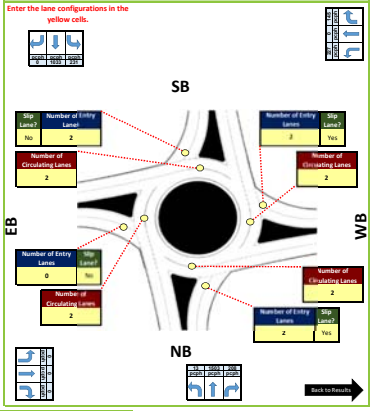
		Critical Lane Volume Sum			
Project Name:	Sweetgrasss	< 1200	1200 - 1399	1400 - 1599	≥ 1600
EW Facility:	Primary Entrancd	VOLUME / CAPACITY RATIO:			1.32
NS Facility:	Benn's Church Boulevard				
Date:	December 17, 2019				



Roundabout

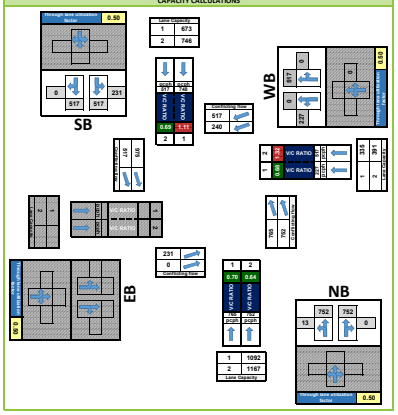
DATA INPUT AND CONFIGURATION

Enter the lane configurations in the yellow cells.



Roundabout

CAPACITY CALCULATIONS



EQUATION: A x exp(-B x Q)

Number of Entry Lanes	Number of Circulating Lanes	Lane	A	B
1	1	-	1380	0.00102
1	2	-	1420	0.00085
2	1	Left	1420	0.00091
2	1	Right	1420	0.00091
2	2	Left	1350	0.00092
2	2	Right	1420	0.00085

Safety - Conflict Point Diagram

Conflict Type	Count
Crossing	0
Merging	4
Diverging	4
Total	8

Conflict Type	Weight
Crossing	2
Merging	1
Diverging	1

Weighted Total Conflict Points

8

Assumptions

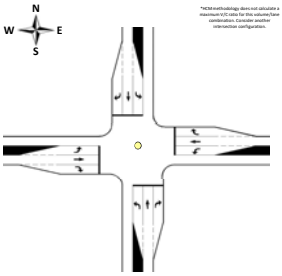
- The number of circulating lanes in one quadrant is assumed to be equal to the number of exiting lanes in the next quadrant.
- The roundabout is limited to a maximum of two entry lanes and two circulating lanes.
- All left-turning vehicles are assumed to stay in the innermost lane until exiting the roundabout.
- This worksheet does not use the CLV methodology. The calculations are based on the *HCM 6th Edition* .

Two-Way Stop Control (TWSC)

DESIGN AND RESULTS

Project Name	Sweetgrasss	Critical Lane Volume Sum
MM Facility	Primary Entrance	< 500 | 500 - 599 | 600 - 699 | ≥ 700
ME Facility	Bein's Church Boulevard	VOLUME / CAPACITY RATIO: N/A*
Date	December 17, 2019	

*HCM methodology does not calculate a maximum V/C ratio for this volume/lane combination. Consider another intersection configuration.

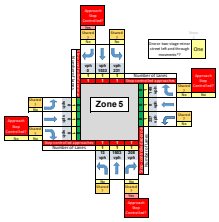


Note: This diagram does not reflect the actual lane configuration of the intersection

Two-Way Stop Control (TWSC)

DATA INPUT AND CONFIGURATION

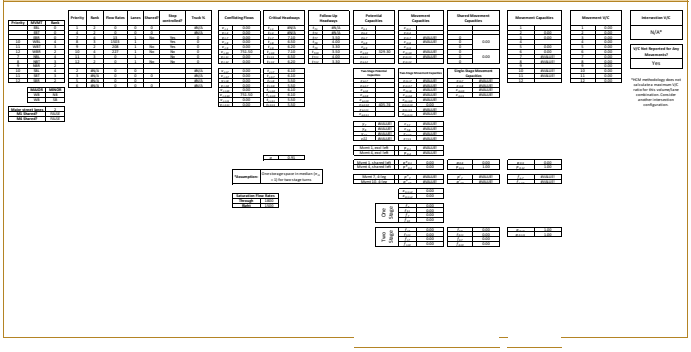
Step 1: Identify which approaches are stop-controlled by selecting "Yes" from the drop-down
Step 2: Enter the lane configurations in the yellow cells.



Back to Results

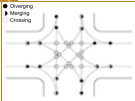
Two-Way Stop Control (TWSC)

HCM 6 CALCULATIONS



Safety - Conflict Point Diagram

- Diverging
- Merging
- Crossing



Conflict Type	Count
Crossing	16
Merging	8
Diverging	8
Total	32

Conflict Type	Weight
Crossing	2
Merging	1
Diverging	1

Weighted Total Conflict Points: 48

Assumptions

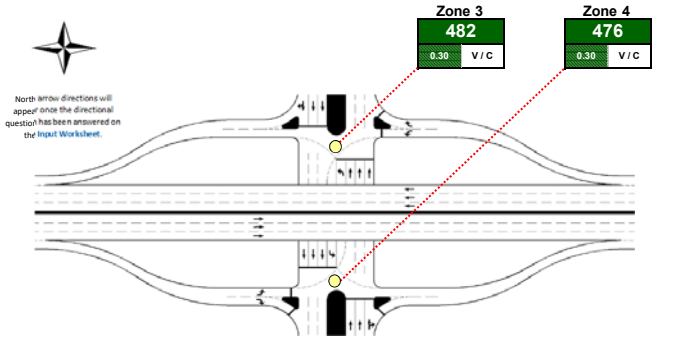
- This worksheet does not use the CLV methodology. The calculations are based on the *HCM, 6th Edition*. The calculations are based on vehicles per hour.

Traditional Diamond Interchange

DESIGN AND RESULTS

Project Name:	Sweetgrasss
EW Facility:	Primary Entrancd
NS Facility:	Benn's Church Boulevard
Date:	December 17, 2019

Critical Lane Volume Sum			
< 1200	1200 - 1399	1400 - 1599	≥ 1600
VOLUME / CAPACITY RATIO:			0.30

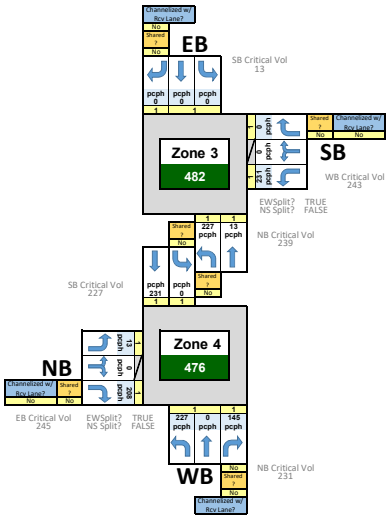


Note: This diagram does not reflect the actual lane configuration of the intersection

Traditional Diamond Interchange

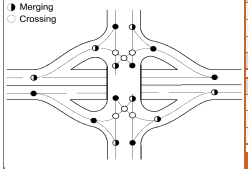
DATA INPUT AND CONFIGURATION

Enter the lane configurations in the yellow cells.



Safety - Conflict Point Diagram

● Diverging
◗ Merging
○ Crossing



Conflict Type	Count
Crossing	6
Merging	8
Diverging	8
Total	22

Conflict Type	Weight
Crossing	2
Merging	1
Diverging	1

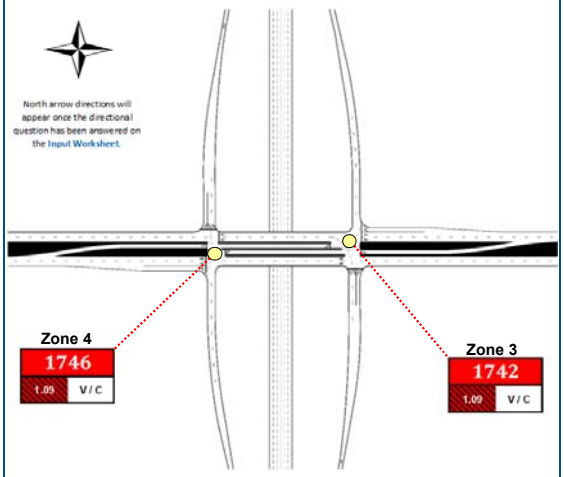
Weighted Total Conflict Points

28

Contraflow Left Interchange

DESIGN AND RESULTS

		Critical Lane Volume Sum			
Project Name:	Sweetgrasss	< 1200	1200 - 1399	1400 - 1599	≥ 1600
EW Facility:	Primary Entrancd				
NS Facility:	Benn's Church Boulevard	VOLUME / CAPACITY RATIO:			1.09
Date:	December 17, 2019				

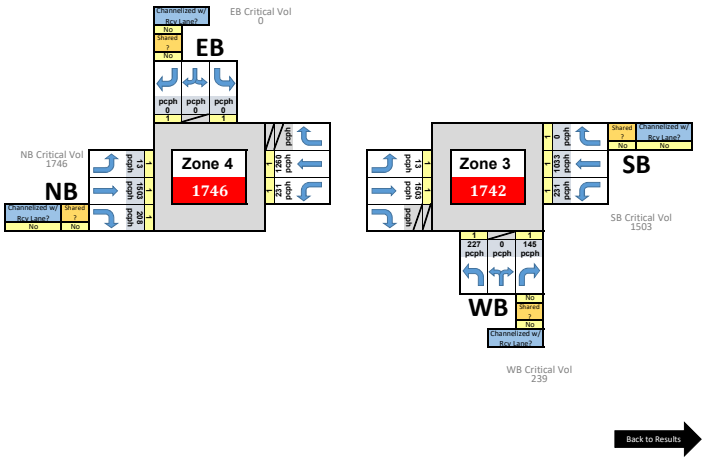


Note: This diagram does not reflect the actual lane configuration of the intersection

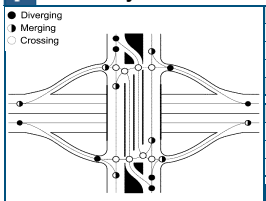
Contraflow Left Interchange

DATA INPUT AND CONFIGURATION

Enter the lane configurations in the yellow cells.



Safety - Conflict Point Diagram



Conflict Type	Count
Crossing	8
Merging	8
Diverging	8
Total	**24**

Conflict Type	Weight
Crossing	2
Merging	1
Diverging	1

Weighted Total Conflict Points

32

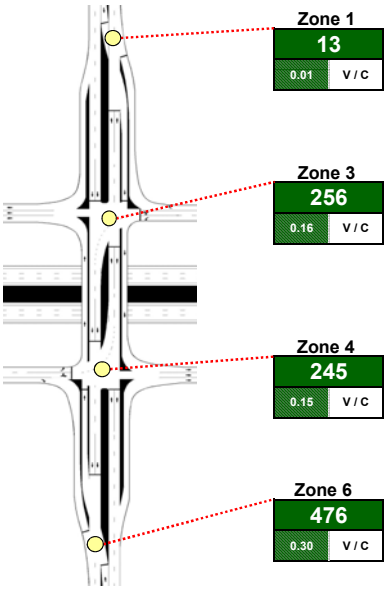
Displaced Left Turn Interchange

DESIGN AND RESULTS

Project Name:	Sweetgrasss
EW Facility:	Primary Entrancd
NS Facility:	Benn's Church Boulevard
Date:	December 17, 2019

Critical Lane Volume Sum			
< 1200	1200 - 1399	1400 - 1599	≥ 1600
VOLUME / CAPACITY RATIO:		0.30	

North arrow directions will appear once the directional question has been answered on the Input Worksheet.

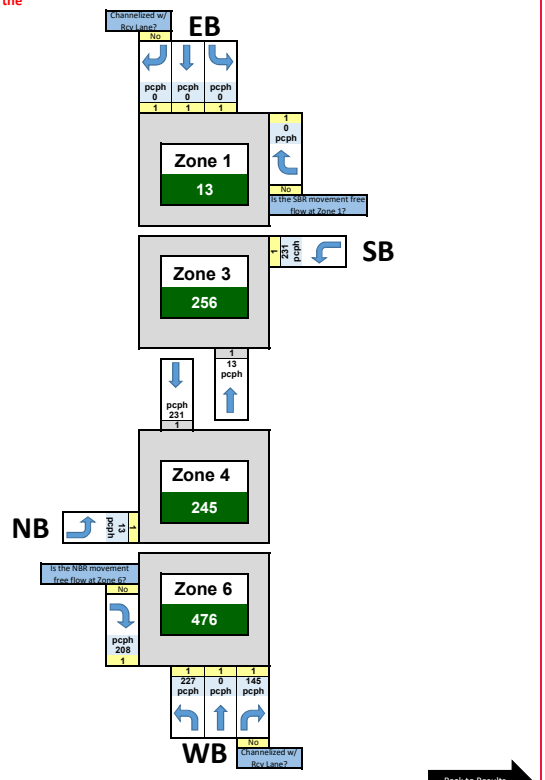


Note: This diagram does not reflect the actual lane configuration of the intersection

Displaced Left Turn Interchange

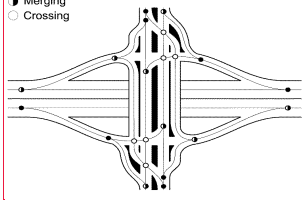
DATA INPUT AND CONFIGURATION

Enter the lane configurations in the yellow cells.



Safety - Conflict Point Diagram

- Diverging
- Merging
- Crossing



Conflict Type	Count
Crossing	6
Merging	8
Diverging	8
Total	**22**

Conflict Type	Weight
Crossing	2
Merging	1
Diverging	1

Weighted Total Conflict Points

28

Assumptions

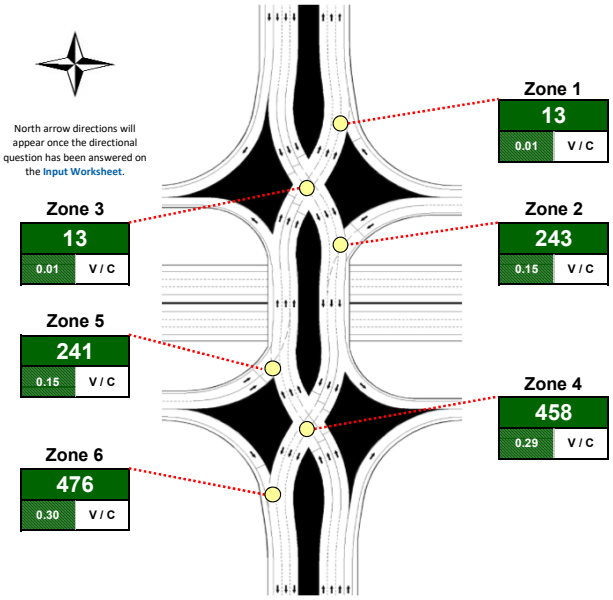
- The number of through lanes entered in one zone is assumed to be equal to the number of through lanes in all zones that the movement passes through.

Diverging Diamond Interchange (DDI)

DESIGN AND RESULTS

		Critical Lane Volume Sum			
Project Name:	Sweetgrasss	< 1200	1200 - 1399	1400 - 1599	≥ 1600
EW Facility:	Primary Entrancd				
NS Facility:	Benn's Church Boulevard	VOLUME / CAPACITY RATIO:			0.30
Date:	December 17, 2019				

North arrow directions will appear once the directional question has been answered on the Input Worksheet.

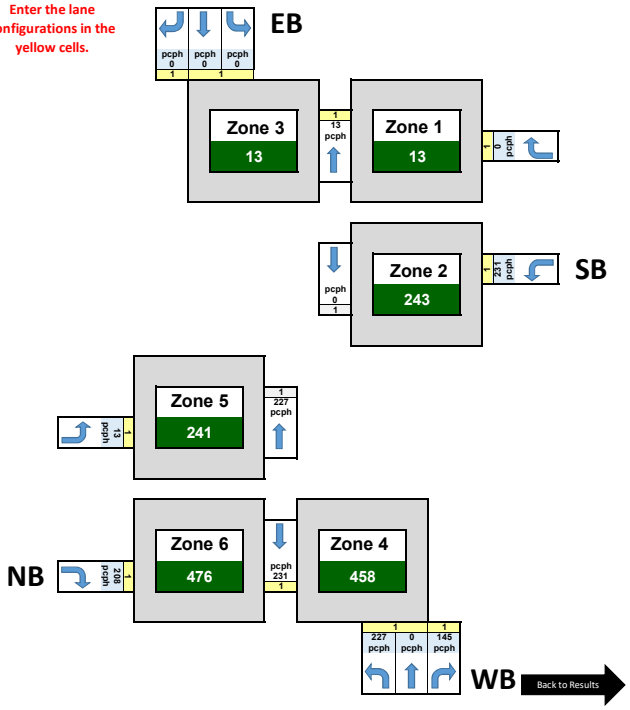


Note: This diagram does not reflect the actual lane configuration of the intersection

Diverging Diamond Interchange (DDI)

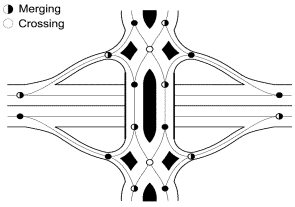
DATA INPUT AND CONFIGURATION

Enter the lane configurations in the yellow cells.



Safety - Conflict Point Diagram

● Diverging
◑ Merging
○ Crossing



Conflict Type	Count
Crossing	2
Merging	8
Diverging	8
Total	18

Conflict Type	Weight
Crossing	2
Merging	1
Diverging	1

Weighted Total Conflict Points

20

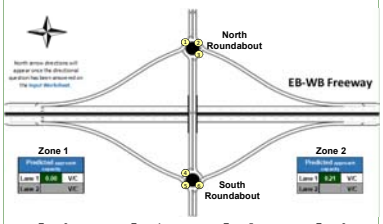
Assumptions

- The number of WB through lanes entered in Zone 4 is assumed to be equal to the number of through lanes in Zone 5. The number of EB through lanes entered in Zone 3 is assumed to be equal to the number of through lanes in Zone 2.

Double Roundabout Interchange

DESIGN AND RESULTS

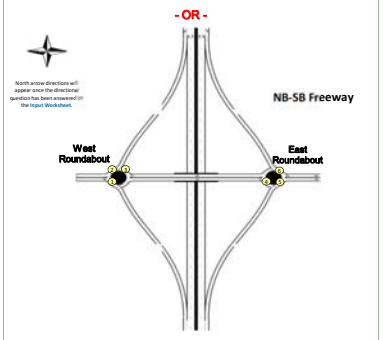
		Critical Lane Volume Sum			
Project Name:	Sweetgrasss	< 1200	1200 - 1399	1400 - 1599	> 1600
EW Facility:	Primary Entrancd				
NS Facility:	Benn's Church Boulevard	VOLUME / CAPACITY RATIO:			0.27
Date:	December 17, 2019				



Zone 1		Zone 2	
Predicted approach capacity		Predicted approach capacity	
Lane 1	0.00 V/C	Lane 1	0.21 V/C
Lane 2	V/C	Lane 2	V/C

Zone 3		Zone 4		Zone 5		Zone 6	
Predicted approach capacity		Predicted approach capacity		Predicted approach capacity		Predicted approach capacity	
Lane 1	0.17 V/C	Lane 1	0.17 V/C	Lane 1	0.29 V/C	Lane 1	0.27 V/C
Lane 2	V/C	Lane 2	V/C	Lane 2	V/C	Lane 3	V/C

- OR -

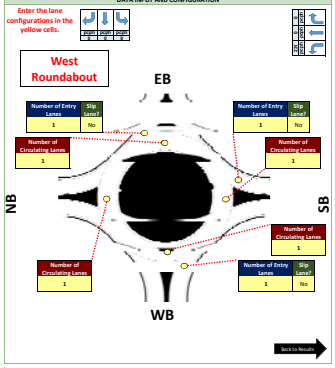


Note: This diagram does not reflect the actual lane configuration of the intersection

Double Roundabout Interchange

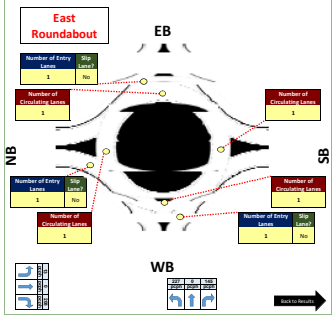
DATA INPUT AND CONFIGURATION

Enter the lane configurations in the yellow cells.



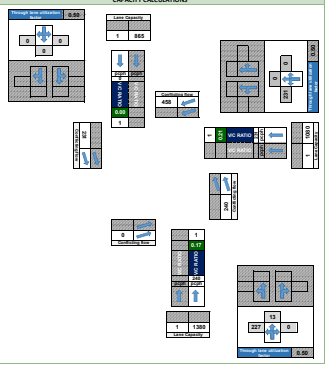
Double Roundabout Interchange

DATA INPUT AND CONFIGURATION

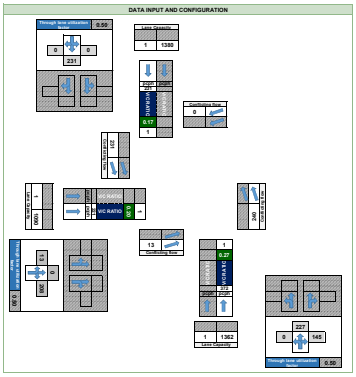


Double Roundabout Interchange

CAPACITY CALCULATIONS



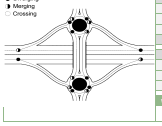
DATA INPUT AND CONFIGURATION



EQUATION: A x exp(-B x Q)

Number of Entry Lanes	Number of Circulating Lanes	Lane	A	B
1	1	-	1380	0.00102
1	2	-	1420	0.00085
2	1	Left	1420	0.00091
2	1	Right	1420	0.00091
2	2	Left	1350	0.00092
2	2	Right	1420	0.00085

Safety - Conflict Point Diagram



Conflict Type	Count
Crossing	0
Merging	8
Diverging	8
Total	16

Conflict Type	Weight
Crossing	2
Merging	1
Diverging	1

Weighted Total Conflict Points: **16**

Assumptions

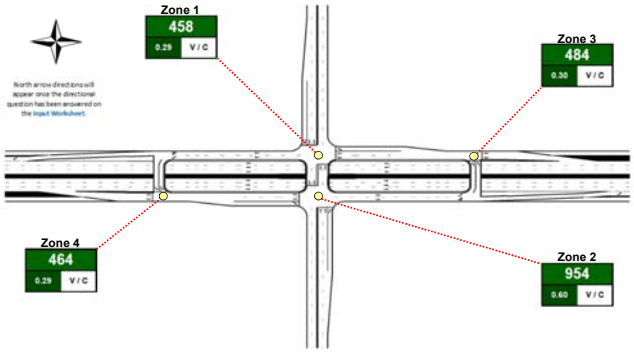
- The number of circulating lanes in one quadrant is assumed to be equal to the number of exiting lanes in the next quadrant.
- The roundabout is limited to a maximum of two entry lanes and two circulating lanes.
- All left-turning vehicles are assumed to stay in the innermost lane until exiting the roundabout.
- This worksheet does not use the CLV methodology. The calculations are based on the *HCM 6th Edition*.

Michigan Urban Diamond Intersection

DESIGN AND RESULTS

Project Name:	Sweetgrasss
EW Facility:	Primary Entrancd
NS Facility:	Benn's Church Boulevard
Date:	December 17, 2019

Critical Lane Volume Sum			
< 1200	1200 - 1399	1400 - 1599	≥ 1600
VOLUME / CAPACITY RATIO:	0.60		

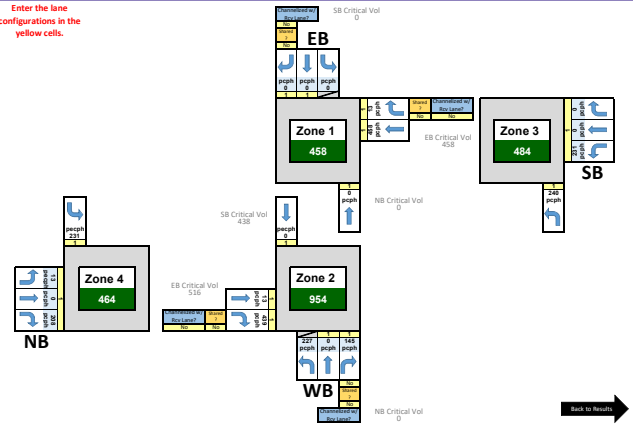


Note: This diagram does not reflect the actual lane configuration of the intersection

Michigan Urban Diamond Intersection

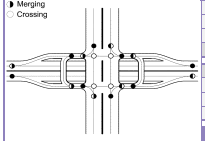
DATA INPUT AND CONFIGURATION

Enter the lane configurations in the yellow cells.



Safety - Conflict Point Diagram

- Diverging
- Merging
- Crossing



Conflict Type	Count
Crossing	4
Merging	8
Diverging	8
Total	20

Conflict Type	Weight
Crossing	2
Merging	1
Diverging	1

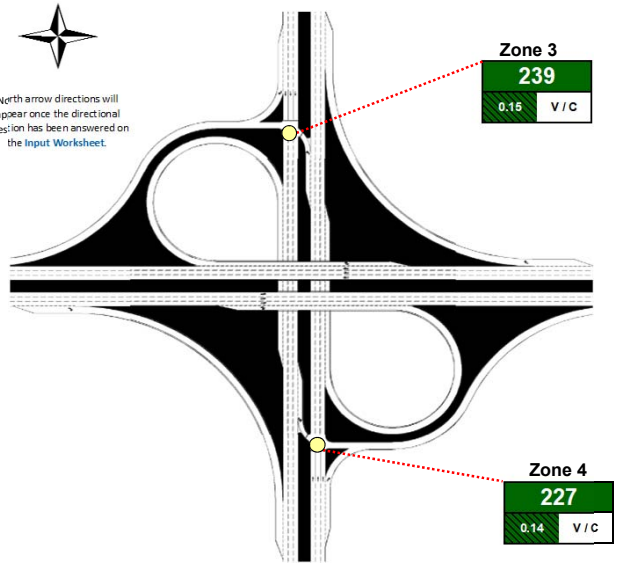
Weighted Total Conflict Points: **24**

Partial Cloverleaf Interchange

DESIGN AND RESULTS

		Critical Lane Volume Sum			
Project Name:	Sweetgrasss	< 1200	1200 - 1399	1400 - 1599	≥ 1600
EW Facility:	Primary Entrancd				
NS Facility:	Benn's Church Boulevard	VOLUME / CAPACITY RATIO:			0.15
Date:	December 17, 2019				

North arrow directions will appear once the directional question has been answered on the Input Worksheet.

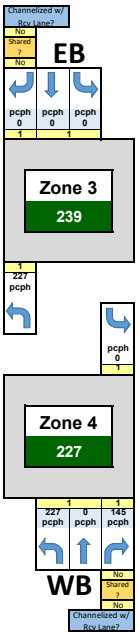


Note: This diagram does not reflect the actual lane configuration of the intersection

Partial Cloverleaf Interchange

DATA INPUT AND CONFIGURATION

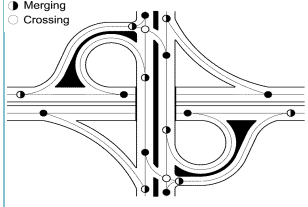
Enter the lane configurations in the yellow cells.



Back to Results

Safety - Conflict Point Diagram

● Diverging
◑ Merging
○ Crossing



Conflict Type	Count
Crossing	2
Merging	8
Diverging	8
Total	18

Conflict Type	Weight
Crossing	2
Merging	1
Diverging	1

Weighted Total Conflict Points

20

Assumptions

- This configuration assumes the Partial cloverleaf has two loop ramps, both of which will be used by vehicles exiting the freeway.

Single Point Urban Interchange (SPUI)

DESIGN AND RESULTS

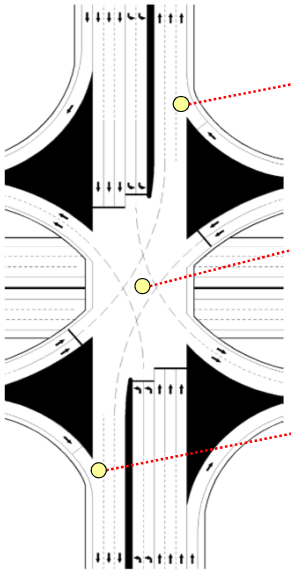
Project Name:	Sweetgrasss
EW Facility:	Primary Entrancd
NS Facility:	Benn's Church Boulevard
Date:	December 17, 2019

Critical Lane Volume Sum

< 1200	1200 - 1399	1400 - 1599	≥ 1600

VOLUME / CAPACITY RATIO: **0.30**

North arrow directions will appear once the directional question has been answered on the **Input Worksheet**.

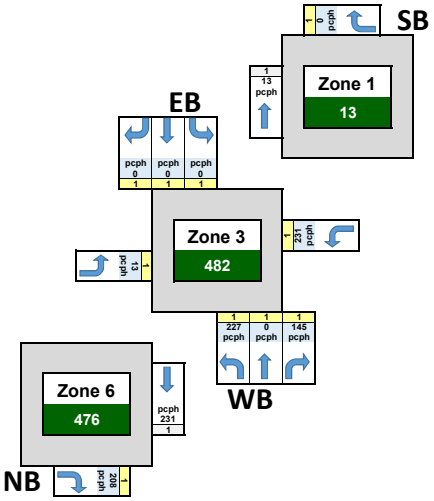


Note: This diagram does not reflect the actual lane configuration of the intersection

Single Point Urban Interchange (SPUI)

DATA INPUT AND CONFIGURATION

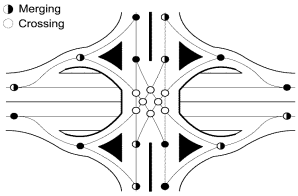
Enter the lane configurations in the yellow cells.



Back to Results

Safety - Conflict Point Diagram

- Diverging
- Merging
- Crossing



Conflict Type	Count
Crossing	8
Merging	8
Diverging	8
Total	24

Conflict Type	Weight
Crossing	2
Merging	1
Diverging	1

Weighted Total Conflict Points

32

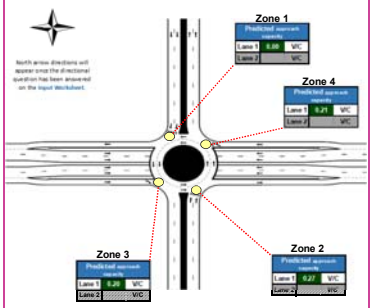
Assumptions

- The number of through lanes entered in one zone is assumed to be equal to the number of through lanes in all zones that the movement passes through.

Single Roundabout Interchange

DESIGN AND RESULTS

		Critical Lane Volume Sum			
Project Name:	Sweetgrasss				
EW Facility:	Primary Entrancd	< 1200	1200 - 1399	1400 - 1599	≥ 1600
NS Facility:	Benn's Church Boulevard	VOLUME / CAPACITY RATIO:			0.27
Date:	December 17, 2019				

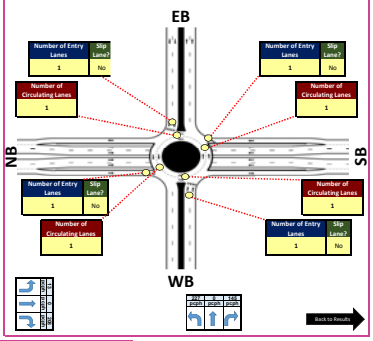


Note: This diagram does not reflect the actual lane configuration of the intersection

Single Roundabout Interchange

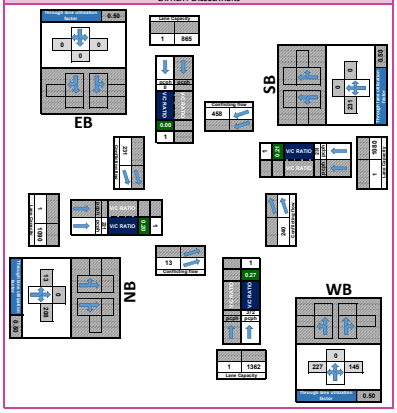
DATA INPUT AND CONFIGURATION

Enter the lane configurations in the yellow cells.



Single Roundabout Interchange

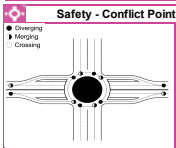
CAPACITY CALCULATIONS



EQUATION: A x exp(-B x Q)

Number of Entry Lanes	Number of Circulating Lanes	Lane	A	B
1	1	-	1380	0.00102
1	2	-	1420	0.00085
2	1	Left	1420	0.00091
2	1	Right	1420	0.00091
2	2	Left	1350	0.00092
2	2	Right	1420	0.00085

Safety - Conflict Point Diagram



Conflict Type	Count
Crossing	0
Merging	6
Diverging	6
Total	12

Conflict Type	Weight
Crossing	2
Merging	1
Diverging	1

Weighted Total Conflict Points

12

Assumptions

- The number of circulating lanes in one quadrant is assumed to be equal to the number of exiting lanes in the next quadrant.
- The roundabout is limited to a maximum of two entry lanes and two circulating lanes.
- All left-turning vehicles are assumed to stay in the innermost lane until exiting the roundabout.
- This worksheet does not use the CLV methodology. The calculations are based on the *HCM 6th Edition* .

Appendix C (optional):
TIA, Safety Study, and/or other Studies (if available)


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To: VDOT and Isle of Wight County

Date: June 25, 2021
Project #: 34417.00

Memorandum

From: Kirsten Tynch, PE, PTOE

Re: Sweetgrass Supplemental Memo to December 2019 Traffic Impact Study

Introduction

Yeoman's Tract is an undeveloped parcel located at 14096 Benns Church Boulevard in Isle of Wight County. The parcel is on the northeast side US 258/Rt (Benns Church Boulevard) between US 258/Rt 32 (Brewers Neck Boulevard) and Canteberry Lane. Ryan Homes is planning a development of single family, and multi-family living residential units as well as a shopping center on this parcel. The developer is in the process of rezoning the property to Conditional Mixed Use Areas (C-PD-MX). This development is expected to be in full operation in 2026.

The Virginia Department of Transportation (VDOT) and Isle of Wight County require a traffic study in compliance with Chapter 527 Regulations. A traffic study was completed in December 2019 and submitted for approval. The proposed development is now referred to as Sweetgrass, and this memorandum is a supplement to the December 2019 traffic impact study.

Trip Generation

The development plan has been modified since the 2019 TIA to provide a lower number of housing units. It also eliminated the public park and the fast food restaurant with a drive thru. Table 1 shows the land use plan for the proposed development and trips generated by this updated plan, while Table 2 shows the trips that were to be generated from the December 2019 plan.

Table 1. Trip generation for current development plan

Land Use	ITE Code	Size	Units	Daily	AM Peak Hour			PM Peak Hour		
					Enter	Exit	Total	Enter	Exit	Total
Conceptual Site Plan										
Single-Family Detached Housing	210	390	Dwelling Units	3,682	72	217	289	243	143	386
Multifamily Housing (Low-Rise)	220	225	Dwelling Units	1,660	24	80	104	79	47	126
Shopping Center	820	35	1000 Sq. Ft. GLA	2,944	20	13	33	120	130	250
Subtotal				**8,286**	**116**	**310**	**426**	**442**	**320**	**762**
Pass-by Trips (Shopping Center)	34%		% Pass-by	1,001	7	4	11	41	44	85
Total New Trips				**7,285**	**109**	**306**	**415**	**401**	**276**	**677**

Reference: Trip Generation, 10th Edition + Supplement, Institute of Transportation Engineers, Washington, DC. 2019.
Note: Used highest of average rate and fitted curve unless fitted curve unless R2<0.75

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Virginia Beach, VA 23462-3361
P 757.490.0132

Memorandum

Table 2. Trip generation from December 2019 TIA

Land Use	ITE Code	Size	Units	Daily	AM Peak Hour			PM Peak Hour		
					Enter	Exit	Total	Enter	Exit	Total
Conceptual Site Plan										
Single-Family Detached Housing	210	400	Dwelling Units	3,776	74	222	296	249	147	396
Multifamily Housing (Low-Rise)	220	285	Dwelling Units	2,144	30	101	131	101	59	160
Shopping Center	820	30	1000 Sq. Ft. GLA	2,651	17	11	28	107	116	223
Public Park	411	4	Acres	91	0	0	0	13	10	23
Fast Food with Drive-Thru	934	5	1000 Sq. Ft. GLA	2,355	102	99	201	85	78	163
Subtotal				**11,017**	**223**	**433**	**656**	**555**	**410**	**965**
Pass-by Trips (Fast Food only)	49%		% Pass-by	1,154	50	49	98	42	38	80
Pass-by Trips (Shopping Center)	34%		% Pass-by	901	6	4	10	36	39	76
Total New Trips				**8,962**	**167**	**380**	**548**	**477**	**333**	**809**

Reference: Trip Generation, 10th Edition, Institute of Transportation Engineers, Washington, DC. 2017.
Note: Used highest total between aveage rate and fitted curve unless R2<0.75

The site is estimated to generate 7,285 new daily trips with 415 trips in the morning peak hour and 677 trips during the evening peak hour. This equates to a reduction of 1,677 daily trips, 133 AM peak trips and 132 PM peak trips. The Appendix includes figures with the site trips and the projected 2026 and 2032 Build volumes for the AM and PM peak.

Since the anticipated traffic volumes are expected to be lower than those studied in the December 2019 TIA, the mitigation measures recommended as part of that study are still appropriate. One additional recommendation has been included to address a comment received by VDOT in 2020 regarding queuing at Benns Church Boulevard and Turner Drive.

The TIA showed that queuing occurs at the intersection of Benns Church Boulevard and Turner Drive under existing conditions. The proposed development is expected to increase queuing for some movements. In order to address the queuing for the northbound left turn movement that experiences the most significant queuing under existing conditions, it is recommended that the turn lane storage be extended to 250' while maintaining the 100' taper. This would address any projected queuing deficiencies for any of the analyzed scenarios. For the Build conditions, it would allow a reduction in green time for northbound left turn movement which would reduce queuing on the southbound right turn.

Response to June 2020 Comments

VHB received comments on June 12, 2020 for the above referenced project. The project was placed on hold while a new development plan was developed. The following offers responses to the documented comments based on the June 2021 development plan:

Isle of Wight County Comments:

1. On page 1, two different AM peak trips are listed - one for 548 trips in the second paragraph and one for 380 in fifth paragraph. Last bullet refers to planned improvements to Turner Drive. Please note that these are now complete.

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P 757.490.0132

Memorandum

- The total trips generated in the AM peak is 401 trips based on the current development plan. This volume is reflected in the TIA memo dated June 25, 2021.

2. Page 5 should refer to the proposed conditional planned mixed use development and delete the reference to the comprehensive plan amendment application.
    - Noted. Reference to the comprehensive plan amendment can be deleted and land use has been updated to reflect the Conditional Mixed Use Areas (C-PD-MX). This is reflected in the TIA memo dated June 25, 2021.
3. The TIA should not include an assumption that all network signal cycle lengths and splits will be optimized for the 2026 and 2032 build scenarios. There are no plans to do this, and who would perform and pay for this signal optimization?
    - As traffic grows on a state-maintained corridor, signal operations are periodically reviewed by VDOT. By 2026, a new statewide central signal system and controller should be implemented allowing easier review of traffic conditions and more frequent optimization of signal timings by VDOT.
4. Please address the degradation of capacity for the northbound through movement between the 2018-2026 build scenario for the Brewers Neck/Benns Church Blvd. intersection. Explain how capacity improves again in 2032.
    - Optimization of the signal timings for the 2026 and 2032 Build conditions influence the change in level of service from 2018 to 2026 and 2032. Since the background growth factor was applied to all movements, adjustments were made to provide improved traffic flow on individual movements throughout the corridor. By increasing green time for turning movements, there was minor increase in the anticipated delay for the northbound movement under the 2026 Build conditions. As traffic was projected to 2032, additional changes were made to intersection splits that improved the projected delay under the 2032 Build conditions for the northbound through movement. During all analysis periods, the northbound through movement is projected to continue to operate at an acceptable LOS (LOS D or better).
5. In table 7, there is improved queue storage for the northbound left at Benns Church Blvd and Turner Drive in the 2032 build scenario in the am. What changes to increase storage? Similar questions for Tables 8 and 9 where service levels seem to increase in the build scenarios. What accounts for these improvements?
    - The cycle length for 2026 was 90 seconds compared to 130 seconds for 2032. The optimization of signal timings in 2026 and 2032 provides different amounts of green time for the northbound left movement. The amount of green time allocated to movement impacts the expected queuing of stopped vehicles during each cycle.
6. On page 7 of signal warrant analysis, warrant 5 is not met due to no planned school crossing. Because the proposed development is located less than a mile from the assigned high school and middle school, it is a safe assumption that a school crossing will be in place on Route 10 and possibly Turner Drive in the future.

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- Current conditions do not have sidewalks along Benns Church Boulevard or Turned Drive. Without sidewalks, a school crossing is not recommended.

7. Warrant 6 is not met in the signal analysis due to an uncoordinated signal system; however, you assume a coordinated system throughout the rest of the analysis. Please explain.
   - During the initial screening of the signal warrants, the adjacent signal was not part of a coordinated system. Therefore, it did not meet that warrant. Once the modeling was completed, it was determined that coordination of the corridor provided better traffic flow. Since a signal was warranted by other criteria, it was not deemed necessary to modify the original signal warrant documentation.
8. Page 11 of Appendix I shows a 45 mph speed limit at the Queen Anne's Court and Brewers Neck intersection. Please revised to show the actual speed limit of 55 mph.
   - Correction of the speed limit is noted. However, the change doesn't impact analyses or proposed recommendations of the study.
9. Please provide a written narrative as to why a partial median U-turn cannot be used in place of a conventional signal. It appears to provide less conflict points and is considered safer for pedestrians. Copies of the worksheets are hard to read, and no written explanation of the results is provided. Please submit legible copies.

Phase 1 Use	No. of Units	Units
Single Family Detached Housing	400	dwelling units
Multi-Family Housing (Low-Rise)	285	dwelling units
Public Park	4	acres
Shopping Center	30	1000 sq. ft. GLA
Fast Food with Drive Thru	5	1000 sq. ft. GLA

   - Based on the width of the existing median and lane geometry, preliminary evaluations show that a loon, or bulb out of the pavement, would need to be provided to accommodate the U-turn movement of single unit and larger trucks. Based on AASHTO Guidelines, the minimum median width for U-turn crossovers to accommodate trucks varies between 49' to 64' (depending on truck size) without providing a loon, or bulb out, to accommodate the movement. Constructing a loon would require right of way acquisition on property not controlled/owned by the developer.

VDOT Comments:

1. We concur with the proposed trip generation rates as provided in the submitted study based on the following development schedule:

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The proposed uses have the potential to generate 11,017 daily, 656 AM peak hour, and 965PM peak hour trips on the roadway network. As outlined in the study, these trips are reduced by allowable pass-by and internal capture rates to represent new trips on the roadway network (8,962 daily, 548 AM peak, and 809 PM peak).

- Noted. The revised trip distribution provided in the TIA Memo dated June 25, 2021 uses the same methodology and equations as the previous analysis with the revised number of units resulting in a reduction of trips generated by the development. The new totals are 7,285 vpd, 415 vph in the AM peak and 677 vph in the PM peak. No new analysis was performed and the recommendations remain unchanged with the exception of item #2 below.

2. Although queuing is an existing issue for northbound left turns at the Benn's Church Blvd. and Turner Drive intersection, the development adds to the queues during the build scenarios. There are no recommended improvements at this intersection. We recommend providing improvements to mitigate the queuing situation, including the installation of a turn lane with sufficient storage to accommodate the queuing.
   - As discussed earlier in this memo, the development has minor increases in queuing for eastbound right and southbound left movements. These minor increases are less than a car length. No changes in storage based on development are recommended. There is additional storage required for the southbound right due to additional green time allocated to the northbound left to reduce queuing on this leg. The developer will increase the storage to 250' for the northbound left turn movement at Turner + 100' taper. This change would address an existing issue and allow for less green time in the future conditions which should reduce the queuing for the southbound right movement.
3. The construction of dual exiting left turns will likely impact the northbound U-turn lane at the main entrance, as the turn radius required will take up more of the median break. Reconstruction of this intersection shall include constructing the turn lanes to the minimum VDOT standards (100' storage x 100' taper).
   - Site plan will reflect the 100' storage and 100' taper.
4. Our previous recommendation of a 200' storage x 200' taper right turn lane was incorporated into the submitted traffic study. The submitted traffic improvement proffers, particularly Item 6(a)(i), still indicates using a 100' storage x 200' taper right turn lane.
   - Proffer has been adjusted to match traffic study recommendation.

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Recommendations

The following improvements are recommended to address impacts of the proposed development:

2026 Build:

- Construct northbound right turn lane (200' storage plus 200' taper) into right in/right out Proposed Secondary Entrance off of US 258/Rt 10 (Benns Church Boulevard).
- Construct northbound right turn lane (200' storage plus 200' taper) into Proposed Main Entrance off of US 258/ Rt 10 (Benns Church Boulevard).
- Lengthen southbound left turn lane to provide 200' storage plus 200' taper into Proposed Main Entrance off of US 258/Rt 10 (Benns Church Boulevard).
- Install traffic signal at intersection of US 258/Rt 10 (Benns Church Boulevard) and Proposed Main Entrance.
- Install signal infrastructure to provide a protected eastbound right-turn overlap at US 258/Rt 10 (Benns Church Boulevard) and Turner Drive.
- Construct a northbound turn lane with 250' storage and 100' taper at US 258/Rt 10 (Benns Church Boulevard) and Turner Drive.
- Install flashing yellow arrows for the northbound and southbound left turn lanes at the intersection of US 258/ Rt 10 (Benns Church Boulevard) at Canteberry Lane, Cypress Run Drive, Turner Drive and the Proposed Main Entrance to allow lead/lag operation.

2032 Build:

- Install signal infrastructure to provide a protected southbound right-turn overlap at US 258/Rt 10 (Benns Church Boulevard) and Turner Drive.

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Appendix
Revised Figures

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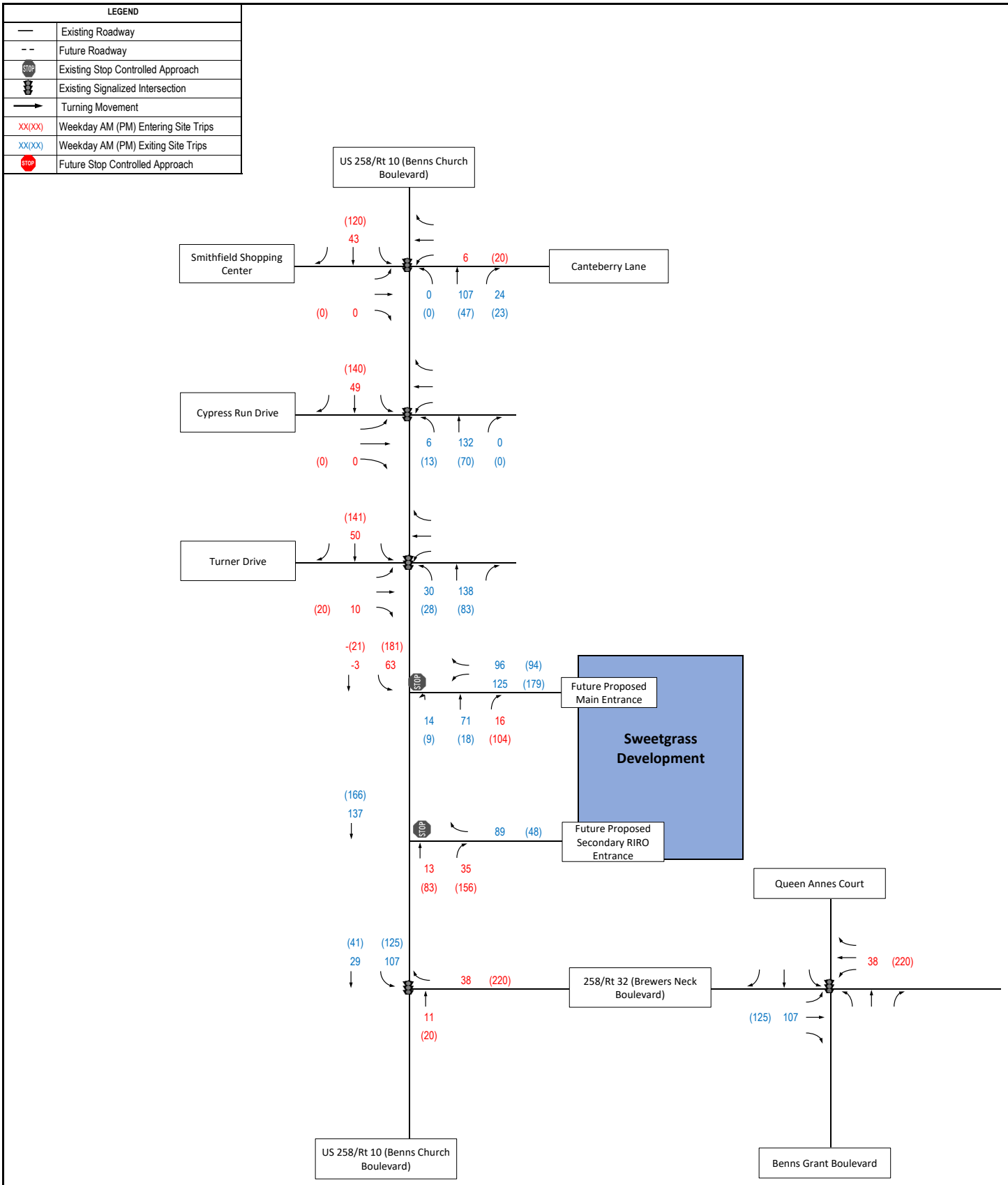


Figure 10
Combined AM and PM Peak Hour Site Trips

Sweetgrass
Isle of Wight County, VA

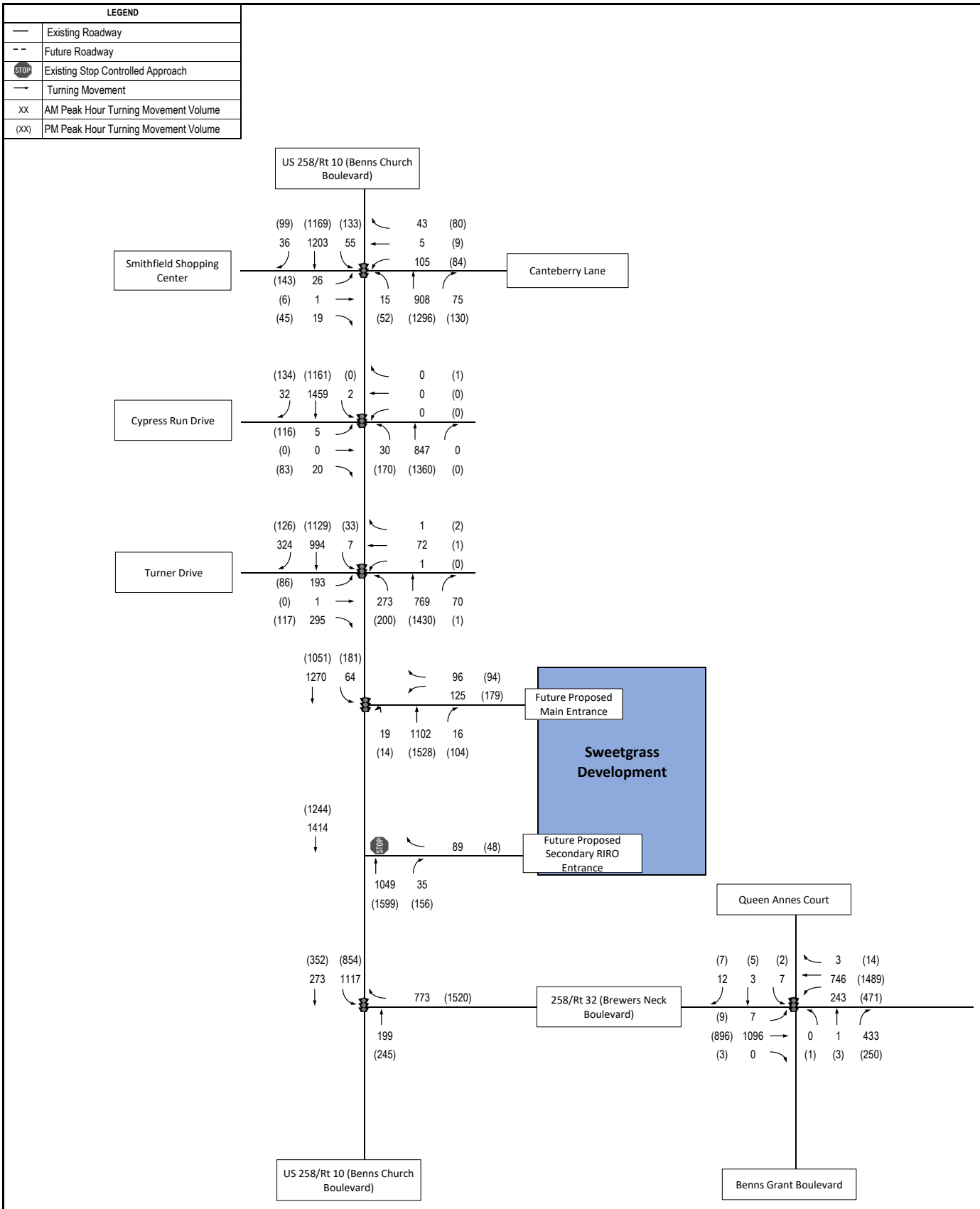


Figure 11
2026 Build AM and PM Peak Hour Traffic Volumes

Sweetgrass
Isle of Wight County, VA

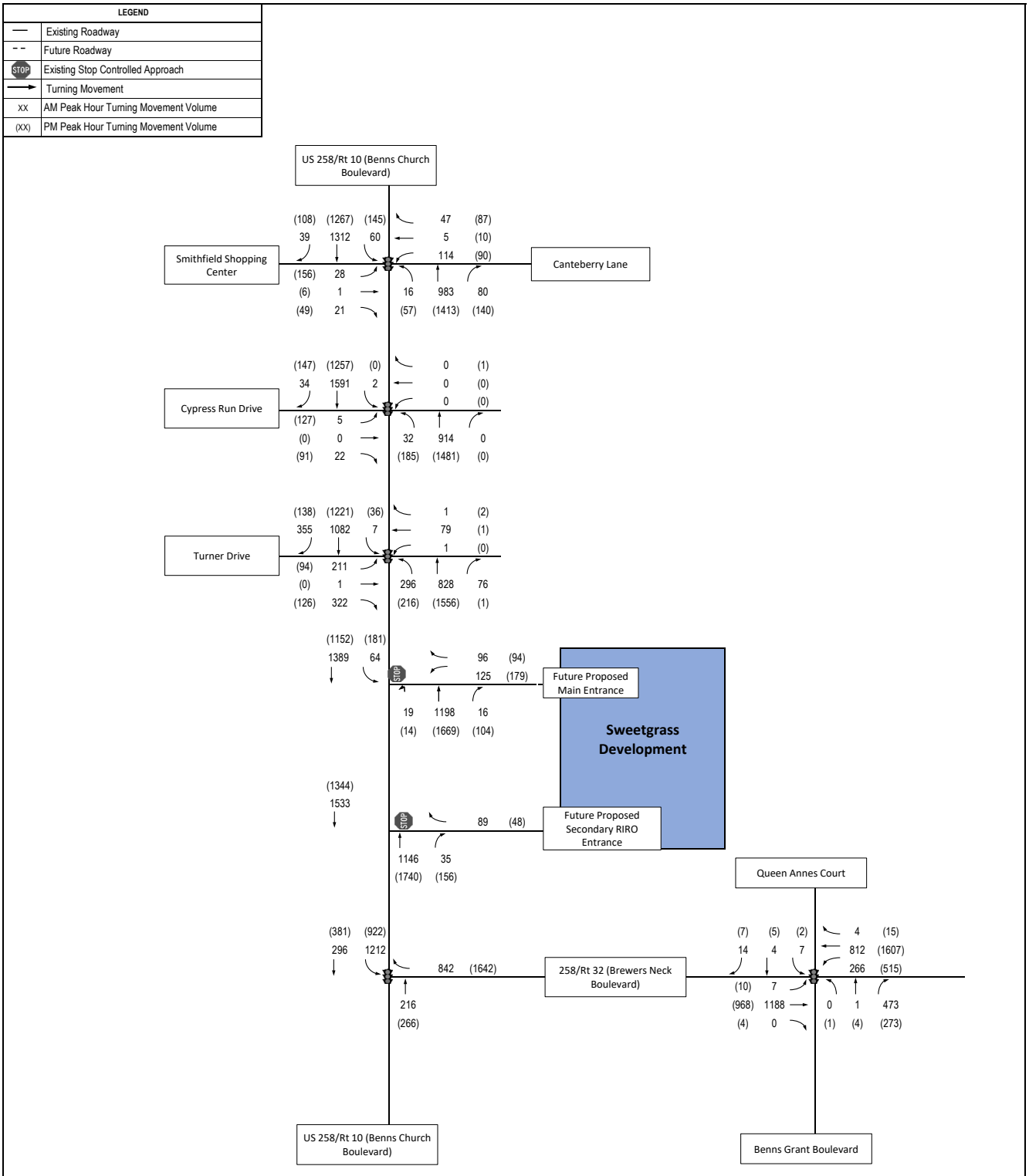


Figure 12
2032 Build AM and PM Peak Hour Traffic Volumes

Sweetgrass
Isle of Wight County, VA

MEMORANDUM

To: Michael Stallings
Town of Smithfield
911 South Church Street
Smithfield, VA 23430

From: Devin Simpson, P.E.
Kimley-Horn and Associates, Inc.

Date: August 15, 2025

Subject: Benns Church Master TIA Consistency Memorandum
for The Promontory (Turner North and Cypress Run South) – *Version 6*

Introduction

This memorandum summarizes a review of land use, densities, and access associated with The Promontory for consistency with the Benns Church Master Traffic Impact Analysis (TIA) that was completed and approved in October 2023. The Promontory is a commercial and residential development located in Isle of Wight County, Virginia and consists of both the **Turner North** and **Cypress Run South** developments analyzed as part of the Benns Church Master TIA.

The purpose of this TIA was to assess the cumulative impact of multiple developments on the surrounding roadway network to anticipate future roadway needs. The intended use of the approved TIA was to plan for anticipated future roadway improvements needed and be used as a baseline tool for comparing planned development impacts to actual development impacts as individual developments progress further toward rezoning, site plan, or construction.

The intent of this memorandum is to confirm that the land use, densities, and access for the proposed Promontory development are consistent with the TIA and thus, no additional impacts are anticipated on the surrounding roadway network.

Site Traffic Assessment

In the approved TIA, the following land uses and densities for Turner North and Cypress Run South were analyzed:

Turner North

- Fast Food Restaurant with Drive-Through Window (5,000 SF)
- Automated Car Wash (3,000 SF)
- High-Turnover (Sit-Down) Restaurant (6,000 SF)
- Drive-In Bank (4 Lanes)

Cypress Run South

- Single Family Detached (154 Dwelling Units)
- Single-Family Attached (108 Dwelling Units)

The updated engineering site plan for Turner North indicates there are no proposed changes to land uses and densities. Within Cypress Run South a change was made to the number of Single Family Detached dwelling units, decreasing from 131 to 107 dwelling units. The number of Villas decreased from 68 dwelling units to 67 dwelling units and the number of Townhouses decreased from 40 dwelling units to 36 dwelling units. This decreases the overall Single Family Attached land use from 108 to 103 dwelling units. The updated dwelling unit split between Single Family Detached, Townhouses, and Villas is listed below. *Overall, the total number of dwelling units decreased from the original approved Benns Church Master TIA which resulted in a trip generation decrease*. The latest site plan for The Promontory (Turner North and Cypress Run South) is in **Attachment A**.

- Single Family Detached (107 Dwelling Units)
- Townhouses (36 Dwelling Units)
- Villas (67 Dwelling Units)

Table 1 shows the original Cypress Run South trip generation that was used in the Benns Church Master TIA and **Table 2** shows the revised trip generation within The Promontory due to the change in the number of dwelling units. As shown in **Table 2** the revised Cypress Run South layout will result in approximately 465 fewer daily trips, 33 fewer AM peak trips, and 46 fewer PM peak hour trips. As previously mentioned, there are no changes in land uses, densities, or trips for Turner North.

Table 1: Cypress Run South (Original Trip Generation from Benns Church Master TIA)

ITE Code	ITE Description	Density	Unit	Daily	AM Peak Hour			PM Peak Hour		
					Total	In	Out	Total	In	Out
210	Single-Family Detached	154	DU	1,501	110	29	81	149	94	55
215	Single-Family Attached	108	DU	772	50	16	34	61	35	26
New Driveway Trips				**2,273**	**160**	**45**	**115**	**210**	**129**	**81**

Table 2: Cypress Run South (Current Trip Generation in The Promontory)

ITE Code	ITE Description	Density	Unit	Daily	AM Peak Hour			PM Peak Hour		
					Total	In	Out	Total	In	Out
210	Single-Family Detached	107	DU	1,074	79	21	58	106	67	39
215	Single-Family Attached	103	DU	734	48	15	33	58	33	25
New Driveway Trips				**1,808**	**127**	**36**	**91**	**164**	**100**	**64**
Trips Difference (Current Trip Gen – Original Trip Gen)				**(465)**	**(33)**	**(9)**	**(24)**	**(46)**	**(29)**	**(17)**

Site Access Assessment

Based on the latest site plan as shown in **Attachment A**, the proposed access point locations for Turner North and Cypress Run South (known as The Promontory) are consistent with the Benns Church Master TIA therefore, no additional traffic impacts are anticipated. These access points include the following unsignalized intersections:

- **Intersection #2:** Public Road A at Benns Church Boulevard (Right-In, Right-Out)
- **Intersection #5:** Public Road J at Benns Church Boulevard (Right-In, Right-Out)
- **Intersection #9:** Public Road G at Turner Drive (Roundabout) *
- Public Road B at Cypress Run Drive ("T" Intersection) – *Not a study intersection for the Benns Church Master TIA, located west of Intersection #1 internal to the Cypress Run South development.*

**A roundabout is the proposed ultimate configuration for this intersection as determined in the Benns Church Master TIA. Those improvements will be completed as part of a joint revenue sharing project funded by Isle of Wight County and surrounding developers. However, the purpose of this memorandum is to evaluate an interim traffic control solution at this intersection that will be put in place until the roundabout is constructed.*

Interim Traffic Control Assessment

As previously mentioned, the purpose of the TIA was to assess the cumulative impact of future development to anticipate future roadway needs. As such, the TIA included three (3) new developments—Turner North, Turner South, and Cypress Run South—as well as three (3) background developments—Smithfield Development, Smithfield Intermediate School, and Sweetgrass—in addition to background traffic growth.

Based on the TIA, a roundabout was proposed at the intersection of Public Road G and Turner Drive (Intersection #9), just west of Benns Church Boulevard, beginning in the Build 2025 scenario. This intersection would also serve Turner South on the southern leg at the time of that development. The intent of this interim traffic control assessment is to analyze vehicle operations at this intersection under an additional interim and build condition should The Promontory development complete construction prior to the remaining developments in the approved TIA.

The additional interim (2025) and interim (2029) condition would not include the full Turner South development but would include the approved Wawa to be located on the southwest corner of Benns Church Boulevard and Turner Drive. The proposed intersection would be unsignalized and not configured with a roundabout. Instead, the proposed intersection (Intersection #9) would operate with stop-control as Right-In, Right-Out (RIRO) only along the Turner North/Cypress Run South approach (Public Road G) and the opposing Wawa development would operate as Right-in, Right-Out, Left-In only.

The interim 2025 and interim 2029 conditions that were analyzed for this memo reflect the same improvements and recommendations as outlined in the approved TIA except for the changes in lane configuration at Intersection #9. These changes are an interim condition until the proposed

roundabout is constructed. The storage and taper lengths shown in the Site Plan in **Attachment A** are reflected in both scenarios.

With the change in intersection lane configuration at Intersection #9, traffic volumes were redistributed to adequately circulate the traffic entering and exiting the site that can no longer turn left in from or out onto Turner Drive to access Turner North or Cypress Run South. The traffic turning left, entering the site from Turner Drive, was rerouted to make a left at the intersection of Benns Church Boulevard and Turner Drive, and follow Benns Church Boulevard north until Cypress Run Drive. At the intersection Benns Church Boulevard and Cypress Run Drive (Intersection #1), residential traffic was assigned to the northbound left movement, and commercial traffic was assigned to the northbound U-turn movement to continue south and enter the site via the RIRO intersections at Intersections #2 and #5. The traffic exiting left from the site onto Turner Drive was rerouted to make a right out of the RIRO intersections #2 or #5 and either make a U-turn at the intersection of Benns Church Boulevard and Turner Drive (Intersection #3) or remain through along Benns Church Boulevard for traffic destined north and south, respectively. The increase in U-turning movements at the two signalized intersections was analyzed for each scenario.

The interim 2025 and interim 2029 conditions configurations were evaluated using *Synchro 12* and *SimTraffic* software. The LOS results for all intersections remained consistent to those in the original approved TIA with marginal changes in delay, therefore no additional traffic impacts will occur to the surrounding roadway network. The turn lane lengths proposed in the site plan and the approved TIA remain adequate to contain the queuing of the diverted traffic. The 2025 AM and PM and 2029 AM and PM LOS result tables are provided in **Attachment B** and the *Synchro* and *SimTraffic* reports for these scenarios are provided in **Attachment C**. **Figure 1** and **Figure 2** depict the traffic volumes and lane configurations for the 2025 and 2029 scenarios.

Table 3 and **Table 4** depict the anticipated vehicle delays and maximum queue lengths at the Turner North/Cypress Run South (Public Road B) and Turner Road intersection in the proposed interim 2025 and interim 2029 conditions.

Table 3: Level of Service Summary for 2025 and 2029 Stop-Control Condition

ID	Year	Intersection	Traffic Control	Level of Service per Movement by Approach (Delay in sec/veh)											
				Eastbound			Westbound			Northbound			Southbound		
				LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
AM Peak Hour															
9	2025	Turner Drive at Public Road B (Turner North Driveway)	Unsignalized	- (0.0)			A (9.1)			B (13.5)			B (12.0)		
9	2029	Turner Drive at Public Road B (Turner North Driveway)	Unsignalized	- (0.0)			B (10.2)			C (18.3)			B (11.1)		
PM Peak Hour															
9	2025	Turner Drive at Public Road B (Turner North Driveway)	Unsignalized	- (0.0)			A (8.2)			B (10.7)			B (10.9)		
9	2029	Turner Drive at Public Road B (Turner North Driveway)	Unsignalized	- (0.0)			A (9.0)			B (12.9)			B (12.0)		

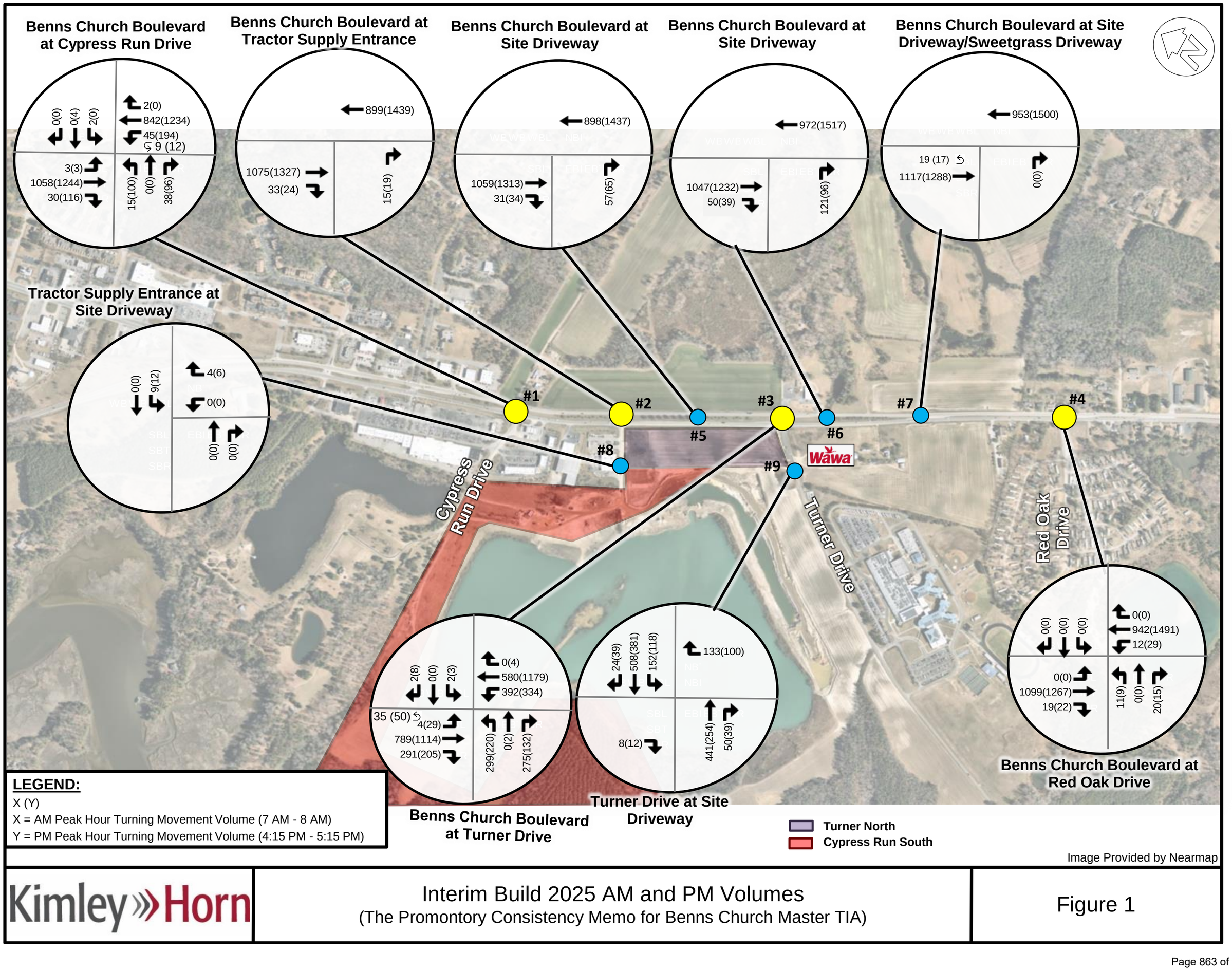
Table 4: Maximum Queue Summary for 2025 and 2029 Stop-Control Condition

ID	Year	Intersection	Maximum Queue Per Movement (Feet)			
			Eastbound	Westbound	Northbound	Southbound
			TH/RT	LTTH/RT	RT	RT
AM Peak Hour						
9	2025	Turner Drive at Public Road B (Turner North Driveway)	20	320	110	30
9	2029	Turner Drive at Public Road B (Turner North Driveway)	235	150	210	40
PM Peak Hour						
9	2025	Turner Drive at Public Road B (Turner North Driveway)	5	130	75	30
9	2029	Turner Drive at Public Road B (Turner North Driveway)	75	135	105	40

Based on a review of anticipated interim and future conditions, a RIRO configuration for the southbound approach at Intersection #9 serving Turner North and Cypress Run South is expected to operate acceptably with the stop-controlled southbound approach expected to operate with minimal delays and at a LOS C in the AM and PM peak hours, respectively. It should be noted that this stop-controlled condition should be an interim condition only and as additional developments come online, the proposed roundabout is intended to be the ultimate intersection condition.

Conclusion

Based on this assessment, The Promontory development is expected to remain consistent with the approved TIA and not create additional traffic impacts to the surrounding roadway network as the current proposed development will result in less trips than initially projected in the Benns Church Master TIA. Furthermore, it is expected that an interim traffic control condition of a RIRO stop-control for the southbound approach to Turner Drive (Intersection #9) will be sufficient to support the development until additional development activity occurs as presented in the TIA.

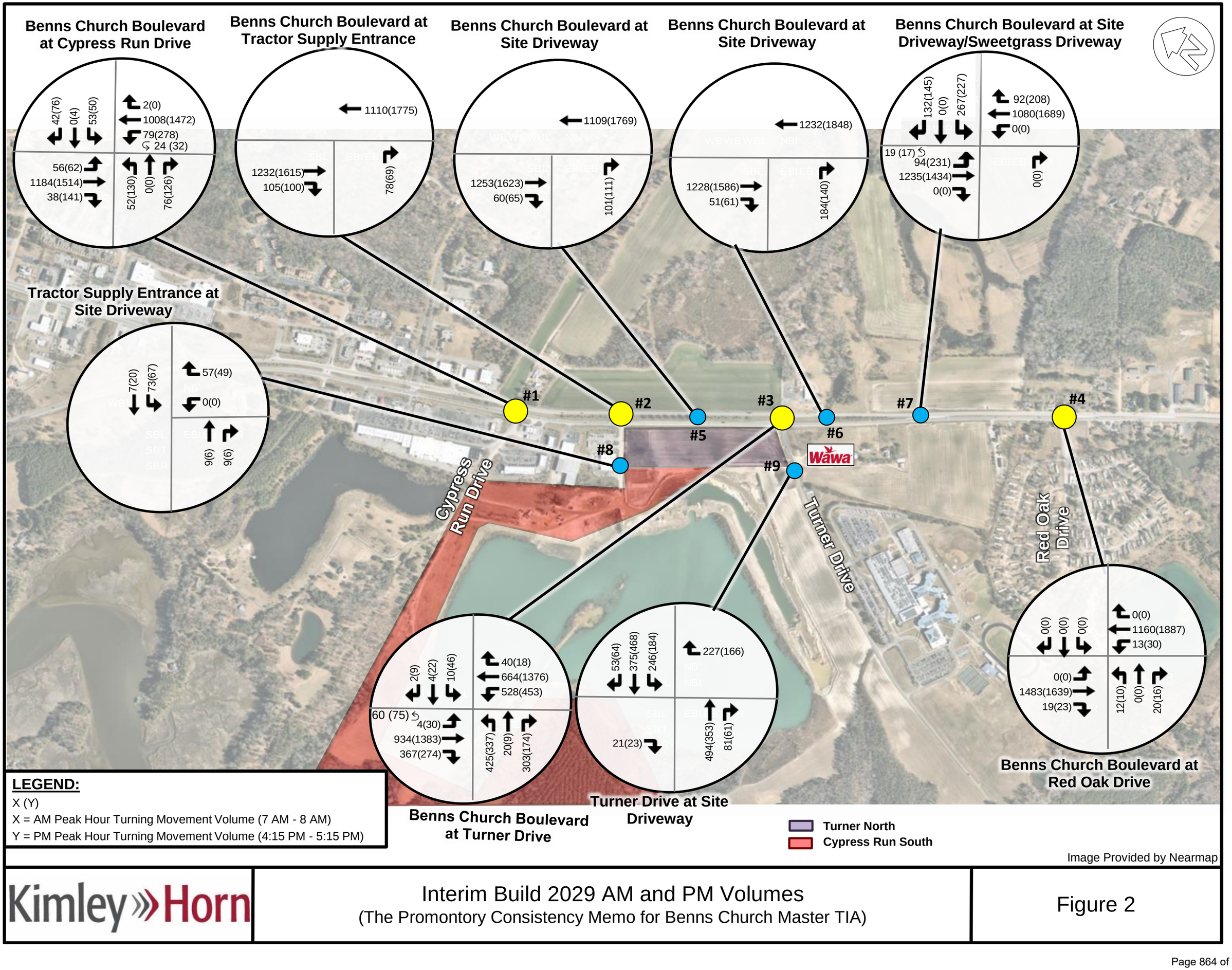


Kimley»Horn

Interim Build 2025 AM and PM Volumes

(The Promontory Consistency Memo for Benns Church Master TIA)

Figure 1



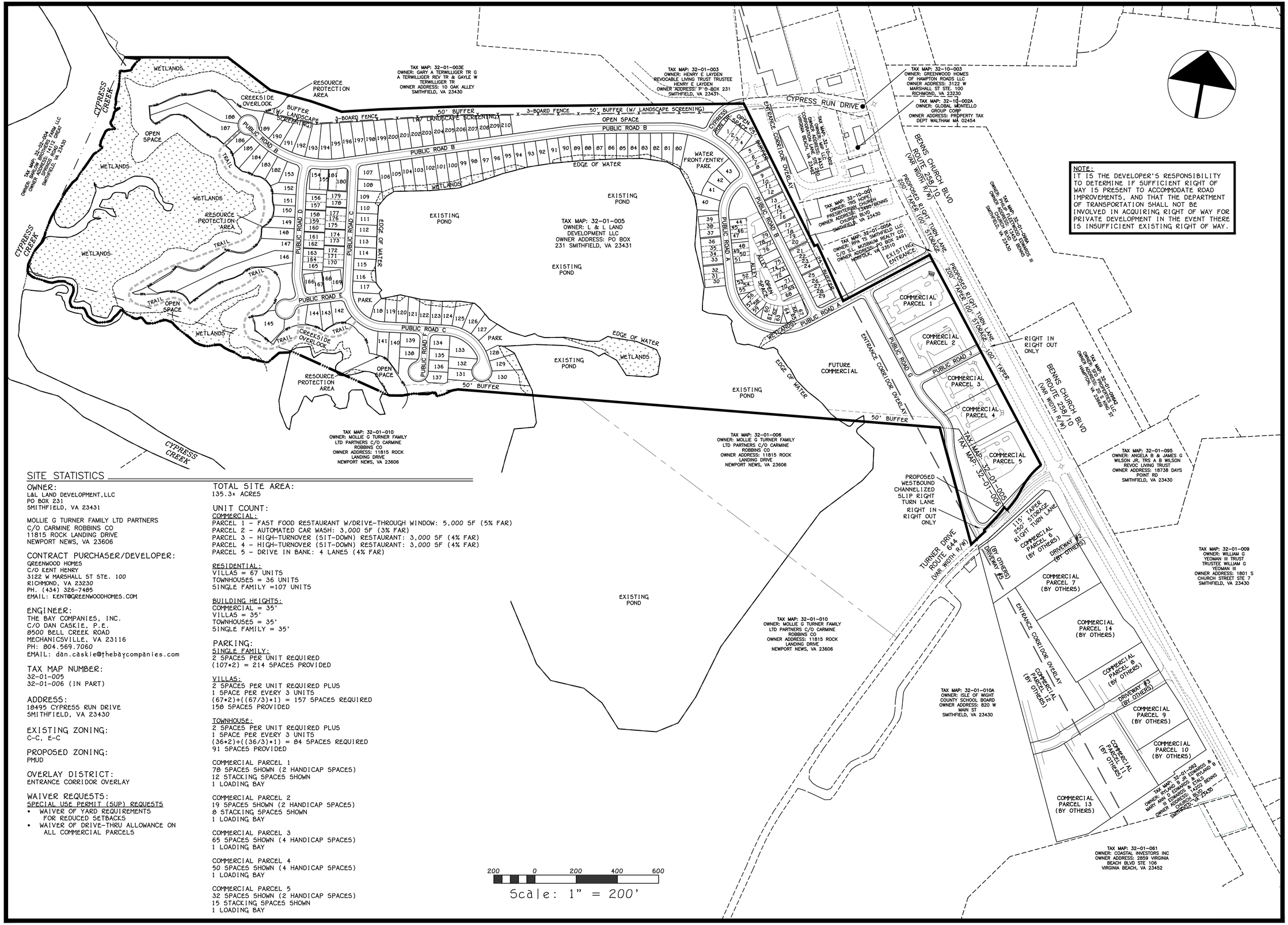
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Interim Build 2029 AM and PM Volumes

(The Promontory Consistency Memo for Benns Church Master TIA)

Figure 2

Attachment A:
Site Plan



NOTE:
IT IS THE DEVELOPER'S RESPONSIBILITY TO DETERMINE IF SUFFICIENT RIGHT OF WAY IS PRESENT TO ACCOMMODATE ROAD IMPROVEMENTS, AND THAT THE DEPARTMENT OF TRANSPORTATION SHALL NOT BE INVOLVED IN ACQUIRING RIGHT OF WAY FOR PRIVATE DEVELOPMENT IN THE EVENT THERE IS INSUFFICIENT EXISTING RIGHT OF WAY.

SITE STATISTICS

OWNER:
L&L LAND DEVELOPMENT,LLC
PO BOX 231
SMITHFIELD, VA 23431

MOLLIE G TURNER FAMILY LTD PARTNERS
C/O CARMINE ROBBINS CO
11815 ROCK LANDING DRIVE
NEWPORT NEWS, VA 23606

CONTRACT PURCHASER/DEVELOPER:
GREENWOOD HOMES
C/O KENT HENRY
3122 W MARSHALL ST STE. 100
RICHMOND, VA 23230
PH. (434) 326-7485
EMAIL: KENT@GREENWOODHOMES.COM

ENGINEER:
THE BAY COMPANIES, INC.
C/O DAN CASKIE, P.E.
8500 BELL CREEK ROAD
MECHANICSVILLE, VA 23116
PH: 804.569.7060
EMAIL: dan.caskie@thebaycompanies.com

TAX MAP NUMBER:
32-01-005
32-01-006 (IN PART)

ADDRESS:
18495 CYPRESS RUN DRIVE
SMITHFIELD, VA 23430

EXISTING ZONING:
C-C, E-C

PROPOSED ZONING:
PMUD

OVERLAY DISTRICT:
ENTRANCE CORRIDOR OVERLAY

WAIVER REQUESTS:
SPECIAL USE PERMIT (SUP) REQUESTS
- WAIVER OF YARD REQUIREMENTS FOR REDUCED SETBACKS
- WAIVER OF DRIVE-THRU ALLOWANCE ON ALL COMMERCIAL PARCELS

TOTAL SITE AREA:
135.3± ACRES

UNIT COUNT:
COMMERCIAL:
PARCEL 1 - FAST FOOD RESTAURANT W/DRIVE-THROUGH WINDOW: 5,000 SF (5% FAR)
PARCEL 2 - AUTOMATED CAR WASH: 3,000 SF (3% FAR)
PARCEL 3 - HIGH-TURNOVER (SIT-DOWN) RESTAURANT: 3,000 SF (4% FAR)
PARCEL 4 - HIGH-TURNOVER (SIT-DOWN) RESTAURANT: 3,000 SF (4% FAR)
PARCEL 5 - DRIVE IN BANK: 4 LANES (4% FAR)

RESIDENTIAL:
VILLAS = 67 UNITS
TOWNHOUSES = 36 UNITS
SINGLE FAMILY =107 UNITS

BUILDING HEIGHTS:
COMMERCIAL = 35'
VILLAS = 35'
TOWNHOUSES = 35'
SINGLE FAMILY = 35'

PARKING:
SINGLE FAMILY:
2 SPACES PER UNIT REQUIRED
(107*2) = 214 SPACES PROVIDED

VILLAS:
2 SPACES PER UNIT REQUIRED PLUS
1 SPACE PER EVERY 3 UNITS
(67*2)+((67/3)*1) = 157 SPACES REQUIRED
150 SPACES PROVIDED

TOWNHOUSE:
2 SPACES PER UNIT REQUIRED PLUS
1 SPACE PER EVERY 3 UNITS
(36*2)+((36/3)*1) = 84 SPACES REQUIRED
91 SPACES PROVIDED

COMMERCIAL PARCEL 1
78 SPACES SHOWN (2 HANDICAP SPACES)
12 STACKING SPACES SHOWN
1 LOADING BAY

COMMERCIAL PARCEL 2
19 SPACES SHOWN (2 HANDICAP SPACES)
0 STACKING SPACES SHOWN
1 LOADING BAY

COMMERCIAL PARCEL 3
65 SPACES SHOWN (4 HANDICAP SPACES)
1 LOADING BAY

COMMERCIAL PARCEL 4
50 SPACES SHOWN (4 HANDICAP SPACES)
1 LOADING BAY

COMMERCIAL PARCEL 5
32 SPACES SHOWN (2 HANDICAP SPACES)
15 STACKING SPACES SHOWN
1 LOADING BAY

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FILED: 23021_general development
DATE: August 31, 2023
REVISED: December 13, 2023
REVISED: July 29, 2024
REVISED: October 15, 2024
REVISED: January 2, 2025
REVISED: March 7, 2025
REVISED: May 22, 2025

THE BAY COMPANIES
CIVIL ENGINEERS
8500 BELL CREEK ROAD
MECHANICSVILLE, VA 23116
(804) 569-7060
FAX: (804) 569-7061

PROJECT:
The Promontory
Zoning Concept Plan
Smithfield, Virginia

SHEET:
General Development Plan

SHEET NO: C2

JOB NO. 23021

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Attachment B:
2025 AM and PM and 2029 AM and PM LOS Results

2025 AM Interim Scenario LOS Results

ID	Intersection	Traffic Control	Overall LOS	Level of Service per Movement by Approach (Delay in sec/veh)											
				Eastbound			Westbound			Northbound			Southbound		
				LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
AM Peak Hour															
1	Benns Church Boulevard at Cypress Run Drive	Signalized	B (14.3)	**E** (69.1)		**E** (66.6)	**E** (70.1)			B (13.5)	B (12.5)		A (7.2)	B (13.1)	A (8.6)
				E (67.3)						B (12.5)			B (13.0)		
2	Benns Church Boulevard at Tractor Supply Entrance	Unsignalized		-		B (13.2)	-			-	A (0.0)	-	-	A (0.0)	A (0.0)
				B (13.2)						A (0.0)			A (0.0)		
3	Benns Church Boulevard at Turner Drive	Signalized	D (51.9)	**E** (66.7)	**E** (66.7)	D (53.4)	**E** (71.2)			D (48.7)	B (19.9)		A (9.0)	D (45.4)	**F** (126.1)
				E (60.4)						C (31.5)			E (65.2)		
4	Benns Church Boulevard at Red Oak Drive	Unsignalized		D (32.8)			-			B (11.5)	A (0.0)		A (0.0)		A (0.0)
										A (0.1)			A (0.0)		
5	Benns Church Boulevard at Site Driveway #1	Unsignalized		-		B (13.7)	-			-	A (0.0)	-	-	A (0.0)	A (0.0)
				B (13.7)						A (0.0)			A (0.0)		
6	Benns Church Boulevard at Site Driveway #2	Unsignalized		-		C (15.2)	-			-	A (0.0)	-	-	A (0.0)	A (0.0)
				C (15.2)						A (0.0)			A (0.0)		
7	Benns Church Boulevard at Site Driveway #3	Unsignalized		-		A (0.0)	-			A (0.0)	A (0.0)	-	C (16.6)	A (0.0)	A (0.0)
				A (0.0)						A (0.0)			A (0.3)		
8	Tractor Supply Entrance at Site Driveway #4	Unsignalized		-	A (0.0)		A (7.2)		-	A (8.3)			-		
				A (0.0)			A (7.2)			A (8.3)					
9	Turner Drive at Site Driveway #5	Unsignalized		A (0.0)			A (9.1)			B (13.5)			B (12.0)		
							A (2.0)			B (13.5)			B (12.0)		

2025 PM Interim Scenario LOS Results

ID	Intersection	Traffic Control	Overall LOS	Level of Service per Movement by Approach (Delay in sec/veh)											
				Eastbound			Westbound			Northbound			Southbound		
				LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
PM Peak Hour															
1	Benns Church Boulevard at Cypress Run Drive	Signalized	C (23.8)	**E** (71.9)		**E** (61.6)	**E** (88.8)			C (29.3)	B (16.8)		B (14.0)	C (23.8)	B (14.9)
				E (66.9)						B (18.6)			C (23.0)		
2	Benns Church Boulevard at Tractor Supply Entrance	Unsignalized		-		A (15.3)	-			-	A (0.0)	-	-	A (0.0)	A (0.0)
				A (15.3)						A (0.0)			A (0.0)		
3	Benns Church Boulevard at Turner Drive	Signalized	D (35.9)	**E** (66.8)	**E** (67.0)	**E** (58.0)	**E** (71.3)			D (52.6)	B (20.8)		B (13.0)	D (37.5)	D (45.6)
				E (63.6)						C (27.8)			D (37.3)		
4	Benns Church Boulevard at Red Oak Drive	Unsignalized		**F** (59.7)			-			B (12.7)	A (0.0)		A (0.0)		A (0.0)
										A (0.2)			A (0.0)		
5	Benns Church Boulevard at Site Driveway #1	Unsignalized		-		C (16.3)	-			-	A (0.0)	-	-	A (0.0)	A (0.0)
				C (16.3)						A (0.0)			A (0.0)		
6	Benns Church Boulevard at Site Driveway #2	Unsignalized		-		A (16.6)	-			-	A (0.0)	-	-	A (0.0)	A (0.0)
				A (16.6)						A (0.0)			A (0.0)		
7	Benns Church Boulevard at Site Driveway #3	Unsignalized	A (0.5)	-		A (0.0)	-			A (0.0)	A (0.0)	-	D (34.6)	A (0.0)	A (0.0)
				A (0.0)						A (0.0)			A (0.5)		
8	Tractor Supply Entrance at Site Driveway #4	Unsignalized		-	A (0.0)		A (7.2)		-	A (8.3)			-		
				A (0.0)			A (7.2)			A (8.3)					
9	Turner Drive at Site Driveway #5	Unsignalized		A (0.0)			A (8.2)			B (10.7)			B (10.9)		
							A (1.8)			B (10.7)			B (10.9)		

2029 AM Interim Scenario LOS Results

ID	Intersection	Traffic Control	Overall LOS	Level of Service per Movement by Approach (Delay in sec/veh)											
				Eastbound			Westbound			Northbound			Southbound		
				LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
AM Peak Hour															
1	Benns Church Boulevard at Cypress Run Drive	Signalized	C (35.0)	E (79.6)		E (64.7)	F (80.3)			D (42.1)	C (32.8)		C (29.6)	C (29.6)	B (17.9)
				E (70.8)						C (33.6)			C (29.3)		
2	Benns Church Boulevard at Tractor Supply Entrance	Unsignalized		-		C (16.4)	-			-	A (0.0)	-	-	A (0.0)	A (0.0)
				C (16.4)						A (0.0)			A (0.0)		
3	Benns Church Boulevard at Turner Drive	Signalized	D (43.2)	F (103.0)	F (101.9)	D (52.6)	E (73.4)			D (40.1)	C (26.6)	B (18.1)	A (6.4)	C (30.2)	D (39.2)
				E (82.3)						C (32.1)			C (31.5)		
4	Benns Church Boulevard at Red Oak Drive	Unsignalized		E (89.7)			-			B (14.5)	A (0.0)		A (0.0)		A (0.0)
										A (0.2)			A (0.0)		
5	Benns Church Boulevard at Site Driveway #1	Unsignalized		-		C (17.0)	-			-	A (0.0)	-	-	A (0.0)	A (0.0)
				C (17.0)						A (0.0)			A (0.0)		
6	Benns Church Boulevard at Site Driveway #2	Unsignalized		-		C (21.1)	-			-	A (0.0)	-	-	A (0.0)	A (0.0)
				C (21.1)						A (0.0)			A (0.0)		
7	Benns Church Boulevard at Site Driveway #3	Signalized	D (16.9)	-	A (0.0)		E (77.6)	E (59.4)		A (0.0)	A (6.4)	A (4.2)	A (5.7)	B (10.5)	A (0.0)
				A (0.0)			E (71.6)			A (6.2)			B (10.1)		
8	Tractor Supply Entrance at Site Driveway #4	Unsignalized		-	A (0.0)		A (7.4)	-		A (8.6)			-		
				A (0.0)			A (6.7)			A (8.6)					
9	Turner Drive at Site Driveway #5	Unsignalized		A (0.0)			B (10.2)			C (18.3)			B (11.0)		
							A (3.7)			C (18.3)			B (11.0)		

2029 PM Interim Scenario LOS Results

ID	Intersection	Traffic Control	Overall LOS	Level of Service per Movement by Approach (Delay in sec/veh)											
				Eastbound			Westbound			Northbound			Southbound		
				LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
PM Peak Hour															
1	Benns Church Boulevard at Cypress Run Drive	Signalized	D (50.3)	F (98.8)		E (62.3)	F (281.0)			F (77.1)	C (31.8)		C (33.8)	D (41.2)	B (19.8)
				F (80.8)						D (39.7)			D (39.2)		
2	Benns Church Boulevard at Tractor Supply Entrance	Unsignalized		-		C (21.6)	-			-	A (0.0)	-	-	A (0.0)	A (0.0)
				C (21.6)						A (0.0)			A (0.0)		
3	Benns Church Boulevard at Turner Drive	Signalized	D (37.9)	E (75.0)	F (75.5)	E (55.8)	F (116.4)			E (56.0)	B (14.5)	B (17.5)	D (54.2)	D (43.1)	B (13.4)
				E (68.8)						C (24.7)			D (39.2)		
4	Benns Church Boulevard at Red Oak Drive	Unsignalized		F (241.5)			-			C (16.2)	A (0.0)		A (0.0)		A (0.0)
										A (0.3)			A (0.0)		
5	Benns Church Boulevard at Site Driveway #1	Unsignalized		-		C (26.2)	-			-	A (0.0)	-	-	A (0.0)	A (0.0)
				C (24.2)						A (0.0)			A (0.0)		
6	Benns Church Boulevard at Site Driveway #2	Unsignalized		-		D (26.6)	-			-	A (0.0)	-	-	A (0.0)	A (0.0)
				D (26.6)						A (0.0)			A (0.0)		
7	Benns Church Boulevard at Site Driveway #3	Signalized	D (24.1)	-	A (0.0)		E (73.3)	E (61.4)		A (0.0)	C (23.3)	B (11.5)	B (17.9)	B (16.5)	C (0.0)
				A (0.0)			E (68.6)			C (22.0)			B (16.7)		
8	Tractor Supply Entrance at Site Driveway #4	Unsignalized		-	A (0.0)		A (7.4)	-		A (8.5)			-		
				A (0.0)			A (5.7)			A (8.5)					
9	Turner Drive at Site Driveway #5	Unsignalized		A (0.0)			B (9.0)			B (12.9)			B (12.0)		
							A (2.3)			B (12.9)			B (12.0)		

Attachment C:
Synchro and *SimTraffic* Reports

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	15	0	38	2	0	0	9	45	842	2	3	1058
Future Volume (vph)	15	0	38	2	0	0	9	45	842	2	3	1058
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95	0.95	1.00	0.95
Frt			0.850									
Flt Protected		0.950			0.950			0.950			0.950	
Satd. Flow (prot)	0	1492	1495	0	1203	0	0	1662	3374	0	1805	3471
Flt Permitted		0.950						0.218			0.304	
Satd. Flow (perm)	0	1492	1495	0	1267	0	0	381	3374	0	578	3471
Satd. Flow (RTOR)			157									
Adj. Flow (vph)	16	0	40	2	0	0	10	47	877	2	3	1102
Lane Group Flow (vph)	0	16	40	0	2	0	0	57	879	0	3	1102
Turn Type	Split	NA	Perm	Perm	NA		custom	D.P+P	NA		D.P+P	NA
Protected Phases	4	4			3			5	2		1	6
Permitted Phases			4	3			5	6			2	
Total Split (s)	14.0	14.0	14.0	46.0	46.0		13.4	13.4	71.0		14.0	71.6
Total Lost Time (s)		6.8	6.8		7.1			8.4	8.4		8.4	8.4
Act Effct Green (s)		7.7	7.7		10.3			113.2	118.8		118.4	110.9
Actuated g/C Ratio		0.05	0.05		0.07			0.78	0.82		0.82	0.76
v/c Ratio		0.20	0.18		0.02			0.17	0.32		0.01	0.42
Control Delay (s/veh)		71.5	1.7		59.0			7.4	9.8		5.7	9.6
Queue Delay		0.0	0.0		0.0			0.0	0.0		0.0	0.0
Total Delay (s/veh)		71.5	1.7		59.0			7.4	9.8		5.7	9.6
LOS		E	A		E			A	A		A	A
Approach Delay (s/veh)		21.6			59.0				9.6			9.3
Approach LOS		C			E				A			A

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	30
Future Volume (vph)	30
Lane Util. Factor	1.00
Frt	0.850
Flt Protected	
Satd. Flow (prot)	1509
Flt Permitted	
Satd. Flow (perm)	1509
Satd. Flow (RTOR)	145
Adj. Flow (vph)	31
Lane Group Flow (vph)	31
Turn Type	Perm
Protected Phases	
Permitted Phases	6
Total Split (s)	71.6
Total Lost Time (s)	8.4
Act Effct Green (s)	110.9
Actuated g/C Ratio	0.76
v/c Ratio	0.03
Control Delay (s/veh)	0.0
Queue Delay	0.0
Total Delay (s/veh)	0.0
LOS	A
Approach Delay (s/veh)	
Approach LOS	

Intersection Summary

Cycle Length: 145
Actuated Cycle Length: 145
Offset: 0 (0%), Referenced to phase 2:NBSB, Start of Yellow
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.42
Intersection Signal Delay (s/veh): 9.8 Intersection LOS: A
Intersection Capacity Utilization 70.7% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 1: Benns Church Boulevard & Cypress Run Drive



Lanes, Volumes, Timings
1: Benns Church Boulevard & Cypress Run Drive
The Promontory Consistency Memo
Interim 2025 Build AM Peak

Intersection Summary

Timing Plan: AM Peak Hour
Kimley-Horn and Associates, Inc.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	15	0	38	2	0	0	9	45	842	2	3	1058
Future Volume (vph)	15	0	38	2	0	0	9	45	842	2	3	1058
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.8	6.8		7.1			8.4	8.4		8.4	8.4
Lane Util. Factor		1.00	1.00		1.00			1.00	0.95		1.00	0.95
Frt		1.00	0.85		1.00			1.00	1.00		1.00	1.00
Flt Protected		0.95	1.00		0.95			0.95	1.00		0.95	1.00
Satd. Flow (prot)		1492	1495		1203			1662	3373		1805	3471
Flt Permitted		0.95	1.00		1.00			0.22	1.00		0.30	1.00
Satd. Flow (perm)		1492	1495		1267			381	3373		578	3471
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.92	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	16	0	40	2	0	0	10	47	877	2	3	1102
RTOR Reduction (vph)	0	0	38	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	16	2	0	2	0	0	57	879	0	3	1102
Heavy Vehicles (%)	21%	0%	8%	50%	0%	0%	2%	10%	7%	0%	0%	4%
Turn Type	Split	NA	Perm	Perm	NA		custom	D.P+P	NA		D.P+P	NA
Protected Phases	4	4			3			5	2		1	6
Permitted Phases			4	3			5	6			2	
Actuated Green, G (s)		6.3	6.3		3.5			104.5	103.4		104.5	95.5
Effective Green, g (s)		6.3	6.3		3.5			104.5	103.4		104.5	95.5
Actuated g/C Ratio		0.04	0.04		0.02			0.72	0.71		0.72	0.66
Clearance Time (s)		6.8	6.8		7.1			8.4	8.4		8.4	8.4
Vehicle Extension (s)		3.0	3.0		3.0			2.0	5.0		2.0	5.0
Lane Grp Cap (vph)		64	64		30			354	2405		425	2286
v/s Ratio Prot		c0.01						c0.01	0.26		0.00	c0.32
v/s Ratio Perm			0.00		c0.00			0.11			0.01	
v/c Ratio		0.25	0.03		0.07			0.16	0.37		0.01	0.48
Uniform Delay, d1		67.1	66.4		69.2			12.2	8.1		7.5	12.4
Progression Factor		1.00	1.00		1.00			1.10	1.49		1.00	1.00
Incremental Delay, d2		2.1	0.2		0.9			0.1	0.4		0.0	0.7
Delay (s)		69.1	66.6		70.1			13.5	12.5		7.5	13.1
Level of Service		E	E		E			B	B		A	B
Approach Delay (s/veh)		67.3			70.1				12.5			13.0
Approach LOS		E			E				B			B

Intersection Summary			
HCM 2000 Control Delay (s/veh)	14.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	145.0	Sum of lost time (s)	30.7
Intersection Capacity Utilization	70.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	30
Future Volume (vph)	30
Ideal Flow (vphpl)	1900
Total Lost time (s)	8.4
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1509
Flt Permitted	1.00
Satd. Flow (perm)	1509
Peak-hour factor, PHF	0.96
Adj. Flow (vph)	31
RTOR Reduction (vph)	11
Lane Group Flow (vph)	20
Heavy Vehicles (%)	7%
Turn Type	Perm
Protected Phases	
Permitted Phases	6
Actuated Green, G (s)	95.5
Effective Green, g (s)	95.5
Actuated g/C Ratio	0.66
Clearance Time (s)	8.4
Vehicle Extension (s)	5.0
Lane Grp Cap (vph)	993
v/s Ratio Prot	
v/s Ratio Perm	0.01
v/c Ratio	0.02
Uniform Delay, d1	8.6
Progression Factor	1.00
Incremental Delay, d2	0.0
Delay (s)	8.6
Level of Service	A
Approach Delay (s/veh)	
Approach LOS	

Intersection Summary



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	15	0	899	1075	33
Future Volume (vph)	0	15	0	899	1075	33
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.865				0.850
Flt Protected						
Satd. Flow (prot)	0	1611	0	3374	3471	1583
Flt Permitted						
Satd. Flow (perm)	0	1611	0	3374	3471	1583
Adj. Flow (vph)	0	16	0	977	1168	36
Lane Group Flow (vph)	0	16	0	977	1168	36
Sign Control	Stop			Free	Free	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 39.7%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	15	0	899	1075	33
Future Vol, veh/h	0	15	0	899	1075	33
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	75
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	7	4	2
Mvmt Flow	0	16	0	977	1168	36

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	584	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	455	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	455	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

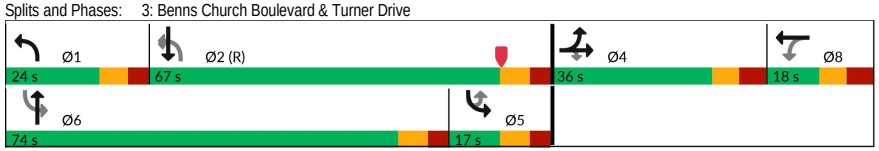
Approach	EB	NB	SB
HCM Control Delay, s/v	13.2	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	455	-	-
HCM Lane V/C Ratio	-	0.036	-	-
HCM Control Delay (s/veh)	-	13.2	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q (veh)	-	0.1	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	299	0	275	2	0	2	392	580	0	35	4	789
Future Volume (vph)	299	0	275	2	0	2	392	580	0	35	4	789
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	1.00	0.95
Frt			0.850		0.932							
Flt Protected	0.950	0.950			0.976		0.950				0.950	
Satd. Flow (prot)	1531	1531	1524	0	1728	0	1719	3438	0	0	1774	3505
Flt Permitted	0.950	0.950					0.164				0.362	
Satd. Flow (perm)	1531	1531	1524	0	1771	0	297	3438	0	0	676	3505
Satd. Flow (RTOR)			313		232							
Adj. Flow (vph)	340	0	313	2	0	2	445	659	0	38	5	897
Lane Group Flow (vph)	170	170	313	0	4	0	445	659	0	0	43	897
Turn Type	Split	NA	Perm	Perm	NA		D.P+P	NA		custom	D.P+P	NA
Protected Phases	4	4			8		1	6			5	2
Permitted Phases			4	8			2			5	6	
Total Split (s)	36.0	36.0	36.0	18.0	18.0		24.0	74.0		17.0	17.0	67.0
Total Lost Time (s)	9.0	9.0	9.0		9.0		8.3	8.3			8.3	8.3
Act Effct Green (s)	23.6	23.6	23.6		7.0		92.6	87.3			94.3	58.7
Actuated g/C Ratio	0.16	0.16	0.16		0.05		0.64	0.60			0.65	0.40
v/c Ratio	0.68	0.68	0.61		0.01		0.85	0.32			0.09	0.63
Control Delay (s/veh)	71.0	71.0	10.7		0.0		45.6	17.2			5.8	38.1
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.0			0.0	0.0
Total Delay (s/veh)	71.0	71.0	10.7		0.0		45.6	17.2			5.8	38.1
LOS	E	E	B		A		D	B			A	D
Approach Delay (s/veh)		42.1						28.7				30.2
Approach LOS		D						C				C

Intersection Summary		
Cycle Length: 145		
Actuated Cycle Length: 145		
Offset: 49 (34%), Referenced to phase 2:NBSB, Start of Yellow		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.85		
Intersection Signal Delay (s/veh): 32.2	Intersection LOS: C	
Intersection Capacity Utilization 79.5%	ICU Level of Service D	
Analysis Period (min) 15		

Splits and Phases: 3: Benns Church Boulevard & Turner Drive



Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	291
Future Volume (vph)	291
Lane Util. Factor	1.00
Frt	0.850
Flt Protected	
Satd. Flow (prot)	1538
Flt Permitted	
Satd. Flow (perm)	1538
Satd. Flow (RTOR)	331
Adj. Flow (vph)	331
Lane Group Flow (vph)	331
Turn Type	Perm
Protected Phases	
Permitted Phases	2
Total Split (s)	67.0
Total Lost Time (s)	8.3
Act Effct Green (s)	58.7
Actuated g/C Ratio	0.40
v/c Ratio	0.40
Control Delay (s/veh)	12.0
Queue Delay	0.0
Total Delay (s/veh)	12.0
LOS	B
Approach Delay (s/veh)	
Approach LOS	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	299	0	275	2	0	2	392	580	0	35	4	789
Future Volume (vph)	299	0	275	2	0	2	392	580	0	35	4	789
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	9.0	9.0	9.0		9.0		8.3	8.3			8.3	8.3
Lane Util. Factor	0.95	0.95	1.00		1.00		1.00	0.95			1.00	0.95
Frt	1.00	1.00	0.85		0.93		1.00	1.00			1.00	1.00
Flt Protected	0.95	0.95	1.00		0.98		0.95	1.00			0.95	1.00
Satd. Flow (prot)	1531	1531	1524		1729		1719	3438			1774	3505
Flt Permitted	0.95	0.95	1.00		1.00		0.16	1.00			0.36	1.00
Satd. Flow (perm)	1531	1531	1524		1772		296	3438			677	3505
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.92	0.88	0.88
Adj. Flow (vph)	340	0	312	2	0	2	445	659	0	38	5	897
RTOR Reduction (vph)	0	0	262	0	4	0	0	0	0	0	0	0
Lane Group Flow (vph)	170	170	51	0	0	0	445	659	0	0	43	897
Heavy Vehicles (%)	12%	0%	6%	0%	0%	0%	5%	5%	0%	2%	0%	3%
Turn Type	Split	NA	Perm	Perm	NA		D.P+P	NA		custom	D.P+P	NA
Protected Phases	4	4			8		1	6			5	2
Permitted Phases			4	8			2			5	6	
Actuated Green, G (s)	23.6	23.6	23.6		1.4		85.4	78.4			85.4	51.5
Effective Green, g (s)	23.6	23.6	23.6		1.4		85.4	78.4			85.4	51.5
Actuated g/C Ratio	0.16	0.16	0.16		0.01		0.59	0.54			0.59	0.36
Clearance Time (s)	9.0	9.0	9.0		9.0		8.3	8.3			8.3	8.3
Vehicle Extension (s)	5.0	5.0	5.0		3.0		4.0	6.0			2.0	6.0
Lane Grp Cap (vph)	249	249	248		17		507	1858			451	1244
v/s Ratio Prot	c0.11	0.11					c0.21	0.19			0.00	0.26
v/s Ratio Perm			0.03		c0.00		c0.31				0.05	
v/c Ratio	0.68	0.68	0.21		0.00		0.88	0.35			0.10	0.72
Uniform Delay, d1	57.2	57.2	52.6		71.1		32.4	18.9			16.5	40.5
Progression Factor	1.00	1.00	1.00		1.00		1.01	1.02			0.54	1.03
Incremental Delay, d2	9.6	9.6	0.9		0.1		16.1	0.5			0.0	3.5
Delay (s)	66.7	66.7	53.4		71.2		48.7	19.9			9.0	45.4
Level of Service	E	E	D		E		D	B			A	D
Approach Delay (s/veh)		60.4			71.2			31.5				65.2
Approach LOS		E			E			C				E

Intersection Summary			
HCM 2000 Control Delay (s/veh)	51.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	145.0	Sum of lost time (s)	34.6
Intersection Capacity Utilization	79.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	291
Future Volume (vph)	291
Ideal Flow (vphpl)	1900
Total Lost time (s)	8.3
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1538
Flt Permitted	1.00
Satd. Flow (perm)	1538
Peak-hour factor, PHF	0.88
Adj. Flow (vph)	331
RTOR Reduction (vph)	213
Lane Group Flow (vph)	118
Heavy Vehicles (%)	5%
Turn Type	Perm
Protected Phases	
Permitted Phases	2
Actuated Green, G (s)	51.5
Effective Green, g (s)	51.5
Actuated g/C Ratio	0.36
Clearance Time (s)	8.3
Vehicle Extension (s)	6.0
Lane Grp Cap (vph)	546
v/s Ratio Prot	
v/s Ratio Perm	0.08
v/c Ratio	0.22
Uniform Delay, d1	32.6
Progression Factor	3.84
Incremental Delay, d2	0.9
Delay (s)	126.1
Level of Service	F
Approach Delay (s/veh)	
Approach LOS	

Intersection Summary

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	11	20	12	942	1099	19
Future Volume (vph)	11	20	12	942	1099	19
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	0.913					0.850
Flt Protected	0.983		0.950			
Satd. Flow (prot)	1694	0	1787	3406	3471	1599
Flt Permitted	0.983		0.950			
Satd. Flow (perm)	1694	0	1787	3406	3471	1599
Adj. Flow (vph)	12	22	13	1035	1208	21
Lane Group Flow (vph)	34	0	13	1035	1208	21
Sign Control	Stop			Free	Free	

Intersection Summary		
Control Type: Unsignalized		
Intersection Capacity Utilization 40.4%		ICU Level of Service A
Analysis Period (min) 15		

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	11	20	12	942	1099	19
Future Vol, veh/h	11	20	12	942	1099	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	200	-	-	140
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	1	1	6	4	1
Mvmt Flow	12	22	13	1035	1208	21

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1752	604	1229	0	-	0
Stage 1	1208	-	-	-	-	-
Stage 2	544	-	-	-	-	-
Critical Hdwy	6.8	6.92	4.12	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.31	2.21	-	-	-
Pot Cap-1 Maneuver	78	444	568	-	-	-
Stage 1	250	-	-	-	-	-
Stage 2	551	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	76	444	568	-	-	-
Mov Cap-2 Maneuver	76	-	-	-	-	-
Stage 1	244	-	-	-	-	-
Stage 2	551	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	32.8	0.1	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	568	-	163	-	-
HCM Lane V/C Ratio	0.023	-	0.209	-	-
HCM Control Delay (s/veh)	11.5	-	32.8	-	-
HCM Lane LOS	B	-	D	-	-
HCM 95th %tile Q (veh)	0.1	-	0.8	-	-



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	57	0	898	1059	31
Future Volume (vph)	0	57	0	898	1059	31
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.865				0.850
Flt Protected						
Satd. Flow (prot)	0	1611	0	3374	3438	1583
Flt Permitted						
Satd. Flow (perm)	0	1611	0	3374	3438	1583
Adj. Flow (vph)	0	60	0	945	1115	33
Lane Group Flow (vph)	0	60	0	945	1115	33
Sign Control	Stop			Free	Free	

Intersection Summary		
Control Type: Unsignalized		
Intersection Capacity Utilization 39.5%		ICU Level of Service A
Analysis Period (min) 15		

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	57	0	898	1059	31
Future Vol, veh/h	0	57	0	898	1059	31
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	200
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	7	5	2
Mvmt Flow	0	60	0	945	1115	33

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	558	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	473	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	473	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	13.7	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	473	-	-
HCM Lane V/C Ratio	-	0.127	-	-
HCM Control Delay (s/veh)	-	13.7	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q (veh)	-	0.4	-	-

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	121	0	972	1047	50
Future Volume (vph)	0	121	0	972	1047	50
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.865				0.850
Flt Protected						
Satd. Flow (prot)	0	1611	0	3406	3471	1583
Flt Permitted						
Satd. Flow (perm)	0	1611	0	3406	3471	1583
Adj. Flow (vph)	0	127	0	1023	1102	53
Lane Group Flow (vph)	0	127	0	1023	1102	53
Sign Control	Stop			Free	Free	

Intersection Summary		
Control Type: Unsignalized		
Intersection Capacity Utilization 43.1%		ICU Level of Service A
Analysis Period (min) 15		

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	121	0	972	1047	50
Future Vol, veh/h	0	121	0	972	1047	50
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	150
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	6	4	2
Mvmt Flow	0	127	0	1023	1102	53

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	551	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	478	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	478	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	15.2	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	478	-	-
HCM Lane V/C Ratio	-	0.266	-	-
HCM Control Delay (s/veh)	-	15.2	-	-
HCM Lane LOS	-	C	-	-
HCM 95th %tile Q (veh)	-	1.1	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	0	953	0	19	0	1117
Future Volume (vph)	0	0	0	0	0	0	0	953	0	19	0	1117
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	1.00	0.95
Frt												
Flt Protected											0.950	
Satd. Flow (prot)	0	0	1863	0	0	1863	1863	3406	0	0	1770	3471
Flt Permitted											0.950	
Satd. Flow (perm)	0	0	1863	0	0	1863	1863	3406	0	0	1770	3471
Adj. Flow (vph)	0	0	0	0	0	0	0	1003	0	21	0	1176
Lane Group Flow (vph)	0	0	0	0	0	0	0	1003	0	0	21	1176
Sign Control		Stop			Stop			Free				Free

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization	34.2%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	0
Future Volume (vph)	0
Lane Util. Factor	0.95
Frt	
Flt Protected	
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Adj. Flow (vph)	0
Lane Group Flow (vph)	0
Sign Control	

Intersection Summary

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations													
Traffic Vol, veh/h	0	0	0	0	0	0	0	953	0	19	0	1117	0
Future Vol, veh/h	0	0	0	0	0	0	0	953	0	19	0	1117	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	-	None
Storage Length	-	-	0	-	-	0	200	-	-	-	125	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	92	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	6	2	2	2	4	2
Mvmt Flow	0	0	0	0	0	0	0	1003	0	21	0	1176	0

Major/Minor	Minor2			Minor1			Major1			Major2			
Conflicting Flow All	-	-	588	-	-	502	1176	0	0	1003	1003	0	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.94	-	-	6.94	4.14	-	-	6.44	4.14	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.32	-	-	3.32	2.22	-	-	2.52	2.22	-	-
Pot Cap-1 Maneuver	0	0	452	0	0	515	590	-	-	331	686	-	-
Stage 1	0	0	-	0	0	-	-	-	-	-	-	-	-
Stage 2	0	0	-	0	0	-	-	-	-	-	-	-	-
Platoon blocked, %								-	-			-	-
Mov Cap-1 Maneuver	-	-	452	-	-	515	590	-	-	331	331	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	0	0	0	0.3
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	590	-	-	-	-	331	-	-
HCM Lane V/C Ratio	-	-	-	-	-	0.062	-	-
HCM Control Delay (s/veh)	0	-	-	0	0	16.6	-	-
HCM Lane LOS	A	-	-	A	A	C	-	-
HCM 95th %tile Q (veh)	0	-	-	-	-	0.2	-	-



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	0	0	9	0	0	4
Future Volume (vph)	0	0	9	0	0	4
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.865	
Flt Protected				0.950		
Satd. Flow (prot)	1863	0	0	1770	1611	0
Flt Permitted				0.950		
Satd. Flow (perm)	1863	0	0	1770	1611	0
Adj. Flow (vph)	0	0	10	0	0	4
Lane Group Flow (vph)	0	0	0	10	4	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 13.3%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	0	0	9	0	0	4
Future Vol, veh/h	0	0	9	0	0	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	10	0	0	4

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	-	1	0	21	1
Stage 1	-	-	-	-	1	-
Stage 2	-	-	-	-	20	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	0	1622	-	996	1084
Stage 1	-	0	-	-	1022	-
Stage 2	-	0	-	-	1003	-
Platoon blocked, %	-			-		
Mov Cap-1 Maneuver	-	-	1622	-	990	1084
Mov Cap-2 Maneuver	-	-	-	-	990	-
Stage 1	-	-	-	-	1022	-
Stage 2	-	-	-	-	997	-

Approach	EB	WB	NB
HCM Control Delay, s/v	0	7.2	8.3
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	WBL	WBT
Capacity (veh/h)	1084	-	1622	-
HCM Lane V/C Ratio	0.004	-	0.006	-
HCM Control Delay (s/veh)	8.3	-	7.2	0
HCM Lane LOS	A	-	A	A
HCM 95th %tile Q (veh)	0	-	0	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	441	50	152	508	24	0	0	133	0	0	8
Future Volume (vph)	0	441	50	152	508	24	0	0	133	0	0	8
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.986			0.995				0.865			0.865
Flt Protected					0.989							
Satd. Flow (prot)	0	1837	0	0	1833	0	0	0	1611	0	0	1611
Flt Permitted					0.989							
Satd. Flow (perm)	0	1837	0	0	1833	0	0	0	1611	0	0	1611
Adj. Flow (vph)	0	479	54	165	552	26	0	0	145	0	0	9
Lane Group Flow (vph)	0	533	0	0	743	0	0	0	145	0	0	9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 69.5%		ICU Level of Service C	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	441	50	152	508	24	0	0	133	0	0	8
Future Vol, veh/h	0	441	50	152	508	24	0	0	133	0	0	8
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	479	54	165	552	26	0	0	145	0	0	9

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	533	0	0	-	-	506	-	-	565
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	-	4.12	-	-	-	-	6.22	-	-	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	2.218	-	-	-	-	3.318	-	-	3.318
Pot Cap-1 Maneuver	0	-	-	1035	-	-	0	0	566	0	0	524
Stage 1	0	-	-	-	-	-	0	0	-	0	0	-
Stage 2	0	-	-	-	-	-	0	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	-	-	-	1035	-	-	-	-	566	-	-	524
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	0	2	13.5	12
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	566	-	-	1035	-	-	524
HCM Lane V/C Ratio	0.255	-	-	0.16	-	-	0.017
HCM Control Delay (s/veh)	13.5	-	-	9.1	0	-	12
HCM Lane LOS	B	-	-	A	A	-	B
HCM 95th %tile Q (veh)	1	-	-	0.6	-	-	0.1



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	0	1863	1863	0	1863	0
Flt Permitted						
Satd. Flow (perm)	0	1863	1863	0	1863	0
Adj. Flow (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0
Sign Control		Free	Free		Stop	

Intersection Summary		
Control Type: Unsignalized		
Intersection Capacity Utilization 0.0%		ICU Level of Service A
Analysis Period (min) 15		

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	0	0	0
Future Vol, veh/h	0	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	0	0	0	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1	0	-	0	1	1
Stage 1	-	-	-	-	1	-
Stage 2	-	-	-	-	0	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1622	-	-	-	1022	1084
Stage 1	-	-	-	-	1022	-
Stage 2	-	-	-	-	-	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1622	-	-	-	1022	1084
Mov Cap-2 Maneuver	-	-	-	-	1022	-
Stage 1	-	-	-	-	1022	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s/v	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1622	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s/veh)	0	-	-	-	0
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q (veh)	0	-	-	-	-



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	1863	0	0	1863	0	0
Flt Permitted						
Satd. Flow (perm)	1863	0	0	1863	0	0
Adj. Flow (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 0.0%		ICU Level of Service A	
Analysis Period (min) 15			



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	0	934	0	0	1101
Future Volume (vph)	0	0	934	0	0	1101
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Frt						
Flt Protected						
Satd. Flow (prot)	0	1863	3539	0	0	3539
Flt Permitted						
Satd. Flow (perm)	0	1863	3539	0	0	3539
Adj. Flow (vph)	0	0	1015	0	0	1197
Lane Group Flow (vph)	0	0	1015	0	0	1197
Sign Control	Stop		Free			Free

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 33.8%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	934	0	0	1101
Future Vol, veh/h	0	0	934	0	0	1101
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	1015	0	0	1197

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	508	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	510	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	510	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-
HCM Control Delay (s/veh)	-	-	0	-
HCM Lane LOS	-	-	A	-
HCM 95th %tile Q (veh)	-	-	-	-

Intersection: 1: Benns Church Boulevard & Cypress Run Drive

Movement	EB	EB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LTR	UL	T	TR	L	T	T	R
Maximum Queue (ft)	77	52	37	96	131	138	22	209	220	40
Average Queue (ft)	16	16	3	28	20	35	1	60	61	5
95th Queue (ft)	52	40	23	64	82	106	11	149	155	24
Link Distance (ft)	656		676		798	798		1702	1702	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)		180		255			150			245
Storage Blk Time (%)					0			1	0	
Queuing Penalty (veh)					0			0	0	

Intersection: 2: Benns Church Boulevard & Tractor Supply Entrance

Movement	EB
Directions Served	R
Maximum Queue (ft)	27
Average Queue (ft)	8
95th Queue (ft)	27
Link Distance (ft)	470
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: Benns Church Boulevard & Turner Drive

Movement	EB	EB	EB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	LT	R	LTR	L	T	TR	UL	T	T	R
Maximum Queue (ft)	274	236	202	30	130	286	263	140	387	418	280
Average Queue (ft)	154	127	88	4	123	210	114	33	218	229	136
95th Queue (ft)	237	206	162	19	147	358	236	103	334	355	285
Link Distance (ft)	390			471		266	266		786	786	
Upstream Blk Time (%)	0					16	0				
Queuing Penalty (veh)	0					79	1				
Storage Bay Dist (ft)		305	305		130			140			280
Storage Blk Time (%)	0	0	0		35	22		0	22	2	0
Queuing Penalty (veh)	0	0	0		103	89		0	9	7	2

Intersection: 4: Benns Church Boulevard & Red Oak Drive

Movement	EB	NB	NB	SB
Directions Served	LR	L	T	R
Maximum Queue (ft)	51	33	6	2
Average Queue (ft)	18	6	0	0
95th Queue (ft)	42	25	6	2
Link Distance (ft)	950		1134	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)		200		140
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 5: Benns Church Boulevard & Site Driveway #1

Movement	EB
Directions Served	R
Maximum Queue (ft)	62
Average Queue (ft)	22
95th Queue (ft)	46
Link Distance (ft)	377
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 6: Benns Church Boulevard & Site Driveway #2

Movement	EB	NB	NB	SB
Directions Served	R	T	T	T
Maximum Queue (ft)	105	328	196	5
Average Queue (ft)	43	74	19	0
95th Queue (ft)	81	265	138	5
Link Distance (ft)	325	806	806	266
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 7: Benns Church Boulevard & Site Driveway #3

Movement	SB
Directions Served	UL
Maximum Queue (ft)	32
Average Queue (ft)	8
95th Queue (ft)	26
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	125
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 8: Site Driveway #4 & Tractor Supply Entrance

Movement	NB
Directions Served	LR
Maximum Queue (ft)	31
Average Queue (ft)	4
95th Queue (ft)	20
Link Distance (ft)	679
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 9: Wawa Dwy/Site Driveway #5 & Turner Drive

Movement	EB	WB	NB	SB
Directions Served	TR	LTR	R	R
Maximum Queue (ft)	18	316	108	28
Average Queue (ft)	1	89	43	5
95th Queue (ft)	9	209	76	22
Link Distance (ft)	1420	390	168	719
Upstream Blk Time (%)		0		
Queuing Penalty (veh)		0		
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 10: Tractor Supply Entrance & Site Driveway #6

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 11: Site Driveway #3

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 12: Benns Church Boulevard & Site Driveway #7

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

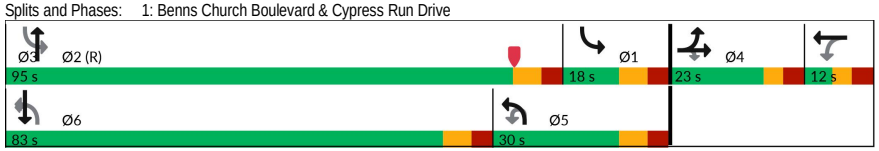
Network Summary

Network wide Queuing Penalty: 290

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	100	0	96	0	4	0	12	194	1234	0	3	1244
Future Volume (vph)	100	0	96	0	4	0	12	194	1234	0	3	1244
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95	0.95	1.00	0.95
Frt			0.850									
Flt Protected		0.950						0.950			0.950	
Satd. Flow (prot)	0	1805	1615	0	1900	0	0	1803	3539	0	1805	3471
Flt Permitted		0.950						0.141			0.180	
Satd. Flow (perm)	0	1805	1615	0	1900	0	0	268	3539	0	342	3471
Satd. Flow (RTOR)			216									
Adj. Flow (vph)	102	0	98	0	4	0	13	198	1259	0	3	1269
Lane Group Flow (vph)	0	102	98	0	4	0	0	211	1259	0	3	1269
Turn Type	Split	NA	Perm		NA		custom	D.P+P	NA		D.P+P	NA
Protected Phases	4	4			3			5	2		1	6
Permitted Phases			4	3			5	6			2	
Total Split (s)	23.0	23.0	23.0	12.0	12.0		30.0	30.0	95.0		18.0	83.0
Total Lost Time (s)		6.8	6.8		7.1			8.4	8.4		8.4	8.4
Act Effct Green (s)		13.5	13.5		6.6			108.5	113.7		118.4	96.0
Actuated g/C Ratio		0.09	0.09		0.04			0.73	0.77		0.80	0.65
v/c Ratio		0.62	0.29		0.05			0.65	0.46		0.01	0.56
Control Delay (s/veh)		80.6	2.1		69.8			26.2	12.1		5.7	17.8
Queue Delay		0.0	0.0		0.0			0.0	0.0		0.0	0.0
Total Delay (s/veh)		80.6	2.1		69.8			26.2	12.1		5.7	17.8
LOS		F	A		E			C	B		A	B
Approach Delay (s/veh)		42.1			69.8				14.1			16.2
Approach LOS		D			E				B			B

Intersection Summary			
Cycle Length: 148			
Actuated Cycle Length: 148			
Offset: 0 (0%), Referenced to phase 2:NBSB, Start of Yellow			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.65			
Intersection Signal Delay (s/veh): 17.0		Intersection LOS: B	
Intersection Capacity Utilization 83.2%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 1: Benns Church Boulevard & Cypress Run Drive



Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	116
Future Volume (vph)	116
Lane Util. Factor	1.00
Frt	0.850
Flt Protected	
Satd. Flow (prot)	1553
Flt Permitted	
Satd. Flow (perm)	1553
Satd. Flow (RTOR)	204
Adj. Flow (vph)	118
Lane Group Flow (vph)	118
Turn Type	Perm
Protected Phases	
Permitted Phases	6
Total Split (s)	83.0
Total Lost Time (s)	8.4
Act Effct Green (s)	96.0
Actuated g/C Ratio	0.65
v/c Ratio	0.11
Control Delay (s/veh)	0.2
Queue Delay	0.0
Total Delay (s/veh)	0.2
LOS	A
Approach Delay (s/veh)	
Approach LOS	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	100	0	96	0	4	0	12	194	1234	0	3	1244
Future Volume (vph)	100	0	96	0	4	0	12	194	1234	0	3	1244
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.8	6.8		7.1			8.4	8.4		8.4	8.4
Lane Util. Factor		1.00	1.00		1.00			1.00	0.95		1.00	0.95
Frt		1.00	0.85		1.00			1.00	1.00		1.00	1.00
Flt Protected		0.95	1.00		1.00			0.95	1.00		0.95	1.00
Satd. Flow (prot)		1805	1615		1900			1803	3539		1805	3471
Flt Permitted		0.95	1.00		1.00			0.14	1.00		0.18	1.00
Satd. Flow (perm)		1805	1615		1900			268	3539		342	3471
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.92	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	102	0	98	0	4	0	13	198	1259	0	3	1269
RTOR Reduction (vph)	0	0	89	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	102	9	0	4	0	0	211	1259	0	3	1269
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	0%	2%	0%	0%	4%
Turn Type	Split	NA	Perm		NA		custom	D.P+P	NA		D.P+P	NA
Protected Phases	4	4			3			5	2		1	6
Permitted Phases			4	3			5	6			2	
Actuated Green, G (s)		13.5	13.5		1.0			102.8	101.2		102.8	83.5
Effective Green, g (s)		13.5	13.5		1.0			102.8	101.2		102.8	83.5
Actuated g/C Ratio		0.09	0.09		0.01			0.69	0.68		0.69	0.56
Clearance Time (s)		6.8	6.8		7.1			8.4	8.4		8.4	8.4
Vehicle Extension (s)		3.0	3.0		3.0			2.0	5.0		2.0	5.0
Lane Grp Cap (vph)		164	147		12			386	2419		253	1958
v/s Ratio Prot		c0.06			c0.00			c0.07	0.36		0.00	c0.37
v/s Ratio Perm			0.01					0.31			0.01	
v/c Ratio		0.62	0.06		0.33			0.55	0.52		0.01	0.65
Uniform Delay, d1		64.8	61.5		73.2			33.0	11.5		14.0	22.2
Progression Factor		1.00	1.00		1.00			0.87	1.40		1.00	1.00
Incremental Delay, d2		7.1	0.2		15.7			0.7	0.7		0.0	1.7
Delay (s)		71.9	61.6		88.8			29.3	16.8		14.0	23.8
Level of Service		E	E		F			C	B		B	C
Approach Delay (s/veh)		66.9			88.8				18.6			23.0
Approach LOS		E			F				B			C

Intersection Summary			
HCM 2000 Control Delay (s/veh)	23.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	148.0	Sum of lost time (s)	30.7
Intersection Capacity Utilization	83.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	116
Future Volume (vph)	116
Ideal Flow (vphpl)	1900
Total Lost time (s)	8.4
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1553
Flt Permitted	1.00
Satd. Flow (perm)	1553
Peak-hour factor, PHF	0.98
Adj. Flow (vph)	118
RTOR Reduction (vph)	51
Lane Group Flow (vph)	67
Heavy Vehicles (%)	4%
Turn Type	Perm
Protected Phases	
Permitted Phases	6
Actuated Green, G (s)	83.5
Effective Green, g (s)	83.5
Actuated g/C Ratio	0.56
Clearance Time (s)	8.4
Vehicle Extension (s)	5.0
Lane Grp Cap (vph)	876
v/s Ratio Prot	
v/s Ratio Perm	0.04
v/c Ratio	0.08
Uniform Delay, d1	14.7
Progression Factor	1.00
Incremental Delay, d2	0.2
Delay (s)	14.9
Level of Service	B
Approach Delay (s/veh)	
Approach LOS	

Intersection Summary



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	19	0	1439	1327	24
Future Volume (vph)	0	19	0	1439	1327	24
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.865				0.850
Flt Protected						
Satd. Flow (prot)	0	1611	0	3539	3471	1583
Flt Permitted						
Satd. Flow (perm)	0	1611	0	3539	3471	1583
Adj. Flow (vph)	0	21	0	1564	1442	26
Lane Group Flow (vph)	0	21	0	1564	1442	26
Sign Control	Stop			Free	Free	

Intersection Summary		
Control Type: Unsignalized		
Intersection Capacity Utilization 46.7%		ICU Level of Service A
Analysis Period (min) 15		

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	19	0	1439	1327	24
Future Vol, veh/h	0	19	0	1439	1327	24
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	75
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	4	2
Mvmt Flow	0	21	0	1564	1442	26

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	721	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	370	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	370	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

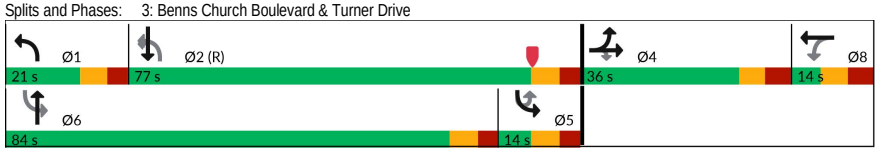
Approach	EB	NB	SB
HCM Control Delay, s/v	15.3	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	370	-	-
HCM Lane V/C Ratio	-	0.056	-	-
HCM Control Delay (s/veh)	-	15.3	-	-
HCM Lane LOS	-	C	-	-
HCM 95th %tile Q (veh)	-	0.2	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	220	2	132	3	0	8	334	1179	4	50	29	1114
Future Volume (vph)	220	2	132	3	0	8	334	1179	4	50	29	1114
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	1.00	0.95
Frt			0.850		0.902							
Flt Protected	0.950	0.953			0.987		0.950				0.950	
Satd. Flow (prot)	1698	1703	1599	0	1692	0	1719	3539	0	0	1782	3539
Flt Permitted	0.950	0.953			0.909		0.104				0.155	
Satd. Flow (perm)	1698	1703	1599	0	1558	0	188	3539	0	0	291	3539
Satd. Flow (RTOR)			228		228							
Adj. Flow (vph)	232	2	139	3	0	8	352	1241	4	54	31	1173
Lane Group Flow (vph)	116	118	139	0	11	0	352	1245	0	0	85	1173
Turn Type	Split	NA	Perm	Perm	NA		D.P+P	NA		custom	D.P+P	NA
Protected Phases	4	4			8		1	6			5	2
Permitted Phases			4	8			2			5	6	
Total Split (s)	36.0	36.0	36.0	14.0	14.0		21.0	84.0		14.0	14.0	77.0
Total Lost Time (s)	9.0	9.0	9.0		9.0		8.3	8.3			8.3	8.3
Act Effct Green (s)	18.1	18.1	18.1		7.0		97.9	92.2			97.9	68.7
Actuated g/C Ratio	0.12	0.12	0.12		0.05		0.66	0.62			0.66	0.46
v/c Ratio	0.56	0.57	0.35		0.04		0.83	0.56			0.34	0.71
Control Delay (s/veh)	70.6	71.0	2.4		0.2		50.9	19.5			9.5	32.5
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.0			0.0	0.0
Total Delay (s/veh)	70.6	71.0	2.4		0.2		50.9	19.5			9.5	32.5
LOS	E	E	A		A		D	B			A	C
Approach Delay (s/veh)		45.3			0.2			26.5				27.6
Approach LOS		D			A			C				C

Intersection Summary		
Cycle Length: 148		
Actuated Cycle Length: 148		
Offset: 38 (26%), Referenced to phase 2:NBSB, Start of Yellow		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.83		
Intersection Signal Delay (s/veh): 28.9	Intersection LOS: C	
Intersection Capacity Utilization 83.4%	ICU Level of Service E	
Analysis Period (min) 15		

Splits and Phases: 3: Benns Church Boulevard & Turner Drive



Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	205
Future Volume (vph)	205
Lane Util. Factor	1.00
Frt	0.850
Flt Protected	
Satd. Flow (prot)	1615
Flt Permitted	
Satd. Flow (perm)	1615
Satd. Flow (RTOR)	194
Adj. Flow (vph)	216
Lane Group Flow (vph)	216
Turn Type	Perm
Protected Phases	
Permitted Phases	2
Total Split (s)	77.0
Total Lost Time (s)	8.3
Act Effct Green (s)	68.7
Actuated g/C Ratio	0.46
v/c Ratio	0.25
Control Delay (s/veh)	7.8
Queue Delay	0.0
Total Delay (s/veh)	7.8
LOS	A
Approach Delay (s/veh)	
Approach LOS	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	220	2	132	3	0	8	334	1179	4	50	29	1114
Future Volume (vph)	220	2	132	3	0	8	334	1179	4	50	29	1114
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	9.0	9.0	9.0		9.0		8.3	8.3			8.3	8.3
Lane Util. Factor	0.95	0.95	1.00		1.00		1.00	0.95			1.00	0.95
Frt	1.00	1.00	0.85		0.90		1.00	1.00			1.00	1.00
Flt Protected	0.95	0.95	1.00		0.99		0.95	1.00			0.95	1.00
Satd. Flow (prot)	1698	1704	1599		1690		1719	3538			1782	3539
Flt Permitted	0.95	0.95	1.00		0.91		0.10	1.00			0.16	1.00
Satd. Flow (perm)	1698	1704	1599		1558		189	3538			291	3539
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.92	0.95	0.95
Adj. Flow (vph)	232	2	139	3	0	8	352	1241	4	54	31	1173
RTOR Reduction (vph)	0	0	122	0	11	0	0	0	0	0	0	0
Lane Group Flow (vph)	116	118	17	0	0	0	352	1245	0	0	85	1173
Heavy Vehicles (%)	1%	0%	1%	0%	0%	0%	5%	2%	0%	2%	0%	2%
Turn Type	Split	NA	Perm	Perm	NA		D.P+P	NA		custom	D.P+P	NA
Protected Phases	4	4			8		1	6			5	2
Permitted Phases			4	8			2			5	6	
Actuated Green, G (s)	18.1	18.1	18.1		2.8		92.5	86.8			92.5	63.3
Effective Green, g (s)	18.1	18.1	18.1		2.8		92.5	86.8			92.5	63.3
Actuated g/C Ratio	0.12	0.12	0.12		0.02		0.63	0.59			0.63	0.43
Clearance Time (s)	9.0	9.0	9.0		9.0		8.3	8.3			8.3	8.3
Vehicle Extension (s)	5.0	5.0	5.0		3.0		4.0	6.0			2.0	6.0
Lane Grp Cap (vph)	207	208	195		29		419	2074			239	1513
v/s Ratio Prot	0.07	c0.07					c0.17	0.35			0.01	0.33
v/s Ratio Perm			0.01		c0.00		c0.36				0.21	
v/c Ratio	0.56	0.57	0.09		0.01		0.84	0.60			0.36	0.78
Uniform Delay, d1	61.2	61.3	57.6		71.2		38.1	19.5			28.6	36.3
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00			0.44	0.94
Incremental Delay, d2	5.6	5.7	0.4		0.1		14.6	1.3			0.3	3.6
Delay (s)	66.8	67.0	58.0		71.3		52.6	20.8			13.0	37.5
Level of Service	E	E	E		E		D	C			B	D
Approach Delay (s/veh)		63.6			71.3			27.8				37.3
Approach LOS		E			E			C				D

Intersection Summary			
HCM 2000 Control Delay (s/veh)	35.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	148.0	Sum of lost time (s)	34.6
Intersection Capacity Utilization	83.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	205
Future Volume (vph)	205
Ideal Flow (vphpl)	1900
Total Lost time (s)	8.3
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1615
Flt Permitted	1.00
Satd. Flow (perm)	1615
Peak-hour factor, PHF	0.95
Adj. Flow (vph)	216
RTOR Reduction (vph)	111
Lane Group Flow (vph)	105
Heavy Vehicles (%)	0%
Turn Type	Perm
Protected Phases	
Permitted Phases	2
Actuated Green, G (s)	63.3
Effective Green, g (s)	63.3
Actuated g/C Ratio	0.43
Clearance Time (s)	8.3
Vehicle Extension (s)	6.0
Lane Grp Cap (vph)	690
v/s Ratio Prot	
v/s Ratio Perm	0.06
v/c Ratio	0.15
Uniform Delay, d1	25.9
Progression Factor	1.74
Incremental Delay, d2	0.4
Delay (s)	45.6
Level of Service	D
Approach Delay (s/veh)	
Approach LOS	

Intersection Summary

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	9	15	29	1491	1267	22
Future Volume (vph)	9	15	29	1491	1267	22
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	0.914					0.850
Flt Protected	0.982		0.950			
Satd. Flow (prot)	1705	0	1736	3539	3505	1615
Flt Permitted	0.982		0.950			
Satd. Flow (perm)	1705	0	1736	3539	3505	1615
Adj. Flow (vph)	9	16	30	1553	1320	23
Lane Group Flow (vph)	25	0	30	1553	1320	23
Sign Control	Stop			Free	Free	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 51.2%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	9	15	29	1491	1267	22
Future Vol, veh/h	9	15	29	1491	1267	22
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	200	-	-	140
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	0	0	4	2	3	0
Mvmt Flow	9	16	30	1553	1320	23

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2157	660	1343	0	-	0
Stage 1	1320	-	-	-	-	-
Stage 2	837	-	-	-	-	-
Critical Hdwy	6.8	6.9	4.18	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.24	-	-	-
Pot Cap-1 Maneuver	42	410	499	-	-	-
Stage 1	218	-	-	-	-	-
Stage 2	390	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	39	410	499	-	-	-
Mov Cap-2 Maneuver	39	-	-	-	-	-
Stage 1	205	-	-	-	-	-
Stage 2	390	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	59.7	0.2	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	499	-	90	-	-
HCM Lane V/C Ratio	0.061	-	0.278	-	-
HCM Control Delay (s/veh)	12.7	-	59.7	-	-
HCM Lane LOS	B	-	F	-	-
HCM 95th %tile Q (veh)	0.2	-	1	-	-

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	65	0	1437	1313	34
Future Volume (vph)	0	65	0	1437	1313	34
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.865				0.850
Flt Protected						
Satd. Flow (prot)	0	1611	0	3539	3539	1583
Flt Permitted						
Satd. Flow (perm)	0	1611	0	3539	3539	1583
Adj. Flow (vph)	0	68	0	1513	1382	36
Lane Group Flow (vph)	0	68	0	1513	1382	36
Sign Control	Stop			Free	Free	

Intersection Summary		
Control Type: Unsignalized		
Intersection Capacity Utilization 47.0%		ICU Level of Service A
Analysis Period (min) 15		

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	65	0	1437	1313	34
Future Vol, veh/h	0	65	0	1437	1313	34
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	200
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	68	0	1513	1382	36

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	691	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	387	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	387	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	16.3	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	387	-	-
HCM Lane V/C Ratio	-	0.177	-	-
HCM Control Delay (s/veh)	-	16.3	-	-
HCM Lane LOS	-	C	-	-
HCM 95th %tile Q (veh)	-	0.6	-	-

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	96	0	1517	1232	39
Future Volume (vph)	0	96	0	1517	1232	39
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.865				0.850
Flt Protected						
Satd. Flow (prot)	0	1611	0	3539	3539	1583
Flt Permitted						
Satd. Flow (perm)	0	1611	0	3539	3539	1583
Adj. Flow (vph)	0	101	0	1597	1297	41
Lane Group Flow (vph)	0	101	0	1597	1297	41
Sign Control	Stop			Free	Free	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 46.7%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	96	0	1517	1232	39
Future Vol, veh/h	0	96	0	1517	1232	39
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	150
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	101	0	1597	1297	41

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	649	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	412	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	412	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	16.6	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	412	-	-
HCM Lane V/C Ratio	-	0.245	-	-
HCM Control Delay (s/veh)	-	16.6	-	-
HCM Lane LOS	-	C	-	-
HCM 95th %tile Q (veh)	-	1	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	0	1500	0	17	0	1288
Future Volume (vph)	0	0	0	0	0	0	0	1500	0	17	0	1288
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	1.00	0.95
Frt												
Flt Protected											0.950	
Satd. Flow (prot)	0	0	1863	0	0	1863	1863	3539	0	0	1770	3539
Flt Permitted											0.950	
Satd. Flow (perm)	0	0	1863	0	0	1863	1863	3539	0	0	1770	3539
Adj. Flow (vph)	0	0	0	0	0	0	0	1579	0	18	0	1356
Lane Group Flow (vph)	0	0	0	0	0	0	0	1579	0	0	18	1356
Sign Control		Stop			Stop			Free				Free

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization	44.8%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	0
Future Volume (vph)	0
Lane Util. Factor	0.95
Frt	
Flt Protected	
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Adj. Flow (vph)	0
Lane Group Flow (vph)	0
Sign Control	

Intersection Summary

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations													
Traffic Vol, veh/h	0	0	0	0	0	0	0	1500	0	17	0	1288	0
Future Vol, veh/h	0	0	0	0	0	0	0	1500	0	17	0	1288	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	-	None
Storage Length	-	-	0	-	-	0	200	-	-	-	125	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	92	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	0	0	0	0	1579	0	18	0	1356	0

Major/Minor	Minor2			Minor1			Major1			Major2			
Conflicting Flow All	-	-	678	-	-	790	1356	0	0	1579	1579	0	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.94	-	-	6.94	4.14	-	-	6.44	4.14	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.32	-	-	3.32	2.22	-	-	2.52	2.22	-	-
Pot Cap-1 Maneuver	0	0	395	0	0	333	503	-	-	140	413	-	-
Stage 1	0	0	-	0	0	-	-	-	-	-	-	-	-
Stage 2	0	0	-	0	0	-	-	-	-	-	-	-	-
Platoon blocked, %								-	-			-	-
Mov Cap-1 Maneuver	-	-	395	-	-	333	503	-	-	140	140	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	0	0	0	0.5
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	503	-	-	-	-	140	-	-
HCM Lane V/C Ratio	-	-	-	-	-	0.132	-	-
HCM Control Delay (s/veh)	0	-	-	0	0	34.6	-	-
HCM Lane LOS	A	-	-	A	A	D	-	-
HCM 95th %tile Q (veh)	0	-	-	-	-	0.4	-	-

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	0	0	12	0	0	6
Future Volume (vph)	0	0	12	0	0	6
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.865	
Flt Protected				0.950		
Satd. Flow (prot)	1863	0	0	1770	1611	0
Flt Permitted				0.950		
Satd. Flow (perm)	1863	0	0	1770	1611	0
Adj. Flow (vph)	0	0	13	0	0	7
Lane Group Flow (vph)	0	0	0	13	7	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 13.3%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	7.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	0	0	12	0	0	6
Future Vol, veh/h	0	0	12	0	0	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	13	0	0	7

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	-	1	0	27	1
Stage 1	-	-	-	-	1	-
Stage 2	-	-	-	-	26	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	0	1622	-	988	1084
Stage 1	-	0	-	-	1022	-
Stage 2	-	0	-	-	997	-
Platoon blocked, %	-			-		
Mov Cap-1 Maneuver	-	-	1622	-	980	1084
Mov Cap-2 Maneuver	-	-	-	-	980	-
Stage 1	-	-	-	-	1022	-
Stage 2	-	-	-	-	989	-

Approach	EB	WB	NB
HCM Control Delay, s/v	0	7.2	8.3
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	WBL	WBT
Capacity (veh/h)	1084	-	1622	-
HCM Lane V/C Ratio	0.006	-	0.008	-
HCM Control Delay (s/veh)	8.3	-	7.2	0
HCM Lane LOS	A	-	A	A
HCM 95th %tile Q (veh)	0	-	0	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	254	39	118	381	39	0	0	100	0	0	12
Future Volume (vph)	0	254	39	118	381	39	0	0	100	0	0	12
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.982			0.990				0.865			0.865
Flt Protected					0.989							
Satd. Flow (prot)	0	1829	0	0	1824	0	0	0	1611	0	0	1611
Flt Permitted					0.989							
Satd. Flow (perm)	0	1829	0	0	1824	0	0	0	1611	0	0	1611
Adj. Flow (vph)	0	276	42	128	414	42	0	0	109	0	0	13
Lane Group Flow (vph)	0	318	0	0	584	0	0	0	109	0	0	13
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 51.3%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	254	39	118	381	39	0	0	100	0	0	12
Future Vol, veh/h	0	254	39	118	381	39	0	0	100	0	0	12
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	276	42	128	414	42	0	0	109	0	0	13

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	318	0	0	-	-	297	-	-	435
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	-	4.12	-	-	-	-	6.22	-	-	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	2.218	-	-	-	-	3.318	-	-	3.318
Pot Cap-1 Maneuver	0	-	-	1242	-	-	0	0	742	0	0	621
Stage 1	0	-	-	-	-	-	0	0	-	0	0	-
Stage 2	0	-	-	-	-	-	0	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	-	-	-	1242	-	-	-	-	742	-	-	621
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	0	1.8	10.7	10.9
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	742	-	-	1242	-	-	621
HCM Lane V/C Ratio	0.146	-	-	0.103	-	-	0.021
HCM Control Delay (s/veh)	10.7	-	-	8.2	0	-	10.9
HCM Lane LOS	B	-	-	A	A	-	B
HCM 95th %tile Q (veh)	0.5	-	-	0.3	-	-	0.1



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	0	1863	1863	0	1863	0
Flt Permitted						
Satd. Flow (perm)	0	1863	1863	0	1863	0
Adj. Flow (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0
Sign Control		Free	Free		Stop	

Intersection Summary		
Control Type: Unsignalized		
Intersection Capacity Utilization 0.0%		ICU Level of Service A
Analysis Period (min) 15		

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	0	0	0
Future Vol, veh/h	0	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	0	0	0	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1	0	-	0	1	1
Stage 1	-	-	-	-	1	-
Stage 2	-	-	-	-	0	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1622	-	-	-	1022	1084
Stage 1	-	-	-	-	1022	-
Stage 2	-	-	-	-	-	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1622	-	-	-	1022	1084
Mov Cap-2 Maneuver	-	-	-	-	1022	-
Stage 1	-	-	-	-	1022	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s/v	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1622	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s/veh)	0	-	-	-	0
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q (veh)	0	-	-	-	-



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	1863	0	0	1863	0	0
Flt Permitted						
Satd. Flow (perm)	1863	0	0	1863	0	0
Adj. Flow (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 0.0%		ICU Level of Service A	
Analysis Period (min) 15			



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	0	1476	0	0	1264
Future Volume (vph)	0	0	1476	0	0	1264
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Frt						
Flt Protected						
Satd. Flow (prot)	0	1863	3539	0	0	3539
Flt Permitted						
Satd. Flow (perm)	0	1863	3539	0	0	3539
Adj. Flow (vph)	0	0	1604	0	0	1374
Lane Group Flow (vph)	0	0	1604	0	0	1374
Sign Control	Stop		Free			Free

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 44.1%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	1476	0	0	1264
Future Vol, veh/h	0	0	1476	0	0	1264
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	1604	0	0	1374

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	802	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	327	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	327	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-
HCM Control Delay (s/veh)	-	-	0	-
HCM Lane LOS	-	-	A	-
HCM 95th %tile Q (veh)	-	-	-	-

Intersection: 1: Benns Church Boulevard & Cypress Run Drive

Movement	EB	EB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LTR	UL	T	TR	L	T	T	R
Maximum Queue (ft)	190	157	24	218	252	250	60	361	360	244
Average Queue (ft)	89	41	3	107	96	104	4	180	177	46
95th Queue (ft)	161	103	16	187	198	201	31	320	321	160
Link Distance (ft)	656		676		798	798		1702	1702	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)		180		255			150			245
Storage Blk Time (%)	1	0		0	0		0	11	3	0
Queuing Penalty (veh)	1	0		0	0		0	0	3	1

Intersection: 2: Benns Church Boulevard & Tractor Supply Entrance

Movement	EB
Directions Served	R
Maximum Queue (ft)	38
Average Queue (ft)	10
95th Queue (ft)	31
Link Distance (ft)	470
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: Benns Church Boulevard & Turner Drive

Movement	EB	EB	EB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	LT	R	LTR	L	T	TR	UL	T	T	R
Maximum Queue (ft)	203	176	143	40	130	300	289	140	418	453	280
Average Queue (ft)	112	87	56	10	127	255	216	65	231	246	105
95th Queue (ft)	172	152	107	33	141	344	326	134	395	418	280
Link Distance (ft)	390			471		266	266		786	786	
Upstream Blk Time (%)						24	3				
Queuing Penalty (veh)						181	26				
Storage Bay Dist (ft)		305	305		130			140			280
Storage Blk Time (%)					43	27		1	13	4	0
Queuing Penalty (veh)					253	92		3	10	9	2

Intersection: 4: Benns Church Boulevard & Red Oak Drive

Movement	EB	NB	NB	NB	SB
Directions Served	LR	L	T	T	R
Maximum Queue (ft)	71	52	6	13	6
Average Queue (ft)	19	15	0	0	0
95th Queue (ft)	54	42	6	13	5
Link Distance (ft)	950		1134	1134	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)		200			140
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 5: Benns Church Boulevard & Site Driveway #1

Movement	EB
Directions Served	R
Maximum Queue (ft)	75
Average Queue (ft)	28
95th Queue (ft)	57
Link Distance (ft)	377
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 6: Benns Church Boulevard & Site Driveway #2

Movement	EB	NB	NB	SB
Directions Served	R	T	T	T
Maximum Queue (ft)	113	474	448	5
Average Queue (ft)	41	133	90	0
95th Queue (ft)	83	388	328	5
Link Distance (ft)	325	854	854	266
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 7: Benns Church Boulevard & Site Driveway #3

Movement	SB
Directions Served	UL
Maximum Queue (ft)	39
Average Queue (ft)	10
95th Queue (ft)	32
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	125
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 8: Site Driveway #4 & Tractor Supply Entrance

Movement	NB
Directions Served	LR
Maximum Queue (ft)	31
Average Queue (ft)	5
95th Queue (ft)	23
Link Distance (ft)	679
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 9: Wawa Dwy/Site Driveway #5 & Turner Drive

Movement	EB	WB	NB	SB
Directions Served	TR	LTR	R	R
Maximum Queue (ft)	2	127	73	26
Average Queue (ft)	0	41	35	7
95th Queue (ft)	2	100	60	25
Link Distance (ft)	1418	390	170	719
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 10: Tractor Supply Entrance & Site Driveway #6

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 11: Site Driveway #3

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 12: Benns Church Boulevard & Site Driveway #7

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 581

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	52	0	76	53	0	42	24	79	1008	2	56	1184
Future Volume (vph)	52	0	76	53	0	42	24	79	1008	2	56	1184
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95	0.95	1.00	0.95
Frt			0.850		0.940							
Flt Protected		0.950			0.973			0.950			0.950	
Satd. Flow (prot)	0	1492	1495	0	1360	0	0	1670	3374	0	1805	3471
Flt Permitted		0.950			0.122			0.129			0.192	
Satd. Flow (perm)	0	1492	1495	0	171	0	0	227	3374	0	365	3471
Satd. Flow (RTOR)			157		155							
Adj. Flow (vph)	54	0	79	55	0	44	26	82	1050	2	58	1233
Lane Group Flow (vph)	0	54	79	0	99	0	0	108	1052	0	58	1233
Turn Type	Split	NA	Perm	Perm	NA		custom	D.P+P	NA		D.P+P	NA
Protected Phases	4	4			3			5	2		1	6
Permitted Phases			4	3			5	6			2	
Total Split (s)	14.0	14.0	14.0	46.0	46.0		13.4	13.4	71.0		14.0	71.6
Total Lost Time (s)		6.8	6.8		7.1			8.4	8.4		8.4	8.4
Act Effct Green (s)		8.5	8.5		25.5			80.3	77.5		82.0	75.3
Actuated g/C Ratio		0.06	0.06		0.18			0.55	0.53		0.57	0.52
v/c Ratio		0.62	0.34		0.63			0.62	0.58		0.22	0.68
Control Delay (s/veh)		95.3	3.8		18.4			41.4	35.9		20.4	30.9
Queue Delay		0.0	0.0		0.0			0.0	0.0		0.0	0.0
Total Delay (s/veh)		95.3	3.8		18.4			41.4	35.9		20.4	30.9
LOS		F	A		B			D	D		C	C
Approach Delay (s/veh)		41.0			18.4				36.4			29.5
Approach LOS		D			B				D			C

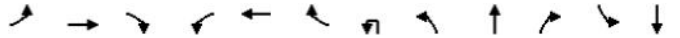
Intersection Summary			
Cycle Length: 145			
Actuated Cycle Length: 145			
Offset: 0 (0%), Referenced to phase 2:NBSB, Start of Yellow			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.68			
Intersection Signal Delay (s/veh): 32.6		Intersection LOS: C	
Intersection Capacity Utilization 75.7%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 1: Benns Church Boulevard & Cypress Run Drive



Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	38
Future Volume (vph)	38
Lane Util. Factor	1.00
Frt	0.850
Flt Protected	
Satd. Flow (prot)	1509
Flt Permitted	
Satd. Flow (perm)	1509
Satd. Flow (RTOR)	145
Adj. Flow (vph)	40
Lane Group Flow (vph)	40
Turn Type	Perm
Protected Phases	
Permitted Phases	6
Total Split (s)	71.6
Total Lost Time (s)	8.4
Act Effct Green (s)	75.3
Actuated g/C Ratio	0.52
v/c Ratio	0.05
Control Delay (s/veh)	0.1
Queue Delay	0.0
Total Delay (s/veh)	0.1
LOS	A
Approach Delay (s/veh)	
Approach LOS	

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	52	0	76	53	0	42	24	79	1008	2	56	1184
Future Volume (vph)	52	0	76	53	0	42	24	79	1008	2	56	1184
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.8	6.8		7.1			8.4	8.4		8.4	8.4
Lane Util. Factor		1.00	1.00		1.00			1.00	0.95		1.00	0.95
Frt		1.00	0.85		0.94			1.00	1.00		1.00	1.00
Flt Protected		0.95	1.00		0.97			0.95	1.00		0.95	1.00
Satd. Flow (prot)		1492	1495		1360			1670	3373		1805	3471
Flt Permitted		0.95	1.00		0.12			0.13	1.00		0.19	1.00
Satd. Flow (perm)		1492	1495		171			226	3373		365	3471
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.92	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	54	0	79	55	0	44	26	82	1050	2	58	1233
RTOR Reduction (vph)	0	0	74	0	82	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	54	5	0	17	0	0	108	1052	0	58	1233
Heavy Vehicles (%)	21%	0%	8%	50%	0%	0%	2%	10%	7%	0%	0%	4%
Turn Type	Split	NA	Perm	Perm	NA		custom	D.P+P	NA		D.P+P	NA
Protected Phases	4	4			3			5	2		1	6
Permitted Phases			4	3			5	6			2	
Actuated Green, G (s)		8.5	8.5		25.5			80.3	75.8		80.3	73.6
Effective Green, g (s)		8.5	8.5		25.5			80.3	75.8		80.3	73.6
Actuated g/C Ratio		0.06	0.06		0.18			0.55	0.52		0.55	0.51
Clearance Time (s)		6.8	6.8		7.1			8.4	8.4		8.4	8.4
Vehicle Extension (s)		3.0	3.0		3.0			2.0	5.0		2.0	5.0
Lane Grp Cap (vph)		87	87		30			191	1763		246	1761
v/s Ratio Prot		c0.04						c0.03	0.31		0.01	c0.36
v/s Ratio Perm			0.00		c0.10			0.29			0.12	
v/c Ratio		0.62	0.05		0.58			0.57	0.60		0.24	0.70
Uniform Delay, d1		66.7	64.5		54.8			44.1	24.0		29.4	27.3
Progression Factor		1.00	1.00		1.00			0.91	1.31		1.00	1.00
Incremental Delay, d2		13.0	0.3		25.4			1.9	1.2		0.2	2.3
Delay (s)		79.6	64.7		80.3			42.1	32.8		29.6	29.6
Level of Service		E	E		F			D	C		C	C
Approach Delay (s/veh)		70.8			80.3				33.6			29.3
Approach LOS		E			F				C			C

Intersection Summary			
HCM 2000 Control Delay (s/veh)	35.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	145.0	Sum of lost time (s)	30.7
Intersection Capacity Utilization	75.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Movement	SBR
Lane Configurations	
Traffic Volume (vph)	38
Future Volume (vph)	38
Ideal Flow (vphpl)	1900
Total Lost time (s)	8.4
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1509
Flt Permitted	1.00
Satd. Flow (perm)	1509
Peak-hour factor, PHF	0.96
Adj. Flow (vph)	40
RTOR Reduction (vph)	20
Lane Group Flow (vph)	20
Heavy Vehicles (%)	7%
Turn Type	Perm
Protected Phases	
Permitted Phases	6
Actuated Green, G (s)	73.6
Effective Green, g (s)	73.6
Actuated g/C Ratio	0.51
Clearance Time (s)	8.4
Vehicle Extension (s)	5.0
Lane Grp Cap (vph)	765
v/s Ratio Prot	
v/s Ratio Perm	0.01
v/c Ratio	0.03
Uniform Delay, d1	17.8
Progression Factor	1.00
Incremental Delay, d2	0.1
Delay (s)	17.9
Level of Service	B
Approach Delay (s/veh)	
Approach LOS	

Intersection Summary

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	78	0	1110	1232	105
Future Volume (vph)	0	78	0	1110	1232	105
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.865				0.850
Flt Protected						
Satd. Flow (prot)	0	1611	0	3374	3471	1583
Flt Permitted						
Satd. Flow (perm)	0	1611	0	3374	3471	1583
Adj. Flow (vph)	0	85	0	1207	1339	114
Lane Group Flow (vph)	0	85	0	1207	1339	114
Sign Control	Stop			Free	Free	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 45.6%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	78	0	1110	1232	105
Future Vol, veh/h	0	78	0	1110	1232	105
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	250
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	7	4	2
Mvmt Flow	0	85	0	1207	1339	114

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	670	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	399	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	399	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

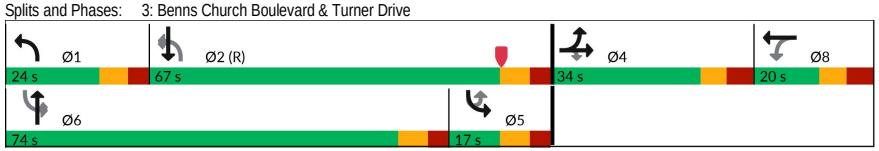
Approach	EB	NB	SB
HCM Control Delay, s/v	16.4	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	399	-	-
HCM Lane V/C Ratio	-	0.212	-	-
HCM Control Delay (s/veh)	-	16.4	-	-
HCM Lane LOS	-	C	-	-
HCM 95th %tile Q (veh)	-	0.8	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	425	20	303	10	4	2	528	664	40	60	4	934
Future Volume (vph)	425	20	303	10	4	2	528	664	40	60	4	934
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	0.97	0.95	1.00	0.95	1.00	0.95
Frt			0.850		0.985				0.850			
Flt Protected	0.950	0.956			0.970		0.950				0.950	
Satd. Flow (prot)	1531	1556	1524	0	1815	0	3335	3438	1615	0	1772	3505
Flt Permitted	0.950	0.956			0.666		0.122				0.305	
Satd. Flow (perm)	1531	1556	1524	0	1246	0	428	3438	1615	0	569	3505
Satd. Flow (RTOR)			344		2				175			
Adj. Flow (vph)	483	23	344	11	5	2	600	755	45	65	5	1061
Lane Group Flow (vph)	251	255	344	0	18	0	600	755	45	0	70	1061
Turn Type	Split	NA	Perm	Perm	NA		D.P+P	NA	Perm	custom	D.P+P	NA
Protected Phases	4	4			8		1	6			5	2
Permitted Phases			4	8			2		6	5	6	
Total Split (s)	34.0	34.0	34.0	20.0	20.0		24.0	74.0	74.0	17.0	17.0	67.0
Total Lost Time (s)	9.0	9.0	9.0		9.0		8.3	8.3	8.3		8.3	8.3
Act Effct Green (s)	25.0	25.0	25.0		8.0		83.8	78.5	78.5		85.4	60.5
Actuated g/C Ratio	0.17	0.17	0.17		0.06		0.58	0.54	0.54		0.59	0.42
v/c Ratio	0.95	0.95	0.63		0.25		0.84	0.41	0.05		0.17	0.73
Control Delay (s/veh)	103.7	102.7	10.7		68.6		39.4	25.6	0.3		4.7	27.6
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.0	0.0		0.0	0.0
Total Delay (s/veh)	103.7	102.7	10.7		68.6		39.4	25.6	0.3		4.7	27.6
LOS	F	F	B		E		D	C	A		A	C
Approach Delay (s/veh)		65.7			68.6			30.7				21.0
Approach LOS		E			E			C				C

Intersection Summary		
Cycle Length: 145		
Actuated Cycle Length: 145		
Offset: 49 (34%), Referenced to phase 2:NBSB, Start of Yellow		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.95		
Intersection Signal Delay (s/veh): 34.7	Intersection LOS: C	
Intersection Capacity Utilization 79.6%	ICU Level of Service D	
Analysis Period (min) 15		

Splits and Phases: 3: Benns Church Boulevard & Turner Drive



Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	367
Future Volume (vph)	367
Lane Util. Factor	1.00
Frt	0.850
Flt Protected	
Satd. Flow (prot)	1538
Flt Permitted	
Satd. Flow (perm)	1538
Satd. Flow (RTOR)	380
Adj. Flow (vph)	417
Lane Group Flow (vph)	417
Turn Type	Perm
Protected Phases	
Permitted Phases	2
Total Split (s)	67.0
Total Lost Time (s)	8.3
Act Effct Green (s)	60.5
Actuated g/C Ratio	0.42
v/c Ratio	0.48
Control Delay (s/veh)	6.8
Queue Delay	0.0
Total Delay (s/veh)	6.8
LOS	A
Approach Delay (s/veh)	
Approach LOS	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	425	20	303	10	4	2	528	664	40	60	4	934
Future Volume (vph)	425	20	303	10	4	2	528	664	40	60	4	934
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	9.0	9.0	9.0		9.0		8.3	8.3	8.3		8.3	8.3
Lane Util. Factor	0.95	0.95	1.00		1.00		0.97	0.95	1.00		1.00	0.95
Frt	1.00	1.00	0.85		0.99		1.00	1.00	0.85		1.00	1.00
Flt Protected	0.95	0.96	1.00		0.97		0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1531	1557	1524		1816		3335	3438	1615		1772	3505
Flt Permitted	0.95	0.96	1.00		0.67		0.12	1.00	1.00		0.31	1.00
Satd. Flow (perm)	1531	1557	1524		1246		427	3438	1615		569	3505
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.92	0.88	0.88
Adj. Flow (vph)	483	23	344	11	5	2	600	755	45	65	5	1061
RTOR Reduction (vph)	0	0	285	0	2	0	0	0	22	0	0	0
Lane Group Flow (vph)	251	255	59	0	16	0	600	755	23	0	70	1061
Heavy Vehicles (%)	12%	0%	6%	0%	0%	0%	5%	5%	0%	2%	0%	3%
Turn Type	Split	NA	Perm	Perm	NA		D.P+P	NA	Perm	custom	D.P+P	NA
Protected Phases	4	4			8		1	6			5	2
Permitted Phases			4	8			2		6	5	6	
Actuated Green, G (s)	25.0	25.0	25.0		5.2		80.2	73.2	73.2		80.2	57.0
Effective Green, g (s)	25.0	25.0	25.0		5.2		80.2	73.2	73.2		80.2	57.0
Actuated g/C Ratio	0.17	0.17	0.17		0.04		0.55	0.50	0.50		0.55	0.39
Clearance Time (s)	9.0	9.0	9.0		9.0		8.3	8.3	8.3		8.3	8.3
Vehicle Extension (s)	5.0	5.0	5.0		3.0		4.0	6.0	6.0		2.0	6.0
Lane Grp Cap (vph)	263	268	262		44		701	1735	815		372	1377
v/s Ratio Prot	c0.16	0.16					c0.14	0.22			0.01	0.30
v/s Ratio Perm			0.04		c0.01		c0.34		0.01		0.09	
v/c Ratio	0.95	0.95	0.23		0.37		0.86	0.44	0.03		0.19	0.77
Uniform Delay, d1	59.4	59.4	51.7		68.3		34.4	22.8	18.0		22.7	38.3
Progression Factor	1.00	1.00	1.00		1.00		0.88	1.13	1.00		0.28	0.69
Incremental Delay, d2	43.6	42.5	0.9		5.1		9.8	0.7	0.1		0.1	3.7
Delay (s)	103.0	101.9	52.6		73.4		40.1	26.6	18.1		6.4	30.2
Level of Service	F	F	D		E		D	C	B		A	C
Approach Delay (s/veh)		82.3			73.4			32.1				31.5
Approach LOS		F			E			C				C

Intersection Summary			
HCM 2000 Control Delay (s/veh)	43.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	145.0	Sum of lost time (s)	34.6
Intersection Capacity Utilization	79.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	367
Future Volume (vph)	367
Ideal Flow (vphpl)	1900
Total Lost time (s)	8.3
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1538
Flt Permitted	1.00
Satd. Flow (perm)	1538
Peak-hour factor, PHF	0.88
Adj. Flow (vph)	417
RTOR Reduction (vph)	231
Lane Group Flow (vph)	186
Heavy Vehicles (%)	5%
Turn Type	Perm
Protected Phases	
Permitted Phases	2
Actuated Green, G (s)	57.0
Effective Green, g (s)	57.0
Actuated g/C Ratio	0.39
Clearance Time (s)	8.3
Vehicle Extension (s)	6.0
Lane Grp Cap (vph)	604
v/s Ratio Prot	
v/s Ratio Perm	0.12
v/c Ratio	0.31
Uniform Delay, d1	30.4
Progression Factor	1.25
Incremental Delay, d2	1.2
Delay (s)	39.2
Level of Service	D
Approach Delay (s/veh)	
Approach LOS	

Intersection Summary

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	12	20	13	1160	1483	19
Future Volume (vph)	12	20	13	1160	1483	19
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	0.915					0.850
Flt Protected	0.982		0.950			
Satd. Flow (prot)	1697	0	1787	3406	3471	1599
Flt Permitted	0.982		0.950			
Satd. Flow (perm)	1697	0	1787	3406	3471	1599
Adj. Flow (vph)	13	22	14	1275	1630	21
Lane Group Flow (vph)	35	0	14	1275	1630	21
Sign Control	Stop			Free	Free	

Intersection Summary		
Control Type: Unsignalized		
Intersection Capacity Utilization 51.0%		ICU Level of Service A
Analysis Period (min) 15		

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	12	20	13	1160	1483	19
Future Vol, veh/h	12	20	13	1160	1483	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	200	-	-	140
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	1	1	6	4	1
Mvmt Flow	13	22	14	1275	1630	21

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2296	815	1651	0	-	0
Stage 1	1630	-	-	-	-	-
Stage 2	666	-	-	-	-	-
Critical Hdwy	6.8	6.92	4.12	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.31	2.21	-	-	-
Pot Cap-1 Maneuver	34	323	392	-	-	-
Stage 1	148	-	-	-	-	-
Stage 2	478	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	33	323	392	-	-	-
Mov Cap-2 Maneuver	33	-	-	-	-	-
Stage 1	143	-	-	-	-	-
Stage 2	478	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	89.7	0.2	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	392	-	75	-	-
HCM Lane V/C Ratio	0.036	-	0.469	-	-
HCM Control Delay (s/veh)	14.5	-	89.7	-	-
HCM Lane LOS	B	-	F	-	-
HCM 95th %tile Q (veh)	0.1	-	1.9	-	-

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	101	0	1109	1253	60
Future Volume (vph)	0	101	0	1109	1253	60
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.865				0.850
Flt Protected						
Satd. Flow (prot)	0	1611	0	3374	3438	1583
Flt Permitted						
Satd. Flow (perm)	0	1611	0	3374	3438	1583
Adj. Flow (vph)	0	106	0	1167	1319	63
Lane Group Flow (vph)	0	106	0	1167	1319	63
Sign Control	Stop			Free	Free	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 47.6%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	101	0	1109	1253	60
Future Vol, veh/h	0	101	0	1109	1253	60
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	250
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	7	5	2
Mvmt Flow	0	106	0	1167	1319	63

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	660	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	406	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	406	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	17	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	406	-	-
HCM Lane V/C Ratio	-	0.262	-	-
HCM Control Delay (s/veh)	-	17	-	-
HCM Lane LOS	-	C	-	-
HCM 95th %tile Q (veh)	-	1	-	-

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	184	0	1232	1228	51
Future Volume (vph)	0	184	0	1232	1228	51
Lane Util. Factor	1.00	1.00	1.00	0.91	0.95	1.00
Frt		0.865				0.850
Flt Protected						
Satd. Flow (prot)	0	1611	0	4893	3471	1583
Flt Permitted						
Satd. Flow (perm)	0	1611	0	4893	3471	1583
Adj. Flow (vph)	0	194	0	1297	1293	54
Lane Group Flow (vph)	0	194	0	1297	1293	54
Sign Control	Stop			Free	Free	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 52.0%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	184	0	1232	1228	51
Future Vol, veh/h	0	184	0	1232	1228	51
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	250
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	6	4	2
Mvmt Flow	0	194	0	1297	1293	54

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	647	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	414	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	414	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

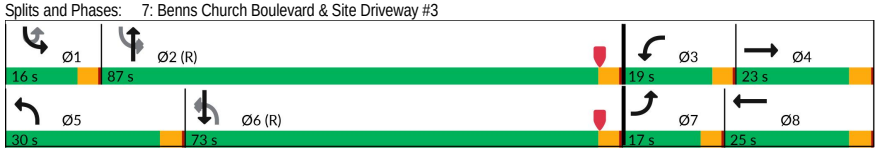
Approach	EB	NB	SB
HCM Control Delay, s/v	21.1	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	414	-	-
HCM Lane V/C Ratio	-	0.468	-	-
HCM Control Delay (s/veh)	-	21.1	-	-
HCM Lane LOS	-	C	-	-
HCM 95th %tile Q (veh)	-	2.4	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	0	0	0	267	0	132	0	1080	92	19	94	1235
Future Volume (vph)	0	0	0	267	0	132	0	1080	92	19	94	1235
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95
Frt					0.850				0.850			
Flt Protected				0.950							0.950	
Satd. Flow (prot)	1863	1863	0	3433	1583	0	1863	3406	1583	0	1770	3471
Flt Permitted				0.950							0.221	
Satd. Flow (perm)	1863	1863	0	3433	1583	0	1863	3406	1583	0	412	3471
Satd. Flow (RTOR)					305				97			
Adj. Flow (vph)	0	0	0	281	0	139	0	1137	97	21	99	1300
Lane Group Flow (vph)	0	0	0	281	139	0	0	1137	97	0	120	1300
Turn Type	Prot			Prot	NA		D.P+P	NA	Perm	custom	D.P+P	NA
Protected Phases	7	4		3	8		5	2			1	6
Permitted Phases							6		2	1	2	
Total Split (s)	17.0	23.0		19.0	25.0		30.0	87.0	87.0	16.0	16.0	73.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0		4.0	4.0
Act Effct Green (s)				14.6	14.6			111.3	111.3		118.4	122.4
Actuated g/C Ratio				0.10	0.10			0.77	0.77		0.82	0.84
v/c Ratio				0.81	0.32			0.44	0.08		0.30	0.44
Control Delay (s/veh)				82.4	1.9			6.6	0.9		4.8	10.7
Queue Delay				0.0	0.0			0.0	0.0		0.0	0.0
Total Delay (s/veh)				82.4	1.9			6.6	0.9		4.8	10.7
LOS				F	A			A	A		A	B
Approach Delay (s/veh)					55.8			6.1				10.2
Approach LOS					E			A				B

Intersection Summary			
Cycle Length: 145			
Actuated Cycle Length: 145			
Offset: 0 (0%), Referenced to phase 2:NBSB and 6:NBSB, Start of Yellow			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.81			
Intersection Signal Delay (s/veh): 14.8		Intersection LOS: B	
Intersection Capacity Utilization 55.6%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 7: Benns Church Boulevard & Site Driveway #3



Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	0
Future Volume (vph)	0
Lane Util. Factor	1.00
Frt	
Flt Protected	
Satd. Flow (prot)	1863
Flt Permitted	
Satd. Flow (perm)	1863
Satd. Flow (RTOR)	
Adj. Flow (vph)	0
Lane Group Flow (vph)	0
Turn Type	Perm
Protected Phases	
Permitted Phases	6
Total Split (s)	73.0
Total Lost Time (s)	4.0
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay (s/veh)	
Queue Delay	
Total Delay (s/veh)	
LOS	
Approach Delay (s/veh)	
Approach LOS	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	0	0	0	267	0	132	0	1080	92	19	94	1235
Future Volume (vph)	0	0	0	267	0	132	0	1080	92	19	94	1235
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor				0.97	1.00			0.95	1.00		1.00	0.95
Frt				1.00	0.85			1.00	0.85		1.00	1.00
Flt Protected				0.95	1.00			1.00	1.00		0.95	1.00
Satd. Flow (prot)				3433	1583			3406	1583		1770	3471
Flt Permitted				0.95	1.00			1.00	1.00		0.22	1.00
Satd. Flow (perm)				3433	1583			3406	1583		412	3471
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.92	0.95	0.95
Adj. Flow (vph)	0	0	0	281	0	139	0	1137	97	21	99	1300
RTOR Reduction (vph)	0	0	0	0	125	0	0	0	23	0	0	0
Lane Group Flow (vph)	0	0	0	281	14	0	0	1137	74	0	120	1300
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	6%	2%	2%	2%	4%
Turn Type	Prot			Prot	NA		D.P+P	NA	Perm	custom	D.P+P	NA
Protected Phases	7	4		3	8		5	2			1	6
Permitted Phases							6		2	1	2	
Actuated Green, G (s)				14.6	14.6			111.3	111.3		118.4	122.4
Effective Green, g (s)				14.6	14.6			111.3	111.3		118.4	122.4
Actuated g/C Ratio				0.10	0.10			0.77	0.77		0.82	0.84
Clearance Time (s)				4.0	4.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)				3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)				345	159			2614	1215		402	2930
v/s Ratio Prot				c0.08	0.01			0.33			0.01	c0.37
v/s Ratio Perm									0.05		0.23	
v/c Ratio				0.81	0.09			0.43	0.06		0.30	0.44
Uniform Delay, d1				63.9	59.2			5.9	4.1		3.4	2.8
Progression Factor				1.00	1.00			1.00	1.00		1.60	3.59
Incremental Delay, d2				13.7	0.2			0.5	0.1		0.3	0.4
Delay (s)				77.6	59.4			6.4	4.2		5.7	10.5
Level of Service				E	E			A	A		A	B
Approach Delay (s/veh)		0.0			71.6			6.2				10.1
Approach LOS		A			E			A				B

Intersection Summary			
HCM 2000 Control Delay (s/veh)	16.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	145.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	55.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	0
Future Volume (vph)	0
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.95
Adj. Flow (vph)	0
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Heavy Vehicles (%)	2%
Turn Type	Perm
Protected Phases	
Permitted Phases	6
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s/veh)	
Approach LOS	

Intersection Summary

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	9	9	73	7	0	57
Future Volume (vph)	9	9	73	7	0	57
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.932				0.865	
Flt Protected				0.957		
Satd. Flow (prot)	1736	0	0	1783	1611	0
Flt Permitted				0.957		
Satd. Flow (perm)	1736	0	0	1783	1611	0
Adj. Flow (vph)	10	10	79	8	0	62
Lane Group Flow (vph)	20	0	0	87	62	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 21.3%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	6.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	9	9	73	7	0	57
Future Vol, veh/h	9	9	73	7	0	57
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	10	10	79	8	0	62

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	20	0	181	15
Stage 1	-	-	-	-	15	-
Stage 2	-	-	-	-	166	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1596	-	808	1065
Stage 1	-	-	-	-	1008	-
Stage 2	-	-	-	-	863	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1596	-	768	1065
Mov Cap-2 Maneuver	-	-	-	-	768	-
Stage 1	-	-	-	-	1008	-
Stage 2	-	-	-	-	820	-

Approach	EB	WB	NB
HCM Control Delay, s/v	0	6.7	8.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1065	-	-	1596	-
HCM Lane V/C Ratio	0.058	-	-	0.05	-
HCM Control Delay (s/veh)	8.6	-	-	7.4	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q (veh)	0.2	-	-	0.2	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	494	81	246	375	53	0	0	227	0	0	21
Future Volume (vph)	0	494	81	246	375	53	0	0	227	0	0	21
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.981			0.989				0.865			0.865
Flt Protected					0.982							
Satd. Flow (prot)	0	1827	0	0	1809	0	0	0	1611	0	0	1611
Flt Permitted					0.982							
Satd. Flow (perm)	0	1827	0	0	1809	0	0	0	1611	0	0	1611
Adj. Flow (vph)	0	537	88	267	408	58	0	0	247	0	0	23
Lane Group Flow (vph)	0	625	0	0	733	0	0	0	247	0	0	23
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 74.1%		ICU Level of Service D	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	4.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	494	81	246	375	53	0	0	227	0	0	21
Future Vol, veh/h	0	494	81	246	375	53	0	0	227	0	0	21
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	537	88	267	408	58	0	0	247	0	0	23

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	625	0	0	-	-	581	-	-	437
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	-	4.12	-	-	-	-	6.22	-	-	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	2.218	-	-	-	-	3.318	-	-	3.318
Pot Cap-1 Maneuver	0	-	-	956	-	-	0	0	514	0	0	620
Stage 1	0	-	-	-	-	-	0	0	-	0	0	-
Stage 2	0	-	-	-	-	-	0	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	-	-	-	956	-	-	-	-	514	-	-	620
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	0	3.7	18.3	11
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	514	-	-	956	-	-	620
HCM Lane V/C Ratio	0.48	-	-	0.28	-	-	0.037
HCM Control Delay (s/veh)	18.3	-	-	10.2	0	-	11
HCM Lane LOS	C	-	-	B	A	-	B
HCM 95th %tile Q (veh)	2.6	-	-	1.2	-	-	0.1



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	7	18	0
Future Volume (vph)	0	0	0	7	18	0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.865			
Flt Protected					0.950	
Satd. Flow (prot)	0	1863	1611	0	1770	0
Flt Permitted					0.950	
Satd. Flow (perm)	0	1863	1611	0	1770	0
Adj. Flow (vph)	0	0	0	8	20	0
Lane Group Flow (vph)	0	0	8	0	20	0
Sign Control		Free	Free		Stop	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 13.3%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	6.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	7	18	0
Future Vol, veh/h	0	0	0	7	18	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	0	8	20	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	8	0	-	0	4	4
Stage 1	-	-	-	-	4	-
Stage 2	-	-	-	-	0	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1612	-	-	-	1018	1080
Stage 1	-	-	-	-	1019	-
Stage 2	-	-	-	-	-	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1612	-	-	-	1018	1080
Mov Cap-2 Maneuver	-	-	-	-	1018	-
Stage 1	-	-	-	-	1019	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s/v	0	0	8.6
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1612	-	-	-	1018
HCM Lane V/C Ratio	-	-	-	-	0.019
HCM Control Delay (s/veh)	0	-	-	-	8.6
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q (veh)	0	-	-	-	0.1



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	1863	0	0	1863	0	0
Flt Permitted						
Satd. Flow (perm)	1863	0	0	1863	0	0
Adj. Flow (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 0.0%		ICU Level of Service A	
Analysis Period (min) 15			



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	33	1036	37	0	1395
Future Volume (vph)	0	33	1036	37	0	1395
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt		0.865		0.850		
Flt Protected						
Satd. Flow (prot)	0	1611	3539	1583	0	3539
Flt Permitted						
Satd. Flow (perm)	0	1611	3539	1583	0	3539
Adj. Flow (vph)	0	36	1126	40	0	1516
Lane Group Flow (vph)	0	36	1126	40	0	1516
Sign Control	Stop		Free			Free

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 41.9%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	33	1036	37	0	1395
Future Vol, veh/h	0	33	1036	37	0	1395
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	200	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	36	1126	40	0	1516

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	563	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	470	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	470	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	13.3	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	470	-
HCM Lane V/C Ratio	-	-	0.076	-
HCM Control Delay (s/veh)	-	-	13.3	-
HCM Lane LOS	-	-	B	-
HCM 95th %tile Q (veh)	-	-	0.2	-

Intersection: 1: Benns Church Boulevard & Cypress Run Drive

Movement	EB	EB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LTR	UL	T	TR	L	T	T	R
Maximum Queue (ft)	183	144	219	196	272	270	149	432	446	244
Average Queue (ft)	59	41	85	70	108	120	41	190	202	23
95th Queue (ft)	136	101	181	143	223	232	108	364	380	114
Link Distance (ft)	656		676		798	798		1702	1702	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)		180		255			150			245
Storage Blk Time (%)	1	0		0	0		0	11	6	0
Queuing Penalty (veh)	0	0		0	0		0	6	2	0

Intersection: 2: Benns Church Boulevard & Tractor Supply Entrance

Movement	EB	SB
Directions Served	R	T
Maximum Queue (ft)	78	2
Average Queue (ft)	31	0
95th Queue (ft)	62	2
Link Distance (ft)	470	798
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Benns Church Boulevard & Turner Drive

Movement	EB	EB	EB	B30	WB	NB	NB	NB	NB	NB	SB	SB
Directions Served	L	LT	R	T	LTR	L	L	T	T	R	UL	T
Maximum Queue (ft)	373	297	282	90	51	325	397	352	331	119	140	491
Average Queue (ft)	256	217	134	13	13	322	374	155	145	16	47	278
95th Queue (ft)	383	327	258	60	38	336	404	312	276	70	126	442
Link Distance (ft)	297			41	456		364	364	364			766
Upstream Blk Time (%)	6	1	0	4			63	1	0			0
Queuing Penalty (veh)	45	0	0	28			258	5	0			1
Storage Bay Dist (ft)		310	310			325				200	140	
Storage Blk Time (%)	6	1	0			35	67		1	0	0	22
Queuing Penalty (veh)	34	3	0			93	178		1	0	1	14

Intersection: 3: Benns Church Boulevard & Turner Drive

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	555	280
Average Queue (ft)	282	153
95th Queue (ft)	463	331
Link Distance (ft)	766	
Upstream Blk Time (%)	0	
Queuing Penalty (veh)	1	
Storage Bay Dist (ft)		280
Storage Blk Time (%)	6	1
Queuing Penalty (veh)	21	3

Intersection: 4: Benns Church Boulevard & Red Oak Drive

Movement	EB	NB	NB	NB	SB
Directions Served	LR	L	T	T	R
Maximum Queue (ft)	135	140	654	653	2
Average Queue (ft)	39	15	109	109	0
95th Queue (ft)	113	80	603	599	2
Link Distance (ft)	950		1134	1134	
Upstream Blk Time (%)			4	4	
Queuing Penalty (veh)			0	0	
Storage Bay Dist (ft)		200			140
Storage Blk Time (%)		0	11		
Queuing Penalty (veh)		0	1		

Intersection: 5: Benns Church Boulevard & Site Driveway #1

Movement	EB	SB	SB
Directions Served	R	T	T
Maximum Queue (ft)	112	20	20
Average Queue (ft)	44	2	2
95th Queue (ft)	88	28	31
Link Distance (ft)	377	472	472
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 6: Benns Church Boulevard & Site Driveway #2

Movement	EB	NB	NB	NB
Directions Served	R	T	T	T
Maximum Queue (ft)	164	856	839	788
Average Queue (ft)	70	653	492	182
95th Queue (ft)	128	1056	1043	640
Link Distance (ft)	325	814	814	814
Upstream Blk Time (%)		30	12	0
Queuing Penalty (veh)		125	48	1
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 7: Benns Church Boulevard & Site Driveway #3

Movement	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	L	TR	T	T	R	UL	T	T
Maximum Queue (ft)	244	270	233	401	424	300	171	224	217
Average Queue (ft)	137	186	68	197	210	74	65	44	40
95th Queue (ft)	253	263	162	445	452	267	136	116	109
Link Distance (ft)			490	371	371			814	814
Upstream Blk Time (%)			0	18	17				
Queuing Penalty (veh)			0	94	93				
Storage Bay Dist (ft)	300	300				300	300		
Storage Blk Time (%)	0	0	0	30	25	0		0	0
Queuing Penalty (veh)	0	1	1	0	23	2		0	0

Intersection: 8: Site Driveway #4 & Tractor Supply Entrance

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	29	49
Average Queue (ft)	2	26
95th Queue (ft)	14	50
Link Distance (ft)	470	679
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 9: Wawa Dwy/Site Driveway #5 & Turner Drive

Movement	EB	WB	B30	B30	NB	SB
Directions Served	TR	LTR	T		R	R
Maximum Queue (ft)	234	147	346	330	208	38
Average Queue (ft)	39	107	145	43	78	14
95th Queue (ft)	159	152	326	218	173	35
Link Distance (ft)	656	41	297	297	277	703
Upstream Blk Time (%)		27	2	1	2	
Queuing Penalty (veh)		242	10	6	0	
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 10: Tractor Supply Entrance & Site Driveway #6

Movement	SB
Directions Served	LR
Maximum Queue (ft)	33
Average Queue (ft)	14
95th Queue (ft)	40
Link Distance (ft)	938
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 11: Site Driveway #3

Movement				
Directions Served				
Maximum Queue (ft)				
Average Queue (ft)				
95th Queue (ft)				
Link Distance (ft)				
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 12: Benns Church Boulevard & Site Driveway #7

Movement	WB	NB	NB	NB
Directions Served	R	T	T	R
Maximum Queue (ft)	151	503	514	160
Average Queue (ft)	39	131	134	24
95th Queue (ft)	133	496	500	130
Link Distance (ft)	245	554	554	
Upstream Blk Time (%)	4	8	9	
Queuing Penalty (veh)	0	49	50	
Storage Bay Dist (ft)				200
Storage Blk Time (%)			21	0
Queuing Penalty (veh)			8	1

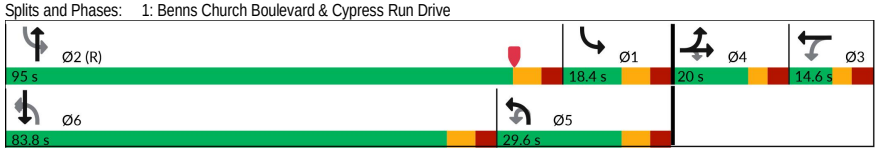
Network Summary

Network wide Queuing Penalty: 1450

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	130	0	126	50	4	76	32	278	1472	0	62	1514
Future Volume (vph)	130	0	126	50	4	76	32	278	1472	0	62	1514
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95	0.95	1.00	0.95
Frt			0.850		0.921							
Flt Protected		0.950			0.981			0.950			0.950	
Satd. Flow (prot)	0	1805	1615	0	1717	0	0	1801	3539	0	1805	3471
Flt Permitted		0.950			0.817			0.054			0.099	
Satd. Flow (perm)	0	1805	1615	0	1430	0	0	102	3539	0	188	3471
Satd. Flow (RTOR)			216		36							
Adj. Flow (vph)	133	0	129	51	4	78	35	284	1502	0	63	1545
Lane Group Flow (vph)	0	133	129	0	133	0	0	319	1502	0	63	1545
Turn Type	Split	NA	Perm	Perm	NA		custom	D.P+P	NA		D.P+P	NA
Protected Phases	4	4			3			5	2		1	6
Permitted Phases			4	3			5	6			2	
Total Split (s)	20.0	20.0	20.0	14.6	14.6		29.6	29.6	95.0		18.4	83.8
Total Lost Time (s)		6.8	6.8		7.1			8.4	8.4		8.4	8.4
Act Effct Green (s)		12.9	12.9		7.8			96.6	90.3		98.3	75.4
Actuated g/C Ratio		0.09	0.09		0.05			0.65	0.61		0.66	0.51
v/c Ratio		0.85	0.38		1.22			1.03	0.70		0.28	0.87
Control Delay (s/veh)		107.0	3.3		196.4			96.0	31.8		15.3	38.9
Queue Delay		0.0	0.0		0.0			0.0	0.0		0.0	0.0
Total Delay (s/veh)		107.0	3.3		196.4			96.0	31.8		15.3	38.9
LOS		F	A		F			F	C		B	D
Approach Delay (s/veh)		55.9			196.4				43.1			35.0
Approach LOS		E			F				D			C

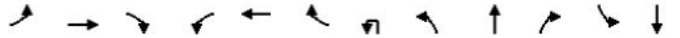
Intersection Summary		
Cycle Length: 148		
Actuated Cycle Length: 148		
Offset: 0 (0%), Referenced to phase 2:NBSB, Start of Yellow		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 1.22		
Intersection Signal Delay (s/veh): 45.5	Intersection LOS: D	
Intersection Capacity Utilization 100.1%	ICU Level of Service G	
Analysis Period (min) 15		

Splits and Phases: 1: Benns Church Boulevard & Cypress Run Drive



Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	141
Future Volume (vph)	141
Lane Util. Factor	1.00
Frt	0.850
Flt Protected	
Satd. Flow (prot)	1553
Flt Permitted	
Satd. Flow (perm)	1553
Satd. Flow (RTOR)	204
Adj. Flow (vph)	144
Lane Group Flow (vph)	144
Turn Type	Perm
Protected Phases	
Permitted Phases	6
Total Split (s)	83.8
Total Lost Time (s)	8.4
Act Effct Green (s)	75.4
Actuated g/C Ratio	0.51
v/c Ratio	0.16
Control Delay (s/veh)	0.8
Queue Delay	0.0
Total Delay (s/veh)	0.8
LOS	A
Approach Delay (s/veh)	
Approach LOS	

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	130	0	126	50	4	76	32	278	1472	0	62	1514
Future Volume (vph)	130	0	126	50	4	76	32	278	1472	0	62	1514
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.8	6.8		7.1			8.4	8.4		8.4	8.4
Lane Util. Factor		1.00	1.00		1.00			1.00	0.95		1.00	0.95
Frt		1.00	0.85		0.92			1.00	1.00		1.00	1.00
Flt Protected		0.95	1.00		0.98			0.95	1.00		0.95	1.00
Satd. Flow (prot)		1805	1615		1717			1801	3539		1805	3471
Flt Permitted		0.95	1.00		0.82			0.05	1.00		0.10	1.00
Satd. Flow (perm)		1805	1615		1430			103	3539		187	3471
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.92	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	133	0	129	51	4	78	35	284	1502	0	63	1545
RTOR Reduction (vph)	0	0	118	0	34	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	133	11	0	99	0	0	319	1502	0	63	1545
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	0%	2%	0%	0%	4%
Turn Type	Split	NA	Perm	Perm	NA		custom	D.P+P	NA		D.P+P	NA
Protected Phases	4	4			3			5	2		1	6
Permitted Phases			4	3			5	6			2	
Actuated Green, G (s)		12.9	12.9		7.8			96.6	88.6		96.6	73.7
Effective Green, g (s)		12.9	12.9		7.8			96.6	88.6		96.6	73.7
Actuated g/C Ratio		0.09	0.09		0.05			0.65	0.60		0.65	0.50
Clearance Time (s)		6.8	6.8		7.1			8.4	8.4		8.4	8.4
Vehicle Extension (s)		3.0	3.0		3.0			2.0	5.0		2.0	5.0
Lane Grp Cap (vph)		157	140		75			329	2118		209	1728
v/s Ratio Prot		c0.07						c0.15	0.42		0.02	0.45
v/s Ratio Perm			0.01		c0.07			c0.48			0.18	
v/c Ratio		0.85	0.08		1.32			0.97	0.71		0.30	0.89
Uniform Delay, d1		66.6	62.1		70.1			51.6	20.7		33.5	33.6
Progression Factor		1.00	1.00		1.00			0.88	1.47		1.00	1.00
Incremental Delay, d2		32.2	0.2		210.9			31.7	1.3		0.3	7.6
Delay (s)		98.8	62.3		281.0			77.1	31.8		33.8	41.2
Level of Service		F	E		F			E	C		C	D
Approach Delay (s/veh)		80.8			281.0				39.7			39.2
Approach LOS		F			F				D			D

Intersection Summary				
HCM 2000 Control Delay (s/veh)	50.3	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.98			
Actuated Cycle Length (s)	148.0	Sum of lost time (s)	30.7	
Intersection Capacity Utilization	100.1%	ICU Level of Service	G	
Analysis Period (min)	15			
c Critical Lane Group				



Movement	SBR
Lane Configurations	
Traffic Volume (vph)	141
Future Volume (vph)	141
Ideal Flow (vphpl)	1900
Total Lost time (s)	8.4
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1553
Flt Permitted	1.00
Satd. Flow (perm)	1553
Peak-hour factor, PHF	0.98
Adj. Flow (vph)	144
RTOR Reduction (vph)	72
Lane Group Flow (vph)	72
Heavy Vehicles (%)	4%
Turn Type	Perm
Protected Phases	
Permitted Phases	6
Actuated Green, G (s)	73.7
Effective Green, g (s)	73.7
Actuated g/C Ratio	0.50
Clearance Time (s)	8.4
Vehicle Extension (s)	5.0
Lane Grp Cap (vph)	773
v/s Ratio Prot	
v/s Ratio Perm	0.05
v/c Ratio	0.09
Uniform Delay, d1	19.6
Progression Factor	1.00
Incremental Delay, d2	0.2
Delay (s)	19.8
Level of Service	B
Approach Delay (s/veh)	
Approach LOS	

Intersection Summary



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	69	0	1775	1615	100
Future Volume (vph)	0	69	0	1775	1615	100
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.865				0.850
Flt Protected						
Satd. Flow (prot)	0	1611	0	3539	3471	1583
Flt Permitted						
Satd. Flow (perm)	0	1611	0	3539	3471	1583
Adj. Flow (vph)	0	75	0	1929	1755	109
Lane Group Flow (vph)	0	75	0	1929	1755	109
Sign Control	Stop			Free	Free	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization	55.6%	ICU Level of Service	B
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	69	0	1775	1615	100
Future Vol, veh/h	0	69	0	1775	1615	100
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	250
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	4	2
Mvmt Flow	0	75	0	1929	1755	109

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	878	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	291	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	291	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

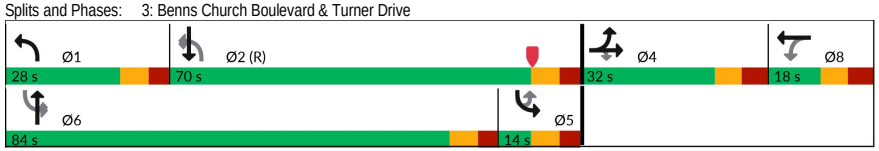
Approach	EB	NB	SB
HCM Control Delay, s/v	21.6	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	291	-	-
HCM Lane V/C Ratio	-	0.258	-	-
HCM Control Delay (s/veh)	-	21.6	-	-
HCM Lane LOS	-	C	-	-
HCM 95th %tile Q (veh)	-	1	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	337	9	174	46	22	9	453	1376	18	75	30	1383
Future Volume (vph)	337	9	174	46	22	9	453	1376	18	75	30	1383
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	0.97	0.95	1.00	0.95	1.00	0.95
Frt			0.850		0.985				0.850			
Flt Protected	0.950	0.955			0.971		0.950				0.950	
Satd. Flow (prot)	1698	1708	1599	0	1817	0	3335	3539	1615	0	1779	3539
Flt Permitted	0.950	0.955			0.709		0.064				0.077	
Satd. Flow (perm)	1698	1708	1599	0	1327	0	225	3539	1615	0	144	3539
Satd. Flow (RTOR)			228		3				172			
Adj. Flow (vph)	355	9	183	48	23	9	477	1448	19	82	32	1456
Lane Group Flow (vph)	181	183	183	0	80	0	477	1448	19	0	114	1456
Turn Type	Split	NA	Perm	Perm	NA		D.P+P	NA	Perm	custom	D.P+P	NA
Protected Phases	4	4			8		1	6			5	2
Permitted Phases			4	8			2		6	5	6	
Total Split (s)	32.0	32.0	32.0	18.0	18.0		28.0	84.0	84.0	14.0	14.0	70.0
Total Lost Time (s)	9.0	9.0	9.0		9.0		8.3	8.3	8.3		8.3	8.3
Act Effct Green (s)	21.1	21.1	21.1		10.2		82.1	76.4	76.4		82.1	62.8
Actuated g/C Ratio	0.14	0.14	0.14		0.07		0.55	0.52	0.52		0.55	0.42
v/c Ratio	0.75	0.75	0.43		0.86		0.90	0.79	0.02		0.80	0.97
Control Delay (s/veh)	79.9	80.0	5.6		124.0		54.5	14.7	0.0		55.6	43.6
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.0	0.0		0.0	0.0
Total Delay (s/veh)	79.9	80.0	5.6		124.0		54.5	14.7	0.0		55.6	43.6
LOS	E	F	A		F		D	B	A		E	D
Approach Delay (s/veh)		55.1			124.0			24.3				38.4
Approach LOS		E			F			C				D

Intersection Summary		
Cycle Length: 148		
Actuated Cycle Length: 148		
Offset: 38 (26%), Referenced to phase 2:NBSB, Start of Yellow		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.97		
Intersection Signal Delay (s/veh): 35.9	Intersection LOS: D	
Intersection Capacity Utilization 86.7%	ICU Level of Service E	
Analysis Period (min) 15		

Splits and Phases: 3: Benns Church Boulevard & Turner Drive



Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	274
Future Volume (vph)	274
Lane Util. Factor	1.00
Frt	0.850
Flt Protected	
Satd. Flow (prot)	1615
Flt Permitted	
Satd. Flow (perm)	1615
Satd. Flow (RTOR)	191
Adj. Flow (vph)	288
Lane Group Flow (vph)	288
Turn Type	Perm
Protected Phases	
Permitted Phases	2
Total Split (s)	70.0
Total Lost Time (s)	8.3
Act Effct Green (s)	62.8
Actuated g/C Ratio	0.42
v/c Ratio	0.36
Control Delay (s/veh)	5.3
Queue Delay	0.0
Total Delay (s/veh)	5.3
LOS	A
Approach Delay (s/veh)	
Approach LOS	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	337	9	174	46	22	9	453	1376	18	75	30	1383
Future Volume (vph)	337	9	174	46	22	9	453	1376	18	75	30	1383
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	9.0	9.0	9.0		9.0		8.3	8.3	8.3		8.3	8.3
Lane Util. Factor	0.95	0.95	1.00		1.00		0.97	0.95	1.00		1.00	0.95
Frt	1.00	1.00	0.85		0.98		1.00	1.00	0.85		1.00	1.00
Flt Protected	0.95	0.95	1.00		0.97		0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1698	1707	1599		1817		3335	3539	1615		1779	3539
Flt Permitted	0.95	0.95	1.00		0.71		0.06	1.00	1.00		0.08	1.00
Satd. Flow (perm)	1698	1707	1599		1326		224	3539	1615		143	3539
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.92	0.95	0.95
Adj. Flow (vph)	355	9	183	48	23	9	477	1448	19	82	32	1456
RTOR Reduction (vph)	0	0	157	0	3	0	0	0	9	0	0	0
Lane Group Flow (vph)	181	183	26	0	77	0	477	1448	10	0	114	1456
Heavy Vehicles (%)	1%	0%	1%	0%	0%	0%	5%	2%	0%	2%	0%	2%
Turn Type	Split	NA	Perm	Perm	NA		D.P+P	NA	Perm	custom	D.P+P	NA
Protected Phases	4	4			8		1	6			5	2
Permitted Phases			4	8			2		6	5	6	
Actuated Green, G (s)	21.1	21.1	21.1		10.2		82.1	76.3	76.3		82.1	62.7
Effective Green, g (s)	21.1	21.1	21.1		10.2		82.1	76.3	76.3		82.1	62.7
Actuated g/C Ratio	0.14	0.14	0.14		0.07		0.55	0.52	0.52		0.55	0.42
Clearance Time (s)	9.0	9.0	9.0		9.0		8.3	8.3	8.3		8.3	8.3
Vehicle Extension (s)	5.0	5.0	5.0		3.0		4.0	6.0	6.0		2.0	6.0
Lane Grp Cap (vph)	242	243	227		91		532	1824	832		143	1499
v/s Ratio Prot	0.11	c0.11					0.12	0.41			0.03	c0.41
v/s Ratio Perm			0.02		c0.06		0.38		0.01		c0.41	
v/c Ratio	0.75	0.75	0.11		0.85		0.90	0.79	0.01		0.80	0.97
Uniform Delay, d1	60.9	60.9	55.3		68.1		47.5	29.4	17.5		53.6	41.8
Progression Factor	1.00	1.00	1.00		1.00		0.92	0.41	1.00		0.68	0.70
Incremental Delay, d2	14.1	14.6	0.5		48.2		12.4	2.3	0.0		17.8	13.7
Delay (s)	75.0	75.5	55.8		116.4		56.0	14.5	17.5		54.2	43.1
Level of Service	E	E	E		F		E	B	B		D	D
Approach Delay (s/veh)		68.8			116.4			24.7				39.2
Approach LOS		E			F			C				D

Intersection Summary			
HCM 2000 Control Delay (s/veh)	37.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	148.0	Sum of lost time (s)	34.6
Intersection Capacity Utilization	86.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	274
Future Volume (vph)	274
Ideal Flow (vphpl)	1900
Total Lost time (s)	8.3
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1615
Flt Permitted	1.00
Satd. Flow (perm)	1615
Peak-hour factor, PHF	0.95
Adj. Flow (vph)	288
RTOR Reduction (vph)	110
Lane Group Flow (vph)	178
Heavy Vehicles (%)	0%
Turn Type	Perm
Protected Phases	
Permitted Phases	2
Actuated Green, G (s)	62.7
Effective Green, g (s)	62.7
Actuated g/C Ratio	0.42
Clearance Time (s)	8.3
Vehicle Extension (s)	6.0
Lane Grp Cap (vph)	684
v/s Ratio Prot	
v/s Ratio Perm	0.11
v/c Ratio	0.26
Uniform Delay, d1	27.6
Progression Factor	0.46
Incremental Delay, d2	0.6
Delay (s)	13.4
Level of Service	B
Approach Delay (s/veh)	
Approach LOS	

Intersection Summary

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	10	16	30	1887	1639	23
Future Volume (vph)	10	16	30	1887	1639	23
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	0.915					0.850
Flt Protected	0.982		0.950			
Satd. Flow (prot)	1707	0	1736	3539	3505	1615
Flt Permitted	0.982		0.950			
Satd. Flow (perm)	1707	0	1736	3539	3505	1615
Adj. Flow (vph)	10	17	31	1966	1707	24
Lane Group Flow (vph)	27	0	31	1966	1707	24
Sign Control	Stop			Free	Free	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 62.2%		ICU Level of Service B	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	10	16	30	1887	1639	23
Future Vol, veh/h	10	16	30	1887	1639	23
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	200	-	-	140
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	0	0	4	2	3	0
Mvmt Flow	10	17	31	1966	1707	24

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2752	854	1731	0	-	0
Stage 1	1707	-	-	-	-	-
Stage 2	1045	-	-	-	-	-
Critical Hdwy	6.8	6.9	4.18	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.24	-	-	-
Pot Cap-1 Maneuver	16	306	352	-	-	-
Stage 1	135	-	-	-	-	-
Stage 2	304	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	15	306	352	-	-	-
Mov Cap-2 Maneuver	15	-	-	-	-	-
Stage 1	123	-	-	-	-	-
Stage 2	304	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	241.5	0.3	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	352	-	36	-	-
HCM Lane V/C Ratio	0.089	-	0.752	-	-
HCM Control Delay (s/veh)	16.2	-	241.5	-	-
HCM Lane LOS	C	-	F	-	-
HCM 95th %tile Q (veh)	0.3	-	2.7	-	-

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	111	0	1769	1623	65
Future Volume (vph)	0	111	0	1769	1623	65
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.865				0.850
Flt Protected						
Satd. Flow (prot)	0	1611	0	3539	3539	1583
Flt Permitted						
Satd. Flow (perm)	0	1611	0	3539	3539	1583
Adj. Flow (vph)	0	117	0	1862	1708	68
Lane Group Flow (vph)	0	117	0	1862	1708	68
Sign Control	Stop			Free	Free	

Intersection Summary		
Control Type: Unsignalized		
Intersection Capacity Utilization 58.4%		ICU Level of Service B
Analysis Period (min) 15		

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	111	0	1769	1623	65
Future Vol, veh/h	0	111	0	1769	1623	65
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	250
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	117	0	1862	1708	68

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	854	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	302	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	302	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	24.2	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	302	-	-
HCM Lane V/C Ratio	-	0.387	-	-
HCM Control Delay (s/veh)	-	24.2	-	-
HCM Lane LOS	-	C	-	-
HCM 95th %tile Q (veh)	-	1.8	-	-

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	140	0	1848	1586	61
Future Volume (vph)	0	140	0	1848	1586	61
Lane Util. Factor	1.00	1.00	1.00	0.91	0.95	1.00
Frt		0.865				0.850
Flt Protected						
Satd. Flow (prot)	0	1611	0	5085	3539	1583
Flt Permitted						
Satd. Flow (perm)	0	1611	0	5085	3539	1583
Adj. Flow (vph)	0	147	0	1945	1669	64
Lane Group Flow (vph)	0	147	0	1945	1669	64
Sign Control	Stop			Free	Free	

Intersection Summary		
Control Type: Unsignalized		
Intersection Capacity Utilization 59.2%		ICU Level of Service B
Analysis Period (min) 15		

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	140	0	1848	1586	61
Future Vol, veh/h	0	140	0	1848	1586	61
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	250
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	147	0	1945	1669	64

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	835	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	311	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	311	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

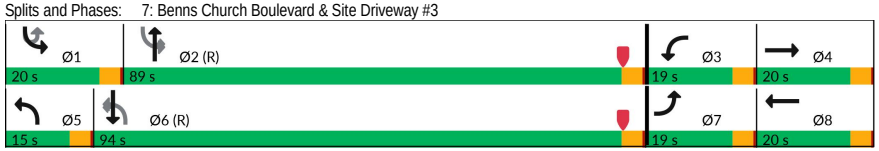
Approach	EB	NB	SB
HCM Control Delay, s/v	26.6	0	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	311	-	-
HCM Lane V/C Ratio	-	0.474	-	-
HCM Control Delay (s/veh)	-	26.6	-	-
HCM Lane LOS	-	D	-	-
HCM 95th %tile Q (veh)	-	2.4	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	0	0	0	227	0	145	0	1689	208	17	231	1434
Future Volume (vph)	0	0	0	227	0	145	0	1689	208	17	231	1434
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95
Frt					0.850				0.850			
Flt Protected				0.950							0.950	
Satd. Flow (prot)	1863	1863	0	3433	1583	0	1863	3539	1583	0	1770	3539
Flt Permitted				0.950							0.053	
Satd. Flow (perm)	1863	1863	0	3433	1583	0	1863	3539	1583	0	99	3539
Satd. Flow (RTOR)					257				174			
Adj. Flow (vph)	0	0	0	239	0	153	0	1778	219	18	243	1509
Lane Group Flow (vph)	0	0	0	239	153	0	0	1778	219	0	261	1509
Turn Type	Prot			Prot	NA		D.P+P	NA	Perm	custom	D.P+P	NA
Protected Phases	7	4		3	8		5	2			1	6
Permitted Phases							6		2	1	2	
Total Split (s)	19.0	20.0		19.0	20.0		15.0	89.0	89.0	20.0	20.0	94.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0		4.0	4.0
Act Effct Green (s)				14.1	14.1			93.5	93.5		121.9	125.9
Actuated g/C Ratio				0.10	0.10			0.63	0.63		0.82	0.85
v/c Ratio				0.74	0.40			0.80	0.21		0.65	0.50
Control Delay (s/veh)				78.9	3.1			23.9	3.3		18.5	17.0
Queue Delay				0.0	0.0			0.0	0.0		0.0	0.0
Total Delay (s/veh)				78.9	3.1			23.9	3.3		18.5	17.0
LOS				E	A			C	A		B	B
Approach Delay (s/veh)					49.3			21.6				17.2
Approach LOS					D			C				B

Intersection Summary		
Cycle Length: 148		
Actuated Cycle Length: 148		
Offset: 0 (0%), Referenced to phase 2:NBSB and 6:NBSB, Start of Yellow		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.80		
Intersection Signal Delay (s/veh): 22.4	Intersection LOS: C	
Intersection Capacity Utilization 79.4%	ICU Level of Service D	
Analysis Period (min) 15		

Splits and Phases: 7: Benns Church Boulevard & Site Driveway #3



Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	0
Future Volume (vph)	0
Lane Util. Factor	1.00
Frt	
Flt Protected	
Satd. Flow (prot)	1863
Flt Permitted	
Satd. Flow (perm)	1863
Satd. Flow (RTOR)	
Adj. Flow (vph)	0
Lane Group Flow (vph)	0
Turn Type	Perm
Protected Phases	
Permitted Phases	6
Total Split (s)	94.0
Total Lost Time (s)	4.0
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay (s/veh)	
Queue Delay	
Total Delay (s/veh)	
LOS	
Approach Delay (s/veh)	
Approach LOS	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	0	0	0	227	0	145	0	1689	208	17	231	1434
Future Volume (vph)	0	0	0	227	0	145	0	1689	208	17	231	1434
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor				0.97	1.00			0.95	1.00		1.00	0.95
Frt				1.00	0.85			1.00	0.85		1.00	1.00
Flt Protected				0.95	1.00			1.00	1.00		0.95	1.00
Satd. Flow (prot)				3433	1583			3539	1583		1770	3539
Flt Permitted				0.95	1.00			1.00	1.00		0.05	1.00
Satd. Flow (perm)				3433	1583			3539	1583		100	3539
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.92	0.95	0.95
Adj. Flow (vph)	0	0	0	239	0	153	0	1778	219	18	243	1509
RTOR Reduction (vph)	0	0	0	0	138	0	0	0	64	0	0	0
Lane Group Flow (vph)	0	0	0	239	15	0	0	1778	155	0	261	1509
Turn Type	Prot			Prot	NA		D.P+P	NA	Perm	custom	D.P+P	NA
Protected Phases	7	4		3	8		5	2			1	6
Permitted Phases							6		2	1	2	
Actuated Green, G (s)				14.1	14.1			93.4	93.4		121.9	125.9
Effective Green, g (s)				14.1	14.1			93.4	93.4		121.9	125.9
Actuated g/C Ratio				0.10	0.10			0.63	0.63		0.82	0.85
Clearance Time (s)				4.0	4.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)				3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)				327	150			2233	999		403	3010
v/s Ratio Prot				c0.07	0.01			c0.50			c0.12	0.43
v/s Ratio Perm									0.10		0.41	
v/c Ratio				0.73	0.10			0.80	0.15		0.65	0.50
Uniform Delay, d1				65.1	61.1			20.2	11.2		41.5	2.9
Progression Factor				1.00	1.00			1.00	1.00		0.38	5.61
Incremental Delay, d2				8.2	0.3			3.0	0.3		2.0	0.3
Delay (s)				73.3	61.4			23.3	11.5		17.9	16.5
Level of Service				E	E			C	B		B	B
Approach Delay (s/veh)		0.0			68.6			22.0				16.7
Approach LOS		A			E			C				B

Intersection Summary			
HCM 2000 Control Delay (s/veh)	24.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	148.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	79.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	0
Future Volume (vph)	0
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.95
Adj. Flow (vph)	0
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	Perm
Protected Phases	
Permitted Phases	6
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s/veh)	
Approach LOS	

Intersection Summary

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	6	6	67	20	0	49
Future Volume (vph)	6	6	67	20	0	49
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.932				0.865	
Flt Protected				0.963		
Satd. Flow (prot)	1736	0	0	1794	1611	0
Flt Permitted				0.963		
Satd. Flow (perm)	1736	0	0	1794	1611	0
Adj. Flow (vph)	7	7	73	22	0	53
Lane Group Flow (vph)	14	0	0	95	53	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 21.4%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	6.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	6	6	67	20	0	49
Future Vol, veh/h	6	6	67	20	0	49
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	7	73	22	0	53

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	14	0	179	11
Stage 1	-	-	-	-	11	-
Stage 2	-	-	-	-	168	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1604	-	811	1070
Stage 1	-	-	-	-	1012	-
Stage 2	-	-	-	-	862	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1604	-	774	1070
Mov Cap-2 Maneuver	-	-	-	-	774	-
Stage 1	-	-	-	-	1012	-
Stage 2	-	-	-	-	822	-

Approach	EB	WB	NB
HCM Control Delay, s/v	0	5.7	8.5
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1070	-	-	1604	-
HCM Lane V/C Ratio	0.05	-	-	0.045	-
HCM Control Delay (s/veh)	8.5	-	-	7.4	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q (veh)	0.2	-	-	0.1	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	353	61	184	468	64	0	0	166	0	0	23
Future Volume (vph)	0	353	61	184	468	64	0	0	166	0	0	23
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.980			0.988				0.865			0.865
Flt Protected					0.987							
Satd. Flow (prot)	0	1825	0	0	1816	0	0	0	1611	0	0	1611
Flt Permitted					0.987							
Satd. Flow (perm)	0	1825	0	0	1816	0	0	0	1611	0	0	1611
Adj. Flow (vph)	0	384	66	200	509	70	0	0	180	0	0	25
Lane Group Flow (vph)	0	450	0	0	779	0	0	0	180	0	0	25
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 67.6%		ICU Level of Service C	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	353	61	184	468	64	0	0	166	0	0	23
Future Vol, veh/h	0	353	61	184	468	64	0	0	166	0	0	23
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	384	66	200	509	70	0	0	180	0	0	25

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	450	0	0	-	-	417	-	-	544
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	-	4.12	-	-	-	-	6.22	-	-	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	2.218	-	-	-	-	3.318	-	-	3.318
Pot Cap-1 Maneuver	0	-	-	1110	-	-	0	0	636	0	0	539
Stage 1	0	-	-	-	-	-	0	0	-	0	0	-
Stage 2	0	-	-	-	-	-	0	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	-	-	-	1110	-	-	-	-	636	-	-	539
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	0	2.3	12.9	12
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	636	-	-	1110	-	-	539
HCM Lane V/C Ratio	0.284	-	-	0.18	-	-	0.046
HCM Control Delay (s/veh)	12.9	-	-	9	0	-	12
HCM Lane LOS	B	-	-	A	A	-	B
HCM 95th %tile Q (veh)	1.2	-	-	0.7	-	-	0.1



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	20	13	0
Future Volume (vph)	0	0	0	20	13	0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.865			
Flt Protected					0.950	
Satd. Flow (prot)	0	1863	1611	0	1770	0
Flt Permitted					0.950	
Satd. Flow (perm)	0	1863	1611	0	1770	0
Adj. Flow (vph)	0	0	0	22	14	0
Lane Group Flow (vph)	0	0	22	0	14	0
Sign Control		Free	Free		Stop	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 13.3%		ICU Level of Service A	
Analysis Period (min) 15			

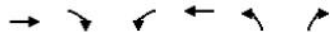
Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	20	13	0
Future Vol, veh/h	0	0	0	20	13	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	0	22	14	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	22	0	-	0	11	11
Stage 1	-	-	-	-	11	-
Stage 2	-	-	-	-	0	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1593	-	-	-	1009	1070
Stage 1	-	-	-	-	1012	-
Stage 2	-	-	-	-	-	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1593	-	-	-	1009	1070
Mov Cap-2 Maneuver	-	-	-	-	1009	-
Stage 1	-	-	-	-	1012	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s/v	0	0	8.6
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1593	-	-	-	1009
HCM Lane V/C Ratio	-	-	-	-	0.014
HCM Control Delay (s/veh)	0	-	-	-	8.6
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q (veh)	0	-	-	-	0



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	1863	0	0	1863	0	0
Flt Permitted						
Satd. Flow (perm)	1863	0	0	1863	0	0
Adj. Flow (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 0.0%		ICU Level of Service A	
Analysis Period (min) 15			



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	39	1700	116	0	1511
Future Volume (vph)	0	39	1700	116	0	1511
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt		0.865		0.850		
Flt Protected						
Satd. Flow (prot)	0	1611	3539	1583	0	3539
Flt Permitted						
Satd. Flow (perm)	0	1611	3539	1583	0	3539
Adj. Flow (vph)	0	42	1848	126	0	1642
Lane Group Flow (vph)	0	42	1848	126	0	1642
Sign Control	Stop		Free			Free

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 57.0%		ICU Level of Service B	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	39	1700	116	0	1511
Future Vol, veh/h	0	39	1700	116	0	1511
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	200	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	42	1848	126	0	1642

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	924	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	271	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	271	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	20.7	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	271	-
HCM Lane V/C Ratio	-	-	0.156	-
HCM Control Delay (s/veh)	-	-	20.7	-
HCM Lane LOS	-	-	C	-
HCM 95th %tile Q (veh)	-	-	0.5	-

Intersection: 1: Benns Church Boulevard & Cypress Run Drive

Movement	EB	EB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LTR	UL	T	TR	L	T	T	R
Maximum Queue (ft)	297	180	233	255	696	707	149	699	721	245
Average Queue (ft)	131	86	112	230	418	402	54	434	444	124
95th Queue (ft)	242	180	212	304	801	790	126	629	652	299
Link Distance (ft)	656		676		798	798		1702	1702	
Upstream Blk Time (%)					3	1				
Queuing Penalty (veh)					27	11				
Storage Bay Dist (ft)		180		255			150			245
Storage Blk Time (%)	5	0		37	29		0	34	25	1
Queuing Penalty (veh)	6	0		274	91		0	21	35	4

Intersection: 2: Benns Church Boulevard & Tractor Supply Entrance

Movement	EB	NB	NB	SB	SB	SB
Directions Served	R	T	T	T	T	R
Maximum Queue (ft)	97	118	113	132	170	50
Average Queue (ft)	35	22	20	19	24	3
95th Queue (ft)	75	149	144	117	140	51
Link Distance (ft)	470	472	472	798	798	
Upstream Blk Time (%)		0	0			
Queuing Penalty (veh)		1	0			
Storage Bay Dist (ft)						250
Storage Blk Time (%)					0	0
Queuing Penalty (veh)					0	0

Intersection: 3: Benns Church Boulevard & Turner Drive

Movement	EB	EB	EB	B30	WB	NB	NB	NB	NB	NB	SB	SB
Directions Served	L	LT	R	T	LTR	L	L	T	T	R	UL	T
Maximum Queue (ft)	350	290	235	38	150	325	384	360	367	113	140	791
Average Queue (ft)	192	155	74	3	59	323	371	180	192	9	84	627
95th Queue (ft)	308	258	158	23	121	332	387	339	347	64	155	948
Link Distance (ft)	301			48	456		361	361	361			771
Upstream Blk Time (%)	2	0	0	1			72	0	1			8
Queuing Penalty (veh)	10	0	0	4			446	3	3			71
Storage Bay Dist (ft)		310	310			325				200	140	
Storage Blk Time (%)	2	0	0			37	77		7	0	2	49
Queuing Penalty (veh)	7	0	0			83	175		1	0	15	51

Intersection: 3: Benns Church Boulevard & Turner Drive

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	797	280
Average Queue (ft)	637	216
95th Queue (ft)	955	386
Link Distance (ft)	771	
Upstream Blk Time (%)	9	
Queuing Penalty (veh)	79	
Storage Bay Dist (ft)		280
Storage Blk Time (%)	37	1
Queuing Penalty (veh)	101	8

Intersection: 4: Benns Church Boulevard & Red Oak Drive

Movement	EB	NB	NB	NB	SB
Directions Served	LR	L	T	T	R
Maximum Queue (ft)	348	186	1175	1177	9
Average Queue (ft)	154	42	514	526	0
95th Queue (ft)	390	157	1415	1424	6
Link Distance (ft)	950		1134	1134	
Upstream Blk Time (%)			30	36	
Queuing Penalty (veh)			0	0	
Storage Bay Dist (ft)		200			140
Storage Blk Time (%)		0	34		
Queuing Penalty (veh)		1	10		

Intersection: 5: Benns Church Boulevard & Site Driveway #1

Movement	EB	NB	NB	SB	SB	SB
Directions Served	R	T	T	T	T	R
Maximum Queue (ft)	278	14	12	392	404	175
Average Queue (ft)	134	1	1	156	168	32
95th Queue (ft)	335	18	15	458	476	169
Link Distance (ft)	377	771	771	472	472	
Upstream Blk Time (%)	11			1	1	
Queuing Penalty (veh)	0			8	11	
Storage Bay Dist (ft)						250
Storage Blk Time (%)					9	0
Queuing Penalty (veh)					6	1

Intersection: 6: Benns Church Boulevard & Site Driveway #2

Movement	EB	NB	NB	NB	SB
Directions Served	R	T	T	T	T
Maximum Queue (ft)	149	974	974	975	5
Average Queue (ft)	64	851	784	638	0
95th Queue (ft)	123	1183	1280	1259	3
Link Distance (ft)	325	937	937	937	361
Upstream Blk Time (%)		25	13	3	
Queuing Penalty (veh)		158	80	17	
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 7: Benns Church Boulevard & Site Driveway #3

Movement	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	L	TR	T	T	R	UL	T	T
Maximum Queue (ft)	228	265	244	285	307	249	278	302	297
Average Queue (ft)	120	173	90	238	259	145	143	108	104
95th Queue (ft)	236	250	206	327	327	331	251	229	216
Link Distance (ft)			490	249	249			937	937
Upstream Blk Time (%)			0	24	31	1			
Queuing Penalty (veh)			0	213	277	0			
Storage Bay Dist (ft)	300	300				300	300		
Storage Blk Time (%)	0	1	0	24	31	1	1	0	0
Queuing Penalty (veh)	0	1	1	0	66	8	4	1	0

Intersection: 8: Site Driveway #4 & Tractor Supply Entrance

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	14	55
Average Queue (ft)	1	25
95th Queue (ft)	9	49
Link Distance (ft)	470	679
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 9: Wawa Dwy/Site Driveway #5 & Turner Drive

Movement	EB	WB	B30	B30	NB	SB
Directions Served	TR	LTR	T		R	R
Maximum Queue (ft)	72	133	150	26	105	39
Average Queue (ft)	6	65	16	1	43	14
95th Queue (ft)	40	132	85	23	78	36
Link Distance (ft)	864	48	301	301	289	706
Upstream Blk Time (%)		7	0			
Queuing Penalty (veh)		49	0			
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 10: Tractor Supply Entrance & Site Driveway #6

Movement	SB
Directions Served	LR
Maximum Queue (ft)	31
Average Queue (ft)	11
95th Queue (ft)	34
Link Distance (ft)	938
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 11: Site Driveway #3

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 12: Benns Church Boulevard & Site Driveway #7

Movement	WB	NB	NB	NB
Directions Served	R	T	T	R
Maximum Queue (ft)	253	587	595	200
Average Queue (ft)	147	345	364	113
95th Queue (ft)	305	755	761	276
Link Distance (ft)	245	554	554	
Upstream Blk Time (%)	37	14	20	
Queuing Penalty (veh)	0	134	189	
Storage Bay Dist (ft)				200
Storage Blk Time (%)			47	1
Queuing Penalty (veh)			56	11

Network Summary

Network wide Queuing Penalty: 2828



The Promontory

Fiscal Impact Study

Town of Smithfield, Virginia
Isle of Wight County, Virginia

Prepared by

Ted Figura Consulting

For

Greenwood Homes
Greenwood, Virginia
and

L& L Land Development, LLC
Smithfield, Virginia

March 9, 2023
Revised November 30, 2023
Corrected and Revised July 11, 2024
Second Revision March 12, 2025
Third Revision May 31, 2025
Fourth Revision: August 18, 2025

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The Promontory: Fiscal Impact Analysis

Executive Summary

The applicants, Greenwood Homes and L&L Land Development, LLC are seeking a rezoning of 133.043 acres located on Benns Church Boulevard and Cypress Run Drive on parcel 35-01-005 in the Town of Smithfield ("the Site"). The Site is currently zoned Community Conservation (C-C) and Environmental Conservation (E-C) with an Entrance Corridor overlay. The applicant is seeking a rezoning to Planned Mixed Use Development (PMUD) to permit the development of The Promontory (or "the proposed development"). The Promontory is planned to contain 238 residential dwellings and up to 19,000 square feet of commercial space to be developed in five pad sites. Greenwood Homes will be the developer of the residential component of the proposed development and L & L Land Development will be the developer of the commercial component.

The Promontory is planned to consist of 107 single-family detached dwellings, 36 townhomes, and 67 "villa" attached single-family units. The residential units will be upscale with premium finishes, more upscale than Eagle Harbor but with fewer custom finished homes than Founder's Pointe. The Promontory is currently programmed to have a fast food establishment, two fast casual restaurants, a car wash and a bank with drive-thru windows.

As proposed, this development is projected to have a positive fiscal impact for all funds of both Isle of Wight County ("the County") and the Town of Smithfield ("the Town" and collectively "the Localities") over an initial ten-year analysis period and in its stabilization year. Annual cash flow is projected to be almost $1 million for the County and more than $255,000 for the Town. For the County, more than 56% of this net revenue will be enter its general fund with the remainder entering its enterprise fund and, for the Town, virtually all of this annual net revenue will enter its general fund. The Town is predicted to see a slight decrease in revenue to its enterprise fund, accompanied by a commensurate decrease in operating costs. The annual revenue surplus from the proposed development can be expected to be received by the Localities each year after the proposed development is built out. Over the ten-year analysis period, the cumulative positive cash flow is projected to be almost $8 million for the County and more than $1.6 million for the Town.

Average prices for the residential units to be developed on the site are expected to be about $615,000 for the single-family detached homes and about $407,400 for the attached units. Average household incomes are projected to be about $120,325, with single-family detached households averaging $139,775 in annual household income and townhome and villa households averaging $92,600. This compares to a projected average household income for Smithfield of $128,575 and for the County of $120,425 in 2023 and a median household income of $106,400 for Smithfield and $96,950 for the County.

Using the County's student generation formula, the proposed development is expected to add 63 students to the County's school system. Counting only students expected to be generated by The Promontory, all schools to which students from the Site are currently zoned can be expected to have sufficient capacity to absorb those students. When students expected to be generated due to development that has already been approved are added, all schools continue to have the capacity to absorb students from The Promontory without exceeding their instructional capacities.

Although The Promontory would not generate a need to construct new classroom space, the proposed development is expected to generate demand for a new standard school bus and a new special needs school bus. However, the extent to which buses purchased to accommodate students generated by pipeline development would also accommodate students generated by The Promontory is uncertain. Therefore, only a portion of the cost of a standard school bus was counted as generating a fiscal impact on the County.

The tables below and on the following page summarize the fiscal impact measures for The Promontory for the County and the Town. The fiscal impact is presented in constant 2023 dollars.

The Promontory Fiscal Impact Measures, Combined General and Enterprise Funds, Isle of Wight County	
Stabilization Period	
Annual Revenues	$1,417,325
Annual Costs	$ 434,525
Cash Flow	$ 982,775
Benefit-to-Cost Ratio	2.87-to-1
Cumulative Measures	
Total Revenues	$10,507,475
Total Costs	$ 2,541,650
Cumulative Cash Flow	$ 7,965,825
Benefit-to-Cost Ratio	4.13-to-1

Figures rounded to the nearest $25

The Promontory Fiscal Impact Measures, Combined General and Enterprise Funds, Town of Smithfield	
Stabilization Period	
Annual Revenues	**$446,450**
Annual Costs	**$191,450**
Cash Flow	**$255,025**
Benefit-to-Cost Ratio	**2.33-to-1**
Cumulative Measures	
Total Revenues	**$2,748,625**
Total Costs	**$1,132,325**
Cumulative Cash Flow	**$1,616,300**
Benefit-to-Cost Ratio	**2.42-to-1**

Figures rounded to the nearest $25

A more detailed analysis follows.

Background

Greenwood Homes and L&L Land Development, LLC, the applicants, have proposed a multi-use development to be known as The Promontory ("the proposed development"). While most of the Site would be developed residentially by Greenwood Homes, approximately 10.6 acres fronting along Benns Church Boulevard would be developed commercially by L&L Land Development, LLC. Five pad sites are intended with standalone buildings housing a fast food establishment, two fast casual restaurants, a car wash, and a bank with drive-thru windows. Additionally, a parcel along Public Road B is reserved for future commercial development. If, when and how this parcel would be developed is unknown at this time and it is not included in the fiscal impact analysis.

The Promontory is planned to include 107 single-family detached units, 36 townhomes, and 67 single-family attached "villa" units. The residential component is planned to be developed in five phases, with six phases in all, including the commercial component (phase 1). Single-family detached product would be developed in phases 3 through 6, while the attached residential product would be completed in phases 2, 3 and 5. Finishes are planned to be premium, exceeding current development in Eagle Harbor and comparable to Founder's Pointe, less its custom built homes. Amenities at The Promontory will be passive in nature, consisting of pocket parks, trails and water features.

Single-family homes would average 2,700 square feet in size and attached units would average about 1,950 square feet. Single-family detached units would have four or five bedrooms and two and one-half to three and one-half baths. Attached units would have three or four bedrooms and two and one-half to three and one-half baths. The single-family detached units are expected to sell for between $579,990 and $649,990, averaging $614,990. The attached units are expected to sell for about $399,990 for the townhomes and $439,990 for the villa units in today's market prices.

Assuming a timely rezoning approval, the applicant expects that construction will begin in the first quarter of 2027 after sitework is completed. The first villas are expected to be occupied early in the fourth quarter of 2027, with the first townhomes occupied in the second quarter of 2028 and the first single-family detached units occupied in the third quarter of 2028. Construction and occupancy of the last townhome units is expected to occur at the start of the second quarter 2029, occupancy of the last villa units is expected to occur at the start of the second quarter of 2031, and the last single-family detached homes are expected to be occupied by the start of the fourth quarter 2032. A fast food establishment is expected to open in early 2028, with pad sites sequentially developed thereafter. Commercial development is expected to be completed by the end of 2030.

Additional detail describing The Promontory is available in the methodological Appendix accompanying this report.

These parameters are best estimates of the scope of the proposed development made by the applicant at this point in time. The specifics of the proposed development are subject to change based upon final determinations of site constraints and/or market conditions. Descriptions of the proposed development contained herein are not guarantees by the applicant that the proposed development will be constructed exactly as described above. However, the basic elements of the proposed development are those outlined above. Any change in the fiscal impact of the proposed development on the County or the Town due to minor changes in the scope of the proposed development are expected to be in the magnitude of projected revenues and costs projected in this report and are expected to be in practically the same proportion of revenues to costs as estimated in the fiscal impact analysis report.

Methodology

The fiscal impact of The Promontory on the County and the Town was calculated using the methodology described below. Fiscal impact is defined as the difference between all revenues to the Localities generated by the development and all costs to the Localities attributable to the development. Revenues and costs are described in further detail below.

As noted above, the fiscal impact was calculated over a ten-year period. This period was chosen because the stabilization year occurs near the end of the second five-year period within which development occurs. The stabilization year for the proposed development is FY 2034. The stabilization year is the year following the completion of all components of a proposed development, the year beyond which the fiscal cash flow from the development in constant dollars does not change. Thus, there is no reason to continue the analysis period beyond the five year increment that includes the stabilization year. The analysis period extends from FY 2026 to FY 2035.

All fiscal impacts are presented in constant 2023 dollars, (i.e., inflation is not applied to either revenues or costs throughout the analysis period). A constant in 2023 dollars was chosen because the analysis is substantially based on the revenue, cost and tax rate assumptions contained in the *Isle of Wight County, Virginia, Adopted Operating & Capital Budgets for the Period Fiscal Year July 1, 2022 - June 30, 2023, Town of Smithfield Operating Budgets & Capital Improvements Plan, FY 22-23* and the *Isle of Wight County Schools School Operating Budget, Fiscal Year 2023* ("the *Budget(s)*"). However, student generation and school impact was calculated using the latest data available.

The constant dollar approach means that no assumptions are made about rates of increase in real estate assessments in the Localities. Also, no assumptions are made about increasing tax revenues from sales, meals or business license taxes based upon retail price increases. Neither are assumptions made about future increases in the unit costs of government. The practical implication of this approach is that any future systemic imbalances between rising revenues and rising costs are assumed to be adjusted through changes in the Localities' tax rate, either upward or downward.

A marginal revenue/marginal cost approach was used to calculate expected revenues and costs to the Localities attributable to the development. This is opposed to an average revenue/average cost approach, in which estimates of a project's revenues and costs are based upon a jurisdiction's per-capita revenues and costs. The marginal revenue/marginal cost methodology counts only variable costs and revenues and, thus, does not count fixed costs and revenues that would be spent or received by the Localities whether additional development occurs or not. It counts only revenues and costs attributable to an increase in the number of households or businesses from the development being analyzed.

It is, thus, a more accurate estimate of future revenues and costs resulting from a development than is the average revenue/average cost approach. The average revenue/average cost approach actually calculates a project's "fair share" of public costs, rather than the incremental impact of a project on a locality's fiscal position. A more detailed description of the methodology used in this analysis is presented in the Appendix.

Revenues estimated for The Promontory fall into three categories: one-time direct revenues, recurring direct revenues and additional tax revenues generated by households. The methodology does not use multipliers to calculate revenues that could be generated through a project's secondary impacts, as such multipliers are considered to be unreliable for small geographic areas. The methodology does not include revenues generated from spending by construction workers at The Promontory, as such spending cannot reliably be said to occur within the Localities.

One-time direct revenues are revenues to the County derived from the construction of The Promontory. They include all building permit and associated fees (electrical, mechanical and plumbing), other development fees, including water and sewer tap fees, and the local recordation tax and grantor's fees.

Recurring direct revenues consist of real estate property taxes, personal property taxes (car tax), motor vehicle registration fees, business personal property taxes, local option sales taxes, meals taxes, business license fees, car rental taxes, water and sewer collection fees, and other fees paid by households and businesses to the Localities. These are taxes and fees paid directly to the Localities by households, businesses and/or property owners. Taxes currently paid on the assessed value of the Site's land were deducted from real estate property tax calculations. Taxes were calculated based upon estimates of the assessed property values, sales and receipts of businesses located at The Promontory, the County's per-household/per business user fees or other methodologies explained in the Appendix.

Additional tax revenues generated by households are estimates of taxes paid by businesses located in the Localities due to purchases made by The Promontory residents. These include the local option sales tax, meals tax, cigarette tax and the business license fees paid by businesses on gross receipts from these sales. The methodology for estimating net new sales and gross receipts is presented in the Appendix.

Purchases by The Promontory residents are estimated based upon spending patterns according to household estimated income. Spending patterns are derived from the most recent U.S. Bureau of Labor Statistics Consumer Expenditure Survey. An adjustment was made for purchases made outside the County and for spending occurring within the Town versus the remainder of the County. The methodology for estimating these revenues is presented in the Appendix.

Adjustments were also made to tax revenues derived from businesses located at The Promontory. These adjustments were made for sales and receipts that would be redirected to The Promontory businesses from existing businesses in the Town and the County. The methodology for making these adjustments is presented in the Appendix.

No generated taxes were estimated for construction workers or employees of businesses located at The Promontory or elsewhere in Localities, as these employees were assumed either to be already living and spending in Localities or living outside the Localities and, thus, spending most of their income outside the Localities.

Costs were divided into five categories: education variable operating costs per student, other variable operating costs of government per household, education capital costs, general government capital costs and enterprise fund costs. Cost data and assumptions were derived from the *Budgets.*

Per household and per business costs were calculated for various budget line items. State and federal revenues supporting various budget line items were deducted to leave only the Localities' operating cost. Certain government functions, such as public assistance and public health services, that would not serve The Promontory population were not included in the calculations. Chief executive, legislative and administrative functions, which would be performed regardless of population size, were not included in the calculations. A percentage of certain administrative support services, to the extent that they support operations which would be provided independent of population size, were not included in the calculations. Certain costs (and revenues) were adjusted for household size. The methodology for estimating the cost of government, including, enterprise fund costs (the per-customer cost of billing and the per-linear foot cost of line maintenance), is presented in more detail in the Appendix.

Education costs exclude administrative and other fixed costs. The County's student generation rates were used to calculate the number of students expected to be generated by the proposed development. The distribution of The Promontory students to elementary, middle and high schools was estimated based on student generation rates by class grouping provided by the County's school system.

Data provided by the Isle of Wight County Public Schools were then used to calculate available capacity for the schools which The Promontory students would attend. An analysis was performed to determine whether any capital fiscal impact existed due to the development of The Promontory. In order for a fiscal impact to exist, the proposed development would have to cause the County to spend capital dollars to alleviate the development's facility impact. If there would be no change in the County's capital spending plans whether The Promontory is developed or not, there is no capital fiscal impact.

In calculating fiscal impact, students generated by future development, reasonably expected to occur, that have not yet added students to the County's school system are counted in calculating whether a school would exceed its capacity due to the proposed development. Also, any planned construction that would expand the County's capacity to accommodate future students, whether from unbuilt developments that are "in the pipeline" or from the proposed development, are factored into the calculation of whether The Promontory would cause the County to remedy school overcapacity caused by the development of The Promontory.

An analysis was also performed to determine whether any additional school buses would likely be required due to the development of The Promontory. This included evaluating the need for both standard and special needs school buses. If it was determined an additional school bus would be purchased to accommodate students generated from The Promontory, the cost was counted as an educational capital cost in the fiscal impact analysis.

Three measures of fiscal impact were used—cash flow, cumulative cash flow and the benefit-to-cost ratio. Cash flow shows the annual surplus or deficit of revenues less costs for a sample of ramp up years through the stabilization year. Because revenues and costs are reported in constant dollars, there is no change in the projected cash flow after the stabilization year.

Cumulative cash flow is the sum of annual cash flows over the analysis period. Another way of explaining cumulative cash flow is that it is derived by subtracting total costs to the locality attributable to a proposed development from total revenues to the locality derived from that development over the analysis period, leaving the locality's total net revenue from the development.

Finally, the benefit-to-cost ratio is the ratio of total project revenues to the Locality and total project costs to the locality. A benefit-to-cost ratio greater than 1.0-to-1 signals a net fiscal benefit. The magnitude of the benefit-to-cost ratio signals the strength of the fiscal impact on the locality. For instance, a benefit-to-cost ratio of 1.5-to-1 indicates that for every additional dollar of spending a project costs the locality, the locality is expected to receive $1.50 in additional revenue.

These fiscal impact measures, as well as their revenue and cost components, were calculated for both the County and the Town.

The methodologies used to calculate the fiscal impact of the proposed development are described in more detail in the Appendix.

School Impact of The Promontory

Altogether, the proposed development is expected to add 63 students to the County's school system—24 students added to Hardy Elementary School, 9 students to Westside Elementary School, 10 students to Smithfield Middle School and 20 students to Smithfield High School.

An analysis was performed using the criteria mandated by the state statute governing the offer of cash proffers. Those criteria require that only current enrollment and current school capacity be considered when calculating whether a school facility will exceed its capacity due to a proposed development.

Table 1, below, shows the capacities, current enrollment, projected enrollment after adding students from The Promontory and remaining capacity for each school in a cash proffer analysis. It is evident, since no school to which students from The Promontory are currently zoned would exceed their instructional capacity after students from The Promontory are added, that cash proffers cannot be reasonably offered or accepted.

Table 1
Available School Capacities Before and After The Promontory

School	Instructional Capacity	Current Enrollment	Enrollment after The Promontory	Capacity after The Promontory
Hardy Elementary	885	649	673	212
Westside Elementary	849	682	691	158
Smithfield M.S.	634	565	575	59
Smithfield H.S.	1,588	1,322	1,342	246

Sources: *Isle of Wight County Schools Student Yield and Subdivision Analysis, April 2018;* Isle of Wight County Schools, Virginia Department of Education

Relaxing the standards imposed by Virginia cash proffer law allows the consideration of students that would be generated from development that is currently under construction, approved by the County, or planned ("pipeline development"), plus school capacities that would exist in the future. Table 2, below, shows remaining school capacities after The Promontory is developed, and after students from pipeline development are taken into consideration. As shown below, counting students from pipeline development and students from The Promontory, all schools to which students from The Promontory are zoned retain sufficient capacity.

Table 2
Available School Capacities Before and After The Promontory and Future Development

School	Instructional Capacity	Current Enrollment	Future Development Enrollment	The Promontory Enrollment	Capacity After The Promontory
Hardy Elementary	885	649	197	24	15
Westside Elementary	849	682	133	9	25
Smithfield M.S.	634	565	44	10	15
Smithfield H.S.	1,588	1,322	199	20	47

Sources: *Isle of Wight County Schools Student Yield and Subdivision Analysis, April 2018;* Isle of Wight County Schools, Virginia Department of Education; *Residential Pipeline Projects as of 03/29/2022; Is*le of Wight County Planning Department

The proposed development's impact on the demand for school bus purchases was also evaluated. A conclusion was reached that the development of The Promontory would cause the County to purchase an additional standard school bus but that students from pipeline development would also cause this school bus to be purchased if The Promontory is not developed. Therefore, a pro-rata cost of the school bus was attributed to The Promontory as a fiscal capital cost. It was also determined that the development of The Promontory would cause the County to purchase a larger special needs school bus than would need to be purchased to accommodate students from pipeline development. The additional cost of upgrading the size of this school bus was included as a fiscal capital cost and attributed to The Promontory.

The operating education cost has been calculated in the fiscal impact analysis and applied to all students generated by The Promontory. This cost, included in the fiscal impact analysis, is shown in Table 4 below. The methodology for reaching the foregoing conclusions is described in more detail in the Appendix.

Fiscal Impact of The Promontory on Isle of Wight County

The applicants are seeking a rezoning of the Site to Planned Mixed Use Development (PMUD) from its current Community Conservation (C-C) and Environmental Conservation (E-C) zoning with an Entrance Corridor overlay. This zoning would permit the development described above. The derivation of the revenues and costs attributed to The Promontory are described in the Methodology section, above, and in the Appendix. The revenues projected to be received by the County from The Promontory are listed in the Table 3 on the following page. Costs to the County generated by The Promontory are displayed in Table 4 on the next page. Both revenues and costs are shown for the stabilization year and for the total ten-year analysis period (FY 2026-FY 2035).

Subtracting projected costs from revenues yields a positive overall cash flow (or revenues net of costs) for the proposed development. In the stabilization year, the County is expected to receive more than $1.4 million annually in new revenue from the development of The Promontory while incurring less than $435,000 in new annual costs. Over the ten-year analysis period, the County can expect to receive more than $10.5 million in new revenues while incurring about $2.5 million in new costs.

Annual cash flow from The Promontory is shown in Table 5 on page 15. Cash flow is shown for both the general fund and the County's enterprise funds. In the stabilization year, the County is expected to see net new revenues (revenues less costs) of almost $1 million. More than 56% of this revenue surplus enters the County's general fund with the remainder entering the County's enterprise funds.

Table 6, on page 16, shows the fiscal impact measures for The Promontory for the County. These are very positive. The County can expect to receive almost $8 million in surplus revenue from the proposed development during the ten-year analysis period. Benefit-to-cost ratios in the stabilization year exceeds 2.75-to-1. The County is expected to receive $2.82 in revenue for every dollar of cost attributed to the development in the stabilization year and beyond. The somewhat higher benefit-to-cost ratio for the ten-year period is due to the presence of one-time revenues.

Table 3 The Promontory Projected Revenues for Isle of Wight County		
Revenue Type	Annual Revenues, Stabilization Year (FY 2034)	Ten-Year Total (FYs 2026-2035)
Current Real Estate Tax	$ (9,150)	$ (91,350)
Real Estate Property Tax, Land	$ 39,250	$ 449,225
Real Estate Property Tax, Improvements	$ 652,175	$ 3,464,300
Personal Property (Car) Tax, Motor Vehicle Registration	$ 217,275	$ 1,177,325
Business Personal Property/Machinery and Tool Taxes	$ 20,250	$ 120,450
Local Option Sales Tax	$ 13,525	$ 89,600
Meals Tax/Business License Fee (loss from redirection)	$ (51,725)	$ (349,050)
Other Fees	$ 21,625	$ 120,600
Utility Taxes	$ 36,725	$ 210,250
Subtotal Direct Taxes	*$ 939,950*	*$ 5,191,350*
Additional Revenues Derived from Households	$ 41,675	$ 228,875
General Fund Revenues	***$ 981,625***	***$ 5,420,225***
Sewer Use Fees	$ 140,800	$ 815,675
Water Use Fees	$ 294,900	$ 1,697,325
Enterprise Fund Revenues	***$ 435,700***	***$ 2,513,000***
Total Annual Revenues	**$1,417,325**	**$ 7,933,225**
Building Permit and Review Fees		$ 207,775
Recordation Tax and Grantor's Fee		$ 147,950
General Fund One-time Revenues		***$ 355,725***
Erosion Control, Stormwater and VSMP Fees (Enterprise Fund)		$ 43,725
Sewer Development Fees		$ 1,024,800
Water Development Fees		$ 1,150,000
Enterprise Funds One-time Revenues		***$ 2,218,525***
Total One-time Revenues		***$ 2,575,250***
Total Revenues	**$1,417,325**	**$10,507,475**
Revenues from Residential Development*	***$1,239,775***	**$ 9,073,750**
Revenues from Commercial Development*	***$ 163,550***	**$ 1,395,275**

Figures rounded to the nearest $25.

*Current real estate tax not deducted; does not include general development revenues

Table 4
The Promontory
Projected Costs for Isle of Wight County

Cost Type	Annual Revenues, Stabilization Year (FY 2034)	Ten-Year Total (FYs 2026-2035)
General Government Service Operating Costs	$131,150	$ 754,350
General Government Service Capital Costs		$ 0
Education Operating Costs	$294,675	$1,571,600
Education Capital Costs		$ 122,200
Total General Fund Costs	***$425,825***	***$2,448,150***
Enterprise Fund Costs	***$ 8,700***	***$ 93,500***
Total Costs	**$434,525**	**$2,541,650**
Costs from Residential Development	***$430,475***	***$2,510,225***
Costs from Commercial Development	***$ 4,050***	***$ 31,425***

Figures rounded to the nearest $25.

Table 5
The Promontory
Projected Cash Flow for Isle of Wight County

	FY 2026-2027	FY 2028	FY 2030	FY 2031	FY 2033	Stabilization Year FY 2034**
General Fund Revenues	$ 27,025	$133,125	$ 584,075	$ 819,900	$ 989,375	$ 981,625
Enterprise Fund Revenues	$264,500	$571,775	$ 806,875	$ 608,225	$ 435,925	$ 435,700
Total Revenues*	$291,525	$704,900	$1,390,950	$1,428,135	$1,425,300	$1,417,325
General Fund Costs	$ 9,900	$ 25,900	$ 208,275	$ 434,075	$ 434,525	$ 434,525
Enterprise Fund Costs	$ 3,150	$ 12,800	$ 15,900	$ 12,225	$ 8,700	$ 8,700
Total Costs	$ 13,050	$ 38,700	$ 224,175	$ 446,300	$ 494,550	$ 494,550
General Fund Cash Flow	$ 17,125	$107,225	$ 375,800	$ 385,825	$ 563,550	$ 555,800
Enterprise Fund Cash Flow	$261,350	$558,975	$ 790,975	$ 596,000	$ 427,200	$ 426,975
Total Cash Flow	$278,475	$666,200	$1,166,775	$ 981,825	$ 990,750	$ 982,775

Figures rounded to the nearest $25.
*The "cost" of taxes currently collected on the site is subtracted from General Fund revenues.
**Does not include one-time revenues received in FY 2035

Table 6 The Promontory Fiscal Impact Measures, General and Enterprise Funds		
	Stabilization Year (FY 2034)	Ten-Year Total (FYs 2026-2035)
Cumulative Cash Flow	N/A	$7,965,825
General Fund	N/A	$3,327,800
Enterprise Funds	N/A	$4,638,025
Benefit-to-Cost Ratio	2.87-to-1	4.13-to-1
General Fund	2.26-to-1	2,36-to-1
Enterprise Funds	50.1-to-1	50.6-to-1

Fiscal Impact of The Promontory on the Town of Smithfield

The fiscal impact of the proposed development on the Town is also positive after subtracting projected costs from revenues. The revenues projected to be received by the Town from The Promontory are listed in the Table 7 on the following page. Costs to the Town generated by The Promontory are displayed in Table 8, located on page 18. Both revenues and costs are shown for the stabilization year and for the total ten-year analysis period (FY 2026-FY 2035).

In the stabilization year, the Town is expected to receive more than $445,000 annually in new revenue from the development of The Promontory while incurring only less than $195,000 in new annual costs. Over the ten-year analysis period, the Town can expect to receive more than $2.75 million in new revenues while incurring about $1.1 million in new costs.

Annual cash flow from The Promontory is shown in Table 9 on page 18. Cash flow is shown for the general fund and the Town's enterprise funds separately. In the stabilization year, the Town is expected to see cash flow (revenues less costs) of more than $255,000. All of this revenue surplus enters the Town's general fund.

Table 10, also on page 18, shows the fiscal impact measures for the Town resulting from The Promontory. These are also positive. The Town can expect to receive almost $1.8 million in surplus revenue from the proposed development during the ten-year analysis period. The overall benefit-to-cost ratios in the stabilization year exceeds 2-to-1. This means that the Town's general fund is expected to receive $2.33 in revenue for every dollar of cost attributed to the development in the stabilization year and beyond. Benefit-to-cost ratios could not be computed for commercial development because the denominator (costs) is negative (the decrease in the cost of providing water to the car wash cancels out the cost of providing government services to The Promontory businesses and results in an overall decrease in costs for the Town).

Table 7 The Promontory Projected Revenues for the Town of Smithfield		
Revenue Type	Annual Revenues, Stabilization Year (FY 2034)	Ten-Year Total (FYs 2026-2035)
Current Real Estate Tax	$ (2,050)	$ (20,400)
Real Estate Property Tax, Land	$ 8.775	$ 109,200
Real Estate Property Tax, Improvements	$145,775	$ 776,275
Personal Property (Car) Tax, Decals	$ 60,400	$ 325,500
Car Rental Tax	$ 600	$ 3,250
Business Personal Property/Machinery and Tool Taxes	$ 4,950	$ 29,375
Local Option Sales Tax	$ 1,900	$ 12,575
Meals Tax	$177,575	$1,185,525
Business License Fee	$ 4.025	$ 27,050
Utility Taxes	$ 13,525	$ 77,225
Other fees	$ 25,575	$ 142,600
Subtotal Direct Taxes	*$441,050*	*$2,668,175*
Additional Revenues Derived from Households	$ 17,775	$ 98,000
General Fund Annual Revenues	***$458,825***	***$2,766,175***
Water Consumption and Sewer Fee Loss	$(12,375)	$ (86,675)
Enterprise Fund Annual Revenues	***$(12,375)***	***$ (86,675)***
Subtotal Annual Revenues	**$446,450**	**$2,679,500**
Contractor's Business License Fee		$ 39,025
Permits, Development Review and Other Fees		$ 30,100
General Fund One-time Revenues		***$ 69,125***
Total Revenues	**$446,450**	**$2,748,625**
General Fund Revenues	***$458,825***	***$2,766,175***
Enterprise Fund Revenues	***$(12,375)***	***$ (86,675)***
Revenues from Residential Development*	***$249,300***	***$1,446,800***
Revenues from Commercial Development*	***$199,200***	***$1,320,175***

Figures rounded to the nearest $25.
*Current real estate tax not deducted; does not include general development revenues

Table 8
The Promontory
Projected Costs for the Town of Smithfield

Cost Type	Annual Revenues, Stabilization Year (FY 2034)	Ten-Year Total (FYs 2026-2035)
General Government Service Operating Costs	$194,525	$1,084,375
General Government Service Capital Costs		$ 69,500
Education Operating Costs	$ 0	$ 0
Education Capital Costs		$ 0
Total General Fund Costs	$194,525	$1,153,875
Enterprise Fund Costs	$ (3,075)	$ (21,550)
Total Costs	**$191,450**	**$1,132,325**
Costs from Residential Development	***$190,600***	***$1,130,525***
Costs from Commercial Development	***$ 850***	***$ 1,800***

Figures rounded to the nearest $25.

Table 9
The Promontory
Projected Town of Smithfield Cash Flow

	FY 2026-2027	FY 2028	FY 2030	FY 2031	FY 2033	Stabilization Year FY 2034
Total Revenues	$21,100	$89,150	$289,775	$394,600	$446,750	$446,450
Total Costs	$ 0	$14,000	$100,025	$143,675	$260,950	$191,450
Total Cash Flow	$21,100	$75,150	$189,750	$250,925	$185,800	$255,025

Figures rounded to the nearest $25.
*The "cost" of taxes currently collected on the site is subtracted from General Fund revenues.

Table 10
The Promontory
Fiscal Impact Measures, Town General and Enterprise Funds

	Annual Revenues, Stabilization Year (FY 2034)	Ten-Year Total (FYs 2026-2035)
Cumulative Cash Flow	N/A	$1,616,300
From Residential Development*	N/A	$ 316,275
From Commercial Development*	N/A	$1,318,375
Benefit-to-Cost Ratio	2.33-to-1	2.42-to-1
Of Residential Development*	1.31-to-1	1.28-to-1
Of Commercial Development*	234.4-to-1	733.4-to-1

Figures rounded to the nearest $25
*Current real estate tax not deducted; does not include general development revenues

In summary, the fiscal impact of The Promontory on both the County and the Town are convincingly positive. This is true for both the Town's general fund and for the County's general fund and enterprise fund, with the Town's enterprise fund expected to incur a miniscule net loss of revenue due to redirection by The Promontory car wash. Additionally, the development of The Promontory is not expected to produce undue stress on the County's school system.

The Promontory

Appendix

Methodology

Revised August 18, 2025

Note: Unit counts, construction timing, and school impact metrics were revised. Other data remains the same as in the original fiscal impact analysis, including the continued use of fiscal year 2023 budget data.

Approach

Fiscal impact is defined as the difference between all revenues to Isle of Wight County and the Town of Smithfield ("the County" or "the Town," respectively, or, collectively, "the Localities" or "each Locality") generated by the project and all costs to the Localities attributable to the project.

Only variable revenues and costs are counted in the fiscal impact study. This means that, rather than applying per capita or per household and per business total non-tax revenue and total Locality per capita or per household and per business expenditures to The Promontory ("the proposed development"), only those incremental revenues and costs that the Localities will actually receive or incur due to the increase in households and businesses are counted as having a fiscal impact. Fixed costs that do not rise as population, households or businesses increase incrementally are not counted as having a fiscal impact.

Revenues include one-time direct revenues, annual direct revenues from the project and tax revenues generated by households. One-time revenues include building permit fees and other development fees, sewer and water connection fees, and recordation and grantors' taxes received by the County. They also may include the value of any on and off-site public infrastructure improvements or amenities provided by the developer that have benefit to the Localities beyond the benefit to the proposed development.

Annual direct revenues include: real estate property taxes, personal property taxes, business personal property taxes, the net increase in taxes generated by business sales (local option sales tax, meals tax and business license fee), the car rental tax remitted by the Commonwealth, motor vehicle registration fees, utility taxes, and various local government fees, fines and user charges. They also include sewer collection and water consumption charges which provide revenue to the County's enterprise funds. Tax revenues generated by households are taxes paid or collected by Isle of Wight County and Smithfield businesses due to purchases made by the proposed development's households.

Costs include: operating costs of government per household or per other unit, any Locality (non-school) capital costs generated by the proposed development that will actually be incurred by the Locality, education operating costs per student, and any school capital costs generated by the proposed development that will actually be incurred by the County.

All fiscal impacts are presented in constant 2023 dollars. Inflation is not applied to either revenues or costs throughout the analysis period. The constant dollar approach also means that no assumptions are made about the rate of real estate assessment increases in the County. No assumptions are made about future increases in tax revenues from sales, meals or business license taxes that are based upon retail price increases. Neither are assumptions made about future increases in the unit costs or revenues of government.

The practical implication of this approach is that any systemic future imbalances between rising (or falling) revenues and rising costs will be adjusted through changes in a Locality's tax rate, either upward or downward. All cost and revenue data were derived from the *Isle of Wight County, Virginia, Adopted Operating and Capital Budgets, Fiscal Year 2022-2023, Town of Smithfield Operating Budgets & Capital Improvements Plan FY 22-23* and the *Isle of Wight County Schools School Operating Budget, Fiscal Year 2023* ("the *Budget(s)*").

The net revenue surplus or deficit of the proposed development is calculated by subtracting total costs to each Locality attributable to the project from total revenues to each Locality derived from the project over the analysis period. This was calculated for each year of project activity through the stabilization year. The year in which all costs and revenues have been fully realized was designated the stabilization year for the proposed development. This was FY 2035. The stabilization year captures the cost and revenue impact generated by the project upon and after completion. Because revenues and costs are reported in constant dollars, there is no significant change in the projected cash flow after the stabilization year. For convenience, the analysis period was extended to the end of the five-year increment within which the stabilization year falls. Thus, the analysis period used was FY 2026-FY 2035, resulting in a ten-year analysis period.

Three measures of fiscal impact are used. One is the annual cash flow through the stabilization year (revenue minus costs). The second fiscal impact measure is the cumulative net revenue surplus over the ten-year analysis period (total revenues minus total costs). This is also the cumulative annual cash flow over the analysis period.

Finally, the benefit-to-cost ratio is the ratio of total project revenues to each Locality and total project costs to each Locality. A benefit-to-cost ratio greater than 1.0-to-1 signals a net fiscal benefit. The magnitude of the benefit-to-cost ratio signals the strength of the fiscal impact on the Locality. For instance, a benefit-to-cost ratio of 1.5.0-to-1 indicates that for every additional dollar of spending the project costs a Locality, the Locality is expected to receive $1.50 in additional revenue.

Throughout, revenue and cost data are estimated on a per household or per business basis or per some other unit, as appropriate. When costs are clearly variable per-capita (e.g., population-based funding formulas), they were converted to a per-household cost. Additionally, per-household data were adjusted, where appropriate, for the somewhat larger household size predicted for The Promontory (the residential component of the proposed development) as opposed to all households in the County or the Town. This was done whenever the number of persons in a household would have a marginal impact on variable costs or revenues. This is more fully described below under "Cost Calculation."

The number of households in the County in FY 2023 (15,080) was estimated by multiplying the number of households reported by the U.S. Census Bureau's American Community Survey (ACS) for 2021 (five-year average) by the rate of household increase from 2019 to 2021 (also from the ACS). The number of households in the Town in FY 2023 (3,469) was estimated using the same methodology. The County's estimated FY 2023 population (40,653) using the same methodology employed for calculating the FY 2023 number of households but using the 2020 Census count as a base and the ACS 2018 and 2021 population estimates to compute the rate of increase from 2020. No additional increase in households was forecast in keeping with the constant dollar approach.

The number of business establishments in the County (908), available from the second quarter 2021 Virginia Employment Commission's Quarterly Census of Employment and Wages, was used to adjust per-household metrics when services are provided to both businesses and households (see under "Cost Calculations" for an explanation of the adjustment methodology). The estimated number of business establishments located in the Town (176) was derived from an examination of business locations on Google Maps. Home businesses and self-employment are not included in either count.

Parameters and Assumptions

A total of 210 residential units are proposed by the developer of the residential component of The Promontory. The applicants are also proposing up to 19,000 square feet of commercial space to be developed on five outparcels, with 18,000 square feet assumed for analysis purposes. The Promontory will contain a mix of single-family detached and attached or townhouse units. The 107 single-family detached product is expected to be located on 60' x 100' lots. They are expected to be developed in four models ranging from 2,400 square feet priced at $579,990 to 3,000 square feet priced at $649,990. For analysis purposes, sales across these models are assumed to be equally distributed. The single family attached units are expected to be offered in two types: 1,915 square foot townhomes priced at $399,990 and 2,117 square feet villas on 42'x100' lots priced at $439,990. Table A-1, on the following page, provides a detailed description of the proposed development's residential mix, including the number of units, expected price, and size, number of bedrooms and number of baths. Table A-2, also on the following page, provides a more detailed description of The Promontory's expected commercial mix.

The proposed development will be located on Benns Church Boulevard and Cypress Run Drive on parcel 32-01-005 ("the Site"). The legal address for the Site is 18495 Cypress Run Drive. Frontage along Benns Church Boulevard will be developed commercially. The Site is 165+/- acres, as determined by the applicant's land use consultant. However, the County's calculation of this parcel's size is 133.043 acres, presumably because it does not include the marshy lake in the interior of the parcel and possibly also does not include the creek running through the property. A substantial portion of the Site is covered by the lake, around which the proposed development would be built.

Additionally, a parcel located behind Public Road B is labeled "future commercial." This parcel may be developed at some future unknown time in an unknown commercial use. Given that the timing and parameters of this potential future development is unknown, any calculation of the fiscal impact of developing this parcel would be highly speculative, at best. It can be said with confidence, however, that the fiscal impact of a future commercial development would be significantly positive with respect to its benefit-to-cost ratio.

Table A-1
The Promontory
Residential Product

Product Type	# of Units	Average Price	Average Size	# of bedrooms	# of baths//
Single-family detached					
Model 1	27	$579,990	2,400 sf	4	2.5 - 3
Model 2	27	$599,990	2,600 sf	4 - 5	2.5 – 3.5
Model 3	27	$629,990	2,800 sf	4 - 5	2.5 – 3.5
Model 4	26	$649,990	3,000 sf	4 - 5	2.5 – 3.5
Single-family attached					
Townhomes (Poplar), 3 story	36	$399,990	1,915 sf	3 - 4	2.5 – 3.5
Villas (Bayberry), 2 story	67	$439,990	2,117 sf	3	2.5

Table A-2
The Promontory
Commercial Product

Parcel	Use	Square Footage
1	Fast food restaurant	5,000 sf
2	Automated car wash	3,000 sf
3	Fast casual restaurant	3,000 sf
4	Fast casual restaurant	3,000 sf
5	Bank w/4-lane drive-thru	3-5,000 sf

A change of zoning is being requested to Planned Mixed Use Development (PMUD) to replace the current Community Conservation (C-C) and Environmental Conservation (E-C) with an Entrance Corridor overlay. The current assessed value of the Site is approximately $1,074,900. It is assumed that the marshy lake area was not included in the assessment and that the assessed value of the land applies to the 133.043 acres listed on the County's property records (the site is 135.3 acres according to the applicant's survey). The land would, therefore, have a current assessed value of $8,079 per acre. It should be noted that a substantial portion of the parcel is covered in wetlands, located on the west side of the creek.

The proposed development will contain several parks/open spaces, and the lake will be maintained to become an amenity feature. The creek will also provide a water view amenity. The applicant also proposes to establish a trail system through the western portion of the property.

The proposed development is expected to be constructed in six phases, with the residential component comprising five of these phases. Sitework is expected to begin in the third quarter of 2026 and construction beginning in the first quarter of 2027. The first phase is planned to consist of the proposed development's commercial component and the second phase is planned to consist of 29 single-family attached (villa) units beginning at the entrance located at the current termination of Cypress Run Drive. Construction of phases 1 and 2 are expected to begin simultaneously.

The residential and commercial components are expected to be developed by separate entities. The third phase of the residential development would consist of all 36 townhomes, 10 villas and the first four single-family detached units. Phase 4 continues the single-family detached development with 43 units. Phase 5 adds the remaining 28 villas and 26 additional single-family detached units. Phase 6 completes the single-family detached development with the remaining 34 units.

Absorption of all residential products was calculated based upon the phasing schedule provided by the applicant. All units are expected to be sold and occupied by the end of the fourth quarter 2032 (second quarter of FY 2032), with the townhouses sold out earlier (the start of the second quarter of 2030) and the villas sold by the start of the second quarter 2031). The commercial development, also, is expected to be completed and tenanted by the end of 2030. The stabilization year—the year following completion of development beyond which revenues and costs, measured in constant dollars, do not change—is expected to be FY 2034.

Although The Promontory is planned to be developed in phases, it is assumed that a single site or subdivision plan will be filed for approval. However, it is assumed that the parcel will be replatted into individual parcels as each phase is developed. Land retained by the developer until sold was assumed to be platted as a single parcel, even though the resulting parcel may not be contiguous. Land to be developed as right-of-way was assumed to be platted and then deeded to a homeowners association (HOA), thus becoming tax exempt until accepted by VDOT. A significant amount of land (63.1 acres) is expected to be deeded to an HOA. The HOA will be created and the land deeded to it when the parcel is first platted, although the developer will maintain effective control over the HOA until the residential component is 70% complete. Nevertheless, after this property is deeded to the HOA, it is assumed to become tax exempt.

It is recognized that the above description is based on a preliminary concept plan and details of the proposed development may change due to site considerations or changing market conditions. This representation is not a pledge or guarantee from the developer that the proposed development will exactly match this description. However, the final development plan is expected to not diverge from the above description to an extent that would materially change the results of this fiscal impact.

By-right Development Assumptions

Current zoning severely restricts development of the Site. Even with a special use permit, zoning would only permit a 5-unit subdivision and highly restricted commercial uses to be developed there. Effectively, by-right development of the Site would result in significant underutilization of its development potential, leaving most of the Site vacant. Given this, a by-right development was assumed to be highly unlikely to occur. No fiscal impact analysis of a hypothetical by-right development has been prepared by the Consultant.

Revenue Calculations

Revenues estimated for the proposed development fall into three categories: one-time direct revenues, direct annual revenues, and additional annual tax revenues and fees generated by households. The methodology does not use multipliers to calculate revenues that could be generated through the project's secondary impacts. Such multipliers are considered to be unreliable when applied to small economic units, such as localities.

One-time direct revenues are revenues to the Localities derived from the construction of the proposed development. These include Locality development fees and County building permit fees, as well as County water and sanitary sewer connection fees, plus recordation taxes and grantor's taxes and other payments paid to the Localities during the development period. Specific fees are listed below. Fees are paid to the County unless otherwise specified.

- Administrative review fee to the Town
- Building permit fees, including electrical, mechanical, plumbing, sign and technology fees (the sign permit fee is to the Town)
- Building plan examination fee
- Business license fee paid by construction contractors to the Town
- Code enforcement administration fee
- Erosion and sediment control fee
- Erosion and sediment control inspection fee to the Town
- Land disturbance permit fee to the Town
- Recordation tax and grantors fees
- Sign permit fee to the Town
- Site/Subdivision/utility plan/preliminary plat application fee to the Town
- Stormwater infrastructure inspection fee
- Street sign permit fee
- Water service fee (paid once upon each unit's occupancy)
- VSMP fees local share, including renewal fees
- Water and sewer tap fees
- Zoning permit fee to the Town

For calculating building permits, the average sizes shown in Tables 1 and 2, above, were used. The bank was assumed to be 4,000 square feet. It was assumed that the plan examination fee would be levied for the review of each model or block type rather than for each unit and that this would occur at the beginning of phase 1 or phase 2 (for the villas). It was assumed that a plan review would occur for each commercial building, since those buildings are assumed to be built to tenant specifications.

Electrical permit fees were calculated assuming all residential services are 200 amps and that all commercial services are 600 amps. Temporary electrical service permits were not assumed, as the construction contractor is likely to use self-provided generators to supply electric power during construction.

Plumbing permits for residential units were based upon the number of baths shown in Table 1. For the commercial units, each restaurant was assumed to have two restrooms, each with three fixtures. The car wash was assumed to have 1 restroom with two fixtures. The bank was assumed to have two restrooms, each with two fixtures. Plumbing permits for manholes and storm drains were based upon a standard of one occurrence every 400 feet and 10,930 linear feet of roadway. This yields an estimated 27 manholes and storm drains. All residential unit plans are assumed to be submitted in FY 2026, with the first permits also issued in FY 2026. Commercial building plans are expected to be submitted prior to the construction of each building. One water and sewer line connection was assumed for each residential unit and commercial building. Mechanical permits were based on an average cost of $16,320 per residential unit, pro-rated by unit size, and $150,000 for each commercial building, except the bank, which was estimated at $75,000. All units except the car wash will be served by natural gas.

It was assumed that infrastructure permits would be obtained (and inspection fees paid) for the entire development, rather than for each major phase of development or for each lot. Similarly, all reviews, except building plan reviews as noted above, would be for the entire development. One monument sign at the entrance to the residential portion is anticipated and one monument sign for each commercial building is assumed. Based on the applicant's concept plan, 11 public street signs were assumed.

Inspection fees paid to the County were based upon cost estimates supplied by the applicant. The erosion and sediment control inspection and the residential stormwater infrastructure inspection fees were assumed to be paid at the start of each phase of development. The stormwater infrastructure inspection fee for the commercial development was assumed to be paid for the entire commercial parcel rather than for each pad site. The local portion of the VSMP fee and renewals was assumed to be calculated on gross acreage. The County's 5% IT surcharge was applied to all building permits charges paid to the County.

Water and sewer tap fees paid to the County were calculated based on 5/8" meters for each residential unit and a 2" meter for each commercial building except the bank, which is assumed to have a 3/4" meter. Fire hydrant meters were assumed to be 1" but be exempt from the sewer tap fee. Based upon a standard of one fire hydrant every 500 feet and 10,930 linear feet of street, 22 fire hydrants were assumed for the residential component of the proposed development. One new fire hydrant was assumed for the commercial component.

Recordation and grantor's taxes were based on selling prices. Contractor's receipts were estimated to be 50% of the unit sale price for computing business license fees. Construction costs for commercial buildings were estimated using the Buildingjournal.com construction cost calculator.

No on- or off-site improvements are contemplated to be made by the developer that would provide benefit to property beyond the Site.

Direct annual revenues consist of those revenues paid directly to the Localities by the proposed development's property owners, residents and businesses. These include real estate property taxes and personal property taxes on vehicles paid to the County; real estate property taxes, personal property taxes on vehicles, motor vehicle license fees, utility taxes, water usage charges and meter fees, and sewer usage charges paid to the Town; the car rental tax remitted to the Town by the Commonwealth; and other fees paid to the Localities, including the EMS fee paid to the County. They also include the net increase in local option sales tax paid to the Localities and the net increase in meals tax and business license fee revenues paid to the Town by businesses located at the proposed development.

The annual stormwater fee was not included as direct annual revenue, though it will be paid by The Promontory property owners and provide revenue for the County's enterprise fund. It was excluded because this fee is levied at the discretion of the County (and is, thus, not a reliable revenue source) and because these fees are dedicated to funding stormwater improvements that would not be made if the County did not levy the fee (thus, they do not constitute a net revenue to the enterprise fund).

The remittance from the Commonwealth of the communications sales tax was also not included as direct annual revenue because this remittance is based upon a fixed formula that would not be affected by increasing population in the County**.**

Real estate property tax

The County's Commissioner of the Revenue recommended real estate assessment estimates for each product type based on comparable product located in the County. The Commissioner also recommended undeveloped lot assessments for single-family lots and townhouses, as well as the assessed value for commercially developed land. For purposes of calculating bank thru-lane square footage, each lane was assumed to be 12 feet wide and 20 feet long.

Estimated assessed values supplied by the Commissioner and imputed assessed land values are shown in Table A-3 on the following page.

Table A-3 Estimated Assessed Values, by Product Type		
Product Type	Assessed Value per Lot or Parcel	Finished Product Assessed Value
Single-family detached units	$ 85,000	
Model 1		$ 411,400
Model 2		$ 418,900
Model 3		$ 426,500
Model 4		$ 434,100
Villa units	$ 60,000	$ 282,900
Townhomes units	$ 40,000	$ 274,900
Fast food restaurant	$ 958,320	$1,000.000
Fast casual restaurants (ea.)	$ 718,740	$ 510,000
Bank	$1,326,000	$ 680,000
Car wash	$ 958,320	$ 471,000

Source: Isle of Wight County Commissioner of the Revenue

Although land value will ultimately be incorporated into the assessed value of the residential product, it must be taken into account during the development phase of the project. Once lots are platted, they will be assessed at their market value as determined by the County's Commissioner of the Revenue and subject to taxation as unimproved real estate until the finished product is sold, at which time land will become a part of the unit's total real estate assessed value. It is assumed that land to be commercially developed will be assessed as commercially developed land once platted. It is assumed that land will be platted by phase and that commercial parcels will be individually platted when sold.

Right-of-way land is assumed to be part of land deeded to the HOA until it is dedicated to VDOT. Based upon the length of roadway, right-of-way was estimated to be 15.05 acres. As noted above, land deeded to the HOA is assumed to become tax exempt at that point.

Personal Property Tax and Motor Vehicle Registration Fee

The annual personal property tax to be received by the Localities from the proposed development's residents was estimated by first calculating the Town's average personal property tax per vehicle. This amount was then adjusted by income level and tenure to account for variations in the number and value of vehicles owned by the proposed development's households.

The average personal property tax per vehicle computed for the Town is a reflection of vehicle assessed value. The average personal property tax per vehicle was provided by the Commissioner of Revenue upon deriving this data from the Town. For the Town, this was $99.54. Applying the County's personal property tax rate relative to the Town's, the Commissioner estimated the County's personal property tax per vehicle as $388.21. These metrics were used in the formula shown below.

Data from the 2021 U.S. Bureau of Labor Statistics Consumer Expenditure Survey (CES), the latest data available, were used to estimate the relative value of vehicles owned by households at the income levels estimated for The Promontory households. Comparing 2021 CES data to pre-COVID 2019 data, expenditures on vehicles were seen to have recovered from their 2020 decline and, therefore, the 2021 CES data was used.

The relative expenditure by income was derived by first calculating the vehicle purchase net outlay from the CES data for the average household income estimated for each residential type (distinguished by average household income) in the proposed development. This amount was then divided by the amount of vehicle purchase net outlay calculated for the average household income for Smithfield (derived from the ACS). The ratio of predicted purchase outlay for The Promontory households to the predicted purchase outlay for the average Town household was then applied to the average personal property tax per vehicle received by the Town to derive the average personal property tax per vehicle for households with an average income comparable to that of the proposed development's residents in reference to other households of the Town.

The number of vehicles owned per household for the average household income level of each residential type in the proposed development was then calculated. The average number of vehicles per household for the income level associated with the proposed development was first derived from the CES data. This was then adjusted for the larger number of vehicles per household among homeowner households in Smithfield (2.37 using ACS data) compared to all Smithfield households (2.08). Although the ACS underreports vehicle ownership, the relative difference in ownership by tenure was assumed to be valid.

Another adjustment was made to account for the somewhat larger actual number of vehicles per Smithfield household than predicted by CES data for average Smithfield household income (2.33 vehicles per household). The total number of vehicles taxed in Smithfield (8,184) was obtained from the Town Treasurer. Dividing this number by the number of households yielded an estimated 2.36 vehicles per household, compare to 2.33 vehicles per household predicted using CES data and Smithfield average household income. This adjustment was made by multiplying the income-based, tenure-adjusted estimated number of vehicles per household by 1.0126 (2.36 / 2.33).

Finally, the estimated number of vehicles per household at the proposed development was multiplied by the estimated personal property tax received per vehicle. This result was multiplied by the number of occupied units for the appropriate model type. The entire calculation can be demonstrated in the series of equations on the following page.

$$PPT_S = \sum PPT/V_P \times V/HH_P \times HH_{OP}$$

Where, PPT_S = Total personal property tax paid by The Promontory households to the Town of Smithfield
PPT/V_P = Personal property tax per vehicle for each residential type at The Promontory
V/HH_P = Vehicles per household at The Promontory for each residential type and
HH_{OP} = the number of occupied households for each residential type at The Promontory

$$PPT/V_P = PPT/V_S \times IA_{CES}$$

Where PPT/V_S = average personal property tax per vehicle in Smithfield and

IA_{CES} = the adjustment based on differences in household income

$$IA_{CES} = VE_{PM} / VE_{SI}$$

Where VE_{PM} = the vehicle expenditure calculated from CES data for the household income level for each residential model type and
VE_{SI} = the vehicle expenditure calculated from CES data for the average Smithfield household income

and

$$V/HH_P = V/HH_{CES} \times V/HH_{OACS} / V/HH_{SACS} \times V/HH_S / V/HH_{SIACS}$$

Where V/HH_{CES} = number of vehicles per household for each model computed from CES by income level
V/HH_{OACS} = number of vehicles per owner household in Smithfield from ACS
V/HH_{SACS} = number of vehicles per all Smithfield households from ACS
V/HH_S = actual number of vehicles per household in Smithfield and
V/HH_{SIACS} = number of vehicles predicted by CES data for an average income Smithfield household

The personal property tax collected by the County is then computed using the formula below:

$$PPT_{IoW} = PPR_S \times 3.9$$

Where PPT_{IoW} = the personal property tax received by the County and 3.9 is the County's tax rate (Smithfield's is $1.00 per $100)

The Town's motor vehicle registration fee was multiplied by the estimated number of vehicles per The Promontory household as calculated for V/HH_{CR} in the formula above.

Business Personal Property Tax

The Business personal property and machinery and tool taxes for commercial tenants were estimated using a business personal property assessment data set for calendar year 2016 (the latest year for which detailed information was available) obtained from the City of Newport News, Virginia. Businesses deemed comparable to the tenant mix at The Promontory were selected. Their square foot occupancy was calculated using City of Newport News real estate assessment data or online map measurements, and the business personal property assessment per square foot was then calculated.

Categories for which these estimates were derived are:

- fast food restaurants
- fast casual restaurants and
- car washes.

Banks do not pay business personal property taxes. While car wash equipment was considered business personal property in the Newport News data set, it is taxed as machinery & tools in Isle of Wight County.

The estimated assessed values for each category were converted into original cost by multiplying those values by 3 (Newport News assesses business personal property at one-third of original cost). The resulting original cost estimate per square foot was then converted to assessed value using the County's assessment formula (40% of original cost) and those assessment estimates per square foot were applied to the appropriate tenant space sizes to estimate a preliminary business personal property assessment for each business located at The Promontory.

The resulting estimated assessments were deemed to be a highly conservative, however, since the Newport News data set is based upon business equipment purchases made in the past at lower prices than if such purchases were made today. The Producer Price Index (PPI) for private capital equipment for nonmanufacturing industries was used to inflate the calculated assessed values to 2023 dollars. Since businesses located at The Promontory would purchase a variety of equipment, no further disaggregation of this category was attempted.

It was assumed that business equipment on average has a useful life expectancy of seven years. It was then assumed that the purchase of business equipment by Newport News businesses was equally distributed over a seven year period. In other words, The business equipment owned by those businesses may have been purchased or replaced at any time during the previous seven years. The latest PPI data is from December 2022. However, January was used as the reference month. This was assumed to reflect the prior year's inflation. Using the December data only slightly underestimates the rate of inflation for 2022 (applied to 2023).

The change in the PPI from each year to January 2016 beginning with January 2009 represents inflation from 2009 to 2015 dollars, since the last year in which equipment would have been purchased for 2016 assessment would be 2015, and 2009 would be the first year in which equipment would have been assumed to be purchased for this data set). The average of each year's calculated change in PPI was then computed (or each year's change was weighted by 1/7 and then summed). This average index of change in the cost of equipment (3.64% for the seven year period) was then applied to the preliminary assessment estimates to derive the final assessment estimates.

The PPI from January 2016 to December 2022 (an increase of 21%) was then applied to this interim assessment estimate to obtain the final business personal property estimates per square foot. This resulted in estimated business personal property original cost estimates of: $146.16 per square foot for the fast food tenant, $79.36 per square foot for the fast casual restaurant tenants and $89.275 for the car wash. A per-business estimate for the car wash was deemed to be more valid and reliable than a per-square foot estimate since and also yields a more conservative estimate of business equipment cost.

Given the nature of the expected outparcel tenants, it is assumed that all businesses located at The Promontory will be new to the County rather than relocated either from within the Town or from other parts of the County. Therefore, all business personal property revenue from the proposed development will be new to the County.

Local Option Sales and Meals Taxes; Business License Fee

Initial estimates of the sales and meals taxes and business license fee revenues to be received by the Localities are based upon estimates of business sales revenue.

A 2020 Statistica report on average sales per unit of leading quick service restaurant chains was used to estimate likely sales revenue for the fast food and fast casual restaurants. Based on this report, the fast food restaurant was estimated to generate up to $6 million in sales. A more conservative estimate of $4.1 million was used, however, based upon including average per-unit sales of the next leading competitor to the expected fast food tenant. The two fast casual restaurants were estimated to generate sales revenue of almost $2.5 million each. This estimate was based upon the Statistica report and a 2019 Bloom Intelligence report estimating sales per square foot for a limited service restaurant to be healthy, financially.

A U.S. Census Bureau report based on the 2017 Economic Census reports average car wash annual sales of almost $600,000. Since this data is based on 2016 sales, the CPI was used to inflate this estimate to 2023 dollars. This yielded estimated annual car wash sales of about $750,000. This should be considered a conservative estimate, since the data includes older an non-automated car washes.

Banks are not subject to taxes based on business income.

Adjustment of Business Income

Potentially, not all tax revenue generated by The Promontory commercial establishments will be new to Isle of Wight County and the Town of Smithfield. A regression analysis study conducted by the Consultant in Newport News, Virginia showed that market growth was the dominant factor in predicting increases in sales tax revenue for the City and that the addition of retail space had no effect on the growth of sales tax revenue. Given that retail supply does not create its own demand, new commercial establishments must compete with existing commercial establishments for market share, whether of the existing market base or for additional market demand associated with new residential development or reduced residential vacancies.

A location analysis was undertaken to determine the extent to which the businesses anticipated to locate at The Promontory would compete with other businesses in the Town or in the County, thus redirecting sales from those establishments to the new businesses. To the extent that sales are redirected, the Localities would receive no new revenue from taxes levied on sales or business income. This analysis was conducted in two parts. The first part examines potentially competing establishments in the Town. Revenue redirected from establishments located in Smithfield would produce no new tax revenue for the Town (and no new local option sales tax revenue for the County).

The next part examines potentially competing establishments in the County. Revenue redirected from establishments in the County would generate a loss of meals and business license tax revenue for the County and a gain in this tax revenue for the Town. Neither the County nor the Town would receive net new local sales tax revenue from sales redirected from the County.

A location analysis is based on an assumption that shoppers will consider distance in their shopping decisions and that, all other things being equal, the propensity to shop at a certain location is exponentially related to the drive time (or walking time) distance from the consumer to the retail outlet. Travel time is scored, with 1 minute scored as 1, 2 minutes scored as 0.5, 3 minutes as 0.333, etc. This score is termed the distance gradient.

With respect to estimating retail redirection, distant gradient scores represent a consumer's propensity to shop at locations in the existing array of competing stores. While technically, a set of distance gradients should be calculated for each household in the Town and the County, this is impractical and the Site location was considered to be a valid proxy for all potential consumers in the Town and County. Taking the Site as the source location effectively measures the propensity for The Promontory business to redirect sales from existing competitors to The Promontory business.

To compute this propensity, the distance gradient scores for existing establishments in the Town, the County and locations outside the County were summed, respectively. These sums were then divided into the sum of all distance gradients, producing a percentage score. That percentage score represents the percentage of all retail redirection taken from each of the subject geographic areas. Putting new demand created by The Promontory households aside for now, all sales by The Promontory businesses were assumed to be redirected from some other existing establishment located in the Town, the County or elsewhere. Only the percentage of sales redirected from outside the Town were assumed to generate new meals and business license revenue for the Town and only sales redirected from outside the County were assumed to generate new local option sales tax revenue for the County and the Town. Sales redirected from the County to The Promontory businesses would decrease the amount of revenue from meals and business license taxes received by the County.

Location analyses were conducted for a fast food business, the fast casual restaurants and a car wash. Fast food establishments selling similar fare to the anticipated fast food tenant were identified in Smithfield, the County and outside of the County. Only closest same-brand establishments were used in the location analysis except where two locations were relatively equi-distant, in which case the distance gradient was divided by two so that the brand would only be counted once in the calculation.

Other fast food establishments with which the anticipated tenant may compete indirectly were also identified. These were establishments selling a different type of fare for which the fare sold by the anticipated tenant could be substituted. Consumers who currently patronized these establishments were assumed to prefer that type of fare but to have some taste for variety and, hence, would occasionally switch to the fare sold by the anticipated tenant, it being now more readily available and a brand currently not available within close proximity. Lacking any data on the propensity to substitute, these establishments were weighted by one third compared to establishments selling similar fare to that sold by the anticipated tenant.

Six directly competing fast food restaurants were located in the search. One is located in the County and the remaining five are all located outside the County, in Suffolk, Hampton and Newport News. Eight indirectly competing fast food establishments were found. Seven are located in the Town of Smithfield and one is located in the County. Applying the distance gradients, it was determined that 59.25% of The Promontory fast food establishment sales would be redirected from fast food establishments located in the Town, 18.86% of sales would be redirected from establishments located in the County and 21.89% of sales would be redirected from establishments located outside the County. Tax revenues derived from The Promontory fast food sales were adjusted accordingly.

The same methodology was applied to the fast casual restaurant sales. In this case, the distance gradient scores were divided by the number of establishments offering similar fast casual fare, as well as those same-brand establishments that were relatively equi-distant. Six categories of fast casual restaurants were identified: sandwich shops; higher end bread and sandwich plus restaurants, bagel stores, pizzerias, Chinese take-out/dine-in, and fast Mexican fare. Fifteen fast casual restaurants were identified in the market area. Six are located in Smithfield, one is located in the County and the remainder are located in Suffolk, Hampton, Newport News and Norfolk.

Additionally, a proxy for local Smithfield family style restaurants was included, assuming that some sales would be redirected from those establishments, as well. Applying the distance gradients, it was determined that 76,59% of The Promontory fast casual restaurant sales would be redirected from businesses located in Smithfield, 9.34% would be redirected from the County, and 14.07% would be redirected from fast casual restaurants located outside the County.

Two automated car washes were identified in the County, one of them being located in Smithfield. Car wash purchases are expected to be highly convenience oriented with respect to choice of car wash. Because motorists are not likely to travel to other municipalities for a car wash, all The Promontory car wash sales were assumed to be redirected from the Town or County. The distance gradient analysis estimated that 59.09% of car wash sales would be redirected from the car wash located in the Town and that 40.91% would be redirected from the car wash located in the County. It is recognized that some consumers who wash their own cars who live closer to The Promontory may now choose to pay for an automated car wash due to the more convenient location. However, it is not possible to accurately estimate what percentage of sales may derive from this source. It is also recognized that residents of The Promontory are highly likely to patronize The Promontory car wash and that this would generate new business license fee revenue for the Town. The methodology for estimating this new tax revenue is presented under "Tax revenues generated by households," below.

Since the bank does not generate any sales-based tax revenue for the Localities, no estimate of redirected business was necessary for the proposed bank.

Other Direct Taxes and Fees

Estimates of the vehicle rental tax remitted to the Town by the Commonwealth and the cigarette tax collected by the Town attributed to the proposed development were calculated using methodologies similar to that used to calculate PPT/V_{CR} in the formula above, substituting the average amount of tax for the average personal property tax per vehicle. Thus, the vehicle rental tax per household ($3.13) was adjusted for expenditures by household income using CES data for vehicle rental expenditures.

The average consumption tax per household was estimated to be $3.37 and the average consumption tax per The Promontory business was estimated to be $45.17, based on calculations from the amount of revenue budgeted and an assumption (derived from U.S. Energy Information Administration data) that an average business will use 23 times the electricity as an average household (but 13.4 times residential usage for The Promontory businesses). In estimating revenues per household from local utility taxes on electric and natural gas service, the maximum residential utility tax levies were assumed (as these are capped at relatively low levels). Commercial usage was estimated to be sufficient to be capped at the maximum commercial utility tax rate.

User fees per household were calculated by dividing revenues estimated to be received in FY 2023, as reported in the *Budgets,* by the number of households or households and businesses, as appropriate, located in each Locality. For the County, per household user fee revenue was calculated for animal licenses, Commonwealth Attorney fees, concealed weapons permit fees, court security and building fees, court fines and forfeitures, EMS fees, Parks and Recreation fees and Sheriff's fees. Animal license, concealed weapons permit, and Parks and Recreation fees were calculated for households only. Other fees were deemed paid by businesses as well as households.

For the Town, user fee revenue was calculated for fines and costs and fingerprinting fees,. Fee revenue was also calculated for kayak rentals, various other rentals (including the Smithfield Center, sports complex and Windsor Castle manor house), and park impact fees. These, however, were calculated on a per County household basis, rather than on households in the Town, since these revenue sources are derived from a wider population. Fees for fines and costs, fingerprinting, and WC Manor House and Luter Sports Complex rentals were assumed to be paid by businesses as well as households, with the remaining fees paid by households only.

For certain revenues calculated on a per-Locality household basis, adjustments were made for the somewhat larger household size anticipated at The Promontory relative to both the County and the Town. These adjustments were made for Commonwealth Attorney fees, Court security & building fees, EMS charges, fines and forfeitures, park impact fees, Park and Recreation fees, Sheriff's fees and weapons permits for the County; and for fines and costs, and fingerprinting fees for the Town. It was assumed that businesses paid a higher consumption tax than households.

Based upon data from the U.S. Energy Information Administration, it was assumed that businesses paid more than six times the consumption tax, on average, than did households. The business unit in the formula used to distribute revenues and costs among households and businesses (see below under "Cost Calculation") was, therefore, multiplied by this factor. These adjustments are reflected in the revenue per household calculation shown in Tables A-4A and 4B. Tables A-4A and A-4B, on the following page, detail variable revenues from the County and the Town, other than those derived from the direct levy of taxes on the project.

Tax rates and fees found on the current County and Town websites and/or reported in the *Budgets* were used and assumed to be accurate.

Household water consumption was estimated using an industry standard of 74 gallons per day per person derived from the American Waterworks Association (AWA). This yields an estimated 193.1 gallons per day consumed by households at The Promontory. This compares to approximately 103.25 gallons per day consumed per County water account (based on estimated 2023 annual water sales or 150,748,250 gallons (rounding to the nearest 50 gallons). County water sales were computed using FY 2017 water sales data received from the County proportioned to the change in water sale revenue from the FY2017 to the FY 2023 *Budget,* adjusted for the change in water rates. Current data on water sales was not able to be obtained from the County.

Table A-4A Isle of Wight County Variable, Non-Direct Per-Household and Per-Business Revenues, FY 2022-2023			
Item	Revenue	Revenue per Household	Revenue per Business
Animal Licenses and Adoption Fees	$ 70,000	$ 4.64	$ 0.00
Commonwealth Attorney Fees	$ 3,000	$ 0.19	$ 0.19
Concealed Weapons Permits	$ 40,000	$ 2.74	$ 0.00
Court Fines & Forfeitures, Code Violations	$ 85,000	$ 5.48	$ 5.32
Court Security & Building Fees	$ 115,000	$ 7.42	$ 7.19
EMS Fees	$1,000,000	$ 64.53	$62.55
Impound Fees	$ 1,000	$ 0.06	$ 0.06
Parks and Recreation Fees	$ 231,350	$ 15.83	$ 0.00
Sheriff Fees	$ 4,000	$ 0.26	$ 0.25
Total	$1,549,350	$101.15	$75.56

Revenues rounded to the nearest $25

Table A-4B Town of Smithfield Variable, Non-Direct Per-Household and Per-Business Revenues, FY 2022-2023			
Item	Revenue	Revenue per Household	Revenue per Business
Consumption Tax	$ 50,100	$ 10.93	$ 69.33
Fines and Costs	$ 47,200	$ 13.58	$ 12.95
Fingerprinting Fees	$ 100	$ 0.03	$ 0.03
Kayak Rentals	$ 13,000	$ 0.86	$ 0.00
Refuse Collection Fee	$218,950	$ 71.93	$ 0.00
Rental Income	$351,725	$ 22.00	$ 22.00
Total	$681,075	$119.33	$104.31

Revenues rounded to the nearest $25

A study on water use by the University of Florida, *Methods for Estimating Commercial, Industrial, and Institutional Water Use,* was used to estimate water consumption by the commercial establishments at The Promontory. According to the International Car Wash Association, the average car wash processes 132 cars per day. Water usage estimates range from 40 to 85 gallons per car. Taking the midrange, an estimate of 65 gallons per car was used. Thus, a car wash can be expected to use 8,580 gallons of water per day.

The County's water rate was applied to these estimates of water consumption, with the County's bi-monthly meter fee added to calculate annual revenues from water consumption. All water usage was assumed to be applicable to the calculation of sewer charges.

A refuse collection fee was recently levied by the Town. This was assumed to apply to all single-family attached and detached units and to duplex units within the Town. Data on the number of units falling into these categories was collected from the ACS and per-household revenue was calculated using this as the denominator rather than all household. Additionally, Town residents may bring recycling and large items to the County's collection center and, therefore, a cost to the County would be generated. However, data does not exist that would allow an estimate of this cost.

Additional revenues generated by households are estimates of taxes paid by Isle of Wight County and Smithfield businesses due to purchases made by the proposed development's residents. Purchases by The Promontory residents are estimated based upon their projected spending patterns. These spending patterns were estimated using the CES.

Household incomes were estimated for the proposed development's residents based upon the projected sale price of residential units. A housing price-to-income ratio of 4.4-to-1 was assumed, based on recent conversations with area mortgage brokers. The proposed development's household incomes were, thus, estimated by dividing average unit sale prices by 4.4. This resulted in an average income estimate for households at the proposed development of $120,325, with average incomes for specific models and product types ranging from $90,900 to $147,725. This compares to the average 2023 estimated countywide household income of $120,425 and average household income for the Town of $128,575.

Median incomes for the County and the Town, respectively, were estimated to be $96.950 for the County and $106.400 for the Town. Average and median incomes were estimated using the latest available ACS data (2021 5-year average) multiplied by 80% of the CPI inflation measure for the last four years (assuming incomes have lagged inflation somewhat). A four year growth period was used because the 2021 5-year average income is a rolling average and, therefore, a single-year estimate was calculated from its midpoint. This resulted in an 14.51% assumed rate of income growth, compared to the nearly 27% change in income using the ACS 2017-2021 average income levels for the County and 29% rate of change calculated for the Town.

Estimated average and median incomes for each model and product type are displayed in Table A-5, on the following page.

These spending estimates were then used to calculate local sales and meals taxes generated by the proposed development at businesses located in Isle of Wight County and in Smithfield, as well as the business license fees from revenue generated by this spending. Using a methodology similar to that used to estimate spending on vehicle purchases, average household spending for households with income levels equivalent to those predicted for The Promontory households was estimated for food at home, food away from home, other retail, and service spending.

Table A-5 Estimated Household Incomes, The Promontory	
Residential Product	Average Household Income
Single-Family Detached	
Model 1	$131.825
Model 2	$136,350
Model 3	$143,175
Model 4	$147,725
Townhomes	$ 90,900
Villa SF-Attached	$100,000
Average Detached Product	$139,775
Average Attached Product	$ 92,600
Isle of Wight County Average	$120,425
Smithfield Average	$128,575
Isle of Wight County Median	$ 96,950
Smithfield Median	$106,400

Adjustment was made for purchases made outside the County. The adjustment for purchases made outside the County was based on a calculation of the leakage of retail spending from the County. This was accomplished by comparing the per-household spending levels predicted with CES data (using spending predicted for the County's average household income level) to actual retail spending in the County. The County's average per-household income was obtained from the ACS and retail spending in the County was obtained from data on taxable retail sales as reported by the Weldon Cooper Center for Public Service, Center for Economic Policy Studies, at the University of Virginia, 2021 annual data (with data derived from the Virginia Department of Taxation).

Some CES spending categories were collapsed or distributed among the NAICS store categories contained in the Weldon Cooper data in order to arrive at four category groupings—food at home (grocery and convenience store spending), food away from home, and other retail spending. Retail sales in each category group were divided by the retail spending predicted for that category group using CES data to compute the percentage of household spending in Isle of Wight that was retained within the County and, thus, generated tax revenue for the County.

Overall, it was determined that 62.28% of household retail spending occurred within the Isle of Wight County. For grocery item spending, the retail leakage analysis indicated an influx of grocery spending into the County and, thus, 100% of grocery spending retained within the County. This could be the result of residents of outlying, more rural counties patronizing grocery outlets in Isle of Wight County.

However, Food Lion on Church Street, Kroger at Smithfield Shopping Center and the new Publix at The Crossings in Carrollton are the only major grocery stores located in Isle of Wight County. While the daily shopping and the majority of weekly grocery shopping for The Promontory residents can be expected to occur these stores due to their proximity to the proposed development, those wishing to shop at higher end grocers (Fresh Market, Trader Joe's and Whole Foods) or a buying club (BJs, Costco, Sam's Club) will have to do so outside Isle of Wight County.

It was assumed that The Promontory residents would do their daily and convenience grocery shopping and a substantial amount of their weekly grocery shopping at the Isle of Wight grocers. It was assumed that the average The Promontory household could be expected to conduct at least 10% of their grocery shopping at the specialty "organic" grocers and at buying clubs located outside of Isle of Wight County. Thus, the percentage of grocery spending by The Promontory households assumed to be retained within the County was estimated to be 90%.

Cigarettes are typically purchased at grocery stores so the percentage of tobacco spending occurring in the County was also estimated to be 90%. It was assumed that cigarette purchases made in Smithfield came from a wider population than just the Town. Consequently, the estimated number of households for the surrounding Census tracts (2801-01, 04, 05 and 06), which includes Smithfield, was used as the denominator to calculate the cigarette tax per household. A cigarette tax of $32.73 per household was calculated.

The percentage of food away from home spending retained within Isle of Wight County was estimated by the retail leakage analysis to be 92.73%. For most other retail categories, the County experiences significant retail leakage, as the closest department stores, category-killer stores and shopping malls are all located in Hampton, Newport News and Suffolk. Only 24.78% of other retail spending was estimated to occur within the County.

However, the Weldon Cooper data does not include on-line purchases, for which the home address of the purchaser is considered the point of sale. Thus, localities would be remitted the local portion of sales tax collected on on-line purchases made by their residents. Most on-line sellers now automatically add sales tax to their charges. According to the *Budget*, 34% of purchases in the County are made on-line. On-line food purchases were assumed to be made for delivery or take-out from local stores or restaurants and, so, was not assumed to have an effect on taxes generated from spending on food. The metric estimating online shopping was assumed to apply evenly to food and non-food purchases and, so 34% of all non-food spending on goods was assumed to be online and, therefore, 100% local. Thus, the 75.22% leakage in other retail spending was only applied to 66% of estimated household spending on non-food goods.

Personal service spending (hair and nail salons, dry cleaners, etc.) and spending on other services was assumed to be highly convenience oriented. Few Smithfield residents were assumed to travel outside the County to patronize these services. Thus, it was assumed that 100% of service spending (for categories on which the CES reports) to remain within the County.

An exception was made for medical services, given that there is no major hospital located in Isle of Wight County and residents are likely to visit doctors affiliated with hospitals in Suffolk, Hampton or Newport News whose offices are in those localities. In the absence of data and consideration that patronage choices in this case are not likely to be influenced by distance to the extent occurring otherwise, 50% of medical service spending was assumed to occur outside the County.

Based upon these estimates of retail spending retention, local sales and meals taxes and business license fees calculated from predicted retail spending by the proposed development's households were reduced by 10% for grocery spending, 7.27% for food away from home spending, 49.65% for all other retail spending and 50% for medical services spending—the amounts of estimated grocery, restaurant, other retail and medical services spending leakage out of the County. The adjustment for restaurant spending was modified further as discussed below.

Additional adjustments were then made for the distribution of the local option sales tax revenue between the County and the towns and for meals tax spending occurring within the Towns of Smithfield and Windsor. The local option sales tax remitted by the Commonwealth to the County is divided by between the County and the towns based upon the proportion of school children generated from each jurisdiction. The percentages retained by the County (84.53%) and the Town of Smithfield (11.87%) were derived from the Commissioner of the Revenue and applied to the estimated net new local option sales tax revenue expected to be generated by the proposed development.

However, meals taxes and business license fees accrue to the Locality in which the establishments are located at which residents of the proposed development shop. In order to determine the likelihood that The Promontory residents would shop in Smithfield rather than at establishments located in the County, a location analysis was performed for all three shopping categories. This involved a modified gradient model methodology which was described above to estimate retail redirection.

The gradient model, briefly described, plots retail locations and their distances from the subject development. All other things held equal, it is assumed that shoppers are less likely to patronize competing retail outlets the farther the distance from their residence. To estimate propensity to shop in the Town versus elsewhere in the County, distance weighted scores are disaggregated by the Town and the County.

Gradient models were developed for groceries, food away from home, other non-grocery retail spending and services. Distance gradients were measured for the Food Lion and Kroger in Smithfield and for the future Publix in the County. Based on this analysis, it was estimated that, of grocery shopping occurring in the County, 82% would occur at the two grocers in Smithfield.

A Google Map search identified 10 fast food establishments and 29 restaurants in Isle of Wight County. Nine of the fast food establishments and 19 of the other restaurants were located in Smithfield. To perform the distance gradient analysis, the proposed fast food tenant and the two fast casual restaurants at The Promontory were added to this mix. The result of the distance gradient analysis was that 93.9% of the fast food spending occurring in the County by The Promontory residents would be at establishments in Smithfield and 87.99% of fast casual, ethnic and family style restaurant dining by The Promontory residents would occur in Smithfield.

Although the leakage analysis predicts that 92.73% of food away from home spending would occur in Isle of Wight County, it can be expected that the dining behavior of The Promontory residents may be somewhat more wide-ranging than indicated by the leakage quotient. Furthermore, some of the apparent capture of County resident spending within the County may actually reflect spending by tourists and visitors to Smithfield. Isle of Wight County contains no national brand restaurants and few fine dining or destination restaurants. For those dining experiences, County residents must travel to downtown Portsmouth or downtown Norfolk, or to Harbour View in Suffolk, Chesapeake Square or the Patrick Henry area of Newport News.

Given the discretionary spending levels assumed for residents of The Promontory, it was assumed that 15% of total dining would occur outside the County. It was also assumed that 35% of total dining would occur at fast food establishments or take-out from convenience stores, etc. The remaining 50% occurring at other sit-down restaurants. For analysis purposes, these were assumed to have the same Town-County distribution as fast casual establishments.

Therefore, applying the ratios of dining in Smithfield versus the County, the following metrics were calculated. For calculation of local option sales tax revenue, 85% of dining was assumed to occur within the County. For meals tax and business license fee estimates, 76.86% of dining expenditures by The Promontory residents were assumed to occur in Smithfield and 8.14% were assumed to occur elsewhere in the County. It was assumed that little if any dining by The Promontory residents would occur in the Town of Windsor.

Another adjustment was made in order to avoid double counting of expenditures by The Promontory residents at the food establishments to be located at The Promontory. Based on the location analysis described above and the assumptions about spending outside the County, it was estimated that The Promontory residents would spend 12.72% of their food away from home budget at The Promontory fast food establishment and 14.85% of their food away from home budget at the two fast casual restaurants at The Promontory. Based on CES data and estimated household income, spending by The Promontory residents at The Promontory fast food establishment was estimated to be $141,000, rounding to the nearest $100, and spending at the two fast casual restaurants was estimated to be $164,600.

As previously discussed, much of sales from these establishments are assumed to be redirected from similar establishments located in Smithfield or the County. Since a share of the spending by The Promontory residents at these restaurants would be redirected from other establishments in Smithfield or the County and, thus, otherwise produce new revenue for the Localities, such spending should still be counted as generating new and unique revenue for the Localities and only that portion of The Promontory resident spending that would otherwise occur outside the Town and/or County should be viewed as being double counted and deducted from the estimate of tax revenues generated by households. In other words, The Promontory resident dining spending that would otherwise have occurred at restaurants located in the County were never counted as generating new tax revenue from The Promontory businesses and, therefore, that revenue would not be double counted. Applying this formula, 4.87% of sales tax generated by food away from home spending was deducted from taxes generated by households for both the County and the Town, and 4.87% of meals taxes generated by households for the County were deducted from taxes, and 8.66% of meals taxes generated by households for the Town were deducted.

For the other retail and service analyses, similar establishments were identified in the Town and the County, as well as establishment types that are located only in either the Town or the County. While some establishments located in the County were individually identified (those in Benn's Church and Carrollton) , others were assumed based upon the number of establishments by category derived from either the above-referenced Weldon Cooper Center data or data from the Virginia Employment Commission *Quarterly Census of Employment and Wages* (QCEW) by subtracting the number of individually identified establishments. These assumed establishments were considered to be scattered throughout the County and an average driving distance of 30 minutes was assumed in order to calculate the distance gradient, based on the average driving time to other Isle of Wight communities (Carrsville, Isle of Wight, Windsor and Zuni).

CES data on average expenditure per household by establishment category were used to weight establishment gradient scores to reflect likely household buying patterns. In some cases, weights were adjusted to account for greater sensitivity to distance or a store that was significantly larger than the average of the group. In other cases, such as insurance agents where distance matters much less, a straight percentage based upon establishment location in either the Town or the County was used. The weighted distance gradient scores were then used to estimate the percentage of other retail and service spending from The Promontory households occurring in the Town and in the County.

It was estimated that, of non-food retail spending that would occur within Isle of Wight County, 50.4% would occur at businesses locate in Smithfield and 49.6% would occur at businesses located in the County outside Smithfield. For services, it was estimated that 57.4% of spending retained by the County would occur in Smithfield and 42.6% would occur elsewhere in the County. Further, it was estimated that 54.9% of the business license fee generated by The Promontory spending would be from retail establishments, 21.3% would be generated by business and other service establishments, and 23.8% by professional service establishments, chiefly medical. Estimated business license fee revenue generated by The Promontory households was distributed accordingly, with retail-based business license fees being the "known" quantity in the equation.

Cost Calculations

Costs per household were estimated separately for the County and the Town. Costs were divided into five categories: general government operating costs, general government capital costs, education operating costs, education capital costs, and enterprise fund costs. As the Isle of Wight Public Schools receive local funding from the County and not the Town, the Town bears no education costs.

Certain special funds in the County *Budget* are treated as belonging to the general fund, even though they are separate from the general fund for budgetary purposes. These include functions that are often included in the by many localities in the general fund and do not constitute separate enterprises. These funds are shown below:

- Children's Service Act (although not applicable to the proposed development)
- County Fair (a fixed cost)
- Emergency 911
- Grants Fund (self-sustaining)
- Risk Management
- Social Services (although not applicable to the proposed development) and
- Technology Service Fund (although a fixed cost)

General government operating costs and capital costs were calculated on either a per household basis or on a per capita basis and, then, converted to cost per household. Costs calculated on a per capita basis were converted to a per household measure by multiplying the per capita cost by 2.61 (the number of persons per household estimated for The Promontory). This was the average household size for owner-occupied households in the Town of Smithfield (see below for the estimation of household sizes). Cost data and assumptions were derived from the *Budgets*.

Variable per household cost of public services other than education. As stated above, variable cost estimates for services provided by the Localities' general government were derived from their respective *Budgets*. Some public services are consumed by households only and some public services are consumed by households and businesses (i.e., recreational services would be assigned completely to households, since businesses do not directly consume these services). For those public services that serve businesses and households, the costs generated by businesses and the costs generated by households must be distinguished and only costs generated by households attributed to the proposed development.

Per household and per business variable operating costs were determined in the following manner. Business establishments and households were considered to be equal from the standpoint of generating public service costs, when both households and business establishments consumed those services A percentage of each service shared by households and businesses was allocated to households or businesses according to the formula on the following page.

% allocated to households = # households / [#households + # businesses]
% allocated to business = # businesses / [#households + # businesses]

Per household costs were then determined according to the formula below:

Expenditure per household =
[Expenditure] x [% allocated to households] / # of households

Per business costs were determined according to the following formula:

Expenditure per business =
[Expenditure] x [% allocated to business] / # of businesses

Governmental functions that serve both households and businesses are shown below:

- adult criminal justice (5th District Court Services, Clerk of Court, Commonwealth Attorney, Prisoner Confinement, Sheriff and the Town's Police Department, since crimes are committed against (and by) businesses as well as persons
- Assessment (both business and residential property are assessed)
- Commissioner of the Revenue and the County and Town Treasurers (both businesses and households are taxed)
- Emergency E-911, Emergency Services and Fire & Rescue Response (responses to events occur at businesses and households)
- Public Utilities (both businesses and households are billed) and
- Budget & Finance, Human Resource, Risk Management and Unemployment Insurance (which support all County governmental functions).

Certain per household costs were then adjusted to take into account the somewhat larger household sizes at The Promontory compared to each Locality's overall average household size. The calculation of the estimated household size for The Promontory households was made using 5-year average 2021 ACS data for the Town of Smithfield (in which the proposed development is located). Household size was calculated for owner-occupied housing since all units in the proposed development will be for sale. The Countywide and Town household sizes were derived from the ACS household size tables for the County and the Town, respectively. To adjust Locality expenditures to estimate costs per The Promontory household, the person per household estimate for households in the proposed development (2.61) was divided by the person per household estimate for all County households (2.53) to calculate the adjustment factor (1.0316) and by the person per household estimate for all Town households (2.49) to calculate the adjustment factor (1.0482).

The per household cost of governmental functions that serve persons, rather than households, was adjusted according to the following formula:

Expenditure per owner household = [Expenditure per household] x [persons per owner households] / [persons per all households]

Government functions that are sensitive to household size were

- criminal justice functions
- emergency services/EMS
- Emergency E-911 and
- recreation.

Certain contributions to regional organizations made by the County are based on a population formula. These contributions were calculated on a per-capita basis and then converted to a per-household cost using The Promontory persons-per-household estimate according to the formula shown below:

$$E_{HH} = E / P \times P_{CR}$$

Where: E_{HH} = Expenditure per household
E = Regional organization contribution
P = County population and
P_{CR} = The Promontory persons-per-owner household

The County's 2023 population (40,683) was estimated by multiplying the 2020 Census population count by the rate of population increase from 2018 to 2021 (from the 5-year ACS population estimates). Regional organizations for which costs were calculated are shown below:

- Blackwater Regional Library Services
- Hampton Roads Military and Federal Facilities Alliance
- Hampton Roads Planning District Commission and
- Senior Services of Virginia

The County also made contributions to certain regional criminal justice functions based on usage. Usage was assumed to be corelated with the number households, with the cost per household also adjusted for differences in household size.

The County performs a real estate re-assessment every four years which it contracts out. Thus, the annual cost of the re-assessment is equal to 25% of the total of this contract amount and other associated costs. Costs were taken from FY 2020, FY 2021, FY 2022 and FY 2023 as shown in the FY 2023 and FY 2020 *Budgets.* Associated costs included the extra cost of advertising, postage, office supplies and training. The cost of contract professional services for the quadrennial assessment is now placed into a reserve fund, with $100,000 budgeted for this fund annually. The average annual assessment cost was allocated on a per parcel basis using the number of real estate parcels from the *Budget*. The Assessor's Office also performs an initial assessment for new construction and real estate transfers. This assessment is also contracted at a cost of $40 per parcel.

An initial assessment is assumed to occur for each parcel when the site is platted, as well as when each unit is sold. Ancillary postage and mailing costs were estimated to be $0.75 per parcel and this was added to the contracted initial assessment cost. Staff costs associated with initial assessments are included in the Commissioner of the Revenue variable cost analysis, and the Commissioner's Office's workload from initial assessments is assumed to be absorbed without any increase in staff positions or overtime.

Although cost per voter is generally the most appropriate metric for calculating the Registrar variable cost per unit of measure, the fact that The Promontory households are not expected to be appreciable different in size than the average County household, and most of the difference can be attributable to differing number of children, it was deemed appropriate to use households as the unit of measure for Registrar variable costs.

Government functions for which the proposed development's population would generate no significant demands were then excluded. These included:

- Social Services/Social Services-Children's Services Act Fund (household income levels of residents of The Promontory make it extremely unlikely that these households will ever demand social services from the County)
- Virginia Cooperative Extension Service (serves the rural areas of the County)
- Western Tidewater Community Services Board (primarily serves the Medicaid-eligible population) and
- Western Tidewater Health District (primarily serves lower income population).

Government functions that would be performed regardless of population size were excluded. These included the functions listed on the following page and are items in the County *Budget* unless otherwise indicated.

- the chief executive and legislative functions of the County and the Town
- administrative divisions of various departments
- Capital Projects Fund
- Communications (which is a 1-person office in the County)
- Contributions of the Town to the County for Parks, Recreation and Culture
- County Attorney
- County Fair Fund
- Debt Service
- Economic Development
- Grants Fund
- Local Organizational Support (except as noted)
- Non-departmental (except unemployment contributions)
- Parks and Recreation – Gateways and Grounds, Windsor Castle Park and the Town's other parks expenditures
- Public Works – Buildings and Grounds, Capital Programs and Inspections, and Transportation, and Public Buildings for the Town
- Road Maintenance (which is provided by VDOT)
- Support by the Town of various venues including the Luter Sports Complex, the Museum, and the Smithfield Center
- Technology Services Fund
- Tourism/Markets

It is reasonable to expect that existing staff of the County's Planning & Zoning and Inspections Departments and the Town's Community Development and Planning Department would handle the workload created by the development of the proposed development. The costs of these functions were, thus, counted as fixed costs and not included as a public service cost attributable to the proposed development.

The Town's cost for trash collection was assumed to mostly be for the Southern Public Service Authority (SPSA) tipping and hauling fee. The cost was calculated on a per household basis, with the cost per household closely matching the tipping fee for an average Smithfield household, based on the number of pounds generated per person per day (2.3452 from the EPA's *Facts & Figures on Materials, Waste and Recycling*).

For functions which are a one-person office that is not likely to be expanded due to population growth but which have other variable costs, such as office supplies, personnel costs were excluded from the variable cost calculation.

These functions included:

- Circuit Court
- General District Court
- Juvenile and Domestic Relations Court and
- Magistrate

Certain administrative support functions can be viewed as fixed costs (since they must be provided) but have a variable cost component (since they serve County functions that incur variable costs due to population growth). A percentage of the variable costs of these functions were thus counted in the cost calculations. This percentage was calculated to be 40.37% of budgeted cost of these functions for households. This was obtained by dividing total variable cost salaries into the amount of total salaries in the County's operating budget. A separate calculation was performed to determine the variable cost for the support by these departments of businesses, as certain functions do not serve businesses. The variable cost percentage for businesses was calculated as 36.92%.

Functions to which this percentage was applied included:

- Budget & Finance
- Human Resources
- Purchasing
- Risk Management – workers' compensation and
- Non-departmental – unemployment payments.

For Risk Management line-of-duty insurance, the percentage of variable cost salaries in the Fire and Rescue and the Sheriff's departments (74.03% for households and 69.35% for businesses) was applied. Purchasing was formerly a one-person office. However, the addition of the junior accountant position indicates the potential for adding staff due to expanding workload. The junior accountant position, though specialized, was counted as a variable cost.

Various adjustments were made to expenditure line items to arrive at the Localities' variable costs of providing public services. Generally, positions that must be provided for a department to function and that will not expand due to population growth ("fixed cost positions") were excluded from the cost analysis. Salaries for fixed cost positions were identified in the *Isle of Wight County, Virginia Position Classification and Compensation Plan, 2020-2021 Fiscal Year* (the latest available at the time data for this fiscal impact analysis was collected) and the *Town of Smithfield FY 2022 Compensation Plan*. The mid-point of the ranges were used to estimate salaries. The salaries for County Constitutional Officers was provided by the County's Human Resources Department.

Fixed cost positions included the director and assistant director, or equivalent position(s). For the County's E-911, the Sheriff Captain position was deemed to be equivalent to the director of this division. In the Sheriff's office, the Major was deemed to be equivalent to an assistant director and, the Captain was deemed to be equivalent to division head. Also, the four Sheriff deputies assigned to court security and the Court Security Officer are required regardless of population change and were considered to be fixed cost positions. In Fire & Rescue Response, the Fire & EMS Captains were deemed to be equivalent to assistant directors and the Fire & EMS Lieutenants were deemed to be the equivalent of administrative managers. The Fire Chief's position was contained in Emergency Services. In the Town's Police Department, the two lieutenants were viewed as equivalent to division managers for patrol and investigation activities but the Sergeants in those divisions were viewed as higher ranking line officers and not counted as fixed cost positions.

Fixed cost positions also included certain specialized, single-person positions for which a second person is not expected to be added in the foreseeable future.

These specialized positions included:

- Medical Billing/HIPPA Supervisor (Emergency Services)
- Human Resources Coordinator
- IT Support Specialist II (Emergency Communication Center)
- Kennel Assistant (Animal Control)
- Office Manager or equivalent position, and
- Recreation Manager

Furthermore, only the accountants and technicians positions in Budget and Financing and only part-time employment of the Electoral Board were counted as variable cost positions in those departments. Salaries for these positions were also identified using the *Position Classification and Compensation Plan.*

Fringe benefits and other costs associated with personnel are shown for all personnel within a budget function and must be disaggregated for fixed cost personnel and subtracted from costs, as well. These costs included are shown on the following page.

- 457 deferred compensation (County only)
- Disability benefit (Town only)
- FICA
- group life (County only)
- health or hospital/medical plans
- travel and training
- uniforms and wearing apparel and
- VSRS retirement.

For the Sheriff, these costs also included fleet expenses and, for the Town Police Department, this also included vehicle maintenance, gas and tires; line of duty insurance, other insurance (assumed to be primarily vehicle insurance), and equipment.

Fringe benefit and other costs associated with fixed cost positions were removed proportionally according to the formula shown below:

$$FB_{FC} = FB \times (S_{FC} / S)$$

Where: FB_{FC} = fringe benefit and other personnel associated costs assigned to fixed cost positions
FB = all fringe benefits and other personnel associated costs
S_{FC} = salaries of fixed cost positions
S = all full-time salaries (of the department or division)

In applying this formula, a distinction was made between FICA, which is paid on all salaries and wages, and other fringe benefit categories, which generally are applicable only to full-time employees. Thus, for the FICA calculation, part-time salaries and overtime were added to full-time salaries for S. Separate calculations were also performed when an item was a cost for part-time personnel (e.g., uniforms), in which case the denominator was full-time and part-time regular salaries.

Various other types of line item costs were also excluded as fixed costs to the Localities. These included items shown below and on the following page.

- advertising (except Electoral Board, Human Resources, Real Estate Assessment and Treasurer)
- books and subscriptions (except Commissioner of the Revenue)
- building and grounds maintenance
- capital costs
- computer and technology expenses
- copier costs
- dues and associated memberships
- equipment
- insurance
- leases

- professional services (except Assessor, Juvenile Accountability, Fifth District Court Services)
- repair and maintenance (except Commissioner of the Revenue maintenance contract)
- telecommunications/telephone (except E-911 Operations)
- tolls and parking and
- utilities.

Certain other costs specific to various functions were also excluded as fixed costs. These included:

- Four for Life program (fully funded by a grant) – Fire and Rescue Response and
- RMS licenses – Sheriff

The variable costs for Public Utilities billing (postage and office supplies from Public Utilities Administration, since the billing function is carried out by a single position) were divided by the total number of sewer and water customers (4,728 for FY 2023 according to the *Budget*).

For the Public Utilities water division, only the costs of treatment supplies were counted as variable costs. The presence of large water users argues for the calculation of these costs on a per gallon basis rather than on a per customer basis. The number of gallons of water purchased was obtained from the County's Public Utilities department. However, the number of gallons of water sold by the County was not available from the County's Public Utilities Department at the time this fiscal impact analysis was completed. Therefore, the number of gallons of water sold by the County was estimated. The amount of water sold was used to calculate the cost per gallon of water treatment.

A proportional methodology, correcting for the change in the County's water consumption charge, was used to estimate the number of gallons sold by the County. The revenue from water sales estimated in the FY 2023 *Budget* was divided by the FY 2023 water consumption charge per gallon to obtain the budgeted number of gallons of water estimated to be sold in FY 2023. This was then done using the data in the FY 2016 *Budget* to obtain the budgeted number of gallons of water estimated to be sold in FY 2016. The FY 2023 quotient was then divided by the FY 2016 quotient to obtain the increase from FY 2016 to FY 2023 in the budgeted estimated number of gallons of water to be sold. This percentage increase was then multiplied by the number of gallons of water sold provided previously by the County's Public Utilities Department for FY 2016. That method would use the change in revenue from water sales, factoring out the change in the water rate, to estimate proportionally the change in the number of gallons sold.

This can be summarized by the formula below:

$$WS_{FY2023} = (W\$_{FY2023}/WR_{FY2023})/(W\$_{FY2016}/WR_{FY2016})*WS_{FY2016}$$

Where WS = Number of gallons of water sold
W$ = Estimated revenue from water sales and
WR = Water consumption rate

Based on data for revenue from water sales and the water consumption rate for FYs 2016 and 2023, the number of gallons estimated to be sold by the County in FT 2023 is projected to be 150,748,250 gallons. This compares to 273,740,490 gallons of water purchased and pumped from wells according to the latest data recently supplied by the County's Public Utilities Department.

Household water consumption was estimated using an industry standard of 74 gallons per day per person derived from the American Waterworks Association (AWA). This yields an estimated 193.1 gallons per day consumed by households at The Promontory. A study on water use by the University of Florida, *Methods for Estimating Commercial, Industrial, and Institutional Water Use,* was used to estimate water consumption by the commercial establishments at The Promontory.

As explained above, The Promontory car wash is assumed to redirect sales from existing car washes in the County. Thus, there would be no net change in water usage countywide but only a transfer of water demand from the Town's water system (where two of the three car washes are located) to the County's. According to the International Car Wash Association, the average car wash processes 132 cars per day. Water usage estimates range from 40 to 85 gallons per car. Taking the midrange, an estimate of 65 gallons per car was used. Thus, a car wash can be expected to use 8,580 gallons of water per day. If 59.09% of The Promontory car wash sales are expected to be redirected from the car wash located in the Town (see above), then the County would see an increase in water usage of approximately 5,070 gallons per day, with the Town seeing an equal decrease.

The Promontory can be expected to consume about 23,777,900 gallons of water annually. Adding this to the County's estimated annual waster sales would increase annual water demand for the County to about 174,526,150 gallons. This is well below the amount of water that the County is obligated to purchase under current water purchase contracts. Thus, water for The Promontory can easily be drawn from existing water purchases at no additional cost to the County. Therefore, for the proposed development, water purchases were deemed a fixed cost.

The cost of sewer and water maintenance were not deemed to be variable costs based upon information obtained from the County's Public Utilities department. Currently, and in the foreseeable future, amounts budgeted for sewer and water line maintenance are determined not by the length of sewer and water lines serviced by the County but by budgetary constraint. Therefore, this was deemed to be a fixed cost. Furthermore, the new sewer and water lines to be installed by the developer and deeded to the County are not likely to require County maintenance for a period well beyond the fiscal impact analysis period.

The cost of installing water meters is a one-time cost potentially born by the County which was included as a variable cost. This was estimated through on-line pricing for materials. It was assumed that labor is a fixed cost since water meter installation is episodic and Public Utilities crews would not be expanded to handle the water meter installation at the proposed development. Prices were estimated at $175 for a 5/8” or 3/4" water meter and $1,500 for a 2” water meter, including fire hydrants.

Fire & Rescue Response and Parks and Recreation each perform functions that can be deemed to generate fixed costs. Costs associated with fire protection and prevention are not affected by incremental changes in population or households. Fire protection is, for the most part, a function of latent demand which is distributed over geographic areas determined by response times. The department’s EMS function, on the other hand, is sensitive to incremental changes in population and is deemed to generate variable costs. These fixed and variable cost functions are not differentiated within the County’s *Budget* for Fire & Rescue Response. In the absence of such data, 50% of the otherwise variable costs for each department were deemed to support fixed cost functions and excluded from the variable cost calculation. The Town makes a contribution to support fire protection services and it was assumed that this contribution is related to a population share formula. Therefore, it was included as a variable cost.

For Parks and Recreation, the parks function is deemed to generate fixed costs since the costs of park supervision and maintenance will remain the same regardless of the size of the population served. Therefore, Administration and the Parks, Gateways and Ground Maintenance components of the County’s Parks and Recreation costs were deemed to be fixed costs and were excluded from the analysis. The demand for recreational services, however, is generally sensitive to changes in population and generates variable costs.

All of the Town’s Parks and Recreation activities involve parks, it was assumed that the scale of population increase that would be experienced by the Town due to the development of The Promontory would not result in staffing increases, except for docent services. In particular, any staff increases to handle increased park usage is assumed to be the result of the recently approved Mallory Pointe and Scott Farm development, with any such staff increases easily able to absorb the marginal demand generated by the proposed development. However, the Town’s parks also serve a Countywide population and, therefore, in calculating per-household impact, half of the costs were assumed to occur from visitation from County households (which would not increase due to the proposed development) and half from the Town.

Since the Town’s Police Department handles patrol and incident response within the Town limits, costs associated with these functions were subtracted from the Sheriff’s variable costs. As these costs are not separately identified by line item in the *Budget,* they were estimated by attributing Sheriff deputy time to those functions as a percentage of all Sheriff deputy hours.

Since specific metrics on time spent are unavailable, the Performance Measures Statistics contained in the *Budget* were used as a proxy. Specifically, calls for service, incident reports, and crime statistics were assumed to be associated with patrol activities. Traffic incidents were assumed to involve Smithfield residents equally as County residents (though occurring outside Town limits) and civil processes, warrants, and gun permits were assumed to be served on or issued to County and Town residents alike. Likewise, all school checks were assumed to be performed by Sheriff deputies rather than police officers whether the school was in the Town or the County.

Recognizing the possibility that Town residents may commit crimes in the County, a percentage (Town population as a percentage of total County population) of crime incidents were attributed to incidents involving Smithfield residents. No attempt was made to determine the time spent on various activities and so the metrics reported were used on their face value. Seventy-four and fifty-eight hundredths percent (74.58%) of Sheriff activities were estimated to be associated with patrol or incident response duties (which would be handled by the Town). Therefore, Sheriff's variable costs otherwise attributable to the proposed development were reduced by this percentage.

Finally, certain revenues received by the County from the Commonwealth and by the Town from the Commonwealth and the federal government were deducted to leave only the County's operating costs. This was applied to the line items shown below:

- Clerk of Circuit Court
- Commissioner of the Revenue
- Commonwealth Attorney
- E-911 Operations
- General Registrar
- Law Enforcement (for the Town)
- Sheriff and
- Treasurer (for the County)

With respect to E-911 Operations, various non-local revenue sources are used to fund E-911 costs. These include 40% of the remittance of communications sales tax, payments from the Towns of Smithfield and Windsor, and other grants and contributions from the Commonwealth. These totaled $1,264,893 in the FY 2023 *Budget*.

When revenues were deducted from costs, the reduction in cost was distributed between fixed and variable costs. Only that portion of revenues defraying costs assigned to variable costs was actually deducted from costs. The formula for distributing revenues and calculating costs is displayed below:

$$NVC = VC - (R*(VC/TC))$$

Where NVC = Net Variable Costs (variable costs after revenue is deducted)
VC = Variable Costs (prior to revenue deduction)
R = Reimbursement Revenue
TC = Total Cost (variable and fixed costs)

Portions of the reimbursement from the Commonwealth for shared cost positions are earmarked for the support of constitutional officers, which are fixed cost positions. The salaries of these positions were subtracted from the amount of reimbursement available to fund variable costs. The amount of Constitutional Officer salaries reimbursed by the Commonwealth, as well as the amount of fringe benefits for these positions that were reimbursed by the Commonwealth, was obtained for FY 2023 from the Commonwealth of Virginia Compensation Board website. The salaries and fringe benefits of other fixed costs positions (e.g. a deputy constitutional officer) were also subtracted from R in the above formula. TC was set to equal total costs less the reimbursed salaries and fringe benefits of the constitutional officer and other fixed cost positions (which were also subtracted from R).

Table A-6A on the following pages details the County's variable cost expenditures for households and businesses. The Town's variable cost expenditures are shown in Table A-6B on page A-38. Table A-7A on page A-38 details the County's variable cost expenditures for government functions calculated on other than a per-household/per business basis. This is shown for the Town in Table A-7B on page A-39. This was used to calculate the Town's cost reduction due to car wash redirection. Total variable costs are shown for each department or function and any adjustments are made to the cost per household, with those adjustments shown in the Notes column.

Capital costs. A distinction must be made between the theoretical consumption of capital resources and capital fiscal impact. While models employed by the County may estimate the share of a capital resource that a proposed development may consume, or employ standards to determine the amount of a capital resource employed to serve a proposed development, a capital fiscal impact will only occur if the propose development actually causes a municipality to expend funds not otherwise budgeted to remedy a capital deficit caused by the proposed development. The essence of fiscal impact is that a change in a municipality's fiscal position occurs and if no cost is actually borne by the municipality, even if capital resources are consumed, there is no capital fiscal impact.

The proposed development is not expected to cause the Localities to change their administrative structure or to create new departments. Thus, no expansion of general government public buildings or creation of new fixed positions is anticipated to occur. The Town has significant park resources which are supplemented by those of the County and no expansion of the park system in either the Town or the County would be caused by the proposed development.

Water and sewer lines will be extended into the Site by the developer and future maintenance costs associated with this new infrastructure has been accounted for under operating costs. The Town's water treatment facility is rated at 1.5 million gallons per day with a current average usage of 543,000 gallons per day based on water sales data, leaving a reserve capacity of 957,000 gallons per day. At an estimated usage of 193.1 gallons per day per household, The Promontory should increase water usage by about 135,700 gallons per day. This is well within the Town's water capacity even if average daily water usage would increase beyond the estimated amount.

Subtracting the supervisory patrol lieutenant position, the Town currently employs 17 police patrol officers. Thus, each patrol officer serves 204 households. An increase of 239 households would create the need for one additional patrol officer. This patrol officer would require the purchase of a patrol vehicle plus one-time costs for training and equipment. Based upon data in the Town's Capital Improvements Plan (CIP), each police vehicle was estimated to cost $35,000 and to be replaced every four years. Based upon data from a similar Virginia locality, the one-time cost of training and equipment was estimated to be $34,500. The additional annual cost of adding patrol officers is accounted for in the Town's operating expense estimate. The initial vehicle was assumed to be purchased in FY 2032 once The Promontory's population reaches the warrant for a new patrol.

Table A-6A
Isle of Wight County Non-School Expenditures per Household
FY 2022-2023 Adopted Operating and Capital Budget

Item	Expenditure*	Expenditure per Household	Expenditure per Business	Notes
Animal Services	$ 501,825	$ 33.28	$ 0.00	
Budget & Finance	$ 191,575	$ 4.84	$ 4.42	40.37%/36.92% variable cost
Circuit Court	$ 1,000	$ 0.07	$ 0.06	
Clerk of Circuit Court	$ 211,175	$ 13.63	$ 13.21	Excludes costs paid by Commonwealth; adjusted for household size
Commissioner of the Revenue	$ 525,050	$ 32.84	$ 32.84	Excludes costs paid by Commonwealth.
Commonwealth Attorney	$ 398,425	$ 25.71	$ 24.92	Excludes costs paid by Commonwealth; adjusted for household size
E-911	$ 765,175	$ 49.37	$ 47.86	Excludes costs paid by Communications Sales Tax, grants and towns; adjusted for household size
Emergency Management Billing	$ 63,125	$ 4.07	$ 3.95	EMS Billing
Fifth District Court Services	$ 200,275	$ 13.70	$ 0.00	Adjusted for household size
Fire & Rescue Response	$1,860,550	$120.05	$116.37	50% of costs (EMS); excludes costs paid by Four for Life; adjusted for household size
General District Court	$ 3,550	$ 0.23	$ 0.22	Adjusted for household size; no personnel costs
Hampton Roads Military and Federal Facility Alliance	$ 18,975	$ 1.22	$ 0.00	Adjusted for household size
Hampton Roads Planning District Commission	$ 5,350	$ 2.27	$ 0.00	Adjusted for household size
Hampton Roads Workforce Council	$ 9.275	$ 0.60	$ 0.00	Adjusted for household size
Human Resources	$ 214,825	$ 5.42	$ 4.96	40.37%/36.92% variable cost
Juvenile Accountability Program	$ 2,500	$ 0.17	$ 0.00	Adjusted for household size
Juvenile & Domestic Relations Court	$ 2,800	$ 0.19	$ 0.00	no personnel costs
Library (Blackwater Regional)	$ 925,600	$ 59.43	$ 0.00	Adjusted for household size
Parks & Recreation Programs	$ 507,200	$ 34.70	$ 0.00	Adjusted for household size
Purchasing	$ 81,700	$ 2.06	$ 1.89	40.37%/36.92% variable cost
Registrar	$ 85,050	$ 5.82	$ 0.00	Excludes costs paid by Commonwealth; adjusted for household size
Risk Management Health & Wellness/Claims Deductible	$ 8,450	$ 0.21	$ 0.19	40.37%/36.92% variable cost
Risk Management-Line of Duty Insurance	$ 90,650	$ 4.20	$ 4.20	74.03% variable costs
Risk Management-Workers Compensation	$ 275,000	$ 6.94	$ 6.35	40.37%/36.92% variable cost

Table A-6A (cont.)
Isle of Wight County Non-School Expenditures per Household
FY 2022-2023 Adopted Operating and Capital Budget

Item	Expenditure*	Expenditure per Household	Expenditure per Business	Notes
Senior Services of Virginia	$ 138,450	$ 8.89	$ 0.00	Adjusted for household size
Sheriff	$ 961,550	$ 62.05	$ 60.14	Excludes police patrol function. Excludes costs paid by Commonwealth; adjusted for household size
Treasurer	$ 441,900	$ 27.64	$ 27.64	Excludes costs paid by Commonwealth, Administrative Fees
Unemployment Payments	$ 20,000	$ 0.50	$ 0.46	40.37%/36.92% variable cost
Western Tidewater Community Corrections	$ 18,625	$ 1.27	$ 0.00	Adjusted for household size
Western Tidewater Regional Jail	$1,293,325	$ 88.48	$ 0.00	Adjusted for household size
Total	**$9,852,950**	**$609.85**	**$349.68**	

* Less than $0.01 per household
Rounded to the nearest $25

Table 6-4B
Town of Smithfield Non-School Expenditures per Household
FY 2022-2023 Adopted Operating and Capital Budget

Item	Expenditure	Expenditure per Household	Expenditure per Business	Notes
E-911 Dispatch Center	$ 424,100	$121.97	$116.37	Contribution
Fire Department	$ 15,000	$ 4.31	$ 4.31	Contribution
Parks & Recreation	$ 63,775	$ 9.64	$ 0.00	
Police Department	$2,093,925	$602.22	$574.53	
Trash Collection (Public Works)	$ 265.000	$ 80.08	$ 0.00	
Treasurer	$ 325,925	$ 89.43	$ 89.43	
Total	**$2,920,725**	**$907.65**	**$784.64**	

Rounded to the nearest $25

Table A-7A
Isle of Wight County Non-School Expenditures per Unit other than Household
FY 2022-2023 Adopted Operating and Capital Budget

Item	Expenditure	Expenditure per Unit	Unit of Measure/Notes
Assessment (Quadrennial assessment)	$120,000	$ 5.45	Per parcel / 25% of quadrennial professional services purchase
Assessment (One-time costs)	N/A	$40.75	Per housing unit (new construction)
Public utilities billing	$ 39,500	$ 8.35	Per customer
Sewer treatment	$ 50,000	$0.332	Per 1,000 gallons
Water treatment	$ 15,000	$0.101	Per 1,000 gallons

Table A-7B Town of Smithfield Non-School Expenditures per Unit other than Household FY 2022-2023 Adopted Operating and Capital Budget			
Item	Expenditure	Expenditure per Unit	Unit of Measure/Notes
Water Treatment	$505,200	$2.55	Per 1,000 gallons/ Includes HRSD fee

It is presumed that the fire protection and EMS capabilities of fire station 5 in Smithfield are adequate to serve the proposed development. The Promontory is located in a well-developed area of Smithfield to which this fire station is already providing services, Since response time is the key measure of fire station capacity and the proposed development is within the area currently served by this fire station (presumably with adequate response times), it can be assumed that demand from The Promontory can be accommodated by this fire station without any additional equipment or expansion of this fire station.

Education costs are born by the County through its contribution to the Isle of Wight County Public School System. These were estimated separately from other public service costs of local government. Education costs were calculated on a per pupil basis. The Isle of Wight County public school population for the 2022-23 school year (5,619 students) was obtained from the Virginia Department of Education, website, Fall Membership Data page. As stated above, cost data and assumptions for school operating costs were derived from the *Isle of Wight County Schools School Operating Budget Fiscal Year 2023.*

Costs for functions that must be provided and are not affected by relatively small changes in student population were excluded. This includes operations for which one office is present in each school (media, nurse's office, principal's office). However, functions that are provided systemwide or with a staff member responsible for multiple schools were included in the calculation of variable costs, as changes in student population could affect the FTEs allocated to that function. Some of these excluded line items were included in the Instructional Services category. Other categories that were excluded as fixed costs either in whole or in part are:

- Administration, Attendance, Health, except Financial Services. Human Resources, Psychologists Office and medical supplies
- Debt Service
- Operations and Maintenance, except a portion of Building Maintenance and
- Technology

As in the County *Budget*, financial service and human resources variable costs were apportioned between the school system's fixed and variable costs, with only the costs from these two divisions serving variable cost functions counted as generating fiscal impact. This percentage (77.08%) was calculated by dividing the total calculated school variable cost by the total school operating fund cost. No instructional positions were included in the Technology cost center and all costs were assumed to be fixed costs supporting systemwide technology platforms.

Funds which were determined to be entirely self-funded and/or funded with state or federal grants were excluded as costs not borne by the County. These are:

- Capital Maintenance Fund
- Child Nutrition (Food Services) Fund and
- School Grants (Categorical Grants) Fund

Additionally, the School Health Insurance Fund is funded from other sources and or by transfers that are counted as costs in the School's operating budget. Therefore, this fund was excluded from the fiscal impact analysis.

Within Instructional Services, administrative costs and other fixed costs within variable cost operating categories were excluded from the calculation of variable costs. These include the costs associated with single-occupant positions that are housed at each school. Typically, these included those items shown below:

- Administrative salaries
- Adult education (The Promontory residents would not be pursuing a GED)
- Assistant Superintendent salaries
- Books/subscriptions
- Capital outlays and replacement
- Cell phones (not issued to teachers)
- Clerical salaries and wages
- Dues and memberships
- Extra-curricular activities (these are discreet activities; school support does not typically expand for these activities with marginal increases in student population)
- Equipment repair and maintenance
- Food purchases (for administrative functions)
- High school athletics and Athletics services (teams are fixed in number and size and, therefore, are not affected by marginal increases ins student population
- Leases and rentals
- Librarian
- Office supplies
- Preschool (this is an income tested program for which households at The Promontory will not be eligible)
- Principal's office
- Purchased services
- Retiree health care credit
- Staff development

Where fixed cost positions are listed above, they include the salaries and fringe benefit costs associated with those positions.

In the Transportation category, administrative salaries, clerical salaries and wages, and technical salaries (in general compensation) were excluded as fixed costs. Technical salaries were assumed to be specialized or administrative in nature. Items that were counted as fixed cost for the Instructional Services category were similarly excluded in Transportation. Bus maintenance was assumed not to be affected by small changes in fleet size or composition and was excluded as a fixed cost.

For Building Maintenance, certain assumptions were made concerning fixed and variable costs. Since this function supports the fixed capital owned by the school system, most costs were deemed fixed and were excluded. The exceptions to this rule were custodial activity and water usage. It was assumed that 25% of custodian compensation and custodial supplies is variable and varies with student density (more trash, etc.), while 75% of janitorial work occurs regardless of student population and is, thus, a fixed cost. It was also assumed that 25% of water and sewer usage was for cleaning and that 75% was for domestic use and, thus, variable with student and staff population.

These variable costs were then distributed between local funding and other funding sources. Since the *Schools Budget* did not disaggregate federal and state funding into general and categorical funding sources (except functions funded by categorical grants, which were not included in the School's general operating fund), it was assumed that all state and federal General Fund *Budget* revenue was available to fund any school general fund *Budget* function. Thus, a calculation of the local share of education variable costs was a straightforward division of the County's contribution to the Isle of Wight Schools General Fund (excluding support for debt service) into the total General Fund *Budget*. Table A-8, below, shows the data for these calculations.

Table A-8
Funding Sources for Variable Costs
Isle of Wight County School Budget

Source of Funding	Total Funds
Local (Isle of Wight County)	$26,282,250
Commonwealth	$39,214,725
Federal	$ 3,945,650
Other (Fees, etc.)	$ 1,670,550
Totals	$71,113,175
Percent Local	36.96%

Source: *Isle of Wight County School Operating Budget FY 2023 Approved*
Does not include Child Nutrition Services or other special fund revenue

Variable costs were then multiplied by the local share percentage to obtain the local share of variable costs. An exception to this method for computing local share costs occurs with respect to textbooks. The local contribution to textbooks, contained in a separate fund, was identified and counted without adjustment.

Per-student education costs are then computed by dividing the local share of variable costs by the number of students. This is detailed in Table A-9 below. Thus, as seen in Table A-9, below, although gross spending per student is calculated at $14,018.37, variable costs funded by the County account for only $4,202.36 of this per-pupil cost.

Table A-9
Isle of Wight County Variable Cost of Operations per Student, SY 2022-2023

Item	Variable Costs	Cost per Student	County Cost per Student
General Instruction	$45,285,375	$8,059.33	$2,978.59
Career & Technical	$ 1,897.425	$ 337.68	$ 124.80
Financial Services (77.08%)	$ 227,275	$ 40.45	$ 14.95
Gifted	$ 234.100	$ 41.66	$ 15.40
Guidance	$ 1,623,075	$ 288.85	$ 106.76
Human Resources (77.08%)	$ 144,875	$ 25.78	$ 9.53
ISAEP	$ 64,675	$ 11.51	$ 4.25
Limited English	$ 141,975	$ 25.26	$ 9.34
Media Centers	$ 47,625	$ 8.48	$ 3.13
Nursing Services	$ 22,500	$ 4.00	$ 1.48
Operations and Maintenance	$ 544,075	$ 96.83	$ 35.79
Psychological Services	$ 271,375	$ 48.30	$ 17.85
Special Education	$ 9,155,350	$1,629.36	$ 602.18
Summer Classroom	$ 49,200	$ 8.76	$ 3.24
Textbooks*	$ 309,400	$ 55.07	$ 55.07
Transportation	$ 3,344,825	$ 595.27	$ 220.00
Total	$63,363,125	$11,276.59	$4,202.36
Non -Variable Costs**	$15,406,100		
Grand Total**	$78,769,225		

Source: *Isle of Wight County Schools FY 2023 Approved Budget*

*Local share calculated directly from *School Budget*

**All Funds, except School Health Insurance Fund

Education expenditures were assigned to the proposed development by estimating the number of students to be generated by the project and multiplying this by the per-student cost of education. Student generation rates used for Isle of Wight County were taken from the *Isle of Wight County Schools Student Yield and Subdivision Analysis, April 2018*. This study identified student generation rates for grades pre-K-3. 4-6, Pre-K-5, 7-8, 6-8, and 9-13 for single-family detached, single-family attached, multi-family and mobile home housing units. The schools to which the Site is currently zoned are Hardy Elementary School (pre-K-4), Westside Elementary School (4-6, with Promontory students attending grades 5-6), Smithfield Middle School (7-8) and Smithfield High School (9-12).

The *Analysis* states student generation rates applicable to Hardy Elementary School of 0.104 students per household for single-family detached units and 0.086 students per household for single-family attached units; 0.08 and 0.048 students per single-family detached and attached units, respectively, applicable to Westside Elementary School; 0.059 middle-school students per household for single-family detached units and 0.031 middle school students per single-family attached unit; and 0.125 high school students per household for single-family detached units, 0.065 high school students per household for single-family attached units.

Based upon these metrics, a total of 72 students were assumed to be added to the Isle of Wight Public Schools due to the construction of the proposed development, with 28 students added to Hardy Elementary School, 10 students added to Westside Elementary School, 11 students added to Smithfield Middle School and 23 students added to Smithfield High School.

Education capital cost calculations were performed first under the rules governing the calculation of "reasonable proffers" under Virginia law governing the offer and acceptance of cash proffers and then by taking into account additional students to be generated by residential developments that are currently under construction or newly approved for development (collectively, "pipeline developments." Calculations were based upon the number of students to be added to each of the County's schools to which students are generated by the proposed development.

Student enrollment data was derived from the Virginia Department of Education *Fall Membership Data* for SY 2025 (the latest available at the time that fiscal impact calculations were originally prepared). School capacity data was supplied by the Isle of Wight School System's *Preparing for the Future* document published in 2018 and by the County school system for the new Hardy Elementary School.

Table A-10, below, shows school capacities, current enrollment, enrollment after the proposed development is built out, and remaining school capacity after the addition of students resulting from the proposed rezoning.

Table A-10
Available School Capacities Before and After The Promontory

School	Instructional Capacity	Current Enrollment	Enrollment after The Promontory	Capacity after The Promontory
Hardy Elementary	885	649	673	212
Westside Elementary	849	682	691	158
Smithfield M.S.	634	565	575	59
Smithfield H.S.	1,588	1,322	1,342	246

Sources: *Isle of Wight County Schools Student Yield and Subdivision Analysis, April 2018;* Isle of Wight County Schools, Virginia Department of Education

As shown above, applying the parameters specified under Virginia proffer law, none of the schools to which students from The Promontory are currently zoned would exceed their facility capacity after students from The Promontory are absorbed. Thus, the basic test for the reasonableness of cash proffers is not met.

In contrast to the proffer analysis conducted above, an analysis of any education capital fiscal impact includes those students generated by pipeline development. However, a fiscal impact is only determined to exist if it is likely that the County would actually incur a capital cost due to the proposed development. If a capital costs would be incurred whether or not the proposed development is built, it does not constitute a capital fiscal impact.

Students expected to be generated from these "pipeline developments" are added to the future enrollment calculations in Table A-11, below. Pipeline development was determined from the table, *Residential Pipeline Projects as of 03/29/2022*, modified through consultation with the County's Planning Department and with units already constructed estimated by the Consultant using Google Maps and other online resources. Pipeline developments identified as zoned for the relevant County schools were: Archer's Meade, Brewer's Station, The Crossings Condos, Cypress Creek, The Grange at 10Main, Lippe, and Pitt, and Mallory Pointe and Scott Farm.

Table A-11
Available School Capacities Before and After
The Promontory and Pipeline Development

School	Programmed Capacity	Current Enrollment	Pipeline Enrollment	The Promontory Enrollment	Remaining Capacity
Hardy Elementary	885	649	197	24	15
Westside Elementary	849	682	133	9	25
Smithfield M.S.	634	565	44	10	15
Smithfield H.S.	1,588	1,322	199	20	47

Table A-11, above, all of the schools to which students from The Promontory would be zoned retain sufficient capacity to absorb more development after students from The Promontory and future pipeline development are absorbed. This is likely a conservative estimate since there has likely been further construction in some of the pipeline developments that have already added enrollment to these schools, and others, such as The Grange, may see reduced densities and generate fewer students than projected in this analysis. Therefore, The Promontory would create no capital fiscal impact resulting from the need to expand school capacities.

However, a capital expenditure for the purchase of a new school bus due to students generated by the development of The Promontory may occur. A standard school bus can accommodate up to 64 riders. Based upon school experience, about 15% of students can be expected to ride a special needs school bus. Elementary school students from The Promontory are expected to add 28 standard school bus riders, counting all Westside students as elementary school students for the purpose of transportation. If students from both Hardy and Westside Elementary Schools rode the same bus from The Promontory, this would fill almost 44% of the capacity of a new school bus, warranting a purchase.

However, ridership generated by pipeline development also needs to be considered. Pipeline development would generate enough students attending Hardy and Westside Elementary Schools to fill four new school bus to capacity with 25 additional students needing standard school bus transportation. These students would ordinarily require the County to purchase a fifth school bus. However, a school bus purchased to accommodate students from The Promontory would have enough capacity to absorb these students, saving the County from purchasing another school bus. In consideration of this, the cost of a new school bus was apportioned between The Promontory and pipeline development, with 52.8% of the cost of a standard school bus assigned to The Promontory as a capital cost.

It is estimated that a new school bus costs $123,725 in 2020 dollars. Using the Producer Price Index data for truck and bus chassis to inflate this cost to 2023 dollars, a new standard school bus was assumed to cost $146,200. It was assumed that the County would seek to postpone a school bus purchase as long as possible and that buses purchased to accommodate pipeline development could accommodate students generated by The Promontory until FY 2031, when The Promontory standard school bus ridership is expected to reach 20 riders.

As noted above, 15% of students are expected to be special needs students, potentially requiring special transportation. Unlike ridership of a standard school bus, special needs ridership was calculated across all grade levels. Standard school buses are assumed to be reused for middle school and high school bus routes, being on a different schedule than elementary schools. Furthermore, school bus ridership declines for high school students as many will either drive to school or share rides with friends or family who can drive to school.

The Promontory can be expected to generate 9 special needs students. Special needs buses come in varying sizes from large vans to 45-passenger buses. While students from The Promontory could fill a small special needs vehicle, again, the demand for special needs buses from pipeline development students must be considered to determine if The Promontory will actually generate a capital fiscal impact due to the need to purchase a special needs vehicle.

Aggregating student generation from pipeline development for the schools that students from The Promontory would attend (Hardy and Westside Elementary Schools, plus Smithfield Middle School and Smithfield High School), pipeline development is estimated to generate 66 special needs students. While the actual capacity of a special needs bus varies depending on the type of student needing to be accommodated (wheel chairs take up more room than standard seating), we can assume that pipeline development would fill at least one 45-passenger special needs bus and one 21-passenger special needs bus. Adding the special needs students from The Promontory would induce the County to purchase a 30-passenger special needs school bus rather than a 21-passenger bus.

Research on the cost of special needs school buses indicates a differential pricing of about $5,000 per seat. Therefore, the additional cost to accommodate special needs riders from The Promontory was estimated to be $45,000 (the addition of 9 more seats). The Promontory students was assumed to be purchased in FY 2031.

Circa~ Cultural Resource Management, LLC
453 McLaws Circle, Suite 3
Williamsburg, Virginia 23185
757-880-4187

Desktop Survey
Greenwood Tract
October 7, 2024

In August 2023, Circa~ Cultural Resource Management, LLC (Circa~) conducted a desktop survey of the Greenwood Tract in Isle of Wight County, Virginia (Figure 1). The project area, which encompasses approximately 130 acres, is bordered by Cypress Run Drive and Turner Drive to the north, Benns Church Boulevard to the east, Cypress Creek to the west, and sand mining, agricultural fields, and Turner Road to the south. The investigation was conducted in compliance with a Town rezoning request.

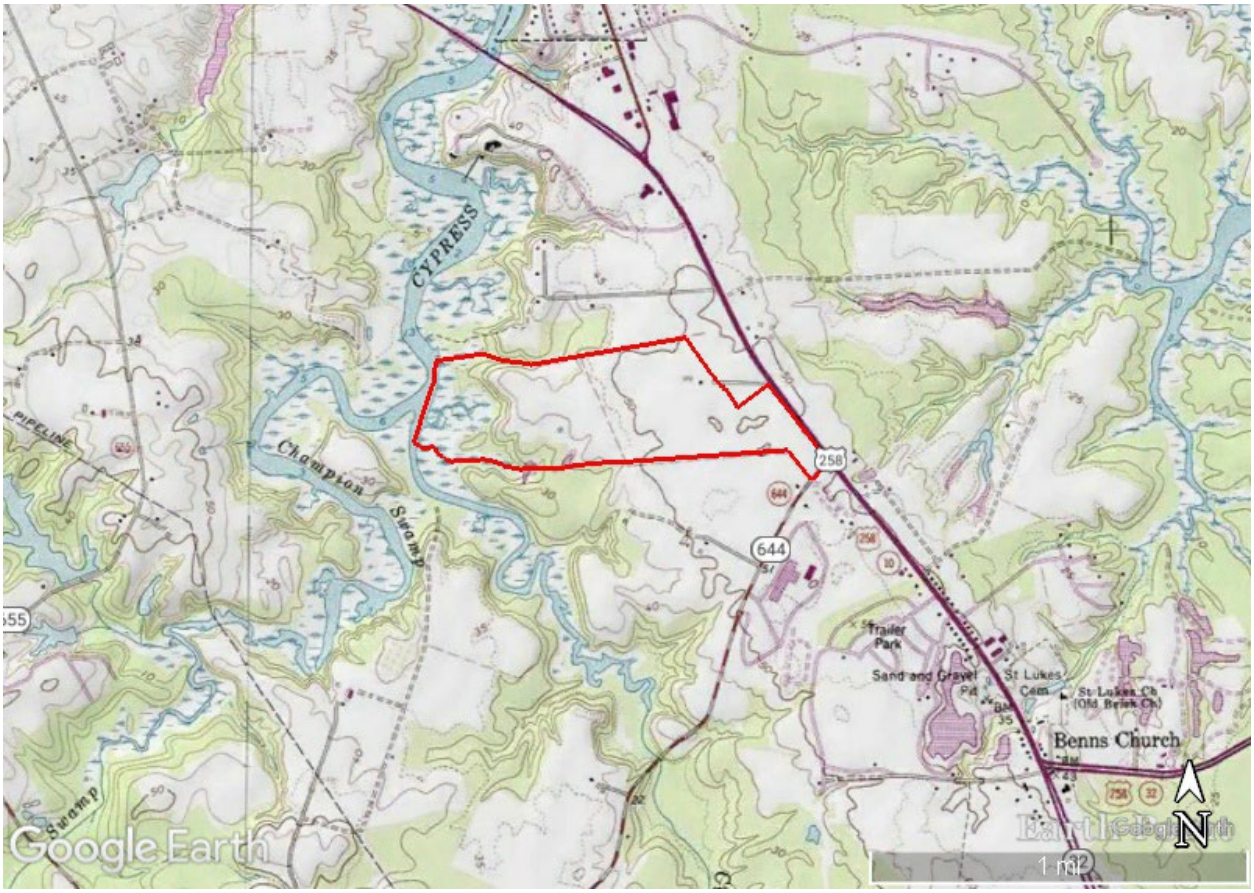


Figure 1. Location of the project area.

The tract is situated in the Coastal Plain physiographic province. Most of the parcel is within an active sand-mining operation or planted agricultural fields with mature trees along the tract's western edge. The tract is relatively level and ranges in elevation from approximately 47 feet above mean sea level (AMSL) on the eastern edge of the site near Benns Church Road and drops to 21 feet AMSL in the western section of the tract. The landform consists of a level upland. A review of aerial photos from 1985 through the present shows significant disturbance from the sand mining operation in the project area sometime before 1994 through the present (Figures 2 - 6).

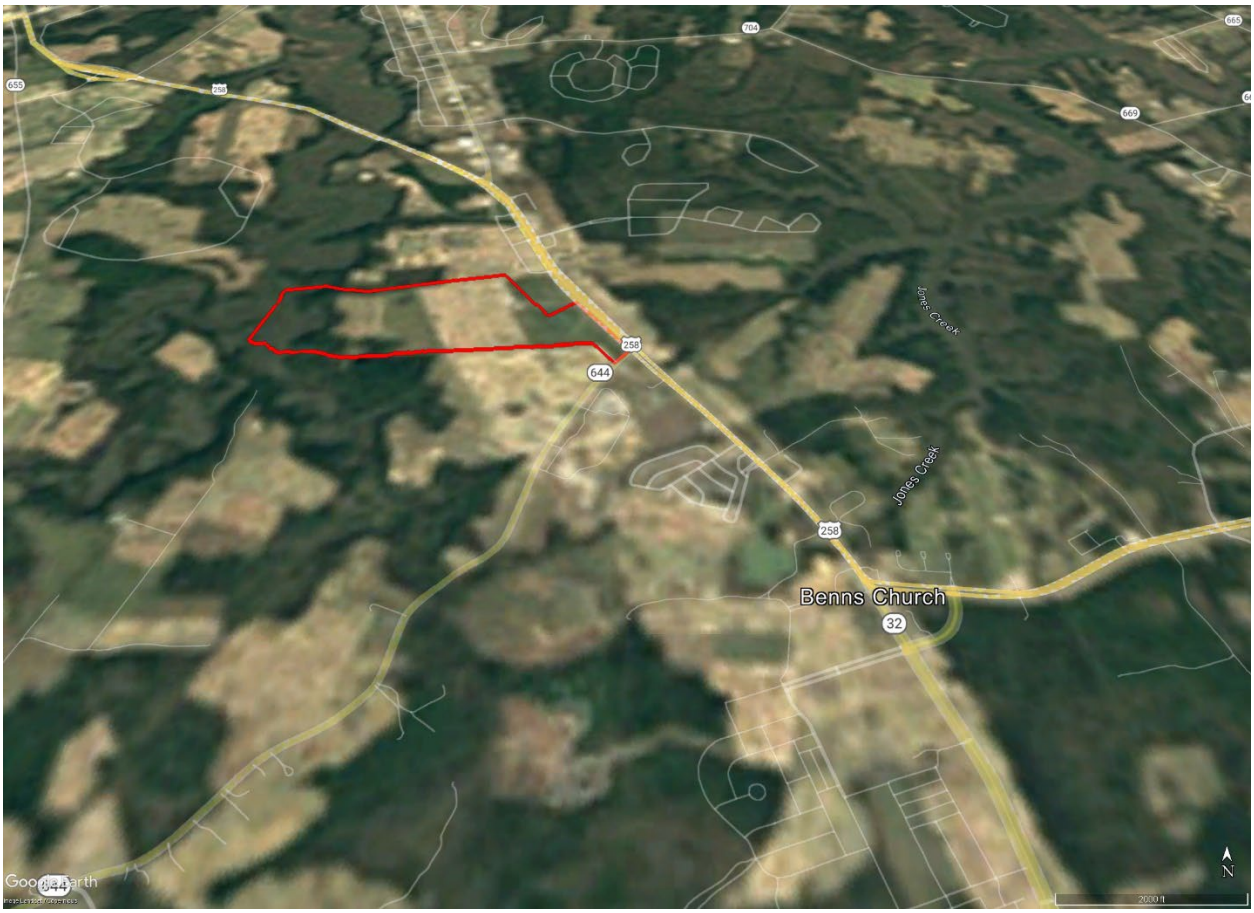


Figure 2. 1985 Google aerial image of the project area.



Figure 3. 1994 Google aerial image of the project area.



Figure 4. 2002 Google aerial image of the project area.

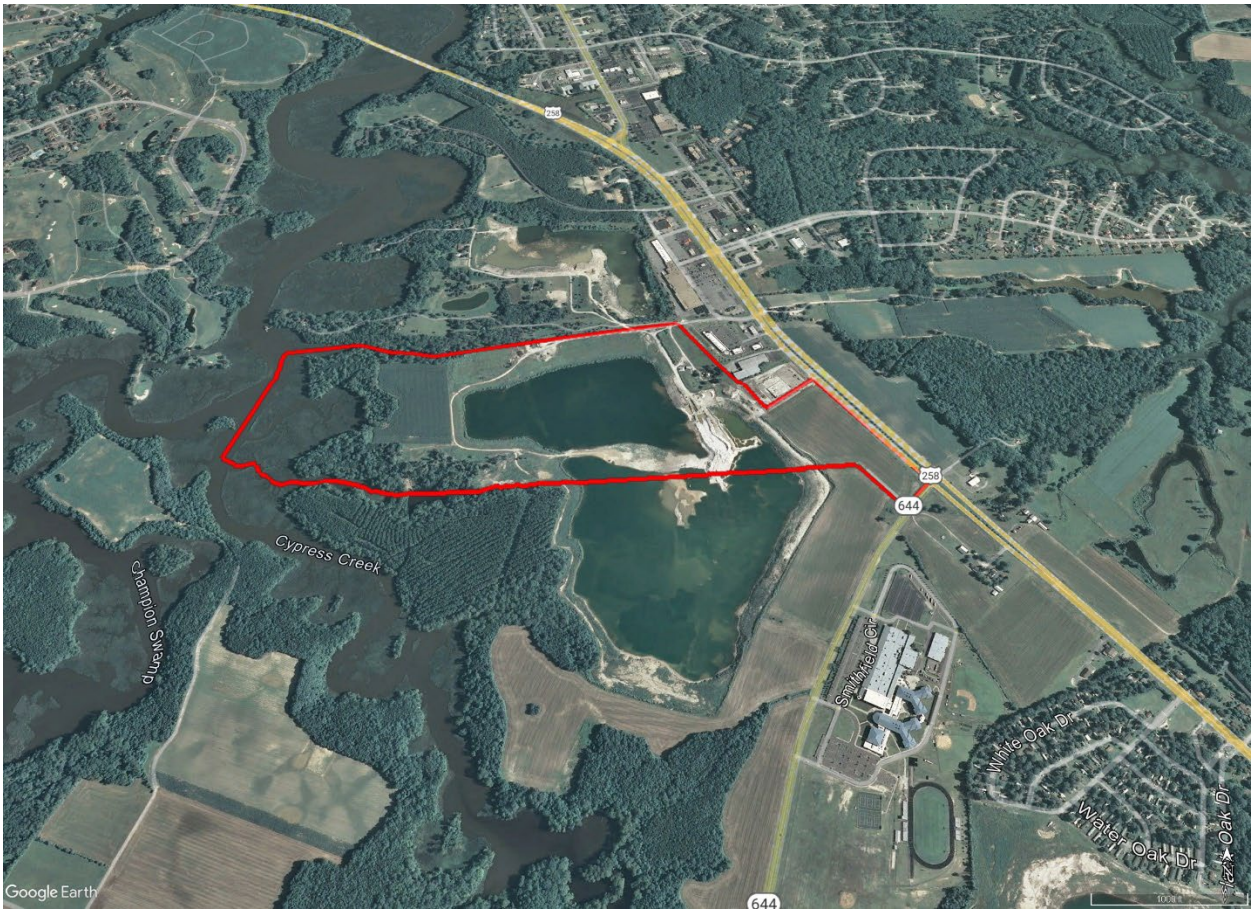


Figure 5. 2012 Google aerial image of the project area.



Figure 6. 2023 Google aerial image of the project area.

Soils

Eight soil types and variants exist within the project area (Natural Resources Conservation Service [NRCS] 2018). These include Rumford loamy sand; Peawick silt loam, 0% to 2% slopes; Nevarc and Remlik soils, 15% to 35% slopes; Bohicket silty clay loam; Yemassee fine sandy loam; Emporia fine sandy loam, 2% to 6% slopes; Chipley sand; and Slagle fine sandy loam, 2% to 6% slopes (Figure 7 and Table 1). A small percentage of the parcel (2.5%) was water. These types and variants are described below, referencing drainage, hunting, gathering, horticultural, and agricultural productivity potential. Further, conclusions regarding the suitability of each for historical and Native American occupation and archaeological site probability are also explained.

Soil maps and associated data analyze soil types within a geographic area. Despite comprehensive and detailed coverage of most areas by soil surveyors, researchers often miss microenvironments due to their small footprints. Unfortunately, resource-rich microenvironments were often common sites of cultural activity. As such, this analysis of archaeological potential is a "best-guess" using the available data.

No navigable waterways exist within the project area; thus, water travel is not a factor in the site probability analysis of this tract. Well-drained, agriculturally and horticulturally productive soils proximal to transportation corridors were the best choices for historic period occupation.

Secondary areas, such as those containing wet and acidic soils, may have also been suitable for historic occupation after improvements such as drainage and liming.

Areas of wet soils may have been attractive to Native American cultures. Edible herbaceous plant species may have been gathered in these areas, and faunal species browsing these areas may have been hunted with success. Well-drained soils proximal to these resource-rich areas may have made adequate hunting and gathering campsites where the hunted and gathered resources were processed. These sites would have left a visible archaeological footprint. Little archaeological evidence would be located within the wet areas, the immediate locale of resource procurement.

Areas containing gravelly soils may have been especially attractive to stone tool-manufacturing Native American cultures; however, the level of attraction may have depended on the type and quality of the stones available. Well-drained soils proximal to quarry-able, gravel-rich areas would have made adequate lithic material procurement campsites. However, archaeological materials may be located at the camp and the quarry sites.

Table 1. Soils Identified Within the Project Area Boundaries.

Soil Symbol	Soil Name	Acres Within the Project Area	Location Within the Project Area	Percentage Within the Project Area
16	Rumford loamy sand	71.80		43.40%
12A	Peawick silt loam, 0% to 2% slopes	34.40		20.80%
11E	Nevarc and Remlik soils, 15% to 35% slopes	20.20		12.20%
2	Bohicket silty clay loam	19.70		11.90%
23	Yemassee fine sandy loam	9.20		5.50%
W	Water	4.10		2.50%
5B	Emporia fine sandy loam, 2% to 6% slopes	3.30		2.00%
4	Chipley sand	2.80		1.70%
18B	Slagle fine sandy loam, 2% to 6% slopes	0.00		0.00%

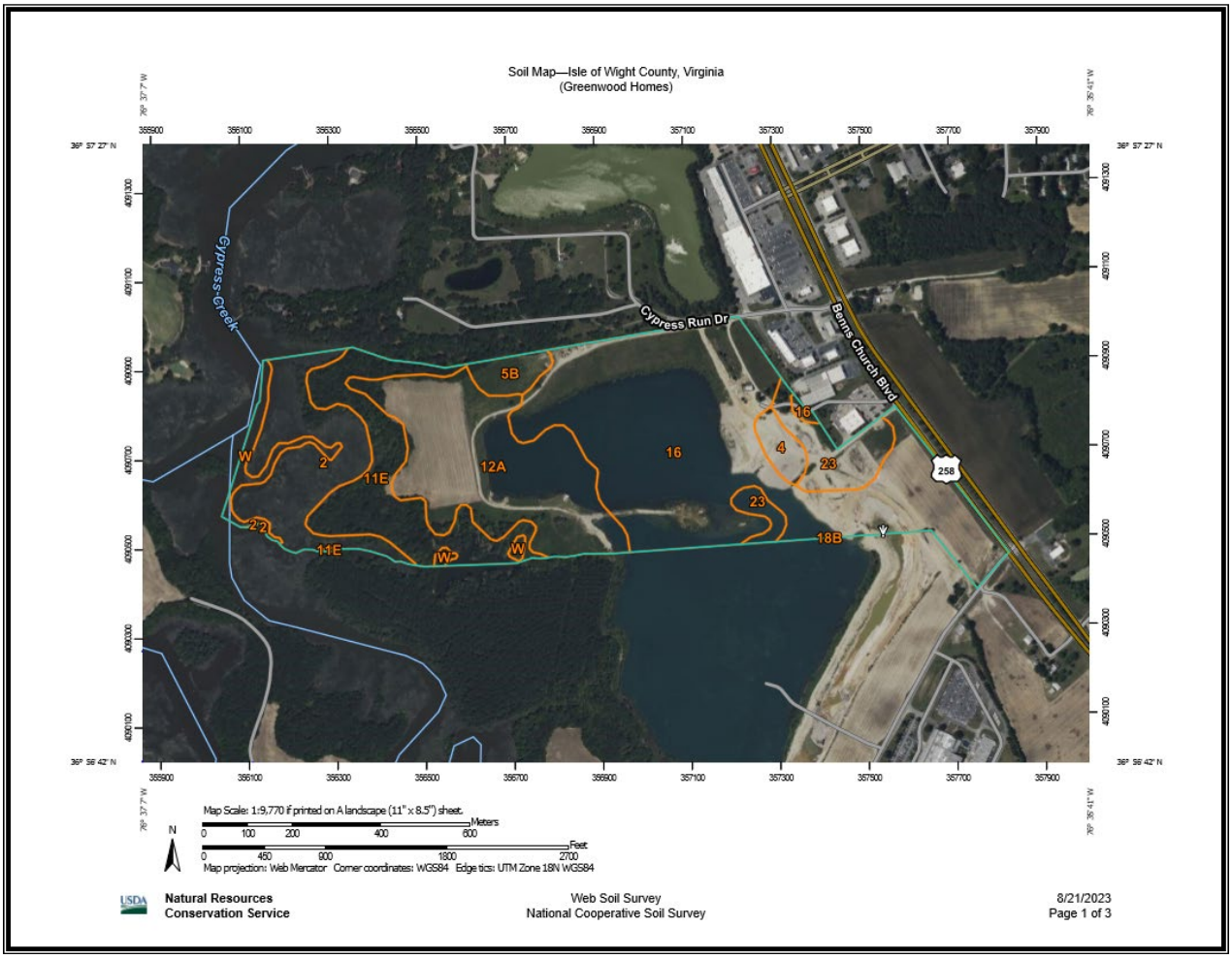


Figure 7. Project area soil map, from NRCS website.

Soils Identified Within the Project Area

Rumford Soil (16)
Rumford soil is a very deep, moderately well to somewhat excessively drained, moderately-rapidly-permeable soil formed in marine sediment found on marine terraces of the Coastal Plain (NRCS 2017). The depth to bedrock is over 72 inches in this extremely acidic to strongly acidic soil. Quartz gravel makes up 0% to 15% of the solum and 0% to 50% of the C-horizon. Most of this soil is in cropland or forested. This soil can support corn, soybeans, small grains, and hay where cultivated. Where forested, this soil can support loblolly pines, Virginia pines, and various hardwoods.

Peawick Soil (12A)
Peawick soil is a very deep, moderately well-drained soil with very slow permeability formed in treads and risers of stream terraces of the Coastal Plain and Piedmont (NRCS 2018). Solum thickness ranges are greater than 60 inches, and the depth to bedrock is greater than 72 inches in this extremely acidic to strongly acidic soil. Quartz gravel is commonly less than 5% but ranges from 0 to 15% in this soil. Particle size has 30-40% silt with very fine sand. This soil features a slow to rapid runoff with sloe internal drainage and very slop permeability. This soil can support corn, soybeans, small grain, and pasture grasses where cultivated. Where forested, the soil can support loblolly pine, yellow poplar, sweetgum, and white oak.

Nevarc Soil (11E)
Nevarc soil is a very deep, moderately well-drained, slowly permeable soil formed by marine deposits of Coastal Plain on former marine terraces and found in the Atlantic Coastal Plain (NRCS 2022). This soil features a high to very high runoff. Bedrock is found at greater than 72 inches below the surface with a seasonally high-water table. The quartz gravel ranges from 0-15 percent throughout the solum and 0-35 percent in the substratum. Soil reaction is extremely acidic to moderately acidic except where limed. This soil is mainly forested with a mix of hardwood trees or pine.

Remlik Soil (11E)
Remlik soil is a very deep, well-drained, moderately permeable to moderately-rapidly permeable soil formed in the loamy and sandy sediments of the Coastal Plain side slopes and found in the Atlantic Coastal Plain (NRCS 2018). This soil features medium to rapid runoff. Most of this soil is forested. Where forested, this soil can support pines and mixed hardwoods. Where cultivated, this soil can support crops and improved pastures.

Bohicket Soil (2)
Bohicket soil is a very poorly drained, very slowly permeable soil formed in the marine sediments of tidal marshes (NRCS 2023). The soil is found in broad tidal flats bordering the Atlantic Ocean. The soil is flooded twice daily by seawater, and soil salinity remains high. Soil acidity ranges from slightly acidic to moderately alkaline throughout. The vegetation supported by this soil includes wetland habitats such as smooth cordgrass. This soil is not used for pasture or cultivation.

Yemassee Soil (23)
Yemassee soil is a very deep, somewhat poorly drained, moderately permeable, loamy soil formed in marine sediments and is located on terraces and broad flats of the lower Coastal Plain (NRCS 2021). Solum thickness ranges from 40 to 70 inches. The soil is extremely acidic to slightly acidic in the A horizon and extremely acidic to strongly acidic in the B and C horizons. The water table is about 1 to 1.5 feet below the surface for up to four months of the year. This soil can support loblolly pine, slash pine, longleaf pine, sweetgum, black gum, water oak, dogwood, and hickory where forested. This soil can support corn, soybeans, small grain, truck crops, and pasture grasses where cultivated.

Emporia Soil (5B)
Emporia soil is very deep, well-drained, moderately-slowly- to slowly-permeable soil found on the uplands of the Atlantic Coastal Plain (NRCS 2017). Bedrock is over 72 inches below the ground surface in this very strongly acidic to moderately acidic soil. This soil supports both crops and woodland. Cultivated areas can support peanuts, soybeans, corn, tobacco, and cotton. Woodland areas can support loblolly pine, Virginia pine, red maple, sweet gum, oak, and hickory.

Chipley Soil (4)
The Chipley soil is a very deep, somewhat poorly drained, very rapid, or rapidly permeable soil located on uplands in the lower Coastal Plain and formed of thick, sandy marine sediments (NRCS 2022). The soil is a mix of silt and clay components between a depth of 10 to 40 inches. The soil acidity ranges from extremely to moderately acidic in the A horizon and very strongly to slightly acidic in the C horizon. Many areas of Chipley soil have been cleared for cropland, pasture, and hayland use. Where forested, this soil can support slash pine, longleaf pine, blackjack oak, turkey oak, post oak, bluestem species, low panicums, and purple lovegrass.

Slagle Soil (18B)
Slagle soil is a very deep, moderately well-drained, moderately slowly to slowly permeable soil found within marine terraces and uplands of the Atlantic Coastal Plain (NRCS 2017). Bedrock is located over 75 inches below the ground surface in this extremely acidic to strongly acidic soil. This soil is mainly used for crops and forestry. This soil can support corn, soybeans, peanuts, and tobacco where cultivated. Where forested, the soil can support loblolly pine, Virginia pine, sweet gum, red maple, southern red oak, water oak, yellow poplar, and hickory.

PREVIOUSLY RECORDED CULTURAL RESOURCES

Circa~ performed an archival search for the Greenwood project area using the VDHR online V-CRIS system on August 29, 2023. This research was completed to determine if historic resources exist within the project area boundaries. The search identified nine archaeological and eight architectural resources within a one-mile radius of the project's boundaries. Table 2 lists all the resources within one mile of the project area boundaries. Figures 8 through 10 show the approximate project area boundaries and resources within proximity. Of the resources identified, no archaeological or architectural resources were identified within the project area.

According to the VDHR V-CRIS search, at least five Phase I surveys have been completed within one mile of the project area (Figure 11). To the north of the project area, in 1988, Virginia

Commonwealth University (VCU) Archeological Research Center conducted a *Phase I Cultural Resources Survey for Improvements to Route 10 in Smithfield, Virginia.* In 1994, the Mid-Atlantic Archaeological Research Associates, Inc. (MAAR) conducted a *Phase II Archaeological Investigation of Sites 44SK20, 44SK391, and 44SK393 in the City of Suffolk and 44IW115 and 44IW148 in Isle of Wight County, Virgini*a. The MAAR report also included an additional Phase I survey of Cypress Creek. Directly east of the project area, MAAR conducted a *Phase I Cultural Resources Survey for the Proposed Smithfield Interceptor in Isle of Wight County, Virginia, and the City of Suffolk* in 1993. To the south of the project area, The Virginia State Library conducted an *Archaeological Reconnaissance of Routes 258/32 and 10/32, Isle of Wight County,* in 1976. In 2005, Cultural Resources, Inc. (CRI) conducted a *Phase I Cultural Resources Survey of Approximately 600 Acres at Benns Church, Isle of Wight County, Virginia*. In addition, VDHR holds one easement (046-0024) within one mile of the project area associated with Saint Luke's Church to the southeast of the project area.

Table 2. Resources Within a One-Mile Radius of Project Area Boundaries.

VDHR Survey Number	Date of resource	Description of resource	Survey Information	Recommendation
Archaeological Sites				
44IW0113	Woodland	Indeterminate site	Phase I survey 6/21/72	None made
44IW0145	Archaic Historic	Camp	Phase I survey 4/7/97	None made
44IW0146	Native American 17th century	Camp	Phase I survey 2/1/93	None made
44IW0148	17th century	Other	Phase II survey 1/1/94 Phase I survey 2/1/93	VDHR determined eligible 4/13/94
44IW0161	18th century 19th century	Single dwelling	Phase I survey 7/1/93	VDHR determined not eligible 4/13/94
44IW0163	19th century 20th century	Single dwelling	Phase I survey 7/22/93	VDHR determined not eligible 4/13/94
44IW0242	Middle Woodland	Camp	Phase I survey 9/05	VDHR determined not eligible 10/20/06
44IW0271 See also 046-0024	No date	Artifact scatter, cemetery, church, and lithic scatter	Archaeological monitoring 7/07	VDHR easement 3/15/11
44IW0352	19th century 20th century	Single dwelling	Phase I survey 5/13/22	None made
Architectural Resources				

VDHR Survey Number	Date of resource	Description of resource	Survey Information	Recommendation
046-0024 See also 44IW0271	ca. 1862	Newport Parish Church, aka Old Brick Church, aka Saint Luke's Church, aka Saint Luke's Smithfield, 14477 Benns Church Boulevard, site includes one church and one cemetery	Historic American Building Survey (HABS) 4/26/34 and 10/58 Phase I survey 7/27/67	Listed as a National Historic Landmark 10/9/60 Listed on the National Register of Historic Places on 10/15/66 Listed on the Virginia Landmark Register 9/9/69 VDHR easement 9/16/10
046-5185	ca. 1850	Farmhouse, Scott's Factory Road and Turner Drive, Route 620, Route 644; the site includes a house, five sheds, an animal shelter, and a dairy	Phase I survey 3/1/05	None made
046-5186	ca. 1898	Farmhouse, 14101 Great Springs Road, Route 655; the site includes a house, garage, animal shelter, a shed, and a smokehouse	Phase I survey 3/1/05	None made
046-5246	ca. 1924	Benns Church, 14571 Benns Church Boulevard, site includes one church and one cemetery	Phase I survey 3/05	None made
046-5274	ca. 1880	W. P. Jordan House, 14564 Benns Church Boulevard; the site includes one house, one shed, one garage, one workshop, and one well	Phase I survey 10/3/05 Phase II survey 8/14/06	VDHR determined eligible 10/19/06
046-5275	ca. 1930	House, 14580 Benns Church Boulevard, site includes two houses	Phase I survey 10/3/05	VDHR determined not eligible on 6/06
046-5276	ca. 1931	House, 19514 Casper Circle, the site includes one house and one warehouse	Phase I survey 10/3/05	VDHR determined not eligible on 6/06
046-5628	ca. 1813	Young Cemetery, Turner Road, 18286 Hollydale Lane	Phase I survey 6/2/15	None made
300-0115	ca. 1921	Angel on Gravestone, 14477 Benns Church Boulevard, the site includes one statue	Save Our Statues (SOS) survey 10/18/95	None made

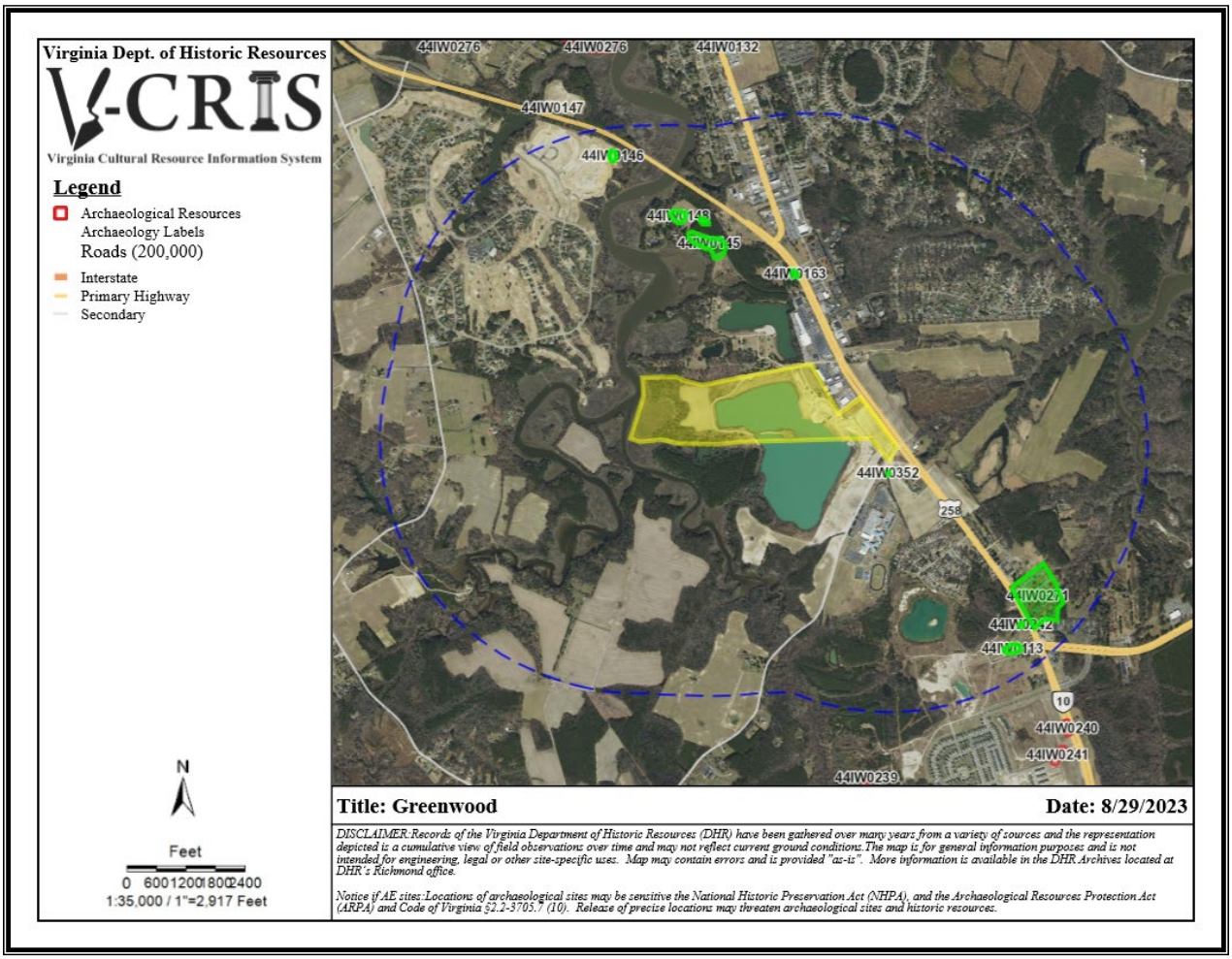


Figure 8. V-CRIS map showing previously identified archaeological resources within a one-mile radius of project area boundaries (yellow-shaded area).

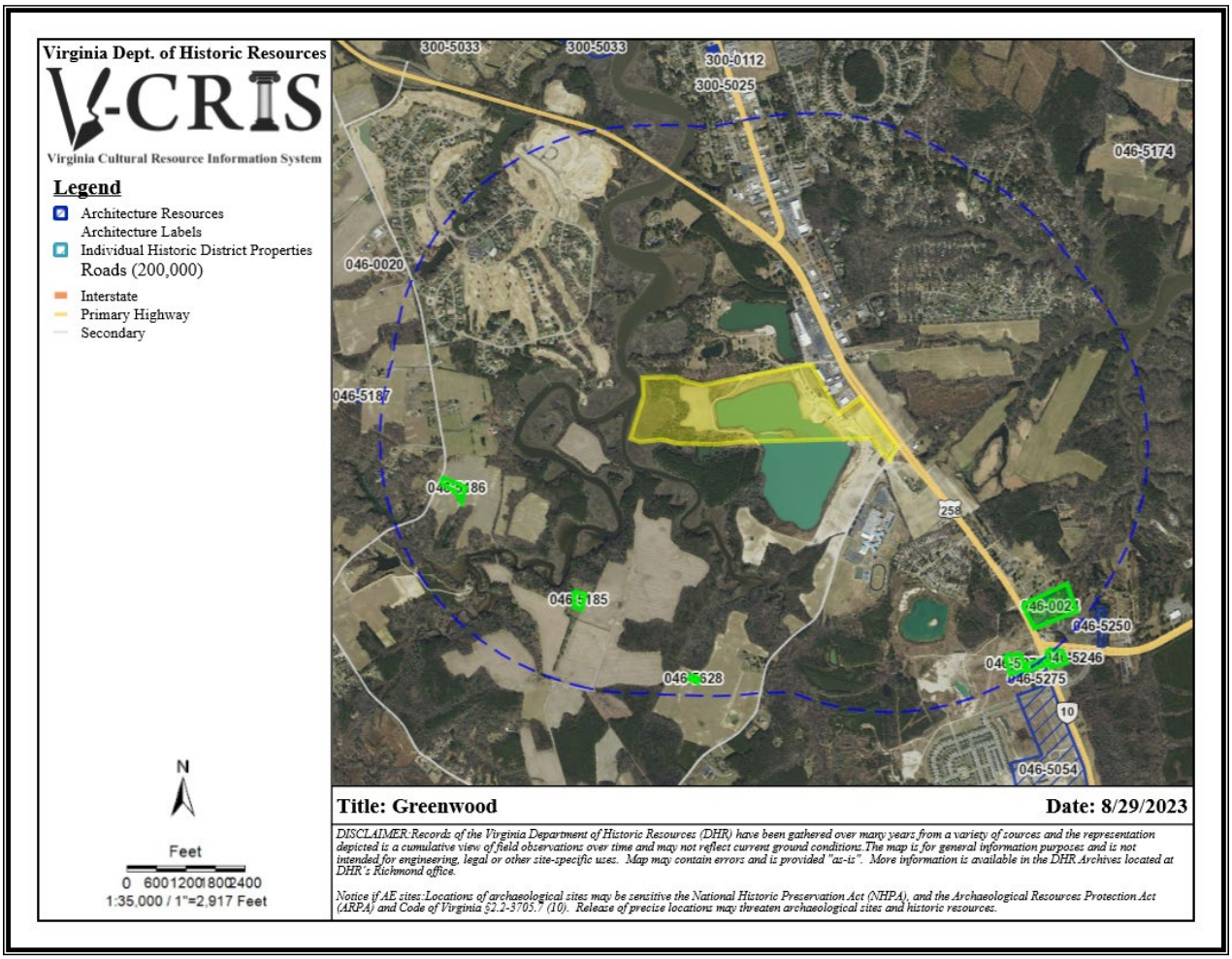


Figure 9. V-CRIS map showing previously identified architectural resources within a one-mile radius of project area boundaries (yellow-shaded area).

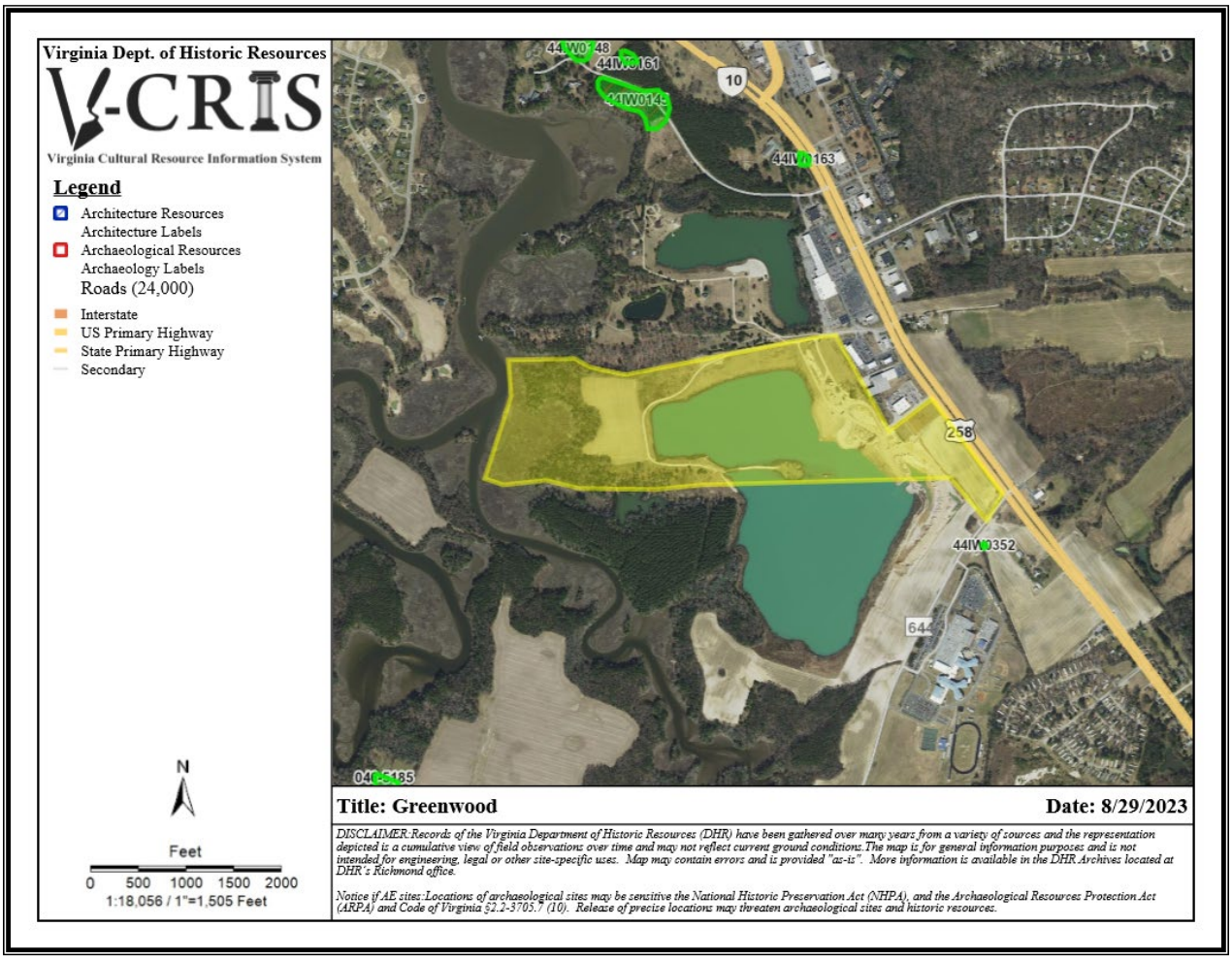


Figure 10. Detailed V-CRIS map showing previously identified resources near the project boundaries (yellow-shaded area).

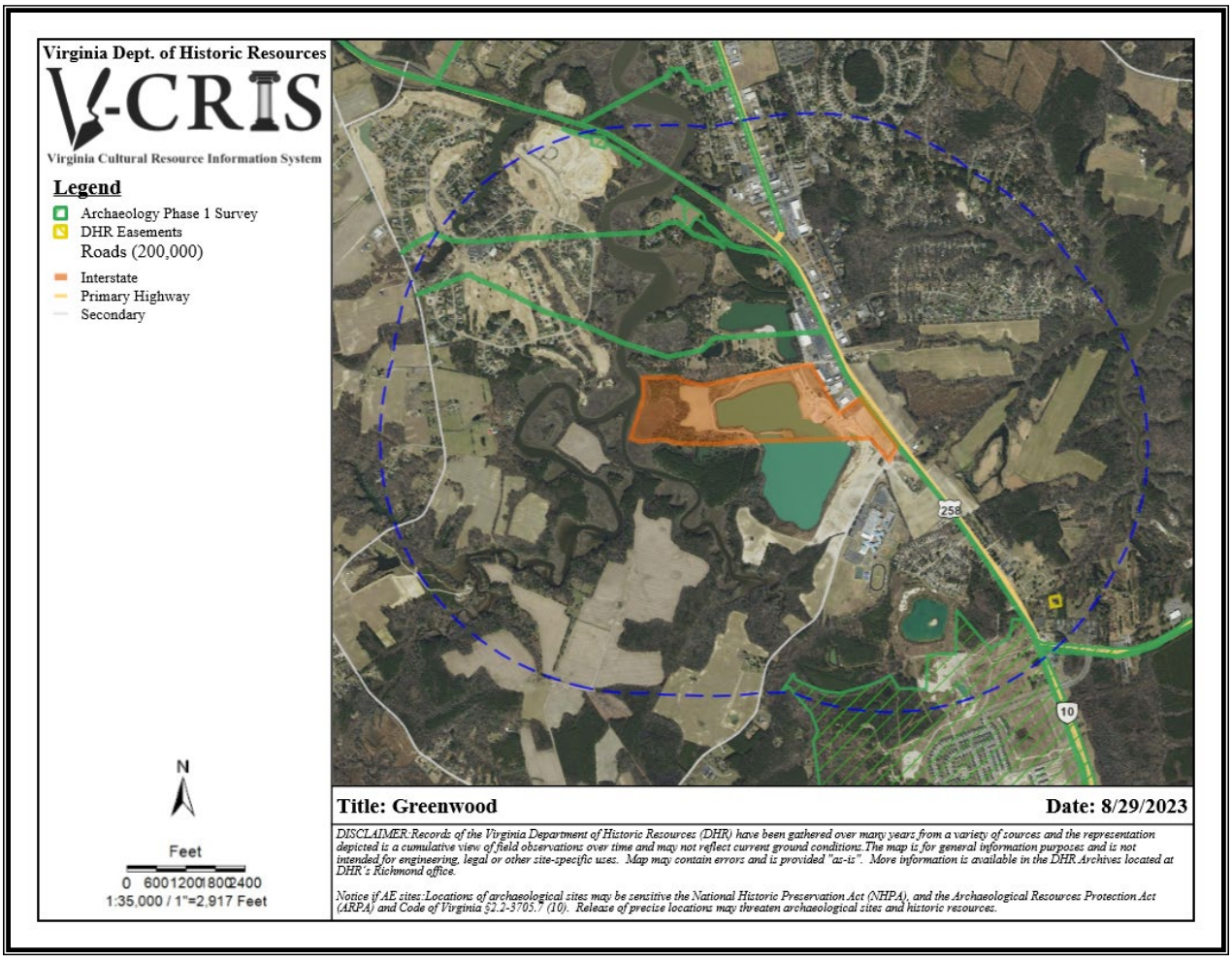


Figure 11. VDHR V-CRIS map showing project area in orange, previous survey areas outlined in green, and VDHR easements outlined in yellow.

In sum, the review of aerials indicates that most of the project area has been impacted by active sand-mining activities or lies within wetlands in the western section of the project area (Figure 12).



Figure 12. View of the impacts from sand-mining activities and wetlands.

PHASE I ENVIRONMENTAL SITE ASSESSMENT



BENNS CHURCH SITE

18495 CYPRESS RUN DR
SMITHFIELD, VIRGINIA 23430

ECS PROJECT NO. 47:14575

FOR: GREENWOOD HOMES

JUNE 1, 2022

June 1, 2022

Sandy Garber
Greenwood Homes
3481 Frances Berkley
Williamsburg, Virginia 23188

ECS Project No. 47: 14575

Reference: Phase I Environmental Site Assessment Report, Benns Church Site, 18495 Cypress Run Dr, Smithfield, Isle of Wight, Virginia 23430

Dear Mr. Garber:

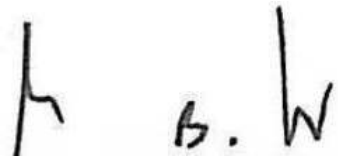
ECS Mid-Atlantic, LLC (ECS) is pleased to provide you with the results of our Phase I Environmental Site Assessment (ESA) for the referenced site. ECS's services were provided in general accordance with ECS Proposal No. 47:23297 authorized on May 18, 2022 and generally meet the requirements of ASTM E1527-21, Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process, which ECS believes to be in accordance with EPA Standards and Practices for All Appropriate Inquiries contained in 40 CFR Part 312.

If there are questions regarding this report, or a need for further information, please contact the undersigned.

Sincerely,

ECS Mid-Atlantic, LLC





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Environmental Scientist
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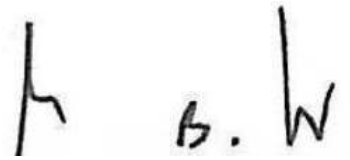
Project Summary

Benns Church Site
18495 Cypress Run Dr
Smithfield, Virginia 23430

Report Section		No Further Action	REC	CREC	HREC	BER	Comment
4.0	User Provided Information	✔					
5.1	Federal ASTM Databases	✔					
5.2	State ASTM Databases	✔					
5.3	Additional Environmental Record Sources	✔					
6.0	Historical Use Information	✔					
7.0	Site and Area Reconnaissance	✔					
8.0	Additional Services	✔					
9.0	Interviews	✔					

ENVIRONMENTAL PROFESSIONAL STATEMENT

We declare that, to the best of our professional knowledge and belief, we meet the definition of Environmental Professional as defined in § 312.10 of 40 CFR 312. We have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the subject property. We have developed and performed the all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312.



Garnett B. Williams, C.P.G.
Principal Geologist
June 1, 2022

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1.0 EXECUTIVE SUMMARY

ECS Mid-Atlantic, LLC (ECS) was contracted by Greenwood Homes to perform an ASTM E1527-21, Phase I Environmental Site Assessment (ESA) of the Benns Church Site located at 18495 Cypress Run Dr in Smithfield, Isle of Wight, Virginia (i.e. subject property). This Executive Summary is an integral part of the Phase I ESA report. ECS recommends that the report be read in its entirety.

The subject property is identified by Isle of Wight County as Parcel 32-01-005 and owned by L & L Land Development LLC. The approximately 133-acre subject property is occupied by a sand mine, with a maintenance shed, a small storage shed, and several non-permanent buildings.

The subject property is located in a commercial area of Smithfield, Virginia. The subject property is bound on the north by wooded land followed by a pond and a house, on the east by a strip mall and several stores followed by Benns Church Boulevard, on the south by a pond which is located partially on the subject property, followed by Turner Drive and on the west by Cypress Creek and marshland. ECS did not identify environmental issues at adjoining or nearby properties that are believed to present a recognized environmental condition (REC) at the subject property.

Based on the records search, site reconnaissance and interviews, it appears that the subject property was used as farmland from at least 1959 through 1982. By at least 1994, mining operations had begun on the property. Historical records prior to 1919 were not reasonably ascertainable for the subject property.

Our review of historical information for adjoining or nearby properties identified the area as originally rural farmland and woods that transitioned to commercial developments.

ECS conducted two Phase I ESA's on portions of the subject property in February and March 2022. These reports did not identify RECs for the subject property.

A regulatory database search report was provided by EDR. The database search involves researching a series of Federal, State, Local, and other databases for facilities and properties that are located within specified minimum search distances from the subject property. The report identified the subject property on the US MINES database. The EDR report identified several off-site properties within the minimum ASTM search distances. Based on our review of available public records, none of the listings are believed to represent a REC for the subject property.

ASTM E1527-21 defines a "*data gap*" as: "a lack of or inability to obtain information required by this practice despite good faith efforts by the environmental professional to gather such information." A *"significant data gap"* is "a data gap that affects the ability of the environmental professional to identify a recognized environmental condition." Significant data gaps that would be expected to impact our ability to render a professional opinion concerning RECs for the subject property were not identified.

We have performed a Phase I Environmental Site Assessment in general conformance with the scope and limitations of ASTM E1527-21 of the Benns Church Site located at 18495 Cypress Run Dr in Smithfield, Isle of Wight, Virginia, the subject property. Any exceptions to, or deletions from, this

practice are described in Section 2.6 of this report. This assessment has revealed no evidence of recognized environmental conditions, controlled recognized environmental conditions, or significant data gaps in connection with the property.

Table of Critical Dates

Item	Date
Report Issuance Date	June 1, 2022
Date of Interview with Past and Present Owners and Occupants	May 18, 2022
Date of Recorded Environmental Cleanup Lien Search	N/A
Date of Government Record Review Report	May 6, 2022
Date of Visual Inspection of Subject and Adjoining Properties	May 20, 2022
Earliest Date of Interviews, Lien Search, Record Reviews, and Inspections	May 6, 2022
Report Viability Date	November 2, 2022

2.0 INTRODUCTION

2.1 Purpose and Reason for Performing Phase I ESA

The purpose of the ESA was to:

- evaluate the probability of impact to the surface water, groundwater and/or soils within the property boundaries through a review of regulatory information and a reconnaissance of the subject property and vicinity;
- evaluate historical land usage to identify previous conditions that could potentially impact the environmental condition of the subject property;
- conduct all appropriate inquiry as defined by ASTM E1527-21 and 40 CFR Part 312;
- evaluate the potential for on-site and off-site contamination; and,
- provide a professional opinion regarding the potential for environmental impact at the site and a list of Recognized Environmental Conditions (RECs).

The ESA should allow the Users the opportunity to qualify for landowner liability protection under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) provided certain stipulations are met. The landowner liability protections are: an innocent landowner, a contiguous property owner, or a bona fide prospective purchaser. The User must meet the protection stipulations detailed in CERCLA to qualify as well as meet the User Obligations contained within the ASTM E1527-21 standard.

The reason for conducting this ESA is to perform all appropriate inquiries into the uses and prior ownership of the subject property for a pending real estate transaction.

2.2 Scope of Services

The environmental assessment was conducted in general accordance with ASTM E1527-21, which ECS believes to be in accordance with EPA Standards and Practices for All Appropriate Inquiry (40 CFR §312.10). The environmental assessment was conducted under the supervision or responsible charge of an individual that qualifies as an environmental professional, as defined in 40 CFR §312.10.

ECS was contracted by Greenwood Homes to perform an ASTM E1527-21, Phase I Environmental Site Assessment (ESA) of the Benns Church Site located at 18495 Cypress Run Dr in Smithfield, Isle of Wight, Virginia. ECS was not contracted to address non-scope considerations.

2.3 Definitions

ASTM E1527-21 defines a "*recognized environmental condition (REC)*" as "(1) the presence of hazardous substances or petroleum products in, on, or at the subject property due to a release to the environment; (2) the likely presence of hazardous substances or petroleum products in, on, or at the subject property due to a release or likely release to the environment; or (3) the presence of hazardous substances or petroleum products in, on, or at the subject property under conditions that pose a material threat of a future release to the environment." For the purposes of this definition,

"likely" is that which is neither certain nor proved, but can be expected or believed by a reasonable observer based on the logic and/or experience of the environmental professional, and/or available evidence, as stated in the report to support the opinions given therein.

ASTM E1527-21 defines a "*historical recognized environmental condition (HREC)*" as "a previous release of hazardous substances or petroleum products affecting the subject property that has been addressed to the satisfaction of the applicable regulatory authority or authorities and meeting unrestricted use criteria established by the applicable regulatory authority or authorities without subjecting the subject property to any controls (for example, activity and use limitations or other property use limitations). A historical recognized environmental condition is not a recognized environmental condition."

ASTM E1527-21 defines a "*controlled recognized environmental condition (CREC)*" as "recognized environmental condition affecting the subject property that has been addressed to the satisfaction of the applicable regulatory authority or authorities with hazardous substances or petroleum products allowed to remain in place subject to implementation of required controls (for example, activity and use limitations or other property use limitations)."

ASTM E1527-21 defines a "*business environmental risk (BER)*" as "a risk that can have a material environmental or environmentally-driven impact on the business associated with the current or planned use of commercial real estate, not necessarily related to those environmental issues required to be investigated in this practice." This assessment does not include ASTM Non-Scope items or identify business environmental risks unless specifically requested by the Client, and included in Section 8.0 of this report.

ASTM E1527-21 defines a "*de minimis condition" as "a* condition related to a release that generally does not present a threat to human health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies. A condition determined to be a *de minimis* condition is not a recognized environmental condition nor a controlled recognized environmental condition."

2.4 Limitations

The ESA involved a reconnaissance of the subject property and contiguous properties and a review of regulatory and historical information in general accordance with the ASTM standard and EPA regulation referenced herein. No non-scope considerations or additional issues such as asbestos, radon, wetlands or mold were investigated, unless otherwise described in Section 8.0 of this report.

Note: vapor migration in the subsurface is described in Guide E2600 published by ASTM. ECS has not conducted a Vapor Encroachment Screen in accordance with the E2600 guide.

The conclusions and/or recommendations presented within this report are based upon a level of investigation consistent with the standard of care and skill exercised by members of the same profession currently practicing in the same locality under similar conditions. The intent of this assessment is to identify the potential for recognized environmental conditions in connection with the subject property; however, no environmental site assessment can completely eliminate uncertainty regarding the potential for recognized environmental conditions in connection with the

subject property. The findings of this ESA are not intended to serve as an audit for health and safety compliance issues pertaining to improvements or activities at the subject property. ECS is not liable for the discovery or elimination of hazards that may potentially cause damage, accidents or injury.

Observations, conclusions and/or recommendations pertaining to environmental conditions at the subject property are necessarily limited to conditions observed, and or materials reviewed at the time this study was undertaken. It was not the purpose of this study to determine the actual presence, degree or extent of contamination, if any, at this subject property. This could require additional exploratory work, including sampling and laboratory analysis. No warranty, expressed or implied, is made with regard to the conclusions and/or recommendations presented within this report.

This report is provided for the exclusive use of Greenwood Homes. This report is not intended to be used or relied upon in connection with other projects or by other unidentified third parties. The use of this report by any undesignated third party or parties will be at such party's sole risk and ECS disclaims liability for any such third party use or reliance. The use of this report is subject to the same terms, conditions and scope of work reflected in this report and the associated proposal.

2.5 Data Gaps

ASTM E1527-21 defines a "*data gap*" as: "a lack of or inability to obtain information required by this practice despite good faith efforts by the environmental professional to gather such information." A *"significant data gap"* is "a data gap that affects the ability of the environmental professional to identify a recognized environmental condition."

Data failures (historical data gaps) were identified during the historical research of the subject property. Use of the subject property was generally documented back to 1919. Historical information was missing for various periods. However, due to the apparent continued use of the subject property as farmland and a sand mine, the historical data gaps are not expected to impact our ability to render a professional opinion regarding RECs for the subject property.

Significant data gaps that would be expected to impact our ability to render a professional opinion concerning RECs for the subject property were not identified.

2.6 Limiting Conditions/Deviations

ASTM E1527-21 requires that the Environmental Professional identify limiting conditions, deletions, and deviations from the ASTM E1527-21 standard, if any, including client-imposed constraints. Limiting conditions and/or deviations from the standard practice that would be expected to impact our ability to provide a professional opinion concerning RECs for the subject property were not encountered during the performance of this Phase I ESA.

3.0 SUBJECT PROPERTY DESCRIPTION

3.1 Subject Property Location and Legal Description

Site Name	Benns Church Site
Property Address	18495 Cypress Run Dr
Property City, State	Smithfield, Virginia
Property County	Isle of Wight
Number of Parcels	One
Property ID Number(s)	32-01-005
Property Size	133-acres
Property Owner of Record	L & L Land Development LLC
Property Legal Description	ADJ JONES TURNER BUNKLEY FARM

3.2 Physical Setting and Hydrogeology

USGS Topographic Map	
Quad Designation	Benns Church and Smithfield
Date	2019
Subject Property Settings	
Average Subject Property Elevation (in feet or meters)	30 feet above sea level
General Sloping Direction	West
Bodies of Water	A portion of a large pond is located in the center of the subject property. Cypress Creek and an associated wetland are located on the west side of the subject property.
General Directions of Surface Flow	Towards the pond in the center of the site
Presumed Direction of Groundwater Flow	West
Geologic Province	Coastal Plain
Up-gradient Property Direction	East

Nearby Properties' Setting	
General Sloping Direction	Properties west of Benns Church Boulevard slope west and properties east of Benns Church Boulevard slope east.
Bodies of Water	Cypress Creek, a tributary of the Pagan River, is located directly west of the subject property and partially on the property. Several tributaries of Jones Creek are located approximately 1800 feet to the east.
General Directions of Surface Flow	Properties west of Benns Church Boulevard flow west and properties east of Benns Church Boulevard flow east.
Presumed Direction of Groundwater Flow	Properties west of Benns Church Boulevard flow west and properties east of Benns Church Boulevard flow east.

Regional influences such as geologic conditions and impermeable soils may have an impact on groundwater flow. The actual groundwater flow direction cannot be determined without site-specific information obtained through the gauging of groundwater monitoring wells.

3.3 Current Use and Description of the Site

The subject property consists of an approximately 133-acre parcel of land that is currently utilized as a sand mine. The subject property is improved with a maintenance shed, a small storage shed, and two non-permanent buildings. The subject property is located in an area that can generally be described as commercial.

4.0 USER PROVIDED INFORMATION

The ASTM standard includes disclosure and obligations of the User to help the Environmental Professional identify the potential for Recognized Environmental Conditions associated with the subject property. The ASTM E1527-21 User Questionnaire was submitted to and completed by Sandy Garber, representing Greenwood Homes (User of the report). Section 4.0 is based on the completed User Questionnaire. A copy of the completed User Questionnaire is included in Appendix II.

4.1 Title Information

ECS was not provided with title information by the User. If this information is provided following the issuance of this report and information contained therein materially changes the outcome of this report, ECS will issue an addendum to this report.

4.2 Environmental Liens or Activity and Use Limitations

ECS was neither contracted to obtain information on environmental liens or activity and use limitations, nor have we been provided with information on environmental liens or activity and use limitations for our review. It should be noted by the User of this report that if the User does not obtain activity and use limitation information, the User that is seeking to qualify for an innocent landowner, a contiguous property owner, or a bona fide prospective purchaser liability defense may lose these rights to qualify under CERCLA. If the activity and use information is provided following issuance of this report and information contained therein materially changes the outcome of this report, ECS will issue an addendum to this report. The User, however, responded that they were not aware of any AULs associated with the subject property.

4.3 Specialized Knowledge

The User indicated that he did not possess specialized knowledge of the subject property.

4.4 Commonly Known or Reasonably Ascertainable Information

The User indicated that one past and current use of the site is as a borrow pit. He was not aware of specific chemicals that are present or once were present, spills or other chemical releases that have taken place, or environmental cleanups that have taken place at the site.

4.5 Valuation Reduction for Environmental Issues

According to the User, the purchase price being paid for the subject property reasonably reflects the fair market value.

4.6 Owner, Property Manager, and Occupant Information

The User indicated that the owner of the subject property is Henry Layden.

4.7 Degree of Obviousness

The User stated that he was not aware of obvious indicators that point to the presence or likely presence of contamination at the subject property.

5.0 RECORDS REVIEW

A regulatory records search of ASTM standard and supplemental databases was conducted for the subject property and is included in Appendix III. The regulatory search report in the appendix includes additional details about the regulatory databases that were reviewed. The regulatory records search involves searching a series of databases for facilities that are located within a specified distance from the subject property. The ASTM standard specifies an approximate minimum search distance from the subject property for each database. Pursuant to ASTM, the approximate minimum search distance may be reduced for each standard environmental record except for Federal NPL site list, and Federal RCRA TSD list. According to ASTM, government information obtained from nongovernmental sources may be considered current if the source updates the information at least every 90 days or, for information that is updated less frequently than quarterly by the government agency, within 90 days of the date the government agency makes the information available to the public. The following table indicates the standard environmental record sources and the approximate minimum search distances for each record.

Standard Environmental Record Sources	Approximate Minimum Search Distance Per ASTM (miles)	Subject Property	Off-Site Properties
Federal NPL	1.0	No	0
Federal Delisted NPL	0.5	No	0
Federal CERCLIS	0.5	No	0
Federal CERCLIS NFRAP	0.5	No	0
Federal RCRA CORRACTS	1.0	No	0
Federal RCRA non-CORRACTS TSD	0.5	No	0
Federal RCRA Generators	Subject Site and Adjoining Properties	No	1
Federal IC/EC	Subject Site Only	No	N/A
Federal ERNS	Subject Site Only	No	N/A
State and Tribal Hazardous Waste Sites (NPL Equivalent)	1.0	No	0
State and Tribal Hazardous Waste Sites (CERCLIS Equivalent)	0.5	No	0
State and Tribal Landfill and/or solid waste disposal sites	0.5	No	0

Standard Environmental Record Sources	Approximate Minimum Search Distance Per ASTM (miles)	Subject Property	Off-Site Properties
State and Tribal Leaking Tanks	0.5	No	2
State and Tribal Registered UST and AST	Subject Site and Adjoining Properties	No	0
State and Tribal IC/EC	Subject Site Only	No	N/A
State and Tribal Voluntary Cleanup (VCP)	0.5	No	0
State and Tribal Brownfield Sites	0.5	No	0

Based on our knowledge of the subject property and the surrounding area, ECS attempts to verify and interpret this data. While this attempt at verification is made with due diligence, ECS cannot guarantee the accuracy of the record(s) search beyond that of information provided by the regulatory report(s). ECS makes no warranty regarding the accuracy of the database report information included within the regulatory report(s).

The regulatory database search was performed by EDR and their report is dated May 6, 2022. ECS did not reduce the minimum ASTM search distances stipulated in the standard. The regulatory databases reviewed by ECS included supplemental databases researched by EDR.

5.1 Federal ASTM Databases

5.1.1 Federal RCRIS - Generators

RCRIS identifies facilities that generate hazardous wastes as defined by the RCRA. Very small quantity generators (VSQG) (previously identified as conditionally exempt small quantity generators or CESQGs) generate less than 100 kilograms of hazardous waste, or less than 1 kilogram of acutely hazardous waste, per month. Small quantity generators (SQGs) generate between 100 and 1,000 kilograms of hazardous waste per month. Large quantity generators (LQGs) generate more than 1,000 kilograms of hazardous waste or more than 1 kilogram of acutely hazardous waste per month.

The subject property is not listed on the RCRA databases. One off-site property within the minimum search distance of inquiry (adjoining properties) is reported by EDR as being on the Federal RCRIS Generators database. This listing is discussed below:

> **Tractor Supply #1571, 13500 Benns Church Blvd.** This facility is located on one of the eastern adjoining properties. This property is situated in a presumed up-gradient hydrogeological position relative to the subject property. The facility was listed as a very small quantity generator of ignitable waste, corrosive waste, and nonhalogenated solvents. RCRA violations are not listed for the facility. Based on our review of reasonably ascertainable information, this facility is not believed to present a REC for the subject property.

5.2 State ASTM Databases

5.2.1 State Leaking Tanks (LTANKS)

The LTANKS database is a list of all reported leaking underground and above ground tanks recorded by the state. See the LUST section below.

5.2.2 Leaking Underground Storage Tank (LUST) List

The LUST list is a record of reported leaking underground storage tank incidents. The LUST list may also identify properties that have had soil and/or groundwater contamination associated with documented releases from above ground storage tanks, surface spills, and other sources.

The subject property is not listed on the LUST database. The database report lists two incidents within the designated search radius. These off-site listings are plotted more than 1,000 feet away from the subject property. Based on the distance and/or relative topographic position, ECS does not believe releases at these off-site listings would result in a REC for the subject property. Additional information pertaining to these listings can be viewed in the regulatory report included in Appendix III.

5.2.3 Registered Underground Storage Tank (UST) List

The Registered UST List inventories underground storage tanks registered with the state. This list does not identify USTs that have not been registered or are exempt, such as home heating oil tanks and other unregulated tanks.

The subject property is not listed on the UST database. The database report identified no UST facilities within the ASTM-designated search radius (subject and adjoining). However, the database report identified four UST facilities within 0.25 mile of the subject property. One facility is described below:

> **Miller Mart 25, 13458 Benns Church Rd Rte 1.** This listing is plotted 550 feet east the subject property, however, the UST basin is located approximately 445 feet east and up-gradient from the subject property. According to the database report, three 10,000-gallon gasoline USTs, a 4,000-gallon and 2,000-gallon diesel USTs are used on this site. These USTs were installed in 1990. Based on our review of reasonably ascertainable information, this facility is not considered to be a REC for the subject property.

ECS has reviewed the remaining off-site listings reported by EDR on the UST database. These other off-site listings are mapped more than 1,000 feet away from the subject property. Based on the distance and/or relative topographic position, these off-site listings are not considered to be a REC for the subject property. Additional information pertaining to these listings can be viewed in the regulatory report included in Appendix III.

5.3 Additional Environmental Record Sources

5.3.1 Additional Non-ASTM Federal Databases

5.3.1.1 US MINES

Contains all mine identification numbers issued for mines active or opened since 1971. The data also includes
violation information.

The subject property is identified on the US MINES database as **Bay Sand Company Inc, 18514 Cypress Run Drive**. The database indicates that this site is an active surface sand mine. 58 MSHA (Mine Safety and Health Administration) citations have been reported for the site between 2003 and 2022. These citations are likely related to the safety of people working at the mine, and, therefore, do not constitute a REC to the subject property.

5.3.2 Additional Non-ASTM State Databases

Neither the subject property nor properties within the designated search radii are identified on the additional state databases researched for this assessment.

5.3.3 Other Proprietary Databases

5.3.3.1 EDR Historical Cleaners

EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, laundry, laundromat, cleaning/ laundry, wash & dry etc.

The subject property is not listed on the EDR Historical Dry Cleaners database. The database report lists one property within the utilized search radius which is discussed below:

> **Best Cleaners, 13470 Benns Church Blvd.** This facility is plotted approximately 590 feet east of the subject property, however, it is actually located on one of the eastern adjoining properties, approximately 160 feet east and up-gradient from the subject property. According to the database report, this property was used as a dry cleaner between 2005 and 2014. However, based on interviews with employees of this facility during the site reconnaissance, it is used as a drop-off location only. Based on our review of reasonably ascertainable information, this business is not considered to present a REC for the subject property.

5.3.4 Unmapped (Orphan) Facilities and Sites

No properties are identified on the Orphan Summary List. These facilities are considered unmappable because the facility information in the database is insufficient and/or does not report accurate facility location.

5.4 Regulatory Review Summary

A regulatory database search report was provided by EDR. The database search involves researching a series of Federal, State, Local, and other databases for facilities and properties that are located within specified minimum search distances from the subject property. The report identified the subject property on the US MINES database. The EDR report identified several off-site properties within the minimum ASTM search distances. Based on our review of available public records, ECS does not consider the listings to be potential sources of soil, groundwater, or vapor impact to the subject property. Therefore, ECS does not consider the listed sites to be RECs for the subject property.

6.0 HISTORICAL USE INFORMATION

6.1 Aerial Photograph Review

ECS reviewed aerial photographs of the subject property and immediately surrounding properties for evidence of former usage which may indicate potential environmental issues. The aerial photographs were obtained from EDR. The aerial photographs reviewed are dated 1959, 1961, 1970, 1972, 1982, 1994, 2006, 2009, 2012, and 2016. Aerial photographs dated prior to 1959 were not available for review from EDR. The ECS review is dependent on the quality and scale of the photographs.

The following is a description of relevant information from the aerial photographs:

In 1959, the subject property appears to be primarily farmland, with a creek, marshland, and a wooded area on the western side, and an unpaved road and a house with four outbuildings on the eastern side of the property. It remains in this state until 1982, when a small pond and a portion of a small pond are visible on the southern side of the property, in the wooded area. In 1994, a large section of the center of the property appears to be used for mining, with disturbed soil and pits which are filled with water. Two buildings are visible near the mining operation. By 2006, a large pond is located in the center of the property. Smaller areas of farmland are still visible on the eastern and western sides of the property and the mining operation has expanded to the southern and eastern edges of the property. The site remains in this state until 2016 when the pond has expanded toward the southern edge or the property and the house and one of the outbuildings on the eastern side of the property has been demolished. Several small structures are visible on the western side of the large pond.

In 1959, a stream, marshland, and woodland are visible to the west, north, and south of the subject property. Farmland is visible to the northeast, east, and southeast. Further southeast are several houses and further east is an unpaved road. In 1972, a commercial building is visible to the southeast and the road appears to be paved. In 1994 a large pond, a strip mall, and a parking lot appear to the north of the subject property. A commercial building and a building with a suspect canopy indicative of a gas station appear to the east of the subject property. By 2006, additional commercial buildings appear to the east and a pond and sand mine are visible to the south. The area remains in this state throughout the rest of the timeframe of the aerial photographs.

6.2 Sanborn Fire Insurance Map Review

In an effort to identify past uses, ECS utilized EDR to search for historical Sanborn Fire Insurance Maps (Sanborn) for the subject property and surrounding area. Sanborn maps were not available for this area. The absence of such maps generally indicates that the subject property is located in an area where Sanborn maps were not produced because the area was rural or it was not economically feasible. ECS does not expect the lack of Sanborn maps to impact our ability to render a professional opinion concerning the subject property given the amount of historical information obtained from our research, the USGS topographic map, aerial photographs, city directories, and other historical records obtained. A copy of the Unmapped Property report is included within Appendix IV.

6.3 Historical USGS Topographic Maps

Topographic maps are produced by the United States Geological Survey (USGS) for various time periods. ECS reviewed topographic maps of the subject property and immediately surrounding properties for evidence of former usage that may indicate potential environmental issues. The topographic maps were obtained from EDR and are dated 1919, 1944, 1950, 1951, 1952, 1957, 1965, 1972, 1979, 1980, 1986, 1992, 2013, 2016, and 2019. Topographic maps dated prior to 1919 were not available for review from EDR.

The following is a description of relevant information from the topographic maps:

In 1919, Cypress Creek is mapped on the western side of the subject property. The marshland mapped on the western side is labeled "Whitney Wharf". A small building is mapped on the eastern side. In 1944, an unpaved road is mapped running east to west through the center of the site and areas on the eastern and western side are mapped as wooded land. The 1950 and 1951 maps do not provide coverage of the subject property. By 1957 the unpaved road mapped through the center of the subject property is shortened. Three additional buildings are mapped near the building on the east side. In 1965, a small pond is mapped near the center of the property. In 1986, a small pond is mapped on the southern edge of the property and an additional pond is mapped partially on the southern edge of the property. It remains in this state until 2013, when a large pond is mapped in the center of the property. The buildings are no longer mapped. In 2016, several roads are mapped on the eastern side of the property. In 2019, most of these roads are no longer mapped.

6.4 City Directory Review

One of the ASTM standard historical sources to be reviewed for previous subject property uses is local street directories, commonly known as City Directories. The purpose of the directory review is to identify past occupants of the subject property, adjoining properties, or nearby properties. In some rural areas, street directories information is limited.

ECS reviewed City Directories obtained from EDR. The subject property address utilized for the research was 18495 Cypress Run Dr. The directories reviewed are dated 1974, 1977, 1982, 1986, 1992, 1995, 2000, 2005, 2010, 2014, and 2017. The directories reviewed prior to 1992 did not provide listings for the subject property or surrounding area. Directories dated prior to 1974 were not available for review. A copy of the City Directory report is included in Appendix IV.

The following is a description of relevant information from the City Directories:

The subject property is not listed in the City Directories. Nearby properties of note include 13458 Benns Church Blvd, listed as Miller Oil Company in 2000, 2005, 2010, 2014, and 2017. Additionally, 13470 Benns Church Blvd is listed as Best Cleaners in 2010, 2014, and 2017.

6.5 Property Tax Files

Property tax files may include records of past ownership, appraisals, maps, sketches, photos, or other information kept by the local jurisdiction for property tax assessment purposes. According to the Isle of Wight tax assessor online information, the subject property is owned by L & L Land Development LLC. The subject property is listed as a 133-acre parcel with an identification number of 32-01-005.

6.6 Recorded Land Title Records

Recorded land title records may include leases, land contracts, and AULs recorded by the local jurisdiction. Land title records may provide only a list of the names of previous owners and may be of limited use; however, they may provide useful information about uses or occupancy of the property when employed in combination with other sources. ECS was not provided with land title records.

6.7 Building Department Records

The term building department records means those records of the local government indicating permissions of the local government to construct, alter or demolish improvements on the property.

ECS contacted Isle of Wight to determine if they had historical information regarding environmental concerns, construction dates, inspections, permits, or other historical information regarding the subject property. A Freedom of Information Act request was submitted to the County on May 5, 2022. The County reported that an electrical permit was issued in 2007 to upgrade the electrical service from 60 amps to 200 amps. A stormwater review permit was issued in 2021 which was related to a rezoning of the property.

6.8 Zoning/Land Use Records

The term zoning/land use records refers to records of the local government indicating the uses permitted by the government in particular zones within its jurisdictions. ECS reviewed zoning/land use records obtained from Isle of Wight County. The subject property is currently zoned for community conservation and environmental conservation use.

6.9 Previous Reports

ECS previously conducted two Phase I Environmental Site Assessment for two portions of the subject property in February and March 2022. The reports indicated that these two portions of the subject property were farmland. ECS did not identify RECs for the subject property.

6.10 Other Historical Sources

Other credible historical sources may be reviewed to identify past uses of the subject property. These sources may include websites, county or state road maps, historical society documents, or local library information.

ECS contacted the Virginia Department of Health (DOH) on May 6, 2022 to determine if they had historical information regarding environmental issues or responses at the subject property, including records of well or septic systems. The Department provided records of septic system applications and a permit from 1996. Additionally, an application from 1986 for a drain field installation for a grease trap was provided. The grease trap was depicted on the western side of the house that was formerly on the site. A permit was provided for this installation which was issued in 1987.

6.11 Historical Use Summary

According to historical research, the subject property has been used as farmland and as a sand mine. The surrounding area has developed slowly from a primarily rural region of farms and woodland to recent commercial development. No obvious indications of RECs were identified in the historical data review.

7.0 SITE AND AREA RECONNAISSANCE

7.1 Methodology

Julia Kobilka of ECS conducted the field reconnaissance on May 20, 2022. The weather at the time of the reconnaissance was 95 degrees Fahrenheit and sunny. Observations were made from a walking reconnaissance around the perimeter, around the buildings, through the buildings and along several transects across the subject property. Access or visibility limitations, if any, are discussed in Section 2.6. Subject property photographs are included in Appendix V.

7.2 On-Site Features

7.2.1 Observed Geologic, Hydrogeologic, Hydrologic, and Topographic Conditions

A large pond was observed in the center of the subject property as well as several large pits. A stream was observed on the western side of the property. The eastern half of the property appeared to slope easterly; all other areas sloped towards respective low areas. Groundwater is presumed to flow westerly.

7.2.2 Past Site Uses

During the site reconnaissance, ECS observed the subject property for evidence of past occupancy or usage that could indicate the presence of environmental concerns. Based on current site conditions observed during the site reconnaissance, ECS did not identify evidence of past uses or occupancy that would indicate the presence of a REC for the subject property.

7.2.3 Current Uses

At the time of the site reconnaissance, the subject property consisted of farmland, a sand mine, and large ponds on the eastern and central sides. The western side contained grassland, farmland, woodland, and marshland, with a road leading to this area on the northern side. On the western side of the pond was a small non-permanent building. The interior of this building was inaccessible during the site reconnaissance. On the eastern side of the pond were a maintenance shed, a small storage building, and a small office building, which was also non-permanent. On the north and east sides of the pond, sand mining equipment was observed.

The table below lists pertinent features of interest that were assessed for the subject property. Relevant information regarding pertinent features is discussed further in this section.

Feature	Yes	No
Hazardous Substances and Petroleum Products in Connection with Identified Uses	✔	
Hazardous Substance and Petroleum Product Containers Not in Connection with Identified Uses		✔
Drums, Totes, and Intermediate Bulk Containers	✔	

Feature	Yes	No
Unidentified Substance Containers		✔
Underground or Aboveground Storage Tanks	✔	
Strong, Pungent or Noxious Odors		✔
Standing Surface Water and Pools or Sumps Containing Liquids Likely to be Hazardous Substances or Petroleum Products		✔
Known or Suspect PCB-containing Equipment	✔	
Stains or Corrosion to Floors, Walls or Ceilings		✔
Stained Soil or Pavement	✔	
Floor Drains and Sump Pumps		✔
Pits, Ponds or Lagoons	✔	
Stressed Vegetation		✔
Solid Waste Mounds or Non-natural Fill Materials	✔	
Water/Wastewater Discharge		✔
Groundwater Wells		✔
Septic Systems or Cesspools		✔
Hydraulic Equipment (Elevators, Lifts, Compactors, Etc.)	✔	
Dry Cleaning		✔
Specialized Industrial Equipment		✔
Onsite Electrical Generators		✔
Oil-water Separators		✔

Hazardous Substances and Petroleum Products in Connection with Identified Uses

Several drums containing hydraulic fluid, diesel exhaust fluid, and lubricants were observed in the maintenance shed on the eastern side of the site.

Drums, Totes, and Intermediate Bulk Containers

Two bulk containers were observed on the west side of the maintenance building. The contents of the bulk containers are unknown.

Underground or Aboveground Storage Tanks

Two ASTs containing diesel fuel were observed near the small storage shed on the eastern side of the site. An empty AST which formerly contained 1,1,1-trichloroethane was observed on the southern side of the small storage shed. Staining and distressed vegetation were not observed in the vicinity of these ASTs.

Known or Suspect PCB-containing Equipment

Multiple pole-mounted transformers were observed on the eastern and northern sides of the subject property. The transformers are owned and maintained by Dominion Energy. Non-PCB stickers were not observed. Staining, which could be indicative of fluid leakage, was not observed on the transformers or ground surfaces below.

Stained Soil or Pavement

Petroleum staining was observed on the gravel road on the northern side of the site. The staining appeared to be approximately 10 feet by 8 feet in area.

Pits, Ponds or Lagoons

Multiple pits used for mining sand and a large pond were observed near the center of the site.

Solid Waste Mounds or Non-natural Fill Materials

Multiple sand stockpiles were observed in the mine area of the site.

Hydraulic Equipment (Elevators, Lifts, Compactors, Etc.)

A hydraulic lift was observed on the northern side of the site. Staining was not observed in the vicinity of the lift.

7.3 Adjoining and Nearby Properties

Contiguous and nearby properties were observed during a walking and vehicular reconnaissance of the subject property boundary and public places. The subject property is located in a commercial area of Smithfield, Isle of Wight, Virginia. The following is a brief summary of neighboring properties:

Direction	Description	Relative Gradient	REC
North	Wooded land followed by a pond and a house	Cross-gradient	No
East	A strip mall and several stores followed by Benns Church Boulevard	Up-gradient	No
South	Part of the pond which is located on the subject property, followed by Turner Drive	Cross-gradient	No

Direction	Description	Relative Gradient	REC
West	Cypress Creek	Down-gradient	No

A dry cleaner was located in the strip mall to the east of the subject property. However, interviews with employees of the dry cleaner revealed that the site is used as a drop-off location only.

7.4 Site and Area Reconnaissance Summary

According to our site observations and a review of adjoining and nearby properties, the subject property is used as a sand mine with the balance being farmland and wooded. The subject property is located in a commercial area. Details pertaining to our on-site and off-site observations are referenced previously. We did not identify RECs associated with the subject property or neighboring properties and businesses during the reconnaissance.

8.0 ADDITIONAL SERVICES

ASTM guidelines identify non-scope issues, which are beyond the scope of this practice. Non-scope issues have the potential to be business environmental risks. Some of these non-scope issues include; asbestos-containing building materials, radon, lead-based paint, lead in drinking water, wetlands, and mold. ECS was not authorized to assess non-scope issues in conjunction with this assessment.

9.0 INTERVIEWS

Julia Kobilka interviewed Henry Layden, the owner of the subject property, on May 18, 2022. Mr. Layden indicated that he has owned the property since 2012. To his knowledge, prior to being a sand mine, the subject property was used as farmland. He was not aware of 1) environmental concerns associated with the subject property; 2) any pending, past, or threatened administrative litigation or administrative proceedings relevant to hazardous substances or petroleum products in, on, or from the subject property; or 3) any government notices regarding any possible violation of environmental laws or possible liability related to hazardous substances or petroleum products. Mr. Layden stated that approximately 10 years ago, an old white house with an AST had been removed from the property. Additionally, any fill that is used on the site is reportedly clean. Mr. Layden indicated that the AST labeled as containing 1, 1, 1-trichloroethane was purchased from a meatpacking plant approximately 40 years ago and was empty at the time it was purchased. Since then it has been filled with water and used to wash rocks.

Julia Kobilka contacted employees of the dry cleaner east of the subject property during the site reconnaissance. These employees indicated that no dry cleaning takes place there since the store operates only as a drop-off location. They were not aware of additional environmental issues pertaining to the subject property.

ECS contacted local government officials and agencies via written Freedom of Information Act requests. Information gained from such sources is included in Section 6.10.

10.0 FINDINGS AND CONCLUSIONS

10.1 Findings and Opinions

The subject property is identified by Isle of Wight County as Parcel 32-01-005 and owned by L & L Land Development LLC. The approximately 133-acre subject property is occupied by a sand mine, with a maintenance shed, a small storage shed, and several non-permanent buildings.

The subject property is located in a commercial area of Smithfield, Virginia. The subject property is bound on the north by wooded land followed by a pond and a house, on the east by a strip mall and several stores followed by Benns Church Boulevard, on the south by a pond which is located partially on the subject property, followed by Turner Drive and on the west by Cypress Creek and marshland. ECS did not identify environmental issues at adjoining or nearby properties that are believed to present a recognized environmental condition (REC) at the subject property.

Based on the records search, site reconnaissance and interviews, it appears that the subject property was used as farmland from at least 1959 through 1982. By at least 1994, mining operations had begun on the property. Historical records prior to 1919 were not reasonably ascertainable for the subject property.

Our review of historical information for adjoining or nearby properties identified the area as originally rural farmland and woods that transitioned to commercial developments.

ECS conducted two Phase I ESA's on portions of the subject property in February and March 2022. These reports did not identify RECs for the subject property.

A regulatory database search report was provided by EDR. The database search involves researching a series of Federal, State, Local, and other databases for facilities and properties that are located within specified minimum search distances from the subject property. The report identified the subject property on the US MINES database. The EDR report identified several off-site properties within the minimum ASTM search distances. Based on our review of available public records, none of the listings are believed to represent a REC for the subject property.

10.2 Significant Data Gaps

Significant data gaps that would be expected to impact our ability to render a professional opinion concerning RECs for the subject property were not identified.

10.3 De Minimis Conditions

ECS did not identify *de minimis* conditions associated with the subject property during this assessment.

10.4 Conclusions

We have performed a Phase I Environmental Site Assessment in general conformance with the scope and limitations of ASTM E1527-21 of the Benns Church Site located at 18495 Cypress Run Dr in Smithfield, Isle of Wight, Virginia, the subject property. Any exceptions to, or deletions from, this

practice are described in Section 2.6 of this report. This assessment has revealed no evidence of recognized environmental conditions, controlled recognized environmental conditions, or significant data gaps in connection with the property.

11.0 REFERENCES

ASTM E1527-21. Standard Practice for Environmental Site Assessment, Phase I Environmental Site Assessment Process.

Environmental Data Resources, Inc., The EDR Aerial Photo Decade Package (years 1959, 1961, 1970, 1972, 1982, 1994, 2006, 2009, 2012, and 2016), dated May 9, 2022.

Environmental Data Resources, Inc., The EDR Radius Map Report, dated May 6, 2022.

Environmental Data Resources, Inc., Certified Sanborn Map Report (no coverage), dated May 6, 2022.

Environmental Data Resources, Inc., EDR City Directory Image Report (years 1992, 1995, 2000, 2005, 2010, 2014, and 2017), dated May 10, 2022.

Environmental Data Resources, Inc., Historical Topo Map Report (years 1919, 1944, 1950, 1951, 1952, 1957, 1965, 1972, 1979, 1980, 1986, 1992, 2013, 2016, and 2019), dated May 6, 2022.

Appendix I: Figures

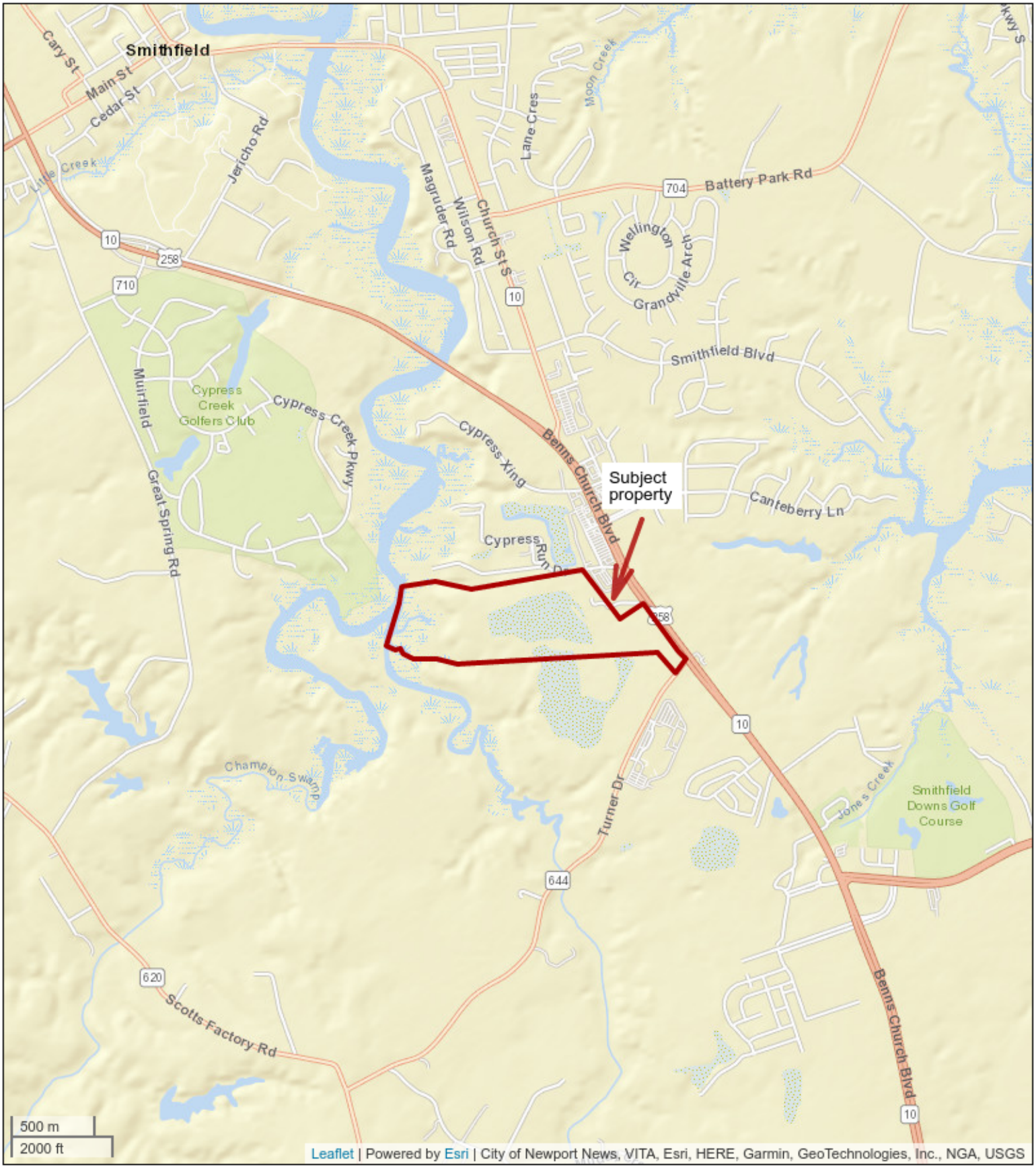


Figure 1

Site Location Map
Benns Church Site
18495 Cypress Run Dr
Smithfield, Virginia 23430

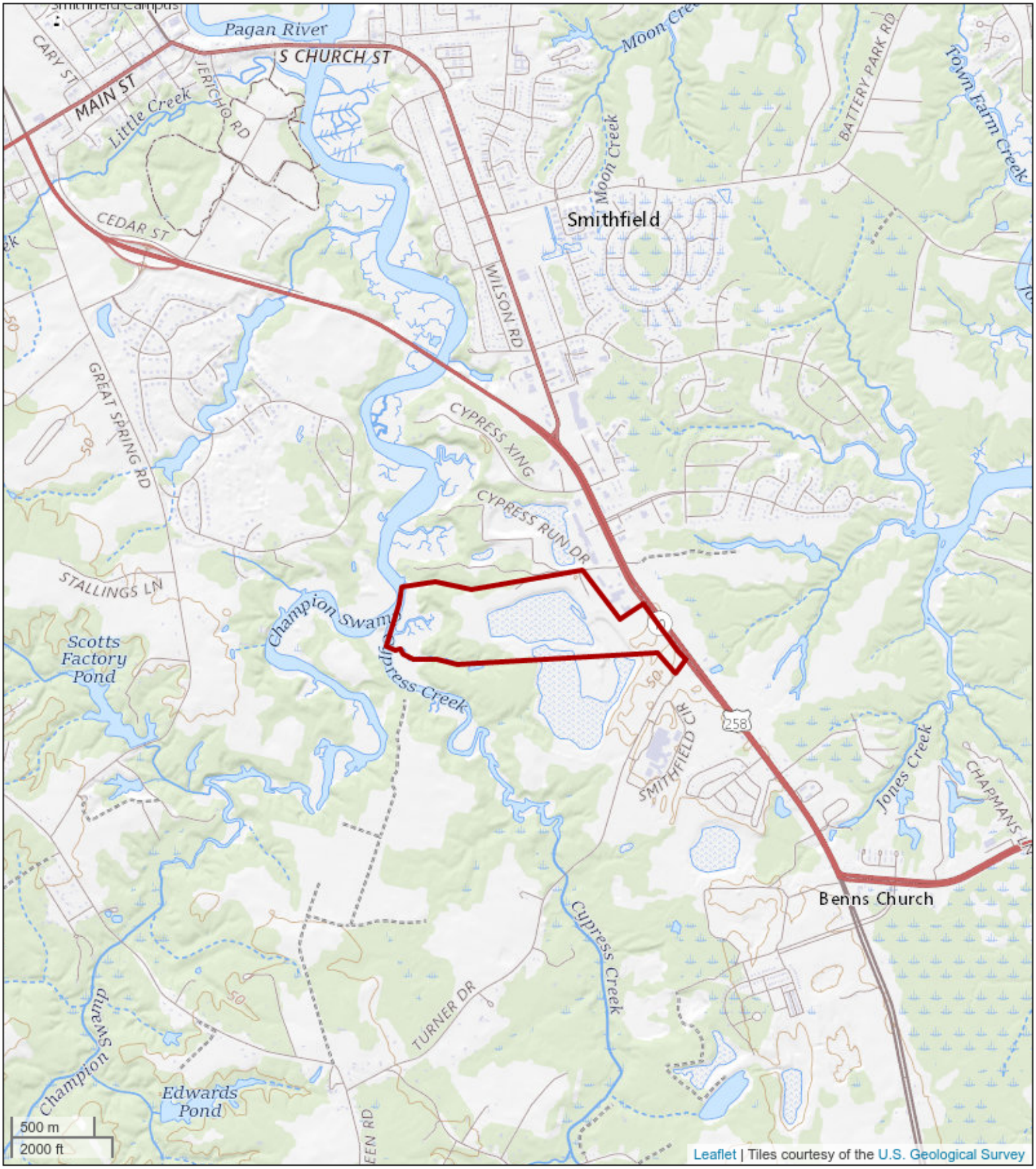


Figure 2

USGS Topographic Map
Benns Church Site
18495 Cypress Run Dr
Smithfield, Virginia 23430

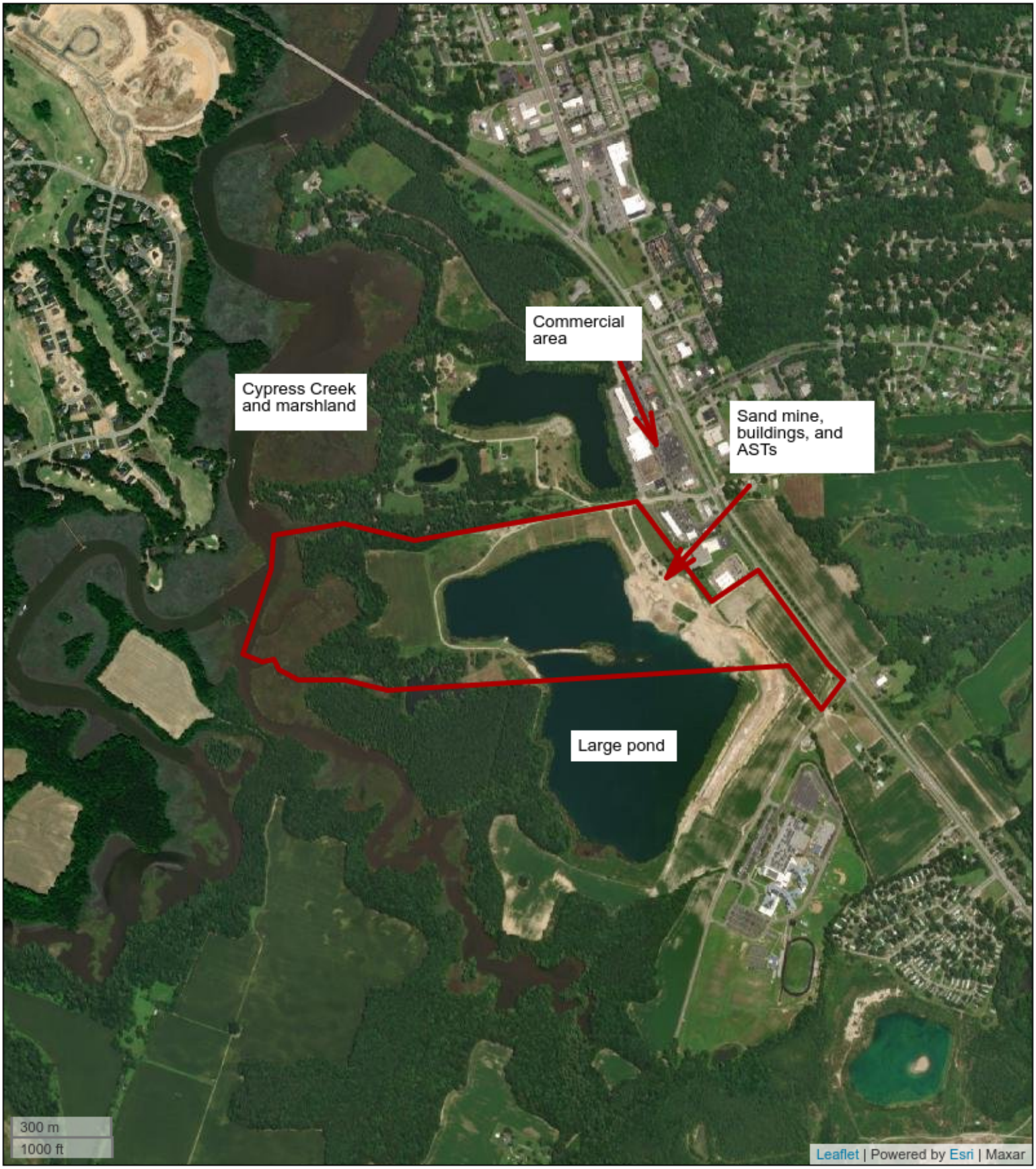


Figure 3
Site Plan
Benns Church Site
18495 Cypress Run Dr
Smithfield, Virginia 23430

Appendix II: Interviews, Correspondence and User Questionnaire

Environmental Questionnaire for User

Completion required for conformance with ASTM E 1527-21. Failure to provide this information may preclude CERCLA liability protections for the property purchaser. Please return answered form to ECS.

Site Name: BENN'S CHURCH - SMITHFIELD

Name and Title of Person Completing Questionnaire (Please Print):

SANAY GARBER

Signature of Person Completing Questionnaire:

Date: 5/6/22

Name of Your Company and Your Contact Number (Please Print):

GREENWOOD HOMES 571-435-9759

ASTM E 1527-21 indicates that, "Either the user shall make known to the environmental professional the reason why the user wants to have the Phase I Environmental Site Assessment performed or, if the user does not identify the purpose of the Phase I Environmental Site Assessment, the environmental professional shall assume the purpose is to qualify for an LLP to CERCLA liability and state this in the report." As the user of this ESA, what is the reason for conducting the Phase I ESA? If this question is unanswered, ECS will assume that the user's reason for the ESA is to qualify for landowner liability protections to CERCLA liability.

Please state reason for having ESA performed: ANTICIPATE PURCHASING AND DEVELOPING THIS PARCEL INTO A RESIDENTIAL SUBDIVISION

Will you provide Property Title Records and a Legal Description to ECS?

Please select one: **NO** ☑ **YES** ☐

Will you provide a 50-year chain of title abstract to ECS?

Please select one: **NO** ☑ **YES** ☐

Please Send Information Promptly

(1a.) Environmental liens that are filed or recorded against the site (40 CFR 312.25). ASTM E 1527-21 states that the user should perform a review of recorded land title records and judicial records for environmental liens or activity and use limitations for the site. Please forward the results of the land title record and judicial record review. If you would prefer, ECS can obtain this information from a third party provider for **an additional fee**. Please let ECS know if you would like to contract ECS for this service.

Please select one: **Client to Provide** ☐ **ECS to Provide for Additional Fee** ☐ ☑ NA

(1b.) Activity and use limitations that are in place on the site or that have been filed or recorded in a registry (40 CFR 312.26). Are you aware of any activity and use limitations (AULs), such as engineering controls, land use restrictions or institutional controls that are in place at the site and/or have been filed or recorded in a registry under federal, tribal, state or local law?

Please select one: **NO** ☑ **YES** ☐
If yes, please explain: _____

(2.) Specialized knowledge - As the user of this ESA do you have any specialized knowledge or experience related to the property or nearby properties? For example, are you involved in the same line of business as the current or former occupants of the property or an adjoining property so that you would have specialized knowledge of the chemicals and processes used by this type of business?

Please select one: **NO** ☑ **YES** ☐
If yes, please explain: _____

(3.) Commonly known or reasonably ascertainable information about the property (40 CFR 312.30). Are you aware of commonly known or reasonably ascertainable information about the property that would help the environmental professional to identify conditions indicative of releases or threatened releases? For example:

(a.) Do you know the past uses of the property?

Please select one: **NO** ☑ **YES** ☐
If yes, please state uses: ONE PAST USE (AND CURRENT) IS AS A BORROW PIT (AND FILL)

(b.) Do you know of specific chemicals that are present or once were present at the property?

Please select one: **NO** ☑ **YES** ☐
If yes, please explain: _____

(c.) Do you know of spills or other chemical releases that have taken place at the property?

Please select one: **NO** ☑ **YES** ☐
If yes, please explain: _____

(d.) Do you know of any environmental cleanups that have taken place at the property?

Please select one: **NO** ☑ **YES** ☐
If yes, please explain: _____

(4.) **Relationship of the purchase price to the fair market value of the property if it were not contaminated (40 CFR 312.29).** Does the purchase price being paid for this property reasonably reflect the fair market value of the property?

Please select one: **NO** ☐ **YES** ☑
If no, please explain: _____

If you are aware that there is a difference, is the lower purchase price because contamination is known or believed to be present at the property?

Please select one: **NO** ☑ **YES** ☐
If yes, please explain: _____

(5.) **Parcel Property Owner(s) & Contact Number(s):**

A. HENRY LAYDEN 757-438-3160
B. _____
C. _____
D. _____

Property Manager and Occupant(s) & Contact Number(s)

Property Manager: _____
Occupant/Tenant: _____
Occupant/Tenant: _____

(6.) **The degree of obviousness of the presence or likely presence of contamination at the property, and the ability to detect the contamination by appropriate investigation (40 CFR 312.31).** As the user of this ESA, based on your knowledge and experience related to the property, are there any obvious indicators that point to the presence or likely presence of contamination at the property?

Please select one: **NO** ☑ **YES** ☐
If yes, please explain: _____

NOT AWARE OF ANY, UNLESS THERE IS CONTAMINATED FILL

Sewage Disposal System Operation Permit

Commonwealth of Virginia
Department of Health

Health Department
Identification No. 146-[redacted]-86-593
Isle of Wight Co Health Department

Tax Map No. 32(1)5

Grover Yeoman
to Operate a (Type) I Sewage Disposal System Having a Design Capacity of 150 gpd, a

SUBDIVISION	SECTION/BLOCK	LOT
N/A		

This permit is Issued in Accordance with the Provisions of 32.1, Chapter 6 of the Code of Virginia as Amended and Section(s) 3.22 of the Sewage Handling and Disposal Regulations of the Virginia Department of Health and with Previously Issued permits Construction Permit Dated 12/31/86

with the understanding that the Owner and/or any Subsequent Owner will operate the Sewage Disposal System in Accordance with the Sewage Handling and Disposal Regulations of the Virginia Department of Health and any Variances or Conditions Granted. Issuance of an Operating Permit does not imply or Guarantee that the Sewage Disposal System will Function for any Specified Period of Time.

VARIANCES GRANTED
☒ NONE ☐ SEE ATTACHED

SPECIAL CONDITIONS
☒ NONE ☐ SEE ATTACHED

C.M.G. Buttery, M.D

1/30/87
Effective Date

Recommended (Sanitarian)

XXXXXXXXXXXXXXX
Approved (State Health Commissioner)

C.H.S. 205 Rev. 4/83

Completion Statement

Commonwealth of Virginia
State Department of Health

Health Department
Identification Number 146-86-593
Isle of Wight Health Department

Name of Company/Corporation/Individual: Henry Layden

Address: Telephone:

Owner's Name Grover YOEMAN

Owner's Address RT4, Box 119, Smithfield Va 23430

Location of Installation: Lot Block

Section: Subdivision:

Other: 32(01)05

I hereby certify that the onsite sewage disposal system has been installed and completed in accordance with the construction permit issued (date) and is in compliance with Part D of the Sewage Handling and Disposal Regulations and when appropriate the plans and specifications for the project.

1/7/87
Date

Henry Layden
Signature and Title

C.H.S. 203 Rev. 4/83

Sewage Disposal System Construction Permit

Commonwealth of Virginia
Department of Health
Isle of Wight Health Department

Health Department
Identification Number 146-86-593
Map Reference 32(1)5

General Information

New ☐ Repair ☒ Expanded ☐ Conditional ☐ FHA ☐ VA ☐ Case No. ____

Based on the application for a sewage disposal system construction permit filed in accordance with Section 3.13.01, a construction permit is hereby issued to:

Owner Grover YOEMAN Telephone 357-2649

Address RT4, BOX 119 Smithfield Va 23430

For a Type I Sewage disposal system which is to be constructed on/at for MAIN House of RTS 644 & 10/258

Subdivision — Section/Block — Lot —

Actual or estimated water use 150 gpd (grease trap) Laundry + sink wastes

DESIGN	NOTE: INSPECTION RESULTS
Water supply, existing: (describe) Public Water Supply **To be installed:** class ____ cased ____ grouted ____	**Water supply location:** Satisfactory yes ☐ no ☐ comments G. W. 2 Received: yes ☐ no ☐ not applicable ☐
Building sewer: — I.D. PVC 40, or equivalent. Slope 1.25″ per 10′ (minimum). ☐ Other ____	**Building sewer:** Satisfactory yes ☐ no ☐ comments
Septic tank: Capacity — gals. (minimum). ☐ Other Fat Grease Trap	**Pretreatment unit:** Satisfactory yes ☐ no ☐ comments
Inlet-outlet structure: PVC 40, 4″ tees or equivalent. ☐ Other ____	**Inlet-outlet structure:** Satisfactory yes ☐ no ☐ comments
Pump and pump station: No ☒ Yes ☐ describe and show design. if yes: ____	**Pump & pump station:** Satisfactory yes ☐ no ☐ comments
Gravity mains: 3″ or larger I.D., minimum 6″ fall per 100′, 1500 lb. crush strength or equivalent. ☐ Other ____	**Conveyance method:** Satisfactory yes ☐ no ☐ comments
Distribution box: Precast concrete with 4 ports. ☐ Other ____	**Distribution box:** Satisfactory yes ☒ no ☐ comments
Header lines: Material: 4″ I.D. 1500 lb. crush strength plastic or equivalent from distribution box to 2′ into absorption trench. Slope 2″ minimum. ☐ Other —	**Header lines:** Satisfactory yes ☒ no ☐ comments
Percolation lines: Gravity 4″ plastic 1000 lb. per foot bearing load or equivalent, slope 2″ 4″ (min. max.) per 100′. ☐ Other ____	**Percolation lines:** Satisfactory yes ☒ no ☐ comments
Absorption trenches: Square ft. required 300: depth from ground surface to bottom of trench 36″; aggregate size ½ to 1½″; Trench bottom slope 2-4″ per 100′; center to center spacing 6′; trench width 2′ Depth of aggregate 13″; Trench length 75′; Number of trenches 2	**Absorption trenches:** Satisfactory yes ☒ no ☐ comments Date 1/7/87 Inspected and approved by: ____ Sanitarian

C.H.S. 202A Revised 6/84

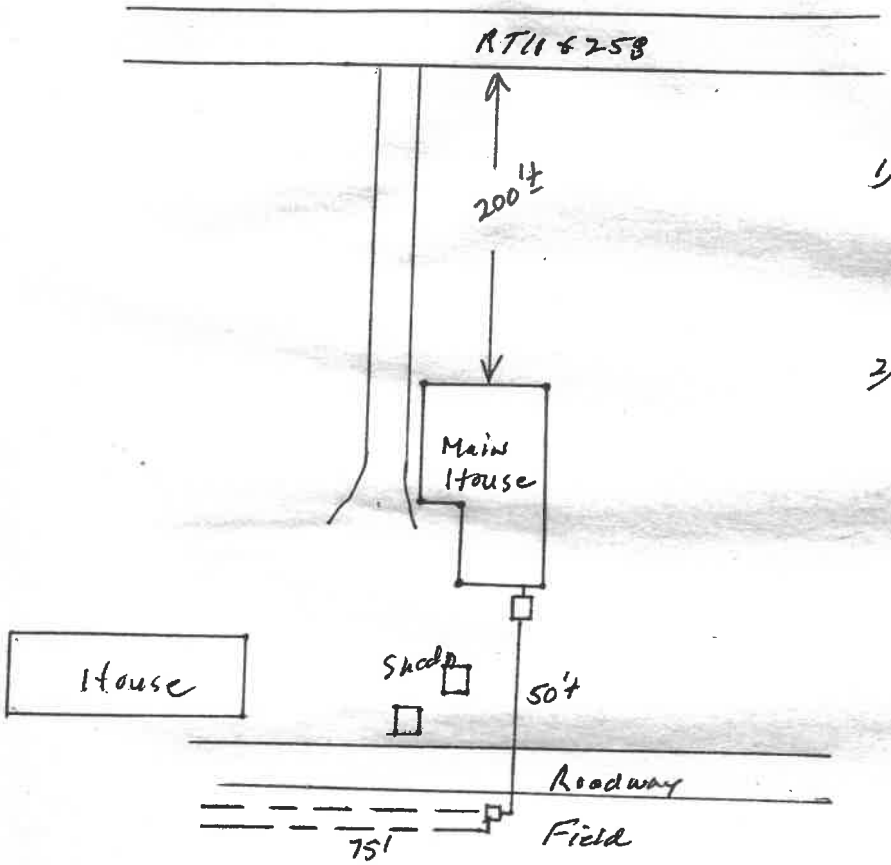
Health Department
Identification Number 146-06-593

Schematic drawing of sewage disposal system and topographic features.

PAGE 2 OF 2

Show the lot lines of the building lot and building site, sketch of property showing any topographic features which may impact on the design of the system, all existing and/or proposed structures including sewage disposal systems and wells within 100 feet of sewage disposal system and reserve area. The schematic drawing of the sewage disposal system shall show sewer lines, pretreatment unit, pump station, conveyance system, and subsurface soil absorption system, reserve area, etc. When a nonpublic drinking water supply is to be located on the same lot show all sources of pollution within 100 feet.

☒ The information required above has been drawn on the attached copy of the sketch submitted with the application. Attach additional sheets as necessary to illustrate the design.



1/ Install a new sewer line (4" sch 40 PVC) from grease trap to a new distribution box.

2/ Install 2 - 75' drainlines, 2' wide & 6' apart. Drainfield to be 36" deep.

The sewage disposal system is to be constructed as specified by the permit ☒ or attached plans and specifications ☐.

This sewage disposal system construction permit is null and void if (a) conditions are changed from those shown on the application (b) conditions are changed from those shown on the construction permit.

No part of any installation shall be covered or used until inspected, corrections made if necessary, and approved, by the local health department or unless expressly authorized by the local health dept. Any part of any installation which has been covered prior to approval shall be uncovered, if necessary, upon the direction of the Department.

Date: 12/31/86 Issued by: _____ Sanitarian

Date: 1-6-86 Reviewed by: _____ Supervisory Sanitarian

This Construction Permit Valid until 7/1/91

If FHA or VA financing

Reviewed by Date _____ _____ Supervisory Sanitarian Date _____

S. 202B Revised 6/84

11-2A

Soil Evaluation Form

Commonwealth of Virginia
Department of Health

Health Department Identification Number 146-86-593
Tax Map Number 32(01)05

General Information

Date 12/30/86 Isle of Wight Co Health Department

Applicant Grover Yeoman Telephone No. _____

Address Rt. 4 Box 119 Smithfield, VA 23430

Owner _____ Address _____

Location _____

Subdivision _____ Block/Section _____ Lot _____

Soil Information Summary

1. Position in landscape satisfactory Yes ☒ No ☐ Describe _____

2. Slope 0 %

3. Depth to rock/impervious strata Max. _____ Min. _____ None ✓

4. Depth to seasonal water table (gray mottling or gray color) No ☐ Yes ☐ 50+ inches

5. Free water present No ☒ Yes ☐ _____ range in inches

6. Soil percolation rate estimated Yes ☒ Texture group I (II) III IV
No ☐ Estimated rate 20 min/ inch

7. Percolation test performed Yes ☐ Number of percolation test holes _____
No ☒ Depth of percolation test holes _____
Average percolation rate _____

Name and title of evaluator: J. A. Nourse, Sanitarian

Signature: J. A. Nourse

Department Use

☒ Site Approved: Drainfield to be placed at 36" depth at site designated on permit.

☐ Site Disapproved:

Reasons for rejection:

1. ☐ Position in landscape subject to flooding or periodic saturation.
2. ☐ Insufficient depth of suitable soil over hard rock.
3. ☐ Insufficient depth of suitable soil to seasonal water table.
4. ☐ Rates of absorption too slow.
5. ☐ Insufficient area of acceptable soil for required drainfield, and/or Reserve Area.
6. ☐ Proposed system too close to well.
7. ☐ Other Specify _____

C.H.S. 201A Revised 4/83

Date of Evaluation 12/30/86

Profile Description
SOIL EVALUATION REPORT

Health Department Identification No. 146-86-593

Page _____ of _____

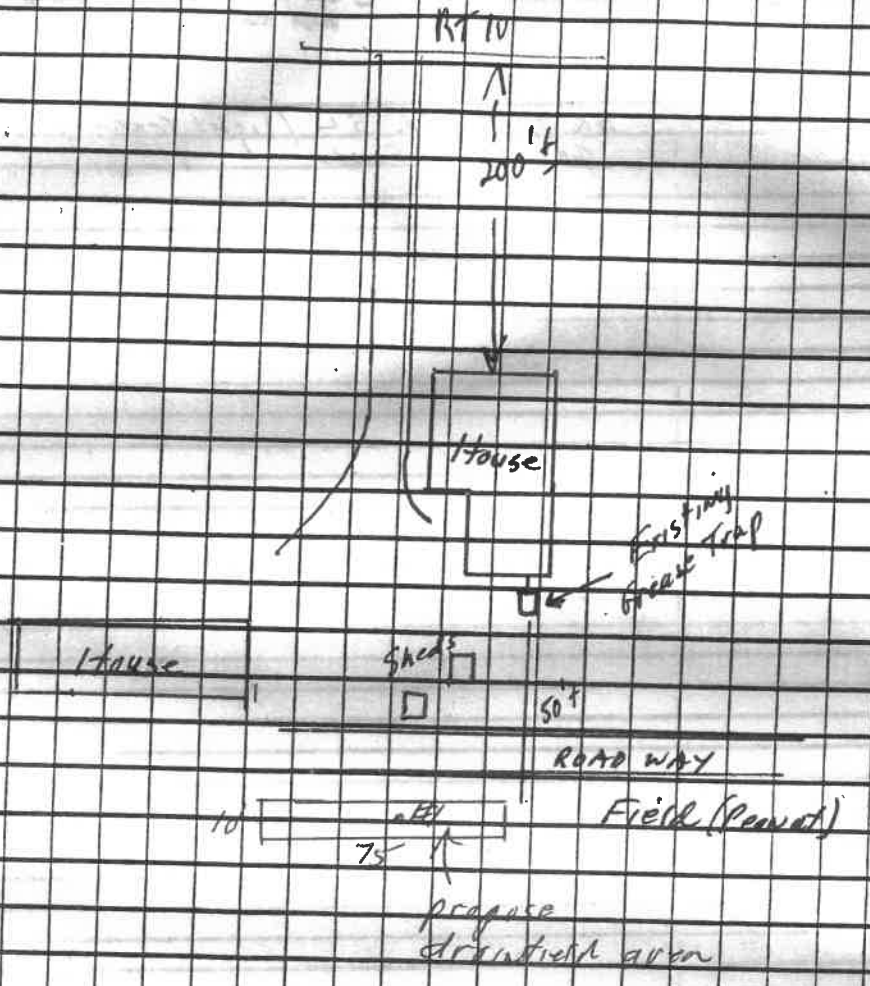
Where the local health department conducts the soil evaluation the location of profile holes may be shown on the schematic drawing on th construction permit or the sketch submitted with the application. If soil evaluations are conducted by a private soil scientist, location of pro file holes and sketch of the area investigated including all structural features i.e., sewage disposal systems, wells, etc., within 100 feet of site (See Section 4) and reserve site shall be shown on the reverse side of this page or prepared on a separate page and attached to this form.

☐ See application sketch ☐ See construction permit ☐ See sketch on reverse side or page attached to this form.

#1	A	0-50	BR TO LT BR SL (Light Texture)	I
		50-60	GRAY LBR Sand	I

Remarks:

C.H.S. 2018 Revised 4/83


RT 10
200 ft
House
Existing Grease Trap
House
Sheds
50 ft
ROAD WAY
10
75
Field (Pervious)
propose drainfield area

plication for a Sewage Disposal System Construction Permit

Commonwealth of Virginia
Department of Health

For Department Use Only

Health Department Identification Number 146-86-593
Map Reference 32 (01) 05

Isle of Wight Health Department

Date Received 12/30/86

To Be Completed By The Applicant

Type sewage system: ☐ New ☒ Repair ☐ Expanded ☐ Conditional
FHA/VA yes ☐ no ☐

Owner GROVER YEOMAN Address RT 4 BOX 119 SMITHFIELD Va 23430 Phone

Agent HENRY LAYDEN Address RT 1 BOX 215 CARROLLTON 23314 Phone 357-6631

Directions to Property OFF OF HWY 10

Subdivision Section Block Lot

Other Property Identification

Dimensions/size of Lot/Property 140 acres ±

Other Application Information

I. Building/facility ☐ New ☒ Existing
Intermittent Use ☐ Yes ☒ No If yes, describe:

II. Residential Use ☒ Yes ☐ No
Termite Treatment ☐ Yes ☐ No
☒ Single Family ☐ Multifamily Number of Units Number of Bedrooms 3
Basement ☐ Yes ☒ No
Fixtures in Basement ☐ Yes ☒ No

III. Commercial Use ☐ Yes ☒ No Describe:

Commercial/Wastewater ☐ Yes ☒ No Number of Patrons Number of Employees
If yes, give volumes and describe

IV. Water Supply: ☒ Public ☐ New Describe: Smithfield
☐ Private ☒ Existing

V. Proposed Installation: ☐ Septic tank and drainfield ☐ Other
If other, describe Install new drainfield for grease trap serves washing machine & 2 sinks

SITE PLAN Attach a site plan (rough sketch) showing dimensions of property, proposed and/or existing structures and driveways, underground utilities, adjacent soil absorption systems, bodies of water, drainage ways, and wells and springs within 200 feet radius of the center of the proposed building or drainfield. Distances may be paced or estimated.

The property lines and building location are clearly marked and the property is sufficiently visible to see the topography. I give permission to the Department to enter onto the property described for the purpose of processing this application.

Henry Layden
Signature of owner/agent

12/30/86
Date

C.H.S. 200 Revised 4/83

Power Yeoman
T4 Box 119
Smithfield VA
23430
200'
Old Grease Trap
Farm House
House
75'
Barn
Driveway
2 lanes 75' long 2' wide
30' to 36' long
Pump Trap
600'
10
Repair to Grease Trap

No. S 146-96-324
32(1)005 part of

PERMIT

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF HEALTH
OPERATION PERMIT

THIS PERMIT EXPIRES ON

DATE OF ISSUE
12-16-96

OPERATOR: Billy Yeoman
ADDRESS: 14096 Benns Church Blvd.
Smithfield, VA 23430

The above operator has made application and in accordance with the regulations of the Board of Health of the Commonwealth of Virginia is authorized by the ISLE OF WIGHT COUNTY *Health Department to operate a* septic system.

Larry C. Griffin
HEALTH OFFICIAL

32(1)005

THIS PERMIT IS NOT TRANSFERABLE FROM ONE INDIVIDUAL OR LOCATION TO ANOTHER

Completion Statement

Commonwealth of Virginia
State Department of Health

Health Department
Identification Number S 146-96-324

Isle of Wight Health Departme

Name of Company/Corporation/Individual: JOHNNIE EDWARDS

Address: 18770 Days Point Rd., Smithfield, VA 23430 Telephone: 357-3513

Owner's Name Billy Yeoman

Owner's Address 14096 Benns Church Blvd., Smithfield, VA 23430

Location of Installation: Lot ---- Block ----

Section: --- Subdivision: ---

Other: 32(1)005 part of

I hereby certify that the onsite sewage disposal system has been installed and completed in accordance with the construction permit issued (date) 9/26/96 and is in compliance with Part D of the Sewage Handling and Disposal Regulations and when appropriate the plans and specifications for the project.

12/16/96
Date

J R Edwards Jr
Signature and Title

C.H.S. 203 Rev. 4/83

Water Supply and/or Sewage Disposal System Construction Permit

Commonwealth of Virginia
Department of Health
Isle of Wight Health Department

Health Department Identification Number S 146-96-324
Map Reference 32(1)005 part of

General Information

Water Supply System: New ___ Repair ___ Public ___ FHA ___ VA ___ Case No. ___
Sewage Disposal System: New ___ Repair X Expanded ___ Conditional ___ Public ___
Based on the application for a sewage disposal system construction permit filed in accordance with Section 2.13 E, of the Sewage Handling and Disposal Regulations and/or Section 2.13 of the Private Well Regulations a construction permit is hereby issued to:
Owner Billy Yeoman
Address 14096 Benns Church Blvd., Smithfield, VA Telephone 357-2649
be constructed on/at Ed, a Type I Sewage Disposal System or Well to
Subdivision ----- Section/Block ---- Lot -- Actual or estimated water use 450

DESIGN	NOTE: SEWAGE DISPOSAL SYSTEM INSPECTION RESULTS
Water supply, existing: (describe) TOWN OF SMITHFIELD **To be installed:** class ___ cased ___ grouted ___	**Water supply location:** Satisfactory yes ☑ no ☐ comments . Completion Report G. W. 2 Received: yes ☐ no ☐ not applicable ☐
Building sewer: REPLACE IF NEEDED 3"-4" I.D. PVC Schedule 40, or equivalent. Slope 1.25" per 10' (minimum). ☐ Other ___	**Building sewer:** yes ☑ no ☐ comments Satisfactory NEW PVC SCH 40 TIED INTO EXISTING CI
Septic tank: Capacity 900 gals. (minimum). ☐ Other ___	**Pretreatment unit:** yes ☑ no ☐ comments Satisfactory
Inlet-outlet structure: PVC Schedule 40, 4" tees or equivalent. ☐ Other ___	**Inlet-outlet structure:** yes ☑ no ☐ comments Satisfactory
Pump and pump station: No ☒ Yes ☐ describe and show design. if yes: N/A	**Pump & pump station:** yes ☐ no ☐ comments Satisfactory N/A
Gravity mains: 3" or larger I.D., minimum 6" fall per 100', 1500 lb. crush strength or equivalent. ☐ Other ___	**Conveyance method:** yes ☑ no ☐ comments Satisfactory
Distribution box: Precast concrete with 8 ports. ☐ Other ___	**Distribution box:** yes ☑ no ☐ comments Satisfactory
Header lines: Material: 4" I.D. 1500 lb. crush strength plastic or equivalent from distribution box to 2' into absorption trench. Slope 2" minimum. ☐ Other ___	**Header lines:** yes ☑ no ☐ comments Satisfactory
Percolation lines: Gravity 4" plastic 1000 lb. per foot bearing load or equivalent, slope 2" 4" (min. max.) per 100'. ☐ Other ___	**Percolation lines:** yes ☑ no ☐ comments Satisfactory
Absorption trenches: Square ft. required 700 ; depth from ground surface to bottom of trench 30" ; aggregate size 1/2-1 1/2 ; Trench bottom slope 2"-4" /100' ; center to center spacing 6' ; trench width 2' ; Depth of aggregate 13" ; Trench length 70' ; Number of trenches 5	**Absorption trenches:** yes ☑ no ☐ comments Satisfactory
	Date 10-7-96 Inspected and approved by: Gary C. Duff Sanitarian

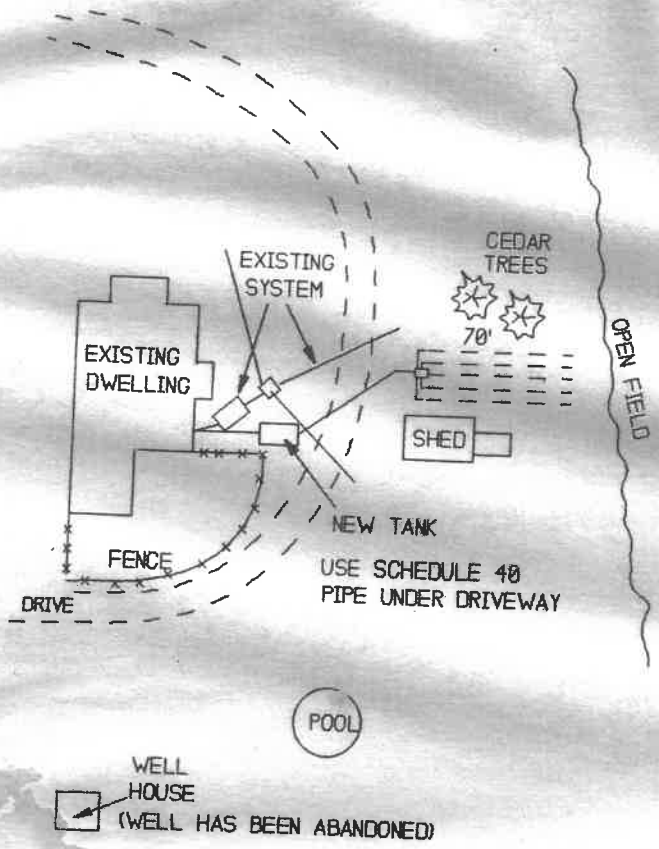
C.H.S 202A

Health Department
Identification Number S 146-96-324

Schematic drawing of sewage disposal and/or water supply system and topographic features.

Show the lot lines of the building site, sketch of property showing any topographic features which may impact on the design of the well or sewage disposal system, including existing and/or proposed structures and sewage disposal systems and wells within 200 feet. The schematic drawing of the well site or area and/or sewage disposal system shall show sewer lines, pretreatment unit, pump station, conveyance system, and subsurface soil absorption system, reserve area, etc. When a nonpublic drinking water supply is to be permitted, show all sources of pollution within 200 feet.

☑ The information required above has been drawn on the attached copy of the sketch submitted with the application. Attach additional sheets as necessary to illustrate the design.



INSTALL A 900 GAL. TANK & 5 - 70' LINES 2' WIDE.

BOTTOM OF DITCHES TO BE 30" BELOW GROUND SURFACE.

NO PORTION OF THE SEWAGE DISPOSAL SYSTEM IS TO BE INSTALLED ON A UTILITY RIGHT-OF-WAY. UNDERGROUND UTILITY LINES MUST NOT INTERSECT OR CROSS THE SEWAGE DISPOSAL SYSTEM.

OLD SEPTIC TANK AND DRAINFIELD TO BE ABANDONED.

This sewage disposal system and/or water supply is to be constructed as specified by the permit ✓ or attached plans and specifications ____.

This sewage disposal system and/or well construction permit is null and void if (a) conditions are changed from those shown on the application (b) conditions are changed from those shown on the construction permit.

No part of any installation shall be covered or used until inspected, corrections made if necessary, and approved, by the local health department or unless expressly authorized by the local health dept. Any part of any installation which has been covered prior to approval shall be uncovered, if necessary, upon the direction of the Department.

Date: 9-26-96 **Issued by:** Larry C. Duffie
Sanitarian

Date: 9-27-96 **Reviewed by:** Calvin W. Jones
Supervisory Sanitarian

This Construction Permit Valid until 3-26-98

If FHA or VA financing

Reviewed by Date _____ _____ **Date** _____ _____
Supervisory Sanitarian Regional Sanitarian

C.H.S. 202B

Soil Evaluation Form

PAGE 1 OF _____

Commonwealth of Virginia
Department of Health

Health Department
Identification Number S 146-96-324
Tax Map Number 32(1)005 part of

General Information

Date 9-26-96 Isle of Wight Health Department

Applicant Billy Yeoman Telephone No. 357-2649

Address 14096 Benns Church Blvd., Smithfield, VA 23430

Owner Same Address Same

Location _____

Subdivision ---- Block/Section ---- Lot ----

Soil Information Summary

1. Position in landscape satisfactory Yes ☑ No ☐ Describe _____

2. Slope 0-1 %

3. Depth to rock/impervious strata Max. _____ Min. _____ None ✓

4. Depth to seasonal water table (gray mottling or gray color) No ☑ Yes ☐ >48 inches

5. Free water present No ☑ Yes ☐ _____ range in inches

6. Soil percolation rate estimated Yes ☑ Texture group (I) II III IV
No ☐ Estimated rate 15-20 min/inch

7. Percolation test performed Yes ☐ Number of percolation test holes _____
No ☑ Depth of percolation test holes _____
Average percolation rate _____

Name and title of evaluator: Larry Griffin, Environmental Health Supervisor

Signature: Larry C. Griffin

Department Use

☑ Site Approved: Drainfield to be placed at 30" depth at site designated on permit.

☐ Site Disapproved:

Reasons for rejection:

1. ☐ Position in landscape subject to flooding or periodic saturation.
2. ☐ Insufficient depth of suitable soil over hard rock.
3. ☐ Insufficient depth of suitable soil to seasonal water table.
4. ☐ Rates of absorption too slow.
5. ☐ Insufficient area of acceptable soil for required drainfield, and/or Reserve Area.
6. ☐ Proposed system too close to well.
7. ☐ Other Specify _____

C.H.S. 201A Revised 4/87

V-1

Profile Description

SOIL EVALUATION REPORT

Date of Evaluation 9-26-96

Health Department
Identification No. 146-96-324

Where the local health department conducts the soil evaluation the location of the profile holes may be shown on the schematic drawing on the construction permit or the sketch submitted with the application. If soil evaluations are conducted by a private soil scientist, location of profile holes and sketch of the area investigated including all structural features i.e., sewage disposal systems, wells, etc., within 100 feet of site (See section 4) and reserve site shall be shown on the reverse side of this page or prepared on a separate page and attached to this form.

Hole #	Horizon	Depth (in.)	Description of, color, texture, etc.	Texture Group
1	Ap	0-8	10YR 5/3 LS	I
	E1	8-40	10YR 6/4 LS	I
	E2	40-48	2.5Y 7/4 LS-S	I
2	Ap	0-14	10YR 4/3 LS	I
	E1	14-25	10YR 6/4 LS	I
	E2	25-44	2.5Y 5/4 SL	II
	E3	44-54	10YR 6/4 LS-S	I

Remarks:

Commonwealth of Virginia
Application for a Sewage Disposal and/or Water Supply Permit

Health Department ID S146-96-324

32-1-5 (PART OF)

To Be Completed By The Applicant

Type of sewage system: ___ New ✓ Repair ___ Expanded ___ Conditional

FHA/VA yes ___ no ✓ Case No ___

Owner Billy YEOMAN Address 14096 Jefferson Davis Hwy Smithfield Va. Phone 357-2649 - Mother's

Agent ___ Address ___ Phone ___

Directions of Property BACK OF HEARN FURNITURE

Subdivision ___ Section ___ Block ___ Lot ✓

Other Property Identification ___

Dimension/size of Lot/Property ___

Other Application Information

I. Building/facility
Intermittent Use ___ New ✓ Existing
___ Yes ✓ No If yes, describe ___

II. Residential Use
Termite Treatment ✓ Yes ___ No
✓ Yes ___ No
✓ Single Family ___ Multi-family
(Number of Bedrooms 3) (Number of Units ___)

Basement ___ Yes ✓ No
Fixtures in Basement ___ Yes ✓ No

III. Commerical Use ___ Yes ✓ No Describe: ___

Commerical/Wastewater ___ Yes ✓ No Number of Patrons ___
Number of Employees ___

If yes, give volumes and describe ___

IV. Water Supply: ✓ Public ___ New ___ Existing
Describe: ___ Private ___ New ___ Existing

V. Proposed Sewage Disposal Method:
Onsite Sewage Disposal System: ___ Septic Tank Drainfield ✓ LPD ___ Mound ___ Other

Public Sewerage System

Attach a site plan (rough sketch) showing dimensions of property, proposed and/or existing structures and driveways, underground utilities, adjacent soil absorption system, bodies of water, drainage ways, and wells and springs within 200 feet radius of the center of the proposed well or drainfield. Distances may be paced or estimated.

The property lines and building location are clearly marked and the property is sufficiently visible to see the topography. I give permission to the Department to enter onto the property described for the purpose of processing this application.

Billy Yeoman
Signature of Owner/Agent

Sept. 25, 1996
Date

CHS 200

Completion Statement

32(1)5

Commonwealth of Virginia
State Department of Health

Health Department
Identification Number 146-83-383

Isle of Wight Health Department

Name of Company/Corporation/Individual: Henry Layden

Address: Rt. 1 Box 424 Carrollton, VA Telephone: 238-3183

Owner's Name Grover Yoeman Jr.

Owner's Address Rt. 4 Smithfield, VA

Location of Installation: Lot _____ Block _____

Section: _____ Subdivision: _____

Other: Tax Map # 32 (1) 5

I hereby certify that the onsite sewage disposal system has been installed and completed in accordance with the construction permit issued (date) 9-1-83 and is in compliance with Part D of the Sewage Handling and Disposal Regulations and when appropriate the plans and specifications for the project.

10/25/83
Date

Henry Layden
Signature and Title

C.H.S. 203 Rev. 4/83

Sewage Disposal System Construction Permit

Commonwealth of Virginia
Department of Health
Isle of Wight Health Department

Health Department Identification Number 146-83-383
Map Reference 32(1)5

General Information

New ☒ Repair ☐ Expanded ☐ Conditional ☐ FHA ☐ VA ☐ Case No. _____

Based on the application for a sewage disposal system construction permit filed in accordance with Section 3.13.01, a construction permit is hereby issued to:

Owner GROVER W YOEMAN JR Telephone 357-3849

Address RT 4 Smithfield

For a Type I Sewage disposal system which is to be constructed ~~on lot~~ for Stephen Sower RT 4 BOX 110 Smithfield Va located off route 10 between by & High School

Subdivision _____ Section/Block — Lot —

Actual or estimated water use 300 gpd

DESIGN	NOTE: INSPECTION RESULTS
Water supply, existing: (describe) Shallow Well (80') Deep Well Jet **To be installed:** class _____ cased _____ grouted _____	**Water supply location:** yes ☐ no ☐ comments Satisfactory
Building sewer: 3 or 4" I.D. PVC 40, or equivalent. Slope 1.25" per 10' (minimum). ☐ Other _____	**Building sewer:** yes ☐ no ☐ comments Satisfactory
Septic tank: Capacity 750 gals. (minimum). ☐ Other _____	**Pretreatment unit:** yes ☐ no ☐ comments Satisfactory
Inlet-outlet structure: PVC 40, 4" tees or equivalent. ☐ Other _____	**Inlet-outlet structure:** yes ☐ no ☐ comments Satisfactory
Pump and pump station: No ☒ Yes ☐ describe and shown design. if yes: _____	**Pump & pump station:** yes ☐ no ☐ comments Satisfactory
Gravity mains: 3" or larger I.D., minimum 6" fall per 100', 1500 lb. crush strength or equivalent. ☐ Other _____	**Conveyance method:** yes ☐ no ☐ comments Satisfactory
Distribution box: Precast concrete with 6 ports. ☐ Other _____	**Distribution box:** yes ☐ no ☐ comments Satisfactory
Header lines: Material: 4" I.D. 1500 lb. crush strength plastic or equivalent from distribution box to 2' into absorption trench. Slope 2" minimum. ☐ Other _____	**Header lines:** yes ☐ no ☐ comments Satisfactory
Percolation lines: Gravity 4" plastic 1000 lb. per foot bearing load or equivalent, slope 2" 4" (min. max.) per 100'. ☐ Other _____	**Percolation lines:** yes ☐ no ☐ comments Satisfactory
Absorption trenches: Square ft. required 400: depth from ground surface to bottom of trench 36"; aggregate size ~~2 TO 1/2~~": Trench bottom slope 2-4" per 100'; center to center spacing 6'; trench width 2'	**Absorption trenches:** yes ☐ no ☐ comments Satisfactory
	Date _____ Inspected and approved by: _____ Sanitarian

C.H.S. 202A Revised 4/83

Health Department
Identification Number 146-83-583

Schematic drawing of sewage disposal system and topographic features. PAGE 2 OF 2

Show the lot lines of the building lot and building site, sketch of property showing any topographic features which may impact on the design of the system, all existing and/or proposed structures including sewage disposal systems and wells within 100 feet of sewage disposal system and reserve area. The schematic drawing of the sewage disposal system shall show sewer lines, pretreatment unit, pump station, conveyance system, and subsurface soil absorption system, reserve area, etc. When a nonpublic drinking water supply is to be located on the same lot show all sources of pollution within 100 feet.

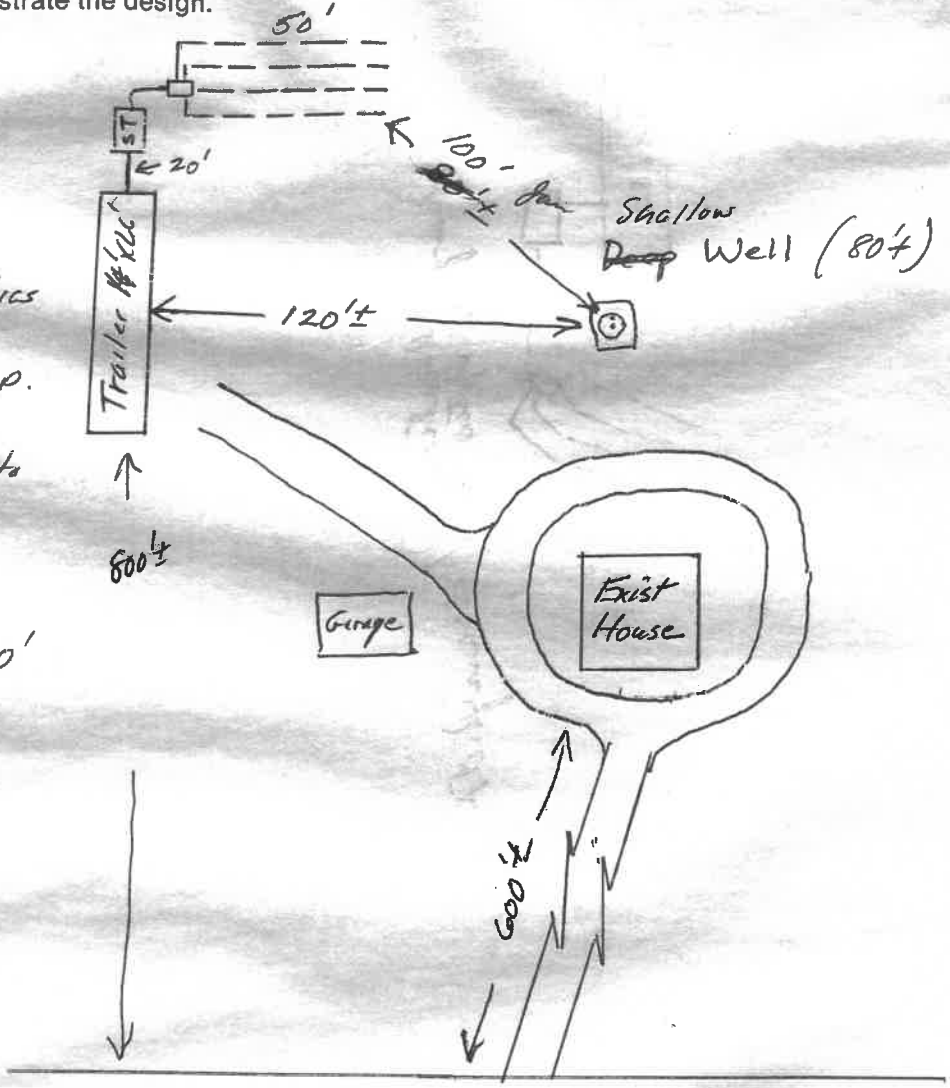
☐ The information required above has been drawn on the attached copy of the sketch submitted with the application. Attach additional sheets as necessary to illustrate the design.

1) Place Septic Tank with top 6" under top of ground.

2) Install 4-60' drainlines 2' wide X 6' apart. Drainfield to be 36" deep.

3) All utility lines are to be 10' from the septic tank system

4) Drainfield to be 100' from well



The sewage disposal system is to be constructed as specified by the permit ☒ or attached plans and specifications ☐.

This sewage disposal system construction permit is null and void if (a) conditions are changed from those shown on the application (b) conditions are changed from those shown on the construction permit. If construction has not commenced within 12 months of date of issuance, the construction permit must be revalidated.

No part of any installation shall be covered or used until inspected, corrections made if necessary, and approved, by the local health department or unless expressly authorized by the local health dept. Any part of any installation which has been covered prior to approval shall be uncovered, if necessary, upon the direction of the Department.

Date: 8/31/83 Issued by: _____
Sanitarian

Date: 9-1-83 Reviewed by: _____
Supervisory Sanitarian

If FHA or VA financing

Reviewed by Date _____ _____ Date _____ _____
Supervisory Sanitarian Regional Sanitarian

C.H.S. 202B Revised 4/83

Application for a Sewage Disposal System Construction Permi

Commonwealth of Virginia
Department of Health

For Department Use Only

Health Department Identification Number 146-83-38
Map Reference 32(1)5

I.O.W. Health Department

Date Received 8/25/83

To Be Completed By The Applicant

Type sewage system: ☑ New ☐ Repair ☐ Expanded ☐ Conditional
FHA/VA yes ☐ no ☑

Owner YOEMAN, GROVER W. JR. Address RT 4 SMFLD, VA Phone 357-2[illegible]

BUYER:
~~Agent~~ SOWER, STEPHEN Address RT 4 BOX 110 SMFLD, VA Phone 357-384[illegible]

Directions to Property LAST DRIVE OFF RT 10 OFF RT. 10 LAST HOUSE R SIDE BEFORE NEW SCHOOL 644.

Subdivision _____ Section _____ Block _____ Lot _____

Other Property Identification _____

Dimensions/size of Lot/Property 146± ACRES - PART OF THIS

Other Application Information

I. **Building/facility** ☑ New ☐ Existing
Intermittent Use ☐ Yes ☑ ~~No~~ If yes, describe: _____

II. **Residential Use** ☑ ~~Yes~~ ☐ No
Termite Treatment ☐ Yes ☑ ~~No~~
☑ ~~Single~~ Family ☐ Multifamily Number of Units #1 Number of Bedrooms 2 TWO
Basement ☐ Yes ☑ ~~No~~
Fixtures in Basement ☐ Yes ☑ ~~No~~

III. **Commercial Use** ☐ Yes ☑ ~~No~~ Describe: _____

Commercial/Wastewater ☐ Yes ☑ ~~No~~ Number of Patrons ____ Number of Employees ____
If yes, give volumes and describe _____

IV. **Water Supply:** ☐ Public ☐ New Describe: EXISTING SHALLOW ~~DEEP~~ WELL (80'±)
☑ ~~Private~~ ☑ ~~Existing~~

V. **Proposed Installation:** ☑ Septic tank and drainfield ☐ Other
If other, describe 3T/DRAIN FOR 2 BEDROOM MOBILE HOME

SITE PLAN Attach a site plan (rough sketch) showing dimensions of property, proposed and/or existing structures and driveways, underground utilities, adjacent soil absorption systems, bodies of water, drainage ways, and wells and springs within 200 feet radius of the center of the proposed building or drainfield. Distances may be paced or estimated.

The property lines and building location are clearly marked and the property is sufficiently visible to see the topography. I give permission to the Department to enter onto the property described for the purpose of processing this application.

Stephen M Sower
Signature of owner/agent

8/25/83
Date

C.H.S. 200 Revised 4/83 C STP TO2. 9/2/83

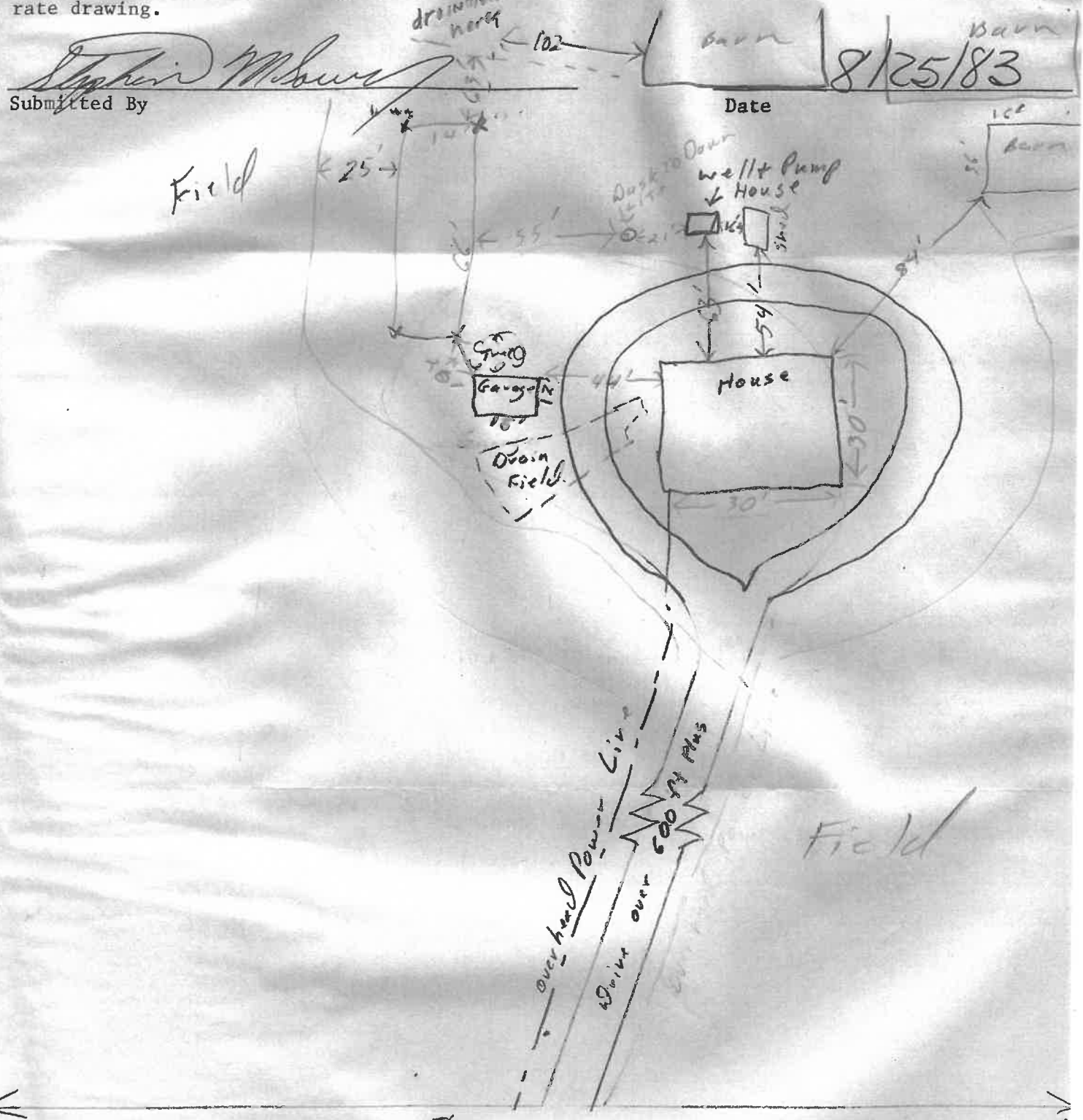
ISLE OF WIGHT HEALTH DEPARTMENT

SITE PLAN

A site plan must be submitted with this application. Examples of acceptable site plans are attached. The site plan must show the dimensions of the property, proposed and existing structures, driveways and underground utilities. In addition, adjacent septic tank systems, pit privies, bodies of water, drainage ways and wells must be shown if located within 200 feet of the proposed building site. Please draw a site plan below or submit it as a separate drawing.

Stephen M Bowers — 8/25/83

Submitted By — Date



Soil Evaluation Form

PAGE ___ OF ___

Commonwealth of Virginia
Department of Health

Health Department Identification Number 146-83-383
Tax Map Number 32 (1) 5

General Information

Date 8/31/83 — Isle of Wight Health Department

Applicant Stephen Sower — Telephone No. 357-3849

Address Rt. 4 Box 110 Smithfield, VA

Owner Yoeman, Grover W. Jr. — Address Rt. 4 Smithfield, VA

Location Last drive off Rt. 10, last house right side before new school. 644

Subdivision _____ Block/Section _____ Lot _____

Soil Information Summary

1. Position in landscape satisfactory Yes ☒ No ☐ Describe _____

2. Slope 0 %

3. Depth to rock/impervious strata Max. _____ Min. _____ None ✓

4. Depth to seasonal water table (gray mottling or gray color) No ☒ Yes ☐ _____ inches

5. Free water present No ☒ Yes ☐ _____ range in inches

6. Soil percolation rate estimated Yes ☒ No ☐ Texture group (I) II III IV
Estimated rate 10 min/ inch

7. Percolation test performed Yes ☐ No ☒ Number of percolation test holes _____
Depth of percolation test holes _____
Average percolation rate _____

Name and title of evaluator: J.A. NOURSE, Sanitarian

Signature: J A Nourse

Department Use

☒ Site Approved: Drainfield to be placed at 36" depth at site designated on permit.

☐ Site Disapproved:

Reasons for rejection:
1. ☐ Position in landscape subject to flooding or periodic saturation.
2. ☐ Insufficient depth of suitable soil over hard rock.
3. ☐ Insufficient depth of suitable soil to seasonal water table.
4. ☐ Rates of absorption too slow.
5. ☐ Insufficient area of acceptable soil for required drainfield, and/or Reserve Area.
6. ☐ Proposed system too close to well.
7. ☐ Other Specify _____

C.H.S. 201A Revised 4/83

Date of Evaluation 8/31/83

Profile Description
SOIL EVALUATION REPORT

Health Department Identification No. 146-83-383

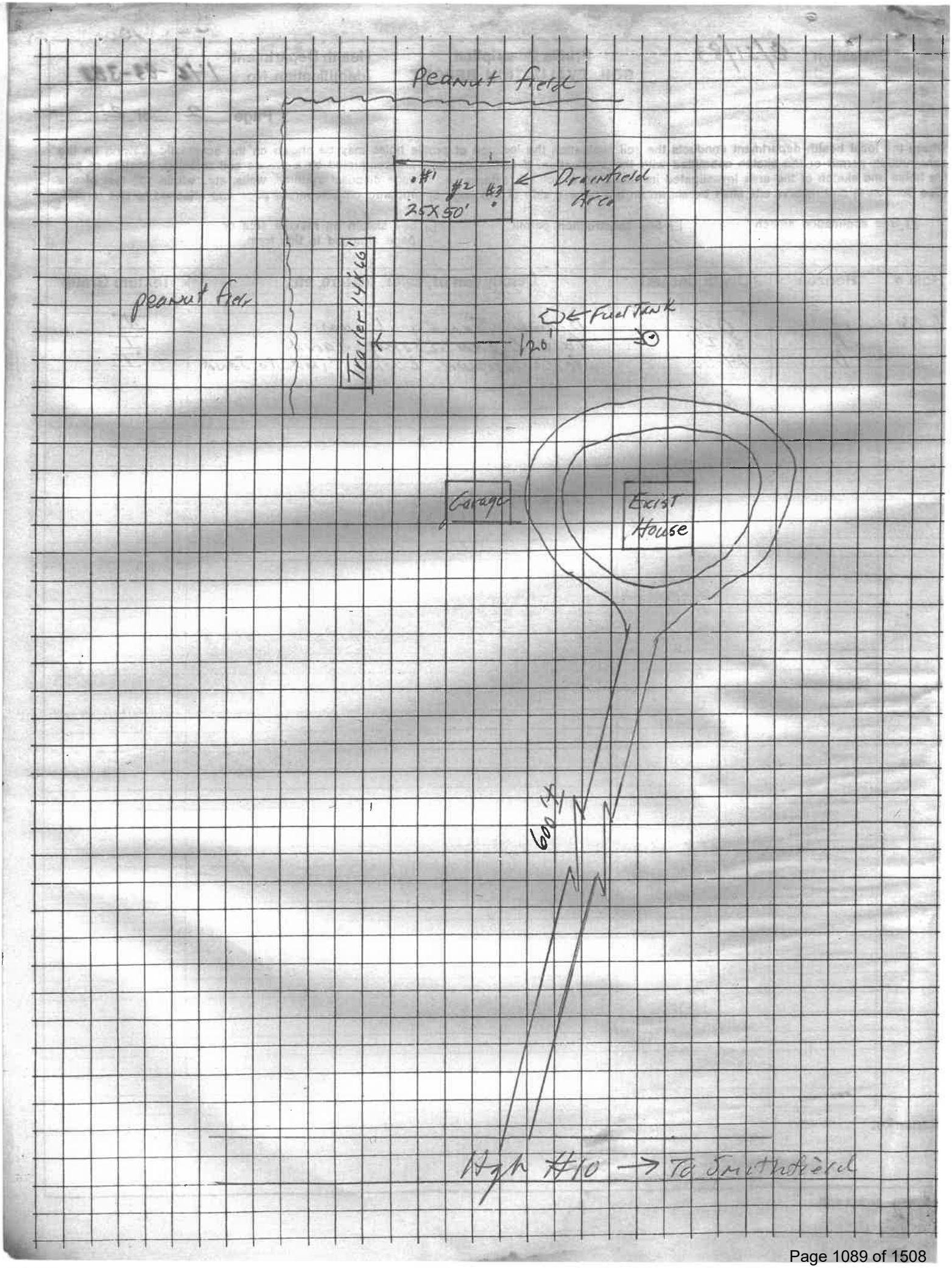
Where the local health department conducts the soil evaluation the location of profile holes may be shown on the schematic drawing on the construction permit or the sketch submitted with the application. If soil evaluations are conducted by a private soil scientist, location of profile holes and sketch of the area investigated including all structural features i.e., sewage disposal systems, wells, etc., within 100 feet of site (See Section 4) and reserve site shall be shown on the reverse side of this page or prepared on a separate page and attached to this form.

☐ See application sketch ☐ See construction permit ☐ See sketch on reverse side or page attached to this form.

Hole #	Horizon	Depth (inches)	Description of, color, texture, etc.	Texture Group
1,23	A	0-6	Brown Sandy Loam	II
	B	6-24	Pale Brown Loamy Sand	I
	B	24-60	Yellow Brown Loamy Sand to Sand	I

Remarks:

C.H.S. 201B Revised 4/83


Peanut field
#1
#2
#3
25X50'
Drainfield Area
peanut field
Trailer 14X66'
120'
Fuel Tank
Garage
Exist House
600 Ft
Hgh #10 → To Smithfield

32(1)5

ISLE OF WIGHT COUNTY HEALTH DEPARTMENT
IN COOPERATION WITH THE
STATE DEPARTMENT OF HEALTH
402 GRACE STREET
P. O. BOX 309
SMITHFIELD, VIRGINIA 23430

December 16, 1987

Mr. Terry Lewis
Planner, Isle of Wight County
Isle of Wight, Virginia 23397

RE: Tax Map Number 32(1)5

Dear Mr. Lewis:

The above referenced plat has been reviewed with regard to the installation of a septic tank system. There has been no application filed with this office for soil studies to be conducted on this parcel. Therefore this office cannot make any determination as to the suitability of the soil for the installation of a septic tank system.

If this office can be of any further assistance, please do not hesitate to call.

Sincerely,

J. A. Nourse
Sanitarian

/ao

County of Isle of Wight

DEPARTMENT OF PLANNING
ISLE OF WIGHT, VIRGINIA 23397

TELEPHONE:
357-3191
242-6821
562-3275

BOARD OF SUPERVISORS
Richard L. Turner, Chairman
C. Fred Bailey, Vice-Chairman
Henry H. Bradby
Joel C. Bradshaw
Thomas L. Ross

Terry D. Lewis
Director of Planning

One Of The Original Eight Shires

December 11, 1987

Isle of Wight County
Health Department
402 Grace Street
Smithfield, VA 23430

Re: Subdivision(s)/
1. Plat showing property for Cypress Run Associates Route 10, Newport Magisterial District

Tax Map Number(s)/
1. 32-1-5

Dear Sir:

Please find attached a copy of the above referenced plat(s) for your review and comments on the suitability of the land for a septic tank system. Upon review of the plat(s), please provide me with your comments on its (their) suitability at your very earliest convenience.

If I can be of further assistance, please advise.

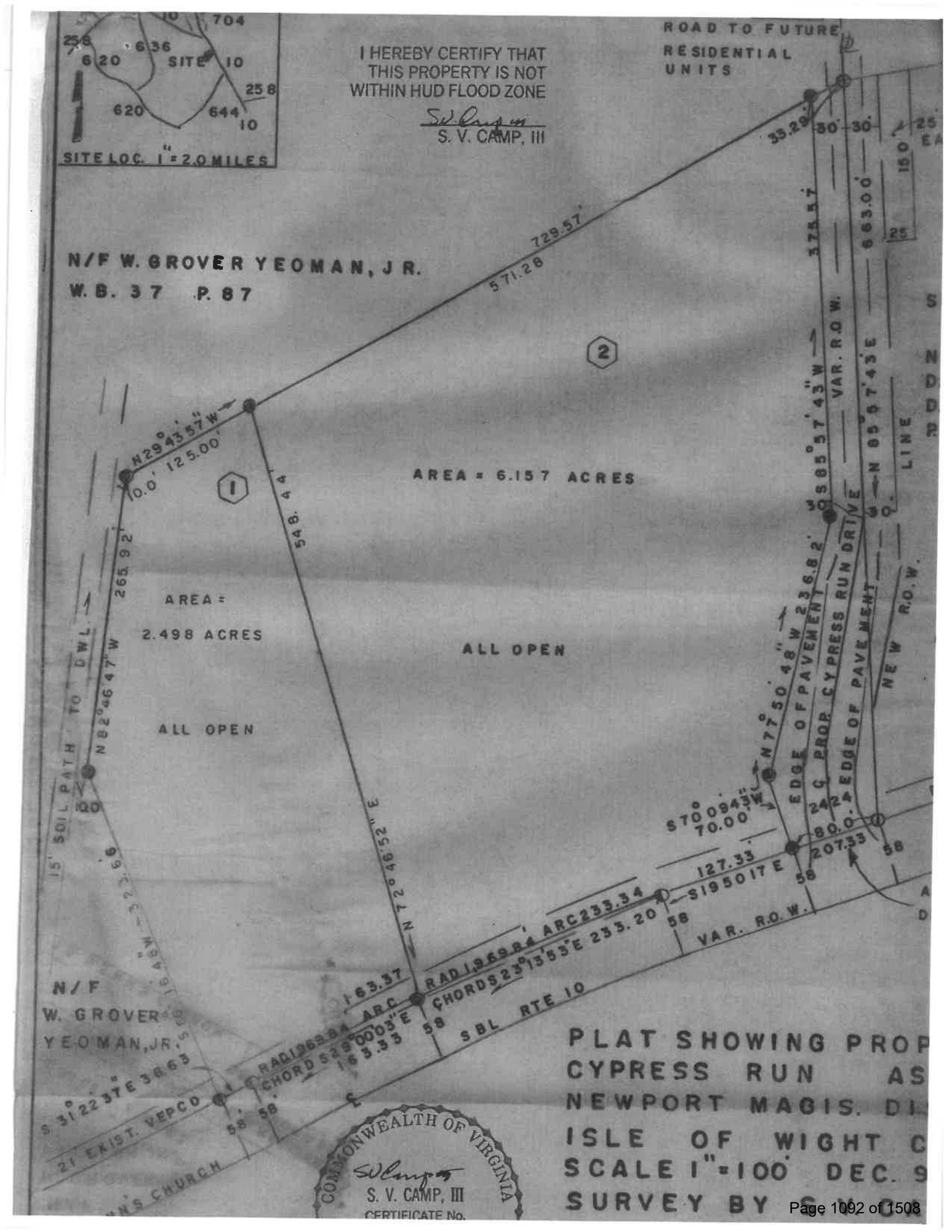
Very truly yours,

Terry D. Lewis /bhw

Terry D. Lewis

TDL/bhw

Attachment(s)


SITE LOC. 1" = 2.0 MILES
SITE
704
636
620
10
258
644
I HEREBY CERTIFY THAT THIS PROPERTY IS NOT WITHIN HUD FLOOD ZONE
S. V. CAMP, III
ROAD TO FUTURE RESIDENTIAL UNITS
N/F W. GROVER YEOMAN, JR.
W.B. 37 P. 87
729.57
571.28
N29°43'57"W
125.00'
10.0'
548.44'
AREA = 6.157 ACRES
AREA = 2.498 ACRES
ALL OPEN
ALL OPEN
N82°46'47"W 265.92'
15' SOIL PATH TO DWL.
100
N72°46'52"E
S85°57'43"W
VAR. R.O.W.
N85°57'43"E
663.00'
373.57'
35.29'
30'
30'
25'
150'
25
EA
LINE
N77°50'48"W 236.82'
EDGE OF PAVEMENT
C PROP CYPRESS RUN DRIVE
EDGE OF PAVEMENT
NEW R.O.W.
S70°09'43"W
70.00'
80.0'
207.33
127.33
S19°50'17"E
58
VAR. R.O.W.
ARC 233.34
RAD 1969.84
CHORD S23°13'53"E 233.20
163.37
ARC
RAD 1969.84
CHORD S25°00'03"E
163.33
SBL RTE 10
N/F W. GROVER YEOMAN, JR.
S31°22'37"E 36.63
21' EXIST. VEPCO
PLAT SHOWING PROP
CYPRESS RUN AS
NEWPORT MAGIS. DI
ISLE OF WIGHT C
SCALE 1" = 100' DEC. 9
SURVEY BY S. V. C
COMMONWEALTH OF VIRGINIA
S. V. CAMP, III
CERTIFICATE No.

32(1)5 pt.07

IN COOPERATION WITH THE
STATE DEPARTMENT OF HEALTH

ISLE OF WIGHT COUNTY HEALTH DEPARTMENT
402 GRACE STREET
P. O. BOX 309
SMITHFIELD, VIRGINIA 23430

March 9, 1989

Mr. William L. McKay
Planner, Isle of Wight County
Isle of Wight, Virginia 23397

RE: Plat of Out Parcel #1, Being the Property of Smithfield Associates
Tax Map 32(1)5 (part of)

Dear Mr. McKay:

The above referenced plat has been reviewed with regard to the installation of septic tank systems. There has been no application filed with this office for soil studies to be conducted on this parcel, nor has any soil report, as prepared by a private soil scientist, been submitted for review. Therefore this office cannot make any determination as to the suitability of the soil for the installation of a septic tank system.

It is the understanding of this office that public sewer is available to this parcel and that we would assume that any commercial establishment would connect to it.

If this office can be of any further assistance, please do not hesitate to call me at 357-4177.

Sincerely,

Larry C. Griffin

Larry C. Griffin
Sanitarian

/ao

COUNTY of ISLE OF WIGHT

THE COURTHOUSE

March 1, 1989

Isle of Wight County
Health Department
402 Grace Street
Smithfield, Virginia 23430

RE: Plat of Out Parcel #1, being the Property of Smithfield Associates, Route 10, Newport Magisterial District, Tax Parcel 32-1-5.

Dear Sir:

Please find attached a copy of the above referenced plat(s) for your review and comments on the suitability of the land for a septic tank system. Upon review of the plat(s), please provide me with your comments on its (their) suitability at your very earliest convenience.

If I can be of further assistance, please advise.

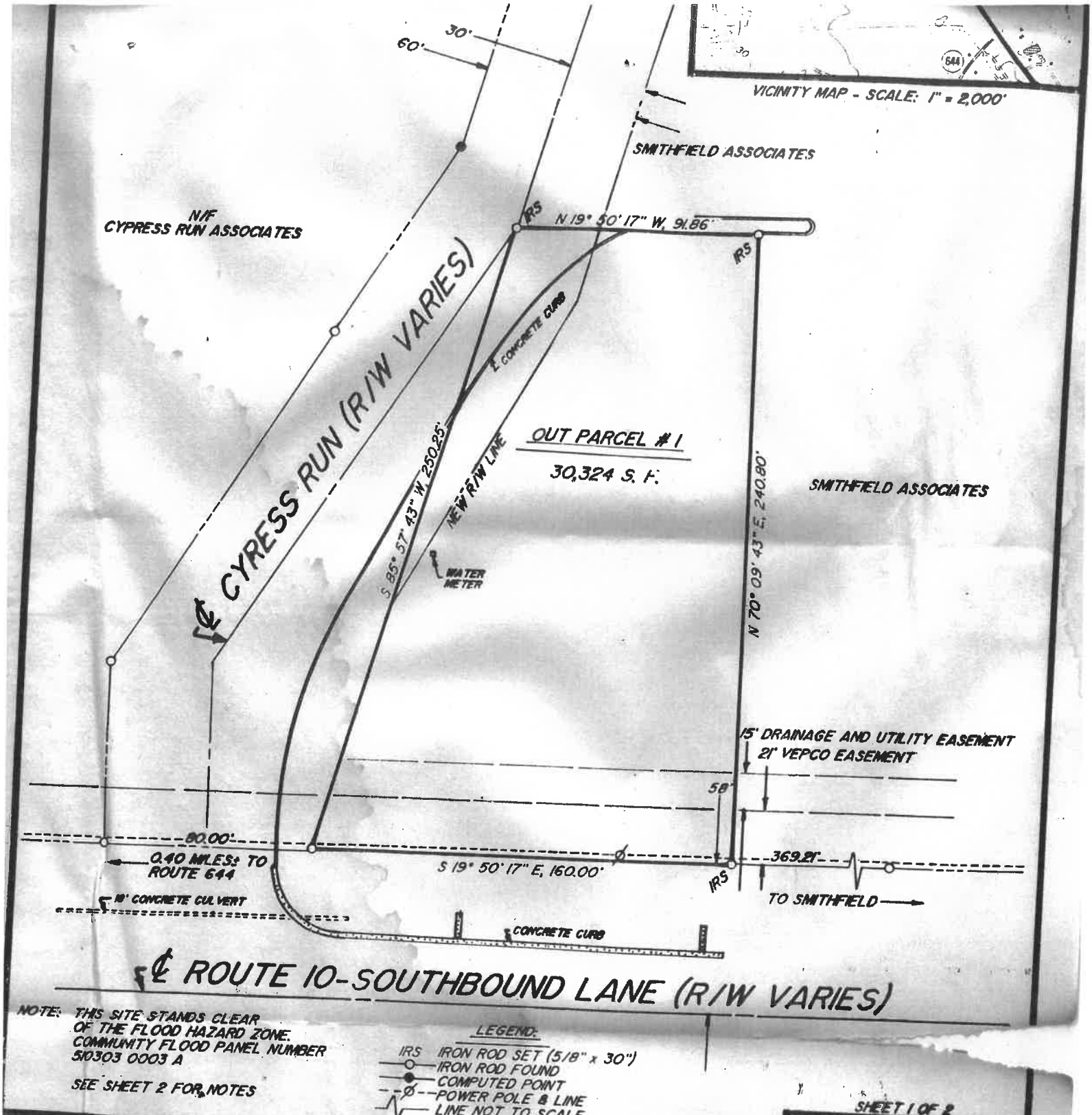
Very truly yours,

William L. McKay, Jr.
County Planner

WLMjr/mjg

Attachment(s)

MAR 03 1989



NOTE: THIS SITE STANDS CLEAR OF THE FLOOD HAZARD ZONE. COMMUNITY FLOOD PANEL NUMBER 510303 0003 A

SEE SHEET 2 FOR NOTES

LEGEND:

- IRS IRON ROD SET (5/8" x 30")
- IRON ROD FOUND
- COMPUTED POINT
- Ø POWER POLE & LINE
- LINE NOT TO SCALE

SHEET 1 OF 2

PLAT OF OUT PARCEL #1

BEING THE PROPERTY OF SMITHFIELD ASSOCIATES DEED BOOK 333, PAGE 199 LOCATED IN NEWPORT MAGISTERIAL DISTRICT ISLE OF WIGHT COUNTY, VIRGINIA

EMIN B. HOLLEY, JR. CERTIFIED LAND SURVEYOR SMITHFIELD, VIRGINIA

SCALE: 1" = 50'

JANUARY 4, 1989

COMMONWEALTH OF VIRGINIA
EMIN B. HOLLEY, JR.
CERTIFICATE No. 1088
CERTIFIED LAND SURVEYOR

Application Reference	Project/Activity	Location	Application Recv'd	Contractor	Project/Activity Desc Line 1	Status Memo
117	I-ELECTRICAL PERMIT	18495 CYPRESS RUN DR	12/10/2007		UPGRADE ELECTRICAL SERV FROM 60 AMP TO 200 AMP	Complete
17676B	I-TENT	18495 CYPRESS RUN DR	06/30/2017	L & L LAND DEVELOPMENT LLC	30' X 60' TENT	Temporary - Completed
25205	STORMWATER REVIEW-SMFLD	18495 CYPRESS RUN DR	11/29/2021		Special Use Permit & REZONING FOR CALIBER COLLISION	Active

Appendix III: Regulatory Records Documentation

18495 Cypress Run Dr
18495 Cypress Run Dr
Smithfield, VA 23430

Inquiry Number: 6970219.2s
May 06, 2022

The EDR Radius Map™ Report with GeoCheck®

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

FORM LBC-GCN

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GEOCHECK ADDENDUM

Physical Setting Source Addendum	A-1
Physical Setting Source Summary	A-2
Physical Setting SSURGO Soil Map	A-5
Physical Setting Source Map	A-13
Physical Setting Source Map Findings	A-15
Physical Setting Source Records Searched	PSGR-1

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

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EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc (EDR). The report was designed to assist parties seeking to meet the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E1527-21), the ASTM Standard Practice for Environmental Site Assessments for Forestland or Rural Property (E 2247-16), the ASTM Standard Practice for Limited Environmental Due Diligence: Transaction Screen Process (E 1528-14) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

TARGET PROPERTY INFORMATION

ADDRESS

18495 CYPRESS RUN DR
SMITHFIELD, VA 23430

COORDINATES

Latitude (North):	36.9505900 - 36ˆ 57' 2.12''
Longitude (West):	76.5986040 - 76ˆ 35' 54.97''
Universal Tranverse Mercator:	Zone 18
UTM X (Meters):	357661.9
UTM Y (Meters):	4090382.0
Elevation:	50 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property Map:	13861737 BENNS CHURCH, VA
Version Date:	2019
West Map:	13861785 SMITHFIELD, VA
Version Date:	2019

AERIAL PHOTOGRAPHY IN THIS REPORT

Portions of Photo from:	20140630, 20140701
Source:	USDA

MAPPED SITES SUMMARY

Target Property Address:
18495 CYPRESS RUN DR
SMITHFIELD, VA 23430

Click on Map ID to see full detail.

MAP ID	SITE NAME	ADDRESS	DATABASE ACRONYMS	RELATIVE ELEVATION	DIST (ft. & mi.) DIRECTION
1	BAY SAND COMPANY INC	18514 CYPRESS RUN DR	US MINES	Lower	1 ft.
2	TRACTOR SUPPLY #1571	13500 BENNS CHURCH B	RCRA-VSQG	Lower	20, 0.004, NNW
A3	MILLER MART 25	13458 BENNS CHURCH R	UST, Financial Assurance	Lower	550, 0.104, NNW
A4	BEST CLEANERS	13470 BENNS CHURCH B	EDR Hist Cleaner	Lower	593, 0.112, NNW
B5	FUEL EXPRESS	1282 BENNS CHURCH BL	LTANKS	Lower	1067, 0.202, NNW
B6	FUEL EXPRESS	1282 BENNS CHURCH BL	UST	Lower	1067, 0.202, NNW
B7	7-ELEVEN #37229	1229 BENNS CHURCH BL	UST, SPILLS, Financial Assurance	Lower	1268, 0.240, NNW
8	SMITHFIELD HIGH SCHO	14171 TURNER DR	UST	Higher	1307, 0.248, SSW
9	SMITHFIELD AMOCO	1201 BENNS CHURCH BL	LUST, LTANKS	Lower	1479, 0.280, NNW

EXECUTIVE SUMMARY

TARGET PROPERTY SEARCH RESULTS

The target property was not listed in any of the databases searched by EDR.

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the target property or within the search radius around the target property for the following databases:

STANDARD ENVIRONMENTAL RECORDS

Lists of Federal NPL (Superfund) sites

NPL ---------- National Priority List
Proposed NPL ---------- Proposed National Priority List Sites
NPL LIENS ---------- Federal Superfund Liens

Lists of Federal Delisted NPL sites

Delisted NPL ---------- National Priority List Deletions

Lists of Federal sites subject to CERCLA removals and CERCLA orders

FEDERAL FACILITY ---------- Federal Facility Site Information listing
SEMS ---------- Superfund Enterprise Management System

Lists of Federal CERCLA sites with NFRAP

SEMS-ARCHIVE ---------- Superfund Enterprise Management System Archive

Lists of Federal RCRA facilities undergoing Corrective Action

CORRACTS ---------- Corrective Action Report

Lists of Federal RCRA TSD facilities

RCRA-TSDF ---------- RCRA - Treatment, Storage and Disposal

Lists of Federal RCRA generators

RCRA-LQG ---------- RCRA - Large Quantity Generators
RCRA-SQG ---------- RCRA - Small Quantity Generators

Federal institutional controls / engineering controls registries

LUCIS ---------- Land Use Control Information System
US ENG CONTROLS ---------- Engineering Controls Sites List
US INST CONTROLS ---------- Institutional Controls Sites List

Federal ERNS list

ERNS ---------- Emergency Response Notification System

Lists of state- and tribal hazardous waste facilities

SHWS ---------- This state does not maintain a SHWS list. See the Federal CERCLIS list and Federal NPL list.

Lists of state and tribal landfills and solid waste disposal facilities

SWF/LF ---------- Solid Waste Management Facilities

Lists of state and tribal leaking storage tanks

INDIAN LUST ---------- Leaking Underground Storage Tanks on Indian Land

Lists of state and tribal registered storage tanks

FEMA UST ---------- Underground Storage Tank Listing
AST ---------- Registered Petroleum Storage Tanks
INDIAN UST ---------- Underground Storage Tanks on Indian Land

State and tribal institutional control / engineering control registries

ENG CONTROLS ---------- Engineering Controls Sites Listing
INST CONTROL ---------- Voluntary Remediation Program Database

Lists of state and tribal voluntary cleanup sites

INDIAN VCP ---------- Voluntary Cleanup Priority Listing
VCP ---------- Voluntary Remediation Program

Lists of state and tribal brownfield sites

BROWNFIELDS ---------- Brownfields Site Specific Assessments

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS ---------- A Listing of Brownfields Sites

Local Lists of Landfill / Solid Waste Disposal Sites

INDIAN ODI ---------- Report on the Status of Open Dumps on Indian Lands
ODI ---------- Open Dump Inventory
DEBRIS REGION 9 ---------- Torres Martinez Reservation Illegal Dump Site Locations
IHS OPEN DUMPS ---------- Open Dumps on Indian Land

Local Lists of Hazardous waste / Contaminated Sites

US HIST CDL ---------- Delisted National Clandestine Laboratory Register

US CDL ---- National Clandestine Laboratory Register

Local Land Records

LIENS 2 ---- CERCLA Lien Information

Records of Emergency Release Reports

HMIRS ---- Hazardous Materials Information Reporting System
SPILLS ---- Prep/Spills Database Listing
SPILLS 90 ---- SPILLS 90 data from FirstSearch

Other Ascertainable Records

RCRA NonGen / NLR ---- RCRA - Non Generators / No Longer Regulated
FUDS ---- Formerly Used Defense Sites
DOD ---- Department of Defense Sites
SCRD DRYCLEANERS ---- State Coalition for Remediation of Drycleaners Listing
US FIN ASSUR ---- Financial Assurance Information
EPA WATCH LIST ---- EPA WATCH LIST
2020 COR ACTION ---- 2020 Corrective Action Program List
TSCA ---- Toxic Substances Control Act
TRIS ---- Toxic Chemical Release Inventory System
SSTS ---- Section 7 Tracking Systems
ROD ---- Records Of Decision
RMP ---- Risk Management Plans
RAATS ---- RCRA Administrative Action Tracking System
PRP ---- Potentially Responsible Parties
PADS ---- PCB Activity Database System
ICIS ---- Integrated Compliance Information System
FTTS ---- FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
MLTS ---- Material Licensing Tracking System
COAL ASH DOE ---- Steam-Electric Plant Operation Data
COAL ASH EPA ---- Coal Combustion Residues Surface Impoundments List
PCB TRANSFORMER ---- PCB Transformer Registration Database
RADINFO ---- Radiation Information Database
HIST FTTS ---- FIFRA/TSCA Tracking System Administrative Case Listing
DOT OPS ---- Incident and Accident Data
CONSENT ---- Superfund (CERCLA) Consent Decrees
INDIAN RESERV ---- Indian Reservations
FUSRAP ---- Formerly Utilized Sites Remedial Action Program
UMTRA ---- Uranium Mill Tailings Sites
LEAD SMELTERS ---- Lead Smelter Sites
US AIRS ---- Aerometric Information Retrieval System Facility Subsystem
ABANDONED MINES ---- Abandoned Mines
FINDS ---- Facility Index System/Facility Registry System
DOCKET HWC ---- Hazardous Waste Compliance Docket Listing
ECHO ---- Enforcement & Compliance History Information
UXO ---- Unexploded Ordnance Sites
FUELS PROGRAM ---- EPA Fuels Program Registered Listing
AIRS ---- Permitted Airs Facility List
NPDES ---- Comprehensive Environmental Data System
COAL ASH ---- Coal Ash Disposal Sites
DRYCLEANERS ---- Drycleaner List

ENF Enforcement Actions Data
Financial Assurance Financial Assurance Information Listing
TIER 2 Tier 2 Information Listing
UIC Underground Injection Control Wells
MINES MRDS Mineral Resources Data System

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP EDR Proprietary Manufactured Gas Plants
EDR Hist Auto EDR Exclusive Historical Auto Stations

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA LF Recovered Government Archive Solid Waste Facilities List
RGA LUST Recovered Government Archive Leaking Underground Storage Tank

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were identified in the following databases.

Elevations have been determined from the USGS Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified. Sites with an elevation equal to or higher than the target property have been differentiated below from sites with an elevation lower than the target property.
Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in ***bold italics*** are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

STANDARD ENVIRONMENTAL RECORDS

Lists of Federal RCRA generators

RCRA-VSQG: RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Very small quantity generators (VSQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

A review of the RCRA-VSQG list, as provided by EDR, and dated 02/28/2022 has revealed that there is 1 RCRA-VSQG site within approximately 0.25 miles of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
TRACTOR SUPPLY #1571 EPA ID:: VAR000528901	13500 BENNS CHURCH B	NNW 0 - 1/8 (0.004 mi.)	2	14

Lists of state and tribal leaking storage tanks

LUST: The Leaking Underground Storage Tank Database.

A review of the LUST list, as provided by EDR, has revealed that there is 1 LUST site within approximately 0.5 miles of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
SMITHFIELD AMOCO	***1201 BENNS CHURCH BL***	***NNW 1/4 - 1/2 (0.280 mi.)***	***9***	***40***
Database: LUST REG TD, Date of Government Version: 06/30/2013 Facility Status: Closed Facility ID: 200000091679 Pollution Complaint Num: 19992328				

LTANKS: The Leaking Tanks Database contains current Leaking petroleum tanks. The data comes from the Department of Environmental Quality.

A review of the LTANKS list, as provided by EDR, and dated 11/03/2021 has revealed that there are 2 LTANKS sites within approximately 0.5 miles of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
FUEL EXPRESS Facility Status: Closed CEDS Facility Id: 200000849865 Pollution Complaint #: 20185194	1282 BENNS CHURCH BL	NNW 1/8 - 1/4 (0.202 mi.)	B5	25
SMITHFIELD AMOCO Facility Status: Closed CEDS Facility Id: 200000091679 Pollution Complaint #: 19992328	***1201 BENNS CHURCH BL***	***NNW 1/4 - 1/2 (0.280 mi.)***	***9***	***40***

Lists of state and tribal registered storage tanks

UST: The Underground Storage Tank database contains registered USTs. USTs are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA). The data come from the Department of Environmental Quality's Underground Storage Tank Data Notification Information.

A review of the UST list, as provided by EDR, and dated 11/01/2021 has revealed that there are 4 UST sites within approximately 0.25 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
SMITHFIELD HIGH SCHO Tank Status: PERM OUT OF USE Tank Status: REM FROM GRD Facility Id: 5013608 CEDS Facility ID: 200000087573	14171 TURNER DR	SSW 1/8 - 1/4 (0.248 mi.)	8	36

Lower Elevation	Address	Direction / Distance	Map ID	Page
MILLER MART 25	***13458 BENNS CHURCH R***	***NNW 0 - 1/8 (0.104 mi.)***	***A3***	***17***

Tank Status: CURR IN USE
Facility Id: 5024060
CEDS Facility ID: 200000066146

FUEL EXPRESS	1282 BENNS CHURCH BL	NNW 1/8 - 1/4 (0.202 mi.)	B6	26
Tank Status: REM FROM GRD Facility Id: 5041052 CEDS Facility ID: 200000849865				
7-ELEVEN #37229	***1229 BENNS CHURCH BL***	***NNW 1/8 - 1/4 (0.240 mi.)***	***B7***	***29***
Tank Status: CURR IN USE Facility Id: 5013991 CEDS Facility ID: 200000067095				

ADDITIONAL ENVIRONMENTAL RECORDS

Other Ascertainable Records

US MINES: Mines Master Index File. The source of this database is the Dept. of Labor, Mine Safety and Health Administration.

A review of the US MINES list, as provided by EDR, has revealed that there is 1 US MINES site within approximately 0.25 miles of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
BAY SAND COMPANY INC	18514 CYPRESS RUN DR	0 - 1/8 (0.000 mi.)	1	8
Database: US MINES, Date of Government Version: 11/02/2021 Database: MINES VIOLATIONS, Date of Government Version: 03/21/2022 Mine ID:: 4406360				

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR Hist Cleaner: EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromat, cleaning/laundry, wash & dry etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

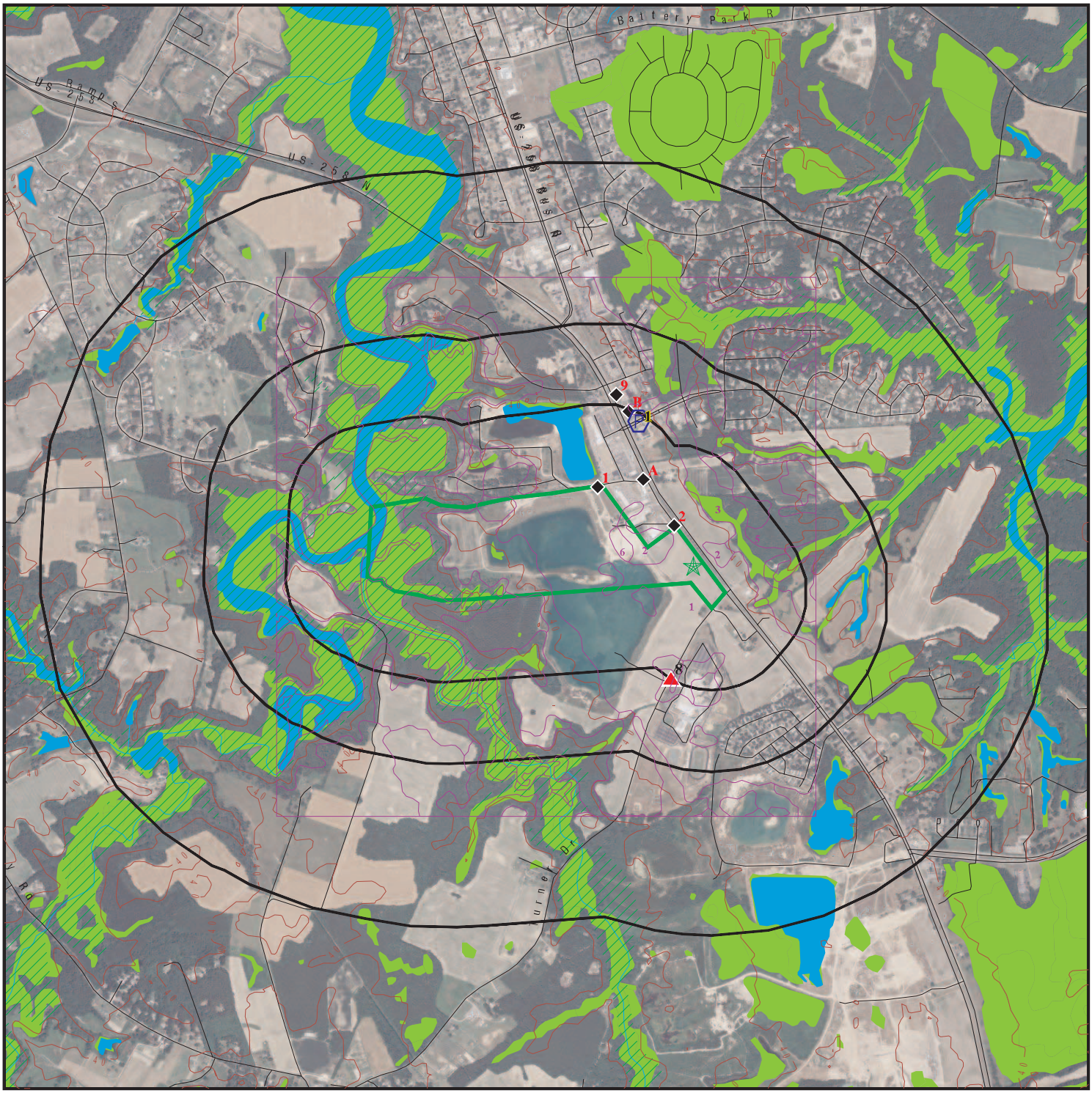
A review of the EDR Hist Cleaner list, as provided by EDR, has revealed that there is 1 EDR Hist Cleaner site within approximately 0.125 miles of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
BEST CLEANERS	13470 BENNS CHURCH B	NNW 0 - 1/8 (0.112 mi.)	A4	25

EXECUTIVE SUMMARY

There were no unmapped sites in this report.

OVERVIEW MAP - 6970219.2S



Target Property

Sites at elevations higher than or equal to the target property

Sites at elevations lower than the target property

Manufactured Gas Plants

National Priority List Sites

Dept. Defense Sites

0 1/4 1/2 1 Miles

Indian Reservations BIA

Special Flood Hazard Area (1%)

0.2% Annual Chance Flood Hazard

National Wetland Inventory

N

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: 18495 Cypress Run Dr ADDRESS: 18495 Cypress Run Dr Smithfield VA 23430 LAT/LONG: 36.95059 / 76.598604	CLIENT: ECS Mid Atlantic, LLC CONTACT: Julia Kobilka INQUIRY #: 6970219.2s DATE: May 06, 2022 1:17 pm

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DETAIL MAP - 6970219.2S



- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- Sensitive Receptors
- National Priority List Sites
- Dept. Defense Sites

0 1/8 1/4 1/2 Miles

- Indian Reservations BIA
- Special Flood Hazard Area (1%)
- 0.2% Annual Chance Flood Hazard
- National Wetland Inventory

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: 18495 Cypress Run Dr	CLIENT: ECS Mid Atlantic, LLC
ADDRESS: 18495 Cypress Run Dr Smithfield VA 23430	CONTACT: Julia Kobilka INQUIRY #: 6970219.2s
LAT/LONG: 36.95059 / 76.598604	DATE: May 06, 2022 1:19 pm

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MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
STANDARD ENVIRONMENTAL RECORDS								
Lists of Federal NPL (Superfund) sites								
NPL	1.000		0	0	0	0	NR	0
Proposed NPL	1.000		0	0	0	0	NR	0
NPL LIENS	1.000		0	0	0	0	NR	0
Lists of Federal Delisted NPL sites								
Delisted NPL	1.000		0	0	0	0	NR	0
Lists of Federal sites subject to CERCLA removals and CERCLA orders								
FEDERAL FACILITY	0.500		0	0	0	NR	NR	0
SEMS	0.500		0	0	0	NR	NR	0
Lists of Federal CERCLA sites with NFRAP								
SEMS-ARCHIVE	0.500		0	0	0	NR	NR	0
Lists of Federal RCRA facilities undergoing Corrective Action								
CORRACTS	1.000		0	0	0	0	NR	0
Lists of Federal RCRA TSD facilities								
RCRA-TSDF	0.500		0	0	0	NR	NR	0
Lists of Federal RCRA generators								
RCRA-LQG	0.250		0	0	NR	NR	NR	0
RCRA-SQG	0.250		0	0	NR	NR	NR	0
RCRA-VSQG	0.250		1	0	NR	NR	NR	1
Federal institutional controls / engineering controls registries								
LUCIS	0.500		0	0	0	NR	NR	0
US ENG CONTROLS	0.500		0	0	0	NR	NR	0
US INST CONTROLS	0.500		0	0	0	NR	NR	0
Federal ERNS list								
ERNS	TP		NR	NR	NR	NR	NR	0
Lists of state- and tribal hazardous waste facilities								
SHWS	N/A		N/A	N/A	N/A	N/A	N/A	N/A
Lists of state and tribal landfills and solid waste disposal facilities								
SWF/LF	0.500		0	0	0	NR	NR	0
Lists of state and tribal leaking storage tanks								
LUST	0.500		0	0	1	NR	NR	1

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
INDIAN LUST	0.500		0	0	0	NR	NR	0
LTANKS	0.500		0	1	1	NR	NR	2
Lists of state and tribal registered storage tanks								
FEMA UST	0.250		0	0	NR	NR	NR	0
UST	0.250		1	3	NR	NR	NR	4
AST	0.250		0	0	NR	NR	NR	0
INDIAN UST	0.250		0	0	NR	NR	NR	0
State and tribal institutional control / engineering control registries								
ENG CONTROLS	0.500		0	0	0	NR	NR	0
INST CONTROL	0.500		0	0	0	NR	NR	0
Lists of state and tribal voluntary cleanup sites								
INDIAN VCP	0.500		0	0	0	NR	NR	0
VCP	0.500		0	0	0	NR	NR	0
Lists of state and tribal brownfield sites								
BROWNFIELDS	0.500		0	0	0	NR	NR	0
ADDITIONAL ENVIRONMENTAL RECORDS								
Local Brownfield lists								
US BROWNFIELDS	0.500		0	0	0	NR	NR	0
Local Lists of Landfill / Solid Waste Disposal Sites								
INDIAN ODI	0.500		0	0	0	NR	NR	0
ODI	0.500		0	0	0	NR	NR	0
DEBRIS REGION 9	0.500		0	0	0	NR	NR	0
IHS OPEN DUMPS	0.500		0	0	0	NR	NR	0
Local Lists of Hazardous waste / Contaminated Sites								
US HIST CDL	TP		NR	NR	NR	NR	NR	0
US CDL	TP		NR	NR	NR	NR	NR	0
Local Land Records								
LIENS 2	TP		NR	NR	NR	NR	NR	0
Records of Emergency Release Reports								
HMIRS	TP		NR	NR	NR	NR	NR	0
SPILLS	TP		NR	NR	NR	NR	NR	0
SPILLS 90	TP		NR	NR	NR	NR	NR	0
Other Ascertainable Records								
RCRA NonGen / NLR	0.250		0	0	NR	NR	NR	0
FUDS	1.000		0	0	0	0	NR	0
DOD	1.000		0	0	0	0	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
SCRD DRYCLEANERS	0.500		0	0	0	NR	NR	0
US FIN ASSUR	TP		NR	NR	NR	NR	NR	0
EPA WATCH LIST	TP		NR	NR	NR	NR	NR	0
2020 COR ACTION	0.250		0	0	NR	NR	NR	0
TSCA	TP		NR	NR	NR	NR	NR	0
TRIS	TP		NR	NR	NR	NR	NR	0
SSTS	TP		NR	NR	NR	NR	NR	0
ROD	1.000		0	0	0	0	NR	0
RMP	TP		NR	NR	NR	NR	NR	0
RAATS	TP		NR	NR	NR	NR	NR	0
PRP	TP		NR	NR	NR	NR	NR	0
PADS	TP		NR	NR	NR	NR	NR	0
ICIS	TP		NR	NR	NR	NR	NR	0
FTTS	TP		NR	NR	NR	NR	NR	0
MLTS	TP		NR	NR	NR	NR	NR	0
COAL ASH DOE	TP		NR	NR	NR	NR	NR	0
COAL ASH EPA	0.500		0	0	0	NR	NR	0
PCB TRANSFORMER	TP		NR	NR	NR	NR	NR	0
RADINFO	TP		NR	NR	NR	NR	NR	0
HIST FTTS	TP		NR	NR	NR	NR	NR	0
DOT OPS	TP		NR	NR	NR	NR	NR	0
CONSENT	1.000		0	0	0	0	NR	0
INDIAN RESERV	1.000		0	0	0	0	NR	0
FUSRAP	1.000		0	0	0	0	NR	0
UMTRA	0.500		0	0	0	NR	NR	0
LEAD SMELTERS	TP		NR	NR	NR	NR	NR	0
US AIRS	TP		NR	NR	NR	NR	NR	0
US MINES	0.250		1	0	NR	NR	NR	1
ABANDONED MINES	0.250		0	0	NR	NR	NR	0
FINDS	TP		NR	NR	NR	NR	NR	0
DOCKET HWC	TP		NR	NR	NR	NR	NR	0
ECHO	TP		NR	NR	NR	NR	NR	0
UXO	1.000		0	0	0	0	NR	0
FUELS PROGRAM	0.250		0	0	NR	NR	NR	0
AIRS	TP		NR	NR	NR	NR	NR	0
NPDES	TP		NR	NR	NR	NR	NR	0
COAL ASH	0.500		0	0	0	NR	NR	0
DRYCLEANERS	0.250		0	0	NR	NR	NR	0
ENF	TP		NR	NR	NR	NR	NR	0
Financial Assurance	TP		NR	NR	NR	NR	NR	0
TIER 2	TP		NR	NR	NR	NR	NR	0
UIC	TP		NR	NR	NR	NR	NR	0
MINES MRDS	TP		NR	NR	NR	NR	NR	0

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP	1.000		0	0	0	0	NR	0
EDR Hist Auto	0.125		0	NR	NR	NR	NR	0
EDR Hist Cleaner	0.125		1	NR	NR	NR	NR	1

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
EDR RECOVERED GOVERNMENT ARCHIVES								
Exclusive Recovered Govt. Archives								
RGA LF	TP		NR	NR	NR	NR	NR	0
RGA LUST	TP		NR	NR	NR	NR	NR	0
- Totals --		0	4	4	2	0	0	10

NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

N/A = This State does not maintain a SHWS list. See the Federal CERCLIS list.

1 **BAY SAND COMPANY INC** **US MINES** **1024925424**
18514 CYPRESS RUN DRIVE **N/A**
< 1/8 **SMITHFIELD, VA 23430**
1 ft.

Relative:
Lower

Actual:
49 ft.

US MINES:

Sic Code(s):	144201
Sic Code(s):	000000
Sic Code(s):	000000
Sic Code(s):	000000
Sic Code(s):	000000
Sic Code(s):	000000
Mine ID:	4406360
Entity Name:	BAY LEASING & MANAGEMENT CO. INC.
Company:	BAY SAND COMPANY INC
Status:	Intermittent (Included Seasonal
Status Date:	20191001
Operation Class:	2
Number of Shops:	0
Number of Plants:	0
Latitude Degree:	36
Longitude Degree:	076
Latitude Minute:	57
Latitude Seconds:	15
Longitude Minutes:	36
Longitude Seconds:	14
Number of Pits:	000

MINES VIOLATIONS:

Name:	BAY SAND COMPANY INC
Address:	18514 CYPRESS RUN DRIVE
City,State,Zip:	SMITHFIELD, VA 23430
Facility ID:	Not reported

MINES VIOLATIONS:

Violation Number:	9429300
Mine ID:	4406360
Contractor ID:	Not reported
Date Issued:	6/23/2021
Action Type:	104(a)
Type of Issue:	Citation
S and S:	N
Term Date:	6/23/2021
Title 30 Code of Federal Regulations:	56.14101(a)(2)
Proposed Penalty:	125.00
Assessment Amount:	125.00
Paid Penalty Amount:	125.00
Assessment Case Status:	Not reported
Assessment Status:	Proposed
Year:	2021
Address Type:	MineLocation
PO Box:	Not reported
Address:	18514 CYPRESS RUN DRIVE
City:	SMITHFIELD
State:	VA
Operator:	Bay Sand Company Inc
Zip:	23430
Mine Controller Name:	Henry Layden
Name:	BAY LEASING & MANAGEMENT CO. INC.

BAY SAND COMPANY INC (Continued) **1024925424**

Ownership Date:	1/4/1994
Mine Status:	Active
Status Date:	1/25/2022
Primary Site Description:	Sand, Common
Mine Type:	Surface
State 2:	VA
County:	ISLE OF WIGHT
Violation Number:	9871940
Mine ID:	4406360
Contractor ID:	Not reported
Date Issued:	1/27/2022
Action Type:	104(a)
Type of Issue:	Citation
S and S:	N
Term Date:	1/27/2022
Title 30 Code of Federal Regulations:	56.15005
Proposed Penalty:	133.00
Assessment Amount:	133.00
Paid Penalty Amount:	0.00
Assessment Case Status:	Not reported
Assessment Status:	Proposed
Year:	2021
Address Type:	MineLocation
PO Box:	Not reported
Address:	18514 CYPRESS RUN DRIVE
City:	SMITHFIELD
State:	VA
Operator:	Bay Sand Company Inc
Zip:	23430
Mine Controller Name:	Henry Layden
Name:	BAY LEASING & MANAGEMENT CO. INC.
Ownership Date:	1/4/1994
Mine Status:	Active
Status Date:	1/25/2022
Primary Site Description:	Sand, Common
Mine Type:	Surface
State 2:	VA
County:	ISLE OF WIGHT
Violation Number:	8633822
Mine ID:	4406360
Contractor ID:	Not reported
Date Issued:	10/04/2011
Action Type:	104(a)
Type of Issue:	Citation
S and S:	N
Term Date:	10/04/2011
Title 30 Code of Federal Regulations:	50.30(a)
Proposed Penalty:	100.00
Assessment Amount:	100.00
Paid Penalty Amount:	100.00
Assessment Case Status:	Proposed
Assessment Status:	Closed
Year:	2011
Address Type:	MineLocation
PO Box:	Not reported

BAY SAND COMPANY INC (Continued) **1024925424**

Address:	18514 CYPRESS RUN DRIVE
City:	SMITHFIELD
State:	VA
Operator:	Bay Sand Company Inc
Zip:	23430
Mine Controller Name:	Henry Layden
Name:	BAY SAND COMPANY INC
Ownership Date:	01/04/1994
Mine Status:	Active
Status Date:	02/05/1987
Primary Site Description:	Sand, Common
Mine Type:	Surface
State 2:	VA
County:	ISLE OF WIGHT
Violation Number:	8633823
Mine ID:	4406360
Contractor ID:	Not reported
Date Issued:	10/04/2011
Action Type:	104(a)
Type of Issue:	Citation
S and S:	N
Term Date:	10/05/2011
Title 30 Code of Federal Regulations:	56.14100(b)
Proposed Penalty:	100.00
Assessment Amount:	100.00
Paid Penalty Amount:	100.00
Assessment Case Status:	Proposed
Assessment Status:	Closed
Year:	2011
Address Type:	MineLocation
PO Box:	Not reported
Address:	18514 CYPRESS RUN DRIVE
City:	SMITHFIELD
State:	VA
Operator:	Bay Sand Company Inc
Zip:	23430
Mine Controller Name:	Henry Layden
Name:	BAY SAND COMPANY INC
Ownership Date:	01/04/1994
Mine Status:	Active
Status Date:	02/05/1987
Primary Site Description:	Sand, Common
Mine Type:	Surface
State 2:	VA
County:	ISLE OF WIGHT
Violation Number:	8633824
Mine ID:	4406360
Contractor ID:	Not reported
Date Issued:	10/04/2011
Action Type:	104(a)
Type of Issue:	Citation
S and S:	N
Term Date:	10/05/2011
Title 30 Code of Federal Regulations:	56.4200(b)(1)
Proposed Penalty:	100.00

BAY SAND COMPANY INC (Continued) **1024925424**

Assessment Amount:	100.00
Paid Penalty Amount:	100.00
Assessment Case Status:	Proposed
Assessment Status:	Closed
Year:	2011
Address Type:	MineLocation
PO Box:	Not reported
Address:	18514 CYPRESS RUN DRIVE
City:	SMITHFIELD
State:	VA
Operator:	Bay Sand Company Inc
Zip:	23430
Mine Controller Name:	Henry Layden
Name:	BAY SAND COMPANY INC
Ownership Date:	01/04/1994
Mine Status:	Active
Status Date:	02/05/1987
Primary Site Description:	Sand, Common
Mine Type:	Surface
State 2:	VA
County:	ISLE OF WIGHT

Violation Number:	8633825
Mine ID:	4406360
Contractor ID:	Not reported
Date Issued:	10/04/2011
Action Type:	104(a)
Type of Issue:	Citation
S and S:	Y
Term Date:	10/04/2011
Title 30 Code of Federal Regulations:	56.9300(a)
Proposed Penalty:	873.00
Assessment Amount:	873.00
Paid Penalty Amount:	873.00
Assessment Case Status:	Proposed
Assessment Status:	Closed
Year:	2011
Address Type:	MineLocation
PO Box:	Not reported
Address:	18514 CYPRESS RUN DRIVE
City:	SMITHFIELD
State:	VA
Operator:	Bay Sand Company Inc
Zip:	23430
Mine Controller Name:	Henry Layden
Name:	BAY SAND COMPANY INC
Ownership Date:	01/04/1994
Mine Status:	Active
Status Date:	02/05/1987
Primary Site Description:	Sand, Common
Mine Type:	Surface
State 2:	VA
County:	ISLE OF WIGHT

Violation Number:	8633826
Mine ID:	4406360
Contractor ID:	Not reported

BAY SAND COMPANY INC (Continued) **1024925424**

Date Issued:	10/04/2011
Action Type:	104(a)
Type of Issue:	Citation
S and S:	N
Term Date:	10/04/2011
Title 30 Code of Federal Regulations:	56.4101
Proposed Penalty:	100.00
Assessment Amount:	100.00
Paid Penalty Amount:	100.00
Assessment Case Status:	Proposed
Assessment Status:	Closed
Year:	2011
Address Type:	MineLocation
PO Box:	Not reported
Address:	18514 CYPRESS RUN DRIVE
City:	SMITHFIELD
State:	VA
Operator:	Bay Sand Company Inc
Zip:	23430
Mine Controller Name:	Henry Layden
Name:	BAY SAND COMPANY INC
Ownership Date:	01/04/1994
Mine Status:	Active
Status Date:	02/05/1987
Primary Site Description:	Sand, Common
Mine Type:	Surface
State 2:	VA
County:	ISLE OF WIGHT

Violation Number:	9367581
Mine ID:	4406360
Contractor ID:	Not reported
Date Issued:	10/16/2019
Action Type:	104(g)(1)
Type of Issue:	Order
S and S:	N
Term Date:	10/16/2019
Title 30 Code of Federal Regulations:	46.8(a)(2)
Proposed Penalty:	218.00
Assessment Amount:	218.00
Paid Penalty Amount:	218.00
Assessment Case Status:	Closed
Assessment Status:	Proposed
Year:	2019
Address Type:	MineLocation
PO Box:	Not reported
Address:	18514 CYPRESS RUN DRIVE
City:	SMITHFIELD
State:	VA
Operator:	Bay Sand Company Inc
Zip:	23430
Mine Controller Name:	Henry Layden
Name:	BAY LEASING & MANAGEMENT CO. INC.
Ownership Date:	1/4/1994
Mine Status:	Intermittent
Status Date:	10/1/2019
Primary Site Description:	Sand, Common

BAY SAND COMPANY INC (Continued) **1024925424**

Mine Type:	Surface
State 2:	VA
County:	ISLE OF WIGHT
Violation Number:	8802925
Mine ID:	4406360
Contractor ID:	Not reported
Date Issued:	06/17/2014
Action Type:	104(a)
Type of Issue:	Citation
S and S:	N
Term Date:	06/17/2014
Title 30 Code of Federal Regulations:	56.13015
Proposed Penalty:	100.00
Assessment Amount:	100.00
Paid Penalty Amount:	100.00
Assessment Case Status:	Proposed
Assessment Status:	Closed
Year:	2014
Address Type:	MineLocation
PO Box:	Not reported
Address:	18514 CYPRESS RUN DRIVE
City:	SMITHFIELD
State:	VA
Operator:	Bay Sand Company Inc
Zip:	23430
Mine Controller Name:	Henry Layden
Name:	BAY SAND COMPANY INC
Ownership Date:	01/04/1994
Mine Status:	Active
Status Date:	02/05/1987
Primary Site Description:	Sand, Common
Mine Type:	Surface
State 2:	VA
County:	ISLE OF WIGHT
Violation Number:	6020500
Mine ID:	4406360
Contractor ID:	Not reported
Date Issued:	03/02/2005
Action Type:	104(a)
Type of Issue:	Citation
S and S:	N
Term Date:	03/03/2005
Title 30 Code of Federal Regulations:	56.14132(a)
Proposed Penalty:	60.00
Assessment Amount:	60.00
Paid Penalty Amount:	60.00
Assessment Case Status:	Proposed
Assessment Status:	Closed
Year:	2005
Address Type:	MineLocation
PO Box:	Not reported
Address:	18514 CYPRESS RUN DRIVE
City:	SMITHFIELD
State:	VA
Operator:	Bay Sand Company Inc

BAY SAND COMPANY INC (Continued) **1024925424**

Zip:	23430
Mine Controller Name:	Henry Layden
Name:	BAY SAND COMPANY INC
Ownership Date:	01/04/1994
Mine Status:	Active
Status Date:	02/05/1987
Primary Site Description:	Sand, Common
Mine Type:	Surface
State 2:	VA
County:	ISLE OF WIGHT
Violation Number:	6020501
Mine ID:	4406360
Contractor ID:	Not reported
Date Issued:	03/03/2005
Action Type:	104(a)
Type of Issue:	Citation
S and S:	Y
Term Date:	03/03/2005
Title 30 Code of Federal Regulations:	56.9300(a)
Proposed Penalty:	144.00
Assessment Amount:	144.00
Paid Penalty Amount:	144.00
Assessment Case Status:	Proposed
Assessment Status:	Closed
Year:	2005
Address Type:	MineLocation
PO Box:	Not reported
Address:	18514 CYPRESS RUN DRIVE
City:	SMITHFIELD
State:	VA
Operator:	Bay Sand Company Inc
Zip:	23430
Mine Controller Name:	Henry Layden
Name:	BAY SAND COMPANY INC
Ownership Date:	01/04/1994
Mine Status:	Active
Status Date:	02/05/1987
Primary Site Description:	Sand, Common
Mine Type:	Surface
State 2:	VA
County:	ISLE OF WIGHT

Click this hyperlink while viewing on your computer to access
48 additional US_MINES_VIOLATIONS: record(s) in the EDR Site Report.

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2 **TRACTOR SUPPLY #1571** **RCRA-VSQG** **1016977267**
NNW **13500 BENNS CHURCH BLVD.** **VAR000528901**
< 1/8 **SMITHFIELD, VA 23430**
0.004 mi.
20 ft.

Relative: RCRA-VSQG:
Lower

Date Form Received by Agency:		20140610
Actual: Handler Name:	TRACTOR SUPPLY #1571	
47 ft. Handler Address:		13500 BENNS CHURCH BLVD.
Handler City,State,Zip:		SMITHFIELD, VA 23430

TRACTOR SUPPLY #1571 (Continued) **1016977267**

EPA ID:	VAR000528901
Contact Name:	TREY BROWN
Contact Address:	200 POWELL PLACE
Contact City,State,Zip:	BRENTWOOD, TN 37027
Contact Telephone:	615-440-4660
Contact Fax:	615-484-4660
Contact Email:	TSCRISKMGMT@TRACTORSUPPLY.COM
Contact Title:	RISK ANALYST
EPA Region:	03
Land Type:	Private
Federal Waste Generator Description:	Conditionally Exempt Small Quantity Generator
Non-Notifier:	Not reported
Biennial Report Cycle:	Not reported
Accessibility:	Not reported
Active Site Indicator:	Handler Activities
State District Owner:	VA
State District:	6
Mailing Address:	200 POWELL PLACE
Mailing City,State,Zip:	BRENTWOOD, TN 37027
Owner Name:	LMB AUBURN HILLS I, LLC
Owner Type:	Private
Operator Name:	TRACTOR SUPPLY COMPANY
Operator Type:	Private
Short-Term Generator Activity:	No
Importer Activity:	No
Mixed Waste Generator:	No
Transporter Activity:	No
Transfer Facility Activity:	No
Recycler Activity with Storage:	No
Small Quantity On-Site Burner Exemption:	No
Smelting Melting and Refining Furnace Exemption:	No
Underground Injection Control:	No
Off-Site Waste Receipt:	No
Universal Waste Indicator:	No
Universal Waste Destination Facility:	No
Federal Universal Waste:	No
Active Site Fed-Reg Treatment Storage and Disposal Facility:	Not reported
Active Site Converter Treatment storage and Disposal Facility:	Not reported
Active Site State-Reg Treatment Storage and Disposal Facility:	Not reported
Active Site State-Reg Handler:	---
Federal Facility Indicator:	Not reported
Hazardous Secondary Material Indicator:	NN
Sub-Part K Indicator:	Not reported
Commercial TSD Indicator:	No
Treatment Storage and Disposal Type:	Not reported
2018 GPRA Permit Baseline:	Not on the Baseline
2018 GPRA Renewals Baseline:	Not on the Baseline
Permit Renewals Workload Universe:	Not reported
Permit Workload Universe:	Not reported
Permit Progress Universe:	Not reported
Post-Closure Workload Universe:	Not reported
Closure Workload Universe:	Not reported
202 GPRA Corrective Action Baseline:	No
Corrective Action Workload Universe:	No
Subject to Corrective Action Universe:	No
Non-TSDFs Where RCRA CA has Been Imposed Universe:	No
TSDFs Potentially Subject to CA Under 3004 (u)/(v) Universe:	No

TRACTOR SUPPLY #1571 (Continued) **1016977267**

TSDFs Only Subject to CA under Discretionary Auth Universe:	No
Corrective Action Priority Ranking:	No NCAPS ranking
Environmental Control Indicator:	No
Institutional Control Indicator:	No
Human Exposure Controls Indicator:	N/A
Groundwater Controls Indicator:	N/A
Operating TSDF Universe:	Not reported
Full Enforcement Universe:	Not reported
Significant Non-Complier Universe:	No
Unaddressed Significant Non-Complier Universe:	No
Addressed Significant Non-Complier Universe:	No
Significant Non-Complier With a Compliance Schedule Universe:	No
Financial Assurance Required:	Not reported
Handler Date of Last Change:	20150414
Recognized Trader-Importer:	No
Recognized Trader-Exporter:	No
Importer of Spent Lead Acid Batteries:	No
Exporter of Spent Lead Acid Batteries:	No
Recycler Activity Without Storage:	Not reported
Manifest Broker:	Not reported
Sub-Part P Indicator:	No

Hazardous Waste Summary:

Waste Code:	D001
Waste Description:	IGNITABLE WASTE
Waste Code:	D002
Waste Description:	CORROSIVE WASTE
Waste Code:	F005
Waste Description:	THE FOLLOWING SPENT NONHALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NONHALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Handler - Owner Operator:

Owner/Operator Indicator:	Operator
Owner/Operator Name:	TRACTOR SUPPLY COMPANY
Legal Status:	Private
Date Became Current:	20111015
Date Ended Current:	Not reported
Owner/Operator Address:	Not reported
Owner/Operator City,State,Zip:	Not reported
Owner/Operator Telephone:	Not reported
Owner/Operator Telephone Ext:	Not reported
Owner/Operator Fax:	Not reported
Owner/Operator Email:	Not reported
Owner/Operator Indicator:	Owner
Owner/Operator Name:	LMB AUBURN HILLS I, LLC
Legal Status:	Private
Date Became Current:	20121221

TRACTOR SUPPLY #1571 (Continued) **1016977267**

Date Ended Current: Not reported
Owner/Operator Address: 3171 GOLDEN AVENUE
Owner/Operator City,State,Zip: CINCINNATI, OH 45226
Owner/Operator Telephone: Not reported
Owner/Operator Telephone Ext: Not reported
Owner/Operator Fax: Not reported
Owner/Operator Email: Not reported

Historic Generators:
Receive Date: 20140610
Handler Name: TRACTOR SUPPLY #1571
Federal Waste Generator Description: Conditionally Exempt Small Quantity Generator
State District Owner: VA
Large Quantity Handler of Universal Waste: No
Recognized Trader Importer: No
Recognized Trader Exporter: No
Spent Lead Acid Battery Importer: No
Spent Lead Acid Battery Exporter: No
Current Record: Yes
Non Storage Recycler Activity: Not reported
Electronic Manifest Broker: Not reported

List of NAICS Codes and Descriptions:
NAICS Code: 453998
NAICS Description: ALL OTHER MISCELLANEOUS STORE RETAILERS (EXCEPT TOBACCO STORES)

Facility Has Received Notices of Violations:
Violations: No Violations Found

Evaluation Action Summary:
Evaluations: No Evaluations Found

A3 **MILLER MART 25** **UST** **U003692436**
NNW **13458 BENNS CHURCH RD RTE 1** **Financial Assurance** **N/A**
< 1/8 **SMITHFIELD, VA 23430**
0.104 mi.
550 ft. **Site 1 of 2 in cluster A**

Relative:
Lower

Actual:
48 ft.

Facility:
Name: MILLER MART 25
Address: 13458 BENNS CHURCH RD RTE 1
City,State,Zip: SMITHFIELD, VA 23430
Facility Id: 5024060
Facility Type: GAS STATION
CEDS Facility ID: 200000066146

Owner:
Owner Id: 27789
Owner Name: Miller Oil Co Inc
Owner Address: 1000 E City Hall Ave
Owner Address2: Not reported
Owner City, State, Zip: Norfolk, VA 23504
Owner Type: COMMERCIAL
Number of Active AST: 0
Number of Active UST: 5

MILLER MART 25 (Continued) **U003692436**

Number of Inactive AST:	0
Number of Inactive UST:	0

UST:

Facility ID:	5024060
Federally Regulated:	Yes
Tank Number:	1
Tank Capacity:	10000
Tank Contents:	GASOLINE
Tank Status:	**CURR IN USE**
Tank Type:	UST

Tank Material:

Install Date:	8/1/1990
Tank Materials: Bare Steel	No
Tank Materials: Cath Protect Steel	Yes
Tank Materials: Epoxy Steel	No
Tank Materials: Fiberglass	No
Tank Materials: Concrete	No
Tank Materials: Composite	No
Tank Materials: Double Walled	No
Tank Materials: Lined Interior	No
Tank Materials: Excav Liner	No
Tank Materials: Insulated Tank Jacket	No
Tank Materials: Repaired	No
Tank Materials: Unknown	No
Tank Materials: Other	Yes
Tank Materials: Other Note	STIP3

Release Detection:

Tank Release Detection: Leak Deferred	No
Tank Release Detection: Manual Gauge	Yes
Tank Release Detection: Auto Gauge	No
Tank Release Detection:Tank Tightness	No
Tank Release Detection: Vapor Monitor	No
Tank Release Detection: Inventory	Yes
Tank Release Detection: Stat Invent Recon	No
Tank Release Detection: Spill Install	Yes
Tank Release Detection: Overfill Install	Not reported
Tank Release Detection: Groundwater	No
Tank Release Detection: Int Sec Containment	No
Tank Release Detection: Int Double Walled	No
Tank Release Detection: Other Method	No
Tank Release Detection: Other Note	SIR
Pipe Release Detection: Leak Deferred	Not reported
Pipe Release Detection: Autoleak	Not reported
Pipe Release Detection: Line Tightness	Yes
Pipe Release Detection: Stat Invent Recon	No
Pipe Release Detection: Groundwater	No
Pipe Release Detection: Int Sec Containment	No
Pipe Release Det: Interior Double Walled	No
Pipe Release Detection: Other Method	No
Pipe Release Detection: Other Note	SIR
Pipe Type:	PRESSURE
Pipe Materials: Bare Steel	No

MILLER MART 25 (Continued) **U003692436**

Pipe Materials: Galvanized Steel	No
Pipe Materials: Copper	No
Pipe Materials: Fiberglass	Yes
Pipe Materials: Cath Protect	No
Pipe Materials: Double Walled	No
Pipe Materials: Sec Containment	No
Pipe Materials: Repaired	No
Pipe Materials: Unknown	No
Pipe Materials: Other	No
Pipe Materials: Other Note	Not reported
Facility ID:	5024060
Federally Regulated:	Yes
Tank Number:	2
Tank Capacity:	10000
Tank Contents:	GASOLINE
Tank Status:	**CURR IN USE**
Tank Type:	UST

Tank Material:

Install Date:	8/1/1990
Tank Materials: Bare Steel	No
Tank Materials: Cath Protect Steel	Yes
Tank Materials: Epoxy Steel	No
Tank Materials: Fiberglass	No
Tank Materials: Concrete	No
Tank Materials: Composite	No
Tank Materials: Double Walled	No
Tank Materials: Lined Interior	No
Tank Materials: Excav Liner	No
Tank Materials: Insulated Tank Jacket	No
Tank Materials: Repaired	No
Tank Materials: Unknown	No
Tank Materials: Other	Yes
Tank Materials: Other Note	STIP3

Release Detection:

Tank Release Detection: Leak Deferred	No
Tank Release Detection: Manual Gauge	Yes
Tank Release Detection: Auto Gauge	No
Tank Release Detection:Tank Tightness	No
Tank Release Detection: Vapor Monitor	No
Tank Release Detection: Inventory	Yes
Tank Release Detection: Stat Invent Recon	No
Tank Release Detection: Spill Install	Yes
Tank Release Detection: Overfill Install	Not reported
Tank Release Detection: Groundwater	No
Tank Release Detection: Int Sec Containment	No
Tank Release Detection: Int Double Walled	No
Tank Release Detection: Other Method	No
Tank Release Detection: Other Note	SIR
Pipe Release Detection: Leak Deferred	Not reported
Pipe Release Detection: Autoleak	Not reported
Pipe Release Detection: Line Tightness	Yes
Pipe Release Detection: Stat Invent Recon	No

MILLER MART 25 (Continued) **U003692436**

Pipe Release Detection: Groundwater	No
Pipe Release Detection: Int Sec Containment	No
Pipe Release Det: Interior Double Walled	No
Pipe Release Detection: Other Method	No
Pipe Release Detection: Other Note	SIR
Pipe Type:	PRESSURE
Pipe Materials: Bare Steel	No
Pipe Materials: Galvanized Steel	No
Pipe Materials: Copper	No
Pipe Materials: Fiberglass	Yes
Pipe Materials: Cath Protect	No
Pipe Materials: Double Walled	No
Pipe Materials: Sec Containment	No
Pipe Materials: Repaired	No
Pipe Materials: Unknown	No
Pipe Materials: Other	No
Pipe Materials: Other Note	Not reported
Facility ID:	5024060
Federally Regulated:	Yes
Tank Number:	3
Tank Capacity:	10000
Tank Contents:	GASOLINE
Tank Status:	**CURR IN USE**
Tank Type:	UST

Tank Material:

Install Date:	8/1/1990
Tank Materials: Bare Steel	No
Tank Materials: Cath Protect Steel	Yes
Tank Materials: Epoxy Steel	No
Tank Materials: Fiberglass	No
Tank Materials: Concrete	No
Tank Materials: Composite	No
Tank Materials: Double Walled	No
Tank Materials: Lined Interior	No
Tank Materials: Excav Liner	No
Tank Materials: Insulated Tank Jacket	No
Tank Materials: Repaired	No
Tank Materials: Unknown	No
Tank Materials: Other	Yes
Tank Materials: Other Note	STIP3

Release Detection:

Tank Release Detection: Leak Deferred	No
Tank Release Detection: Manual Gauge	Yes
Tank Release Detection: Auto Gauge	No
Tank Release Detection:Tank Tightness	No
Tank Release Detection: Vapor Monitor	No
Tank Release Detection: Inventory	Yes
Tank Release Detection: Stat Invent Recon	No
Tank Release Detection: Spill Install	Yes
Tank Release Detection: Overfill Install	Not reported
Tank Release Detection: Groundwater	No

MILLER MART 25 (Continued) **U003692436**

Tank Release Detection: Int Sec Containment	No
Tank Release Detection: Int Double Walled	No
Tank Release Detection: Other Method	No
Tank Release Detection: Other Note	SIR
Pipe Release Detection: Leak Deferred	Not reported
Pipe Release Detection: Autoleak	Not reported
Pipe Release Detection: Line Tightness	Yes
Pipe Release Detection: Stat Invent Recon	No
Pipe Release Detection: Groundwater	No
Pipe Release Detection: Int Sec Containment	No
Pipe Release Det: Interior Double Walled	No
Pipe Release Detection: Other Method	No
Pipe Release Detection: Other Note	SIR

Pipe Type:	PRESSURE
Pipe Materials: Bare Steel	No
Pipe Materials: Galvanized Steel	No
Pipe Materials: Copper	No
Pipe Materials: Fiberglass	Yes
Pipe Materials: Cath Protect	No
Pipe Materials: Double Walled	No
Pipe Materials: Sec Containment	No
Pipe Materials: Repaired	No
Pipe Materials: Unknown	No
Pipe Materials: Other	No
Pipe Materials: Other Note	Not reported

Facility ID:	5024060
Federally Regulated:	Yes

Tank Number:	4
Tank Capacity:	4000
Tank Contents:	DIESEL
Tank Status:	**CURR IN USE**
Tank Type:	UST

Tank Material:

Install Date:	8/1/1990
Tank Materials: Bare Steel	No
Tank Materials: Cath Protect Steel	Yes
Tank Materials: Epoxy Steel	No
Tank Materials: Fiberglass	No
Tank Materials: Concrete	No
Tank Materials: Composite	No
Tank Materials: Double Walled	No
Tank Materials: Lined Interior	No
Tank Materials: Excav Liner	No
Tank Materials: Insulated Tank Jacket	No
Tank Materials: Repaired	No
Tank Materials: Unknown	No
Tank Materials: Other	Yes
Tank Materials: Other Note	STIP3

Release Detection:

Tank Release Detection: Leak Deferred	No
Tank Release Detection: Manual Gauge	Yes

MILLER MART 25 (Continued) **U003692436**

Tank Release Detection: Auto Gauge	No
Tank Release Detection:Tank Tightness	No
Tank Release Detection: Vapor Monitor	No
Tank Release Detection: Inventory	Yes
Tank Release Detection: Stat Invent Recon	No
Tank Release Detection: Spill Install	Yes
Tank Release Detection: Overfill Install	Not reported
Tank Release Detection: Groundwater	No
Tank Release Detection: Int Sec Containment	No
Tank Release Detection: Int Double Walled	No
Tank Release Detection: Other Method	No
Tank Release Detection: Other Note	SIR
Pipe Release Detection: Leak Deferred	Not reported
Pipe Release Detection: Autoleak	Not reported
Pipe Release Detection: Line Tightness	Yes
Pipe Release Detection: Stat Invent Recon	No
Pipe Release Detection: Groundwater	No
Pipe Release Detection: Int Sec Containment	No
Pipe Release Det: Interior Double Walled	No
Pipe Release Detection: Other Method	No
Pipe Release Detection: Other Note	SIR

Pipe Type:	PRESSURE
Pipe Materials: Bare Steel	No
Pipe Materials: Galvanized Steel	No
Pipe Materials: Copper	No
Pipe Materials: Fiberglass	Yes
Pipe Materials: Cath Protect	No
Pipe Materials: Double Walled	No
Pipe Materials: Sec Containment	No
Pipe Materials: Repaired	No
Pipe Materials: Unknown	No
Pipe Materials: Other	No
Pipe Materials: Other Note	Not reported

Facility ID:	5024060
Federally Regulated:	Yes

Tank Number:	5
Tank Capacity:	2000
Tank Contents:	DIESEL
Tank Status:	**CURR IN USE**
Tank Type:	UST

Tank Material:

Install Date:	8/1/1990
Tank Materials: Bare Steel	No
Tank Materials: Cath Protect Steel	Yes
Tank Materials: Epoxy Steel	No
Tank Materials: Fiberglass	No
Tank Materials: Concrete	No
Tank Materials: Composite	No
Tank Materials: Double Walled	No
Tank Materials: Lined Interior	No
Tank Materials: Excav Liner	No
Tank Materials: Insulated Tank Jacket	No
Tank Materials: Repaired	No

MILLER MART 25 (Continued) **U003692436**

Tank Materials: Unknown	No
Tank Materials: Other	Yes
Tank Materials: Other Note	STIP3

Release Detection:

Tank Release Detection: Leak Deferred	No
Tank Release Detection: Manual Gauge	Yes
Tank Release Detection: Auto Gauge	No
Tank Release Detection:Tank Tightness	No
Tank Release Detection: Vapor Monitor	No
Tank Release Detection: Inventory	Yes
Tank Release Detection: Stat Invent Recon	No
Tank Release Detection: Spill Install	Yes
Tank Release Detection: Overfill Install	Not reported
Tank Release Detection: Groundwater	No
Tank Release Detection: Int Sec Containment	No
Tank Release Detection: Int Double Walled	No
Tank Release Detection: Other Method	No
Tank Release Detection: Other Note	SIR
Pipe Release Detection: Leak Deferred	Not reported
Pipe Release Detection: Autoleak	Not reported
Pipe Release Detection: Line Tightness	Yes
Pipe Release Detection: Stat Invent Recon	No
Pipe Release Detection: Groundwater	No
Pipe Release Detection: Int Sec Containment	No
Pipe Release Det: Interior Double Walled	No
Pipe Release Detection: Other Method	No
Pipe Release Detection: Other Note	SIR

Pipe Type:	PRESSURE
Pipe Materials: Bare Steel	No
Pipe Materials: Galvanized Steel	No
Pipe Materials: Copper	No
Pipe Materials: Fiberglass	Yes
Pipe Materials: Cath Protect	No
Pipe Materials: Double Walled	No
Pipe Materials: Sec Containment	No
Pipe Materials: Repaired	No
Pipe Materials: Unknown	No
Pipe Materials: Other	No
Pipe Materials: Other Note	Not reported

VA Financial Assurance 1:

Name:	MILLER MART 25
Address:	13458 BENNS CHURCH RD RTE 1
Address 2:	Not reported
City,State,Zip:	SMITHFIELD, VA 23430
Facility ID:	5024060
Owner Name:	Miller Oil Co Inc
ROF Own Id:	27789
Tank Type:	UST
Mechanism:	Financial Test
Gallonage:	35163667
Per Occurence:	50000
Third Party:	150000

MILLER MART 25 (Continued) **U003692436**

Annual Aggregate: 200000
In Compliance: Not reported
Total Capacity: 10000
CEDS Facility Name: Miller Mart 25
Tank Status: CURR IN USE
Active Federally Regualted UST: Y

Name: MILLER MART 25
Address: 13458 BENNS CHURCH RD RTE 1
Address 2: Not reported
City,State,Zip: SMITHFIELD, VA 23430
Facility ID: 5024060
Owner Name: Miller Oil Co Inc
ROF Own Id: 27789
Tank Type: UST
Mechanism: Financial Test
Gallonage: 35163667
Per Occurence: 50000
Third Party: 150000
Annual Aggregate: 200000
In Compliance: Not reported
Total Capacity: 10000
CEDS Facility Name: Miller Mart 25
Tank Status: CURR IN USE
Active Federally Regualted UST: Y

Name: MILLER MART 25
Address: 13458 BENNS CHURCH RD RTE 1
Address 2: Not reported
City,State,Zip: SMITHFIELD, VA 23430
Facility ID: 5024060
Owner Name: Miller Oil Co Inc
ROF Own Id: 27789
Tank Type: UST
Mechanism: Financial Test
Gallonage: 35163667
Per Occurence: 50000
Third Party: 150000
Annual Aggregate: 200000
In Compliance: Not reported
Total Capacity: 2000
CEDS Facility Name: Miller Mart 25
Tank Status: CURR IN USE
Active Federally Regualted UST: Y

Name: MILLER MART 25
Address: 13458 BENNS CHURCH RD RTE 1
Address 2: Not reported
City,State,Zip: SMITHFIELD, VA 23430
Facility ID: 5024060
Owner Name: Miller Oil Co Inc
ROF Own Id: 27789
Tank Type: UST
Mechanism: Financial Test
Gallonage: 35163667
Per Occurence: 50000
Third Party: 150000

MILLER MART 25 (Continued) **U003692436**

Annual Aggregate:	200000
In Compliance:	Not reported
Total Capacity:	10000
CEDS Facility Name:	Miller Mart 25
Tank Status:	CURR IN USE
Active Federally Regualted UST:	Y

Name:	MILLER MART 25
Address:	13458 BENNS CHURCH RD RTE 1
Address 2:	Not reported
City,State,Zip:	SMITHFIELD, VA 23430
Facility ID:	5024060
Owner Name:	Miller Oil Co Inc
ROF Own Id:	27789
Tank Type:	UST
Mechanism:	Financial Test
Gallonage:	35163667
Per Occurence:	50000
Third Party:	150000
Annual Aggregate:	200000
In Compliance:	Not reported
Total Capacity:	4000
CEDS Facility Name:	Miller Mart 25
Tank Status:	CURR IN USE
Active Federally Regualted UST:	Y

A4 **BEST CLEANERS** **EDR Hist Cleaner** **1019938423**
NNW **13470 BENNS CHURCH BLVD** **N/A**
< 1/8 **SMITHFIELD, VA 23430**
0.112 mi.
593 ft. **Site 2 of 2 in cluster A**

Relative: EDR Hist Cleaner
Lower

Actual:
48 ft.

Year:	Name:	Type:
2005	PRIDE CLEANERS INC	Drycleaning Plants, Except Rugs, NEC
2006	PRIDE CLEANERS INC	Drycleaning Plants, Except Rugs, NEC
2007	PRIDE CLEANERS INC	Drycleaning Plants, Except Rugs, NEC
2009	BEST CLEANERS	Drycleaning Plants, Except Rugs
2010	BEST CLEANERS	Drycleaning Plants, Except Rugs
2011	BEST CLEANERS	Drycleaning Plants, Except Rugs
2012	BEST CLEANERS	Drycleaning Plants, Except Rugs
2013	BEST CLEANERS INC	Drycleaning Plants, Except Rugs
2014	BEST CLEANERS INC	Drycleaning Plants, Except Rugs

B5 **FUEL EXPRESS** **LTANKS** **S122310853**
NNW **1282 BENNS CHURCH BLVD** **N/A**
1/8-1/4 **SMITHFIELD, VA 23430**
0.202 mi.
1067 ft. **Site 1 of 3 in cluster B**

Relative: LTANKS:
Lower

Actual:
48 ft.

Name:	FUEL EXPRESS
Address:	1282 BENNS CHURCH BLVD
City,State,Zip:	SMITHFIELD, VA 23430
City,State,Zip:	SMITHFIELD, VA 23430

FUEL EXPRESS (Continued) **S122310853**

Region:	TRO
CEDS Facility Id:	200000849865
Case Status:	**Closed**
Pollution Complaint #:	20185194
Reported:	01/30/2018
Case Closed Date:	12/18/2019
Program:	RP Lead
Federally Regulated UST (Y/N):	Y
Regulated Petroleum UST (1):	Y
Excluded UST (1):	N
Deferred UST (1):	N
Partially Deferred UST (1):	N
Exempt 1 UST (2):	N
Exempt 2 Heating Oil UST (2):	N
Small Heating Oil AST (2):	N
Regulated AST (3):	N
Unregulated AST (3):	N
Other Y/N:	N
Unknown Y/N:	N
Other Description:	Not reported
Heating Oil Category:	Not reported

B6 **FUEL EXPRESS** **UST** **U004129692**
NNW **1282 BENNS CHURCH BLVD** **N/A**
1/8-1/4 **SMITHFIELD, VA 23430**
0.202 mi.
1067 ft. **Site 2 of 3 in cluster B**

Relative: **Lower**
Actual: **48 ft.**

Facility:

Name:	FUEL EXPRESS
Address:	1282 BENNS CHURCH BLVD
City,State,Zip:	SMITHFIELD, VA 23430
Facility Id:	5041052
Facility Type:	GAS STATION
CEDS Facility ID:	200000849865

Owner:

Owner Id:	44792
Owner Name:	Supervalu Inc
Owner Address:	PO Box 20 Dept # 72405
Owner Address2:	Not reported
Owner City, State, Zip:	Boise, ID 83726
Owner Type:	COMMERCIAL
Number of Active AST:	0
Number of Active UST:	0
Number of Inactive AST:	0
Number of Inactive UST:	2

UST:

Facility ID:	5041052
Federally Regulated:	Yes
Tank Number:	R-1
Tank Capacity:	19000
Tank Contents:	GASOLINE
Tank Status:	**REM FROM GRD**
Tank Type:	UST

FUEL EXPRESS (Continued) **U004129692**

Tank Material:

Install Date:	8/1/2008
Tank Materials: Bare Steel	No
Tank Materials: Cath Protect Steel	No
Tank Materials: Epoxy Steel	No
Tank Materials: Fiberglass	No
Tank Materials: Concrete	No
Tank Materials: Composite	Yes
Tank Materials: Double Walled	Yes
Tank Materials: Lined Interior	No
Tank Materials: Excav Liner	No
Tank Materials: Insulated Tank Jacket	No
Tank Materials: Repaired	No
Tank Materials: Unknown	No
Tank Materials: Other	No
Tank Materials: Other Note	Not reported

Release Detection:

Tank Release Detection: Leak Deferred	No
Tank Release Detection: Manual Gauge	No
Tank Release Detection: Auto Gauge	Yes
Tank Release Detection:Tank Tightness	Yes
Tank Release Detection: Vapor Monitor	No
Tank Release Detection: Inventory	No
Tank Release Detection: Stat Invent Recon	No
Tank Release Detection: Spill Install	Yes
Tank Release Detection: Overfill Install	Yes
Tank Release Detection: Groundwater	No
Tank Release Detection: Int Sec Containment	Yes
Tank Release Detection: Int Double Walled	Yes
Tank Release Detection: Other Method	No
Tank Release Detection: Other Note	Not reported
Pipe Release Detection: Leak Deferred	No
Pipe Release Detection: Autoleak	Not reported
Pipe Release Detection: Line Tightness	Yes
Pipe Release Detection: Stat Invent Recon	No
Pipe Release Detection: Groundwater	No
Pipe Release Detection: Int Sec Containment	Yes
Pipe Release Det: Interior Double Walled	Yes
Pipe Release Detection: Other Method	No
Pipe Release Detection: Other Note	Overfill Shutoff & Alarm

Pipe Type:	PRESSURE
Pipe Materials: Bare Steel	No
Pipe Materials: Galvanized Steel	No
Pipe Materials: Copper	No
Pipe Materials: Fiberglass	No
Pipe Materials: Cath Protect	No
Pipe Materials: Double Walled	Yes
Pipe Materials: Sec Containment	No
Pipe Materials: Repaired	No
Pipe Materials: Unknown	No
Pipe Materials: Other	Yes
Pipe Materials: Other Note	Polyflexible

FUEL EXPRESS (Continued) **U004129692**

Facility ID:	5041052
Federally Regulated:	Yes
Tank Number:	R-2
Tank Capacity:	6000
Tank Contents:	GASOLINE
Tank Status:	**REM FROM GRD**
Tank Type:	UST
Tank Material:	
Install Date:	8/1/2008
Tank Materials: Bare Steel	No
Tank Materials: Cath Protect Steel	No
Tank Materials: Epoxy Steel	No
Tank Materials: Fiberglass	No
Tank Materials: Concrete	No
Tank Materials: Composite	Yes
Tank Materials: Double Walled	Yes
Tank Materials: Lined Interior	No
Tank Materials: Excav Liner	No
Tank Materials: Insulated Tank Jacket	No
Tank Materials: Repaired	No
Tank Materials: Unknown	No
Tank Materials: Other	No
Tank Materials: Other Note	Not reported
Release Detection:	
Tank Release Detection: Leak Deferred	No
Tank Release Detection: Manual Gauge	No
Tank Release Detection: Auto Gauge	Yes
Tank Release Detection:Tank Tightness	Yes
Tank Release Detection: Vapor Monitor	No
Tank Release Detection: Inventory	No
Tank Release Detection: Stat Invent Recon	No
Tank Release Detection: Spill Install	Yes
Tank Release Detection: Overfill Install	Yes
Tank Release Detection: Groundwater	No
Tank Release Detection: Int Sec Containment	Yes
Tank Release Detection: Int Double Walled	Yes
Tank Release Detection: Other Method	No
Tank Release Detection: Other Note	Not reported
Pipe Release Detection: Leak Deferred	No
Pipe Release Detection: Autoleak	Not reported
Pipe Release Detection: Line Tightness	Yes
Pipe Release Detection: Stat Invent Recon	No
Pipe Release Detection: Groundwater	No
Pipe Release Detection: Int Sec Containment	Yes
Pipe Release Det: Interior Double Walled	Yes
Pipe Release Detection: Other Method	No
Pipe Release Detection: Other Note	Overfill Shutoff & Alarm
Pipe Type:	PRESSURE
Pipe Materials: Bare Steel	No
Pipe Materials: Galvanized Steel	No
Pipe Materials: Copper	No
Pipe Materials: Fiberglass	No
Pipe Materials: Cath Protect	No

FUEL EXPRESS (Continued) **U004129692**

Pipe Materials: Double Walled	Yes
Pipe Materials: Sec Containment	No
Pipe Materials: Repaired	No
Pipe Materials: Unknown	No
Pipe Materials: Other	Yes
Pipe Materials: Other Note	Polyflexible

B7 **7-ELEVEN #37229** **UST** **U003691110**
NNW **1229 BENNS CHURCH BLVD** **SPILLS** **N/A**
1/8-1/4 **SMITHFIELD, VA 23430** **Financial Assurance**
0.240 mi.
1268 ft. **Site 3 of 3 in cluster B**

Relative: **Lower**
Actual: **44 ft.**

Facility:

Name:	7-ELEVEN #37229
Address:	1229 BENNS CHURCH BLVD
City,State,Zip:	SMITHFIELD, VA 23430
Facility Id:	5013991
Facility Type:	GAS STATION
CEDS Facility ID:	200000067095

Owner:

Owner Id:	38838
Owner Name:	7 Eleven Incorporated
Owner Address:	PO Box 711 (Attn: Gasoline Compliance)
Owner Address2:	Not reported
Owner City, State, Zip:	Dallas, TX 75221
Owner Type:	COMMERCIAL
Number of Active AST:	0
Number of Active UST:	4
Number of Inactive AST:	0
Number of Inactive UST:	0

Owner Id:	31296
Owner Name:	Southern Oil Company Inc
Owner Address:	1500 Holland Rd
Owner Address2:	Not reported
Owner City, State, Zip:	Suffolk, VA 23434
Owner Type:	COMMERCIAL
Number of Active AST:	0
Number of Active UST:	4
Number of Inactive AST:	0
Number of Inactive UST:	0

UST:

Facility ID:	5013991
Federally Regulated:	Yes
Tank Number:	1
Tank Capacity:	12000
Tank Contents:	GASOLINE GASOHOL
Tank Status:	**CURR IN USE**
Tank Type:	UST

Tank Material:

Install Date:	7/1/1993
Tank Materials: Bare Steel	No

7-ELEVEN #37229 (Continued) **U003691110**

Tank Materials: Cath Protect Steel	No
Tank Materials: Epoxy Steel	No
Tank Materials: Fiberglass	No
Tank Materials: Concrete	No
Tank Materials: Composite	Yes
Tank Materials: Double Walled	No
Tank Materials: Lined Interior	No
Tank Materials: Excav Liner	No
Tank Materials: Insulated Tank Jacket	No
Tank Materials: Repaired	No
Tank Materials: Unknown	No
Tank Materials: Other	No
Tank Materials: Other Note	Not reported

Release Detection:

Tank Release Detection: Leak Deferred	No
Tank Release Detection: Manual Gauge	No
Tank Release Detection: Auto Gauge	No
Tank Release Detection:Tank Tightness	No
Tank Release Detection: Vapor Monitor	No
Tank Release Detection: Inventory	No
Tank Release Detection: Stat Invent Recon	Yes
Tank Release Detection: Spill Install	Yes
Tank Release Detection: Overfill Install	Not reported
Tank Release Detection: Groundwater	No
Tank Release Detection: Int Sec Containment	No
Tank Release Detection: Int Double Walled	No
Tank Release Detection: Other Method	No
Tank Release Detection: Other Note	Not reported
Pipe Release Detection: Leak Deferred	Not reported
Pipe Release Detection: Autoleak	Not reported
Pipe Release Detection: Line Tightness	Yes
Pipe Release Detection: Stat Invent Recon	No
Pipe Release Detection: Groundwater	No
Pipe Release Detection: Int Sec Containment	No
Pipe Release Det: Interior Double Walled	No
Pipe Release Detection: Other Method	No
Pipe Release Detection: Other Note	Automatic shutoff overfill

Pipe Type:	PRESSURE
Pipe Materials: Bare Steel	No
Pipe Materials: Galvanized Steel	No
Pipe Materials: Copper	No
Pipe Materials: Fiberglass	No
Pipe Materials: Cath Protect	No
Pipe Materials: Double Walled	No
Pipe Materials: Sec Containment	Yes
Pipe Materials: Repaired	No
Pipe Materials: Unknown	No
Pipe Materials: Other	Yes
Pipe Materials: Other Note	Polyflexible- Enviroflex

Facility ID:	5013991
Federally Regulated:	Yes

Tank Number:	2

7-ELEVEN #37229 (Continued) **U003691110**

Tank Capacity:	12000
Tank Contents:	GASOLINE GASOHOL
Tank Status:	**CURR IN USE**
Tank Type:	UST

Tank Material:

Install Date:	7/1/1993
Tank Materials: Bare Steel	No
Tank Materials: Cath Protect Steel	No
Tank Materials: Epoxy Steel	No
Tank Materials: Fiberglass	No
Tank Materials: Concrete	No
Tank Materials: Composite	Yes
Tank Materials: Double Walled	No
Tank Materials: Lined Interior	No
Tank Materials: Excav Liner	No
Tank Materials: Insulated Tank Jacket	No
Tank Materials: Repaired	No
Tank Materials: Unknown	No
Tank Materials: Other	No
Tank Materials: Other Note	Not reported

Release Detection:

Tank Release Detection: Leak Deferred	No
Tank Release Detection: Manual Gauge	No
Tank Release Detection: Auto Gauge	No
Tank Release Detection:Tank Tightness	No
Tank Release Detection: Vapor Monitor	No
Tank Release Detection: Inventory	No
Tank Release Detection: Stat Invent Recon	Yes
Tank Release Detection: Spill Install	Yes
Tank Release Detection: Overfill Install	Not reported
Tank Release Detection: Groundwater	No
Tank Release Detection: Int Sec Containment	No
Tank Release Detection: Int Double Walled	No
Tank Release Detection: Other Method	No
Tank Release Detection: Other Note	Not reported
Pipe Release Detection: Leak Deferred	Not reported
Pipe Release Detection: Autoleak	Not reported
Pipe Release Detection: Line Tightness	Yes
Pipe Release Detection: Stat Invent Recon	No
Pipe Release Detection: Groundwater	No
Pipe Release Detection: Int Sec Containment	No
Pipe Release Det: Interior Double Walled	No
Pipe Release Detection: Other Method	No
Pipe Release Detection: Other Note	Automatic shutoff overfill

Pipe Type:	PRESSURE
Pipe Materials: Bare Steel	No
Pipe Materials: Galvanized Steel	No
Pipe Materials: Copper	No
Pipe Materials: Fiberglass	No
Pipe Materials: Cath Protect	No
Pipe Materials: Double Walled	No
Pipe Materials: Sec Containment	Yes
Pipe Materials: Repaired	No
Pipe Materials: Unknown	No

7-ELEVEN #37229 (Continued) **U003691110**

Pipe Materials: Other	Yes
Pipe Materials: Other Note	Polyflexible- Enviroflex
Facility ID:	5013991
Federally Regulated:	Yes
Tank Number:	3
Tank Capacity:	12000
Tank Contents:	GASOLINE GASOHOL
Tank Status:	**CURR IN USE**
Tank Type:	UST

Tank Material:

Install Date:	4/1/2003
Tank Materials: Bare Steel	No
Tank Materials: Cath Protect Steel	No
Tank Materials: Epoxy Steel	No
Tank Materials: Fiberglass	No
Tank Materials: Concrete	No
Tank Materials: Composite	Yes
Tank Materials: Double Walled	No
Tank Materials: Lined Interior	No
Tank Materials: Excav Liner	No
Tank Materials: Insulated Tank Jacket	No
Tank Materials: Repaired	No
Tank Materials: Unknown	No
Tank Materials: Other	No
Tank Materials: Other Note	Not reported

Release Detection:

Tank Release Detection: Leak Deferred	No
Tank Release Detection: Manual Gauge	No
Tank Release Detection: Auto Gauge	No
Tank Release Detection:Tank Tightness	No
Tank Release Detection: Vapor Monitor	No
Tank Release Detection: Inventory	No
Tank Release Detection: Stat Invent Recon	Yes
Tank Release Detection: Spill Install	Yes
Tank Release Detection: Overfill Install	Not reported
Tank Release Detection: Groundwater	No
Tank Release Detection: Int Sec Containment	No
Tank Release Detection: Int Double Walled	No
Tank Release Detection: Other Method	No
Tank Release Detection: Other Note	Not reported
Pipe Release Detection: Leak Deferred	No
Pipe Release Detection: Autoleak	Not reported
Pipe Release Detection: Line Tightness	Yes
Pipe Release Detection: Stat Invent Recon	No
Pipe Release Detection: Groundwater	No
Pipe Release Detection: Int Sec Containment	No
Pipe Release Det: Interior Double Walled	No
Pipe Release Detection: Other Method	No
Pipe Release Detection: Other Note	automatic shutoff overfill
Pipe Type:	PRESSURE
Pipe Materials: Bare Steel	No

7-ELEVEN #37229 (Continued) **U003691110**

Pipe Materials: Galvanized Steel	No
Pipe Materials: Copper	No
Pipe Materials: Fiberglass	No
Pipe Materials: Cath Protect	No
Pipe Materials: Double Walled	No
Pipe Materials: Sec Containment	Yes
Pipe Materials: Repaired	No
Pipe Materials: Unknown	No
Pipe Materials: Other	Yes
Pipe Materials: Other Note	Polyflexible- Enviroflex
Facility ID:	5013991
Federally Regulated:	Yes
Tank Number:	4
Tank Capacity:	4000
Tank Contents:	DIESEL
Tank Status:	**CURR IN USE**
Tank Type:	UST

Tank Material:

Install Date:	7/1/1993
Tank Materials: Bare Steel	No
Tank Materials: Cath Protect Steel	No
Tank Materials: Epoxy Steel	No
Tank Materials: Fiberglass	No
Tank Materials: Concrete	No
Tank Materials: Composite	Yes
Tank Materials: Double Walled	No
Tank Materials: Lined Interior	No
Tank Materials: Excav Liner	No
Tank Materials: Insulated Tank Jacket	No
Tank Materials: Repaired	No
Tank Materials: Unknown	No
Tank Materials: Other	No
Tank Materials: Other Note	Not reported

Release Detection:

Tank Release Detection: Leak Deferred	No
Tank Release Detection: Manual Gauge	No
Tank Release Detection: Auto Gauge	No
Tank Release Detection:Tank Tightness	No
Tank Release Detection: Vapor Monitor	No
Tank Release Detection: Inventory	No
Tank Release Detection: Stat Invent Recon	Yes
Tank Release Detection: Spill Install	Yes
Tank Release Detection: Overfill Install	Not reported
Tank Release Detection: Groundwater	No
Tank Release Detection: Int Sec Containment	No
Tank Release Detection: Int Double Walled	No
Tank Release Detection: Other Method	No
Tank Release Detection: Other Note	Not reported
Pipe Release Detection: Leak Deferred	Not reported
Pipe Release Detection: Autoleak	Not reported
Pipe Release Detection: Line Tightness	Yes
Pipe Release Detection: Stat Invent Recon	No

7-ELEVEN #37229 (Continued) **U003691110**

Pipe Release Detection: Groundwater	No
Pipe Release Detection: Int Sec Containment	No
Pipe Release Det: Interior Double Walled	No
Pipe Release Detection: Other Method	No
Pipe Release Detection: Other Note	Automatic shutoff overfill
Pipe Type:	PRESSURE
Pipe Materials: Bare Steel	No
Pipe Materials: Galvanized Steel	No
Pipe Materials: Copper	No
Pipe Materials: Fiberglass	No
Pipe Materials: Cath Protect	No
Pipe Materials: Double Walled	No
Pipe Materials: Sec Containment	Yes
Pipe Materials: Repaired	No
Pipe Materials: Unknown	No
Pipe Materials: Other	Yes
Pipe Materials: Other Note	Polyflexible- Enviroflex

SPILLS:

Name:	Not reported
Address:	1229 BENNS CHURCH
City,State,Zip:	SMITHFIELD, VA
City,State,Zip:	SMITHFIELD, VA
Fips City/County:	093/Isle of Wight County
Status:	Under Investigation
Reference Id:	269852
IR Number:	2005-T-1147
Associated IR:	Not reported
Incident Date:	Not reported
Call Received Date:	02/08/2005
Closure Comments:	See Site Comments for details
Threat To:	Not reported
Terrorism (Y/N):	NO
Characterize Incident:	Not reported
Incident Type:	Petroleum(Petroleum)
Incident Subtype:	Petroleum
Materials:	Oil (Fuel-Gasoline)
Effect To Receptor:	Not reported
Water Body:	Not reported
Low Quantity To Water:	Not reported
High Quantity To Water:	Not reported
Quantity Units:	Not reported
Other Receptors:	Not reported
RP Company:	Lynne Smith
RP Name:	Not reported
Property Owner:	Not reported
Property Company:	Not reported
Duration Of Event (Hrs):	Not reported
Impacts:	Not reported
Other Impacts:	Not reported
Steps Taken:	Not reported
Steps Taken Description:	Not reported
System Components:	Not reported
Other System Components:	Not reported
Cause Of Event:	Not reported

7-ELEVEN #37229 (Continued) **U003691110**

Corrective Action Taken:	Not reported
Weather Status:	No
Precipitation (Wet):	Not reported
Discharge Type:	Not reported
Discharge Volume:	Not reported
Unknown Discharge (Y/N):	NO
Site Name:	SOUTHERN FOOD STORE GAS STATION
Closure Date:	Not reported
Orig. Call Incident Description:	GAS TANK OVERFLOWED
Original Call Material Description:	GASOLIN E
Original Call Location Description:	Southern Food Store Gas Station-1229 Benns Church-Smithfield-VA--Isle of Wight County
Incident Ongoing at time of Call:	No
Agencies Notified (Y/N):	NO
Other Agencies:	Not reported
Permitted (Y/N):	No
Call Reported By Company Name:	Not reported
Call Property Owner Company Name:	Not reported
Call Property Owner Name:	Not reported
Site Summary:	Not reported

VA Financial Assurance 1:

Name:	7-ELEVEN #37229
Address:	1229 BENNS CHURCH BLVD
Address 2:	Not reported
City,State,Zip:	SMITHFIELD, VA 23430
Facility ID:	5013991
Owner Name:	7 Eleven Incorporated
ROF Own Id:	38838
Tank Type:	UST
Mechanism:	Insurance
Gallonage:	Not reported
Per Occurence:	1000000
Third Party:	1000000
Annual Aggregate:	2000000
In Compliance:	Not reported
Total Capacity:	12000
CEDS Facility Name:	7-Eleven #37229
Tank Status:	CURR IN USE
Active Federally Regualted UST:	Y

Name:	7-ELEVEN #37229
Address:	1229 BENNS CHURCH BLVD
Address 2:	Not reported
City,State,Zip:	SMITHFIELD, VA 23430
Facility ID:	5013991
Owner Name:	7 Eleven Incorporated
ROF Own Id:	38838
Tank Type:	UST
Mechanism:	Insurance
Gallonage:	Not reported
Per Occurence:	1000000
Third Party:	1000000
Annual Aggregate:	2000000
In Compliance:	Not reported
Total Capacity:	12000
CEDS Facility Name:	7-Eleven #37229

7-ELEVEN #37229 (Continued) **U003691110**

Tank Status:	CURR IN USE
Active Federally Regualted UST:	Y
Name:	7-ELEVEN #37229
Address:	1229 BENNS CHURCH BLVD
Address 2:	Not reported
City,State,Zip:	SMITHFIELD, VA 23430
Facility ID:	5013991
Owner Name:	7 Eleven Incorporated
ROF Own Id:	38838
Tank Type:	UST
Mechanism:	Insurance
Gallonage:	Not reported
Per Occurence:	1000000
Third Party:	1000000
Annual Aggregate:	2000000
In Compliance:	Not reported
Total Capacity:	4000
CEDS Facility Name:	7-Eleven #37229
Tank Status:	CURR IN USE
Active Federally Regualted UST:	Y
Name:	7-ELEVEN #37229
Address:	1229 BENNS CHURCH BLVD
Address 2:	Not reported
City,State,Zip:	SMITHFIELD, VA 23430
Facility ID:	5013991
Owner Name:	7 Eleven Incorporated
ROF Own Id:	38838
Tank Type:	UST
Mechanism:	Insurance
Gallonage:	Not reported
Per Occurence:	1000000
Third Party:	1000000
Annual Aggregate:	2000000
In Compliance:	Not reported
Total Capacity:	12000
CEDS Facility Name:	7-Eleven #37229
Tank Status:	CURR IN USE
Active Federally Regualted UST:	Y

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8 **SMITHFIELD HIGH SCHOOL** **UST** **1004607572**
SSW **14171 TURNER DR** **N/A**
1/8-1/4 **SMITHFIELD, VA 23430**
0.248 mi.
1307 ft.

Relative:
Higher

Actual:
53 ft.

Facility:

Name:	SMITHFIELD HIGH SCHOOL
Address:	14171 TURNER DR
City,State,Zip:	SMITHFIELD, VA 23430
Facility Id:	5013608
Facility Type:	LOCAL
CEDS Facility ID:	200000087573

Owner:

Owner Id:	26940
Owner Name:	Isle of Wight County Schools

SMITHFIELD HIGH SCHOOL (Continued) **1004607572**

Owner Address:	17124 Monumnet Circle
Owner Address2:	Not reported
Owner City, State, Zip:	Isle of Wight, VA 23397
Owner Type:	LOCAL
Number of Active AST:	0
Number of Active UST:	0
Number of Inactive AST:	0
Number of Inactive UST:	3

UST:

Facility ID:	5013608
Federally Regulated:	No
Tank Number:	2
Tank Capacity:	20000
Tank Contents:	HEATING OIL
Tank Status:	**PERM OUT OF USE**
Tank Type:	UST

Tank Material:

Install Date:	7/1/1980
Tank Materials: Bare Steel	Yes
Tank Materials: Cath Protect Steel	No
Tank Materials: Epoxy Steel	No
Tank Materials: Fiberglass	No
Tank Materials: Concrete	No
Tank Materials: Composite	No
Tank Materials: Double Walled	No
Tank Materials: Lined Interior	No
Tank Materials: Excav Liner	No
Tank Materials: Insulated Tank Jacket	No
Tank Materials: Repaired	No
Tank Materials: Unknown	No
Tank Materials: Other	No
Tank Materials: Other Note	Not reported

Release Detection:

Tank Release Detection: Leak Deferred	No
Tank Release Detection: Manual Gauge	No
Tank Release Detection: Auto Gauge	No
Tank Release Detection:Tank Tightness	Yes
Tank Release Detection: Vapor Monitor	No
Tank Release Detection: Inventory	No
Tank Release Detection: Stat Invent Recon	No
Tank Release Detection: Spill Install	No
Tank Release Detection: Overfill Install	No
Tank Release Detection: Groundwater	No
Tank Release Detection: Int Sec Containment	No
Tank Release Detection: Int Double Walled	No
Tank Release Detection: Other Method	No
Tank Release Detection: Other Note	Not reported
Pipe Release Detection: Leak Deferred	Not reported
Pipe Release Detection: Autoleak	Not reported
Pipe Release Detection: Line Tightness	No
Pipe Release Detection: Stat Invent Recon	No
Pipe Release Detection: Groundwater	No
Pipe Release Detection: Int Sec Containment	No

SMITHFIELD HIGH SCHOOL (Continued) **1004607572**

Pipe Release Det: Interior Double Walled	No
Pipe Release Detection: Other Method	No
Pipe Release Detection: Other Note	Not reported
Pipe Type:	GRAVITY
Pipe Materials: Bare Steel	No
Pipe Materials: Galvanized Steel	Yes
Pipe Materials: Copper	No
Pipe Materials: Fiberglass	No
Pipe Materials: Cath Protect	No
Pipe Materials: Double Walled	No
Pipe Materials: Sec Containment	No
Pipe Materials: Repaired	No
Pipe Materials: Unknown	No
Pipe Materials: Other	No
Pipe Materials: Other Note	Not reported
Facility ID:	5013608
Federally Regulated:	Yes
Tank Number:	R1
Tank Capacity:	2000
Tank Contents:	DIESEL
Tank Status:	**REM FROM GRD**
Tank Type:	UST

Tank Material:

Install Date:	7/1/1980
Tank Materials: Bare Steel	Yes
Tank Materials: Cath Protect Steel	No
Tank Materials: Epoxy Steel	No
Tank Materials: Fiberglass	No
Tank Materials: Concrete	No
Tank Materials: Composite	No
Tank Materials: Double Walled	No
Tank Materials: Lined Interior	No
Tank Materials: Excav Liner	No
Tank Materials: Insulated Tank Jacket	No
Tank Materials: Repaired	No
Tank Materials: Unknown	No
Tank Materials: Other	No
Tank Materials: Other Note	Not reported

Release Detection:

Tank Release Detection: Leak Deferred	No
Tank Release Detection: Manual Gauge	Yes
Tank Release Detection: Auto Gauge	No
Tank Release Detection:Tank Tightness	Yes
Tank Release Detection: Vapor Monitor	No
Tank Release Detection: Inventory	No
Tank Release Detection: Stat Invent Recon	No
Tank Release Detection: Spill Install	No
Tank Release Detection: Overfill Install	No
Tank Release Detection: Groundwater	No
Tank Release Detection: Int Sec Containment	No
Tank Release Detection: Int Double Walled	No

SMITHFIELD HIGH SCHOOL (Continued) **1004607572**

Tank Release Detection: Other Method	No
Tank Release Detection: Other Note	Not reported
Pipe Release Detection: Leak Deferred	Not reported
Pipe Release Detection: Autoleak	Not reported
Pipe Release Detection: Line Tightness	No
Pipe Release Detection: Stat Invent Recon	No
Pipe Release Detection: Groundwater	No
Pipe Release Detection: Int Sec Containment	No
Pipe Release Det: Interior Double Walled	No
Pipe Release Detection: Other Method	No
Pipe Release Detection: Other Note	Not reported

Pipe Type:	NO VALVE SUCTION
Pipe Materials: Bare Steel	No
Pipe Materials: Galvanized Steel	Yes
Pipe Materials: Copper	No
Pipe Materials: Fiberglass	No
Pipe Materials: Cath Protect	No
Pipe Materials: Double Walled	No
Pipe Materials: Sec Containment	No
Pipe Materials: Repaired	No
Pipe Materials: Unknown	No
Pipe Materials: Other	No
Pipe Materials: Other Note	Not reported

Facility ID:	5013608
Federally Regulated:	Yes

Tank Number:	R3
Tank Capacity:	550
Tank Contents:	GASOLINE
Tank Status:	**REM FROM GRD**
Tank Type:	UST

Tank Material:

Install Date:	Not reported
Tank Materials: Bare Steel	Yes
Tank Materials: Cath Protect Steel	No
Tank Materials: Epoxy Steel	No
Tank Materials: Fiberglass	No
Tank Materials: Concrete	No
Tank Materials: Composite	No
Tank Materials: Double Walled	No
Tank Materials: Lined Interior	No
Tank Materials: Excav Liner	No
Tank Materials: Insulated Tank Jacket	No
Tank Materials: Repaired	No
Tank Materials: Unknown	No
Tank Materials: Other	No
Tank Materials: Other Note	Not reported

Release Detection:

Tank Release Detection: Leak Deferred	No
Tank Release Detection: Manual Gauge	No
Tank Release Detection: Auto Gauge	No
Tank Release Detection:Tank Tightness	No

SMITHFIELD HIGH SCHOOL (Continued) **1004607572**

Tank Release Detection: Vapor Monitor	No
Tank Release Detection: Inventory	No
Tank Release Detection: Stat Invent Recon	No
Tank Release Detection: Spill Install	No
Tank Release Detection: Overfill Install	No
Tank Release Detection: Groundwater	No
Tank Release Detection: Int Sec Containment	No
Tank Release Detection: Int Double Walled	No
Tank Release Detection: Other Method	No
Tank Release Detection: Other Note	Not reported
Pipe Release Detection: Leak Deferred	No
Pipe Release Detection: Autoleak	Not reported
Pipe Release Detection: Line Tightness	No
Pipe Release Detection: Stat Invent Recon	No
Pipe Release Detection: Groundwater	No
Pipe Release Detection: Int Sec Containment	No
Pipe Release Det: Interior Double Walled	No
Pipe Release Detection: Other Method	No
Pipe Release Detection: Other Note	Not reported

Pipe Type:	NO VALVE SUCTION
Pipe Materials: Bare Steel	No
Pipe Materials: Galvanized Steel	Yes
Pipe Materials: Copper	No
Pipe Materials: Fiberglass	No
Pipe Materials: Cath Protect	No
Pipe Materials: Double Walled	No
Pipe Materials: Sec Containment	No
Pipe Materials: Repaired	No
Pipe Materials: Unknown	No
Pipe Materials: Other	No
Pipe Materials: Other Note	Not reported

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9 **SMITHFIELD AMOCO** **LUST** **S104742152**
NNW **1201 BENNS CHURCH BLVD** **LTANKS** **N/A**
1/4-1/2 **SMITHFIELD, VA 23430**
0.280 mi.
1479 ft.

Relative: **Lower**

Actual: **44 ft.**

LUST REG TD:

Region:	TD
Region Code:	TRO
Facility ID:	200000091679
Facility Status:	**Closed**
Completed Date:	01/14/1999
Pollution Complaint Num:	19992328
Fed Regulated Tank:	Yes
Phase Code:	RR
Event Description:	Release Reported
Comments:	CONTAM FOUND DURING UST REMOVALS.

Region:	TD
Region Code:	TRO
Facility ID:	200000091679
Facility Status:	**Closed**
Completed Date:	01/05/2009
Pollution Complaint Num:	19992328

SMITHFIELD AMOCO (Continued) **S104742152**

Fed Regulated Tank:	Yes
Phase Code:	CLOSURE
Event Description:	Case Closure Date - Letter Sent
Comments:	Case closed, no further corrective action letter sent

LTANKS:

Name:	SMITHFIELD AMOCO
Address:	1201 BENNS CHURCH BLVD
City,State,Zip:	SMITHFIELD, VA 23430
City,State,Zip:	SMITHFIELD, VA 23430
Region:	TRO
CEDS Facility Id:	200000091679
Case Status:	**Closed**
Pollution Complaint #:	19992328
Reported:	01/14/1999
Case Closed Date:	01/05/2009
Program:	RP Lead
Federally Regulated UST (Y/N):	Y
Regulated Petroleum UST (1):	Y
Excluded UST (1):	N
Deferred UST (1):	N
Partially Deferred UST (1):	N
Exempt 1 UST (2):	N
Exempt 2 Heating Oil UST (2):	N
Small Heating Oil AST (2):	N
Regulated AST (3):	N
Unregulated AST (3):	N
Other Y/N:	N
Unknown Y/N:	N
Other Description:	Not reported
Heating Oil Category:	Not reported

Count: 0 records.

ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
		NO SITES FOUND			

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

Number of Days to Update: Provides confirmation that EDR is reporting records that have been updated within 90 days from the date the government agency made the information available to the public.

STANDARD ENVIRONMENTAL RECORDS

Lists of Federal NPL (Superfund) sites

NPL: National Priority List

National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 01/25/2022
Date Data Arrived at EDR: 02/03/2022
Date Made Active in Reports: 02/22/2022
Number of Days to Update: 19

Source: EPA
Telephone: N/A
Last EDR Contact: 05/05/2022
Next Scheduled EDR Contact: 07/11/2022
Data Release Frequency: Quarterly

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)
Telephone: 202-564-7333

EPA Region 1
Telephone 617-918-1143

EPA Region 3
Telephone 215-814-5418

EPA Region 4
Telephone 404-562-8033

EPA Region 5
Telephone 312-886-6686

EPA Region 10
Telephone 206-553-8665

EPA Region 6
Telephone: 214-655-6659

EPA Region 7
Telephone: 913-551-7247

EPA Region 8
Telephone: 303-312-6774

EPA Region 9
Telephone: 415-947-4246

Proposed NPL: Proposed National Priority List Sites

A site that has been proposed for listing on the National Priorities List through the issuance of a proposed rule in the Federal Register. EPA then accepts public comments on the site, responds to the comments, and places on the NPL those sites that continue to meet the requirements for listing.

Date of Government Version: 01/25/2022
Date Data Arrived at EDR: 02/03/2022
Date Made Active in Reports: 02/22/2022
Number of Days to Update: 19

Source: EPA
Telephone: N/A
Last EDR Contact: 05/05/2022
Next Scheduled EDR Contact: 07/11/2022
Data Release Frequency: Quarterly

NPL LIENS: Federal Superfund Liens

Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/1991
Date Data Arrived at EDR: 02/02/1994
Date Made Active in Reports: 03/30/1994
Number of Days to Update: 56

Source: EPA
Telephone: 202-564-4267
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

Lists of Federal Delisted NPL sites

Delisted NPL: National Priority List Deletions

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 01/25/2022
Date Data Arrived at EDR: 02/03/2022
Date Made Active in Reports: 02/22/2022
Number of Days to Update: 19

Source: EPA
Telephone: N/A
Last EDR Contact: 05/05/2022
Next Scheduled EDR Contact: 07/11/2022
Data Release Frequency: Quarterly

Lists of Federal sites subject to CERCLA removals and CERCLA orders

FEDERAL FACILITY: Federal Facility Site Information listing

A listing of National Priority List (NPL) and Base Realignment and Closure (BRAC) sites found in the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) Database where EPA Federal Facilities Restoration and Reuse Office is involved in cleanup activities.

Date of Government Version: 05/25/2021
Date Data Arrived at EDR: 06/24/2021
Date Made Active in Reports: 09/20/2021
Number of Days to Update: 88

Source: Environmental Protection Agency
Telephone: 703-603-8704
Last EDR Contact: 04/01/2022
Next Scheduled EDR Contact: 07/11/2022
Data Release Frequency: Varies

SEMS: Superfund Enterprise Management System

SEMS (Superfund Enterprise Management System) tracks hazardous waste sites, potentially hazardous waste sites, and remedial activities performed in support of EPA's Superfund Program across the United States. The list was formerly know as CERCLIS, renamed to SEMS by the EPA in 2015. The list contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This dataset also contains sites which are either proposed to or on the National Priorities List (NPL) and the sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 01/25/2022
Date Data Arrived at EDR: 02/03/2022
Date Made Active in Reports: 02/22/2022
Number of Days to Update: 19

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 05/05/2022
Next Scheduled EDR Contact: 07/25/2022
Data Release Frequency: Quarterly

Lists of Federal CERCLA sites with NFRAP

SEMS-ARCHIVE: Superfund Enterprise Management System Archive

SEMS-ARCHIVE (Superfund Enterprise Management System Archive) tracks sites that have no further interest under the Federal Superfund Program based on available information. The list was formerly known as the CERCLIS-NFRAP, renamed to SEMS ARCHIVE by the EPA in 2015. EPA may perform a minimal level of assessment work at a site while it is archived if site conditions change and/or new information becomes available. Archived sites have been removed and archived from the inventory of SEMS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list the site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. The decision does not necessarily mean that there is no hazard associated with a given site; it only means that. based upon available information, the location is not judged to be potential NPL site.

Date of Government Version: 01/25/2022
Date Data Arrived at EDR: 02/03/2022
Date Made Active in Reports: 02/22/2022
Number of Days to Update: 19

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 05/05/2022
Next Scheduled EDR Contact: 07/25/2022
Data Release Frequency: Quarterly

Lists of Federal RCRA facilities undergoing Corrective Action

CORRACTS: Corrective Action Report

CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 02/28/2022
Date Data Arrived at EDR: 03/02/2022
Date Made Active in Reports: 03/17/2022
Number of Days to Update: 15

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 04/06/2022
Next Scheduled EDR Contact: 07/04/2022
Data Release Frequency: Quarterly

Lists of Federal RCRA TSD facilities

RCRA-TSDF: RCRA - Treatment, Storage and Disposal

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 02/28/2022
Date Data Arrived at EDR: 03/02/2022
Date Made Active in Reports: 03/17/2022
Number of Days to Update: 15

Source: Environmental Protection Agency
Telephone: 800-438-2474
Last EDR Contact: 04/06/2022
Next Scheduled EDR Contact: 07/04/2022
Data Release Frequency: Quarterly

Lists of Federal RCRA generators

RCRA-LQG: RCRA - Large Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

Date of Government Version: 02/28/2022
Date Data Arrived at EDR: 03/02/2022
Date Made Active in Reports: 03/17/2022
Number of Days to Update: 15

Source: Environmental Protection Agency
Telephone: 800-438-2474
Last EDR Contact: 04/06/2022
Next Scheduled EDR Contact: 07/04/2022
Data Release Frequency: Quarterly

RCRA-SQG: RCRA - Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

Date of Government Version: 02/28/2022
Date Data Arrived at EDR: 03/02/2022
Date Made Active in Reports: 03/17/2022
Number of Days to Update: 15

Source: Environmental Protection Agency
Telephone: 800-438-2474
Last EDR Contact: 04/06/2022
Next Scheduled EDR Contact: 07/04/2022
Data Release Frequency: Quarterly

RCRA-VSQG: RCRA - Very Small Quantity Generators (Formerly Conditionally Exempt Small Quantity Generators)

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Very small quantity generators (VSQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

Date of Government Version: 02/28/2022
Date Data Arrived at EDR: 03/02/2022
Date Made Active in Reports: 03/17/2022
Number of Days to Update: 15

Source: Environmental Protection Agency
Telephone: 800-438-2474
Last EDR Contact: 04/06/2022
Next Scheduled EDR Contact: 07/04/2022
Data Release Frequency: Quarterly

Federal institutional controls / engineering controls registries

LUCIS: Land Use Control Information System

LUCIS contains records of land use control information pertaining to the former Navy Base Realignment and Closure properties.

Date of Government Version: 11/15/2021
Date Data Arrived at EDR: 11/16/2021
Date Made Active in Reports: 02/08/2022
Number of Days to Update: 84

Source: Department of the Navy
Telephone: 843-820-7326
Last EDR Contact: 05/05/2022
Next Scheduled EDR Contact: 08/22/2022
Data Release Frequency: Varies

US ENG CONTROLS: Engineering Controls Sites List

A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 11/19/2021
Date Data Arrived at EDR: 11/19/2021
Date Made Active in Reports: 02/14/2022
Number of Days to Update: 87

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 02/23/2022
Next Scheduled EDR Contact: 06/06/2022
Data Release Frequency: Varies

US INST CONTROLS: Institutional Controls Sites List

A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 11/19/2021
Date Data Arrived at EDR: 11/19/2021
Date Made Active in Reports: 02/14/2022
Number of Days to Update: 87

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 02/23/2022
Next Scheduled EDR Contact: 06/06/2022
Data Release Frequency: Varies

Federal ERNS list

ERNS: Emergency Response Notification System

Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 12/31/2021
Date Data Arrived at EDR: 03/01/2022
Date Made Active in Reports: 03/10/2022
Number of Days to Update: 9

Source: National Response Center, United States Coast Guard
Telephone: 202-267-2180
Last EDR Contact: 03/22/2022
Next Scheduled EDR Contact: 07/04/2022
Data Release Frequency: Quarterly

Lists of state- and tribal hazardous waste facilities

SHWS: This state does not maintain a SHWS list. See the Federal CERCLIS list and Federal NPL list.

State Hazardous Waste Sites. State hazardous waste site records are the states' equivalent to CERCLIS. These sites may or may not already be listed on the federal CERCLIS list. Priority sites planned for cleanup using state funds (state equivalent of Superfund) are identified along with sites where cleanup will be paid for by potentially responsible parties. Available information varies by state.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: Department of Environmental Quality
Telephone: 804-698-4236
Last EDR Contact: 03/14/2022
Next Scheduled EDR Contact: 06/27/2022
Data Release Frequency: N/A

Lists of state and tribal landfills and solid waste disposal facilities

SWF/LF: Solid Waste Management Facilities

Solid Waste Facilities/Landfill Sites. SWF/LF type records typically contain an inventory of solid waste disposal facilities or landfills in a particular state. Depending on the state, these may be active or inactive facilities or open dumps that failed to meet RCRA Subtitle D Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 11/29/2021
Date Data Arrived at EDR: 12/01/2021
Date Made Active in Reports: 02/23/2022
Number of Days to Update: 84

Source: Department of Environmental Quality
Telephone: 804-698-4238
Last EDR Contact: 02/25/2022
Next Scheduled EDR Contact: 06/13/2022
Data Release Frequency: Semi-Annually

Lists of state and tribal leaking storage tanks

LUST REG PD: Leaking Underground Storage Tank Sites

Leaking underground storage tank site locaitons. Includes: counties of Amelia, Brunswick, Charles City, Chesterfield, Dinwiddie, Essex, Gloucester, Goochland, Greensville, Hanover, Henrico, King and Queen, King William, Lancaster, Mathews, Middlesex, New Kent, Northumberland, Powhatan, Prince George, Richmond, Surry, Sussex, Westmoreland; cities of Colonial Heights, Emporia, Hopewell, Petersburg.

Date of Government Version: 12/02/2014
Date Data Arrived at EDR: 12/04/2014
Date Made Active in Reports: 01/16/2015
Number of Days to Update: 43

Source: Department of Environmental Quality Piedmont Regional Office
Telephone: 804-527-5020
Last EDR Contact: 08/29/2016
Next Scheduled EDR Contact: 12/12/2016
Data Release Frequency: Quarterly

LUST REG TD: Leaking Underground Storage Tank Sites

Leaking underground storage tank site locations. Includes: counties of Accomack, Isle of Wight, James City, Northampton, Southampton, York; cities of Chesapeake, Franklin, Hampton, Newport News, Norfolk, Poquoson, Portsmouth, Suffolk, Virginia Beach, Williamsburg.

Date of Government Version: 06/30/2013
Date Data Arrived at EDR: 07/05/2013
Date Made Active in Reports: 09/16/2013
Number of Days to Update: 73

Source: Department of Environmental Quality Tidewater Regional Office
Telephone: trofoia@deq.vir
Last EDR Contact: 09/26/2016
Next Scheduled EDR Contact: 01/09/2017
Data Release Frequency: Quarterly

LUST REG SC: Leaking Underground Storage Tanks

Leaking underground storage tank site locations. Includes: counties of Amherst, Appomattox, Buckingham, Campbell, Charlotte, Cumberland, Halifax, Lunenburg, Mecklenburg, Nottoway, Pittsylvania, Prince Deward; cities of Danville, Lynchburg.

Date of Government Version: 09/06/2013
Date Data Arrived at EDR: 09/06/2013
Date Made Active in Reports: 09/17/2013
Number of Days to Update: 11

Source: Department of Environmental Quality, South Central Region
Telephone: 434-582-5120
Last EDR Contact: 08/29/2016
Next Scheduled EDR Contact: 12/12/2016
Data Release Frequency: Semi-Annually

LUST REG VA: Leaking Underground Storage Tank List

Leaking underground storage tank site locations. Includes: counties of Albemarle, Augusta, Bath, Clarke, Fluvanna, Frederick, Greene, Highland, Nelson, Page, Rockbridge, Rockingham, Shenandoah, Warren; cities of Buena Vista, Charlottesville, Harrisonburg, Lexington, Staunton, Waynesboro, Winchester.

Date of Government Version: 12/06/2011
Date Data Arrived at EDR: 12/08/2011
Date Made Active in Reports: 01/16/2012
Number of Days to Update: 39

Source: Department of Environmental Quality Valley Regional Office
Telephone: 540-574-7800
Last EDR Contact: 08/29/2016
Next Scheduled EDR Contact: 12/12/2016
Data Release Frequency: No Update Planned

LUST REG NO: Leaking Underground Storage Tank Tracking Database

Leaking underground storage tank site locations. Includes: counties of Arlington, Caroline, Culpeper, Fairfax, Fauquier, King George, Loudoun, Louisa, Madison, Orange, Prince William, Rappahannock, Spotsylvania, Stafford; cities of Alexandria, Fairfax, Falls Church, Fredericksburg, Manassas, Manassas Park.

Date of Government Version: 05/18/2004
Date Data Arrived at EDR: 05/22/2004
Date Made Active in Reports: 07/09/2004
Number of Days to Update: 48

Source: Department of Environmental Quality Northern Regional Office
Telephone: 703-583-3800
Last EDR Contact: 09/06/2011
Next Scheduled EDR Contact: 12/19/2011
Data Release Frequency: No Update Planned

LUST REG WC: Leaking Underground Storage Tank List

Leaking underground storage tank site locations. Includes: counties of Alleghany, Bedford, Botetourt, Craig, Floyd, Franklin, Giles, Henry, Montgomery, Patrick, Pulaski, Roanoke; cities of Bedford, Clifton Forge, Covington, Martinsville, Radford, Roanoke, Salem.

Date of Government Version: 06/04/2015
Date Data Arrived at EDR: 06/05/2015
Date Made Active in Reports: 07/07/2015
Number of Days to Update: 32

Source: Department of Environmental Quality West Central Regional Office
Telephone: 540-562-6700
Last EDR Contact: 08/29/2016
Next Scheduled EDR Contact: 12/12/2016
Data Release Frequency: No Update Planned

LUST REG SW: Leaking Underground Storage Tank Database

Leaking underground storage tank site locations. Includes: counties of Bland, Buchanan, Carroll, Dickenson, Grayson, Lee, Russell, Scott, Smyth, Tazewell, Washington, Wise, Wythe; cities of Bristol, Galax, Norton.

Date of Government Version: 07/15/2013
Date Data Arrived at EDR: 07/18/2013
Date Made Active in Reports: 09/16/2013
Number of Days to Update: 60

Source: Department of Environmental Quality Southwest Regional Office
Telephone: 276-676-4800
Last EDR Contact: 10/11/2016
Next Scheduled EDR Contact: 01/23/2017
Data Release Frequency: No Update Planned

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Iowa, Kansas, and Nebraska

Date of Government Version: 10/12/2021
Date Data Arrived at EDR: 11/15/2021
Date Made Active in Reports: 02/08/2022
Number of Days to Update: 85

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 04/21/2022
Next Scheduled EDR Contact: 08/01/2022
Data Release Frequency: Varies

INDIAN LUST R8: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming.

Date of Government Version: 10/12/2021
Date Data Arrived at EDR: 11/15/2021
Date Made Active in Reports: 02/08/2022
Number of Days to Update: 85

Source: EPA Region 8
Telephone: 303-312-6271
Last EDR Contact: 04/21/2022
Next Scheduled EDR Contact: 08/01/2022
Data Release Frequency: Varies

INDIAN LUST R9: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Arizona, California, New Mexico and Nevada

Date of Government Version: 10/12/2021
Date Data Arrived at EDR: 11/15/2021
Date Made Active in Reports: 02/08/2022
Number of Days to Update: 85

Source: Environmental Protection Agency
Telephone: 415-972-3372
Last EDR Contact: 04/21/2022
Next Scheduled EDR Contact: 08/01/2022
Data Release Frequency: Varies

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

Date of Government Version: 10/12/2021
Date Data Arrived at EDR: 11/15/2021
Date Made Active in Reports: 02/08/2022
Number of Days to Update: 85

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 04/21/2022
Next Scheduled EDR Contact: 08/01/2022
Data Release Frequency: Varies

INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in New Mexico and Oklahoma.

Date of Government Version: 10/12/2021
Date Data Arrived at EDR: 11/15/2021
Date Made Active in Reports: 02/08/2022
Number of Days to Update: 85

Source: EPA Region 6
Telephone: 214-665-6597
Last EDR Contact: 04/21/2022
Next Scheduled EDR Contact: 08/01/2022
Data Release Frequency: Varies

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 04/28/2021
Date Data Arrived at EDR: 06/11/2021
Date Made Active in Reports: 09/07/2021
Number of Days to Update: 88

Source: EPA Region 1
Telephone: 617-918-1313
Last EDR Contact: 04/21/2022
Next Scheduled EDR Contact: 08/01/2022
Data Release Frequency: Varies

INDIAN LUST R4: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Florida, Mississippi and North Carolina.

Date of Government Version: 05/28/2021
Date Data Arrived at EDR: 06/22/2021
Date Made Active in Reports: 09/20/2021
Number of Days to Update: 90

Source: EPA Region 4
Telephone: 404-562-8677
Last EDR Contact: 04/21/2022
Next Scheduled EDR Contact: 08/01/2022
Data Release Frequency: Varies

INDIAN LUST R5: Leaking Underground Storage Tanks on Indian Land
Leaking underground storage tanks located on Indian Land in Michigan, Minnesota and Wisconsin.

Date of Government Version: 10/12/2021
Date Data Arrived at EDR: 11/15/2021
Date Made Active in Reports: 02/08/2022
Number of Days to Update: 85
Source: EPA, Region 5
Telephone: 312-886-7439
Last EDR Contact: 04/21/2022
Next Scheduled EDR Contact: 08/01/2022
Data Release Frequency: Varies

LTANKS: Leaking Petroleum Storage Tanks
Includes releases of petroleum from underground storage tanks and aboveground storage tanks.

Date of Government Version: 11/03/2021
Date Data Arrived at EDR: 11/22/2021
Date Made Active in Reports: 02/10/2022
Number of Days to Update: 80
Source: Department of Environmental Quality
Telephone: 804-698-4010
Last EDR Contact: 02/24/2022
Next Scheduled EDR Contact: 06/06/2022
Data Release Frequency: Quarterly

Lists of state and tribal registered storage tanks

FEMA UST: Underground Storage Tank Listing
A listing of all FEMA owned underground storage tanks.

Date of Government Version: 10/14/2021
Date Data Arrived at EDR: 11/05/2021
Date Made Active in Reports: 02/01/2022
Number of Days to Update: 88
Source: FEMA
Telephone: 202-646-5797
Last EDR Contact: 04/04/2022
Next Scheduled EDR Contact: 07/18/2022
Data Release Frequency: Varies

UST: Registered Petroleum Storage Tanks
Registered Underground Storage Tanks. UST's are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA) and must be registered with the state department responsible for administering the UST program. Available information varies by state program.

Date of Government Version: 11/01/2021
Date Data Arrived at EDR: 11/22/2021
Date Made Active in Reports: 02/10/2022
Number of Days to Update: 80
Source: Department of Environmental Quality
Telephone: 804-698-4010
Last EDR Contact: 02/24/2022
Next Scheduled EDR Contact: 06/06/2022
Data Release Frequency: Quarterly

AST: Registered Petroleum Storage Tanks
Registered Aboveground Storage Tanks.

Date of Government Version: 11/01/2021
Date Data Arrived at EDR: 11/22/2021
Date Made Active in Reports: 02/10/2022
Number of Days to Update: 80
Source: Department of Environmental Quality
Telephone: 804-698-4010
Last EDR Contact: 02/24/2022
Next Scheduled EDR Contact: 06/06/2022
Data Release Frequency: Quarterly

INDIAN UST R4: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 4 (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee and Tribal Nations)

Date of Government Version: 05/28/2021
Date Data Arrived at EDR: 06/22/2021
Date Made Active in Reports: 09/20/2021
Number of Days to Update: 90
Source: EPA Region 4
Telephone: 404-562-9424
Last EDR Contact: 04/21/2022
Next Scheduled EDR Contact: 08/01/2022
Data Release Frequency: Varies

INDIAN UST R6: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 6 (Louisiana, Arkansas, Oklahoma, New Mexico, Texas and 65 Tribes).

Date of Government Version: 10/12/2021
Date Data Arrived at EDR: 11/15/2021
Date Made Active in Reports: 02/08/2022
Number of Days to Update: 85

Source: EPA Region 6
Telephone: 214-665-7591
Last EDR Contact: 04/21/2022
Next Scheduled EDR Contact: 08/01/2022
Data Release Frequency: Varies

INDIAN UST R5: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 5 (Michigan, Minnesota and Wisconsin and Tribal Nations).

Date of Government Version: 04/06/2021
Date Data Arrived at EDR: 06/11/2021
Date Made Active in Reports: 09/07/2021
Number of Days to Update: 88

Source: EPA Region 5
Telephone: 312-886-6136
Last EDR Contact: 04/21/2022
Next Scheduled EDR Contact: 08/01/2022
Data Release Frequency: Varies

INDIAN UST R1: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 1 (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont and ten Tribal Nations).

Date of Government Version: 10/14/2021
Date Data Arrived at EDR: 11/15/2021
Date Made Active in Reports: 02/08/2022
Number of Days to Update: 85

Source: EPA, Region 1
Telephone: 617-918-1313
Last EDR Contact: 04/21/2022
Next Scheduled EDR Contact: 08/01/2022
Data Release Frequency: Varies

INDIAN UST R10: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 10 (Alaska, Idaho, Oregon, Washington, and Tribal Nations).

Date of Government Version: 10/12/2021
Date Data Arrived at EDR: 11/15/2021
Date Made Active in Reports: 02/08/2022
Number of Days to Update: 85

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 04/21/2022
Next Scheduled EDR Contact: 08/01/2022
Data Release Frequency: Varies

INDIAN UST R7: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 7 (Iowa, Kansas, Missouri, Nebraska, and 9 Tribal Nations).

Date of Government Version: 10/12/2021
Date Data Arrived at EDR: 11/15/2021
Date Made Active in Reports: 02/08/2022
Number of Days to Update: 85

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 04/21/2022
Next Scheduled EDR Contact: 08/01/2022
Data Release Frequency: Varies

INDIAN UST R8: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 8 (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming and 27 Tribal Nations).

Date of Government Version: 10/12/2021
Date Data Arrived at EDR: 11/15/2021
Date Made Active in Reports: 02/08/2022
Number of Days to Update: 85

Source: EPA Region 8
Telephone: 303-312-6137
Last EDR Contact: 04/21/2022
Next Scheduled EDR Contact: 08/01/2022
Data Release Frequency: Varies

INDIAN UST R9: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 9 (Arizona, California, Hawaii, Nevada, the Pacific Islands, and Tribal Nations).

Date of Government Version: 10/12/2021
Date Data Arrived at EDR: 11/15/2021
Date Made Active in Reports: 02/08/2022
Number of Days to Update: 85

Source: EPA Region 9
Telephone: 415-972-3368
Last EDR Contact: 04/21/2022
Next Scheduled EDR Contact: 08/01/2022
Data Release Frequency: Varies

State and tribal institutional control / engineering control registries

ENG CONTROLS: Engineering Controls Sites Listing

A listing of sites with Engineering Controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 12/28/2021
Date Data Arrived at EDR: 01/05/2022
Date Made Active in Reports: 03/21/2022
Number of Days to Update: 75

Source: Department of Environmental Quality
Telephone: 804-698-4228
Last EDR Contact: 04/04/2022
Next Scheduled EDR Contact: 07/18/2022
Data Release Frequency: Quarterly

INST CONTROL: Voluntary Remediation Program Database

Sites included in the Voluntary Remediation Program database that have deed restrictions.

Date of Government Version: 12/28/2021
Date Data Arrived at EDR: 01/05/2022
Date Made Active in Reports: 03/21/2022
Number of Days to Update: 75

Source: Department of Environmental Quality
Telephone: 804-698-4228
Last EDR Contact: 04/04/2022
Next Scheduled EDR Contact: 07/18/2022
Data Release Frequency: Quarterly

Lists of state and tribal voluntary cleanup sites

INDIAN VCP R7: Voluntary Cleanup Priority Lisitng

A listing of voluntary cleanup priority sites located on Indian Land located in Region 7.

Date of Government Version: 03/20/2008
Date Data Arrived at EDR: 04/22/2008
Date Made Active in Reports: 05/19/2008
Number of Days to Update: 27

Source: EPA, Region 7
Telephone: 913-551-7365
Last EDR Contact: 07/08/2021
Next Scheduled EDR Contact: 07/20/2009
Data Release Frequency: Varies

VRP: Voluntary Remediation Program

The Voluntary Cleanup Program encourages owners of elected contaminated sites to take the initiative and conduct voluntary cleanups that meet state environmental standards.

Date of Government Version: 12/28/2021
Date Data Arrived at EDR: 01/05/2022
Date Made Active in Reports: 03/21/2022
Number of Days to Update: 75

Source: Department of Environmental Quality
Telephone: 804-698-4228
Last EDR Contact: 04/04/2022
Next Scheduled EDR Contact: 07/18/2022
Data Release Frequency: Quarterly

INDIAN VCP R1: Voluntary Cleanup Priority Listing

A listing of voluntary cleanup priority sites located on Indian Land located in Region 1.

Date of Government Version: 07/27/2015
Date Data Arrived at EDR: 09/29/2015
Date Made Active in Reports: 02/18/2016
Number of Days to Update: 142

Source: EPA, Region 1
Telephone: 617-918-1102
Last EDR Contact: 03/16/2022
Next Scheduled EDR Contact: 07/04/2022
Data Release Frequency: Varies

Lists of state and tribal brownfield sites

BROWNFIELDS: Brownfields Site Specific Assessments

To qualify for Brownfields Assessment, the site must meet the Federal definition of a Brownfields and should have contaminant issues that need to be addressed and a redevelopment plan supported by the local government and community. Virginia's Department of Environmental Quality performs brownfields assessments under a cooperative agreement with the U.S. Environmental Protection Agency at no cost to communities, property owners or, prospective purchasers. The assessment is an evaluation of environmental impacts caused by previous site uses similar to a Phase II Environmental Assessment.

Date of Government Version: 01/19/2022
Date Data Arrived at EDR: 01/20/2022
Date Made Active in Reports: 04/13/2022
Number of Days to Update: 83

Source: Department of Environmental Quality
Telephone: 804-698-4207
Last EDR Contact: 04/20/2022
Next Scheduled EDR Contact: 08/01/2022
Data Release Frequency: Quarterly

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS: A Listing of Brownfields Sites

Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties takes development pressures off of undeveloped, open land, and both improves and protects the environment. Assessment, Cleanup and Redevelopment Exchange System (ACRES) stores information reported by EPA Brownfields grant recipients on brownfields properties assessed or cleaned up with grant funding as well as information on Targeted Brownfields Assessments performed by EPA Regions. A listing of ACRES Brownfield sites is obtained from Cleanups in My Community. Cleanups in My Community provides information on Brownfields properties for which information is reported back to EPA, as well as areas served by Brownfields grant programs.

Date of Government Version: 02/23/2022
Date Data Arrived at EDR: 03/10/2022
Date Made Active in Reports: 03/10/2022
Number of Days to Update: 0

Source: Environmental Protection Agency
Telephone: 202-566-2777
Last EDR Contact: 03/15/2022
Next Scheduled EDR Contact: 06/27/2022
Data Release Frequency: Semi-Annually

Local Lists of Landfill / Solid Waste Disposal Sites

INDIAN ODI: Report on the Status of Open Dumps on Indian Lands

Location of open dumps on Indian land.

Date of Government Version: 12/31/1998
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 52

Source: Environmental Protection Agency
Telephone: 703-308-8245
Last EDR Contact: 04/21/2022
Next Scheduled EDR Contact: 08/08/2022
Data Release Frequency: Varies

ODI: Open Dump Inventory

An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.

Date of Government Version: 06/30/1985
Date Data Arrived at EDR: 08/09/2004
Date Made Active in Reports: 09/17/2004
Number of Days to Update: 39

Source: Environmental Protection Agency
Telephone: 800-424-9346
Last EDR Contact: 06/09/2004
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

DEBRIS REGION 9: Torres Martinez Reservation Illegal Dump Site Locations

A listing of illegal dump sites location on the Torres Martinez Indian Reservation located in eastern Riverside County and northern Imperial County, California.

Date of Government Version: 01/12/2009
Date Data Arrived at EDR: 05/07/2009
Date Made Active in Reports: 09/21/2009
Number of Days to Update: 137

Source: EPA, Region 9
Telephone: 415-947-4219
Last EDR Contact: 04/14/2022
Next Scheduled EDR Contact: 08/01/2022
Data Release Frequency: No Update Planned

IHS OPEN DUMPS: Open Dumps on Indian Land

A listing of all open dumps located on Indian Land in the United States.

Date of Government Version: 04/01/2014
Date Data Arrived at EDR: 08/06/2014
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 176

Source: Department of Health & Human Serivces, Indian Health Service
Telephone: 301-443-1452
Last EDR Contact: 04/28/2022
Next Scheduled EDR Contact: 08/08/2022
Data Release Frequency: Varies

Local Lists of Hazardous waste / Contaminated Sites

US HIST CDL: National Clandestine Laboratory Register

A listing of clandestine drug lab locations that have been removed from the DEAs National Clandestine Laboratory Register.

Date of Government Version: 11/16/2021
Date Data Arrived at EDR: 11/18/2021
Date Made Active in Reports: 02/08/2022
Number of Days to Update: 82

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 02/23/2022
Next Scheduled EDR Contact: 06/06/2022
Data Release Frequency: No Update Planned

US CDL: Clandestine Drug Labs

A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 11/16/2021
Date Data Arrived at EDR: 11/18/2021
Date Made Active in Reports: 02/08/2022
Number of Days to Update: 82

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 02/23/2022
Next Scheduled EDR Contact: 06/06/2022
Data Release Frequency: Quarterly

PFAS: Per- and Polyfluoroalkyl Substances

PFOS and PFOA stand for perfluorooctane sulfonate and perfluorooctanoic acid, respectively. Both are fluorinated organic chemicals, part of a larger family of compounds referred to as perfluoroalkyl substances (PFASs).

Date of Government Version: 11/19/2021
Date Data Arrived at EDR: 01/06/2022
Date Made Active in Reports: 03/21/2022
Number of Days to Update: 74

Source: Department of Environmental Quality
Telephone: 804-698-4336
Last EDR Contact: 04/04/2022
Next Scheduled EDR Contact: 07/18/2022
Data Release Frequency: Varies

Local Land Records

LIENS 2: CERCLA Lien Information

A Federal CERCLA ('Superfund') lien can exist by operation of law at any site or property at which EPA has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties.

Date of Government Version: 01/25/2022
Date Data Arrived at EDR: 02/03/2022
Date Made Active in Reports: 02/22/2022
Number of Days to Update: 19

Source: Environmental Protection Agency
Telephone: 202-564-6023
Last EDR Contact: 05/05/2022
Next Scheduled EDR Contact: 07/11/2022
Data Release Frequency: Semi-Annually

Records of Emergency Release Reports

HMIRS: Hazardous Materials Information Reporting System
Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 12/15/2021
Date Data Arrived at EDR: 12/16/2021
Date Made Active in Reports: 03/10/2022
Number of Days to Update: 84
Source: U.S. Department of Transportation
Telephone: 202-366-4555
Last EDR Contact: 03/21/2022
Next Scheduled EDR Contact: 07/04/2022
Data Release Frequency: Quarterly

SPILLS BRL: Prep/Spills Database Listing
A listing of spills locations located in the Blue Ridge Regional area, Lynchburg.

Date of Government Version: 09/18/2009
Date Data Arrived at EDR: 09/18/2009
Date Made Active in Reports: 10/06/2009
Number of Days to Update: 18
Source: DEQ, Blue Ridge Regional Office
Telephone: 434-582-6218
Last EDR Contact: 11/28/2011
Next Scheduled EDR Contact: 03/12/2012
Data Release Frequency: Varies

SPILLS VA: PREP Database
The Department of Environmental Quality's POLLUTION RESPONSE PROGRAM, known as PREP, provides for responses to air, water, and waste pollution incidents in order to protect human health and the environment.

Date of Government Version: 08/08/2012
Date Data Arrived at EDR: 08/09/2012
Date Made Active in Reports: 10/05/2012
Number of Days to Update: 57
Source: Department of Environmental Quality, Valley Regional Office
Telephone: 540-574-7800
Last EDR Contact: 05/06/2013
Next Scheduled EDR Contact: 08/19/2013
Data Release Frequency: Quarterly

SPILLS TD: PREP Database
The Department of Environmental Quality's POLLUTION RESPONSE PROGRAM, known as PREP, provides for responses to air, water, and waste pollution incidents in order to protect human health and the environment.

Date of Government Version: 09/17/2009
Date Data Arrived at EDR: 09/23/2009
Date Made Active in Reports: 10/06/2009
Number of Days to Update: 13
Source: Department of Environmental Quality, Tidewater Region
Telephone: trofoia@deq.vir
Last EDR Contact: 09/06/2011
Next Scheduled EDR Contact: 12/19/2011
Data Release Frequency: Quarterly

SPILLS: Prep/Spills Database Listing
The Department of Environmental Quality's POLLUTION RESPONSE PROGRAM, known as PREP, provides for responses to air, water, and waste pollution incidents in order to protect human health and the environment. PREP staff often work to assist local emergency responders, other state agencies, federal agencies, and responsible parties, as may be needed, to manage pollution incidents. Oil spills, fish kills, and hazardous materials spills are examples of incidents that may involve the DEQ's PREP Program.

Date of Government Version: 08/02/2021
Date Data Arrived at EDR: 08/24/2021
Date Made Active in Reports: 11/17/2021
Number of Days to Update: 85
Source: Department of Environmental Quality
Telephone: 804-698-4287
Last EDR Contact: 02/10/2022
Next Scheduled EDR Contact: 06/06/2022
Data Release Frequency: Quarterly

SPILLS SW: Reportable Spills
The Department of Environmental Quality's POLLUTION RESPONSE PROGRAM, known as PREP, provides for responses to air, water, and waste pollution incidents in order to protect human health and the environment.

Date of Government Version: 01/21/2010
Date Data Arrived at EDR: 01/22/2010
Date Made Active in Reports: 02/16/2010
Number of Days to Update: 25
Source: Department of Environmental Quality, Southwest Region
Telephone: 276-676-4839
Last EDR Contact: 07/13/2012
Next Scheduled EDR Contact: 10/29/2012
Data Release Frequency: No Update Planned

SPILLS PD: PREP Database

The Department of Environmental Quality's POLLUTION RESPONSE PROGRAM, known as PREP, provides for responses to air, water, and waste pollution incidents in order to protect human health and the environment.

Date of Government Version: 10/20/2009
Date Data Arrived at EDR: 10/29/2009
Date Made Active in Reports: 12/03/2009
Number of Days to Update: 35

Source: Department of Environmental Quality, Piedmont Region
Telephone: 804-527-5020
Last EDR Contact: 02/06/2012
Next Scheduled EDR Contact: 05/21/2012
Data Release Frequency: Quarterly

SPILLS NO: PREP Database

The Department of Environmental Quality's POLLUTION RESPONSE PROGRAM, known as PREP, provides for responses to air, water, and waste pollution incidents in order to protect human health and the environment.

Date of Government Version: 09/23/2009
Date Data Arrived at EDR: 09/29/2009
Date Made Active in Reports: 10/30/2009
Number of Days to Update: 31

Source: Department of Environmental Quality, Northern Region
Telephone: 703-583-3864
Last EDR Contact: 09/06/2011
Next Scheduled EDR Contact: 12/19/2011
Data Release Frequency: No Update Planned

SPILLS PC: Pollution Complaint Database

Pollution Complaints Database. The pollution reports contained in the PC database include the initial release reporting of Leaking Underground Storage Tanks and all other releases of petroleum to the environment as well as releases to state waters. The database is current through 12/1/93. Since that time, all spill and pollution reporting information has been collected and tracked through the DEQ regional offices.

Date of Government Version: 06/01/1996
Date Data Arrived at EDR: 10/22/1996
Date Made Active in Reports: 11/21/1996
Number of Days to Update: 30

Source: Department of Environmental Quality
Telephone: 804-698-4287
Last EDR Contact: 03/08/2010
Next Scheduled EDR Contact: 06/21/2010
Data Release Frequency: No Update Planned

SPILLS WC: Prep Database

The Department of Environmental Quality's POLLUTION RESPONSE PROGRAM, known as PREP, provides for responses to air, water, and waste pollution incidents in order to protect human health and the environment.

Date of Government Version: 09/21/2009
Date Data Arrived at EDR: 09/29/2009
Date Made Active in Reports: 10/30/2009
Number of Days to Update: 31

Source: Department of Environmental Quality, West Central Region
Telephone: 540-562-6700
Last EDR Contact: 09/06/2011
Next Scheduled EDR Contact: 12/19/2011
Data Release Frequency: No Update Planned

SPILLS 90: SPILLS90 data from FirstSearch

Spills 90 includes those spill and release records available exclusively from FirstSearch databases. Typically, they may include chemical, oil and/or hazardous substance spills recorded after 1990. Duplicate records that are already included in EDR incident and release records are not included in Spills 90.

Date of Government Version: 09/01/2012
Date Data Arrived at EDR: 01/03/2013
Date Made Active in Reports: 02/15/2013
Number of Days to Update: 43

Source: FirstSearch
Telephone: N/A
Last EDR Contact: 01/03/2013
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

Other Ascertainable Records

RCRA NonGen / NLR: RCRA - Non Generators / No Longer Regulated

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

Date of Government Version: 02/28/2022
Date Data Arrived at EDR: 03/02/2022
Date Made Active in Reports: 03/17/2022
Number of Days to Update: 15
Source: Environmental Protection Agency
Telephone: 800-438-2474
Last EDR Contact: 04/06/2022
Next Scheduled EDR Contact: 07/04/2022
Data Release Frequency: Quarterly

FUDS: Formerly Used Defense Sites

The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

Date of Government Version: 10/26/2021
Date Data Arrived at EDR: 11/16/2021
Date Made Active in Reports: 02/08/2022
Number of Days to Update: 84
Source: U.S. Army Corps of Engineers
Telephone: 202-528-4285
Last EDR Contact: 02/15/2022
Next Scheduled EDR Contact: 05/30/2022
Data Release Frequency: Varies

DOD: Department of Defense Sites

This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Date of Government Version: 06/07/2021
Date Data Arrived at EDR: 07/13/2021
Date Made Active in Reports: 03/09/2022
Number of Days to Update: 239
Source: USGS
Telephone: 888-275-8747
Last EDR Contact: 04/12/2022
Next Scheduled EDR Contact: 07/25/2022
Data Release Frequency: Varies

FEDLAND: Federal and Indian Lands

Federally and Indian administrated lands of the United States. Lands included are administrated by: Army Corps of Engineers, Bureau of Reclamation, National Wild and Scenic River, National Wildlife Refuge, Public Domain Land, Wilderness, Wilderness Study Area, Wildlife Management Area, Bureau of Indian Affairs, Bureau of Land Management, Department of Justice, Forest Service, Fish and Wildlife Service, National Park Service.

Date of Government Version: 04/02/2018
Date Data Arrived at EDR: 04/11/2018
Date Made Active in Reports: 11/06/2019
Number of Days to Update: 574
Source: U.S. Geological Survey
Telephone: 888-275-8747
Last EDR Contact: 04/05/2022
Next Scheduled EDR Contact: 07/18/2022
Data Release Frequency: N/A

SCRD DRYCLEANERS: State Coalition for Remediation of Drycleaners Listing

The State Coalition for Remediation of Drycleaners was established in 1998, with support from the U.S. EPA Office of Superfund Remediation and Technology Innovation. It is comprised of representatives of states with established drycleaner remediation programs. Currently the member states are Alabama, Connecticut, Florida, Illinois, Kansas, Minnesota, Missouri, North Carolina, Oregon, South Carolina, Tennessee, Texas, and Wisconsin.

Date of Government Version: 01/01/2017
Date Data Arrived at EDR: 02/03/2017
Date Made Active in Reports: 04/07/2017
Number of Days to Update: 63
Source: Environmental Protection Agency
Telephone: 615-532-8599
Last EDR Contact: 02/08/2022
Next Scheduled EDR Contact: 05/23/2022
Data Release Frequency: Varies

US FIN ASSUR: Financial Assurance Information

All owners and operators of facilities that treat, store, or dispose of hazardous waste are required to provide proof that they will have sufficient funds to pay for the clean up, closure, and post-closure care of their facilities.

Date of Government Version: 12/13/2021
Date Data Arrived at EDR: 12/17/2021
Date Made Active in Reports: 03/17/2022
Number of Days to Update: 90
Source: Environmental Protection Agency
Telephone: 202-566-1917
Last EDR Contact: 03/21/2022
Next Scheduled EDR Contact: 07/04/2022
Data Release Frequency: Quarterly

EPA WATCH LIST: EPA WATCH LIST

EPA maintains a "Watch List" to facilitate dialogue between EPA, state and local environmental agencies on enforcement matters relating to facilities with alleged violations identified as either significant or high priority. Being on the Watch List does not mean that the facility has actually violated the law only that an investigation by EPA or a state or local environmental agency has led those organizations to allege that an unproven violation has in fact occurred. Being on the Watch List does not represent a higher level of concern regarding the alleged violations that were detected, but instead indicates cases requiring additional dialogue between EPA, state and local agencies - primarily because of the length of time the alleged violation has gone unaddressed or unresolved.

Date of Government Version: 08/30/2013
Date Data Arrived at EDR: 03/21/2014
Date Made Active in Reports: 06/17/2014
Number of Days to Update: 88

Source: Environmental Protection Agency
Telephone: 617-520-3000
Last EDR Contact: 04/28/2022
Next Scheduled EDR Contact: 08/15/2022
Data Release Frequency: Quarterly

2020 COR ACTION: 2020 Corrective Action Program List

The EPA has set ambitious goals for the RCRA Corrective Action program by creating the 2020 Corrective Action Universe. This RCRA cleanup baseline includes facilities expected to need corrective action. The 2020 universe contains a wide variety of sites. Some properties are heavily contaminated while others were contaminated but have since been cleaned up. Still others have not been fully investigated yet, and may require little or no remediation. Inclusion in the 2020 Universe does not necessarily imply failure on the part of a facility to meet its RCRA obligations.

Date of Government Version: 09/30/2017
Date Data Arrived at EDR: 05/08/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 73

Source: Environmental Protection Agency
Telephone: 703-308-4044
Last EDR Contact: 02/03/2022
Next Scheduled EDR Contact: 05/16/2022
Data Release Frequency: Varies

TSCA: Toxic Substances Control Act

Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/2016
Date Data Arrived at EDR: 06/17/2020
Date Made Active in Reports: 09/10/2020
Number of Days to Update: 85

Source: EPA
Telephone: 202-260-5521
Last EDR Contact: 03/18/2022
Next Scheduled EDR Contact: 06/27/2022
Data Release Frequency: Every 4 Years

TRIS: Toxic Chemical Release Inventory System

Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/2018
Date Data Arrived at EDR: 08/14/2020
Date Made Active in Reports: 11/04/2020
Number of Days to Update: 82

Source: EPA
Telephone: 202-566-0250
Last EDR Contact: 02/18/2022
Next Scheduled EDR Contact: 05/30/2022
Data Release Frequency: Annually

SSTS: Section 7 Tracking Systems

Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 01/19/2022
Date Data Arrived at EDR: 01/19/2022
Date Made Active in Reports: 04/11/2022
Number of Days to Update: 82

Source: EPA
Telephone: 202-564-4203
Last EDR Contact: 04/20/2022
Next Scheduled EDR Contact: 08/01/2022
Data Release Frequency: Annually

ROD: Records Of Decision

Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 01/25/2022
Date Data Arrived at EDR: 02/03/2022
Date Made Active in Reports: 02/22/2022
Number of Days to Update: 19

Source: EPA
Telephone: 703-416-0223
Last EDR Contact: 05/05/2022
Next Scheduled EDR Contact: 06/13/2022
Data Release Frequency: Annually

RMP: Risk Management Plans

When Congress passed the Clean Air Act Amendments of 1990, it required EPA to publish regulations and guidance for chemical accident prevention at facilities using extremely hazardous substances. The Risk Management Program Rule (RMP Rule) was written to implement Section 112(r) of these amendments. The rule, which built upon existing industry codes and standards, requires companies of all sizes that use certain flammable and toxic substances to develop a Risk Management Program, which includes a(n): Hazard assessment that details the potential effects of an accidental release, an accident history of the last five years, and an evaluation of worst-case and alternative accidental releases; Prevention program that includes safety precautions and maintenance, monitoring, and employee training measures; and Emergency response program that spells out emergency health care, employee training measures and procedures for informing the public and response agencies (e.g the fire department) should an accident occur.

Date of Government Version: 10/20/2021
Date Data Arrived at EDR: 11/05/2021
Date Made Active in Reports: 11/12/2021
Number of Days to Update: 7

Source: Environmental Protection Agency
Telephone: 202-564-8600
Last EDR Contact: 04/18/2022
Next Scheduled EDR Contact: 08/01/2022
Data Release Frequency: Varies

RAATS: RCRA Administrative Action Tracking System

RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/1995
Date Data Arrived at EDR: 07/03/1995
Date Made Active in Reports: 08/07/1995
Number of Days to Update: 35

Source: EPA
Telephone: 202-564-4104
Last EDR Contact: 06/02/2008
Next Scheduled EDR Contact: 09/01/2008
Data Release Frequency: No Update Planned

PRP: Potentially Responsible Parties

A listing of verified Potentially Responsible Parties

Date of Government Version: 01/25/2022
Date Data Arrived at EDR: 02/03/2022
Date Made Active in Reports: 02/25/2022
Number of Days to Update: 22

Source: EPA
Telephone: 202-564-6023
Last EDR Contact: 05/05/2022
Next Scheduled EDR Contact: 08/15/2022
Data Release Frequency: Quarterly

PADS: PCB Activity Database System

PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 01/20/2022
Date Data Arrived at EDR: 01/20/2022
Date Made Active in Reports: 03/25/2022
Number of Days to Update: 64

Source: EPA
Telephone: 202-566-0500
Last EDR Contact: 04/08/2022
Next Scheduled EDR Contact: 07/18/2022
Data Release Frequency: Annually

ICIS: Integrated Compliance Information System

The Integrated Compliance Information System (ICIS) supports the information needs of the national enforcement and compliance program as well as the unique needs of the National Pollutant Discharge Elimination System (NPDES) program.

Date of Government Version: 11/18/2016
Date Data Arrived at EDR: 11/23/2016
Date Made Active in Reports: 02/10/2017
Number of Days to Update: 79

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 03/31/2022
Next Scheduled EDR Contact: 07/18/2022
Data Release Frequency: Quarterly

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Telephone: 202-566-1667
Last EDR Contact: 08/18/2017
Next Scheduled EDR Contact: 12/04/2017
Data Release Frequency: No Update Planned

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

A listing of FIFRA/TSCA Tracking System (FTTS) inspections and enforcements.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA
Telephone: 202-566-1667
Last EDR Contact: 08/18/2017
Next Scheduled EDR Contact: 12/04/2017
Data Release Frequency: No Update Planned

MLTS: Material Licensing Tracking System

MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 07/29/2021
Date Data Arrived at EDR: 08/24/2021
Date Made Active in Reports: 11/19/2021
Number of Days to Update: 87

Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
Last EDR Contact: 04/18/2022
Next Scheduled EDR Contact: 08/01/2022
Data Release Frequency: Quarterly

COAL ASH DOE: Steam-Electric Plant Operation Data

A listing of power plants that store ash in surface ponds.

Date of Government Version: 12/31/2020
Date Data Arrived at EDR: 11/30/2021
Date Made Active in Reports: 02/22/2022
Number of Days to Update: 84

Source: Department of Energy
Telephone: 202-586-8719
Last EDR Contact: 02/28/2022
Next Scheduled EDR Contact: 06/13/2022
Data Release Frequency: Varies

COAL ASH EPA: Coal Combustion Residues Surface Impoundments List

A listing of coal combustion residues surface impoundments with high hazard potential ratings.

Date of Government Version: 01/12/2017
Date Data Arrived at EDR: 03/05/2019
Date Made Active in Reports: 11/11/2019
Number of Days to Update: 251

Source: Environmental Protection Agency
Telephone: N/A
Last EDR Contact: 02/28/2022
Next Scheduled EDR Contact: 06/13/2022
Data Release Frequency: Varies

PCB TRANSFORMER: PCB Transformer Registration Database
The database of PCB transformer registrations that includes all PCB registration submittals.

Date of Government Version: 09/13/2019
Date Data Arrived at EDR: 11/06/2019
Date Made Active in Reports: 02/10/2020
Number of Days to Update: 96
Source: Environmental Protection Agency
Telephone: 202-566-0517
Last EDR Contact: 02/04/2022
Next Scheduled EDR Contact: 05/16/2022
Data Release Frequency: Varies

RADINFO: Radiation Information Database
The Radiation Information Database (RADINFO) contains information about facilities that are regulated by U.S. Environmental Protection Agency (EPA) regulations for radiation and radioactivity.

Date of Government Version: 07/01/2019
Date Data Arrived at EDR: 07/01/2019
Date Made Active in Reports: 09/23/2019
Number of Days to Update: 84
Source: Environmental Protection Agency
Telephone: 202-343-9775
Last EDR Contact: 03/28/2022
Next Scheduled EDR Contact: 07/11/2022
Data Release Frequency: Quarterly

HIST FTTS: FIFRA/TSCA Tracking System Administrative Case Listing
A complete administrative case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40
Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2007
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

HIST FTTS INSP: FIFRA/TSCA Tracking System Inspection & Enforcement Case Listing
A complete inspection and enforcement case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40
Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2008
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

DOT OPS: Incident and Accident Data
Department of Transporation, Office of Pipeline Safety Incident and Accident data.

Date of Government Version: 01/02/2020
Date Data Arrived at EDR: 01/28/2020
Date Made Active in Reports: 04/17/2020
Number of Days to Update: 80
Source: Department of Transporation, Office of Pipeline Safety
Telephone: 202-366-4595
Last EDR Contact: 04/26/2022
Next Scheduled EDR Contact: 08/08/2022
Data Release Frequency: Quarterly

CONSENT: Superfund (CERCLA) Consent Decrees
Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: 12/31/2021
Date Data Arrived at EDR: 01/14/2022
Date Made Active in Reports: 03/25/2022
Number of Days to Update: 70

Source: Department of Justice, Consent Decree Library
Telephone: Varies
Last EDR Contact: 04/04/2022
Next Scheduled EDR Contact: 07/18/2022
Data Release Frequency: Varies

BRS: Biennial Reporting System

The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/2019
Date Data Arrived at EDR: 03/02/2022
Date Made Active in Reports: 03/25/2022
Number of Days to Update: 23

Source: EPA/NTIS
Telephone: 800-424-9346
Last EDR Contact: 03/02/2022
Next Scheduled EDR Contact: 07/04/2022
Data Release Frequency: Biennially

INDIAN RESERV: Indian Reservations

This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 07/14/2015
Date Made Active in Reports: 01/10/2017
Number of Days to Update: 546

Source: USGS
Telephone: 202-208-3710
Last EDR Contact: 04/05/2022
Next Scheduled EDR Contact: 07/18/2022
Data Release Frequency: Semi-Annually

FUSRAP: Formerly Utilized Sites Remedial Action Program

DOE established the Formerly Utilized Sites Remedial Action Program (FUSRAP) in 1974 to remediate sites where radioactive contamination remained from Manhattan Project and early U.S. Atomic Energy Commission (AEC) operations.

Date of Government Version: 07/26/2021
Date Data Arrived at EDR: 07/27/2021
Date Made Active in Reports: 10/22/2021
Number of Days to Update: 87

Source: Department of Energy
Telephone: 202-586-3559
Last EDR Contact: 04/28/2022
Next Scheduled EDR Contact: 08/15/2022
Data Release Frequency: Varies

UMTRA: Uranium Mill Tailings Sites

Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized.

Date of Government Version: 08/30/2019
Date Data Arrived at EDR: 11/15/2019
Date Made Active in Reports: 01/28/2020
Number of Days to Update: 74

Source: Department of Energy
Telephone: 505-845-0011
Last EDR Contact: 02/17/2022
Next Scheduled EDR Contact: 05/30/2022
Data Release Frequency: Varies

LEAD SMELTER 1: Lead Smelter Sites

A listing of former lead smelter site locations.

Date of Government Version: 01/25/2022
Date Data Arrived at EDR: 02/03/2022
Date Made Active in Reports: 02/22/2022
Number of Days to Update: 19

Source: Environmental Protection Agency
Telephone: 703-603-8787
Last EDR Contact: 05/05/2022
Next Scheduled EDR Contact: 07/11/2022
Data Release Frequency: Varies

LEAD SMELTER 2: Lead Smelter Sites

A list of several hundred sites in the U.S. where secondary lead smelting was done from 1931and 1964. These sites may pose a threat to public health through ingestion or inhalation of contaminated soil or dust

Date of Government Version: 04/05/2001
Date Data Arrived at EDR: 10/27/2010
Date Made Active in Reports: 12/02/2010
Number of Days to Update: 36

Source: American Journal of Public Health
Telephone: 703-305-6451
Last EDR Contact: 12/02/2009
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

US AIRS (AFS): Aerometric Information Retrieval System Facility Subsystem (AFS)

The database is a sub-system of Aerometric Information Retrieval System (AIRS). AFS contains compliance data on air pollution point sources regulated by the U.S. EPA and/or state and local air regulatory agencies. This information comes from source reports by various stationary sources of air pollution, such as electric power plants, steel mills, factories, and universities, and provides information about the air pollutants they produce. Action, air program, air program pollutant, and general level plant data. It is used to track emissions and compliance data from industrial plants.

Date of Government Version: 10/12/2016
Date Data Arrived at EDR: 10/26/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 100

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 09/26/2017
Next Scheduled EDR Contact: 01/08/2018
Data Release Frequency: Annually

US AIRS MINOR: Air Facility System Data

A listing of minor source facilities.

Date of Government Version: 10/12/2016
Date Data Arrived at EDR: 10/26/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 100

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 09/26/2017
Next Scheduled EDR Contact: 01/08/2018
Data Release Frequency: Annually

MINES VIOLATIONS: MSHA Violation Assessment Data

Mines violation and assessment information. Department of Labor, Mine Safety & Health Administration.

Date of Government Version: 03/21/2022
Date Data Arrived at EDR: 03/22/2022
Date Made Active in Reports: 03/25/2022
Number of Days to Update: 3

Source: DOL, Mine Safety & Health Admi
Telephone: 202-693-9424
Last EDR Contact: 03/14/2022
Next Scheduled EDR Contact: 06/13/2022
Data Release Frequency: Quarterly

US MINES: Mines Master Index File

Contains all mine identification numbers issued for mines active or opened since 1971. The data also includes violation information.

Date of Government Version: 11/02/2021
Date Data Arrived at EDR: 11/22/2021
Date Made Active in Reports: 02/14/2022
Number of Days to Update: 84

Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959
Last EDR Contact: 02/23/2022
Next Scheduled EDR Contact: 06/06/2022
Data Release Frequency: Semi-Annually

US MINES 2: Ferrous and Nonferrous Metal Mines Database Listing

This map layer includes ferrous (ferrous metal mines are facilities that extract ferrous metals, such as iron ore or molybdenum) and nonferrous (Nonferrous metal mines are facilities that extract nonferrous metals, such as gold, silver, copper, zinc, and lead) metal mines in the United States.

Date of Government Version: 05/06/2020
Date Data Arrived at EDR: 05/27/2020
Date Made Active in Reports: 08/13/2020
Number of Days to Update: 78

Source: USGS
Telephone: 703-648-7709
Last EDR Contact: 02/24/2022
Next Scheduled EDR Contact: 06/06/2022
Data Release Frequency: Varies

US MINES 3: Active Mines & Mineral Plants Database Listing

Active Mines and Mineral Processing Plant operations for commodities monitored by the Minerals Information Team of the USGS.

Date of Government Version: 04/14/2011
Date Data Arrived at EDR: 06/08/2011
Date Made Active in Reports: 09/13/2011
Number of Days to Update: 97

Source: USGS
Telephone: 703-648-7709
Last EDR Contact: 02/24/2022
Next Scheduled EDR Contact: 06/06/2022
Data Release Frequency: Varies

ABANDONED MINES: Abandoned Mines

An inventory of land and water impacted by past mining (primarily coal mining) is maintained by OSMRE to provide information needed to implement the Surface Mining Control and Reclamation Act of 1977 (SMCRA). The inventory contains information on the location, type, and extent of AML impacts, as well as, information on the cost associated with the reclamation of those problems. The inventory is based upon field surveys by State, Tribal, and OSMRE program officials. It is dynamic to the extent that it is modified as new problems are identified and existing problems are reclaimed.

Date of Government Version: 12/14/2021
Date Data Arrived at EDR: 12/15/2021
Date Made Active in Reports: 03/10/2022
Number of Days to Update: 85

Source: Department of Interior
Telephone: 202-208-2609
Last EDR Contact: 03/04/2022
Next Scheduled EDR Contact: 06/20/2022
Data Release Frequency: Quarterly

FINDS: Facility Index System/Facility Registry System

Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 11/04/2021
Date Data Arrived at EDR: 11/22/2021
Date Made Active in Reports: 02/25/2022
Number of Days to Update: 95

Source: EPA
Telephone: (215) 814-5000
Last EDR Contact: 02/28/2022
Next Scheduled EDR Contact: 06/13/2022
Data Release Frequency: Quarterly

ECHO: Enforcement & Compliance History Information

ECHO provides integrated compliance and enforcement information for about 800,000 regulated facilities nationwide.

Date of Government Version: 01/01/2022
Date Data Arrived at EDR: 01/04/2022
Date Made Active in Reports: 01/10/2022
Number of Days to Update: 6

Source: Environmental Protection Agency
Telephone: 202-564-2280
Last EDR Contact: 04/05/2022
Next Scheduled EDR Contact: 07/18/2022
Data Release Frequency: Quarterly

DOCKET HWC: Hazardous Waste Compliance Docket Listing

A complete list of the Federal Agency Hazardous Waste Compliance Docket Facilities.

Date of Government Version: 05/06/2021
Date Data Arrived at EDR: 05/21/2021
Date Made Active in Reports: 08/11/2021
Number of Days to Update: 82

Source: Environmental Protection Agency
Telephone: 202-564-0527
Last EDR Contact: 02/22/2022
Next Scheduled EDR Contact: 06/06/2022
Data Release Frequency: Varies

UXO: Unexploded Ordnance Sites

A listing of unexploded ordnance site locations

Date of Government Version: 12/31/2020
Date Data Arrived at EDR: 01/11/2022
Date Made Active in Reports: 02/14/2022
Number of Days to Update: 34

Source: Department of Defense
Telephone: 703-704-1564
Last EDR Contact: 04/12/2022
Next Scheduled EDR Contact: 07/25/2022
Data Release Frequency: Varies

FUELS PROGRAM: EPA Fuels Program Registered Listing

This listing includes facilities that are registered under the Part 80 (Code of Federal Regulations) EPA Fuels Programs. All companies now are required to submit new and updated registrations.

Date of Government Version: 11/15/2021
Date Data Arrived at EDR: 11/15/2021
Date Made Active in Reports: 02/01/2022
Number of Days to Update: 78

Source: EPA
Telephone: 800-385-6164
Last EDR Contact: 02/17/2022
Next Scheduled EDR Contact: 05/30/2022
Data Release Frequency: Quarterly

AIRS: Permitted Airs Facility List

A listing of permitted Airs facilities.

Date of Government Version: 12/15/2021
Date Data Arrived at EDR: 12/16/2021
Date Made Active in Reports: 03/11/2022
Number of Days to Update: 85

Source: Department of Environmental Quality
Telephone: 804-698-4000
Last EDR Contact: 03/28/2022
Next Scheduled EDR Contact: 06/27/2022
Data Release Frequency: Annually

CEDS: Comprehensive Environmental Data System

Virginia Water Protection Permits, Virginia Pollution Discharge System (point discharge) permits and Virginia Pollution Abatement (no point discharge) permits.

Date of Government Version: 09/14/2021
Date Data Arrived at EDR: 09/15/2021
Date Made Active in Reports: 09/23/2021
Number of Days to Update: 8

Source: Department of Environmental Quality
Telephone: 804-698-4077
Last EDR Contact: 03/14/2022
Next Scheduled EDR Contact: 06/13/2022
Data Release Frequency: Quarterly

COAL ASH: Coal Ash Disposal Sites

A listing of facilities with coal ash impoundments.

Date of Government Version: 12/31/2020
Date Data Arrived at EDR: 05/26/2021
Date Made Active in Reports: 08/18/2021
Number of Days to Update: 84

Source: Department of Environmental Protection
Telephone: 804-698-4285
Last EDR Contact: 03/28/2022
Next Scheduled EDR Contact: 06/13/2022
Data Release Frequency: Varies

DRYCLEANERS: Drycleaner List

A listing of registered drycleaners.

Date of Government Version: 04/11/2022
Date Data Arrived at EDR: 04/12/2022
Date Made Active in Reports: 04/13/2022
Number of Days to Update: 1

Source: Department of Environmental Quality
Telephone: 804-698-4407
Last EDR Contact: 04/04/2022
Next Scheduled EDR Contact: 07/18/2022
Data Release Frequency: Varies

ENFORCEMENT: Enforcement Actions Data

A listing of enforcement actions.

Date of Government Version: 12/28/2021
Date Data Arrived at EDR: 01/06/2022
Date Made Active in Reports: 02/23/2022
Number of Days to Update: 48

Source: Department of Environmental Quality
Telephone: 804-698-4031
Last EDR Contact: 03/28/2022
Next Scheduled EDR Contact: 07/11/2022
Data Release Frequency: Quarterly

Financial Assurance 1: Financial Assurance Information Listing

A listing of financial assurance information for underground storage tank facilities. Financial assurance is intended to ensure that resources are available to pay for the cost of closure, post-closure care, and corrective measures if the owner or operator of a regulated facility is unable or unwilling to pay.

Date of Government Version: 10/25/2021
Date Data Arrived at EDR: 10/28/2021
Date Made Active in Reports: 01/19/2022
Number of Days to Update: 83

Source: Department of Environmental Quality
Telephone: 804-698-4205
Last EDR Contact: 04/18/2022
Next Scheduled EDR Contact: 08/08/2022
Data Release Frequency: Varies

Financial Assurance 2: Financial Assurance Information listing

Solid waste financial assurance information.

Date of Government Version: 01/26/2022
Date Data Arrived at EDR: 01/28/2022
Date Made Active in Reports: 01/31/2022
Number of Days to Update: 3

Source: Department of Environmental Quality
Telephone: 804-698-4123
Last EDR Contact: 04/25/2022
Next Scheduled EDR Contact: 08/08/2022
Data Release Frequency: Varies

TIER 2: Tier 2 Information Listing

A listing of facilities which store or manufacture hazardous materials and submit a chemical inventory report.

Date of Government Version: 12/31/2019
Date Data Arrived at EDR: 01/04/2022
Date Made Active in Reports: 03/21/2022
Number of Days to Update: 76

Source: Department of Environmental Quality
Telephone: 804-698-4159
Last EDR Contact: 04/25/2022
Next Scheduled EDR Contact: 06/27/2022
Data Release Frequency: No Update Planned

UIC: Underground Injection Control Wells

A listing of underground injection controls wells.

Date of Government Version: 10/26/2021
Date Data Arrived at EDR: 10/27/2021
Date Made Active in Reports: 01/19/2022
Number of Days to Update: 84

Source: Department of Mines, Minerals and Energy
Telephone: 276-415-9700
Last EDR Contact: 04/20/2022
Next Scheduled EDR Contact: 08/08/2022
Data Release Frequency: Quarterly

PCS ENF: Enforcement data

No description is available for this data

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 02/05/2015
Date Made Active in Reports: 03/06/2015
Number of Days to Update: 29

Source: EPA
Telephone: 202-564-2497
Last EDR Contact: 03/31/2022
Next Scheduled EDR Contact: 07/18/2022
Data Release Frequency: Varies

PCS INACTIVE: Listing of Inactive PCS Permits

An inactive permit is a facility that has shut down or is no longer discharging.

Date of Government Version: 11/05/2014
Date Data Arrived at EDR: 01/06/2015
Date Made Active in Reports: 05/06/2015
Number of Days to Update: 120

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 03/31/2022
Next Scheduled EDR Contact: 07/18/2022
Data Release Frequency: Semi-Annually

PCS: Permit Compliance System

PCS is a computerized management information system that contains data on National Pollutant Discharge Elimination System (NPDES) permit holding facilities. PCS tracks the permit, compliance, and enforcement status of NPDES facilities.

Date of Government Version: 07/14/2011
Date Data Arrived at EDR: 08/05/2011
Date Made Active in Reports: 09/29/2011
Number of Days to Update: 55

Source: EPA, Office of Water
Telephone: 202-564-2496
Last EDR Contact: 03/31/2022
Next Scheduled EDR Contact: 07/18/2022
Data Release Frequency: Semi-Annually

MINES MRDS: Mineral Resources Data System
Mineral Resources Data System

Date of Government Version: 04/06/2018
Date Data Arrived at EDR: 10/21/2019
Date Made Active in Reports: 10/24/2019
Number of Days to Update: 3

Source: USGS
Telephone: 703-648-6533
Last EDR Contact: 02/24/2022
Next Scheduled EDR Contact: 06/06/2022
Data Release Frequency: Varies

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP: EDR Proprietary Manufactured Gas Plants
The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. Manufactured gas sites were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

EDR Hist Auto: EDR Exclusive Historical Auto Stations
EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, service station, etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR Hist Cleaner: EDR Exclusive Historical Cleaners
EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromat, cleaning/laundry, wash & dry etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA LF: Recovered Government Archive Solid Waste Facilities List

The EDR Recovered Government Archive Landfill database provides a list of landfills derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department of Environmental Quality in Virgina.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 01/20/2014
Number of Days to Update: 203

Source: Department of Environmental Quality
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

RGA LUST: Recovered Government Archive Leaking Underground Storage Tank

The EDR Recovered Government Archive Leaking Underground Storage Tank database provides a list of LUST incidents derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department of Environmental Quality in Virgina and at the Regional VA Levels.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 01/15/2014
Number of Days to Update: 198

Source: Department of Environmental Quality
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

OTHER DATABASE(S)

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

CT MANIFEST: Hazardous Waste Manifest Data

Facility and manifest data. Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a tsd facility.

Date of Government Version: 11/11/2021
Date Data Arrived at EDR: 11/12/2021
Date Made Active in Reports: 02/01/2022
Number of Days to Update: 81

Source: Department of Energy & Environmental Protection
Telephone: 860-424-3375
Last EDR Contact: 02/11/2022
Next Scheduled EDR Contact: 05/23/2022
Data Release Frequency: No Update Planned

NJ MANIFEST: Manifest Information

Hazardous waste manifest information.

Date of Government Version: 12/31/2018
Date Data Arrived at EDR: 04/10/2019
Date Made Active in Reports: 05/16/2019
Number of Days to Update: 36

Source: Department of Environmental Protection
Telephone: N/A
Last EDR Contact: 04/07/2022
Next Scheduled EDR Contact: 07/18/2022
Data Release Frequency: Annually

NY MANIFEST: Facility and Manifest Data

Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a TSD facility.

Date of Government Version: 01/01/2019
Date Data Arrived at EDR: 10/29/2021
Date Made Active in Reports: 01/19/2022
Number of Days to Update: 82

Source: Department of Environmental Conservation
Telephone: 518-402-8651
Last EDR Contact: 04/28/2022
Next Scheduled EDR Contact: 08/08/2022
Data Release Frequency: Quarterly

PA MANIFEST: Manifest Information

Hazardous waste manifest information.

Date of Government Version: 06/30/2018
Date Data Arrived at EDR: 07/19/2019
Date Made Active in Reports: 09/10/2019
Number of Days to Update: 53

Source: Department of Environmental Protection
Telephone: 717-783-8990
Last EDR Contact: 04/08/2022
Next Scheduled EDR Contact: 07/25/2022
Data Release Frequency: Annually

RI MANIFEST: Manifest information

Hazardous waste manifest information

Date of Government Version: 12/31/2020
Date Data Arrived at EDR: 11/30/2021
Date Made Active in Reports: 02/18/2022
Number of Days to Update: 80

Source: Department of Environmental Management
Telephone: 401-222-2797
Last EDR Contact: 02/14/2022
Next Scheduled EDR Contact: 05/30/2022
Data Release Frequency: Annually

WI MANIFEST: Manifest Information

Hazardous waste manifest information.

Date of Government Version: 05/31/2018
Date Data Arrived at EDR: 06/19/2019
Date Made Active in Reports: 09/03/2019
Number of Days to Update: 76

Source: Department of Natural Resources
Telephone: N/A
Last EDR Contact: 03/02/2022
Next Scheduled EDR Contact: 06/20/2022
Data Release Frequency: Annually

Oil/Gas Pipelines

Source: Endeavor Business Media

Petroleum Bundle (Crude Oil, Refined Products, Petrochemicals, Gas Liquids (LPG/NGL), and Specialty Gases (Miscellaneous)) N = Natural Gas Bundle (Natural Gas, Gas Liquids (LPG/NGL), and Specialty Gases (Miscellaneous)). This map includes information copyrighted by Endeavor Business Media. This information is provided on a best effort basis and Endeavor Business Media does not guarantee its accuracy nor warrant its fitness for any particular purpose. Such information has been reprinted with the permission of Endeavor Business Media.

Electric Power Transmission Line Data

Source: Endeavor Business Media

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Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

AHA Hospitals:

Source: American Hospital Association, Inc.
Telephone: 312-280-5991

The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.

Medical Centers: Provider of Services Listing

Source: Centers for Medicare & Medicaid Services
Telephone: 410-786-3000

A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

Nursing Homes
Source: National Institutes of Health
Telephone: 301-594-6248
Information on Medicare and Medicaid certified nursing homes in the United States.
Public Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.
Private Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on private school locations in the United States.
Daycare Centers: Licensed Facilities
Source: Department of Social Services
Telephone: 804-692-1900

Flood Zone Data: This data was obtained from the Federal Emergency Management Agency (FEMA). It depicts 100-year and 500-year flood zones as defined by FEMA. It includes the National Flood Hazard Layer (NFHL) which incorporates Flood Insurance Rate Map (FIRM) data and Q3 data from FEMA in areas not covered by NFHL.
Source: FEMA
Telephone: 877-336-2627
Date of Government Version: 2003, 2015

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

Current USGS 7.5 Minute Topographic Map
Source: U.S. Geological Survey

STREET AND ADDRESS INFORMATION

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GEOCHECK ®- PHYSICAL SETTING SOURCE ADDENDUM

TARGET PROPERTY ADDRESS

18495 CYPRESS RUN DR
18495 CYPRESS RUN DR
SMITHFIELD, VA 23430

TARGET PROPERTY COORDINATES

Latitude (North):	36.95059 - 36ˆ 57’ 2.12’’
Longitude (West):	76.598604 - 76ˆ 35’ 54.97’’
Universal Tranverse Mercator:	Zone 18
UTM X (Meters):	357661.9
UTM Y (Meters):	4090382.0
Elevation:	50 ft. above sea level

USGS TOPOGRAPHIC MAP

Target Property Map:	13861737 BENNS CHURCH, VA
Version Date:	2019
West Map:	13861785 SMITHFIELD, VA
Version Date:	2019

EDR’s GeoCheck Physical Setting Source Addendum is provided to assist the environmental professional in forming an opinion about the impact of potential contaminant migration.

Assessment of the impact of contaminant migration generally has two principle investigative components:

1. Groundwater flow direction, and
2. Groundwater flow velocity.

Groundwater flow direction may be impacted by surface topography, hydrology, hydrogeology, characteristics of the soil, and nearby wells. Groundwater flow velocity is generally impacted by the nature of the geologic strata.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW DIRECTION INFORMATION

Groundwater flow direction for a particular site is best determined by a qualified environmental professional using site-specific well data. If such data is not reasonably ascertainable, it may be necessary to rely on other sources of information, such as surface topographic information, hydrologic information, hydrogeologic data collected on nearby properties, and regional groundwater flow information (from deep aquifers).

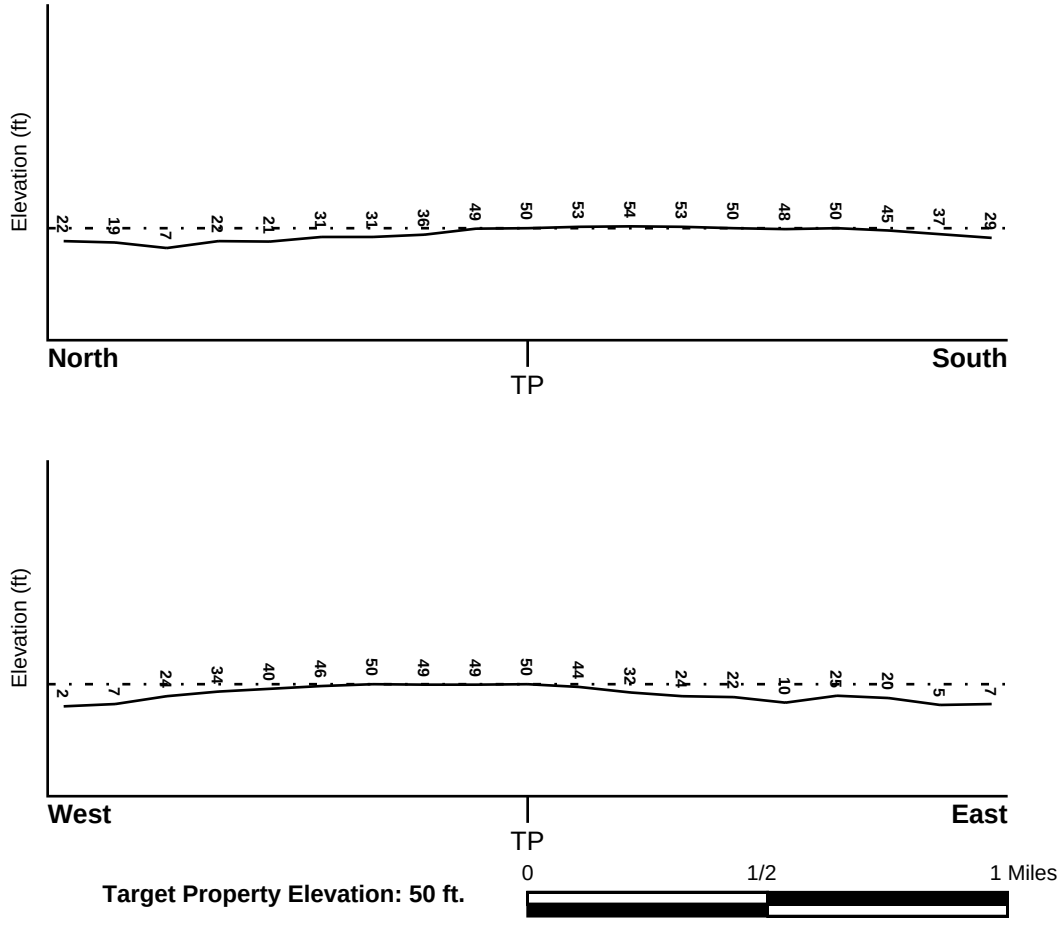
TOPOGRAPHIC INFORMATION

Surface topography may be indicative of the direction of surficial groundwater flow. This information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

TARGET PROPERTY TOPOGRAPHY

General Topographic Gradient: General NE

SURROUNDING TOPOGRAPHY: ELEVATION PROFILES



Source: Topography has been determined from the USGS 7.5' Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

HYDROLOGIC INFORMATION

Surface water can act as a hydrologic barrier to groundwater flow. Such hydrologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Refer to the Physical Setting Source Map following this summary for hydrologic information (major waterways and bodies of water).

FEMA FLOOD ZONE

Flood Plain Panel at Target Property	FEMA Source Type
51093C0155D	FEMA FIRM Flood data

Additional Panels in search area:	FEMA Source Type
51093C0165D	FEMA FIRM Flood data

NATIONAL WETLAND INVENTORY

NWI Quad at Target Property	NWI Electronic Data Coverage
BENNS CHURCH	YES - refer to the Overview Map and Detail Map

HYDROGEOLOGIC INFORMATION

Hydrogeologic information obtained by installation of wells on a specific site can often be an indicator of groundwater flow direction in the immediate area. Such hydrogeologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Site-Specific Hydrogeological Data*:

Search Radius:	1.25 miles
Status:	Not found

AQUIFLOW®

Search Radius: 1.000 Mile.

EDR has developed the AQUIFLOW Information System to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted by environmental professionals to regulatory authorities at select sites and has extracted the date of the report, groundwater flow direction as determined hydrogeologically, and the depth to water table.

MAP ID	LOCATION FROM TP	GENERAL DIRECTION GROUNDWATER FLOW
Not Reported		

* ©1996 Site−specific hydrogeological data gathered by CERCLIS Alerts, Inc., Bainbridge Island, WA. All rights reserved. All of the information and opinions presented are those of the cited EPA report(s), which were completed under a Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS) investigation.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW VELOCITY INFORMATION

Groundwater flow velocity information for a particular site is best determined by a qualified environmental professional using site specific geologic and soil strata data. If such data are not reasonably ascertainable, it may be necessary to rely on other sources of information, including geologic age identification, rock stratigraphic unit and soil characteristics data collected on nearby properties and regional soil information. In general, contaminant plumes move more quickly through sandy-gravelly types of soils than silty-clayey types of soils.

GEOLOGIC INFORMATION IN GENERAL AREA OF TARGET PROPERTY

Geologic information can be used by the environmental professional in forming an opinion about the relative speed at which contaminant migration may be occurring.

ROCK STRATIGRAPHIC UNIT

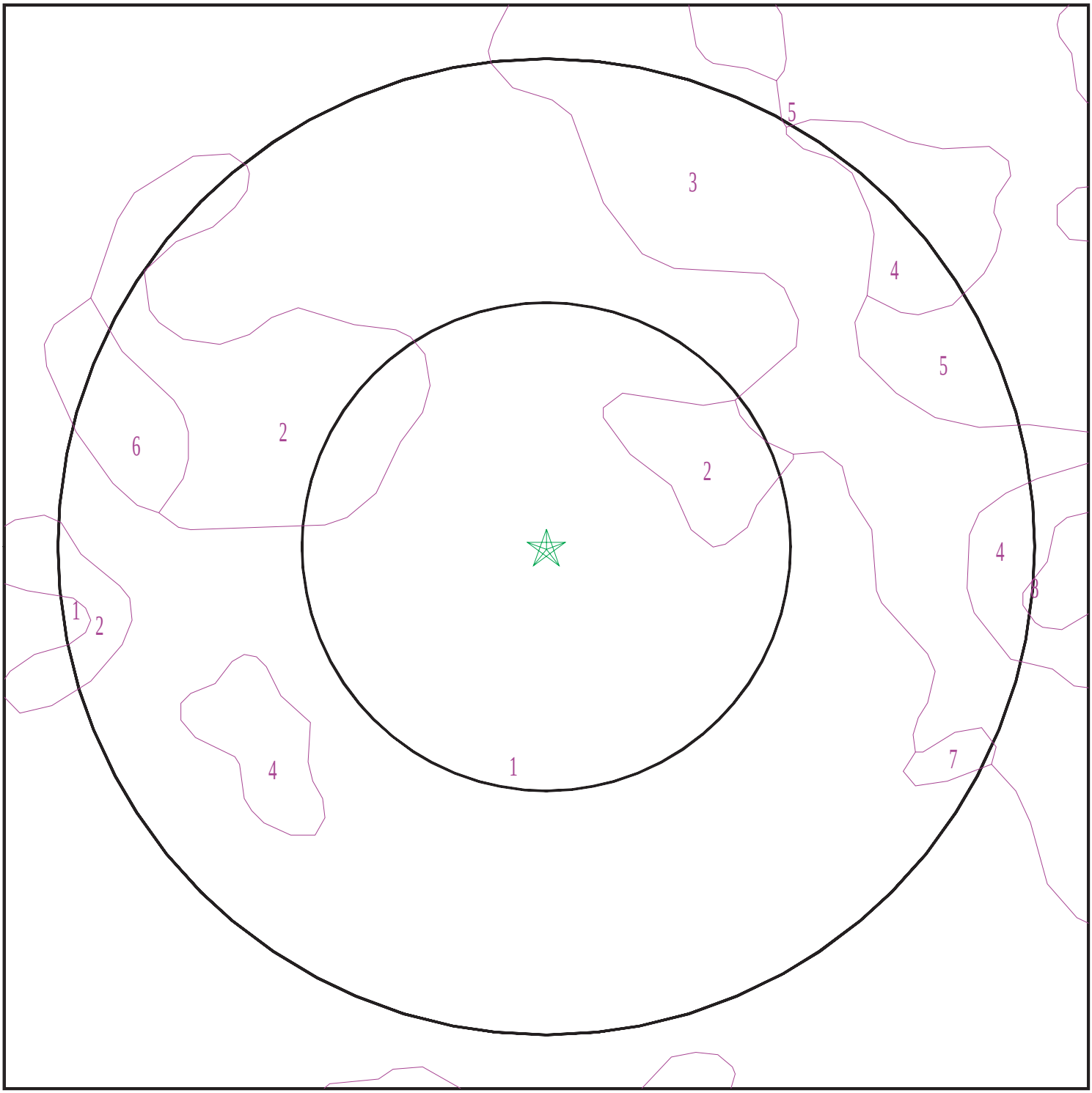
Era:	Cenozoic
System:	Tertiary
Series:	Miocene
Code:	Tm *(decoded above as Era, System & Series)*

GEOLOGIC AGE IDENTIFICATION

Category: Stratified Sequence

Geologic Age and Rock Stratigraphic Unit Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - a digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

SSURGO SOIL MAP - 6970219.2s



Target Property
SSURGO Soil
Water

0 1/16 1/8 1/4 Miles

N

SITE NAME:	18495 Cypress Run Dr	CLIENT:	ECS Mid Atlantic, LLC
ADDRESS:	18495 Cypress Run Dr Smithfield VA 23430	CONTACT:	Julia Kobilka
		INQUIRY #:	6970219.2s
LAT/LONG:	36.95059 / 76.598604	DATE:	May 06, 2022 1:19 pm

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GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

DOMINANT SOIL COMPOSITION IN GENERAL AREA OF TARGET PROPERTY

The U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) leads the National Cooperative Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. The following information is based on Soil Conservation Service SSURGO data.

Soil Map ID: 1

Soil Component Name: Rumford

Soil Surface Texture: loamy sand

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Well drained

Hydric Status: Partially hydric

Corrosion Potential - Uncoated Steel: Low

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	16 inches	loamy sand	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 141 Min: 14	Max: 6.5 Min: 3.6
2	16 inches	35 inches	sandy loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 141 Min: 14	Max: 6.5 Min: 3.6
3	35 inches	59 inches	sand	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 141 Min: 14	Max: 6.5 Min: 3.6

Soil Map ID: 2

Soil Component Name: Yemassee

Soil Surface Texture: fine sandy loam

Hydrologic Group: Class C - Slow infiltration rates. Soils with layers impeding downward movement of water, or soils with moderately fine or fine textures.

Soil Drainage Class: Somewhat poorly drained

Hydric Status: Partially hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 38 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	9 inches	fine sandy loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Clayey sand.	Max: 14 Min: 4	Max: 5.5 Min: 3.6
2	9 inches	51 inches	sandy clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Clayey sand.	Max: 14 Min: 4	Max: 5.5 Min: 3.6
3	51 inches	59 inches	fine sandy loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Clayey sand.	Max: 14 Min: 4	Max: 5.5 Min: 3.6

Soil Map ID: 3

Soil Component Name: Kinston

Soil Surface Texture: loam

Hydrologic Group: Class B/D - Drained/undrained hydrology class of soils that can be drained and are classified.

Soil Drainage Class: Poorly drained

Hydric Status: All hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 15 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	9 inches	loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Clayey sand.	Max: 14 Min: 4	Max: 5.5 Min: 4.5
2	9 inches	59 inches	sandy clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Clayey sand.	Max: 14 Min: 4	Max: 5.5 Min: 4.5

Soil Map ID: 4

Soil Component Name: Slagle

Soil Surface Texture: fine sandy loam

Hydrologic Group: Class C - Slow infiltration rates. Soils with layers impeding downward movement of water, or soils with moderately fine or fine textures.

Soil Drainage Class: Moderately well drained

Hydric Status: Partially hydric

Corrosion Potential - Uncoated Steel: Moderate

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 69 inches

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	12 inches	fine sandy loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Clayey sand.	Max: 4 Min: 0.01	Max: 5.5 Min: 3.6
2	12 inches	25 inches	sandy clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Clayey sand.	Max: 4 Min: 0.01	Max: 5.5 Min: 3.6
3	25 inches	59 inches	sandy clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Clayey sand.	Max: 4 Min: 0.01	Max: 5.5 Min: 3.6

Soil Map ID: 5

Soil Component Name: Peawick

Soil Surface Texture: silt loam

Hydrologic Group: Class D - Very slow infiltration rates. Soils are clayey, have a high water table, or are shallow to an impervious layer.

Soil Drainage Class: Moderately well drained

Hydric Status: Partially hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 69 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	3 inches	silt loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), silt.	Max: 0.42 Min: 0.01	Max: 5.5 Min: 3.6
2	3 inches	70 inches	clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), silt.	Max: 0.42 Min: 0.01	Max: 5.5 Min: 3.6

Soil Map ID: 6

Soil Component Name: Chipley

Soil Surface Texture: sand

Hydrologic Group: Class C - Slow infiltration rates. Soils with layers impeding downward movement of water, or soils with moderately fine or fine textures.

Soil Drainage Class: Moderately well drained

Hydric Status: Partially hydric

Corrosion Potential - Uncoated Steel: Low

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 76 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	5 inches	sand	Granular materials (35 pct. or less passing No. 200), Fine Sand.	COARSE-GRAINED SOILS, Sands, Clean Sands, Poorly graded sand. COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 141 Min: 42	Max: 6.5 Min: 4.5

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
2	5 inches	59 inches	sand	Granular materials (35 pct. or less passing No. 200), Fine Sand.	COARSE-GRAINED SOILS, Sands, Clean Sands, Poorly graded sand. COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 141 Min: 42	Max: 6.5 Min: 4.5

Soil Map ID: 7

Soil Component Name: Water

Soil Surface Texture: sand

Hydrologic Group: Class C - Slow infiltration rates. Soils with layers impeding downward movement of water, or soils with moderately fine or fine textures.

Soil Drainage Class:
Hydric Status: Unknown

Corrosion Potential - Uncoated Steel: Not Reported

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

No Layer Information available.

Soil Map ID: 8

Soil Component Name: Nevarc

Soil Surface Texture: silt loam

Hydrologic Group: Class C - Slow infiltration rates. Soils with layers impeding downward movement of water, or soils with moderately fine or fine textures.

Soil Drainage Class: Moderately well drained

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Hydric Status: Partially hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 69 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	3 inches	silt loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Clayey sand.	Max: 42 Min: 4	Max: 6 Min: 3.6
2	3 inches	57 inches	clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Clayey sand.	Max: 42 Min: 4	Max: 6 Min: 3.6
3	57 inches	63 inches	sandy clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Clayey sand.	Max: 42 Min: 4	Max: 6 Min: 3.6

LOCAL / REGIONAL WATER AGENCY RECORDS

EDR Local/Regional Water Agency records provide water well information to assist the environmental professional in assessing sources that may impact ground water flow direction, and in forming an opinion about the impact of contaminant migration on nearby drinking water wells.

WELL SEARCH DISTANCE INFORMATION

DATABASE	SEARCH DISTANCE (miles)
Federal USGS	1.000
Federal FRDS PWS	Nearest PWS within 1 mile
State Database	1.000

FEDERAL USGS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

FEDERAL USGS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
No Wells Found		

FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION

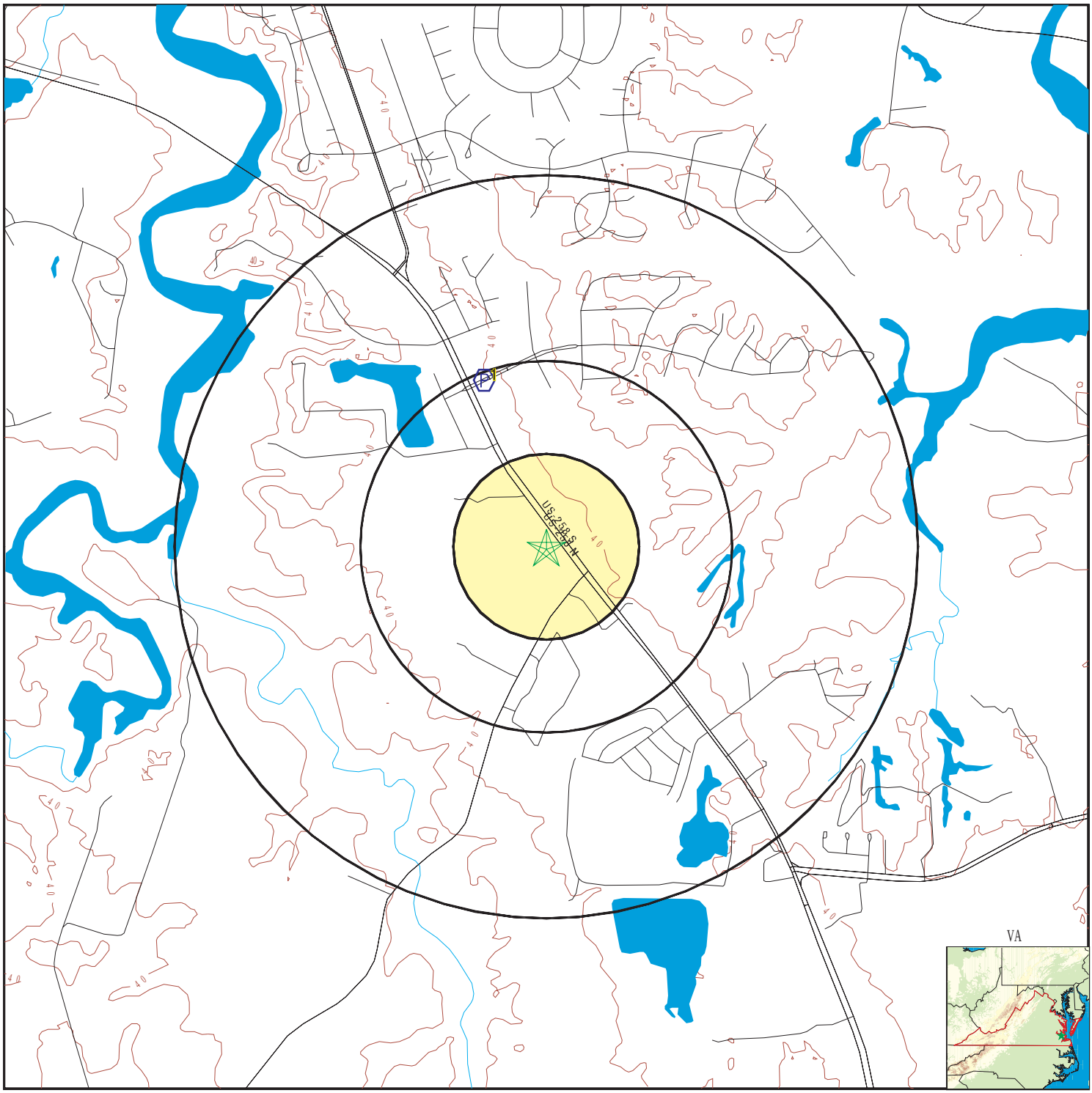
MAP ID	WELL ID	LOCATION FROM TP
1	VA3093830	1/4 - 1/2 Mile NNW

Note: PWS System location is not always the same as well location.

STATE DATABASE WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
No Wells Found		

PHYSICAL SETTING SOURCE MAP - 6970219.2s



- County Boundary
- Major Roads
- Contour Lines
- Earthquake epicenter, Richter 5 or greater
- Water Wells
- Public Water Supply Wells
- Cluster of Multiple Icons
- Groundwater Flow Direction
- GI Indeterminate Groundwater Flow at Location
- GV Groundwater Flow Varies at Location
- HD Closest Hydrogeological Data
- Oil, gas or related wells

SITE NAME:	18495 Cypress Run Dr	CLIENT:	ECS Mid Atlantic, LLC
ADDRESS:	18495 Cypress Run Dr Smithfield VA 23430	CONTACT:	Julia Kobilka
		INQUIRY #:	6970219.2s
LAT/LONG:	36.95059 / 76.598604	DATE:	May 06, 2022 1:19 pm

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GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance
Elevation

	Database	EDR ID Number
1		
NNW	**FRDS PWS**	**VA3093830**
1/4 - 1/2 Mile		
Lower		

Epa region:	03	State:	VA
Pwsid:	VA3093830	Pwsname:	WATERFORD OAKS-C/O IOW PUB UTIL
Cityserved:	Not Reported	Stateserved:	VA
Zipserved:	Not Reported	Fipscounty:	51093
Status:	Closed	Retpopsrvd:	66
Pwssvcconn:	22	Psource longname:	Purch_groundwater
Pwstype:	CWS	Owner:	unknown
Contact:	WATERFORD OAKS-C/O IOW PUB UTIL		
Contactorgname:	Not Reported	Contactphone:	804-357-3191
Contactaddress1:	17130 MONUMENT CIRCLE	Contactaddress2:	Not Reported
Contactcity:	ISLE OF WIGHT	Contactstate:	VA
Contactzip:	23397	Pwsactivitycode:	I
PWS ID:	VA3093830	PWS name:	WATERFORD OAKS-C/O IOW PUB UTIL
Address:	Not Reported	Care of:	17130 MONUMENT CIRCLE
City:	ISLE OF WIGHT	State:	VA
Zip:	23397	Owner:	WATERFORD OAKS-C/O IOW PUB UTIL
Source code:	Purchased ground water	Population:	66
PWS ID:	VA3093830	PWS type:	System Owner/Responsible Party
PWS name:	ISLE OF WIGHT PUBLIC UTILITIES		
PWS address:	PO BOX 80	PWS city:	ISLE OF WIGHT
PWS state:	VA	PWS zip:	23397
PWS ID:	VA3093830	Activity status:	Active
Date system activated:	9208	Date system deactivated:	Not Reported
Retail population:	00000066	System name:	WATERFORD OAKS-C/O IOW PUB UTIL
System address:	17130 MONUMENT CIRCLE	System city:	ISLE OF WIGHT
System state:	VA	System zip:	23397
County FIPS:	Not Reported	City served:	ISLE OF WIGHT
Population served:	Under 101 Persons	Treatment:	Untreated
Latitude:	365725	Longitude:	0763607

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS
RADON

AREA RADON INFORMATION

EPA Region 3 Statistical Summary Readings for Zip Code: 23430

Number of sites tested: 8.

Maximum Radon Level: 3.2 pCi/L.
Minimum Radon Level: 0.9 pCi/L.

pCi/L <4	pCi/L 4-10	pCi/L 10-20	pCi/L 20-50	pCi/L 50-100	pCi/L >100
8 (100.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)

Federal EPA Radon Zone for ISLE OF WIGHT County: 3

Note: Zone 1 indoor average level > 4 pCi/L.
: Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L.
: Zone 3 indoor average level < 2 pCi/L.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

TOPOGRAPHIC INFORMATION

USGS 7.5' Digital Elevation Model (DEM)
Source: United States Geologic Survey
EDR acquired the USGS 7.5' Digital Elevation Model in 2002 and updated it in 2006. The 7.5 minute DEM corresponds to the USGS 1:24,000- and 1:25,000-scale topographic quadrangle maps. The DEM provides elevation data with consistent elevation units and projection.

Current USGS 7.5 Minute Topographic Map
Source: U.S. Geological Survey

HYDROLOGIC INFORMATION

Flood Zone Data: This data was obtained from the Federal Emergency Management Agency (FEMA). It depicts 100-year and 500-year flood zones as defined by FEMA. It includes the National Flood Hazard Layer (NFHL) which incorporates Flood Insurance Rate Map (FIRM) data and Q3 data from FEMA in areas not covered by NFHL.
Source: FEMA
Telephone: 877-336-2627
Date of Government Version: 2003, 2015

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

HYDROGEOLOGIC INFORMATION

AQUIFLOW^{R} Information System
Source: EDR proprietary database of groundwater flow information
EDR has developed the AQUIFLOW Information System (AIS) to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted to regulatory authorities at select sites and has extracted the date of the report, hydrogeologically determined groundwater flow direction and depth to water table information.

GEOLOGIC INFORMATION

Geologic Age and Rock Stratigraphic Unit
Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - A digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

STATSGO: State Soil Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Service (NRCS)
The U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) leads the national Conservation Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps.

SSURGO: Soil Survey Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Service (NRCS)
Telephone: 800-672-5559
SSURGO is the most detailed level of mapping done by the Natural Resources Conservation Service, mapping scales generally range from 1:12,000 to 1:63,360. Field mapping methods using national standards are used to construct the soil maps in the Soil Survey Geographic (SSURGO) database. SSURGO digitizing duplicates the original soil survey maps. This level of mapping is designed for use by landowners, townships and county natural resource planning and management.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

LOCAL / REGIONAL WATER AGENCY RECORDS

FEDERAL WATER WELLS

PWS: Public Water Systems
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

PWS ENF: Public Water Systems Violation and Enforcement Data
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Violation and Enforcement data for Public Water Systems from the Safe Drinking Water Information System (SDWIS) after August 1995. Prior to August 1995, the data came from the Federal Reporting Data System (FRDS).

USGS Water Wells: USGS National Water Inventory System (NWIS)
This database contains descriptive information on sites where the USGS collects or has collected data on surface water and/or groundwater. The groundwater data includes information on wells, springs, and other sources of groundwater.

STATE RECORDS

Virginia Public Water Supplies
Source: Department of Health, Office of Water Programs
Telephone: 804-786-1756

OTHER STATE DATABASE INFORMATION

Virginia Oil and Gas Wells
Source: Department of Mines, Minerals and Energy
Telephone: 804-692-3200
A listing of oil and gas well locations.

RADON

Area Radon Information
Source: USGS
Telephone: 703-356-4020
The National Radon Database has been developed by the U.S. Environmental Protection Agency (USEPA) and is a compilation of the EPA/State Residential Radon Survey and the National Residential Radon Survey. The study covers the years 1986 - 1992. Where necessary data has been supplemented by information collected at private sources such as universities and research institutions.

EPA Radon Zones
Source: EPA
Telephone: 703-356-4020
Sections 307 & 309 of IRAA directed EPA to list and identify areas of U.S. with the potential for elevated indoor radon levels.

EPA Region 3 Statistical Summary Readings
Source: Region 3 EPA
Telephone: 215-814-2082
Radon readings for Delaware, D.C., Maryland, Pennsylvania, Virginia and West Virginia.

OTHER

Airport Landing Facilities: Private and public use landing facilities
Source: Federal Aviation Administration, 800-457-6656

Epicenters: World earthquake epicenters, Richter 5 or greater
Source: Department of Commerce, National Oceanic and Atmospheric Administration

Earthquake Fault Lines: The fault lines displayed on EDR's Topographic map are digitized quaternary faultlines, prepared in 1975 by the United State Geological Survey

PHYSICAL SETTING SOURCE RECORDS SEARCHED

STREET AND ADDRESS INFORMATION

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Appendix IV: Historical Research Documentation

18495 Cypress Run Dr

18495 Cypress Run Dr

Smithfield, VA 23430

Inquiry Number: 6970219.8

May 09, 2022

The EDR Aerial Photo Decade Package

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

EDR Aerial Photo Decade Package

05/09/22

Site Name:

18495 Cypress Run Dr
18495 Cypress Run Dr
Smithfield, VA 23430
EDR Inquiry # 6970219.8

Client Name:

ECS Mid Atlantic, LLC
14026 Thunderbolt Place
Chantilly, VA 20151
Contact: Julia Kobilka

Environmental Data Resources, Inc. (EDR) Aerial Photo Decade Package is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's professional researchers provide digitally reproduced historical aerial photographs, and when available, provide one photo per decade.

Search Results:

Year	Scale	Details	Source
2016	1"=875'	Flight Year: 2016	USDA/NAIP
2012	1"=875'	Flight Year: 2012	USDA/NAIP
2009	1"=875'	Flight Year: 2009	USDA/NAIP
2006	1"=875'	Flight Year: 2006	USDA/NAIP
1994	1"=875'	Acquisition Date: March 06, 1994	USGS/DOQQ
1982	1"=875'	Flight Date: April 01, 1982	USDA
1972	1"=875'	Flight Date: February 14, 1972	USGS
1970	1"=875'	Flight Date: September 24, 1970	USGS
1961	1"=875'	Flight Date: June 20, 1961	USGS
1959	1"=875'	Flight Date: December 08, 1959	USGS

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INQUIRY #: 6970219.8
YEAR: 2016
= 875'
N
EDR



INQUIRY #: 6970219.8

YEAR: 2012

= 875'

N

EDR


INQUIRY #: 6970219.8
YEAR: 2009
= 875'
N
EDR



INQUIRY #: 6970219.8

YEAR: 2006

= 875'

N

EDR



INQUIRY #: 6970219.8

YEAR: 1994

= 875'

N

EDR



INQUIRY #: 6970219.8

YEAR: 1982

= 875'

N

EDR



INQUIRY #: 6970219.8

YEAR: 1972

= 875'

N

EDR

Subject boundary not shown because it exceeds image extent or image is not georeferenced.



INQUIRY #: 6970219.8

YEAR: 1970

= 875'

N

EDR



INQUIRY #: 6970219.8

YEAR: 1961

= 875'

N

EDR


INQUIRY #: 6970219.8
YEAR: 1959
= 875'
N
EDR

18495 Cypress Run Dr

18495 Cypress Run Dr

Smithfield, VA 23430

Inquiry Number: 6970219.3

May 06, 2022

Certified Sanborn® Map Report

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

Certified Sanborn® Map Report

05/06/22

Site Name:

18495 Cypress Run Dr
18495 Cypress Run Dr
Smithfield, VA 23430
EDR Inquiry # 6970219.3

Client Name:

ECS Mid Atlantic, LLC
14026 Thunderbolt Place
Chantilly, VA 20151
Contact: Julia Kobilka

The Sanborn Library has been searched by EDR and maps covering the target property location as provided by ECS Mid Atlantic, LLC were identified for the years listed below. The Sanborn Library is the largest, most complete collection of fire insurance maps. The collection includes maps from Sanborn, Bromley, Perris & Browne, Hopkins, Barlow, and others. Only Environmental Data Resources Inc. (EDR) is authorized to grant rights for commercial reproduction of maps by the Sanborn Library LLC, the copyright holder for the collection. Results can be authenticated by visiting www.edrnet.com/sanborn.

The Sanborn Library is continually enhanced with newly identified map archives. This report accesses all maps in the collection as of the day this report was generated.

Certified Sanborn Results:

Certification # 52F1-4835-A012

PO # 2022/05/06 - JK

Project 14575 - Cypress Run Site

UNMAPPED PROPERTY

This report certifies that the complete holdings of the Sanborn Library, LLC collection have been searched based on client supplied target property information, and fire insurance maps covering the target property were not found.

Sanborn® Library search results

Certification #: 52F1-4835-A012

The Sanborn Library includes more than 1.2 million fire insurance maps from Sanborn, Bromley, Perris & Browne, Hopkins, Barlow and others which track historical property usage in approximately 12,000 American cities and towns. Collections searched:

- ☑ Library of Congress
- ☑ University Publications of America
- ☑ EDR Private Collection

The Sanborn Library LLC Since 1866™

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18495 Cypress Run Dr

18495 Cypress Run Dr

Smithfield, VA 23430

Inquiry Number: 6970219.4

May 06, 2022

EDR Historical Topo Map Report

with QuadMatch™

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

EDR Historical Topo Map Report

05/06/22

Site Name:

18495 Cypress Run Dr
18495 Cypress Run Dr
Smithfield, VA 23430
EDR Inquiry # 6970219.4

Client Name:

ECS Mid Atlantic, LLC
14026 Thunderbolt Place
Chantilly, VA 20151
Contact: Julia Kobilka

EDR Topographic Map Library has been searched by EDR and maps covering the target property location as provided by ECS Mid Atlantic, LLC were identified for the years listed below. EDR's Historical Topo Map Report is designed to assist professionals in evaluating potential liability on a target property resulting from past activities. EDRs Historical Topo Map Report includes a search of a collection of public and private color historical topographic maps, dating back to the late 1800s.

Search Results:

P.O.# 2022/05/06 - JK
Project: 14575 - Cypress Run Site

Coordinates:

Latitude: 36.95059 36° 57' 2" North
Longitude: -76.598604 -76° 35' 55" West
UTM Zone: Zone 18 North
UTM X Meters: 357665.35
UTM Y Meters: 4090584.97
Elevation: 50.00' above sea level

Maps Provided:

2019	1965
2016	1957
2013	1952
1992	1951
1986	1950
1980	1944
1979	1919
1972	

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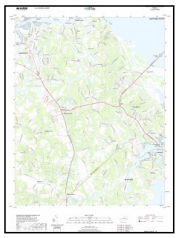
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Topo Sheet Key

This EDR Topo Map Report is based upon the following USGS topographic map sheets.

2019 Source Sheets

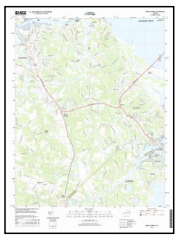


Benns Church
2019
7.5-minute, 24000

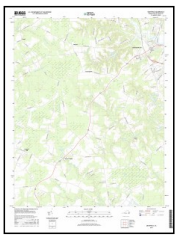


Smithfield
2019
7.5-minute, 24000

2016 Source Sheets



Benns Church
2016
7.5-minute, 24000

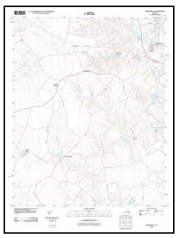


Smithfield
2016
7.5-minute, 24000

2013 Source Sheets



Benns Church
2013
7.5-minute, 24000



Smithfield
2013
7.5-minute, 24000

1992 Source Sheets



Benns Church
1992
7.5-minute, 24000
Aerial Photo Revised 1982

Topo Sheet Key

This EDR Topo Map Report is based upon the following USGS topographic map sheets.

1986 Source Sheets



Smithfield
1986
7.5-minute, 24000
Aerial Photo Revised 1982



Benns Church
1986
7.5-minute, 24000
Aerial Photo Revised 1982

1980 Source Sheets



Smithfield
1980
7.5-minute, 24000
Aerial Photo Revised 1978



Benns Church
1980
7.5-minute, 24000
Aerial Photo Revised 1978

1979 Source Sheets



Benns Church
1979
7.5-minute, 24000
Aerial Photo Revised 1978

1972 Source Sheets



Benns Church
1972
7.5-minute, 24000
Aerial Photo Revised 1963

Topo Sheet Key

This EDR Topo Map Report is based upon the following USGS topographic map sheets.

1965 Source Sheets



Benns Church
1965
7.5-minute, 24000
Aerial Photo Revised 1963

1957 Source Sheets



Benns Church
1957
7.5-minute, 24000
Aerial Photo Revised 1956

1952 Source Sheets



Benns Church
1952
7.5-minute, 24000
Aerial Photo Revised 1942

1951 Source Sheets



Blackstone
1951
7.5-minute, 24000
Aerial Photo Revised 1947

Topo Sheet Key

This EDR Topo Map Report is based upon the following USGS topographic map sheets.

1950 Source Sheets



Blackstone
1950
7.5-minute, 24000
Aerial Photo Revised 1947

1944 Source Sheets



Smithfield
1944
7.5-minute, 24000
Aerial Photo Revised 1942



BENNS CHURCH
1944
7.5-minute, 24000

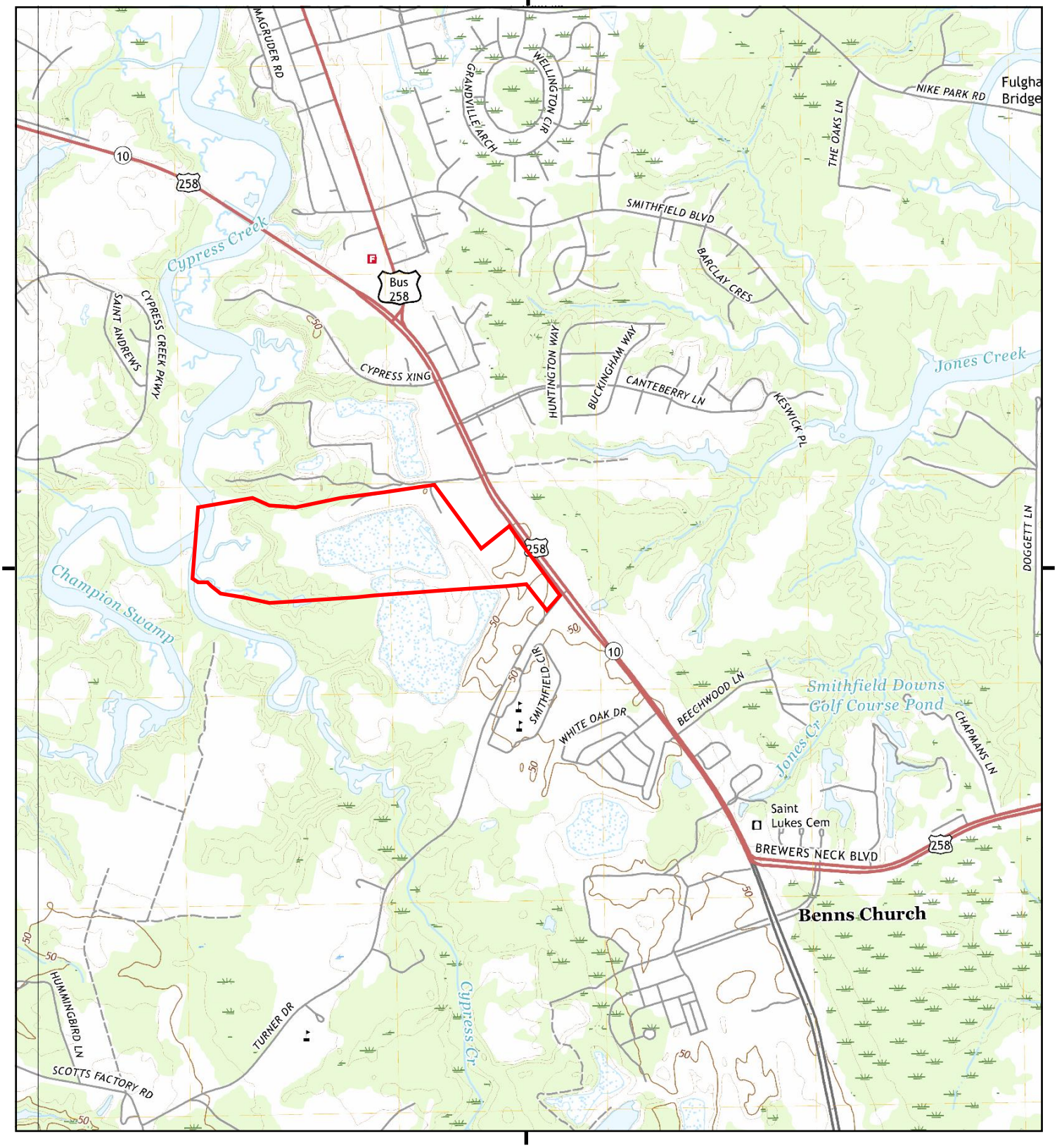
1919 Source Sheets



Smithfield
1919
15-minute, 62500

Historical Topo Map

2019



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

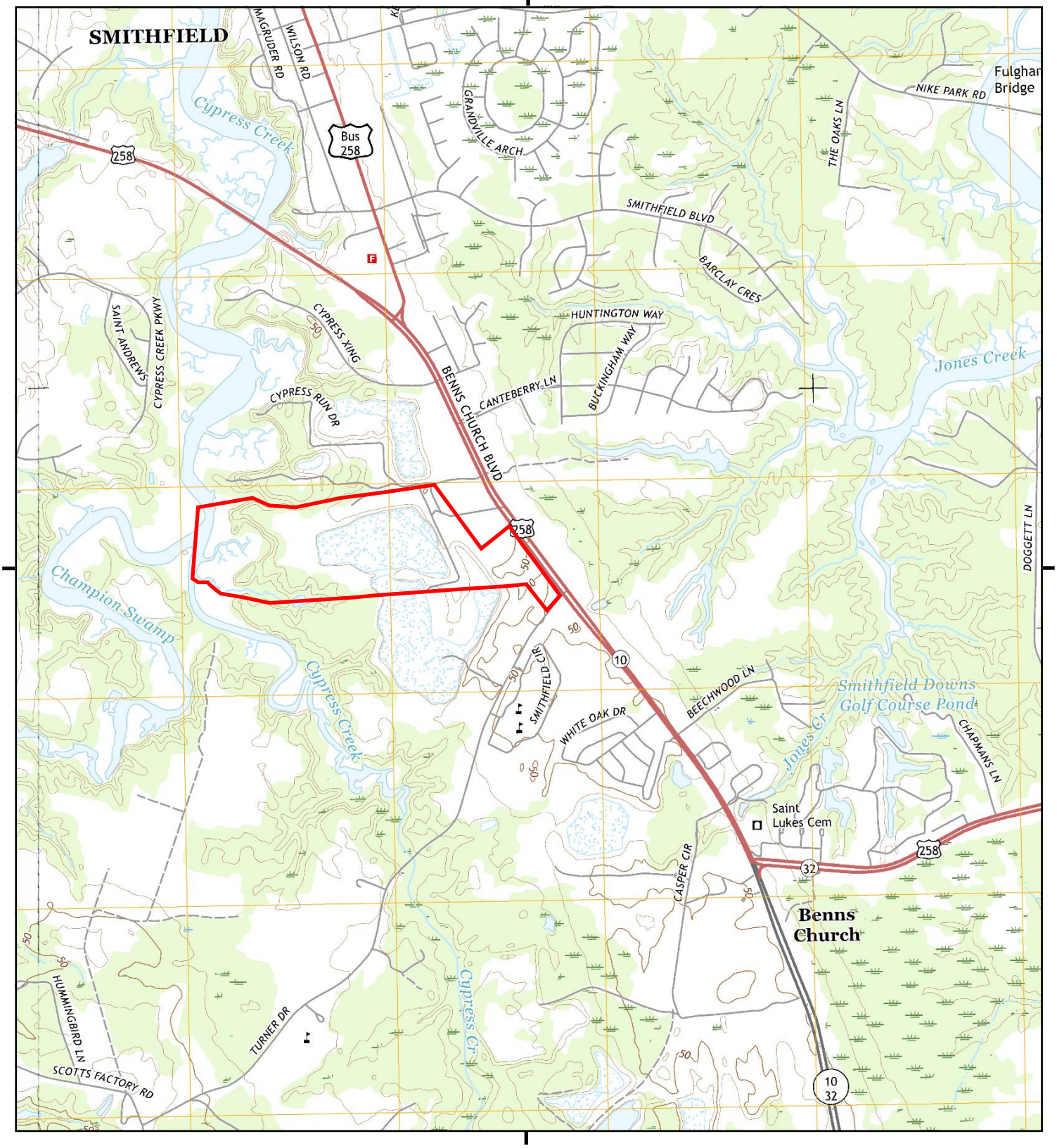
TP, Benns Church, 2019, 7.5-minute
W, Smithfield, 2019, 7.5-minute

SITE NAME: 18495 Cypress Run Dr
ADDRESS: 18495 Cypress Run Dr
Smithfield, VA 23430
CLIENT: ECS Mid Atlantic, LLC

N

Historical Topo Map

2016



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

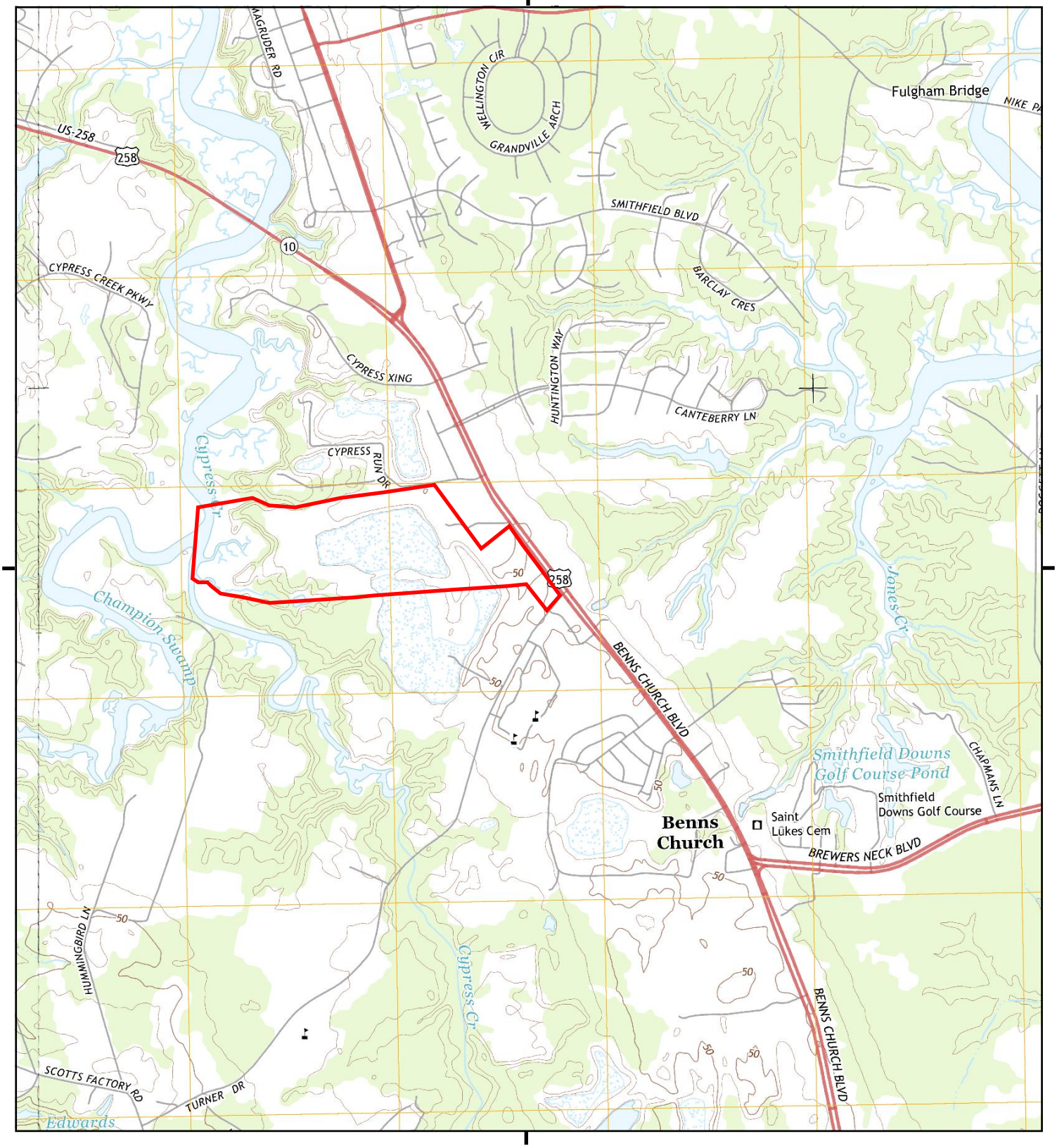
TP, Benns Church, 2016, 7.5-minute
W, Smithfield, 2016, 7.5-minute

SITE NAME: 18495 Cypress Run Dr
ADDRESS: 18495 Cypress Run Dr
Smithfield, VA 23430
CLIENT: ECS Mid Atlantic, LLC

N

Historical Topo Map

2013



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, Benns Church, 2013, 7.5-minute
W, Smithfield, 2013, 7.5-minute

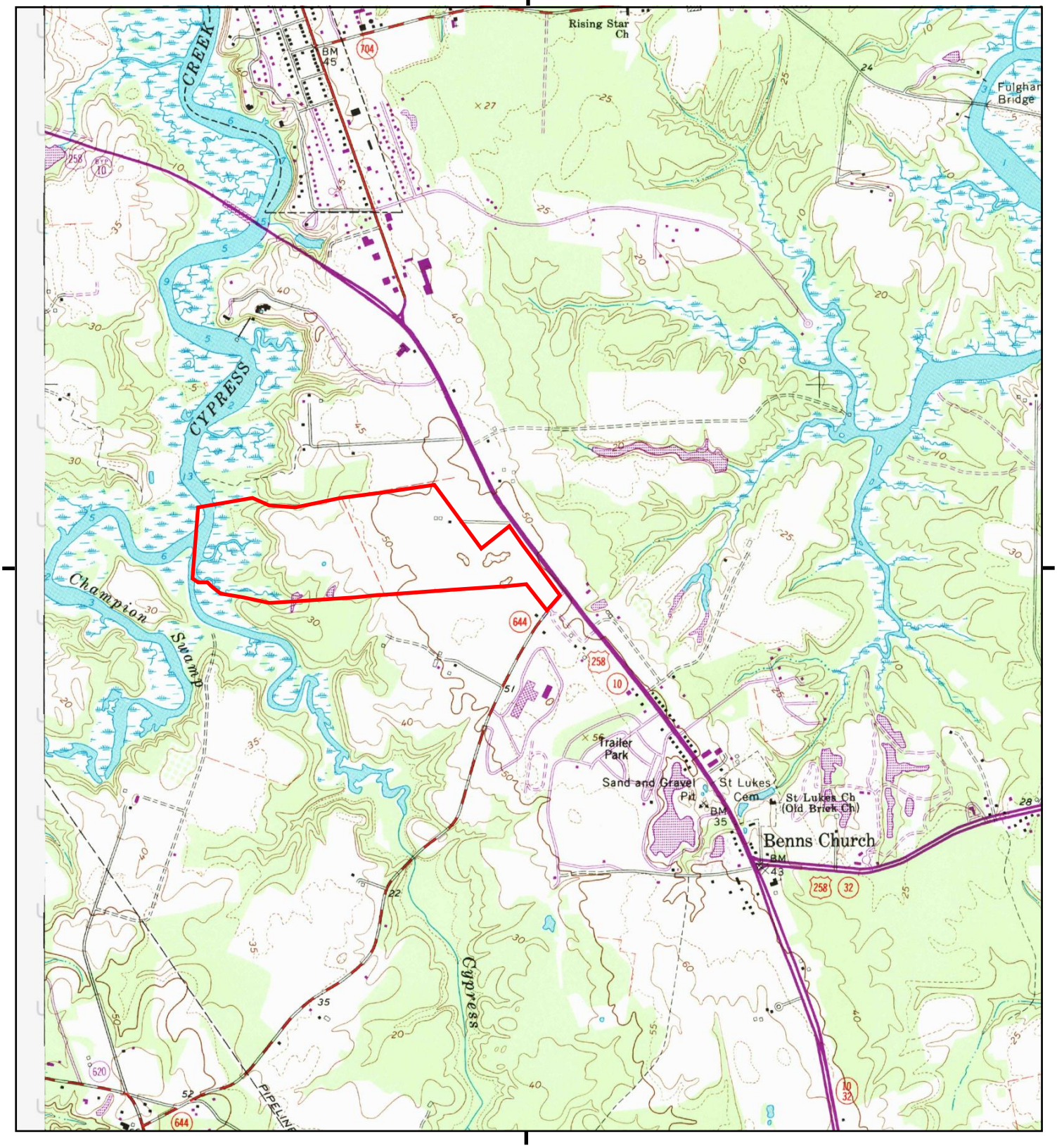
SITE NAME: 18495 Cypress Run Dr
ADDRESS: 18495 Cypress Run Dr
Smithfield, VA 23430
CLIENT: ECS Mid Atlantic, LLC

N

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Historical Topo Map

1992



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, Benns Church, 1992, 7.5-minute

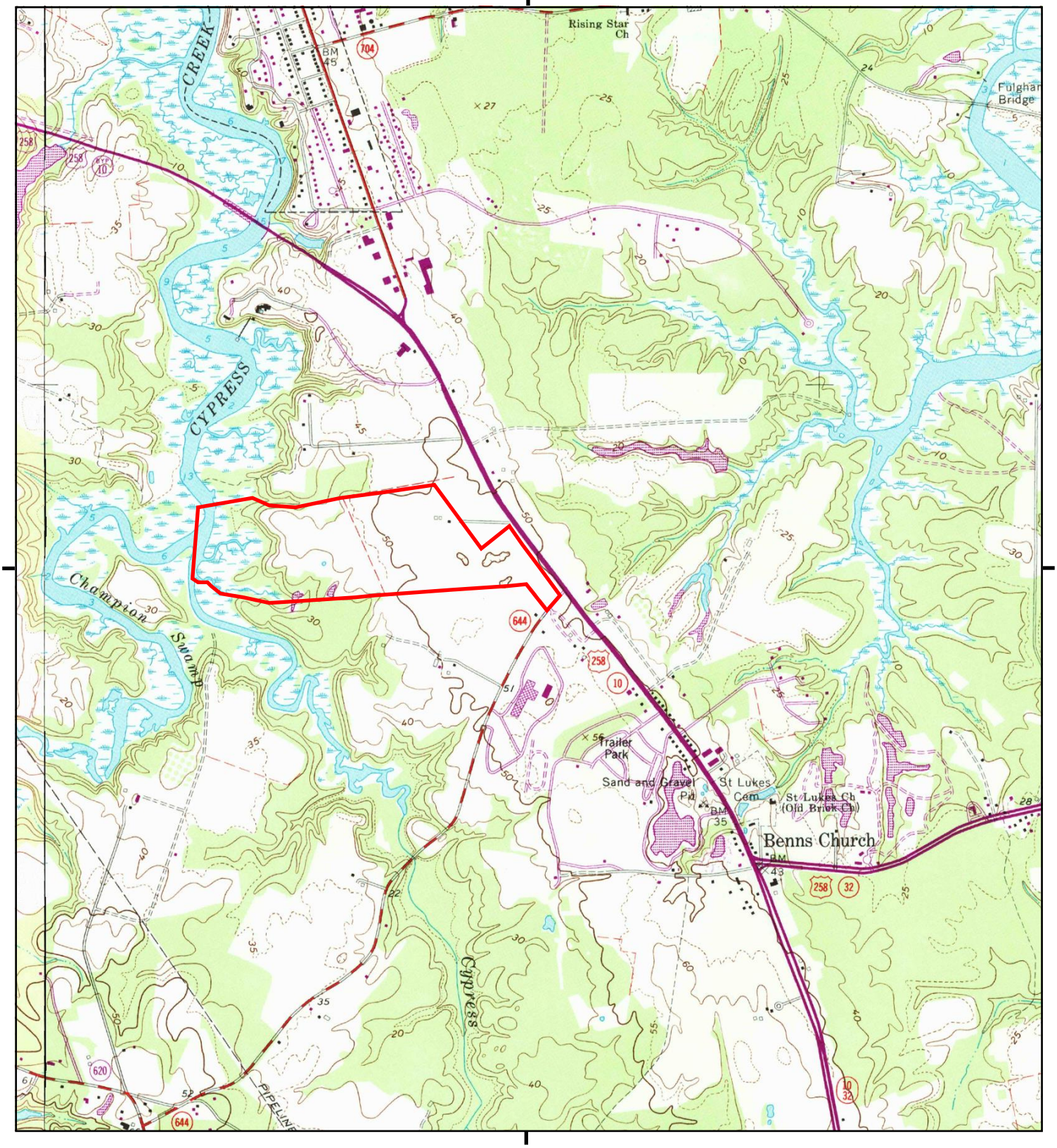
SITE NAME: 18495 Cypress Run Dr
ADDRESS: 18495 Cypress Run Dr
Smithfield, VA 23430
CLIENT: ECS Mid Atlantic, LLC

N

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Historical Topo Map

1986



This report includes information from the following map sheet(s).

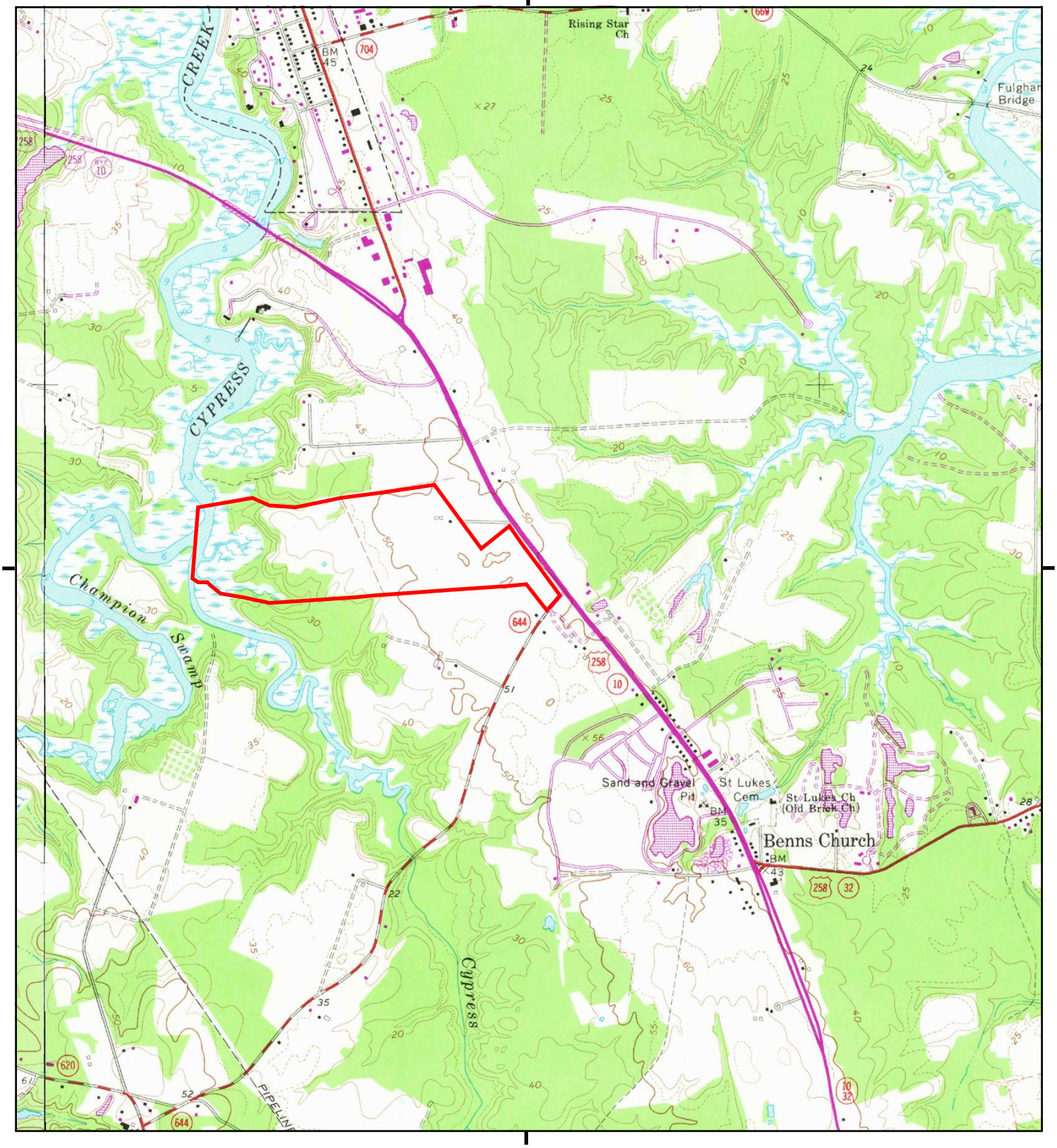
0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, Benns Church, 1986, 7.5-minute
W, Smithfield, 1986, 7.5-minute

SITE NAME: 18495 Cypress Run Dr
ADDRESS: 18495 Cypress Run Dr
Smithfield, VA 23430
CLIENT: ECS Mid Atlantic, LLC

N



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

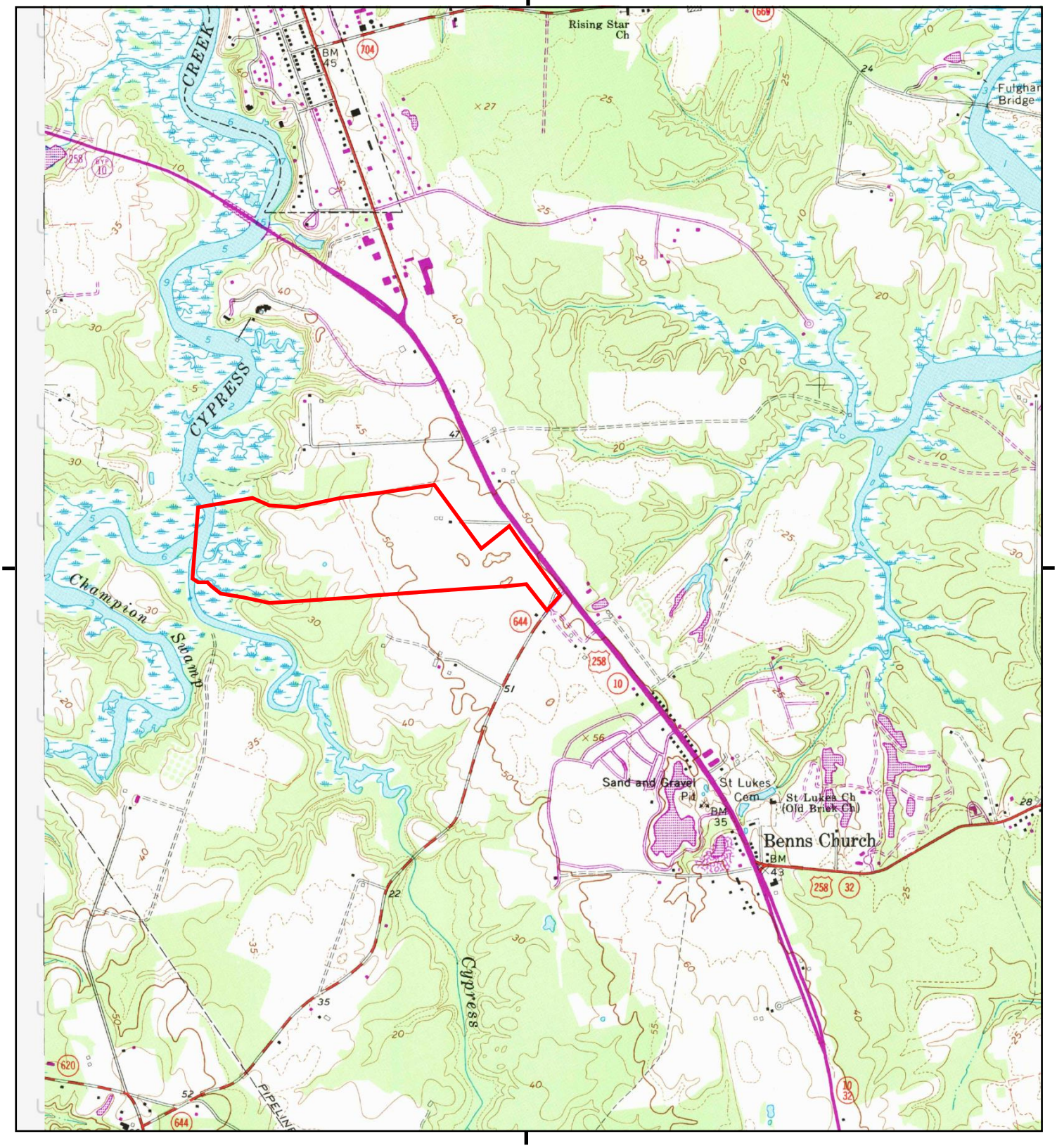
TP, Benns Church, 1980, 7.5-minute
W, Smithfield, 1980, 7.5-minute

SITE NAME: 18495 Cypress Run Dr
ADDRESS: 18495 Cypress Run Dr
Smithfield, VA 23430
CLIENT: ECS Mid Atlantic, LLC

N

Historical Topo Map

1979



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

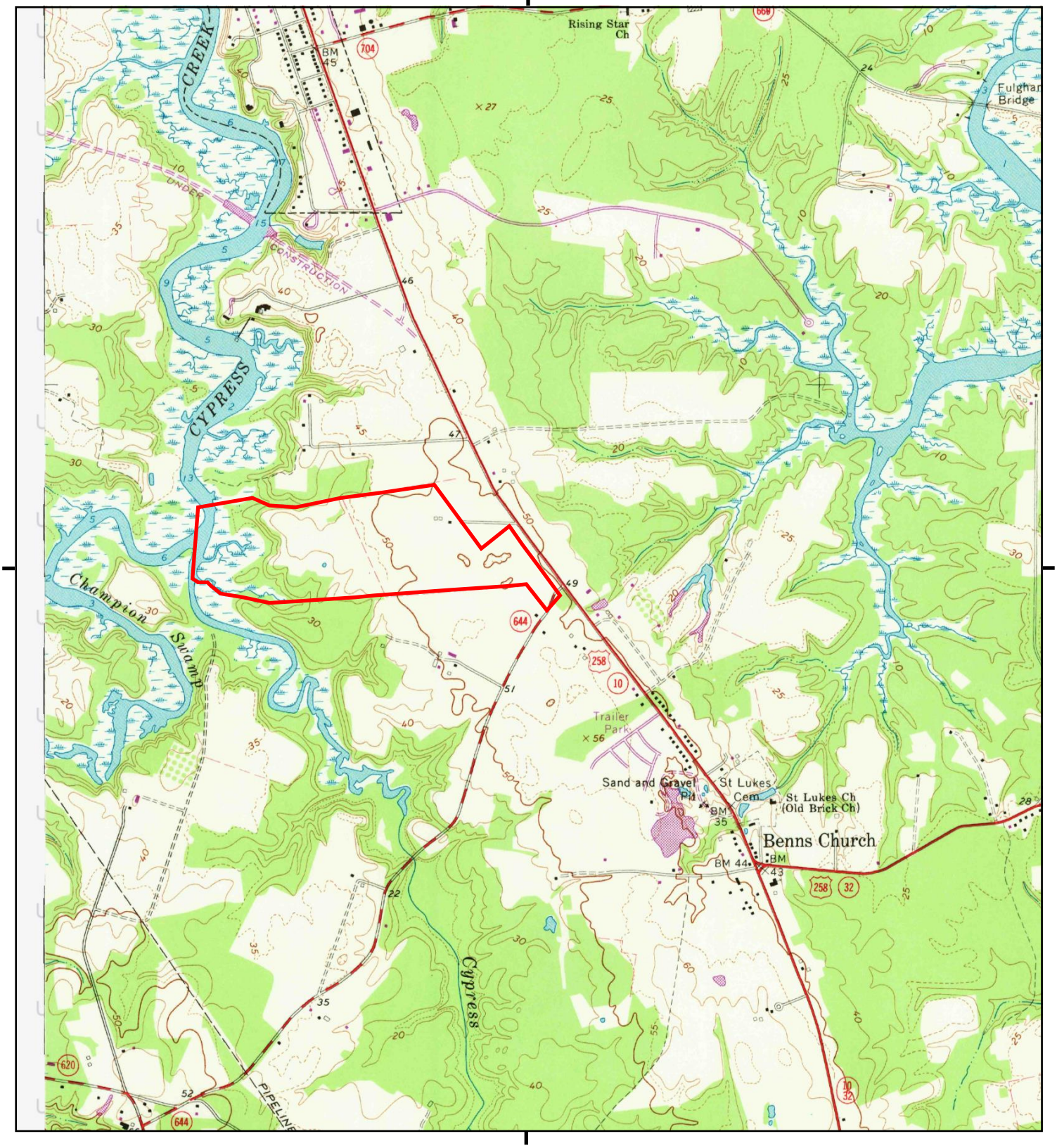
NW N NE
W E
SW S SE

TP, Benns Church, 1979, 7.5-minute

SITE NAME: 18495 Cypress Run Dr
ADDRESS: 18495 Cypress Run Dr
Smithfield, VA 23430
CLIENT: ECS Mid Atlantic, LLC

N

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This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

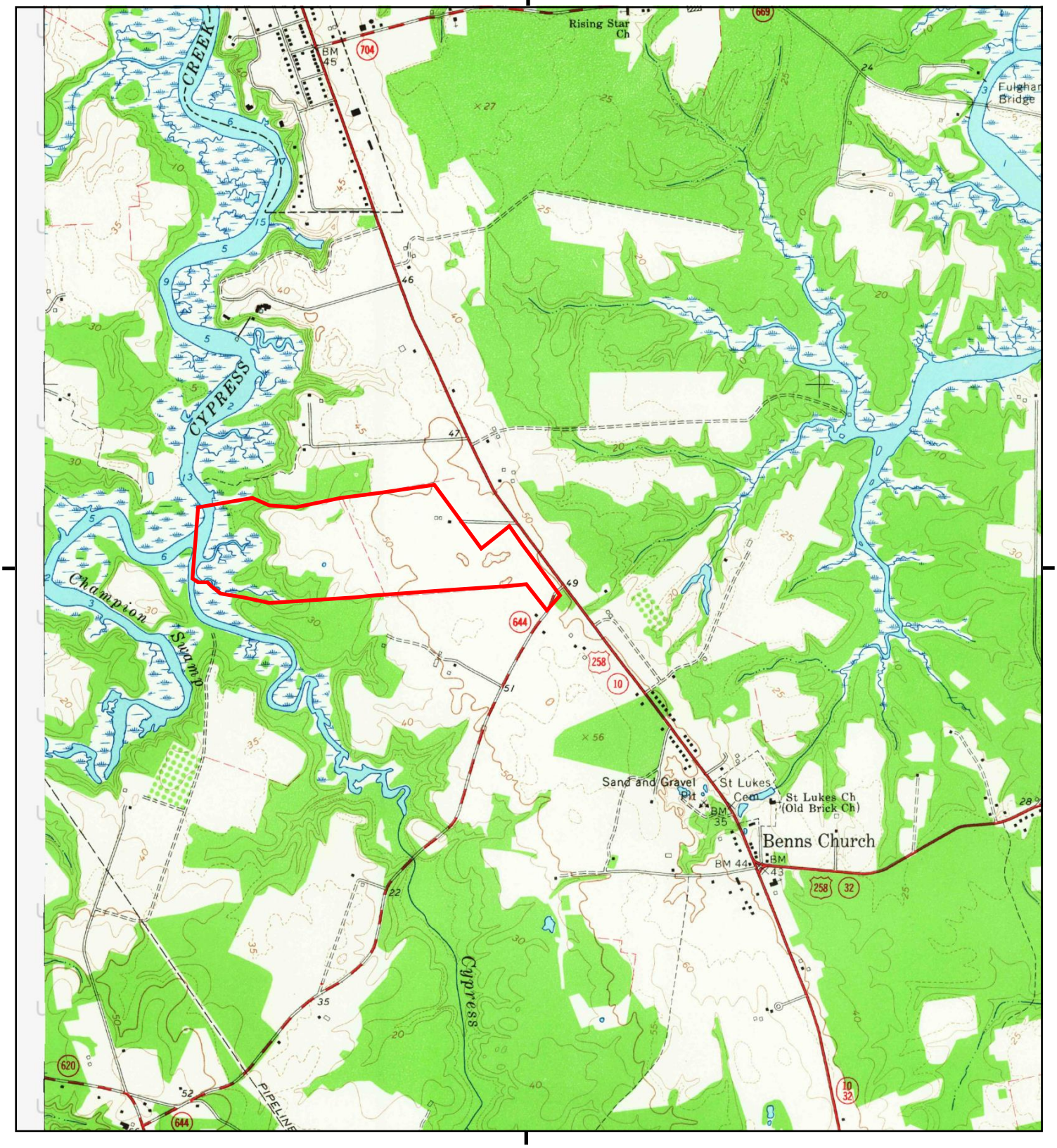
TP, Benns Church, 1972, 7.5-minute

SITE NAME: 18495 Cypress Run Dr
ADDRESS: 18495 Cypress Run Dr
Smithfield, VA 23430
CLIENT: ECS Mid Atlantic, LLC

N

Historical Topo Map

1965



This report includes information from the following map sheet(s).

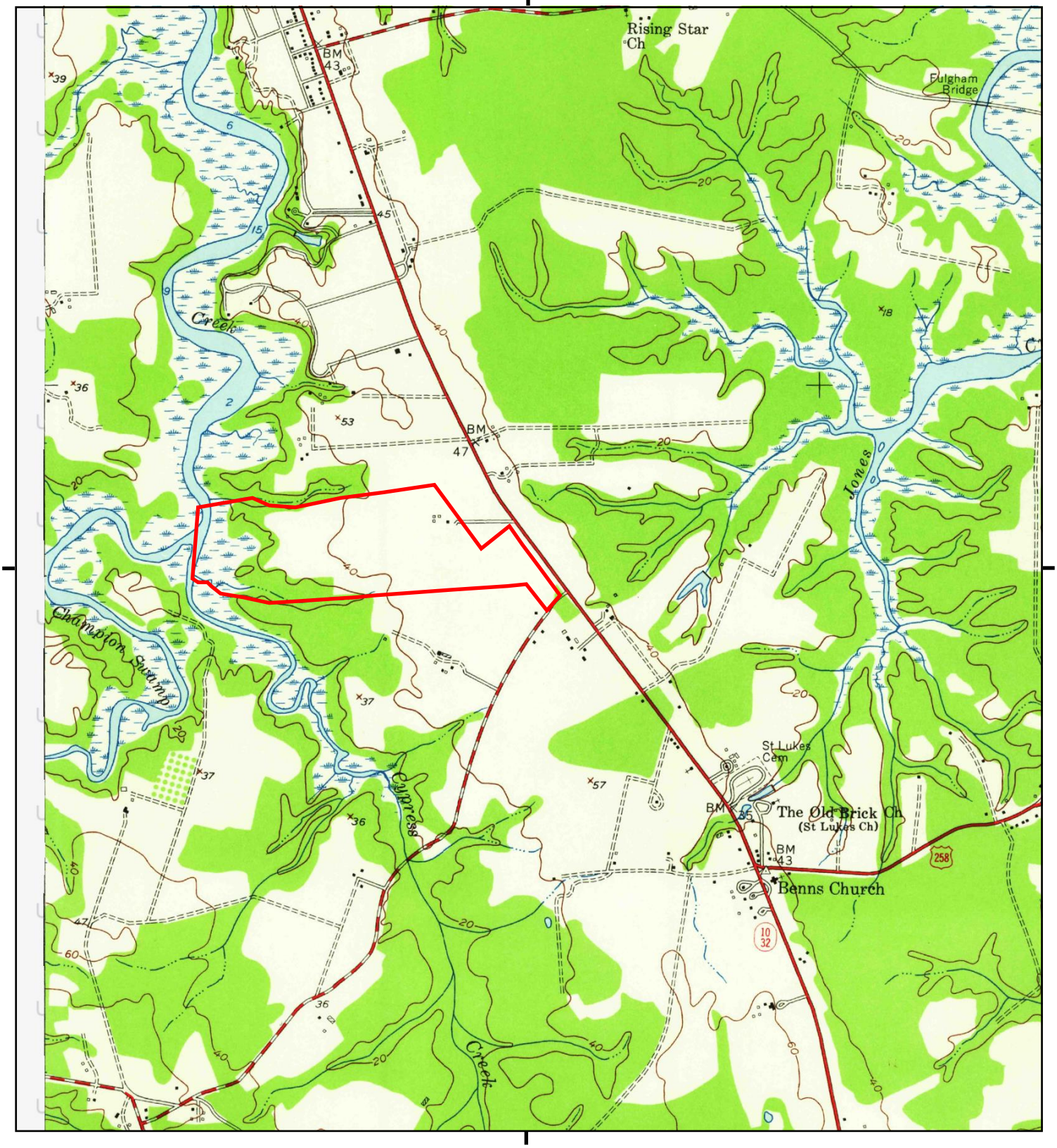
0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, Benns Church, 1965, 7.5-minute

SITE NAME: 18495 Cypress Run Dr
ADDRESS: 18495 Cypress Run Dr
Smithfield, VA 23430
CLIENT: ECS Mid Atlantic, LLC

N



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

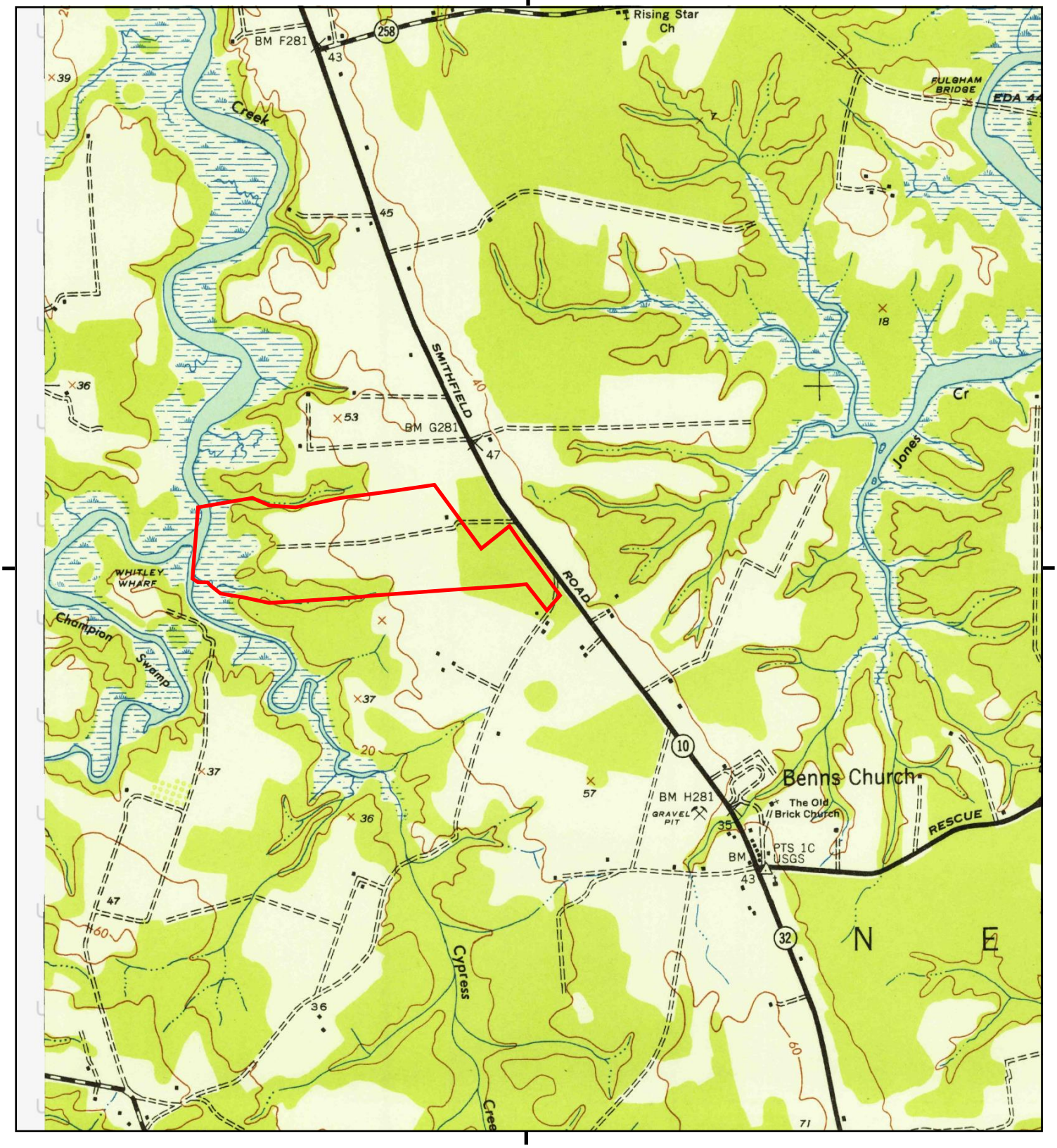
TP, Benns Church, 1957, 7.5-minute

SITE NAME: 18495 Cypress Run Dr
ADDRESS: 18495 Cypress Run Dr
Smithfield, VA 23430
CLIENT: ECS Mid Atlantic, LLC

N

Historical Topo Map

1952



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

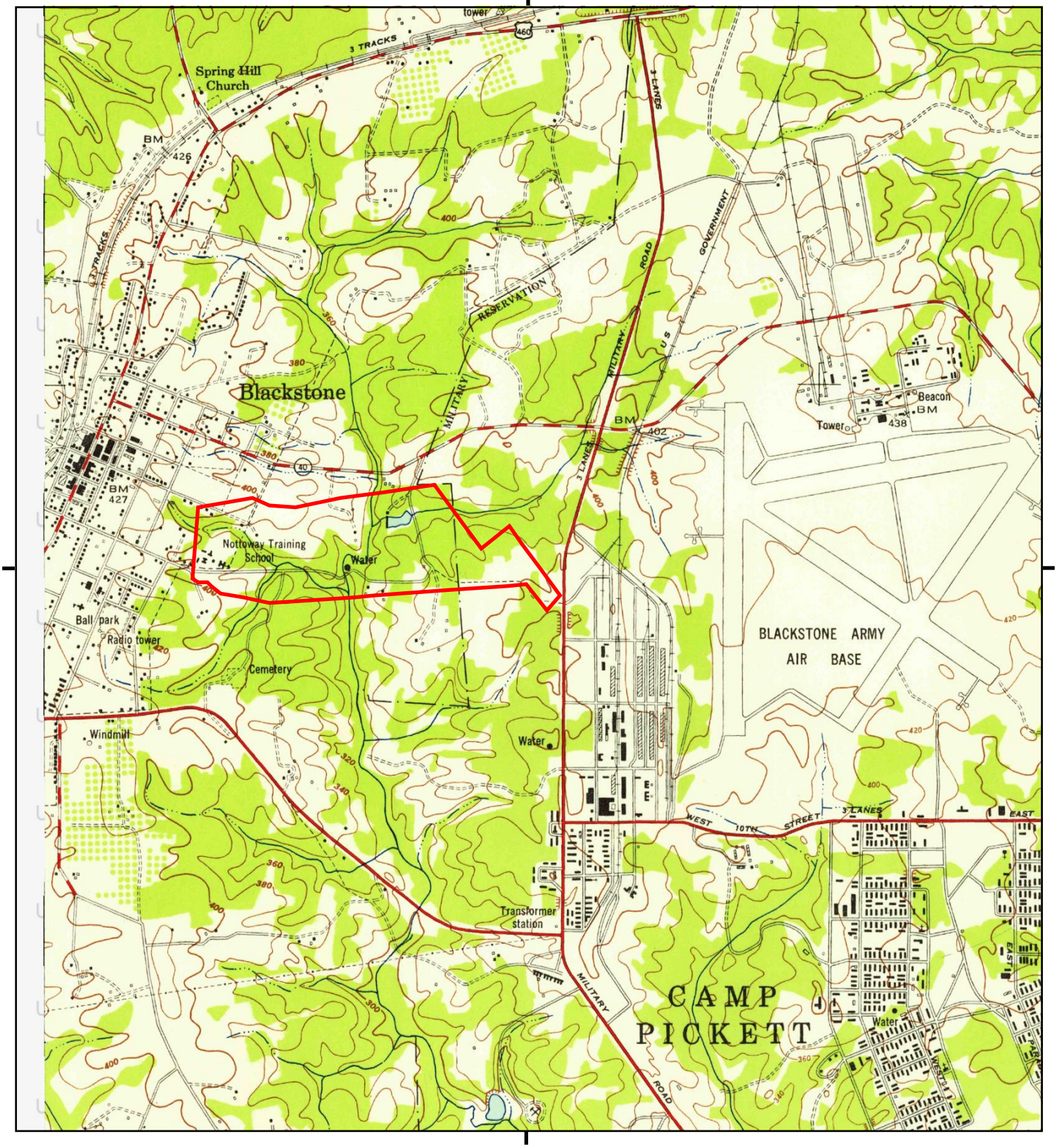
NW N NE
W E
SW S SE

TP, Benns Church, 1952, 7.5-minute

SITE NAME: 18495 Cypress Run Dr
ADDRESS: 18495 Cypress Run Dr
Smithfield, VA 23430
CLIENT: ECS Mid Atlantic, LLC

N

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This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

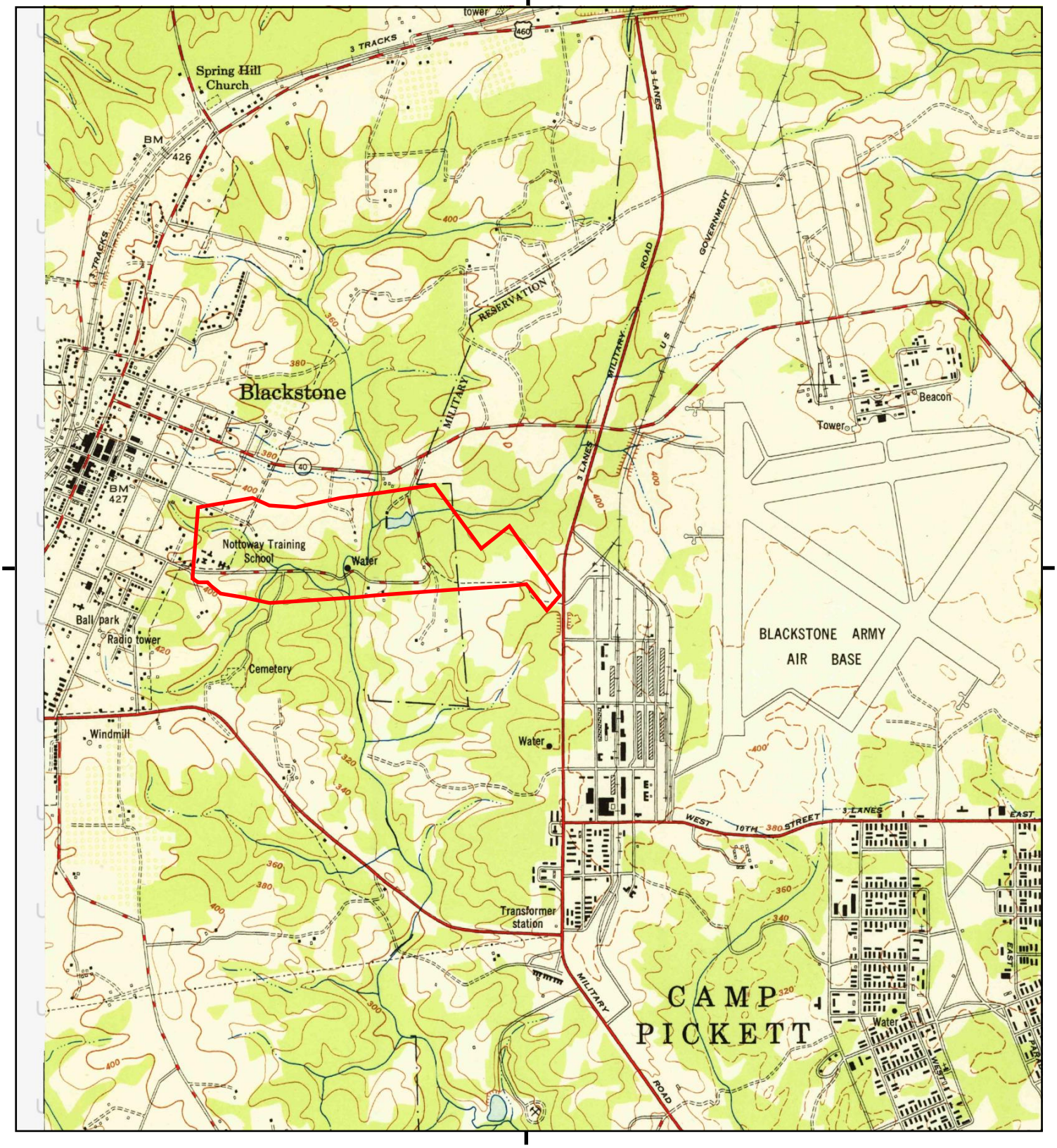
TP, Blackstone, 1951, 7.5-minute

SITE NAME: 18495 Cypress Run Dr
ADDRESS: 18495 Cypress Run Dr
Smithfield, VA 23430
CLIENT: ECS Mid Atlantic, LLC

N

Historical Topo Map

1950



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

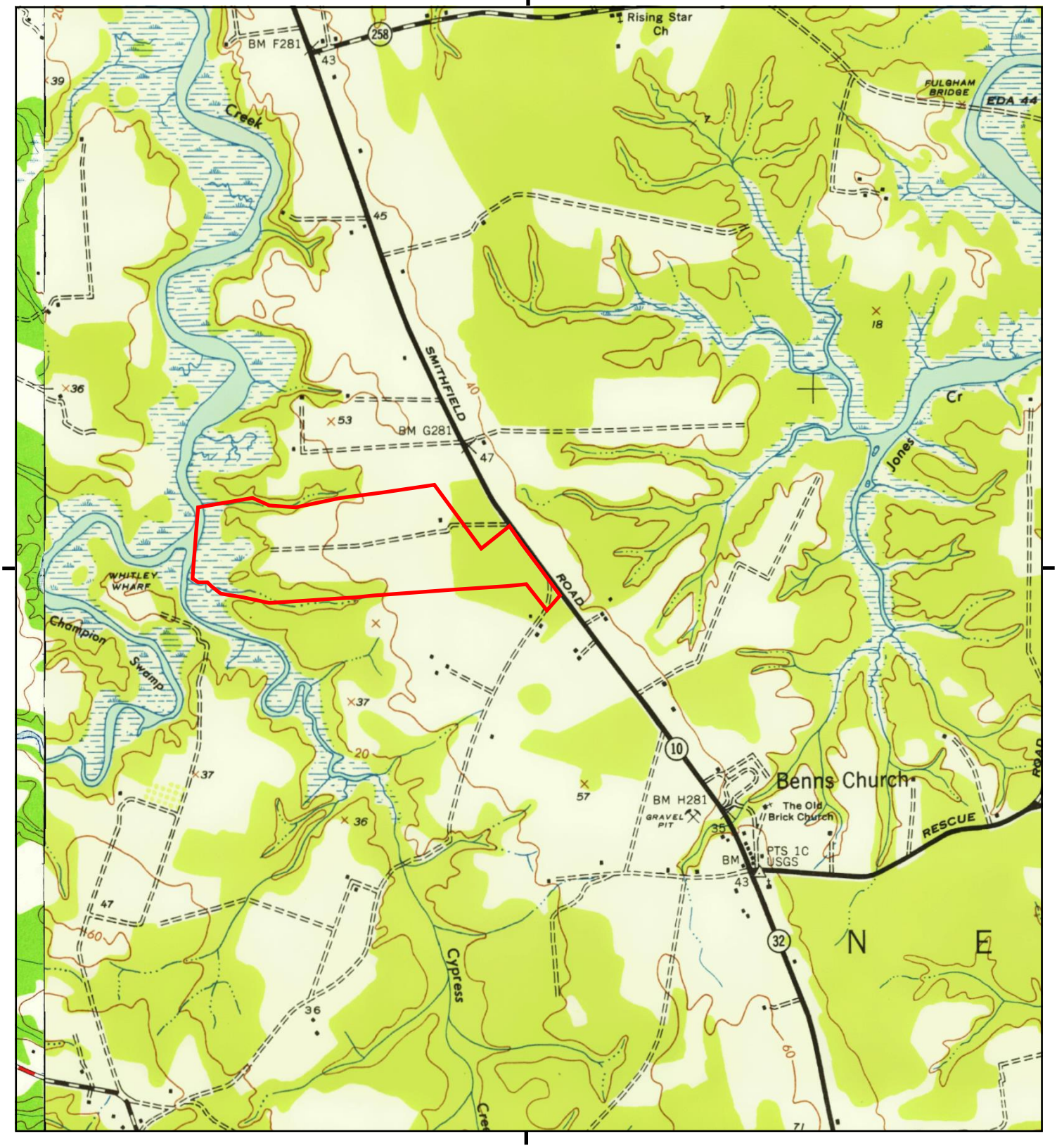
TP, Blackstone, 1950, 7.5-minute

SITE NAME: 18495 Cypress Run Dr
ADDRESS: 18495 Cypress Run Dr
Smithfield, VA 23430
CLIENT: ECS Mid Atlantic, LLC

N

Historical Topo Map

1944



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

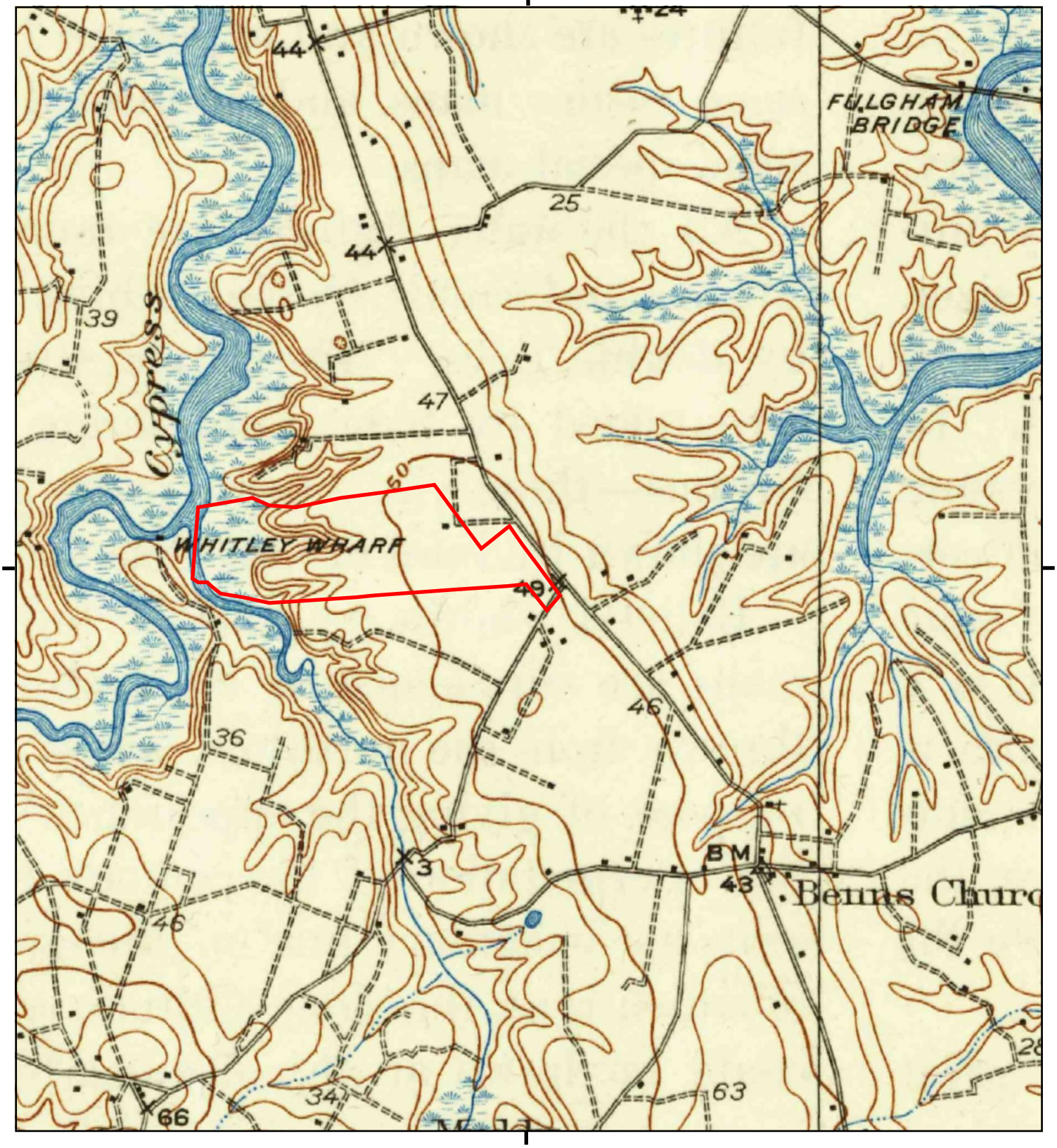
NW N NE
W E
SW S SE

TP, BENNS CHURCH, 1944, 7.5-minute
W, Smithfield, 1944, 7.5-minute

SITE NAME: 18495 Cypress Run Dr
ADDRESS: 18495 Cypress Run Dr
Smithfield, VA 23430
CLIENT: ECS Mid Atlantic, LLC

N

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This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, Smithfield, 1919, 15-minute

SITE NAME: 18495 Cypress Run Dr
ADDRESS: 18495 Cypress Run Dr
Smithfield, VA 23430
CLIENT: ECS Mid Atlantic, LLC

N

18495 Cypress Run Dr
18495 Cypress Run Dr
Smithfield, VA 23430

Inquiry Number: 6970219.5
May 10, 2022

The EDR-City Directory Image Report

Environmental Data Resources Inc
6 Armstrong Road
Shelton, CT 06484
800.352.0050
www.edrnet.com

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SECTION

Executive Summary

Findings

City Directory Images

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

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EXECUTIVE SUMMARY

DESCRIPTION

Environmental Data Resources, Inc.'s (EDR) City Directory Report is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's City Directory Report includes a search of available city directory data at 5 year intervals.

RECORD SOURCES

EDR's Digital Archive combines historical directory listings from sources such as Cole Information and Dun & Bradstreet. These standard sources of property information complement and enhance each other to provide a more comprehensive report.

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Data by
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RESEARCH SUMMARY

The following research sources were consulted in the preparation of this report. A check mark indicates where information was identified in the source and provided in this report.

Year	Target Street	Cross Street	Source
2017	☑	☑	EDR Digital Archive
2014	☑	☑	EDR Digital Archive
2010	☑	☑	EDR Digital Archive
2005	☑	☑	EDR Digital Archive
2000	☑	☑	EDR Digital Archive
1995	☑	☑	EDR Digital Archive
1992	☑	☑	EDR Digital Archive
1986	☐	☐	Polk's City Directory
1982	☐	☐	Polk's City Directory
1977	☐	☐	Hill's City Directory
1974	☐	☐	Hill's City Directory

FINDINGS

TARGET PROPERTY STREET

18495 Cypress Run Dr
Smithfield, VA 23430

Year	*CD Image*	*Source*	

CYPRESS RUN DR

2017	pg A2	EDR Digital Archive	
2014	pg A4	EDR Digital Archive	
2010	pg A6	EDR Digital Archive	
2005	pg A8	EDR Digital Archive	
2000	pg A10	EDR Digital Archive	
1995	pg A12	EDR Digital Archive	
1992	pg A14	EDR Digital Archive	
1986	-	Polk's City Directory	Street not listed in Source
1982	-	Polk's City Directory	Street not listed in Source
1977	-	Hill's City Directory	Street not listed in Source
1974	-	Hill's City Directory	Street not listed in Source

FINDINGS

CROSS STREETS

Year	*CD Image*	*Source*	
BENNS CHURCH BLVD			
2017	pg. A1	EDR Digital Archive	
2014	pg. A3	EDR Digital Archive	
2010	pg. A5	EDR Digital Archive	
2005	pg. A7	EDR Digital Archive	
2000	pg. A9	EDR Digital Archive	
1995	pg. A11	EDR Digital Archive	
1992	pg. A13	EDR Digital Archive	
1986	-	Polk's City Directory	Street not listed in Source
1982	-	Polk's City Directory	Street not listed in Source
1977	-	Hill's City Directory	Street not listed in Source
1974	-	Hill's City Directory	Street not listed in Source

City Directory Images

Target Street	Cross Street	Source
-	✓	EDR Digital Archive

BENNS CHURCH BLVD 2017

13400	WELLS FARGO BANK
13404	VAUGHAN TECHNOLOGIES UNLIMITED
13408	XTC NAILS
13412	ULTIMATE TAN
13416	SISTAS CAFE
13428	HAIR WORX
13432	JALAPENOS MEXICAN RESTAURANT
13453	EDWARDS, PHILIP F
13458	MILLER OIL COMPANY
13466	TOKYO & THAI RESTAURANT LLC
13470	BEST CLEANERS
13474	HOMETOWN RENTALS
13500	TRACTOR SUPPLY CO
14041	SHERWINWILLIAMS
14096	DALE, REBECCA H
14106	CORNETT, GEORGE C

Target Street	Cross Street	Source
✓	-	EDR Digital Archive

CYPRESS RUN DR 2017

18210 GAMBLE, LEON
18220 GAMBLE, VIVIA

Target Street	Cross Street	Source
-	✓	EDR Digital Archive

BENNS CHURCH BLVD 2014

13400	WELLS FARGO
	WELLS FARGO BANK
13404	VAUGHAN TECHNOLOGIES UNLIMITED
13408	XTC NAIL TECH
13412	ULTIMATE TAN OF SMITHFIELD
13416	BURGERS INC
	SISTAS CAFE
13420	CHECK INTO CASH
	CHECK INTO CASH SMITHFIELD
13428	HAIR WORX
13432	JALAPENOS MEXICAN RESTAURANT
13453	EDWARDS, PHILIP F
13458	MILLER OIL
13466	TOKYO & THAI RESTAURANT LLC
13470	BEST CLEANERS
13474	HOMETOWN RENTALS
13500	TRACTOR SUPPLY CO
14041	SHERWINWILLIAMS PAINT STORE
14096	CORNETT, RODNEY W
14106	CORNETT, GEORGE C

Target Street	Cross Street	Source
✓	-	EDR Digital Archive

CYPRESS RUN DR 2014

18210 GAMBLE, LEON
18220 GAMBLE, VIVIA
18312 WARREN, ALDA
18528 SEQUOYAH, ALLEN D

Target Street	Cross Street	Source
-	✓	EDR Digital Archive

BENNS CHURCH BLVD 2010

13400	WACHOVIA BANK
13408	XTC NAILS
13412	ULTIMATE TAN OF SMITHFIELD
13420	CHECK INTO CASH
13424	WEIGHT LOSS SOLUTIONS
13432	JALAPENOS MEXICAN RESTAURANT
13453	EDWARDS, PHILIP F
13458	MILLER OIL CO
13466	ZS
13470	BEST CLEANERS INC
13474	MOVIE GALLERY
14041	SHERWINWILLIAMS
14096	CORNETT, P

Target Street	Cross Street	Source
✓	-	EDR Digital Archive

CYPRESS RUN DR 2010

18220 DRIVER, COLUMBUS J
18312 PHELPS, PAUL A

Target Street	Cross Street	Source
-	✓	EDR Digital Archive

BENNS CHURCH BLVD 2005

13404 ELEGANT ALTERNATIVE UPSCALE
13408 XTC NAILS
13412 ULTIMATE TAN OF SMITHFIELD
13424 WEIGHT LOSS FOREVER
13428 REFLECTIONS STYLING STUDIO
13436 CPG INC
13453 EDWARDS, PHILIP F
13458 MILLER MART 25
13490 HEARN FURNITURE SALES INC
14041 SHERWIN WILLIAMS CO
14096 BROWN, MICHAEL P
14106 WILLIAM G YEOMAN III
YEOMAN, WILLIAM G

Target Street	Cross Street	Source
✓	-	EDR Digital Archive

CYPRESS RUN DR 2005

18210 GAMBLE, VIVIAN
18220 DRIVER, COLUMBUS J
18312 BENTLEY, CECIL R
18400 TERWILLIGER, GARY

Target Street	Cross Street	Source
-	✓	EDR Digital Archive

BENNS CHURCH BLVD 2000

13453 EDWARDS, PHILIP F
13458 MILLER OIL COMPANY
13490 HEARN FURNITURE
14096 YEOMAN, WILLIAM G
14106 YEOMAN, W G

Target Street	Cross Street	Source
✓	-	EDR Digital Archive

CYPRESS RUN DR 2000

18210 ANDERSON, VIVIAN
18220 DRIVER, C

Target Street	Cross Street	Source
-	✓	EDR Digital Archive

BENNS CHURCH BLVD 1995

13453 EDWARDS, PHILIP F JR
13490 HEARN FURNITURE
14041 J C PALLET CO
14096 YEOMAN, W G III
14106 YEOMAN, W G

Target Street	Cross Street	Source
✓	-	EDR Digital Archive

CYPRESS RUN DR 1995

18210 WHITE, ERIC
18220 DRIVER, C

Target Street	Cross Street	Source
-	✓	EDR Digital Archive

BENNS CHURCH BLVD 1992

14096 YEOMAN, W G III
14106 YEOMAN, W G

Target Street	Cross Street	Source
✓	-	EDR Digital Archive

CYPRESS RUN DR 1992

18220 DRIVER, C

Isle of Wight, Virginia

generated on 5/27/2022 1:23:16 PM CDT

Parcel ID	Alt. PIN	Parcel Address	AV - Tot. Lnd & Improv.	Data as of
32-01-005	7832	18495 CYPRESS RUN DR, SMITHFIELD	$1,074,900	5/23/2022

Property Owner Information

Property Owner	L & L LAND DEVELOPMENT LLC
Property Owner Address	PO BOX 231 SMITHFIELD VA 23431
Transfer Date	05/01/2009
Document No.	090002478
Document Reference No.	

Location Information

Tax Group Code	55	Routing No.	
Township No.	001,	Legal Desc.	ADJ JONES TURNER BUNKLEY FARM
Parcel Address	18495 CYPRESS RUN DR, SMITHFIELD		
Legal Acreage	133.0430		

Parcel Information

Property Class Code	AGR/UNDEV 100 UP ACR
Neighborhood Code	156
Neighborhood Factor	.00
Neighborhood Type	B

Assessment Information

Current AV - Total Land	$1,073,100	Adj. Factor Applied	0.00
Current AV - Total Improv.	$1,800	Average AV/Acre	$0
AV - Tot. Lnd & Improv.	$1,074,900	Appraisal Date	12/1/2018
Reason for Change Code	19		
Prior AV - Total Land	$1,064,800		
Prior AV - Total Improv.	$1,800		

Appendix V: Site Photographs



1 - Mining operations on the eastern side of the site and mounds of sand



2 - Farmland on the eastern side of the site



3 - View of the pond from the eastern side



4 - View of the pond and dock structure from the western side



5 - View of the road on the northern side of the site



6 - View of mining equipment on the northern side of the site



7 - View of grassy area on the northern side of the site



8 - View of farmland on the northern side of the site



9 - Wooded area on the north and north-western side of the site



10 - Marshland and stream on the western side of the site



11 - Northern side of the maintenance shed



12 - Western side of the maintenance shed



13 - View of mining equipment on the northeastern side of the site



14 - Eastern side of the maintenance shed



15 - View of small storage building on the eastern side of the site with empty 1 1 1-trichloroethane AST



16 - Eastern side of the small storage shed



17 - Inside of the small storage shed on the eastern side



18 - Western side of small office building



19 - Eastern side of the office building



20 - Inside of small office building



21 - View of temporary shed west of the pond



22 - View of 5-gallon hydraulic fluid bucket



23 - View of drums containing lubricants near the maintenance shed



24 - View of drums containing diesel exhaust fluid in the maintenance shed



25 - Bulk containers containing an unknown substance



26 - View of two diesel ASTs on the eastern side of the site



27 - View of one pole-mounted transformer on the eastern side of the site



28 - View of one pole-mounted transformer on the northern side of the site



29 - View of stained gravel on the northern side of the site



30 - View of three pole-mounted transformers on the eastern side of the property



31 - View of hydraulic lift on the northern side of the site



32 - View of two pole-mounted transformers on the northern side of the site



33 - Neighboring property - north



34 - Neighboring property - east



35 - Neighboring property - south



36 - Neighboring property - west

Appendix VI: Statement of Qualifications

Firm Profile

Overview

The ECS family of Companies (ECS) is a geotechnical, environmental, construction materials testing and facilities consulting engineering firm headquartered in Chantilly, Virginia. An employee-owned Subchapter S Corporation whose principal owners are engineers, ECS employs more than 900 personnel and is ranked 107 in *Engineering News-Record's* Top 500 Design Firms (ENR, April 2012).

ECS consistently provides our clients with "out of the box" thinking that is aimed toward helping them achieve their strategic goals. We accomplish this at the local level with staff that includes creative individuals who have an interest in supporting our clients' needs as they relate to specific project goals.

ECS delivers creative, value-added solutions through our core service lines:

- geotechnical engineering
- environmental consulting
- construction materials testing
- integrated building / facilities consulting services

RESPONSIVENESS

We pride ourselves on the timely and effective services we provide to our clients. They know that we're part of the team that can help them assess and analyze current field conditions, determine an appropriate course of action, and assist them in reaching project goals with cost-effective, professional and practical solutions. ECS engineers review field and laboratory data and deliver test reports to the project team within 48 hours of observation and testing. ECS provides field and laboratory reports to the project team with the vital information they need — when they need it.

QUALITY AND PROJECT CONTROL

Quality is integrated into our tasks. Our high repeat customer volume and the recommendations from our clients and professional associates are measures of our commitment to quality.

The quality control process includes ECS personnel ranging from field technicians to senior management. As a team and as individuals, we strive to achieve consistent quality during each step of a project. Elements of this process include:

- Maintain an effective, ongoing quality control program to measure and verify performance;
- Monitor daily operational performance of the team and provide timely corrective action;
- Track corrective actions for resolution and appropriateness;
- Review data and reporting requirements for accuracy, precision and completeness;
- Maintain field data records and reports generated by the team;
- Maintain a data review process; and
- Provide training to employees and other team members to educate them and increase their understanding of operating procedures and their roles and responsibilities as they apply to specific project tasks.



Quality control is focused on preventive actions and review of ongoing activities, rather than fixing problems 'after the fact.' It is important that team members be educated regarding site safety protocols, quality control measures, testing procedures and workmanship required prior to their arrival at the job site.

A team review in the initial phase is followed by daily checks to assure continuing compliance with contract requirements. The team leader for each type of work assigned is responsible to ensure that these procedures are communicated and followed by team members. Our internal quality assurance review program exceeds industry standards. At ECS, it's not just about getting the job done — it's about getting the job done right.

Through our internal project management and accounting systems, we track various tasks and associated timing for deliverables to assist in meeting project deadlines. Our internal controls also allow ECS project managers to follow each project's progress with regard to cost expenditures (including subconsultants).

Client success is a core value of our company. ECS provides creative, value-added solutions to satisfy customer objectives, overcome project challenges and help meet applicable federal, state and municipal regulatory requirements. These needs are met by understanding field conditions and having realistic expectations of how they can potentially impact your project's budget and timeline. ECS personnel provide information and make recommendations that offer practical solutions. We anticipate and help moderate project delays as practicable, and proactively prepare the team for project contingencies. These details are relayed early in the project timeline, so that the project team can determine timely, cost-effective technical solutions.

ENVIRONMENTAL SERVICES

The environmental services group performs several types of environmental studies and assessments. ECS's experience with due diligence requirements and knowledge of federal, state and local regulations helps clients manage environmental conditions encountered on project sites.

- ***Phase I Environmental Site Assessments (ESA)*** – An initial stage in the environmental due diligence process, the Phase I ESA is performed to determine if current and historical site and surrounding area activities and uses have resulted in environmental impacts to the property being studied.
- ***Phase II, Soil and Groundwater Exploration and Sampling Study*** – A Phase II environmental study is generally performed to determine the presence and extent of contamination on a property. In most cases, the Phase II Study is performed based on the results of a previous study, such as a Phase I ESA, that has concluded the presence or likely presence of an environmental impact or recognized environmental condition on the subject property. However, Phase II studies can be performed based on a known event, such as a release of potential contaminants at the site which warrants further investigation.
- ***Phase III, Feasibility Study and Remedial Design***– These studies are specific to the site and environmental condition(s) encountered and based on identified contaminants of concern and impacted media. During these studies various remedial alternatives may be explored to determine the most feasible approach to effectively remediate the site. Both active and passive alternatives are considered, as applicable. Current site conditions/development, future development considerations, federal, state and local regulations and guidelines, and site specific constraints are considered in these studies.

- ***Corrective Action Plans*** – These plans outline the actions to be taken to perform remediation of a known and identified condition and are generally completed in accordance with federal, state and local regulations and guidelines. In general a corrective action plan will discuss the site history, the environmental concerns, the extent of the contamination, the impacted media and remedial requirements and remedial endpoints (i.e. clean up goals). The plans may also discuss post remedial activity such as periodic monitoring and engineering controls which may be needed to ensure clean up goals are achieved and sustained and that risk tolerances are acceptable. Often times corrective action plans are approved by a regulating agency prior to implementation; however, depending on the jurisdiction and intended outcome, they may not need to be pre-approved or approved at all.

INDUSTRIAL HYGIENE SERVICES - INDOOR AIR QUALITY

Since most daily life puts us indoors, it is important to provide an office or work environment with good air quality. Indoor air quality is important not only for overall worker health, but also to improve comfort in the workplace and to show that the environment is both safe and healthy for people to work in. Poor indoor air quality may typically produce headaches; eye and throat irritation and can cause or increase respiratory symptoms such as coughing, breathing difficulty, or a full-blown asthma attack. Indoor contaminates can also cause cancer and other diseases such as Pontiac Fever and Histoplasmosis.

Improvements in energy efficiency can have a negative impact on indoor air quality. In some instances, overly tight buildings have been shown to have indoor air quality concerns simply because there is a lack of adequate fresh air ventilation. Other conditions can also contribute to poor air quality. These may be related to activities occurring inside the building (or in the case of a past building renovation, activities which previously occurred in the building), such as improperly vented combustion sources, poor dust control or cleaning practices, smoking, the release of volatile organic compounds from building materials (including furnishings, carpet, paints, woods, and other substances), improper storage or use of chemicals, personal hygiene, or pesticide applications. Other problem conditions may arise in a building from other concerns, including moisture intrusion, sewage backflow, and excessive humidity.

IAQ Investigations should take a holistic approach to evaluate multiple potential concerns, ultimately identifying the underlying cause (or causes) of the problem(s). A key factor is understanding the nature of the complaints by interviewing building occupants. In general, solutions must be approached analytically and scientifically to find more successful, cost-effective measure(s) to address the underlying indoor air quality complaint. ECS will often recommend outside resources to assist with corrective measures to find the most effective means of addressing the problem. It is important to note, however, that there are some instances where our investigation does not find an environmental concern. In these instances, we will stand behind our findings and report the data. There are numerous studies that show poor indoor air quality ***perception*** can be influenced by social factors, poor working conditions, lack of comfort and/or space, etc. and are not necessarily related to an environmental factor.

ECS provides comprehensive IAQ testing services, including:

- Sick Building / Indoor contaminant studies (including asbestos, formaldehyde, mold, soot, dust, volatile organic hydrocarbons, and formaldehyde)
- Unknown contaminant identification
- Mold and moisture intrusion diagnosis – initial and post remediation testing, including remediation protocols, building envelope review, cause and origin diagnosis
- Bird droppings (histoplasmosis) sampling

- Gray and/or black water contamination testing, including remediation protocols
- Legionella / Pontiac Fever sampling
- Ventilation studies
- Methamphetamine contamination sampling
- Radon exposure sampling
- Litigation support
- Moisture intrusion / infrared camera surveys
- LEED® credit testing and analysis
- General Industrial Hygiene consulting

ASBESTOS AND LEAD-BASED PAINT SERVICES

ECS performs a variety of industrial hygiene services to identify the presence and location of asbestos (ACM) and lead-based paint (LBP). ECS can perform surveys to identify the presence of these materials using licensed and accredited staff. We also have accredited staff that can prepare abatement specifications and conduct pre-bid meetings, and assist with contractor selection. Once abatement work starts, ECS has additional licensed staff that can perform contractor oversight and post-abatement testing following completion of asbestos or LBP removal. ECS can prepare plans and specifications for removal projects, conduct pre-bid meetings, assist with contractor selection, prepare operations and maintenance programs and perform air monitoring during and post-ACM and LBP removal.

MOLD

Mold is type of fungi without chlorophyll that reproduces by spores and lives by absorbing nutrients from organic matter. It lives in the soil, on plants, and on dead or decaying matter. Mold produces spores to reproduce, which then settle on surfaces. As surfaces begin to dry, these spores release mycotoxins. When ingested or inhaled, the spores may cause allergic reactions, including flu-like symptoms – itchy, watery eyes, coughing, bronchial and nasal passage irritation and inflammation, runny nose and sneezing. One of the most difficult challenges in properly handling mold is that once mold is present, dispersion can easily occur into unaffected areas, such as into and through HVAC systems. Cross contamination occurs as mold spores move from the initial area of contamination via HVAC systems through the air, possibly reaching interior spaces throughout the entire building.

Mold will not be present without adequate moisture; therefore as part of any sampling program, identification of the moisture intrusion sources is key. Before any mold problem can be corrected, these moisture sources need to be identified and corrected. Mitigation is the correction/restoration of conditions within the first 24-48 hours of a moisture release. These measures can include water extraction, material removal, dehumidification, and use of fans to completely dry the area. Proactive steps are necessary to reduce the potential for mold growth, as several molds will begin to grow within 24-48 hours of a water release event (i.e. Aspergillus sp.) These procedures should be performed by certified/accredited personnel. ECS's building envelope specialists can assist with the diagnosis and corrective measures needed to address mold issues within buildings. As needed, our staff of industrial hygienists can also perform sampling (air, surface, bulk, vacuum) to help determine the presence, type and quantity of fungal spores in the environment. Using this data, ECS staff can prepare remediation guidelines to address building contamination.

Mold Remediation is the identification and correction of the conditions that caused mold growth and the safe removal of mold-impacted materials. Remediation is the appropriate course of action when visible mold is present and/or elevated spore levels are present in the air remedial activity should be

performed by trained and accredited personnel. Accredited personnel can safely remove mold from the indoor environment without causing harm to building workers or occupants.

The final step in resolving a mold concern is post-remediation testing, in which an industrial hygienist returns to the environment to perform visual observations in an effort to evaluate if the remediated areas are dry, visibly clean and free of debris, and that all repairs have been completed. As needed these personnel will take additional surface/air samples 24-48 hours after remedial activities are concluded. Residual air concentrations will be checked against background outdoor concentrations, and testing will be performed to determine whether all materials register at normal moisture levels prior to build back activities. The environmental team will then document the remedial efforts performed, as well as the effectiveness of the final results.

LEED® IAQ TESTING

IAQ testing is a way to obtain credit in a project's path toward LEED® certification. It is important to note that certification can only be granted by the Green Building Certification Institute, which will require third party verification of project compliance with LEED requirements. ECS has significant experience in performing standardized tests on buildings such as educational facilities, high-rise office buildings, hotels, community centers, and individual tenant spaces. While ECS can make recommendations on proper test procedures, the method selected is solely up to the client.

For new construction and major renovations in accordance with Credit 3.2 IAQ Management Plan (part of the LEED rating system for the design, construction and operation of 'green' properties in which credits are allocated, based in part, upon compliance with environmental laws and regulations), two testing options are available:

Air Testing

IAQ air testing protocol requires sampling the indoor air using standard EPA methods for a four- to eight-hour event during normal ventilation operations. Sampling parameters are measured after the installation of all interior finishes, but prior to occupancy, and include total volatile organic compounds, carbon monoxide, formaldehyde, PM-10 (Particulate Matter), and 4-phenylcyclohexane. ECS can advise on proper test procedures and discuss common problems encountered with the testing, so that we can help increase the chances of a successful sampling event. These factors include completing activities such as painting, and the application of adhesives and cleaning chemicals well before testing can help prevent false positive sample results.

IAQ testing can provide a cost-effective method of securing this LEED® point. ECS personnel will provide expert consultation, prepare the necessary documentation and streamline the LEED® certification process.

Clean Air Flush-Out Option

This option is sometimes a more cost effective alternative when compared with IAQ air testing. Due to temperature and humidity requirements, the flush-out option has seasonal limitations, which often prohibit testing during either summer or winter months. This option requires running the building's ventilation systems 24-hours a day for multiple weeks to obtain the required flush-out volume. When combined with the tracking costs charged by mechanical consultants, this can sometimes lead to a significant cost and time component.

OSHA COMPLIANCE SAMPLING

The United States Department of Labor – Occupational Health and Safety Administration (OSHA) regulations state that "Each employer shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or

serious physical harm to his employees " (General Duty clause under 29 CFR 1910). In the work place, employees can be exposed to a variety of chemical and physical hazards, including dust, vapors, noise, radiation, etc. OSHA and other government and non-government entities have various exposure limits to protect employees from illness or death due to the existence of hazardous conditions.

ECS's staff of trained industrial hygienists and environmental scientists can work with employers in evaluating various types of occupational exposures and determine employee exposure levels, as well as evaluating whether they are in compliance with regulatory standards and voluntary guidelines. In addition, ECS can assist employers in correcting workplace settings where overexposure situations may exist. ECS can work with employers to develop long-term sampling programs and supply trained staff to perform monitoring at your facility.

ECS's safety and health services also include:

- Environmental, Health and Safety Audits
- Qualitative and quantitative Industrial Hygiene Studies
- Various types of OSHA-compliance surveys, including noise
- Preparation and presentation of Safety Programs

Training

ECS's staff of trained industrial hygienists and environmental scientists can also perform training for the individual needs of our clients. ECS staff includes OSHA-authorized instructors who can perform both OSHA 10- and 30-hour safety courses, HAZWOPER classes (both 24- and 40-hour, along with refresher classes), and Mold Inspector, Mold Supervisor, and Mold Worker classes. We can also perform specific safety training dependent upon specific client needs, including respirator training, HAZCOM, lockout tag out, confined space, etc. ECS can also perform lead awareness training under OSHA construction standards.

HAZARDOUS MATERIALS STUDIES FOR BUILDING RENOVATION/DEMOLITION

When it comes to tearing down a building, the process is not as easy as it once was. In addition to requirements for asbestos testing, there may also be concerns involving lead-based paint, mercury, polychlorinated biphenyl, chlorofluorocarbon, hydraulic oils (such as in elevator lifts), radioactive materials (in some emergency exit signs) and so on.

ECS's staff of trained industrial hygienists and environmental scientists can assist the building owner by conducting surveys tailored to the building type being renovated or demolished. Following the surveys, our staff can develop abatement specifications to address specific hazardous materials identified and help the owner through the "regulatory morass" of trying to demolish or renovate a building. During actual abatement activities, ECS can provide project oversight /Title II services and monitor the abatement through project completion.

Our staff has significant experience with large, complex projects, including the demolition of entire hospitals, industrial complexes, school buildings and Department of Defense structures. With an understanding of the applicable hazardous waste regulations, ECS works with our clients to evaluate and implement innovative alternatives and potential cost-savings options.

Hazardous materials identification and management services include:

- Initial surveys, inspections and analysis
- Preparation of plans and specifications
- Conduct pre-bid meetings
- Contractor selection assistance
- Preparation of removal specifications, operation and management programs

JULIA KOBILKA

ENVIRONMENTAL SCIENTIST

SKILLS

Phase I and II ESAs
Wetland Delineation
Habitat Restoration
Fisheries Management

EDUCATION

Bachelor of Science, Environmental Science, Policy, and Management, Conservation and Resource Management Track, 2021, University of Minnesota - Twin Cities, Minneapolis, MN

PROFESSIONAL PROFILE

Ms. Kobilka is an Environmental Scientist with ECS Mid-Atlantic, LLC. Her primary duties include performing environmental site assessments, groundwater and soil investigations and media sampling, hydrogeologic studies, remediation system installation, operation and maintenance and industrial hygiene services including asbestos, lead-based paint and indoor air quality assessments and underground storage tank assessments.

PROJECT EXPERIENCE

- Proposed Hayes Starbucks P1ESA, HAYES, VA
- Dam Neck Building 127 Water Sampling, VIRGINIA BEACH, VA
- Holland Road Phase 1 ESA, Suffolk, VA
- Tidal Wave Chesapeake-ESA, Chesapeake, VA

GARNETT B. WILLIAMS, PG
ECS MID-ATLANTIC, LLC

EDUCATION

Bachelor of Science, 1983
Geology
James Madison University

REGISTRATIONS

- Professional Geologist: VA

CERTIFICATIONS

- National Certification Program for Construction Code Inspectors
- Asbestos Inspector: VA
- Professional Wetland Delineator: VA
- e-Railsafe

MEMBERSHIPS

- Association of Groundwater Scientists and Engineers
- Virginia Association of Wetland Professionals

EXPERIENCE

Mr. Williams serves as senior environmental project manager for the Mid-Atlantic region. Responsibilities include coordinating and preparing Phase I/Phase II Environmental Site Assessments, facility audits, environmental site characterization studies, remediation feasibility studies, coordinating and implementation of corrective action plans and contaminant remediation efforts, and wetlands delineation studies, and associated environmental permitting. Mr. Williams has worked on numerous VDEQ State Lead projects since 2004 involving both petroleum and hazardous substance/waste impacted properties.

PROJECT EXPERIENCE

Blue Ridge Community College, Weyers Cave, VA - This project consisted of an emergency response mold assessment and final clearance sampling and screening following a catastrophic release of water, when a thrust joint failed on a 10-inch diameter gravity water line inside the mechanical room. The amount of water released was unknown but a substantial area of the first floor was flooded by the incident. The bulk of the impact occurred to gypsum drywall and limited areas of the wood sub-floor in the theater. Dispatched a remediation subcontractor to the site to deploy drying fans and large commercial de-humidifiers, used a FLIR Systems ThermaCAM to perform nondestructive scanning, and obtained moisture readings using a Protimeter Moisture Measuring System.

Bohler-Uddeholm, New Boston, VA - This project consists of environmental services for a former hazardous waste management unit operating under a Resource Conservation and Recovery Act Post-Closure Care Permit, and a recently identified former hazardous waste management unit undergoing investigation for potential inclusion in the existing permit at the site. Conducting semi-annual and quarterly groundwater monitoring, providing statistical analysis and reporting, coordinating and submitting reports to the Virginia Department of Environmental Quality office, preparing a permit application for renewal of the existing 30-year Post-Closure Care Permit, conducting soil and groundwater sampling, installing groundwater monitoring wells, conducting an annual review, and preparing a Spill Prevention Control and Countermeasure Plan.

Former Star City Lumber, Roanoke, VA - This project consisted of environmental services for four buildings located in a commercial/industrial area identified as first being developed as part

of the Johnson Carpet Furniture Company in 1947 with buildings being added and subtracted from the property for many years. The site was also identified as part of the Singer Furniture facility from at least 1947 to at least 2000. The Singer facility is listed at a leaking underground storage tank, a registered storage tank, and Voluntary Remediation Program listed facility. Evaluated the probability of impact to the surface water, groundwater and/or soils within the property boundaries, evaluated historical land usage to identify previous conditions, evaluated the potential for on-site and off-site contamination, conducted a Phase I Environmental Site Assessment, and provided engineering controls or appropriate placement and treatment of soils during construction.

Fort Rucker, Small Arms Ranges, Washington, DC - This project consisted of environmental services to support the U.S. Army Environmental Center in a demonstration of small arms range berm improvement technologies, to eliminate or minimize metal contamination of soil and surface water, and enable recovery of lead from spent rounds. Developed a technical sampling plan, performed site characterization studies, collected data to evaluate berm stabilization and metal containment technologies, implemented and studied engineering and environmental design controls, designed and constructed a prototypical range and berm, and installed permanent Isco stormwater samplers in the re-constructed range floor and sedimentation basin outlets.

Handley High School Additions and Renovations, Winchester, VA - This project consisted of additions and renovations to the existing 80-year-old structure to update the existing facilities and to provide additional space for classrooms, offices and activities. Conducted inspections for the presence and abatement oversight of hazardous materials, provided construction material testing and inspection services, performed laboratory tests, analyzed the field and laboratory data to develop engineering recommendations, and provided testing and observation services during construction.

Korean Orthodox Presbyterian Church, Herndon, VA - This project consisted of environmental services for a building constructed in 1965, originally used as a two-story warehouse building designed for research. The Korean Orthodox Presbyterian Church purchased the property to provide church services to the Korean and English speaking community. Conducted an asbestos and lead-based paint survey of the building, and prepared an Operations and Maintenance Plan for the asbestos-containing materials identified at the site.

Oxhampton Estates, Lorton, VA - This project consisted of environmental services on a private shotgun and small arms range previously used for recreational shooting for over 30 years. A single station shotgun trap field and a two-lane rifle/pistol range with an earthen backstop were identified on the property. Collected soil and sediment samples using hand augers and analyzed for total and

leachable concentrations of metals, determined where concentrations of lead exceeding residential screening levels had accumulated based on the distribution of lead shot fall-out from the trap range, determined which areas of the site required mixing and burial or offsite disposal of lead-impacted soils.

Port Republic Road, Harrisonburg, VA - This project consisted of a road widening to four, 12-foot lanes with curbs and gutters, a 16-foot raised median, crossovers and turn lanes at all major intersections. Additional construction includes pedestrian and bicycle accommodations to include a multi-use path for bicycles and pedestrians on the east side of the road and a sidewalk on the west side of the road. Provided a subsurface investigation and conducted laboratory testing services to support engineering and design of pavements and structures.

Rockingham County Small Arms Range, Harrisonburg, VA - This project consisted of environmental services for a small arms municipal firing range adjacent to the Rockingham County Landfill to evaluate the concentration and distribution of lead in the backstop, range floor and runoff pathways. Prepared a site specific Health and Safety Plan, collected and analyzed soil, sediment, and groundwater samples for total and leachable concentrations of metals, estimated quantities of soil requiring excavation and treatment, completed an assessment of remedial technologies, performed oversight of the treatment process and final confirmation sampling, and transported treated soils to the adjacent municipal landfill and used as cap and cover materials.

Rockingham Memorial Hospital, Harrisonburg, VA - This project consisted of the construction of a proposed six-story, 575,000-square-foot hospital building. The new hospital will feature 238 beds, a rehabilitation/fitness center, a cancer center, a nature preserve, and state-of-the art medical technology. Currently, officials are working with a group from James Madison University to create a farm on the hospital's campus that would serve organic foods to the hospital and surrounding community. Performed a comprehensive geotechnical study, conducted a geophysical investigation for sinkhole assessment, conducted a Refraction Microtremor survey for seismic site classification, and performed construction testing and inspection for bulk earthwork operations, roads, utilities, and other infrastructure.

Root Property, Augusta County, VA - This project consisted of approximately 120 acres of undeveloped agricultural land for the construction of a large scale commercial development, associated parking lots, travel ways, emergency access, and utility corridors necessary for project completion. The project involved the disturbance of 0.23 acres of emergent wetlands and approximately 1,900-linear-feet of stream through grading, and building and road construction. Completed the wetland delineation, classification, and stream assessments of over one-mi of perennial and intermittent streams utilizing the Unified Stream Methodology, participated in the

design phase and project planning to minimize impacts to the maximum extent practicable, quantified the current functionality of the aquatic system, determine the impacts of the proposed project, and calculate the required compensatory mitigation requirements, and designed all aspects of stream restoration plan.

Russell Farm, Phase I Cultural Resources Survey, Loudoun County, VA - This project consisted of the development and implementation of a Phase I cultural resources survey of the 150-acre Russell Farm tract. The project involved historic architectural evaluation, the development of a field research model meeting the Virginia Department of Historical Resources guidelines, and completion of background and archival studies. Identified and recommended 11 previously unknown archaeological sites as ineligible for the NRHP, delineated the recorded archaeological sites, and evaluated and recommended the property as not eligible for the NRHP during Phase II.

Shenandoah Gas Line Extension, Middletown, VA - This project consisted of environmental services for an eight-inch, high-pressure, liquid, natural gas pipeline along the existing Washington Gas/Shenandoah Gas easement extending 4.5-miles from Middletown north to Stephens City, Virginia. The new installation impacted areas of federally regulated waters of the U.S. Army Corps of Engineers (USACE) at 17 locations identified as palustrine emergent (PEM) wetland areas, intermittent channels with fringe PEM wetlands, intermittent channels, and two perennial stream crossings. Performed wetland and stream bed delineation, historic and archeological surveys, and a threatened and endangered species assessment, and prepared the final permit application for submission to the U.S. Army Corps of Engineers and the Virginia Department of Environmental Quality.

Virginia School for the Deaf and Blind, Environmental, Staunton, VA - This project consisted of new construction and renovations to the Virginia School for the Deaf and Blind, a state agency owned by the Board of Education providing special education services. Performed a comprehensive Asbestos Hazard Emergency Response Act survey, conducted lead-based paint surveys following Housing and Urban Development guidelines, conducted a hazardous materials survey to include polychlorinated biphenyls and radon in light, electrical fixtures, and mercury switches, and prepared an Environmental Impact Report for the Department of General Services and Department of Energy review.

Virginia School for the Deaf and Blind, Environmental Impact Report, Staunton, VA - This project consisted of environmental services for 75 acres of land for the proposed construction and renovations for the Virginia School for the Deaf and Blind, a state agency owned by the Board of Education providing special education and related services to deaf and blind children. The consolidation of the two campuses will

consist of 21 buildings consisting of dorms, classrooms, maintenance and support facilities, and faculty/administrative offices. Completed an Environmental Impact Report following the "Procedures for Environmental Impact Review of Major State Facilities," and Section 708 of the "Construction and Professional Services Manual," and provided alternatives to the proposed construction, as the intended plan adversely affected the wildlife habitat and environment.

Virginia State Lead Program, Valley View Plaza, Penn Laird, VA - This project consisted of environmental services to evaluate alternate water supply scenarios to bring clean potable water to a former abandoned gasoline/service station now operating as an antique store called Valley View Plaza. Prepared an initial Corrective Action Plan, performed engineering studies to analyze a proposed waterline extension, provided recommendations to install a replacement well with sufficient distance from the plume, coordinated bid solicitation for drilling the well and final plumbing of the water line, and monitored installation of the replacement well.

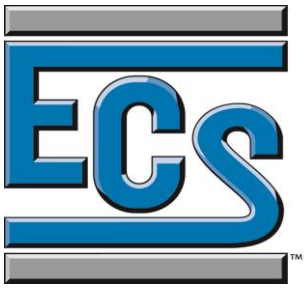
Western State Hospital, Staunton, VA - This project consisted of a proposed 246-bed hospital with a gross floor area of approximately 330,000-square-feet to replace the existing hospital to the south. The building is a multi-story structure with slab-on-grade and includes a two-story central section with a large interior courtyard. Performed a wetland delineation, conducted a Phase IA archeological survey, review of threatened and endangered species, and a final habitat assessment, completed a geotechnical study, drilled and sampled soil test borings, performed rock coring, measured shallow water table elevations, and provided engineering recommendations pertaining to subsurface conditions, foundations, paved areas, construction of stormwater ponds, and general earthwork.

Winebrenner's Crossing Tract, Archaeological Survey, Martinsburg, WV - This project consisted of a Phase I Archaeological survey of 336 acres of land on the Winebrenner's Crossing tract located in the southern portion of Berkeley County. ECS conducted the survey on an expedited project schedule and concluded work within the prescribed budget. Performed shovel testing on land with medium to high probability of producing cultural resources, conducted archival research, which produced a number of maps with previously recorded archaeological sites and architectural resources near the project area, discovered six previously unrecorded archaeological sites and three previously unrecorded archaeological locations.

Appendix VII: Acronyms

List of Common Acronyms

AULs	Activity and Use Limitations
AST	Aboveground Storage Tank
ASTM	American Society for Testing and Materials
ACM	Asbestos Containing Materials
BER	Business Environmental Risk
CORRACTS	CERCLA Corrective Action List
NPL	CERCLA National Priorities List
NFRAP	CERCLA No Further Remedial Action Planned
CERCLA	Comprehnsive Environmental Response Cleanup Liability Act
CESQG	Conditionally Exempt Small Quantity Generator
CREC	Controlled Recognized Environmental Condition
ERNS	Emergency Response Notification System
EC	Engineering Controls
HIST LF	Historical Landfill
HREC	Historical Recognized Environmental Condition
IC	Institutional Controls
LQG	Large Quantity Generator
LBP	Lead Based Paint
LTANKS	Leaking Tanks
LUST	Leaking Underground Storage Tank
REC	Recognized Environmental Condition
RCRA	Resource Conservation and Recovery Act
RCRIS	Resource Conservation and Recovery Information System
SQG	Small Quantity Generator
SWF/LF	Solid Waste Facility/Landfill
SHWS	State Hazardous Waste Sites
UST	Underground Storage Tank
USGS	United States Geological Survey



Geotechnical Engineering Services Report

Layden Property
Smithfield, Virginia
Prepared For

GREENWOOD HOMES

999 Jolly Road
Williamsburg, Virginia 23188

Prepared By
Engineering & Testing Services, Inc.
5226 Indian River Road
Suite 103
Virginia Beach, Virginia, 23464
Telephone: 757-306-1040
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ENGINEERING & TESTING SERVICES, INC.

October 25, 2023

To: Greenwood Homes
999 Jolly Pond Road
Williamsburg, Virginia 23188

Attn: Mr. Chris Thompson

Re: **Geotechnical Engineering Services Report**
Layden Property
Smithfield, Virginia
ETS Report No.: ETS-23E159-1

Dear Mr. Thompson:

Transmitted herewith is the Geotechnical Engineering Services Report for the above referenced project. This study was authorized by Hunter Taylor on August 10, 2023 and prepared in general accordance with ETS Proposal No.: ETS-23P215 dated August 2, 2023 and current industry practices as well as from recent general discussions regarding the proposed construction.

This report contains the results of our field exploration program and laboratory testing procedures along with an engineering interpretation of these data with respect to the available project characteristics, and our recommendations to aid in the design and construction of foundations and other earth related components of the project. We will store the soil samples for 30 days after which time they will be discarded, unless you request otherwise.

We appreciate the opportunity to be of service to you on this project. If we can be of further assistance, such as providing our inspection services during construction, or if you have any questions regarding this report, please contact our office at 757-306-1040.

Respectfully Submitted,
Engineering & Testing Services, Inc.

COMMONWEALTH OF VIRGINIA
10/25/2023
CHARBEL T. NABHAN
No. 25133
PROFESSIONAL ENGINEER

Charlie T. Nabhan, PE
Principal Geotechnical Engineer
VA License No.: 025133

Samrat Raut, MSCE, EIT
Geotechnical Engineer

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1.0 Purpose and Scope of Study

The purpose of this study was to determine the general subsurface conditions by drilling soil test borings and to evaluate the subsurface soils characteristics for foundations, and other earth supported components of the proposed residential dwellings to be constructed at the Layden Property project site in Smithfield, Virginia.

Also included is an evaluation of the site with respect to potential construction problems and recommendations dealing with the earthwork and quality control during construction. The recommended construction procedures are considered necessary to verify the subsurface conditions and to aid in ascertaining that the soils connected phases are properly performed.

2.0 Site and Project Characteristics

The project site, designated as Layden Property, is located in Smithfield, Virginia. Specifically, the proposed project site is located east and southeast of the intersection of Benns Church Boulevard and Cypress Run Drive. To explore the potential characteristics of the proposed construction area, an ETS engineer visited the above referenced project site. During the time of the site visit, the site was fairly level and open field situated along the bank of a man-made lake. Debris and fill materials such as brick, stone, wires, bottles were observed at various location along the bank of the lake.

It is our understanding that the proposed development at this site will consist of building residential dwellings, roadways, and pavements. Underground utility lines will be designed and installed at this project. The proposed residential dwellings will be supported by column and walls with slab on grade construction. Based on our experience with similar projects, the maximum column and wall loads associated with the residential structures are not expected to exceed 50 kips and 4 kips per foot, respectively.

If any of the proposed design information noted above is incorrect or has changed, please inform ETS so that we may amend the recommendations presented in this report, if appropriate.

3.0 Field Exploration Program

To explore the general subsurface soil types and to aid in the geotechnical study of foundations and other earth supported components, eleven 25-foot Standard Penetration Test (SPT) Borings, designated as B-1 through B-11, were drilled within the proposed project site as shown in the boring locations plan included in Appendix I of this report. In addition, ten 10-foot deep SPT borings, designated as CBR-1 through CBR-

10, were drilled within the proposed pavement area. Also, two 25-foot deep SPT borings, designated as DB-1 and DB-2, were drilled adjacent to an existing pond.

The SPT borings were performed with the use of a power drill rig using mud-drilling procedures. The soil samples were obtained with a Split-Spoon Sampler in general accordance with the Standard Penetration Test (SPT) procedure (ASTM D1586). These samples were collected continuously from the ground surface to a 10-foot depth and at 5-foot intervals thereafter. The soil samples were obtained with a standard 2-inch outside diameter and 30-inch-long split spoon sampler with each SPT. The split spoon sampler was driven into the soils 24 inches by a 140-pound hammer falling approximately 30 inches. The number of blows required to drive the sampler each 6-inch increment of penetration was recorded and is noted on the boring logs. The recorded SPT N value (blows per foot) noted in this report is the sum of the second and third penetration increments. The SPT borings were located and staked in the field by others. The approximate boring and CBR locations are shown on the attached plan included in Appendix I of this report. The boring logs and profiles are included in Appendix II and III of this report, respectively.

In addition to the SPT borings, ten bulk soil samples, designated as CBR-1 through CBR-10, were collected from the site. The CBR bulk soil samples were collected from a depth of about 12 to 24 inches below grades. The bulk soil samples were collected and returned to our AASHTO Accredited Laboratory for performing California Bearing Ratio (CBR) testing in accordance with ASTM Standards.

4.0 Laboratory Testing Procedures

Representative portions of all soil samples collected during field exploration study were sealed, labeled, and transferred to our AASHTO Accredited Laboratory for classification and analysis. Following the sampling procedures, the soil specimens were examined by our geotechnical staff engineer and visually classified in accordance with the Unified Soil Classification System (USCS) under the direction of a Professional Geotechnical Engineer, and in accordance with ASTM D2487 and ASTM D2488 test methods.

Several test specimens retrieved from the SPT borings were selected and subjected to natural moisture content (ASTM D2216), Atterberg Limits (ADTM D4318) and Sieve Analysis testing (ASTM D1140). The purpose of these tests was to substantiate the visual soil classifications and to estimate in-situ soil design parameters. The summary of laboratory test results is included in the Appendix IV of this report.

The CBR bulk soil samples were subjected to Natural Moisture Content (ASTM D2216), Atterberg Limits (ASTM D4318), No. 200 Sieve Analysis (ASTM D1140), Moisture-Density Relationship testing (ASTM D698) and California Bearing Ratio (CBR) testing (ASTM D1883). The summary of CBR test results is included in Appendix V of this report. The Moisture-Density Relationship curves and the California Bearing Ratio Graphs are included in Appendix VI and VII, respectively.

5.0 Subsurface Soil Conditions

5.1 SPT Borings B-1 through B-11

The results of our field exploration program indicated the presence of 2 to 4 inches of topsoil materials at the boring locations. The thickness of the topsoil materials will vary between the boring locations. Underlying the topsoil materials, fill materials were encountered at SPT boring locations of B-1 through B-3, and B-7 through B-11. The depth of the fill materials, at the locations of the borings previously mentioned, ranged from 2 feet to 13 feet below existing grades. The depth of fill materials is graphically presented in Figure 1. Based on our experience with this project the depth of fill materials will vary between boring locations and throughout the site. Underlying the fill materials and extending to boring termination depths of 25 feet, the subsurface soils mainly consisted of sands (SP, SP-SM, SM, SC) with varying amounts of silt and/or clay. The Standard Penetration Test results, N-values, recorded within the native sandy soils encountered at the test borings ranged from 2 to 26 blows per foot, indicating that these soils were very loose to medium dense relative density. A layer of cohesive soils (CL, and CH) was sandwiched between fill materials and sandy materials at the boring locations of B-6, B-7, and B-10. The Standard Penetration Test results, N-values, recorded within the clayey soils encountered at the test borings ranged from 6 to 15 blows per foot, indicating firm to stiff consistency. The SPT blow counts profiles at the boring locations are presented in Figure 2 on the next page.

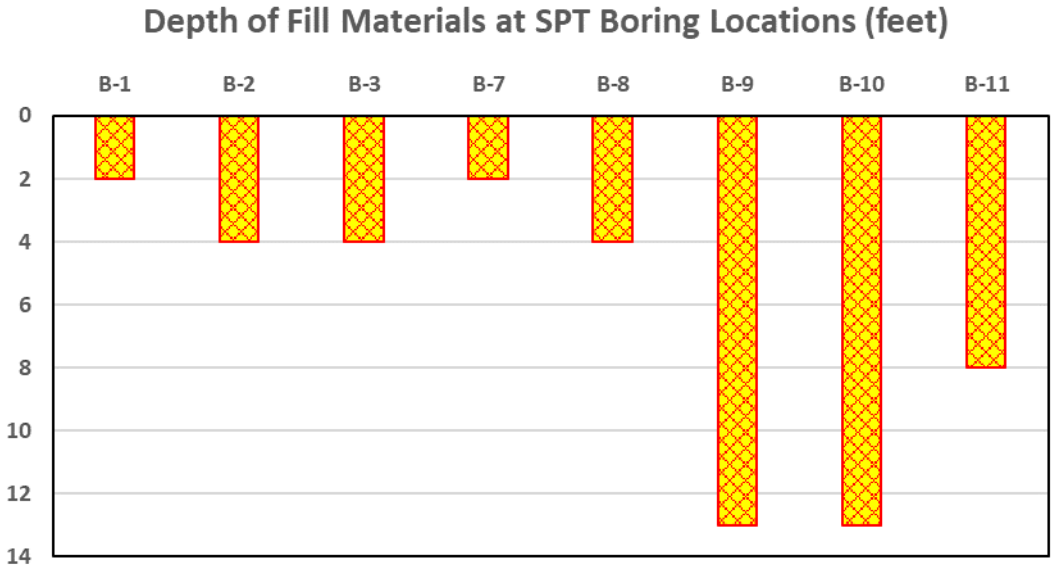


Figure 1. Depth of fill materials at SPT boring locations

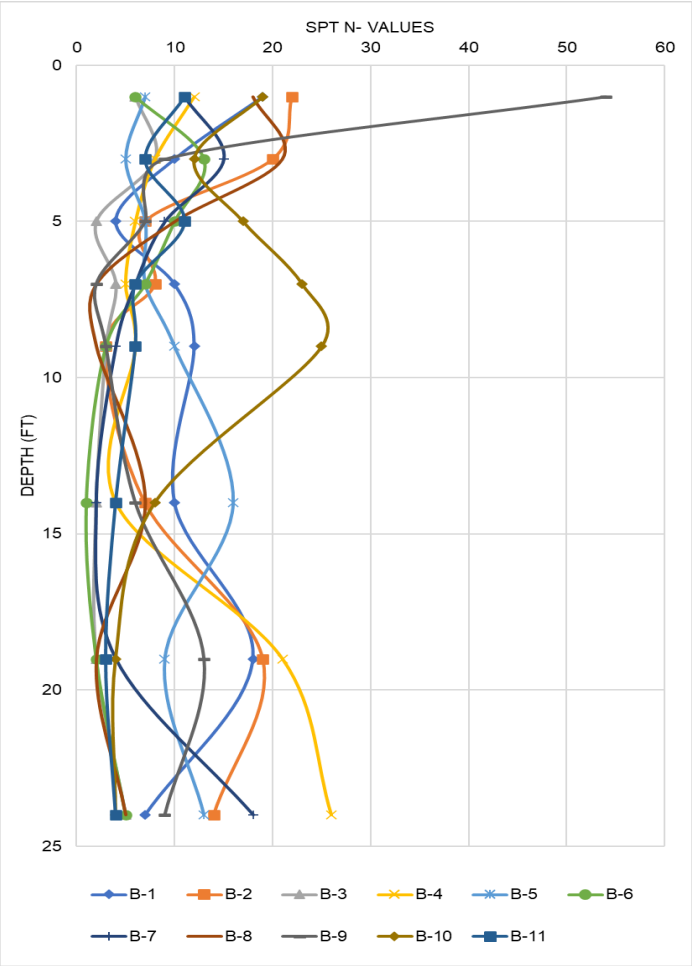


Figure 2: Soil resistance through the soil strata at the boring locations

5.2 SPT Borings CBR-1 through CBR-10

The results of our field exploration program indicated the presence of 2 to 5 inches of topsoil layer at the CBR boring locations. The thickness of the topsoil layer will vary between the boring locations. Underlying the topsoil materials, approximately 2 feet of fill materials were encountered at SPT boring locations of CBR-2, CBR-6 through CBR-8. Based on our experience with this project the depth of fill materials will vary between boring locations and throughout the site. Underlying the fill materials and extending to boring termination depths of 10 feet, the subsurface soils mainly consisted of sands (SP, SP-SM, SM, SC) with varying amounts of silt and/or clay. The Standard Penetration Test results, N-values, recorded within the native sandy soils encountered at the test borings ranged from 3 to 23 blows per foot, indicating that these soils were very loose to medium dense relative density. A layer of cohesive soils (CL) was encountered between the depths of 3 inches and 5 feet below the existing site grades at

the boring locations of CBR-7, CBR-9, and CBR-10. The Standard Penetration Test results, N-values, recorded within the clayey soils encountered at the test borings ranged from 9 to 32 blows per foot, indicating stiff to hard consistency. The SPT blow counts profiles at the boring locations are presented in Figure 3 below.

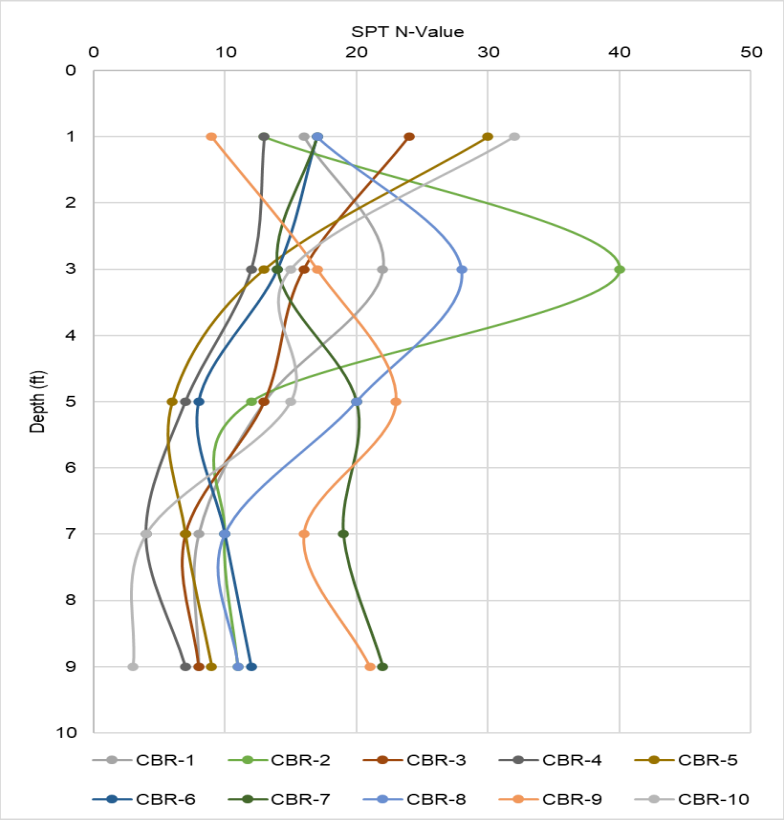


Figure 3: Soil resistance through the soil strata at the boring locations

5.3 SPT Borings DB-1 and DB-2

The results of our field exploration program indicated the presence of 3 inches of topsoil layer at the DB-1 and DB-2 boring locations. The thickness of the topsoil layer will vary between the boring locations. Underlying the topsoil materials, approximately 4 feet of clay materials were encountered at SPT boring location of DB-1. The Standard Penetration Test results, N-values, recorded within the clayey soils encountered at the test borings ranged from 9 to 22 blows per foot, indicating stiff to very stiff consistency. Underlying the topsoil materials and extending to boring termination depths of 25 feet, the subsurface soils mainly consisted of sands (SP, SP-SM, SM, SC) with varying amounts of silt and/or clay. The Standard Penetration Test results, N-values, recorded within the native sandy soils encountered at the test borings ranged from 4 to 29 blows

per foot, indicating that these soils were very loose to medium dense relative density. The SPT blow counts profiles at the boring locations are presented in Figure 4 below.

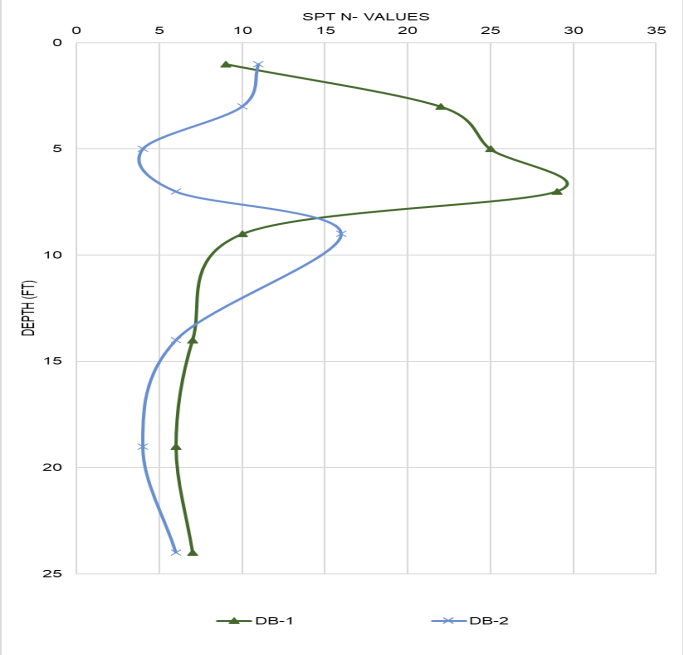


Figure 4: Soil resistance through the soil strata at the boring locations

6.0 Groundwater Observations

6.1 Groundwater Level

The groundwater level was measured at each boring location immediately following completion of drilling operations. The ground water table at the location of the borings was found at a depth of about 5 to 13 feet below the existing grades. The relatively higher variation in water table at the boring locations is due to difference in the elevations of the SPT boring locations. It should be noted that the ground water levels tend to fluctuate during periods of prolonged drought and extended rainfall. In general, high groundwater levels are normally recorded in late winter and early spring.

6.2 Groundwater Concerns

It is expected that dewatering will be required for excavations which extend below the water levels. Dewatering at depths below the groundwater table from existing grades may require well pointing. It is recommended that the contractor determine the actual groundwater levels at the time of construction to determine groundwater impact during construction at this project. Groundwater conditions will vary with environmental

variations and seasonal conditions, such as the frequency and magnitude of rainfall patterns, as well as man-made influences, such as existing swales, drainage ponds, underdrains and areas of covered soil (asphalt and concrete parking lots, sidewalks, etc…It is recommended that the contractor determine the actual groundwater levels at the time of construction to determine groundwater impact during construction at this project.

7.0 Construction Recommendations

7.1 Clearing and Subgrade Preparation

Prior to construction, the location of any existing underground utility lines within the construction area should be established, and these utilities relocated to an area that will not be affected or interfere with construction. If underground pipes are not properly integrated, removed or plugged, they may serve as conduits for subsurface erosion, which subsequently may result in excessive settlement of foundations.

It is recommended that the proposed structural areas be cleared of topsoil, organic matter, fill materials, excessively wet or soft soils and any other unsuitable materials encountered during construction to the satisfaction of the Geotechnical Engineer. A cut of approximately 2 to 6 inches will be required to remove the topsoil materials from within the proposed structural areas. In addition, deeper undercut will be required at various locations to remove the unsuitable fill materials from within the structural areas. Any buried debris encountered during construction should be removed under the observation of the Geotechnical Engineer. It is recommended that the clearing operations extend laterally, at least 5 feet beyond the perimeter of the proposed construction limits.

After the subgrade soil elevations within the proposed structural areas have been established, they should be proofrolled under the observation of ETS personnel. Any pumping and unstable areas observed during proofrolling should be undercut and/or stabilized at the directions of the Geotechnical Engineer. It is recommended that, within the proposed structures area, natural soils at the proposed subgrade elevations should be compacted to a dry density of at least 95 percent of the standard proctor maximum dry density (ASTM D698). The Geotechnical Engineer can waive the compaction requirement if firm subgrade soils are observed during the proofroll operation.

7.2 Structural Fill and Placement Requirements

All structural fill should be compacted to a dry density of at least 95 percent of the Standard Proctor maximum dry density (ASTM D698). Any material to be used for backfill or compacted fill should be tested by the Geotechnical Engineer prior to placement to determine if they are suitable for the intended use. Imported structural fill

materials should consist of sand or gravel with less than 20 % passing the No. 200 Sieve (0.074 mm) and classified as SP, SM, SW, GP, and GW.

All structural fill materials should be placed in 10-inch loose lifts and be compacted to a dry density of at least 95 % of the Standard Proctor maximum dry density (ASTM D698). A soils technician working under the direction of a licensed professional Geotechnical Engineer should perform field density tests on each lift as necessary to determine that adequate compaction is achieved.

Backfill material in utility trenches to be located within the proposed building and pavement areas should consist of structural fill (as described above) and should be compacted to at least 95 percent of ASTM D698. This fill should be placed in 4 to 6-inch loose lifts when hand compaction equipment is used.

8.0 Engineering Evaluation & Foundation Discussion

Currently, this site is an active borrow pit; therefore, earthwork activities such as cut and fill are possibly being conducted daily at this project site which may affect the depth of fill noted on the boring logs. In this regard, prior to construction, test pits and hand auger borings should be conducted within each structure area. The purpose of the test pits and handauger borings is to determine the shallow subsurface soils conditions and determine their suitability for foundation construction. Recommendations to drill SPT borings, if any required, and ground improvements will depend on the nature and composition of the soils encountered at the test pits and handuager boring's locations.

Based on the results of our field exploration program at this site, fill materials were encountered at some of the boring locations as described under section 5. At the time of this reporting, a preliminary layout of the proposed construction was provided to ETS; however, the grading plans were not available. In general, ground improvements will be required to support the proposed structures located within the vicinity of the borings where fill and debris materials encountered. For approximate depths of the fill materials encountered at this site, the reader is referred to the boring logs included in Appendix II of this report. The ground improvements may consist of over excavations the fill materials from underneath all foundations as directed by the Geotechnical Engineer and backfill with either # 57 stone or flowable fill. It is possible that some of the residential dwellings may be required to be supported on piles(helical or timber) due to excessive amounts of fill buried under the surface. All debris encountered during construction should be removed from within structural areas under the supervision of the Geotechnical Engineer.

Residential structures located within native and non-disturbed soils may be supported by shallow spread footings bearing on the native subgrade soils or properly placed structural fill materials. All footing foundations for the proposed buildings located within native and non-disturbed soils may be designed using a net allowable soil pressure of 2,000 pounds per square foot (PSF). In using net pressures, the weight of the footing

and backfill over the footing need not be considered. Hence, only loads applied at or above the finished ground floor need to be used for dimensioning the footings.

Once the grading plans are developed and the type of construction is determined, a comprehensive geotechnical program consisting of additional borings and/or test pits should be conducted at this site. The purpose of the comprehensive geotechnical program will be to provide foundation design and construction recommendations for the proposed structures.

9.0 Analysis of Existing Pond

Two 20-foot deep SPT borings, designated as DB-1 and DB-2, were drilled within the vicinity of an existing pond located at this property. The purpose of these borings will be to determine the soils conditions and conduct slope stability analyses of the embankment of the pond. At the time of this reporting, the depth of the water within the pond and the topography of the pond and its embankment were not available. Once the topography become available, ETS will conduct the slope stability analyses and submit the results via a report prepared by a professional engineer.

10.0 Pavement

Ten bulk soil samples were collected from the location of SPT borings CBR-1 through CBR-10 from a depth of about 12 to 24 inches below existing grades. The bulk soil samples consisted mainly of silty sand (SM) and cohesive soils (CL & CL-ML). The CBR tests conducted on the bulk soil samples indicated a soaked CBR values ranging from 3.0 to 20.7 at 0.1-inch penetration. The highest and lowest CBR values from the ten (10) tests were rejected in conformance with the *VDOT Pavement Design Guide for Subdivision and Secondary Roads in Virginia*; thus, the value of 8.4 is the average of the remaining CBR test values. The average soaked CBR value should be multiplied by a factor of two-thirds to determine a pavement design CBR value. The two-thirds factor provides the necessary safety margins since the specified time per ASTM standards for soaking may not be long enough to give the minimum CBR strength of some tested soils, to compensate for any non-uniformity of the soil, and to account for any low-test results not considered when computing the average. Therefore, a design CBR value of 5.6 should be used for pavement design purposes. Based on the soils conditions encountered at the boring locations and review of the Pavement Design Guide for Subdivision and Secondary Roads in Virginia published by the Virginia Department of Transportation (VDOT), the subgrade soils at the anticipated design elevations are expected to have support characteristics and Soil Resiliency Factor of 2 to 3.

It should be noted that the CBR tests were performed under optimum conditions on compacted samples. Therefore, it is suggested that the CBR values be applied conservatively. It is recommended that considerations particular to these subgrade soils

be made beyond those based solely on CBR values. The following suggestions are therefore made regarding pavements construction.

- Following pavement rough grading operations, the exposed subgrade soils should be proofrolled under the observation of the Geotechnical Engineer. This proofrolling should be accomplished with a fully loaded dump truck or 7 to 10-ton drum roller to check for pockets of soft material hidden beneath a thin crust of better soil. Any unsuitable materials thus exposed should be removed and replaced with a well-compacted structural fill material. The inspection of these phases should be performed by the Geotechnical Engineer.
- If excessively unstable subgrade soils are observed during proofrolling and/or fill placement, it is expected that these weak areas can be stabilized by means of thickening the base course layer and/or the use of a Geotextile fabric (such as Mirafi 500x or equivalent). These alternatives are to be addressed by the Geotechnical Engineer during construction, if necessary, who will recommend the most economical approach at the time.

The Geotechnical Engineer should be called on to provide a final inspection of the stone surfaces prior to paving. The best indication of what problems could arise during the service life of the pavements is the performance of the stone base after exposure to construction traffic and the elements. It is therefore recommended that this inspection be performed so that observed drainage problems or base or subgrade deterioration problems can be addressed.

11.0 Warranty and Limitations of Study

Our professional services have been performed, our findings obtained, and our recommendations prepared in accordance with generally accepted Geotechnical engineering principles and practices. This warranty is in lieu of all warranties, either express or implied. ETS, Inc. is not responsible for the independent conclusions; opinions or recommendations made by others based on the field exploration program and laboratory test data presented in this report.

The recommendations were developed from the information obtained from the test borings, which only depict subsurface conditions at the specific locations, times and depth shown on the logs. Soils conditions at other locations may differ from those encountered in the test borings, and the passage of time may cause the soil conditions to change from those described in this report.

The nature and extent of variation and change in the subsurface conditions at the site may not become evident until the course of construction. Construction monitoring by the Geotechnical Engineer or by his representative is therefore considered necessary to verify the subsurface conditions and to check that the soils construction phases are properly executed. If significant variations or changes are in evidence, it may be

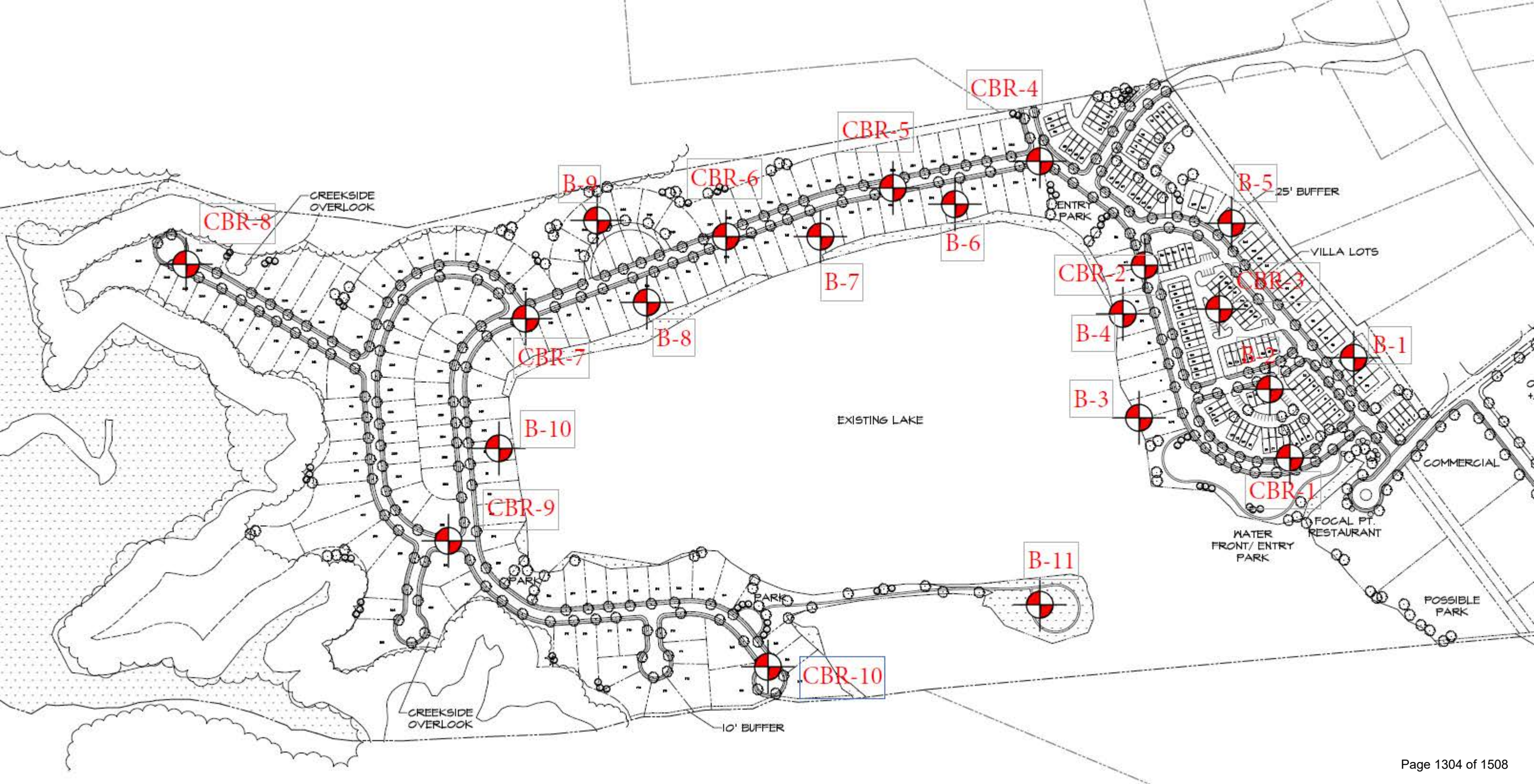
necessary to re-evaluate the recommendations of this report. Furthermore, if the project characteristics are altered from those discussed in this report, if the project information contained in this report is incorrect, or if additional information becomes available, a review should be made by this office to determine if any modifications in the recommendations will be required.

The scope of our services does not include any environmental assessment or investigations for the possible presence of hazardous or toxic materials in the soil, groundwater or surface water within or in the general vicinity of the site studied. Any statements made in this report or shown on the test boring logs regarding unusual subsurface conditions, and/or composition, odor, staining, origin or other characteristics of the surface and/or subsurface materials are strictly for the information of our client and may or may not be indicative of an environmental problem. Unless complete environmental information regarding the site is already available, an environmental assessment is recommended prior to the development of this site.

APPENDICES

APPENDIX I – BORING LOCATION PLAN
APPENDIX II – SOIL BORING LOGS
APPENDIX III – SOIL BORINGS PROFILES
APPENDIX IV – SUMMARY OF LABORATORY TEST RESULTS
APPENDIX V – SUMMARY OF CBR TEST RESULTS
APPENDIX VI – MOISTURE-DENSITY RELATIONSHIP CURVES
APPENDIX VII – CALIFORNIA BEARING RATIO GRAPHS

APPENDIX I – SOIL BORINGS PLAN


CBR-4
CBR-5
CBR-6
B-9
CBR-8
CREEKSIDE OVERLOOK
B-5
25' BUFFER
ENTRY PARK
B-6
VILLA LOTS
CBR-2
CBR-3
B-7
B-4
B-8
B-1
CBR-7
B-2
B-3
B-10
EXISTING LAKE
COMMERCIAL
CBR-1
CBR-9
FOCAL PT. RESTAURANT
WATER FRONT/ ENTRY PARK
B-11
PARK
PARK
POSSIBLE PARK
CBR-10
CREEKSIDE OVERLOOK
10' BUFFER


DB-1
DB-2
Google

APPENDIX II – SOIL BORING LOGS

Engineering & Testing Services, Inc.
5226 Indian River Road, Suite 103
Virginia Beach, Virginia 23464
Telephone: (757) 306-1040
Fax: (757) 306-1042

BORING NUMBER B-1

CLIENT Greenwood Homes
PROJECT NAME Layden Property
PROJECT NUMBER ETS-23E159
PROJECT LOCATION Smithfield, Virginia
DATE STARTED 09/06/23 **COMPLETED** 09/06/23
GROUND ELEVATION _____ **HOLE SIZE** 3 inches
DRILLING CONTRACTOR FDI
GROUND WATER LEVELS:
DRILLING METHOD MUD
▽ **AT TIME OF DRILLING** 13.00 ft
LOGGED BY S.Raut,EIT **CHECKED BY** C. Nabhan, PE
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
0		2" Topsoil					
		(SP-SM) Light gray f poorly graded SAND with silt, fill, medium dense, moist	SPT 1	92	7-9-10-10 (19)		
		(SM) Bown- gray f poorly graded SAND, medium dense, moist	SPT 2	83	6-5-5-4 (10)		
5		(SP) Light gray f poorly graded SAND, loose to medium dense, moist to wet	SPT 3	100	2-2-2-3 (4)		
			SPT 4	50	3-5-5-5 (10)		
10			SPT 5	83	5-5-7-7 (12)		
		▽ (SP-SM) Tan gray brown f-m poorly graded SAND with silt and trace gravel, medium dense, wet	SPT 6	83	5-5-5-6 (10)		
15							
			SPT 7	63	10-10-8-8 (18)		
20							
		(SP) Tan gray f poorly graded SAND with trace gravel, loose, wet	SPT 8	75	3-3-4-4 (7)		
25							

▲ SPT N VALUE ▲
20 40 60 80
PL MC LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80

Bottom of borehole at 25.0 feet.

GEOTECH BH PLOTS - GINT STD US LAB.GDT - 10/04/23 14:58 - N:\ETS-23E\ETS-23E159 LAYDEN PROPERTY\BORING LOGS.GPJ

Engineering & Testing Services, Inc.
5226 Indian River Road, Suite 103
Virginia Beach, Virginia 23464
Telephone: (757) 306-1040
Fax: (757) 306-1042

BORING NUMBER B-2

CLIENT Greenwood Homes
PROJECT NAME Layden Property
PROJECT NUMBER ETS-23E159
PROJECT LOCATION Smithfield, Virginia
DATE STARTED 09/06/23 **COMPLETED** 09/06/23
GROUND ELEVATION _____ **HOLE SIZE** 3 inches
DRILLING CONTRACTOR FDI
GROUND WATER LEVELS:
DRILLING METHOD MUD
▽ **AT TIME OF DRILLING** 13.00 ft
LOGGED BY S.Raut,EIT **CHECKED BY** C. Nabhan, PE
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
0	2" Topsoil					
	(SM) Brown gray f silty SAND with trace clay, gravel and asphalt material, fill, medium dense, moist	SPT 1	100	9-9-13-8 (22)		
		SPT 2	100	9-11-9-7 (20)		
5	(SM) Tan brown f silty SAND with trace clay, loose, moist	SPT 3	75	5-3-4-3 (7)		
	(SP-SM) Brown f poorly graded SAND with silt, loose to very loose, moist to wet	SPT 4	83	5-5-3-3 (8)		
10		SPT 5	83	1-1-2-3 (3)		
	▽ (SP) Light gray brown f-c poorly graded SAND with gravel, loose to medium dense, wet	SPT 6	63	3-3-4-3 (7)		
15						
		SPT 7	83	15-9-10-10 (19)		
20						
	(SP) Gray f poorly graded SAND, medium dense, wet	SPT 8	63	8-7-7-7 (14)		
25						

▲ SPT N VALUE ▲
20 40 60 80
PL MC LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80

Bottom of borehole at 25.0 feet.

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Engineering & Testing Services, Inc.
5226 Indian River Road, Suite 103
Virginia Beach, Virginia 23464
Telephone: (757) 306-1040
Fax: (757) 306-1042

BORING NUMBER B-3

CLIENT Greenwood Homes
PROJECT NAME Layden Property
PROJECT NUMBER ETS-23E159
PROJECT LOCATION Smithfield, Virginia
DATE STARTED 09/06/23 **COMPLETED** 09/06/23
GROUND ELEVATION _____ **HOLE SIZE** 3 inches
DRILLING CONTRACTOR FDI
GROUND WATER LEVELS:
DRILLING METHOD MUD
▽ **AT TIME OF DRILLING** 5.00 ft
LOGGED BY S.Raut,EIT **CHECKED BY** C. Nabhan, PE
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
0		2" Topsoil					
		(SC) Brown f clayey SAND with trace gravel, fill, loose, moist	SPT 1	75	2-2-4-4 (6)		
			SPT 2	83	4-5-3-2 (8)		
5		(SC) Tan brown-gray f clayey SAND with trace clay, very loose to loose, moist to wet ▽	SPT 3	75	3-1-1-1 (2)		
			SPT 4	63	2-2-2-4 (4)		
		(SM) Brown f silty SAND with trace gravel, very loose, moist to wet	SPT 5	75	2-1-2-1 (3)		
10							
		(SM) Gray to tan gray f-m silty SAND with gravel, loose to medium dense, wet	SPT 6	29	1-1-1-1 (2)		
15							
			SPT 7	42	1-1-1-1 (2)		
20							
			SPT 8	63	2-2-3-3 (5)		
25							

▲ SPT N VALUE ▲
20 40 60 80
PL MC LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80

Bottom of borehole at 25.0 feet.

GEOTECH BH PLOTS - GINT STD US LAB.GDT - 10/04/23 14:58 - N:\ETS-23E\ETS-23E159 LAYDEN PROPERTY\BORING LOGS.GPJ

Engineering & Testing Services, Inc.
5226 Indian River Road, Suite 103
Virginia Beach, Virginia 23464
Telephone: (757) 306-1040
Fax: (757) 306-1042

BORING NUMBER B-4

CLIENT Greenwood Homes
PROJECT NAME Layden Property
PROJECT NUMBER ETS-23E159
PROJECT LOCATION Smithfield, Virginia
DATE STARTED 09/06/23 **COMPLETED** 09/06/23
GROUND ELEVATION _____ **HOLE SIZE** 3 inches
DRILLING CONTRACTOR FDI
GROUND WATER LEVELS:
DRILLING METHOD MUD
▽ **AT TIME OF DRILLING** 13.00 ft
LOGGED BY S.Raut,EIT **CHECKED BY** C. Nabhan, PE
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
0	2" Topsoil (SM) Tan brown f silty SAND with trace clay, medium dense, moist	SPT 1	63	4-5-7-6 (12)		
	(SP) Tan brown f poorly graded SAND, loose, moist	SPT 2	83	6-4-4-4 (8)		
5		SPT 3	83	3-3-3-2 (6)		
	(SP-SM) Dark brown f-c poorly graded SAND with gravel, loose, moist to wet	SPT 4	83	3-2-3-3 (5)		
10		SPT 5	83	3-3-3-3 (6)		
	▽ (SP) Tan light gray brown f poorly graded SAND with trace gravel, medium dense, wet	SPT 6	63	2-2-2-2 (4)		
15						
		SPT 7	75	6-10-11-10 (21)		
20						
		SPT 8	75	13-11-15-13 (26)		
25						

▲ SPT N VALUE ▲
20 40 60 80
PL MC LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80

Bottom of borehole at 25.0 feet.

GEOTECH BH PLOTS - GINT STD US LAB.GDT - 10/04/23 14:58 - N:\ETS-23E\ETS-23E159 LAYDEN PROPERTY\BORING LOGS.GPJ

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5226 Indian River Road, Suite 103
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Telephone: (757) 306-1040
Fax: (757) 306-1042

BORING NUMBER B-5

CLIENT Greenwood Homes
PROJECT NAME Layden Property
PROJECT NUMBER ETS-23E159
PROJECT LOCATION Smithfield, Virginia
DATE STARTED 09/06/23 **COMPLETED** 09/06/23
GROUND ELEVATION _____ **HOLE SIZE** 3 inches
DRILLING CONTRACTOR FDI
GROUND WATER LEVELS:
DRILLING METHOD MUD
▽ **AT TIME OF DRILLING** 13.00 ft
LOGGED BY S.Raut,EIT **CHECKED BY** C. Nabhan, PE
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
0	2" Topsoil (SM) Tan brown-gray f silty SAND with trace clay, loose, moist	SPT 1	63	2-3-4-3 (7)		
	(SP) Reddish brown f poorly graded SAND, loose, moist	SPT 2	83	3-3-2-3 (5)		
5		SPT 3	92	4-4-3-4 (7)		
	(SP) Tan gray-brown f poorly graded SAND, loose, moist	SPT 4	92	2-3-4-3 (7)		
	(SP-SM) Reddish brown f poorly graded SAND, loose to medium dense, moist to wet	SPT 5	75	4-4-6-5 (10)		
10						
▽	(SP) Tan gray f-c poorly graded SAND with gravel, medium dense to loose, wet	SPT 6	63	6-8-8-7 (16)		
15						
		SPT 7	63	4-5-4-5 (9)		
20						
		SPT 8	75	6-7-6-6 (13)		
25						

▲ SPT N VALUE ▲
20 40 60 80
PL MC LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80

Bottom of borehole at 25.0 feet.

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BORING NUMBER B-6

CLIENT Greenwood Homes
PROJECT NAME Layden Property
PROJECT NUMBER ETS-23E159
PROJECT LOCATION Smithfield, Virginia
DATE STARTED 09/07/23 **COMPLETED** 09/07/23
GROUND ELEVATION _____ **HOLE SIZE** 3 inches
DRILLING CONTRACTOR FDI
GROUND WATER LEVELS:
DRILLING METHOD MUD
▽ **AT TIME OF DRILLING** 13.00 ft
LOGGED BY S.Raut,EIT **CHECKED BY** C. Nabhan, PE
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
0	4" Topsoil					
	(CL) Tan gray sandy lean CLAY, firm, moist	SPT 1	63	2-2-4-5 (6)		
	(CL) Gray -tan orange lean CLAY with sand, stiff, moist	SPT 2	92	5-6-7-8 (13)		
5	(SC) Dark brown -gray f clayey SAND with trace gravel, medium dense to loose, moist	SPT 3	100	6-5-5-5 (10)		
		SPT 4	92	5-4-3-3 (7)		
10	(SC-SM) Gray -mottled tan orange f silty clayey SAND, very loose, moist to wet	SPT 5	92	2-1-2-2 (3)		
	▽	SPT 6	50	1-1-0-1 (1)		
15						
20	(CL) Gray sandy lean CLAY, very soft, wet	SPT 7	83	1-1-1-1 (2)		
	(SC) Tan f clayey SAND, loose, wet	SPT 8	75	1-3-2-1 (5)		
25						

▲ SPT N VALUE ▲
20 40 60 80
PL MC LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80

Bottom of borehole at 25.0 feet.

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BORING NUMBER B-7

CLIENT Greenwood Homes
PROJECT NAME Layden Property
PROJECT NUMBER ETS-23E159
PROJECT LOCATION Smithfield, Virginia
DATE STARTED 09/07/23 **COMPLETED** 09/07/23
GROUND ELEVATION _____ **HOLE SIZE** 3 inches
DRILLING CONTRACTOR FDI
GROUND WATER LEVELS:
DRILLING METHOD MUD
▽ **AT TIME OF DRILLING** 13.00 ft
LOGGED BY S.Raut,EIT **CHECKED BY** C. Nabhan, PE
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
0		3" Topsoil					
		(SM) Gray f silty SAND, fill, medium dense, moist	SPT 1	83	2-4-7-6 (11)		
		(CL) Gray -tan brown sandy lean CLAY, very stiff to firm, moist	SPT 2	83	9-9-6-5 (15)		
5			SPT 3	75	5-6-3-3 (9)		
			SPT 4	83	4-3-3-3 (6)		
		(SC) Gray f clayey SAND, loose, moist	SPT 5	100	2-2-2-2 (4)		
10							
		▽ (SC-SM) Gray -tan brown f silty clayey SAND with trace gravel, very loose to loose, wet	SPT 6	100	1-1-1-1 (2)		
15							
			SPT 7	100	2-2-2-2 (4)		
20							
		(SP-SM) Gray to tan brown f poorly graded SAND with silt, medium dense, wet	SPT 8	75	8-10-8-6 (18)		
25							

▲ SPT N VALUE ▲
20 40 60 80
PL MC LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80

Bottom of borehole at 25.0 feet.

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BORING NUMBER B-8

CLIENT Greenwood Homes
PROJECT NAME Layden Property
PROJECT NUMBER ETS-23E159
PROJECT LOCATION Smithfield, Virginia
DATE STARTED 09/07/23 **COMPLETED** 09/07/23
GROUND ELEVATION _____ **HOLE SIZE** 3 inches
DRILLING CONTRACTOR FDI
GROUND WATER LEVELS:
DRILLING METHOD MUD
▽ **AT TIME OF DRILLING** 13.00 ft
LOGGED BY S.Raut,EIT **CHECKED BY** C. Nabhan, PE
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
0	2" Topsoil (SC-SM) Tan brown-gray f silty clayey SAND with asphalt mix, fill, medium dense, moist	SPT 1	42	2-8-10-10 (18)		
		SPT 2	63	6-10-11-18 (21)		
5	(SM) Tan brown f silty SAND with trace clay, medium dense, moist	SPT 3	75	6-6-4-4 (10)		
	(SM) Tan brown f silty SAND with trace clay, very loose, moist	SPT 4	83	1-1-1-2 (2)		
		SPT 5	92	1-1-1-1 (2)		
10	(SM) Dark brown f silty SAND with trace gravel, very loose, moist to wet					
	▽ (SP-SM) Grayish tan brown f poorly graded SAND with silt, loose, wet	SPT 6	29	4-3-4-4 (7)		
15						
	(SC-SM) Gray f silty clayey SAND with trace gravel and abundant marine shell fragments, very loose, wet	SPT 7	42	1-1-1-2 (2)		
20						
	(CL) Bluish gray sandy lean CLAY with marine shell fragments,firm, wet	SPT 8	100	1-1-4-5 (5)		
25						

▲ SPT N VALUE ▲
20 40 60 80
PL MC LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80

Bottom of borehole at 25.0 feet.

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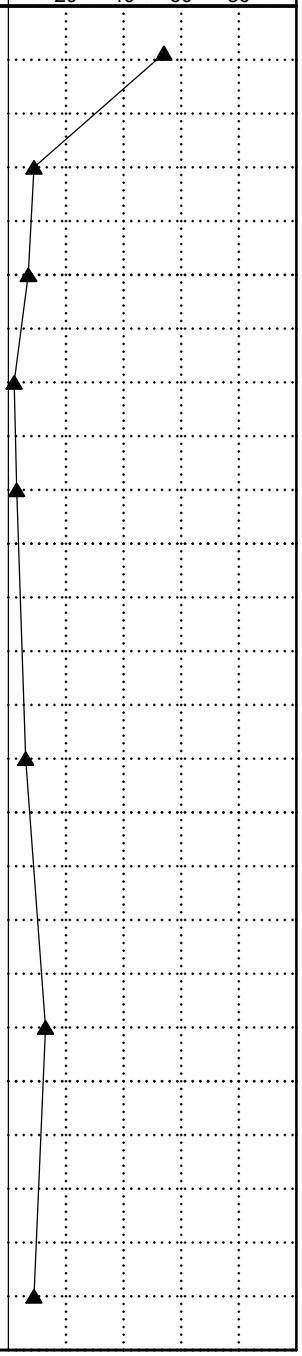
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BORING NUMBER B-9

CLIENT Greenwood Homes
PROJECT NAME Layden Property
PROJECT NUMBER ETS-23E159
PROJECT LOCATION Smithfield, Virginia
DATE STARTED 09/07/23 **COMPLETED** 09/07/23
GROUND ELEVATION _____ **HOLE SIZE** 3 inches
DRILLING CONTRACTOR FDI
GROUND WATER LEVELS:
DRILLING METHOD MUD
▽ **AT TIME OF DRILLING** 13.00 ft
LOGGED BY S.Raut,EIT **CHECKED BY** C. Nabhan, PE
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
0	2" Topsoil (SM) Brown f silty SAND with gravel, fill, medium dense, moist	SPT 1	33	2-4-50 (54)		
	Refusal at 18" (SC) Tan brown-gray f clayey SAND with trace gravel, fill, medium dense, moist	SPT 2	50	2-4-5-6 (9)		
5		SPT 3	63	2-3-4-3 (7)		
		SPT 4	75	2-1-1-1 (2)		
	(SC) Organic reddish f clayey SAND with wooden fragments, fill, soft, moist	SPT 5	75	1-1-2-3 (3)		
10						
	▽ (SM) Tan brow f-c silty SAND with trace gravel, loose, wet	SPT 6	42	3-3-3-5 (6)		
15						
	(SP-SM) Brown-gray f-c poorly graded SAND with silt and gravel, medium dense, wet	SPT 7	42	5-7-6-6 (13)		
20						
	(SP) Tan gray f poorly graded SAND, loose, wet	SPT 8	42	6-4-5-6 (9)		
25						

▲ SPT N VALUE ▲
20 40 60 80
PL MC LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80



Bottom of borehole at 25.0 feet.

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BORING NUMBER B-10

CLIENT Greenwood Homes
PROJECT NAME Layden Property
PROJECT NUMBER ETS-23E159
PROJECT LOCATION Smithfield, Virginia
DATE STARTED 08/31/23 **COMPLETED** 08/31/23
GROUND ELEVATION _____ **HOLE SIZE** 3 inches
DRILLING CONTRACTOR FDI
GROUND WATER LEVELS:
DRILLING METHOD MUD
▽ **AT TIME OF DRILLING** 13.00 ft
LOGGED BY S.Raut,EIT **CHECKED BY** C. Nabhan, PE
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
0		3" Topsoil					
		(SM) Gray f silty SAND with trace clay, medium dense, moist	SPT 1	75	3-8-11-9 (19)		
		(CH) Tan brown sandy fat CLAY, stiff, moist	SPT 2	83	3-4-8-8 (12)		
5		(SC-SM) Tan brown f silty clayey SAND with trace gravel, medium dense, moist to wet	SPT 3	83	8-8-9-8 (17)		
			SPT 4	75	9-11-12-13 (23)		
		(SM) Tan brown f silty SAND with trace gravel, medium dense, wet	SPT 5	63	10-12-13-12 (25)		
10							
		▽					
		(SP-SM) Reddish orange f poorly graded SAND with silt, loose, wet	SPT 6	50	3-4-4-5 (8)		
15							
			SPT 7	83	3-3-1-1 (4)		
20							
		(SP) Tan gray f poorly graded SAND, loose, wet	SPT 8	4	1-2-2-2 (4)		
25							

▲ SPT N VALUE ▲
20 40 60 80
PL MC LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80

Bottom of borehole at 25.0 feet.

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BORING NUMBER B-11

CLIENT Greenwood Homes
PROJECT NAME Layden Property
PROJECT NUMBER ETS-23E159
PROJECT LOCATION Smithfield, Virginia
DATE STARTED 08/31/23 **COMPLETED** 08/31/23
GROUND ELEVATION _____ **HOLE SIZE** 3 inches
DRILLING CONTRACTOR FDI
GROUND WATER LEVELS:
DRILLING METHOD MUD
▽ **AT TIME OF DRILLING** 8.00 ft
LOGGED BY S.Raut,EIT **CHECKED BY** C. Nabhan, PE
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
0	3" Topsoil (SM) Tan brown-gray f silty SAND with trace clay, fill, medium dense, moist	SPT 1	63	3-6-5-5 (11)		
	(SC-SM) Gray f silty clayey SAND with trace gravel, fill, loose, moist	SPT 2	67	5-4-3-5 (7)		
5		SPT 3	75	5-6-5-5 (11)		
	Wooden fragments with organics	SPT 4	75	20-3-3-3 (6)		
	▽ (SP-SM) Tan gray f poorly graded SAND with silt, loose, moist	SPT 5	63	3-3-3-3 (6)		
10						
	(SP) Tan orange f poorly graded SAND, loose, moist to wet	SPT 6	63	2-2-2-3 (4)		
15						
	(SM) Tan orange gray f-c silty SAND with clay and trace gravel, very loose, wet	SPT 7	58	1-1-2-1 (3)		
20						
	(CH) Tan orange -gray fat CLAY, soft, wet	SPT 8	100	1-2-2-2 (4)		
25						

▲ SPT N VALUE ▲
20 40 60 80
PL MC LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80

Bottom of borehole at 25.0 feet.

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BORING NUMBER CBR-1

CLIENT Greenwood Homes
PROJECT NAME Layden Property
PROJECT NUMBER ETS-23E159
PROJECT LOCATION Smithfield, Virginia
DATE STARTED 09/06/23 **COMPLETED** 09/06/23
GROUND ELEVATION _____ **HOLE SIZE** 3 inches
DRILLING CONTRACTOR FDI
GROUND WATER LEVELS:
DRILLING METHOD MUD
▽ **AT TIME OF DRILLING** 8.00 ft
LOGGED BY S.Raut,EIT **CHECKED BY** C. Nabhan, PE
AT END OF DRILLING ---
NOTES Water table was not found to the boring termination depth.
AFTER DRILLING ---

DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
0.0	2" Topsoil (SM) Dark brown f silty SAND with trace clay, medium dense, moist	SPT 1	83	7-9-7-15 (16)		
2.5	(SP-SM) Tan brown f poorly graded SAND with silt, medium dense to loose, moist	SPT 2	75	10-10-12-13 (22)		
5.0		SPT 3	75	7-6-7-5 (13)		
7.5	▽	SPT 4	83	2-2-6-5 (8)		
10.0		SPT 5	100	6-4-4-3 (8)		

▲ SPT N VALUE ▲
20 40 60 80
PL MC LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80

Bottom of borehole at 10.0 feet.

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BORING NUMBER CBR-2

CLIENT Greenwood Homes
PROJECT NAME Layden Property
PROJECT NUMBER ETS-23E159
PROJECT LOCATION Smithfield, Virginia
DATE STARTED 09/06/23 **COMPLETED** 09/06/23
GROUND ELEVATION _____ **HOLE SIZE** 3 inches
DRILLING CONTRACTOR FDI
GROUND WATER LEVELS:
DRILLING METHOD MUD
AT TIME OF DRILLING ---
LOGGED BY S.Raut,EIT **CHECKED BY** C. Nabhan, PE
AT END OF DRILLING ---
NOTES Water table was not found to the boring termination depth.
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
0.0		3" Topsoil					
		(SM) Brown f silty SAND with trace clay and trace gravel, fill, medium dense, moist	SPT 1	92	3-6-7-14 (13)		
2.5		(SM) Tan f silty SAND with gravel, fill, dense, moist	SPT 2	100	17-22-18-9 (40)		
5.0		(SC) Tan clayey SAND, medium dense, moist	SPT 3	50	5-5-7-6 (12)		
		(SP-SM) Gray f poorly graded SAND with silt, medium dense, moist	SPT 4	83	5-5-5-4 (10)		
7.5			SPT 5	83	5-5-6-6 (11)		
10.0		Bottom of borehole at 10.0 feet.					

▲ SPT N VALUE ▲
20 40 60 80
PL MC LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80

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BORING NUMBER CBR-3

CLIENT Greenwood Homes
PROJECT NAME Layden Property
PROJECT NUMBER ETS-23E159
PROJECT LOCATION Smithfield, Virginia
DATE STARTED 09/06/23 **COMPLETED** 09/06/23
GROUND ELEVATION _____ **HOLE SIZE** 3 inches
DRILLING CONTRACTOR FDI
GROUND WATER LEVELS:
DRILLING METHOD MUD
AT TIME OF DRILLING ---
LOGGED BY S.Raut,EIT **CHECKED BY** C. Nabhan, PE
AT END OF DRILLING ---
NOTES Water table was not found to the boring termination depth.
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
0.0		3" Topsoil					
		(SM) Tan f silty SAND, medium dense, moist	SPT 1	42	6-10-14-15 (24)		
2.5		(SM) Tan f silty SAND, medium dense, moist	SPT 2	75	6-9-7-5 (16)		
5.0		(SP-SM) Tan f poorly graded SAND with silt, loose, moist	SPT 3	83	7-7-6-5 (13)		
		(SM) Brown f silty SAND, loose, moist	SPT 4	92	3-3-4-4 (7)		
7.5			SPT 5	92	3-3-5-5 (8)		
10.0							

▲ SPT N VALUE ▲
20 40 60 80
PL MC LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80

Bottom of borehole at 10.0 feet.

GEOTECH BH PLOTS - GINT STD US LAB.GDT - 10/04/23 14:59 - N:\ETS-23E\ETS-23E159 LAYDEN PROPERTY\BORING LOGS.GPJ

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BORING NUMBER CBR-4

CLIENT Greenwood Homes
PROJECT NAME Layden Property
PROJECT NUMBER ETS-23E159
PROJECT LOCATION Smithfield, Virginia
DATE STARTED 09/06/23 **COMPLETED** 09/06/23
GROUND ELEVATION _____ **HOLE SIZE** 3 inches
DRILLING CONTRACTOR FDI
GROUND WATER LEVELS:
DRILLING METHOD MUD
AT TIME OF DRILLING ---
LOGGED BY S.Raut,EIT **CHECKED BY** C. Nabhan, PE
AT END OF DRILLING ---
NOTES Water table was not found to the boring termination depth.
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
0.0		3" Topsoil					
		(SC) Brown f clayey SAND with trace gravel, medium dense, moist	SPT 1	75	2-4-9-16 (13)		
2.5		(SM) Tan f silty SAND, medium dense, moist	SPT 2	75	7-7-5-4 (12)		
5.0		(SP-SM) Tan f poorly graded SAND with silt, loose, moist	SPT 3	100	3-3-4-4 (7)		
		(SM) Tan f silty SAND, loose, moist	SPT 4	92	2-2-2-2 (4)		
7.5			SPT 5	100	3-3-4-3 (7)		
10.0							

▲ SPT N VALUE ▲
20 40 60 80
PL MC LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80

Bottom of borehole at 10.0 feet.

GEOTECH BH PLOTS - GINT STD US LAB.GDT - 10/04/23 14:59 - N:\ETS-23E\ETS-23E159 LAYDEN PROPERTY\BORING LOGS.GPJ

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BORING NUMBER CBR-5

CLIENT Greenwood Homes
PROJECT NAME Layden Property
PROJECT NUMBER ETS-23E159
PROJECT LOCATION Smithfield, Virginia
DATE STARTED 09/06/23 **COMPLETED** 09/06/23
GROUND ELEVATION _____ **HOLE SIZE** 3 inches
DRILLING CONTRACTOR FDI
GROUND WATER LEVELS:
DRILLING METHOD MUD
AT TIME OF DRILLING ---
LOGGED BY S.Raut,EIT **CHECKED BY** C. Nabhan, PE
AT END OF DRILLING ---
NOTES Water table was not found to the boring termination depth.
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
0.0		4" Topsoil					
		(SM) Tan-brown f silty SAND, medium dense, moist	SPT 1	42	2-12-18-9 (30)		
2.5			SPT 2	92	6-6-7-5 (13)		
5.0		(SP-SM) Tan f-c poorly graded SAND with silt and trace gravel, loose, moist	SPT 3	83	3-2-4-3 (6)		
7.5			SPT 4	100	2-3-4-5 (7)		
10.0			SPT 5	100	4-4-5-5 (9)		

▲ SPT N VALUE ▲
20 40 60 80
PL MC LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80

Bottom of borehole at 10.0 feet.

GEOTECH BH PLOTS - GINT STD US LAB.GDT - 10/04/23 14:59 - N:\ETS-23E\ETS-23E159 LAYDEN PROPERTY\BORING LOGS.GPJ

Engineering & Testing Services, Inc.
5226 Indian River Road, Suite 103
Virginia Beach, Virginia 23464
Telephone: (757) 306-1040
Fax: (757) 306-1042

BORING NUMBER CBR-6

CLIENT Greenwood Homes
PROJECT NAME Layden Property
PROJECT NUMBER ETS-23E159
PROJECT LOCATION Smithfield, Virginia
DATE STARTED 09/06/23 **COMPLETED** 09/06/23
GROUND ELEVATION _____ **HOLE SIZE** 3 inches
DRILLING CONTRACTOR FDI
GROUND WATER LEVELS:
DRILLING METHOD MUD
AT TIME OF DRILLING ---
LOGGED BY S.Raut,EIT **CHECKED BY** C. Nabhan, PE
AT END OF DRILLING ---
NOTES Water table was not found to the boring termination depth.
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
0.0		4" Topsoil					
		(SC-SM) Tan brown f silty clayey SAND with trace gravel, fill, medium dense, moist	SPT 1	63	2-6-11-11 (17)		
2.5		(SM) Tan f silty SAND, medium dense, moist	SPT 2	75	10-7-7-5 (14)		
5.0		(SP-SM) Orange brown f-c poorly graded SAND with silt and trace gravel, loose to medium dense, moist	SPT 3	83	4-4-4-11 (8)		
7.5			SPT 4	67	6-6-4-5 (10)		
10.0			SPT 5	83	5-6-6-5 (12)		

▲ SPT N VALUE ▲
20 40 60 80
PL MC LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80

Bottom of borehole at 10.0 feet.

GEOTECH BH PLOTS - GINT STD US LAB.GDT - 10/04/23 14:59 - N:\ETS-23E\ETS-23E159 LAYDEN PROPERTY\BORING LOGS.GPJ

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Telephone: (757) 306-1040
Fax: (757) 306-1042

BORING NUMBER CBR-7

CLIENT Greenwood Homes
PROJECT NAME Layden Property
PROJECT NUMBER ETS-23E159
PROJECT LOCATION Smithfield, Virginia
DATE STARTED 09/06/23 **COMPLETED** 09/06/23
GROUND ELEVATION _____ **HOLE SIZE** 3 inches
DRILLING CONTRACTOR FDI
GROUND WATER LEVELS:
DRILLING METHOD MUD
AT TIME OF DRILLING ---
LOGGED BY S.Raut,EIT **CHECKED BY** C. Nabhan, PE
AT END OF DRILLING ---
NOTES Water table was not found to the boring termination depth.
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
0.0		4" Topsoil					
		(SM) Tan brown f-c silty SAND with trace gravel, fill, medium dense, moist	SPT 1	42	3-10-7-5 (17)		
2.5		(CL) Brown f sandy lean CLAY, stiff, moist	SPT 2	75	7-6-8-7 (14)		
5.0		(SP-SM) Tan brown f-c poorly graded SAND with silt and gravel, medium dense, moist	SPT 3	63	7-10-10-6 (20)		
		(SP-SM) Tan gray f poorly graded SAND with silt, medium dense, moist	SPT 4	42	9-10-9-2 (19)		
7.5			SPT 5	42	10-11-11-12 (22)		
10.0		Bottom of borehole at 10.0 feet.					

▲ SPT N VALUE ▲
20 40 60 80
PL MC LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80

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Virginia Beach, Virginia 23464
Telephone: (757) 306-1040
Fax: (757) 306-1042

BORING NUMBER CBR-8

CLIENT Greenwood Homes
PROJECT NAME Layden Property
PROJECT NUMBER ETS-23E159
PROJECT LOCATION Smithfield, Virginia
DATE STARTED 09/06/23 **COMPLETED** 09/06/23
GROUND ELEVATION _____ **HOLE SIZE** 3 inches
DRILLING CONTRACTOR FDI
GROUND WATER LEVELS:
DRILLING METHOD MUD
AT TIME OF DRILLING ---
LOGGED BY S.Raut,EIT **CHECKED BY** C. Nabhan, PE
AT END OF DRILLING ---
NOTES Water table was not found to the boring termination depth.
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
0.0		2" Topsoil (CL-ML) Tan brown sandy lean CLAY , very stiff, moist	SPT 1	17	3-8-9-7 (17)		
2.5		(SC-SM) Tan brown f silty clayey SAND, medium dense, moist	SPT 2	100	9-13-15-11 (28)		
5.0		(SM) Tan brown f-c silty SAND with trace clay, medium dense, moist	SPT 3	42	11-10-10-8 (20)		
7.5		(SP-SM) Brown-orange f-c poorly graded SAND with silt, medium dense, moist	SPT 4	75	5-5-5-1 (10)		
10.0			SPT 5	42	5-5-6-7 (11)		

▲ SPT N VALUE ▲
20 40 60 80
PL MC LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80

Bottom of borehole at 10.0 feet.

GEOTECH BH PLOTS - GINT STD US LAB.GDT - 10/04/23 14:59 - N:\ETS-23E\ETS-23E159 LAYDEN PROPERTY\BORING LOGS.GPJ

Engineering & Testing Services, Inc.
5226 Indian River Road, Suite 103
Virginia Beach, Virginia 23464
Telephone: (757) 306-1040
Fax: (757) 306-1042

BORING NUMBER CBR-9

CLIENT Greenwood Homes
PROJECT NAME Layden Property
PROJECT NUMBER ETS-23E159
PROJECT LOCATION Smithfield, Virginia
DATE STARTED 09/06/23 **COMPLETED** 09/06/23
GROUND ELEVATION _____ **HOLE SIZE** 3 inches
DRILLING CONTRACTOR FDI
GROUND WATER LEVELS:
DRILLING METHOD MUD
AT TIME OF DRILLING ---
LOGGED BY S.Raut,EIT **CHECKED BY** C. Nabhan, PE
AT END OF DRILLING ---
NOTES Water table was not found to the boring termination depth.
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
0.0		5" Topsoil					
		(CL) Tan orange sandy lean CLAY, stiff, moist	SPT 1	75	3-5-4-5 (9)		
2.5		(SC) Tan orange f clayey SAND, medium dense, moist	SPT 2	83	7-8-9-11 (17)		
5.0		(SM) Orange f silty SAND, medium dense, moist	SPT 3	83	10-11-12-9 (23)		
			SPT 4	100	9-8-8-8 (16)		
7.5		(SP-SM) Tan f-c poorly graded SAND with silt, medium dense, moist	SPT 5	75	10-12-9-11 (21)		
10.0							

▲ SPT N VALUE ▲
20 40 60 80
PL MC LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80

Bottom of borehole at 10.0 feet.

GEOTECH BH PLOTS - GINT STD US LAB.GDT - 10/04/23 14:59 - N:\ETS-23E\ETS-23E159 LAYDEN PROPERTY\BORING LOGS.GPJ

Engineering & Testing Services, Inc.
5226 Indian River Road, Suite 103
Virginia Beach, Virginia 23464
Telephone: (757) 306-1040
Fax: (757) 306-1042

BORING NUMBER CBR-10

CLIENT Greenwood Homes
PROJECT NAME Layden Property
PROJECT NUMBER ETS-23E159
PROJECT LOCATION Smithfield, Virginia
DATE STARTED 09/06/23 **COMPLETED** 09/06/23
GROUND ELEVATION _____ **HOLE SIZE** 3 inches
DRILLING CONTRACTOR FDI
GROUND WATER LEVELS:
DRILLING METHOD MUD
AT TIME OF DRILLING ---
LOGGED BY S.Raut,EIT **CHECKED BY** C. Nabhan, PE
AT END OF DRILLING ---
NOTES Water table was not found to the boring termination depth.
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
0.0		3" Topsoil					
		(CL) Dark brown sandy lean CLAY, hard, moist	SPT 1	63	6-18-14-8 (32)		
2.5			SPT 2	8	6-8-7-7 (15)		
		(SM) Orange f silty SAND, medium dense, moist	SPT 3	100	7-8-7-6 (15)		
5.0							
			SPT 4	67	4-2-2-2 (4)		
7.5		(SP-SM) Tan f-c poorly graded SAND with silt, medium dense, moist					
			SPT 5	75	1-1-2-2 (3)		
10.0							

▲ SPT N VALUE ▲
20 40 60 80
PL MC LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80

Bottom of borehole at 10.0 feet.

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5226 Indian River Road, Suite 103
Virginia Beach, Virginia 23464
Telephone: (757) 306-1040
Fax: (757) 306-1042

BORING NUMBER DB-1

CLIENT Greenwood Homes
PROJECT NAME Layden Property
PROJECT NUMBER ETS-23E159
PROJECT LOCATION Smithfield, Virginia
DATE STARTED 08/31/23 **COMPLETED** 08/31/23
GROUND ELEVATION _____ **HOLE SIZE** 3 inches
DRILLING CONTRACTOR FDI
GROUND WATER LEVELS:
DRILLING METHOD MUD
▽ **AT TIME OF DRILLING** 13.00 ft
LOGGED BY S.Raut,EIT **CHECKED BY** C. Nabhan, PE
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
0	3" Topsoil (CL) Tan brown-gray sandy lean CLAY, stiff to very stiff, moist	SPT 1	75	4-4-5-5 (9)		
		SPT 2	50	7-10-12-9 (22)		
5	(SC) Gray-tan brown f clayey SAND, medium dense, moist	SPT 3	83	10-12-13-11 (25)		
	(SM) Gray-tan brown f silty SAND, traces clay lumps, medium dense, moist	SPT 4	83	17-15-14-12 (29)		
10	(SP-SM) Tan f-c poorly graded SAND with silt, trace gravel, loose to medium dense, moist to wet	SPT 5	63	4-5-5-3 (10)		
	▽					
15		SPT 6	50	4-3-4-4 (7)		
20	(SP-SM) Tan brown-dark gray f-c poorly graded SAND with silt and gravel, loose, wet	SPT 7	42	3-3-3-4 (6)		
25	(SP) Reddish tan orange f poorly graded SAND, loose, wet	SPT 8	42	3-4-3-4 (7)		

▲ SPT N VALUE ▲
20 40 60 80
PL MC LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80

Bottom of borehole at 25.0 feet.

GEOTECH BH PLOTS - GINT STD US LAB.GDT - 10/04/23 14:59 - N:\ETS-23E\ETS-23E159 LAYDEN PROPERTY\BORING LOGS.GPJ

Engineering & Testing Services, Inc.
5226 Indian River Road, Suite 103
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Telephone: (757) 306-1040
Fax: (757) 306-1042

BORING NUMBER DB-2

CLIENT Greenwood Homes
PROJECT NAME Layden Property
PROJECT NUMBER ETS-23E159
PROJECT LOCATION Smithfield, Virginia
DATE STARTED 08/31/23 **COMPLETED** 08/31/23
GROUND ELEVATION _____ **HOLE SIZE** 3 inches
DRILLING CONTRACTOR FDI
GROUND WATER LEVELS:
DRILLING METHOD MUD
▽ **AT TIME OF DRILLING** 13.00 ft
LOGGED BY S.Raut,EIT **CHECKED BY** C. Nabhan, PE
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
0		3" Topsoil					
		(SM) Brown f silty SAND with trace clay and brick fragments, fill, medium dense, moist	SPT 1	29	2-5-6-7 (11)		
		(SC) Dark brown f clayey SAND with brick fragments, fill, medium dense to loose, moist	SPT 2	63	8-6-4-4 (10)		
5			SPT 3	67	3-2-2-2 (4)		
			SPT 4	63	4-3-3-2 (6)		
		(SC-SM) Tan brown f silty clayey SAND, medium dense, moist to wet	SPT 5	42	3-6-10-7 (16)		
10							
	▽						
		(SP-SM) Tan orange f poorly graded SAND with silt, loose, wet	SPT 6	50	6-3-3-3 (6)		
15							
		(SM) Gray f-c silty SAND with trace clay and gravel, loose, wet	SPT 7	83	3-2-2-2 (4)		
20							
		(SP) Reddish tan orange f poorly graded SAND, loose, wet	SPT 8	83	2-3-3-3 (6)		
25							

▲ SPT N VALUE ▲
20 40 60 80
PL MC LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80

Bottom of borehole at 25.0 feet.

GEOTECH BH PLOTS - GINT STD US LAB.GDT - 10/04/23 14:59 - N:\ETS-23E\ETS-23E159 LAYDEN PROPERTY\BORING LOGS.GPJ

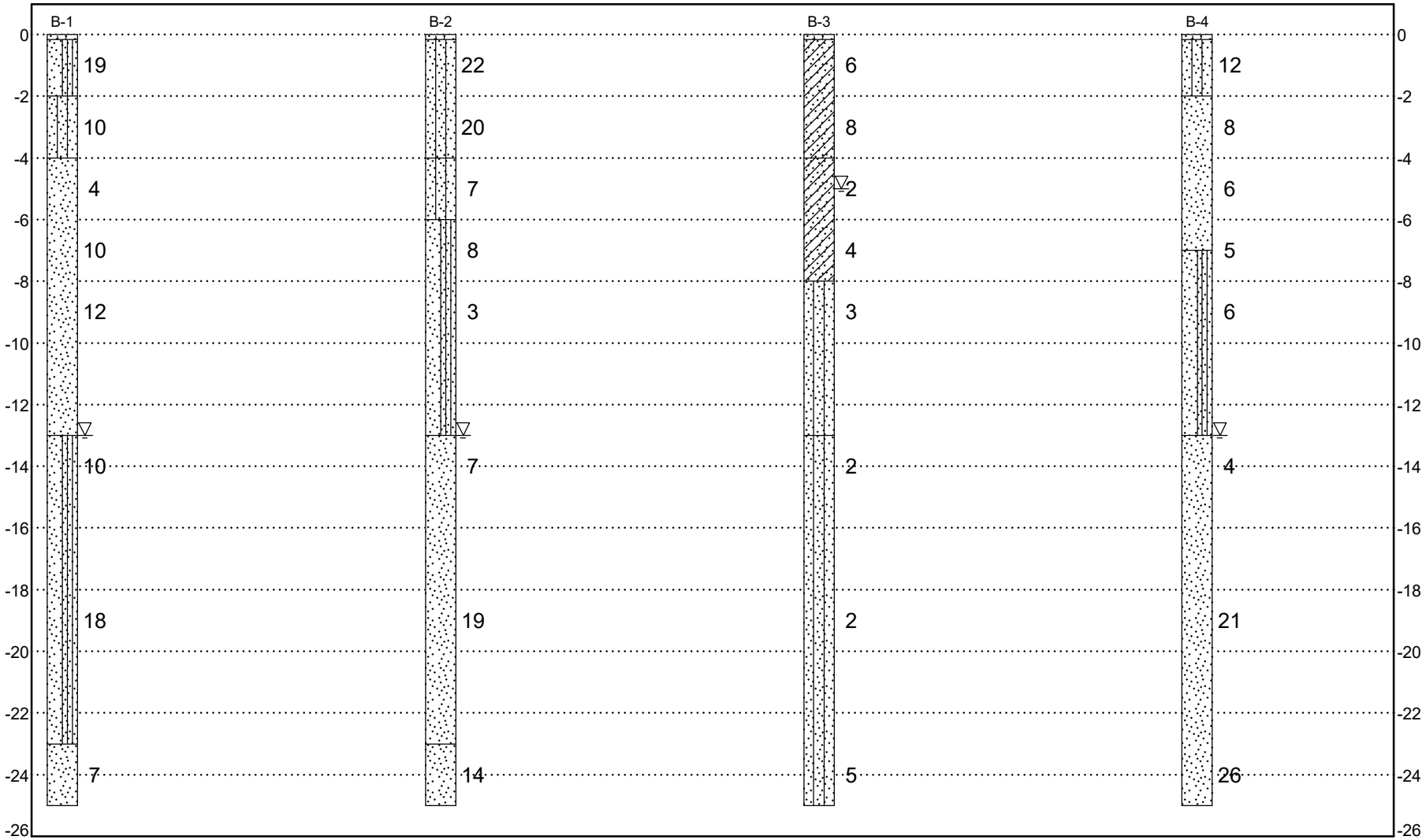
APPENDIX III – SOIL BORINGS PROFILE

Engineering & Testing Services, Inc.
5226 Indian River Road, Suite 103
Virginia Beach, Virginia 23464
Telephone: (757) 306-1040
Fax: (757) 306-1042

SUBSURFACE DIAGRAM

Topsoil
USCS Poorly-graded Sand
USCS Poorly-graded Sand with Silt
USCS Clayey Sand
USCS Silty Sand

CLIENT Greenwood Homes
PROJECT NAME Layden Property
PROJECT NUMBER ETS-23E159
PROJECT LOCATION Smithfield, Virginia



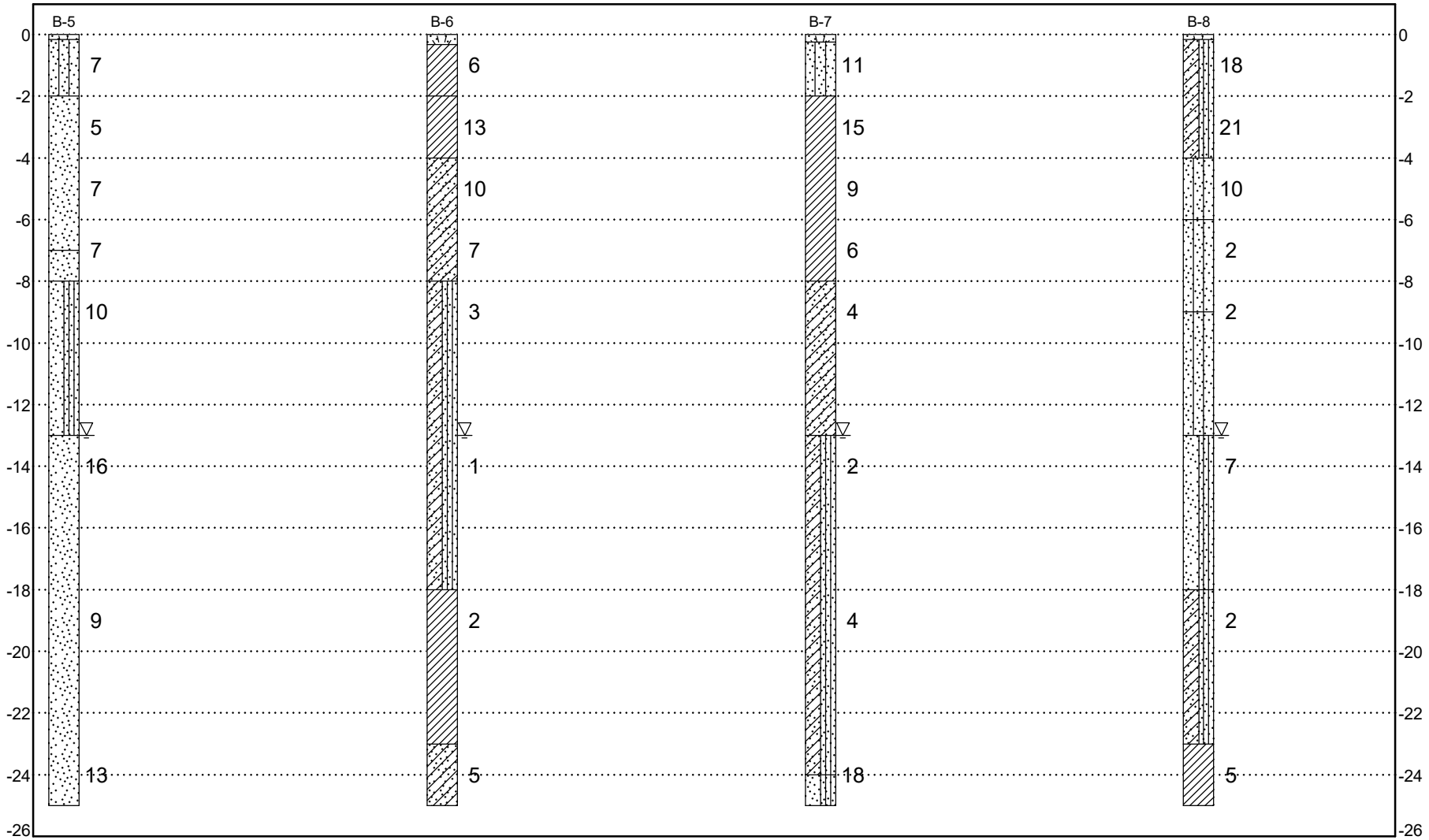
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Engineering & Testing Services, Inc.
5226 Indian River Road, Suite 103
Virginia Beach, Virginia 23464
Telephone: (757) 306-1040
Fax: (757) 306-1042

SUBSURFACE DIAGRAM

Topsoil
USCS Poorly-graded Sand with Silt
USCS Clayey Sand
USCS Silty Sand
USCS Low Plasticity Clay
USCS Poorly-graded Sand
USCS Clayey Sand

CLIENT Greenwood Homes
PROJECT NUMBER ETS-23E159
PROJECT NAME Layden Property
PROJECT LOCATION Smithfield, Virginia



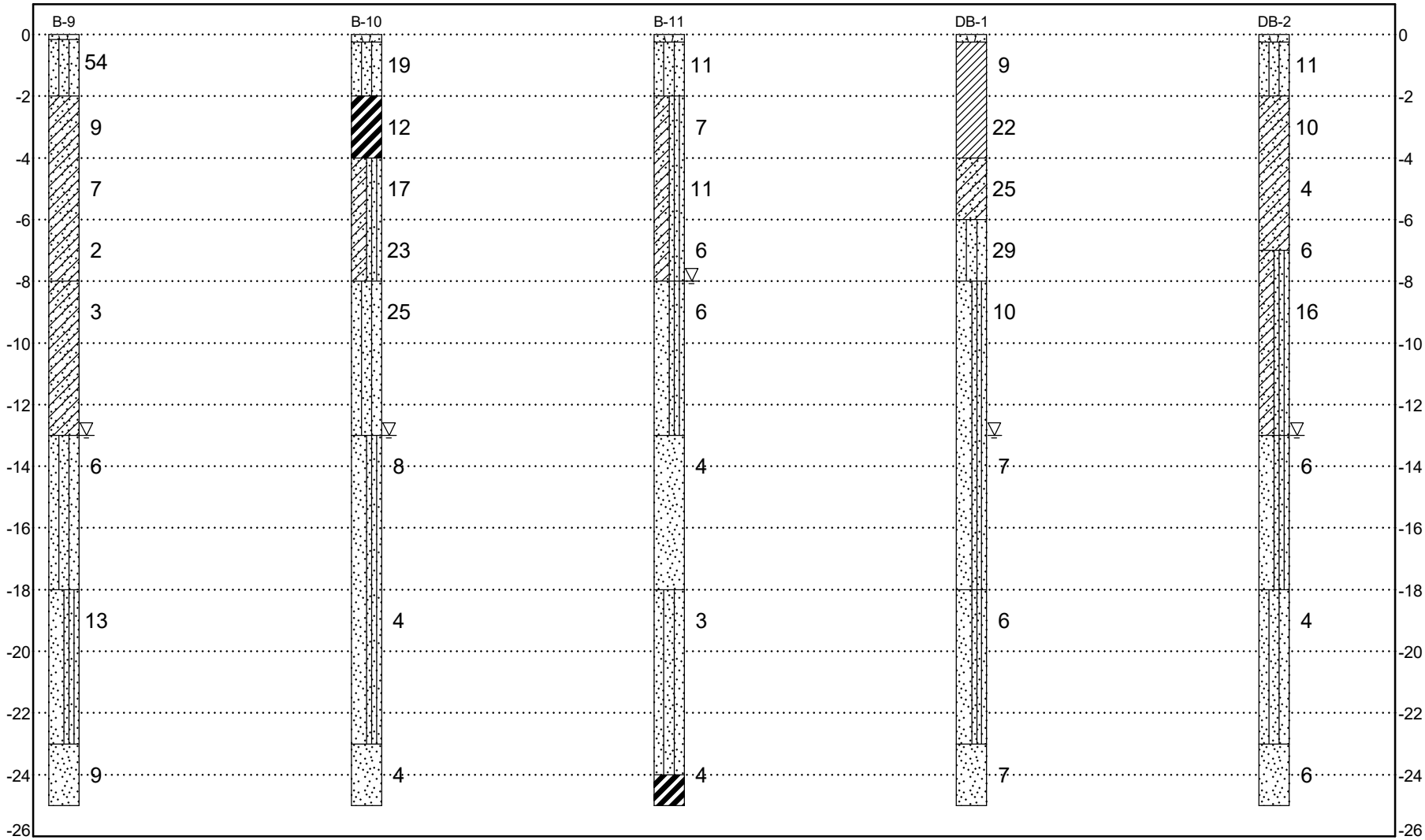
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Virginia Beach, Virginia 23464
Telephone: (757) 306-1040
Fax: (757) 306-1042

SUBSURFACE DIAGRAM

Topsoil
USCS Poorly-graded Sand with Silt
USCS Clayey Sand
USCS Silty Sand
USCS Poorly-graded Sand
USCS Low Plasticity Clay
USCS Clayey Sand
USCS High Plasticity Clay

CLIENT Greenwood Homes
PROJECT NUMBER ETS-23E159
PROJECT NAME Layden Property
PROJECT LOCATION Smithfield, Virginia



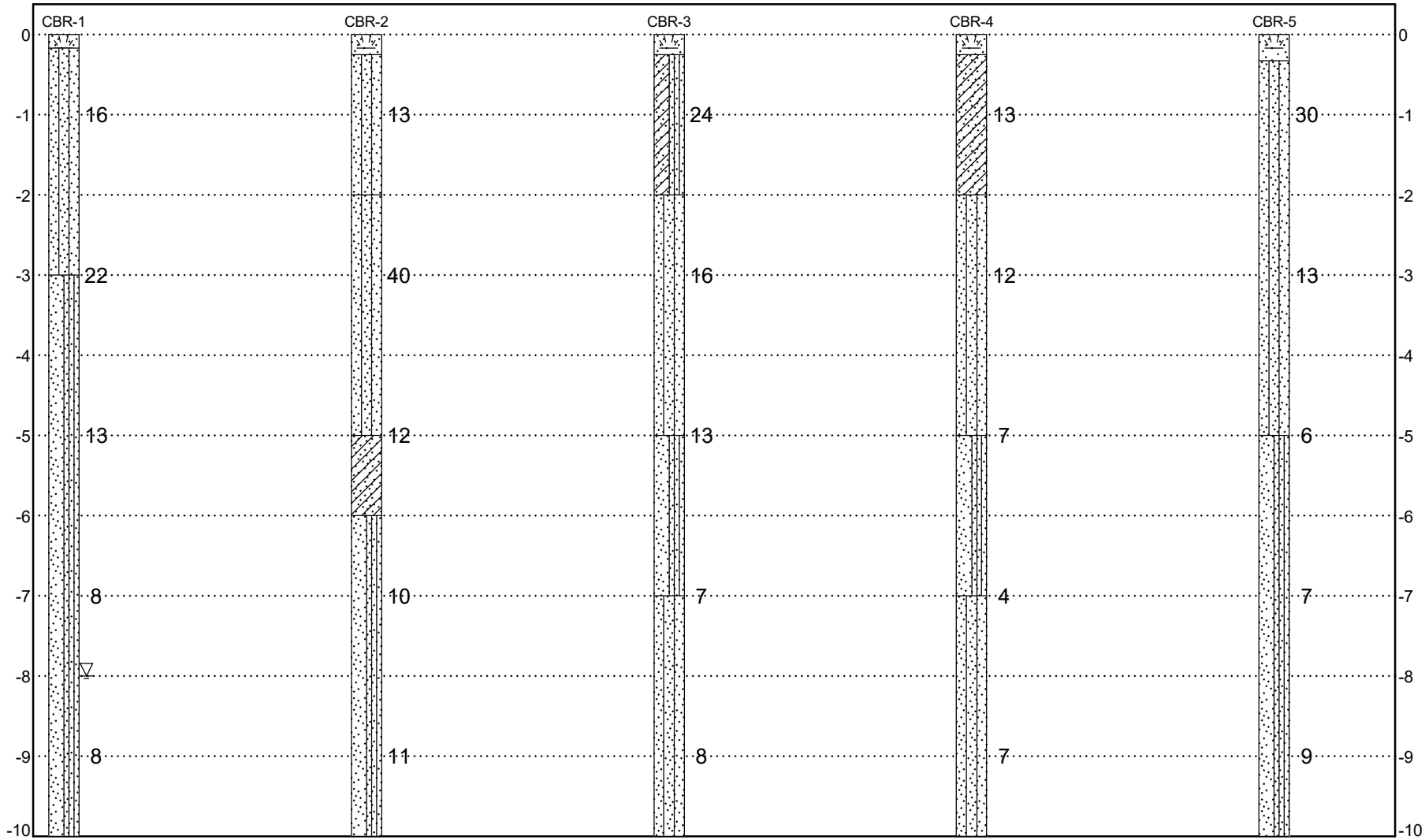
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Virginia Beach, Virginia 23464
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Fax: (757) 306-1042

SUBSURFACE DIAGRAM

Topsoil | USCS Silty Sand | USCS Poorly-graded Sand with Silt | USCS Clayey Sand | USCS Clayey Sand

CLIENT Greenwood Homes
PROJECT NAME Layden Property
PROJECT NUMBER ETS-23E159
PROJECT LOCATION Smithfield, Virginia



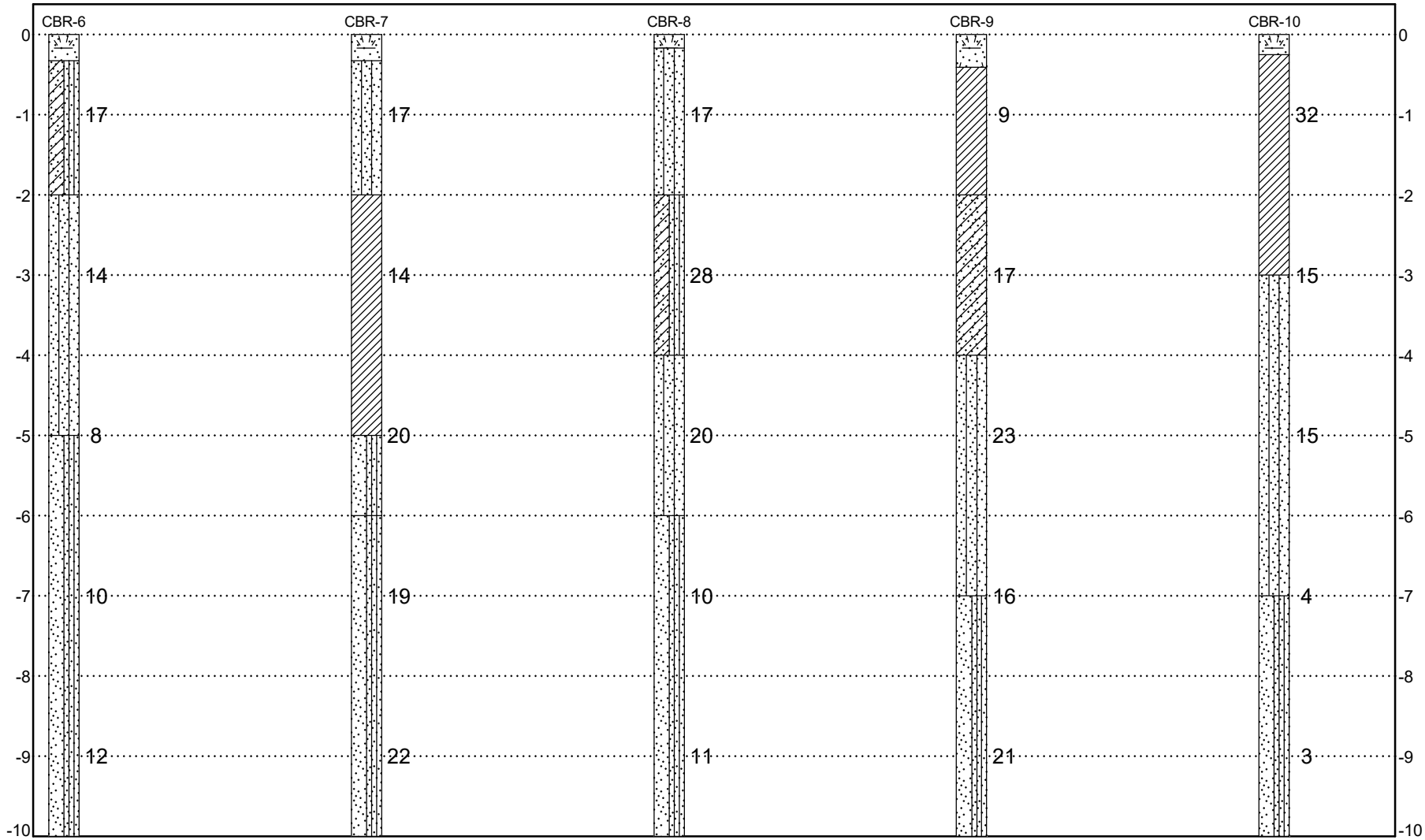
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Engineering & Testing Services, Inc.
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Virginia Beach, Virginia 23464
Telephone: (757) 306-1040
Fax: (757) 306-1042

SUBSURFACE DIAGRAM

Topsoil
USCS Poorly-graded Sand with Silt
USCS Clayey Sand
USCS Low Plasticity Clay
USCS Silty Sand
USCS Clayey Sand

CLIENT Greenwood Homes
PROJECT NUMBER ETS-23E159
PROJECT NAME Layden Property
PROJECT LOCATION Smithfield, Virginia



N VALUE TEMPLATE - GINT STD US LAB.GDT - 10/04/23 15:05 - N:\ETS-23E\ETS-23E159 LAYDEN PROPERTY\BORING LOGS.GPJ

APPENDIX IV – SUMMARY OF LABORATORY TEST RESULTS

Summary of Laboratory Test Results

Project Name: Layden Property

Project Number: ETS-23E159

Client: Greenwood Homes

Boring Number	Depth (ft)	Natural Moisture (%)	Atterberg Limits		- #200 Sieve (%)	USCS
			LL	PI		
B-1	8-10	2.6	NT	NT	1.4	SP
B-2	4-6	14.9	NT	NT	30.4	SM
B-3	13-15	12.5	NT	NT	20.0	SM
B-4	2-4	4.0	NT	NT	2.1	SP
B-5	6-8	3.9	NT	NT	2.0	SP
B-6	2-4	30.5	27	12	85.0	CL
B-6	8-10	13.0	NT	NT	27.3	SC-SM
B-6	18-20	38.8	NT	NT	59.6	CL
B-7	6-8	21.8	33	17	60.8	CL
B-8	4-6	6.0	NT	NT	26.9	SM
B-8	23-25	32.6	30	12	51.0	CL
B-9	8-10	28.9	NT	NT	37.2	SC
B-10	2-4	22.4	51	33	61.2	CH
B-10	6-8	11.9	NT	NT	25.2	SC-SM
B-11	18-20	20.2	NT	NT	21.2	SM
B-11	23-25	38.6	55	34	92.5	CH
DB-1	4-6	11.7	NT	NT	24.1	SC
DB-2	6-8	42.1	NT	NT	20.8	SM
CBR-7	2-4	17.2	36	21	51.0	CL

APPENDIX V – SUMMARY OF CBR TEST RESULTS

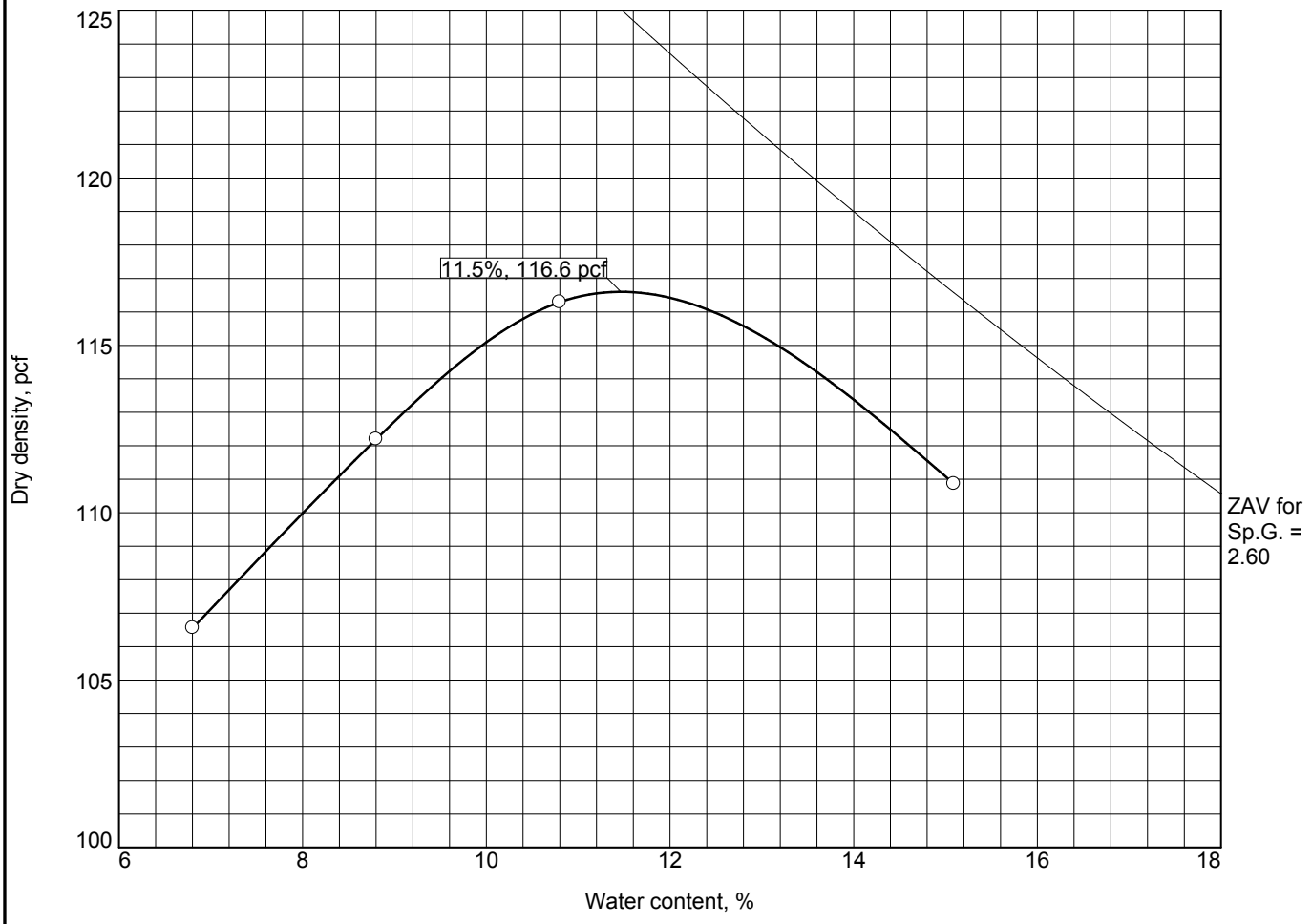
Summary of CBR Test Data

Project Name: Layden Property
Report Number: ETS-23E159
Client: Greenwood Homes

Sample Number	Sample Depth (ft)	USCS	Natural Moisture (%)	- #200 Sieve (%)	Maximum Dry Density (PCF)	Optimum Moisture (%)	CBR Value @ 0.1"	Resiliency Factor
CBR-1	1.0-2.0	SM	11.7	32.9	116.6	11.5	16.3	3.0
CBR-2	1.0-2.0	SM	12.4	25.8	121.9	10.5	7.0	3.0
CBR-3	1.0-2.0	SM	6.7	34.0	119.2	10.0	7.2	3.0
CBR-4	1.0-2.0	SC	11.1	47.0	118.4	11.4	5.3	2.5
CBR-5	1.0-2.0	SM	8.5	15.3	117.0	10.1	13.7	3.0
CBR-6	1.0-2.0	SC-SM	11.2	39.0	118.1	10.7	5.2	3.0
CBR-7	1.0-2.0	SM	7.3	19.2	123.5	9.5	20.7	3.0
CBR-8	1.0-2.0	CL-ML	1.6	57.4	109.1	13.3	9.3	2.5
CBR-9	1.0-2.0	CL	10.1	67.7	106.7	16.6	3.5	2.0
CBR-10	1.0-2.0	CL	9.5	54.8	111.6	11.0	3.0	2.5

APPENDIX VI – MOISTURE-DENSITY RELATIONSHIP CURVES

MOISTURE DENSITY RELATIONSHIP CURVE



Test specification: ASTM D 698-12 Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
1-2	SM	A-2-4(0)	11.7	2.6	NV	NP	4.2	32.9

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 116.6 pcf Optimum moisture = 11.5 %	Brown silty SAND (SM), trace clay

Project No. ETS-23E159 **Client:** Greenwood Homes
Project: Layden Property
Date: 9/13/2023
○ **Sample Number:** CBR-1

ENGINEERING AND TESTING SERVICES, INC.

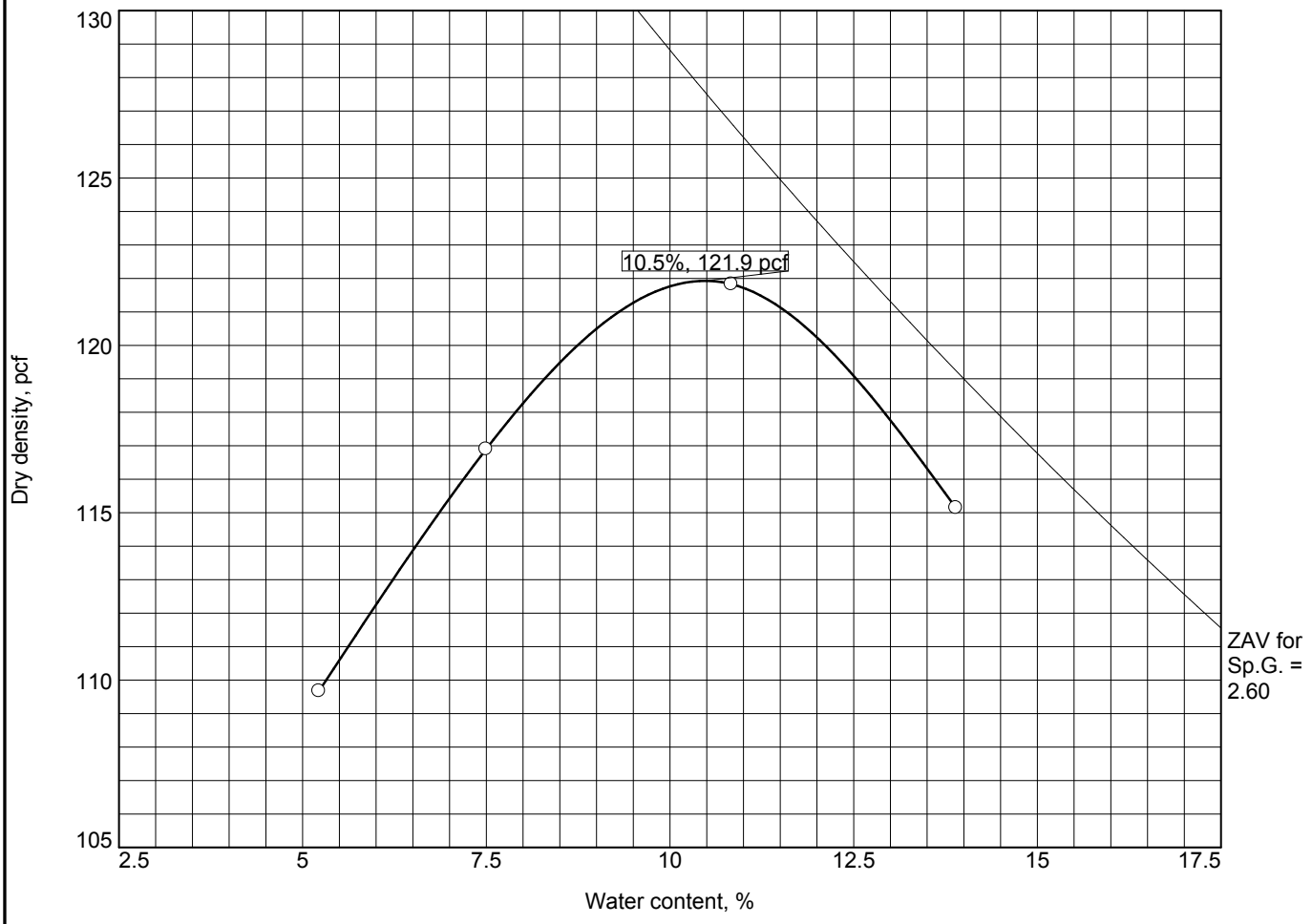
Virginia Beach, VA

Remarks:
Tested on 9/13/2023

Figure CBR-1

Tested By: MM **Checked By:** S. Raut, EIT

MOISTURE DENSITY RELATIONSHIP CURVE



Test specification: ASTM D 698-12 Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
1-2	SM	A-2-4(0)	12.4	2.6	NV	NP	1.0	25.8

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 121.9 pcf Optimum moisture = 10.5 %	Brown silty SAND (SM), moist

Project No. ETS-23E159 **Client:** Greenwood Homes
Project: Layden Property
Date: 9/13/2023
○ **Sample Number:** CBR-2

ENGINEERING AND TESTING SERVICES, INC.

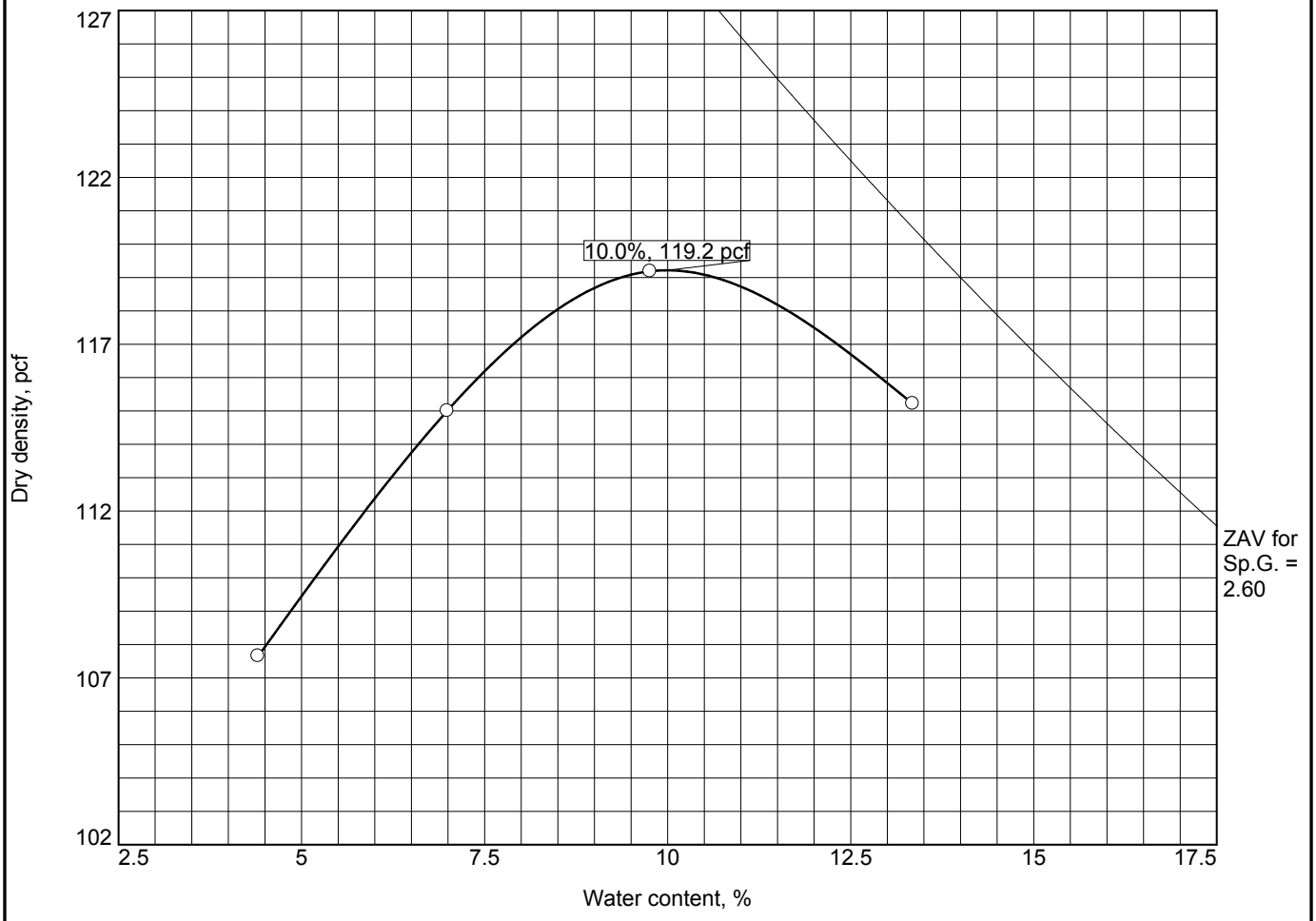
Virginia Beach, VA

Remarks:
Tested on 9/13/2023

Figure CBR-2

Tested By: MM **Checked By:** S. Raut, EIT

MOISTURE DENSITY RELATIONSHIP CURVE



Test specification: ASTM D 698-12 Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
1-2	SM	A-2-4(0)	6.7	2.6	NV	NP	2.4	34.0

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 119.2 pcf Optimum moisture = 10.0 %	Brown silty SAND (SM), trace clay

Project No. ETS-23E159 **Client:** Greenwood Homes
Project: Layden Property
Date: 9/7/2023
○ **Sample Number:** CBR-3

ENGINEERING AND TESTING SERVICES, INC.

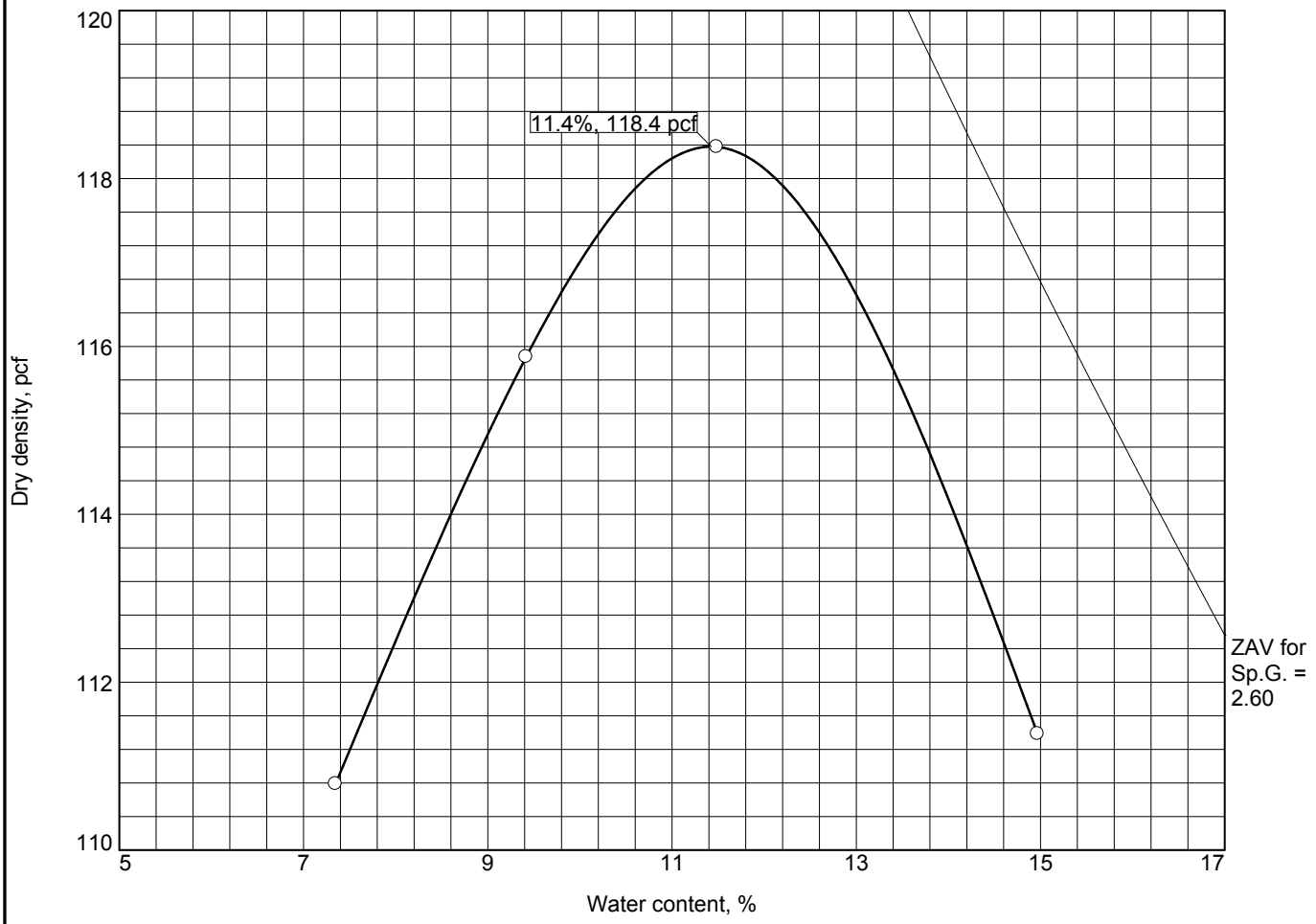
Virginia Beach, VA

Remarks:
Tested on 9/7/2023

Figure CBR-3

Tested By: MM **Checked By:** S. Raut, EIT

MOISTURE DENSITY RELATIONSHIP CURVE



Test specification: ASTM D 698-12 Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
1-2	SC	A-4(1)	11.1	2.6	24	8	3.1	47.0

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 118.4 pcf Optimum moisture = 11.4 %	Brown clayey SAND (SC), moist

Project No. ETS-23E159 **Client:** Greenwood Homes
Project: Layden Property
Date: 9/13/2023
○ **Sample Number:** CBR-4

ENGINEERING AND TESTING SERVICES, INC.

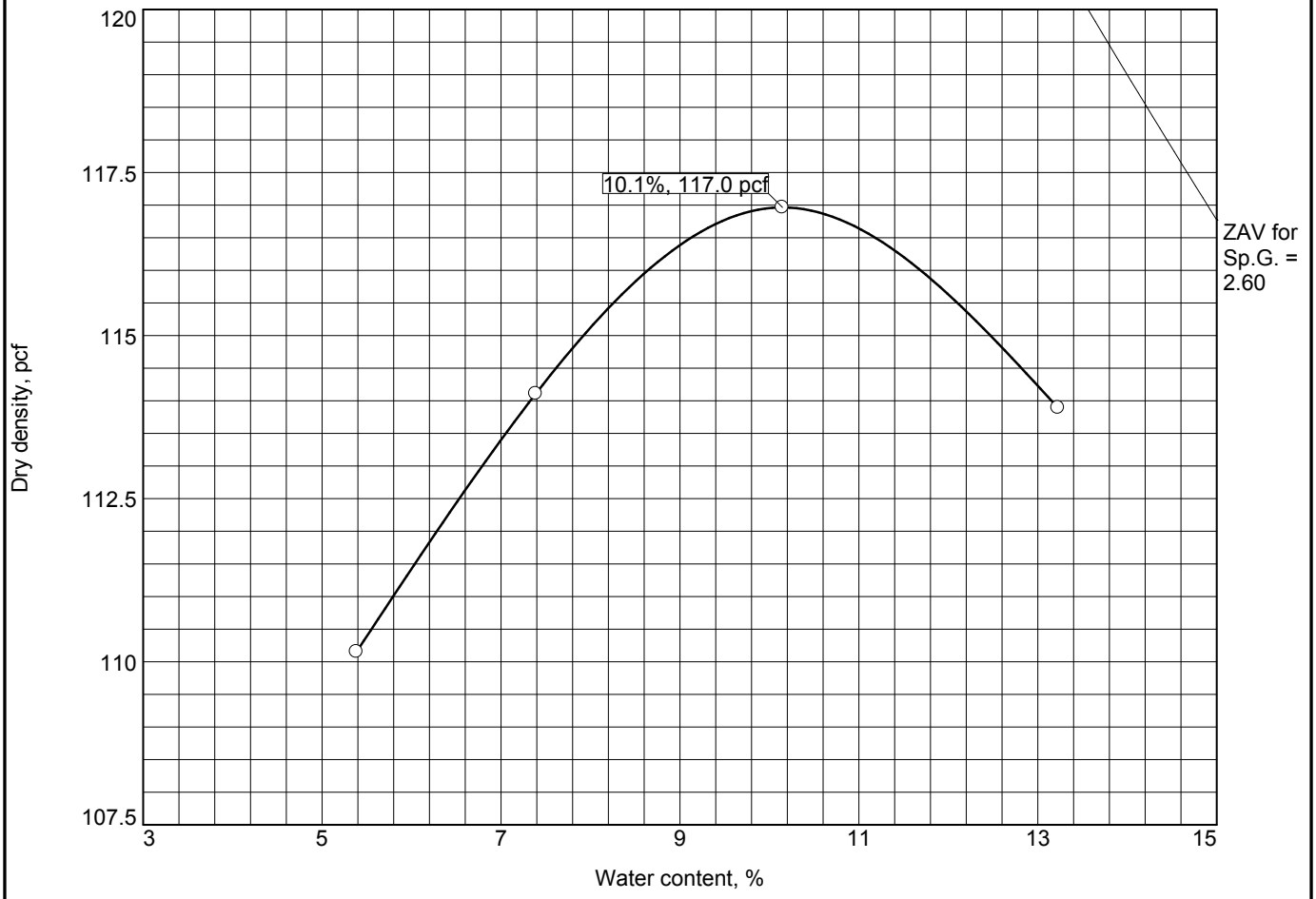
Virginia Beach, VA

Remarks:
Tested on 9/13/2023

Figure CBR-4

Tested By: MM **Checked By:** S. Raut, EIT

MOISTURE DENSITY RELATIONSHIP CURVE



Test specification: ASTM D 698-12 Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
1-2	SM	A-2-4(0)	8.5	2.6	NV	NP	0.2	15.3

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 117.0 pcf Optimum moisture = 10.1 %	Brown silty SAND (SM),moist

Project No. ETS-23E159 **Client:** Greenwood Homes
Project: Layden Property
Date: 9/13/2023
○ **Sample Number:** CBR-5

ENGINEERING AND TESTING SERVICES, INC.

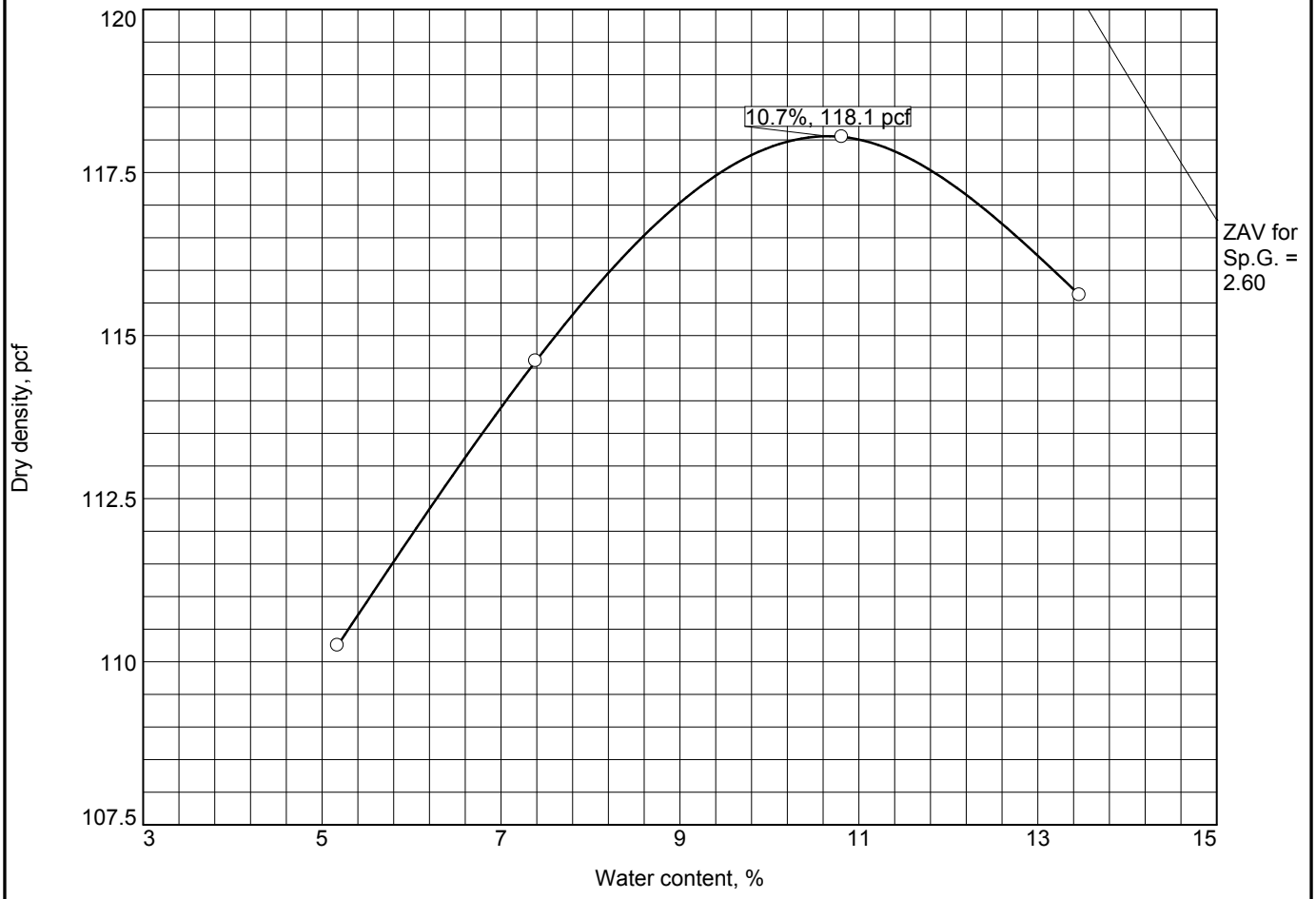
Virginia Beach, VA

Remarks:
Tested on 9/13/2023

Figure CBR-5

Tested By: MM **Checked By:** S. Raut, EIT

MOISTURE DENSITY RELATIONSHIP CURVE



Test specification: ASTM D 698-12 Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
1-2	SC-SM	A-4(0)	11.2	2.6	21	4	5.4	39.0

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 118.1 pcf Optimum moisture = 10.7 %	Tan brown silty clayey SAND (SC-SM), moist

Project No. ETS-23E159 **Client:** Greenwood Homes
Project: Layden Property
Date: 9/7/2023
○ **Sample Number:** CBR-6

ENGINEERING AND TESTING SERVICES, INC.

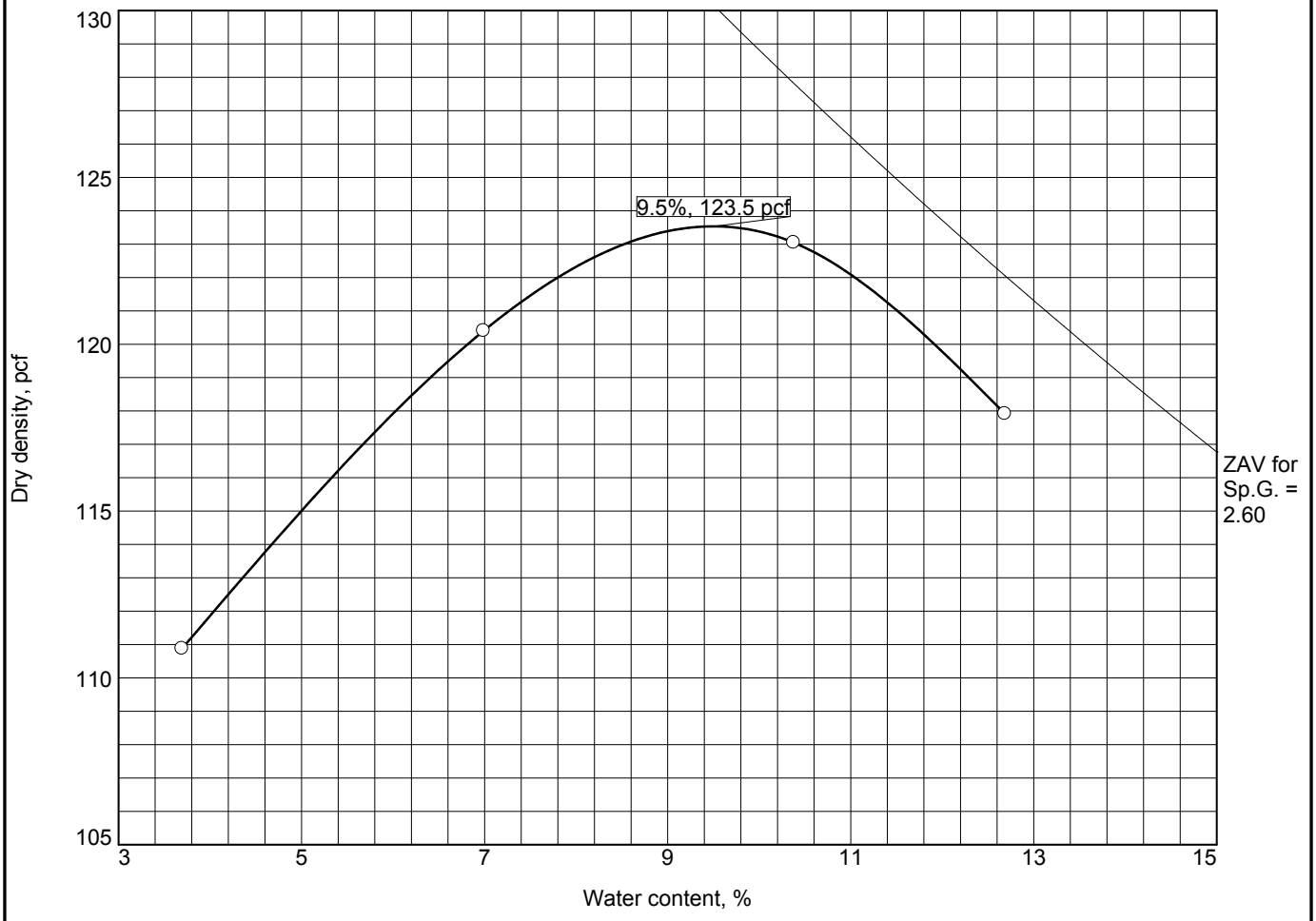
Virginia Beach, VA

Remarks:
Tested on 9/7/2023

Figure CBR-6

Tested By: MM

MOISTURE DENSITY RELATIONSHIP CURVE



Test specification: ASTM D 698-12 Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
1-2	SM	A-2-4(0)	7.3	2.6	NV	NP	0.8	19.2

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 123.5 pcf Optimum moisture = 9.5 %	Tan brown silty SAND (SM), moist

Project No. ETS-23E159 **Client:** Greenwood Homes
Project: Layden Property
Date: 9/13/2023
○ **Sample Number:** CBR-7

ENGINEERING AND TESTING SERVICES, INC.

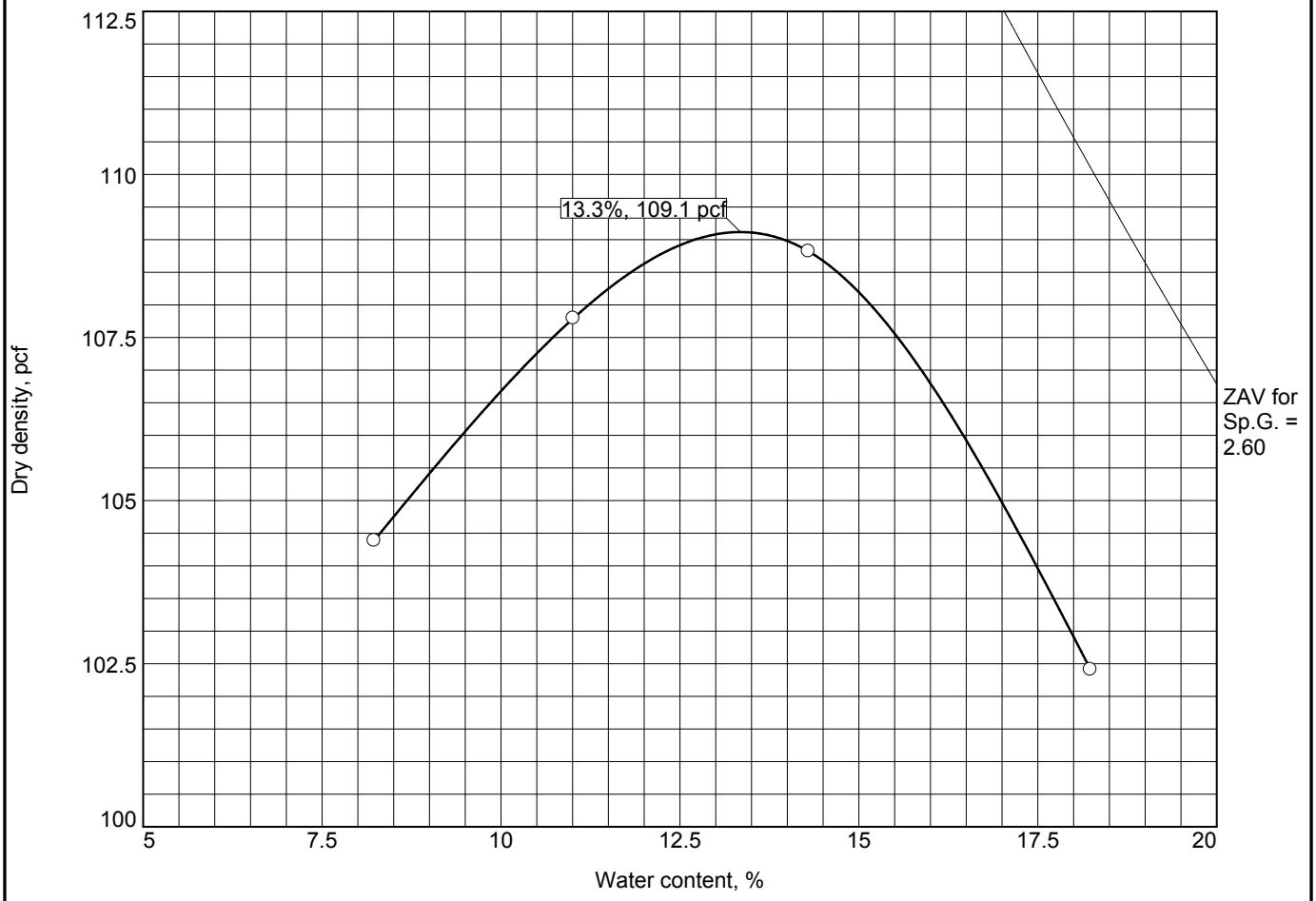
Virginia Beach, VA

Remarks:
Tested on 9/13/2023

Figure CBR-7

Tested By: MM **Checked By:** S. Raut, EIT

MOISTURE DENSITY RELATIONSHIP CURVE



Test specification: ASTM D 698-12 Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
1-2	CL-ML	A-4(1)	1.6	2.6	24	7	0.0	57.4

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 109.1 pcf Optimum moisture = 13.3 %	Tan brown sandy lean CLAY (CL), moist

Project No. ETS-23E159 **Client:** Greenwood Homes
Project: Layden Property
Date: 9/18/2023
○ **Sample Number:** CBR-8

ENGINEERING AND TESTING SERVICES, INC.

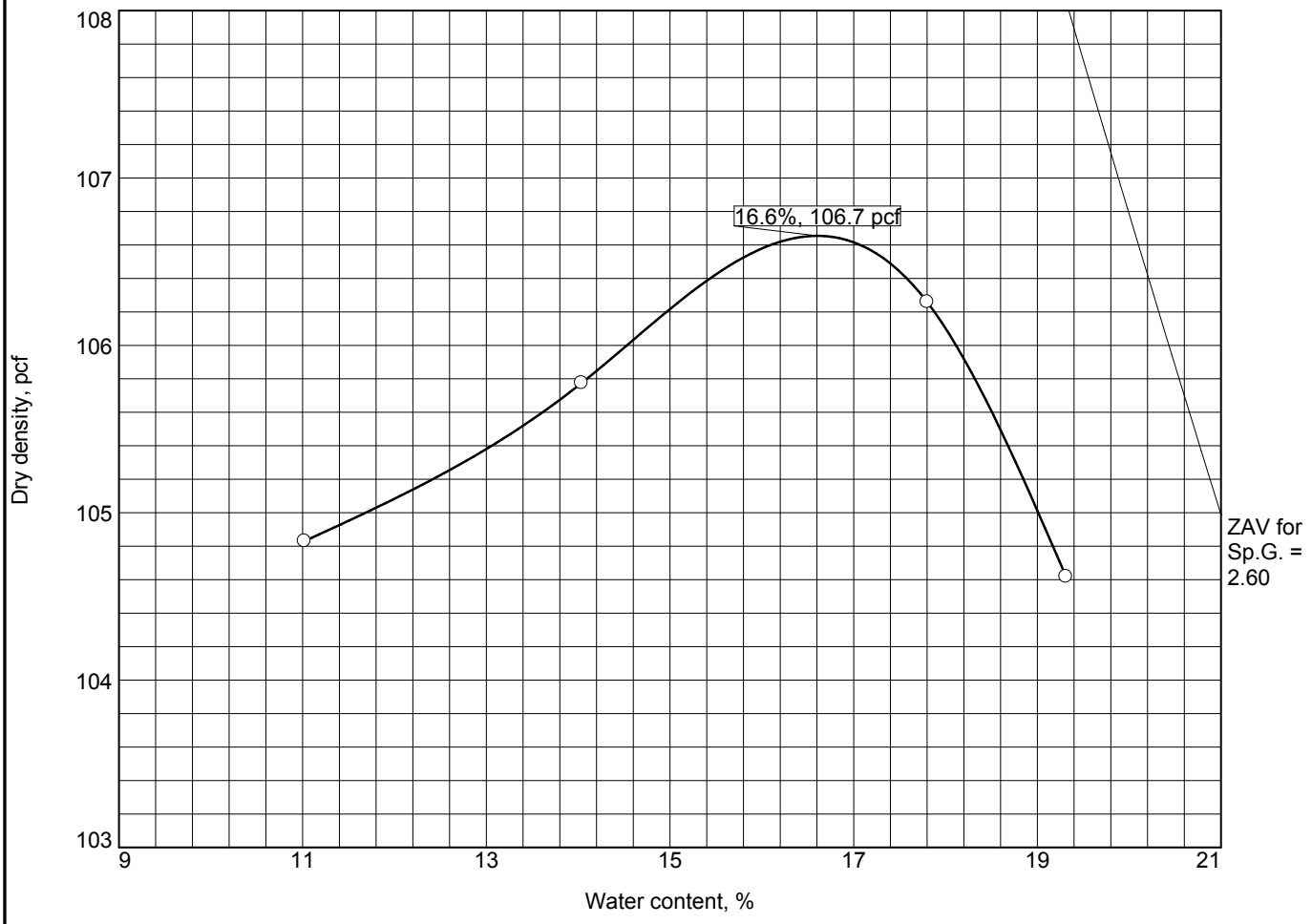
Virginia Beach, VA

Remarks:
Tested on 9/18/2023

Figure CBR-8

Tested By: MM **Checked By:** S. Raut, EIT

MOISTURE DENSITY RELATIONSHIP CURVE



Test specification: ASTM D 698-12 Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
1-2	CL	A-4(3)	10.1	2.6	27	8	0.0	67.7

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 106.7 pcf Optimum moisture = 16.6 %	Tan brown sandy lean CLAY (CL), moist

Project No. ETS-23E159 **Client:** Greenwood Homes
Project: Layden Property
Date: 9/13/2023
○ **Sample Number:** CBR-9

ENGINEERING AND TESTING SERVICES, INC.

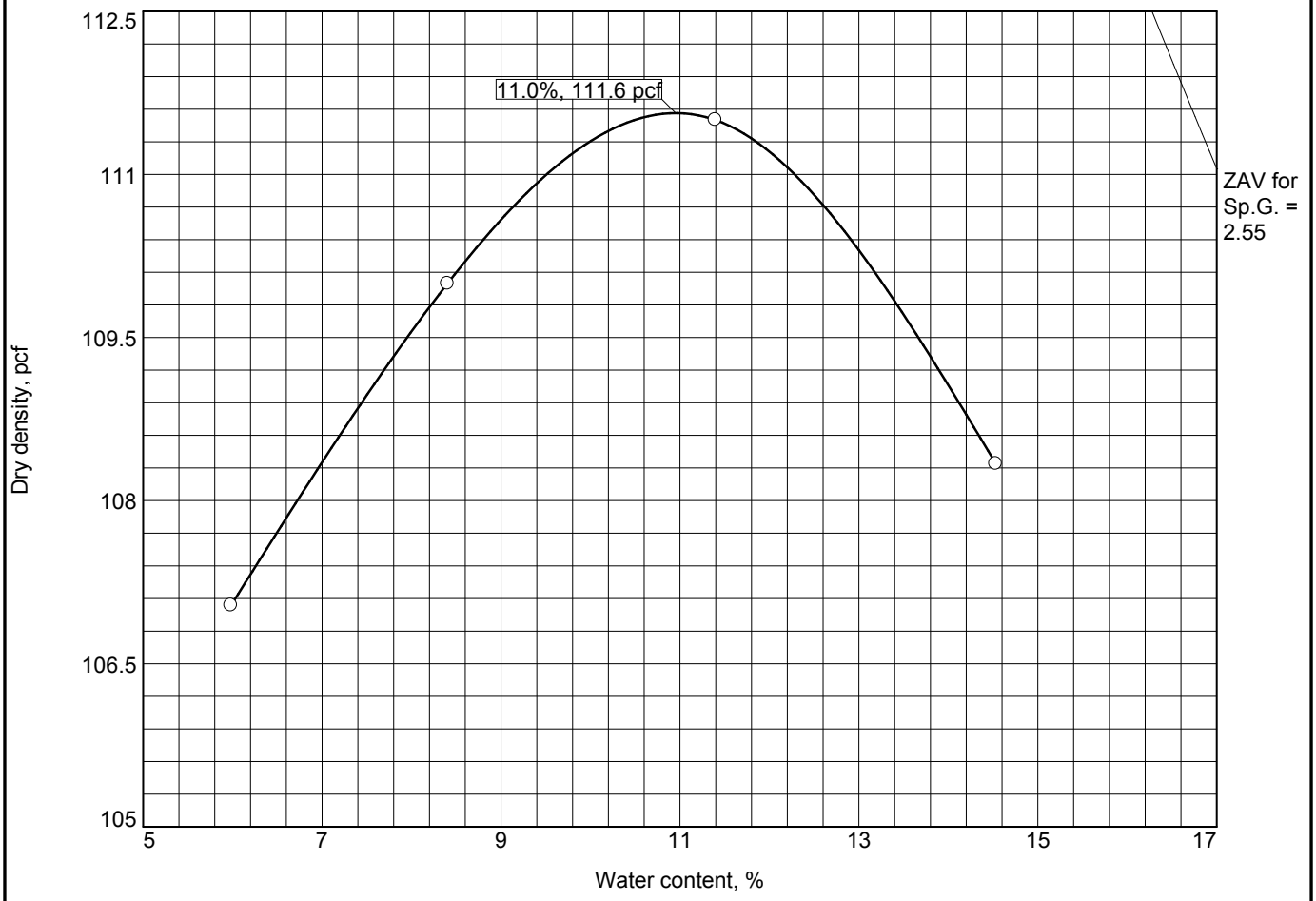
Virginia Beach, VA

Remarks:
Tested on 9/13/2023

Figure CBR-9

Tested By: MM **Checked By:** S. Raut, EIT

MOISTURE DENSITY RELATIONSHIP CURVE



Test specification: ASTM D 698-12 Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
1-2	CL	A-4(2)	9.5	2.55	25	9	1.1	54.8

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 111.6 pcf Optimum moisture = 11.0 %	Brown sandy lean CLAY (CL), moist

Project No. ETS-23E159 **Client:** Greenwood Homes
Project: Layden Property
Date: 9/15/2023
○ **Sample Number:** CBR-10

ENGINEERING AND TESTING SERVICES, INC.

Virginia Beach, VA

Remarks:
Tested on 9/15/2023

Figure CBR-10

Tested By: MM **Checked By:** S. Raut, EIT

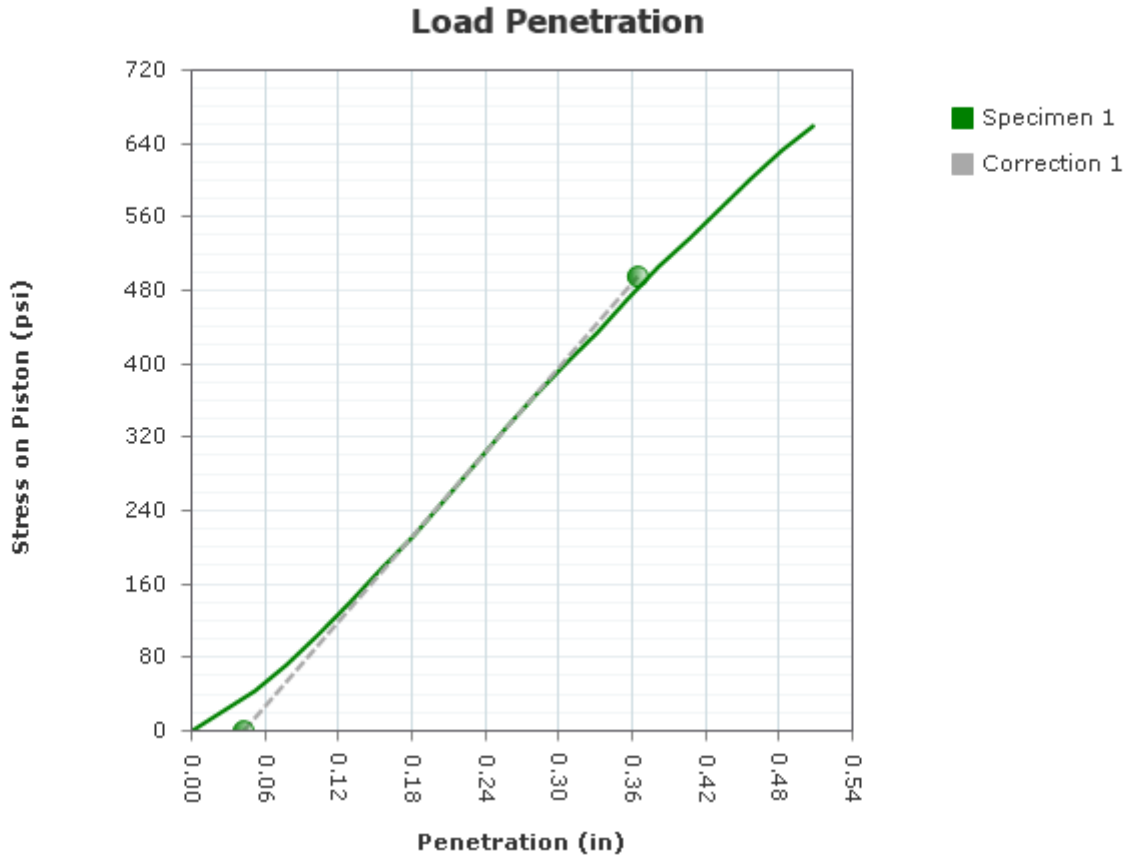
APPENDIX VII – CALIFORNIA BEARING RATIO GRAPHS

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Phone: 757-306-1040

CBR Test Results

ASTM (D1883) / AASHTO (T193)



CBR Results								
Results	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
CBR @ 0.10 (in)	16.3							
CBR @ 0.20 (in)	21.1							

Project Information	
Project:	Layden Property
Project Number:	ETS-23E159
Sampling Date:	
Sample Number:	CBR-1
Sample Depth:	1-2 ft
Location:	Smithfield, VA
Client Name:	Greenwood Homes
Remarks:	Brown silty SAND (SM), moist

Tested By: _____ Date: _____ Checked By: _____ Date: _____

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CBR Test

ASTM (D1883) / AASHTO (T193)

Before Soaking	Specimen Number 1	2	3	4	5	6	7	8
Specific Gravity	2.6							
Liquid Limit	0							
Plastic Limit	0							
Surcharge Weight (g)	4500.0							
Number of Blows	25							
Maximum Dry Density (pcf)	121.9							
Optimum Moisture Content (%)	10.5							
Mold ID								
Mold Diameter (in)	6.000							
Mold Weight (g)	7120.7							
Sample Height (in)	4.580							
Mold Volume (in^3)	129.50							
Moisture Content (%)	10.2							
Weight of Mold + Soil (g)	11622.4							
Weight of Soil (g)	4501.7							
Dry Density (pcf)	120.1							
Wet Density (pcf)	132.4							
After Soaking	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Soaked Sample Height (in)	4.580							
Soaked Time (Day)	4.0							
Swell (%)	0.0							
Moisture Content (%)	0.0							
Weight of Mold + Soil (g)	0.0							
Weight After Soaking (g)	-7120.7							
Dry Density (pcf)	-209.5							
Wet Density (pcf)	-209.5							

Project Name: Laydem Property Project Number: ETS-23E159

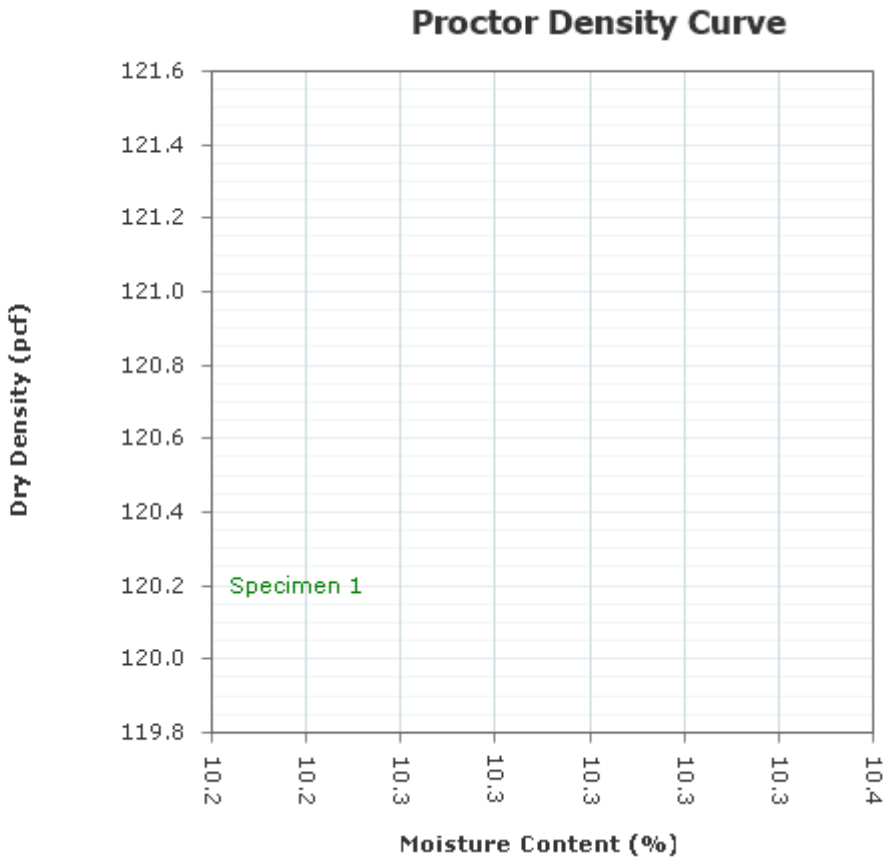
Tested By: _____ Date: _____ Checked By: _____ Date: _____

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CBR Proctor Density Curve

ASTM (D1883) / AASHTO (T193)



CBR Proctor Density Curve	
Maximum Dry Density (pcf)	120.1
Optimum Moisture Content (%)	10.2

Project Name: Laydem Property Project Number: ETS-23E159

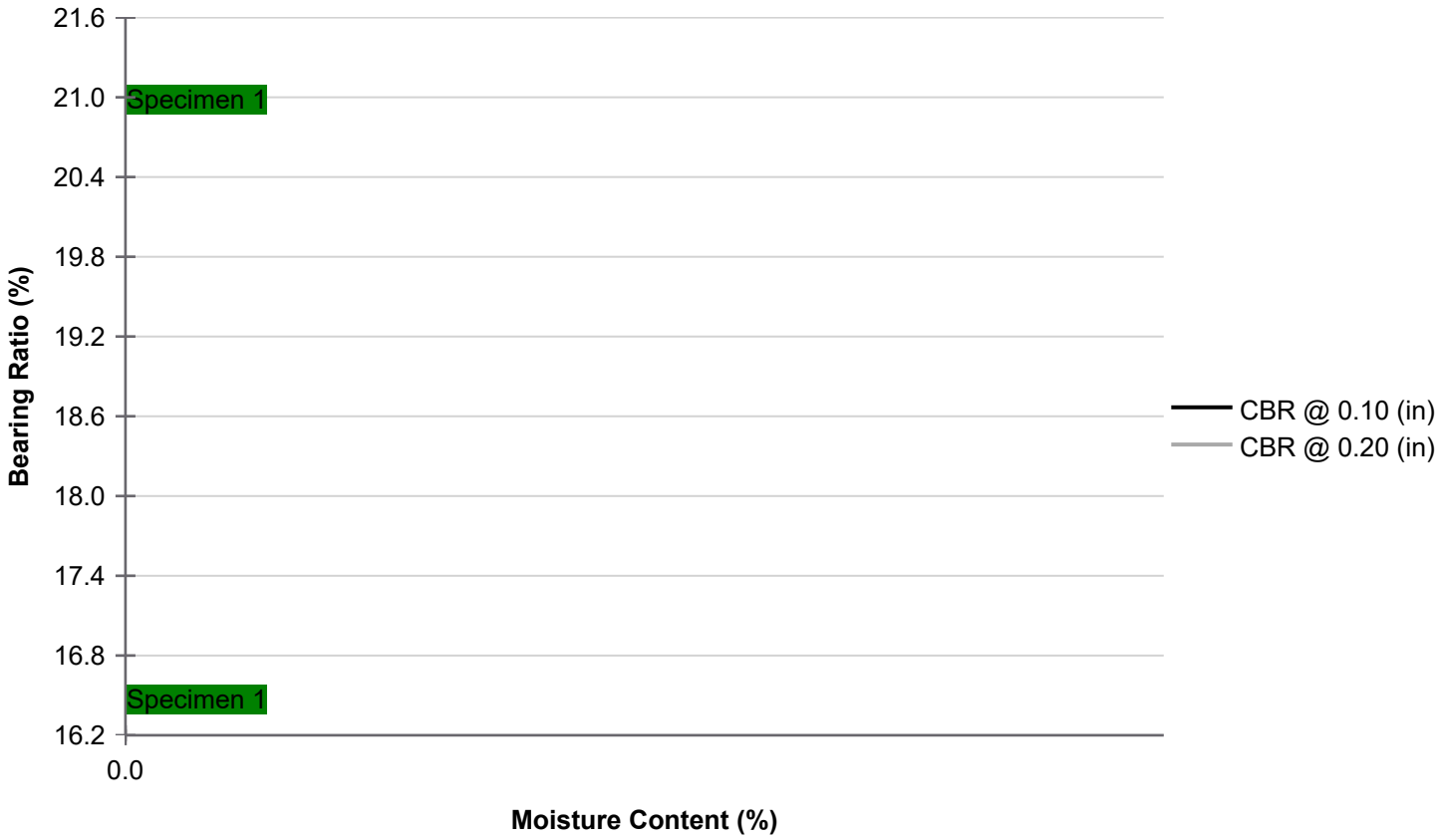
Tested By: _____ Date: _____ Checked By: _____ Date: _____

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CBR Bearing Ratio

ASTM (D1883) / AASHTO (T193)



CBR Results	
CBR @ 0.10 (in)	16.3
CBR @ 0.20 (in)	21.1
Moisture Content (%)	10.2

Project Name: Laydem Property Project Number: ETS-23E159

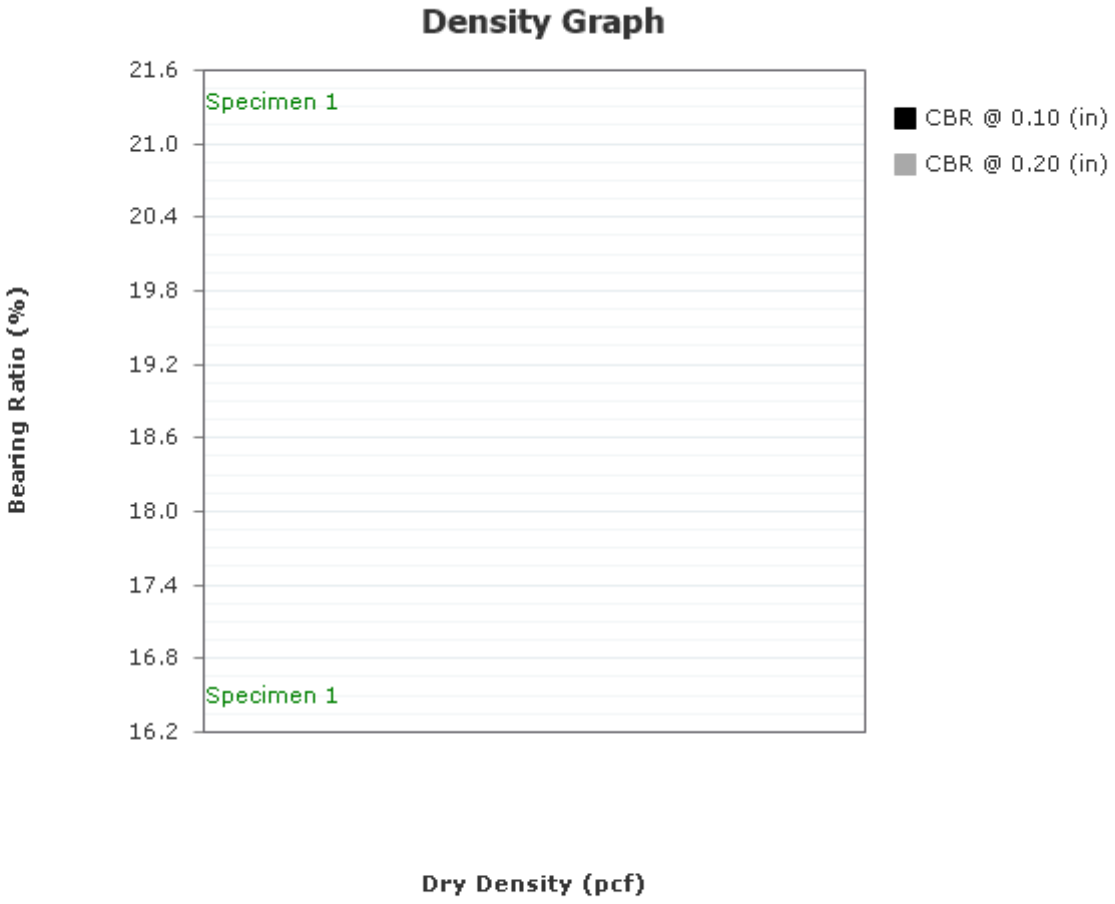
Tested By: _____ Date: _____ Checked By: _____ Date: _____

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CBR Density Graph

ASTM (D1883) / AASHTO (T193)



CBR Results	
CBR @ 0.10 (in)	16.3
CBR @ 0.20 (in)	21.1
Maximum Dry Density (pcf)	120.1

Project Name: Laydem Property Project Number: ETS-23E159

Tested By: _____ Date: _____ Checked By: _____ Date: _____

CBR Test - Specimen 1

ASTM (D1883) / AASHTO (T193)

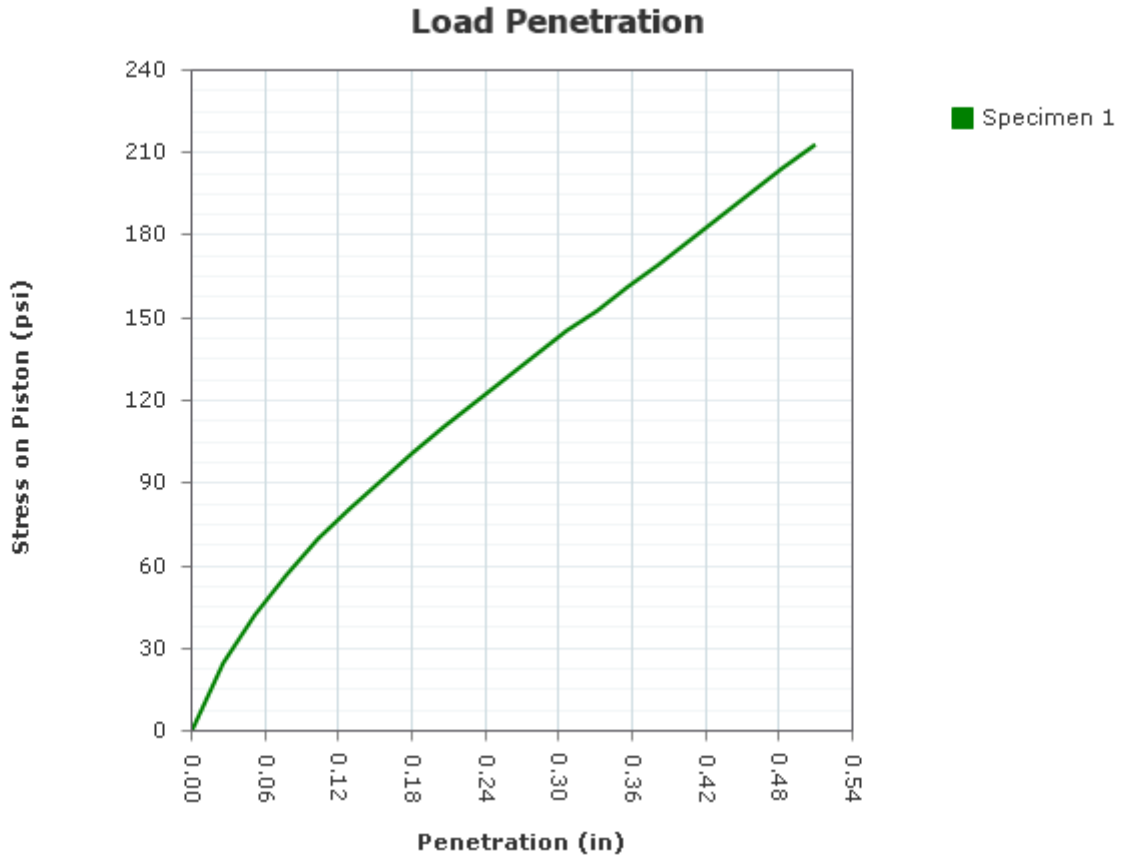
Index	Elapsed Time (hh:mm:ss)	Load (Lbf)	Displacement (in)	Corrected Load (Lbf)	Corrected Penetration (in)	Stress On Piston (psi)	CBR (%)	Corrected CBR (%)
0	00:00:00	1.4	0.0089	0.0	0.00	0	0.0	0.0
1	00:00:29	69.8	0.0347	68.4	0.03	23	0.0	0.0
2	00:01:00	135.4	0.0605	134.0	0.05	45	0.0	0.0
3	00:01:30	216.1	0.0863	214.6	0.08	72	0.0	0.0
4	00:02:03	315.8	0.1121	314.4	0.10	105	10.5	16.3
5	00:02:35	417.4	0.1379	415.9	0.13	139	0.0	0.0
6	00:03:07	530.8	0.1637	529.3	0.15	176	0.0	0.0
7	00:03:37	639.2	0.1895	637.7	0.18	213	0.0	0.0
8	00:04:08	755.1	0.2150	753.7	0.21	251	16.7	21.1
9	00:04:39	872.6	0.2401	871.1	0.23	290	0.0	0.0
10	00:05:11	988.8	0.2651	987.3	0.26	329	0.0	0.0
11	00:05:43	1,101.3	0.2902	1,099.9	0.28	367	0.0	0.0
12	00:06:12	1,203.4	0.3153	1,202.0	0.31	401	21.1	24.2
13	00:06:42	1,304.3	0.3404	1,302.9	0.33	434	0.0	0.0
14	00:07:14	1,413.7	0.3655	1,412.3	0.36	471	0.0	0.0
15	00:07:45	1,517.0	0.3905	1,515.5	0.38	505	0.0	0.0
16	00:08:15	1,614.1	0.4157	1,612.6	0.41	538	23.4	25.7
17	00:08:46	1,710.9	0.4409	1,709.4	0.43	570	0.0	0.0
18	00:09:18	1,807.8	0.4660	1,806.3	0.46	602	0.0	0.0
19	00:09:49	1,897.0	0.4912	1,895.6	0.48	632	0.0	0.0
20	00:10:18	1,980.2	0.5164	1,978.8	0.51	660	25.4	0.0
21	00:10:19	1,982.4	0.5168	1,980.9	0.51	660	0.0	0.0

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CBR Test Results

ASTM (D1883) / AASHTO (T193)



CBR Results								
Results	1	2	3	4	5	6	7	8
CBR @ 0.10 (in)	7.0							
CBR @ 0.20 (in)	7.4							

Project Information	
Project:	Layden Property
Project Number:	ETS-23E159
Sampling Date:	
Sample Number:	CBR-2
Sample Depth:	1-2 ft
Location:	Smithfield, VA
Client Name:	Greenwood Homes
Remarks:	

Tested By: _____ Date: _____ Checked By: _____ Date: _____

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CBR Test

ASTM (D1883) / AASHTO (T193)

Before Soaking	Specimen Number 1	2	3	4	5	6	7	8
Specific Gravity	2.6							
Liquid Limit	0							
Plastic Limit	0							
Surcharge Weight (g)	4500.0							
Number of Blows	25							
Maximum Dry Density (pcf)	116.6							
Optimum Moisture Content (%)	11.5							
Mold ID								
Mold Diameter (in)	6.000							
Mold Weight (g)	7120.9							
Sample Height (in)	4.580							
Mold Volume (in^3)	129.50							
Moisture Content (%)	11.2							
Weight of Mold + Soil (g)	11503.9							
Weight of Soil (g)	4383.0							
Dry Density (pcf)	116.0							
Wet Density (pcf)	128.9							
After Soaking	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Soaked Sample Height (in)	4.580							
Soaked Time (Day)	4.0							
Swell (%)	0.0							
Moisture Content (%)	0.0							
Weight of Mold + Soil (g)	0.0							
Weight After Soaking (g)	-7120.9							
Dry Density (pcf)	-209.5							
Wet Density (pcf)	-209.5							

Project Name: Laydem Property Project Number: ETS-23E159

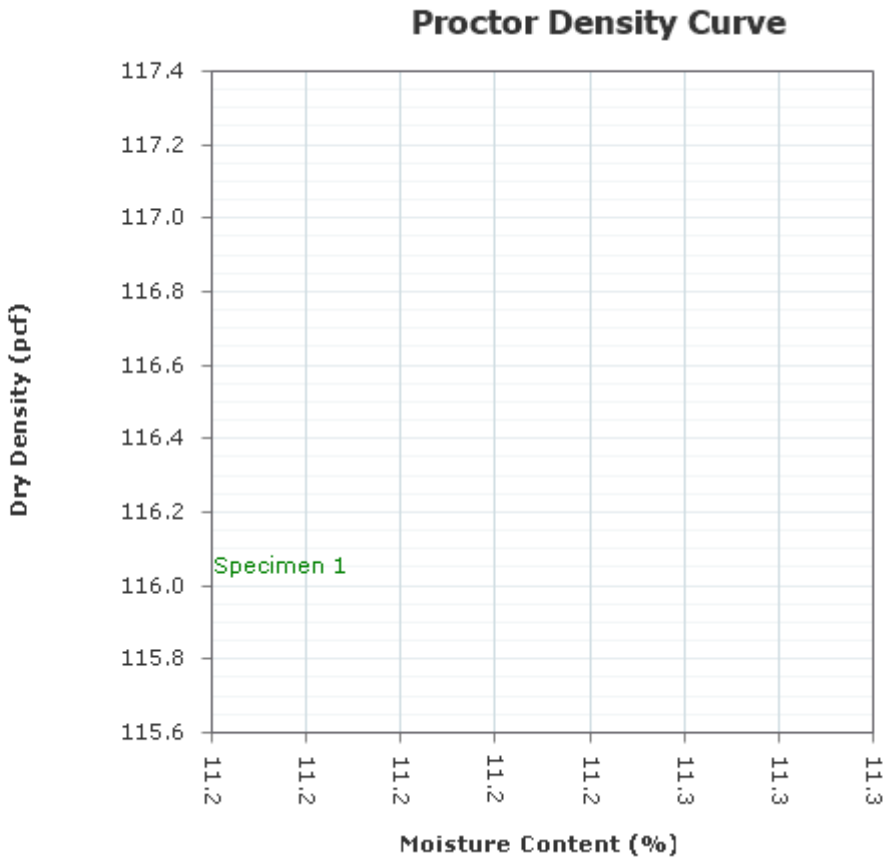
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CBR Proctor Density Curve

ASTM (D1883) / AASHTO (T193)



CBR Proctor Density Curve	
Maximum Dry Density (pcf)	116.0
Optimum Moisture Content (%)	11.2

Project Name: Laydem Property Project Number: ETS-23E159

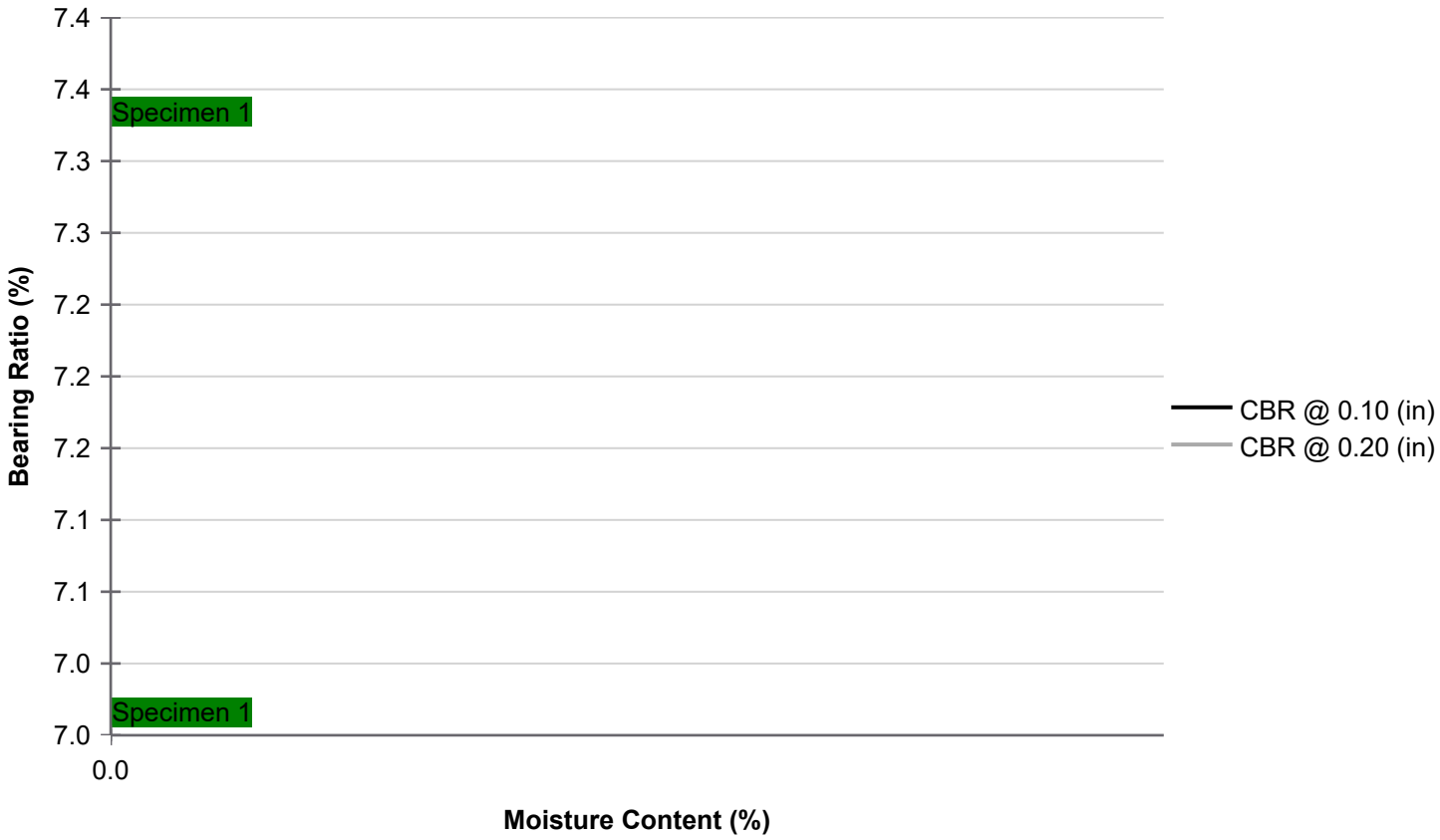
Tested By: _____ Date: _____ Checked By: _____ Date: _____

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Virginia Beach, Virginia 23464
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CBR Bearing Ratio

ASTM (D1883) / AASHTO (T193)



CBR Results	
CBR @ 0.10 (in)	7.0
CBR @ 0.20 (in)	7.4
Moisture Content (%)	11.2

Project Name: Laydem Property Project Number: ETS-23E159

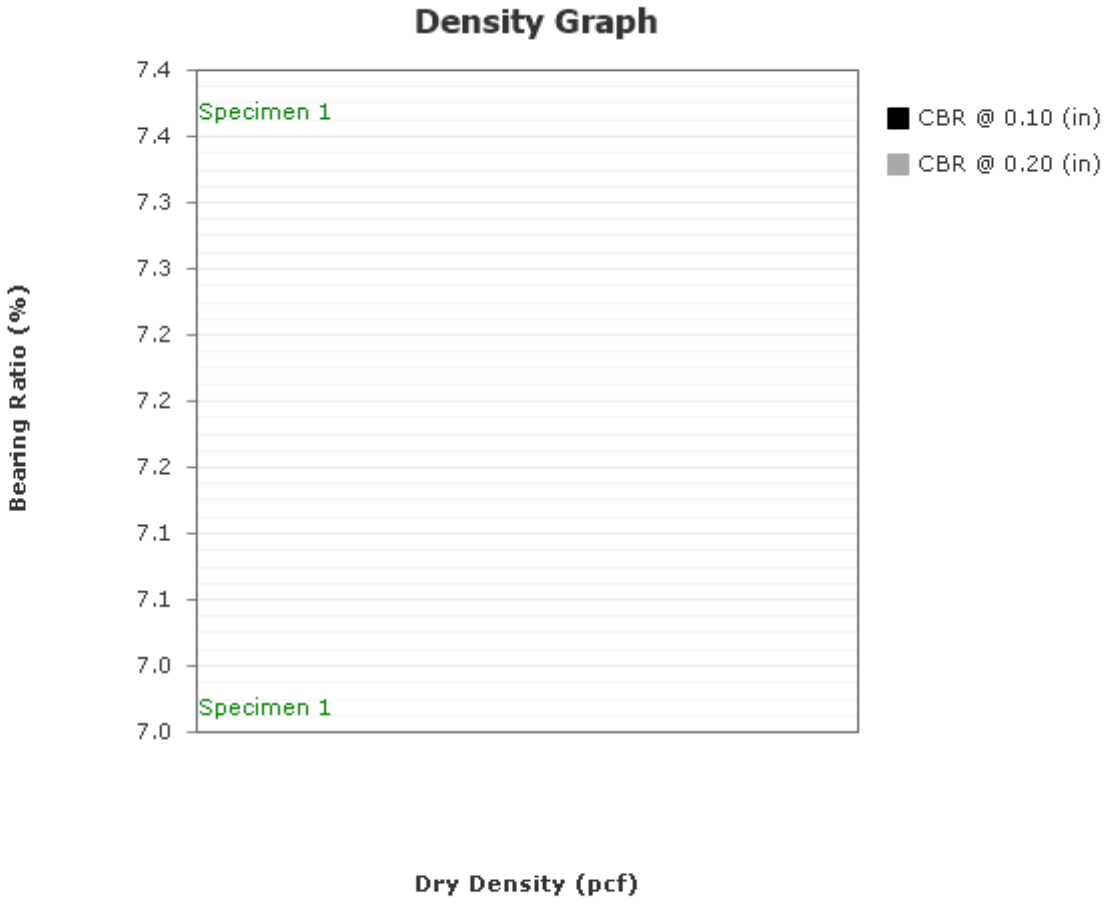
Tested By: _____ Date: _____ Checked By: _____ Date: _____

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CBR Density Graph

ASTM (D1883) / AASHTO (T193)



CBR Results	
CBR @ 0.10 (in)	7.0
CBR @ 0.20 (in)	7.4
Maximum Dry Density (pcf)	116.0

Project Name: Laydem Property Project Number: ETS-23E159

Tested By: _____ Date: _____ Checked By: _____ Date: _____

CBR Test - Specimen 1

ASTM (D1883) / AASHTO (T193)

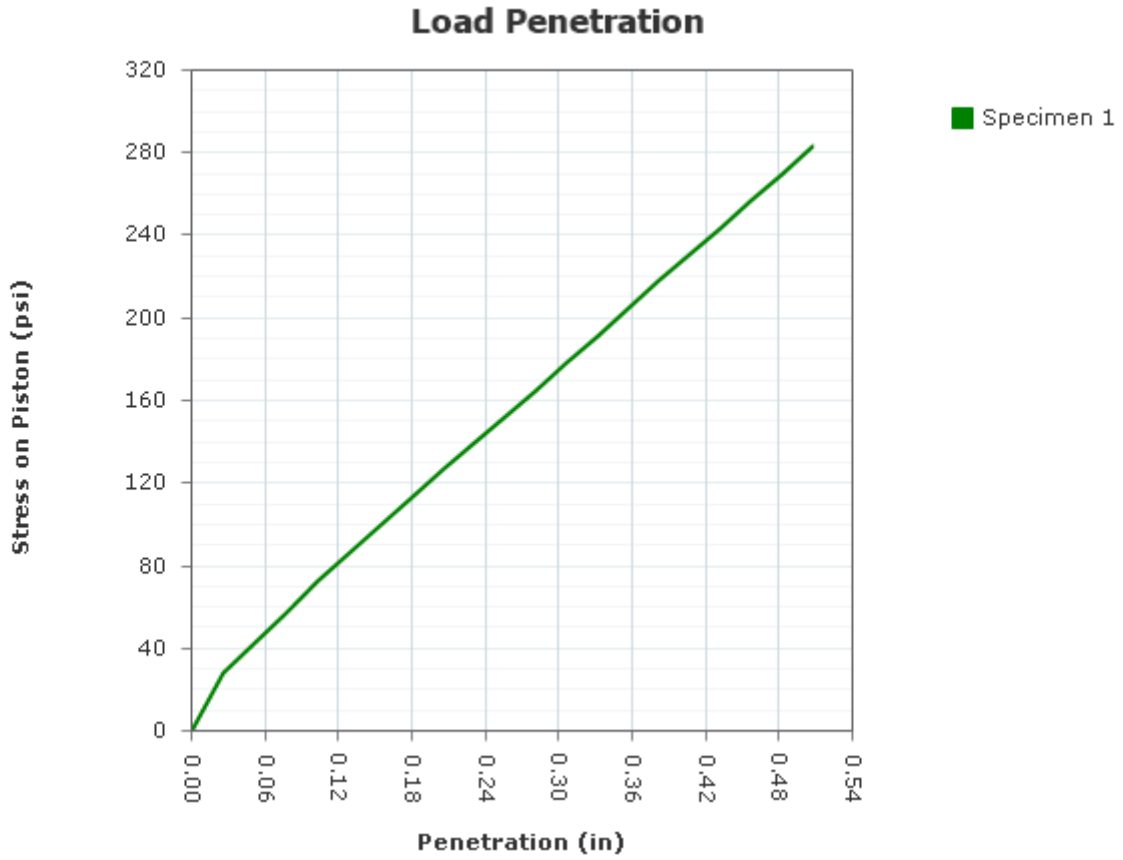
Index	Elapsed Time (hh:mm:ss)	Load (Lbf)	Displacement (in)	Corrected Load (Lbf)	Corrected Penetration (in)	Stress On Piston (psi)	CBR (%)	Corrected CBR (%)
0	00:00:00	2.0	0.0091	0.0	0.00	0	0.0	0.0
1	00:00:29	77.1	0.0349	75.1	0.03	25	0.0	0.0
2	00:00:59	129.5	0.0607	127.5	0.05	43	0.0	0.0
3	00:01:30	172.9	0.0865	170.9	0.08	57	0.0	0.0
4	00:02:02	212.0	0.1123	210.0	0.10	70	7.0	7.0
5	00:02:33	245.1	0.1381	243.1	0.13	81	0.0	0.0
6	00:03:03	275.8	0.1639	273.8	0.15	91	0.0	0.0
7	00:03:33	305.1	0.1897	303.1	0.18	101	0.0	0.0
8	00:04:05	333.2	0.2152	331.2	0.21	110	7.4	7.4
9	00:04:35	360.4	0.2403	358.4	0.23	119	0.0	0.0
10	00:05:05	385.6	0.2653	383.6	0.26	128	0.0	0.0
11	00:05:36	411.9	0.2904	409.9	0.28	137	0.0	0.0
12	00:06:07	437.5	0.3155	435.5	0.31	145	7.6	7.6
13	00:06:36	460.4	0.3406	458.4	0.33	153	0.0	0.0
14	00:07:07	486.4	0.3656	484.4	0.36	161	0.0	0.0
15	00:07:37	511.0	0.3907	509.0	0.38	170	0.0	0.0
16	00:08:08	536.8	0.4159	534.8	0.41	178	7.8	7.8
17	00:08:38	562.1	0.4410	560.1	0.43	187	0.0	0.0
18	00:09:09	588.8	0.4662	586.8	0.46	196	0.0	0.0
19	00:09:40	614.9	0.4914	612.9	0.48	204	0.0	0.0
20	00:10:10	639.8	0.5166	637.8	0.51	213	8.2	8.2
21	00:10:12	641.5	0.5186	639.5	0.51	213	0.0	0.0

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CBR Test Results

ASTM (D1883) / AASHTO (T193)



CBR Results								
Results	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
CBR @ 0.10 (in)	7.2							
CBR @ 0.20 (in)	8.5							

Project Information	
Project:	Layden Property
Project Number:	ETS-23E159
Sampling Date:	
Sample Number:	CBR-3
Sample Depth:	1-2 ft
Location:	Smithfield, VA
Client Name:	Greenwood Homes
Remarks:	

Tested By: _____ Date: _____ Checked By: _____ Date: _____

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CBR Test

ASTM (D1883) / AASHTO (T193)

Before Soaking	Specimen Number 1	2	3	4	5	6	7	8
Specific Gravity	2.6							
Liquid Limit	0							
Plastic Limit	0							
Surcharge Weight (g)	45000.0							
Number of Blows	25							
Maximum Dry Density (pcf)	119.2							
Optimum Moisture Content (%)	10.0							
Mold ID								
Mold Diameter (in)	6.000							
Mold Weight (g)	7196.5							
Sample Height (in)	4.580							
Mold Volume (in^3)	129.50							
Moisture Content (%)	10.1							
Weight of Mold + Soil (g)	11618.4							
Weight of Soil (g)	4421.9							
Dry Density (pcf)	118.1							
Wet Density (pcf)	130.1							
After Soaking	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Soaked Sample Height (in)	-454.960							
Soaked Time (Day)	4.0							
Swell (%)	-10033.6							
Moisture Content (%)	0.0							
Weight of Mold + Soil (g)	0.0							
Weight After Soaking (g)	-7196.5							
Dry Density (pcf)	-211.7							
Wet Density (pcf)	-211.7							

Project Name: Laydem Property Project Number: ETS-23E159

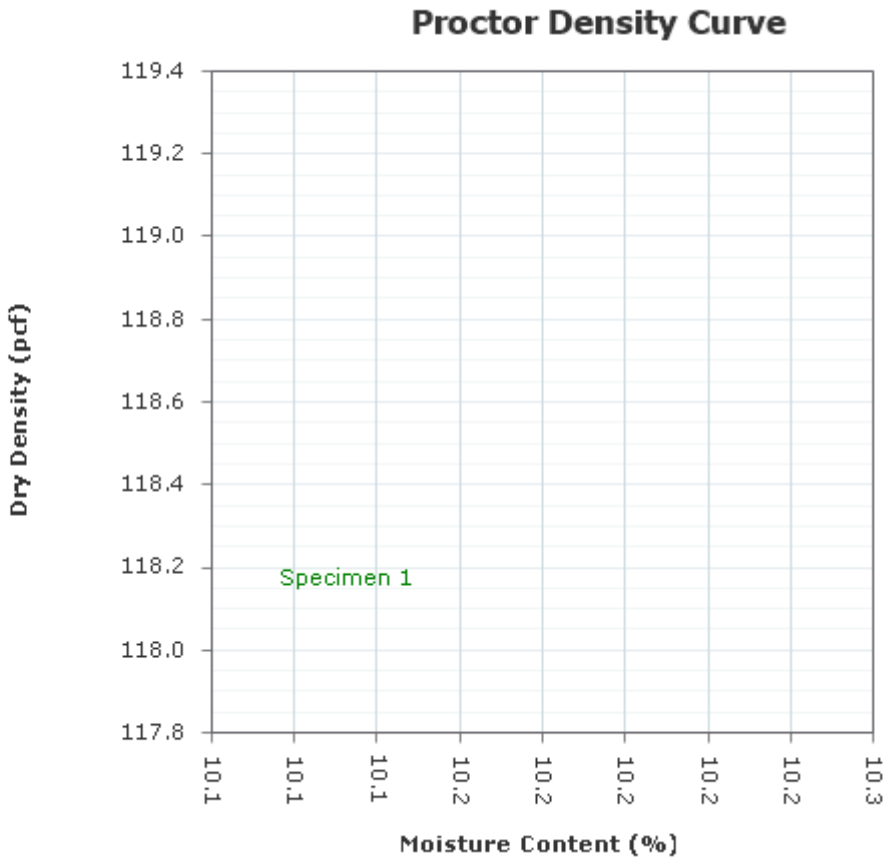
Tested By: _____ Date: _____ Checked By: _____ Date: _____

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CBR Proctor Density Curve

ASTM (D1883) / AASHTO (T193)



CBR Proctor Density Curve	
Maximum Dry Density (pcf)	118.1
Optimum Moisture Content (%)	10.1

Project Name: Laydem Property Project Number: ETS-23E159

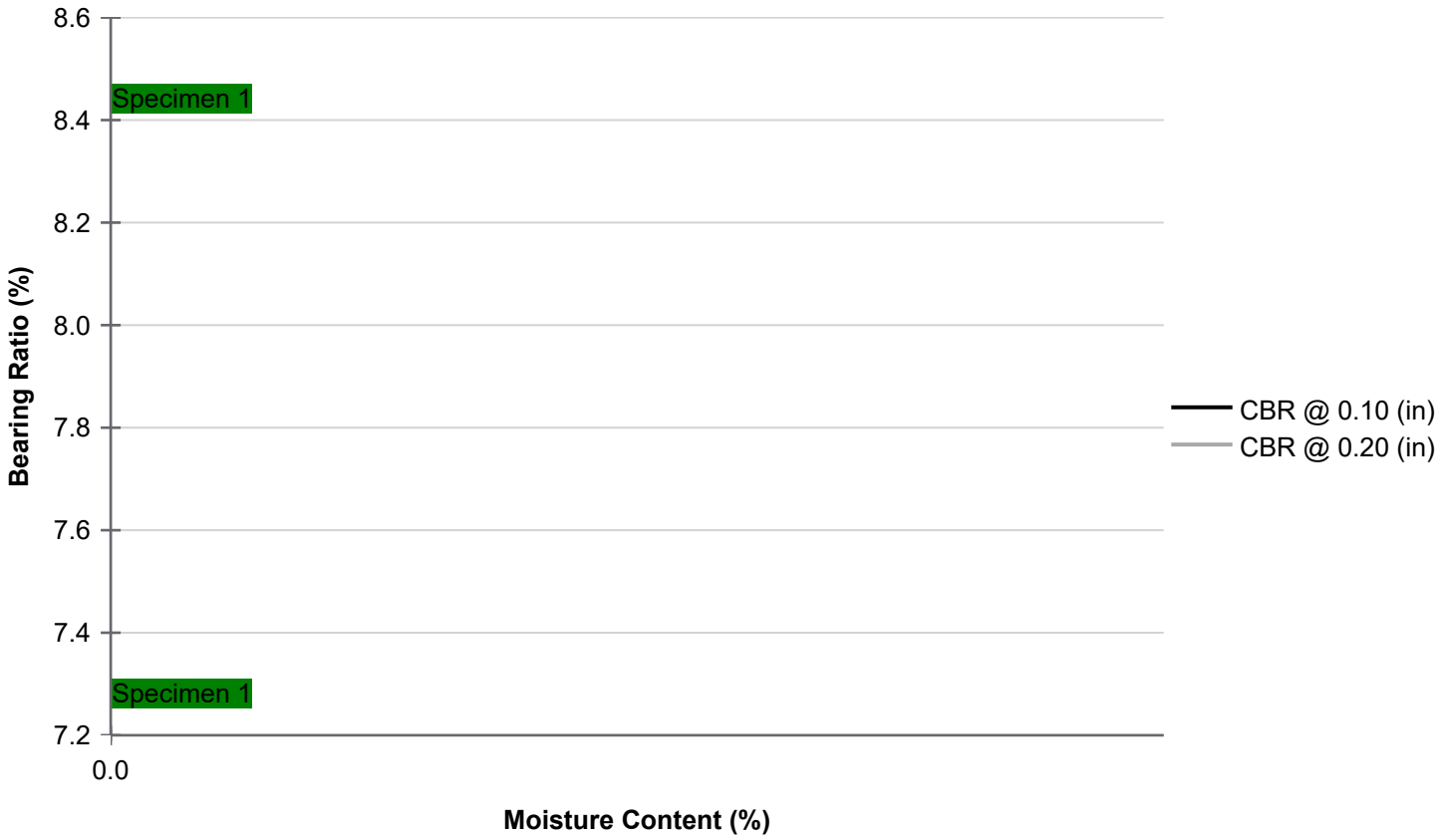
Tested By: _____ Date: _____ Checked By: _____ Date: _____

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CBR Bearing Ratio

ASTM (D1883) / AASHTO (T193)



CBR Results	
CBR @ 0.10 (in)	7.2
CBR @ 0.20 (in)	8.5
Moisture Content (%)	10.1

Project Name: Laydem Property Project Number: ETS-23E159

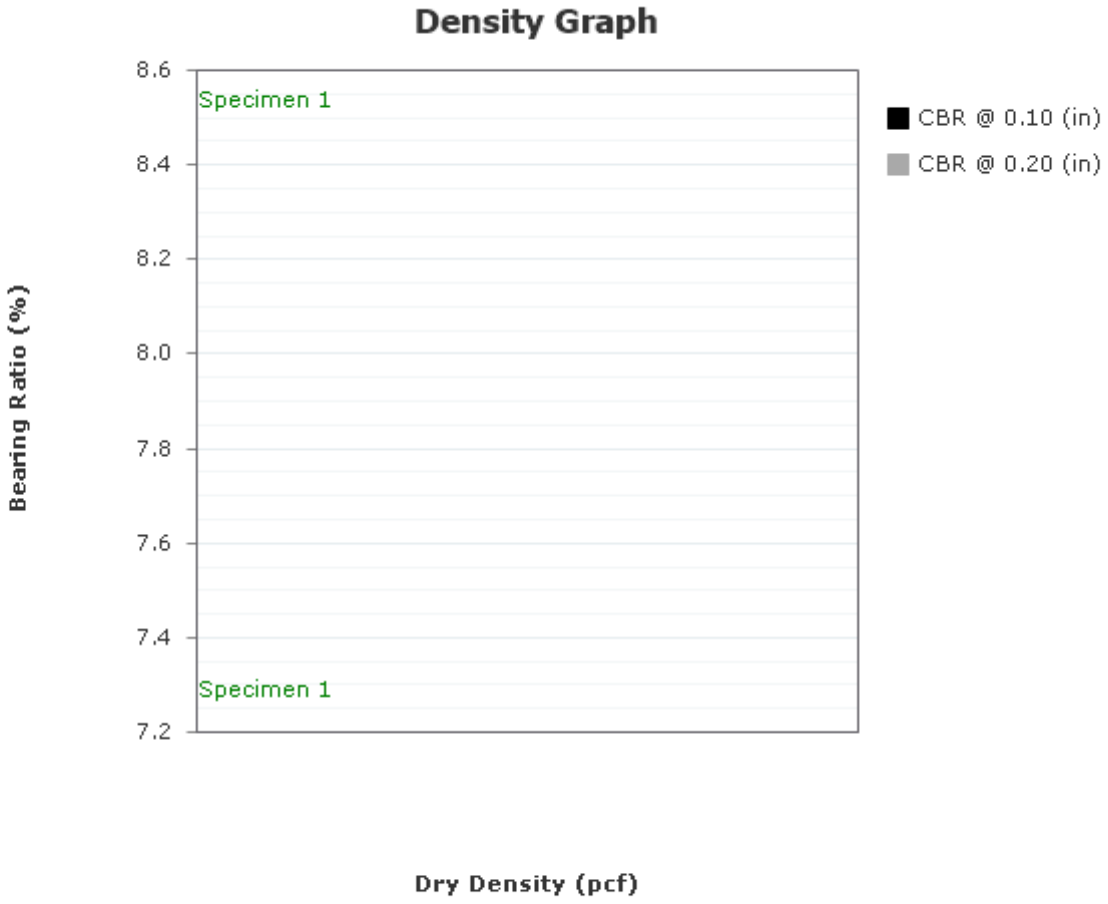
Tested By: _____ Date: _____ Checked By: _____ Date: _____

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CBR Density Graph

ASTM (D1883) / AASHTO (T193)



CBR Results	
CBR @ 0.10 (in)	7.2
CBR @ 0.20 (in)	8.5
Maximum Dry Density (pcf)	118.1

Project Name: Laydem Property Project Number: ETS-23E159

Tested By: _____ Date: _____ Checked By: _____ Date: _____

CBR Test - Specimen 1

ASTM (D1883) / AASHTO (T193)

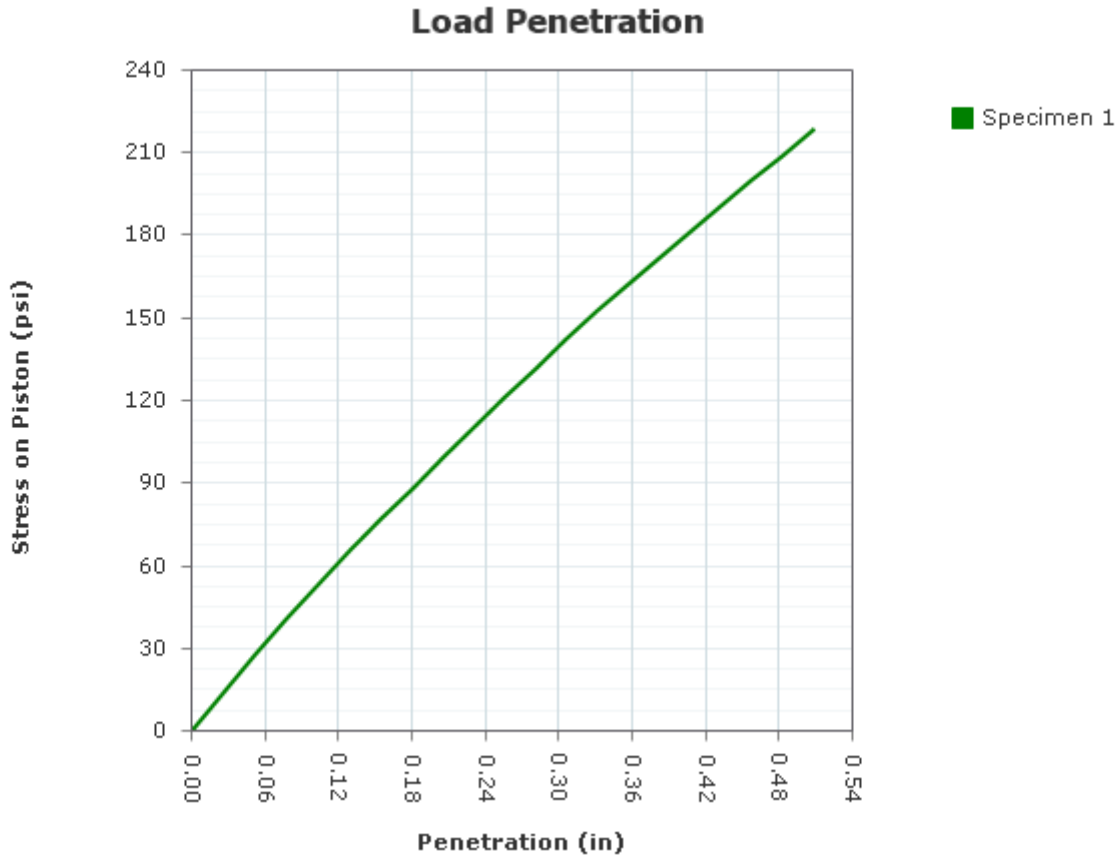
Index	Elapsed Time (hh:mm:ss)	Load (Lbf)	Displacement (in)	Corrected Load (Lbf)	Corrected Penetration (in)	Stress On Piston (psi)	CBR (%)	Corrected CBR (%)
0	00:00:00	0.5	0.0088	0.0	0.00	0	0.0	0.0
1	00:00:30	83.8	0.0346	83.4	0.03	28	0.0	0.0
2	00:00:59	128.5	0.0604	128.0	0.05	43	0.0	0.0
3	00:01:29	172.2	0.0861	171.8	0.08	57	0.0	0.0
4	00:02:01	217.6	0.1119	217.2	0.10	72	7.2	7.2
5	00:02:32	259.4	0.1377	259.0	0.13	86	0.0	0.0
6	00:03:03	300.3	0.1635	299.8	0.15	100	0.0	0.0
7	00:03:34	340.6	0.1893	340.1	0.18	113	0.0	0.0
8	00:04:07	382.3	0.2149	381.8	0.21	127	8.5	8.5
9	00:04:36	420.4	0.2399	420.0	0.23	140	0.0	0.0
10	00:05:06	458.1	0.2650	457.7	0.26	153	0.0	0.0
11	00:05:36	495.7	0.2901	495.2	0.28	165	0.0	0.0
12	00:06:08	535.2	0.3152	534.8	0.31	178	9.4	9.4
13	00:06:38	574.0	0.3402	573.6	0.33	191	0.0	0.0
14	00:07:08	612.9	0.3653	612.5	0.36	204	0.0	0.0
15	00:07:39	654.8	0.3904	654.4	0.38	218	0.0	0.0
16	00:08:09	694.3	0.4155	693.8	0.41	231	10.1	10.1
17	00:08:39	731.7	0.4407	731.3	0.43	244	0.0	0.0
18	00:09:08	770.5	0.4659	770.1	0.46	257	0.0	0.0
19	00:09:38	808.1	0.4911	807.6	0.48	269	0.0	0.0
20	00:10:10	849.8	0.5162	849.4	0.51	283	10.9	10.9
21	00:10:11	851.2	0.5172	850.7	0.51	284	0.0	0.0

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CBR Test Results

ASTM (D1883) / AASHTO (T193)



CBR Results								
Results	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
CBR @ 0.10 (in)	5.3							
CBR @ 0.20 (in)	6.6							

Project Information	
Project:	Layden Property
Project Number:	ETS-23E159
Sampling Date:	
Sample Number:	CBR-4
Sample Depth:	1-2 ft
Location:	Smithfield, VA
Client Name:	Greenwood Homes
Remarks:	Brown clayey SAND (SC), moist

Tested By: _____ Date: _____ Checked By: _____ Date: _____

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CBR Test

ASTM (D1883) / AASHTO (T193)

Before Soaking	Specimen Number 1	2	3	4	5	6	7	8
Specific Gravity	2.6							
Liquid Limit	24							
Plastic Limit	8							
Surcharge Weight (g)	4500.0							
Number of Blows	25							
Maximum Dry Density (pcf)	118.4							
Optimum Moisture Content (%)	11.4							
Mold ID								
Mold Diameter (in)	6.000							
Mold Weight (g)	7256.9							
Sample Height (in)	4.580							
Mold Volume (in^3)	129.50							
Moisture Content (%)	10.6							
Weight of Mold + Soil (g)	11634.0							
Weight of Soil (g)	4377.1							
Dry Density (pcf)	116.4							
Wet Density (pcf)	128.8							
After Soaking	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Soaked Sample Height (in)	4.587							
Soaked Time (Day)	4.0							
Swell (%)	0.2							
Moisture Content (%)	0.0							
Weight of Mold + Soil (g)	0.0							
Weight After Soaking (g)	-7256.9							
Dry Density (pcf)	-213.5							
Wet Density (pcf)	-213.5							

Project Name: Laydem Property Project Number: ETS-23E159

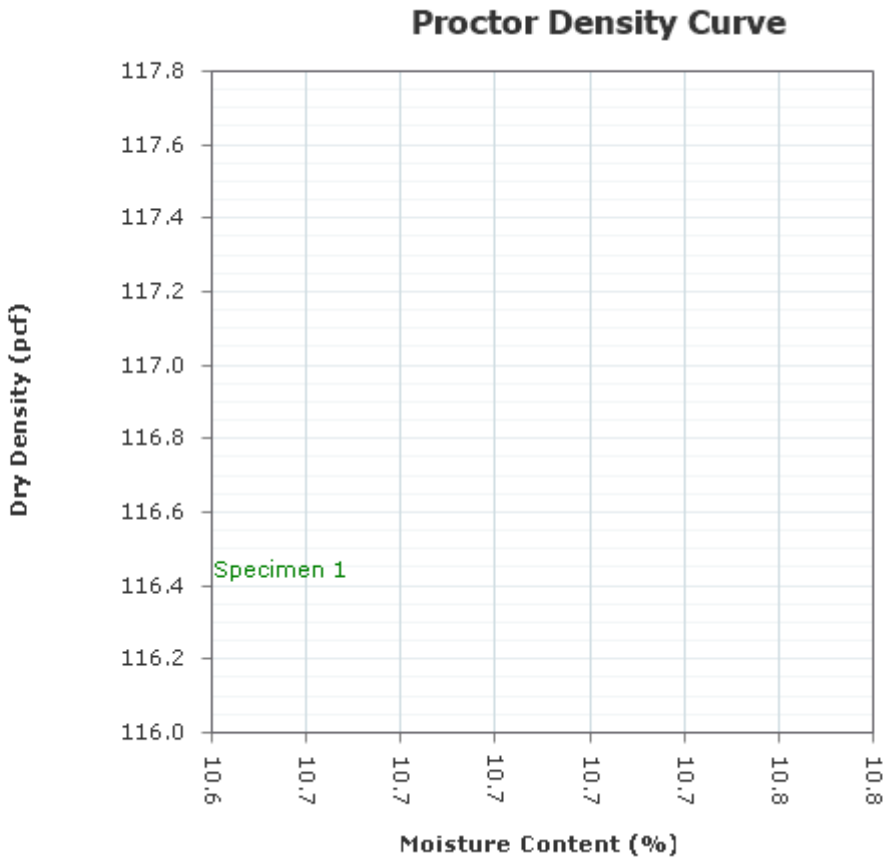
Tested By: _____ Date: _____ Checked By: _____ Date: _____

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CBR Proctor Density Curve

ASTM (D1883) / AASHTO (T193)



CBR Proctor Density Curve	
Maximum Dry Density (pcf)	116.4
Optimum Moisture Content (%)	10.6

Project Name: Laydem Property Project Number: ETS-23E159

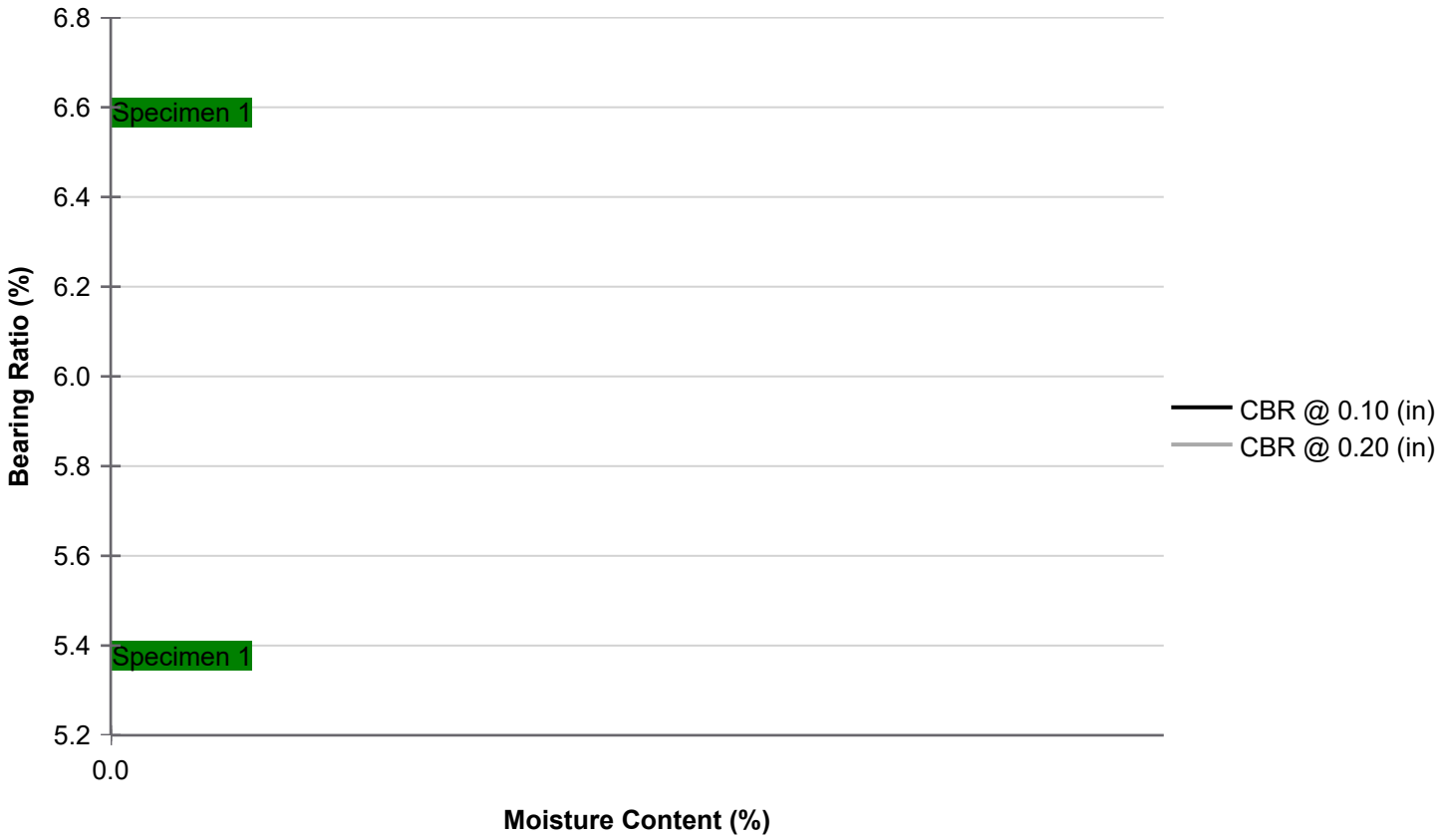
Tested By: _____ Date: _____ Checked By: _____ Date: _____

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CBR Bearing Ratio

ASTM (D1883) / AASHTO (T193)



CBR Results	
CBR @ 0.10 (in)	5.3
CBR @ 0.20 (in)	6.6
Moisture Content (%)	10.6

Project Name: Laydem Property Project Number: ETS-23E159

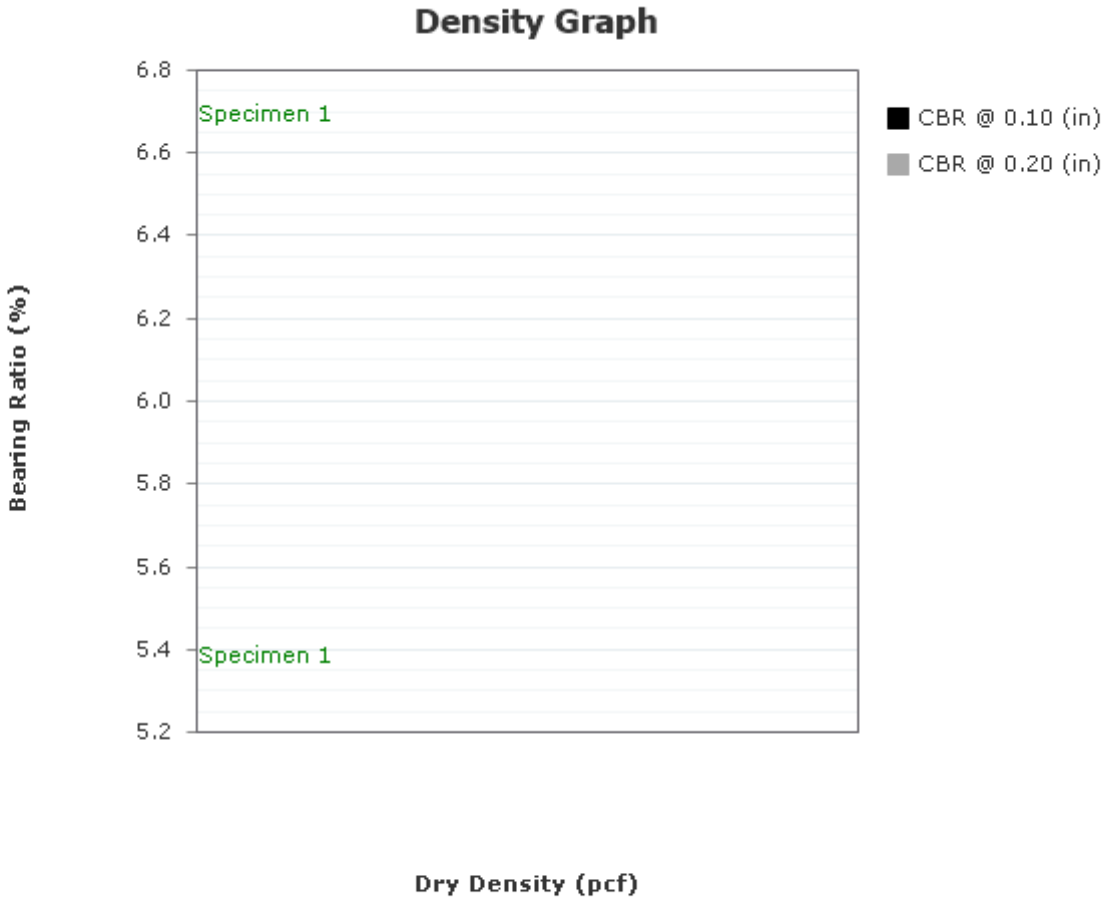
Tested By: _____ Date: _____ Checked By: _____ Date: _____

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CBR Density Graph

ASTM (D1883) / AASHTO (T193)



CBR Results	
CBR @ 0.10 (in)	5.3
CBR @ 0.20 (in)	6.6
Maximum Dry Density (pcf)	116.4

Project Name: Laydem Property Project Number: ETS-23E159

Tested By: _____ Date: _____ Checked By: _____ Date: _____

CBR Test - Specimen 1

ASTM (D1883) / AASHTO (T193)

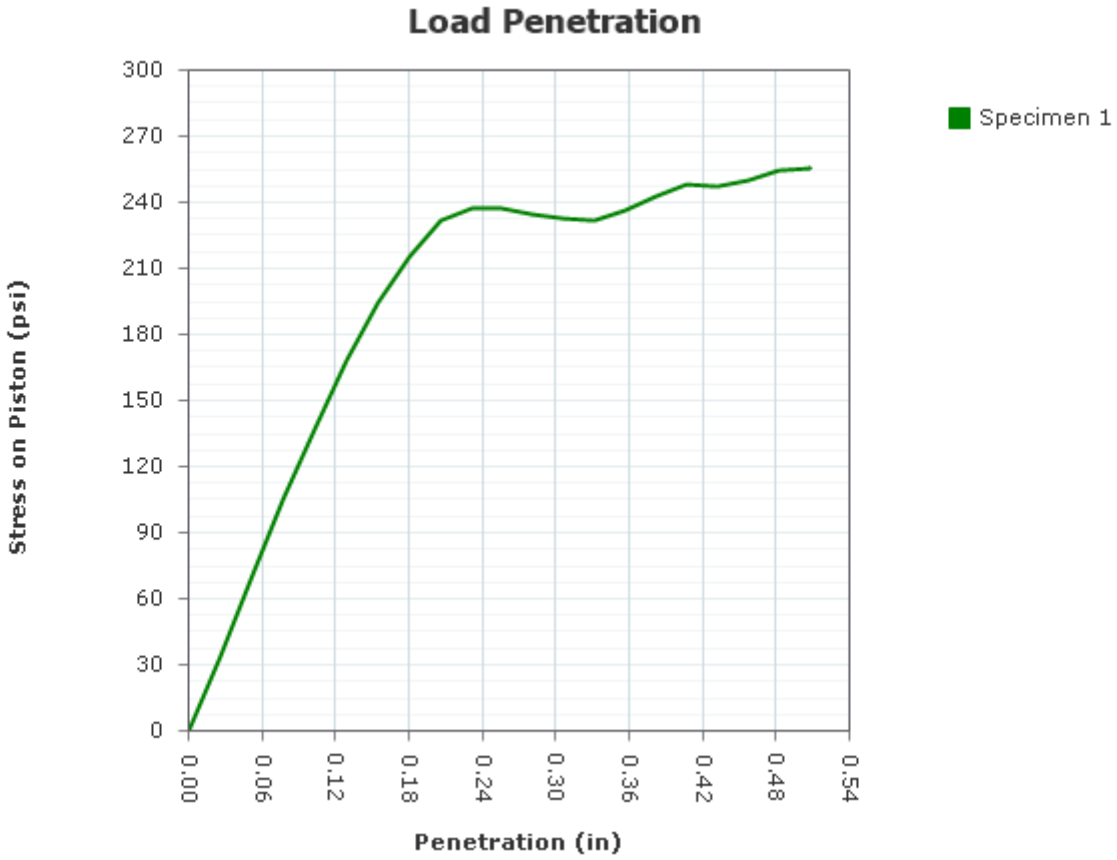
Index	Elapsed Time (hh:mm:ss)	Load (Lbf)	Displacement (in)	Corrected Load (Lbf)	Corrected Penetration (in)	Stress On Piston (psi)	CBR (%)	Corrected CBR (%)
0	00:00:00	1.2	0.0089	0.0	0.00	0	0.0	0.0
1	00:00:31	42.6	0.0347	41.4	0.03	14	0.0	0.0
2	00:01:02	83.3	0.0605	82.2	0.05	27	0.0	0.0
3	00:01:34	123.2	0.0863	122.0	0.08	41	0.0	0.0
4	00:02:06	161.0	0.1121	159.8	0.10	53	5.3	5.3
5	00:02:37	197.8	0.1379	196.6	0.13	66	0.0	0.0
6	00:03:07	232.7	0.1637	231.5	0.15	77	0.0	0.0
7	00:03:39	266.0	0.1895	264.8	0.18	88	0.0	0.0
8	00:04:09	299.8	0.2150	298.7	0.21	100	6.6	6.6
9	00:04:39	332.9	0.2401	331.7	0.23	111	0.0	0.0
10	00:05:09	364.7	0.2652	363.5	0.26	121	0.0	0.0
11	00:05:40	396.0	0.2902	394.8	0.28	132	0.0	0.0
12	00:06:10	428.1	0.3153	426.9	0.31	142	7.5	7.5
13	00:06:43	459.4	0.3404	458.2	0.33	153	0.0	0.0
14	00:07:12	487.2	0.3655	486.0	0.36	162	0.0	0.0
15	00:07:43	515.6	0.3906	514.4	0.38	171	0.0	0.0
16	00:08:12	543.7	0.4157	542.5	0.41	181	7.9	7.9
17	00:08:43	572.1	0.4409	570.9	0.43	190	0.0	0.0
18	00:09:14	600.2	0.4660	599.0	0.46	200	0.0	0.0
19	00:09:45	628.2	0.4912	627.0	0.48	209	0.0	0.0
20	00:10:15	655.7	0.5164	654.5	0.51	218	8.4	8.4
21	00:10:17	657.3	0.5175	656.1	0.51	219	0.0	0.0

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CBR Test Results

ASTM (D1883) / AASHTO (T193)



CBR Results								
Results	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
CBR @ 0.10 (in)	13.7							
CBR @ 0.20 (in)	15.4							

Project Information	
Project:	Layden Property
Project Number:	ETS-23E159
Sampling Date:	
Sample Number:	CBR-5
Sample Depth:	1-2 ft
Location:	Smithfield, VA
Client Name:	Greenwood Homes
Remarks:	Brown silty SAND (SM),moist

Tested By: _____ Date: _____ Checked By: _____ Date: _____

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CBR Test

ASTM (D1883) / AASHTO (T193)

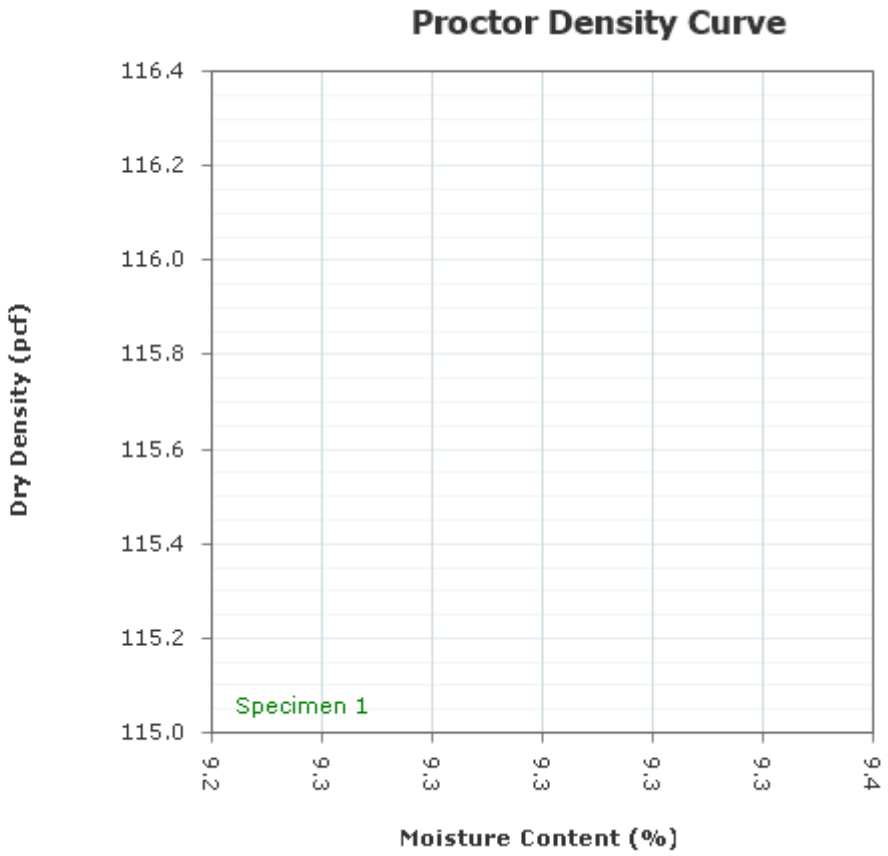
Before Soaking	Specimen Number 1	2	3	4	5	6	7	8
Specific Gravity	2.6							
Liquid Limit	0							
Plastic Limit	0							
Surcharge Weight (g)	4500.0							
Number of Blows	25							
Maximum Dry Density (pcf)	117.1							
Optimum Moisture Content (%)	10.1							
Mold ID								
Mold Diameter (in)	6.000							
Mold Weight (g)	7168.9							
Sample Height (in)	4.580							
Mold Volume (in^3)	129.50							
Moisture Content (%)	9.3							
Weight of Mold + Soil (g)	11440.0							
Weight of Soil (g)	4271.1							
Dry Density (pcf)	115.0							
Wet Density (pcf)	125.6							
After Soaking	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Soaked Sample Height (in)	4.580							
Soaked Time (Day)	4.0							
Swell (%)	0.0							
Moisture Content (%)	0.0							
Weight of Mold + Soil (g)	0.0							
Weight After Soaking (g)	-7168.9							
Dry Density (pcf)	-210.9							
Wet Density (pcf)	-210.9							

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CBR Proctor Density Curve

ASTM (D1883) / AASHTO (T193)



CBR Proctor Density Curve	
Maximum Dry Density (pcf)	115.0
Optimum Moisture Content (%)	9.3

Project Name: Laydem Property Project Number: ETS-23E159

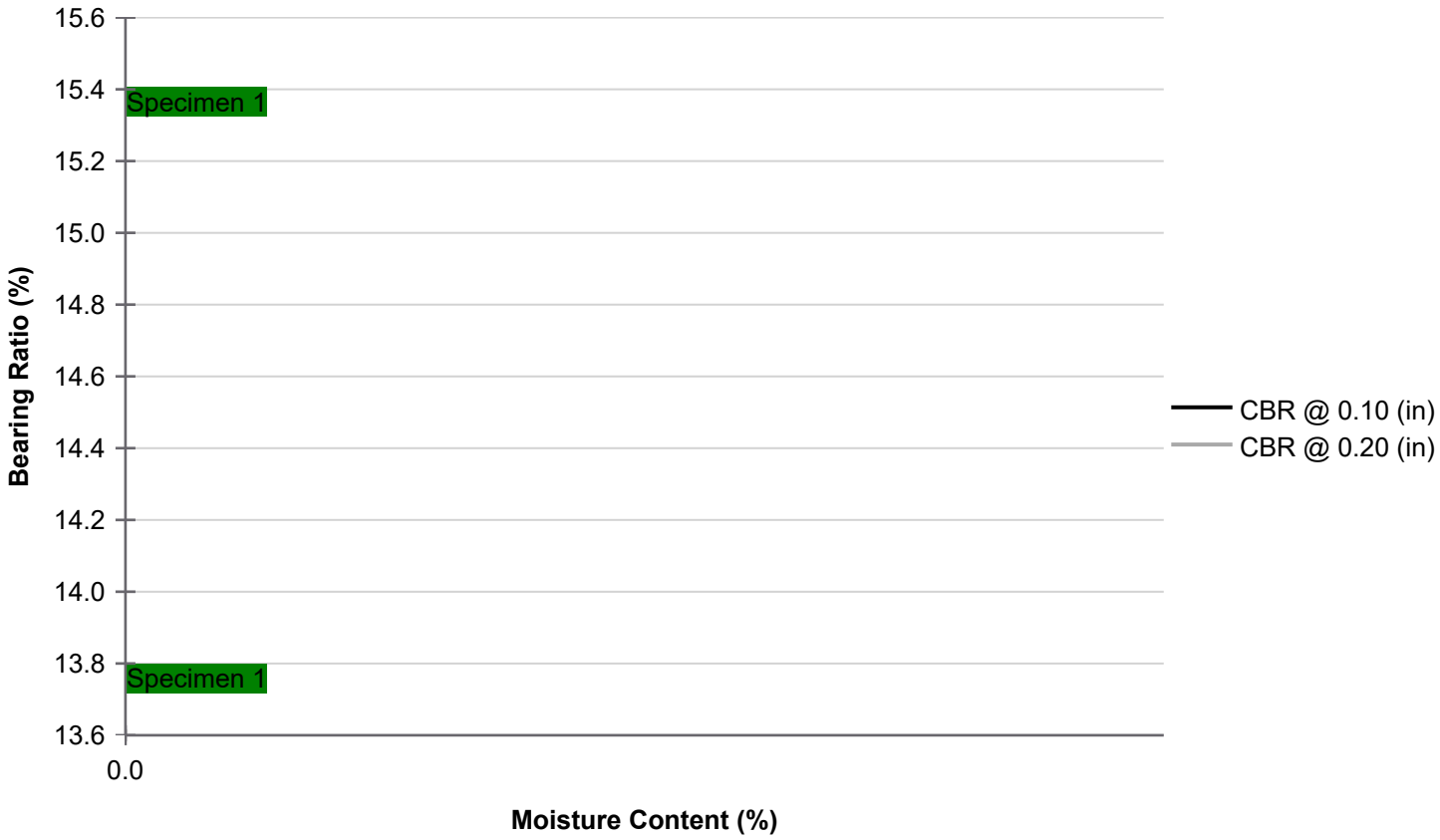
Tested By: _____ Date: _____ Checked By: _____ Date: _____

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CBR Bearing Ratio

ASTM (D1883) / AASHTO (T193)



CBR Results	
CBR @ 0.10 (in)	13.7
CBR @ 0.20 (in)	15.4
Moisture Content (%)	9.3

Project Name: Laydem Property Project Number: ETS-23E159

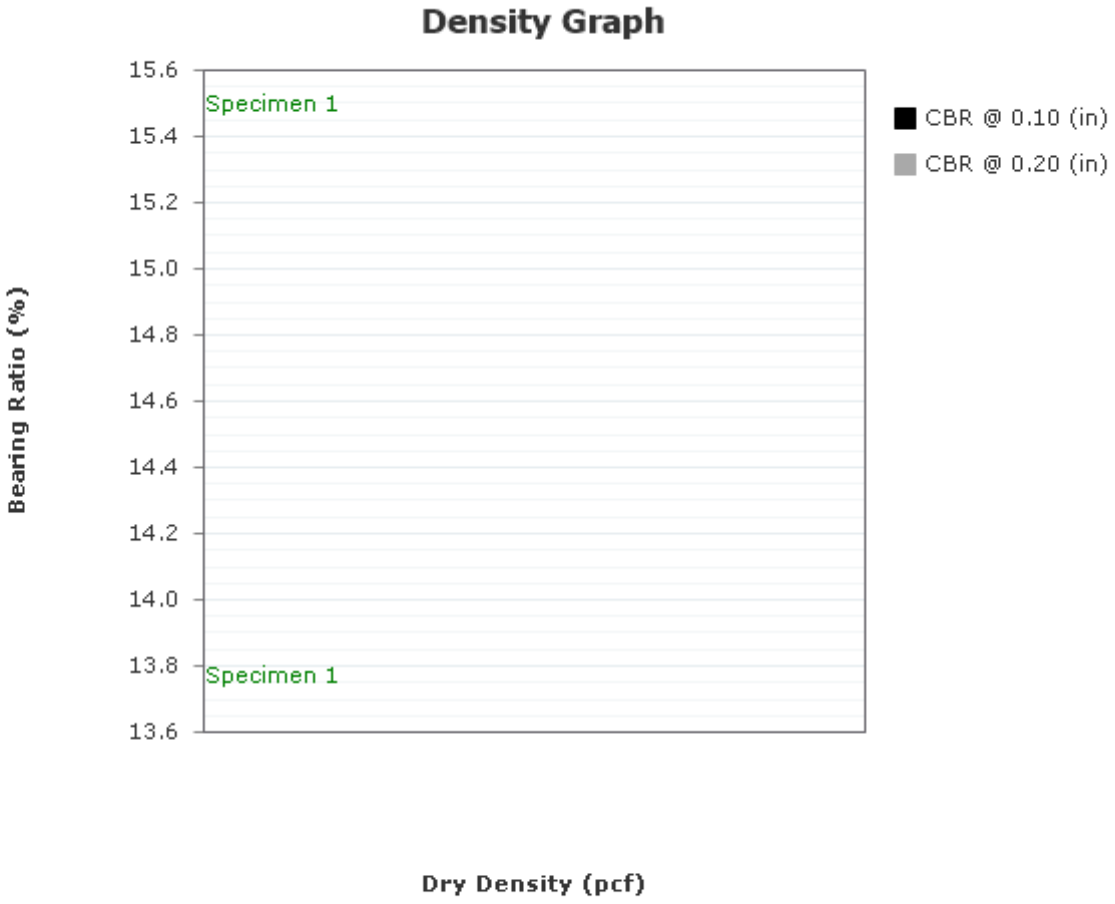
Tested By: _____ Date: _____ Checked By: _____ Date: _____

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CBR Density Graph

ASTM (D1883) / AASHTO (T193)



CBR Results	
CBR @ 0.10 (in)	13.7
CBR @ 0.20 (in)	15.4
Maximum Dry Density (pcf)	115.0

Project Name: Laydem Property Project Number: ETS-23E159

Tested By: _____ Date: _____ Checked By: _____ Date: _____

CBR Test - Specimen 1

ASTM (D1883) / AASHTO (T193)

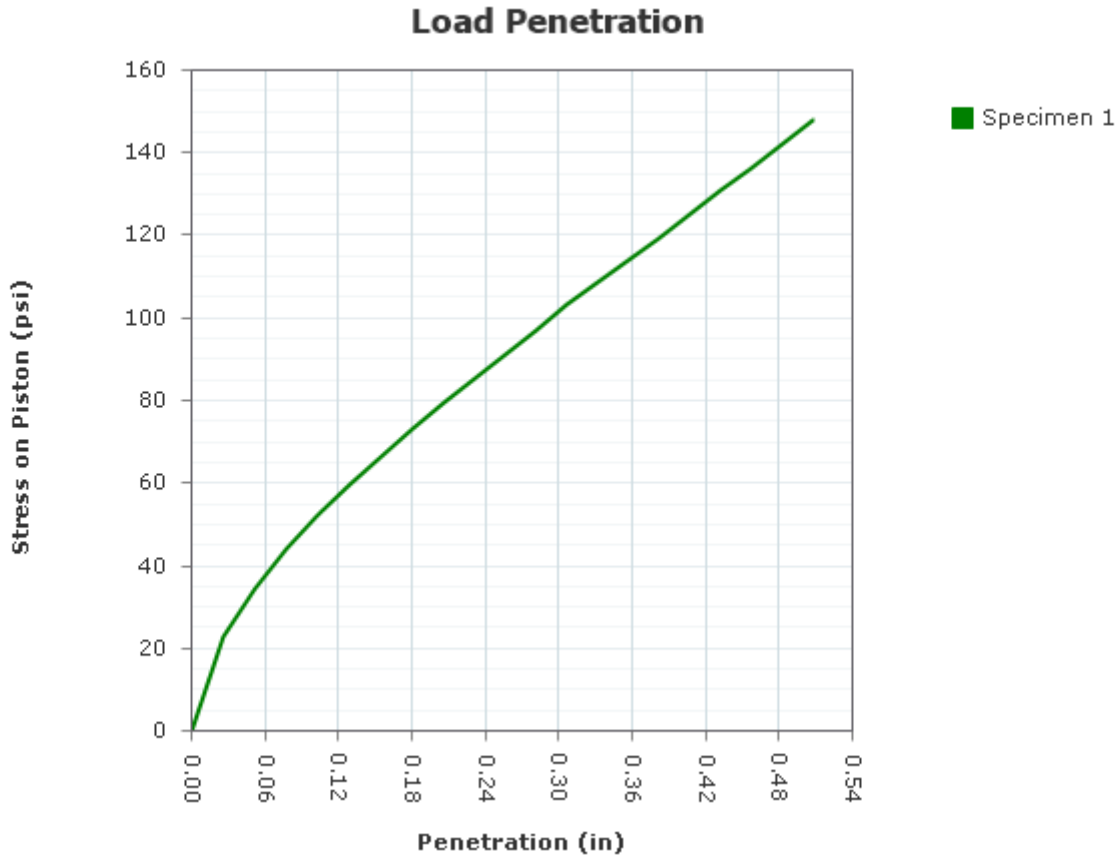
Index	Elapsed Time (hh:mm:ss)	Load (Lbf)	Displacement (in)	Corrected Load (Lbf)	Corrected Penetration (in)	Stress On Piston (psi)	CBR (%)	Corrected CBR (%)
0	00:00:00	1.5	0.0090	0.0	0.00	0	0.0	0.0
1	00:00:29	101.1	0.0347	99.6	0.03	33	0.0	0.0
2	00:01:02	210.6	0.0605	209.0	0.05	70	0.0	0.0
3	00:01:33	316.6	0.0863	315.1	0.08	105	0.0	0.0
4	00:02:04	412.5	0.1121	410.9	0.10	137	13.7	13.7
5	00:02:36	505.1	0.1379	503.6	0.13	168	0.0	0.0
6	00:03:07	583.9	0.1637	582.4	0.15	194	0.0	0.0
7	00:03:38	646.8	0.1895	645.3	0.18	215	0.0	0.0
8	00:04:10	695.7	0.2150	694.1	0.21	231	15.4	15.4
9	00:04:41	713.1	0.2401	711.6	0.23	237	0.0	0.0
10	00:05:10	714.0	0.2652	712.5	0.26	237	0.0	0.0
11	00:05:40	703.9	0.2903	702.4	0.28	234	0.0	0.0
12	00:06:09	700.1	0.3153	698.5	0.31	233	12.3	12.3
13	00:06:40	697.2	0.3404	695.6	0.33	232	0.0	0.0
14	00:07:09	710.5	0.3655	709.0	0.36	236	0.0	0.0
15	00:07:40	728.7	0.3906	727.2	0.38	242	0.0	0.0
16	00:08:11	745.8	0.4157	744.2	0.41	248	10.8	10.8
17	00:08:41	743.3	0.4409	741.7	0.43	247	0.0	0.0
18	00:09:12	752.6	0.4661	751.1	0.46	250	0.0	0.0
19	00:09:41	764.0	0.4912	762.5	0.48	254	0.0	0.0
20	00:10:11	769.0	0.5164	767.4	0.51	256	9.8	9.8
21	00:10:12	769.9	0.5171	768.3	0.51	256	0.0	0.0

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CBR Test Results

ASTM (D1883) / AASHTO (T193)



CBR Results								
Results	1	2	3	4	5	6	7	8
CBR @ 0.10 (in)	5.2							
CBR @ 0.20 (in)	5.3							

Project Information	
Project:	Layden Property
Project Number:	ETS-23E159
Sampling Date:	
Sample Number:	CBR-6
Sample Depth:	1-2 ft
Location:	Smithfield, VA
Client Name:	Greenwood Homes
Remarks:	

Project Name: Laydem Property Project Number: ETS-23E159

Tested By: _____ Date: _____ Checked By: _____ Date: _____

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CBR Test

ASTM (D1883) / AASHTO (T193)

Before Soaking	Specimen Number 1	2	3	4	5	6	7	8
Specific Gravity	2.6							
Liquid Limit	0							
Plastic Limit	0							
Surcharge Weight (g)	45000.0							
Number of Blows	25							
Maximum Dry Density (pcf)	118.1							
Optimum Moisture Content (%)	10.7							
Mold ID								
Mold Diameter (in)	6.000							
Mold Weight (g)	7111.2							
Sample Height (in)	4.580							
Mold Volume (in^3)	129.50							
Moisture Content (%)	9.9							
Weight of Mold + Soil (g)	11473.0							
Weight of Soil (g)	4361.8							
Dry Density (pcf)	116.7							
Wet Density (pcf)	128.3							
After Soaking	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Soaked Sample Height (in)	-454.960							
Soaked Time (Day)	4.0							
Swell (%)	-10033.6							
Moisture Content (%)	0.0							
Weight of Mold + Soil (g)	0.0							
Weight After Soaking (g)	-7111.2							
Dry Density (pcf)	-209.2							
Wet Density (pcf)	-209.2							

Project Name: Laydem Property Project Number: ETS-23E159

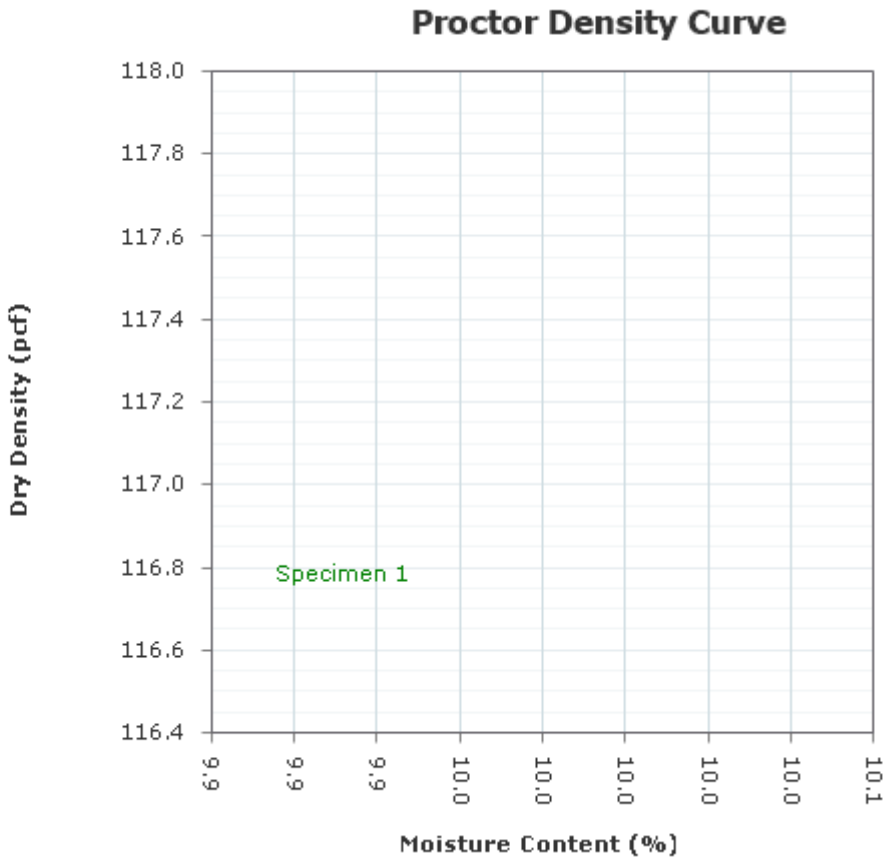
Tested By: _____ Date: _____ Checked By: _____ Date: _____

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CBR Proctor Density Curve

ASTM (D1883) / AASHTO (T193)



CBR Proctor Density Curve	
Maximum Dry Density (pcf)	116.7
Optimum Moisture Content (%)	9.9

Project Name: Laydem Property Project Number: ETS-23E159

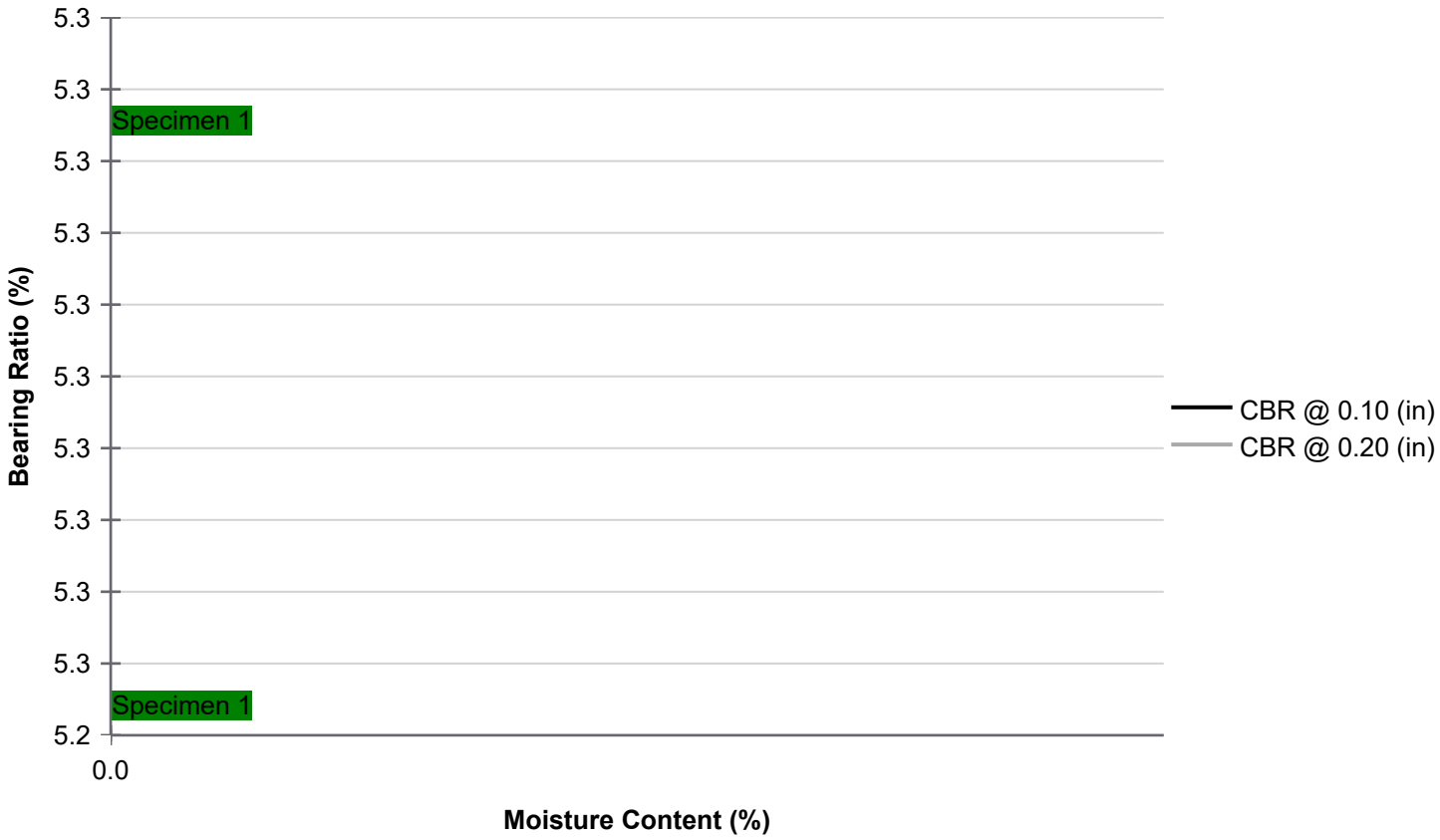
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CBR Bearing Ratio

ASTM (D1883) / AASHTO (T193)



CBR Results	
CBR @ 0.10 (in)	5.2
CBR @ 0.20 (in)	5.3
Moisture Content (%)	9.9

Project Name: Laydem Property Project Number: ETS-23E159

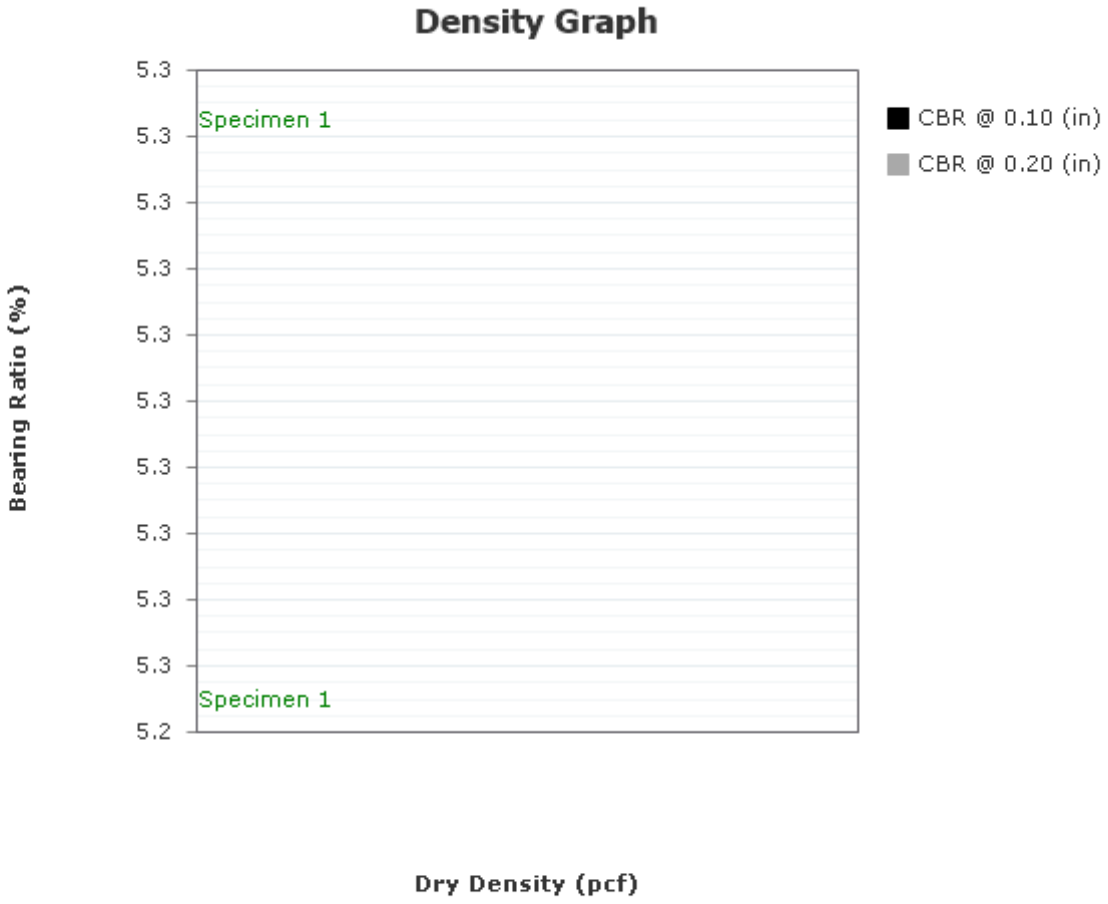
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CBR Density Graph

ASTM (D1883) / AASHTO (T193)



CBR Results	
CBR @ 0.10 (in)	5.2
CBR @ 0.20 (in)	5.3
Maximum Dry Density (pcf)	116.7

Project Name: Laydem Property Project Number: ETS-23E159

Tested By: _____ Date: _____ Checked By: _____ Date: _____

CBR Test - Specimen 1

ASTM (D1883) / AASHTO (T193)

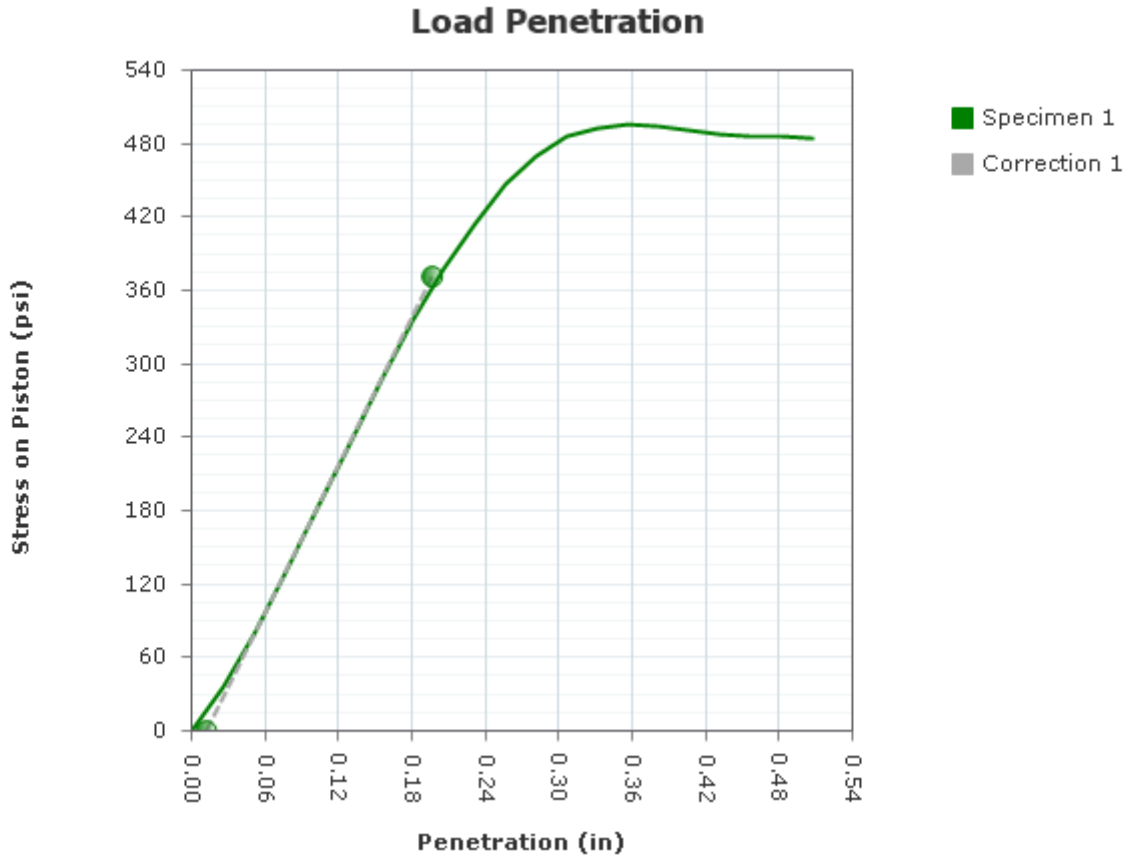
Index	Elapsed Time (hh:mm:ss)	Load (Lbf)	Displacement (in)	Corrected Load (Lbf)	Corrected Penetration (in)	Stress On Piston (psi)	CBR (%)	Corrected CBR (%)
0	00:00:00	2.5	0.0090	0.0	0.00	0	0.0	0.0
1	00:00:29	71.4	0.0348	68.9	0.03	23	0.0	0.0
2	00:00:59	105.4	0.0606	102.8	0.05	34	0.0	0.0
3	00:01:31	134.3	0.0864	131.8	0.08	44	0.0	0.0
4	00:02:03	159.9	0.1122	157.4	0.10	52	5.2	5.2
5	00:02:33	181.1	0.1380	178.6	0.13	60	0.0	0.0
6	00:03:04	201.7	0.1638	199.2	0.15	66	0.0	0.0
7	00:03:35	221.7	0.1896	219.2	0.18	73	0.0	0.0
8	00:04:05	240.6	0.2151	238.0	0.21	79	5.3	5.3
9	00:04:35	258.3	0.2402	255.8	0.23	85	0.0	0.0
10	00:05:04	275.7	0.2652	273.1	0.26	91	0.0	0.0
11	00:05:36	294.0	0.2903	291.5	0.28	97	0.0	0.0
12	00:06:07	311.7	0.3154	309.1	0.31	103	5.4	5.4
13	00:06:36	327.7	0.3405	325.2	0.33	108	0.0	0.0
14	00:07:06	343.9	0.3656	341.3	0.36	114	0.0	0.0
15	00:07:37	360.7	0.3906	358.2	0.38	119	0.0	0.0
16	00:08:07	378.1	0.4158	375.6	0.41	125	5.4	5.4
17	00:08:37	394.7	0.4410	392.2	0.43	131	0.0	0.0
18	00:09:08	411.8	0.4661	409.3	0.46	136	0.0	0.0
19	00:09:38	429.1	0.4913	426.5	0.48	142	0.0	0.0
20	00:10:08	445.9	0.5165	443.4	0.51	148	5.7	5.7
21	00:10:09	446.5	0.5178	443.9	0.51	148	0.0	0.0

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CBR Test Results

ASTM (D1883) / AASHTO (T193)



CBR Results								
Results	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
CBR @ 0.10 (in)	20.7							
CBR @ 0.20 (in)	26.3							

Project Information	
Project:	Layden Property
Project Number:	ETS-23E159
Sampling Date:	
Sample Number:	CBR-7
Sample Depth:	1-2 ft
Location:	Smithfield, VA
Client Name:	Greenwood Homes
Remarks:	Brown silty SAND (SM),moist

Tested By: _____ Date: _____ Checked By: _____ Date: _____

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CBR Test

ASTM (D1883) / AASHTO (T193)

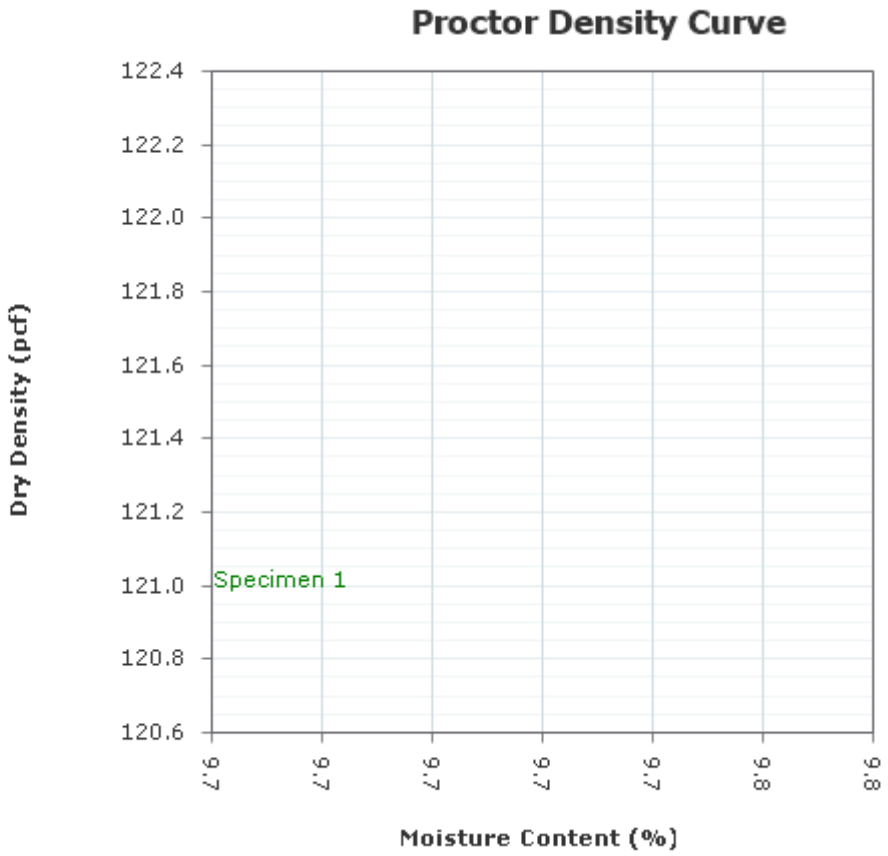
Before Soaking	Specimen Number 1	2	3	4	5	6	7	8
Specific Gravity	2.6							
Liquid Limit	0							
Plastic Limit	0							
Surcharge Weight (g)	4500.0							
Number of Blows	25							
Maximum Dry Density (pcf)	123.5							
Optimum Moisture Content (%)	9.5							
Mold ID								
Mold Diameter (in)	6.000							
Mold Weight (g)	7291.2							
Sample Height (in)	4.580							
Mold Volume (in^3)	129.50							
Moisture Content (%)	9.7							
Weight of Mold + Soil (g)	11800.0							
Weight of Soil (g)	4508.8							
Dry Density (pcf)	121.0							
Wet Density (pcf)	132.6							
After Soaking	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Soaked Sample Height (in)	4.581							
Soaked Time (Day)	4.0							
Swell (%)	0.0							
Moisture Content (%)	0.0							
Weight of Mold + Soil (g)	0.0							
Weight After Soaking (g)	-7291.2							
Dry Density (pcf)	-214.5							
Wet Density (pcf)	-214.5							

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CBR Proctor Density Curve

ASTM (D1883) / AASHTO (T193)



CBR Proctor Density Curve	
Maximum Dry Density (pcf)	121.0
Optimum Moisture Content (%)	9.7

Project Name: Laydem Property Project Number: ETS-23E159

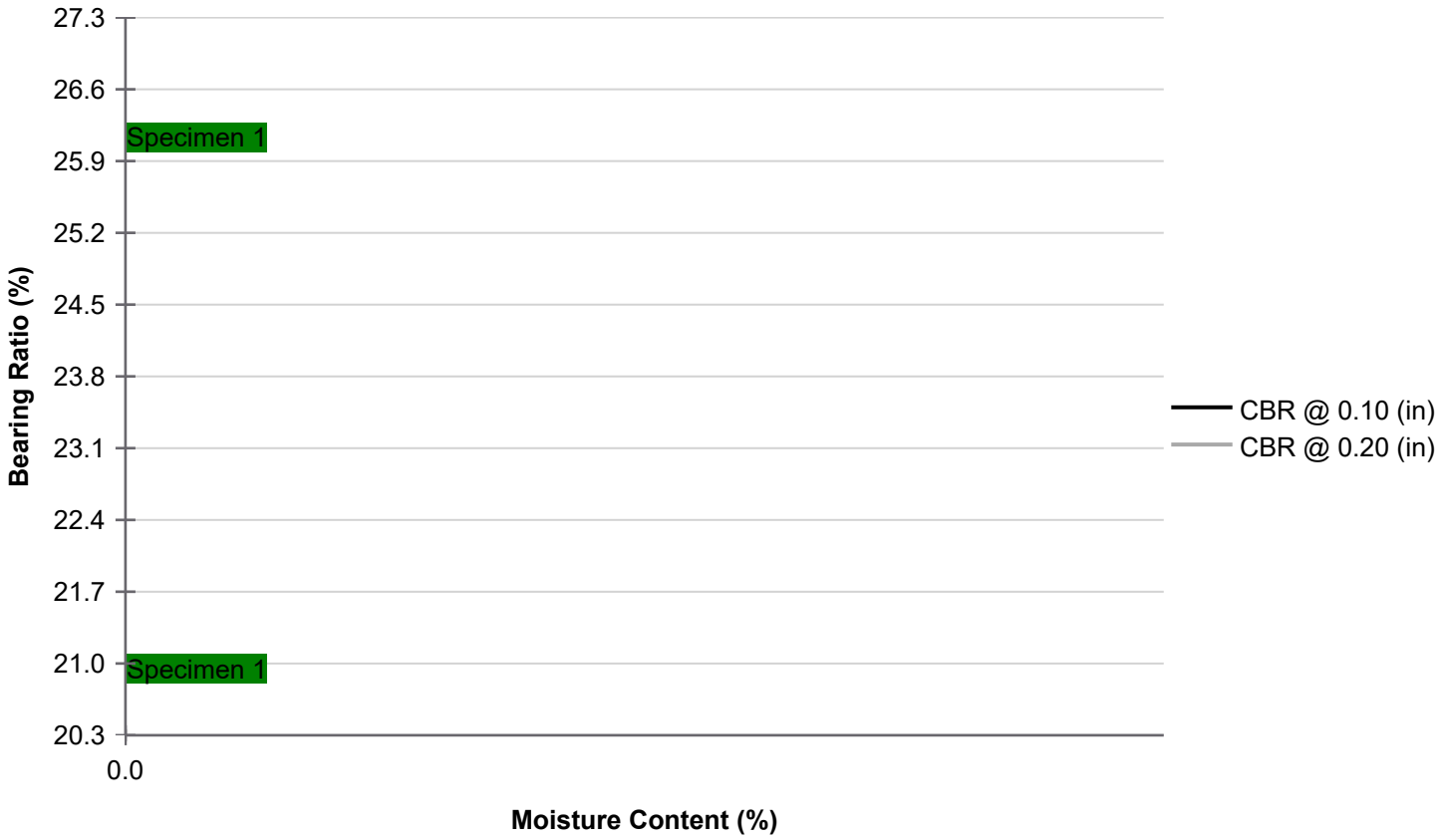
Tested By: _____ Date: _____ Checked By: _____ Date: _____

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CBR Bearing Ratio

ASTM (D1883) / AASHTO (T193)



CBR Results	
CBR @ 0.10 (in)	20.7
CBR @ 0.20 (in)	26.3
Moisture Content (%)	9.7

Project Name: Laydem Property Project Number: ETS-23E159

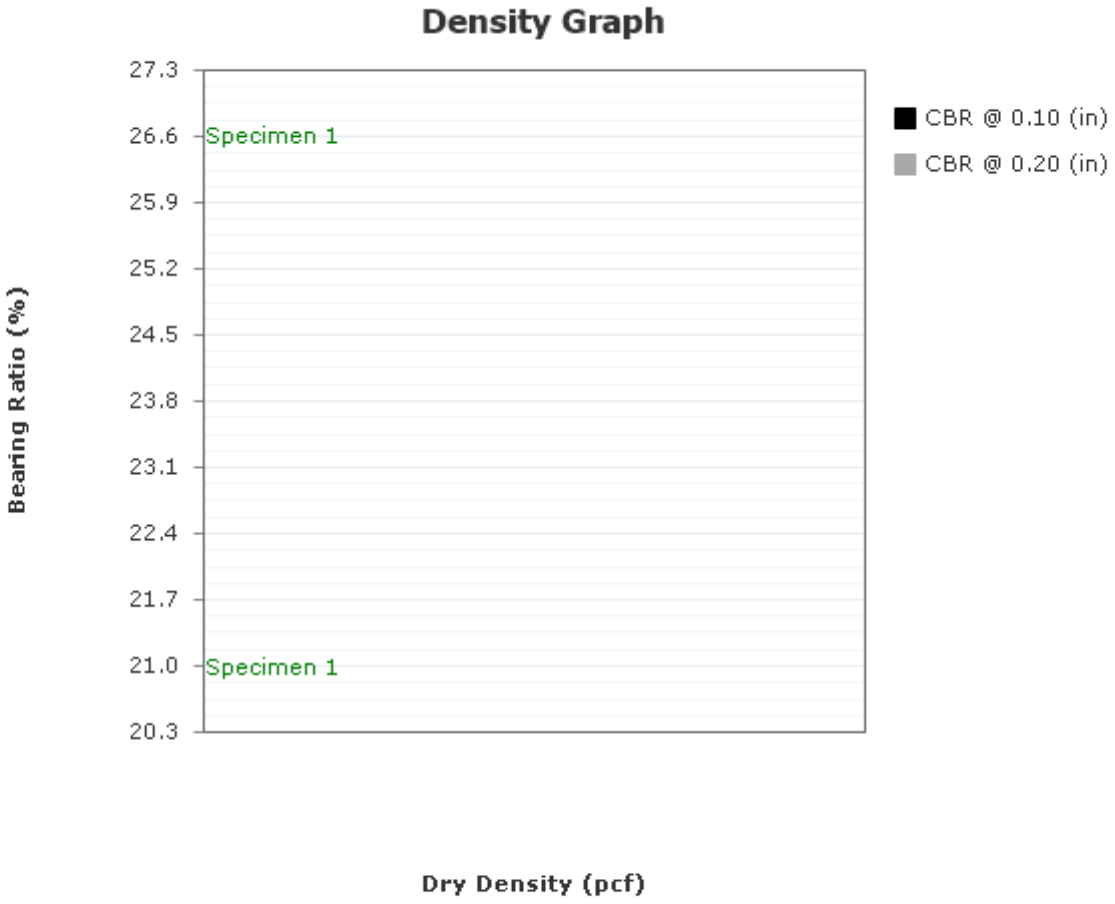
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CBR Density Graph

ASTM (D1883) / AASHTO (T193)



CBR Results	
CBR @ 0.10 (in)	20.7
CBR @ 0.20 (in)	26.3
Maximum Dry Density (pcf)	121.0

Project Name: Laydem Property Project Number: ETS-23E159

Tested By: _____ Date: _____ Checked By: _____ Date: _____

CBR Test - Specimen 1

ASTM (D1883) / AASHTO (T193)

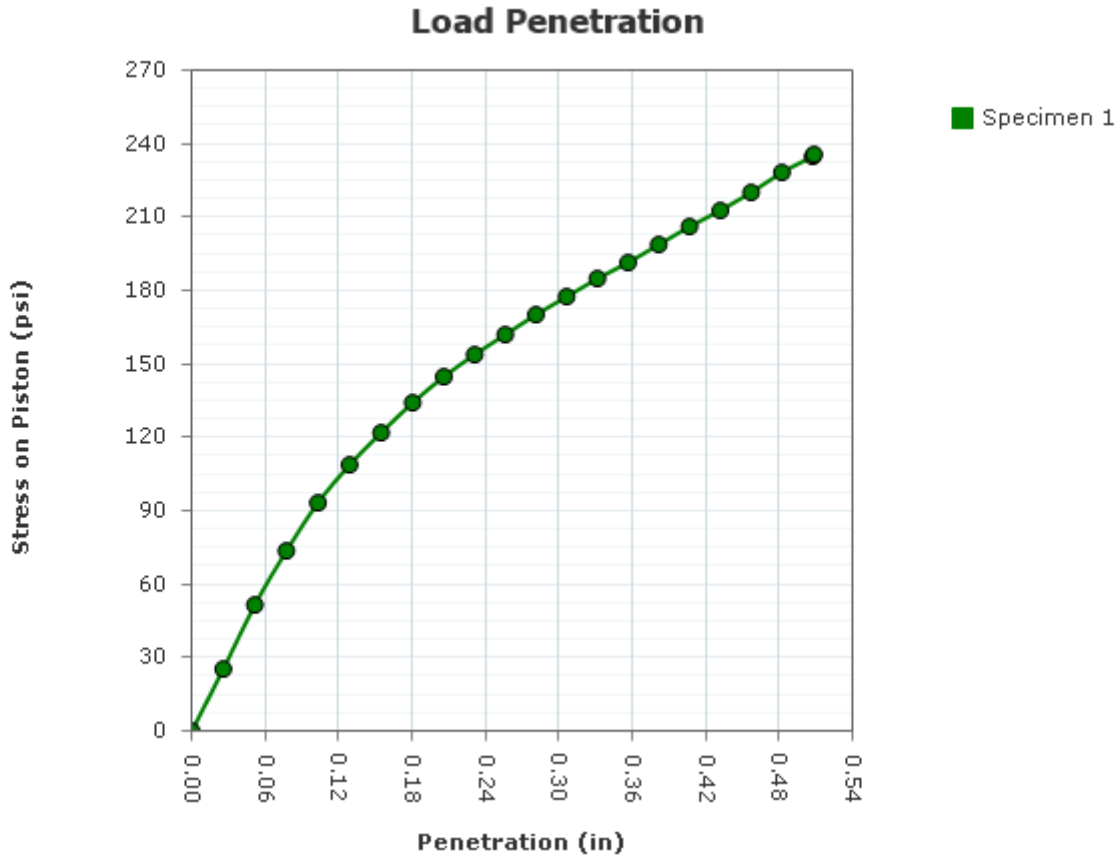
Index	Elapsed Time (hh:mm:ss)	Load (Lbf)	Displacement (in)	Corrected Load (Lbf)	Corrected Penetration (in)	Stress On Piston (psi)	CBR (%)	Corrected CBR (%)
0	00:00:00	1.4	0.0089	0.0	0.00	0	0.0	0.0
1	00:00:30	108.6	0.0347	107.3	0.03	36	0.0	0.0
2	00:01:02	241.5	0.0605	240.1	0.05	80	0.0	0.0
3	00:01:35	395.0	0.0863	393.7	0.08	131	0.0	0.0
4	00:02:07	553.3	0.1121	551.9	0.10	184	18.4	20.7
5	00:02:38	704.0	0.1379	702.6	0.13	234	0.0	0.0
6	00:03:11	859.4	0.1637	858.0	0.15	286	0.0	0.0
7	00:03:43	1,007.5	0.1895	1,006.1	0.18	335	0.0	0.0
8	00:04:13	1,133.0	0.2150	1,131.6	0.21	377	25.1	26.3
9	00:04:45	1,245.2	0.2401	1,243.8	0.23	415	0.0	0.0
10	00:05:15	1,341.9	0.2652	1,340.5	0.26	447	0.0	0.0
11	00:05:45	1,411.0	0.2902	1,409.7	0.28	470	0.0	0.0
12	00:06:15	1,461.1	0.3153	1,459.7	0.31	487	25.6	25.8
13	00:06:44	1,480.9	0.3404	1,479.5	0.33	493	0.0	0.0
14	00:07:15	1,488.2	0.3655	1,486.8	0.36	496	0.0	0.0
15	00:07:44	1,481.9	0.3906	1,480.5	0.38	494	0.0	0.0
16	00:08:15	1,476.2	0.4157	1,474.8	0.41	492	21.4	21.3
17	00:08:46	1,464.1	0.4409	1,462.7	0.43	488	0.0	0.0
18	00:09:16	1,457.8	0.4660	1,456.4	0.46	485	0.0	0.0
19	00:09:45	1,457.0	0.4912	1,455.7	0.48	485	0.0	0.0
20	00:10:14	1,455.5	0.5164	1,454.1	0.51	485	18.6	0.0
21	00:10:16	1,455.2	0.5177	1,453.8	0.51	485	0.0	0.0

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CBR Test Results

ASTM (D1883) / AASHTO (T193)



CBR Results								
Results	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
CBR @ 0.10 (in)	9.3							
CBR @ 0.20 (in)	9.6							

Project Information	
Project:	Layden Property
Project Number:	ETS-23E159
Sampling Date:	
Sample Number:	CBR-8
Sample Depth:	1-2 ft
Location:	Smithfield, VA
Client Name:	Greenwood Homes
Remarks:	Tan brown sandy silty CLAY (CL-ML), moist

Tested By: _____ Date: _____ Checked By: _____ Date: _____

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CBR Test

ASTM (D1883) / AASHTO (T193)

Before Soaking	Specimen Number 1	2	3	4	5	6	7	8
Specific Gravity	2.6							
Liquid Limit	24							
Plastic Limit	7							
Surcharge Weight (g)	4500.0							
Number of Blows	25							
Maximum Dry Density (pcf)	109.1							
Optimum Moisture Content (%)	13.3							
Mold ID								
Mold Diameter (in)	6.000							
Mold Weight (g)	7120.2							
Sample Height (in)	4.580							
Mold Volume (in^3)	129.50							
Moisture Content (%)	12.6							
Weight of Mold + Soil (g)	11260.7							
Weight of Soil (g)	4140.5							
Dry Density (pcf)	108.1							
Wet Density (pcf)	121.8							
After Soaking	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Soaked Sample Height (in)	4.586							
Soaked Time (Day)	4.0							
Swell (%)	0.1							
Moisture Content (%)	0.0							
Weight of Mold + Soil (g)	0.0							
Weight After Soaking (g)	-7120.2							
Dry Density (pcf)	-209.5							
Wet Density (pcf)	-209.5							

Project Name: Laydem Property Project Number: ETS-23E159

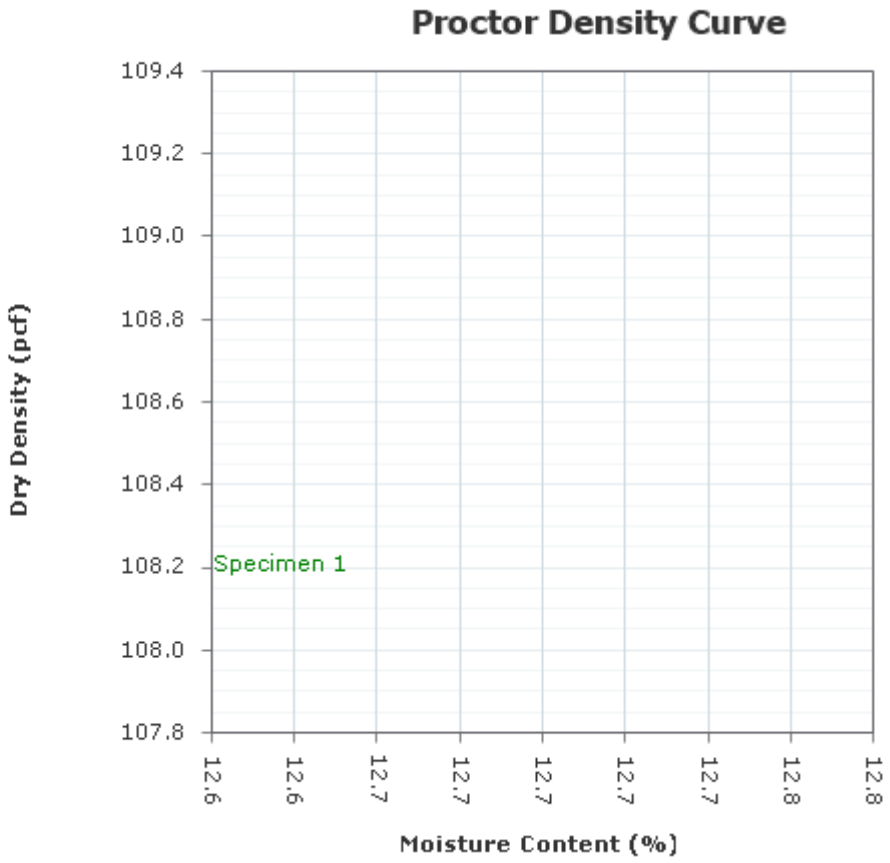
Tested By: _____ Date: _____ Checked By: _____ Date: _____

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CBR Proctor Density Curve

ASTM (D1883) / AASHTO (T193)



CBR Proctor Density Curve	
Maximum Dry Density (pcf)	108.1
Optimum Moisture Content (%)	12.6

Project Name: Laydem Property Project Number: ETS-23E159

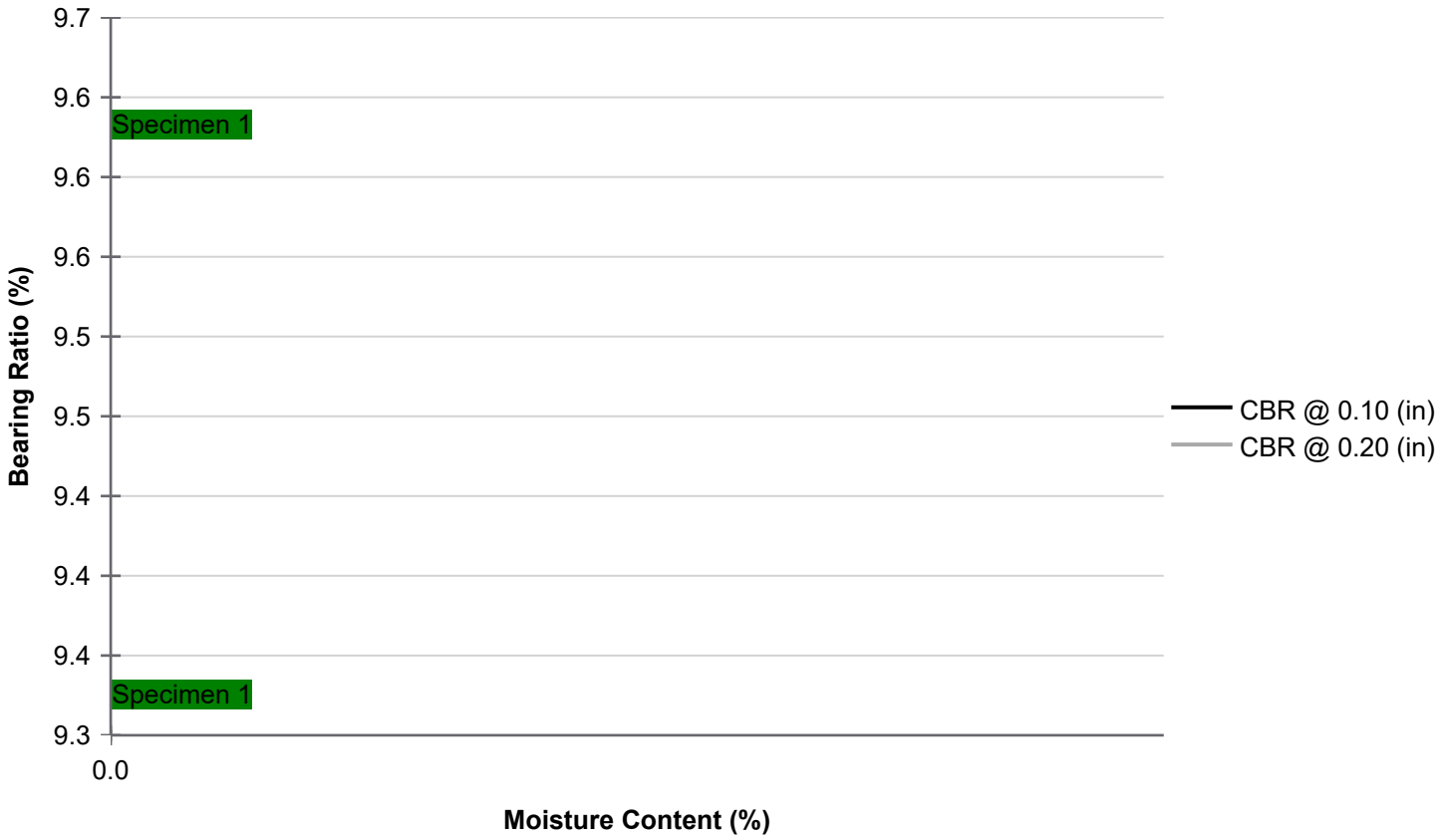
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CBR Bearing Ratio

ASTM (D1883) / AASHTO (T193)



CBR Results	
CBR @ 0.10 (in)	9.3
CBR @ 0.20 (in)	9.6
Moisture Content (%)	12.6

Project Name: Laydem Property Project Number: ETS-23E159

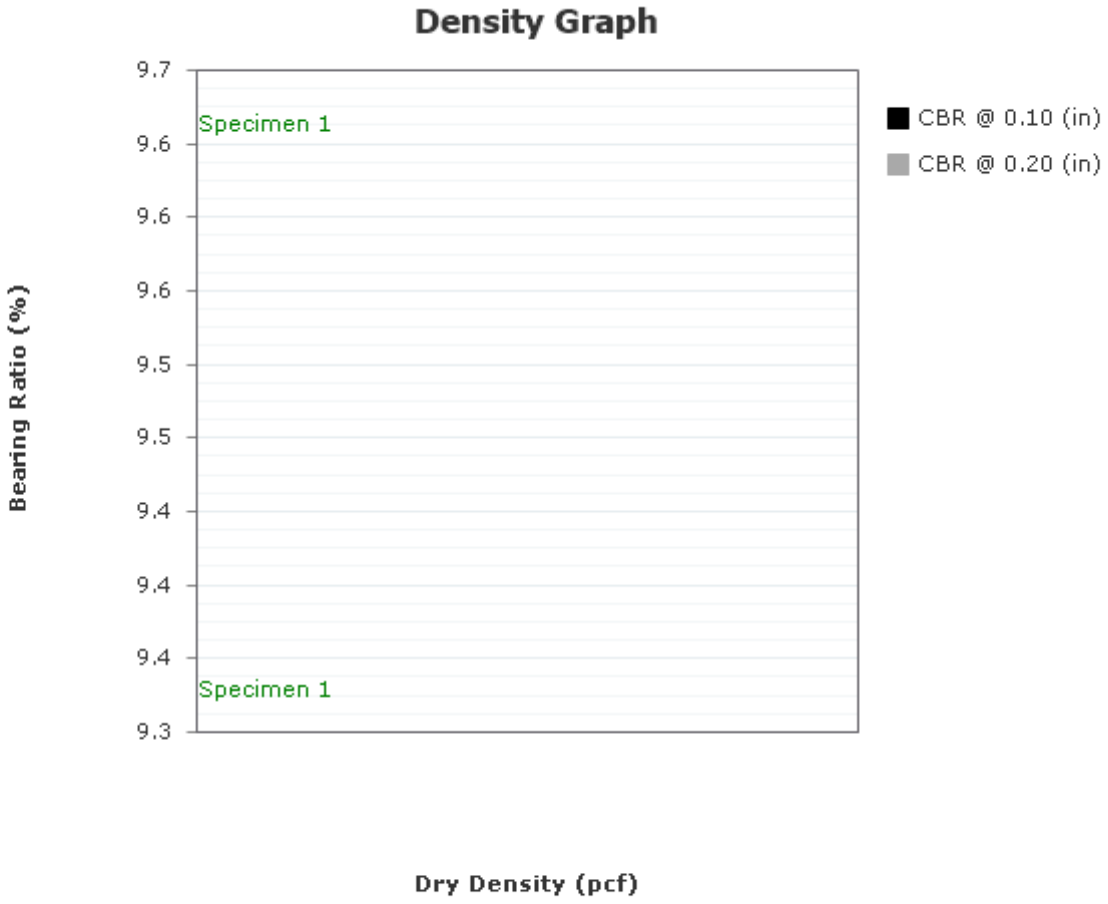
Tested By: _____ Date: _____ Checked By: _____ Date: _____

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Phone: 757-306-1040

CBR Density Graph

ASTM (D1883) / AASHTO (T193)



CBR Results	
CBR @ 0.10 (in)	9.3
CBR @ 0.20 (in)	9.6
Maximum Dry Density (pcf)	108.1

Project Name: Laydem Property Project Number: ETS-23E159

Tested By: _____ Date: _____ Checked By: _____ Date: _____

CBR Test - Specimen 1

ASTM (D1883) / AASHTO (T193)

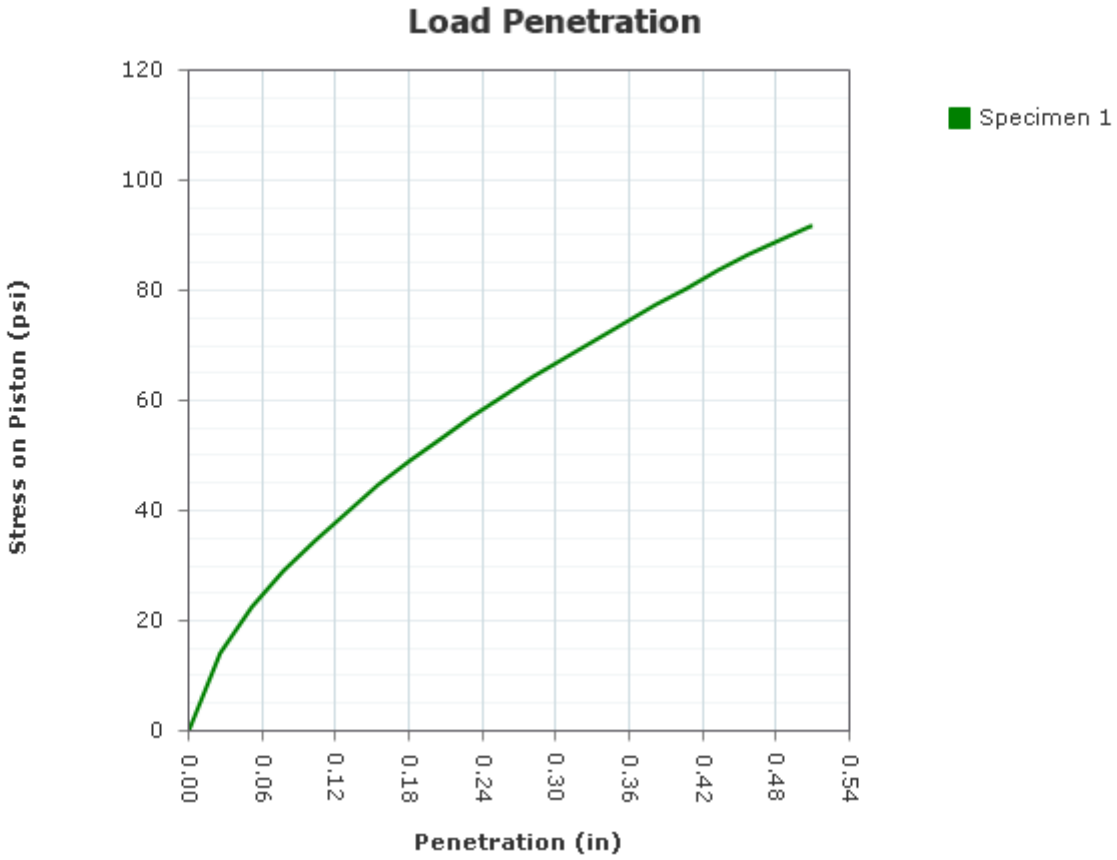
Index	Elapsed Time (hh:mm:ss)	Load (Lbf)	Displacement (in)	Corrected Load (Lbf)	Corrected Penetration (in)	Stress On Piston (psi)	CBR (%)	Corrected CBR (%)
0	00:00:00	-6.8	0.0092	0.0	0.00	0	0.0	0.0
1	00:00:31	68.8	0.0350	75.5	0.03	25	0.0	0.0
2	00:01:02	147.3	0.0608	154.0	0.05	51	0.0	0.0
3	00:01:33	213.4	0.0865	220.2	0.08	73	0.0	0.0
4	00:02:06	273.1	0.1123	279.9	0.10	93	9.3	9.3
5	00:02:37	320.1	0.1381	326.9	0.13	109	0.0	0.0
6	00:03:07	358.8	0.1639	365.6	0.15	122	0.0	0.0
7	00:03:39	395.9	0.1897	402.6	0.18	134	0.0	0.0
8	00:04:09	426.9	0.2152	433.7	0.21	145	9.6	9.6
9	00:04:39	454.3	0.2403	461.1	0.23	154	0.0	0.0
10	00:05:09	479.8	0.2654	486.5	0.26	162	0.0	0.0
11	00:05:40	504.3	0.2905	511.1	0.28	170	0.0	0.0
12	00:06:11	526.8	0.3156	533.6	0.31	178	9.4	9.4
13	00:06:40	547.2	0.3406	554.0	0.33	185	0.0	0.0
14	00:07:11	567.7	0.3657	574.5	0.36	191	0.0	0.0
15	00:07:43	590.2	0.3908	596.9	0.38	199	0.0	0.0
16	00:08:13	612.2	0.4159	619.0	0.41	206	9.0	9.0
17	00:08:42	632.5	0.4411	639.3	0.43	213	0.0	0.0
18	00:09:12	654.1	0.4663	660.8	0.46	220	0.0	0.0
19	00:09:45	677.0	0.4914	683.8	0.48	228	0.0	0.0
20	00:10:15	698.0	0.5166	704.8	0.51	235	9.0	9.0
21	00:10:17	699.2	0.5177	706.0	0.51	235	0.0	0.0

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CBR Test Results

ASTM (D1883) / AASHTO (T193)



CBR Results								
Results	1	2	3	4	5	6	7	8
CBR @ 0.10 (in)	3.5							
CBR @ 0.20 (in)	3.6							

Project Information	
Project:	Layden Property
Project Number:	ETS-23E159
Sampling Date:	
Sample Number:	CBR-9
Sample Depth:	1-2 ft
Location:	Smithfield, VA
Client Name:	Greenwood Homes
Remarks:	Tan brown sandy lean CLAY (CL), moist

Tested By: _____ Date: _____ Checked By: _____ Date: _____

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CBR Test

ASTM (D1883) / AASHTO (T193)

Before Soaking	Specimen Number 1	2	3	4	5	6	7	8
Specific Gravity	2.6							
Liquid Limit	27							
Plastic Limit	8							
Surcharge Weight (g)	4500.0							
Number of Blows	25							
Maximum Dry Density (pcf)	106.7							
Optimum Moisture Content (%)	16.6							
Mold ID								
Mold Diameter (in)	6.000							
Mold Weight (g)	7152.4							
Sample Height (in)	4.580							
Mold Volume (in^3)	129.50							
Moisture Content (%)	16.0							
Weight of Mold + Soil (g)	11386.0							
Weight of Soil (g)	4233.6							
Dry Density (pcf)	107.4							
Wet Density (pcf)	124.5							
After Soaking	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Soaked Sample Height (in)	4.595							
Soaked Time (Day)	4.0							
Swell (%)	0.3							
Moisture Content (%)	0.0							
Weight of Mold + Soil (g)	0.0							
Weight After Soaking (g)	-7152.4							
Dry Density (pcf)	-210.4							
Wet Density (pcf)	-210.4							

Project Name: Laydem Property Project Number: ETS-23E159

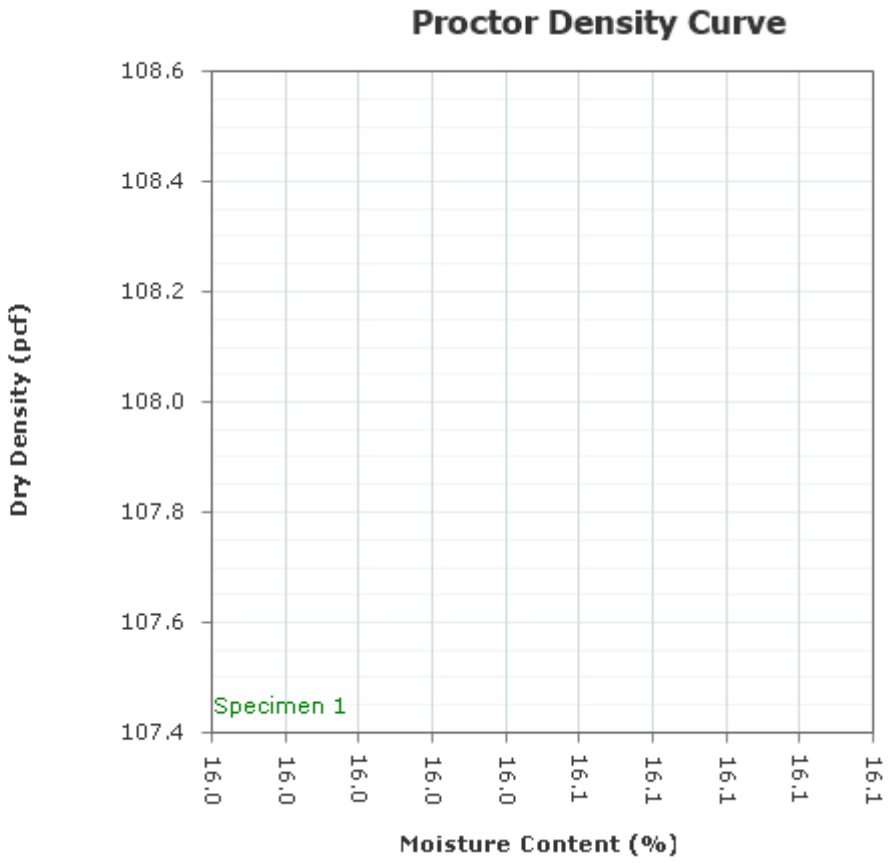
Tested By: _____ Date: _____ Checked By: _____ Date: _____

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CBR Proctor Density Curve

ASTM (D1883) / AASHTO (T193)



CBR Proctor Density Curve	
Maximum Dry Density (pcf)	107.4
Optimum Moisture Content (%)	16.0

Project Name: Laydem Property Project Number: ETS-23E159

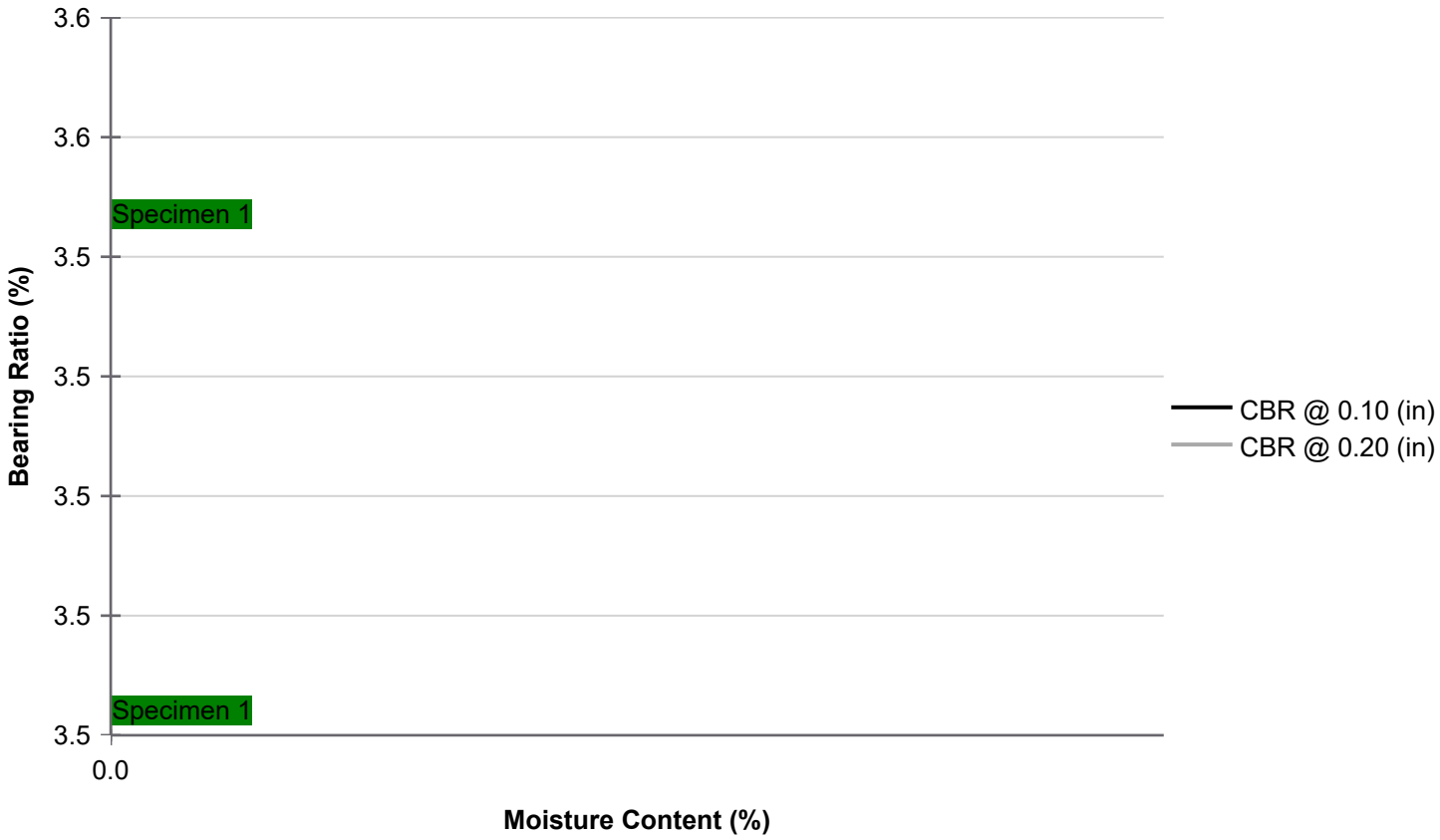
Tested By: _____ Date: _____ Checked By: _____ Date: _____

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CBR Bearing Ratio

ASTM (D1883) / AASHTO (T193)



CBR Results	
CBR @ 0.10 (in)	3.5
CBR @ 0.20 (in)	3.6
Moisture Content (%)	16.0

Project Name: Laydem Property Project Number: ETS-23E159

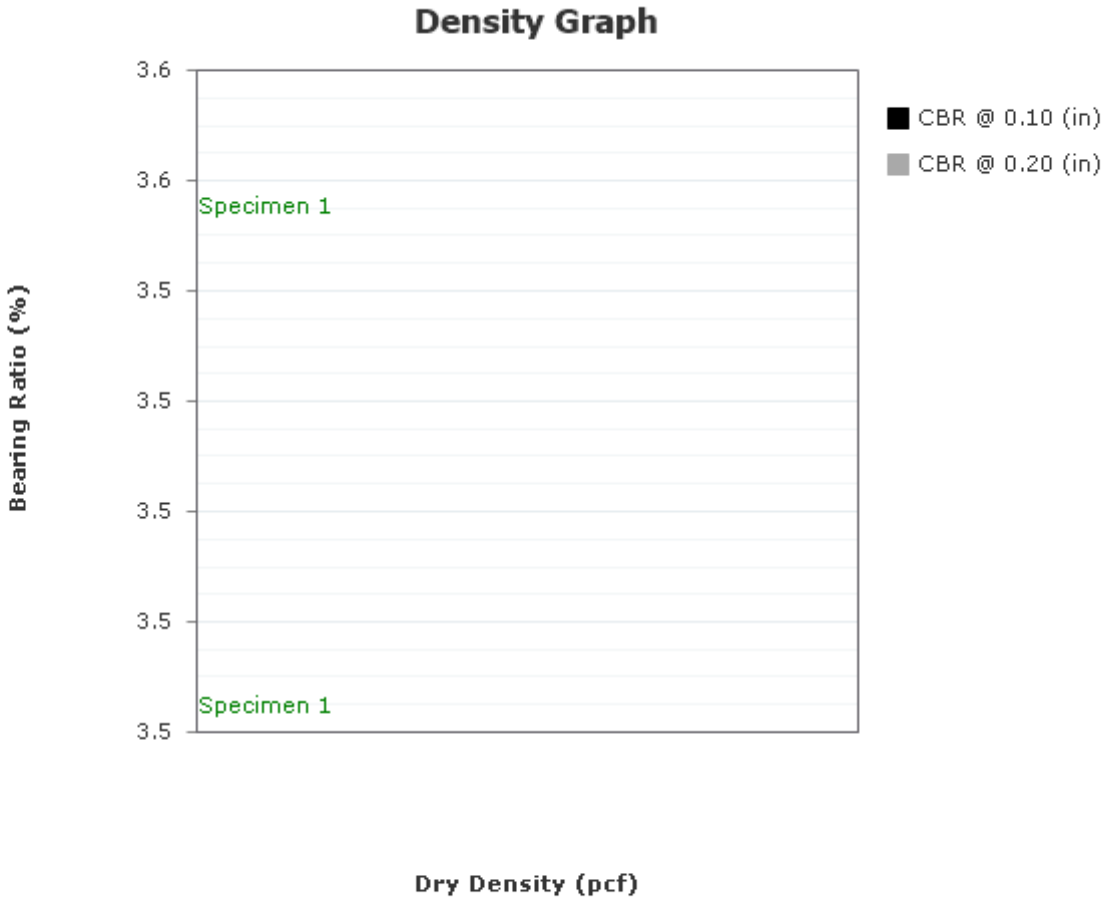
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CBR Density Graph

ASTM (D1883) / AASHTO (T193)



CBR Results	
CBR @ 0.10 (in)	3.5
CBR @ 0.20 (in)	3.6
Maximum Dry Density (pcf)	107.4

Project Name: Laydem Property Project Number: ETS-23E159

Tested By: _____ Date: _____ Checked By: _____ Date: _____

CBR Test - Specimen 1

ASTM (D1883) / AASHTO (T193)

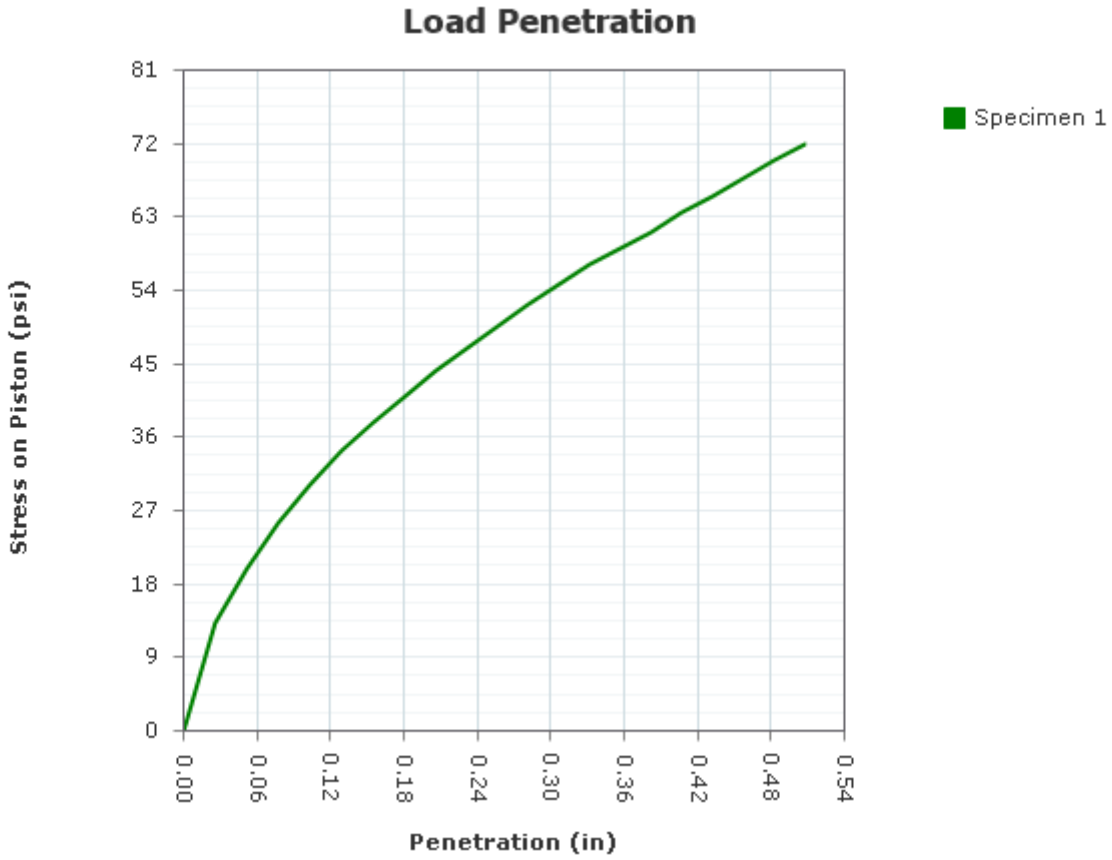
Index	Elapsed Time (hh:mm:ss)	Load (Lbf)	Displacement (in)	Corrected Load (Lbf)	Corrected Penetration (in)	Stress On Piston (psi)	CBR (%)	Corrected CBR (%)
0	00:00:00	1.1	0.0089	0.0	0.00	0	0.0	0.0
1	00:00:29	43.5	0.0347	42.4	0.03	14	0.0	0.0
2	00:00:59	68.2	0.0605	67.1	0.05	22	0.0	0.0
3	00:01:30	88.5	0.0863	87.4	0.08	29	0.0	0.0
4	00:02:00	104.9	0.1121	103.8	0.10	35	3.5	3.5
5	00:02:32	120.6	0.1379	119.4	0.13	40	0.0	0.0
6	00:03:03	135.2	0.1637	134.1	0.15	45	0.0	0.0
7	00:03:33	148.3	0.1895	147.2	0.18	49	0.0	0.0
8	00:04:03	160.9	0.2150	159.8	0.21	53	3.6	3.6
9	00:04:33	172.5	0.2400	171.4	0.23	57	0.0	0.0
10	00:05:04	183.7	0.2651	182.5	0.26	61	0.0	0.0
11	00:05:34	194.5	0.2902	193.4	0.28	64	0.0	0.0
12	00:06:04	204.5	0.3153	203.3	0.31	68	3.6	3.6
13	00:06:35	213.8	0.3404	212.6	0.33	71	0.0	0.0
14	00:07:05	223.6	0.3654	222.5	0.36	74	0.0	0.0
15	00:07:35	233.0	0.3905	231.9	0.38	77	0.0	0.0
16	00:08:05	242.4	0.4157	241.3	0.41	80	3.5	3.5
17	00:08:36	251.7	0.4408	250.6	0.43	84	0.0	0.0
18	00:09:07	260.5	0.4660	259.4	0.46	86	0.0	0.0
19	00:09:37	268.6	0.4912	267.5	0.48	89	0.0	0.0
20	00:10:06	275.5	0.5163	274.4	0.51	91	3.5	3.5
21	00:10:08	275.9	0.5187	274.8	0.51	92	0.0	0.0

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CBR Test Results

ASTM (D1883) / AASHTO (T193)



CBR Results								
Results	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
CBR @ 0.10 (in)	3.0							
CBR @ 0.20 (in)	2.9							

Project Information	
Project:	Layden Property
Project Number:	ETS-23E159
Sampling Date:	
Sample Number:	CBR-10
Sample Depth:	1-2 ft
Location:	Smithfield, VA
Client Name:	Greenwood Homes
Remarks:	Brown sandy lean CLAY (CL), moist

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CBR Test

ASTM (D1883) / AASHTO (T193)

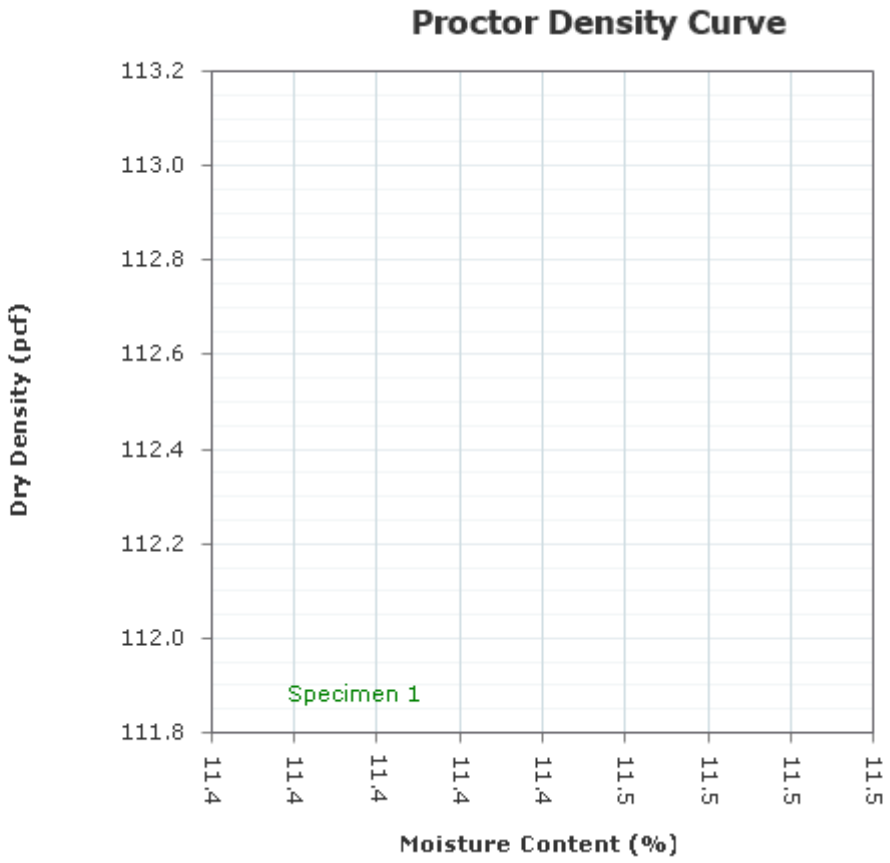
Before Soaking	Specimen Number 1	2	3	4	5	6	7	8
Specific Gravity	2.6							
Liquid Limit	25							
Plastic Limit	9							
Surcharge Weight (g)	4500.0							
Number of Blows	25							
Maximum Dry Density (pcf)	111.6							
Optimum Moisture Content (%)	11.0							
Mold ID								
Mold Diameter (in)	6.000							
Mold Weight (g)	7165.9							
Sample Height (in)	4.580							
Mold Volume (in^3)	129.50							
Moisture Content (%)	11.4							
Weight of Mold + Soil (g)	11400.4							
Weight of Soil (g)	4234.5							
Dry Density (pcf)	111.8							
Wet Density (pcf)	124.6							
After Soaking	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Soaked Sample Height (in)	4.638							
Soaked Time (Day)	4.0							
Swell (%)	1.3							
Moisture Content (%)	0.0							
Weight of Mold + Soil (g)	0.0							
Weight After Soaking (g)	-7165.9							
Dry Density (pcf)	-210.8							
Wet Density (pcf)	-210.8							

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CBR Proctor Density Curve

ASTM (D1883) / AASHTO (T193)



CBR Proctor Density Curve	
Maximum Dry Density (pcf)	111.8
Optimum Moisture Content (%)	11.4

Project Name: Laydem Property Project Number: ETS-23E159

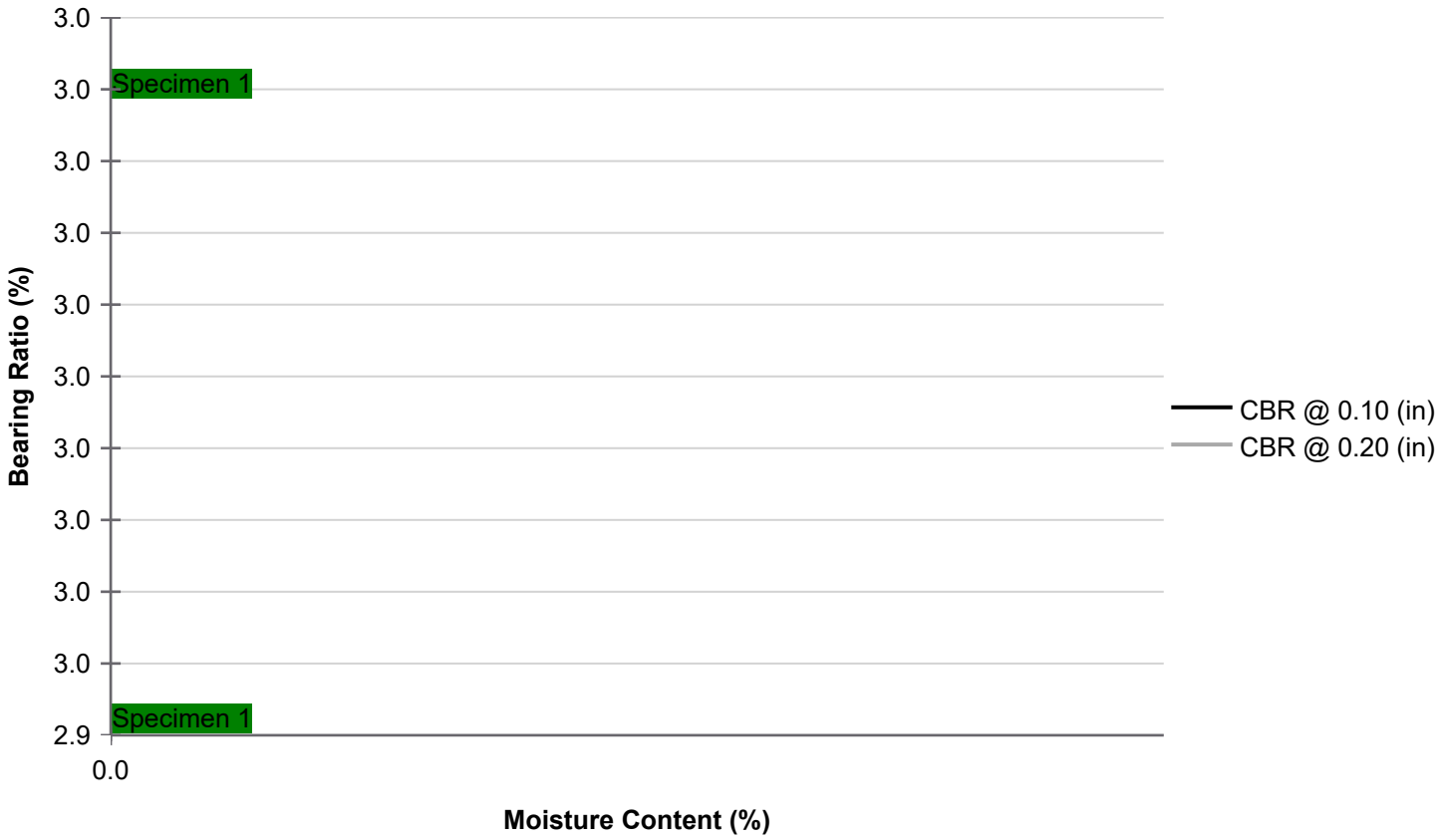
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CBR Bearing Ratio

ASTM (D1883) / AASHTO (T193)



CBR Results	
CBR @ 0.10 (in)	3.0
CBR @ 0.20 (in)	2.9
Moisture Content (%)	11.4

Project Name: Laydem Property Project Number: ETS-23E159

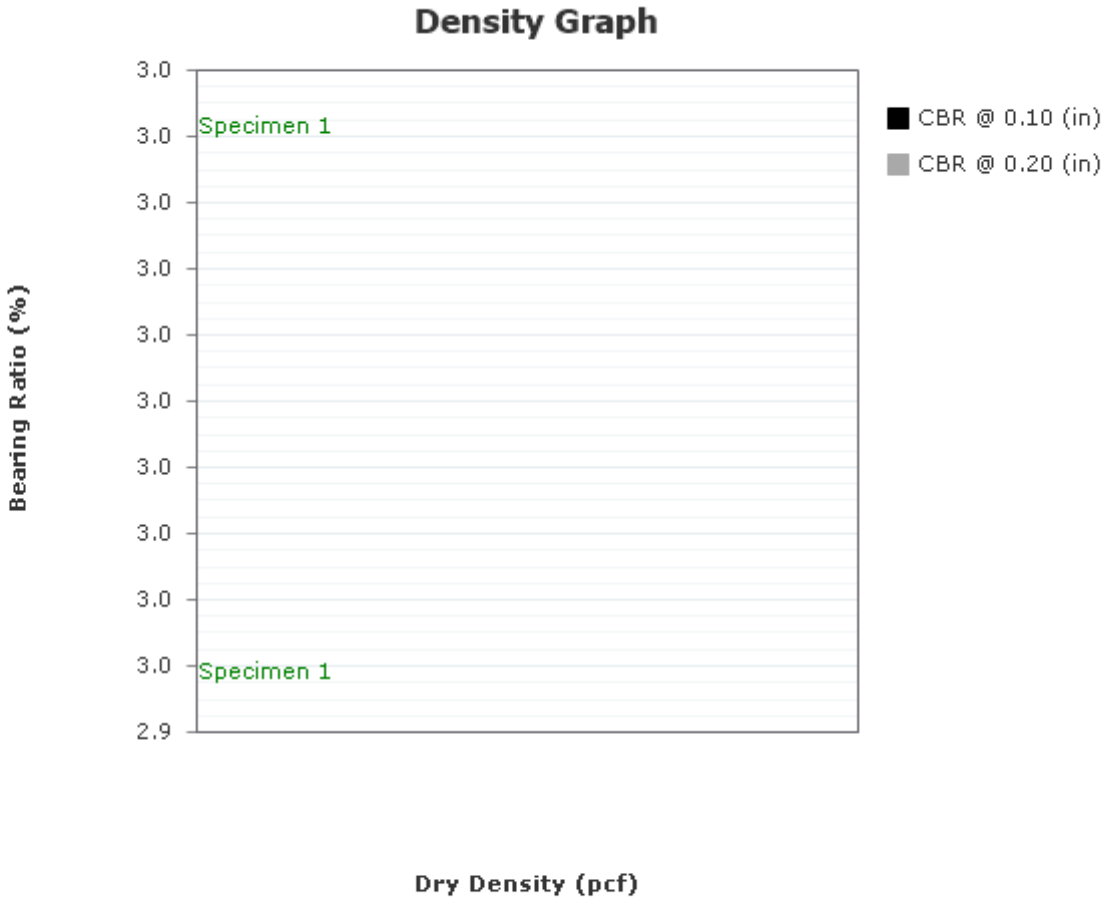
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CBR Density Graph

ASTM (D1883) / AASHTO (T193)



CBR Results	
CBR @ 0.10 (in)	3.0
CBR @ 0.20 (in)	2.9
Maximum Dry Density (pcf)	111.8

Project Name: Laydem Property Project Number: ETS-23E159

Tested By: _____ Date: _____ Checked By: _____ Date: _____

CBR Test - Specimen 1

ASTM (D1883) / AASHTO (T193)

Index	Elapsed Time (hh:mm:ss)	Load (Lbf)	Displacement (in)	Corrected Load (Lbf)	Corrected Penetration (in)	Stress On Piston (psi)	CBR (%)	Corrected CBR (%)
0	00:00:00	1.7	0.0091	0.0	0.00	0	0.0	0.0
1	00:00:30	41.6	0.0349	39.9	0.03	13	0.0	0.0
2	00:01:00	61.5	0.0607	59.8	0.05	20	0.0	0.0
3	00:01:31	77.9	0.0865	76.2	0.08	25	0.0	0.0
4	00:02:02	92.5	0.1123	90.8	0.10	30	3.0	3.0
5	00:02:32	104.6	0.1381	103.0	0.13	34	0.0	0.0
6	00:03:02	115.2	0.1639	113.5	0.15	38	0.0	0.0
7	00:03:32	124.8	0.1897	123.1	0.18	41	0.0	0.0
8	00:04:03	134.2	0.2152	132.5	0.21	44	2.9	2.9
9	00:04:32	142.5	0.2403	140.8	0.23	47	0.0	0.0
10	00:05:02	150.5	0.2653	148.8	0.26	50	0.0	0.0
11	00:05:32	158.2	0.2904	156.5	0.28	52	0.0	0.0
12	00:06:03	166.1	0.3155	164.4	0.31	55	2.9	2.9
13	00:06:33	173.1	0.3406	171.4	0.33	57	0.0	0.0
14	00:07:03	179.0	0.3656	177.3	0.36	59	0.0	0.0
15	00:07:33	185.2	0.3907	183.5	0.38	61	0.0	0.0
16	00:08:04	192.1	0.4159	190.4	0.41	63	2.8	2.8
17	00:08:33	198.0	0.4410	196.3	0.43	65	0.0	0.0
18	00:09:03	204.7	0.4662	203.0	0.46	68	0.0	0.0
19	00:09:33	211.3	0.4914	209.6	0.48	70	0.0	0.0
20	00:10:03	217.5	0.5165	215.8	0.51	72	2.8	2.8
21	00:10:05	217.8	0.5178	216.1	0.51	72	0.0	0.0

PROFFER STATEMENT

Pursuant to that certain application ("Application") submitted by L&L Land Development, LLC ("Owner") and Greenwood Homes Hampton Roads, LLC ("Developer") to rezone that certain parcel of real property located at 18495 Cypress Run Drive Smithfield, VA 23431 and designated as Tax Map Nos. 32-01-005 and 32-01-006 ("Property") to develop a planned mixed-use development project of residential and commercial uses known as "The Promontory" ("Project"), the Owner hereby voluntarily proffers as a part and provision of the above-referenced rezoning that the use and development of the Property shall be in strict accordance with the following conditions, which are reasonable and offered voluntarily, which shall constitute covenants running with the Property, and which shall be binding upon the Property and upon all parties and persons claiming under or through the owners and applicants, their heirs, personal representative, assigns, grantees and other successors in interest or title:

1. The site shall be developed in substantial conformance with the conceptual plan entitled "GENERAL DEVELOPMENT PLAN", dated August 31, 2023, last revised August 13, 2025, and prepared by Bay Civil Engineers (the "Conceptual Plan") a copy of which is on file with the Community Development and Planning Department and has been exhibited to the Planning Commission and the Smithfield Town Council for illustrative purposes and to provide justification for the rezoning action requested by the Application. Changes in the Conceptual Plan may be made to accommodate environmental, engineering, architectural, topographic or other development conditions, or site plan and subdivision approval requirements as required by law and subject to the approval of the Community Development and Planning Director.

2. There shall be a maximum of 210 residential units as depicted on the Conceptual Plan.

3. The residential buildings shall be constructed in substantial conformance with the elevations entitled, "THE PROMONTORY DESIGN GUIDELINES", dated March 2025, and prepared by Developer and Cite Design ("Pattern Book"), copies of which are on file with the Community Development and Planning Department and have been exhibited to the Planning Commission and the Smithfield Town Council for illustrative purposes and to provide justification for the rezoning action requested by the Application. The Community Development and Planning Director may approve additional elevations provided they are consistent with the Pattern Book, as determined by the Community Development and Planning Director or designee.

4. The architectural renderings for the commercial buildings shall be subject to approval by the Planning Commission.

5. The Project shall provide the amenities as shown on the Conceptual Plan and contemplated on sheets L11 through L15 in the Pattern Book's amenity plan ("Amenity Book"). Other similar amenities may be provided in place of those shown on the Conceptual Plan and the

Amenity Book with the approval of the Community Development and Planning Director or designee.

6. A property owners association shall be established in accordance with Virginia law which shall be responsible for the maintenance and upkeep of the following features of the Project: (i) all open space, common areas, and other amenities noted in Conceptual Plan; (ii) all stormwater management infrastructure, including "wet" stormwater management infrastructure, specifically best management practices; and (iii) landscaped buffer areas, as shown in the Conceptual Plan.

7. The Project shall contract with a professional management company to administer the above-referenced property owner's association.

8. Prior to the issuance of the first certificate of occupancy for the Project's residential units on the Property (not including model homes), the Developer will design and construct the following road improvements:

a. Southbound right-turn lane (100-foot storage plus 200-foot taper) into right in/right out proposed Project entrance off of US 258/Rt. 10 (Benns Church Boulevard) designated as Public Road A on the Conceptual Plan and currently serving as an entrance to the existing Tractor Supply;

b. Southbound right-turn lane (100-foot storage plus 200-foot taper) into right in/right out proposed Project entrance off of US 258/Rt. 10 (Benns Church Boulevard) designated as Public Road J on the Conceptual Plan; and

9. Provided Isle of Wight County and/or the Town of Smithfield receives a grant from the Virginia Department of Transportation to develop a proposed roundabout on Turner Drive ("Roundabout"), the Developer shall contribute to the Town an amount of cash equal to One Million and No/100 Dollars ($1,000,000.00) ("Roundabout Payment") payable and conditioned as follows: (a) $400,000.00 shall be payable from the owner(s) of the Project's commercial parcels as shown on the Conceptual Plan on a prorata basis upon such commercial parcel(s) receiving a final certificate of occupancy; and (b) $600,000.00 shall be payable from the Developer and allocated to the Project's residential parcels on a per unit basis payable upon such residential units obtaining final certificates of occupancy.

10. The proposed rezoning could potentially impact capacity at Smithfield Middle School ("SMS") and result in SMS being over enrollment capacity upon completion of the Project. If the Project results in a lack of capacity at SMS (as determined by the annual Isle of Wight County Membership Report for SMS and verified by Developer), Developer shall pay a cash proffer in the amount of $62,519 per seat over enrollment capacity up to a maximum amount of $625,190. The calculated impact of students generated, and the value of a cash proffer contribution, shall be based upon the enrollment at the time of issuance of a certificate of occupancy for each dwelling constructed as part of the Project. The cash proffer contribution shall be paid across the cost of all

units in the Project. If capacity is available at the time of the application for a certificate of occupancy, a cash proffer payment will not be required. If capacity is not available at the time of the application of a certificate of occupancy, then the cash proffer payment shall be made to Isle of Wight County to be designated for its school system prior to the issuance of a certificate of occupancy as indicated above.

11. The Project shall be developed in multiple phases; provided, however, the Developer shall develop the Project's commercial parcels in the first phase of development. Upon issuance of the first zoning permit for the first phase of residential development on the Property, there shall be no more than sixty (60) zoning permits issued by the Town of Smithfield for residential units developed on the Property within the succeeding 12 consecutive month period and in each successive 12 consecutive month period thereafter.

12. Except as otherwise shown on the Concept Plan and Pattern Book, no pier, dock, or similar structure shall be erected as part of the Project or otherwise extended into the existing pond shown on the Conceptual Plan, Cypress Creek, or any wetlands or water bodies within the Project boundaries. This prohibition applies to all waterfront structures, including, but not limited to, fixed or floating piers, boat docks, fishing platforms, observation decks extending over water, and any other structure that protrudes into or over water bodies or wetlands.

[Signatures on the following page]

WITNESS the following signature and seal:

OWNER:

L&L Land Development, LLC

_____
Henry Layden, Manager

COMMONWEAL TH OF VIRGINIA
TOWN OF SMITHFIELD, to-wit:

The foregoing instrument was acknowledged before me this ___ day of August, 2025 by Henry Layden on behalf of the company.

Registration No:

My commission expires:

NOTICE OF PUBLIC HEARING
TOWN COUNCIL OF THE TOWN OF SMITHFIELD
AMENDMENT & REVISION OF ZONING ORDINANCE

Notice is hereby given that the Town Council of the Town of Smithfield, Virginia will hold a public hearing at the regular meeting of the Town Council in the council chambers in The Smithfield Center, 220 N. Church Street, meeting room A, Smithfield, Virginia, on Tuesday, September 2nd, 2025 at 6:30 p.m. to consider the application of the Town of Smithfield, applicant for text amendments to the provisions of the Zoning Ordinance of the Town of Smithfield, Virginia, adopted September 1, 1998, and as amended thereafter, for the following: to reclassify accessory apartments as accessory dwelling units and clarify regulations in Article 2.Q and P; to update the Floodplain Overlay District in Article 3.O; and create the Pinewood Heights Industrial Park Overlay in Article 3.S.

Any person affected by or interested in the aforesaid applications may appear at the hearing and be heard. Copies of the current Zoning Ordinance of the Town of Smithfield, Virginia, adopted Tuesday, September 1st, 1998, and all amendments thereto, along with copies of the text amendment applications, are on file and may be examined in the Community Development & Planning Department, 310 Institute St, Smithfield, VA 23430.

TOWN OF SMITHFIELD, VIRGINIA

BY: Lesley G. King, Clerk

Publish: Wednesday, August 20th, 2025, and Wednesday, August 27th, 2025.

TOWN COUNCIL STAFF REPORT: ARTICLE 2 P & Q TEXT AMENDMENT
PUBLIC HEARING

TUESDAY, SEPTEMBER 2nd, 2025, 6:30 PM

This is a proposed text amendment to Article 2Q updating accessory apartments to accessory dwelling units. ADUs would still require an SUP; however, a family relationship and age requirements are removed. This would also allow free standing ADUs in addition to ADUs over detached garages, and not require the removal of the kitchen.

Article 2P changes accessory apartments to accessory dwelling units.

Planning Commission favorably recommended this application with the following conditions:

Removal of item 4.

Remove breezeway from 8a.

8c replace shall with "may."

Staff suggest also removing porch, patio, etc. from 8a.

Please direct inquiries to Tammie Clary at 1-(757)-365-4200 or tclary@smithfieldva.gov.

Article 2:

GENERAL REGULATIONS

Article 2:
General Regulations

A. Purpose and Intent: General Effect of Zoning Ordinance

No building or structure hereafter shall be erected and no existing building or structure shall be moved, altered, added to or enlarged, nor shall any land or structure be used or arranged for any purpose or manner other than those permitted within the assigned zoning districts and specific provisions of this ordinance. Any building or structure shall be located on an approved lot of record, and, in no case, shall there be more than one principal building on one lot unless otherwise provided in this ordinance.

B. Prior Approvals

Nothing in this ordinance shall be deemed to require any change to the plans, plats, lots or buildings previously approved prior to the effective date of this ordinance.

C. Administration and Enforcement

The provisions of this ordinance shall be administered and enforced by the Planning and Zoning Administrator, who shall be appointed by the Town Manager. The Planning and Zoning Administrator and such staff members or committees as may be assigned to or appointed by him shall have all necessary authority on behalf of the Town to administer and enforce the provisions of this ordinance, including the ordering in writing of the remedying of any condition found in violation of this ordinance, the bringing of legal action to ensure compliance with this ordinance, including, but not limited to, injunction, abatement or other appropriate action or proceeding.

D. Building Permits

1. A building permit is required in advance of the initiation of any building construction activity including erecting, constructing, enlarging, structurally altering, converting or relocating any building or structure and for any other activity as required by the Virginia Uniform Statewide Building Code. All applications for building permits shall be accompanied by building plans, specifications and site plans as required by the Virginia Uniform Statewide Building Code, plus additional information deemed necessary by the Planning and Zoning Administrator to enforce the provisions of this ordinance.

2. Issuance of any building permit is subject to the applicant obtaining a zoning permit or zoning waiver from the Planning and Zoning Administrator. No building permit will be issued by the Isle of Wight County Building Inspections Office until the Planning and Zoning Administrator has certified that the proposed construction and use of the premises conform with all applicable provisions of this ordinance. The Planning and Zoning Administrator shall be responsible for determining whether those applications for permits are in accord with the requirements of this ordinance.

3. It shall be unlawful for any person to erect, construct, enlarge, extend, structurally alter or use any building except in conformance with plans approved by the Planning and Zoning Administrator as required by this Article.

4. All building permits shall be issued by the Isle of Wight Building Inspections Office.

E. Certificates of Use and Occupancy

1. A building hereafter erected under the expressed conditions of a building permit, with the exception of accessory buildings not intended for human occupancy, shall not be occupied in whole or in part until a certificate of use and occupancy has been issued by the Isle of Wight Building Inspections Office and the Planning and Zoning Administrator. Said permit shall certify compliance with current administration requirements as stated within the documents known as the Virginia Uniform Statewide Building Code. In addition, the occupancy permit shall also certify applicable compliance with current zoning regulations as attested by the Planning and Zoning Administrator.

2. An existing building hereafter enlarged, structurally altered, and/or changed in use under the expressed conditions of a building permit, with the exception of accessory buildings not intended for human occupancy, shall not be occupied in whole or in part until an occupancy permit has been issued by the Isle of Wight Building Inspections Office and the Planning and Zoning Administrator under applicable State and Town regulations. For the purpose of zoning interpretation, the conversion of single-family residential dwelling to multi-family or other residential tenant (for lease) facility shall constitute a change in use.

3. The Planning and Zoning Administrator and the Isle of Wight Building Inspections Office shall be responsible for determining whether applications for certificates of use and occupancy as defined in the Virginia Uniform Statewide Building Code are in accord with the requirements of this ordinance.

4. No certificates of use and occupancy or temporary certificate of use and occupancy shall be issued by the Building Official unless the Planning and Zoning Administrator has certified that all applicable provisions of this ordinance have been met.

5. The Planning and Zoning Administrator shall not approve any temporary certificate of use and occupancy where the applicable provisions of this ordinance are not met, except in such instances where lack of compliance is of a temporary nature and involved site related improvements, such as landscaping, vegetative screening and paving which cannot reasonably be completed due to seasonal or weather conditions. In such instances the Planning and Zoning Administrator shall, before approving such temporary certificate of use and occupancy, be satisfied that the premises involved is physically suitable for use and occupancy in terms of access, parking and other site-related improvements.

   Temporary certificates of use and occupancy shall state the nature of the incomplete work and the time period within which the work must be complete, which in no case shall exceed one hundred eighty (180) calendar days. Before approving any such temporary certificate of use and occupancy, the Planning and Zoning Administrator may require a performance bond or other form of surety approved by the Town Attorney in an amount equal to one and one fifth (1 1/5) times the amount necessary to meet the requirements of this ordinance, as certified by an architect, engineer or landscape professional. Such bond or surety shall be released within ten (10) days of satisfactory completion, inspection and approval of the installation of all required improvements.

6. If the provisions of this ordinance are violated, the certificate of use and occupancy shall become null and void, and a new certificate shall be required for any further use of such building, structure or land.

F. Zoning Districts

The incorporated territory of the Town of Smithfield, Virginia shall be divided into classes of residential, office, commercial, industrial, and special overlay zoning districts as presented in Article 3. The location and boundaries of the zoning districts established by this ordinance are as indicated on the map entitled “Official Zoning Map of the Town of Smithfield, Virginia,” as approved by the Town Council as part of this ordinance, endorsed by the Clerk to the Smithfield Town Council, and filed in the office of the Planning and Zoning Administrator.

G. Interpretation of Zoning District Boundaries

In the event that uncertainties exist with respect to the intended boundaries of the various zoning districts as shown on the Official Zoning Map, the following rules shall apply:

1. Where zoning district boundaries of the Town of Smithfield appear to follow streets, alleys, railroads or highways, such boundaries shall be construed as the centerlines of those streets, alleys, railroads or highways.

2. Where zoning district boundaries appear to follow lines of lots or parcels of record, such lot or acre lines shall be construed to be such boundary.

3. Where a zoning district divides a parcel of land, the location of such boundary shall be determined by the use of the Zoning Map scale as measured to the nearest foot unless such line can be more accurately determined by geometric or land surveying computations.

4. Where indicated district boundaries are approximately following corporate boundaries, such corporate boundaries shall be construed to be the district boundaries.

5. Where district boundaries are indicated as approximately following a river, stream, or marsh, the centerline of the river, stream or marsh shall be construed to be the district boundary.

6. The Flood Boundary and Floodway Map, as amended, prepared by the Federal Emergency Management Administration, shall be incorporated into the Official Zoning Map to delineate the boundaries of the Floodplain Overlay District (FP-O District). This map is filed in the office of the Planning and Zoning Administrator.

7. The Chesapeake Bay Preservation Area Map, as adopted by the Town Council, shall be incorporated into the Official Zoning Map to delineate the boundaries of the Resource Protection Areas, Resource Management Areas, and Intensively Development Areas. This map is filed in the office of the Planning and Zoning Administrator.

8. The Historic Areas Map and zoning district language describing the boundaries of the Historic Preservation Overlay, HP-O District of this ordinance, as adopted by the Town Council, shall be incorporated into the Official Zoning Map to delineate the boundaries of the HP-O districts. The Historic Areas Map is filed in the office of the Planning and Zoning Administrator.

9. All areas of the Town which are under water are considered to be within a zoning district and controlled by applicable district regulations. District boundaries over water areas are located by noted or scaled dimensions, with reference to physical features, Town corporate limits or straight line projection of the district boundaries.

H. Interpretation of District Regulations

1. Permitted uses and special permit uses are listed for the various zoning districts governed by this ordinance. Any use not specifically permitted in a specified district or districts as a by right use or a special permit use shall be prohibited.

2. Where a reference is made to specific prohibitions it is for the purpose of clarification or guidance and no further inference may be drawn therefrom.

3. No structure shall hereafter be built or moved, and no structure or land shall hereafter be occupied, except for a use that is permitted as a by right use or a special permit use as regulated by the provisions for such use and the applicable district requirements of this ordinance.

4. No use of a structure or land that is designated as a special permit use in any district shall be established or hereafter changed to another use designated as a special use, unless a special use permit has been secured from the Town Council.

5. No sign, fence, wall, accessory use or structure, or home occupation shall be hereafter established, altered, or enlarged unless in accordance with the provisions of this ordinance.

6. Within each zoning district there are additional regulations referenced that are directly applicable to development permitted in the district.

7. If any property in the Town is not shown on the Official Zoning Map as being located within a zoning district, such property shall be classified as C-C, Community Conservation District until the property zoning designation as been changed in accord with the provisions of this ordinance.

I. District Size

1. Where no minimum district size is specified, the minimum lot areas and width requirements for that zoning district shall define the minimum district size.

J. Density, Open Space and Lot Coverage

1. The maximum density or yield (in terms of total allowable residential dwelling units or gross square footage of non-residential building area) shall be calculated based on the net developable area of the lot or property subject to development or subdivision, less the area which is either (a) existing deeded and/or dedicated public right of way contiguous to or located within the boundary of the lot, or (b) depicted on the Town's adopted Official Map or Future Land Use Plan for proposed public right-of-way, or the expansion thereof, contiguous to or located within the boundary of the lot.

2. The net developable area of a lot or property is a function of the physical land units of that lot or property, including slopes, soils, wetlands and other sensitive environmental features. Adjustment factors for physical land units are as specified on the following chart.

3. The subdivision plat and/or site plan for a project shall graphically depict the location and area for the physical land units as outlined herein below. A calculation of the net developable area shall be required for all subdivision and site plan submissions. *(Refer to illustrative example of net developable area calculation in the appendix .)*

Physical Land Unit	Percent Credited Toward Net Acreage
Slopes less than 10%:	*100%*
Slopes from 10% but less than 20%:	*75%*
Slopes from 20% but less than 30%	*50%*
Slopes 30% or more:	*10%*
Soils with high shrink/swell characteristics, as defined.	*75%*
Wetlands, existing water features and streams:	*0%*
Stormwater management basins and structures:	*0%*
Above-ground 69 KV or greater transmission lines:	*0%*
Public right-of-way	*0%*
Private streets, travelways and combined travelways and parking bays	*0%*

4. No credit towards net developable area shall be given for planned public rights-of-way, private streets, travelways and combined travelways and parking bays within a lot or

property to be developed or subdivided. Twenty percent (20%) shall be subtracted from the calculated net developable acreage to allow for street rights of way, unless it can be demonstrated by survey calculations to the satisfaction of the Planning Commission that proposed street rights of way, private streets, travelways and combined travelways and parking bays in a subdivision will be less than 20% percent of the calculated net acreage.

5. Areas deeded to and accepted by the Town for use as a public park, public school site, and/or public facilities (excluding rights of way) shall be included in the computation of the maximum allowable density for the remainder of the parcel and may provide a maximum of fifty (50%) percent of the parcel towards the required open space for the zoning district.

6. In administering the provisions of this article, the Planning and Zoning Administrator shall have the authority to interpret the definitions of qualifying physical land uses to be used for open space or landscaped open space ratios in a given district.

7. Lands in common open space shall be so covenanted and perpetually maintained, managed and owned by a non-profit organization or other legal entity established under the laws of the State of Virginia. Such entity shall be approved by the Town Attorney or designated agent as a condition of final plan approval.

8. Lands proposed for open space, recreational and active community open space, or landscaped open space shall be of a shape, size and location suitable for the intended open space uses.

9. Maximum lot coverage standards, where specified for certain zoning districts, shall be construed to include that portion of a lot occupied by buildings or structures which are roofed or otherwise not open to the sky and which are greater than three feet in height.

10. No new structures (primary or accessory) exceeding the maximum floor area ratio specified for the underlying zoning district shall be permitted to be erected on that lot. The floor area ratio shall be derived by dividing the gross floor area of all buildings on the lot by the net developable area of the lot.
(Ord. of 8-1-2001)

K. Annexation

Repealed. (Ord. of 2025-03-04)

L. Condominiums

Notwithstanding the specific minimum lot size requirements and minimum yard requirements specified for a given zoning district, a single family detached or attached dwelling condominium development and other forms of real estate condominiums may be permitted under the Condominium Laws of Virginia. Condominium developments shall comply with the density and other provisions of the zoning district in which they are located.

M. Public Sanitary Sewerage Facilities

1. The Town may develop a Sanitary Sewerage Facilities Master Plan to determine the projected sewerage flow, collection mains and facilities, easements, and costs to provide ultimate sewerage service to Town drainage sheds at full development of those sheds. Such facilities plan shall be designed to and in accordance with the adopted Comprehensive Plan. The facilities cost shall be updated annually by applying the appropriate Engineering News-Record cost index factor. The facilities plan shall be adopted by Town Council.

2. Upon adoption of a Sanitary Sewerage Facilities Master Plan, a subdivider or developer of land shall be required to pay a pro rata share of the cost of providing reasonable and necessary sanitary sewerage facilities which may be outside the property limits of the land owned or controlled by the subdivider or developer, but necessitated or required, at least in part, by the construction or improvement of such land, in accordance with the intent and provisions of Section 15.2-2243 of the Code of Virginia, the adopted Comprehensive Plan, the adopted Sanitary Sewerage Facilities Master Plan, the subdivision ordinance, and this ordinance.

3. The policy and criteria for determination of pro rata share of total cost, financial and implementation procedures and other related matters shall be the responsibility of the Town Manager and adopted by the Town Council as part of the Sanitary Sewerage Facilities Master Plan.

N. Public Water Facilities

1. The Town may develop a Public Water Facilities Master Plan to determine the projected public water demand, distribution mains and facilities, easements, and costs to provide ultimate public water services to Town drainage sheds at full development of those sheds. Such facilities plan shall be designed to and in accordance with the adopted Comprehensive Plan. The facilities cost shall be updated annually by applying the appropriate Engineering News-Record cost index factor. The facilities plan shall be adopted by Town Council.

2. Upon adoption of any public water facilities plan, a subdivider or developer of land shall be required to pay a pro rata share of the cost of providing reasonable and necessary water facilities which may be outside the property limits of the land owned or controlled by the subdivider or developer, but are necessitated or required, at least in part, by construction or improvement of such land in accordance with the intent and provisions of Section 15.2-2243 of the Code of Virginia, the adopted Comprehensive Plan, the adopted Public Water Facilities Master Plan, the subdivision ordinance and this ordinance.

3. The development of Town policy and criteria for determination of pro rata share of total cost, financial and implementation procedures and other related matters shall be the responsibility of the Town Manager and shall be approved and adopted by the Town Council as part of the Public Water Facilities Master Plan.

O. Storm Drainage and Stormwater Management Facilities

1. The Town may develop a Storm Drainage and Stormwater Management Facilities Master Plan to determine the projected storm drainage impacts, pre- and post-development runoff quantities and flow, storm drainage culverts and pipe systems, storm drainage ditches and structures, stormwater management facilities, waterfront protection measures, best management practices facilities (BMPs), easements and costs to provide adequate and necessary drainage improvements to the Town's drainage sheds at full development of those sheds. This facilities plan shall be designed to and in accordance with the future land uses on the adopted Comprehensive Plan. The facilities and improvements cost shall be updated annually by applying the appropriate Engineering News-Record cost index factor. The facilities plan shall be approved and adopted by Town Council.

2. Upon adoption of a Storm Drainage and Stormwater Management Facilities Master Plan, a subdivider or developer of land shall be required to pay a pro rata share of the cost of providing reasonable and necessary storm drainage improvements facilities which may

be located outside the property limits of the land owned or controlled by the subdivider or developer, but necessitated or required, at least in part, by the construction or improvement of such land, in accordance with the intent and provisions of Section 15.2-2243 of the Code of Virginia, the adopted Comprehensive Plan, the adopted Storm Drainage and Stormwater Management Facilities Master Plan, the subdivision ordinance, and this ordinance.

3. The policy and criteria for determination of pro rata share of total cost, financial and implementation procedures and other related matters shall be the responsibility of the Town Manager and adopted by the Town Council as part of the Storm Drainage and Stormwater Management Facilities Master Plan.

P. Accessory Uses and Structures

1. Accessory uses are permitted in any zoning district, but only in connection with, incidental to, and on the same lot with, a principal structure which is in use and permitted in such district. Walls and fences are regulated separately in the following section.

2. Except as necessary for ongoing construction activity, the storage or overnight parking of buses, school buses and commercial vehicles (including tractors, trailers and step vans) rated over one ton (as classified by the Department of Motor Vehicles) is prohibited in any residential zoning district.

3. In residential districts, no motor homes, recreational vehicles, trailers or boats shall be parked on the street right of way. No more than two of any combination of the above cited vehicles shall be parked on a residential lot. No parking of any of the above cited vehicles shall be permitted in a front yard or side yard setback of a residential lot. No such vehicle shall be used for any form of habitation on a residential lot and no such vehicle may be connected to a private or public utility.

4. (Repealed by Ord. 9-5-2000)

5. No accessory structure shall be located in a front yard, except for flagpoles, fences and walls.

6. Accessory buildings on lots in commercial and industrial districts which abut a residential district shall be located a minimum of fifty (50) feet from such residential district line.

7. No accessory building may be placed within the limits of a recorded easement, alley or required fire lane.

8. No accessory structure other than garages shall exceed sixteen (16) feet in height. Garages may be as tall as twenty-four (24) feet in height provided that the garage shall meet the primary structure's side yard setback on all lot lines and that the height of the garage shall not exceed the height of the primary residential structure.

9. (Repealed by Ord. 9-5-2000)

10. Accessory ~~apartments~~ dwelling units meeting the conditions listed below in section "Q" are the only accessory buildings that may be used as a residential dwelling unit.

11. No accessory building, except for farm accessory buildings, shall be constructed upon a lot for more than six months prior to the commencement of construction of the principal building, and no accessory building shall be used for more than six months unless the principal building on the lot is being used or unless the principal building is under construction. However, accessory buildings may be located on a parcel in which no primary structure exists, if such parcel is immediately adjacent to a parcel on which a single family dwelling is located and both parcels are under common ownership. Such accessory structure(s) shall be for a use accessory to the primary structure and shall be located in the rear yard. The rear yard of the parcel without a primary structure is defined as being equal to the rear yard for the immediately adjacent commonly owned parcel on which a primary structure is located.

12. Accessory buildings which are not a part of the principal structure (this includes those accessory structures that are connected to the principal building by an open breezeway), may be constructed in a rear yard, provided such accessory building does not occupy more than twenty (20) percent of the area of the required rear yard and provided it is not located closer than five (5) feet to any lot line. Accessory buildings may also be constructed in the side yard provided they meet the primary structures setback requirements.

13. Satellite dish antennas, satellite receiving dishes, satellite earth stations and similar antenna structures are deemed accessory structures. These structures shall be permitted in any zoning district under the following conditions:

    a. No satellite dish antennas, satellite receiving dishes, satellite earth stations or similar structures may be located within a front yard;

b. No satellite dish antennas, satellite receiving dishes, satellite earth stations or similar structures may be located closer than ten (10) feet from any property line;

c. In residential districts, no satellite dish antennas, satellite receiving dishes, satellite earth stations or similar structures may be more than ten (10) feet in height measured at ground grade, nor may they exceed district height requirements if attached to a residence, nor may they extend more than three (3) feet in diameter;

d. In commercial and industrial districts, no satellite dish antennas, satellite receiving dishes, satellite earth stations or similar structures may be more than twenty (20) feet in height measured at ground grade, nor may they exceed district height requirements if attached to a building, nor may they extend more than ten (10) feet in diameter;

e. Such structures shall be of a neutral color and no satellite dish antennas, satellite receiving dishes, satellite earth stations or similar structures may be repainted to anything other than a neutral color;

f. No lettering or advertising message shall be allowed on or attached to any satellite dish antennas, satellite receiving dishes, satellite earth stations or similar structure;

g. The design and placement of the antenna, satellite dish, earth station or similar structure(s) incorporates appropriate landscaping and screening measures as outlined in the Landscaping and Screening regulations in Article 9; and

h. Where in the opinion of the Planning and Zoning Administrator the installation and location of satellite dish antennas, satellite receiving dishes, satellite earth stations or similar structures may adversely affect the health, safety, community character and welfare of adjacent properties, a Special Exception by the Board of Zoning Appeals shall be required for the installation and location of such structure.

14. Swimming pools may occupy a required rear or side yard, provided that such pools are not located closer than ten (10) feet to a rear lot line or ten (10) feet to an interior or side lot line. Swimming pools are not permitted in the front yard. A pedestrian space at least three (3) feet in width shall be provided between pool walls and the protective fences or barrier walls of the pool. All BOCA code requirements pertaining to fencing around swimming pools shall be adhered to. Permanent swimming pools shall be fenced and/or

landscaped in a manner satisfactory to the Planning and Zoning Administrator. For the purpose of this Ordinance, permanent swimming pools shall be defined as any pool that requires electrical service for its operation. Seasonal, non-permanent, above ground pools are exempt from this provision.

15. Portable storage units are considered temporary accessory structures and are permissible on properties for twenty-one (21) days. After the twenty-one days, portable storage units are permitted for use for a maximum of forty-five (45) days with a zoning waiver after which time a zoning permit must be obtained for up to an additional ninety (90) days of use, based upon a legitimate need for further use having been determined by the Zoning Administrator. If additional time is needed beyond what is permitted above, an appeal to the Planning Commission must be made in order to obtain the approval for further use. The Planning Commission shall have the option to attach conditions to the extended use thereof. Portable storage units can be placed in required front or side yard setback areas but cannot be placed in any right-of-way area. The use of portable storage units can be revoked by the town, whether or not previously permitted, if it is determined by the Zoning Administrator that the use or location constitutes a nuisance or a sight distance hazard. A temporary accessory structure shall not be located on any environmentally sensitive lands (RPAs) or wetlands.

16. Construction debris containers, including but not limited to dumpsters and shipping containers, are considered temporary accessory structures for construction activities. Construction debris containers are permitted for on the premises and may be stored thereon during the time that a valid permit is in effect for construction on the premises. The use of construction debris containers can be revoked by the town if it is determined by the Administrator that the use or location constitutes a nuisance or a sight distance hazard. A temporary accessory structure shall not be located on any environmentally sensitive lands (RPAs) or wetlands.

17. Shipping containers are considered accessory structures for setback placement purposes and shall not be utilized as a primary building or dwelling. Shipping containers shall be permitted by right in the Heavy Industrial Zoning District (I-2) and for construction activities. At no time shall shipping containers be stacked or used for habitation, without the successful acquisition of a Special Use Permit. Shipping containers, except construction debris containers are permissible in the Light Industrial (I-1) Zoning District, Community Conservation (C-C) Zoning District, and Highway Retail Commercial (HR-C) Zoning District, only after the successful acquisition of a Special Use Permit. Shipping containers are not permissible in any other zoning district, except construction debris containers. A shipping container shall not be located on any environmentally sensitive lands (RPAs) or wetlands. Appeals of a decision of the Planning and Zoning

Administrator in the administration of this section shall be to the Planning Commission as provided in Section 15.2-2311 (1997) of the Code of Virginia. Appeals of a decision of the Planning Commission by the applicant or a party in interest regarding a site plan, waiver, variation, or substitution shall be to the Town Council, provided that such appeal is filed with the Town Manager within ten (10) calendar days of the decision being appealed. The appeal shall be placed on the agenda of the Town Council at the next regular meeting. The Town Council may reverse or affirm, wholly or partly, or may modify the decision of the Planning Commission.

18. Donation drop-off boxes, as defined in Article 13, shall be permitted with Planning Commission approval and only in accordance with the following standards and procedures:
    a. Donation drop-off boxes shall not be allowed in any residential or agricultural zoning district, except on properties where a Special Use Permit exists for a place of religious worship or assembly.
    b. Donation drop-off boxes are permitted only on properties that contain a primary permitted use.
    c. Donation drop-off boxes shall be limited to three (3) per location.
    d. Donation drop-off boxes are subject to the issuance of a Zoning Permit and upon receipt of written authorization by the property owner or legal representative.
    e. Donation drop-off boxes shall not obstruct pedestrian or vehicular circulation, nor be located in public rights-of-way, required building setbacks, landscape areas, drive aisles, required parking spaces, fire lanes, loading zones, buffers or any other location that may cause hazardous conditions, constitute a threat to the public safety, or create a condition detrimental to surrounding land uses. The Fire Department should review proposed placement.
    f. Donation drop-off boxes shall not be located closer than 100 feet from a residential district.
    g. Each donation drop-off box shall have a firmly closing lid and shall have a capacity no greater than four cubic yards. No donation drop-off box shall exceed seven feet in height.
    h. Donation drop-off boxes may be constructed of painted metal, plastic, or suitable material and shall be properly maintained in a safe and good substantial condition with a neat and tidy appearance.
    i. Donation drop-off boxes shall be clearly marked to identify the specific items and materials requested to be left for donation, the name of the operator or owners of the donation container, the entity responsible for maintenance of the drop-off box and removal of materials and trash from the immediate area, and a telephone number where the owner, operator or agent of the owner or operator may be reached at any time. The box shall display a notice stating that no items or

materials shall be left outside of the donation drop-off box as well as a notice that shall read "Not for refuse disposal. Liquids are prohibited. Do not use for garbage, candy wrappers, soft drink bottles, etc."

j. Occupation of parking spaces by donation drop-off boxes shall not reduce the number of available parking spaces below the minimum number required for the site.

k. All donated items must be collected and stored in the donation drop-off box. Donated items or materials shall not be left outside of donation drop-off boxes and the area around each box shall be maintained by the owner or operator, or the property owner, free of litter and any other undesirable materials.

l. If unable to comply with any of the above regulations, the applicant can apply for a Special Use Permit for the proposed donation box and location.

m. Donation boxes shall be placed against buildings, fences, shrubbery or other means so as to not interfere with traffic.

(Ord. of 9-5-2000; Ord. of 8-1-2001; Ord. of 3-1-2005; Ord. of 9-06-2011; Ord. 2023-03-07; Ord. 2024-06-04; Ord. 2024-09-03)

Q. Accessory ~~Apartments~~ Dwelling Units

~~One accessory apartment may be maintained within a single-family detached dwelling in the C-C, S-R, N-R, and DN-R zoning districts, contingent upon approval as a special use, in accordance with this article, and subject to the following:~~

Accessory dwelling units are permitted after obtaining a special use permit in the C-C, S-R, N-R, DNR, RO and PMUD (excluding multifamily dwellings) zoning districts, and subject to the following:

1. ~~The occupants of the accessory apartment shall be related to the owner of the principal dwelling by blood, adoption or marriage.~~

2. There shall be no other ~~apartment facilities or~~ room rentals in the primary dwelling, the accessory dwelling unit or its accessory buildings.

3. The principal dwelling or the accessory dwelling unit shall be occupied ~~during the maintenance of the accessory apartment~~ by the ~~fee simple~~ property owner ~~and members of the owner's family related by blood, adoption or marriage.~~ as their primary residence.

4. ~~The permitted accessory apartment dwelling unit shall be exclusively occupied by not more than two persons~~, ~~at least one of whom is related to the owner by blood, adoption or marriage and who must be either 62 years of age or older or must be physically or~~

~~mentally handicapped, and the other occupant whom, if not of the requisite age, handicapped condition or familial relationship, must be a live-in attendant of the qualifying handicapped person.~~

a. ~~A person shall be deemed physically or mentally handicapped if by virtue of a physical or mental condition such person is permanently incapable of carrying on some material activity reasonably necessary to independent daily living.~~

~~b. A written certification by the handicapped person's regular physician shall accompany the permit application. Such certification shall state the nature of the handicap, the effect upon the person's ability to function normally in daily life, the expected duration of the handicap and whether or not the handicap may be expected to moderate with time.~~

5. A minimum of one (1) Off-street parking space shall be ~~as~~ required ~~by Article 8.~~ for the accessory dwelling unit in addition to the required parking for the primary structure.

6. When a building addition or additional parking is proposed, a minor site plan meeting the requirements of Article 11 regarding site planning shall be submitted.

7. The floor plan and exterior elevations of the proposed accessory ~~apartment~~ dwelling unit and of the building housing same shall be presented to and approved by the ~~Planning and~~ Zoning Administrator. Exterior elevations shall not be required if no exterior changes are proposed. Exterior elevations shall also be approved by the Review Board when required by the HP-O District.

8. An accessory ~~apartment~~ dwelling unit shall have a floor area of not less than 400 square feet nor greater than ~~800~~ 1000 square feet, but in no event shall the floor area of an accessory ~~apartment~~ dwelling unit exceed ~~twenty-five (25)~~ forty (40) percent of the existing floor area of the ~~main building which will house the same.~~ primary structure, whichever is less.

a. An accessory ~~apartment~~ dwelling unit shall have one kitchen and shall have not more than two bedrooms, one bathroom and one all purpose room and shall be entirely located either within the outer walls of the main building or connected thereto by a common wall, ceiling or floor ~~but not by a breezeway, or porch, deck, patio or the like~~. Accessory ~~apartments~~ dwelling unit located on a separate level over a freestanding garage are also permissible provided that it is in compliance with residential building codes.

b. The architectural treatment of the accessory ~~apartment~~ dwelling unit shall be consistent with that of the character of the principal single-family dwelling.

c. An accessory ~~apartment~~ dwelling unit ~~shall~~ may be accessible from the interior of the main building of which it is part. Only one main entrance shall be permitted on the front of the accessory ~~apartment~~ dwelling unit; all other exterior entrances shall be at the side or in the rear.

d. No accessory ~~apartment~~ dwelling unit shall be permitted in a basement or cellar or above the first floor of the principal dwelling, except over attached garages.

e. Any accessory dwelling unit, if in a separate structure from the primary dwelling unit, shall be located in the rear or side of the principal dwelling.

f. Aside from the primary dwelling unit, only one accessory dwelling unit may be located on a lot. Accessory buildings not intended for use as a dwelling are permitted.

~~9. If the following conditions are met, then the Planning and Zoning Administrator shall issue a temporary special use permit to allow the establishment and maintenance of the accessory apartment during the time of allowed occupancy:~~

~~a. The required public hearing is held;~~

~~b. The Planning and Zoning Administrator determines that all enumerated requirements have been satisfied and that the required accessory apartment will not have a net negative effect upon the peace and tranquility of adjacent properties or upon the value thereof;~~

~~c. All fee simple owners of the affected property have executed in form recordable among the land records of the clerk's office of the Circuit Court of the County of Isle of Wight an agreement to remove the necessary kitchen improvements and to do all other things necessary to establish the accessory apartment area as a functional, non-discrete portion of the single-family dwelling housing same upon termination of the required temporary special exception permit; and~~

~~d. All applicable requirements of Article 12 have been met.~~

~~10. After construction of the accessory apartment has been completed, but prior to its occupancy, a fee simple owner of the main building housing same shall certify by affidavit delivered to the Planning and Zoning Administrator that the persons who will occupy such apartment are the same to whom information was presented to the Planning and Zoning Administrator and that any handicap which formed the basis for the issuance of the temporary special exception permit continues. Upon receipt of such affidavit in proper form, an occupancy permit shall be issued. Thereafter, the applicant or other fee simple owner of the property in question shall submit such~~

~~notarized affidavit to the Planning and Zoning Administrator by first of September of each ensuing year as a requirement for the continuance of the temporary special use permit and the occupancy permit.~~

~~11. Within 45 days after the use of an accessory apartment is discontinued or after said use ceases to comply with the requirements of this section, the kitchen facilities (other than permanently installed plumbing pipes located in the wall and/or floor) shall be removed and said accessory apartments shall be brought into compliance with this ordinance in all respects. Furthermore, the portion of the main building which had contained the accessory apartment shall not thereafter be occupied or maintained as a separate dwelling unit. "Kitchen facilities" shall include sinks, dishwashers, stoves, refrigerators and the like.~~

R. Walls and Fences

Walls and fences, berms and similar items which may restrict passage or vision or simply enhance private property may be located within required yards as defined by building setbacks except as restricted herein:

1. No walls or fences located within front and side yards shall exceed a height of forty-two (42) inches as measured from the grade at the point of placement. No walls or fences or similar items other than landscaping within rear yards shall exceed a height of six (6) feet. However, rear yard fences that are taller than forty-two (42) inches may extend to the front corners of the primary structure. Fences in the rear yard on corner lots shall meet the side yard setback adjacent to the right-of-way line in the underlying zoning district. These provisions shall not be interpreted to prohibit the erection of an open-mesh type fence enclosing any school or playground site or business or industrial activity for security purposes.

2. In business, residential and industrial districts, walls and fences which are clearly used for safety or security purposes may be superseded by other height regulations.

3. In all use districts, walls and fences, hedgerows and other dense landscaping and other items which occur on corner lots, which exceed three and one-half (3 1/2) feet in height, and present an obstruction to vision, shall be reduced in height or relocated at least twenty (20) feet from the intersection of right-of-way lines.

4. In all use districts, walls and fences, hedgerows and other dense landscaping and other items which exceed three and one-half (3 1/2) feet in height and present an obstruction of

vision to traffic ingress and egress on property shall be reduced in height or relocated in a manner which negates the obstruction.

5. In all residential districts, walls and fences which adjoin property lines shall not be electrified, barbed or otherwise secured in a manner inappropriate or dangerous to the neighborhood. Such restrictions may be waived within customary agricultural areas.

6. Trellises and trellis work, play equipment, outdoor furniture, mailboxes, ornamental entry columns and gates are allowed within required yards.

6. Walls, fences and other enclosures for uses such as swimming pools, refuse enclosures, transformers and substations may be restricted by other regulations which shall supersede this section.
(Ord. of 9-5-2000; 8-1-2001)

S. Telecommunication Towers

1. For the purpose of this ordinance, telecommunication towers shall include radio, cellular telephone, television, microwave, short wave radio and/or any other tower used exclusively for communication purposes as interpreted by the Planning and Zoning Administrator.

2. No telecommunication tower(s) (hereinafter referred to as “tower(s)”) shall be located within five hundred (500) feet of a Residential district unless the applicant can otherwise demonstrate by providing coverage, interference and capacity analysis that the proposed location of the antenna is necessary to meet the frequency reuse and spacing needs of the wireless telecommunications facility and to provide adequate coverage and capacity to areas which cannot be adequately served by locating the tower(s) in a less sensitive area.

3. Tower(s) or structures supporting telecommunication antenna(s) or otherwise conforming to all the applicable provisions of this ordinance are hereby permitted subject to approval of a special use permit in the following zoning districts when the tower(s) is considered an accessory use:

   a. I-1, Light Industrial
   b. I-2, Heavy Industrial

Tower(s) and supporting telecommunication antenna(s) are also permitted subject to approval of a special use permit in the following locations regardless of the underlying zoning district:

a. Church sites when camouflaged as steeples or bell towers;
b. Park sites when compatible with the existing environment and nature of the park; and
c. Government, school, utility and institutional sites.

4. The minimum setback from the base of the tower to any property line or to any adjacent non-residential structure shall be equal to one-half (1/2) the height of the tower, unless the Town Council grants a waiver due to special or unusual characteristics.

5. The following general criteria shall be considered in determining the appropriateness of sites for communication tower(s) when considering a special use permit:

a. Whether the proposed tower is to be located in an area where it would be unobtrusive to surrounding uses and would not substantially detract from the local aesthetic or neighborhood character;
b. Whether the application represents a request for multiple use of a proposed tower(s) as is recommended in the Town's Comprehensive Plan; and
c. Whether the application exhibits how the site and the tower(s) and/or antenna(s) will be designed and arranged to accommodate future multiple users.

6. No microwave dishes or other dish or conical shaped antennas shall be permitted on the tower(s) unless otherwise approved as part of the special use permit. Photo simulations of the "before and after" visual impacts of the tower(s) shall be submitted to the Town with the special use permit application.

7. Tower(s) and antenna(s) shall be limited in total height to one hundred and ninety-nine (199) feet or lower unless so waived by the Town Council.

8. Line of sight profiles depicting the proposed tower with attached antenna(s) and arrays from no fewer than three (3) locations, including all critical viewsheds determined by the Planning and Zoning Administrator, shall be submitted at the time of initial application for all towers in excess of fifty (50) feet.

9. In the event the tower(s) and antenna array(s) shall serve as the primary use of the property, any accessory facility or building greater than one hundred (100) square feet

will be designed so as to be architecturally compatible with principal structures on the site and shall be compatible with the surrounding natural or built-up environment.

10. No communications equipment shall be installed which will interfere in any way with the Town's emergency communications system.

11. Advertising or signage provided for any use other than to provide warning or equipment instruction and/or any other information pertinent to the safe operation of the facility on any portion of the tower and/or antenna or any other accessory facility shall be prohibited, and each tower shall maintain a gray or other neutral colored finish.

12. Towers shall not be artificially lighted, unless required by the Federal Communications Commission (FCC) and the Federal Aviation Administration (FAA) or other applicable authority. If lighting is required, the Planning Commission and the Town Council shall review the available lighting alternatives and approve the engineering design solution that would create the least visual disturbance to the surrounding area.

13. Tower(s) and antenna(s) in excess of fifty (50) feet in height shall include screening as deemed necessary by the Town Planning and Zoning Administrator.

14. The applicant shall possess a communication license issued by the FCC and any other federal regulatory agency as deemed necessary by the Town, and the site selection, design and operation of the facility must meet all applicable State and Federal requirements and regulations.

15. If at any time the use of the tower(s) and/or antenna(s) ceases, the owner or lessee of the tower(s) and/or antenna(s) shall dismantle and remove it within six (6) months after ceasing to use it, unless:

    a. A binding lease agreement with another wireless communications provider on the same tower has been executed in which case an additional six (6) months shall be granted; or
    b. The Town requests, in writing, that the tower(s) and/or antenna(s) be reserved for Town use.

T. Borrow Pits

1. Borrow pits and related uses involving the extraction of natural resources conforming to all the applicable provisions of this ordinance are hereby permitted subject to approval of a special use permit in the following zoning districts:

    a. C-C, Community Conservation
    b. I-2, Heavy Industrial

2. The application for special use permit for a borrow pit shall be accompanied by a site plan meeting all the requirements for a major site plan review. In addition, the following information shall be provided with the special use permit application:

    a. A master phasing plan;
    b. A vehicular access plan to be utilized by the excavation operator;
    c. An enhanced erosion and sediment control plan detailing methods to be used to protect surrounding properties and public streets;
    d. A comprehensive facility operations plan, including an estimate of annual yardage or tonnage to be excavated;
    e. A detailed reclamation and restoration plan;
    f. Design and construction details for fencing and gating;
    g. Copies of all state and federal permits for use and use operations;
    h. Proffers and plats supporting permanent easements, setbacks and buffer areas;
    i. Evidence of ownership's record of borrow bit operations and prior record of compliance with borrow pit permits;
    j. A site plan depicting enhanced roadside landscape, yard setbacks and related buffers; and
    k. An operations maintenance plan.

3. In addition to the bonding requirements of Article 11, Section K. 4 (Site Plan Requirements), the following bonding (surety) requirements for borrow pits development shall apply:

    a. In addition to other bonding requirements of this Ordinance, the operator shall furnish a bond of the amount on the form to be prescribed by the Town Attorney payable to the Town of Smithfield.

    b. The bond shall serve to condition the use permit subject to the operator performing all of the requirements of this ordinance as well as the conditions of the special use permit, the facility improvements plan, the operations plan, the reclamation and restoration plan and the maintenance plan.

c. The operator shall submit a cost estimate for the above considerations with the bond form, with said estimate to be prepared by a registered professional engineer qualified to undertake such examinations. The Town Attorney shall employ said estimate in setting the bond or surety amount.

d. The bond or surety posted by the operator for such use and operations shall not be refunded until the operator has obtained the approval of the Planning Commission.

e. Within ten days of the anniversary of a bond, the operator shall post any additional bond in the amount determined by the Planning and Zoning Administrator.

f. If the operator does not undertake to complete any reclamation, operations or maintenance deficiency within thirty (30) days of notification by the Planning and Zoning Administrator, the Town may order the forfeiture of the bond or surety and have the necessary work performed with the money so received.

4. All special use permits issued for borrow pits will be valid for a period of five (5) years from the date of issuance. An extension of time or renewal of said permit will require new applications filed in accordance with the terms of this ordinance.

5. A violation of this article shall be deemed as adequate cause to declare the special use permit null and void upon action by the Planning Commission at a regularly scheduled meetings.

U. Home Occupations

1. A home occupation permit shall be approved by the Planning and Zoning Administrator prior to commencement of business operations.

2. The home occupation shall be clearly incidental to the use of the premises for dwelling purposes.

3. The home occupation shall be conducted only by direct family members residing on the premises and not more than one person who is not a direct member of the family.

4. The home occupation shall not result in the alteration of the appearance of the residential dwelling unit or the lot on which it is located. There shall be no storage or display of goods outside of a completely enclosed structure.

5. The home occupation shall be conducted within the dwelling or fully enclosed accessory building, shall not require external alternative to the appearance of the dwelling, and shall involve no equipment which is deemed to be in conflict with the intent of the residential nature of the community.

6. The home occupation shall not involve the use or storage of explosives, flammable or hazardous materials and may not involve any process that produces smoke, dust, odor, noise, vibration, or electrical interference, which in the opinion of the Planning and Zoning Administrator, is deteriorative or harmful to surrounding properties.

7. The home occupation shall not involve the delivery and storage of materials at a frequency beyond that which is reasonable to the residential use of the property.

8. Any use which generates traffic to and from the home in excess of what is normally associated with a single-family dwelling shall not be permitted as a home occupation.

9. There shall be no group instruction, assembly or activity, or no display that will indicate from the exterior that the dwelling is being utilized in part for any purpose other than that of a residential dwelling. There shall be no advertising on the premises.

10. No home occupation shall be permitted which comprises more than twenty-five (25) percent of the gross floor area of the dwelling or more than 400 square feet of the dwelling, whichever is less.

11. A home occupation shall comply with all applicable Town, State and Federal laws and regulations governing the intended use, including applicable business licenses and permits.

12. Home occupation applicants shall permit reasonable inspections of the premises by the Planning and Zoning Administrator or other Town official to determine compliance with this ordinance and the conditions attached to the granting of a home occupation permit.

13. Any home occupation, which in the opinion of the Planning and Zoning Administrator, has violated the provisions of the home occupation permit or becomes a burden to the neighborhood due to excessive traffic, noise, hours of operation, lighting, or use intensity,

shall have its permit revoked and the home occupation shall discontinue or correct operations within ten days upon notification.

14. Any person aggrieved by the action of the Planning and Zoning Administrator in granting, denying or revoking a home occupation permit or in stipulating conditions or corrections thereto may appeal the decision to the Board of Zoning Appeals.

15. Within the context of the above requirements, home occupation uses include, but are not limited to, the following:

    a. Artist, sculptor or photographer.
    b. Author or composer.
    c. Computer programmer or internet service provider.
    d. Home care provider
    e. Tailor or seamstress.
    f. (Repealed by Ord. 2020-08-04).
    g. Tutoring.
    h. Salesperson, provided that no retail or wholesale transactions occur on premises.
    i. Telephone answering service.
    j. Music teacher, limited to two students at any one time.
    k. Caterer.
    l. Child day care provider (Babysitting for not more than 5 children; however a Special Use Permit may be an option for 6-11 children in some zoning districts.)

16. Specifically prohibited home occupation uses include, but are not limited to, the following:

    a. Auto repair or auto paint shop.
    b. (repealed 11-2014)
    c. Gift shops.
    d. Adult entertainment businesses and massage parlors.
    e. Medical and dental clinics.
    f. Veterinary activities and kennels.
    g. Wrecking and towing service.
    h. Welding and machine shop.
    i. Beauty parlors.
    j. Barber shops.
    k. Nursing homes, convalescent homes, and adult care facilities.

l. Child day care center.
m. Eating establishments.
n. Antique shops.
o. Tourist homes.
p. Fortune tellers.
q. Small machinery repair shop.
r. Other similar use.

19. Nothing in this Ordinance shall preclude an owner/occupant from having a professional office within their home. A professional office shall be excluded from obtaining a home occupation permit from the Planning and Zoning Administrator, so long as a business license is obtained from the Town, and all other applicable standards of this Section have been met.
20. Professional office home occupations may enjoy client visits to the property following the successful acquisition of a special use permit from the Town Council.

(Ord. of 2000-09-05; Ord. of 2014-11-04; Ord. of 2020-08-04)

V. Lot and Yard Requirements and Modifications

1. No structure or part thereof shall hereafter be constructed or moved on a lot which does not meet all of the minimum lot area and yard requirements established for the zoning district in which the structure is or is planned to be located.

2. The minimum lot width shall be measured at the minimum front yard setback line approved on the final subdivision plat. No portion of the lot between the front and rear yard setback lines shall be less than the minimum lot width required for the zoning district. Each lot must maintain a minimum street frontage of at least twenty-five (25) feet.

3. Pipestem lots (also known as “flag lots”) are not permitted in any residential district.

4. Cornices, awnings, eaves, ADA ramps, gutters, and other similar structural overhangs at least eight feet above grade may extend not more than three feet into any required yard.

5. Uncovered and unenclosed decks, porches, patios, terraces and other similar features not covered by a roof or canopy may extend or project into a front, side or rear yard setback line not more than four (4) feet.

6. (Repealed by Ord. 9-5-2000)

7. Corner lots shall provide a setback equal to the required front setback for all yards adjoining a public street provided, however, that the setback regulations shall not reduce the buildable width of a lot to less than fifty (50) percent of lot width as measured at the point of required setback line.

8. Where the frontage on one side of a street between two (2) intersecting streets is improved with buildings having a setback greater or less than one setback heretofore permitted, no building shall project beyond the average setback line of the existing buildings of the same zoning classification so established.

9. Chimneys, solar devices, architectural features or the like, may project into required yards not more than thirty (30) inches. No such feature shall connect a principle structure with an accessory structure unless the accessory structure conforms with setbacks applicable to principle structures and all building code requirements are met.

10. No commercial above ground fuel storage tanks may be located less than one hundred (100) feet from any residential district. Canopies and pump operations are not classified as accessory buildings and shall comply with standard principal building setbacks for the district concerned.

11. (Repealed by Ord. 5-4-2004)

12. No residential lot shall be created in which an area more than 25% of the total lot area is comprised of one or more of the physical land units: (a) slopes 30% or greater, (b) wetlands, (c) 100-year floodplains and (d) water features.

13. Development on shrink/swell soils is not encouraged by the Town of Smithfield. Any development on lots containing shrink/swell soils shall be subject to specific soils and geotechnical analysis of the lot and detailed foundation engineering evaluations for the intended improvements. The following additional lot regulations and requirements shall apply to any subdivided lot:

    a. Lots to be developed on shrink/swell soils shall require a geotechnical study and foundation design report for each lot prior to issuance a building permit. Such report shall be prepared by a registered professional engineer and shall address (1) the location and characteristics of the soils and (2) foundation and related structural engineering design recommendations for the intended structure.

    b. (Repealed by Ord 2022-09-06)

c. No subdivision plat or site plan shall be approved for recordation until a geotechnical and foundation report has been reviewed by the Town in conjunction with final site plan, lot development plan and/or final subdivision plat review, or as otherwise required by the Planning and Zoning Administrator.

d. All recorded plats for new subdivided lots containing shrink/swell soils shall bear the following notation:

"This lot contains shrink/swell soils which require special engineering design for foundations and structural elements. No structure will be approved for issuance of a building permit until a certified engineering design has been submitted for the foundation and other related structural elements for the proposed structure."

14. Repealed (Ord. of 2024-06-04).

15. Any plat submitted to the Town must show, as applicable, the existence of a Resource Protection Area (RPA) designation, its implications regarding future development, and acknowledgment of a maintenance agreement for on-site BMPs.
(Ord. of 8-1-2000; Ord. of 9-5-2000; Ord. of 5-4-2004; Ord. 2022-09-06)

W. Public Hearings

1. Public hearings held by the Town Council, Planning Commission, Board of Zoning Appeals or other duly appointed authority, shall be held in accordance with Section 15.2-2204, 2205 and other appropriate sections of the Code of Virginia, 1950, as amended.

2. In accordance with applicable regulations, before such hearings, the following is required:

a. Notice of the intended action shall be published once a week for two successive weeks in a newspaper of general circulation in the Town of Smithfield; provided that such notice for matters to be considered by more than one board or commission may be published concurrently. Such notice shall specify the time and place of the hearing at which persons affected may appear and present their views, with the first notice appearing no more than 28 days before and the second appearing no less than seven days before the date of the meeting referenced in the notice. (Ord. of 2025-03-04)

b. The applicant for action requiring a public hearing shall bear the cost of said notice. The Zoning Administrator shall be required to obtain the names of the adjacent property owners and notify them with certified letters. Any person entitled to such notice may waive such right in writing.

(1) Applications for Appeals, Special Exceptions, Variances, Special Use Permits, Special Sign Exceptions, Special Yard Exceptions, Exceptions to the RPA, Rezonings and amendments to zoning ordinance involving a change in zoning classification of twenty-five or fewer parcels of land, require, in addition to the advertising required herein, written notices to be given at least five days before the hearing to the owner (the last known address as shown on the current real estate assessment records of the Town of Smithfield) of each parcel involved, the owners of all abutting property and the owners of property immediately across the street or road from the property affected. If such notice is sent by an applicant other than a representative of the Town Council, it shall be sent by registered or certified mail and the return receipts shall be filed with the records of the case. If such notice is sent by a representative of the Council, the notice may be sent by first class mail; provided that the representative make affidavit that such mailings have been made and file such affidavit with the records of the case.

(2) When a proposed amendment to the zoning ordinance involves a change in the zoning classification of more than twenty-five but less than five hundred parcels of land, then in addition to the advertising required hereinabove, written notice shall be given at least five days before the hearing to the owners of each parcel of land involved. Notice shall be sent by first class mail to the last known address of such owner as shown on the current real estate assessment records of the Town of Smithfield. The party responsible for sending the required notice shall make affidavit that such mailings have been made and file such affidavit with the papers in the case.

(3) When a proposed amendment to the zoning ordinance involves a change in the zoning classification of five hundred or more parcels of land, written notice to the owners of each parcel is not required. Notice shall be advertised as required herein.

c. At least fourteen days preceding a public hearing involving a site specific request, the Zoning Administrator shall erect on the subject parcel or parcels, a

sign or signs, in such number as indicated below, stating “PUBLIC HEARING NOTICE” and indicating the telephone number of the Planning and Zoning Administrator. The sign or signs shall be erected by the applicant within ten feet of whatever boundary line of such land abuts a public street and shall be so places as to be clearly visible from the street. Such signs shall not be erected on the public right-of-way. If more than one such street abuts the subject parcel or parcels, then at least two signs shall be erected in the same manner as specified above, along at least two abutting streets. If no public street abuts thereon, then signs shall be placed in the same manner as above on at least one (or as many as deemed necessary by the Planning and Zoning Administrator) boundary of the property abutting land not owned by the applicant.

3. Any sign erected as required by this article shall be maintained at all times by the Zoning Administrator up to the time of the hearing.

4. It shall be unlawful for any person, except the Planning and Zoning Administrator, or authorized agent, to remove or tamper with any required sign during the period it is required to be maintained under this section.

5. All signs erected under this section shall be removed by the Zoning Administrator within five days following the public hearing for which it was erected.

6. (Repealed by Ord. 5-4-2004)

7. Failure to constantly maintain such sign on the property prior to the date of the public hearing shall not invalidate the public hearing or any approval thereafter granted.

8. If any hearing is continued, written notice of the new hearing date shall be mailed to those persons that received notice of the previous hearing, as required above.

(Ord. of 5-4-2004)

X. Violations and Penalties

1. The Planning and Zoning Administrator and all other Town officials and employees who are vested with duty or authority to issue permits or licenses shall adhere to the provisions of this ordinance and shall issue permits or licenses only when uses and buildings comply with the provisions of this ordinance.

2. The Town reserves the right to revoke, upon written notification and failure to remedy within a reasonable period of time, any permit wrongfully issued or otherwise found to be in conflict with the provisions of this ordinance.

3. Any person who is convicted of violating any of the provisions of this Ordinance shall be found guilty of a Class I misdemeanor.

4. In addition to pursuing the penalties and fines hereinabove provided, the Planning and Zoning Administrator may bring additional legal action to insure compliance with this ordinance, including injunction, abatement or other appropriate action or proceeding.

5. In addition to any other remedies which may be obtained under this ordinance, any person who: (i) violates any provision of any this ordinance or (ii) violates or fails, neglects, or refuses to obey any final notice, order, rule, regulation, or variance or permit condition authorized or issued by the Planning and Zoning Administrator or the Town Council under this ordinance shall, upon such finding by the circuit court, be assessed a civil penalty not to exceed $5,000 for each day of violation. Such civil penalties may, at the discretion of the court assessing them, be directed to be paid into the treasury of the Town of Smithfield for the purpose of abating environmental damage to or restoring Chesapeake Bay Preservation Areas therein, in such a manner as the court may direct by order.

6. With the consent of any person who: (i) violates any provision of this ordinance related to the protection of water quality in Chesapeake Bay Preservation Areas or (ii) violates or fails, neglects, or refuses to obey any order, rule, regulation, or variance or permit condition authorized or issued by the Planning and Zoning Administrator or the Town Council under this ordinance, the Town Council may provide for the issuance of an order against such person for the one-time payment of civil charges for each violation in specific sums, not to exceed $10,000 for each violation. Such civil charges shall be paid into the treasury of the Town of Smithfield for the purpose of abating environmental damage to or restoring Chesapeake Bay Preservation Areas therein. Civil charges shall be in lieu of any appropriate civil penalty that could be imposed under Paragraph 5 immediately hereinabove. Civil charges may be in addition to the cost of any restoration required or ordered by the Planning and Zoning Administrator or the Town Council.
(Ord. of 8-1-2000)

Y. Event Facilities

1. A place of public assembly used primarily as an event facility is a place for hosting functions including, but not limited to, parties, lessons/classes/courses, weddings,

receptions, banquets, anniversaries, meetings, and/or conferences. The event facility may be a building, tent, uncovered outdoor gathering space, or a combination thereof. For the purposes of this Section, an event facility is one that charges a fee or requires compensation to use the space or charges an entry or other fee for the uses related to the facility. Facilities exclusively used by membership groups such as clubs, or civic, fraternal, and/or social organizations, are excluded from this definition.

2. All event facilities, and the parcel(s) upon which they are located, must meet the following standards:

   a. Access to and from the event facility shall not occur via a shared or common driveway.

   b. To the greatest degree possible, the permanent component(s) of a proposed event facility should be placed on a parcel so as to avoid areas identified by any Town Ordinance or publication (Comprehensive Plan, etc.) as a viewshed.

   c. Where proposed, temporary tents are allowed for the duration of the event, or a period not to exceed seven (7) consecutive days, whichever is less. The seven (7) day time period may be extended following a written request to the Zoning Administrator or their designee, showing reasonable cause.

   d. The protect the citizens of the Town from excessive noise, events facilities must comply with Chapter 38 of the Town Code.

   e. In any zoning district in which this use is permitted, the maximum number of attendees for any given event is limited to the maximum live load according to the Virginia Uniform Statewide Building Code (VUSBC) for the building in or at which the event is to occur. Outdoor events may exceed this restriction. The maximum number of attendees includes, but is not limited to, any event staff, caterers, photographers, and/or vendors.

3. An application for a new event facility must include the following items:

   a. The applicant must demonstrate that all performance standards would be met by their proposal through the submission of a site plan.

   b. All applicable requirements in this Article, as well as Articles 3, 6, 8, 9, 10, and 11 must be met.

(Ord. of 2019-09-03)

Z. Short-Term Rentals

1. These regulations are established to allow the short-term rental of rooms to transient persons in all residential settings, while at the same time preserving the residential character of the neighborhoods in which the dwellings are located. For the purpose of this section, short-term rentals include short-term rentals and homestays. In any zoning district in which residential uses exist or are permitted, accessory short-term rentals (hereinafter referred to as "homestays") are permitted by-right- short-term rentals as principal uses are permissible by special use permit (SUP) only. Short-term rentals in any mixed-use building or structure shall also require an SUP. In all other cases, the following conditions must be met:

    a. A copy of the declarations page, a certificate of insurance, or a binder of insurance (if newly applied for) showing general, personal, or premises liability insurance in the name of the owner/operator, covering the rental of the property to transient persons, with coverage of not less than $500,000 must be furnished to the Town. Such insurance coverage must remain in place at all times while any part of the property is being offered for short-term rental.
    b. Short-term rentals shall be permitted for not more than 104 nights per calendar year.
    c. At all times, no more than ten (10) over-night guests shall occupy any short-term rental, or no more than two (2) per bedroom at any one time, whichever is greater.
    d. Accessory buildings and structures shall not be used or occupied as short-term rentals, except upon the issuance of an SUP by the Town Council.
    e. All operators engaging in short-term rentals are required to obtain and maintain a business license from the Town, and the operator of the short-term rental shall remain liable for all taxes that may be owed, in addition to the transient occupancy tax.
    f. Nothing in this section shall be construed to supersede or limit contracts or lease agreements between or among individuals or private entities related to the use of real property, including recorded declarations and covenants, the provision of condominium instruments of a condominium created pursuant to the Condominium Act (Va. Code § 55-79.39 et seq.), the declaration of a common interest community as defined in Va. Code § 55-528, the cooperative instruments of a cooperative created pursuant to the Virginia Real Estate Cooperative Act (Va. Code § 55-424 et seq.), or any declaration of a property owners' association created pursuant to the Property Owners' Association Act (Va. Code § 55-508 et seq.).
    g. The short-term rental must be serviced by a Virginia-licensed waste management facilities operator.

h. To protect the citizens of the Town from excessive noise, short-term rentals must comply with Chapter 38 of the Town Code.

i. The operator of the short-term rental must submit to the Town a signed and notarized short-term rental affidavit assuring compliance with all of the above provisions.

j. Any of the above provisions may be waived by the Town Council, upon the issuance of an SUP. Additionally, if there is any uncertainty in interpretation between the applicant and the Administrator as to any of the provisions of this section, the Administrator may require an SUP.

2. Existing short-term rentals which conflict with the standards of this Section, and which were in operation sixty (60) days prior to the date of adoption of the same, may be administratively approved by Town staff, provided that the applicant submit satisfactory evidence to the Town that their short-term rental was in operation at that time. If uncertainty arises between the applicant and the Administrator as to whether or not satisfactory evidence has been submitted to the Town, the Planning Commission shall determine the validity of the evidence.

3. If the operator is found to have violated any of the provisions of this section, the following penalties shall apply:

a. The revocation of the operator's business license.

b. Any additional penalties as prescribed in this or any other Town Ordinance.

(Ord. of 2020-09-01)

AA. Public Buildings, New Construction

1. The purpose of establishing these provisions is to protect the aesthetic and visual character of the new construction of primary and accessory structures intended as public buildings, located on government owned parcels, as defined herein, and to provide for and promote their orderly development. All new construction proposed, meeting the definitions below, shall be subject to the procedures, standards, and guidelines specified in the following Sections, in addition to those standards pertaining to the particular base zoning district and overlays in which the development occurs.

a. New Construction:

i. For the purpose of this section, new construction includes the addition of additional square footage to an existing building, along with the construction of a new primary building and / or accessory building(s).

ii. For the purpose of this section, new construction does not include exterior modification and / or changes to existing structures, both primary and accessory.

b. Public Buildings:

i. For the purpose of this section, public buildings include any building constructed on a Town, County, State, and / or Federally owned parcel, for the intended purpose of providing a service to the public, as either a primary or accessory use.

2. No new construction of a primary building or accessory structure shall be authorized or constructed in the Town unless and until the general location, character, and extent thereof has been submitted to and approved by the Planning Commission, as being substantially in conformance with the Guidelines of the Entrance Corridor Overlay (ECO) District, and Entrance Corridor Guidelines. This provision applies to properties that meet the definition above but are located outside of the ECO.

3. All development plans shall be submitted and reviewed according to the following procedures:
   a. A complete development plan shall be submitted to the Zoning Administrator.
   b. Applicants shall be informed in writing of the outcome of their review including a list of required revisions, if necessary.
   c. After the complete development plan and related materials have been submitted, it shall be reviewed and processed by the Planning Commission and other affected governmental agencies for conformity to this Article and other applicable Articles and regulations. The Planning Commission shall act upon a complete development plan and related materials as submitted by the applicant, or as modified by the development plan review process within thirty (30) days, unless extensive modification to the development plan or extenuating circumstances requires additional time.
   d. Applicants shall be informed in writing of a final decision of the development plan.

4. Waivers
   a. An applicant or owner may request a waiver, variation or substitution pursuant to the requirements and application of this article. A written request for a wavier, variation or substitution shall state the rationale and justification for such request together with such alternatives as may be proposed by the applicant or owner.
   b. Such request shall be submitted to the Planning and Zoning Administrator with the filing of a preliminary or final site plan.
   c. The Planning Commission, at its sole discretion, may accept the request for waiver, variation or substitution for any requirement in a particular case upon a finding that the waiver, variation or substitution of such requirement would advance the purposes of this ordinance and otherwise serve the public interest in a manner equal to or exceeding the desired effects of the requirements of the ordinance. Alternatively, the Planning Commission may recommend a conditional modification to the request, or the Planning Commission may deny the request.
   d. Approval or conditional approval of a waiver, variation, or substitution shall be accompanied by a statement from the Planning Commission as to the public

purpose served by such waiver, variation, or substitution, particularly in regard to the purpose and intent of this article, this ordinance, the subdivision ordinance, and the Comprehensive Plan.

e. No such waiver, variation, or substitution shall be detrimental to the public health, safety, or welfare, orderly development of the area, sound engineering practice, or to properties located within the project impact area.

5. Appeal to Town Council

a. Appeals of a decision of the Planning and Zoning Administrator in the administration of this article shall be to the Planning Commission as provided in Section 15.2-2311 (1997) of the Code of Virginia.

b. Appeals of a decision of the Planning Commission by the applicant or a party in interest regarding a site plan, waiver, variation, or substitution shall be to the Town Council, provided that such appeal is filed with the Town Manager within ten (10) calendar days of the decision being appealed. The appeal shall be placed on the agenda of the Town Council at the next regular meeting. The Town Council may reverse or affirm, wholly or partly, or may modify the decision of the Planning Commission.

(Ord. 2023-02-07)

TOWN COUNCIL STAFF REPORT: ARTICLE 3.0 TEXT AMENDMENT
PUBLIC HEARING

TUESDAY, SEPTEMBER 2nd, 2025, 6:30 PM

This is a proposed text amendment to Article 3.O updating our Floodplain Ordinance. FEMA has updated our Flood Insurance Rate Map (FIRM) and Flood Insurance Study (FIS). Town staff utilized the model ordinance, and this has already been approved by DCR (Department of Conservation and Recreation). Once approved by Town Council, it will need to be approved by FEMA.

This appeared on the April 9th, 2024 Planning Commission agenda as a discussion item.

Planning Commission favorably recommended this application with the condition that alternative language allowing accessory structures in the SFHA.

Staff suggest removing that language allowing accessory structures and instead prohibiting accessory structures in the SFHA, as that would be in conformance with our CBPA guidelines which do not allow accessory structures in the RPA.

Please direct inquiries to Tammie Clary at 1-(757)-365-4200 or tclary@smithfieldva.gov.

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Article 3.O:

FP-O, Floodplain Overlay District

Article 3.O:

FP-O, Floodplain Overlay District

SECTION I - GENERAL PROVISIONS

Section 1.1 – Statutory Authorization and Purpose [44 CFR 59.22(a)(2)]

Va. **Code** § 15.2-2283 specifies that zoning ordinances shall be for the general purpose of promoting the health, safety, or general welfare of the public and of further accomplishing the objectives of § 15.2-2200 which encourages localities to improve the public health, safety, convenience, and welfare of their citizens. To these ends, flood ordinances shall be designed to provide for safety from flood, to facilitate the provision of flood protection, and to protect against loss of life, health, or property from flood.

In accordance with these directed provisions, this ordinance is specifically adopted pursuant to the authority granted to localities by Va. **Code** § 15.2 - 2280.

The purpose of these provisions is to prevent: the loss of life, health, or property, the creation of health and safety hazards, the disruption of commerce and governmental services, the extraordinary and unnecessary expenditure of public funds for flood protection and relief, and the impairment of the tax base by:

A. Regulating uses, activities, and development which, alone or in combination with other existing or future uses, activities, and development, will cause unacceptable increases in flood heights, velocities, and frequencies;

B. Restricting or prohibiting certain uses, activities, and development from locating within districts subject to flooding;

C. Requiring all those uses, activities, and developments that do occur in flood-prone districts to be protected and/or floodproofed against flooding and flood damage; and,

D. Protecting individuals from buying land and structures which are unsuited for intended purposes because of flood hazards.

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Section 1.2 – Applicability

These provisions shall apply to all privately and publicly owned lands within the jurisdiction of the Town of Smithfield and identified as areas of special flood hazard identified by the community or shown on the flood insurance rate map (FIRM) or included in the flood insurance study (FIS) that are provided to the Town of Smithfield by FEMA. The flood insurance rate map panels specifically referenced by this ordinance effective as of January 9, 2026 include the following: 51093C0088F, 51093C0135F, 51093C0151F, 51093C0152F, 51093C0153F, 51093C0154F.

Section 1.3 - Compliance and Liability

A. No land shall hereafter be developed and no structure shall be located, relocated, constructed, reconstructed, enlarged, or structurally altered except in full compliance with the terms and provisions of this ordinance and any other applicable ordinances and regulations which apply to uses within the jurisdiction of this ordinance.

B. The degree of flood protection sought by the provisions of this ordinance is considered reasonable for regulatory purposes and is based on acceptable engineering methods of study, but does not imply total flood protection. Larger floods may occur on rare occasions. Flood heights may be increased by man-made or natural causes, such as ice jams and bridge openings restricted by debris. This ordinance does not imply that districts outside the floodplain district or land uses permitted within such district will be free from flooding or flood damages.

C. This ordinance shall not create liability on the part of the Town of Smithfield or any officer or employee thereof for any flood damages that result from reliance on this ordinance or any administrative decision lawfully made thereunder.

Section 1.4 – Records [44 CFR 59.22(a)(9)(iii)]

Records of actions associated with administering this ordinance shall be kept on file and maintained by or under the direction of the Floodplain Administrator in perpetuity.

Section 1.5 - Abrogation and Greater Restrictions [44 CFR 60.1(b)]

To the extent that the provisions are more restrictive, this ordinance supersedes any ordinance currently in effect in flood-prone districts. To the extent that any other existing law or regulation is more restrictive or does not conflict it shall remain in full force and effect.

These regulations are not intended to repeal or abrogate any existing ordinances including subdivision regulations, zoning ordinances, or building codes. In the event of a conflict between these regulations and any other ordinance, the more restrictive shall govern.

Section 1.6 - Severability

If any section, subsection, paragraph, sentence, clause, or phrase of this ordinance shall be declared invalid for any reason whatever, such decision shall not affect the remaining portions of this ordinance. The remaining portions shall remain in full force and effect; and for this purpose, the provisions of this ordinance are hereby declared to be severable.

Section 1.7 - Penalty for Violations [44 CFR 60.2(e)]

Any person who fails to comply with any of the requirements or provisions of this article or directions of the director of planning or any authorized employee of the Town of Smithfield shall be guilty of the appropriate violation and subject to the penalties thereof.

The VA USBC addresses building code violations and the associated penalties in Section 104 and Section 115. Violations and associated penalties of the Zoning Ordinance of the Town of Smithfield are addressed in Article 11 Section Q and Article 2: Section X of the Zoning Ordinance.

In addition to the above penalties, all other actions are hereby reserved, including an action in equity for the proper enforcement of this article. The imposition of a fine or penalty for any violation of, or noncompliance with, this article shall not excuse the violation or noncompliance or permit it to continue; and all such persons shall be required to correct or remedy such violations within a reasonable time. Any structure constructed, reconstructed, enlarged, altered or relocated in noncompliance with this article may be declared by the Town of Smithfield to be a public nuisance and abatable as such. Flood insurance may be withheld from structures constructed in violation of this article.

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SECTION II - ADMINISTRATION

Section 2.1 - Designation of the Floodplain Administrator [44 CFR 59.22(b)]

The Zoning Administrator is hereby appointed to administer and implement these regulations and is referred to herein as the Floodplain Administrator. The Floodplain Administrator may:

A. Do the work themselves. In the absence of a designated Floodplain Administrator, the duties are conducted by the Town of Smithfield chief executive officer.

B. Delegate duties and responsibilities set forth in these regulations to qualified technical personnel, plan examiners, inspectors, and other employees.

C. Enter into a written agreement or written contract with another community or private sector entity to administer specific provisions of these regulations. Administration of any part of these regulations by another entity shall not relieve the community of its responsibilities pursuant to the participation requirements of the National Flood Insurance Program as set forth in the Code of Federal Regulations at 44 C.F.R. Section 59.22.

Section 2.2 - Duties and Responsibilities of the Floodplain Administrator [44 CFR 60.3]

The duties and responsibilities of the Floodplain Administrator shall include but are not limited to:

A. Review applications for permits to determine whether proposed activities will be located in the Special Flood Hazard Area (SFHA).

B. Interpret floodplain boundaries and provide available base flood elevation and flood hazard information.

C. Review applications to determine whether proposed activities will be reasonably safe from flooding and require new construction and substantial improvements to meet the requirements of these regulations.

D. Review applications to determine whether all necessary permits have been obtained from the Federal, State, or local agencies from which prior or concurrent approval is required; in particular, permits from state agencies for any construction, reconstruction, repair, or alteration of a dam, reservoir, or waterway obstruction (including bridges, culverts, structures), any alteration of a watercourse, or any change of the course, current, or cross section of a stream or body of water, including any change to the 100-year frequency floodplain of free-flowing non-tidal waters of the State.

E. Verify that applicants proposing an alteration of a watercourse have notified adjacent communities, the Department of Conservation and Recreation (Division of Dam Safety and Floodplain Management), and other appropriate agencies (VADEQ, USACE), and have submitted copies of such notifications to FEMA.

F. Advise applicants for new construction or substantial improvement of structures that are located within an area of the Coastal Barrier Resources System established by the Coastal Barrier Resources Act that Federal flood insurance is not available on such structures; areas subject to this limitation are shown on Flood Insurance Rate Maps as Coastal Barrier Resource System Areas (CBRS) or Otherwise Protected Areas (OPA).

G. Approve applications and issue permits to develop in flood hazard areas if the provisions of these regulations have been met, or disapprove applications if the provisions of these regulations have not been met.

H. Inspect or cause to be inspected, buildings, structures, and other development for which permits have been issued to determine compliance with these regulations or to determine if non-compliance has occurred or violations have been committed.

I. Review Elevation Certificates and require incomplete or deficient certificates to be corrected.

J. Submit to FEMA, or require applicants to submit to FEMA, data and information necessary to maintain FIRMs, including hydrologic and hydraulic engineering analyses prepared by or for the Town of Smithfield, within six months after such data and information becomes available if the analyses indicate changes in base flood elevations.

K. Maintain and permanently keep records that are necessary for the administration of these regulations, including:

1. Flood Insurance Studies, Flood Insurance Rate Maps (including historic studies and maps and current effective studies and maps), and Letters of Map Change; and

2. Documentation supporting issuance and denial of permits, Elevation Certificates, documentation of the elevation (in relation to the datum on the FIRM) to which structures have been floodproofed, inspection records, other required design certifications, variances, and records of enforcement actions taken to correct violations of these regulations.

L. Enforce the provisions of these regulations, investigate violations, issue notices of violations or stop work orders, and require permit holders to take corrective action.

M. Advise the Board of Zoning Appeals regarding the intent of these regulations and, for each application for a variance, prepare a staff report and recommendation.

N. Administer the requirements related to proposed work on existing buildings:

1. Make determinations as to whether buildings and structures that are located in flood hazard areas and that are damaged by any cause have been substantially damaged.

2. Make reasonable efforts to notify owners of substantially damaged structures of the need to obtain a permit to repair, rehabilitate, or reconstruct. Prohibit the non-compliant repair of substantially damaged buildings except for temporary emergency protective measures necessary to secure a property or stabilize a building or structure to prevent additional damage.

O. Undertake, as determined appropriate by the Floodplain Administrator due to the circumstances, other actions which may include but are not limited to: issuing press releases, public service announcements, and other public information materials related to permit requests and repair of damaged structures; coordinating with other Federal, State, and local agencies to assist with substantial damage determinations; providing owners of damaged structures information related to the proper repair of damaged structures in special flood hazard areas; and assisting property owners with documentation necessary to file claims for Increased Cost of Compliance coverage under NFIP flood insurance policies.

P. Notify the Federal Emergency Management Agency when the corporate boundaries of the Town of Smithfield have been modified and:

1. Provide a map that clearly delineates the new corporate boundaries or the new area for which the authority to regulate pursuant to these regulations has either been assumed or relinquished through annexation; and

2. If the FIRM for any annexed area includes special flood hazard areas that have flood zones that have regulatory requirements that are not set forth in these regulations, prepare amendments to these regulations to adopt the FIRM and appropriate requirements, and submit the amendments to the governing body for adoption; such adoption shall take place at the same time as or prior to the date of annexation and a copy of the amended regulations shall be provided to Department of Conservation and Recreation (Division of Dam Safety and Floodplain Management) and FEMA.

Q. Upon the request of FEMA, complete and submit a report concerning participation in the NFIP which may request information regarding the number of buildings in the SFHA, number of permits issued for development in the SFHA, and number of variances issued for development in the SFHA.

R. It is the duty of the Community Floodplain Administrator to take into account flood, mudslide and flood-related erosion hazards, to the extent that they are known, in all official actions relating to land management and use throughout the entire jurisdictional area of the Community, whether or not those hazards have been specifically delineated geographically (e.g. via mapping or surveying).

Section 2.3 - Use and Interpretation of FIRMs [44 CFR 60.3]

The Floodplain Administrator shall make interpretations, where needed, as to the exact location of special flood hazard areas, floodplain boundaries, and floodway boundaries. The following shall apply to the use and interpretation of FIRMs and data:

A. Where field surveyed topography indicates that adjacent ground elevations:

1. Are below the base flood elevation in riverine SFHAs, or below the 1% storm surge elevation in coastal SFHAs, even in areas not delineated as a special flood hazard area on a FIRM, the area shall be considered as special flood hazard area and subject to the requirements of these regulations;

2. Are above the base flood elevation and the area is labelled as a SFHA on the FIRM, the area shall be regulated as special flood hazard area unless the applicant obtains a Letter of Map Change that removes the area from the SFHA.

B. In FEMA-identified special flood hazard areas where base flood elevation and floodway data have not been identified and in areas where FEMA has not identified SFHAs, any other flood hazard data available from a Federal, State, or other source shall be reviewed and reasonably used.

C. Base flood elevations and designated floodway boundaries on FIRMs and in FISs shall take precedence over base flood elevations and floodway boundaries by any other sources if such sources show reduced floodway widths and/or lower base flood elevations.

D. Other sources of data shall be reasonably used if such sources show increased base flood elevations and/or larger floodway areas than are shown on FIRMs and in FISs.

E. If a Preliminary Flood Insurance Rate Map and/or a Preliminary Flood Insurance Study has been provided by FEMA:

1. Upon the issuance of a Letter of Final Determination by FEMA, the preliminary flood hazard data shall be used and shall replace the flood hazard data previously provided from FEMA for the purposes of administering these regulations.

2. Prior to the issuance of a Letter of Final Determination by FEMA, the use of preliminary flood hazard data shall be deemed the best available data pursuant to Article III, Section 3.1.A.3 and used where no base flood elevations and/or floodway areas are provided on the effective FIRM.

3. Prior to issuance of a Letter of Final Determination by FEMA, the use of preliminary flood hazard data is permitted where the preliminary base flood elevations or floodway areas exceed the base flood elevations and/or designated floodway widths in existing flood hazard data provided by FEMA. Such preliminary data may be subject to change and/or appeal to FEMA.

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Section 2.4 - Jurisdictional Boundary Changes [44 CFR 59.22, 65.3]

The County floodplain ordinance in effect on the date of annexation shall remain in effect and shall be enforced by the municipality for all annexed areas until the municipality adopts and enforces an ordinance which meets the requirements for participation in the National Flood Insurance Program. Municipalities with existing floodplain ordinances shall pass a resolution acknowledging and accepting responsibility for enforcing floodplain ordinance standards prior to annexation of any area containing identified flood hazards. If the FIRM for any annexed area includes special flood hazard areas that have flood zones that have regulatory requirements that are not set forth in these regulations, the governing body shall prepare amendments to these regulations to adopt the FIRM and appropriate requirements, and submit the amendments to the governing body for adoption; such adoption shall take place at the same time as or prior to the date of annexation and a copy of the amended regulations shall be provided to Department of Conservation and Recreation (Division of Dam Safety and Floodplain Management) and FEMA.

In accordance with the Code of Federal Regulations, Title 44 Subpart (B) Section 59.22(a)(9)(v) all NFIP participating communities must notify the Federal Insurance Administration and optionally the State Coordinating Office in writing whenever the boundaries of the community have been modified by annexation or the community has otherwise assumed or no longer has authority to adopt and enforce floodplain management regulations for a particular area.

In order that all Flood Insurance Rate Maps accurately represent the community's boundaries, a copy of a map of the community suitable for reproduction, clearly delineating the new corporate limits or new area for which the community has assumed or relinquished floodplain management regulatory authority must be included with the notification.

Section 2.5 - District Boundary Changes

The delineation of any of the Floodplain Districts may be revised by the Town of Smithfield where natural or man-made changes have occurred and/or where more detailed studies have been conducted or undertaken by the U. S. Army Corps of Engineers or other qualified agency, or an individual documents the need for such change. However, prior to any such change, approval must be obtained from the Federal Emergency Management Agency. A completed LOMR is a record of this approval.

Section 2.6 - Interpretation of District Boundaries

Initial interpretations of the boundaries of the Floodplain Districts shall be made by the Zoning Administrator. Should a dispute arise concerning the boundaries of any of the Districts, the Board of Zoning Appeals shall make the necessary determination. The person questioning or contesting the location of the District boundary shall be given a reasonable opportunity to present his case to the Board and to submit his own technical evidence if he so desires.

Section 2.7 – Submitting Model Backed Technical Data [44 CFR 65.3]

A community's base flood elevations may increase or decrease resulting from physical changes affecting flooding conditions. As soon as practicable, but not later than six months after the date such information becomes available, a community shall notify the Federal Emergency Management Agency of the changes by submitting technical or scientific data. The community may submit data via a LOMR. Such a submission is necessary so that upon confirmation of those physical changes affecting flooding conditions, risk premium rates and floodplain management requirements will be based upon current data.

Section 2.8 – Letters of Map Revision

When development in the floodplain will cause or causes a change in the base flood elevation, the applicant, including state agencies, must notify FEMA by applying for a Conditional Letter of Map Revision and then a Letter of Map Revision.

Example cases:

- Any development that causes a rise in the base flood elevations within the floodway**.**
- Any development occurring in Zones A1-30 and AE without a designated floodway, which will cause a rise of more than one foot in the base flood elevation.
- Alteration or relocation of a stream (including but not limited to installing culverts and bridges) *44 Code of Federal Regulations §65.3 and §65.6(a)(12)*.

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SECTION III - ESTABLISHMENT OF ZONING DISTRICTS

Section 3.1 - Description of Special Flood Hazard Districts [44 CFR 59.1, 60.3]

A. Basis of Districts

The various special flood hazard districts shall include the SFHAs. The basis for the delineation of these districts shall be the FIS and the FIRM for the Town of Smithfield prepared by the Federal Emergency Management Agency, Federal Insurance Administration, dated January 9th, 2026, and any subsequent revisions or amendments thereto.

The Town of Smithfield may identify and regulate local flood hazard or ponding areas that are not delineated on the FIRM. These areas may be delineated on a “Local Flood Hazard Map” using best available topographic data and locally derived information such as flood of record, historic high water marks, or approximate study methodologies.

The boundaries of the SFHA Districts are established as shown on the FIRM which is declared to be a part of this ordinance and which shall be kept on file at the Town of Smithfield offices.

1. The **Floodway District** is in an **AE Zone** and is delineated, for purposes of this ordinance, using the criterion that certain areas within the floodplain must be capable of carrying the waters of the one percent annual chance flood without increasing the water surface elevation of that flood more than one (1) foot at any point.

   The following provisions shall apply within the Floodway District of an AE zone [44 CFR 60.3(d)]:

   a. Within any floodway area, no encroachments, including fill, new construction, substantial improvements, or other development shall be permitted unless it has been demonstrated through hydrologic and hydraulic analysis performed in accordance with standard engineering practice that the proposed encroachment will not result in any increase in flood levels within the community during the occurrence of the base flood discharge. Hydrologic and hydraulic analyses shall be undertaken only by professional engineers or others of demonstrated qualifications, who shall certify that the technical methods used correctly reflect currently-accepted technical concepts. Studies, analyses, computations, etc., shall be submitted in sufficient detail to allow a thorough review by the Floodplain Administrator.

      Development activities which increase the water surface elevation of the base flood may be allowed, provided that the applicant first applies – with the Town of Smithfield’s endorsement – for a Conditional Letter of Map Revision (CLOMR), and receives the approval of the Federal Emergency Management Agency.

If Article III, Section 3.1.A.1.a is satisfied, all new construction and substantial improvements shall comply with all applicable flood hazard reduction provisions of Article 4.

b. The placement of manufactured homes (mobile homes) is prohibited, except in an existing manufactured home (mobile home) park or subdivision. A replacement manufactured home may be placed on a lot in an existing manufactured home park or subdivision provided the anchoring, elevation, and encroachment standards are met.

2. The **AE, or AH Zones** on the FIRM accompanying the FIS shall be those areas for which one-percent annual chance flood elevations have been provided and the floodway has **not** been delineated. The following provisions shall apply within an AE or AH zone [44 CFR 60.3(c)] where FEMA has provided base flood elevations (The requirement in 60.3(c)(10) only applies along rivers, streams, and other watercourses where FEMA has provided base flood elevations. The requirement does not apply along lakes, bays and estuaries, and the ocean coast.):

   Until a regulatory floodway is designated, no new construction, substantial improvements, or other development (including fill) shall be permitted within the areas of special flood hazard, designated as Zones A1-30, AE, or AH on the FIRM, unless it is demonstrated that the cumulative effect of the proposed development, when combined with all other existing and anticipated development, will not increase the water surface elevation of the base flood more than one foot at any point within the Town of Smithfield.

Development activities in Zones Al-30, AE, or AH on the Town of Smithfield's FIRM which increase the water surface elevation of the base flood by more than one foot may be allowed, provided that the applicant first applies – with the Town of Smithfield's endorsement – for a Conditional Letter of Map Revision, and receives the approval of the Federal Emergency Management Agency.

3. The **A Zone** on the FIRM accompanying the FIS shall be those areas for which no detailed flood profiles or elevations are provided, but the one percent annual chance floodplain boundary has been approximated. For these areas, the following provisions shall apply [44 CFR 60.3(b)]:

   The Approximated Floodplain District shall be that floodplain area for which no detailed flood profiles or elevations are provided, but where a one percent annual chance floodplain boundary has been approximated. Such areas are shown as Zone A on the maps accompanying the FIS. For these areas, the base flood elevations and floodway information from Federal, State, and other acceptable sources shall be used, when available. Where the specific one percent annual chance flood elevation cannot be determined for this area using other sources of data, such as the U. S. Army Corps of Engineers Floodplain Information Reports, U. S. Geological Survey Flood-Prone Quadrangles, etc., then the applicant for the proposed use, development and/or activity shall determine this base flood elevation. For development proposed in the

approximate floodplain the applicant must use technical methods that correctly reflect currently accepted practices, such as point on boundary, high water marks, or detailed methodologies hydrologic and hydraulic analyses. Studies, analyses, computations, etc., shall be submitted in sufficient detail to allow a thorough review by the Floodplain Administrator.

The Floodplain Administrator reserves the right to require a hydrologic and hydraulic analysis for any development. When such base flood elevation data is utilized, the lowest floor shall be elevated to or above the base flood level plus eighteen (18) inches.

During the permitting process, the Floodplain Administrator shall obtain:

a. The elevation of the lowest floor (in relation to mean sea level), including the basement, of all new and substantially improved structures; and,

b. If the structure has been floodproofed in accordance with the requirements of this article, the elevation (in relation to mean sea level) to which the structure has been floodproofed.

Base flood elevation data shall be obtained from other sources or developed using detailed methodologies comparable to those contained in a FIS for subdivision proposals and other proposed development proposals (including manufactured home parks and subdivisions) that exceed fifty lots or five acres, whichever is the lesser.

4. The **AO Zone** on the FIRM accompanying the FIS shall be those areas of shallow flooding identified as AO on the FIRM. For these areas, the following provisions shall apply [44 CFR 60.3(c)]:

   a. All new construction and substantial improvements of residential structures shall have the lowest floor, including basement, elevated to or above the flood depth specified on the FIRM, above the highest adjacent grade at least as high as the depth number specified in feet on the FIRM. If no flood depth number is specified, the lowest floor, including basement, shall be elevated no less than two feet above the highest adjacent grade.

   b. All new construction and substantial improvements of non-residential structures shall

      (1) Have the lowest floor, including basement, elevated to or above the flood depth specified on the FIRM, above the highest adjacent grade at least as high as the depth number specified in feet on the FIRM. If no flood depth number is specified, the lowest floor, including basement, shall be elevated at least two feet above the highest adjacent grade; or,

      (2) Together with attendant utility and sanitary facilities be completely floodproofed to the specified flood level so that any space below that level is watertight with walls substantially impermeable to the passage

of water and with structural components having the capability of resisting hydrostatic and hydrodynamic loads and effects of buoyancy.

c. Adequate drainage paths around structures on slopes shall be provided to guide floodwaters around and away from proposed structures.

5. The **Coastal A Zone** is labelled as AE on the FIRM; it is those areas that are seaward of the limit of moderate wave action (LiMWA) line. As defined by the VA USBC, these areas are subject to wave heights between 1.5 feet and 3 feet. For these areas, the following provisions shall apply:

   Buildings and structures within this zone shall have the lowest floor elevated to or above the base flood elevation plus eighteen (18) inches of freeboard, and must comply with the provisions in Article III, Section 3.1.A.2 and Article IV, Sections 4.2 and 4.3.

6. The **VE or V Zones** on FIRMs accompanying the FIS shall be those areas that are known as Coastal High Hazard areas, extending from offshore to the inland limit of a primary frontal dune along an open coast or other areas subject to high velocity waves. For these areas, the following provisions shall apply [44 CFR 60.3(e)]:

   a. All new construction and substantial improvements in Zones V and VE, including manufactured homes, shall be elevated on pilings or columns so that:

      (1) The bottom of the lowest horizontal structural member of the lowest floor (excluding the pilings or columns) is elevated to or above the base flood level plus eighteen (18) inches, if the lowest horizontal structural member is parallel to the direction of wave approach or elevated at least two feet above the base flood level if the lowest horizontal structural member is perpendicular to the direction of wave approach; and,

      (2) The pile or column foundation and structure attached thereto is anchored to resist flotation, collapse, and lateral movement due to the effects of wind and water loads acting simultaneously on all building components. Wind and water loading values shall each have a one percent chance of being equaled or exceeded in any given year (one-percent annual chance).

   b. A registered professional engineer or architect shall develop or review the structural design, specifications and plans for the construction, and shall certify that the design and methods of construction to be used are in accordance with accepted standards of practice for meeting the provisions of Article III, Section A.6.a.

   c. The Floodplain Administrator shall obtain the elevation (in relation to mean sea level) of the bottom of the lowest horizontal structural member of the lowest floor (excluding pilings and columns) of all new and substantially

improved structures in Zones V and VE. The Floodplain Management Administrator shall maintain a record of all such information.

d. All new construction shall be located landward of the reach of mean high tide.

e. All new construction and substantial improvements shall have the space below the lowest floor either free of obstruction or constructed with non-supporting breakaway walls, open wood-lattice work, or insect screening intended to collapse under wind and water loads without causing collapse, displacement, or other structural damage to the elevated portion of the building or supporting foundation system. For the purpose of this Section, a breakaway wall shall have a design safe loading resistance of not less than 10 and no more than 20 pounds per square foot. Use of breakaway walls which exceed a design safe loading resistance of 20 pounds per square foot (either by design or when so required by local codes) may be permitted only if a registered professional engineer or architect certifies that the designs proposed meet the following conditions:

(1) Breakaway wall collapse shall result from water load less than that which would occur during the base flood; and

(2) The elevated portion of the building and supporting foundation system shall not be subject to collapse, displacement, or other structural damage due to the effects of wind and water loads acting simultaneously on all building components (structural and nonstructural). Maximum wind and water loading values to be used in this determination shall each have a one percent chance of being equaled or exceeded in any given year.

f. The enclosed space below the lowest floor shall be used solely for parking of vehicles, building access, or storage. Such space shall not be partitioned into multiple rooms, temperature-controlled, or used for human habitation. The enclosed space shall be less than 299 square feet.

g. The use of fill for structural support of buildings is prohibited. When non-structural fill is proposed in a coastal high hazard area, appropriate engineering analyses shall be conducted to evaluate the impacts of the fill prior to issuance of a permit.

h. The man-made alteration of sand dunes, which would increase potential flood damage, is prohibited.

7. The mapped floodplain includes all of the above regions and also the regions designated as having a 0.2 percent annual chance of flooding on any flood map or flood insurance study. In this area no emergency service, medical service, or governmental records storage shall be allowed except by special exception using the variance process.

Section 3.2 - Overlay Concept

The Floodplain Districts described above shall be overlays to the existing underlying districts as shown on the Official Zoning Ordinance Map, and as such, the provisions for the floodplain districts shall serve as a supplement to the underlying district provisions.

If there is any conflict between the provisions or requirements of the Floodplain Districts and those of any underlying district, the more restrictive provisions and/or those pertaining to the floodplain districts shall apply.

In the event any provision concerning a Floodplain District is declared inapplicable as a result of any legislative or administrative actions or judicial decision, the basic underlying provisions shall remain applicable.

SECTION IV - DISTRICT PROVISIONS [44 CFR 59.22, 60.2, 60.3]

Section 4.1 – Permit and Application Requirements

A. Permit Requirement

All uses, activities, and development occurring within any floodplain district, including placement of manufactured homes, shall be undertaken only upon the issuance of a permit. Such development shall be undertaken only in strict compliance with the provisions of this Ordinance and with all other applicable codes and ordinances, as amended, such as the Virginia Uniform Statewide Building Code (VA USBC) and the Town of Smithfield Subdivision and Zoning Regulations. Prior to the issuance of any such permit, the Floodplain Administrator shall require all applications to include compliance with all applicable State and Federal laws and shall review all sites to assure they are reasonably safe from flooding. Under no circumstances shall any use, activity, and/or development adversely affect the capacity of the channels or floodways of any watercourse, drainage ditch, or any other drainage facility or system.

B. Site Plans and Permit Applications

All applications for development within any floodplain district and all permits issued for the floodplain shall incorporate the following information:

1. The elevation of the Base Flood at the site.

2. For structures to be elevated, the elevation of the lowest floor (including basement) or, in V zones, the lowest horizontal structural member.

3. For structures to be floodproofed (non-residential only), the elevation to which the structure will be floodproofed.

4. Topographic information showing existing and proposed ground elevations.

Section 4.2 - General Standards

The following provisions shall apply to all permits:

A. New construction and substantial improvements shall be built according to this ordinance and the VA USBC, and anchored to prevent flotation, collapse, or lateral movement of the structure.

B. Manufactured homes shall be anchored to prevent flotation, collapse, or lateral movement. Methods of anchoring may include, but are not limited to, use of over-the-top or frame ties to ground anchors. This standard shall be in addition to and consistent with applicable state anchoring requirements for resisting wind forces.

C. New construction and substantial improvements shall be constructed with materials and utility equipment resistant to flood damage.

D. New construction or substantial improvements shall be constructed by methods and practices that minimize flood damage.

E. Electrical, heating, ventilation, plumbing, air conditioning equipment, and other service facilities, including duct work, shall be designed and/or located so as to prevent water from entering or accumulating within the components during conditions of flooding.

F. New and replacement water supply systems shall be designed to minimize or eliminate infiltration of flood waters into the system.

G. New and replacement sanitary sewage systems shall be designed to minimize or eliminate infiltration of flood waters into the systems and discharges from the systems into flood waters.

H. On-site waste disposal systems shall be located and constructed to avoid impairment to them or contamination from them during flooding.

In addition to provisions A – H above, in all special flood hazard areas, the additional provisions shall apply:

I. Prior to any proposed alteration or relocation of any channels or of any watercourse, stream, etc., within this jurisdiction a permit shall be obtained from the U. S. Corps of Engineers, the Virginia Department of Environmental Quality, and the Virginia Marine Resources Commission (a joint permit application is available from any of these organizations). Furthermore, in riverine areas, notification of the proposal shall be given by the applicant to all affected adjacent jurisdictions, the Department of Conservation and Recreation (Division of Dam Safety and Floodplain Management), other required agencies, and the Federal Emergency Management Agency.

J. The flood carrying capacity within an altered or relocated portion of any watercourse shall be maintained.

Section 4.3 - Elevation and Construction Standards [44 CFR 60.3]

In all identified flood hazard areas where base flood elevations have been provided in the FIS or generated by a certified professional in accordance with Article III, Section 3.1.A.3 the following provisions shall apply:

A. Residential Construction

New construction or substantial improvement of any residential structure (including manufactured homes) in Zones A1-30, AE, AH, and A with detailed base flood elevations shall have the lowest floor, including basement, elevated to or above the base flood level plus eighteen (18) inches. See Article III, Section 3.1.A.5 and Article III, Section 3.1.A.6 for requirements in the Coastal A, VE, and V zones.

B. Non-Residential Construction

1. New construction or substantial improvement of any commercial, industrial, or non-residential building (or manufactured home) shall have the lowest floor, including basement, elevated to or above the base flood level plus eighteen (18) inches. See Article III, Section 3.1.A.5 and Article III, Section 3.1.A.6 for requirements in the Coastal A, VE, and V zones.

2. Non-residential buildings located in all A1-30, AE, and AH zones may be floodproofed in lieu of being elevated provided that all areas of the building components below the elevation corresponding to the BFE plus eighteen (18) inches are water tight with walls substantially impermeable to the passage of water, and use structural components having the capability of resisting hydrostatic and hydrodynamic loads and the effect of buoyancy. A registered professional engineer or architect shall certify that the standards of this subsection are satisfied. Such certification, including the specific elevation (in relation to mean sea level) to which such structures are floodproofed, shall be maintained by the Town Clerk.

C. Space Below the Lowest Floor

In zones A, AE, AH, AO, and A1-A30, fully enclosed areas, of new construction or substantially improved structures, which are below the regulatory flood protection elevation shall:

1. Not be designed or used for human habitation, but shall be used solely for parking of vehicles, building access, or limited storage of maintenance equipment used in connection with the premises. Access to the enclosed area shall be the minimum necessary to allow for parking of vehicles (garage door) or limited storage of maintenance equipment (standard exterior door), or entry to the living area (stairway or elevator).

2. Be constructed entirely of flood resistant materials below the regulatory flood protection elevation;

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3. Include measures to automatically equalize hydrostatic flood forces on walls by allowing for the entry and exit of floodwaters. To meet this requirement, the openings must either be certified by a professional engineer or architect or meet the following minimum design criteria:

   a. Provide a minimum of two openings on different sides of each enclosed area subject to flooding.

   b. The total net area of all openings must be at least one (1) square inch for each square foot of enclosed area subject to flooding.

   c. If a building has more than one enclosed area, each area must have openings to allow floodwaters to automatically enter and exit.

   d. The bottom of all required openings shall be no higher than one (1) foot above the adjacent grade.

   e. Openings may be equipped with screens, louvers, or other opening coverings or devices, provided they permit the automatic flow of floodwaters in both directions.

   f. Foundation enclosures made of flexible skirting are not considered enclosures for regulatory purposes, and, therefore, do not require openings. Masonry or wood underpinning, regardless of structural status, is considered an enclosure and requires openings as outlined above.

D. Accessory Structures

1. Accessory structures of any size shall be prohibited within the SFHA and no variance shall be granted for accessory structures.
1. Accessory structures in the SFHA shall comply with the elevation requirements and other requirements of Article IV, Section 4.3.B or, if not elevated or dry floodproofed, shall:

   a. Not be used for human habitation;

   b. Be limited to no more than *600 square feet*1 in total floor area;

   c. Be useable only for parking of vehicles or limited storage;

   d. Be constructed with flood damage-resistant materials below the base flood elevation;

[1] This is the minimum size restriction set by FEMA Region III, but a community could choose a higher standard and limit accessory structures to a size less than 600 square feet. However, a variance could be issued for larger accessory structures, not to exceed 600 square feet. If a smaller size limit is chosen, additional language would be required in Article VI: Variances - see Footnote 23. The chosen size restriction should also be reflected in Article IV, Section 4.3.D.2.b, Article VI, Section M, and Article VIII-Glossary in the definition of "Appurtenant or accessory structure".

e. Be constructed and placed to offer the minimum resistance to the flow of floodwaters;

f. Be anchored to prevent flotation;

g. Have electrical service and mechanical equipment elevated to or above the base flood elevation;

h. Shall be provided with flood openings which shall meet the following criteria:

(1) There shall be a minimum of two flood openings on different sides of each enclosed area; if a building has more than one enclosure below the lowest floor, each such enclosure shall have flood openings on exterior walls.

(2) The total net area of all flood openings shall be at least 1 square inch for each square foot of enclosed area (non-engineered flood openings), or the flood openings shall be engineered flood openings that are designed and certified by a licensed professional engineer to automatically allow entry and exit of floodwaters; the certification requirement may be satisfied by an individual certification or an Evaluation Report issued by the ICC Evaluation Service, Inc.

(3) The bottom of each flood opening shall be 1 foot or less above the higher of the interior floor or grade, or the exterior grade, immediately below the opening.

(4) Any louvers, screens or other covers for the flood openings shall allow the automatic flow of floodwaters into and out of the enclosed area.

i. A signed Declaration of Land Restriction (Non-Conversion Agreement) shall be recorded on the property deed.

E. Standards for Manufactured Homes and Recreational Vehicles

1. In zones A, AE, VE, V, AH, and AO, all manufactured homes placed, or substantially improved, on individual lots or parcels, must meet all the requirements for new construction, including the elevation and anchoring requirements in Article III, Section 3.1.A.6 and Article IV, Sections 4.2 and 4.3.

2. All recreational vehicles placed on sites must either:

a. Be on the site for fewer than 180 consecutive days, be fully licensed and ready for highway use (a recreational vehicle is ready for highway use if it is on its wheels or jacking system, is attached to the site only by quick disconnect type utilities and security devices and has no permanently attached additions); or

b. Meet all the requirements for manufactured homes in Article IV, Section 4.3.E.1.

Section 4.4 - Standards for Subdivision Proposals

A. All subdivision proposals shall be consistent with the need to minimize flood damage;

B. All subdivision proposals shall have public utilities and facilities such as sewer, gas, electrical and water systems located and constructed to minimize flood damage;

C. All subdivision proposals shall have adequate drainage provided to reduce exposure to flood hazards, and

D. Base flood elevation data shall be obtained from other sources or developed using detailed methodologies, hydraulic and hydrologic analysis, comparable to those contained in a Flood Insurance Study for subdivision proposals and other proposed development proposals (including manufactured home parks and subdivisions) that exceed fifty lots or five acres, whichever is the lesser.

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SECTION V – EXISTING STRUCTURES IN FLOODPLAIN AREAS

Any structure or use of a structure or premises must be brought into conformity with these provisions when it is changed, repaired, or improved unless one of the following exceptions is established before the change is made:

A. The floodplain manager has determined that:

1. Change is not a substantial repair or substantial improvement AND
2. No new square footage is being built in the floodplain that is not complaint AND
3. No new square footage is being built in the floodway AND
4. The change complies with this ordinance and the VA USBC AND
5. The change, when added to all the changes made during a rolling 5-year period does not constitute 50% of the structure's value.

B. The changes are required to comply with a citation for a health or safety violation.

C. The structure is a historic structure and the change required would impair the historic nature of the structure.

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SECTION VI - VARIANCES: FACTORS TO BE CONSIDERED [44 CFR 60.6]

Variances shall be issued only upon (i) a showing of good and sufficient cause, (ii) after the Board of Zoning Appeals has determined that failure to grant the variance would result in exceptional hardship to the applicant, and (iii) after the Board of Zoning Appeals has determined that the granting of such variance will not result in (a) unacceptable or prohibited increases in flood heights, (b) additional threats to public safety, (c) extraordinary public expense; and will not (d) create nuisances, (e) cause fraud or victimization of the public, or (f) conflict with local laws or ordinances.

While the granting of variances generally is limited to a lot size less than one-half acre, deviations from that limitation may occur. However, as the lot size increases beyond one-half acre, the technical justification required for issuing a variance increases. Variances may be issued by the Board of Zoning Appeals for new construction and substantial improvements to be erected on a lot of one-half acre or less in size contiguous to and surrounded by lots with existing structures constructed below the base flood level, in conformance with the provisions of this Section.

Variances may be issued for new construction and substantial improvements and for other development necessary for the conduct of a functionally dependent use provided that the criteria of this Section are met, and the structure or other development is protected by methods that minimize flood damages during the base flood and create no additional threats to public safety.

In passing upon applications for variances, the Board of Zoning Appeals shall satisfy all relevant factors and procedures specified in other sections of the zoning ordinance and consider the following additional factors:

A. The danger to life and property due to increased flood heights or velocities caused by encroachments. No variance shall be granted for any proposed use, development, or activity within any Floodway District that will cause any increase in the one percent (1%) chance flood elevation.

B. The danger that materials may be swept on to other lands or downstream to the injury of others.

C. The proposed water supply and sanitation systems and the ability of these systems to prevent disease, contamination, and unsanitary conditions.

D. The susceptibility of the proposed facility and its contents to flood damage and the effect of such damage on the individual owners.

E. The importance of the services provided by the proposed facility to the community.

F. The requirements of the facility for a waterfront location.

G. The availability of alternative locations not subject to flooding for the proposed use.

H. The compatibility of the proposed use with existing development and development

anticipated in the foreseeable future.

I. The relationship of the proposed use to the comprehensive plan and floodplain management program for the area.

J. The safety of access by ordinary and emergency vehicles to the property in time of flood.

K. The expected heights, velocity, duration, rate of rise, and sediment transport of the flood waters expected at the site.

L. The historic nature of a structure. Variances for repair or rehabilitation of historic structures may be granted upon a determination that the proposed repair or rehabilitation will not preclude the structure's continued designation as a historic structure and the variance is the minimum necessary to preserve the historic character and design of the structure.

M. Variances will not be issued for any accessory structure within the SFHA. *(Note: See Article IV, Section 4.3.D.1)*.

N. Such other factors which are relevant to the purposes of this Ordinance.

The Board of Zoning Appeals may refer any application and accompanying documentation pertaining to any request for a variance to any engineer or other qualified person or agency for technical assistance in evaluating the proposed project in relation to flood heights and velocities, and the adequacy of the plans for flood protection and other related matters.

Variances shall be issued only after the Board of Zoning Appeals has determined that the granting of such will not result in (a) unacceptable or prohibited increases in flood heights, (b) additional threats to public safety, (c) extraordinary public expense; and will not (d) create nuisances, (e) cause fraud or victimization of the public, or (f) conflict with local laws or ordinances.

Variances shall be issued only after the Board of Zoning Appeals has determined that the variance will be the minimum required to provide relief.

The Board of Zoning Appeals shall notify the applicant for a variance, in writing that the issuance of a variance to construct a structure below the one percent (1%) chance flood elevation (a) increases the risks to life and property and (b) will result in increased premium rates for flood insurance.
A record shall be maintained of the above notification as well as all variance actions, including justification for the issuance of the variances. Any variances that are issued shall be noted in the annual or biennial report submitted to the Federal Insurance Administrator.

SECTION VII - GLOSSARY [44 CFR 59.1]

A. Appurtenant or accessory structure - A non-residential structure which is on the same parcel of property as the principal structure and the use of which is incidental to the use of the principal structure. Accessory structures are not to exceed 600 square feet.

B. Base flood - The flood having a one percent chance of being equalled or exceeded in any given year.

C. Base flood elevation - The water surface elevations of the base flood, that is, the flood level that has a one percent or greater chance of occurrence in any given year. The water surface elevation of the base flood in relation to the datum specified on the community's Flood Insurance Rate Map. For the purposes of this ordinance, the base flood is the 1% annual chance flood.

D. Basement - Any area of the building having its floor sub-grade (below ground level) on all sides.

E. Board of Zoning Appeals - The board appointed to review appeals made by individuals with regard to decisions of the Zoning Administrator in the interpretation of this ordinance.

F. Coastal A Zone - Flood hazard areas that have been delineated as subject to wave heights between 1.5 feet and 3 feet.

G. Development - Any man-made change to improved or unimproved real estate, including, but not limited to, buildings or other structures, temporary structures, mining, dredging, filling, grading, paving, excavation, drilling or other land-disturbing activities or permanent or temporary storage of equipment or materials.

H. Elevated building - A non-basement building built to have the lowest floor elevated above the ground level by means of solid foundation perimeter walls, pilings, or columns (posts and piers).

I. Encroachment - The advance or infringement of uses, plant growth, fill, excavation, buildings, permanent structures or development into a floodplain, which may impede or alter the flow capacity of a floodplain.

J. Existing construction - For the purposes of the insurance program, structures for which the "start of construction" commenced before the effective date of the FIRM or before January 1, 1975 for FIRMs effective before that date. "Existing construction" may also be referred to as "existing structures" and "pre-FIRM."

K. Flood or flooding -
   1. A general or temporary condition of partial or complete inundation of normally dry land areas from:
      a. The overflow of inland or tidal waters; or,

b. The unusual and rapid accumulation or runoff of surface waters from any source.
c. Mudflows which are proximately caused by flooding as defined in paragraph (1)(b) of this definition and are akin to a river of liquid and flowing mud on the surfaces of normally dry land areas, as when earth is carried by a current of water and deposited along the path of the current.

2. The collapse or subsidence of land along the shore of a lake or other body of water as a result of erosion or undermining caused by waves or currents of water exceeding anticipated cyclical levels or suddenly caused by an unusually high water level in a natural body of water, accompanied by a severe storm, or by an unanticipated force of nature such as flash flood or an abnormal tidal surge, or by some similarly unusual and unforeseeable event which results in flooding as defined in paragraph 1 (a) of this definition.

L. Flood Insurance Rate Map (FIRM) - an official map of a community, on which the Federal Emergency Management Agency has delineated both the special hazard areas and the risk premium zones applicable to the community. A FIRM that has been made available digitally is called a Digital Flood Insurance Rate Map (DFIRM).

M. Flood Insurance Study (FIS) - a report by FEMA that examines, evaluates and determines flood hazards and, if appropriate, corresponding water surface elevations, or an examination, evaluation and determination of mudflow and/or flood-related erosion hazards.

N. Floodplain or flood-prone area - Any land area susceptible to being inundated by water from any source.

O. Floodproofing - any combination of structural and non-structural additions, changes, or adjustments to structures which reduce or eliminate flood damage to real estate or improved real property, water and sanitary facilities, structures and their contents.

P. Floodway - The channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than one foot at any point within the community.

Q. Freeboard - A factor of safety usually expressed in feet above a flood level for purposes of floodplain management. “Freeboard” tends to compensate for the many unknown factors that could contribute to flood heights greater than the height calculated for a selected size flood and floodway conditions, such as wave action, bridge openings, and the hydrological effect of urbanization in the watershed.

R. Functionally dependent use - A use which cannot perform its intended purpose unless it is located or carried out in close proximity to water. This term includes only docking facilities, port facilities that are necessary for the loading and unloading of cargo or passengers, and shipbuilding and ship repair facilities, but does not include long-term storage or related manufacturing facilities.

S. Highest adjacent grade - the highest natural elevation of the ground surface prior to construction next to the proposed walls of a structure.

T. Historic structure - Any structure that is:

1. Listed individually in the National Register of Historic Places (a listing maintained by the Department of Interior) or preliminarily determined by the Secretary of the Interior as meeting the requirements for individual listing on the National Register;
2. Certified or preliminarily determined by the Secretary of the Interior as contributing to the historical significance of a registered historic district or a district preliminarily determined by the Secretary to qualify as a registered historic district;
3. Individually listed on a state inventory of historic places in states with historic preservation programs which have been approved by the Secretary of the Interior; or,
4. Individually listed on a local inventory of historic places in communities with historic preservation programs that have been certified either:
   a. By an approved state program as determined by the Secretary of the Interior; or,
   b. Directly by the Secretary of the Interior in states without approved programs.

U. Hydrologic and Hydraulic Engineering Analysis - Analyses performed by a licensed professional engineer, in accordance with standard engineering practices that are accepted by the Virginia Department of Conservation and Recreation and FEMA, used to determine the base flood, other frequency floods, flood elevations, floodway information and boundaries, and flood profiles.

V. Letters of Map Change (LOMC) - A Letter of Map Change is an official FEMA determination, by letter, that amends or revises an effective Flood Insurance Rate Map or Flood Insurance Study. Letters of Map Change include:

Letter of Map Amendment (LOMA) - An amendment based on technical data showing that a property was incorrectly included in a designated special flood hazard area. A LOMA amends the current effective Flood Insurance Rate Map and establishes that a land as defined by meets and bounds or structure is not located in a special flood hazard area.

Letter of Map Revision (LOMR) - A revision based on technical data that may show changes to flood zones, flood elevations, floodplain and floodway delineations, and planimetric features. A Letter of Map Revision Based on Fill (LOMR-F), is a determination that a structure or parcel of land has been elevated by fill above the base flood elevation and is, therefore, no longer exposed to flooding associated with the base flood. In order to qualify for this determination, the fill must have been permitted and placed in accordance with the community's floodplain management regulations.

Conditional Letter of Map Revision (CLOMR) - A formal review and comment as to whether a proposed flood protection project or other project complies with the

minimum NFIP requirements for such projects with respect to delineation of special flood hazard areas. A CLOMR does not revise the effective Flood Insurance Rate Map or Flood Insurance Study.

W. Lowest adjacent grade - the lowest natural elevation of the ground surface next to the walls of a structure.

X. Lowest floor - The lowest floor of the lowest enclosed area (including basement). An unfinished or flood-resistant enclosure, usable solely for parking of vehicles, building access or storage in an area other than a basement area is not considered a building's lowest floor; provided, that such enclosure is not built so as to render the structure in violation of the applicable non-elevation design requirements of Federal Code 44CFR §60.3.

Y. Manufactured home - A structure, transportable in one or more sections, which is built on a permanent chassis and is designed for use with or without a permanent foundation when connected to the required utilities. For floodplain management purposes the term "manufactured home" also includes park trailers, travel trailers, and other similar vehicles placed on a site for greater than 180 consecutive days.

Z. Manufactured home park or subdivision - a parcel (or contiguous parcels) of land divided into two or more manufactured home lots for rent or sale.

AA. Mean Sea Level – for purposes of the National Flood Insurance Program, the National Geodetic Vertical Datum (NGVD) of 1929 or the North American Vertical Datum (NAVD) of 1988 to which base flood elevations shown on a community's FIRM are referenced.

BB. New construction - Structures for which the "start of construction" commenced on or after the effective date of this floodplain management ordinance, and includes any subsequent improvements to such structures. Any construction started after effective date of community's first floodplain management ordinance adopted by the community and before the effective start date of this floodplain management ordinance is subject to the ordinance in effect at the time the permit was issued, provided the start of construction was within 180 days or permit issuance.

CC. Post-FIRM structures – For floodplain management purposes, a structure for which construction or other development for which the "start of construction" occurred on or after the effective date of the initial Flood Insurance Rate Map.

DD. Pre-FIRM structures - For floodplain management purposes, a structure for which construction or other development for which the "start of construction" occurred before the effective date of the initial Flood Insurance Rate Map.

EE. Primary frontal dune - a continuous or nearly continuous mound or ridge of sand with relatively steep seaward and landward slopes immediately landward and adjacent to the beach and subject to erosion and overtopping from high tides and waves during major coastal storms.

FF. Recreational vehicle - A vehicle which is:
1. Built on a single chassis;
2. 400 square feet or less when measured at the largest horizontal projection;
3. Designed to be self-propelled or permanently towable by a light duty truck; and,
4. Designed primarily not for use as a permanent dwelling but as temporary living quarters for recreational camping, travel, or seasonal use.

GG. Repetitive Loss Structure - A building covered by a contract for flood insurance that has incurred flood-related damages on two occasions in a 10-year period, in which the cost of the repair, on the average, equalled or exceeded 25 percent of the market value of the structure at the time of each such flood event; and at the time of the second incidence of flood-related damage, the contract for flood insurance contains increased cost of compliance coverage.

HH. Severe repetitive loss structure - a structure that: (a) Is covered under a contract for flood insurance made available under the NFIP; and (b) Has incurred flood related damage - (i) For which 4 or more separate claims payments have been made under flood insurance coverage with the amount of each such claim exceeding $5,000, and with the cumulative amount of such claims payments exceeding $20,000; or (ii) For which at least 2 separate claims payments have been made under such coverage, with the cumulative amount of such claims exceeding the market value of the insured structure.

II. Shallow flooding area - A special flood hazard area with base flood depths from one to three feet where a clearly defined channel does not exist, where the path of flooding is unpredictable and indeterminate, and where velocity flow may be evident. Such flooding is characterized by ponding or sheet flow.

JJ. Special flood hazard area - The land in the floodplain subject to a one (1%) percent or greater chance of being flooded in any given year as determined in Article 3, Section 3.1 of this ordinance.

KK. Start of construction - For other than new construction and substantial improvement, under the Coastal Barriers Resource Act (P.L. – 97-348), means the date the building permit was issued, provided the actual start of construction, repair, reconstruction, rehabilitation, addition, placement, substantial improvement or other improvement was within 180 days of the permit date. The actual start means either the first placement of permanent construction of a structure on a site, such as the pouring of slab or footings, the installation of piles, the construction of columns, or any work beyond the stage of excavation; or the placement of a manufactured home on a foundation. Permanent construction does not include land preparation, such as clearing, grading and filling; nor does it include the installation of streets and/or walkways; nor does it include excavation for a basement, footings, piers, or foundations or the erection of temporary forms; nor does it include the installation on the property of accessory buildings, such as garages or sheds not occupied as dwelling units or not part of the main structure. For a substantial improvement, the actual start of the construction means the first alteration of any wall, ceiling, floor, or other structural part of a building, whether or not that alteration affects the external dimensions of the building.

LL. Structure - for floodplain management purposes, a walled and roofed building, including a gas or liquid storage tank, that is principally above ground, as well as a manufactured home.

MM. Substantial damage - Damage of any origin sustained by a structure whereby the cost of restoring the structure to it's before damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred. It also means flood-related damages sustained by a structure on two occasions in a 10-year period, in which the cost of the repair, on the average, equals or exceeds 25 percent of the market value of the structure at the time of each such flood event.

NN. Substantial improvement - Any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure before the start of construction of the improvement. The term does not, however, include either:

1. Any project for improvement of a structure to correct existing violations of state or local health, sanitary, or safety code specifications which have been identified by the local code enforcement official and which are the minimum necessary to assure safe living conditions, or
2. Any alteration of a historic structure, provided that the alteration will not preclude the structure's continued designation as a historic structure.
3. Historic structures undergoing repair or rehabilitation that would constitute a substantial improvement as defined above, must comply with all ordinance requirements that do not preclude the structure's continued designation as a historic structure. Documentation that a specific ordinance requirement will cause removal of the structure from the National Register of Historic Places or the State Inventory of Historic places must be obtained from the Secretary of the Interior or the State Historic Preservation Officer. Any exemption from ordinance requirements will be the minimum necessary to preserve the historic character and design of the structure.

OO. Violation - the failure of a structure or other development to be fully compliant with the community's floodplain management regulations. A structure or other development without the elevation certificate, other certifications, or other evidence of compliance required in this ordinance is presumed to be in violation until such time as that documentation is provided.

PP. Watercourse - A lake, river, creek, stream, wash, channel or other topographic feature on or over which waters flow at least periodically. Watercourse includes specifically designated areas in which substantial flood damage may occur.

SECTION VIII – ENACTMENT

Enacted and ordained this 2nd day of September, 2025. This ordinance, Article 3.O of the Zoning Ordinance of the Town of Smithfield, Virginia, shall become effective upon passage.

_____

Signature

_____

Title

_____

Attested

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TOWN COUNCIL STAFF REPORT: ARTICLE 3S PHIPO TEXT AMENDMENT
PUBLIC HEARING

TUESDAY, SEPTEMBER 2nd, 2025, 6:30 PM

This is a proposed text amendment to Article 3S to create a new Pinewood Heights Industrial Park Overlay District. This item appeared as a discussion item at the July Planning Commission meeting, and a red-lined version is attached.

Planning Commission made suggested changes as a discussion item and favorably recommended it to Town Council.

Please direct inquiries to Tammie Clary at 1-(757)-365-4200 or tclary@smithfieldva.gov.

PHIP-O, Pinewood Heights Industrial Park Overlay District

A. Purpose and Intent:

The Pinewood Heights Industrial Park Overlay District is established to provide specific guidance on the redevelopment of the Pinewood Heights subdivision in the Town of Smithfield.

B. Bulk Regulations:

1. Maximum Building Height:
    a. 50 feet
2. Setbacks:
    a. Front: 15 feet
    b. Side: 10 feet
    c. Rear: 10 feet
    d. Accessory Structures: 5 feet
3. Lot Size:
    a. Not regulated
4. Floor area ratio and building area coverage:
    a. Not regulated

C. Permitted Uses and General Development Requirements:

1. All uses allowed by the underlying zoning district of Light Industrial (I-1) are permissible, whether by-right or through obtaining a special use permit. Prohibited uses are not permitted in the Overlay without successfully obtaining a Special Use Permit. Shipping containers require a special use permit.
2. Outdoor storage shall be permitted by-right as an accessory or primary use, provided that it meets the following criteria:
    a. All outdoor storage must be screened from view from the right-of-way by a screening mechanism.
3. Fences:
    a. Fences may be located in front, side, and rear yards regardless of whether it is a corner lot.
    b. All fencing must be maintained and repaired if damaged.
    c. Safety and security may supersede height regulations.
4. Accessory Structures:
    a. Accessory structures may be located in ~~front,~~ side, and rear yards.
    b. Accessory structures cannot exceed the maximum building height.

c. Accessory structures may exceed 20% of the rear yard.
d. Accessory structures are permitted without a primary building.

~~5. Non stacked shipping containers are permitted by-right as accessory structures.~~

6. Required open space is 10% of the lot area.
7. Curb and gutter are not required and pavement of 6 inches of crushed stone is appropriate for parking and drive aisles.
8. Curb cuts shall be approved on a case-by-case basis by the Zoning Administrator.
9. Parking and loading spaces can be located in front yards.
10. The Planning Commission may waive any of the following regulations through a Planning Commission Waiver:
    a. Planning Commission waiver for satellites dish antennas, satellite receiving dishes, or similar structures that do not comply with Article 2.P.13.
    b. Planning Commission waiver for telecommunication towers that do not comply with Article 2.S.
    c. Planning Commission waiver for tree canopy, screening, buffers, and landscaping that does not comply with Article 9.
    d. Planning Commission waiver for required parking minimums and maximums and loading spaces that do not comply with Article 8.
    e. Planning Commission waiver for signage that does not comply with Article 10.K.5.
    f. Planning Commission waiver for accessory structures in front yards.

The Smithfield Town Council held its regular meeting on Tuesday, August 5, 2025. The meeting was called to order at 6:30 PM.

Members present:

Michael Smith - Mayor
Bill Harris - Vice Mayor
Steve Bowman
Mary Ellen Bebermeyer
Valerie Bulter
Darren Cutler
Jeff Brooks

Members absent:

None

Staff present:

William H. Riddick, III – Town Attorney
Lesley King – Town Clerk
Tammie Clary – Community Development & Planning Director
Ed Heide – Director of Public Works
Judy Winslow – Director of Tourism
Laura Ross – Treasurer
Alonzo Howell – Chief, Smithfield Police Department
Eric Phillips – Lieutenant, Smithfield Police Department
Ashley Rogers – Director of Human Resources
Steve Clark - Grounds Attendant

Press:
Stephen Faleski - The Smithfield Times

Citizens:
21

Mayor Smith welcomed all attendees to the meeting and asked all present to stand for the Pledge of Allegiance.

1. **Call To Order**

2. **Pledge Of Allegiance**

3. **Informational Reports**

Tammie Clary, Director of Community Development and Planning, was sitting in for the Town Manager who was not present. She reported that she would be happy to answer any questions that she could regarding the informational reports.

   a. Manager's Report

   b. Committee Summary Reports

4. **Upcoming Meetings And Activities**

August 5 - 6:30 p.m. - Town Council Meeting
August 12 - 6:30 p.m. - Planning Commission
August 19 - 6:30 p.m. - Board of Historic and Architectural Review
August 19 - 7:30 p.m. - Board of Zoning Appeals
August 25 - 3:00 p.m. - Town Council Committees

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NOTE: All of the above public meetings will be held at the Smithfield Center, unless otherwise noted.

5. Public Comments

a. Renee Bevan - Mrs. Bevan, of 101 Beale Avenue in Smithfield, thanked the Town Council for the hard work that they had been putting in. She related that the election in the fall of 2024 had brought new hope to the citizens of Smithfield, and their work had not gone unnoticed. She said that the Mallory Scott Project had made people pay attention to the growth that was neither in character with the Town of Smithfield, nor was it congruent with the current neighborhoods or zoning laws. She noted that the current Town Council was listening to the people who elected them. Mrs. Bevan continued that they had also dealt with the inherited issue of The Cottages, summarizing its history of going from a 150-unit 10-plex project down to a 135-unit condominium project with five Special Use Permits (SUPs) under the current Planning Commission. She stated that the Planning Commission had approved the project 6-1 regardless of the negative aspects of condominium ownership, the developer changing his story about maintenance and fees, and that the developer could not or would not identify the builder for the project. She said that when the application came to the Town Council, due to their firm direction, the Cottages project was reduced further to 104 units and only 2 SUPs. Mrs. Bevan reported that one of the projects they were originally to discuss at the meeting had been approved by the Planning Commission, but the developer had requested a delay. She stated that it was her hope that developers were learning to respect the town's zoning laws, and understood that if they wanted a project approved then they would need to follow them. She reiterated that the citizens who elected them were watching, and there was much support for their campaign on managed growth and transparency. She said that she hoped they were able to maintain the vigor with which they were working on current projects for future projects that may come before them.

b. Bob Hines - Mr. Hines, of 216 Washington Street in Smithfield, recalled a conversation he had with his neighbor, who was born in 1937, that the street that they lived on had at one time been a dirt road. He speculated that it was likely that 150 years ago, all the Town of Smithfield had dirt roads. He said he had seen a picture of Main Street that he was guessing was taken in 20's or 30's, and it looked to be a dirt road in the picture. He continued that also, at that time, there were no real building codes and density seemed to just happen. Mr. Hines read from a recent Smithfield Times article referring to a recent Planning Commission meeting. He read "Darren Cutler in June criticized fellow Commissioners for not being on board with the Town Council's new direction, and asserted that the body was too willing to give its blessing to developer-requested Special Use Permits to waive density limits and other zoning requirements. He cast the lone dissenting vote on two housing development proposals that reached the Planning Commission earlier this year. Other Commissioners say some provisions of the zoning ordinance, such as a five-unit per acre limit in Downtown Neighborhood Residential that overlaps much of the Historic District, were too strict given that existing Historic District neighborhoods already exceed the limit. 'We just had a recent election,' Cutler said, 'In June the Town spoke, there were changes on the Council. Quite a few, and we're trying to adhere to those changes. And now if we have a Planning Commission and Town Council that are on two different paths and the Town council is working to adhere to their campaign promises to the voters and manage the growth at a slower pace, we're not working together yet to do that on the Planning Commission. We're going to be at loggerheads and not going to function well together.' Mrs. Hillegass's response was, 'if you don't want any SUPs then you need to just come out and say that.'" Mr. Hines related that it had been said that times change and people should change with the times. He noted that the past showed that some of Smithfield exceeded the current density zoning statutes, the Historic District, for example. He continued that, over time, those restrictions were put in place, as those that put in those restrictions changed with the times by seeing future problems. Mr. Hines said that when much of the density of Smithfield's Historic District was built, and his house was about 115 years old, he guessed that it was during the time of horse-and-buggy transport. He reported that his neighbor had told him that during World War II, many people came into the town on the weekends by horse-and-buggy. He pointed out that many things had changed over the years. He said that many people did not want the area to turn into Virginia Beach, adding that Route 17 going toward Harbor View was atrocious. He questioned if they wanted to return to a time when, for example, the Historic District was "build as you wish." Mr. Hines reported that just because some areas built in the past were denser than the current code did they necessarily need to return to that time. He said that being too lenient with some SUPs with regard to density seemed to be doing so. Mr. Hines updated that he had

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sent a request concerning the status of the proposed Farmer's Market, and the only response he had gotten in return was from Michael Stallings, Town Manager. He said that maybe none of the Council knew more than what had been given, but they had seen the response that he had seen. He said that he appreciated the candor, but he had some concerns. He read some lines from the response he received, including "No Town of Smithfield General Fund tax dollars were to contribute to its success." He reported that the projection was that the market building itself would be paid for through advanced town and county support, $1.4 million each from the Town and the County. He speculated that the amount was "manna from heaven" as opposed to taxpayer funding. He observed that he was not suggesting that some sort of market was a bad idea, adding that many facilities and services existed for the citizens' benefit and were funded by taxpayer money. He stated that it seemed that taxpayer funds would have to be involved, and if so, then they should admit as much and work from there. He read, "actual ownership of the market space has not yet been determined." Mr. Hines related that given the length of time that the project had been addressed, it would seem as though the issue would have been settled.

c. Robert Small - Mayor Smith reported that Mr. Small was the attorney for a matter listed later in the agenda and would like to move his item forward to be addressed next.

10. Old Business

a. Update on Blighted Property - 1502 Magruder Road
William Riddick, Town Attorney

Robert Small, attorney for the owners of 1502 Magruder Road, updated that his clients were able to get sufficient funds from the insurance company in order to facilitate the entire clean-up of the property. He reported that he had sent a letter to Mr. Bill Riddick, the Town Attorney, on July 28th which included a contract that his clients had entered into with a company that was familiar with the type of work necessary. He added that the letter detailed the work that would be completed, and he had attached the bona fides from the State Corporation Commission for the company as well as a copy of the $5,000 down payment check. He noted that his clients had more than sufficient funds to cover the price the company quoted them. He recognized that the Town had received quotes from several contractors that were higher than the amount his clients were quoted, which may be related to the property's proximity to the Resource Protection Area (RPA). Mr. Small summarized that whatever the cost ended up being, the insurance company had released enough funds for his clients to be able to meet the costs necessary. He continued that he sent a follow-up letter on July 31st to confirm that his clients had retained Davis and Associates to complete the various land surveys for the RPA. He reported that the firm had asked for $2,800 in order to complete the work which had been paid, and his clients would cover any additional expenses that may manifest. He recapped that there was a standing Injunction Order from the Circuit Court that would expire on August 27th, adding that per Davis and Associates, their survey work would take until September 4th. Mr. Small requested that the Town Council vote on a motion to approve the plan he had submitted using the named contractors. He related that in doing so the Town Council would clear up many of the previous actions taken which would enable them to move forward with the necessary work. He stated that the security fence would remain in place during the work and the swimming pool would need to remain filled with water so that it would not rise out of the ground. He noted that his clients would treat the pool for mosquitoes as necessary. Mr. Small reported that not every issue had been resolved with the insurance company; however, the injunction and the Town Council's previous ruling had all given them the necessary elements to enable his clients to receive the funding in order to complete the work necessary. He thanked the Council for their past consideration and their current consideration of his request.

Mayor Smith asked the Town Attorney if they needed to move the item back down the agenda in order to proceed with a vote.

The Town Attorney reported that if the Council agreed with the Mayor's amendment of the agenda, then they could proceed with the vote.

Councilman Bowman made a motion to move Old Business to the beginning of the meeting for consideration. Vice Mayor Harris seconded the motion.

Mayor Smith called for the vote, with seven members present. Councilman Brooks voted aye, Councilman Cutler voted aye, Councilman Bowman voted aye, Councilwoman Bebermeyer voted aye, Councilwoman Butler voted aye, Vice Mayor Harris voted aye, and Mayor Smith

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voted aye. The motion passed unanimously.

Councilman Bowman asked the Town Attorney for confirmation that all the Town's protections remained in place with the knowledge of the lapse in time between the injunction expiring and work completion, and if there were any legal additions to the language of the motion that needed to be made.

The Town Attorney explained that the injunction prevented the Town from taking any action to remove anything from the property. He continued that the injunction would dissolve and would not be an issue. He noted that if the information that Mr. Small had presented had been given months ago, it would have been more than sufficient to meet the Town's requirements. He observed that, due to the proximity to the RPA, there would be a mitigation plan that would be required to submit to Mrs. Clary for approval. He added that the request to keep the swimming pool and the foundation was going to require an application to the Board of Zoning Appeals, which they may rule for or against. The Town Attorney stated that it was all a part of the administrative process which the Town was prepared to handle. He said it was his recommendation that the Council accept the plan.

Councilman Bowman acknowledged there was an administrative process that must be completed, but asked if they should establish a date certain that the main destroyed area of the structure be removed.

The Town Attorney replied that they could set a date for review to determine what the status of the matter was.

Councilman Bowman said that he felt that once the process had moved further, Mr. Small had done exactly what he said he would do. He related that in this type of scenario the issue could linger further. He said his concern was with safety and the impact on the neighbors.

The Town Attorney confirmed with Mr. Small that the expectation was that once the administrative approvals were completed, then they would take care of the demolition of the debris. He said that the foundation could not be removed until the Board of Zoning Appeals gave approval. He stated that if the application was completed quickly then it could be on the agenda for September.

Mr. Small reported that he would attend every Council meeting until the matter was completed. He said that it was his hope that, once the administrative aspects of the matter were taken care of that the physical work would be completed within 30 to 45 days, if not sooner.

The Town Attorney observed that with the information Mr. Small just gave, the Council could move that the demolition should be completed no less than 45 days from the completion of the approvals.

Vice Mayor Harris asked the Town Attorney to confirm that if they accepted the plan, then there would be a 90-day window for resolution.

Mrs. Clary read from the statute: "They shall have 90 days to complete all work approved in the plan; however, the administrator may grant extensions of time to complete the work where the owner has completed a substantial portion of the work in compliance with the plan."

Vice Mayor Harris confirmed that the administrator in that situation would be Mrs. Clary.

Councilman Bowman made a motion to move Old Business to the beginning of the meeting for consideration. Councilwoman Bebermeyer seconded the motion.

Mayor Smith called for the vote, with seven members present. Councilman Brooks voted aye, Councilman Cutler voted aye, Councilman Bowman voted aye, Councilwoman Bebermeyer voted aye, Councilwoman Butler voted aye, Vice Mayor Harris voted aye, and Mayor Smith voted aye. The motion passed unanimously.

6. Council Comments

Councilman Cutler stated that he was relatively new to the Council and had made several

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observations over the last few months and had recommendations for actions to address them. He reviewed the results of the recent election, and said that, despite those results, there remained a push for very dense growth. He continued that there was a lack of awareness of citizen concerns and the direction that the Town Council wanted to go. He noted that if words were spoken, written, contained in a survey, or even if they were not spoken at a Council meeting, the members heard them. He related that later on in the New Business section of the agenda he would discuss a task process that he would present. He recommended that they make a motion that the Council develop a planning department recommendation guideline, and he would like to work with the Town Manager in order to develop that process so that they may create a very high barrier for any applications that do not follow the current zoning laws. Councilman Cutler recapped that the process for The Cottages had been done in a backwards fashion, noting that they should be receiving a development application that fit the Town's zoning law, then came to the Planning Commission and was fixed to meet the laws in a way that was appropriate to the character of the Town of Smithfield, and then come to the Town Council for the final vote. He stated that he would like to enact tasks that would be clearly identified in the meeting minutes and then carried into Old Business until it reached resolution. His first recommendation was that the Town Manager work with himself to develop a Planning Recommendation Guideline for the Planning Department.

Councilwoman Butler suggested that a member of the Planning Department also be involved in the meeting between Councilman Cutler and the Town Manager.

Councilman Cutler pointed out that the Town Council did not task as they had four direct reports. He stated that the Council would assign the task to the Town Manager who would then assign as appropriate to the Town Planner, or perhaps the whole Planning Department.

Councilwoman Butler said that was fine; however, there should be representation from Planning on that committee as well.

Councilman Cutler stated that his second recommendation surrounded school proffers. He thanked the Town Attorney for providing very clear legal guidance and status regarding the issue. He noted that what they had been told was a little contrary to what he had been told by the School Board, but he felt progress was being made. He stated that it had not been as easy as it should be to get answers on the subject. He related that he felt that the school proffer aspect of the Town's growth was a part of what the citizens had been talking about when referring to "managed growth." Councilman Cutler said that his takeaway from the report from the Town Attorney was that there was a pathway to a positive end of the issue; however, the pathway did not exist through the Town Council. He encouraged the Council to continue to work with the County and the citizens to work with the Town and County representatives on the issue. He said that if assistance were available for the schools and infrastructure, it would be poor governance to forego that money. He observed that currently there was a "disappearing" proffer for the schools, but if done properly it was almost $2 million that would go directly to schools with no "disappearing" function. Councilman Cutler stated that his third recommendation addressed the evaluation process for the four staff members that were direct reports to the Town Council. He thanked Director of Human Resources Ashley Rogers, Town Clerk Lesley King, and Town Treasurer Laura Ross for working with the Town Manager to answer a barrage of his questions and requests for data. He noted that the Town was historically deficient on completing evaluations for some personnel. He reported that Mrs. Rogers was working hard to establish a process of evaluation that would be included for all employees of the Town. Councilman Cutler recognized that the Town Council members were not fully paid employees, and had a harder time keeping track due to elections, turnover, etc. He said that making it a Human Resources function would ensure that the Town Council was held accountable to hold the employees accountable by assessing things like performance and pay. He said that the move would address the voter mandate of increased transparency. Councilman Cutler reported that his fourth recommendation would be using the Old Business section of the agenda to track the tasks of developing the evaluation systems and completion of the 2025 evaluations of the Town Council's four direct reports. He offered Mrs. Rogers assistance should she need it to complete the task. Councilman Cutler reported that he wanted to discuss how Closed Sessions were utilized. He said that after reflecting on the most recent Closed Session he had questioned its necessity. He stated that he would leave the answer to the Town Attorney to resolve. He stated that of the items discussed, which were necessary to be discussed in Closed Session, and if they were not, then what was the process needed to return them to the public arena. He reiterated that there needed to

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be transparency on Town Council. He recommended that they task a Council member to work with the Town Attorney and the Town Manager to develop a Closed Session Process, and that process involve inclusion of a motion to determine the necessity of needing to enter into a Closed Session. He continued that the Council had discussed earlier in the year taking minutes of Closed Sessions, as he had learned during his training in Richmond from the attorneys there that even with minutes the Closed Session would remain confidential. He tasked the Town Attorney with establishing a process to ensure that inclusion of minutes for the Closed Session would remain confidential.

7. Consent Agenda Items

Councilman Brooks recommended a motion to approve C1. Resolution Appropriating the Sum of $18,750 from the Department of Criminal Justice Services to the 2025-2026 General Fund Operating Budget and C3 the included Invoices Over $20,000.

Councilman Cutler asked if the Sidewalk Ordinance, item C2, could be discussed further.

There was discussion about whether C2 had been pulled from the Consent Agenda for further discussion.

Mayor Smith asked Councilwoman Butler to address C2.

Councilwoman Butler stated that item C2. Ordinance to Amend Town Code as it Relates to Outdoor Dining on Public Sidewalks had been discussed at the last Committee Meeting. She observed that it was a part of Article 3 Section 26-294: minimum width of sidewalk to reduce the minimum width from 7 feet to 4 feet.

Councilman Cutler stated that when the issue had been discussed previously, it was noted that it would be to ensure that some of the establishments in Town that were already over the minimum were in compliance with the ordinance, but his concern had been with other establishments, notably around the Times Square Stage.

Mayor Smith asked for confirmation that 4 feet was in compliance with the Americans with Disabilities Act (ADA) standards.

The Town Attorney confirmed that it was correct. He pointed out that there was existing outdoor dining at the bakery in that area. He noted that the change to 4 feet would meet the ADA requirement, while allowing existing businesses to continue to operate outdoor seating in compliance with the Town's laws.

Councilman Cutler stated he understood the example of the Fiddlin' Pig Pub not having the ability to conform to the 7 foot standard due to its location, but the bakery seemed to have plenty of space to work within.

The Town Attorney noted that 4 feet was a town-wide minimum that would allow the Fiddlin' Pig to be in compliance, and in the case of the bakery they had over 4 feet so they were already in compliance.

Councilman Cutler clarified that if the bakery decided to extend the sidewalk seating out by another table and still allow the minimum 4 feet, that it would create a bottleneck in that area. He asked if there was a cited problem or if there had been an issue reported.

Mayor Smith stated that the purpose had been to bring the establishment into compliance.

Mrs. Clary said that statement was correct, especially in the case of the Fiddlin' Pig and Cure Coffee Shop.

The Town Attorney reported that Section 26-288 required that a sketch be submitted by the business and approved by the administrator. He recognized that there were valid concerns, but there were safeguards built into the ordinance.

Vice Mayor Harris asked for confirmation that the Town Staff had physically measured from the curb to the tables at the bakery on Main Street.

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Mrs. Clary reported that Town Staff had gone to the Fiddlin' Pig and Cure and confirmed that reduction to 4 feet would bring both establishments into compliance.

Vice Mayor Harris asked about seating on Main Street.

Mrs. Clary stated that she could not recall the exact dimensions, but they were over the 4-foot minimum.

Councilman Bowman made a motion to prove the consent agenda as presented. Councilman Brooks seconded the motion.

Mayor Smith called for the vote, with seven members present. Councilwoman Butler voted aye, Councilwoman Bebermeyer voted aye, Councilman Brooks voted aye, Councilman Cutler voted aye, Councilman Bowman voted aye, Vice Mayor Harris voted aye, and Mayor Smith voted aye. The motion passed unanimously.

a. Resolution Appropriating the Sum of $18,750.00 from the Department of Criminal Justice Services to the 2025-26 General Fund Operating Budget
Finance Committee Chair, Jeff Brooks

b. Ordinance to Amend Town Code as it Relates to Outdoor Dining on Public Sidewalks
Public Buildings and Welfare Committee Chair, Valerie Butler

c. Invoices Over $20,000 Requiring Council Authorization:
Finance Committee Chair, Jeff Brooks

i.	The Blair Brothers, Inc. - Crosswalk in Historic District	$ 79,800.00
ii.	The Blair Brothers, Inc. - Sykes Court	$ 84,450.00
iii.	Xylem - Cypress Creek Pump Station	$ 51,651.00
iv.	Santander Bank - Vac Truck	$ 99,349.81
v.	Tactical Electronics	$ 25,089.50

8. Action Items

a. Public Hearing: Special Use Permit - 107 Saint Pauls Avenue
Tammie Clary, Director of Community Development and Planning

Mrs. Clary reported that the applicant was seeking a special use permit in accordance with Article 3.F.C.18 to utilize a portion of the home as a home occupation, for use as a book author. She said the applicant stated that there would be no customers and no employees coming to the residence. She noted that the application was favorably recommended at the June Planning Commission meeting.

Mayor Smith stated that there were two people who signed up to speak at the public hearing.

Nancy O'Berry - Mrs. O'Berry, the applicant residing at 107 St. Paul's Avenue in Smithfield, explained that she created "intellectual content" and there were no consumers coming to her home to buy goods. She added that she does this in a solitary fashion over her garage at her home. She stated that though she did get physical books printed for sale on occasion to sell at festivals, the majority of her business was conducted online. She continued that her editor, her beta reader, and the person who made the covers for her book all interacted with her via the internet, and were not coming to her residence. Mrs. O'Berry reported that Mrs. Clary had helped her to understand why the ordinance was written to require her to obtain an SUP, and that it really came down to her residence being a part of a multifamily structure. She thanked the Town for being so welcoming and added that she was honored to call Smithfield her home.

Jenny Soule - Mrs. Soule explained that she no longer wished to speak.

Mayor Smith asked if there were any other attendees present who wanted to speak on the matter. Hearing and seeing none, he closed the public hearing.

Councilwoman Bebermeyer made a motion to approve the SUP application as presented.

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Councilman Cutler seconded the motion.

Mayor Smith called for the vote, with seven members present. Councilman Bowman voted aye, Councilwoman Butler voted aye, Councilman Cutler voted aye, Councilwoman Bebermeyer voted aye, Councilman Brooks voted aye, Vice Mayor Harris voted aye, and Mayor Smith voted aye. The motion passed unanimously.

b. Public Hearing: Special Use Permit - 139 Sykes Court
Tammie Clary, Director of Community Development and Planning

Mrs. Clary reported that the applicant was seeking approval to rent 139 Sykes Court, which was an existing single-family residential dwelling, as a short-term rental property. She stated that according to the Smithfield Zoning Ordinance (SZO) Article 2.Z.1, short-term rentals as principal uses are permissible by Special Use Permit (SUP) only. She detailed that no changes to the property were proposed in order to accommodate the short-term rental. Mr s. Clary observed that approval should be conditioned on the applicant following the conditions outlined in Article 2.Z.1.a through Article 2.Z.1.i., except for Article 2.Z.1.b., and the conditions require a signed and notarized short-term rental affidavit ensuring compliance. She reported that the application was favorably recommended by the Planning Commission at their June meeting.

Mayor Smith stated that the matter was subject to a public hearing and asked if there were any attendees present who wanted to speak.

Margret Carrol - Mrs. Carrol reported that she resided at 136 Sykes Court in Smithfield, and she was opposed to approval of the application. She stated that she had seen renters at the property the previous two weekends. She asked if someone could explain why they were able to have renters though the property had not gone through a vote at Town Council.

Mrs. Clary clarified that by-right residents were allowed 104 nights in a calendar year as a short-term rental, meaning that they did not need any special permits for that action. She added that the application was to be able to exceed 104 nights.

Mrs. Carrol stated that the reason she was opposed to approval of the application was due to little available parking in the area of the property. She reported that she had spoken with many of the neighbors, but they had not been able to attend the meeting. She related that there was frequent vehicle traffic on their road with people looking for parking, notably during festivals in town. She said that she was unsure how many people would be allowed to stay in the home for one weekend, and questioned if they would be vetted through Airbnb or Vrbo. Mrs. Carrol reported that there were children who resided on that street, and the street had a tendency to get very crowded during even small events. She noted that at the corner of the street there was already a property used as a short-term rental. She related that she would like to have neighbors that were invested in the community, and not people who were only coming for the weekend.

Councilman Bowman observed that the house in question had recently been sold. He asked Mrs. Carrol if she knew how long the previous occupants had resided in the home.

Mrs. Carrol estimated that there had been about three different occupants at the property in the last five years. She reiterated that her concern was with the amount of people at the property because the parking was too tight.

Anna Boyer - Mrs. Boyer of 11183 Burwell's Bay in Smithfield reported that she was the owner of the property and applicant. She stated that she had purchased the property about 6 months prior, and she wasn't necessarily using the home as a weekly turnover type of rental. She said that initially there had been a renter at the property for a six-month period, and as a realtor in the town, sometimes she had clients who needed different rental periods while moving. She noted that the property could easily fit three cars and the Town had recently made improvements to the sidewalk in the area. Mrs. Boyer said that the house had three bedrooms and one-and-a-half baths, which meant at the most they could hold six to eight people. She explained that the renters came for festivals, markets, weddings, and were enjoying Smithfield. She related that she was happy to give her information to the neighbors so that they could contact her about any issues.
She noted that Airbnb was very good at assisting with any reported issues with renters quickly.

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Councilman Brooks asked Mrs. Boyer if her intent was to keep the property a permanent Airbnb.

Mrs. Boyer stated that was correct. She said that if she was able to get a longer-term renter at the property, then she would block those dates off as unavailable.

Mayor Smith asked if there were any other attendees present who wanted to speak on the matter. Hearing and seeing none, he closed the public hearing.

Vice Mayor Harris advised that they should table the issue. He reported that at the Committee Meetings the Council had tasked the Town Manager with investigating different uses and different numbers of Airbnb's in the Historic Districts of other areas. He said that until they had received that information he felt it would be voting in haste.

Vice Mayor Harris made a motion to table the application. Councilman Cutler seconded the motion.

Councilwoman Butler questioned if the Council's discussion in the Committee Meeting would apply to the matter they were addressing, as the application in question had already been approved by the Planning Commission, or would it only apply to any new requests before the Council.

The Town Attorney clarified that the Planning Commission had only recommended approval. He said that the public hearing had been held, and they did not need to take action. He further explained that though the term was "table," it really meant to defer consideration to a later meeting.

Councilman Cutler reported that the purpose of the action was to be able to review some research results and create a policy as it related to short-term rentals.

The Town Attorney observed that they could not apply a new policy, but if the Council wanted to consider the information the Town Manager presented and create a policy moving forward, that could be done. He noted that the newly created policy could not be applied retroactively.

Councilman Cutler recalled that they had discussed creating a policy because they were seeing many applications for short-term rentals.

Councilwoman Butler referenced the Town Attorney's point, and asked how creating a new policy would affect the application they were currently reviewing.

The Town Attorney said that the Council to take the data given by the Town Manager and use to form their own decision on the matter.

Vice Mayor Harris stated that his recommendation for deferral was based on his request to the Town Manager to conduct research on the subject, and that information may inform the Council's decision.

Councilwoman Butler asked what research the Town Manager would be conducting. She recalled that their discussion had been surrounding Airbnb's that existed in the town, if they had any issues, and which ones were set up to be reviewed annually.

Vice Mayor Harris said that it was his understanding that he would contact the Town Manager in other areas that had seen an influx of Airbnb's, particularly in Historic Districts. He recalled that Front Royal and Virginia Beach had been examples of such communities.

Councilwoman Butler reported that she understood; however, she did not know if she necessarily agreed with the action in relation to the application that was already in process.

Mrs. Clary explained that per the State Code, the town had until December 2023 to regulate short-term rentals. She said that if they were to go back now and try to change their process for short-term rentals, they would not be allowed to use SUPs as a way to regulate them.

Councilman Brooks stated that why the Council had asked the Town Staff to research additional

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information was so that they could ensure that short-term rentals would not disrupt the residential character of a neighborhood. He thanked Mrs. Carrol for her comments earlier about what she had seen impact the neighborhood, because that was the type of information that he wanted everyone to see. He emphasized that it had nothing to do with that specific property, but more a question of whether their allowance would change the character of the small historic town. He recalled that Councilman Bowman likened it to increased commercialization when considered as long-term, short-stay rentals. He said that he was in agreement with the motion to table the application, as he would like much more information.

The Town Attorney said that Councilman Brooks' point was well-taken, but asked them to remember that residents were entitled to 104 nights permitted by-right. He advised that the Council could place conditions on the application, and noted that the Town's was in a good place where the ordinance was situated currently.

Councilwoman Bebermeyer reviewed that the applicant had noted that she had a variety of renters use the property. She asked, hypothetically, if there was a renter who was there for 90 days, would that time count toward the 104 days allowed by-right per calendar year.

Mrs. Clary reported that short-term rentals were defined as less than 30 days.

Councilwoman Bebermeyer confirmed that meant that if there was a renter for 90 days, it would not count toward the 104-day limit.

Vice Mayor Harris confirmed that his motion to defer action on the item until the next Council meeting still stood. Councilman Cutler repeated his second of the motion.

Mayor Smith called for the vote, with seven members present. Councilwoman Butler voted nay, Vice Mayor Harris voted aye, Councilwoman Bebermeyer voted aye, Councilman Cutler voted aye, Councilman Bowman voted aye, Councilman Brooks voted aye, and Mayor Smith voted aye. The motion passed by a majority of 6/1.

c. Public Hearing: Special Use Permit - Eastwood Sales Trailer
Tammie Clary, Director of Community Development and Planning

Mrs. Clary reported that the applicant was seeking a SUP in accordance with Article 3.C.C.24 for temporary real estate marketing office for new subdivisions. She said that the proposed 28’ by 8’ temporary white vinyl trailer would be used to meet with potential customers while the model was under construction and was expected to be on site for no longer than 4–6 months. She stated that the Planning Commission favorably recommended this application at their June meeting.

Mayor Smith stated that the matter was subject to a public hearing and asked if there were any attendees present who wanted to speak. Hearing and seeing none, he closed the public hearing.

Vice Mayor Harris made a motion to approve the application as presented. Councilman Cutler seconded the motion.

Mayor Smith called for the vote, with seven members present. Vice Mayor Harris voted aye, Councilman Brooks voted aye, Councilwoman Bebermeyer voted aye, Councilman Bowman voted aye, Councilman Cutler voted aye, Councilwoman Butler voted aye, and Mayor Smith voted aye. The motion passed unanimously.

d. Public Hearing: Mallory Pointe - Sales Trailer
Tammie Clary, Director of Community Development and Planning

Mrs. Clary reported that the applicant was seeking a SUP in accordance with Article 3.C.C.23 for two temporary real estate marketing offices for a new subdivision. She said that the two model homes would share a temporary parking lot, the garages were planned to function as offices and would be converted back to garages when no longer needed. She said that the offices will be open daily from 10am to 7pm, and by appointment. She noted that the Planning Commission favorably recommended this application at their June meeting.

Mayor Smith stated that the matter was subject to a public hearing and asked if there were any attendees present who wanted to speak.

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Steve Miller - Mr. Miller reported that he represented Stanley Martin Homes, whose office was located at 118820 Fountain Way in Newport News. He said that he was present to answer any questions that the Council may have regarding the application.

Mayor Smith asked if there were any other comments. Hearing and seeing none, he closed the public hearing.

Vice Mayor Harris made a motion to approve the application as presented. Councilman Cutler seconded the motion.

Mayor Smith called for the vote, with seven members present. Councilman Brooks voted aye, Councilwoman Butler voted aye, Councilman Bowman voted aye, Councilwoman Bebermeyer voted aye, Vice Mayor Harris voted aye, Councilman Cutler voted aye, and Mayor Smith voted aye. The motion passed unanimously.

f. Public Hearing: Conditional Rezoning & Special Us Permits - Sheetz
Tammie Clary, Director of Community Development and Planning

Mrs. Clary reported that the applicant was seeking a conditional rezoning to Highway Retail Commercial (HRC) to facilitate the construction of a convenience store with fueling station islands, with 2 additional retail users. She stated that the requested uses were in line with the Future Land Use Map (FLUM), as the current designation was Corridor Mixed Use, which provides for primary commercial uses. She detailed that the 6,139 square foot convenience store would feature a 4,170 square foot fueling station canopy, with 6 double sided self-serve fueling stations. She noted that in addition to traditional convenience store offerings, there would be a made-to-order food menu, Coffee bar, smoothies, indoor/outdoor seating, and the store would operate 24 hours a day, 7 days per week. Mrs. Clary reported that the site had existing access servicing Sherwin Williams and would also include a right-in/ right-out entrance shared among the subdivided parcels with a pedestrian path along Route 10 for connectivity.

1st Special Use Permit- Article 3.J2.C.7: Drive-thru facility: The applicant is requesting to utilize a drive-thru facility at the convenience store for made to order food or other items from the store.

2nd Special Use Permit- C.20: Waiver of parking and loading: The applicant would like to exceed the maximum number of parking spaces allowed by 7 spaces, providing up to 44 spaces instead of the maximum of 37 spaces.

3rd Special Use Permit – C. 15: Service Station: The applicant would like to utilize one parcel as a 5,500 square foot oil express facility.

Mrs. Clary reported that the application package was favorably recommended to Town Council at the July Planning Commission meeting provided the applicants determine a way to review/ limit the third parcel, and they address the Virginia Department of Transportation's (VDOT's) comments prior to the Council meeting. She stated that the Town Staff suggested a deferral of action on the application as they had not received that confirmation from VDOT.

Mayor Smith stated that the matter was subject to a public hearing and asked if there were any attendees present who wanted to speak.

Robin Niss - Mrs. Niss, whose business address was 4525 Main Street in Virginia Beach, reported that she worked at Kimley-Horn and Associates, the civil engineering firm who had prepared the plan that they were reviewing. She noted that they may have already spoken with her colleague, Randy Royal, who was not able to be present and she would be speaking in his place. She stated that also with her was Jim Sallow, representative from Interstate, who was the landowner, Tony Caruso, representative from Sheetz, and Omar Kanaan, the team's Traffic Engineer. She updated that the team was working with VDOT to understand their traffic requirements. Mrs. Niss offered that if they went with the recommendation to defer action on the application to their next meeting, then they would be able to answer any questions they may have. She reviewed that from an engineering standpoint their plan was well-designed: addressing access to and through the site with no back-up on the roadway, accommodations for stormwater management, and considerations for utility connections. She additionally reported that they were planning to acquire off-site property in order to install roadway improvements, and would be cost participating in the improvements generated by the master Traffic Impact Analysis (TIA)

plan for the area. Mrs. Niss gave the update that currently there was not a third party identified to utilize the other parcel and, as part of the agreement with the Planning Commission, they had agreed and were putting in the form of a proffer that they would present to the Planning Commission any additional users to ensure that the business was not a repetitive use of the property.

Jim Sallow - Mr. Sallow reported that he was the Construction Manager for the developer of the land. He praised the team he worked with and reported that the tenant, Sheetz, was a joy to work with.

Tony Caruso - Mr. Caruso reported that he was a representative of Sheetz, whose address was 13302 Ellerton Terrace in Midlothian. He gave a brief presentation regarding the Sheetz company and their mission.

Vice Mayor Harris asked if they could provide a projection regarding how many jobs they would bring to the locality.

Mr. Caruso stated that there would be both full and part-time positions available, with a move towards more full-time. He stated that over three different shifts he stated that there would be 24 positions to cover, including managerial positions, assistant positions, as well as the full and part-time positions.

Councilman Bowman asked where the last Sheetz built was located in relation to Smithfield.

Mr. Caruso reported that there was a Sheetz open near Petersburg, which was located in Disputanta on Route 460. He stated that there was a Sheetz near the Richmond Airport on Route 64, as well as one in the approval process in Gloucester.

Councilman Bowman related that he had been a patron of Sheetz for many years, and had been saddened to see one location had been sold, and the quality had changed. He said that he hoped that the Town Council approved the application that Sheetz considered the Town of Smithfield a unique place to do business and wouldn't flip the business after several years.

Mr. Caruso stated that he understood the sentiment. He noted that it cost them twice now what it cost them to build five years ago, so the company was very diligent in their reviews of sites.

Councilwoman Bebermeyer pointed out that in the presentation it looked like there would be a car wash at the site, but it looked like that aspect would no longer be included.

Mr. Caruso confirmed that there would not be a car wash at the site.

Councilwoman Bebermeyer asked if there was pedestrian access in the area.

Mrs. Clary reported that they were building a sidewalk, with the idea being that as the development progressed in the area, each new addition would connect to that sidewalk eventually.

Councilwoman Bebermeyer asked if there would be a pedestrian crossing at Benn's Church and Turner Drive.

Mrs. Clary clarified that it would be something that VDOT would have to agree to.
Councilman Cutler asked if they were putting a Tesla charging area at the site.

Mr. Caruso reported that there were currently no plans for charging stations at the site. He related that the Sheetz team had reached out to the third party Electric Vehicle (EV) charging companies - including Tesla - to see if they were interested in placing charging stations at the site. He stated that it was currently difficult to fund EV independently, but that did not mean that they couldn't or wouldn't put EV charging at the site in the future.

Councilman Cutler reported that as EV charging was not as prevalent, it provided an interesting tourism opportunity to have a station providing the service in a place like Smithfield.

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Mayor Smith asked if there was anyone else present who wished to speak on the matter. Hearing and seeing none, he closed the public hearing.

Councilman Cutler confirmed with Mrs. Clary that the application should be deferred to September.

Omar Kanaan - Mr. Kanaan, also with Kimley Horn and Associates, explained that they had begun traffic engineering in December when they met with VDOT and Town Staff. He stated that their first iteration of the traffic study was turned in February 2025, with comments received in March 2025 requesting additional traffic to be analyzed from the approved Wawa and Sweetgrass development. He continued that the revised analysis was submitted. He observed that they revised the information using national standards looking at such things as fueling positions, store size, and restaurant inclusion. He reiterated that they were expecting the final word from VDOT by the next month's meeting.

Councilman Cutler reported that at the previous Planning Commission there had been comments from VDOT reviewed, and there were quite a few.

Mayor Smith confirmed with the Town Attorney that if the action was deferred that the application would not need to return to the Planning Commission.

Councilman Cutler made a motion to defer action on the application to the Council's September meeting. Councilwoman Bebermeyer seconded the motion.

Mayor Smith called for the vote, with seven members present. Councilman Brooks voted aye, Councilwoman Butler voted aye, Councilman Bowman voted aye, Vice Mayor Harris voted aye, Councilwoman Bebermeyer voted aye, Councilman Cutler voted aye, and Mayor Smith voted aye. The motion passed unanimously.

e. Public Hearing: Special Use Permit - 13404 Benns Church Boulevard
Tammie Clary, Director of Community Development and Planning

Mrs. Clary reported that the applicant was seeking a SUP in accordance with Article 3.I.C.33 in order to operate a Recreational Substance Establishment. She detailed that the applicant would primarily be selling cigars, cigarettes, cigarillos, e-liquid, and e-cigarettes. She reviewed that the Planning Commission favorably recommended this application at their June meeting. She reported that the requested use was not by-right and required an SUP, adding that due to previous illegal activity the owner/business was shut down. Mrs. Clary stated that the Town Staff suggested the removal of all window signs/ tinting, and they should only be allowed to operate Monday through Sunday from 8am until 8pm. She gave the update that the application was unfavorably recommended at the June Planning Commission meeting.

Mayor Smith stated that the matter was subject to a public hearing and asked if there were any attendees present who wanted to speak. Hearing and seeing none, he closed the public hearing.

Councilman Bowman made a motion to deny the application as presented. Councilman Cutler seconded the motion.

Mayor Smith called for the vote, with seven members present. Councilman Cutler voted aye, Councilman Brooks voted aye, Councilwoman Bebermeyer voted aye, Vice Mayor Harris voted aye, Councilman Bowman voted aye, Councilwoman Butler voted aye, and Mayor Smith voted aye. The motion to deny passed unanimously.

g. Public Hearing: Text Amendment - Group Homes
Tammie Clary, Director of Community Development and Planning

Mrs. Clary reported that the proposed text amendment was to Articles 3.A, 3.B, 3.C, 3.D, 3.E, 3.G 3.H, & 3.J2 of the Zoning Ordinance to incorporate group homes as a by-right use, no longer SUP, in each residential zoning districts: Community Conservation, Neighborhood Residential, Suburban Residential, Downtown Neighborhood Residential, Attached Residential, Residential Office, Downtown, PMUD (excluding multifamily dwellings). She reported the application had been favorably recommended to the Town Council by the Planning Commission.

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Mayor Smith stated that the matter was subject to a public hearing and asked if there were any attendees present who wanted to speak.

Councilman Bowman confirmed that the change was in conformance with State Law.

The Town Attorney noted that there was a draft ordinance for their review attached to the agenda.

Councilman Bowman made a motion to approve the application as presented. Councilwoman Bebermeyer seconded the motion.

Mayor Smith called for the vote, with seven members present. Councilwoman Butler voted aye, Councilwoman Bebermeyer voted aye, Councilman Brooks voted aye, Councilman Cutler voted aye, Vice Mayor Harris voted aye, Councilman Bowman voted aye, and Mayor Smith voted aye. The motion passed unanimously.

h. Public Hearing: Text Amendment - Side Yard Setbacks for Cluster Lots
Tammie Clary, Director of Community Development and Planning

Mrs. Clary stated that the proposed Text Amendment was to Article 3.C.F.2.B.2. of the Zoning Ordinance per Dr. Pope's request:

2. Minimum yard requirements:
   A. Conventional lot:
      (1) Front yard: 35 feet
      (2) Side yard: 15 feet
      (3) Rear yard: 35 feet 5 feet (accessory uses)
   B. Cluster lot:
      (1) Front yard: 25 feet
      (2) Side yard: 10 feet 6 feet
      (3) Rear yard: 25 feet 5 feet (accessory uses)

Mrs. Clary stated that the Planning Commission favorably recommended this application at their June meeting.

Mayor Smith stated that the matter was subject to a public hearing and there was one speaker who signed-up for comment.

Amanda Porter - Mrs. Porter of 708 South Church Street in Smithfield said that what she had read was suggesting a side yard setback of 5 feet, and thanked Mrs. Clary for clarifying that it was an increase to 10 feet. She stated that lowering the setbacks would not be in the best interest of the Town. She noted that if there was any future requests for a reduction, they would seriously consider the impact that it would have on the citizens.

Mayor Smith asked if there were any other attendees present who wanted to speak. Hearing and seeing none, he closed the public hearing.

Councilman Bowman made a motion to approve the application as presented. Councilman Cutler seconded the motion.

Mayor Smith called for the vote, with seven members present. Councilman Bowman voted aye, Councilman Brooks voted aye, Councilwoman Butler voted aye, Vice Mayor Harris voted aye, Councilman Cutler voted aye, Councilwoman Bebermeyer voted aye, and Mayor Smith voted aye. The motion passed unanimously.

i. Public Hearing: Text Amendment - Multi Family Residential
Tammie Clary, Director of Community Development and Planning

Mrs. Clary reported that the proposed Text Amendment was to Article 3.F. of the Zoning Ordinance to remove regulations that address attached, townhouse, and duplex units, as they are subject to Attached Residential (AR) regulations. She stated that the Planning Commission favorably recommended this application at their June meeting.

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Mayor Smith stated that the matter was subject to a public hearing and asked if there were any attendees present who wanted to speak. Hearing and seeing none, he closed the public hearing.

Councilman Cutler made a motion to approve the application as presented. Vice Mayor Harris seconded the motion.

Vice Mayor Harris confirmed with Mrs. Clary that the red strikes seen in the information given were redundancies that could be found elsewhere in the ordinance.

Mayor Smith called for the vote, with seven members present. Vice Mayor Harris voted aye, Councilman Cutler voted aye, Councilman Bowman voted aye, Councilman Brooks voted aye, Councilwoman Bebermeyer voted aye, Councilwoman Butler voted aye, and Mayor Smith voted aye. The motion passed unanimously.

j. Public Hearing: Text Amendment - Requirements and Definition of Duplex
Tammie Clary, Director of Community Development and Planning

Mrs. Clary reported that the proposed text amendment was to Articles 3.D, 3.E, and 13 of the Zoning Ordinance to clarify that duplex units are permitted on one parcel (one duplex, two units, per single parcel of land and/or one duplex per 2 subdivided lots). She added that the action also doubled the minimum lot area and the minimum lot width if the duplex is on one single parcel of land. She reiterated that the change was suggested just to offer clarification within the zoning ordinance, and was favorably recommended by the Planning Commission in July.

Mayor Smith stated that the matter was subject to a public hearing and asked if there were any attendees present who wanted to speak. Hearing and seeing none, he closed the public hearing.

Councilwoman Bebermeyer reported that she had been present at the Planning Commission's meeting during the text amendment's discussion. She asked Mrs. Clary to explain again why this change was necessary.

Mrs. Clary reported that the project had been started by the Town Staff to provide clarity within the zoning ordinance.

Councilwoman Bebermeyer said that she understood the concept, but felt she would not be able to explain it herself. She said that she felt that there should be zoning regulations that the average person could understand. She questioned if there was a problem that prompted the change.

Mrs. Clary reiterated that the language was not clear in the zoning ordinance.

The Town Attorney stated that there was not a clear definition prior.

Councilman Cutler countered that it had been defined.

The Town Attorney stated that the amendment made sense.

Councilwoman Bebermeyer said that she would argue that it did not.

Councilman Cutler said that he had reviewed the amendment with the Planning Commission and the concerns that he had were addressed regarding making the overall lot size smaller, thereby increasing density. He noted that the Planning Commission had worked to stop that from

occurring, and what they were seeing in the draft document was the lots remained the same size-wise. He affirmed that the density could not be changed through the mechanism because the lot sizes and lot widths were all the same. He agreed that it seemed to be a solution to a problem that did not exist.

Vice Mayor Harris made a motion to approve the application as presented. Councilman Bowman seconded the motion.

Mayor Smith called for the vote, with seven members present. Councilman Brooks voted aye, Councilwoman Butler voted aye, Councilwoman Bebermeyer voted nay, Councilman Cutler voted aye, Councilman Bowman voted aye, Vice Mayor Harris voted aye, and Mayor Smith voted aye. The motion passed by a majority of 6/1.

k. Public Hearing: Text Amendment - Home Occupation
Tammie Clary, Director of Community Development and Planning

Mrs. Clary reported that the This is a proposed Text Amendment to Article 2.U.15 of the Zoning Ordinance to remove author, composer, computer programmer, salesperson, and telephone answering service as home occupation uses. She stated that the Planning Commission favorably recommended this application.

Mayor Smith stated that the matter was subject to a public hearing and asked if there were any attendees present who wanted to speak. Hearing and seeing none, he closed the public hearing.

Councilwoman Bebermeyer thanked Mrs. O'Berry for bringing the issue to light, and they were looking to correct something that should not have been an issue.

Councilman Cutler made a motion to approve the application as presented. Councilwoman Bebermeyer seconded the motion.

Mayor Smith called for the vote, with seven members present. Councilwoman Bebermeyer voted aye, Councilman Brooks voted aye, Councilman Bowman voted aye, Vice Mayor Harris voted aye, Councilwoman Butler voted aye, Councilman Cutler voted aye, and Mayor Smith voted aye. The motion passed unanimously.

l. Motion to Accept the Nominating Committee's Recommendation to Fill the Unexpired Term of Bill Davidson on Planning Commission
Councilman Brooks / Councilwoman Butler

Mayor Smith reviewed that Councilman Brooks and Councilman Butler had been nominated to the Committee to fill the unexpired term of Bill Davidson on the Planning Commission.

Councilman Brooks stated that after review of the Talent Bank forms and discussion, the Nominating Committee nominated Dr. Herb Bevan to the Planning Commission.

Vice Mayor Harris made a motion to approve the nomination of Herb Bevan to the Planning Commission. Councilman Cutler seconded the motion.

Mayor Smith called for the vote, with seven members present. Councilman Brooks voted aye, Councilwoman Butler voted aye, Councilman Bowman voted aye, Vice Mayor Harris voted aye, Councilwoman Bebermeyer voted aye, Councilman Cutler voted aye, and Mayor Smith voted aye. The motion passed unanimously.

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m. Approval of the Town Council Summary Minutes of July 1st, 2025
William Riddick, Town Attorney

The Town Attorney reported that he had reviewed the minutes, and recommended that they be approved as presented.

Vice Mayor Harris made a motion to approve the minutes as presented. Councilman Cutler seconded the motion.

Mayor Smith called for the vote, with seven members present. Councilman Cutler voted aye, Vice Mayor Harris voted aye, Councilman Bowman voted aye, Councilwoman Butler voted aye, Councilman Brooks voted aye, Councilwoman Bebermeyer voted aye, and Mayor Smith voted aye. The motion passed unanimously.

9. New Business

Councilman Cutler reported that he had several items to discuss. He said that he would like to task the Town Manager with developing a task-tracking process for the items assigned by the Town Council for completion. He stated that one way to achieve accountability for assigned tasks was through the minutes; however, he would rather leave it to the Town Manager to determine a long-term solution that will carry through the turn-over of Council members and administrators. He acknowledged that such an item may be more appropriate for discussion at the Committee meeting level. Councilman Cutler listed the tasks that he had discussed earlier during the Council Comments section of the agenda: reassessing the closed session process to include clarification during pre-vote and minute-taking during the session, direct-report evaluations of the four personnel discussed, and finally the creation of town planning recommendation guidelines for recommending approval.

Vice Mayor Harris stated that based on the information discussed earlier in the meeting, he would like to make a motion to empower the Town Manager to refund any application within the last year under "home occupation" as it related to the ordinance change effective August 5, 2025. Councilman Cutler seconded the motion.

The Town Attorney advised that he was unsure whether they could refund Mrs. O'Berry her application fee, as the ordinance had simply not been updated. He said that if he found that the action was lawful, and they had made the motion, then they could proceed.

Mayor Smith called for the vote, with seven members present. Councilman Brooks voted aye, Councilman Bowman voted aye, Vice Mayor Harris voted aye, Councilwoman Bebermeyer voted aye, Councilwoman Butler voted aye, Councilman Cutler voted aye, and Mayor Smith voted aye. The motion passed unanimously.

11. Adjournment

The meeting adjourned at 8:29 pm.

_____ _____

Michael Smith - Mayor Lesley King - Town Clerk

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Memo

To: Honorable Mayor & Town Council

From: Ed Heide, Director of Public Works and Utilities

cc: Michael Stallings, Town Manager

Date: August 27, 2025

Re: Cypress Creek Bridge Waterline work

The attached invoice is from Lewis Construction of Virginia in the amount of $25,923.60 for the replacement of waterlines in the vicinity of the Cypress Creek Bridge.

During a regular inspection of the waterlines under the bridge it was noted that the coupling that allows the 8” waterline to pass through the south abutment was significantly degraded. We requested permission at that time from VDOT and Crofton to work under the current lane closure on the bridge.

This gave us an opportunity to replace degraded infrastructure and save the taxpayers the cost and headache of the traffic control for this work.

Lewis Construction Of WATER SEWER DRAIN **Virginia Inc.**
986-2273

7716 Quaker Drive
Suffolk, VA 23437
Voice: 757-986-2273 Fax: 757-986-3536
Suzanne@lcovinc.com

INVOICE

Invoice Number: 0825-1072.2527
Invoice Date: Aug 25, 2025
Page: 1

Bill To:	Ship to:
Town of Smithfield P O BOx 246 Smithfield, VA 23431	Smithfield Bridge Cypress Creek Bridge-VDOT Smithfield, VA 23431

Customer ID	Customer PO	Payment Terms	
Smithfield	Per Jessie/Jeff/Ed	Net 15 Days	
Sales Rep ID	**Shipping Method**	**Ship Date**	**Due Date**
			9/9/25

Quantity	Item	Description	Unit Price	Amount
1.00		44 hrs total labor/equipment from 8/6/25 to 8/21/25	23,700.00	23,700.00
1.00		Diamond saw cut	780.00	780.00
4.00		Truck supplies	75.00	300.00
1.00		Lumber material	158.60	158.60
1.00		Misc. rigging materal	985.00	985.00

Subtotal	25,923.60
Sales Tax	
Total Invoice Amount	25,923.60
Payment/Credit Applied	
TOTAL	**25,923.60**

Check/Credit Memo No:

A finance charge of 1.5% per month(18% annual) on past due invoices.