A G E N D A
ISLE OF WIGHT COUNTY PLANNING COMMISSION
December 12, 2023

1. CALL TO ORDER

INVOCATION

PLEDGE OF ALLEGIANCE

2. ROLL CALL/DETERMINATION OF A QUORUM

BRIAN CARROLL, CHAIRMAN
BOBBY BOWSER, VICE-CHAIRMAN
CYNTHIA TAYLOR
JAMES FORD
JENNIFER S. BOYKIN
GEORGE RAWLS
THOMAS J. DISTEFANO
RICK SIENKIEWICZ
RAYNARD GIBBS
MATTHEW SMITH

3. ACTION ON REQUESTS TO WITHDRAW OR TABLE PENDING AGENDA ITEMS

4. APPROVAL OF AGENDA

5. CONSENT AGENDA

6. CITIZENS' COMMENTS

7. PUBLIC HEARINGS

8. OLD BUSINESS

A. ZA-6-19 Sweetgrass Conditional Planned Development - Mixed Use Rezoning Request

Application of NVR, Inc., applicant, and, Henry Layden, special trustee for the William Grover Yeoman, III Trust, property owner, for a Conditional Rezoning (ZA-06-19) of approximately 250 acres of property with tax map number 32-01-009 located on Benns Grant Boulevard (Rte. 10) from the Rural Agricultural Conservation (RAC) zoning district to the Conditional - Planned Development - Mixed Use (C-PD-MX) zoning district

9. NEW BUSINESS

A. COUNTY ATTORNEY'S REPORT

B. PLANNING DIRECTOR'S REPORT

10. CLOSED MEETING

11. ADJOURNMENT

PLANNING REPORT

APPLICATION:

Application of NVR, Inc., applicant, and, Henry Layden, special trustee for the William Grover Yeoman, III Trust, property owner, for a Conditional Rezoning (ZA-06-19) of approximately 250 acres of property with tax map number 32-01-009 located on Benns Grant Boulevard (Rte. 10) from the Rural Agricultural Conservation (RAC) zoning district to the Conditional - Planned Development - Mixed Use (C-PD-MX) zoning district

ELECTION DISTRICT:

District 1

LOCATION:

The proposed project is located on an approximately 249.47 acre portion of the property with tax map number 32-01-009, also known as the Yeoman tract. The property is bounded to the north by the Town of Smithfield jurisdictional boundary as well as a residential property in the RAC zoning district, and a property in the Conditional-Limited Industrial zoning district which is currently used by the Sherwin Williams Paint Store. The project site is bounded to the west by Benns Church Boulevard (Rte.10), and the remainder of tax map number 32-01-009 is directly across the Rte. 10. The property is bounded to the east by Jones Creek, residential and agricultural property in the RAC zoning district. To the south, it is adjacent residential and agricultural property in the RAC zoning district as well as one property, known as St. Luke's Village, in the C-PD-MX zoning district.

BACKGROUND:

The portion of the property on which the proposed project is located is currently in agricultural and silvicultural use. There is an approximately twenty acre remaining portion on the west side of Route 10 that is also currently in agricultural use. However, a conditional use permit is currently under review for a convenience store and gasoline station on approximately 3.8 acres of the property at the southwest corner of the Turner Drive and Benns Grant Boulevard intersection. The property has historically been used for agricultural and silvicultural uses.

The Planning Commission held a public hearing on the proposed application at

their September 26, 2023, regular meeting. Following the public hearing, the Planning Commission discussed the application and moved to continue their discussion to their next regular meeting in order to allow staff time to provide additional information to the Commission. Staff subsequently sent the list of questions from the Commission to Dr. Chris Coleman at Isle of Wight County Schools. Dr. Coleman responded that additional time was needed to provide responses to the questions.

Staff also met with Fire and Rescue staff to further discuss the operational impact of the projected 349 additional fire and rescue calls from the proposed development. Based on current call volume, staff determined that the additional calls can be absorbed without degradation of service. Staff analysis shows that the development could generate approximately one additional EMS call per day and one additional fire call per week for the northern service area.

In addition, staff also received additional review comments from the Town of Smithfield and the Economic Development Department which are attached to this staff report. Because additional time is needed to provide the requested school information, staff recommended no action for the Planning Commission at their October 24, 2023, regular meeting. Following additional discussion, the Planning Commission voted to continue their discussion of the application to their November 28, 2023, regular meeting in order to allow school staff additional time to provide responses to the list of questions.

Staff updated its assessment of the impact of the proposed development on public facilities based on new information presented since the September 26, 2023, Planning Commission public hearing. Since the Planning Commission's October meeting, Dr. Chris Coleman of Isle of Wight County Schools provided a copy of the new student generation and growth report to the Planning Commission that he presented to the School Board on November 8, 2023. A copy of the report was sent to the Planning Commission via email and is also attached to this staff report.

Staff prepared responses to most of the questions based on information provided by School staff and the November 8, 2023, School Board presentation for the November 28, 2023, Planning Commission meeting. Please find the list of questions followed by staff responses below:

1. **Has schools had any issues with school children coming from the age-restricted neighborhoods? During the meeting, you mentioned that you could pull a report to see if there were any school buses picking up or**

dropping off children in these neighborhoods.

Dr. Coleman will be providing this information.

2. The build-out for the Sweetgrass is six years with a projected 38 non-age restricted townhomes being built each year. How will this impact schools?

The students generated by Sweetgrass would add on average five elementary school students, one middle school student, and two high school students per year for the six year build-out period. According to the County impact model, the development is projected to generate a total of 30 elementary school students, 7 middle schools students and 15 high school students. These students would go to Hardy Elementary, Westside Elementary, Smithfield Middle School, and Smithfield High School. Although there is currently capacity for the students in each school, we have to look at the potential to add incremental operational costs these students may create such as the need for supplies, additional classes to meet demand (i.e., pre-k, CTE, SPED, etc.) because of class size limits and waiting lists, teachers for these additional classes, aids for larger class sizes, fuel, additional bus routes, and drivers, to name a few.

3. What is the actual number of school children generated by Benns Grant? Can you also give numbers for the Crossings condos and the Brewers Station apartments?

The current number of school children generated by Benn's Grant is 363 students. The 240 apartments in Benns Grant are currently under construction. We use four buses to serve the Benn's Grant development. Dr. Coleman will provide the information on Bartlett Station condos and Brewers Station apartments.

4. During the meeting, you mentioned that you were preparing an area plan for the school board that you could also share with the Planning Commission. Do you have a copy of this report available that I could share with the Planning Commission?

A link to the powerpoint presentation from the November 8, 2023, School Board meeting was previously sent to the Planning Commission County email accounts. In addition, a copy of the presentation is attached to this staff report.

5. What are the per capita operational and capital expenses per student? This may require some stakeholder coordination (legal, school, etc.) to distinguish what can reasonably be attributed to a capital expense and may vary from our budgetary definitions. For example, is a student-issued electronic device, chair, desk, etc. capital? Obviously a bus addition would be, so the scope of this answer should include bus capacity and constraints. Also, please specifically address the increased transportation demand the proposed Sweetgrass project would bring.

The operational cost per student is $10,000 of which $5,600 consist of local funds. The County is fully utilizing all of its available buses and is waiting on the delivery of two new buses in April. In addition, staff will be recommending the purchase of 5-6 additional buses in the forthcoming budget. There is time lag of 10-12 months between when an order is placed and when a bus is delivered. Sweetgrass is projected to generate 52 students according to the County's capital impact model which would require additional bus routes to accommodate. The biggest transportation issues we have is vehicle shortage, maintenance issues, and staff shortages.

6. Is there a reasonable projection of added SPED students per added student population (percentage) that require some added capital need? Also consider STEM, CTE, etc.

Currently the school system uses 15% as a projection of added SPED student needs for new student population. Schools currently has a waiting list for CTE classes. CTE classes fall under OSHA oversight, so these programs are limited to 20 students per class, and there aren't enough classes to meet demand.

7. Is it possible to define a student per capita capital/operational expense projection considering all variables? If so, should this be established and updated at some frequency?

For each new student, we could project an additional operational cost of $10,000 per student with another $1,500 to meet additional SPED needs. The school system updates the average cost per student on annual basis. Average capital cost per student can be found in the County's Capital Impact Model.

8. Request the school provide data of current student load, capacity, and projections based on county projected growth. Also, the school is

requested to comment on any recent (last 5 years) mitigation efforts required to maintain adequate classroom occupancy levels (e.g. redistricting, grade level adjustments per school, etc.).

Please refer to the powerpoint presentation on the updated student yield study for current student load, capacity and projections based on current County projected growth. The County is experiencing increased growth in certain areas of the County which has potential impacts on certain schools and grade levels. Total school enrollment is 5,597 as of October 31, 2023. There is a total system-wide school capacity of 7,183 students which represents a 78% utilization rate. If we add the 1,057 projected new students from projects currently under construction as well as those proposed, the utilization rate increases system wide to 93%. However, different schools have different utilization rates. Smithfield Middle School, for example, has a current utilization rate of 95%. The School Board redistricted elementary schools this summer and sent more students to Hardy to provide more room at Carrollton. Even with this measure, there is still not enough room at Carrollton to keep the fourth grade there. We are experiencing increased demand for pre-k, but pre-k classes are capped at 18 students. To go above this number, there needs to be an aid in the classroom which increases operational costs. The school system strives to limit classroom size to 23 students in high school.

9. Request legal opinion on how much school "maneuvering" (redistricting, school grade level service adjustments, etc.) is necessary before a capacity limit requires a significant capital investment in expansion.

The school enrollment projection consultant does not recommend more than a 90% utilization rate. The school system established a 95% utilization rate as a trigger to begin the planning and budgeting process for a capacity expansion.

Current Project Status:

The Planning Commission voted to continue their consideration of the project at their November 28, 2023, regular meeting. School staff will attend the December 12, 2023, meeting to provide additional information to the Planning Commission.

DESCRIPTION:

The purpose of the application is to allow for up to 390 age-restricted single family detached residential units, 225 residential townhomes, and approximately five acres of commercial uses to include up to 18,000 square feet of retail and commercial uses and up to 55,000 square feet of office uses.

The elevations and materials for the residential units are attached to the staff report as Sweetgrass Elevations. Although there are no examples of the single family detached models constructed in the County, there are examples of the townhome models located in the Benn's Grant community. Pictures are attached to the staff report. The proffer statement commits to a master bedroom on the first floor of the age-restricted single family homes. The fiscal impact analysis projects the average sales price of an age-restricted unit to be $305,200 and townhomes to be $258,875.

Retail uses are defined separately in the Zoning Ordinance and are considered a commercial use type. In addition to the proffered retail use, other permitted commercial uses in the PD-MX zoning district could include the following:

- Antique shop;
- Business support service;
- Construction office, temporary;
- Event center;
- Garden center;
- Golf course;
- Itinerant merchant;
- Micro-brewery, distillery, cidery;
- Motor vehicle parts/supply, retail;
- Peddler;
- Personal improvement service;
- Personal service;
- Real estate office, temporary;
- Restaurant, drive-in fast food;

- Restaurant, general;
- Retail sales;
- Studio, fine arts;
- Veterinary hospital/clinic; and
- Wholesale sales.

A copy of the proffered conditions, illustrative concept plan, and other supporting documents are attached to this staff report for your information. Among the proffered conditions are a set of residential and commercial design guidelines as well as a proffer that the age-restricted units will have a master bedroom and bathroom on the first floor. Enforcement of the age-restriction condition and the maintenance for all open space, recreational amenities, stormwater facilities, and landscaping shall be the responsibility of the property owner's association.

Staff assessed the application for its consistency with the County's plans and ordinances as well as potential impacts to natural and cultural resources, public facilities and services. The following is a summary of the projected benefits, potential impacts and any mitigation measures proposed by the applicant.

Environmental Assessment:

The project site lies within the Chesapeake Bay watershed area and has several wetland areas and tributary streams to Jones Creek within it which have been confirmed by the US Army Corps of Engineers. In addition, the Resource Protection Area (RPA) buffer has been confirmed by the Virginia Department of Environmental Quality. There is also a large farm pond created many years ago by a dam that still provides connectivity to the tributary stream.

The Department of Conservation and Recreation has classified the areas containing the streams, wetlands, and Jones Creek as having a "high" (C3) ecological core area score. Ecological core areas are classified into five categories of ecological integrity: C1 - Outstanding; C2 - Very High; C3 - High; C4 - Moderate; and C5 - General. Scores are enhanced if the core or habitat fragment is part of a larger complex of natural lands. Scores also increase for those cores and habitat fragments that contribute to water quality enhancement. In general, larger, more biologically diverse areas are given higher scores.

A review of information from the National Fish and Wildlife Service shows the possibility of several endangered and rare species and species of concern in the

general including the Bald Eagle, the northern long-eared bat, tri-colored bat, red-headed woodpecker, and several other migratory species. Although it is not known whether there are any of these species present on the property, the USFWS information does not identify the property as critical habitat for any of these species.

The Sweetgrass project proposes to retain and restore the full extent of the RPA and floodplain areas that are within the ecological core area except for several access road crossings. The lot area as shown on the concept plan do not contain RPA buffer areas. Future construction on the property may be subject to time-of-year restrictions based on the breeding and migratory needs of critical species.

A review of the USDA soils information shows that the areas proposed for development will occur on soils designated either soils of statewide importance or prime farmland soils. Poorly drained soils occur in and near the wetland, stream and floodplain areas of the property. Prior to construction, all habitable structures will require a shrink/swell soils assessment for foundation design.

Even though the concept plan and water quality impact assessment (WQIA) submitted with the project propose impacts for road crossing and stormwater management impacts, these impacts are subject to a separate review and approval process. Although the concept plan notes these impacts are subject to additional review and approval, staff does not include the WQIA as part of the rezoning approval request, because it will be submitted as part of a future RPA Buffer modification application.

Historic Resources Assessment:

The property falls within the high probability area for archeological resources according to County records. The applicant provide a Phase 1A Cultural Resources Analysis study with their initial application. A copy of the report is attached, however, the staff request for a final report without the word "draft" on it has gone unheeded as of the date of this report. The report states that there are no known archeological resources on the site, however, several of the existing out buildings may be of an historic nature and recommends that a Phase I be conducted. The applicant commits to a Phase I study with further Phase II and Phase III studies as appropriate in the proffer statement. These studies shall be submitted prior to subdivision or site plan submittal and shall be subject to review by the Virginia Department of Historic Resources. County Historic Resources staff concerns are satisfied with the proffered condition.

Transportation Facility Impacts:

All of the streets within the proposed project will be public streets, except for the private drive aisles within the townhome phase which are proposed for a condominium style of ownership. All public roads will be required to be built to the Virginia Department of Transportation (VDOT) standards in order to be accepted into the state secondary street system maintenance program. The project proposes two entrances to serve the development from Benn's Church Boulevard (Rte. 10).

The main entrance will be closest to the Smithfield Town boundary and will utilize an existing median cut. The Traffic Impact Analysis (TIA) recommends and the applicant proffers to a signal at this intersection. The second southern entrance will be a right in/right out entrance only with no signal.

The TIA shows the new development would add an average of 6,685 new vehicle trips per day. The average number of new peak hour morning (6 AM to 8 AM) trips would be 521 trips and new peak hour evening (2:30 PM to 5:30 PM) trips would average 692.

The TIA projects that traffic generated by the development will exceed current turn lane storage length at Turner Drive and Benns Church Boulevard as well as create a need for a new traffic signal and increased turn lane storage at the main entrance of Sweetgrass. The TIA recommends the following traffic improvements be made to mitigate for the projected negative traffic impacts:

1. Construct northbound right turn lane (200' storage plus 200' taper) into right in/right out development entrance off of US 258/Rt 10 (Benns Church Boulevard).
2. Construct northbound right turn lane (200' storage plus 200' taper) into main entrance off of US 258/Rt 10 (Benns Church Boulevard).
3. Lengthen southbound left turn lane to provide 200' storage plus 200' taper into main entrance off of US 258/Rt 10 (Benns Church Boulevard).
4. Install traffic signal at intersection of US 258/Rt 10 (Benns Church Boulevard) and main entrance.
5. Install signal infrastructure to provide a protected eastbound right-turn overlap at US 258/Rt 10 (Benns Church Boulevard) and Turner Drive.
6. 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 main entrance

to allow lead/lag operation.
7. Optimize signal timings along the corridor.

The applicant has committed to making the recommended road improvements in the proffer statement. The proffered conditions address earlier concerns from VDOT and the County Transportation Manager.

As a matter for informational purposes, the County is currently coordinating a master TIA project for the Benn's Church Boulevard and Turner Drive intersection area that will assess needed road improvements to accommodate future commercial, residential and school development planned in both the County and Town of Smithfield. The Sweetgrass applicants are currently not participating in this project.

Emergency Services, Fire and Public Safety Facility Impacts:

The County Capital Impact Model does not show that the proposed development will generate a need for additional capacity at existing fire and rescue or public safety facilities in the northern service area where the project site is located. However, the capital impact model does not show operational impacts, such as additional staff, equipment or supply needs, to these services.

The County's Department of Fire and Rescue reviewed the proposed development as currently proffered and found that the department will see a significate increase in calls for service. The projected annual increase is 349 calls for service with 296 additional EMS calls and 53 additional Fire calls. Since the public hearing at the September Planning Commission meeting, Community Development staff met with Fire and Rescue staff to analyze operational impacts more closely. Fire and Rescue staff concluded the projected increase in call volume would not be detrimental to the County's current level of service.

School Facility Impacts:

The County Capital Impact Model shows that the proposed development will generate approximately 52 new school students with thirty new elementary school students, seven new middle school students, and fifteen high school students. Although the model shows Sweetgrass generating a need for capacity expansion at the middle school, Dr. Chris Coleman with the Isle of Wight School System stated that there is remaining capacity at the middle school to accommodate the projected number of new students. The new Westside, planned to function as a new middle school, remains in the CIP with an estimated total cost of $38 million.

Please note the capital impact model does not show operational impacts, such as additional staff, equipment or supply needs, to these services.

Parks and Recreation Facility Impacts

The County Capital Impact Model shows that the proposed development will generate approximately 1,297 new people which will create a need for additional regional park, neighborhood park, recreational center, community center, and event center recreational facility space. However, the proposed development will include 9.87 acres of pocket park and central park space as well as a community clubhouse facility, pool, play equipment and pedestrian trails throughout the community to help meet this need. The development will also be required to install its portion of the multipurpose trail along its road frontage with Benn's Church Boulevard. The applicant also proposes to preserve the RPA buffer and floodplain to the maximum extent possible which greatly increases the amount of open space in the neighborhood.

Economic Impact Assessment:

While the County's Capital Impact Model reviews impacts to public facilities only, a fiscal impact analysis compares revenues generated from the project with both the operating and capital costs to a jurisdiction associated with the provision of public services and facilities to serve the new development. It includes all direct revenues and costs associated with the development proposal.

The June 2021 Fiscal Impact Analysis submitted with the application assumes an annual absorption of 65 age-restricted single family units per year and 38 townhouses is assumed in the analysis with a six year build-out. The report states that the average projected price of an age-restricted unit will be $305,200 and townhomes will be $258,875. The FIA concludes that the proposed development, to include both the residential and commercial uses, will generate $43.6 million in revenue compared to $22.7 million in expenditures over a 20-year period, generating a $20.9 million net surplus. Costs include ongoing annual operating expenditures and capital costs that include debt financing with payments that continue beyond the last year in the model projection period. The average annual revenues are estimated at $1.05 million per year. No job creation data was included in either the FIA or community impact statement.

To address staff's concern in regard to market saturation of age-restricted housing units in the County, the applicant submitted a market analysis report. The County

currently has several age-restricted communities, including the 340 unit South Harbor development in Carrollton and Church Square in the Town of Smithfield. The 2021 market report states Sweetgrass will draw interest from a broad geographic area, and census data shows 61,234 persons over the age of 55 in that market area. An average of 13% of this population will desire a living or lifestyle change every year. That produces 6,665 potential buyers per year. The applicant's experience suggests that it will capture a minimum of 10% of this market equating to 67 units per year just for the age-restricted housing.

Viewshed Analysis:

The applicant provided several viewshed renderings showing the perspective from Route 10 as to what the proposed residential buildings will look like after project completion. According to the applicant, many of the residential buildings will be similar to the styles Ryan Homes built in Benn's Grant. Examples of a commercial facade are included in the commercial design guidelines. The renderings are included as an attachment to the staff report. The conceptual site plan also includes a recreational greenspace along Route 10 which will preserve a terminal vista down to the pond and woodland at the rear of the property, preserving a portion of the historical landscape within the proposed development.

Staff Findings

After assessing the project's consistency with the County's Plans, Ordinances and current level of service of public facilities available to current County residents, staff found the application generally consistent with the future recommended land use found in the 2020 Comprehensive Plan and was capable of meeting ordinance requirements. However, staff found that the proposed residential uses may negatively impact existing public facilities and services, such as fire and rescue services and school facilities until such time as public expenditures are made to increase facility and operational capacity.

The Comprehensive Plan projects the County population to reach 45,200 people by 2040. To meet the housing needs of the County's growing population, there will be a need for an additional 2,567 residential units based on the 2022 average of 2.3 people per household.

According to the US Census Bureau, the County had 17,085 existing housing units in 2022 . County records that same year show approximately 2,497 additional units approved but not yet constructed. The County's 2022 total population is estimated to be 40,151 people, representing a 2% average growth rate since the

2020 Census. This rate is double the initial projected rate of 1% a year. Although the number of approved units appears to meet the currently projected future need, a reassessment of the number of housing units needed may be in order, if the future growth trend exceeds expectations, barring any economic downshifts similar to 2008. A table showing current residential projects is attached to the report.

COMPREHENSIVE LAND USE PLAN:

The subject property is located in the Newport Development Service District (DSD), an area described in the Comprehensive Plan as a focus area for future growth in the County. The Land Use Plan ("Envision the Isle" chapter) designates the property for future Mixed Use (MU) as part of the larger mixed-use activity center surrounding the intersection of Carrollton Boulevard and Benns Church Boulevard. Mixed use areas are described generally in the plan as comprised of "housing mixed with office, commercial, and other uses…located on major transportation routes and at major intersections." The plan describes future residential development anticipated in these areas as "a mix of detached and attached single family residences, multiplexes, townhomes, and apartment style residences, [having] community amenities and preserved natural features" up to density of 14 dwelling units per acre or higher.

The project as conceptually designed accomplishes several Comprehensive Plan policies regarding the preservation of natural resources. The Plan states that mixed-use areas should include abundant open spaces which preserve natural features (e.g., mature forest cover, wetlands, etc.) and create active- and passive-use recreational amenities such as walking and multi-use trails, playgrounds, open spaces, and natural areas for residents of the community.

The proposed development and its proximity to commercial areas help implement policy statements and accomplish the purposes of the Plan's Newport DSD and Urban Development Area (UDA) designations with respect to housing. The Plan's housing policies and actions aim to provide opportunities for a variety of housing types for people of all incomes, backgrounds, and ages, and to increase opportunities within DSDs for residences to be in close proximity to retail, employment, and public facilities such as schools and parks. The proposed rezoning, therefore, is considered consistent with the Comprehensive Plan.

ORDINANCE REVIEW:

The applicant requests a conditional zoning to the Planned Development-Mixed Use zoning district. In addition, the development also lies within the Newport Development Service and Chesapeake Bay Preservation Area Overlay Districts which require additional performance criteria over and above the underlying zoning district regulations. According to the Zoning Ordinance, all PD-MX areas are also designated urban development areas (UDA) which must meet minimum UDA and Traditional Neighborhood Design requirements in the Zoning and Subdivision Ordinances, such as minimum densities, floor area ratio, open space area, and pedestrian access facilities.

Staff reviewed the proffered residential and commercial design guidelines as well as the conceptual master plan for consistency with the County's Zoning and Subdivision Ordinances. Should the the zoning request be approved, the applicant will be required to submit subdivision plats, construction plans, signage plans, RPA buffer modification applications, and building plans in accordance with the proffered conditions, Zoning, and Subdivision Ordinances.

AGENCY REVIEW:

The application was forwarded to the following departments for their review:

- Economic Development: No concerns.
- Emergency Services: Comments have been incorporated in the project description above. A copy of the comments are also attached to this staff report.
- Utility Services: No concerns.
- Isle of Wight County Museum: No concerns with the application, provided that the proffered archeology condition is followed.
- Virginia Department of Transportation (VDOT): No concerns with the application, provided that the proffered transportation conditions are followed.

Please note that, should the conditional zoning request be approved, the project will be subject to subdivision and site plan review from all applicable agencies.

STAFF CONCLUSIONS:

Strengths:

1. The application is generally consistent with the Comprehensive Plan and can meet all ordinance requirements.

2. The project proposes to preserve the RPA buffer area and floodplain to the greatest extent possible.
3. The proposed development will provide over 9.89 acres of park, trails, community center, pool and play areas to provide parks and recreation services.
4. The applicant proffers that all age-restricted units will have a first floor master bedroom and bathroom which will help facilitate age-friendly housing.
5. The development will include up to 18,000 square feet of retail and commercial uses as well as 55,000 square feet of office which will create employment opportunities and additional revenues to meet public facility and service needs.
6. The conceptual site plan also includes a recreational greenspace along Route 10 which will preserve a terminal vista down to the pond and woodland at the rear of the property, preserving a portion of the historical landscape within the proposed development.

Weaknesses:

1. The proposed residential uses may negatively impact school operations and facilities, such transportation, until such time as public expenditures are made to increase facility and operational capacity.
2. It is unclear what existing historical and cultural resources exist on the project site which may impact the final layout and design of the community.

STAFF RECOMMENDATION:

Based on the weaknesses listed above, staff recommends denial of the rezoning request.

ATTACHMENTS:

Description	Type	Upload Date
Application	Backup Material	9/6/2023
Land Use Narrative	Backup Material	9/6/2023
Community Impact Statement	Backup Material	9/6/2023
Sweetgrass Proffer Statement exec 090823	Backup Material	9/8/2023
Residential Design Guidelines Aug 18 2023	Backup Material	9/8/2023
Commercial Design Guidelines	Backup Material	9/8/2023
Sweetgrass Concept Plan Aug 2023	Backup Material	9/8/2023
Sweetgrass Traffic Impact Analysis 2023 Update	Backup Material	9/6/2023
Sweetgrass TIA 2021 Supplemental	Backup Material	9/6/2023
Sweetgrass TIA 2019	Backup Material	9/6/2023

Wetland Confirmation	Cover Memo	9/6/2023
Water Quality Impact Assessment	Backup Material	9/6/2023
Fiscal Impact Analysis	Backup Material	9/6/2023
Fiscal Impact Analysis Update	Backup Material	9/6/2023
Market Analysis	Backup Material	9/6/2023
Sweetgrass VIsual Impact Analysis June 15, 2023	Backup Material	9/19/2023
Sweetgrass Elevations	Backup Material	9/19/2023
Townhome model 1	Backup Material	9/19/2023
Townhome model 2	Backup Material	9/19/2023
Cultural Resources Assessment 2022	Backup Material	9/6/2023
VDOT Final Comments Aug 2023	Backup Material	9/6/2023
Residential Development Project list	Backup Material	9/19/2023
PC Resolution	Resolution	9/26/2023
Schools Revised Review Comments 092623	Backup Material	9/26/2023
Smithfield Review Comments	Backup Material	10/18/2023
Economic Development Review Comments	Backup Material	11/21/2023
Schools Enrollment Info	Backup Material	11/15/2023
Memo to Planning Commission Oct 23	Cover Memo	11/27/2023
Revised Proffer statement received Oct 23	Backup Material	11/27/2023
Revised Residential Guidelines received Oct 23	Backup Material	11/27/2023
Revised Commercial Guidelines Recd Oct 23	Backup Material	11/27/2023
Rte 10 Visual Impact Oct 23	Backup Material	11/27/2023
Updated FIA memo Oct 23	Backup Material	11/27/2023
Updated Master Plan Oct 23	Backup Material	11/27/2023

ISLE OF WIGHT
COUNTY, VIRGINIA
DEPARTMENT OF PLANNING AND ZONING

APPLICATION FOR REZONING/CONDITIONAL ZONING AMENDMENT

This application should be used to petition for a change to the Official Zoning Map or for an amendment of zoning conditions. The following application requirements are consistent with the procedures set forth in Section 1-1015, *Amendments*, of the Isle of Wight County Zoning Ordinance, as amended.

A. APPLICATION FOR (CHECK ALL THAT APPLY):

[ ] Rezoning

[X] Conditional Rezoning (Are voluntary proffered conditions attached?): X Yes _____ No

Request to change the subject property(s) from the RAC to the PD-MX zoning district.

Proposed Use or Activity: Single Family Detached Homes and Townhomes with commercial outparcel as more particularly described in the accompanying submittal materials.

[ ] Amendment to Conditional Zoning

Request to change conditional zoning as follows (Attach current and proposed conditions): _____

B. PROJECT DESCRIPTION:

Project Name: Sweetgrass

Property Address (if any): 14096 Benns Church Boulevard

Election District: Windsor Legal Reference: _____

Deed Book#_____ Page#_____ Instrument #000000662

Comprehensive Plan Designation: _____

The rezoning will apply to 250 ** acres out of 250 ** total acres **North of Route 10

Tax Parcel Identification # 32-01-009 Number of Acres to be Rezoned: 250**

Requesting Zoning District Change from: RAC to PD-MX

Tax Parcel Identification # _____ Number of Acres to be Rezoned: _____

Requesting Zoning District Change from: _____ to _____

Tax Parcel Identification # _____ Number of Acres to be Rezoned: _____

Requesting Zoning District Change from: _____ to _____

Proposed Utilities (check all that apply): Public Water _____ Private Well _____

Public Sewer _____ Private Septic _____

C. **APPLICATION INFORMATION:**

Applicant(s) Name(s): NVR, Inc. Attn: Eric Shirey

Address: 860 Greenbrier Circle, Suite 100

City, State, Zip Code: Chesapeake, VA 23320

Phone No.: 757.603.0802 Email: eshirey@nvrinc.com Fax No.:

Property Owner(s) Name(s): Henry Layden, special Trustee of the William Grover Yeoman, III Trust, dated December 14, 2007, as amended

Address: 1801 S. Church Street, Suite 7

City, State, Zip Code: Smithfield, VA 23430

Phone No.: Email: Fax No.:

Applicants/Owners Affidavit (including compliance with all deed restrictions and covenants)

This application must be signed by the owner(s) of the subject property or must have attached written evidence of the owner's consent, which may be in the form of a binding contract of sale with the owner's signature or a letter signed by the owner(s), containing written authorization to act with full authority on the owner(s) behalf in filing this rezoning application. Signing this application shall certify the owner's compliance with all deed restrictions and covenants, and shall constitute the granting of authority of the County to enter onto the property for the purpose of conducting site analyses and compliance with Federal, State and County regulations.

Applicant: NVR, Inc. Attn: Eric Shirey
Printed or Typed Name

Applicant: _____ Date: _____
Signature

County of Isle of Wight, Commonwealth of Virginia

Subscribed and sworn to before me _____,
A Notary Public in and for the County of Isle of Wight,
Commonwealth of Virginia, this ___day of _____, 20___

_____
Notary Public

My Commission Expires_____

Henry Layden, special Trustee of the William Grover Yeoman, III Trust, dated December 14, 2007, as amended
Owner:
Printed or Typed Name

Owner: Henry Layden Date: 6/5/19
Signature

County of Isle of Wight, Commonwealth of Virginia

Subscribed and sworn to before me Elizabeth Dixon Jones,
A Notary Public in and for the County of Isle of Wight,
Commonwealth of Virginia, this 5th day of June, 2019

Elizabeth Dixon Jones
Notary Public

My Commission Expires Dec. 31, 2022

Owner: _____
Printed or Typed Name

Owner: _____ Date: _____
Signature

County of Isle of Wight, Commonwealth of Virginia

Subscribed and sworn to before me _____,
A Notary Public in and for the County of Isle of Wight,
Commonwealth of Virginia, this ___day of _____, 20___

_____
Notary Public

My Commission Expires_____

Owner: _____
Printed or Typed Name

Owner: _____ Date: _____
Signature

ELIZABETH DIXON JONES
NOTARY PUBLIC
Commonwealth of Virginia
Reg. # 7767629
Com. Exp. Dec. 31, 2022

County of Isle of Wight, Commonwealth of Virginia

Subscribed and sworn to before me _____,
A Notary Public in and for the County of Isle of Wight,
Commonwealth of Virginia, this __day of _____, 20__

_____
Notary Public

My Commission Expires_____

C. **APPLICATION INFORMATION:**

Applicant(s) Name(s): NVR, Inc. Attn: Eric Shirey

Address: 860 Greenbrier Circle, Suite 100

City, State, Zip Code: Chesapeake, VA 23320

Phone No.: 757.603.0802 Email: eshirey@nvrinc.com Fax No.:

Property Owner(s) Name(s): Henry Layden, special Trustee of the William Grover Yeoman, III Trust, dated December 14, 2007, as amended

Address: 1801 S. Church Street, Suite 7

City, State, Zip Code: Smithfield, VA 23430

Phone No.: Email: Fax No.:

Applicants/Owners Affidavit (including compliance with all deed restrictions and covenants)

This application must be signed by the owner(s) of the subject property or must have attached written evidence of the owner's consent, which may be in the form of a binding contract of sale with the owner's signature or a letter signed by the owner(s), containing written authorization to act with full authority on the owner(s) behalf in filing this rezoning application. Signing this application shall certify the owner's compliance with all deed restrictions and covenants, and shall constitute the granting of authority of the County to enter onto the property for the purpose of conducting site analyses and compliance with Federal, State and County regulations.

Applicant: NVR, Inc. Attn: Eric Shirey
Printed or Typed Name

Applicant: Eric Shirey Date: 6/13/19
Signature

County of Isle of Wight, Commonwealth of Virginia

Subscribed and sworn to before me Diane Renee Spieker,
A Notary Public in and for the County of Isle of Wight,
Commonwealth of Virginia, this 13 day of June, 2019

Diane Renee Spieker
NOTARY PUBLIC 7581566
Commonwealth of Virginia
My Commission Expires Mar. 31, 2022

Diane Renee Spieker
Notary Public

My Commission Expires March 31, 2022

Owner: Henry Layden, special Trustee of the William Grover Yeoman, III Trust, dated December 14, 2007, as amended
Printed or Typed Name

Owner: Date:
Signature

County of Isle of Wight, Commonwealth of Virginia

Subscribed and sworn to before me ,
A Notary Public in and for the County of Isle of Wight,
Commonwealth of Virginia, this day of , 20

Notary Public

My Commission Expires

Owner:
Printed or Typed Name

Owner: Date:
Signature

County of Isle of Wight, Commonwealth of Virginia

Subscribed and sworn to before me ,
A Notary Public in and for the County of Isle of Wight,
Commonwealth of Virginia, this day of , 20

Notary Public

My Commission Expires

Owner:
Printed or Typed Name

Owner: Date:
Signature

County of Isle of Wight, Commonwealth of Virginia

Subscribed and sworn to before me ,
A Notary Public in and for the County of Isle of Wight,
Commonwealth of Virginia, this day of , 20

Notary Public

My Commission Expires

NOTICE: THE ATTACHED CHECKLIST MUST BE COMPLETED, CERTIFIED, AND SUBMITTED OR THE APPLICATION WILL BE CONSIDERED INCOMPLETE.

Remit Application to: Isle of Wight County Department of Planning and Zoning, 17140 Monument Circle, Suite 201 P. O. Box 80, Isle of Wight, Virginia 23397

FOR OFFICE USE ONLY:

Complete Application Received On: _____ Fees Paid: _____
Tax Query: [ ] Current [ ] Delinquent Posted/Date to Post: _____

AGENCIES REFERRALS:

_____ Department of Conservation & Recreation
_____ Economic Development
_____ Emergency Services
_____ Engineering
_____ Environmental Planner
_____ Health Department
_____ Other _____

_____ Inspections
_____ Sheriff's Office
_____ Town of Smithfield
_____ Town of Windsor
_____ VDOT
_____ Budget & Finance
_____ County Attorney

Verified By: _____ Date: _____

SWEETGRASS
LAND USE NARRATIVE

14096 Benns Church Boulevard

February 21, 2020

The Applicant, NVR Inc. d/b/a Ryan Homes, was founded in 1948 in Pittsburgh, Pennsylvania to provide housing in the expanding post-war economy. For more than 70 years Ryan Homes has been building exceptional, award-winning homes – one home at a time. What began as a small, family-run business in Pittsburgh has evolved into one of the top builders in the nation. Today, Ryan Homes builds homes in 32 metropolitan areas in 14 states, as well as Washington D.C., and has constructed more than 400,000 homes. The success of Ryan Homes is built upon unparalleled customer service, innovative, award-winning designs, quality construction, affordable prices and unique communities in prime locations. It's no coincidence a large percentage of the homes Ryan Homes sells are a direct result of customer referrals.

Ryan Homes has been building new homes in Isle of Wight County for many years and is very attracted to the sound governance and quality of life the County has to offer its customers. Accordingly, Ryan Homes is excited to present "Sweetgrass" to Isle of Wight County and strongly desires to continue a mutually beneficial relationship with the County. Similar projects include Benn's Grant and Lakeview Cove in Isle of Wight, Stonehouse and Candle Station in James City County, Arbordale and Silverwood in York County, and Culpepper Landing in Chesapeake.

The property upon which Sweetgrass is envisioned is located at 14096 Benns Church Boulevard in the Windsor District of Smithfield. The site contains approximately 249.47 acres located on the East side of Benns Church Boulevard (Parcel ID # 32-01-009) and is currently zoned RAC – Rural Agricultural Conservation. The property is described by deed as lying on the East side of State Highway No. 10, and bounded by said Highway, the lands now or formerly of Daisy M. Bunkley, Philip F. Edwards, Jones' Creek, the lands now or formerly owned by George Yeoman, Christine Jordan, C. E. Johnson, J. F. Minton and others, and being a portion of the same land of which E. K. Batten and Maggie E. Batten, his wife, died seized and possessed, and is more particularly shown on the Applicant's Master Plan.

As the County's commercial hub in the Smithfield area evolves with the "new" economy, it is important to put consumers and employees in close and convenient proximity to such economic centers. Sweetgrass is strategically positioned on the fringe of the commercial hub for the area and will serve to ensure its success by avoiding sprawl and placing a population center with convenient access to one of the County's primary business districts.

The proposal consists of 400 age-restricted single family homes, 285 non age-restricted townhomes, and a parcel reserved for business/commercial uses. The Applicant's Master Plan, Elevations, and Proffers are intended to present a high quality aesthetic that will contribute to and enhance the appearance of the corridor. The proposed site design incorporates the property's natural beauty and ponds into the creation of view sheds and recreational areas for the project which include large contiguous areas of open space, walking trails, clubhouse and pool, and dog park. The Applicant's Traffic Study indicates that, with the proffered improvements, an acceptable level of service will be maintained on adjacent roadways. Finally, the Applicant's Fiscal Impact Analysis projects that the project, at build out, will generate net positive revenue to the County in the amount of approximately $1.2 million per year.

CONSULTING ENGINEERS

5248 Olde Towne Road, Suite 1
Williamsburg, Virginia 23188
Phone (757) 253-0040
Fax (757) 220-8994
aesva.com

Community Impact Statement

Conditional Rezoning

For

Sweetgrass Development

Prepared For

NVR, INC
860 Greenbrier Circle, Suite 100
Chesapeake, Virginia 23320

And
Timothy O. Trant II
Kaufman & Canoles
11815 Fountain Way, Suite 400
Newport News, Virginia 23606

April 2019
Revised October 2021

AES Project Number: W10516-00

Prepared by:

CONSULTING ENGINEERS

5248 Olde Towne Road Suite 1
Williamsburg, Virginia 23188
Phone: 757-253-0040
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ATTACHMENTS

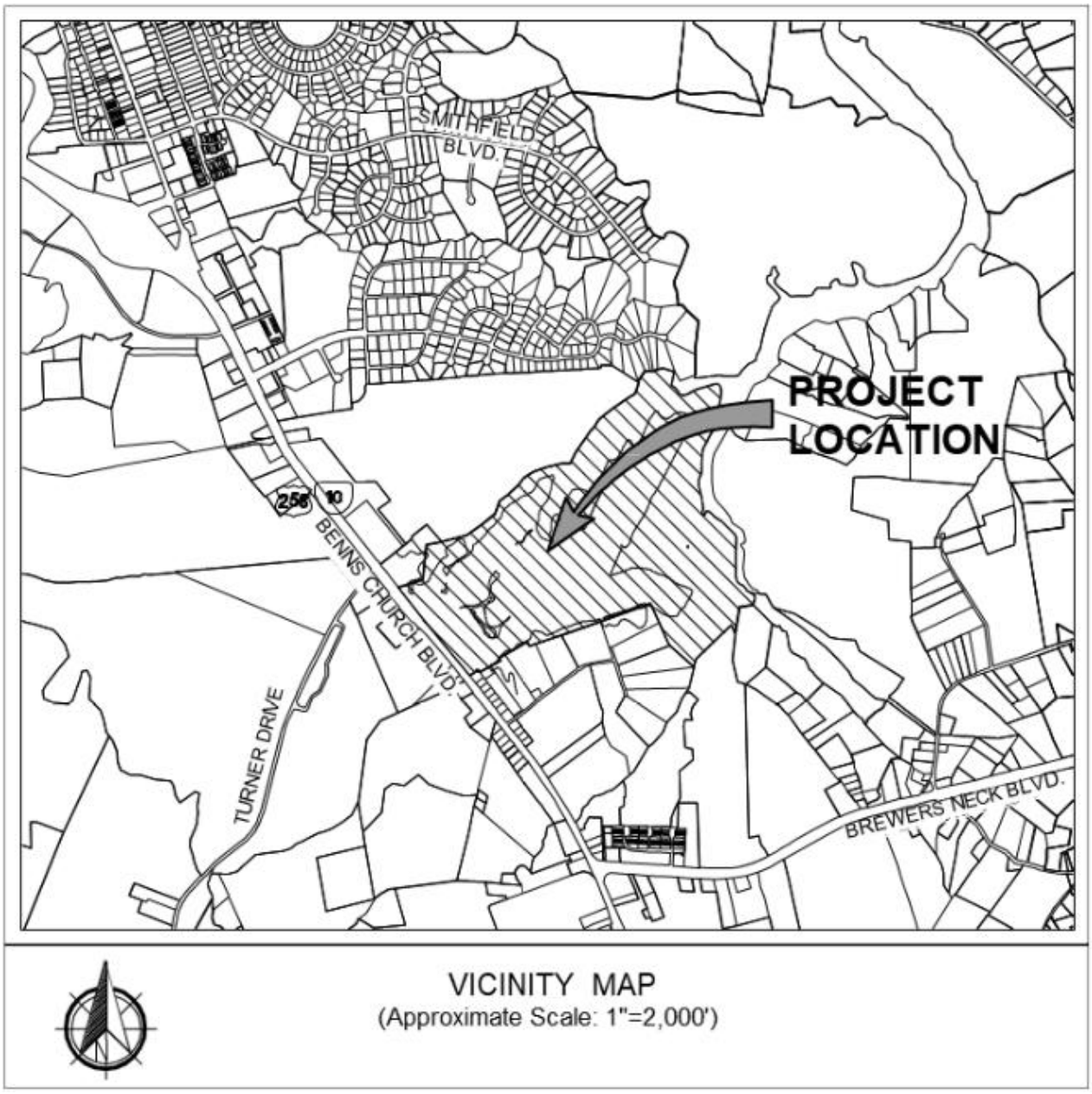
Appendix A Fiscal Analysis
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I. INTRODUCTION

The property owner, on behalf of NVR, Inc., proposes to request a conditional rezoning of their parcel within the Windsor Magisterial District containing 249.47 acres located on the east side of Benns Church Boulevard. The property is currently zoned RAC (Rural Conservation District) and the proposed zoning would be to convert the property to PD/MX (Planned Development Mixed Use) at 14096 Benns Church Boulevard, Smithfield Virginia.

The site is currently undeveloped, with a large portion of the property is in active crop land. The property is fully within the County of Isle of Wight but the property borders the Smithfield town limits to the North, Jones Creek to the East, single family subdivision to the South and Benns Church Boulevard (Route 10/Route 258) to the West. The site contains existing ponds which discharge to the existing Jones Creek. The average soils slope 2% to 6%. The site is within the Peanut Soil and Water Conservation District and has a hydrologic unit code of JL41 which represents the Pagan River-Jones Creek drainage areas.

Exhibit 1 – Location Map



II. THE PROJECT TEAM

The organizations that participated in the preparation of the information provided in this impact study are as follows:

- Developer - NVR, LLC
- Planning/Engineering - Jason Grimes, AES Consulting Engineers
- Legal - Tim Trant, Kaufman & Canoles
- Environmental - Bob Kerr, Wetlands Solutions
- Traffic - Kristen Tynch, VHB
- Fiscal - Julie Herlands, Tischler Bise

Key components of this Community Impact Study are:

- Planning Considerations, Project Description and Density Analysis
- Analysis of Impacts to Public Facilities and Services
- Environmental Inventory
- Traffic
- Fiscal Impact Study
- Visual Impact Study

III. PLANNING CONSIDERATIONS AND PROJECT DESCRIPTION

Planning Considerations

This parcel fronts on Benns Church Boulevard and contains 249.47 acres of wooded and cropland areas. Existing Zoning is currently Rural Agricultural Conservation (RAC). With this proposal, we are making a conditional request to rezone the property to Planned Development Mixed Use (PD-MX) zoning. According to the 2020 Comprehensive Plan this site is within the Newport Development Service District (DSD) and the Highway Corridor Overlay District. Additionally, the property falls within the Urban Development Area (UDA).

Project Description

The developer is proposing a development of the entire parcel of 249.47 acres. Under the conditional zoning, there will be a mixture of uses; from Commercial and Townhomes along Benns Church Boulevard to single family detached homes and Townhomes with multiple recreation areas and a large park area at the central core of the property. The development areas within the project will be built in a more urban nature in keeping with the proposed zoning; small lots, sidewalk lined grided streets, pocket parks, centrally located amenities and large perimeter open area will be provided.

Project Phasing

The developer is proposing to develop this project in phases over the course of the next 5 years and bring on to market a mix of unit types and price points of homes with the goal of bringing online 150 units a year. Amenities and offsite improvements will be brought online as the development size increases and as outlined in the project proffers. A phasing plan is provided showing a general anticipated phasing (Appendix E).

IV. ANALYSIS OF IMPACTS TO PUBLIC FACILITIES AND SERVICES

Public water and public sanitary sewer services (and other public services such as police, fire and life rescue) are presently provided to parcel within Benns Church Blvd.

A. Public Water Facilities

The subject property will be served with public drinking water by the existing water main along Benns Church Blvd as indicated on 2020 Comprehensive Plan (Water Service Areas). The general location of the water system and fire hydrants have been provided on the master plan.

Water consumption for the proposed project is estimated at 197,650 gallons per day. Peak Hour Water Demand for this project is estimated at 32,942.4 gallons per hour (approximately 549.04 gallons per minute). See Table 1 below for details of the projected water usage.

Table 1 – Projected Water Usage

Type of Development	No. of Units	Flow (GPD/Unit)	Average Flow (GPD)	Duration (hrs)	Avg Flow (GPM)	Peak Flow* (GPM)
Single-Family	390	310	120,900	24	83.96	335.84
Townhomes	225	310	69,750	24	48.44	193.76
Office/ Commercial	35,000	0.2	7,000	12	4.86	19.44
Total			197,650		137.26	549.04

*Peak Flow = 4 * Avg. Flow

B. Public Sewer Facilities

The subject property will be served with public sewer by the existing force main along Benns Church as indicated on 2020 Comprehensive Plan (Sewer Service Areas). A single centrally located sewage lift station is planned to service the community.

The estimated average daily flow generated from the proposed development is 197,650 gallons per day (GPD) with a peak flow rate of 345.57 gallons per minute (GPM). See Table 2 below for details of projected project wastewater flows.

Table 2 – Wastewater Flows

Type of Development	No. of Units	Flow (GPD/Unit)	Average Flow (GPD)	Duration (hrs)	Avg Flow (GPM)	Peak Flow* (GPM)
Single-Family	390	310	120,900	24	83.96	209.90
Townhomes	225	310	69,750	24	48.44	121.09
Office/ Commercial	35,000	0.2	7,000	12	4.86	14.58
Total			197,650		137.26	345.57

*Peak Flow = 2.5 * Avg. Flow (Residential)
*Peak Flow = 3 * Avg. Flow (Commercial)

C. Public Schools

The parcel is located within the Carrolton PK-3rd grade area, the Westside 4th -6 grades, Smithfield Middle School and the Smithfield high school zones. Projections indicate this development would be anticipated to generate 66 school age children (@ 0.23 students per unit of townhomes). For specific school capacity see the attached Fiscal Impact Analysis by Tischler Bise (See Attached Fiscal Impact Analysis report for additional information).

D. Fire Protection, Emergency Services and Law Enforcement

There are currently two Volunteer fire stations (VDF) located within Smithfield and Carrollton providing fire protection to the proposed development.

There also are two Volunteer Emergency Medical Services (EMS). The Isle of Wight Volunteer Rescue Squad services Smithfield as well as the Carrollton Volunteer Fire Department as backup for protection of the proposed development. Each station is placed within the County in such a way as to help achieve the response goal of 7.5 minutes or less.

Law Enforcement protection is provided by county's Sheriff Department along with the Virginia State Police.

E. Solid Waste

The proposed development on the subject property will generate solid wastes that will require collection and disposal to promote a safe and healthy environment. County approved, private contractors will handle the collection of the solid waste.

F. Utility Service Providers

Virginia Natural Gas, Dominion Energy, and Spectrum Communications provide, respectively, natural gas, electricity, cable TV service, and telephone service to this area. The current policy of these utility service providers is to extend service to the new development at no cost to the developer when positive revenue is identified; plus, with the new land development, these utility service providers are required to place all new utility service underground.

V. ANALYSIS OF ENVIRONMENTAL IMPACTS

A letter of findings dated November 30, 2017, Wetland, Water and CBPA Assessment by Kerr Environmental Services Corp. has been provided. Additionally, Wetlands Solutions has completed additional field observations to refine the limits of RPA resources, those have been incorporated into the master plan set and impacts to those environmental areas are noted in the Water Quality Impact Assessment included with the submitted zoning package. Impacts associated with roads and stormwater outfalls have been anticipated and noted in the environmental inventory sheet of the master plan.

VI. ANALYSIS OF STORMWATER MANAGEMENT (SWM) / BEST MANAGEMENT PRACTICES (BMP)

A conceptual stormwater management program, meeting the general criteria of the Commonwealth of Virginia and Isle of Wight County's stormwater requirements, was completed

as a component of the planning for the proposed Sweetgrass development. The goal of the stormwater management program is to meet and exceed local and state stormwater requirements.

In evaluating preliminary stormwater management solutions of the proposed development on the subject site, the site characteristics are considered. Preliminary site observations and mapping identify the following unique site characteristics to be considered in stormwater management planning:

- The property drains to an unnamed tributary of the Jones Creek watershed.
- The developable portion of the site is mostly active crop field, with limited forested land.
- All of the project area's existing drainage is surface runoff, ultimately converging to the existing farm pond and out to an unnamed tributary of Jones Creek, located in central and the North and the East of the project site.
- The project site largely consists of sloping of 2 to 6% slopes, with >10% slopes located within the RPA buffer. The site consists of mostly hydric soils.

A stormwater management plan is proposed as part of the master plan for this project to meet the general criteria of the Commonwealth of Virginia and Isle of Wight County stormwater requirements. Stormwater is to be managed by a series of best management practices and pipe drainage networks that ultimately discharge into downstream wetlands.

1. Stormwater ponds will be provided around the site as indicated on the master plan. These ponds may not be needed depending on final staff determination on the use of the existing farm ponds.
2. Low impact development measures such as bioretentions and dry swales (along with the possible purchasing of stormwater credits) will be used to meet the additional water quality requirements of the Virginia Runoff Reduction Method. Per compliance with the Virginia Runoff Reduction Method, all proposed site work will be managed by these stormwater measures to negate downstream wetlands impacts and pollution from entering into the Chesapeake Bay. Final design and placement will be determined by site specific geotechnical analysis when preparing the construction plans.
3. The existing wet ponds on the property have served as the primary means of water quality and quantity control for years. These existing ponds are located in the center of

the site and it is the design team's belief that these existing ponds are best suited to provide for stormwater control with the least potential adverse impact on the environment and to minimize long term HOA maintenance costs, however it is understood that this will have to be confirmed with County Staff bases upon CBPA regulations.

These conceptually planned facilities will be designed to detain and release the regulated design storm events for the on-site and the currently uncontrolled off-site drainage. Stormwater management will be accomplished in accordance with all current applicable standards including the Virginia Stormwater Management Handbook and the Virginia Erosion and Sediment Control Handbook. Our preliminary analysis of the Sweetgrass Development project indicates that the stormwater management plan proposed will improve the overall downstream water quality and will help to control the downstream erosion from uncontrolled runoff from the neighboring properties.

VII. ANALYSIS OF IMPACTS TO TRAFFIC

Based on a Traffic Impact Study was prepared by VHB dated March 14, 2019 and a memo update dated June 2021 outlining changes based on IofW and VDOT staff (along with adjustments to total units) has been provided with this submittal. The results show that the proposed site will still have modest impacts on the intersections within the study area. All intersections are expected to continue to operate at an acceptable LOS D or better. There are several offsite roadway improvements planned to address the proposed traffic as outlined in the traffic analysis and within the development proffers. See Attachment: "Yeoman's Tract Traffic Impact Analysis" as prepared by VHB dated March 14, 2019 and the summary memo dated June 25, 2021 for more details. for more details.

VIII. ANALYSIS OF FISCAL IMPACTS

A Fiscal Impact Analysis was prepared by Tischler Bise dated March 29, 2019. This analysis compares operating and capital costs to revenues generated over a 20-year period. The results of

the analysis show the project generates a $19.3 million net surplus over the 20-year projection period. See Attachments for detailed Fiscal Impact Analysis.

IX. ANALYSIS OF CULTURAL RESOURCES IMPACTS

An Archaeological Assessment to be prepared for Isle of Wight County has been included in the proffers for the development.

X. VISUAL IMPACTS

See Appendix F

XI. CONCLUSION

In summary, the Sweetgrass Development proposes 390 single family detached units, 225 townhomes, and approximately 35,000sf of commercial use under the new zoning, Planned Development Mixed Use (PD-MX). The development will provide a positive Fiscal Impact to the County and proposes traffic improvements to address the added traffic from the development.

- The development provides a significant tax benefit to the County.
- There is adequate capacity in the system of roads serving this project. Additional traffic improvements are proposed to offset any impacts and to address preexisting traffic. The improvements include extended turn lanes and traffic signal.
- The proposed stormwater management systems as proposed will protect downstream channels from erosion and the onsite low impact development measures will increase water infiltration and reduce uncontrolled runoff.
- Adequate public facilities (water, sewer and fire), and utility services (gas, electric cable TV, telephone), are available for the development.

PROFFERED CONDITIONS

August 18, 2023

Conditional Zoning Request ZA-6-19 (the "Application") has been filed by Henry Layden, as Special Trustee of The William G. Yeoman III Trust ("Owner"), the owner of certain real property located within the territorial confines of the County of Isle of Wight, Virginia (the "County") being a portion of that property located at 14096 Benns Church Blvd., Smithfield, VA 23430, Tax Parcel # 32-01-009 (the "Property") more particularly described on **Exhibit A** attached hereto and made part hereof. NVR, INC. ("NVR") is the contract purchaser of the Property. Yeoman and NVR (collectively, the "Owner") filed the Application requesting that the zoning of the Property be changed from RAC to C-PD-MX with proffers in order to permit the development of a mixed use planned development consisting of single-family dwellings, townhouses, and a commercial outparcel (the "Project").

The Owner and the County have carefully evaluated, among other things, a traffic impact analysis, community impact analysis, and fiscal impact analysis (copies of which are on file with the County's Community Development Department, hereinafter referred to as the "Department") and the on and off site impacts of the Project and have determined (i) the impacts specifically attributable to the Project (the "Impacts"), (ii) certain Impacts create a need (or identifiable portion of a need) for the expansion of existing capacity of public transportation facilities (the "Expansion of Existing Capacity"), (iii) the Project will receive a direct and material benefit from the Expansion of Existing Capacity and Proffer 6 below, and (iv) the provisions of the County's zoning ordinance ("Zoning Ordinance") are inadequate for addressing various of the Impacts and necessitate supplementation by these Proffers.

In furtherance of the Application, the Owner, for itself and its successors and/or assigns, hereby voluntarily proffers the conditions specifically set forth below, in addition to the regulations provided for by the Zoning Ordinance, which proffered conditions are determined by the Owner and, upon acceptance by the Board of Supervisors in connection with the approval of the Application, the County: (i) to be reasonable, (ii) to address impacts specifically attributable to the Project, (iii) to address the need (or identifiable portion of a need) for the Expansion of Existing Capacity, (iv) to directly and materially benefit the Project, (v) to have a reasonable relation to the proposed change in zoning, (vi) to be in conformity with County's adopted comprehensive plan, and (vii) to be in accordance with the provisions of Section 15.2-2296, et seq. of the Code of Virginia (1950), as amended (the "Virginia Code"), Sections 15.2-2303.2 through 15.2-2303.4 of the Virginia Code, and the County Zoning Ordinance. The following proffered conditions apply only to the Property.

1. Plan of Development. A conceptual development plan of the Project entitled "MASTER PLAN FOR SWEETGRASS", dated June 14, 2019, and last revised August 18, 2023, prepared by AES Consulting Engineers (the "Master Plan"), has been submitted to the County Planning Division for review by the County in connection with the Application. The Master Plan is on file with the Department. Development of the Property shall be in substantial conformance, as determined by the Community Development Director (the "Director") with the Master Plan.

2. Residential Units. There shall be no more than 615 residential dwellings (the "Residential Units") constructed on the Property, of which no more than 390 of the Residential Units shall be single-family (detached) dwellings, and no more than 225 of the Residential Units shall be townhouses.

3. Non-Residential Use Restrictions. The use of the portion of the Property designated as "COMMERCIAL SECTION 5 AC +/-" on the Mater Plan (the "Commercial Area") shall be limited to (a) inline retail and commercial uses (including accessory uses) comprising no more than 18,000 square feet of floor area, and (b) office uses (including accessory uses) comprising no more than 55,000 square feet of floor area. Notwithstanding the foregoing, the Owner shall not be permitted to develop an amount of non-residential floor area on the Commercial Area that would be projected to exceed 220 p.m. peak hour trips (as determined by the then current edition of the Institute of Transportation Engineers Trip Generation Manual) until the Owner submits for review and approval by the County and the Virginia Department of Transportation ("VDOT") an updated traffic impact analysis including such proposed additional square footage and includes in its site plan for such additional commercial square footage any traffic improvements recommended by the updated traffic impact analysis and not already contained in these Proffers.

4. Design. The Residential Units and clubhouse on the Property shall be constructed by the Owner in substantial conformance with the architectural elevations entitled "Sweetgrass Elevations", dated June 15, 2023 (the "Elevations") and the design guidelines entitled "Residential Design Guidelines for Sweetgrass Development", dated June 16, 2023 (the "Residential Guidelines"), as determined by the Director. The development within the Commercial Area shall be constructed by the Owner in substantial conformance with the design guidelines entitled "Commercial Center Design Guidelines for Sweetgrass Development", dated August 18, 2023 (the "Commercial Guidelines"), as determined by the Director. A copy of the Elevations, the Residential Guidelines, and the Commercial Guidelines are on file in the Department. The Elevations, Residential Guidelines, and Commercial Guidelines may be modified from time to time provided that such modifications do not alter the basic concept or character of the Elevations, Residential Guidelines, and Commercial Guidelines and provided that such amendments are approved by the Director for consistency with the terms of this proffer.

5. Age Restriction. All of the single-family (detached) dwellings Residential Units shall be occupied solely as "housing for older persons" as such term is defined in Virginia Code Section 36-96.7(A), provided no person under 19 years of age shall be housed or domiciled or shall reside in any Residential Unit. For purposes of the foregoing, a person shall be deemed to be housed, domiciled or to reside in a Residential Unit if he or she stays overnight for more than 75 days in any 90-day period or for more than 90 days in any 12-month period. Such restriction shall be set forth in the Declaration and enforced by the Association (as such terms are defined in Proffer 9 below). Unless otherwise approved by the Director, each age-restricted Residential Unit shall have a first-floor bedroom and full bath.

6. Traffic Improvements.

a. Prior to the issuance of the first certificate of occupancy for Residential Units on the Property (not including model homes), the construction, installation, and/or implementation of the following improvements shall be completed or guaranteed by the Owner in accordance with Virginia Code Section 15.2-2299 or such successor provision (a "Guarantee"):

i. Westbound right turn lane (200-foot storage plus 200-foot taper) into right in/right out proposed secondary Project entrance off of US 258/Rt 10 (Benns Church Boulevard);

ii. Westbound right turn lane (200-foot storage plus 200-foot taper) into proposed main Project entrance off of US 258/Rt 10 (Benns Church Boulevard);

iii. Lengthen the existing eastbound left turn lane to provide 200-foot storage plus 200-foot taper into proposed main Project entrance off of US 258/Rt 10 (Benns Church Boulevard);

iv. Lengthen the existing westbound left turn lane on US 258/Rt 10 to provide 250-foot storage plus 100-foot taper at the intersection of US 258/Rt 10 (Benns Church Boulevard) and Turner Drive (the "Rt. 10/Turner Drive Turn Lane Improvement");

v. Replace the existing 3 section signal head serving the dedicated right turn lane on eastbound Turner Drive at US 258/Rt 10 (Benns Church Boulevard) with a 5 section signal head to provide a protected eastbound right-turn overlap (the "Rt. 10/Turner Drive Signal Improvement 1"); and

vi. Install flashing yellow arrows for the eastbound and westbound left turn lanes at the intersection of US 258/Rt 10 (Benns Church Boulevard) and Canterberry Lane, Cypress Run Drive, and Turner Drive.

b. At such time as deemed warranted by VDOT, but in no event prior to issuance of the 50th certificate of occupancy ("CO") for Residential Units on the Property (or the commencement of construction of improvements on the Commercial Area, whichever occurs first), the Owner shall replace the existing 3 section signal head serving the dedicated right turn lane on eastbound US 258/Rt 10 (Benns Church Boulevard) at Turner Drive with a 5 section signal head to provide a protected eastbound right-turn overlap (the "Rt. 10/Turner Drive Signal Improvement 2"). In the event that the Rt. 10/Turner Drive Signal Improvement 2 is not warranted by VDOT prior to the issuance of the final CO for Residential Units on the Property, then Owner's development of the Property (and permits and approvals therefor) may proceed through to the issuance of the final CO for Residential Units on the Property; however, unless waived by the Director based on an agreed upon alternative, the Owner shall pay to the County the then estimated cost of Rt. 10/Turner Drive Signal Improvement 2 (including design, construction, labor, and materials) as approved by the County, and upon such payment shall be deemed to have satisfied all of its obligations under this Proffer 6(b).

c. Notwithstanding the preceding subsections a(iv), a(v), and b, if the County, prior to implementation of the Rt. 10/Turner Drive Turn Lane Improvement, Rt. 10/Turner Drive Signal Improvement 1, and/or the Rt. 10/Turner Drive Signal Improvement 2 (collectively, the "Rt. 10/Turner Drive Proffered Improvements") (i) approves or adopts plans for modification of the intersection of US 258/Rt 10 (Benns Church Boulevard) and Turner Drive that conflict with or supersede one or more of the Rt. 10/Turner Drive Proffered Improvements, or (ii) accepts proffers from or imposes conditions upon another developer(s) for substantially the same obligations as one or more of the Rt. 10/Turner Drive Proffered Improvements (each of such affected Rt. 10 Turner Drive Proffered Improvements being an "Affected Improvement"), then the Owner shall contribute to the County an amount of cash equal to the then estimated cost to complete the Affected Improvement(s) (including design, construction, labor, and materials) as approved by the County multiplied by the Project's proportionate share (assuming the Project's full buildout) of the vehicle trips associated with such Affected Improvements (as determined by the then current edition of the Institute of Transportation Engineers Trip Generation Manual) (the "Cash in Lieu Payment") no later than ninety (90) days after (1) the award of the construction contract for the construction of such conflicting, superseding, or substantially similar improvement(s), and (2) issuance a written request from the County to the Owner for such Cash in Lieu Payment; provided, however, under no circumstances shall the Cash in Lieu Payment be due prior to issuance of the 50th CO for Residential

Units on the Property (or the commencement of construction of improvements on the Commercial Area, whichever occurs first). The payment by the Owner to the County of such Cash in Lieu Payment shall be deemed satisfaction in full of the corresponding portion of the Rt. 10/Turner Drive Proffered Improvements.

d. At such time as deemed warranted by the VDOT, the Owner shall install a traffic signal at intersection of US 258/Rt 10 (Benns Church Boulevard) and the Project's main entrance. Prior to the issuance of the 150th CO for Residential Units on the Property, Owner shall submit to VDOT a traffic signal warrant analysis for the intersection of US 258/Rt 10 (Benns Church Boulevard) and the Project's main entrance. In the event the analysis concludes, and VDOT concurs, that a traffic signal is warranted at this intersection, then the Owner shall Guarantee a traffic signal (including flashing yellow arrows for the eastbound and westbound left turn lanes and any planned pedestrian accommodations at the signal at the intersection of US 258/Rt 10 (Benns Church Boulevard) and the Project's main entrance and shall complete the installation of such signal prior to the issuance of certificates of occupancy for more than 50 additional residences after the date upon which VDOT issues to Owner written confirmation that the signal is warranted.

i. In the event that such traffic signal is not warranted by VDOT in connection with the first traffic signal warrant analysis, then Owner's development of the Property (and permits and approvals therefor) may proceed above the foregoing thresholds; however, prior to the issuance of the 300th CO for Residential Units on the Property, Owner shall submit to VDOT a traffic signal warrant analysis for the intersection of US 258/Rt 10 (Benns Church Boulevard) and the Project's main entrance. In the event the analysis concludes, and VDOT concurs, that a traffic signal is warranted at this intersection, then the Owner shall Guarantee a traffic signal at the intersection of US 258/Rt 10 (Benns Church Boulevard) and the Project's main entrance and shall complete the installation of such signal prior to the issuance of certificates of occupancy for more than 50 additional residences after the date upon which VDOT issues to Owner written confirmation that the signal is warranted.

ii. In the event that such traffic signal is not warranted by VDOT in connection with the second traffic signal warrant analysis, then Owner's development of the Property (and permits and approvals therefor) may proceed above the foregoing thresholds; however, prior to the issuance of the 450th CO for Residential Units on the Property, Owner shall submit to VDOT a traffic signal warrant analysis for the intersection of US 258/Rt 10 (Benns Church Boulevard) and the Project's main entrance. In the event the analysis concludes, and VDOT concurs, that a traffic signal is warranted at this intersection, then the Owner shall Guarantee a traffic signal at the intersection of US 258/Rt 10 (Benns Church Boulevard) and the Project's main entrance and shall complete the installation of such signal prior to the issuance of certificates of occupancy for more than 50 additional residences after the date upon which VDOT issues to Owner written confirmation that the signal is warranted.

iii. In the event that such traffic signal is not warranted by VDOT in connection with the third traffic signal warrant analysis, then Owner's development of the Property (and permits and approvals therefor) may proceed above the foregoing thresholds; however, prior to the issuance of the 600th CO for Residential Units on the Property, Owner shall submit to VDOT a traffic signal warrant analysis for the intersection of US 258/Rt 10 (Benns Church Boulevard) and the Project's main

entrance. In the event the analysis concludes, and VDOT concurs, that a traffic signal is warranted at this intersection, then the Owner shall Guarantee a traffic signal at the intersection of US 258/Rt 10 (Benns Church Boulevard) and the Project's main entrance and shall complete the installation of such signal prior to the issuance of the final certificate of occupancy for the Residential Units on the Property.

iv. In the event that such traffic signal is not warranted by VDOT in connection with the fourth traffic signal warrant analysis, then Owner's development of the Property (and permits and approvals therefor) may proceed through to the issuance of the final CO for Residential Units on the Property; however, unless waived by the Director based on an agreed upon alternative, the Owner shall pay to the County the then estimated cost of the traffic signal (including design and construction labor and materials) as approved by the County, and upon such payment shall be deemed to have satisfied all of its obligations under this Proffer 6(d).

7. Timing of Recreational Amenities. The clubhouse and pool described on the Master Plan shall be completed prior to issuance of the 150th CO for Residential Units constructed on the Property. If not sooner constructed, the pedestrian amenities shown on the Master Plan shall be constructed sequentially by phase when the corresponding phase of the development in when such amenities are shown is constructed.

8. Archaeology. A Phase I Archaeological Site Assessment for the Property shall be submitted to the Director for their review and approval prior to preliminary site plan or subdivision plan submittal. A treatment plan or Phase II Archaeological Site Assessment shall be submitted to, and approved by, the Director for all sites in the Phase I study that are recommended for a Phase II evaluation, and/or identified as being eligible for inclusion on the National Register of Historic Places. If a Phase II study is undertaken, such a study shall be approved by the Director and a treatment plan or Phase III Archaeological Site Assessment for said sites shall be submitted to, and approved by, the Director for sites that are determined to be eligible for inclusion on the National Register of Historic Places and/or those sites that require a Phase III study. If in the Phase II study, a site is determined eligible for nomination to the National Register of Historic Places and said site is to be preserved in place, the treatment plan shall include nomination of the site to the National Register of Historic Places. If a Phase III study is undertaken for said sites, such studies shall be approved by the Director prior to land disturbance within the study area. All Phase I, Phase II and Phase III studies shall meet the Virginia Department of Historic Resources' Guidelines for Preparing Archaeological Resource Management Reports and the Secretary of the Interior's Standard and Guidelines for Archaeological Documentation, as applicable, and shall be conducted under the supervision of a qualified archaeologist who meets the qualifications set forth in the Secretary of the Interior's Professional Qualification Standards. All approved treatment plans shall be incorporated into the plan of development for the site and shall be adhered to during the clearing, grading and construction activities thereon.

9. Property Owners Association. The Owner shall form one or more Property Owners' Associations and/or a Condominium Unit Owners Associations (each an "Association"), which may include separate or sub-associations for the age restricted and non-age restricted Residential Units, in accordance with Virginia law, with the preparation and execution of a Declaration of Covenants, Conditions and Restrictions or Declaration of Condominium, as applicable (a "Declaration") with the members thereof being the owners of the portions of the Property designated for residential use (the "Residential Property"). The Declaration shall provide for, among other things, the qualifying age restrictions in Proffer 5 above, design review by a design review board, and the conveyance from the Owner to an Association of all of the common areas, open spaces, green areas, recreation areas and facilities and the stormwater management

system associated with the Residential Property (collectively, the "Common Elements"). The Owner agrees that it shall retain sole responsibility for the maintenance of the Common Elements until such time as the same are conveyed to an Association, at which time the obligation shall be assigned to an Association. Each Residential Unit owner within the Residential Property shall be a voting member of an Association and be subject to assessments as set forth in the Declaration. The Declaration shall be subject to the approval of the County Attorney for consistency with this proffer and upon approval shall be duly recorded in the Clerk's Office for the Circuit Court of Isle of Wight County. The Declaration shall be recorded in connection with the recordation of the first subdivision (or condominium) plat for the Residential Units on the Property.

10. Successors and Assigns. These Proffers shall run with the title to the Property and shall be binding on the parties hereto and their respective successors and assigns; provided, however once a party ceases to own any portion of the Property, such party shall have no continuing liability hereunder.

11. Severability. In the event that (i) the County's approval of the Application and/or acceptance of these Proffers is appealed within 30 days after the date of the Board of Supervisors' action on same, and (ii) any clause, sentence, paragraph, subparagraph, section or subsection of these Proffers shall be judged by any court of competent jurisdiction to be invalid or unenforceable for any reason, including a declaration that it is contrary to the Constitution of the Commonwealth of Virginia or the United States, or if the application thereof to any owner of any portion of the Property or to any government agency is held invalid, then the change in zoning intended to be accomplished by the County's approval of the Application and acceptance of these Proffers shall be deemed void and the zoning of the Property shall automatically revert to that which existed immediately prior to the date of such approval.

12. Headings. All paragraph and subparagraph headings of the Proffers herein are for convenience only and are not part of these Proffers.

13. Conflicts. In the event that there is any conflict between these Proffers and the Zoning Ordinance, the conflict shall be resolved by the County's Director subject to the appeal process to the Board of Zoning Appeals and the Courts as otherwise provided by law.

14. Void if Application not Approved. In the event that the Application is not approved by the County or is overturned by subsequent judicial determination, these Proffers and the Master Plan shall be null and void.

[SIGNATURES LOCATED ON FOLLOWING PAGES]

[SIGNATURE PAGE TO PROFFERS]

WITNESS the following signatures, thereunto duly authorized:

NVR, INC.

By: _____

Print Name: Jesse Faisant

Title: Vice President

COMMONWEALTH OF VIRGINIA
CITY/COUNTY OF Richmond, to wit:

The foregoing instrument was acknowledged before me this 8th day of September, 2023 by Jesse Faisant as VP of Operations of NVR, Inc.

Kimberly D. Hamrick
NOTARY PUBLIC

My commission expires: 8/31/2025
Registration No.: 7714267

Kimberly Denise Hamrick
Commonwealth of Virginia
Notary Public
Commission No. 7714267
My Commission Expires 8/31/2025

[SIGNATURE PAGE TO PROFFERS]

THE WILLIAM G. YEOMAN III TRUST :

Henry Layden, special Trustee of the William Grover Yeoman III Trust, dated December 14, 2007, as amended

COMMONWEALTH OF VIRGINIA
CITY/COUNTY OF Isle of Wight, to wit:

The foregoing instrument was acknowledged before me this 8th day of Sept, 2023 by Henry Layden, special Trustee of the William Grover Yeoman III Trust, dated December 14, 2007, as amended.

ELIZABETH D JONES STATE OF VIRGINIA NOTARY PUBLIC COMMISSION #7761629 EXPIRES DECEMBER 31 2027

Elizabeth D Jones
NOTARY PUBLIC

My commission expires: December 31, 2027
Registration No.: 7761629

ELIZABETH D JONES STATE OF VIRGINIA NOTARY PUBLIC COMMISSION #7761629 EXPIRES DECEMBER 31 2027

EXHIBIT A

All that certain tract, piece or parcel of land containing approximately 249.47 acres, situate, lying and being near Benns Church, in Newport Magisterial District, Isle of Wight County, Virginia; lying on the East side of State Highway No. 10, and bounded by said Highway, the lands now or formerly of Daisy M. Bunkley, Phillip F. Edwards, Jones' Creek, the lands now or formerly owned by George Yeoman, Christie Jordan, C.E. Johnson, J.F. Minton and others and being a portion of the same land of which E.K. Batten and Maggie E. Batten, his wife, died seized and possessed.

RESIDENTIAL

DESIGN GUIDELINES

FOR

SWEETGRASS DEVELOPMENT

DATED _____

BUILDING design guidelines seek to create a distinct yet coherent architecture that will foster a unique identity for Sweetgrass and form the backdrop to a rich street level experience. These guidelines will significantly help distinguish the community, help define its character and eventually raise its value in the marketplace. The following set of principles will be applied to each of the buildings, irrespective of its use or location.

1. Build in the tradition of simple yet elegant designs. Building architecture and elevations promote a more contemporary nature through use of simple unifying roof and window lines and careful selection of materials. The building aesthetic should emerge from elevation components and building details rather than from mere ornamentation.

2. Variety- Single family homes immediately adjacent to or across from one another shall have distinct and different elevations. No identical color schemes for single family detached houses shall be repeated within three consecutive lots.

3. Use traditional, high quality and durable materials throughout the community. When walls are constructed of more than one material, changes in material shall be permitted along a horizontal or vertical line and should reinforce a base, middle and top for the building. Building walls shall be of one or more of the following materials:

- Brick- A variety of traditional brick colors and modules and bonding variations are encouraged
- Stone- Natural stone and stone veneer are permitted and shall be laid predominantly rectilinear stones in a horizontal pattern. Cast stone shall be permitted as sills, headers and accents.
- Siding- Cement or fiber board siding or high-quality vinyl or its equivalent is the prescribed siding material where brick or stone is not utilized. Aluminum siding is not permitted. A variance in color and texture is encouraged.

4. Emphasize main entries of each home regardless of elevation. The main entrance to each home should be easily identifiable from the main travel ways through use of materials and forms.

Single Family Detached Lots Guidelines

"The architecture shown herein is a representation of builders' architecture that may be built in Sweetgrass, but does not represent the full sampling of architecture or builders that may be provided within the community."

In a development like Sweetgrass it is important to capture a broad buyer group including new buyers, upgrade buyers, move-down buyers, etc. Sweetgrass is offering 3 different minimum lot sizes within the community. The minimum lot size of a single family detached lot is 50' wide (measured at the front BSL) x 100'deep.

Minimum Building Setback Line (BSL)

20' front
15' rear
5' side

Architecture Treatments and Materials

Single Family Detached Highly Visible Lots (HV)

Lots on prominent corners will be designated as High Vis or "HV" lots. These prominent corners will be defined as those fronting on multiple public rights of way, or those that directly border any of the defined recreation areas. These lots will be required to have upgraded architectural features on the visible facades.

HV Features required:

- Masonry water table
- Storm shutters or Trimmed windows
- Gable vent or other similar trim

High Visibility "HV" lots must have landscaping placed along the side foundation that faces the street. The corner lot side setback will be 10 from public right of way'.

Elevations and Materials

Creating a unique and diverse streetscape throughout Sweetgrass is a high priority; to continue pursuing this there will be limitations placed on the frequency and location of elevations that can be used on adjacent lots. The following guidelines shall be followed:

- Builder elevations will be reviewed and approved by the developer prior to construction to ensure a cohesive theme throughout the community.
- Lots next to or across the street from each other cannot be the same elevation/model.
- Accent materials shall be varied to create more differentiation between lots.

Traditional, high-quality and durable building materials shall be used throughout the community. Building materials shall meet all current Local, State, and Federal building codes and regulations. Materials include:

- Brick; includes painted brick
- Natural stone
- Stone veneer
- High quality vinyl siding
- Cement or fiber board siding

Fencing, Landscaping, HVAC Equipment, and Height Restrictions

Fences

Fences will be permitted within the Sweetgrass community but must follow the guidelines below and in accordance with County Code:

- Fence material shall be vinyl.
- Vinyl fencing must be white and non-glossy; including vinyl covered picket fencing.
- Maximum fence height shall be six (6) feet.
- No front yard fencing shall be allowed.
- Fencing shall not be used to satisfy upgraded architectural requirements.

Landscaping

Lot landscaping and screening can add a lot of value and create and aesthetically pleasing streetscape throughout the community. The follow guidelines shall be considered:

- Foundation plantings must be included on every house prior to occupancy.
- Corner lots or high vis lots shall have landscape buffers to screen sides of houses from the street.
- Lots that back to other lots shall include landscaping at the rear of the property to create a visual screen between adjacent lots. Buffer shall be located outside drainage or utility easements.

Utility Equipment

- HV lots shall ensure the HVAC equipment is screened from view of the street with a fence or other opaque screen.
- No equipment shall be placed on the side of the house that abuts two public streets.

Height

- No single family detached dwellings median roof height will be taller than 45 feet in height.

Single Family Attached (SFA) Lots Guidelines

"The architecture shown herein is a representation of builders' architecture that may be built in Sweetgrass but does not represent the full sampling of architecture or builders that may be provided within the community."

In a development like Sweetgrass, it is important to capture a broad buyer group including new buyers, upgrade buyers, move-down buyers, etc. Sweetgrass is offering 2 single-family attached Products.

Minimum Lot Size:	Maximum Stories:
Interior Lot: 1400 square feet	3 levels
Exterior Lot: 1800 square feet	

Setbacks

SFA Fee Simple:

Rear Loading Town Home Building Restriction Line (BSL)

Front yard:	5 feet minimum (front door to front property line).
Side yard:	10 feet minimum; 20' minimum building separation between buildings
Rear yard:	Sufficient to accommodate an 18.5 ft parking space (Not to include, right of way or sidewalk)

Front Loading Town Home Building Restriction Line (BSL)

Front yard:	Sufficient to accommodate an 18.5 ft parking space (Not to include, right of way or sidewalk)
Side yard:	10 feet minimum; 20' minimum building separation between buildings
Rear yard:	10 feet minimum (From rear of unit to property line)

SFA Condominium Ownership:

Rear Loading Town Home Building Restriction Line (BSL)

Front yard:	5 feet minimum; 20' minimum building separation between buildings
Side yard:	10 feet minimum; 20' minimum building separation between buildings
Rear yard:	Sufficient to accommodate an 18.5 ft parking space (Not to include, right of way or sidewalk)

Front Loading Town Home Building Restriction Line (BSL)

Front yard:	Sufficient to accommodate an 18.5 ft parking space (Not to include, right of way or sidewalk)
Side yard:	10 feet minimum; 20' minimum building separation between buildings
Rear yard:	10 feet minimum; 20' minimum building separation between buildings

Setback guidelines:

- Every other lot shall be staggered by two (2) feet for each lot located
- The two (2) alternate setback lots must be separated by a Typical front yard setback lot.
- Front porches will be allowed to encroach over the front yard BSL by 3'.

Architecture Treatments and Materials

Single Family Attached (SFA) Highly Visible Lots (HV)

Lots on prominent corners will be designated as High Vis or “HV” lots. These prominent corners will be defined as those fronting on multiple public rights of way, the subdivision entrance road or those that directly border any of the defined recreation areas. These lots will be required to have upgraded architectural features on the visible facades. Features to be included on these lots are outlined below:

Single Family Attached High Vis 1 Lots (HV1)

Features required:

- Masonry water table
- Storm shutters
- Trimmed windows
- Gable vent
- Gable trim
- Siding located in reverse gable shall be architecturally different from main portion of the house. Options include:
    - Tighter spaced siding
    - Shake siding
    - Vertical siding

Elevations and Materials

Creating a unique and diverse streetscape throughout Sweetgrass is a high priority; to continue pursuing this there will be limitations placed on the frequency and location of elevations that can be used on adjacent lots. The following guidelines shall be followed:

- Builder elevations will be reviewed and approved by the developer prior to construction to ensure a cohesive theme throughout the community.
- Accent materials shall be varied to create more differentiation between elevations.

Traditional, high-quality and durable building materials shall be used throughout the community. Building materials shall meet all current Local, State, and Federal building codes and regulations.

- Materials include:
    - Brick; includes painted brick
    - Natural stone
    - Stone veneer
    - High quality vinyl siding
    - Cement or fiber board siding

Fencing, Landscaping and HVAC Equipment

Fences

Fences will be permitted within the Sweetgrass community but must follow the guidelines below and be in accordance with County Code.

- Fence material shall be vinyl.
- Vinyl fencing must be white and non-glossy
- Maximum fence height shall be six (6) feet.
- For end units side yard fencing shall not extend beyond the middle point of the house.
- Corner lot fencing layout shall be reviewed on a case by case basis, and must meet the minimum County ordinance requirements, to determine the appropriate fence location
- No front yard fencing shall be allowed.
- Fencing shall not be used to satisfy upgraded architectural requirements.

Landscaping

Lot landscaping and screening can add a lot of value and create and aesthetically pleasing streetscape through-out the community. The follow guidelines shall be considered:

- Foundation plantings must be included on every house once constructed.
- Lots with walk-out basements or exposed foundations shall include landscaping to break up large architecture planes.
    - Columnar or taller evergreens shall be used to “soften” the architecture.
- Corner lots or high vis lots shall have landscape buffers to screen rear or sides of houses from the street.
- Lots that back to other lots shall include landscaping at the rear of the property to create a visual screen between adjacent lots. Buffers shall be located outside of drainage and utility easements.

HVAC Equipment

- HVAC units shall be placed in the rear yard.
- High Vis 1 lots shall ensure the HVAC equipment is screened from view of the street with a fence or other opaque screen.
- No equipment shall be placed on the side of end units.

Height Restrictions

- No single family attached dwellings median roof height will be taller than 48 feet in height.

COMMERCIAL CENTER

DESIGN GUIDELINES

FOR

SWEETGRASS DEVELOPMENT

DATED JUNE 16, 2023

COMMERCIAL CENTER STANDARDS (Sweetgrass)

1. Introduction

The commercial center within Sweetgrass is located along the frontage of Route 10 on the Town limits of Smithfield. This commercial center establishes the first image and impression of the Sweetgrass Community and the Town of Smithfield to those who pass by or visit from other areas in the region. Architectural character, landscape requirements, parking and service areas, pedestrian interaction, vehicular movement, signage and lighting are all major factors which should be considered in the design of any commercial center.

2. Building Placement & Massing

2.1. Building Orientation

The orientation and massing of a group of buildings or single building within the commercial center should create a positive spatial ensemble rather than occur as free standing random elements. Buildings should be located so that they form an ordered relationship with one another, ideally through the creation of public open space.

2.2. Building Shape and Footprint

Buildings should be predominantly rectangular in shape or composed of simple rectangular pieces.

Where building footprints are larger than 10,000 sf the buildings should be broken up with alternating materials or architectural elements that give the appearance of multiple buildings. Additionally building depths may not be greater than 100' without being divided into what appears to be multiple buildings.

2.3. Building Height

An appropriate building height is desirable to establish a scale to the mixed-use Community and will not exceed the maximum or minimum heights as set forth in the County PDMX ordinance.

2.4. Building Setback Lines/Frontage Zone

- Benn's Church Boulevard BSL: 70' from Right of Way
- Main Entrance Road BSL: 25' from Right of Way
- All other BSL: 50' from Property Line.

3. Visual Character

3.1. Edge Definition and Screening

1. General Provisions

Walls, fences and planting are to be employed to improve the visual environment as well as to reinforce a streetwall condition. These elements are not intended to block views of the fronts of the buildings but to serve two functions: to define street edges and parking areas and to conceal undesirable views into service areas.

Parking lots and landscaped areas of the site should be defined with a continuous hedge, low walls or fences, combined with planting where appropriate, along the property line or established setback line. The walls and fences should be architecturally consistent with the adjacent buildings and should be limited to 60" in height. The canopy of trees planted within the parking areas or other positive features should dominate the view over such walls and fences to soften the effect of parking area along street rights-of-way.

Loading, service and trash areas, as well as mechanical equipment, are to be screened with high walls or fences, a minimum of 5' in height, combined with planting where appropriate, and consistent in character with the buildings or may be screened by the buildings themselves. Walls or fences should have a minimum opacity of 75%.

2. Mechanical Equipment

All roof mounted mechanical equipment, including ductwork, is to be screened from all public view and access.

3.2. Plantings

Planting is encouraged in all setback areas and throughout the parking areas. Within large areas of parking, planting should be designed to break down large parking lots into smaller parking areas. The preservation of existing mature trees within planting and parking areas is encouraged.

3.3. Scale and Articulation

Buildings in the commercial center should not appear monolithic, but should appear consistent with a village character. The use of articulation should be employed to help reduce the overall size of large buildings. Articulation may be expressed through two devices: building massing and architectural elements. Buildings with large profiles may be designed to appear smaller if the overall massing is articulated as a collection of component masses. The use of architectural elements such as bays, balconies, porches, loggias and arcades can add interest to building facades and aid in relating the scale of any building to human dimensions. Roofs may be articulated through the use of dormers, lanterns, monitors, windows watches and other roof-top elements. Each of these devices adds character and interest to the buildings of the town which, in turn, reinforces the village character intended by these guidelines.

The building height limitations will be determined by the applicable County ordinance and should utilize simple geometric shapes in plan and elevation, subject to required treatment of 1 story buildings set forth in Chapter 3, Section 3.3 above. The overall massing of any building should be a collection of small and medium simple volumes. Buildings are encouraged to have pitched roofs, especially if they contain residential uses, with attic

stories and dormers. Wings and additions should be simple rectangles in plan and oriented parallel or perpendicular to the main body of the building or toward a street frontage.

3.4. Site Lighting

All site lighting should prevent light from shining directly up and should be full cut-off fixtures with the light source fully shielded, except for low wattage and fossil fuel sources, temporary emergency lighting, seasonal lighting, sports field lighting and other special situations. Pedestrian luminaries that permit the limited and controlled visibility of indirect light from the source as an aid to way finding and spatial definition are permitted.

Acceptable light sources include incandescent, fluorescent and metal halide lamps, and should produce a color temperature close to daylight. Mercury vapor sources are not permitted.

The maximum height for on-site fixture poles is 20'.

3.5. Architectural Expression

1. Walls

- Recommended Materials

  - Building walls: brick, with limited use of stucco or synthetic stucco, wood or fiber cement shingle, wood or fiber cement clapboard, board and batten
  - Exposed Foundation Walls: Brick or brick facing, or stucco finished poured concrete block or cast-in-place concrete.

2. Building Elements

- Recommended Materials

  - Chimneys: brick, stucco or synthetic stucco.
  - Arcades and colonnades: brick, stucco, synthetic stucco, wood, or high grade synthetic wood alternative.
  - Porches, columns: painted wood, painted metal
  - Posts, spindles, balusters: painted wood, painted metal- Stoops, exterior stairs: brick, concrete
- Decks: wood
- Signs: wood, painted metal
- Awning and canopies: canvas-covered metal structure, designed to be compatible in configuration and color with the architecture of the buildings.

4. <u>Roofs</u>

- Recommended Materials

- Roofs: Wood shingles, metal standing seam, copper, lead-coated copper, slate, synthetic slate, 40-year architectural asphalt shingle
-Gutters and downspouts: painted metal, copper
-Flashing: copper, lead coated copper, anodized aluminum

- Configurational Standards

  Buildings should have a varied character of traditionally shaped roofs.

  Items to be considered are:

  - Principal Roofs: Gabled, hipped, hipped gables, gabled hips or gambrel in a symmetrical fashion with a slope of 4:12 to 8:12; Buildings with roof areas greater than 12,000 sf may have portions which are flat if concealed from view by sloped roofs of the character described above.
  - Secondary Roofs: Shed with minimum slope of 3:12.
  - Flat Roofs: Flat roofs are to have parapets or railings.
  - Parapets: Horizontal or gabled in elevation
  - Dormers: Pitched or eyebrow
  - Special roof-top elements: Symmetrically situated or aligned with the rhythm of structural bays and fenestration.
  - Roof-top mechanical enclosures: Concealed from view by sloped roofs of the character described above.

5. Openings

- Recommended Materials

  - Windows: wood, painted metal
  - Bay windows: wood, painted metal, with metal tops
  - Doors: painted wood, painted metal
  - Storefronts: painted wood, painted metal
  - Shutters: wood
  - Security doors and grilles: metal

The following photographs are not intended to represent actual users or layouts but merely illustrate the quality of materials and design that is intended to be required by these guidelines.





MASTER PLAN

FOR

SWEETGRASS

WINDSOR DISTRICT

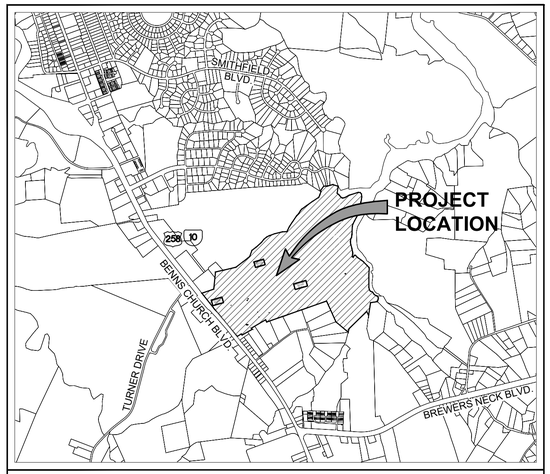
ISLE OF WIGHT, VIRGINIA

APPLICANT INFORMATION:

NVR, INC.
CONTACT: MR. ERIC SHIREY
860 GREENBRIER CIRCLE
CHESAPEAKE, VIRGINIA 23320
PHONE NO.: (757) 603-0802

SITE DATA:

PARCEL ID:	32-01-009
PROPERTY OWNER:	WILLIAM G. YEOMAN III TRUSTEE
PROPERTY ADDRESS:	14096 BENNS CHURCH BOULEVARD
CURRENT ZONING:	RAC, RURAL AGRICULTURAL CONSERVATION DISTRICT
PROPOSED ZONING:	C-PD-MX, CONDITIONAL PLANNED DEVELOPMENT MIXED USE DISTRICT
PROPERTY ACREAGE:	250 AC. ±
OVERLAY DISTRICTS:	NEWPORT DEVELOPMENT SERVICE OVERLAY DISTRICT (DSD) & CHESAPEAKE BAY PRESERVATION AREA OVERLAY DISTRICT



VICINITY MAP
(Approximate Scale: 1"=2,000')

INDEX OF SHEETS

SHEET NO.	SHEET DESCRIPTION
1	COVER SHEET
2	MASTER PLAN
3	ENVIRONMENTAL INVENTORY

County Project No.: ZA-06-19
Original Submittal Date: JUNE 14, 2019

Rev.	Date	Description	Revised By
5	8/18/23	REVISED PER COUNTY COMMENTS	JAG
4	2/15/23	REVISED PER COUNTY COMMENTS	JAG
3	7/22/22	REVISED PER COUNTY COMMENTS	JAG
2	6/01/21	REVISED PER COUNTY COMMENTS	JAG
1		REVISED PER COUNTY COMMENTS	JAG

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REZONING MASTER PLAN
FOR
SWEETGRASS
ISLE OF WIGHT COUNTY WINDSOR DISTRICT VIRGINIA

Project Contacts:	JAG
Project Number:	W10516-00
Scale: AS NOTED	Date: 6/14/19

Sheet Title:
COVER SHEET

Sheet Number
1 OF 3

DENSITY CALCULATIONS

	SF	AC	%
TOTAL SITE AREA	10,866,832	249.47	100%
COMMERCIAL SECTION:	SF	AC	%
TOTAL AREA	236,520	5.43	2%
SLOPES 15%-30%	3,110	0.07	
SLOPES GREATER THAN 30%	-	-	
100' RPA, TIDAL WETLANDS, 100 YEAR FLOOD PLAIN	21,585	0.50	
AREA OF ROUTE 10 BUFFER	50,863	1.17	
NON-DEVELOPABLE AREA	75,558	1.73	
AREA FOR DENSITY CALCULATION	160,962	3.70	
MINIMUM REQUIRED DENSITY	64,385		
PROPOSED DENSITY	73,000 SF		
TOWNHOME SECTION:	SF	AC	%
TOTAL AREA	3,429,642	78.73	32%
SLOPES 15%-30%	2,517	0.06	
SLOPES GREATER THAN 30%	6,742	0.15	
NON-TIDAL WETLANDS	31,513	0.72	
100' RPA, TIDAL WETLANDS, 100 YEAR FLOOD PLAIN	1,791,639	41.13	
NET DEVELOPABLE AREA	1,614,246	37.06	
AREA FOR DENSITY CALCULATION (less 20% RW)	1,291,397	29.65	
PROPOSED OPEN SPACE	2,180,625 SF		64%
MINIMUM REQUIRED DENSITY	178 UNITS		
PROPOSED DENSITY	225 UNITS		
SINGLE FAMILY SECTION:	SF	AC	%
TOTAL AREA	7,135,818	163.82	66%
SLOPES 15%-30%	23,748	0.55	
SLOPES GREATER THAN 30%	-	-	
100' RPA, TIDAL WETLANDS, 100 YEAR FLOOD PLAIN	2,949,782	67.72	
NET DEVELOPABLE AREA	4,174,162	95.83	
AREA FOR DENSITY CALCULATION (less 20% RW)	3,339,330	76.66	
PROPOSED OPEN SPACE	4,307,625 SF		60%
MINIMUM REQUIRED DENSITY	307 UNITS		
PROPOSED DENSITY	390 UNITS		
OVERALL MAXIMUM RESIDENTIAL UNITS (PER PROFFERS)	615 UNITS		

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
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
ISLE OF WIGHT COUNTY SCHOOL BOARD
14171 SMITHFIELD CIR, SMITHFIELD
PARCEL ID: 32-01-010A
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
14221 BENNS CHURCH BOULEVARD
PARCEL ID:32A-02-012
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

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
CARNEY PAMELA D
14125 HAYLOFT LN
PARCEL ID:32B-01-006
ZONING: RAC

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

N/F
ST LUKES VILLAGES LLC
C/O MCCALE DEV COR
20081 BREWERS NECK BLVD
PARCEL ID: 33-01-012E
ZONING: PD-MX

TOWNHOME PARCEL

EXISTING TREELINE (TYP.)

RECREATION AREA 1

RECREATION AREA 2

RECREATION AREA 3

RECREATION AREA 4

APPROX. LIMITS OF EXISTING TREELINE

PRIVATE CONDOMINIUM ROAD AND PARKING

TOWNHOME SECTION 80 AC.±

"COMMERCIAL" SECTION 5 AC.±

SINGLE FAMILY SECTION 164 AC.±

OPEN AREA

OPEN SPACE

PEDESTRIAN ACCESS

BMP C1

BMP D

BMP A

POTENTIAL BMP C2 LOCATION

POTENTIAL BMP B LOCATION

DOG PARK

CENTRAL PARK

END OF PUBLIC ROAD

PARKING FOR PARK

LIMITS OF 100' RPA

LIMITS OF ZONE AE FLOOD PLAIN ELEV = 8

70' BUILDING SETBACK

MULTI-USE PATHWAY

RESTRICTED ACCESS (RIGHT IN/OUT ONLY)

PUBLIC RIGHT OF WAY EXTENDED TO BOUNDARY

POTENTIAL PUBLIC RIGHT OF WAY EXTENDED TO BOUNDARY. FINAL LOCATION TO BE CONFIRMED WITH DEVELOPMENT PLANS.

BEECHWOOD LANE

BENNS CHURCH BLVD (VARIABLE WIDTH PUBLIC R/W)

1220.51'

686'

60' PUBLIC R/W

53' PUBLIC R/W

S PUBLIC RW

LEGEND

- 100 FOOT RPA BUFFER TO PROPERTY LINE
- 100'RPA — 100 FOOT RPA BUFFER
- WETLANDS
- EX. TREELINE
- FLOOD PLANE ZONE AE
- MULTI-USE PATH
- PARK/RECREATION AREA
- WATER / POND
- CONDO TOWNHOME UNITS
- LOTS LINES

* NOTE: WETLANDS AND RPA BUFFERS ARE SHOWN BASED UPON DATA PROVIDED BY WSSI AND ARE NOT FIELD SURVEYED.

PARK/ RECREATION

RECREATION AREAS 1-4 =	4.7 AC. ±
DOG PARK =	1.5 AC. ±
CENTRAL PARK =	3.67 AC. ±

* RECREATION TO INCLUDE: CLUBHOUSE, POOL, PAVED AND UNPAVED TRAILS, PLAY FIELDS, MINIMUM OF 2 GAZEBOS, BENCHES, FIRE PIT AND OTHER AMENITIES

GRAPHIC SCALE
200' 0' 200' 400'
SCALE: 1" = 200'

Rev.	Date	Description	Revised By
5	8/18/23	REVISED PER COUNTY COMMENTS	JAG
4	2/15/23	REVISED PER COUNTY COMMENTS	JAG
3	7/22/22	REVISED PER COUNTY COMMENTS	JAG
2	6/01/21	REVISED PER COUNTY COMMENTS	JAG
1	11/1/2019	**REVISED PER COUNTY COMMENTS**	**JAG**

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REZONING MASTER PLAN
FOR
SWEETGRASS
ISLE OF WIGHT COUNTY | WINDSOR DISTRICT | VIRGINIA

Project Contacts:	JAG
Project Number:	W10516-00
Scale: 1"=200'	Date: 06/14/2019

Sheet Title:
CONCEPTUAL MASTER PLAN

Sheet Number
2 OF 3

SOIL CHARACTERISTICS

SOIL#	SOIL NAME	HYDROLOGIC SOIL GROUP	TYPICAL SLOPES	EROSION FACTOR (K)	EROSION FACTOR (T)
2	BOHICKET SILTY CLAY LOAM	D	0–1%	0.32	5
3	Chickahominy silt loam	D	0–2%	0.55	5
7	Kinston loam	B/D	0–4%	0.32	5
11E	Nevarc and Remlik soils	A	15–35%	0.55	5
12A	Peawick silt loam	D	0–2%	0.55	5
12B	Peawick silt loam	D	2–6%	0.55	5
16	Rumford loamy sand	A	0–4%	0.10	5
18B	Slagle fine sandy loam	C	2–6%	0.24	5

INFORMATION TAKEN FROM "SOIL SURVEY OF TIDEWATER CITIES AREA, VIRGINIA" ISSUED IN 2009 BY THE UNITED STATES DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE IN COOPERATION WITH VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY.

SOIL SUSCEPTIBILITY TO EROSION CLASSIFICATION (K)
0.23 AND LOWER – LOW ERODIBILITY
0.23 – 0.36 – MODERATE ERODIBILITY
0.36 AND UP – HIGH ERODIBILITY

THE MAP SHOWN IS A "BEST FIT MODEL" OF THE SCS MAPS WITH EXISTING BASE INFORMATION.

LEGEND

- SLOPES 15% TO 30%
- SLOPES 30% OR GREATER
- EXISTING WATER
- RPA BUFFER IMPACTS** ± 69,501 S.F.; ± 1.60 AC.
- WETLAND IMPACTS** ± 16,653 S.F. ; ± 0.38 AC.

** NOTE: THE PURPOSE OF THIS MAP IS TO SHOW REPRESENTATIVE IMPACTS BASED ON THE PROPOSED MASTER PLAN. THE APPROVAL OF THIS MASTER PLAN DOES NOT INTEND TO APPROVE THESE IMPACTS. ADDITIONAL PERMITS AND WAIVERS SHALL BE SOUGHT THROUGH THE PROPER REVIEWING AGENCIES.

ENVIRONMENTAL INVENTORY IMPACTS

TIDAL WETLANDS:	NONE IMPACTED
TIDAL SHORES:	NONE IMPACTED
NON-TIDAL WETLANDS IN RPA:	2,670 S.F./0.06 AC.
NON-TIDAL WETLANDS NOT IN RPA:	13,983 S.F./0.32 AC.
100 FT RPA BUFFER:	89,832 S.F./2.07 AC.
NON-TIDAL WETLANDS IN RMA:	NONE IMPACTED
HYDRIC SOILS:	NONE IMPACTED

* SEE WQIA SUBMITTED WITH REZONING APPLICATION FOR DETAILS.

LEGEND

SOILS BOUNDARY

19B SOILS TYPE

GRAPHIC SCALE
200' 0' 200' 400'
SCALE: 1" = 200'

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.

N/F THOMAS BARBARA F 910 CANTEBERRY LN PARCEL ID: 22J-02-150 ZONING: SMITHFIELD: N-R

N/F HENDRIX THOMAS 912 CANTEBERRY LN PARCEL ID: 22J-02-149 ZONING: SMITHFIELD: N-R

N/F EVANS ANTHONY 906 CANTEBERRY LN PARCEL ID: 22J-02-152 ZONING: SMITHFIELD: N-R

N/F BERLAND EDNA R 916 CANTEBERRY LN PARCEL ID: 22J-02-147 ZONING: SMITHFIELD: N-R

N/F DIPPO LAWRENCE K & ELIZABETH TRS L / A & E A DIPPO LIVING TRUST 908 CANTEBERRY LN PARCEL ID: 22J-02-151 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

RPA BUFFER IMPACT #7 6,734 S.F.±; 0.15 AC.±

TOWNHOME PARCEL

EXISTING TREELINE (TYP.)

N/F EDWARDS PHILLIP F JR & CONNIE A BENNS CHURCH BLVD PARCEL ID: 32-01-096 ZONING: SMITHFIELD: C-C

RECREATION AREA 1

RECREATION AREA 4

OPEN SPACE

BMP C1

APPROX. LIMITS OF EXISTING TREELINE

N/F CROWN CASTLE GT COMPANY LLC 14105 BENNS CHURCH BLVD PARCEL ID: 32-01-096B ZONING: RAC

PRIVATE CONDOMINIUM ROAD AND PARKING

TOWNHOME SECTION 80 AC.±

OPEN AREA

PEDESTRIAN ACCESS

WETLANDS IMPACT #1 1,540 S.F.±; 0.04 AC.±

55' PUBLIC R/W

POTENTIAL BMP C2 LOCATION

RPA BUFFER IMPACT #6 4,870 S.F.±; 0.11 AC.±

PARKING FOR PARK

DOG PARK

TURNER DRIVE

N/F WILSON ANGELA B & WILSON JAMES G TRS A B WILSON REVOCABLE 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

RPA BUFFER IMPACT #1 1,756 S.F.±; 0.04AC.±

RPA BUFFER IMPACT #9 4,962 S.F.±; 0.11AC.±

RPA BUFFER IMPACT #5 5,330 S.F.±; 0.12 AC.±

OPEN AREA

BMP D

CENTRAL PARK

END OF PUBLIC ROAD

BMP A

LIMITS OF 100' RPA

LIMITS OF ZONE AE FLOOD PLAIN ELEV = 8

1220.51'

BENNS CHURCH BLVD

N/F ISLE OF WIGHT COUNTY SCHOOL BOARD 14171 SMITHFIELD CIR, SMITHFIELD PARCEL ID: 32-01-010A ZONING: RAC

COMMERCIAL SECTION 5 AC.±

SINGLE FAMILY SECTION 164 AC.±

N/F CORNELL GEORGE C 14106 BENNS CHURCH BLVD PARCEL ID: 32-01-008 ZONING: RAC

70' BUILDING SETBACK

RPA BUFFER IMPACT #2 12,872 S.F.±; 0.30 AC.±

RPA BUFFER IMPACT #10 1,539 S.F.±; 0.04 AC.± (SANITARY SEWER)

WETLANDS IMPACT #3 2,672 S.F.±;0.06 AC.±

RECREATION AREA 2

RECREATION AREA 3

WETLANDS IMPACT #2 3,041 S.F.±; 0.1 AC.±

60' PUBLIC R/W

53' PUBLIC R/W

OPEN SPACE

PARKING FOR PARK

LIMITS OF 100' RPA

RPA BUFFER IMPACT #3 12,149 S.F.±; 0.28 AC.±

RPA BUFFER IMPACT #4 26,023 S.F.±; 0.60 AC.±

EXISTING TREELINE (TYP.)

POTENTIAL PUBLIC RIGHT OF WAY EXTENDED TO BOUNDARY. FINAL LOCATION TO BE CONFIRMED WITH DEVELOPMENT PLANS.

WETLANDS IMPACT #4 9,516 S.F.±; 0.22 AC.±

POTENTIAL BMP B LOCATION

N/F WILLIAM G. YEOMAN, TRUSTEE 14096 BENNS CURCH BOULEVARD PARCEL ID: 32-01-009 ZONING: RAC

MULTI-USE PATHWAY

N/F EDWARDS RYLAND B JR & MARY ANN D & EDWARDS RYLAND B & ETALS 14202 BENNS CHURCH BLVD PARCEL ID: 32-01-062 ZONING: RAC

PUBLIC RIGHT OF WAY EXTENDED TO BOUNDARY

RESTRICTED ACCESS (RIGHT IN/OUT ONLY)

N/F GIRARD PATRICIA A 14225 BENNS CHURCH BOULEVARD PARCEL ID:32A-02-012 ZONING: RAC

N/F WALLACE JIMMY J & MYRTLE T 14111 HAYLOFT LN PARCEL ID: 32B-01-005 ZONING: RAC

N/F WALLACE JIMMY J & MYRTLE T 14108 HAYLOFT LN PARCEL ID: 32-01-094A ZONING: RAC

N/F CARNEY PAMELA D 14125 HAYLOFT LN PARCEL ID: 32B-01-006 ZONING: RAC

N/F BOWDEN RONALD BREWERS NECK BLVD PARCEL ID: 32-01-005 ZONING: RAC

N/F GRAY ROBERTA C/O GARY LAWRENCE 11 CHAPMANS LN PARCEL ID: 32C1-004 ZONING: RAC

N/F TOTTEN CHARLES D BEECHWOOD LN PARCEL ID: 32-01-094,094C,094D ZONING: RAC

N/F CARNEY PAMELA D 14125 HAYLOFT LN PARCEL ID: 32B-01-006 ZONING: RAC

N/F ST LUKES VILLAGES LLC C/O MCCALE DEV CORP 20081 BREWERS NECK BLVD PARCEL ID: 33-01-012E ZONING: PD-MX

BEECHWOOD LANE

N/F BELL LINWOOD E & BARBARA G 19341 BEECHWOOD LN PARCEL ID: 31-01-094B ZONING: RAC

** NOTE: THE PURPOSE OF THIS MAP IS TO SHOW REPRESENTATIVE IMPACTS BASED ON THE PROPOSED MASTER PLAN. THE APPROVAL OF THIS MASTER PLAN DOES NOT INTEND TO APPROVE THESE IMPACTS. ADDITIONAL PERMITS AND WAIVERS SHALL BE SOUGHT THROUGH THE PROPER REVIEWING AGENCIES.

Rev	Date	Description
5	8/18/23	REVISED PER COUNTY COMMENTS
4	2/16/23	REVISED PER COUNTY COMMENTS
3	7/22/22	REVISED PER COUNTY COMMENTS
2	6/01/21	REVISED PER COUNTY COMMENTS
1	11/12/19	REVISED PER COUNTY COMMENTS

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REZONING MASTER PLAN
FOR
SWEETGRASS

Project Contacts:	JAG
Project Number:	W10516-0C
Scale: 1"=200'	Date: 06/14/2019

Sheet Title:
ENVIRONMENTAL INVENTORY

Sheet Number
3 OF 3

Memorandum

To: VDOT and Isle of Wight County

Date: March 17, 2023

Project #: 34417.00

From: Kirsten Tynch, PE, PTOE
Sean Becker, PE, PMP

Re: Sweetgrass Supplemental Memo to December 2019 Traffic Impact Study and June 2021 Memo

Introduction

Sweetgrass (previously referred to as 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 impact analysis (TIA) was completed in December 2019 and submitted for approval. This memorandum is a supplement and follow up to the December 2019 traffic impact study, as well as the Memo submitted June 2021. Modifications were made to the development and in response to requests to provide pedestrian signal timings at the proposed entrance to the development, which results in changes on trip generation and Synchro Build traffic analysis discussed herein. Only 2026 and 2032 Build conditions were updated for the purposes of this memo.

Trip Generation

The development plan has been modified since the 2019 TIA and June 2021 memo to reduce the shopping center area (using a different land use code that better reflects the type of development proposed) and adding general office space, summarized in Table 1. These changes result in a net reduction in trips compared to the previous June 2021 submission, shown in Table 2. December 2019 TIA trip generation is shown in Table 3.

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
Strip Retail Plaza (<40k)	822	18	1000 Sq. Ft. GLA	989	25	17	42	59	60	119
General Office	710	55	1000 Sq. Ft. GLA	690	88	12	100	17	84	101
Subtotal				**7,021**	**209**	**326**	**535**	**398**	**334**	**732**
Pass-by Trips (Shopping Center)	34%		% Pass-by	336	9	6	14	20	20	40
Total New Trips				**6,685**	**200**	**320**	**521**	**378**	**314**	**692**

Note: Used highest of average rate and fitted curve unless fitted curve unless R2<0.75

Table 2. Trip Generation from June 2021 Memo

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

Table 3. 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 6,685 new daily trips with 521 trips in the morning peak hour and 692 trips during the evening peak hour. This is a reduction of 600 daily trips from the June 2021 memo submission, however, AM peak trips increase by 106 and PM peak trips increase by 15. Appendices for this memo include revised figures for trip generation, projected 2026 build volumes, and projected 2032 build volumes for the AM and PM peak.

As compared to the original December 2019 TIA submission, there are 2,277 fewer daily trips, with 27 fewer AM peak hour trips, and 117 fewer PM peak hour trips. Due to lower volumes and generally improved LOS compared to previous analyses, no modifications to mitigation measures are recommended.

Memorandum

Synchro Analysis

To accommodate pedestrian signal timing at the development main entrance, revisions are required to the phase splits along US 258/Rt 10 (Benns Church Blvd) to ensure corridor progression. Split adjustments shift cycle time to the side streets to provide sufficient timing for pedestrian crossings. Results of the updated synchro analysis and comparison to previous analysis are discussed in the following sections.

LOS Summary

A summary of LOS results with timing updates completed is shown in Table 4. Table 5 shows the summary of LOS as submitted in 2019.

In comparing the results from the original TIA against the updated results, LOS and delay is generally reduced across the board or minimally impacted due to the pedestrian timing updates. No approaches are below a LOS D in the updated model. In the 2019 TIA submission, the eastbound approach at US 258/Rt 10 (Benns Church Boulevard) & Canteberry Lane was project to be LOS E in both the 2026 and 2032 build conditions model. With the updated model reflecting lower trip generation and new signal timing for pedestrians, this movement is projected to maintain a LOS C or D in both build conditions.

Table 4. Level of Service Results Summary

Detailed Level of Service Results Summary

ID	Intersection and Approach	Control	2026 Build		2032 Build	
			AM	PM	AM	PM
1	**US 258/Rt 10 (Benns Church Boulevard) & Canteberry Lane**	Signalized	**B (14.9 sec/veh)**	**C (31.1 sec/veh)**	**B (19.9 sec/veh)**	**D (40.6 sec/veh)**
	Eastbound		C-24.9	D-45.3	D-38.8	D-49.5
	Westbound		D-44	D-35.6	D-52	D-37.6
	Northbound		B-10.9	C-32.3	B-17.8	D-47.1
	Southbound		B-14.1	C-27.4	B-17.1	C-32.7
2	**US 258/Rt 10 (Benns Church Boulevard) & Cypress Run Drive**	Signalized	**A (2 sec/veh)**	**A (9.1 sec/veh)**	**A (2.6 sec/veh)**	**A (7.8 sec/veh)**
	Eastbound		A-7.6	D-36.6	B-11.2	D-45.2
	Westbound		---	---	---	---
	Northbound		A-2	A-9.1	A-1.7	A-6.7
	Southbound		A-1.9	A-4.9	A-3	A-3.3
3	**US 258/Rt 10 (Benns Church Boulevard) & Turner Drive**	Signalized	**B (17.9 sec/veh)**	**C (22 sec/veh)**	**C (31.0 sec/veh)**	**A (9.1 sec/veh)**
	Eastbound		C-33.5	B-19.7	C-32.8	B-18.7
	Westbound		C-32.7	C-22.7	D-44.8	C-31.0
	Northbound		A-9	C-22.6	C-26.0	A-9.0
	Southbound		B-18.6	C-21.7	C-33.7	A-7.5
4	**US 258/Rt 10 (Benns Church Boulevard) & Proposed Main Entrance**	Signalized	**A (7.6 sec/veh)**	**B (11.6 sec/veh)**	**B (13.6 sec/veh)**	**B (18.6 sec/veh)**
	Eastbound		---	---	---	---
	Westbound		C-28.5	C-27.3	D-41.5	C-27.8
	Northbound		A-8.8	B-12.7	A-6.7	C-22.1
	Southbound		A-3	A-6.4	B-15	B-12
5	**US 258/Rt 10 (Benns Church Boulevard) & 258/Rt 32 (Brewers Neck Boulevard)**	Signalized	**A (8.6 sec/veh)**	**B (13.3 sec/veh)**	**B (10.6 sec/veh)**	**B (16 sec/veh)**
	Eastbound		---	---	---	---
	Westbound		A-4.9	B-13.9	A-8.1	C-22.6
	Northbound		B-18.3	D-36	C-23.4	C-33.3
	Southbound		A-9.3	A-8.2	B-10.1	A-4.6
6	**Queen Annes Court & 258/Rt 32 (Brewers Neck Boulevard)**	Signalized	**B (16.1 sec/veh)**	**B (19.8 sec/veh)**	**C (21.7 sec/veh)**	**C (21.4 sec/veh)**
	Eastbound		C-21.9	C-33.5	B-10.9	D-35.4
	Westbound		B-14.8	B-15.5	D-40	B-17.1
	Northbound		A-3.9	A-3.7	A-5.9	A-3.7
	Southbound		C-23.1	C-26.1	C-27.8	C-26.1
7	**US 258/Rt 10 (Benns Church Boulevard) & Proposed Secondary Entrance**	Unsignalized	**A (0.5 sec/veh)**	**A (0.3 sec/veh)**	**A (0.5 sec/veh)**	**A (0.3 sec/veh)**
	Eastbound		---	---	---	---
	Westbound		C-15.2	C-19.6	C-16.3	C-21.8
	Northbound		--0	--0	--0	--0
	Southbound		--0	--0	--0	--0

Table 5. Level of Service Results Summary from December 2019 Submission

ID	Intersection and Approach	Control	2026 Build		2032 Build	
			AM	PM	AM	PM
	US 258/Rt 10 (Benns Church Boulevard) & Canteberry Lane	Signalized	**B (16.6 sec/veh)**	**C (30.3 sec/veh)**	**B (18.5 sec/veh)**	**D (41.6 sec/veh)**
1	Eastbound		C-21.5	E-59	D-39.6	E-68.3
	Westbound		D-43.5	D-38.2	D-50.2	D-40
	Northbound		B-14.2	C-30.6	B-14.7	D-50.5
	Southbound		B-15.2	C-25.1	B-17	C-28.7
	US 258/Rt 10 (Benns Church Boulevard) & Cypress Run Drive	Signalized	**A (4.1 sec/veh)**	**A (9.5 sec/veh)**	**A (3.6 sec/veh)**	**B (10.9 sec/veh)**
2	Eastbound		A-6.6	D-36.1	B-11.2	D-39.2
	Westbound		---	---	---	---
	Northbound		A-3.4	A-9.4	A-2.6	B-11.2
	Southbound		A-4.5	A-5.6	A-4	A-6.2
	US 258/Rt 10 (Benns Church Boulevard) & Turner Drive	Signalized	**C (25.7 sec/veh)**	**C (23.1 sec/veh)**	**C (31 sec/veh)**	**C (27.6 sec/veh)**
3	Eastbound		C-27.5	B-17.4	C-31.2	B-18.2
	Westbound		C-28.5	C-22.7	C-29	C-22.7
	Northbound		C-22.2	C-23.3	C-27.7	C-27.9
	Southbound		C-27.8	C-23.7	C-33.9	C-28.7
	US 258/Rt 10 (Benns Church Boulevard) & Proposed Main Entrance	Signalized	**B (10.6 sec/veh)**	**B (18.7 sec/veh)**	**B (12.3 sec/veh)**	**C (21.5 sec/veh)**
4	Eastbound		---	---	---	---
	Westbound		C-24.3	C-31.8	C-21.1	C-32.2
	Northbound		B-10.1	C-20.2	B-13.2	C-25.8
	Southbound		A-7.7	B-13.1	A-9.6	B-13
	US 258/Rt 10 (Benns Church Boulevard) & 258/Rt 32 (Brewers Neck Boulevard)	Signalized	**A (8.8 sec/veh)**	**B (17.3 sec/veh)**	**B (10.3 sec/veh)**	**C (22.9 sec/veh)**
5	Eastbound		---	---	---	---
	Westbound		A-4.5	C-25.6	A-7.3	D-36
	Northbound		C-21.7	C-25.7	C-22.7	C-29.8
	Southbound		A-9.3	A-5.2	B-10.2	A-5
	Queen Annes Court & 258/Rt 32 (Brewers Neck Boulevard)	Signalized	**B (17.8 sec/veh)**	**C (20.1 sec/veh)**	**B (19.1 sec/veh)**	**C (22 sec/veh)**
6	Eastbound		C-23.4	D-35.4	B-12.3	D-40.5
	Westbound		B-17.1	B-15.1	C-32.2	B-15.7
	Northbound		A-5	A-3.4	A-5.6	A-3.5
	Southbound		C-25.6	C-23.7	C-27.8	C-26.1
	US 258/Rt 10 (Benns Church Boulevard) & Proposed Secondary Entrance	Unsignalized	**A (0.6 sec/veh)**	**A (0.4 sec/veh)**	**A (0.6 sec/veh)**	**A (0.4 sec/veh)**
7	Eastbound		---	---	---	---
	Westbound		C-15.3	C-20.8	C-16.4	C-23.4
	Northbound		A-0	--0	--0	--0
	Southbound		A-0	--0	--0	--0

Memorandum

Queue Summary

Results of the updated queue analysis are summarized in Table 5. For comparative purposes, queue results from the 2019 analysis are shown in Table 6. For both tables, queues exceeding available queue storage are shown in red. For the intersection of US 258/Rt 10 (Benns Church Boulevard) & Turner Drive, the 2032 Build AM peak eastbound right, 2026 Build PM peak southbound left, and 2032 AM peak southbound right appear to exceed the full storage length shown in the summary table. However, the effective storage length, as measurement in accordance to VDOT's Traffic Operations and Safety Analysis Manual (TOSAM), is sufficient to accommodate these projected queues under both the 2026 and 2032 build conditions. VDOT's TOSAM defines effective storage length as the turn bay length plus one-half taper length, which was utilized in the simulation model, therefore all build condition queue lengths are within effective storage length. The effective storage length was used in the Synchro analyses.

The addition of a right turn overlap at US 258/Rt 10 (Benns Church Boulevard) & Turner Drive during the 2032 Build condition reduces southbound right queue storage to remain within available effective storage. Further, the expansion of the northbound left queue storage at this same intersection to 250 feet as noted in the 2021 provide sufficient storage for the project queues in 2026 and 2032 build conditions.

No additional improvements over those defined in the 2019 TIA and 2021 memo are necessary to mitigate the projected traffic impacts of the revised proposed development and the addition of pedestrian signals at the main entrance into the site.

Table 5. Queue Results Summary

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		56/162	50/170	58/178	277		47/145	50/201
	EBR	277		45/65	42/68	50/75	277		36/61	58/64
	WBLT	1172		137/103	147/101	162/110	1172		123/159	164/139
	WBR	1172		64/112	72/122	74/125	1172		64/102	107/122
	NBL		150	32/135	33/177	47/208		150	43/91	34/67
	NBT	663		175/348	197/404	210/546	663		126/322	224/277
	NBT	663		183/359	197/411	216/544	663		134/335	233/306
	NBR		225	35/47	36/93	45/271		225	36/55	45/52
	SBL		150	54/114	63/139	66/182		150	63/136	57/126
	SBT	1895		189/227	224/284	240/347	1895		212/246	270/287
	SBT	1895		198/241	230/290	252/355	1895		222/258	305/318
	SBR		325	24/39	26/40	25/41		325	22/40	23/44
US 258/Rt 10 (Benns Church Boulevard) & Cypress Run Drive	EBLT	1824		9/128	10/139	13/138	1824		12/135	11/160
	EBR	1824		31/96	38/101	38/103	1824		33/81	20/107
	WBLTR	1402		-/8	-/6	-/12	1402		-/10	-/14
	NBL		175	33/104	39/125	46/137		175	51/134	62/136
	NBT	1913		61/140	58/185	69/205	1913		37/148	48/86
	NBTR	1913		76/150	77/205	83/229	1913		51/161	72/106
	SBL		75	3/-	3/-	2/-		75	3/-	3/-
	SBT	663		56/81	61/86	75/89	663		68/81	84/89
	SBT	663		69/93	77/105	87/101	633		64/94	97/122
	SBR		150	9/46	14/45	14/49		150	9/44	10/53
US 258/Rt 10 (Benns Church Boulevard) & Turner Drive	EBLTR	1442		342/113	-	-			-	-
	EBLT	1440		-	174/91	220/100	1442		194/101	235/125
	EBR		200	-	168/66	197/73		200	183/73	216/98
	WBL		100	8/-	3/-	6/-	648		-/-	-/-
	WBTR	648		87/19	95/19	109/19	648		-/-	-/-
	WBLTR								94/15	121/16
	NBL		75	185/151	179/136	201/168		250	211/195	147/153
	NBT	1098		260/243	204/218	311/327	1065		174/326	356/160
	NBTR	1098		251/242	189/223	259/324	1065		152/330	310/49
	SBL		75	42/77	46/80	52/89		75	17/77	12/79
	SBT	1913		363/230	302/228	391/282	1913		249/251	334/192
	SBT	1913		378/240	307/237	401/288	1913		258/256	359/199
	SBR		175	200/57	153/59	248/93		175	126/60	252/58
US 258/Rt 10 (Benns Church Boulevard) & Proposed Main Entrance	WBL			-	-	-	816		127/127	145/152
	WBL			-	-	-	816		67/75	105/114
	WBR			-	-	-	816		69/106	138/132
	NBU		75	10/10	17/14	16/14		75	53/77	48/76
	NBT	3868	-	-	-/-	-	470		178/498	259/363
	NBT								161/496	234/360
	NBR							200	38/204	39/40
	SBU		100	5/-	4/-	3/-			-	-
	SBL							200	99/138	95/140
	SBT						1065		172/105	188/176
	SBT	1086		-	-	110/-	1065		191/121	190/194
US 258/Rt 10 (Benns Church Boulevard) & 258/Rt 32 (Brewers Neck Boulevard)	WBR	1008		104/227	134/284	158/337	1008		72/389	129/437
	WBR	1008		104/229	135/280	154/350	1008		76/418	116/426
	NBT	2766		72/71	64/78	73/92	2766		66/103	76/116
	NBT	2766		70/82	73/86	79/103	2766		90/117	80/141
	SBL		200	147/111	150/119	165/135		200	142/160	190/128
	SBL	3868		172/134	180/147	187/163	3191		175/182	214/137
	SBT	3868		4/-	9/-	-/-	3191		-/4	-/-
Queen Annes Court & 258/Rt 32 (Brewers Neck Boulevard)	EBL		125	25/25	24/24	28/27		125	17/27	26/30
	EBT	1008		240/200	265/223	324/260	1008		237/326	306/281
	EBTR	1008		249/217	273/233	327/267	1008		256/337	318/301
	WBL		500	150/242	166/300	183/350		500	156/311	164/396
	WBT	785		238/338	262/417	298/447	785		63/513	162/486
	WBT	785		200/327	235/403	275/460	785		46/525	130/531
	WBR		250	4/13	4/41	6/89		250	-/104	8/116
	NBLT	858		14/15	14/16	11/19	858		9/15	6/14
	NBR		250	171/96	187/106	220/127		250	170/122	193/131
	NBR		250	110/35	127/40	172/59		250	110/59	156/71
	SBLT	565		24/25	28/30	31/30	565		27/25	27/26
	SBR	565		33/27	34/31	38/32	565		29/34	24/28
US 258/Rt 10 (Benns Church Boulevard) & Proposed Secondary Entrance	WBR			-	-	-	1244		57/87	54/60
	NBT			-	-	-	3191		-/9	-/-
	NBT			-	-	-	3191		-/8	-/-
	NBR			-	-	-		100	-/-	-/-

Table 6. Queue Results Summary from December 2019 Submission

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		56/162	50/170	58/178	277		52/190	55/198
	EBR	277		45/65	42/68	50/75	277		34/62	47/67
	WBLT	1172		137/103	147/101	162/110	1172		123/134	171/171
	WBR	1172		64/112	72/122	74/125	1172		68/108	91/113
	NBL		150	32/135	33/177	47/208		150	37/114	56/137
	NBT	663		175/348	197/404	210/546	663		171/321	231/396
	NBT	663		183/359	197/411	216/544	663		186/329	242/407
	NBR		225	35/47	36/93	45/271		225	47/78	42/154
	SBL		150	54/114	63/139	66/182		150	64/121	70/144
	SBT	1895		189/227	224/284	240/347	1895		199/250	271/276
	SBT	1895		198/241	230/290	252/355	1895		213/255	289/286
	SBR		325	24/39	26/40	25/41		325	25/38	24/41
US 258/Rt 10 (Benns Church Boulevard) & Cypress Run Drive	EBLT	1824		9/128	10/139	13/138	1824		9/133	11/169
	EBR	1824		31/96	38/101	38/103	1824		22/88	31/99
	WBLTR	1402		-/8	-/6	-/12	1402		-/12	-/11
	NBL		175	33/104	39/125	46/137		175	45/125	53/141
	NBT	1913		61/140	58/185	69/205	1913		58/151	58/164
	NBTR	1913		76/150	77/205	83/229	1913		81/169	86/180
	SBL		75	3/-	3/-	2/-		75	2/-	3/-
	SBT	663		56/81	61/86	75/89	663		59/89	91/96
	SBT	663		69/93	77/105	87/101	633		74/93	120/107
	SBR		150	9/46	14/45	14/49		150	14/49	10/58
US 258/Rt 10 (Benns Church Boulevard) & Turner Drive	EBLTR	1442		342/113	-	-			-	-
	EBLT	1440		-	174/91	220/100	1442		240/93	309/95
	EBR		200	-	168/66	197/73		200	184/87	240/90
	WBL		100	8/-	3/-	6/-	648		-/3	8/-
	WBTR	648		87/19	95/19	109/19	648		93/14	94/17
	NBL		75	185/151	179/136	201/168		75	192/171	204/201
	NBT	1098		260/243	204/218	311/327	1065		277/310	373/375
	NBTR	1098		251/242	189/223	259/324	1065		241/309	300/374
	SBL		75	42/77	46/80	52/89		75	53/95	63/105
	SBT	1913		363/230	302/228	391/282	1913		312/267	356/309
	SBT	1913		378/240	307/237	401/288	1913		315/272	356/314
	SBR		175	200/57	153/59	248/93		175	192/67	218/85
US 258/Rt 10 (Benns Church Boulevard) & Proposed Main Entrance	WBL			-	-	-	816		137/151	123/162
	WBL			-	-	-	816		88/108	71/126
	WBR			-	-	-	816		87/115	157/111
	NBU		75	10/10	17/14	16/14		75	54/60	64/54
	NBT	3868	-	-	-/-	-	470		191/314	221/390
	NBT								175/314	200/378
	NBR							200	38/96	42/156
	SBU		100	5/-	4/-	3/-			-	-
	SBL							200	111/191	108/212
	SBT						1065		142/102	151/118
	SBT	1086		-	-	110/-	1065		168/119	176/125
US 258/Rt 10 (Benns Church Boulevard) & 258/Rt 32 (Brewers Neck Boulevard)	WBR	1008		104/227	134/284	158/337	1008		82/442	94/536
	WBR	1008		104/229	135/280	154/350	1008		73/456	88/555
	NBT	2766		72/71	64/78	73/92	2766		80/83	84/101
	NBT	2766		70/82	73/86	79/103	2766		81/101	118/88
	SBL		200	147/111	150/119	165/135		200	165/118	189/121
	SBL	3868		172/134	180/147	187/163	3191		187/146	204/149
	SBT	3868		4/-	9/-	-/-	3191		13/4	5/16
Queen Annes Court & 258/Rt 32 (Brewers Neck Boulevard)	EBL		125	25/25	24/24	28/27		125	23/28	26/30
	EBT	1008		240/200	265/223	324/260	1008		299/253	317/297
	EBTR	1008		249/217	273/233	327/267	1008		303/259	321/304
	WBL		500	150/242	166/300	183/350		500	117/319	182/437
	WBT	785		238/338	262/417	298/447	785		86/513	82/614
	WBT	785		200/327	235/403	275/460	785		61/528	60/645
	WBR		250	4/13	4/41	6/89		250	4/55	6/98
	NBLT	858		14/15	14/16	11/19	858		6/14	3/16
	NBR		250	171/96	187/106	220/127		250	190/111	200/136
	NBR		250	110/35	127/40	172/59		250	147/43	154/68
	SBLT	565		24/25	28/30	31/30	565		31/25	34/28
	SBR	565		33/27	34/31	38/32	565		34/34	39/30
US 258/Rt 10 (Benns Church Boulevard) & Proposed Secondary Entrance	WBR			-	-	-	1244		71/101	70/137
	NBT			-	-	-	3191		-/4	-/14
	NBT			-	-	-	3191		-/4	-/16
	NBR			-	-	-		100	-/4	-/-

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Appendix
Revised Network Figures

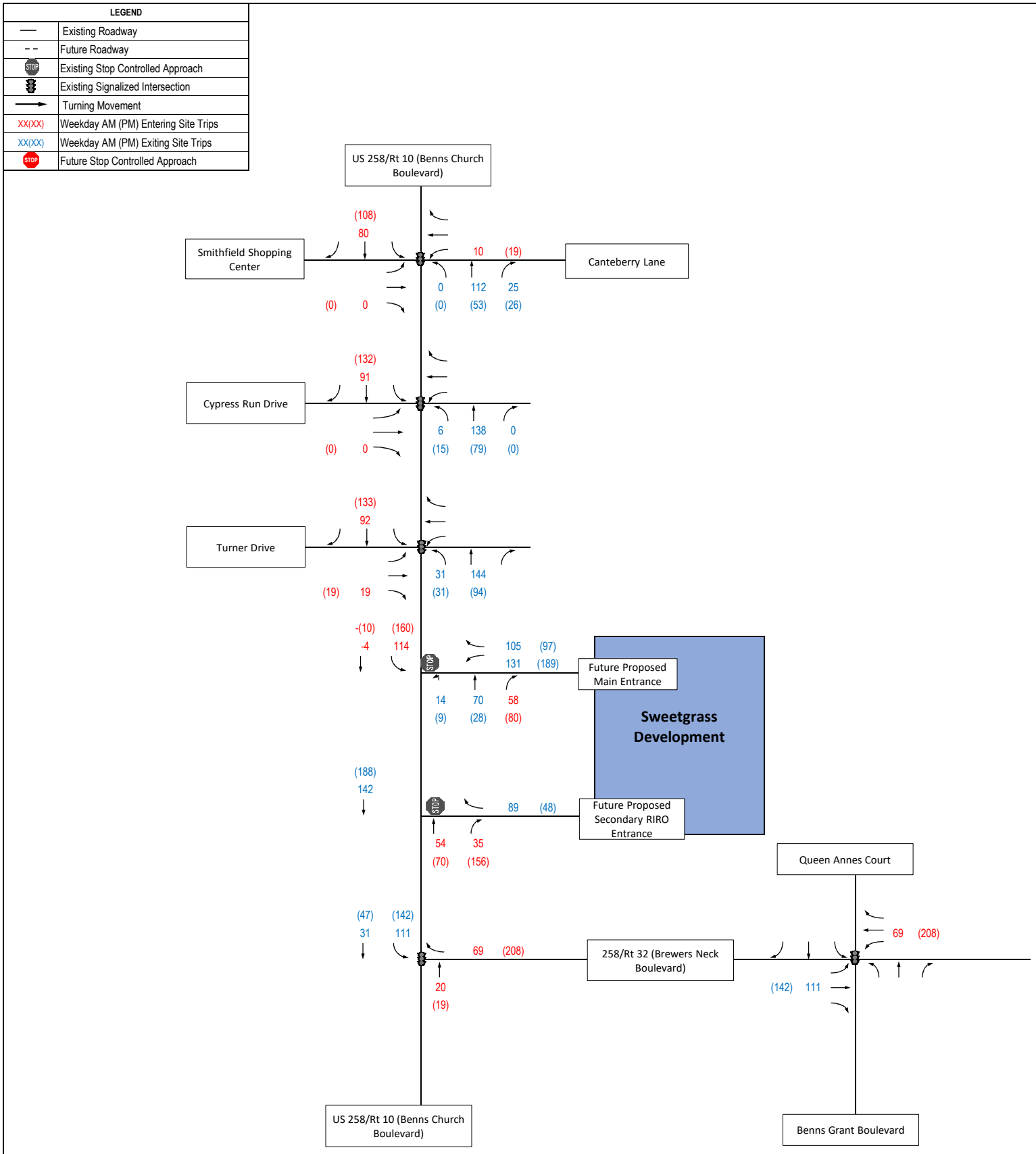


Figure 10
Combined AM and PM Peak Hour Site Trips

Sweetgrass
Isle of Wight County, VA

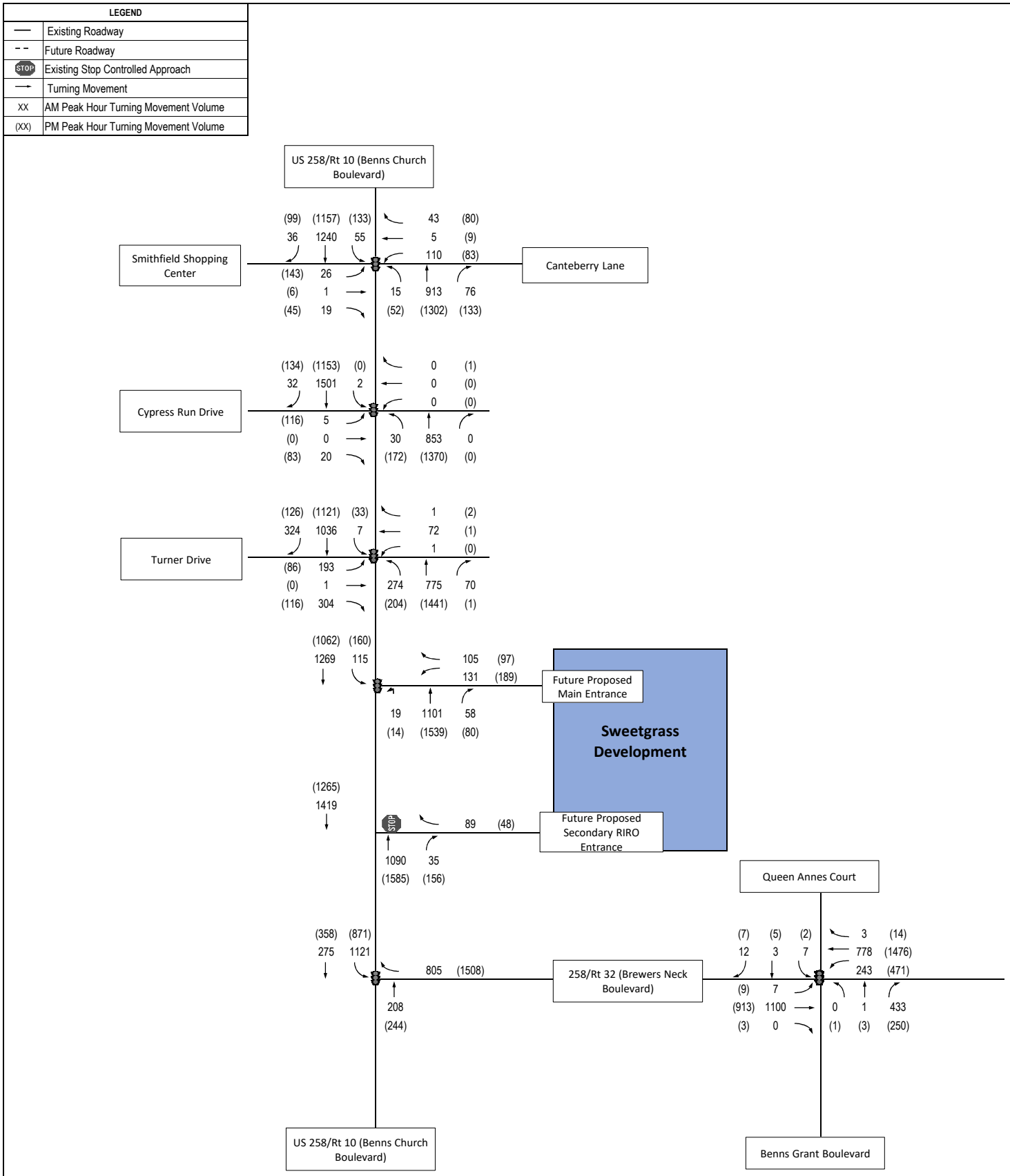


Figure 11
2026 Build AM and PM Peak Hour Traffic Volumes

Sweetgrass
Isle of Wight County, VA

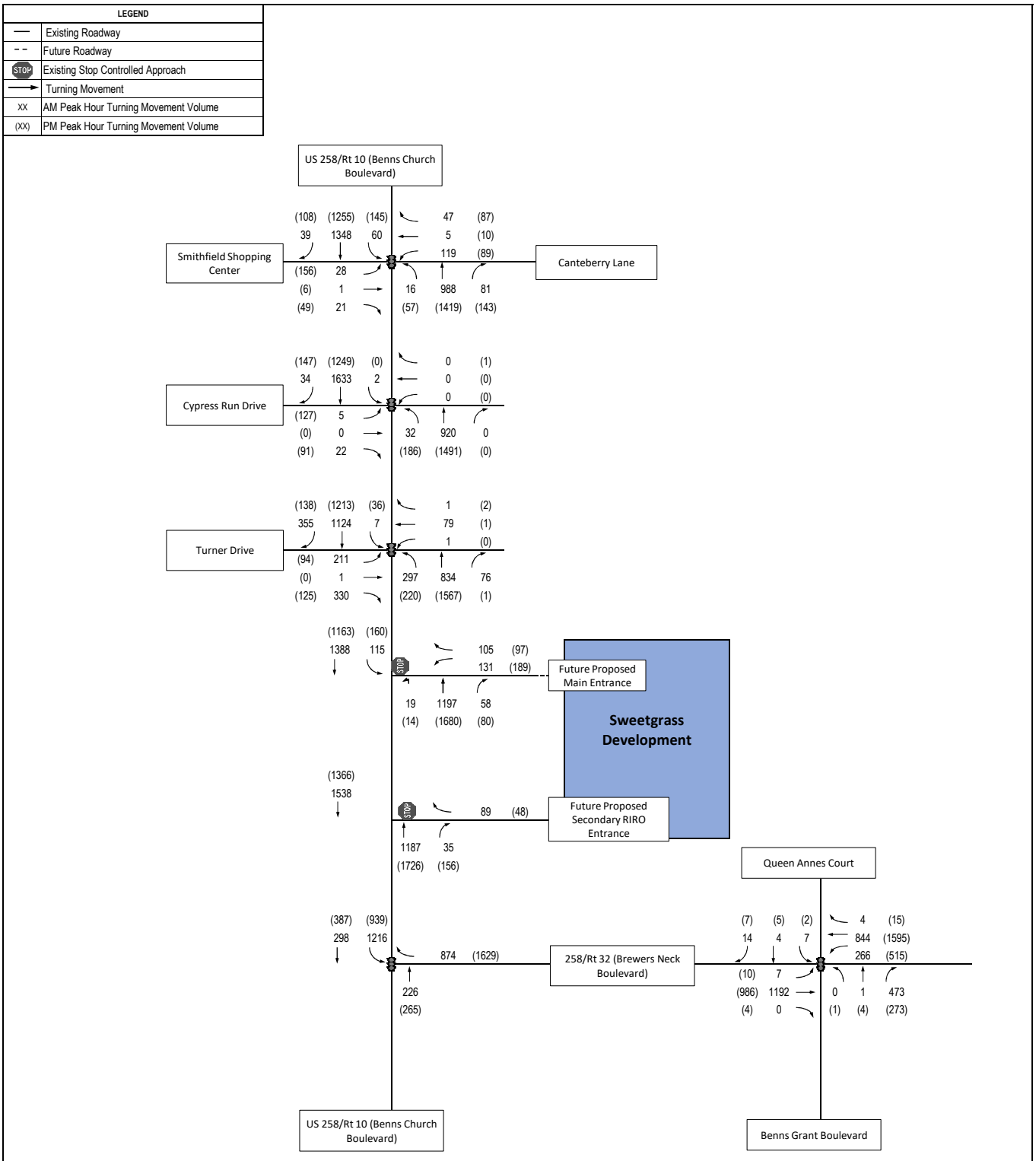


Figure 12
2032 Build AM and PM Peak Hour Traffic Volumes

Sweetgrass
Isle of Wight County, VA

Memorandum

To: VDOT and Isle of Wight County

Date: June 25, 2021
Project #: 34417.00

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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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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- 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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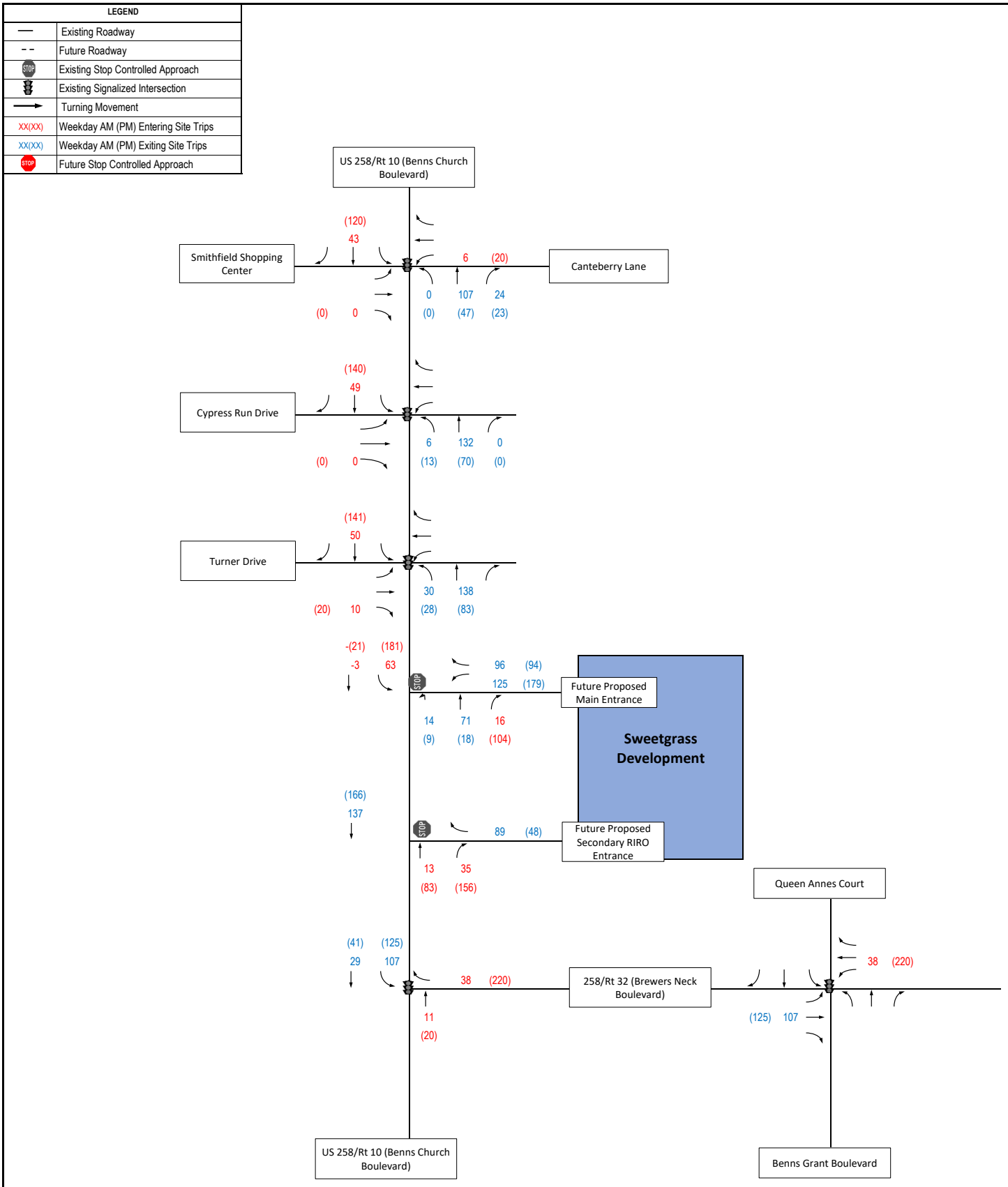


Figure 10
Combined AM and PM Peak Hour Site Trips

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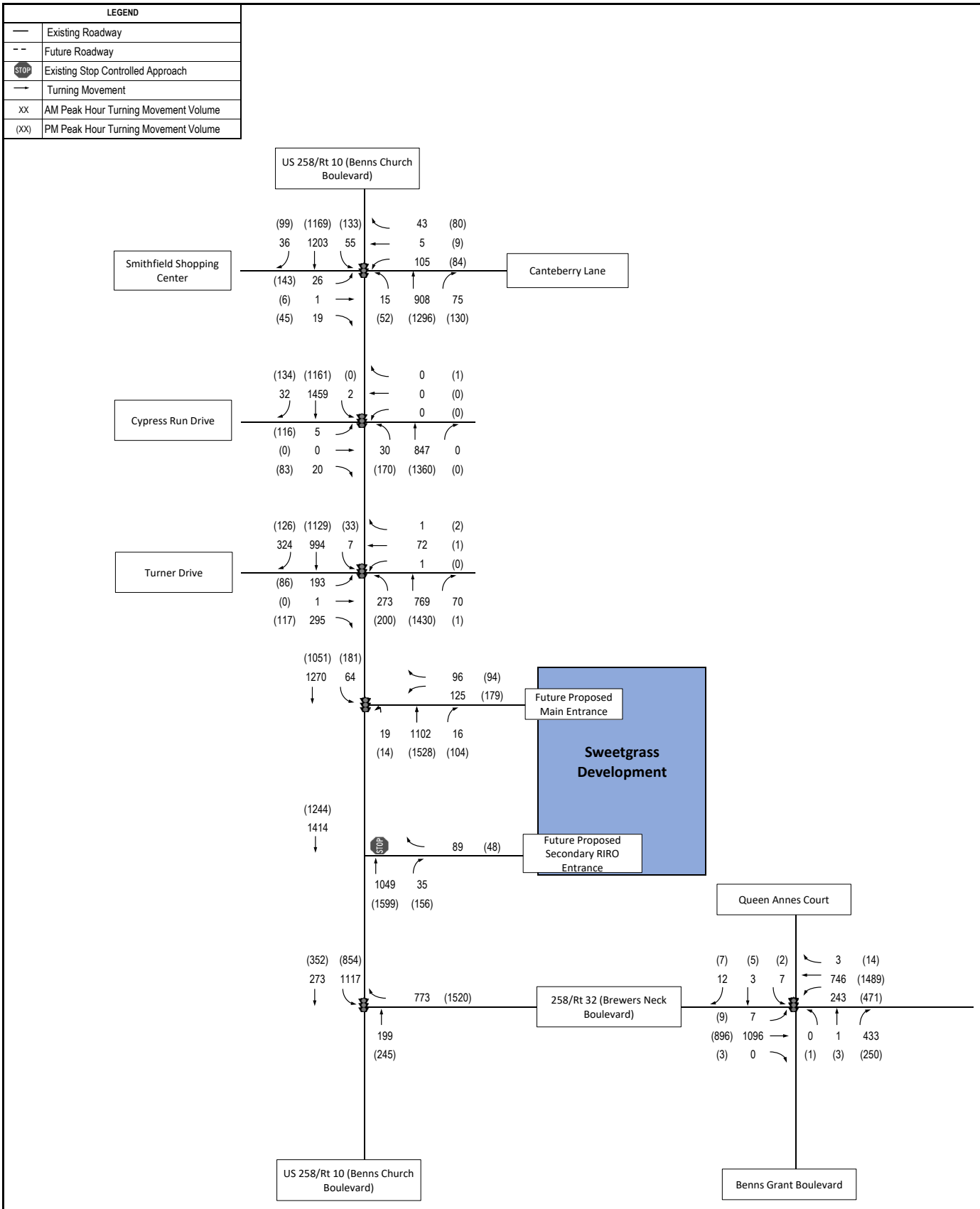


Figure 11
2026 Build AM and PM Peak Hour Traffic Volumes

Sweetgrass
Isle of Wight County, VA

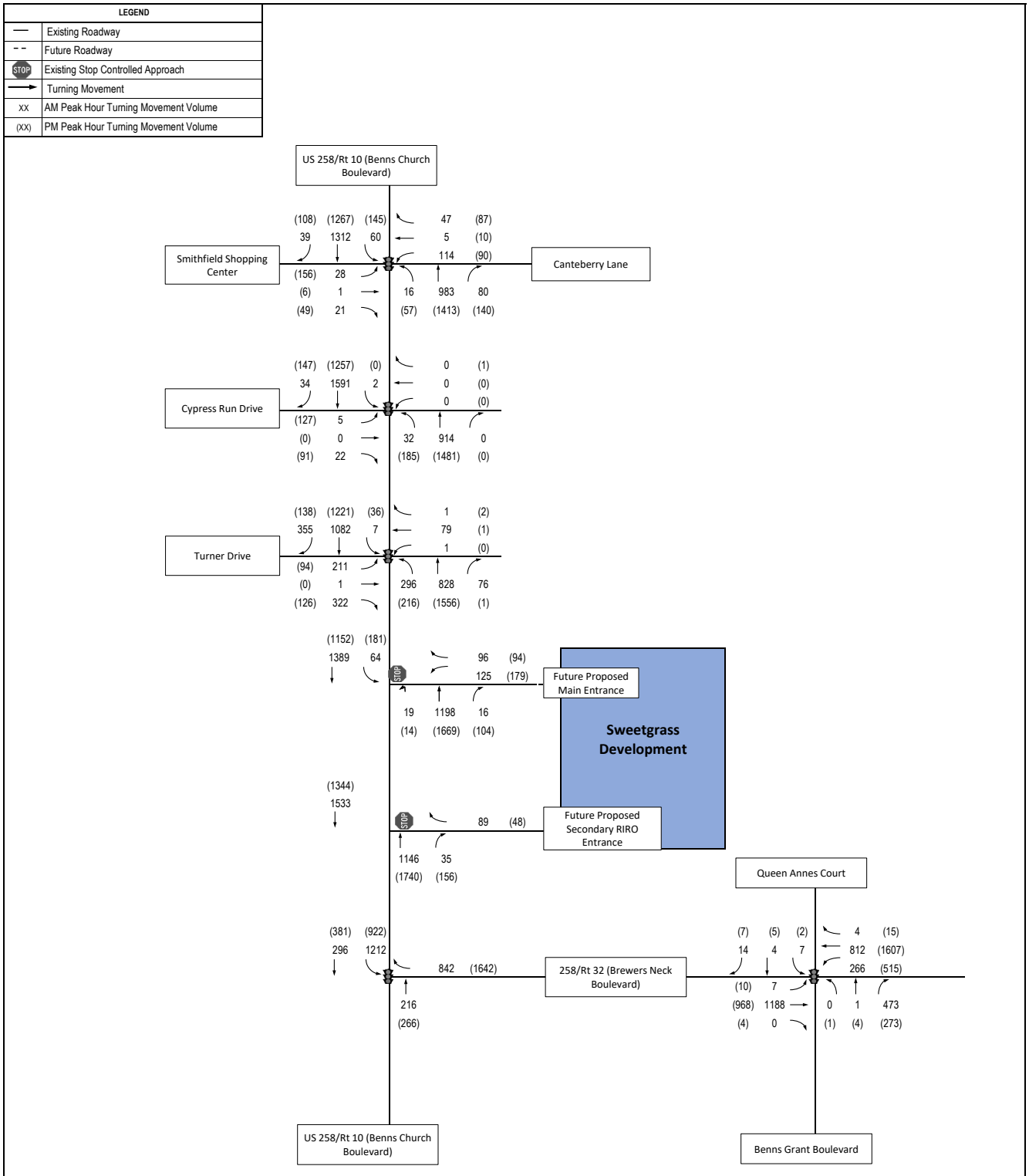


Figure 12
2032 Build AM and PM Peak Hour Traffic Volumes

Sweetgrass
Isle of Wight County, VA

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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Appendix K	Queue Reports
Appendix L	Signal Justification Report

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.

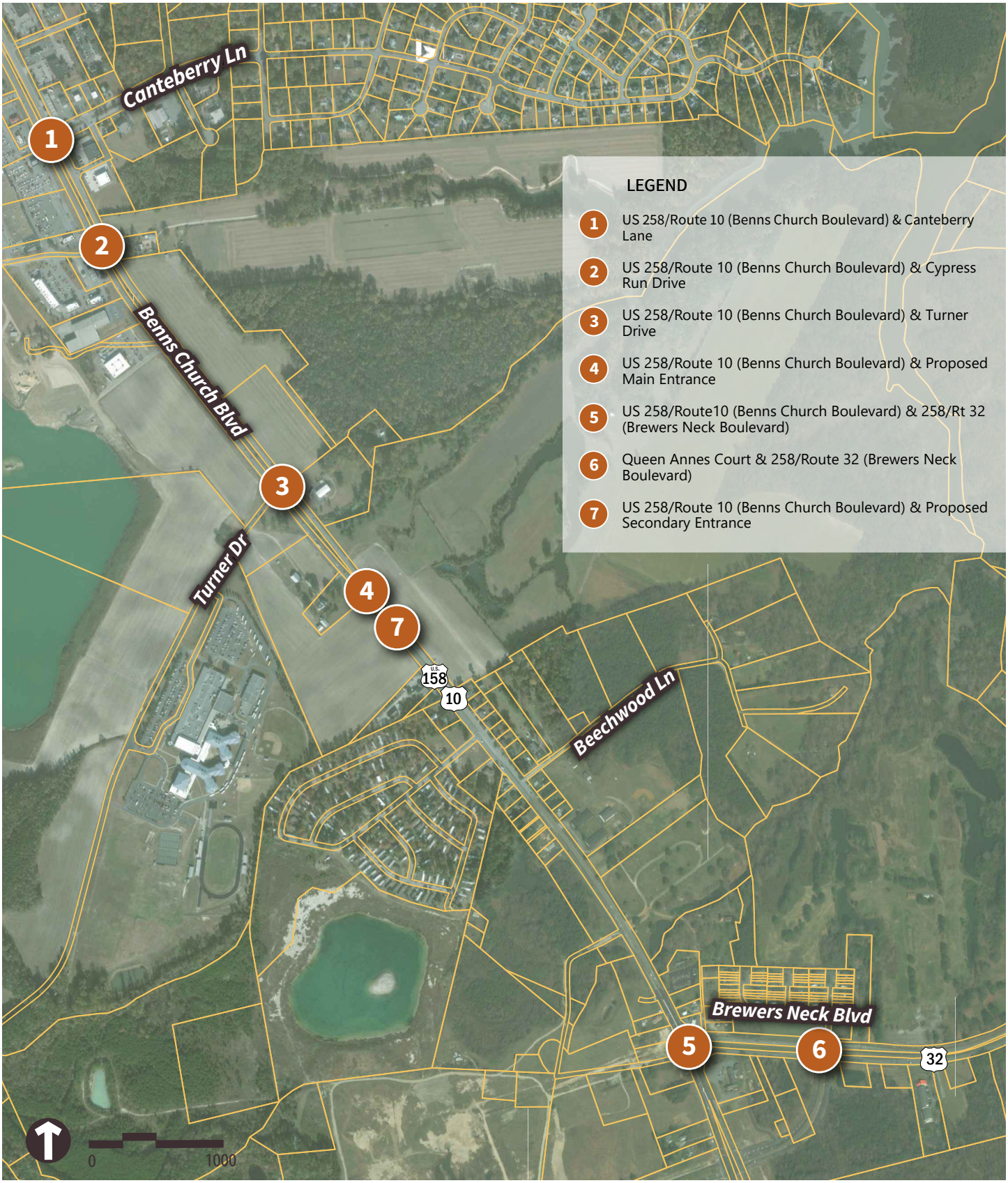


SOURCE: BING, (c) 2015 Microsoft Corporation and its data suppliers.

FIGURE 1

Vicinity Map

Yeoman Tract Traffic Impact Study
Isle of Wight County, Virginia

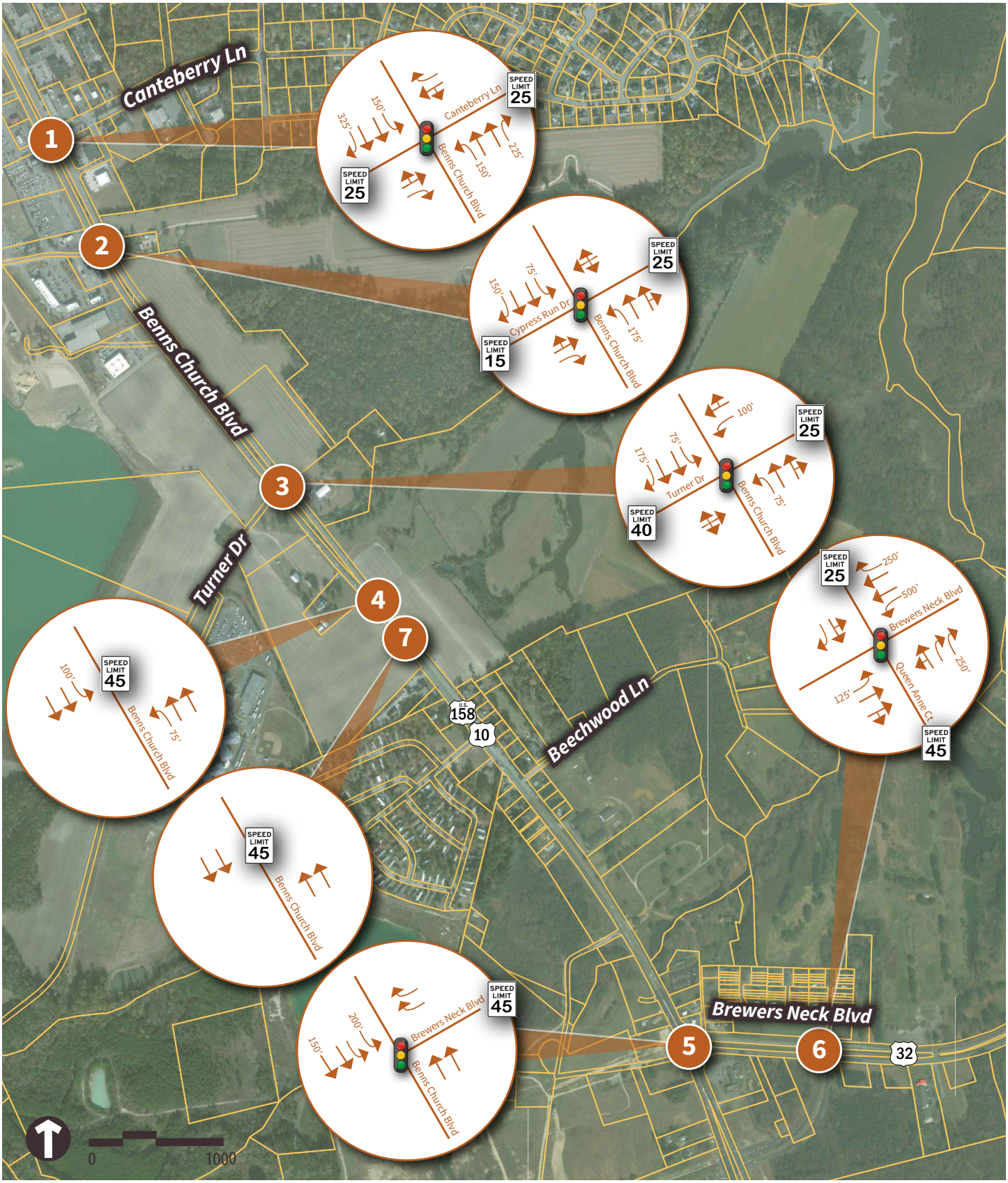


SOURCE: BING, (c) 2015 Microsoft Corporation and its data suppliers.

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

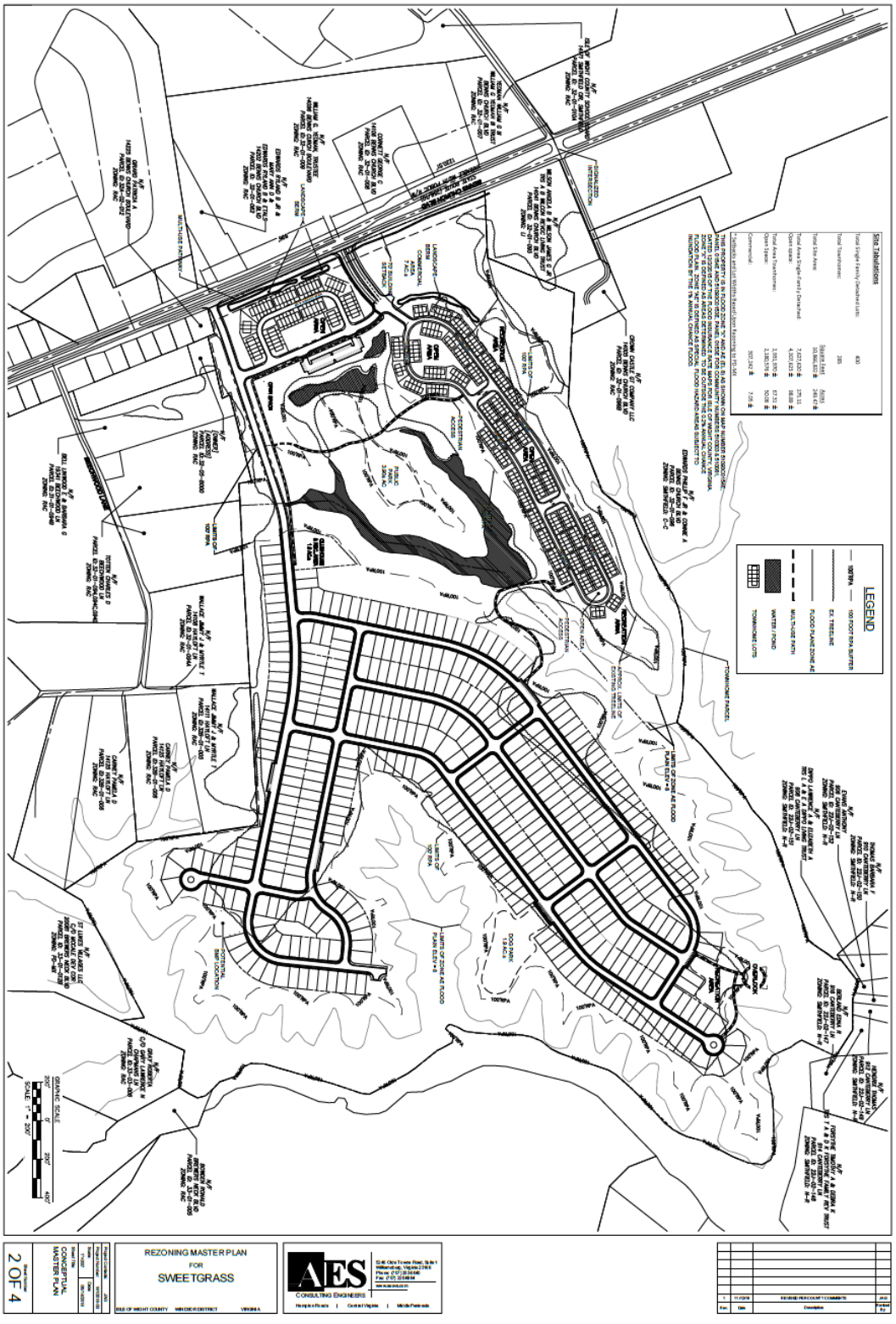


Figure 5. Conceptual Site Plan

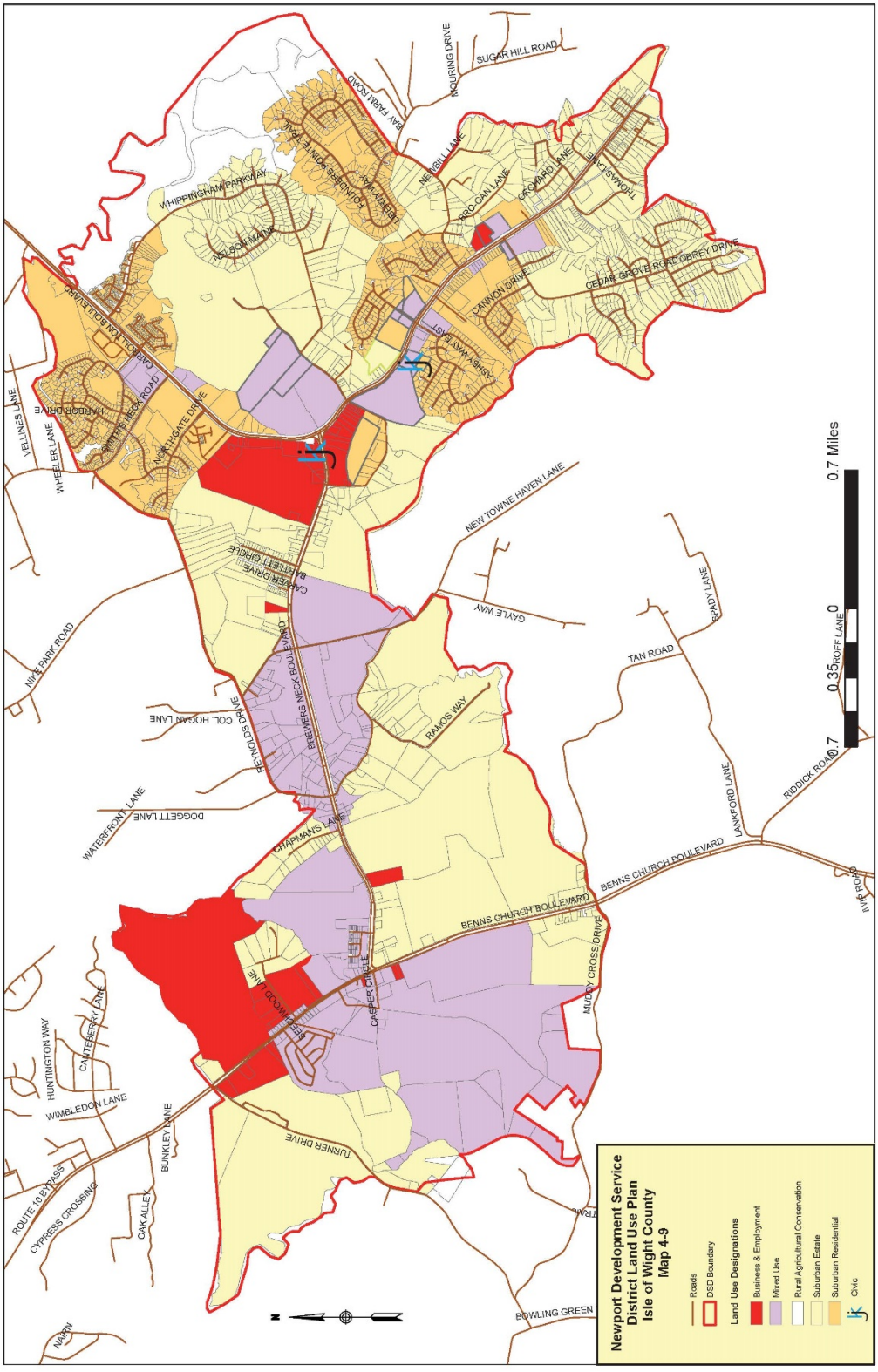


Figure 6. Existing and Proposed Land Use.

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

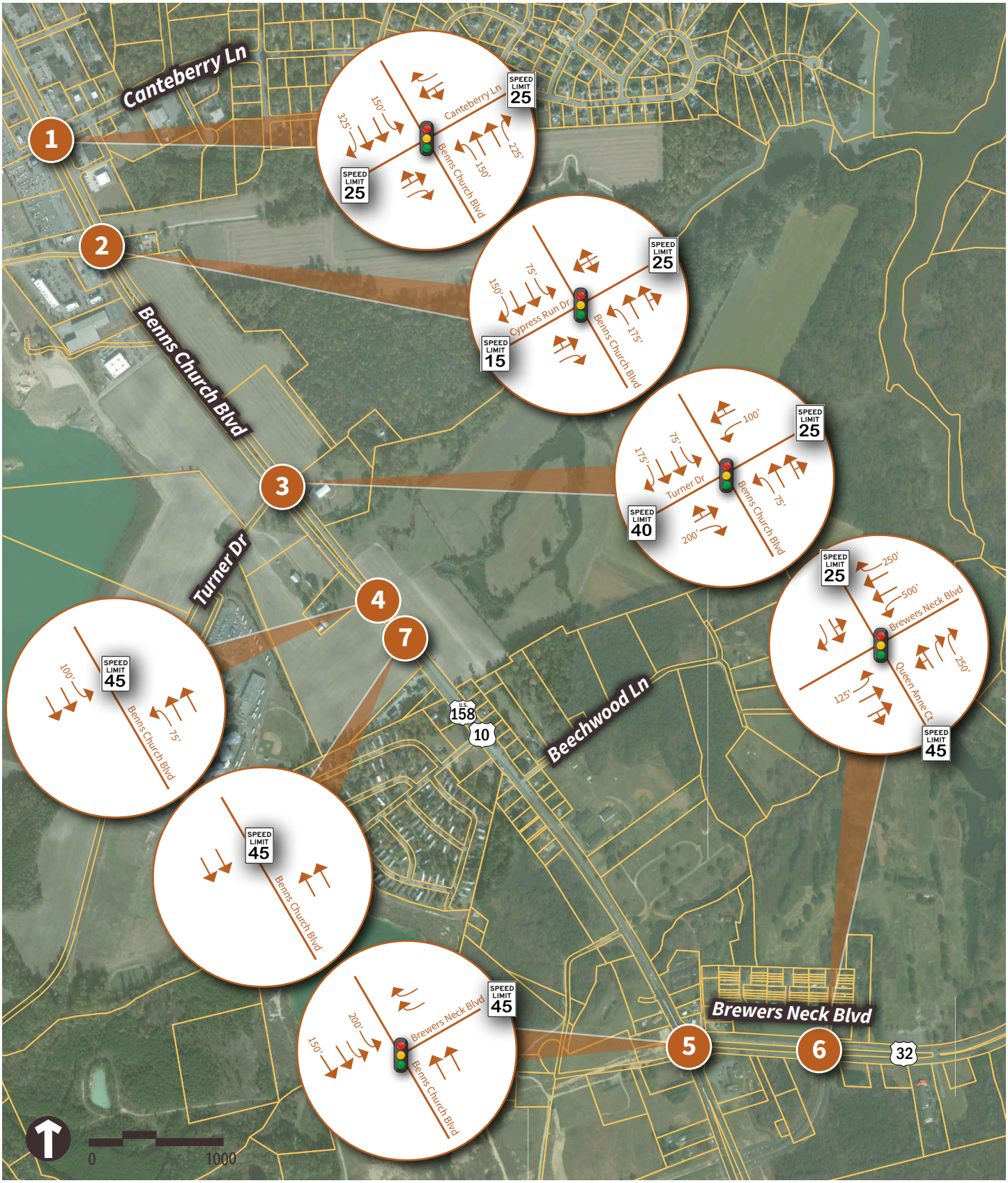
The 2018 am and pm peak hour volumes were projected to horizon years 2026 and 2032 using a growth factor approved by VDOT and Isle of Wight County. One and a half percent (1.5%) growth was used for all intersections within the study area.

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

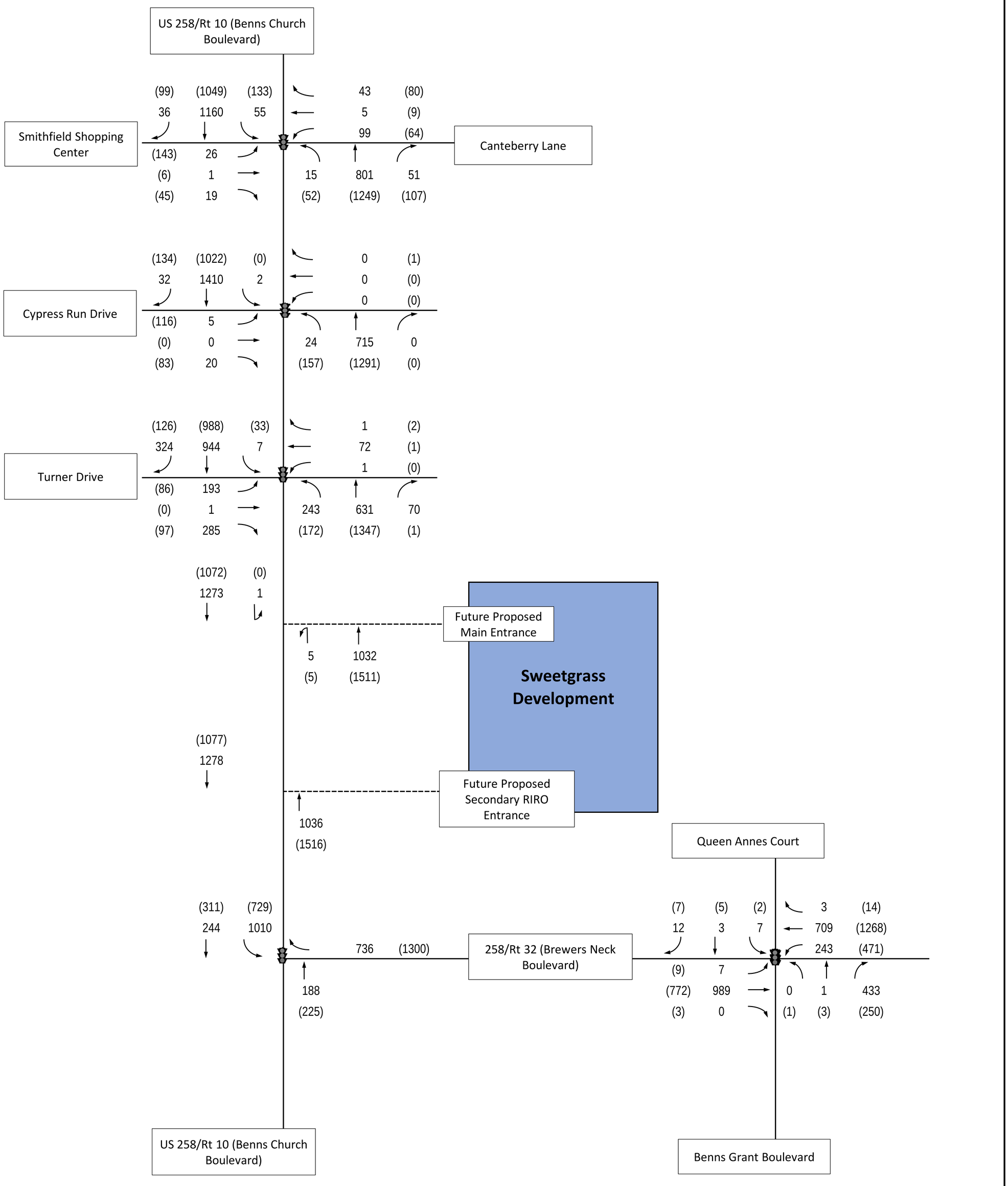


Figure 8
2026 No Build AM and PM Peak Hour Traffic Volumes

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

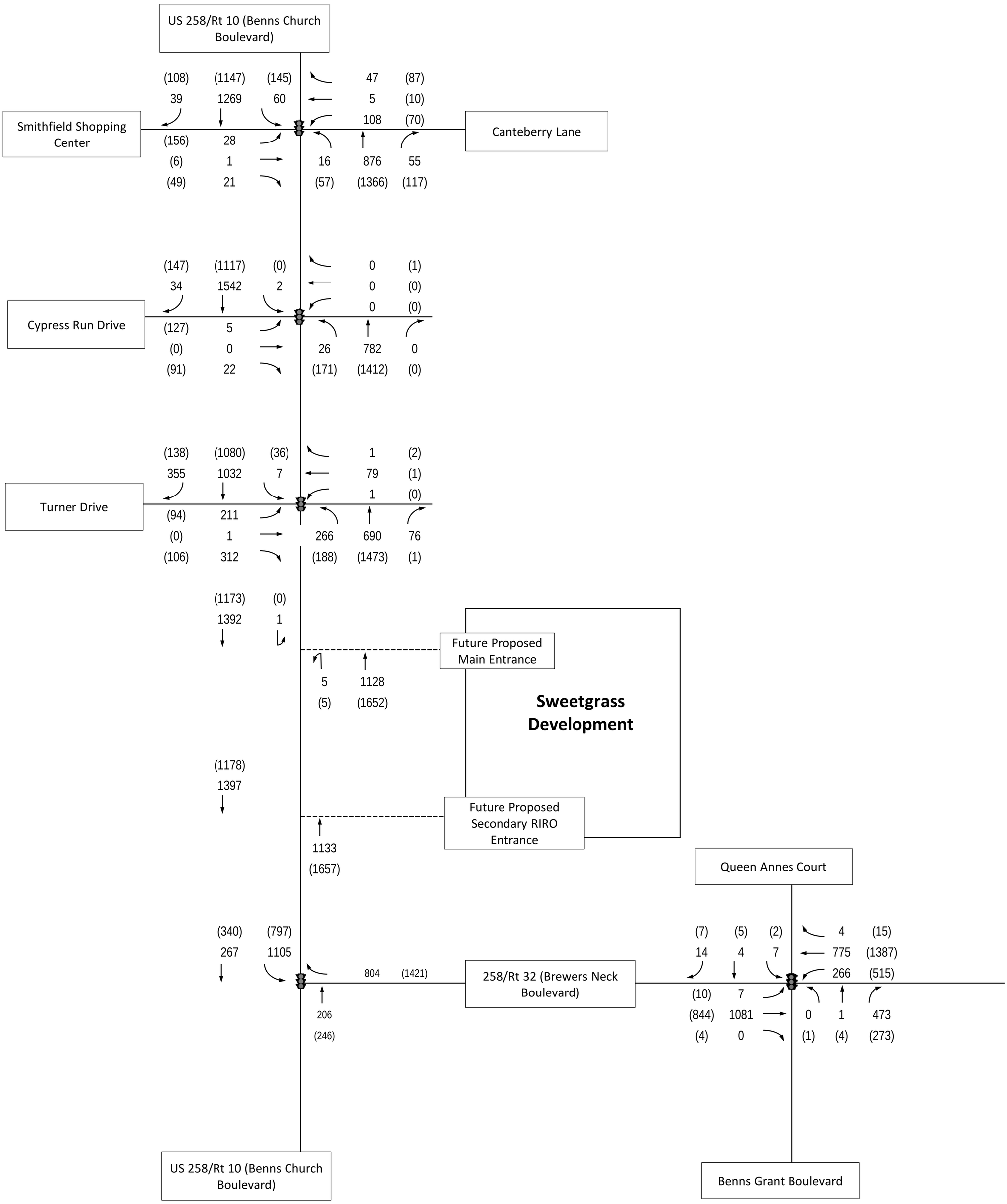


Figure 9
2032 No Build AM and PM Peak Hour Traffic Volumes

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

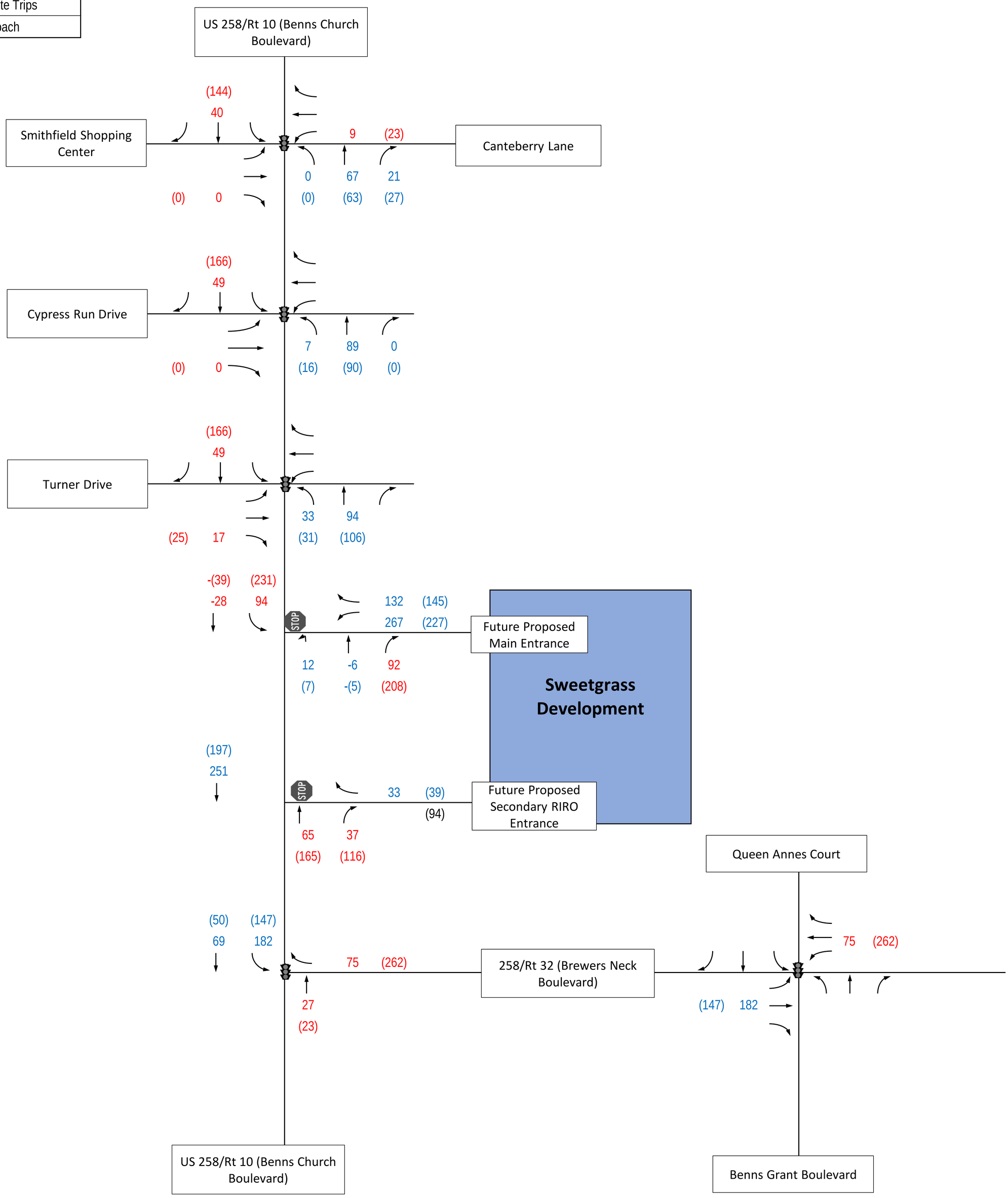


Figure 10
Combined AM and PM Peak Hour Site Trips

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

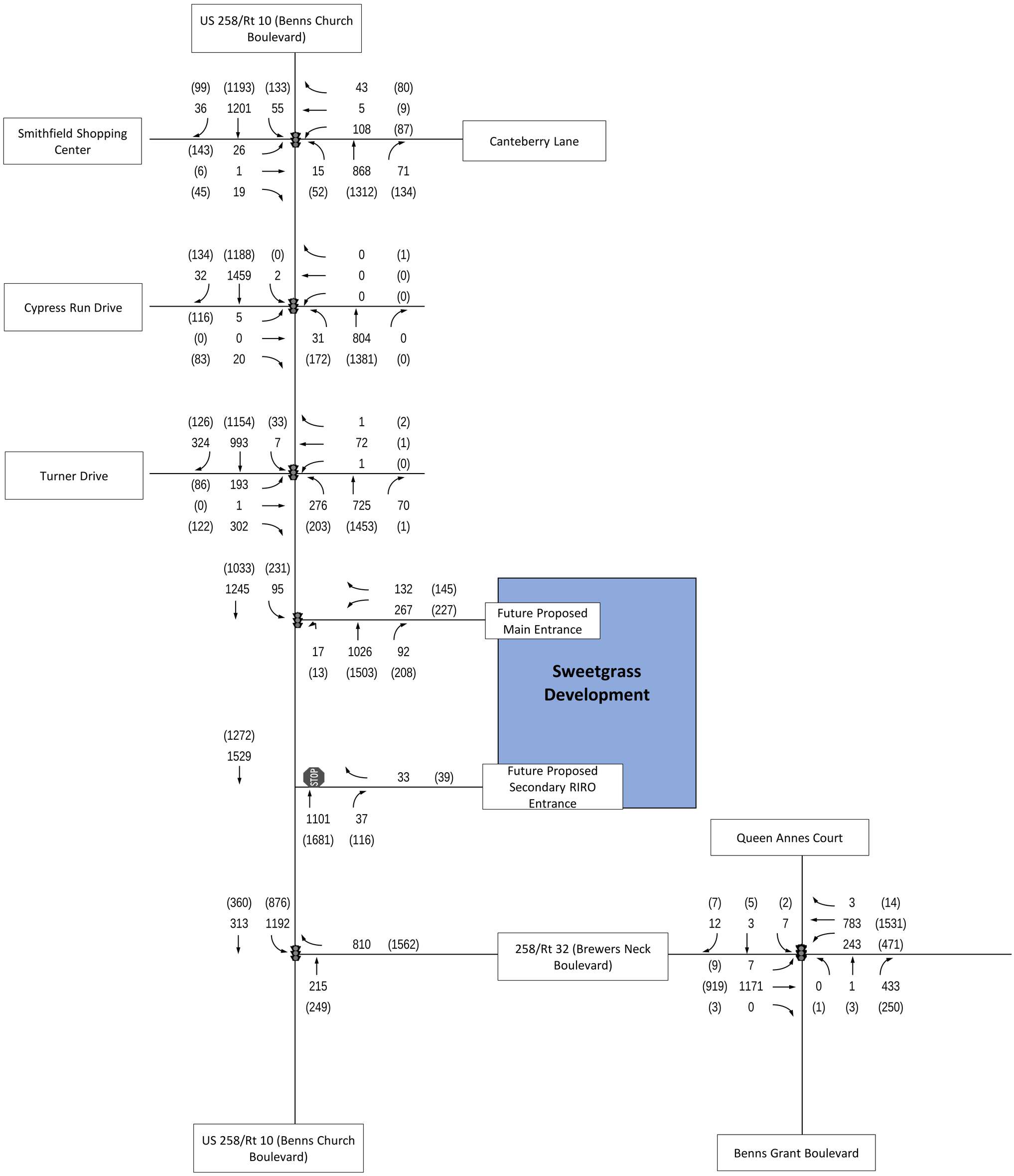


Figure 11
2026 Build AM and PM Peak Hour Traffic Volumes

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

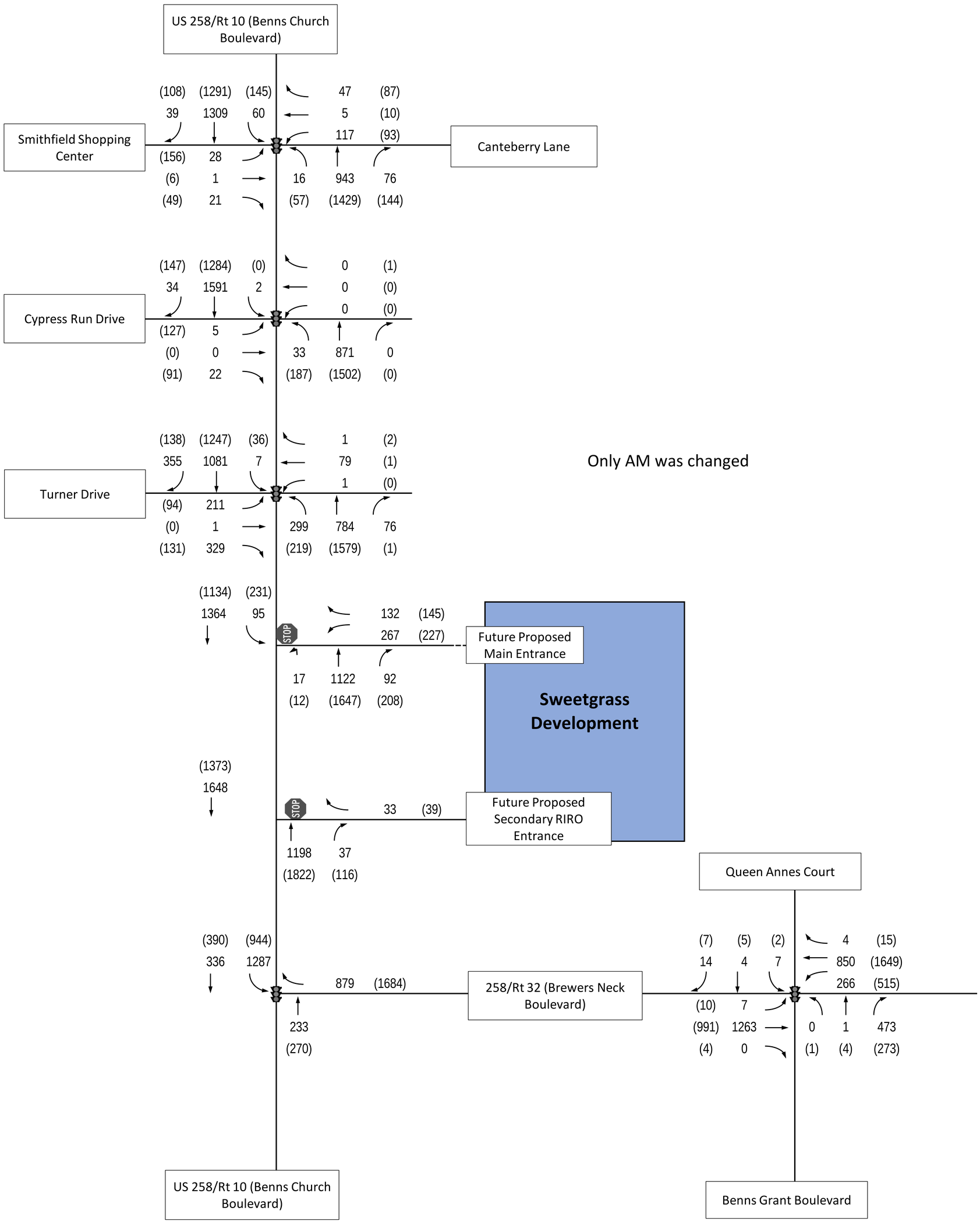


Figure 12
2032 Build AM and PM Peak Hour Traffic Volumes

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

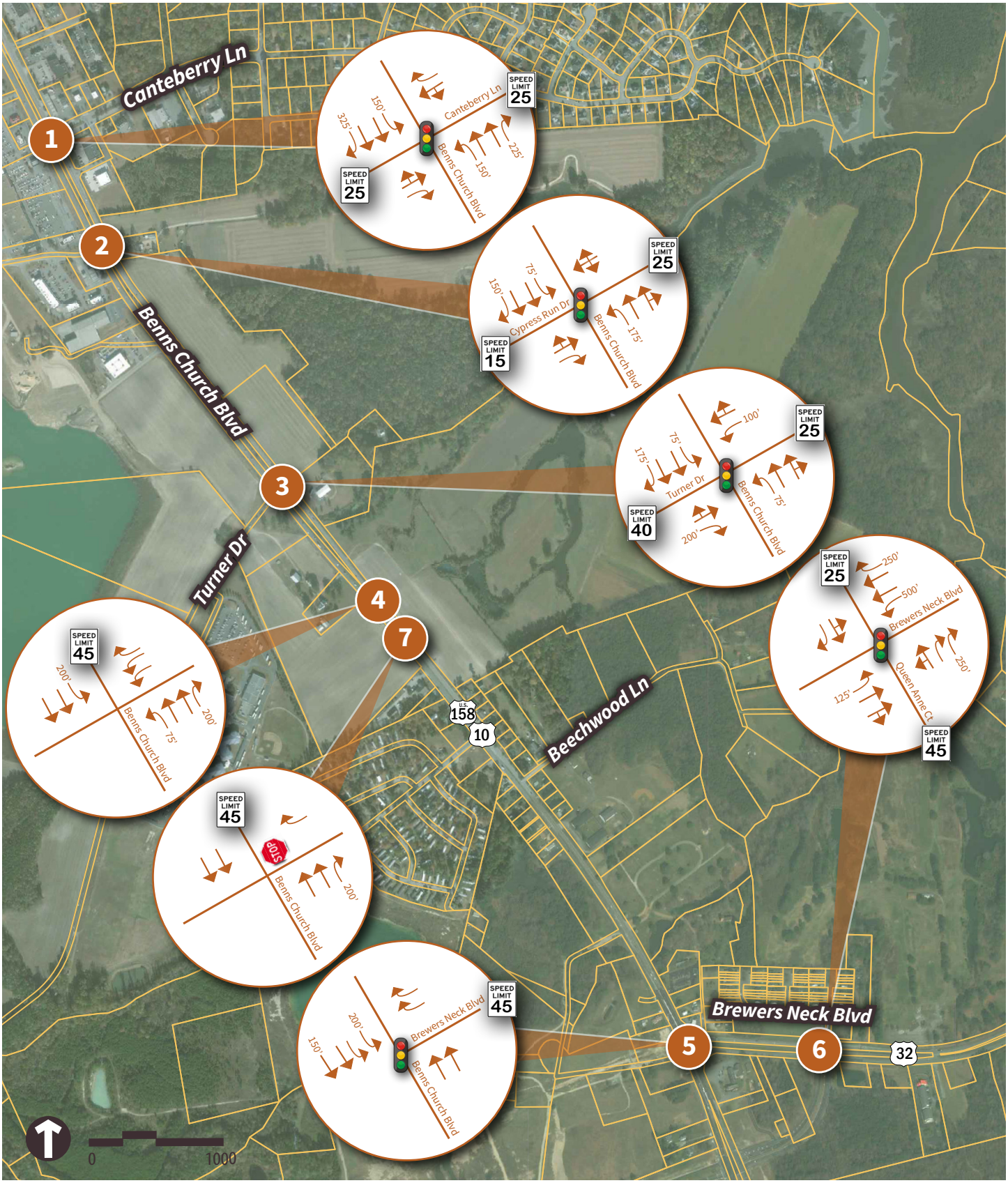
A Manual of Uniform Traffic Control Devices (MUTCD) signal warrant screening was performed based on projected volumes at the intersection of US 258 /Rt.10 (Benns Church Boulevard) and the future proposed main entrance to the development. Chapter 4C (Traffic Control Signal Needs Studies) of the MUTCD 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)
(SLOPE EASEMENT VARIES WITH TOPOGRAPHY)
1220.51'
696'

SIGNALIZED INTERSECTION
TOWNHOME PARCEL
LIMITS OF ZONE AE FLOOD PLAIN ELEV = 8
APPROX. LIMITS OF EXISTING TREELINE
RECREATION AREA
OPEN AREA
PEDESTRIAN ACCESS
LIMITS OF 100' RPA
LANDSCAPE BERM
COMMERCIAL AREA 7 AC.±
70' BUILDING SETBACK
PUBLIC PARK 3.90± AC
OPEN SPACE
CLUBHOUSE & REC. AREA 1.0 AC.±
OVERLOOK
DOG PARK 1.9 AC.±
POTENTIAL BMP LOCATION
MULTI-USE PATHWAY
BEECHWOOD LANE

GRAPHIC SCALE
200' 0' 200' 400'
SCALE: 1" = 200'

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

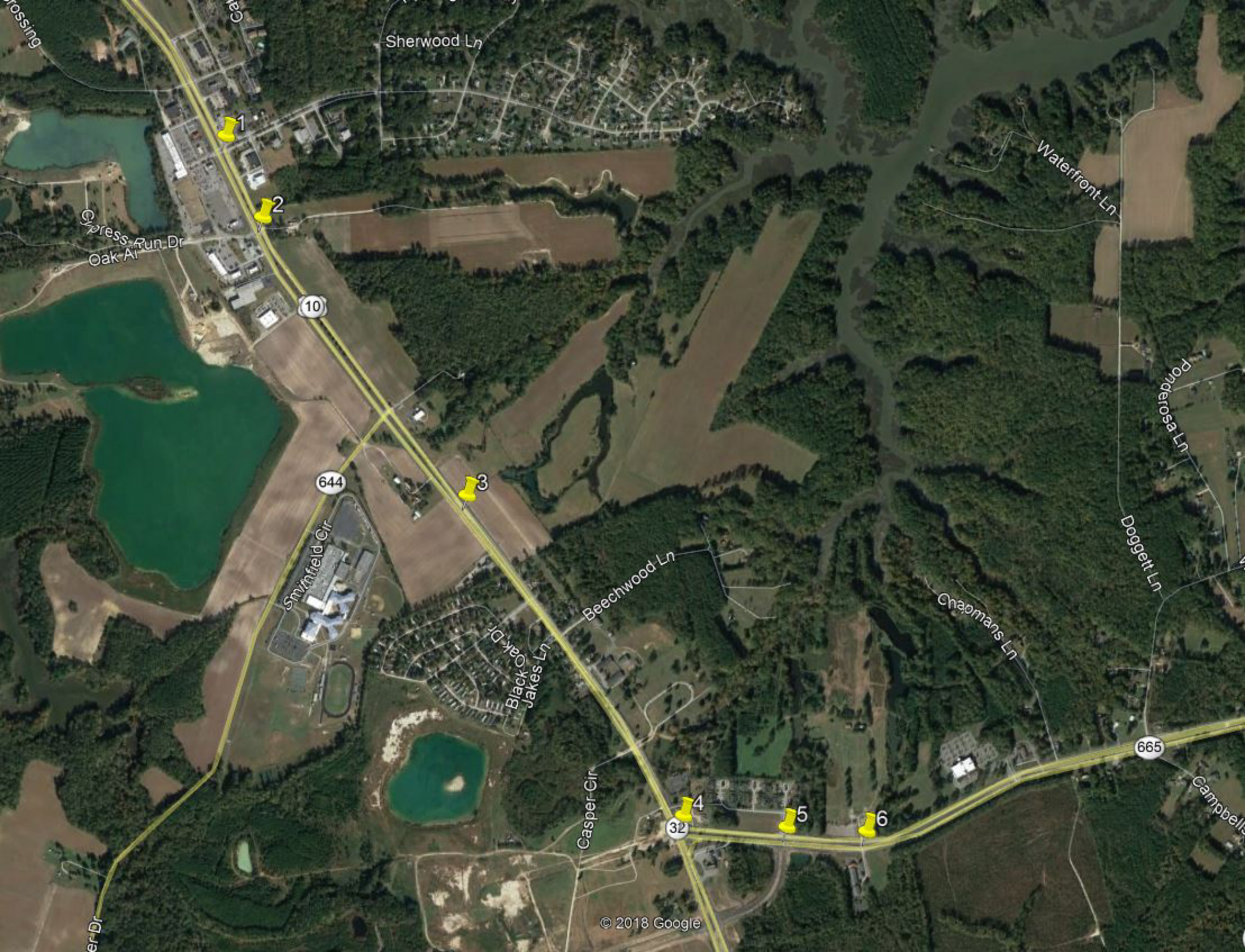
REZONING MASTER PLAN FOR SWEETGRASS

ISLE OF WIGHT COUNTY | WINDSOR DISTRICT | VIRGINIA

Project Contacts:	JAG
Project Number:	W10516-00
Scale: 1"=200'	Date: 06/14/2019

Sheet Title:
CONCEPTUAL MASTER PLAN

Sheet Number
2 OF 4


Sherwood Ln
Waterfront Ln
Cypress Run Dr
Oak Al
10
644
Smithfield Cir
Beechwood Ln
Black Oak Dr
Jakes Ln
Doggett Ln
Chaomans Ln
Ponderosa Ln
Casper Cir
32
665
Campbell
1
2
3
4
5
6
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APPENDIX B

Traffic Data

4500 Main Street
Suite 400
Virginia Beach, VA 23462-3361
757.490.0132

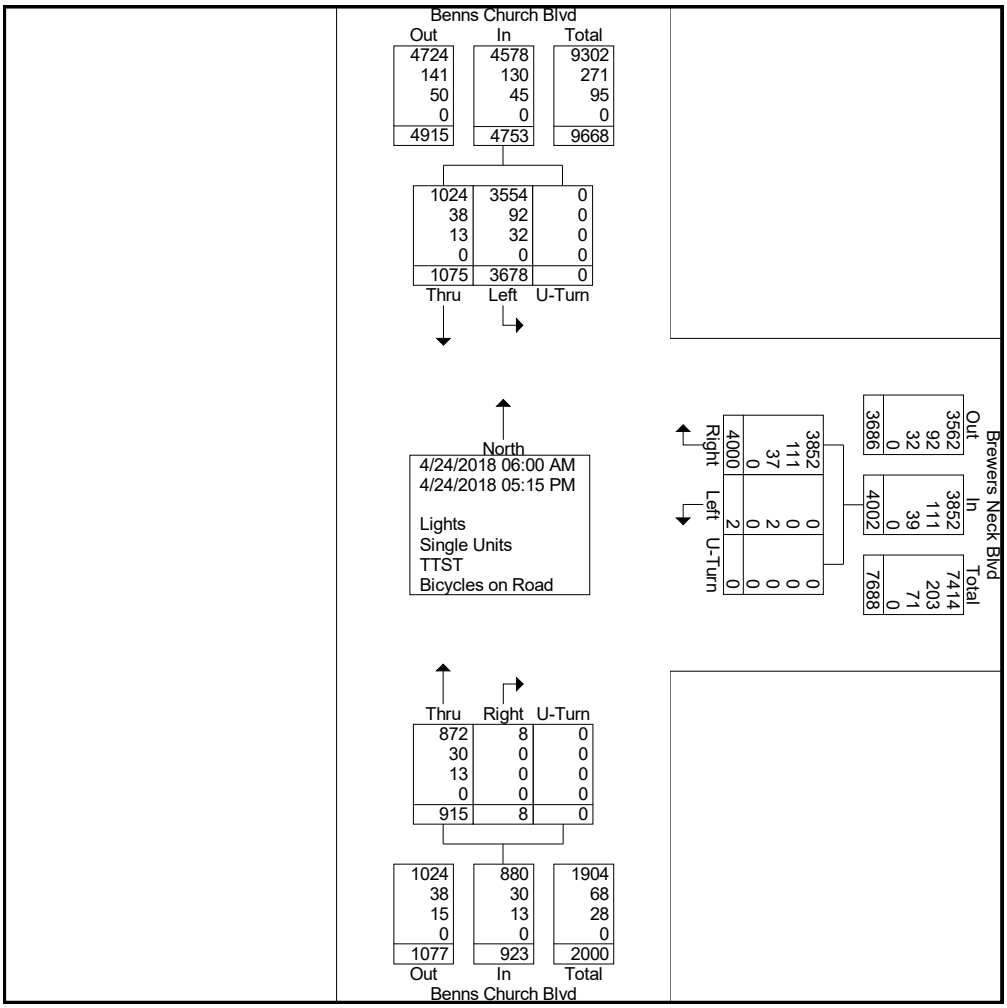
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Site Code :
Start Date : 4/24/2018
Page No : 1

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

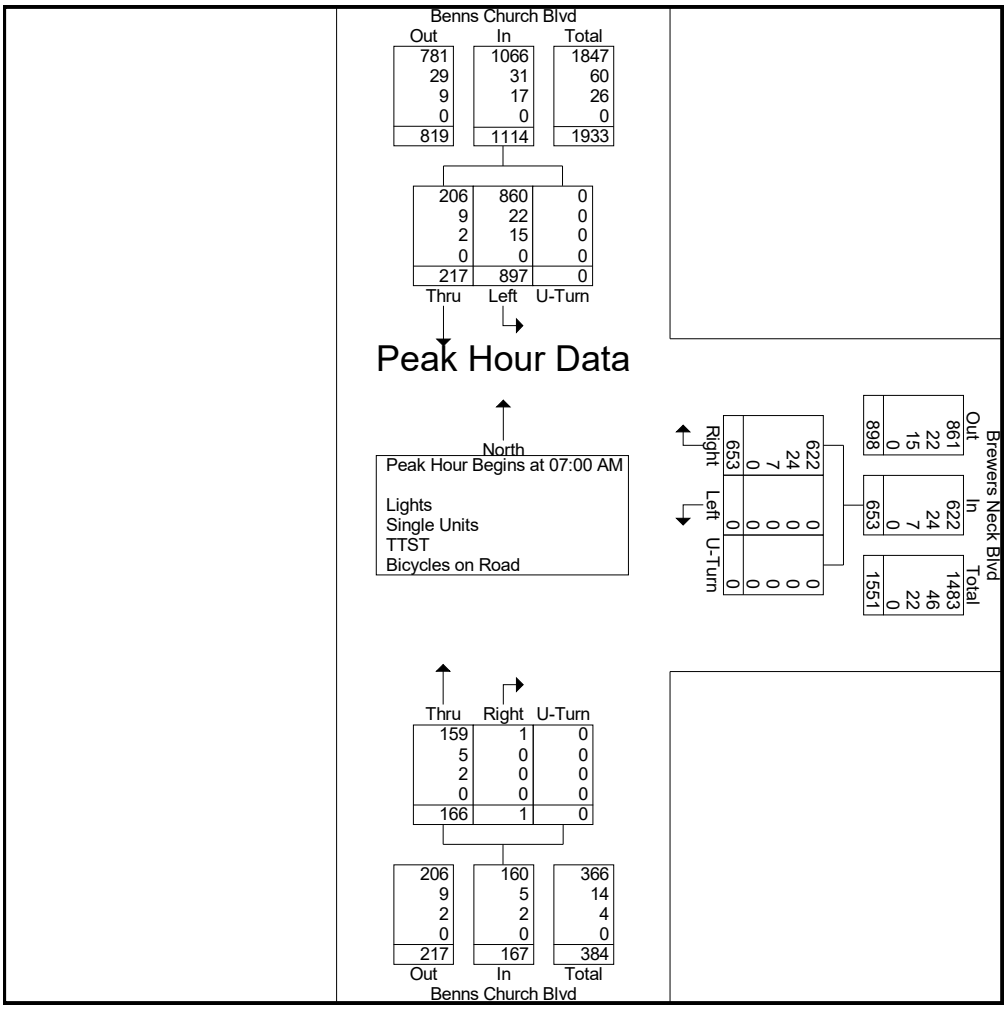
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Site Code :
Start Date : 4/24/2018
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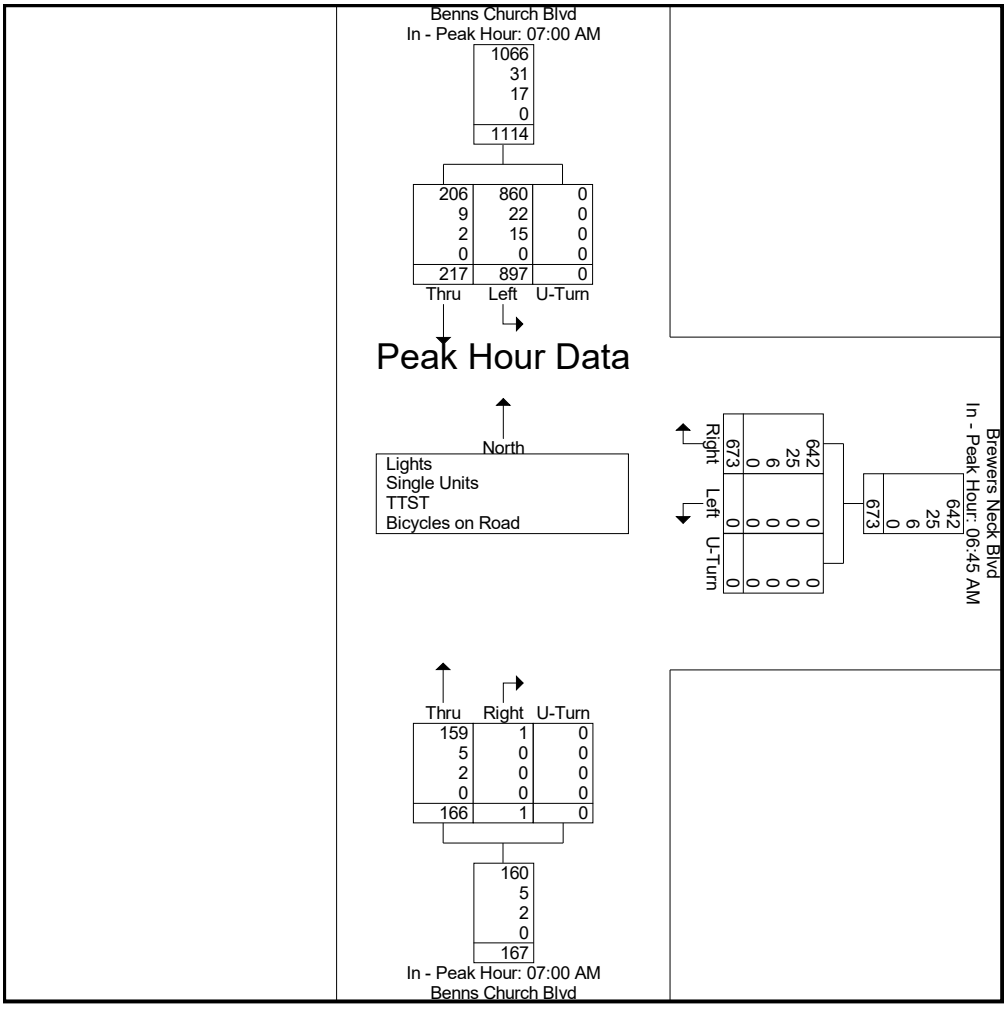
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Start Time	Left	Thru	U-Turn	App. Total	Left	Right	U-Turn	App. Total	Thru	Right	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 11:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:00 AM													
07:00 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
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File Name : Benns_Church_and_Brewers_Neck_514974_04-24-2018
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Page No : 4

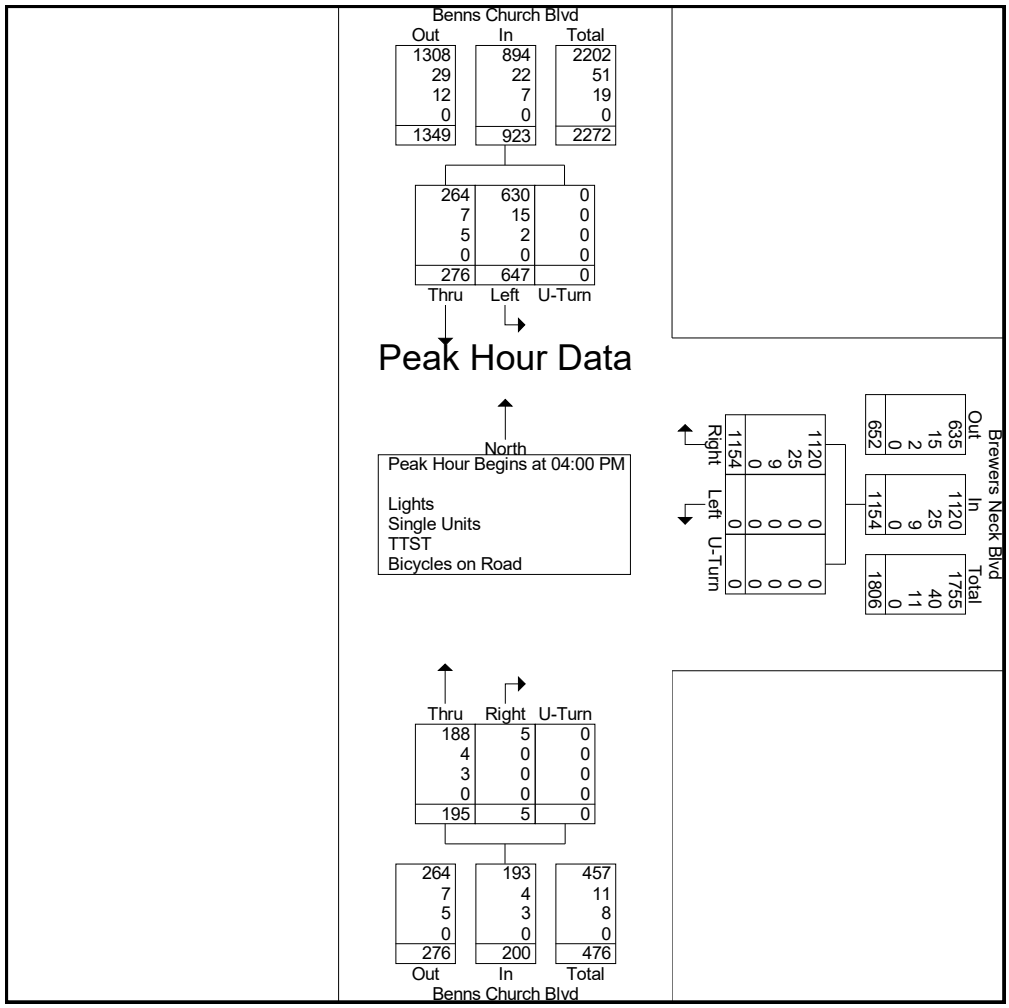
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Start Time	Left	Thru	U-Turn	App. Total	Left	Right	U-Turn	App. Total	Thru	Right	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 11:45 AM - Peak 1 of 1													
Peak Hour for Each Approach Begins at:													
	07:00 AM				06:45 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
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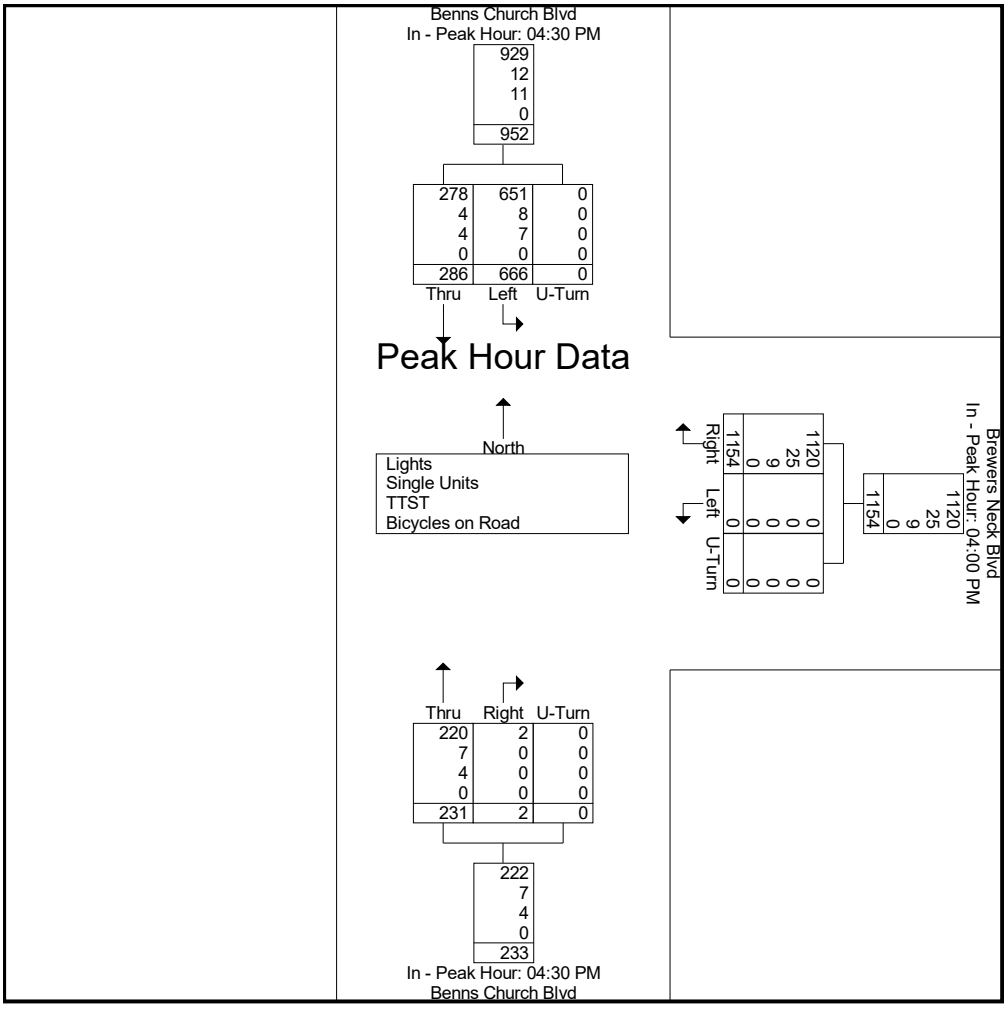
	Benns Church Blvd Southbound				Brewers Neck Blvd Westbound				Benns Church Blvd Northbound				
Start Time	Left	Thru	U-Turn	App. Total	Left	Right	U-Turn	App. Total	Thru	Right	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 05:15 PM - Peak 1 of 1													
Peak Hour for Entire Intersection 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



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File Name : Benns_Church_and_Brewers_Neck_514974_04-24-2018
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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	



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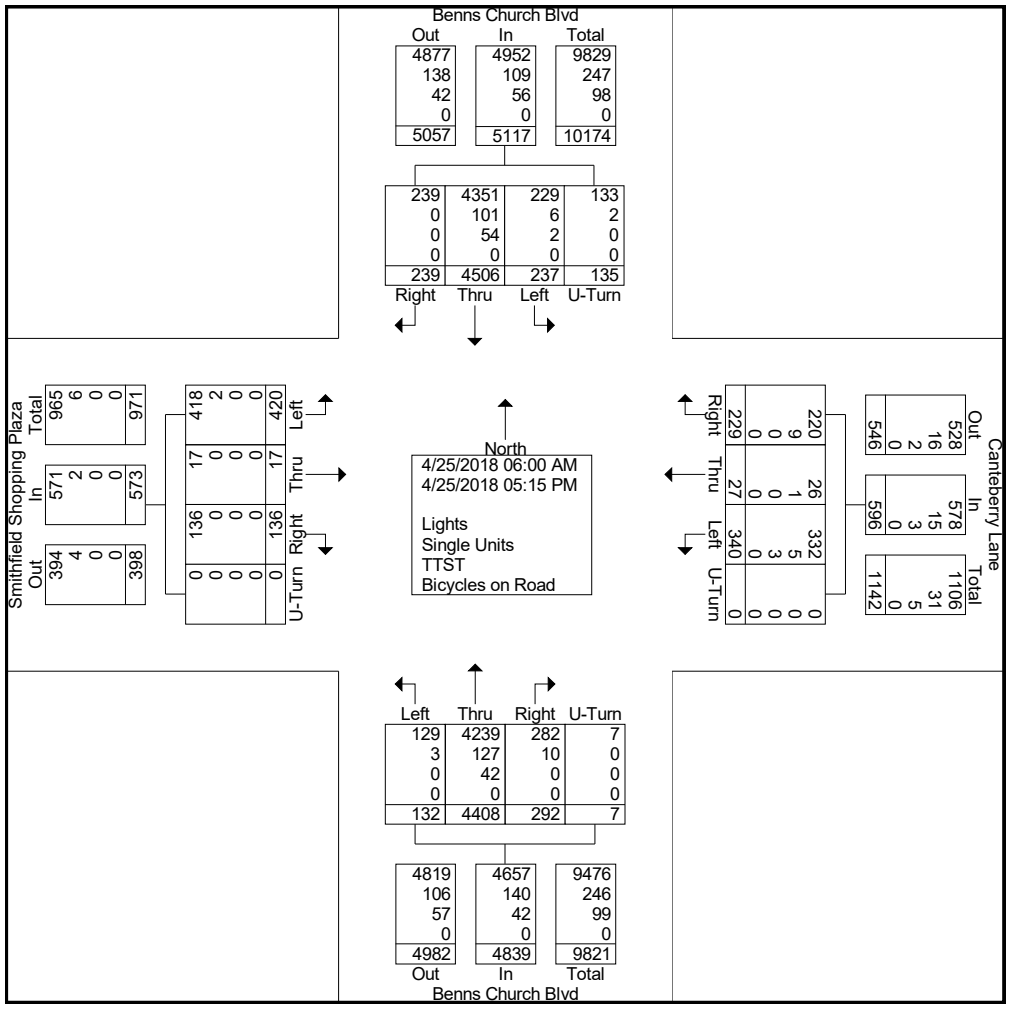
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Start Date : 4/25/2018
Page No : 1

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

4500 Main Street
Suite 400
Virginia Beach, VA 23462-3361
757.490.0132

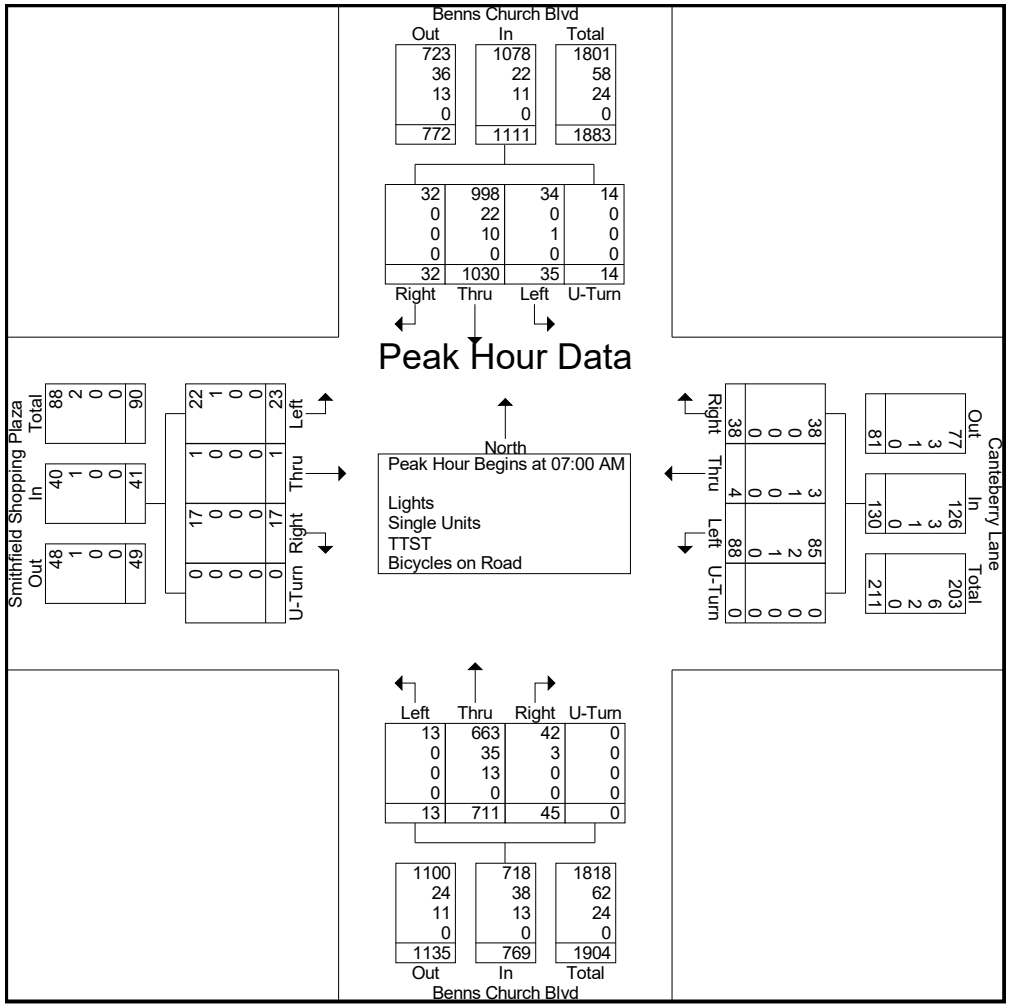
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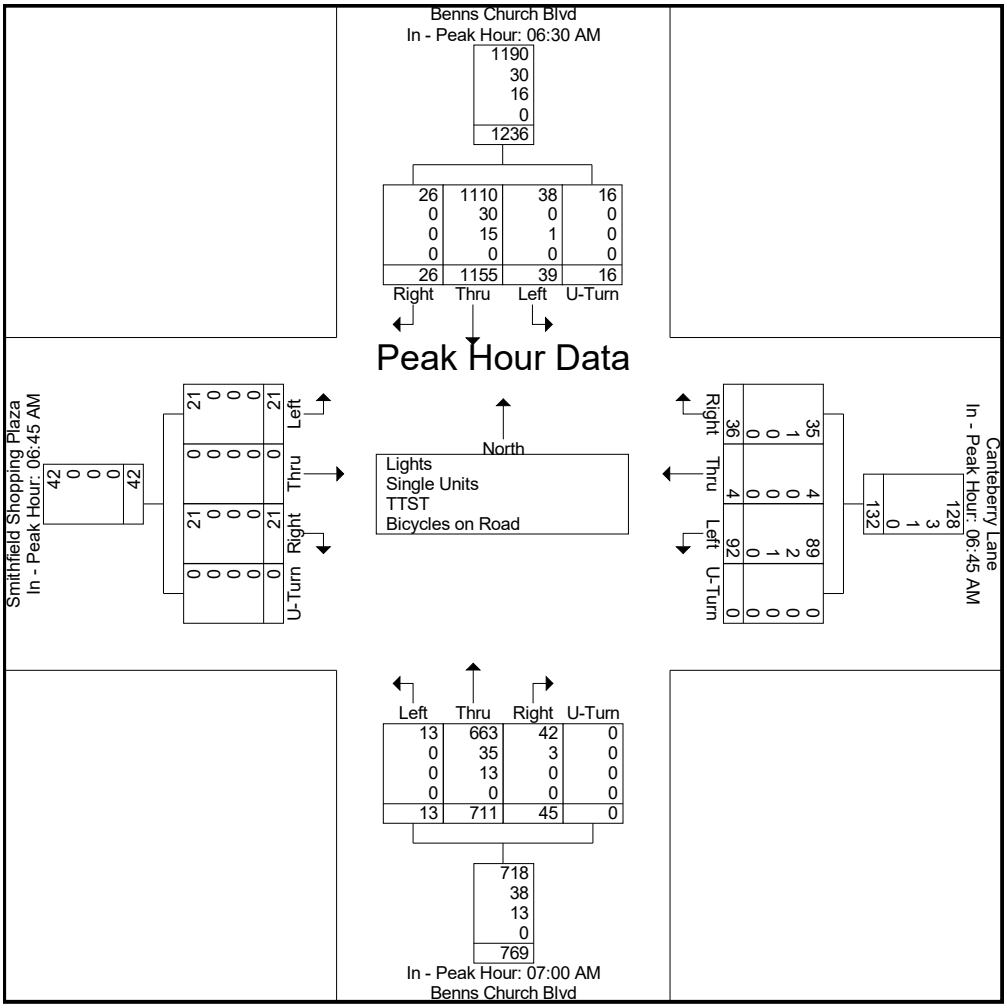
	Benns Church Blvd Southbound					Canteberry Lane Westbound					Benns Church Blvd Northbound					Smithfield Shopping Plaza Eastbound					
Start Time			Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
Peak Hour Analysis 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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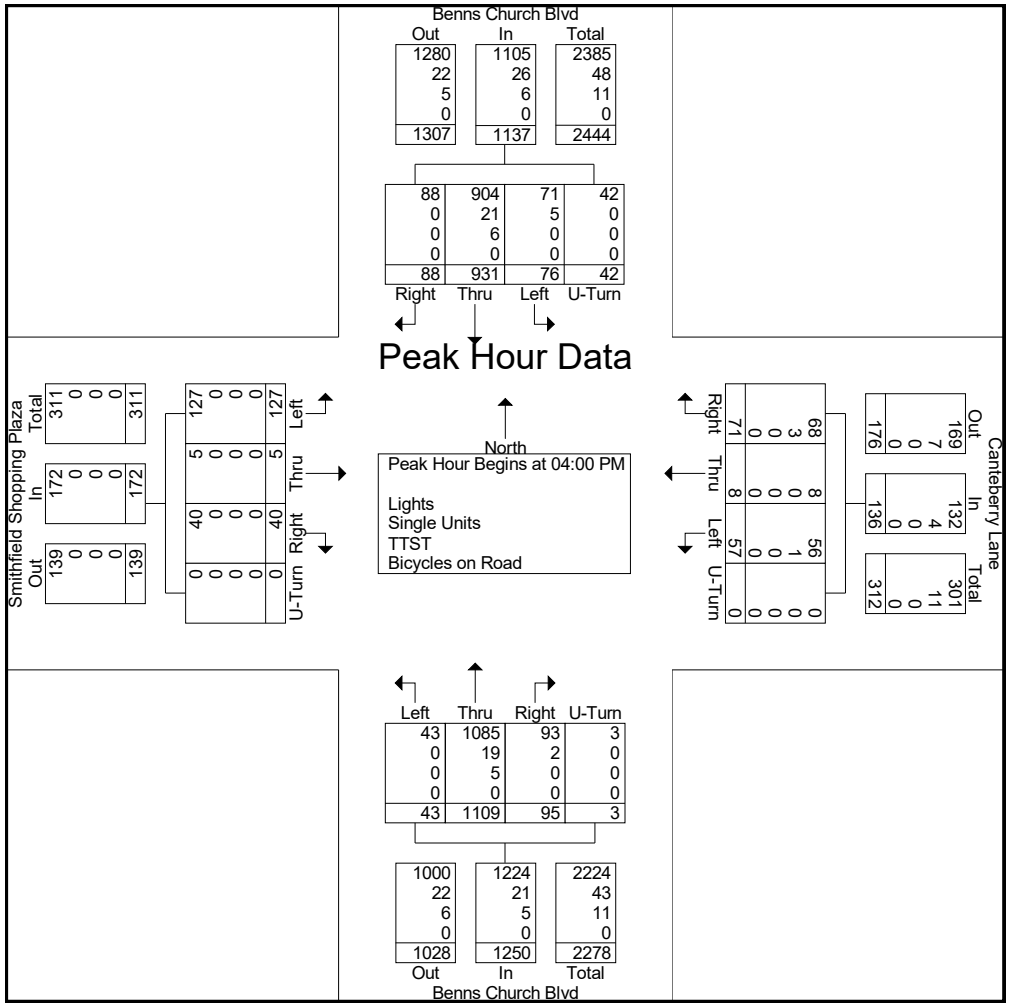
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Start Time			Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Each Approach Begins at:																					
	06:30 AM					06:45 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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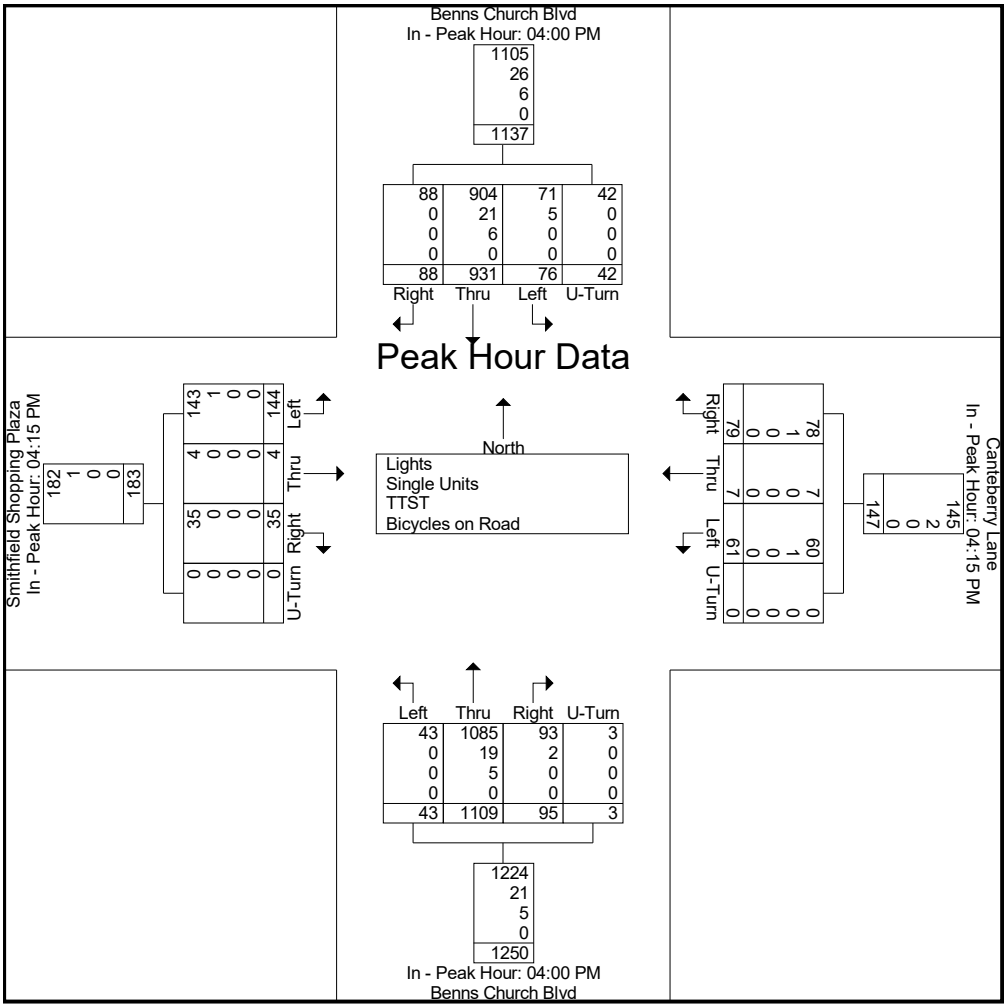
	Benns Church Blvd Southbound					Canteberry Lane Westbound					Benns Church Blvd Northbound					Smithfield Shopping Plaza Eastbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
Peak Hour 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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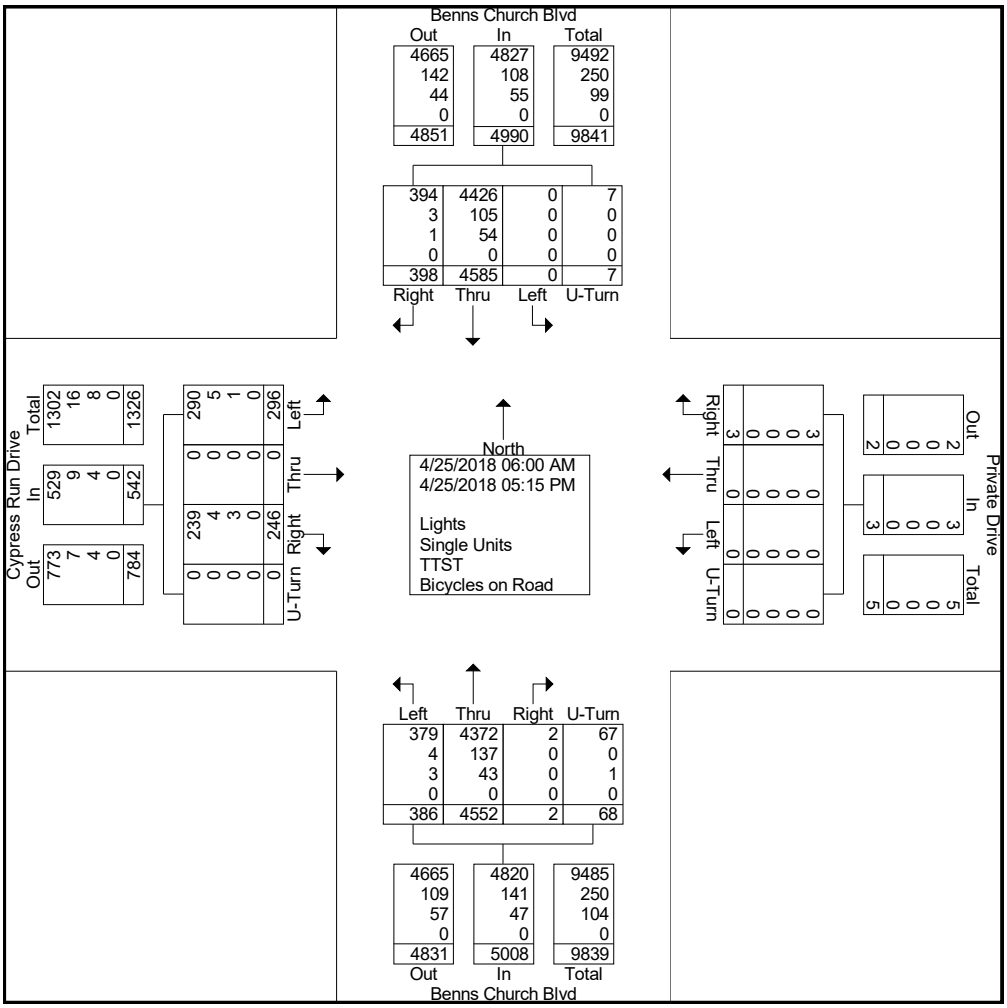
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Groups Printed- Lights - Single Units - TTST - Bicycles on Road

	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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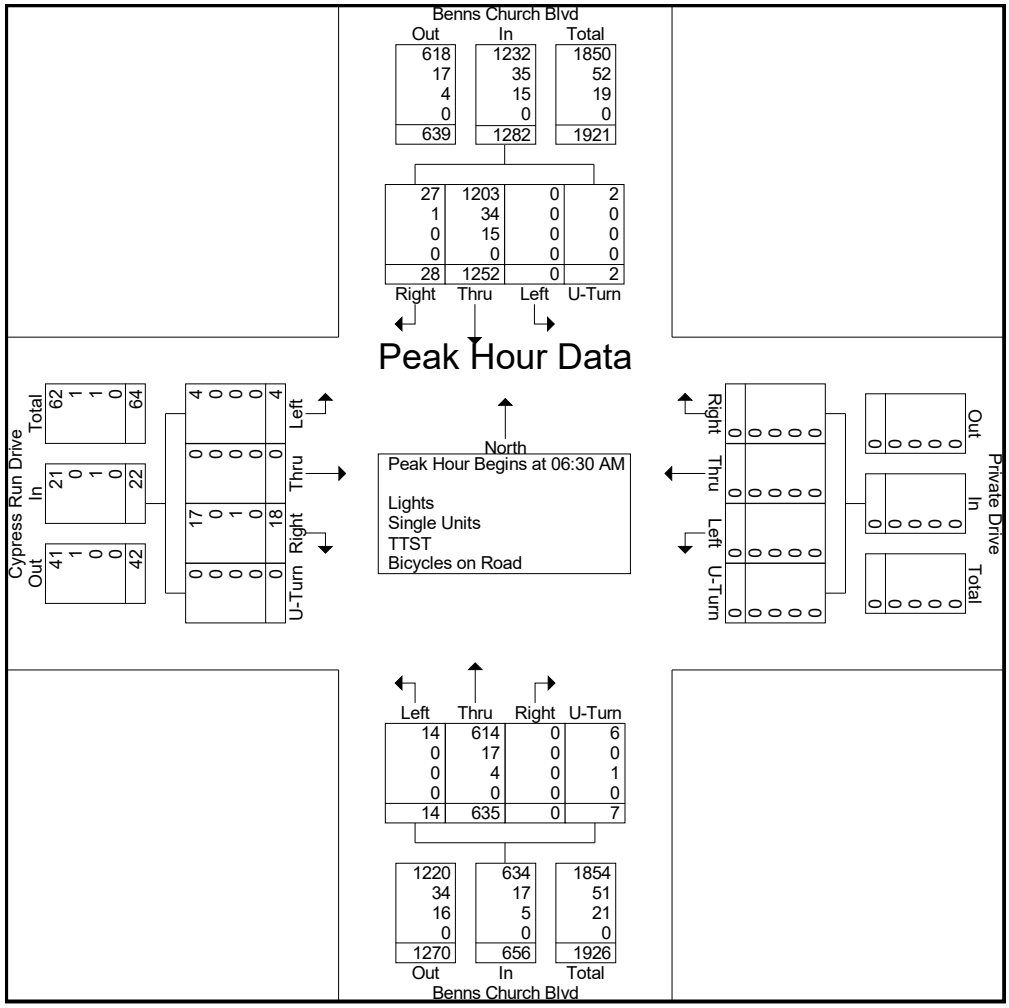
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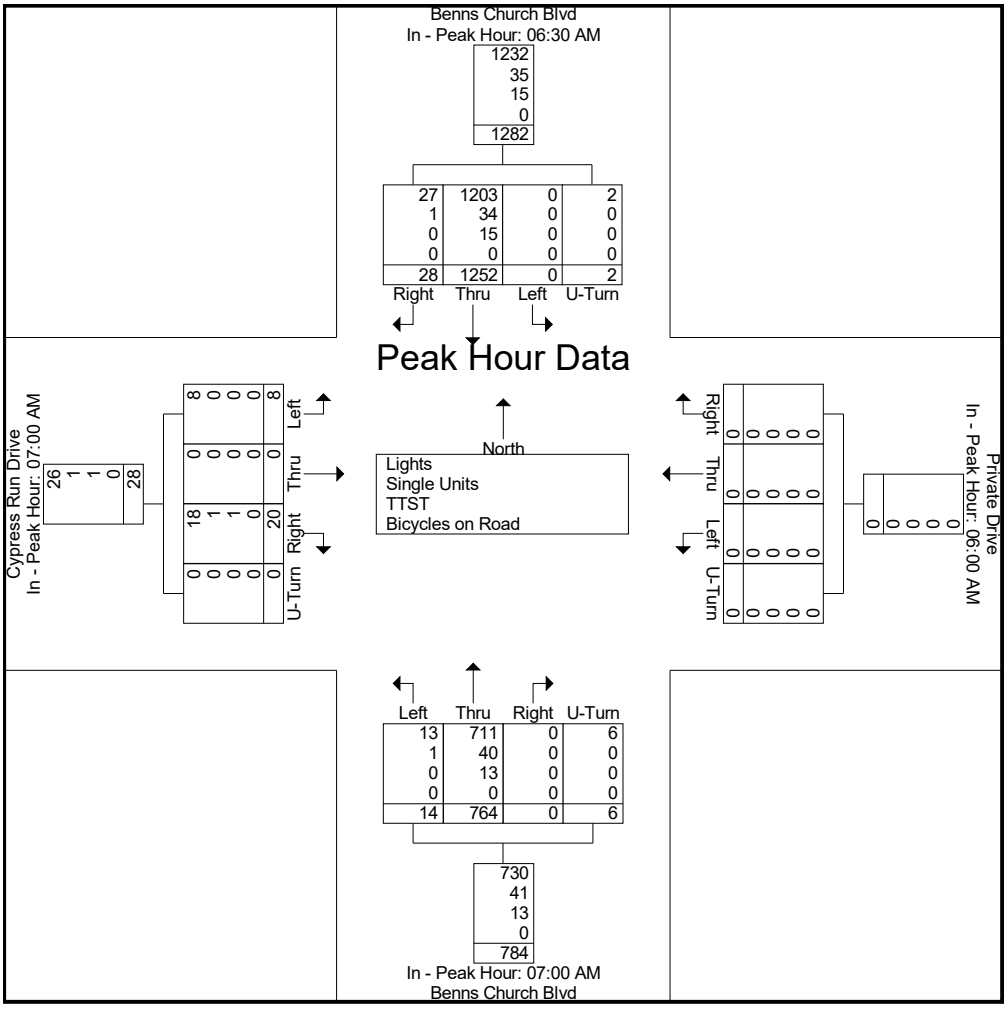
	Benns Church Blvd Southbound					Private Drive Westbound					Benns Church Blvd Northbound					Cypress Run Drive Eastbound					
Start Time			Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 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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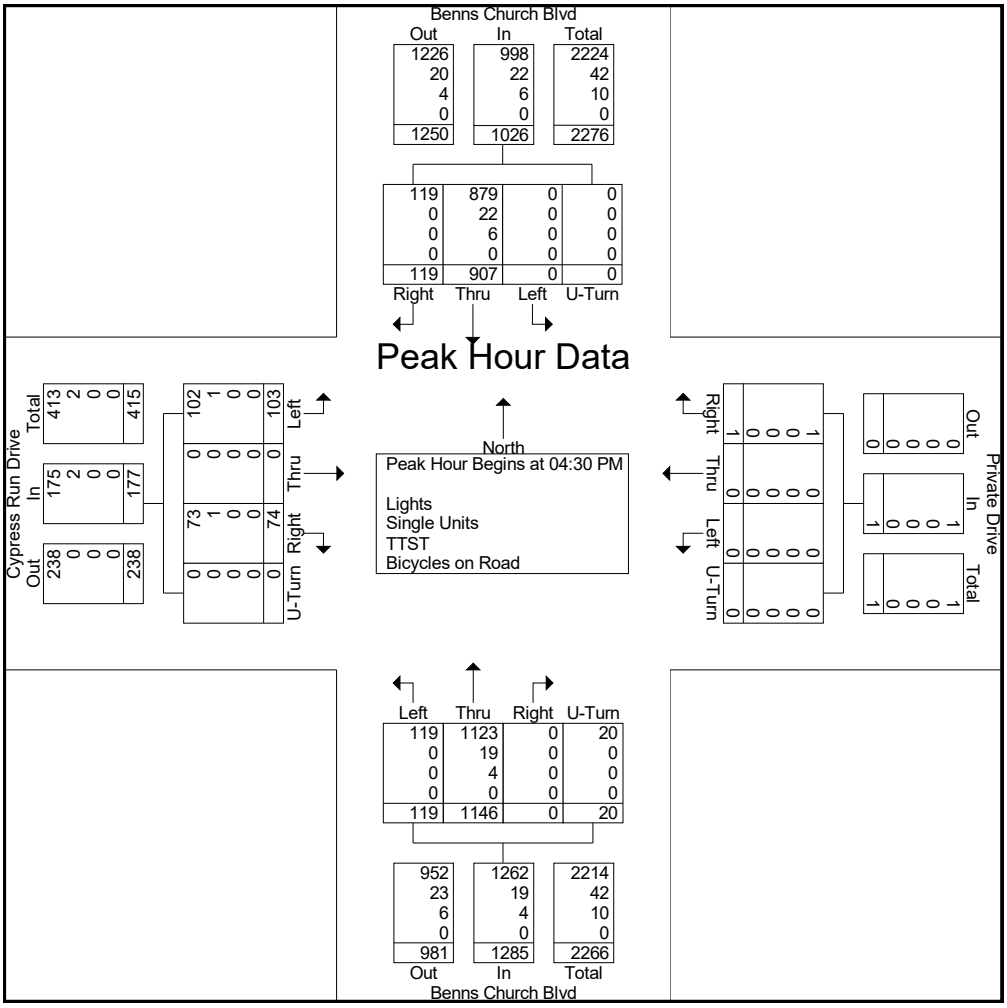
	Benns Church Blvd Southbound					Private Drive Westbound					Benns Church Blvd Northbound					Cypress Run Drive Eastbound					
Start Time			Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for 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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File Name : Benns_Church_and_Cypress_Run_Dr_514981_04-25-2018
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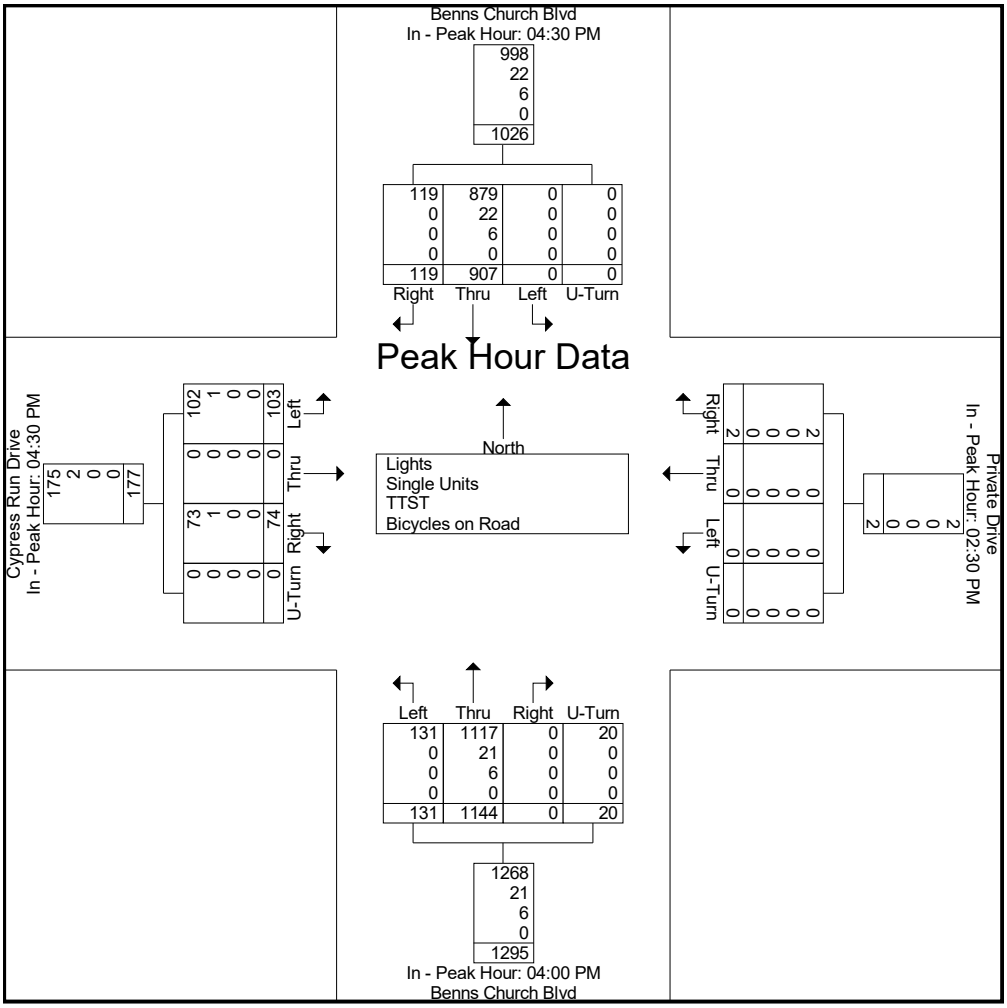
	Benns Church Blvd Southbound					Private Drive Westbound					Benns Church Blvd Northbound					Cypress Run Drive Eastbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
Peak Hour Analysis 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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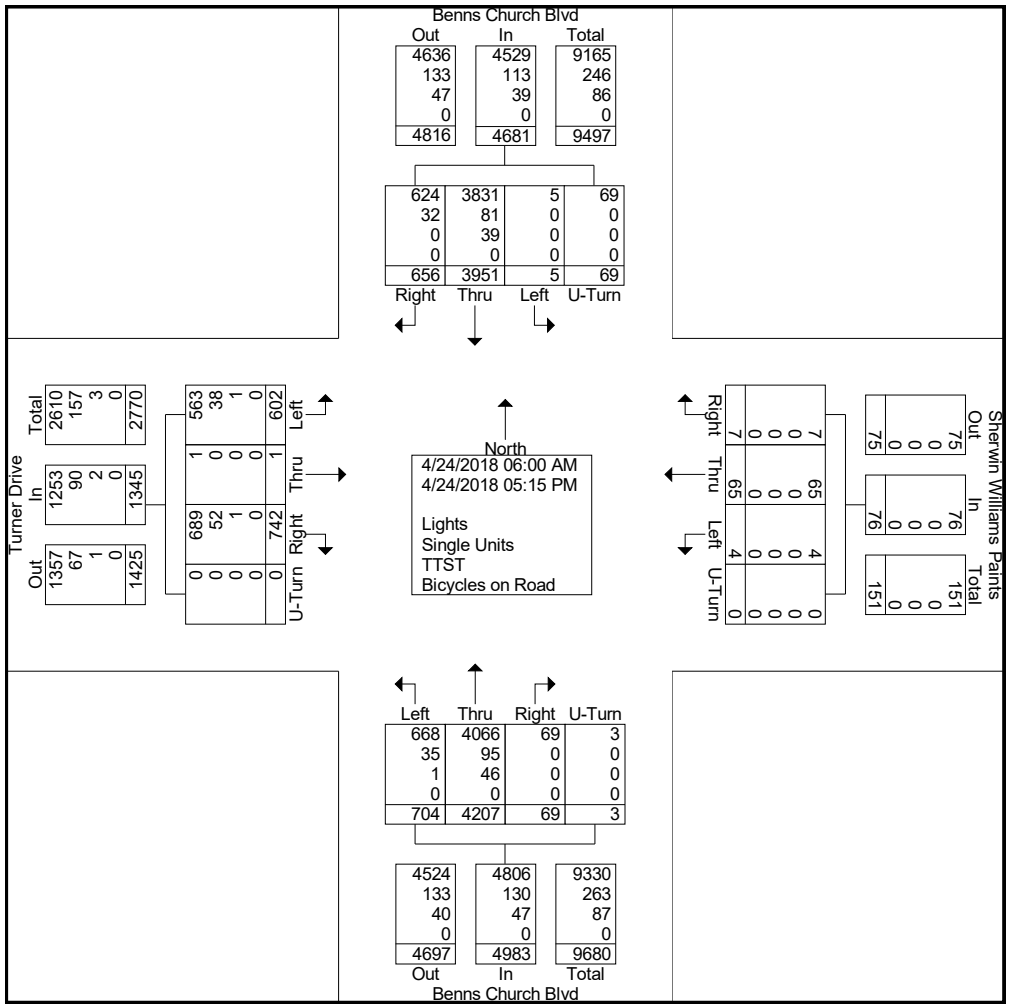
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Groups Printed- Lights - Single Units - TTST - Bicycles on Road

	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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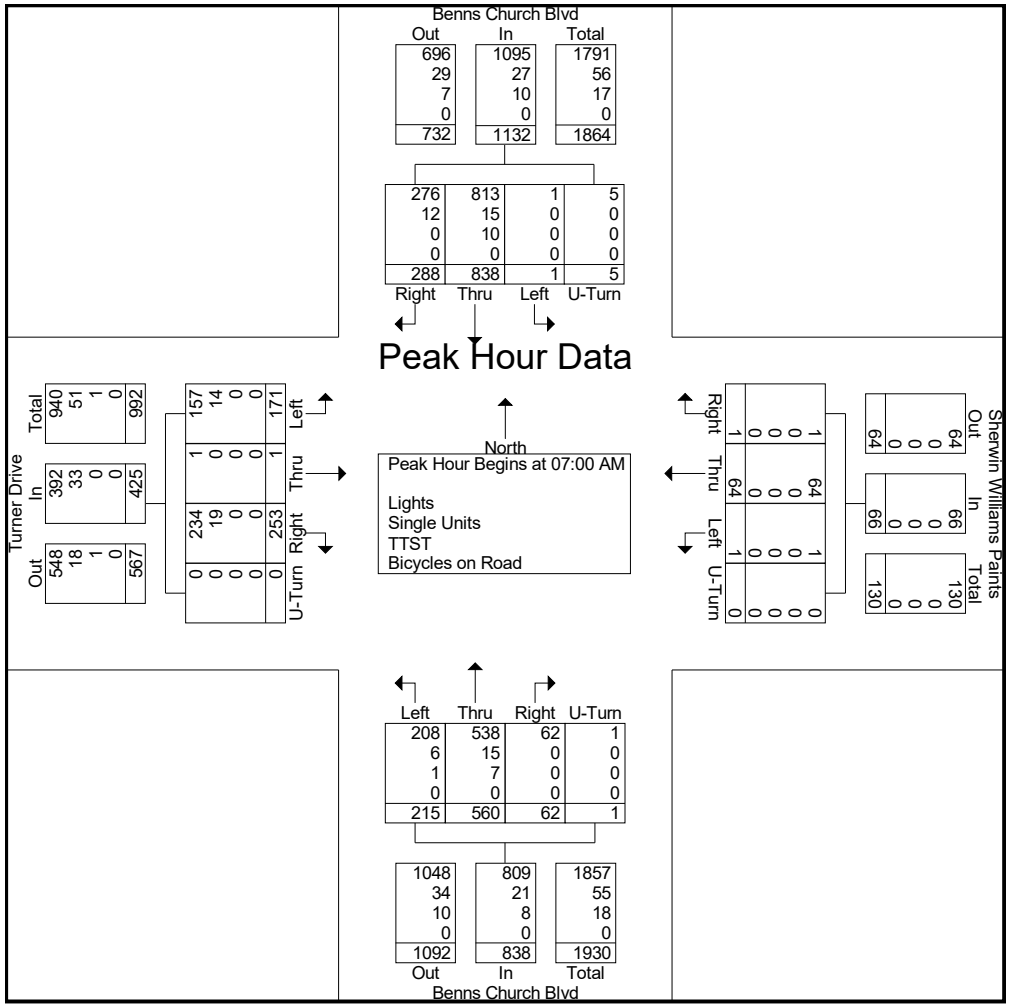
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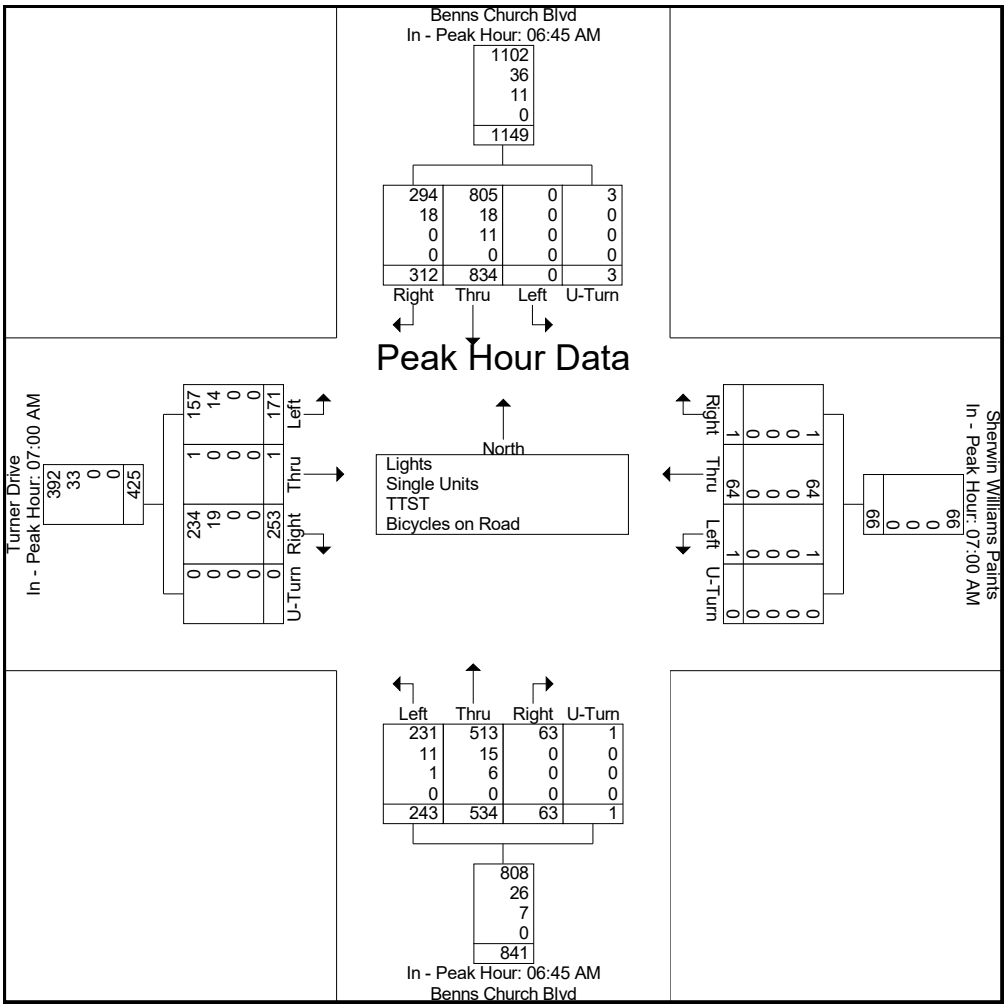
	Benns Church Blvd Southbound					Sherwin Williams Paints Westbound					Benns Church Blvd Northbound					Turner Drive Eastbound					
Start Time			Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
Peak Hour Analysis 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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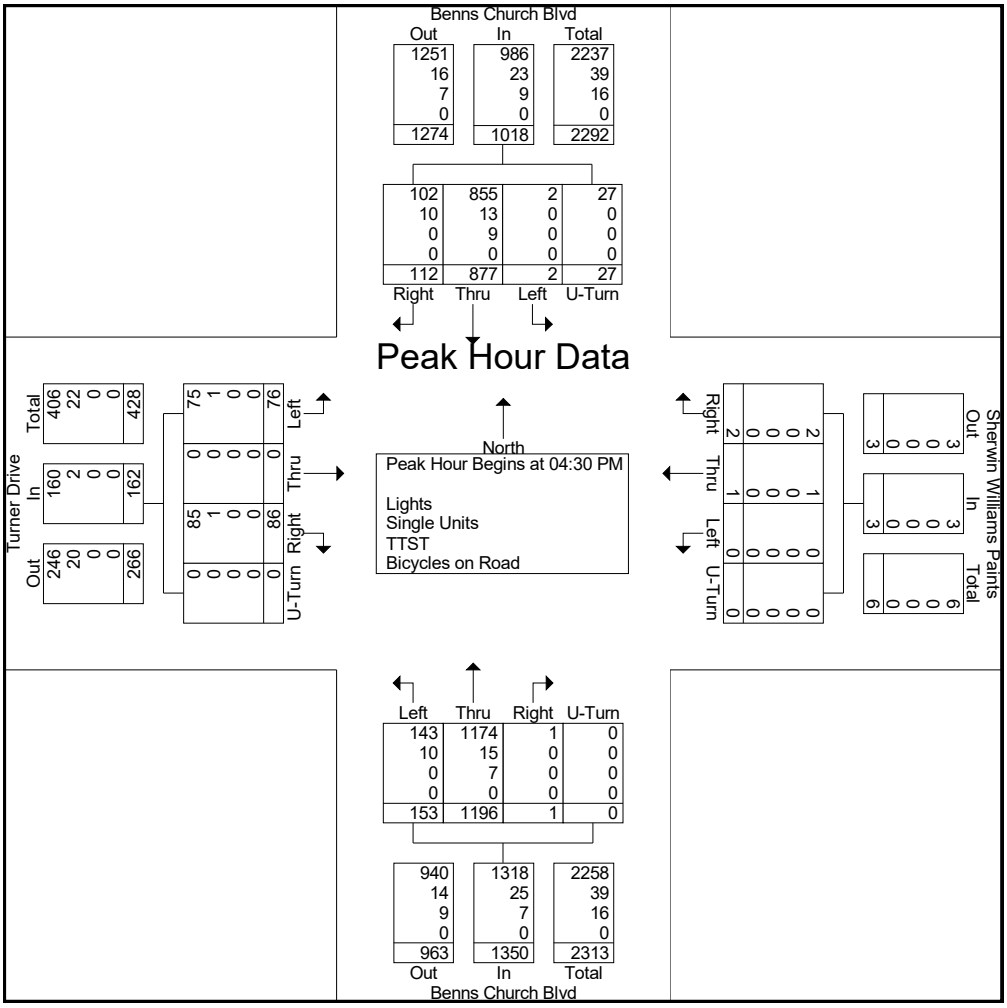
	Benns Church Blvd Southbound					Sherwin Williams Paints Westbound					Benns Church Blvd Northbound					Turner Drive Eastbound					
Start Time			Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
Peak Hour Analysis 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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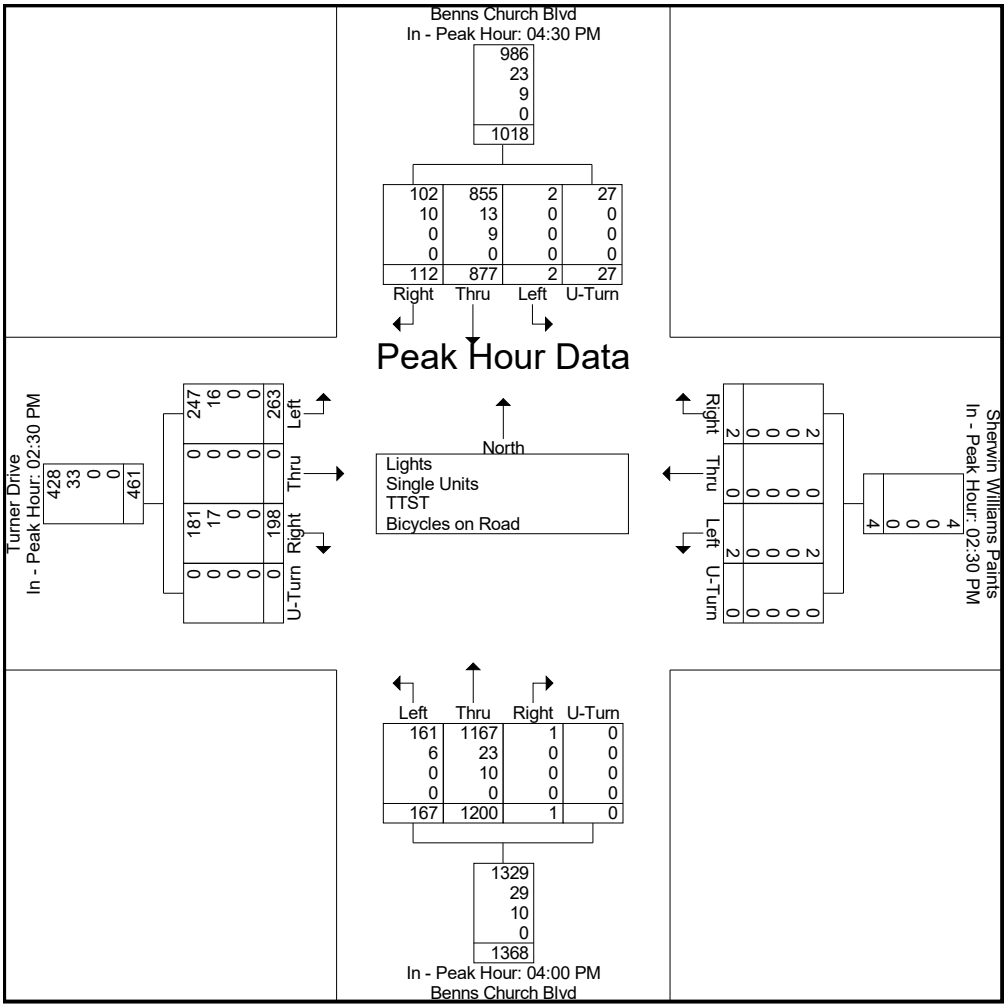
	Benns Church Blvd Southbound					Sherwin Williams Paints Westbound					Benns Church Blvd Northbound					Turner Drive Eastbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
Peak Hour Analysis 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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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 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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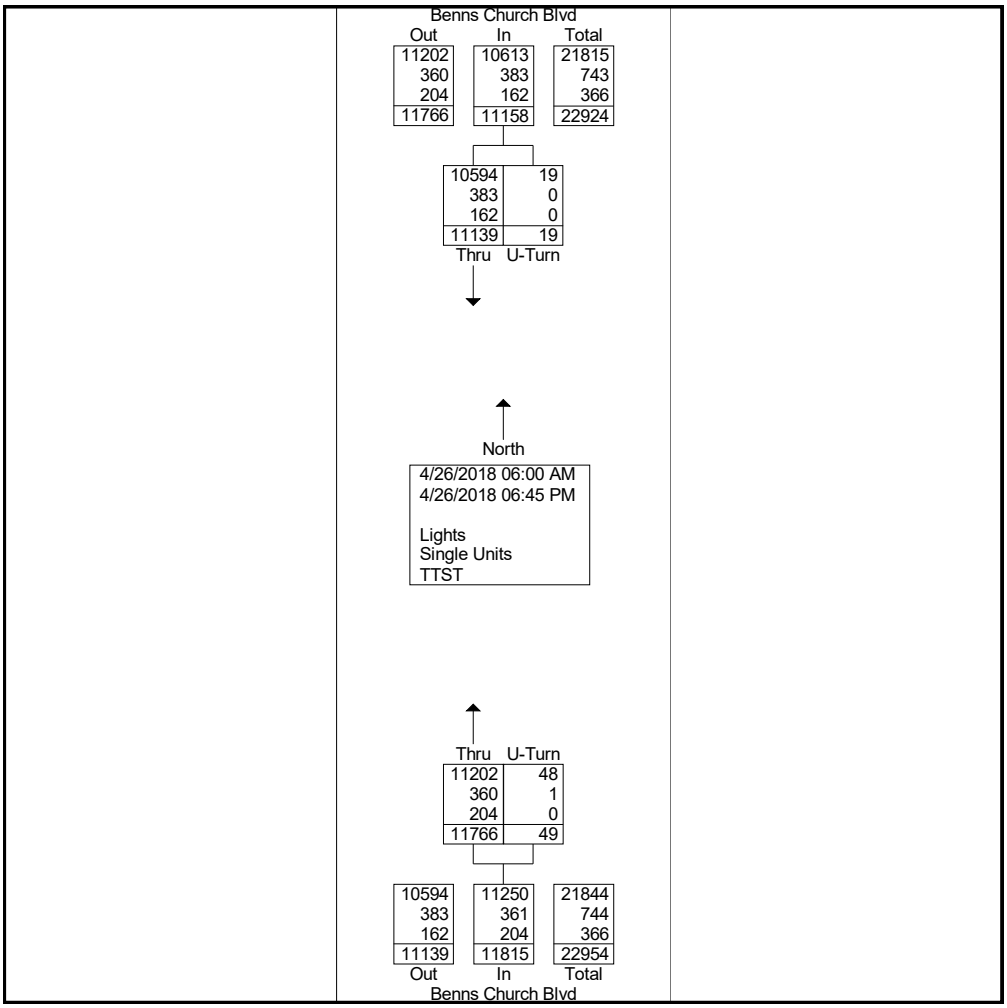
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Groups Printed- Lights - Single Units - TTST

	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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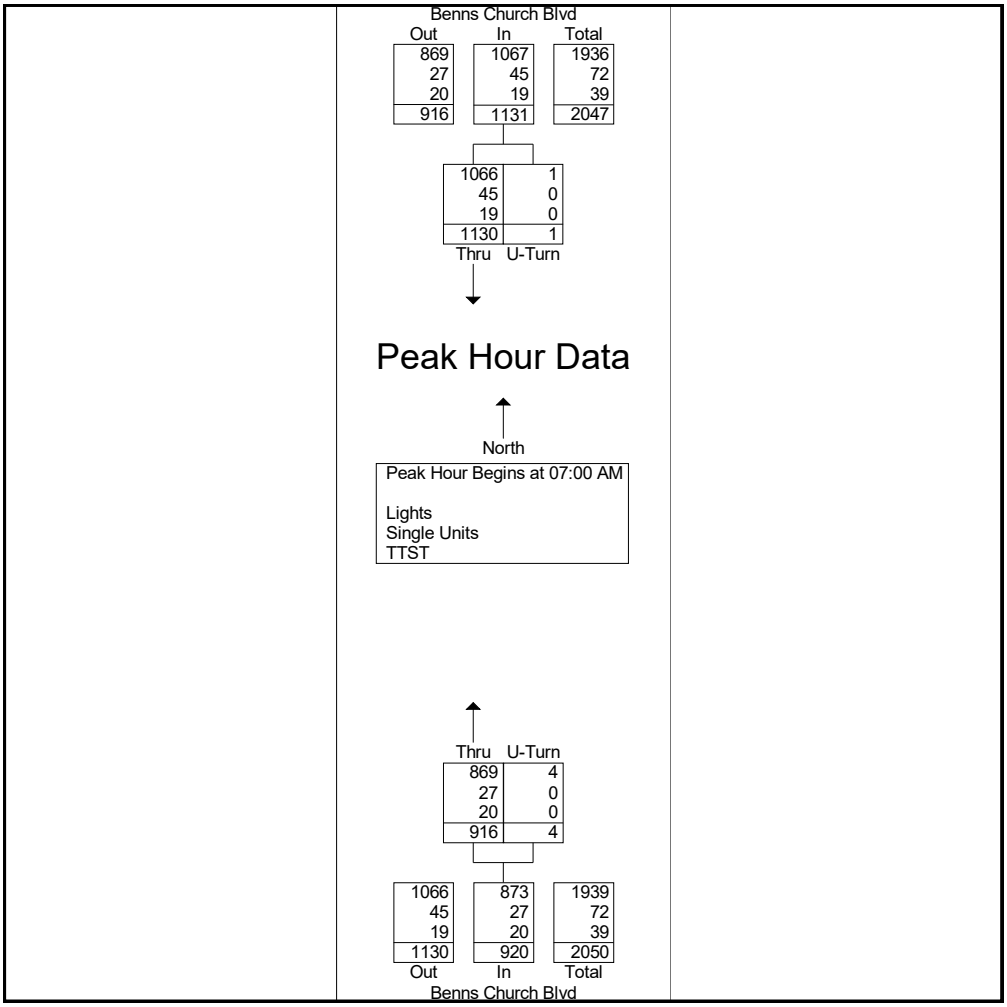
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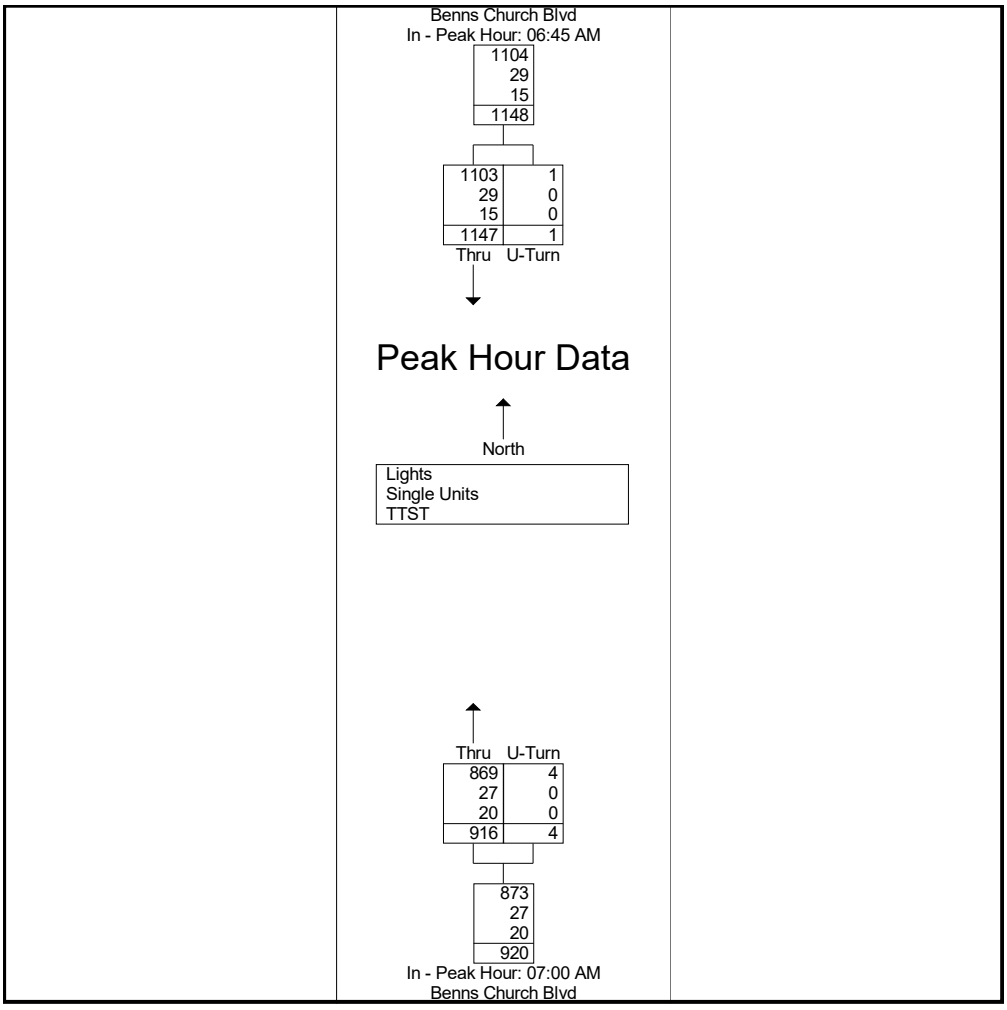
	Benns Church Blvd Southbound			Benns Church Blvd Northbound			
Start Time	Thru	U-Turn	App. Total	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 09:45 AM - Peak 1 of 1							
Peak Hour for Entire Intersection Begins at 07:00 AM							
07:00 AM	246	0	246	268	0	268	514
07:15 AM	322	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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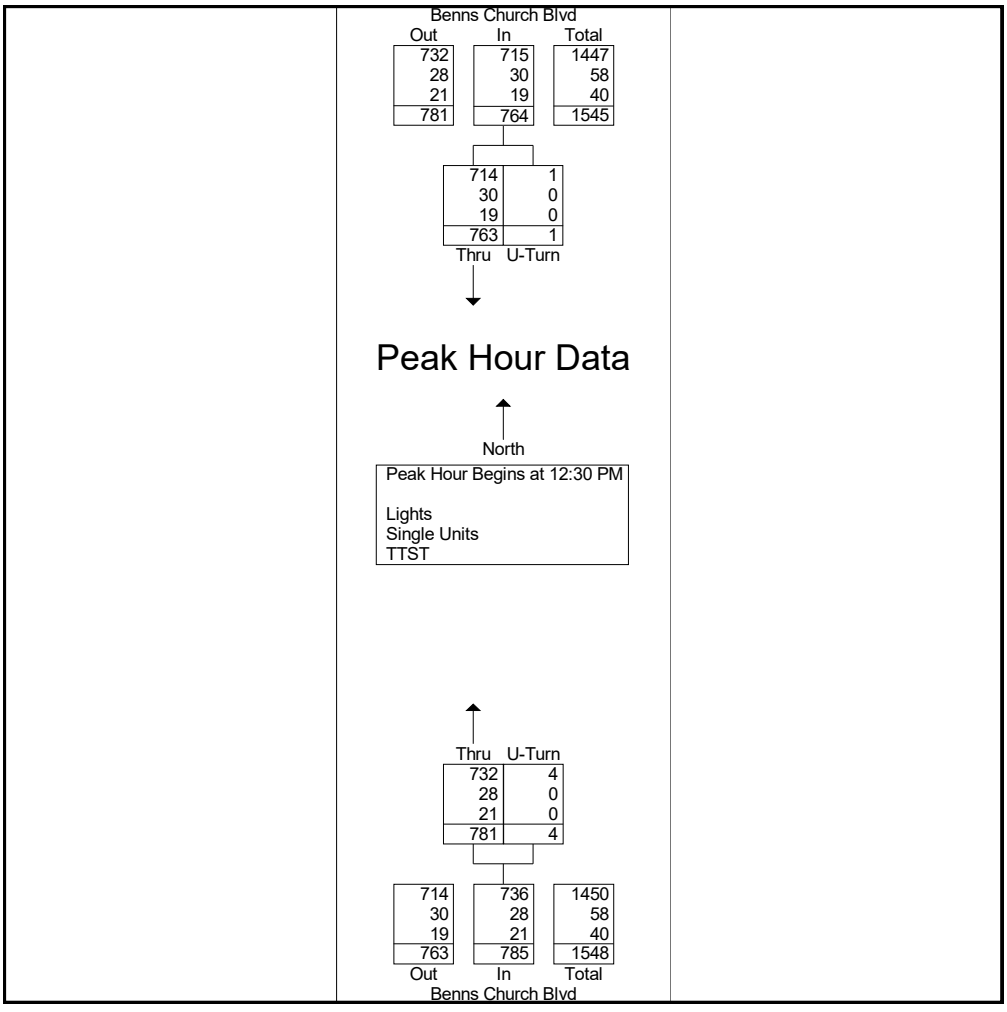
	Benns Church Blvd Southbound			Benns Church Blvd Northbound			
Start Time	Thru	U-Turn	App. Total	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 09:45 AM - Peak 1 of 1							
Peak Hour for Each Approach Begins at:							
	06:45 AM			07:00 AM			
+0 mins.	265	0	265	268	0	268	
+15 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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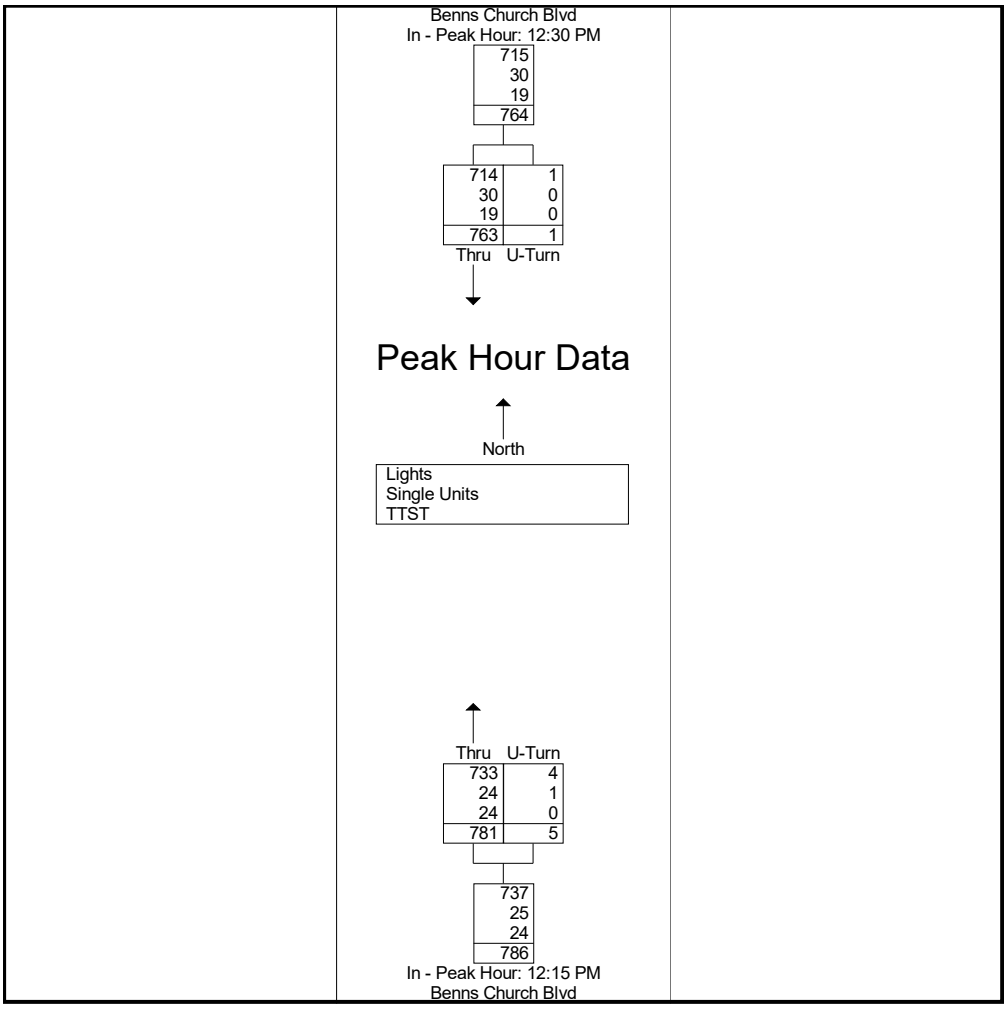
	Benns Church Blvd Southbound			Benns Church Blvd Northbound			
Start Time	Thru	U-Turn	App. Total	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 10:00 AM to 01:45 PM - Peak 1 of 1							
Peak Hour for Entire Intersection Begins at 12:30 PM							
12:30 PM	195	0	195	214	0	214	409
12:45 PM	181	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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File Name : Benns Church with Median Break Combined
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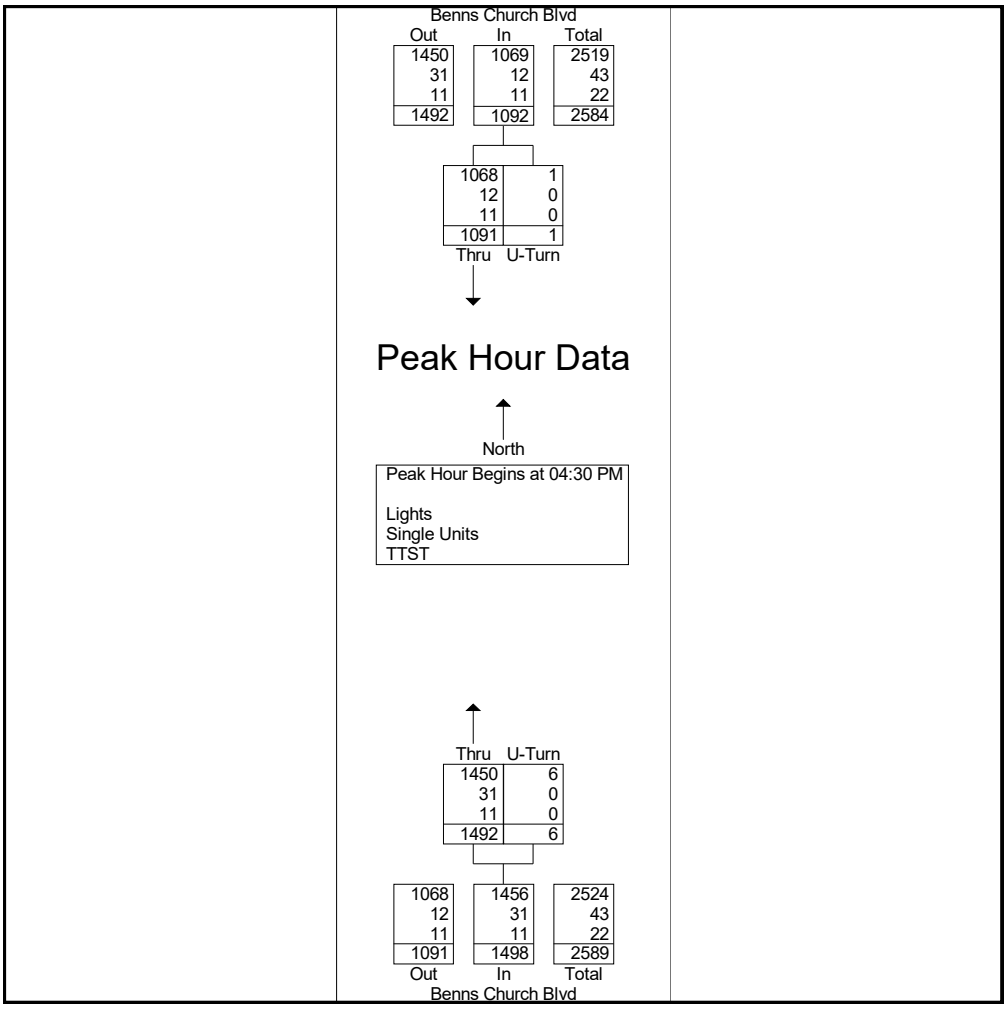
	Benns Church Blvd Southbound			Benns Church Blvd Northbound			
Start Time	Thru	U-Turn	App. Total	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 10:00 AM to 01:45 PM - Peak 1 of 1							
Peak Hour for Each Approach Begins at:							
	12:30 PM			12:15 PM			
+0 mins.	195	0	195	195	2	197	
+15 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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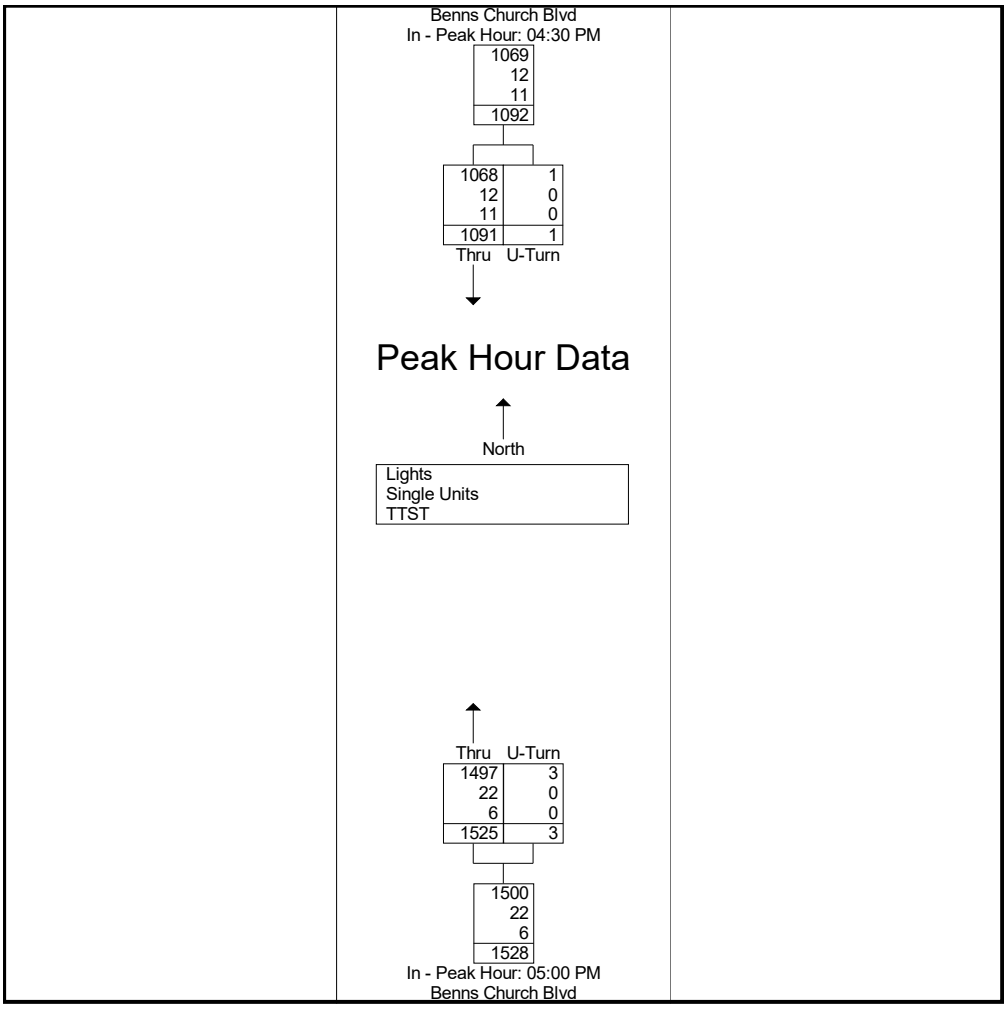
	Benns Church Blvd Southbound			Benns Church Blvd Northbound			
Start Time	Thru	U-Turn	App. Total	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 02:00 PM to 06:45 PM - Peak 1 of 1							
Peak Hour for Entire Intersection Begins at 04:30 PM							
04:30 PM	272	0	272	364	3	367	639
04:45 PM	282	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	

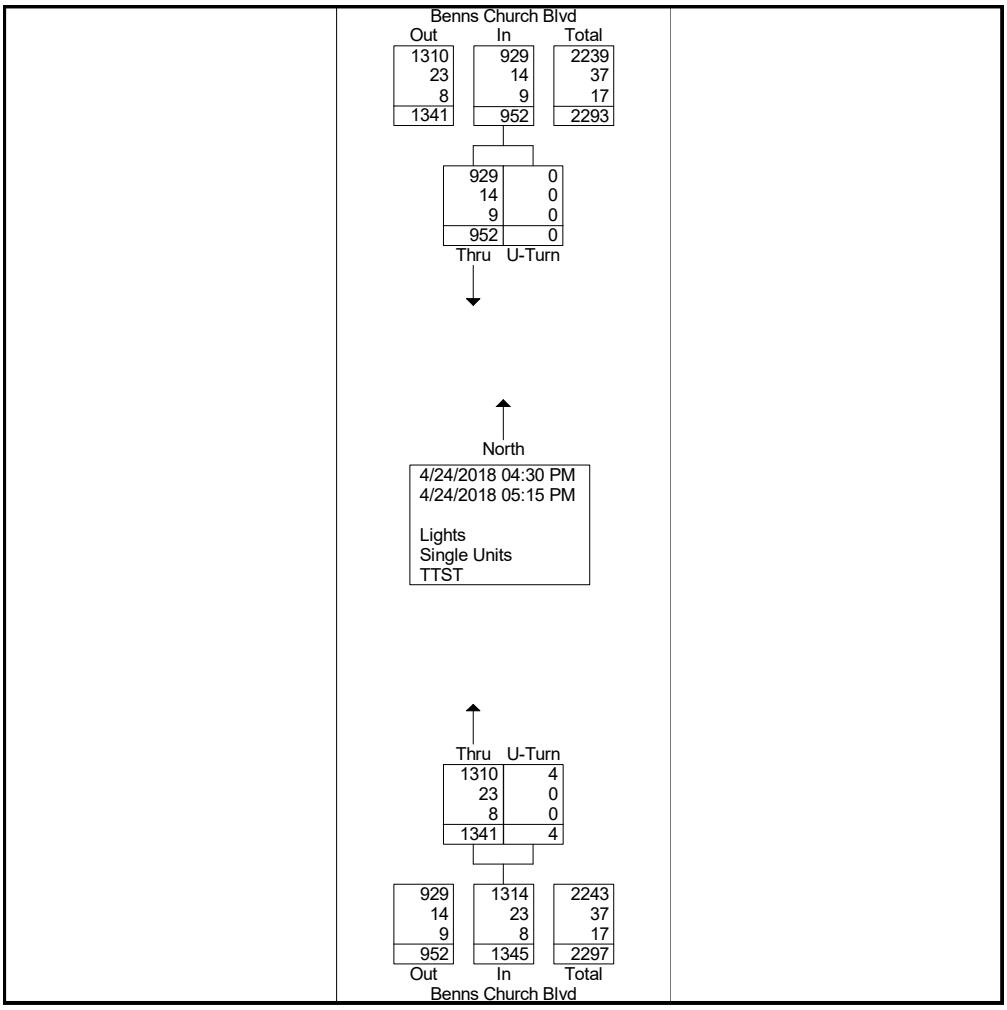


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Groups Printed- Lights - Single Units - TTST

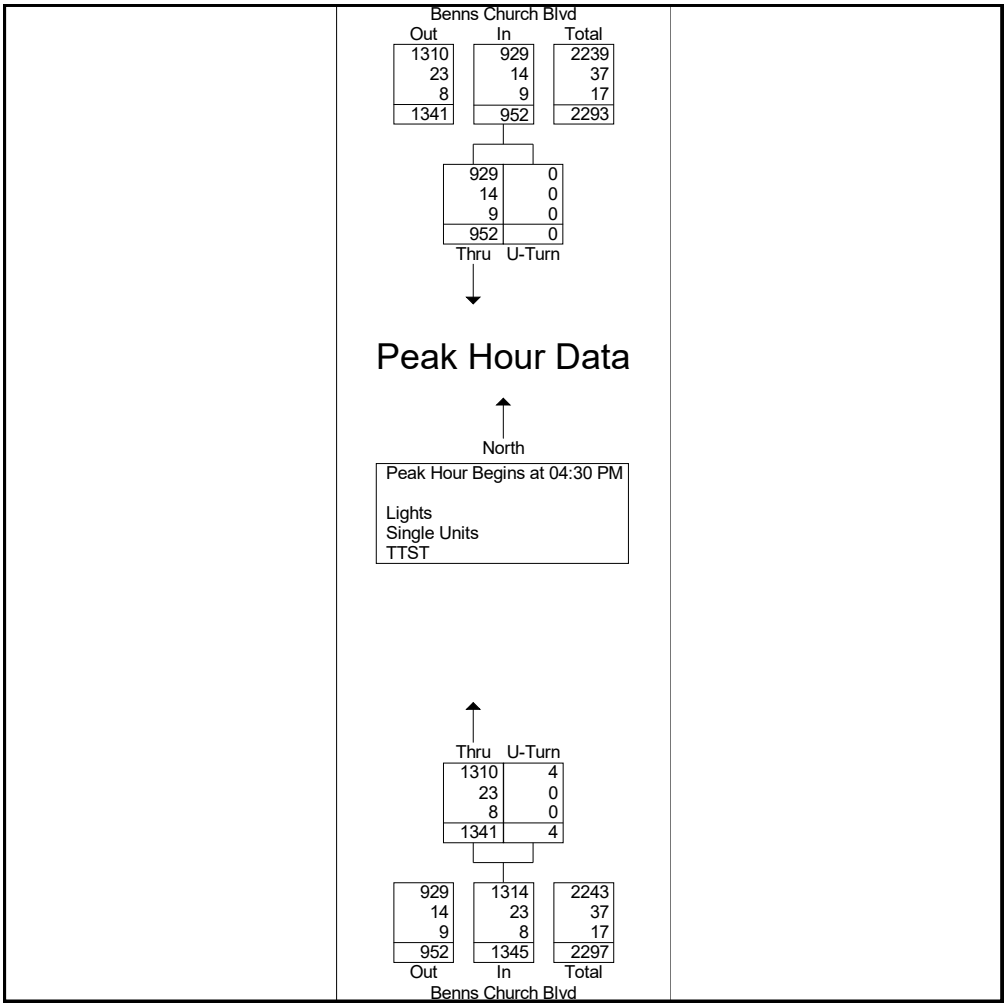
	Benns Church Blvd Southbound		Benns Church Blvd Northbound		
Start Time	Thru	U-Turn	Thru	U-Turn	Int. Total
04:30 PM	241	0	347	0	588
04:45 PM	236	0	347	1	584
Total	477	0	694	1	1172
05:00 PM	235	0	312	1	548
05:15 PM	240	0	335	2	577
Grand Total	952	0	1341	4	2297
Apprch %	100	0	99.7	0.3	
Total %	41.4	0	58.4	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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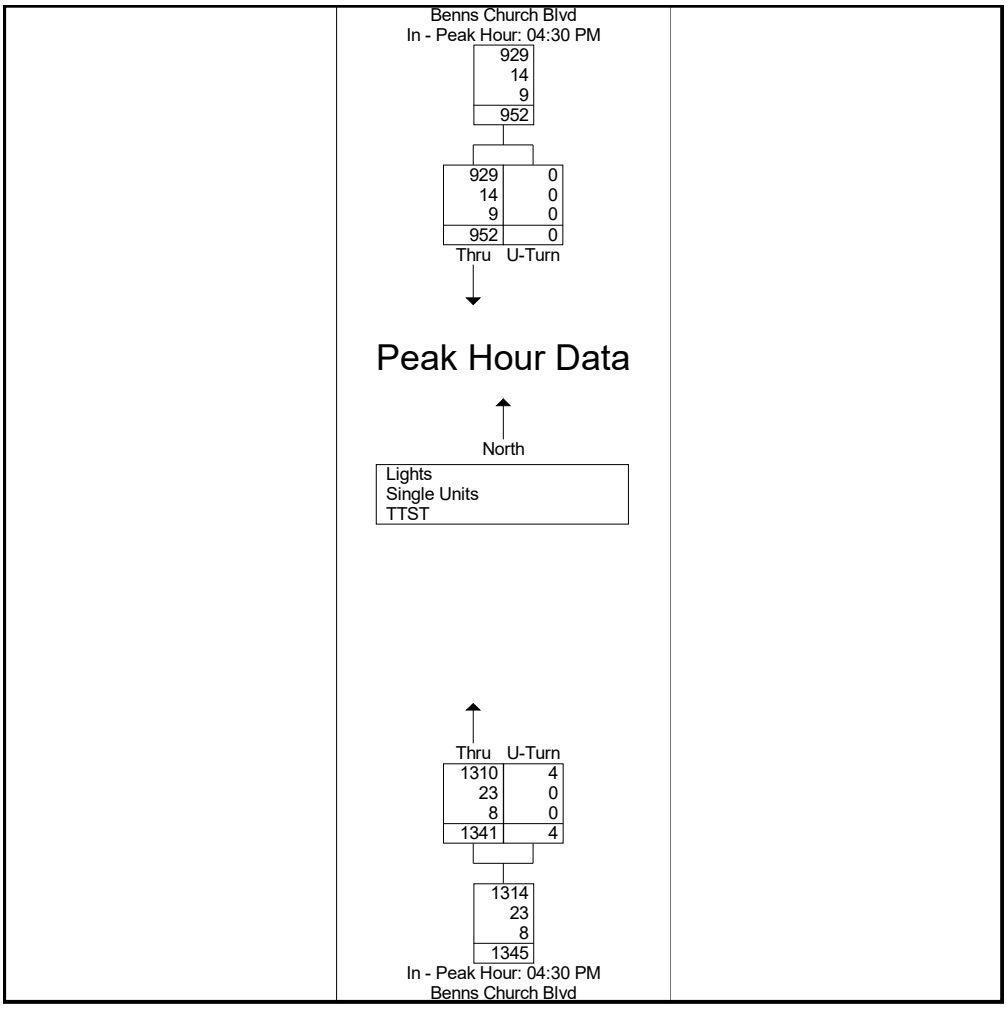
	Benns Church Blvd Southbound			Benns Church Blvd Northbound			
Start Time	Thru	U-Turn	App. Total	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1							
Peak Hour for Entire Intersection Begins at 04:30 PM							
04:30 PM	241	0	241	347	0	347	588
04:45 PM	236	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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	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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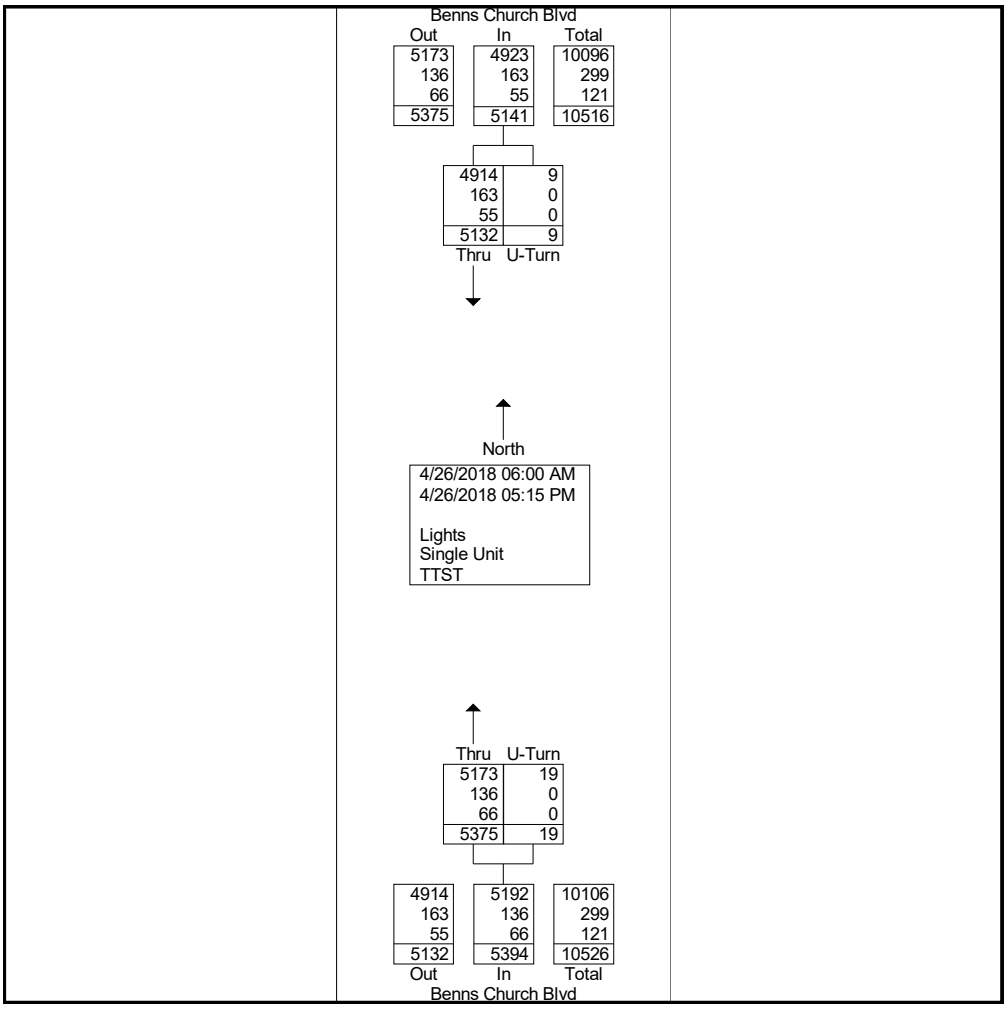
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Groups Printed- Lights - Single Unit - TTST

	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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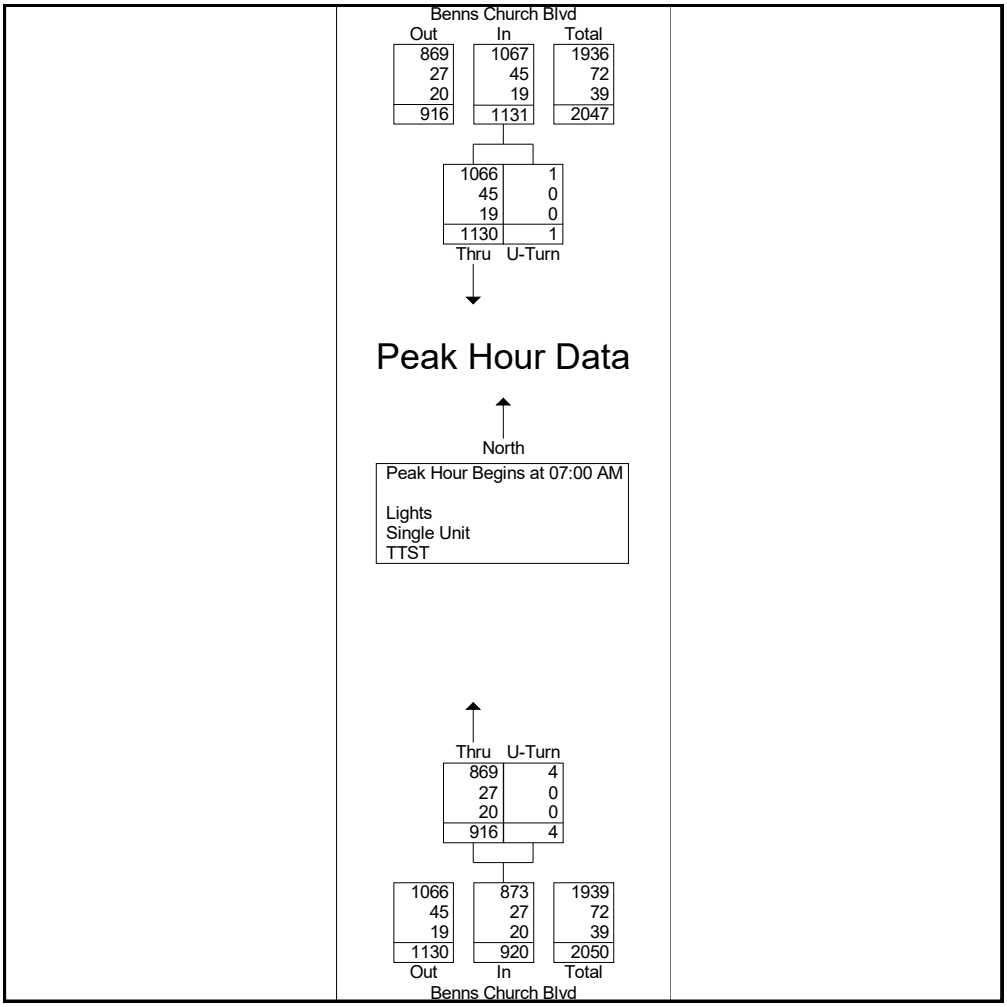
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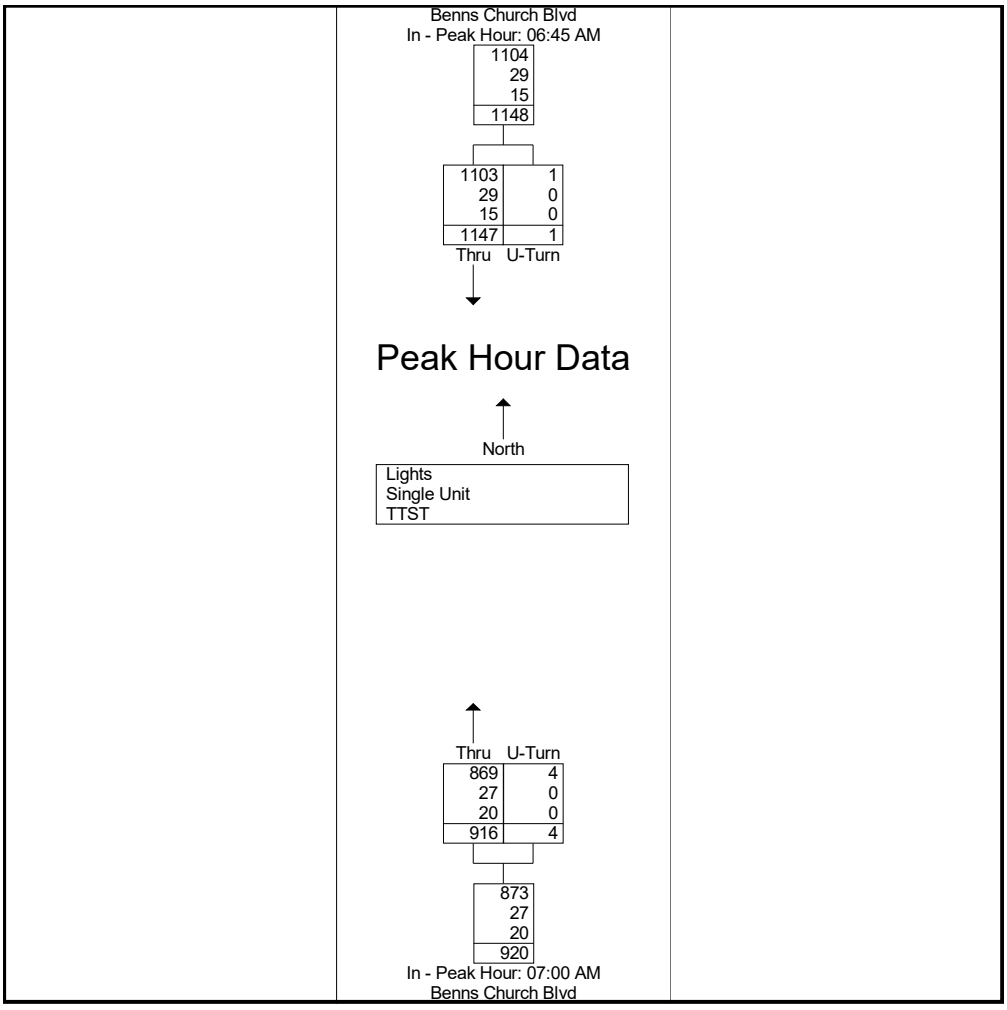
	Benns Church Blvd Southbound			Benns Church Blvd Northbound			
Start Time	Thru	U-Turn	App. Total	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 11:45 AM - Peak 1 of 1							
Peak Hour for Entire Intersection Begins at 07:00 AM							
07:00 AM	246	0	246	268	0	268	514
07:15 AM	322	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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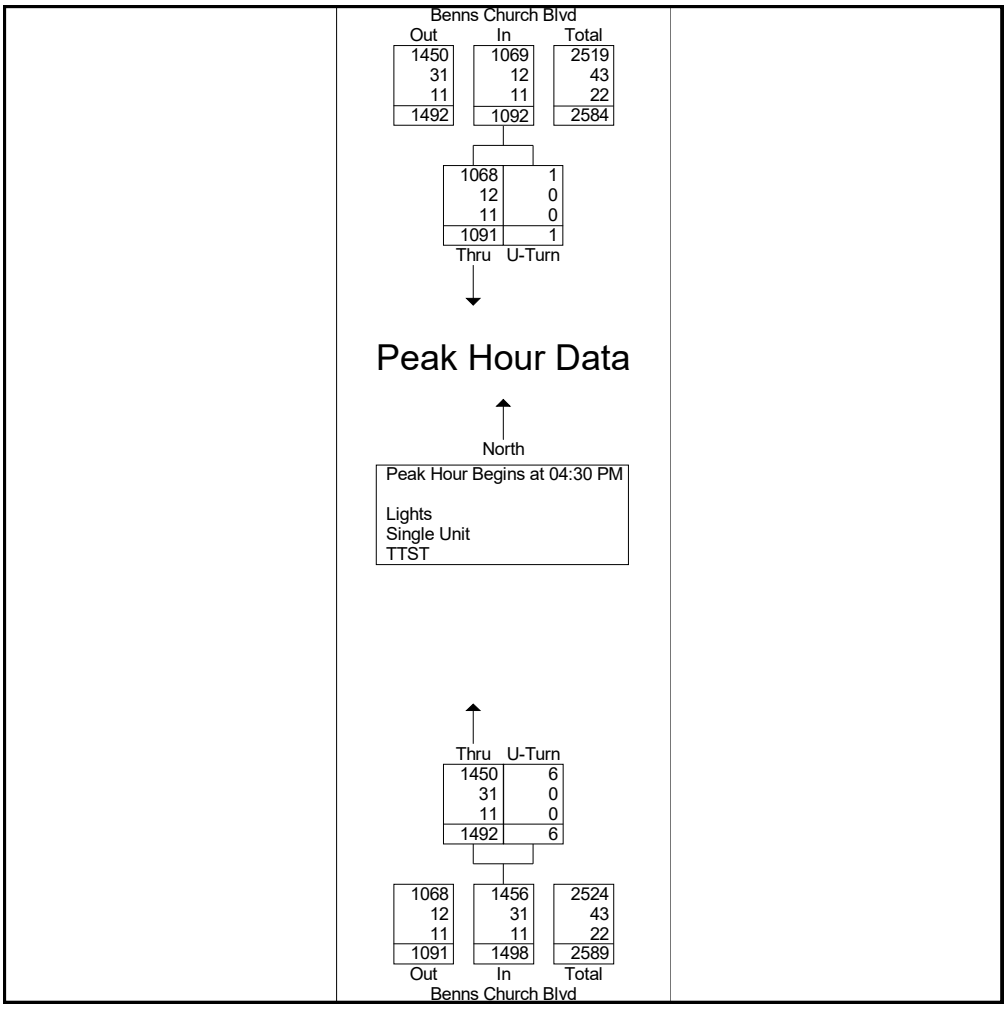
	Benns Church Blvd Southbound			Benns Church Blvd Northbound			
Start Time	Thru	U-Turn	App. Total	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 11:45 AM - Peak 1 of 1							
Peak Hour for Each Approach Begins at:							
	06:45 AM			07:00 AM			
+0 mins.	265	0	265	268	0	268	
+15 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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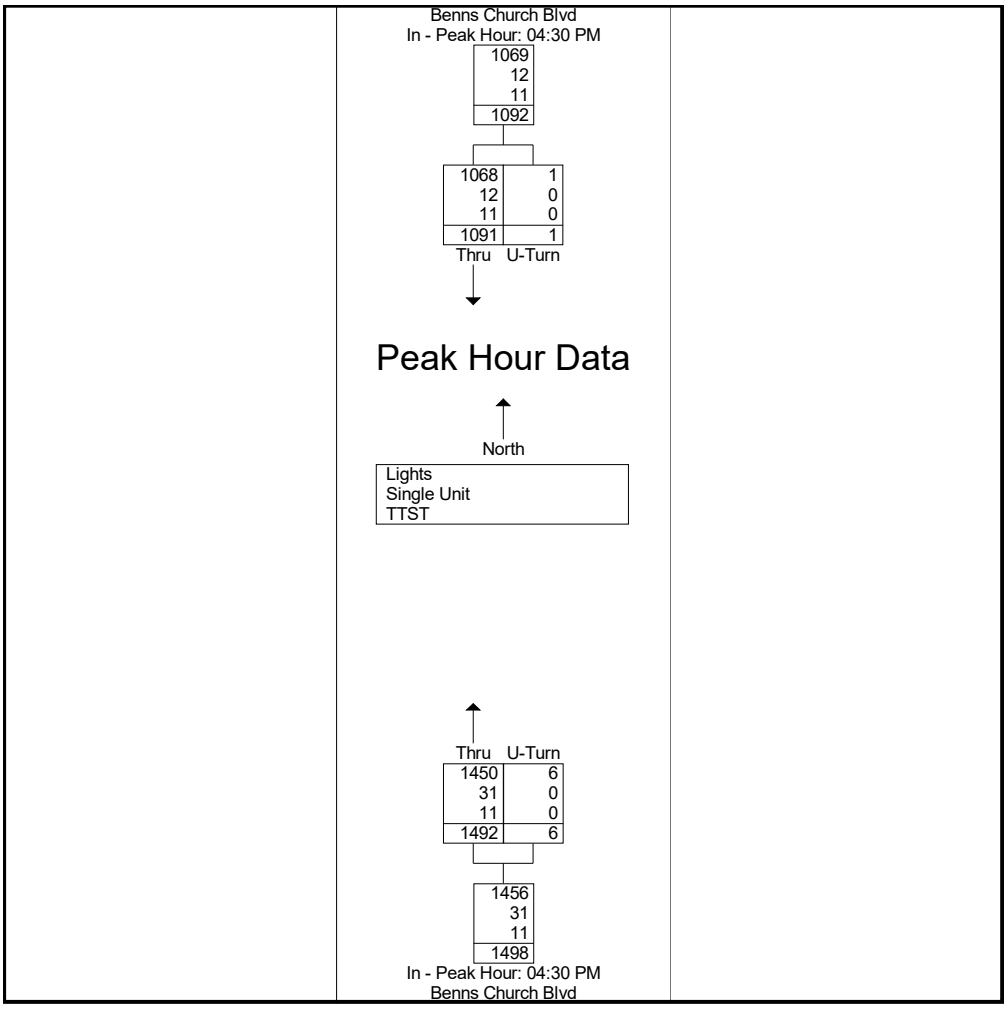
	Benns Church Blvd Southbound			Benns Church Blvd Northbound			
Start Time	Thru	U-Turn	App. Total	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 05:15 PM - Peak 1 of 1							
Peak Hour for Entire Intersection Begins at 04:30 PM							
04:30 PM	272	0	272	364	3	367	639
04:45 PM	282	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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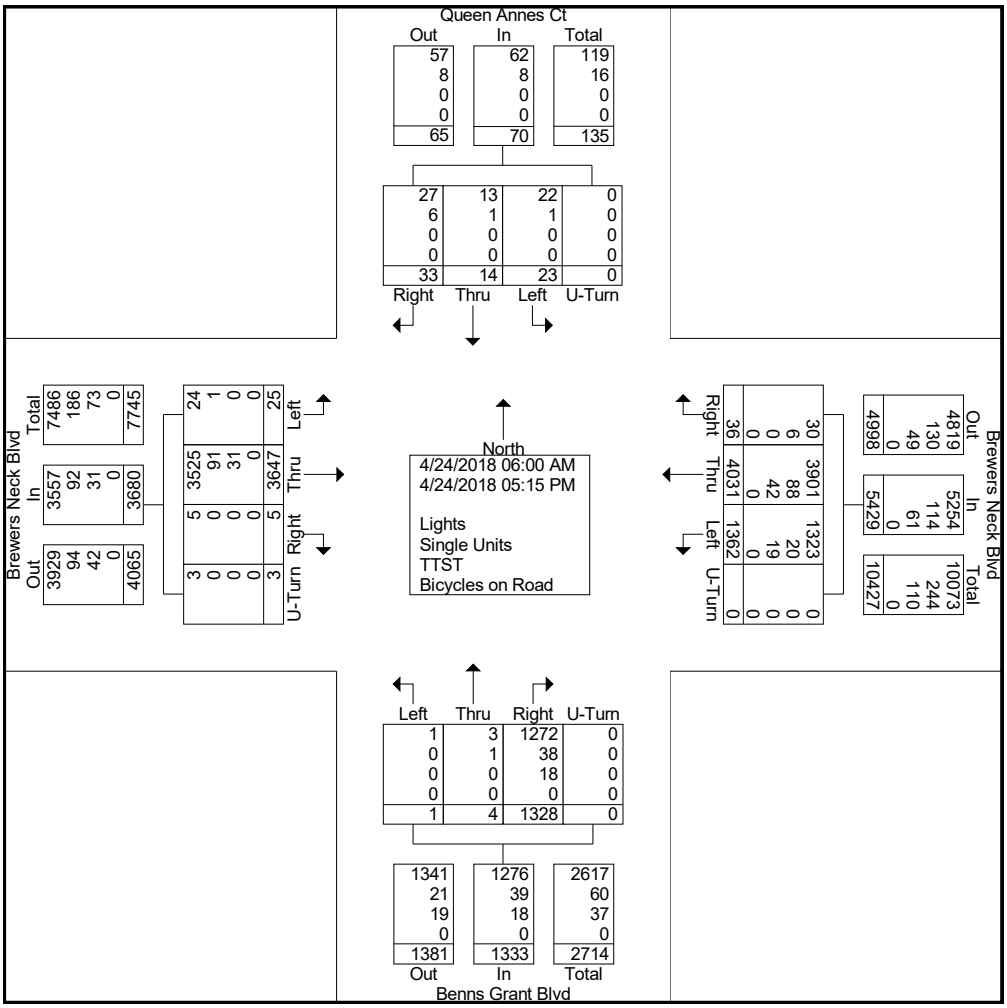
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Groups Printed- Lights - Single Units - TTST - Bicycles on Road

	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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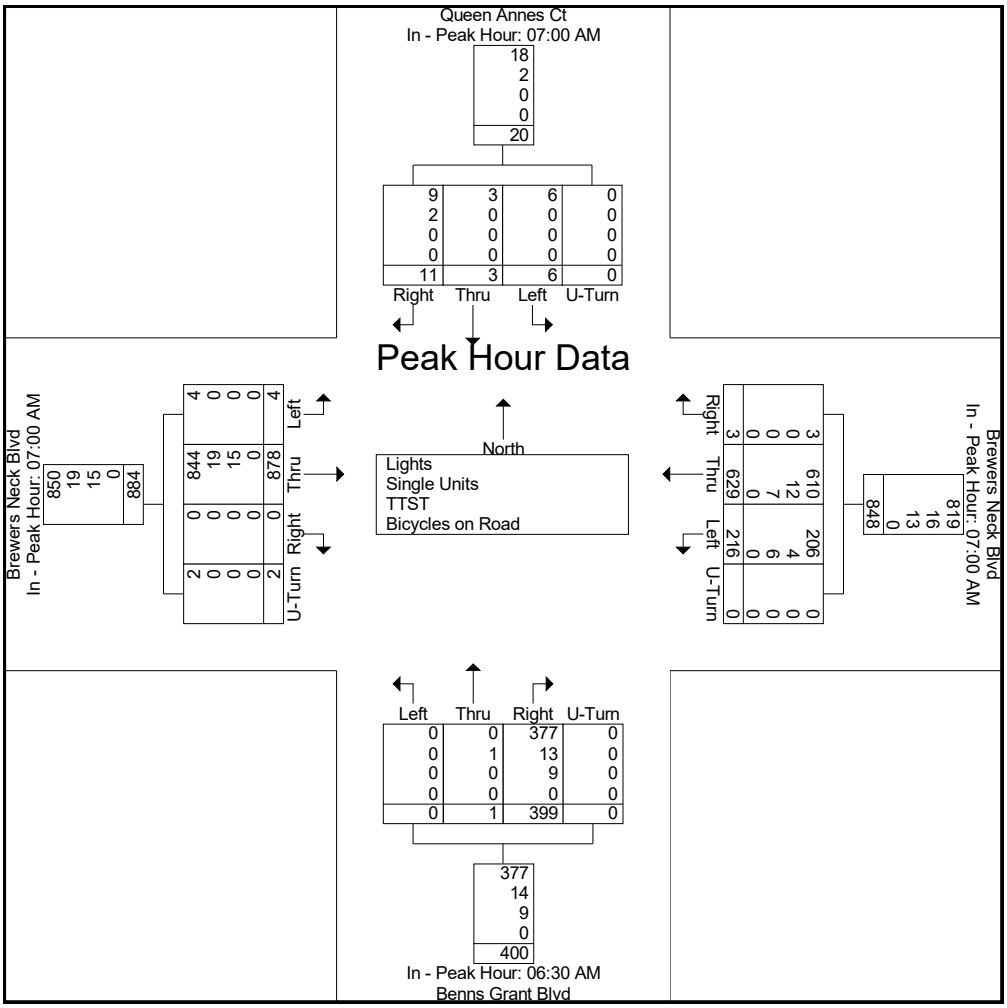
	Queen Annes Ct Southbound					Brewers Neck Blvd Westbound					Benns Grant Blvd Northbound					Brewers Neck Blvd Eastbound					
Start Time			Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 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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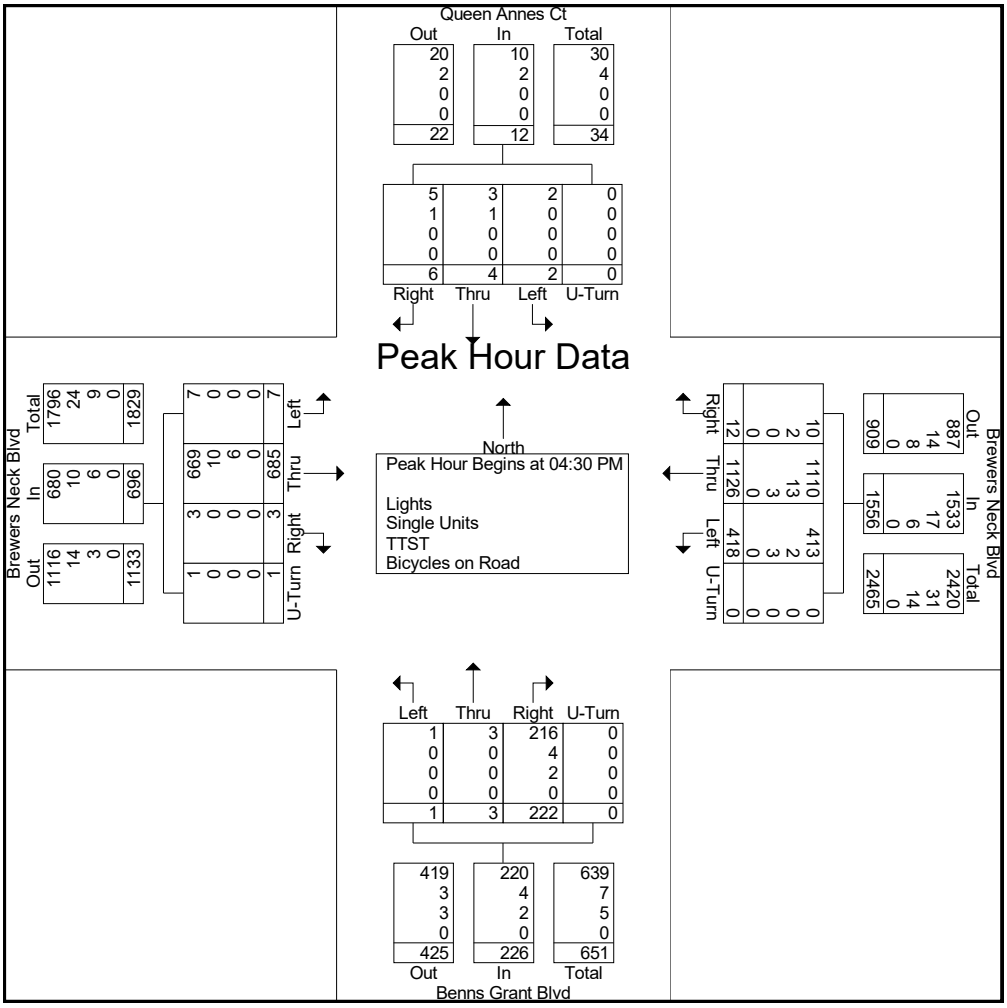
	Queen Annes Ct Southbound					Brewers Neck Blvd Westbound					Benns Grant Blvd Northbound					Brewers Neck Blvd Eastbound					
Start Time			Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 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	



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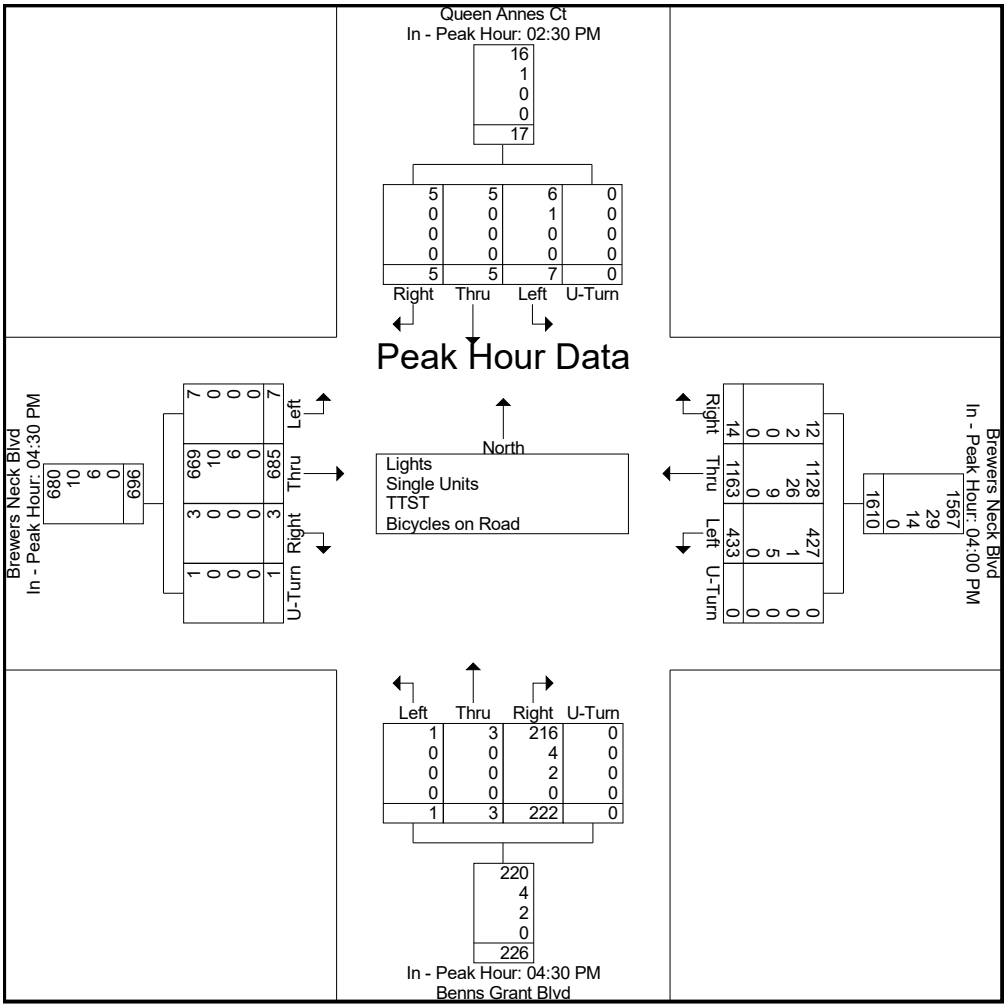
	Queen Annes Ct Southbound					Brewers Neck Blvd Westbound					Benns Grant Blvd Northbound					Brewers Neck Blvd Eastbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
Peak Hour Analysis 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
Suite 400
Virginia Beach, VA 23462-3361
757.490.0132

File Name : Brewers Neck and Benns Grant Blvd
Site Code :
Start Date : 4/24/2018
Page No : 6

	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

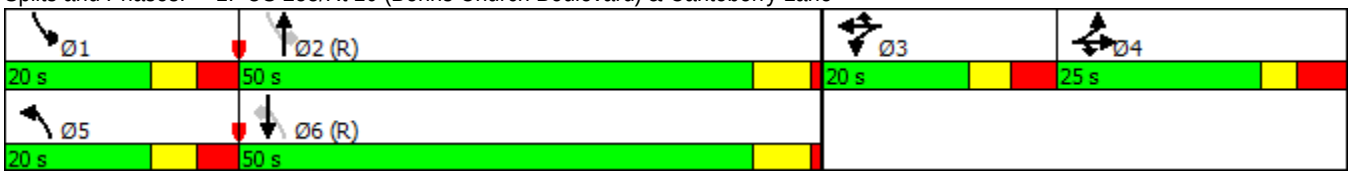
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	1	17	88	4	38	13	711	45	49	1030	32
Future Volume (vph)	23	1	17	88	4	38	13	711	45	49	1030	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	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



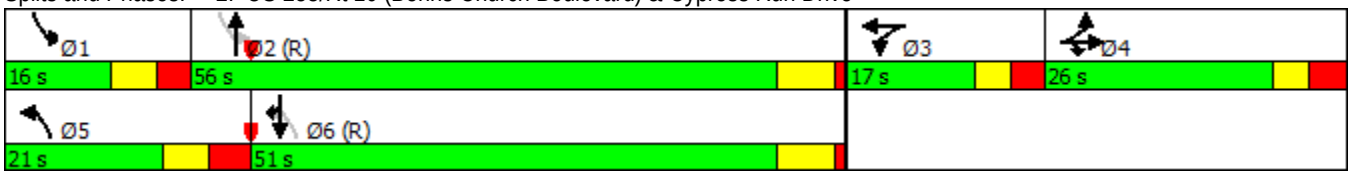
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	0	18	0	0	0	21	635	0	2	1252	28
Future Volume (vph)	4	0	18	0	0	0	21	635	0	2	1252	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		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

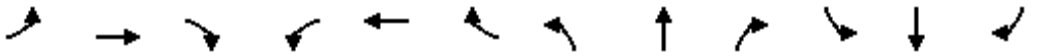
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases							6			2		
Detector Phase	4	4	4	3	3		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		5.0	14.0		5.0	14.0	14.0
Minimum Split (s)	13.5	13.5	13.5	13.0	13.0		12.5	20.0		12.0	20.0	20.0
Total Split (s)	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

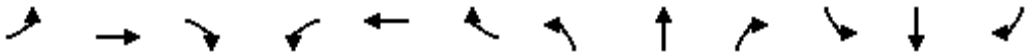


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	4	0	916	0	1	0
Future Volume (vph)	0	0	0	0	0	0	4	0	916	0	1	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0		125		0		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

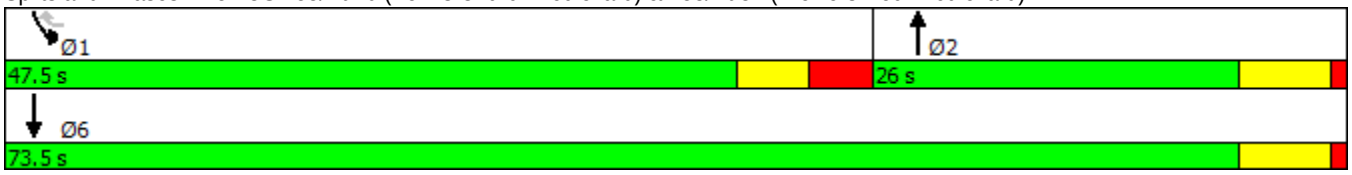


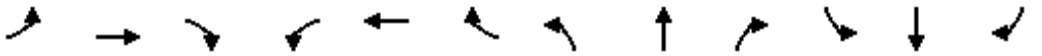
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	653	0	167	0	897	217	0
Future Volume (vph)	0	0	0	0	0	653	0	167	0	897	217	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		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)





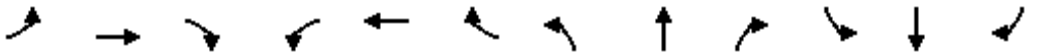
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	878	0	216	629	3	0	1	384	6	3	11
Future Volume (vph)	6	878	0	216	629	3	0	1	384	6	3	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		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)





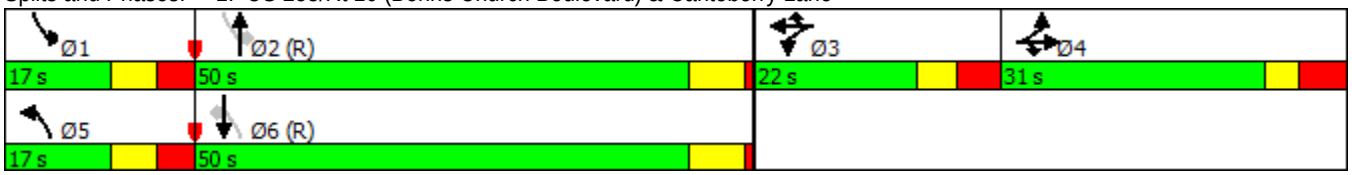
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	127	5	40	57	8	71	46	1109	95	118	931	88
Future Volume (vph)	127	5	40	57	8	71	46	1109	95	118	931	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (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	

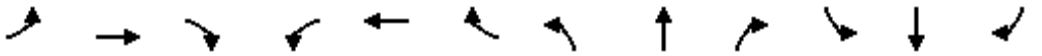
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases							6		2	2		6
Detector Phase	4	4	4	3	3	3	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	5.0	15.0	15.0	5.0	15.0	15.0
Minimum Split (s)	14.5	14.5	14.5	14.5	14.5	14.5	12.5	21.0	21.0	12.5	21.0	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





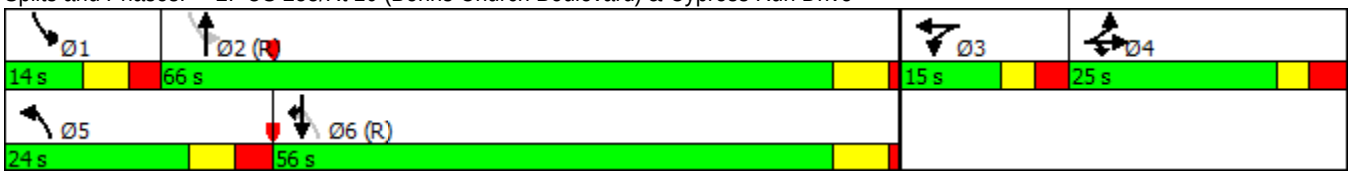
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	103	0	74	0	0	1	139	1146	0	0	907	119
Future Volume (vph)	103	0	74	0	0	1	139	1146	0	0	907	119
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	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



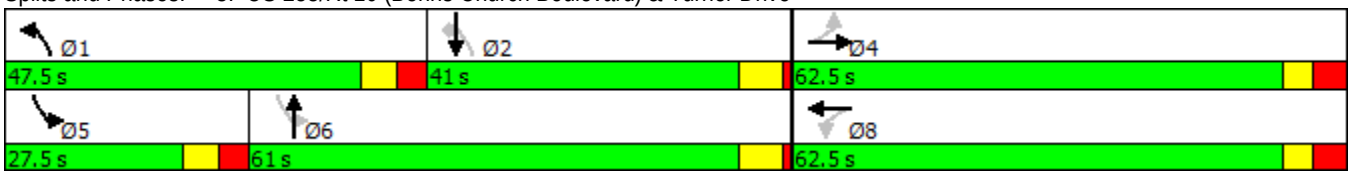
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	76	0	86	0	1	2	153	1196	1	29	877	112
Future Volume (vph)	76	0	86	0	1	2	153	1196	1	29	877	112
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	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



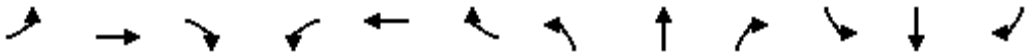
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	4	0	1341	0	0	0
Future Volume (vph)	0	0	0	0	0	0	4	0	1341	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0		125		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

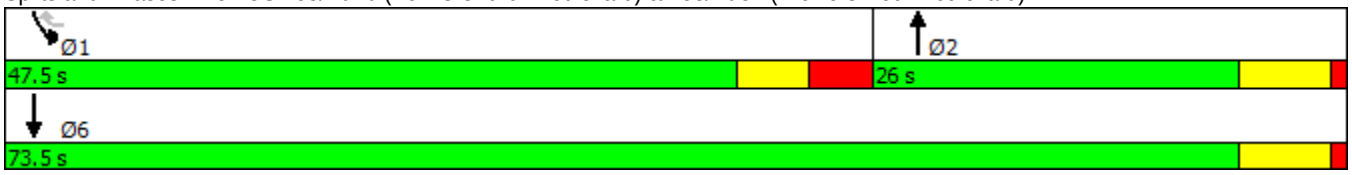


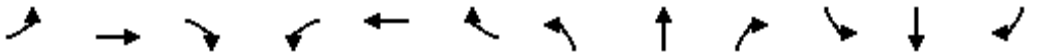
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	1154	0	200	0	647	276	0
Future Volume (vph)	0	0	0	0	0	1154	0	200	0	647	276	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	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

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	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	

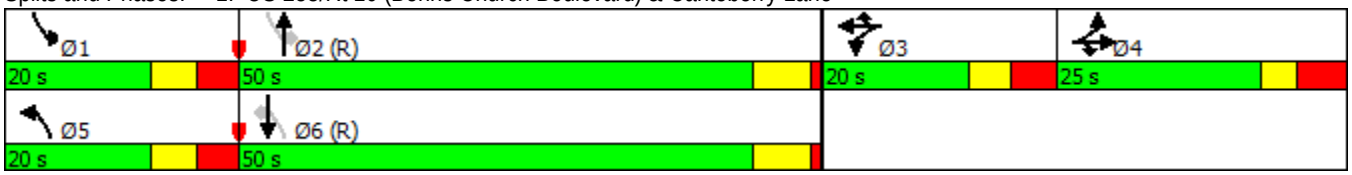
1: US 258/Rt 10 (Benns Church Boulevard) & Canteberry Lane

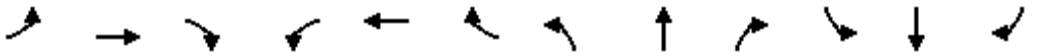
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases							6		2	2		6
Detector Phase	4	4	4	3	3	3	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	5.0	15.0	15.0	5.0	15.0	15.0
Minimum Split (s)	14.5	14.5	14.5	14.5	14.5	14.5	12.5	21.0	21.0	12.5	21.0	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

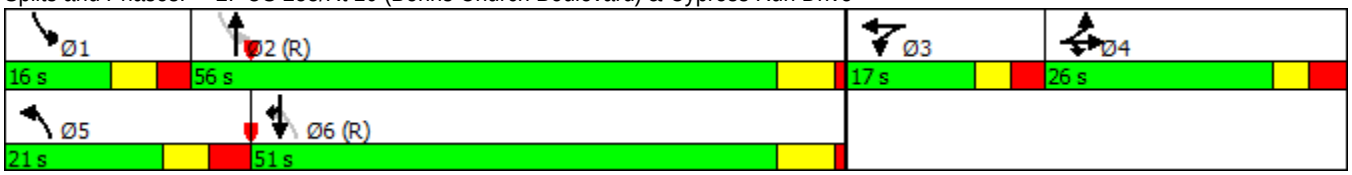
2: US 258/Rt 10 (Benns Church Boulevard) & Cypress Run Drive

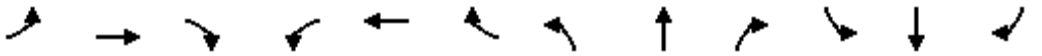
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases							6			2		
Detector Phase	4	4	4	3	3		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		5.0	14.0		5.0	14.0	14.0
Minimum Split (s)	13.5	13.5	13.5	13.0	13.0		12.5	20.0		12.0	20.0	20.0
Total Split (s)	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





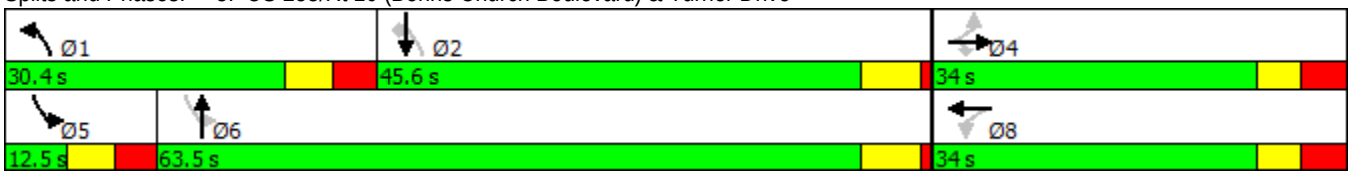
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	193	1	285	1	72	1	243	631	70	7	944	324
Future Volume (vph)	193	1	285	1	72	1	243	631	70	7	944	324
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (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



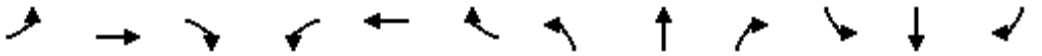
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	5	0	1032	0	1	0
Future Volume (vph)	0	0	0	0	0	0	5	0	1032	0	1	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0		125		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

5: US 258/Rt 10 (Benns Church Boulevard) & 258/Rt 32 (Brewers Neck Boulevard)



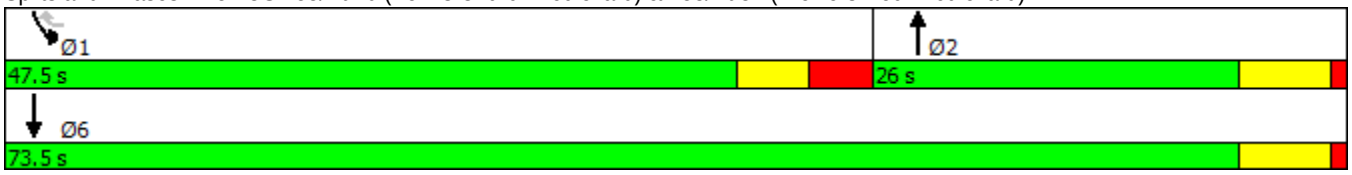
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	736	0	188	0	1010	244	0
Future Volume (vph)	0	0	0	0	0	736	0	188	0	1010	244	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	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	

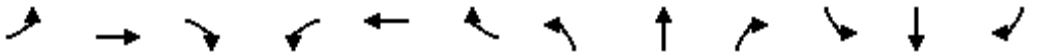
5: US 258/Rt 10 (Benns Church Boulevard) & 258/Rt 32 (Brewers Neck Boulevard)

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)

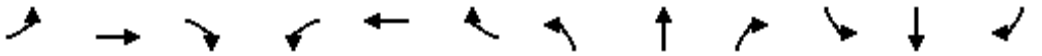
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases						2			4			3
Detector Phase	1	6		5	2	2	4	4	5	3	3	3
Switch Phase												
Minimum Initial (s)	10.0	15.0		10.0	15.0	15.0	10.0	10.0	10.0	5.0	5.0	5.0
Minimum Split (s)	19.0	24.5		19.5	24.5	24.5	26.0	26.0	19.5	26.0	26.0	26.0
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)



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	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	

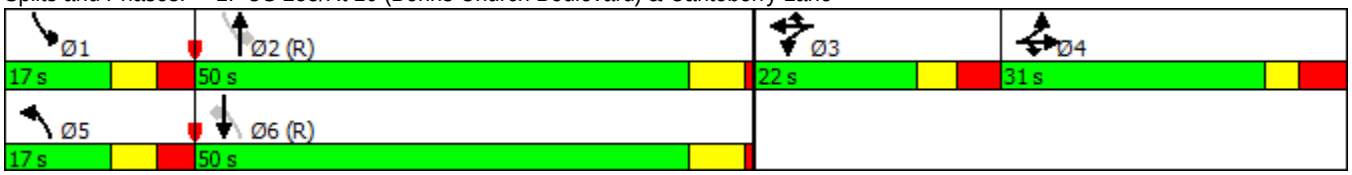
1: US 258/Rt 10 (Benns Church Boulevard) & Canteberry Lane

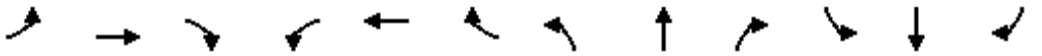
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases							6		2	2		6
Detector Phase	4	4	4	3	3	3	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	5.0	15.0	15.0	5.0	15.0	15.0
Minimum Split (s)	14.5	14.5	14.5	14.5	14.5	14.5	12.5	21.0	21.0	12.5	21.0	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

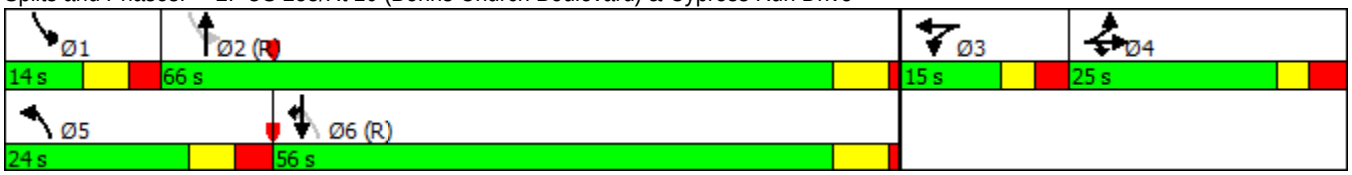
2: US 258/Rt 10 (Benns Church Boulevard) & Cypress Run Drive

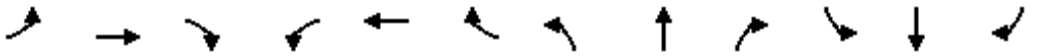
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases							6			2		
Detector Phase	4	4	4	3	3		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		5.0	14.0		5.0	14.0	14.0
Minimum Split (s)	13.5	13.5	13.5	13.0	13.0		12.5	20.0		12.0	20.0	20.0
Total Split (s)	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	

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)	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

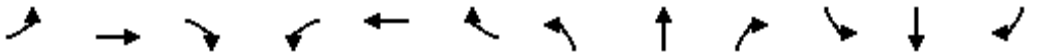


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	5	0	1511	0	0	0
Future Volume (vph)	0	0	0	0	0	0	5	0	1511	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0		125		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



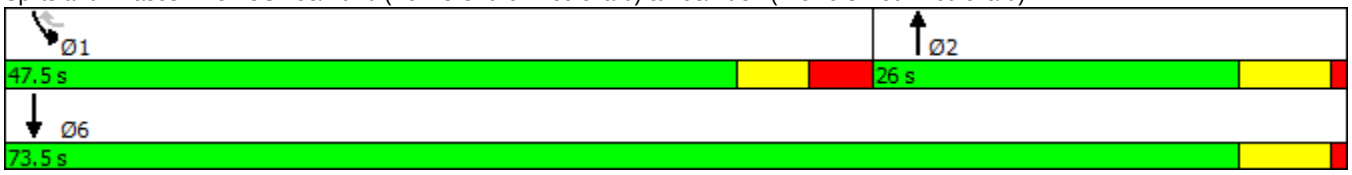
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	1300	0	225	0	729	311	0
Future Volume (vph)	0	0	0	0	0	1300	0	225	0	729	311	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	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	

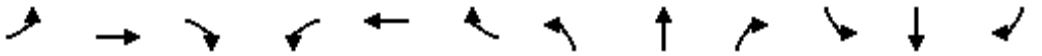
5: US 258/Rt 10 (Benns Church Boulevard) & 258/Rt 32 (Brewers Neck Boulevard)

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)						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	

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	

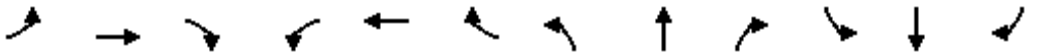
Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 83.9			
Natural Cycle: 140			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.82			
Intersection Signal Delay: 19.9		Intersection LOS: B	
Intersection Capacity Utilization 75.9%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 6: Queen Annes Court & 258/Rt 32 (Brewers Neck Boulevard)



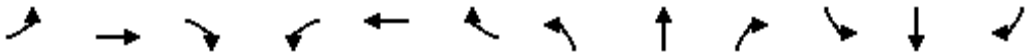
APPENDIX E

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	

1: US 258/Rt 10 (Benns Church Boulevard) & Canteberry Lane

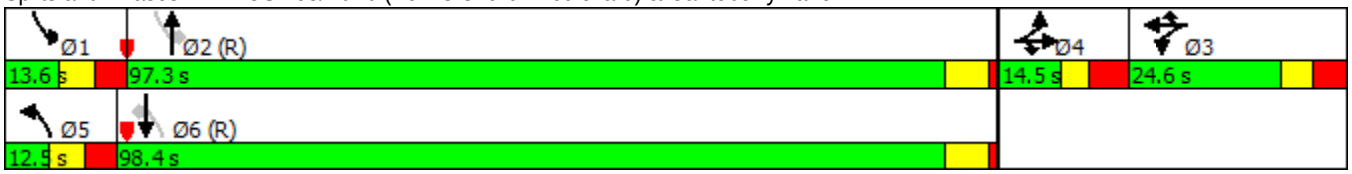


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases							6		2	2		6
Detector Phase	4	4	4	3	3	3	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	5.0	15.0	15.0	5.0	15.0	15.0
Minimum Split (s)	14.5	14.5	14.5	14.5	14.5	14.5	12.5	21.0	21.0	12.5	21.0	21.0
Total Split (s)	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

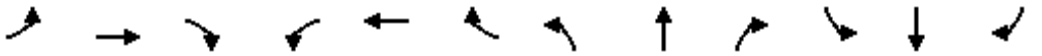
Intersection Summary			
Area Type:	Other		
Cycle Length: 150			
Actuated Cycle Length: 150			
Offset: 120 (80%), Referenced to phase 2:NBSB and 6:NBSB, Start of Green			
Natural Cycle: 120			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.87			
Intersection Signal Delay: 26.4		Intersection LOS: C	
Intersection Capacity Utilization 69.7%		ICU Level of Service C	
Analysis Period (min) 15			

1: US 258/Rt 10 (Benns Church Boulevard) & Canteberry Lane

Splits and Phases: 1: US 258/Rt 10 (Benns Church Boulevard) & Canteberry Lane

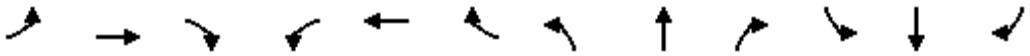


HCM 2010 analysis expects strict NEMA phasing.



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

2: US 258/Rt 10 (Benns Church Boulevard) & Cypress Run Drive

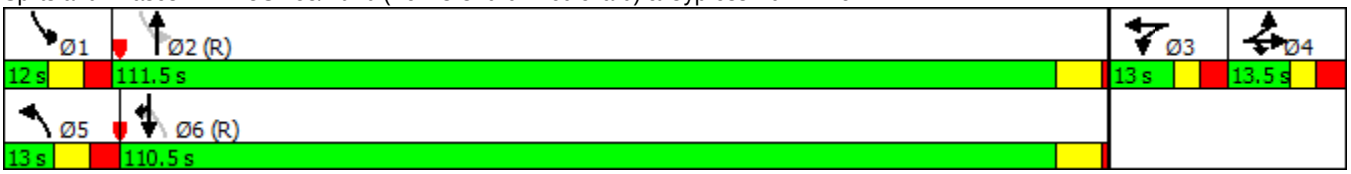


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases							6			2		
Detector Phase	4	4	4	3	3		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		5.0	14.0		5.0	14.0	14.0
Minimum Split (s)	13.5	13.5	13.5	13.0	13.0		12.5	20.0		12.0	20.0	20.0
Total Split (s)	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

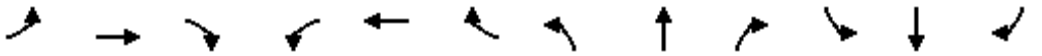
Intersection Summary			
Area Type:	Other		
Cycle Length: 150			
Actuated Cycle Length: 150			
Offset: 128 (85%), Referenced to phase 2:NBSB and 6:NBSB, Start of Green			
Natural Cycle: 110			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.75			
Intersection Signal Delay: 2.8		Intersection 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

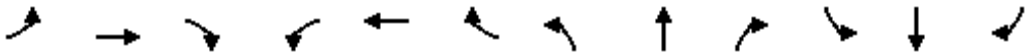


HCM 2010 analysis expects strict NEMA phasing.



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

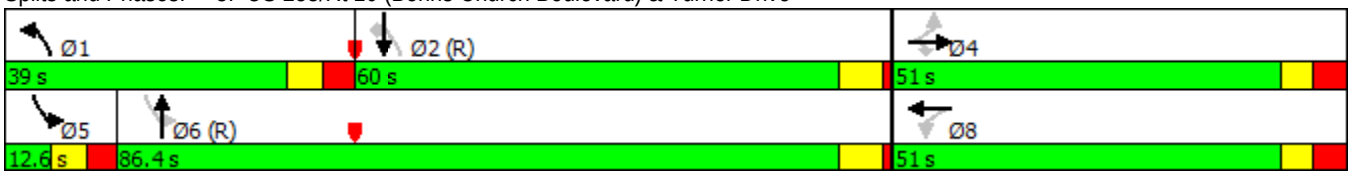


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8			2			6		2
Detector Phase	4	4	4	8	8		1	6		5	2	2
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		5.0	15.0		5.0	15.0	15.0
Minimum Split (s)	15.0	15.0	15.0	14.5	14.5		12.5	21.0		12.5	21.0	21.0
Total Split (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.

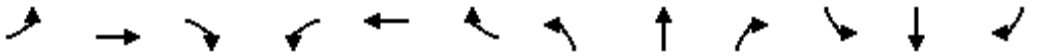
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	5	0	1128	0	1	0
Future Volume (vph)	0	0	0	0	0	0	5	0	1128	0	1	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0		125		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	

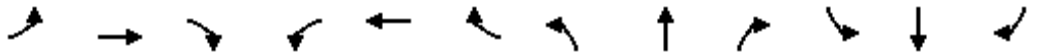
Intersection Summary

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	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)

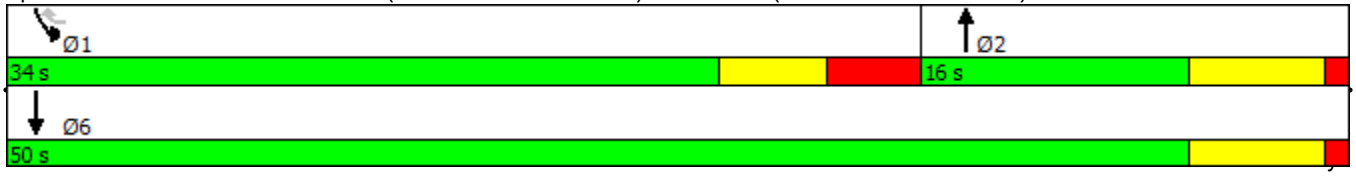


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases						1						
Detector Phase						1		2		1	6	
Switch Phase												
Minimum Initial (s)						15.0		10.0		15.0	15.0	
Minimum Split (s)						22.5		16.0		22.5	21.0	
Total Split (s)						34.0		16.0		34.0	50.0	
Total Split (%)						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	

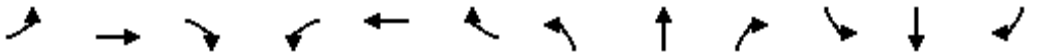
Intersection Summary

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)

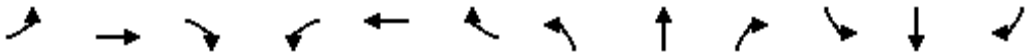


HCM 2010 Research does not support Non-NEMA phasing.



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	

6: Queen Annes Court & 258/Rt 32 (Brewers Neck Boulevard)

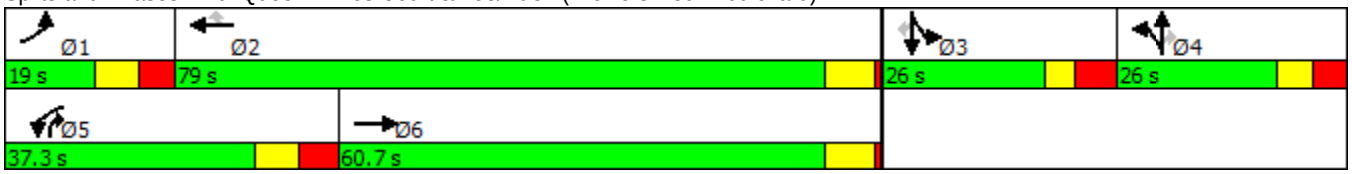


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases						2			4			3
Detector Phase	1	6		5	2	2	4	4	5	3	3	3
Switch Phase												
Minimum Initial (s)	10.0	15.0		10.0	15.0	15.0	10.0	10.0	10.0	5.0	5.0	5.0
Minimum Split (s)	19.0	24.5		19.5	24.5	24.5	26.0	26.0	19.5	26.0	26.0	26.0
Total Split (s)	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

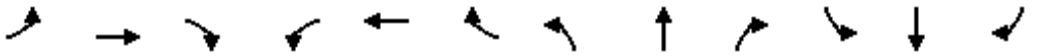
Area Type: Other
Cycle Length: 150
Actuated Cycle Length: 111
Natural Cycle: 150
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.78
Intersection Signal Delay: 21.6 Intersection LOS: C
Intersection Capacity Utilization 73.0% ICU Level of Service C
Analysis Period (min) 15
95th percentile volume 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	

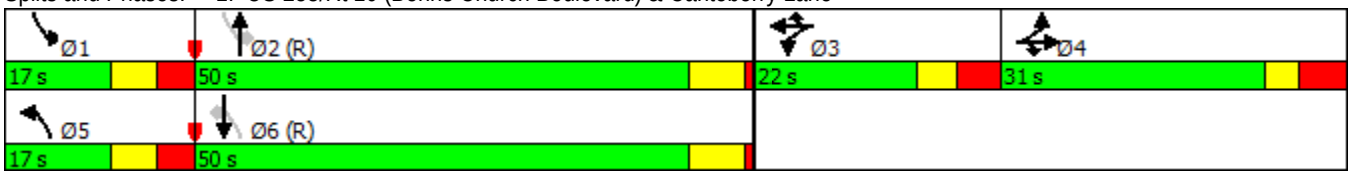
1: US 258/Rt 10 (Benns Church Boulevard) & Canteberry Lane

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

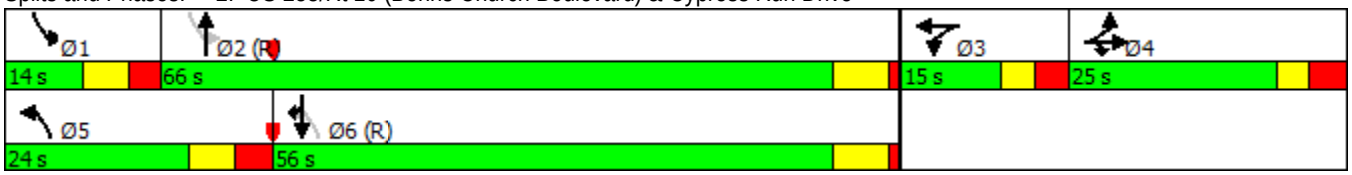
2: US 258/Rt 10 (Benns Church Boulevard) & Cypress Run Drive

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	

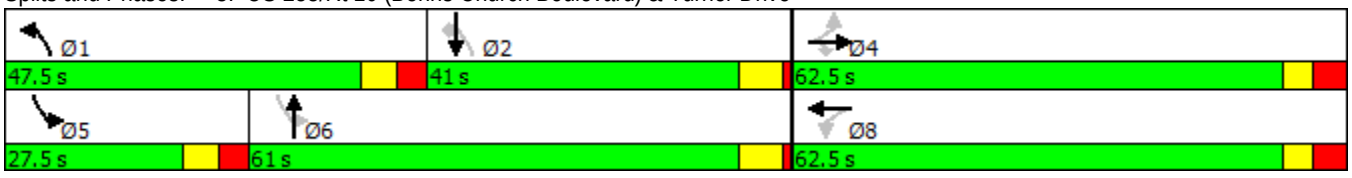
3: US 258/Rt 10 (Benns Church Boulevard) & Turner Drive

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



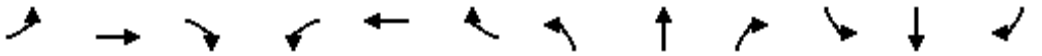
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	5	0	1652	0	0	0
Future Volume (vph)	0	0	0	0	0	0	5	0	1652	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0		125		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

5: US 258/Rt 10 (Benns Church Boulevard) & 258/Rt 32 (Brewers Neck Boulevard)



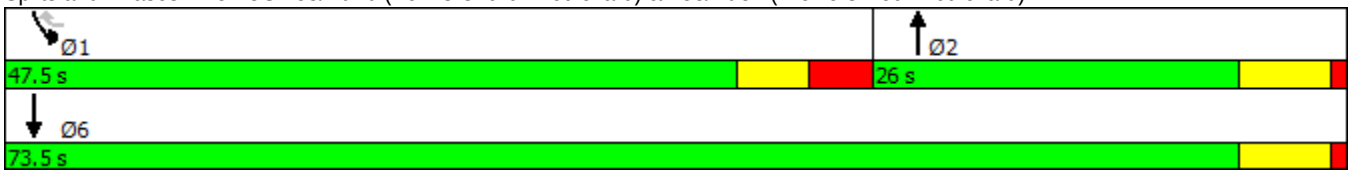
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	1421	0	246	0	797	340	0
Future Volume (vph)	0	0	0	0	0	1421	0	246	0	797	340	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	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	

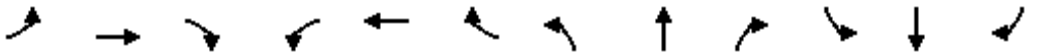
5: US 258/Rt 10 (Benns Church Boulevard) & 258/Rt 32 (Brewers Neck Boulevard)

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	

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

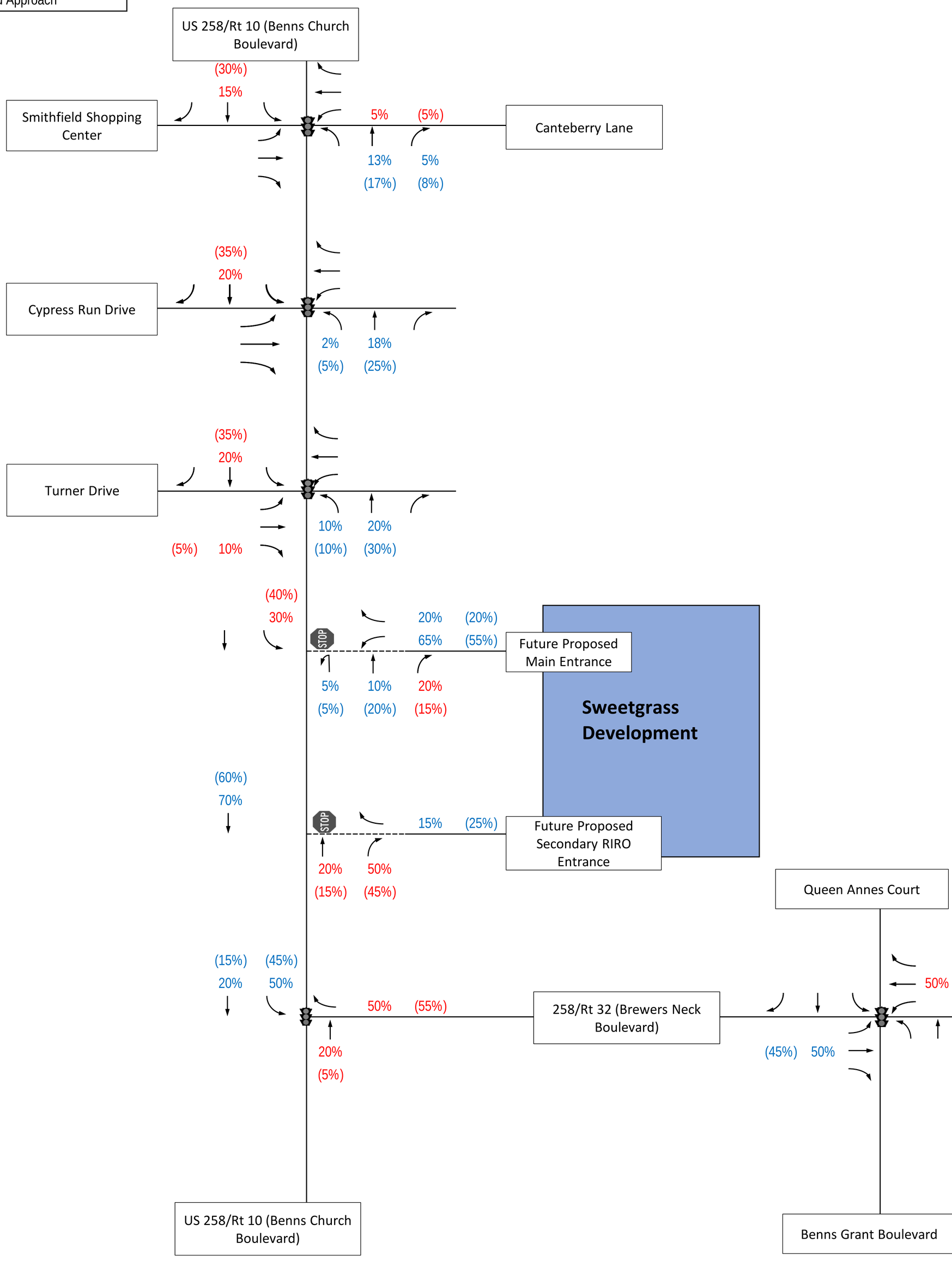


Figure F-1
Single-Family Detached Housing AM and PM Peak Hour Directional Distribution Percentages

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

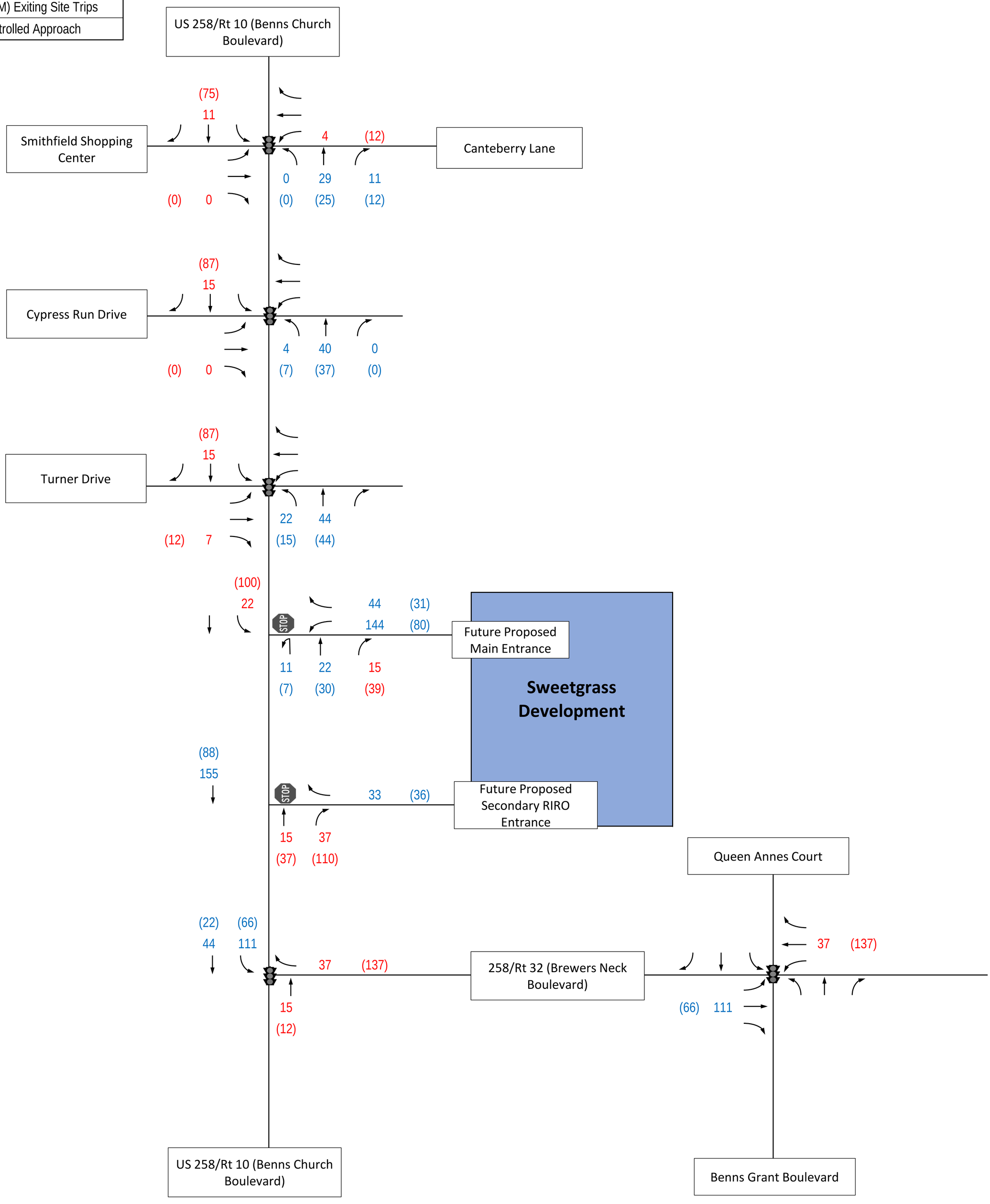


Figure F-2
Single-Family Detached Housing AM and PM Peak Hour Site Trips

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

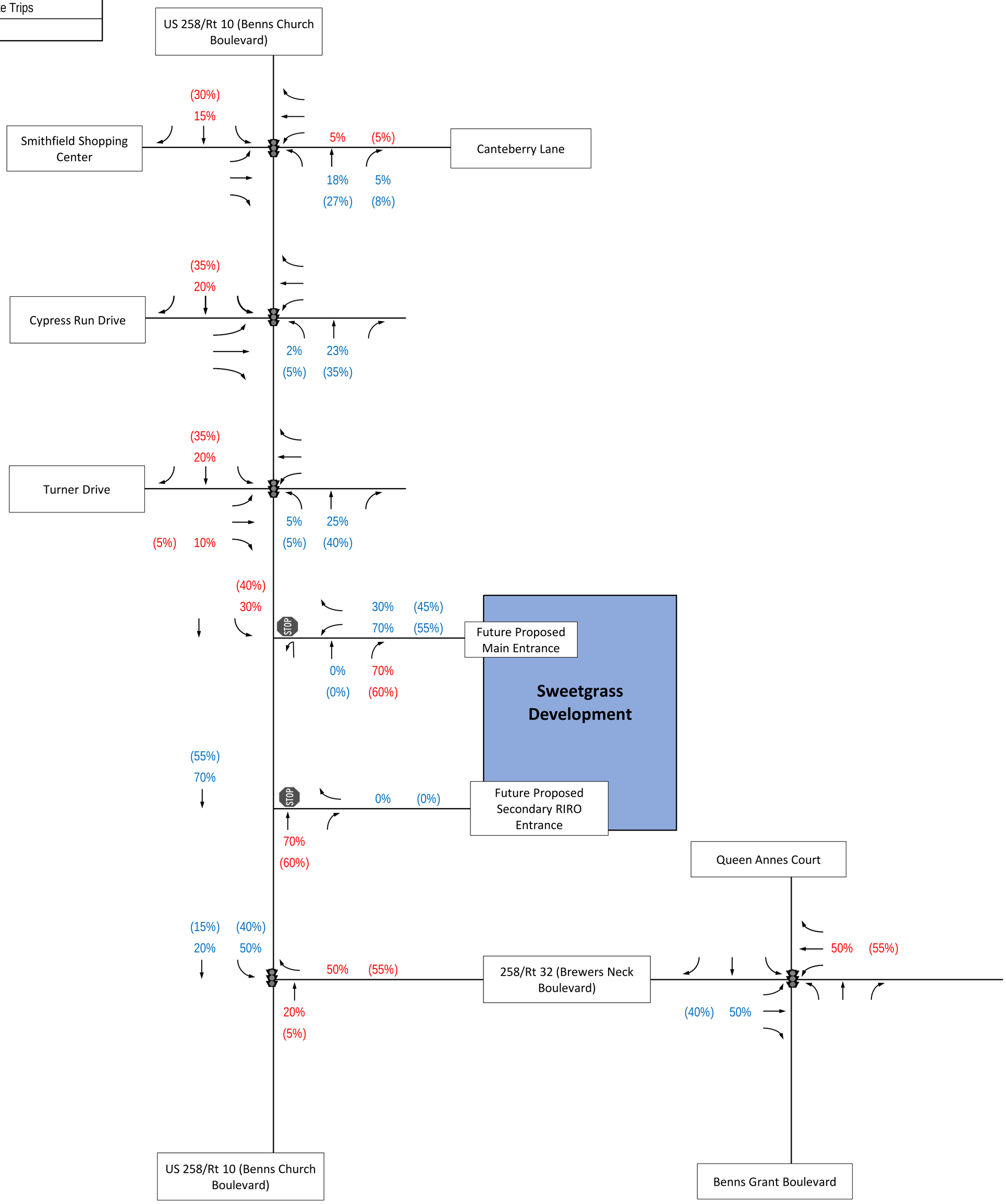


Figure F-3
Multifamily Housing (Low-Rise) AM and PM Peak Hour Directional Distribution Percentages

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

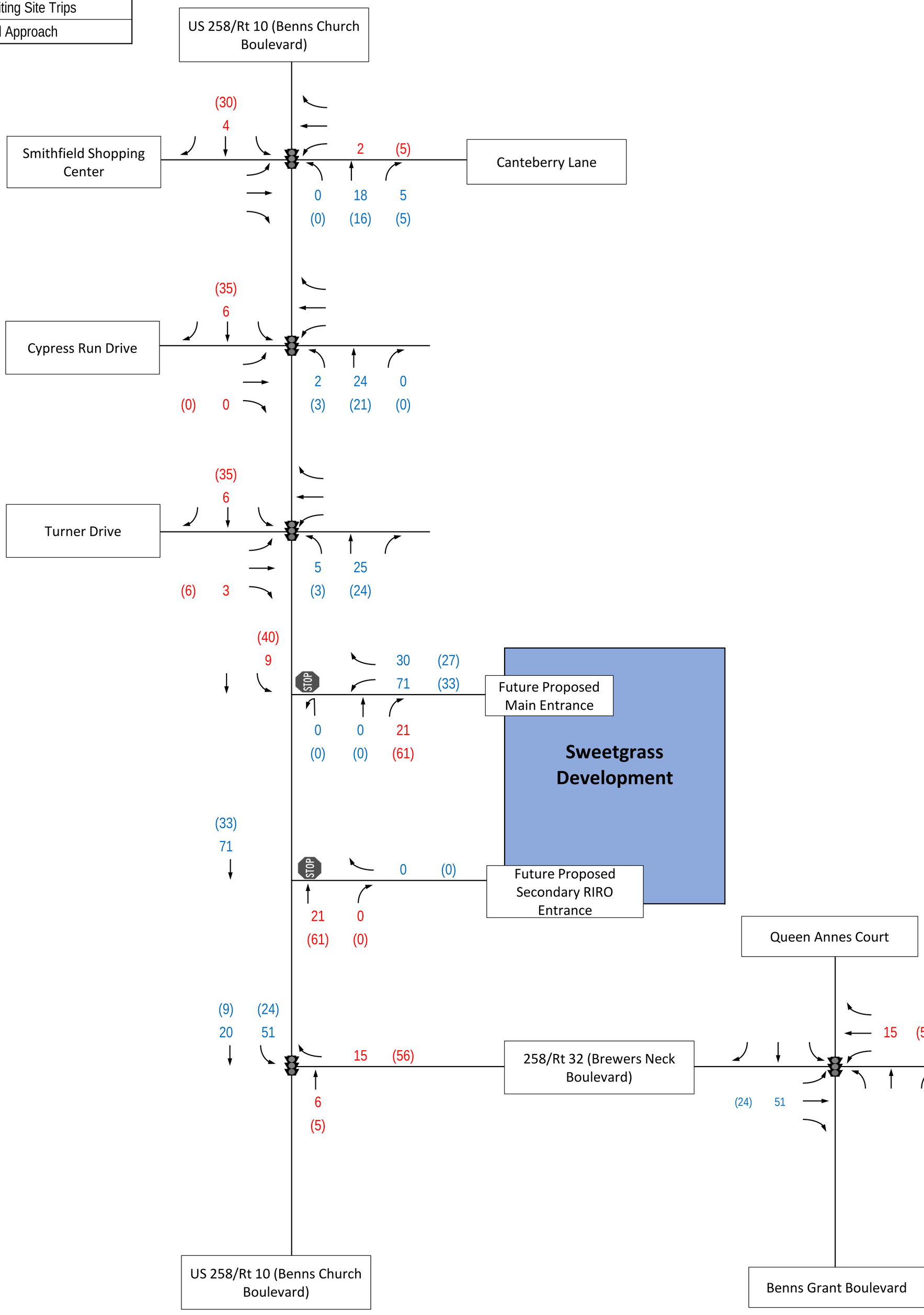


Figure F-4
Multifamily Housing (Low-Rise) AM and PM Peak Hour Site Trips

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

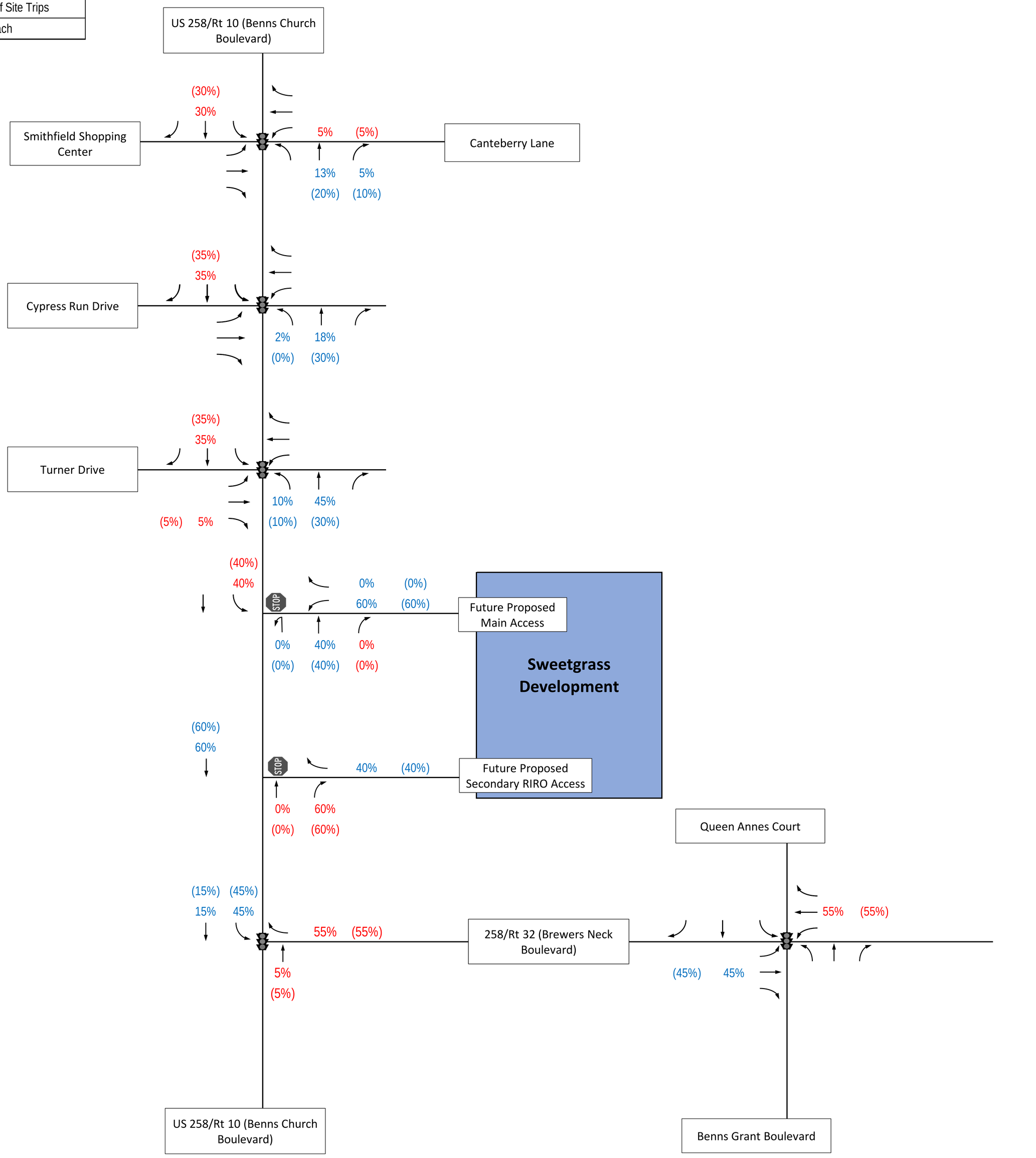


Figure F-5
Public Park AM and PM Peak Hour Directional Distribution Percentages

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

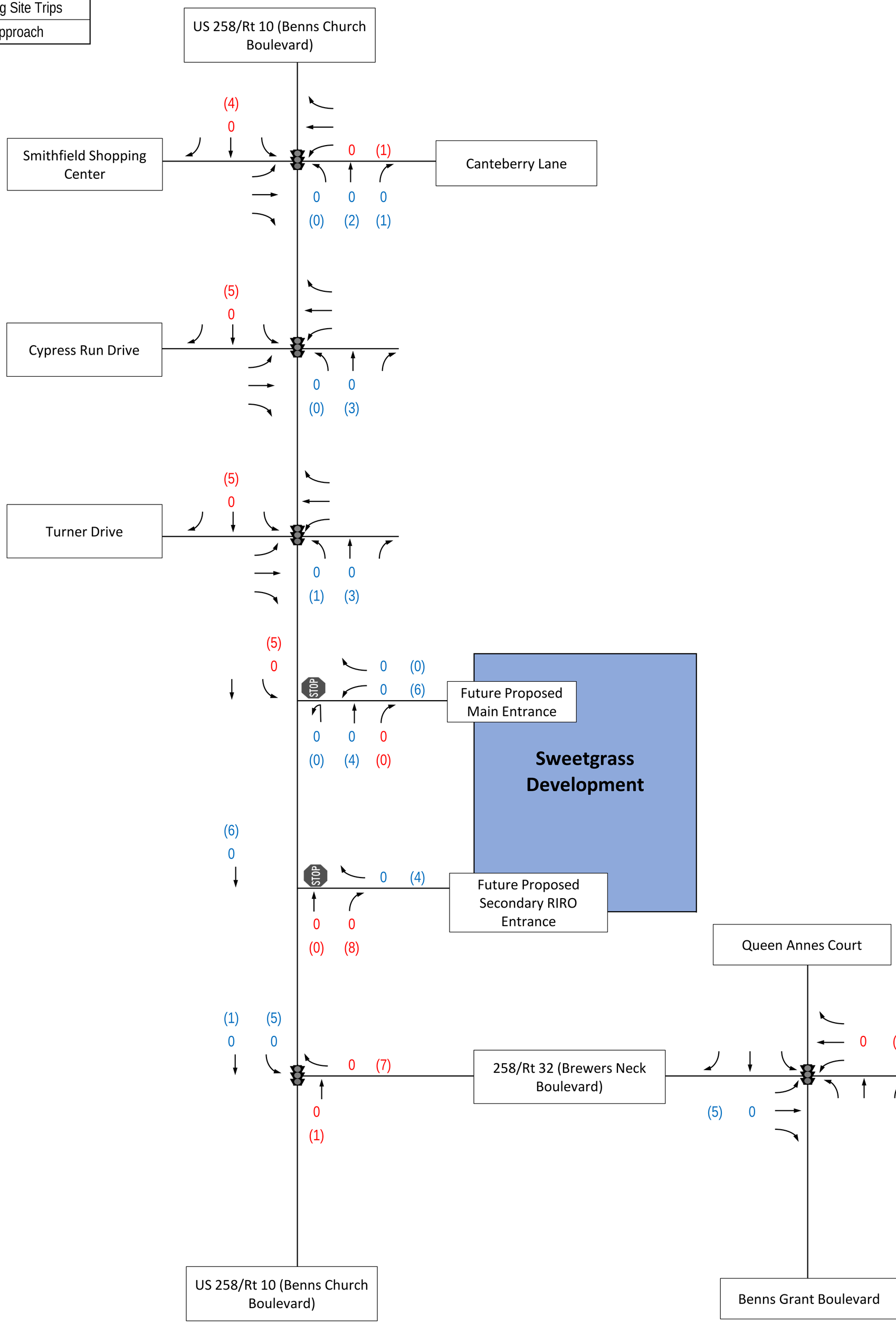


Figure F-6
Public Park AM and PM Peak Hour Site Trips

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

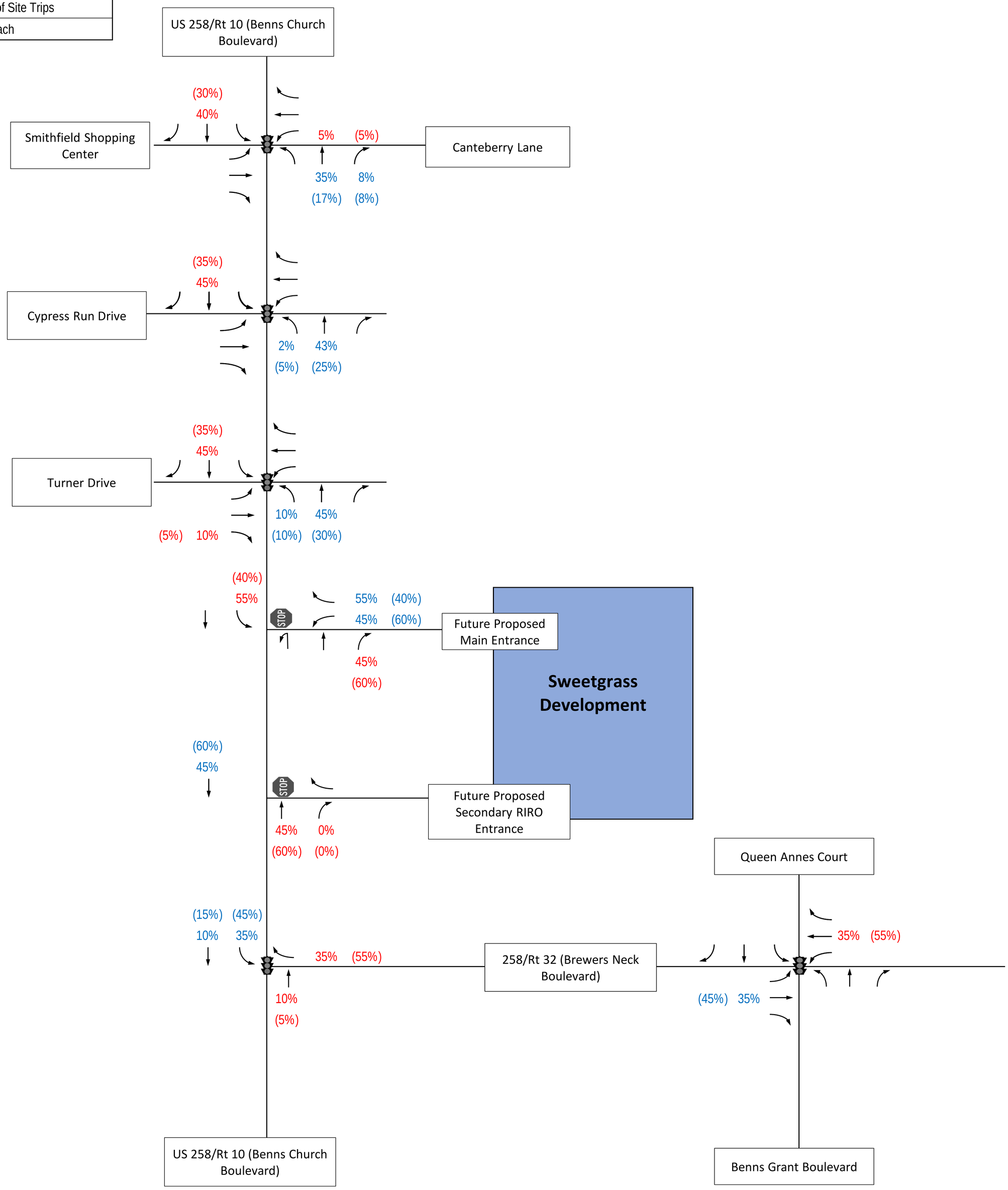


Figure F-7
Shopping Center AM and PM Peak Hour Directional Distribution Percentages

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

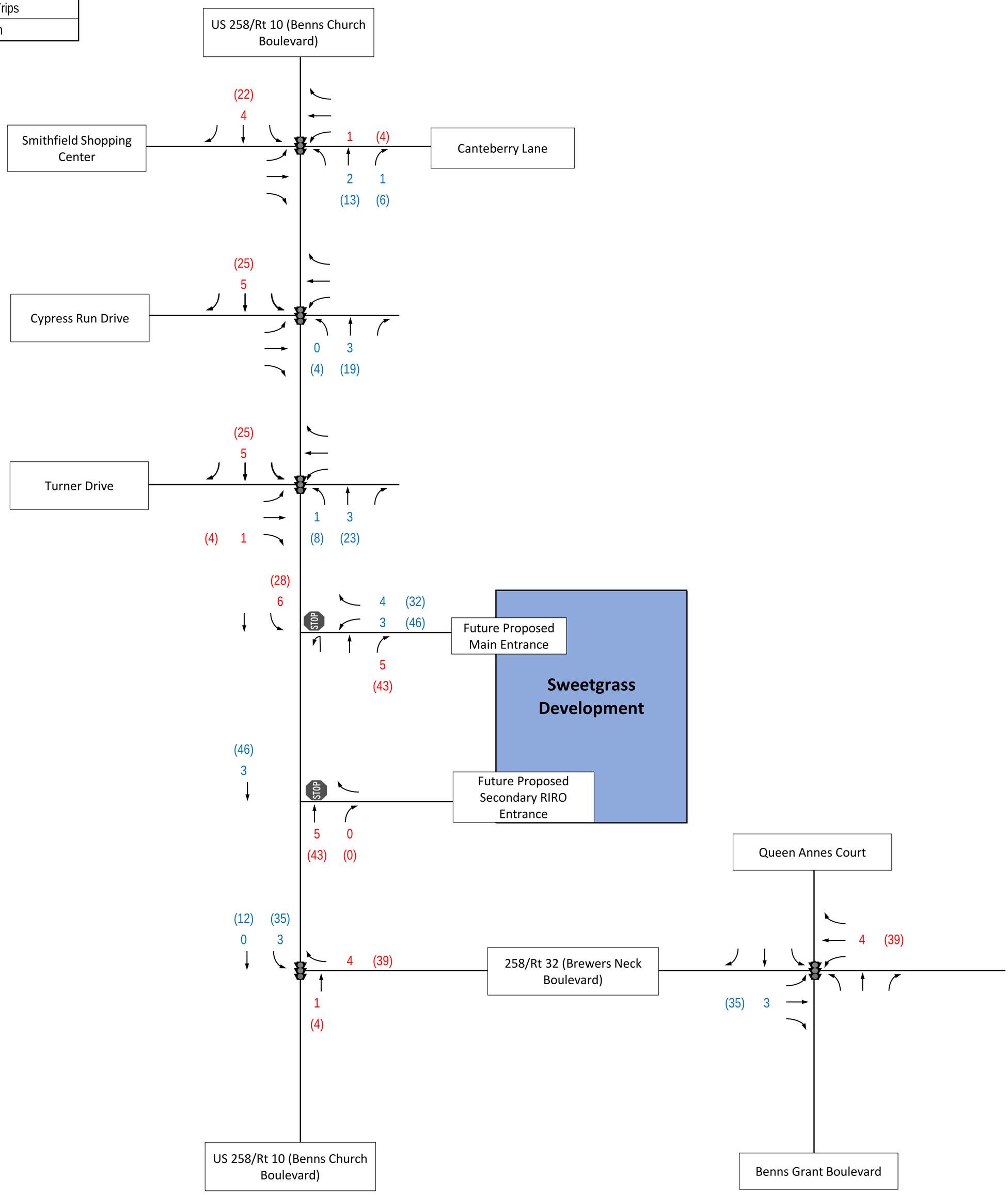


Figure F-8
Shopping Center AM and PM Peak Hour Site Trips

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

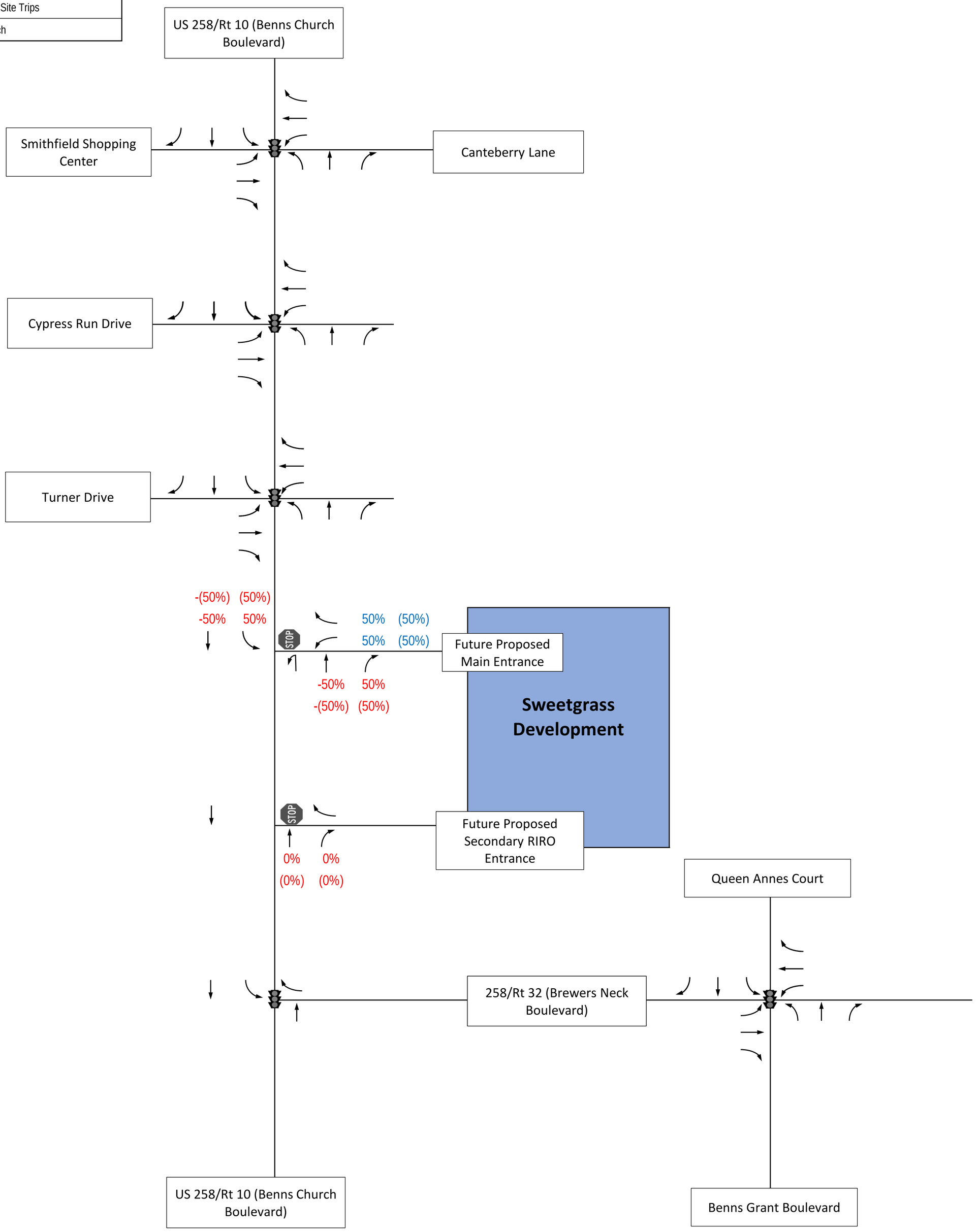


Figure F-9
Shopping Center Pass-by AM and PM Peak Hour Directional Distribution Percentages

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

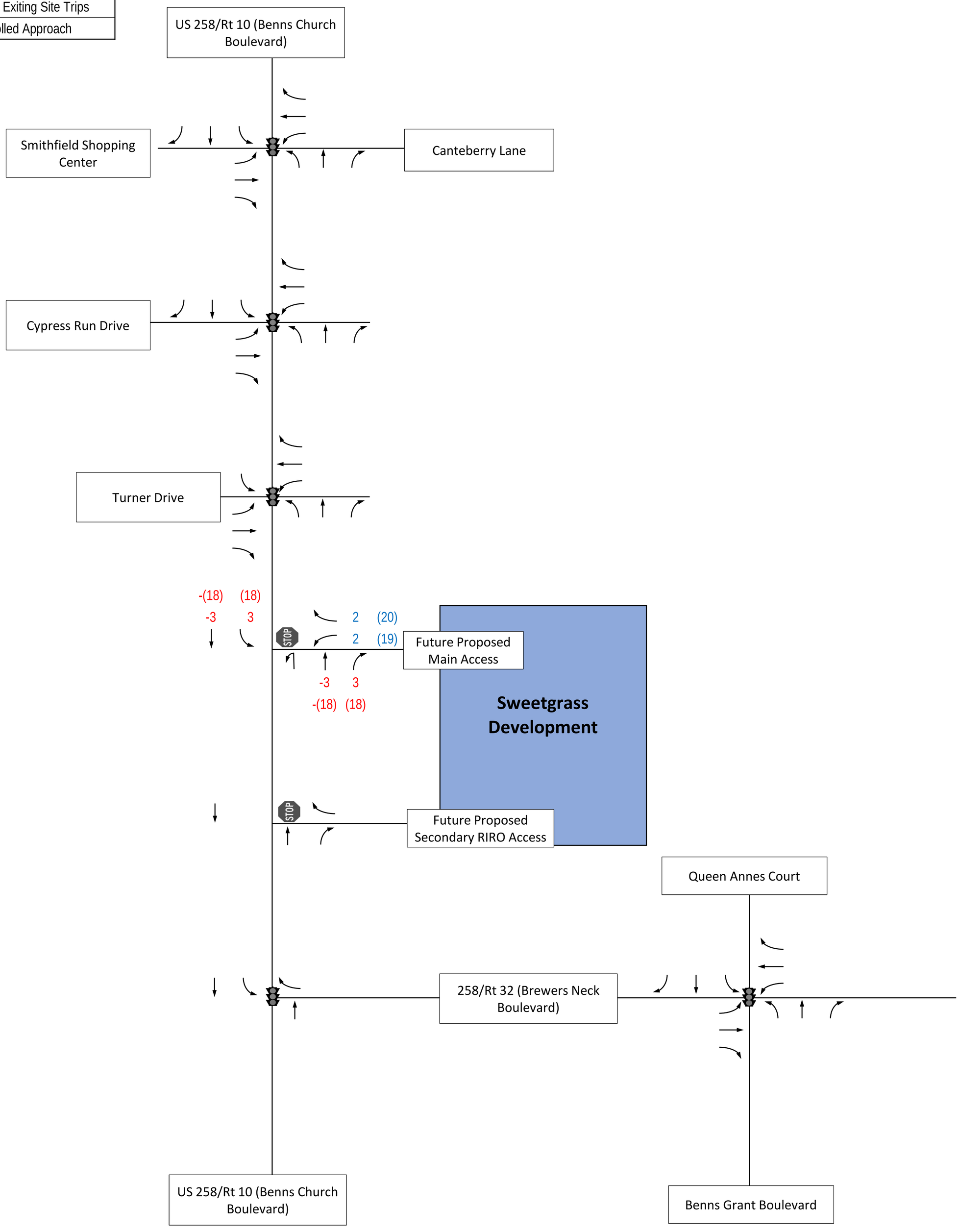


Figure F-10
Shopping Center AM and PM Peak Hour Pass-by Trips

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

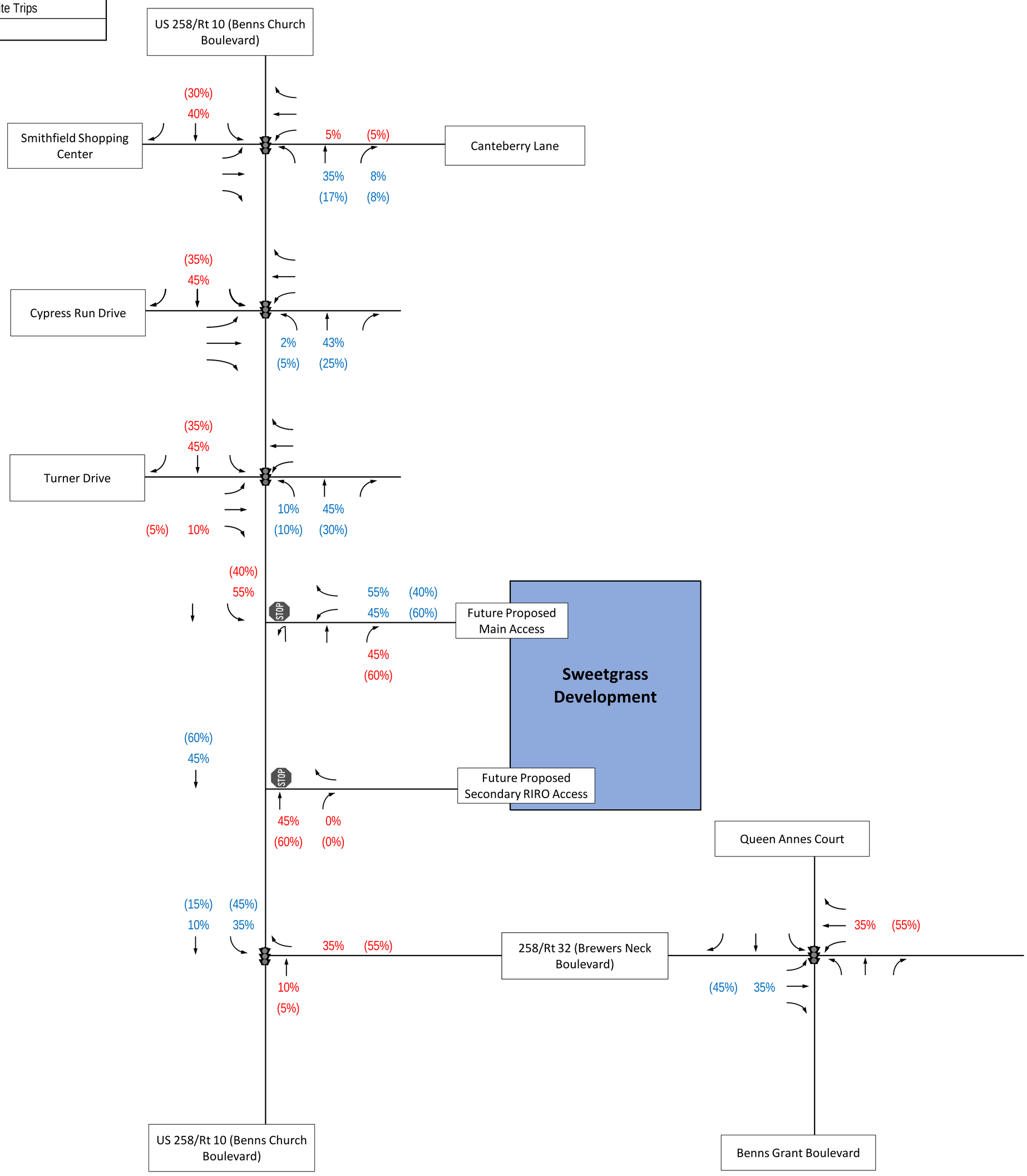


Figure F-11
Fast Food AM and PM Peak Hour Directional Distribution Percentages

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

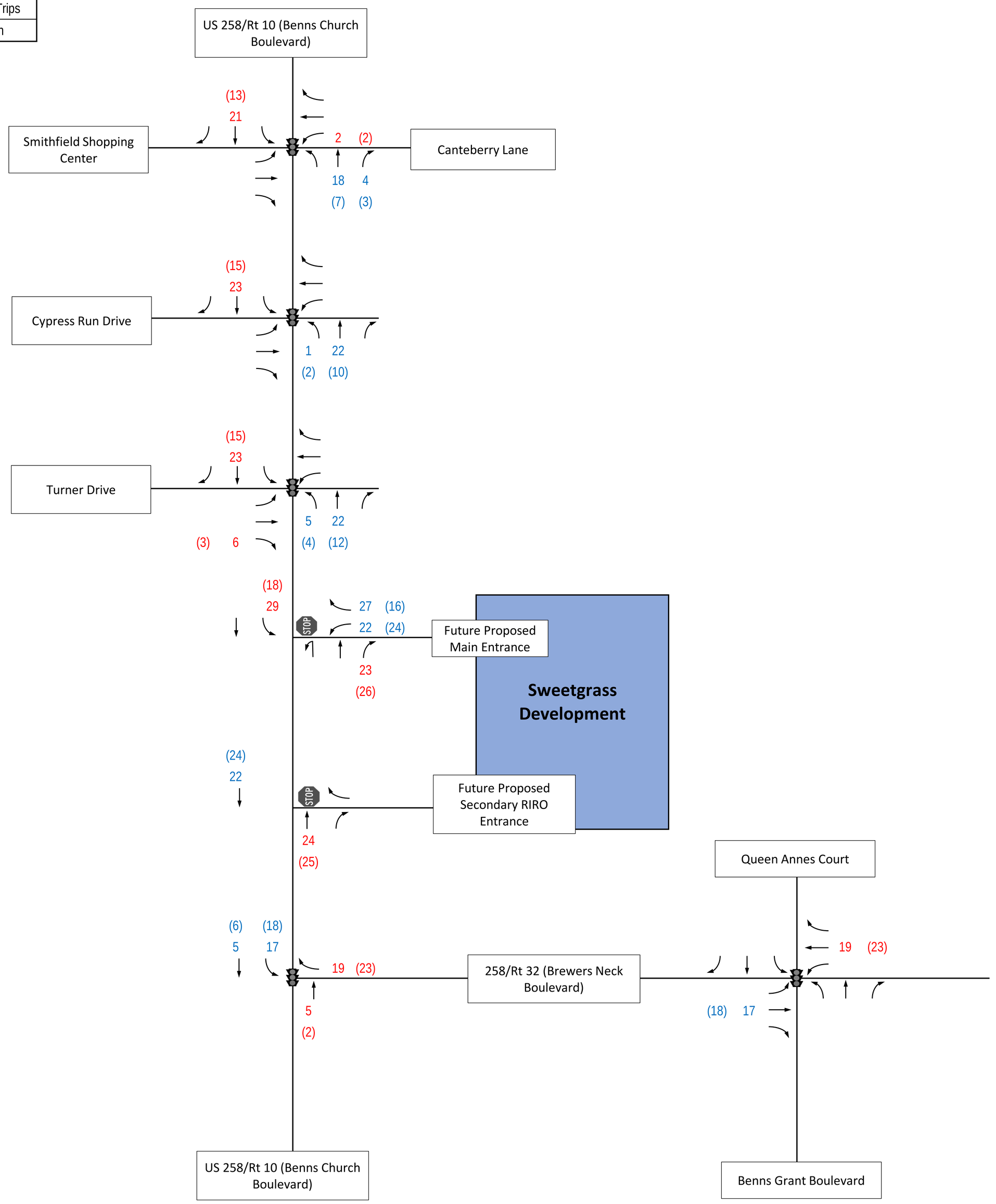


Figure F-12
Fast Food AM and PM Peak Hour New Site Trips

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

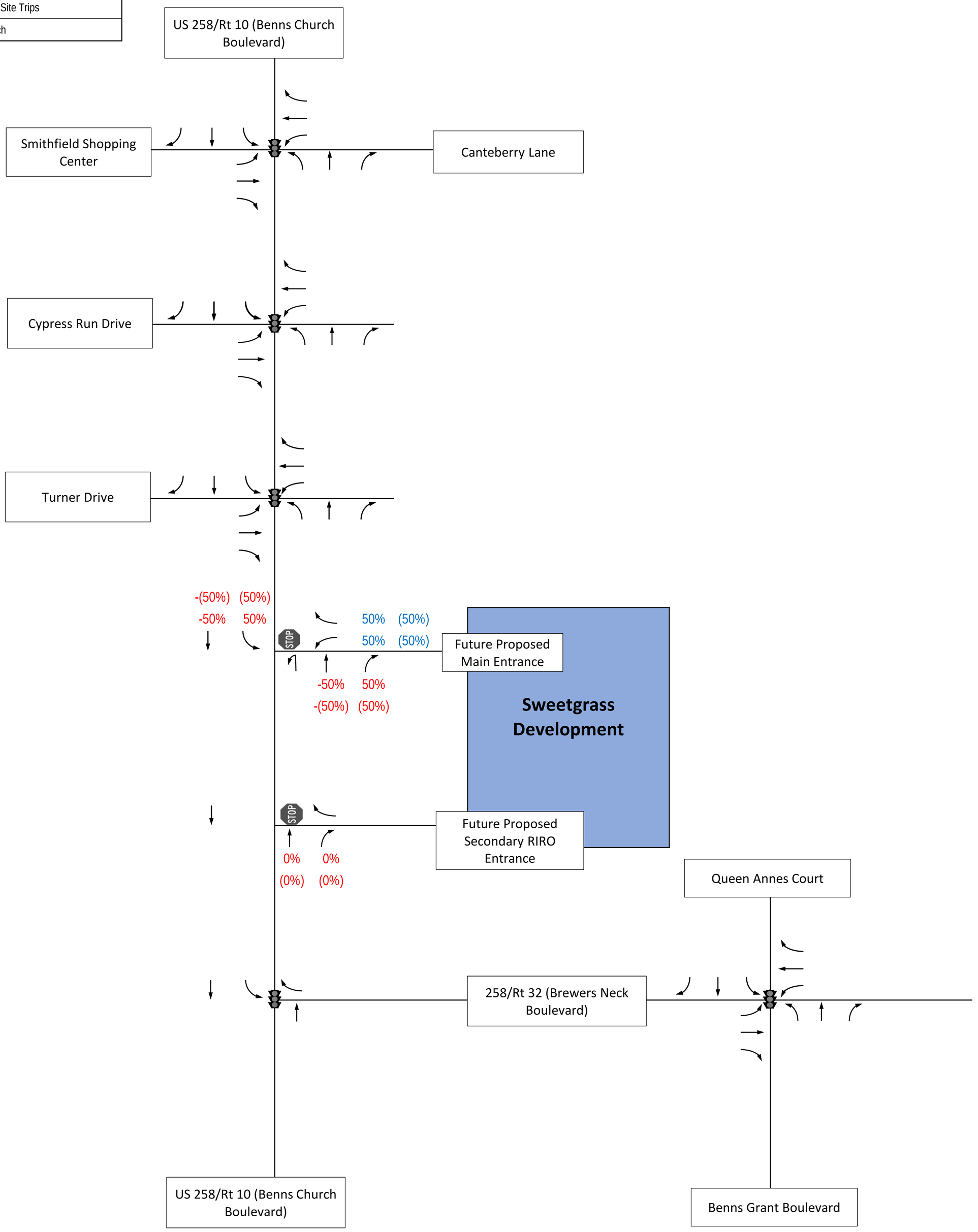


Figure F-15
Fast Food AM and PM Peak Hour Pass-by Directional Distribution Percentages

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

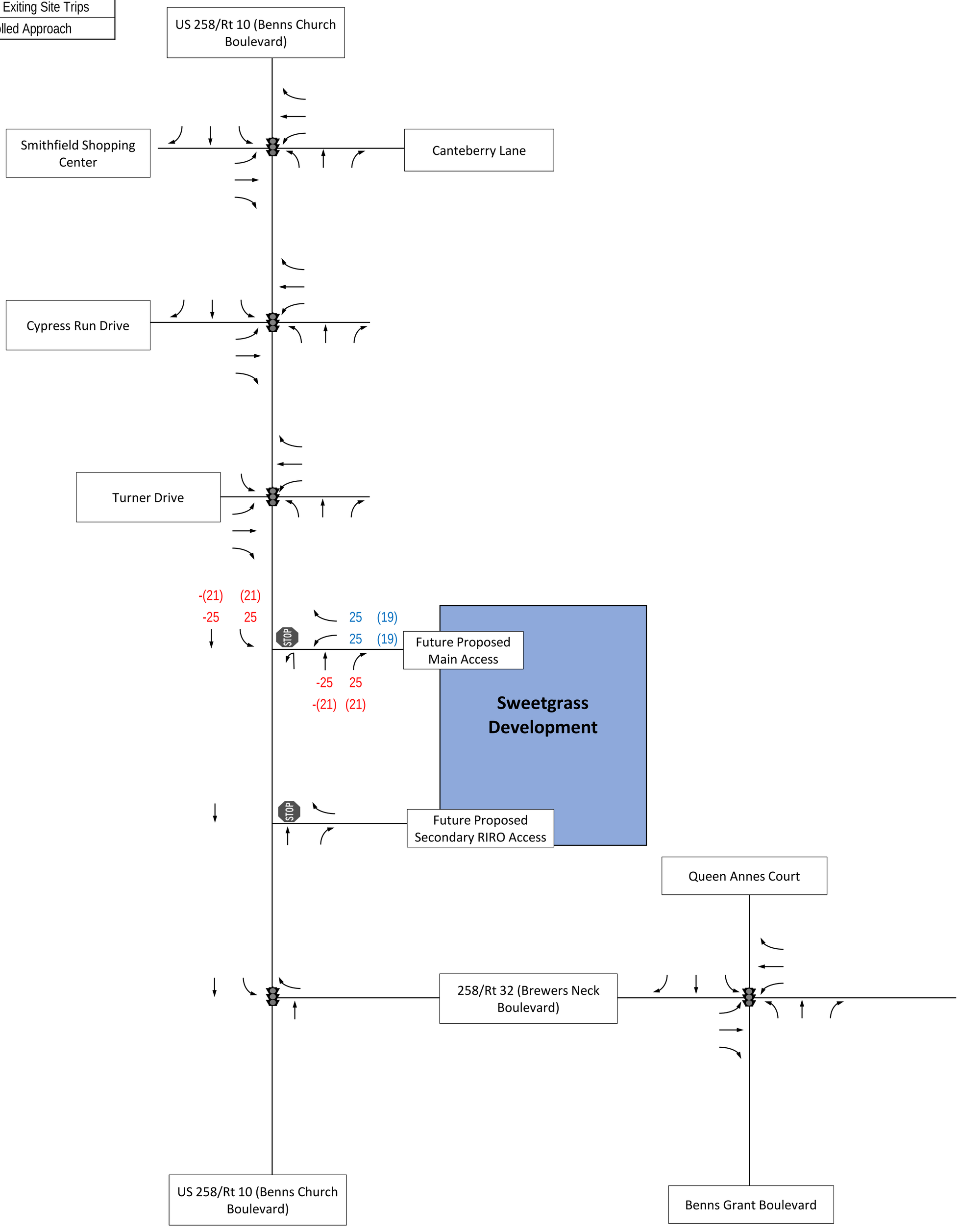


Figure F-16
Fast Food AM and PM Peak Hour Pass-by Trips

Sweetgrass
Isle of Wight County, VA

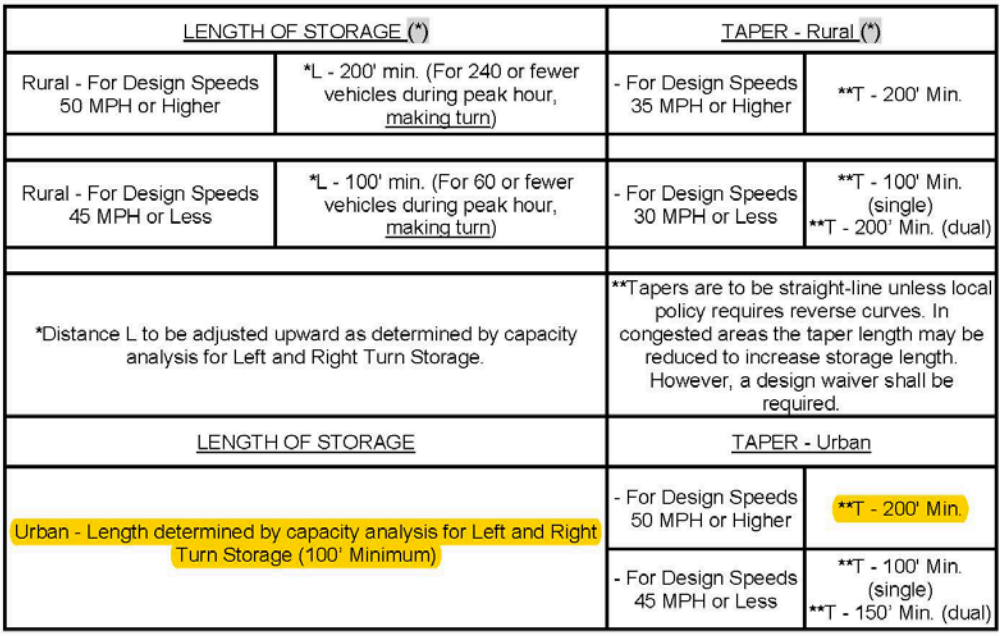
APPENDIX G

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.

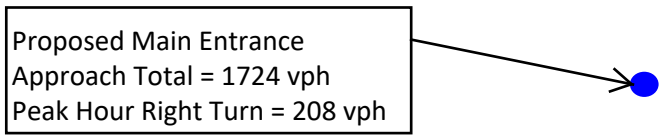
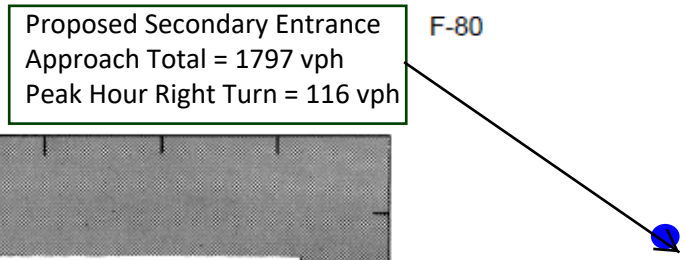
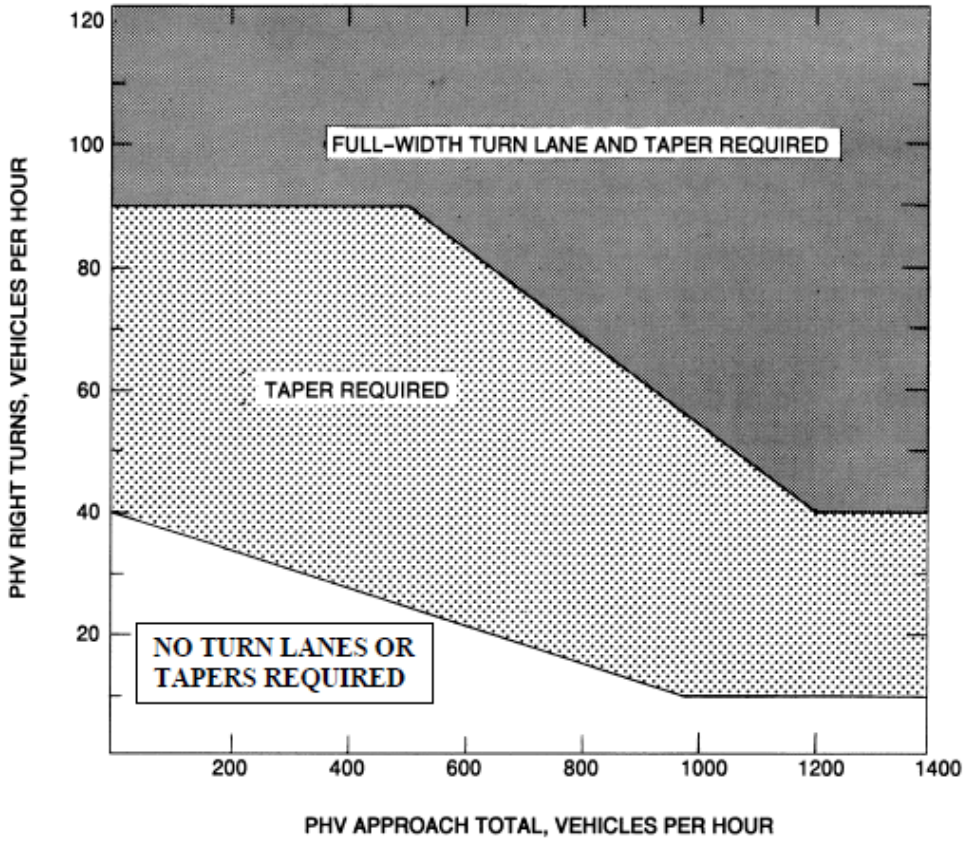


Figure 2. Warrants for Right Turn Treatment (4-Lane Highway)



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

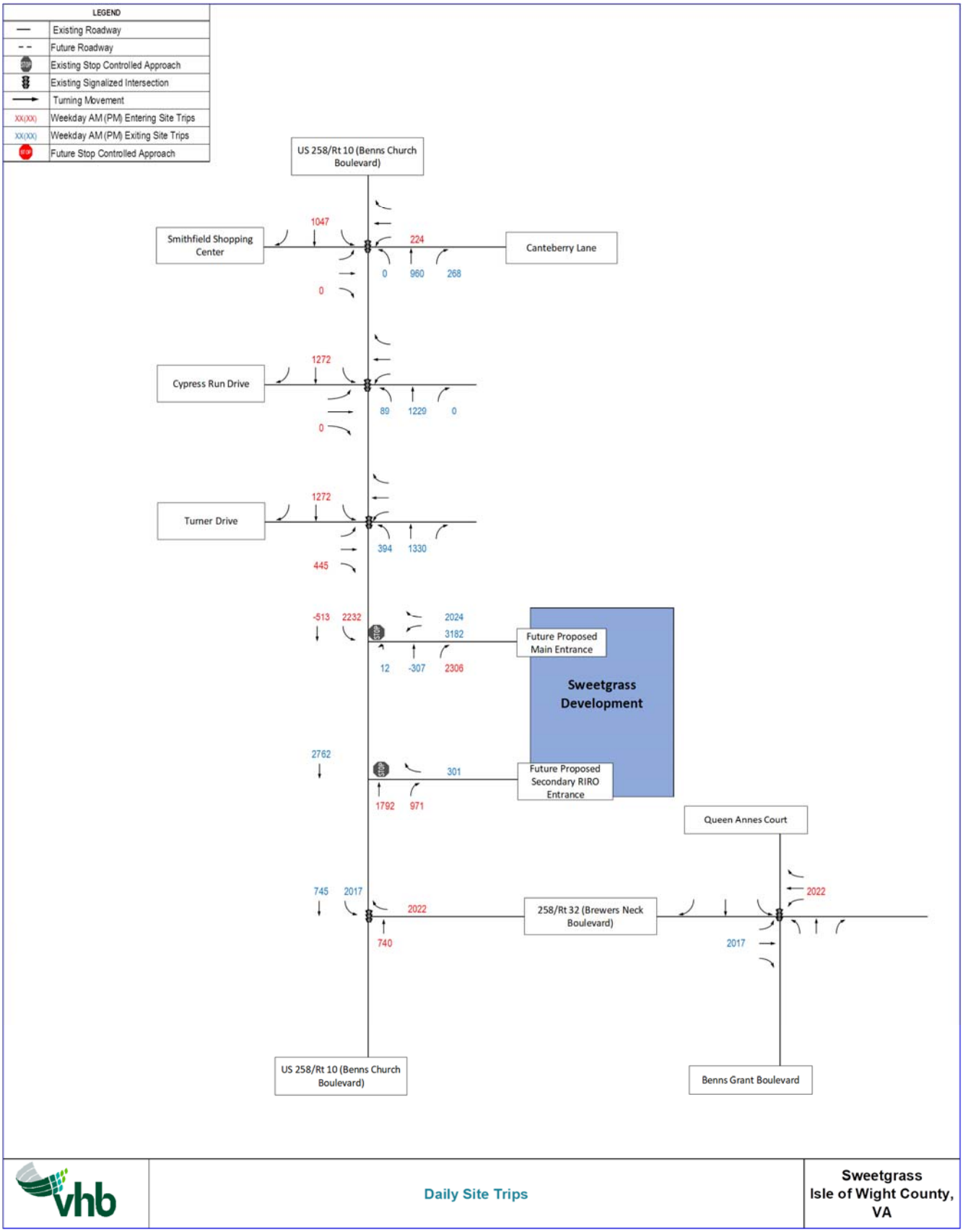

LEGEND
Existing Roadway
Future Roadway
Existing Stop Controlled Approach
Existing Signalized Intersection
Turning Movement
XX(XX) Weekday AM (PM) Entering Site Trips
XX(XX) Weekday AM (PM) Exiting Site Trips
Future Stop Controlled Approach
US 258/Rt 10 (Benns Church Boulevard)
Smithfield Shopping Center
Canteberry Lane
1047
224
0
960
268
0
Cypress Run Drive
1272
89
1229
0
0
Turner Drive
1272
394
1330
445
-513
2232
2024
3182
12
-307
2306
Future Proposed Main Entrance
Sweetgrass Development
2762
301
1792
971
Future Proposed Secondary RIRO Entrance
Queen Annes Court
745
2017
2022
2022
740
258/Rt 32 (Brewers Neck Boulevard)
2022
2017
US 258/Rt 10 (Benns Church Boulevard)
Benns Grant Boulevard
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.

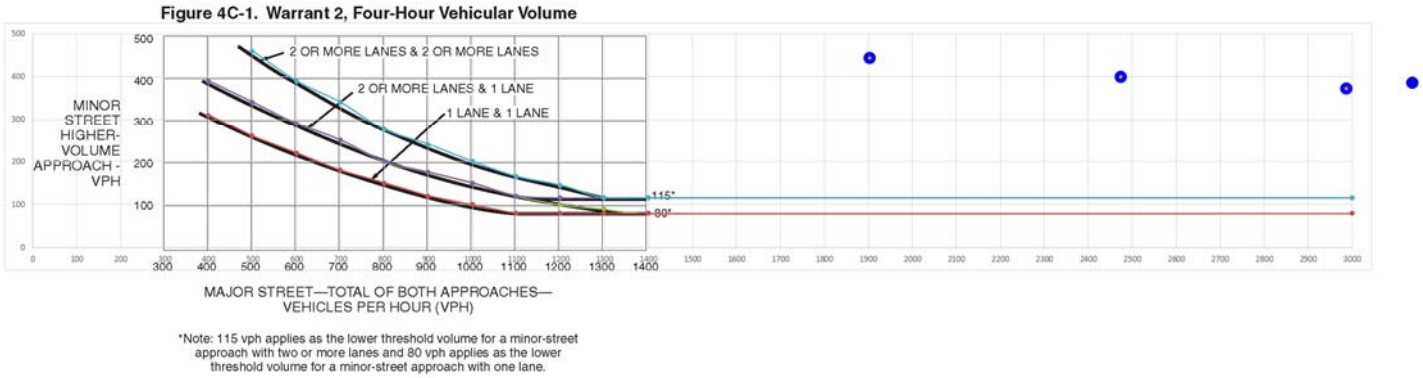
Warrant 2 – Four Hour Vehicular Volume

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	2988	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:

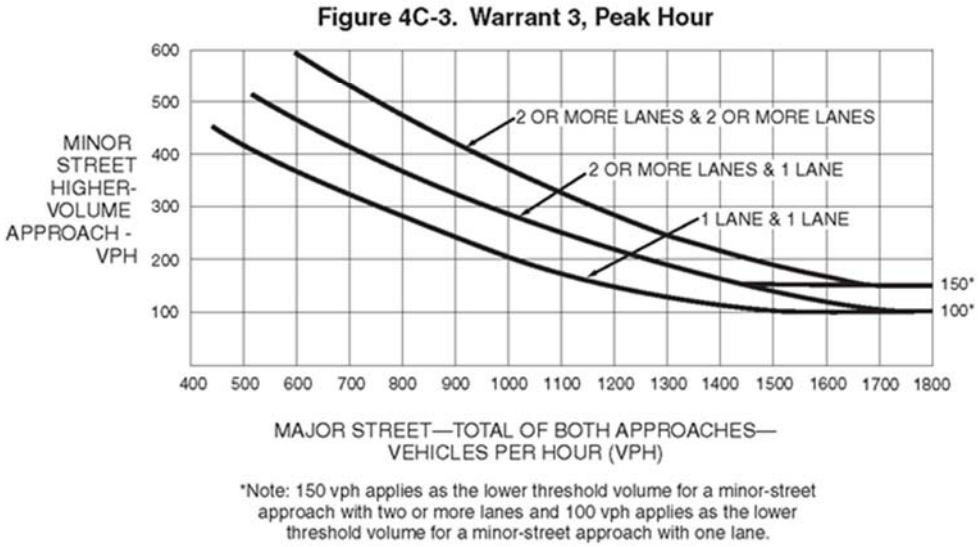
a) The total stopped time delay experienced by the traffic on one minor-street approach controlled by a stop sign equals or exceeds: 4 vehicle-hours for a one-lane approach; or 5 vehicle-hours for a two-lane approach, and

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	2988	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

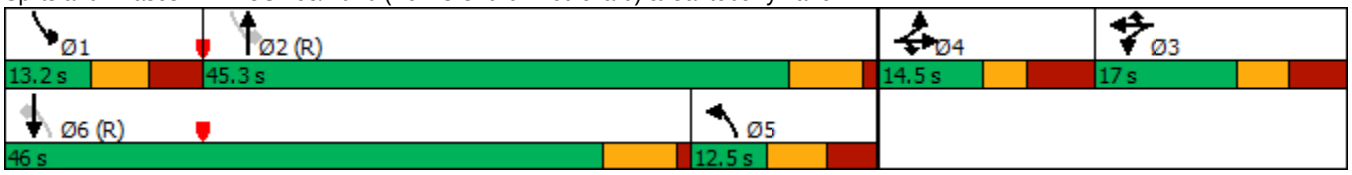
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	1	19	108	5	43	15	868	71	55	1201	36
Future Volume (vph)	26	1	19	108	5	43	15	868	71	55	1201	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (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	

1: US 258/Rt 10 (Benns Church Boulevard) & Canteberry Lane

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

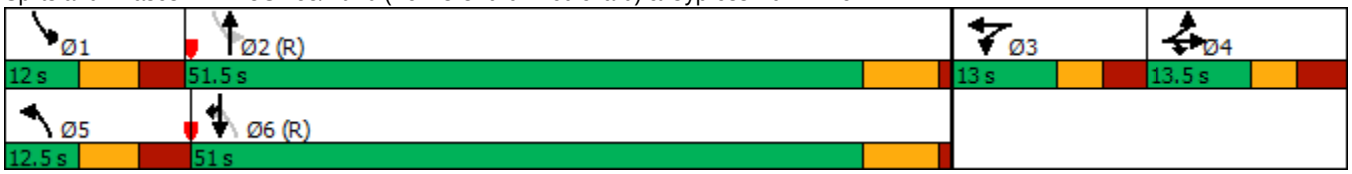


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	0	20	0	0	0	31	804	0	2	1459	32
Future Volume (vph)	5	0	20	0	0	0	31	804	0	2	1459	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		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



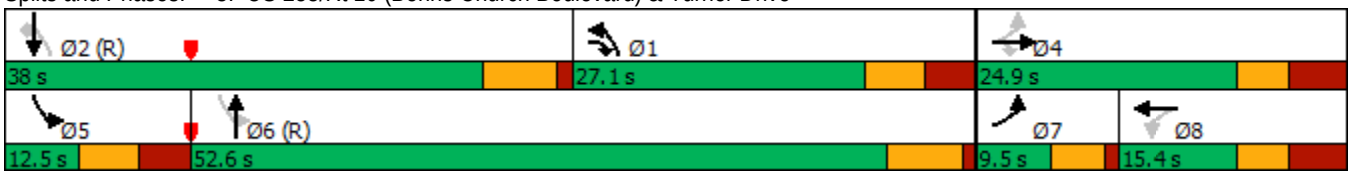
3: US 258/Rt 10 (Benns Church Boulevard) & Turner Drive

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



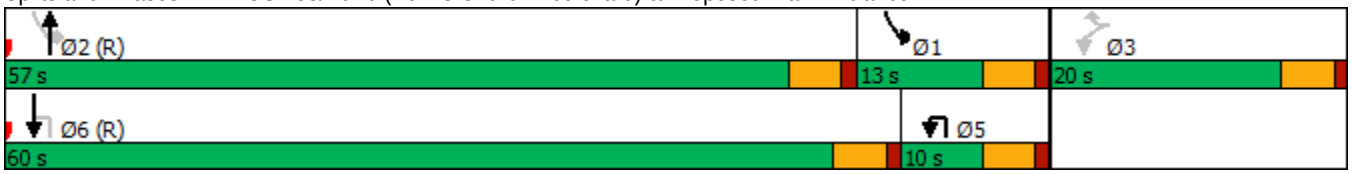


Lane Group	WBL	WBR	NBU	NBT	NBR	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	267	132	16	1026	92	95	1245
Future Volume (vph)	267	132	16	1026	92	95	1245
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	125		300	300	
Storage Lanes	2	1	1		1	1	
Taper Length (ft)	25		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

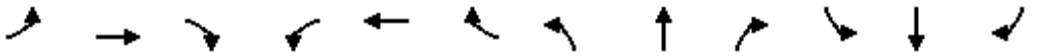
Lane Group	WBL	WBR	NBU	NBT	NBR	SBL	SBT
Queue Length 50th (ft)	80	0	2	155	0	7	54
Queue Length 95th (ft)	115	49	7	261	21	m5	71
Internal Link Dist (ft)	792			616			1073
Turn Bay Length (ft)			125		300	300	
Base Capacity (vph)	608	398	313	2297	1092	428	2533
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback 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)



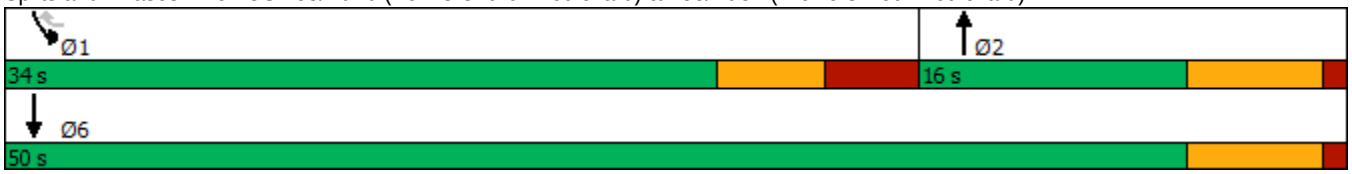
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	810	0	215	0	1192	313	0
Future Volume (vph)	0	0	0	0	0	810	0	215	0	1192	313	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	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	

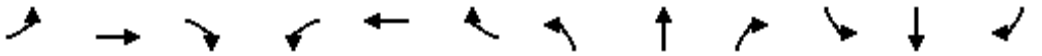
5: US 258/Rt 10 (Benns Church Boulevard) & 258/Rt 32 (Brewers Neck Boulevard)

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	

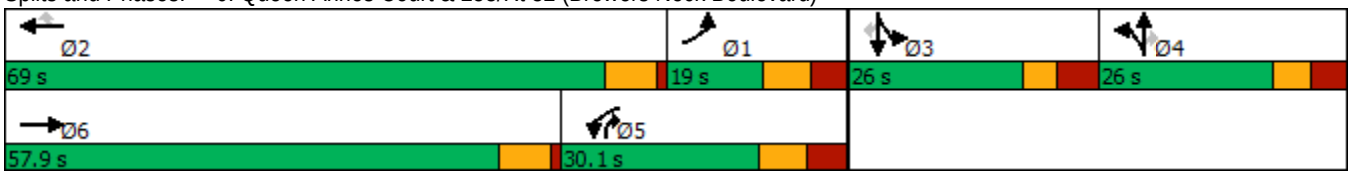
6: Queen Annes Court & 258/Rt 32 (Brewers Neck Boulevard)

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

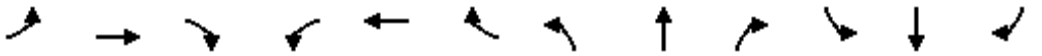
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	0	0	33	0	1101	37	0	1528	0
Future Vol, veh/h	0	0	0	0	0	33	0	1101	37	0	1528	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	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



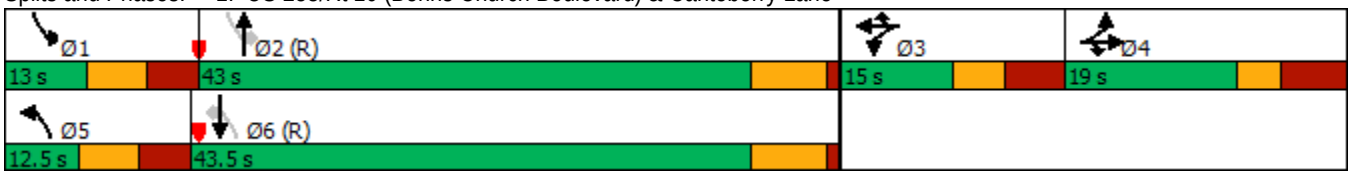
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	143	6	45	87	9	80	52	1312	134	133	1193	99
Future Volume (vph)	143	6	45	87	9	80	52	1312	134	133	1193	99
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage 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



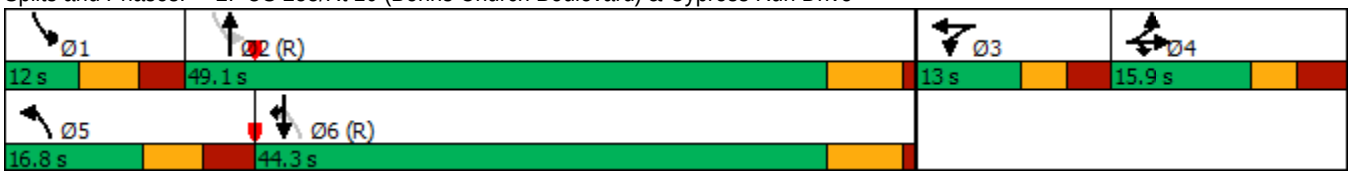
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	116	0	83	0	0	1	172	1381	0	0	1188	134
Future Volume (vph)	116	0	83	0	0	1	172	1381	0	0	1188	134
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	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

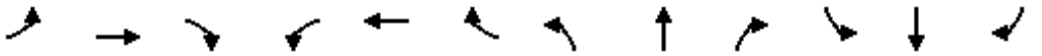
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn		0	0		0		0	0			0	0
Spillback Cap Reductn		0	0		0		0	0			0	0
Storage Cap Reductn		0	0		0		0	0			0	0
Reduced v/c Ratio		0.68	0.26		0.00		0.62	0.58			0.66	0.15

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



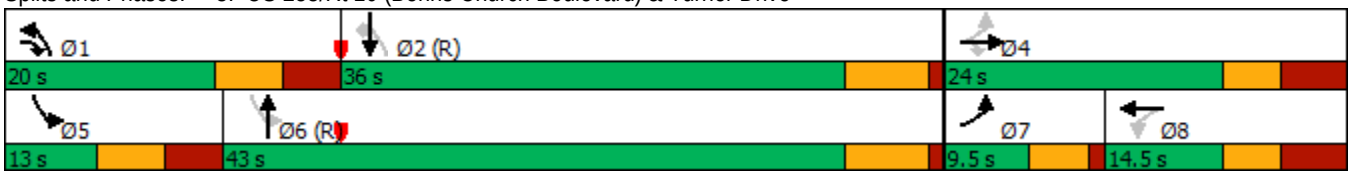


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	86	0	122	0	1	2	203	1453	1	33	1154	126
Future Volume (vph)	86	0	122	0	1	2	203	1453	1	33	1154	126
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (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



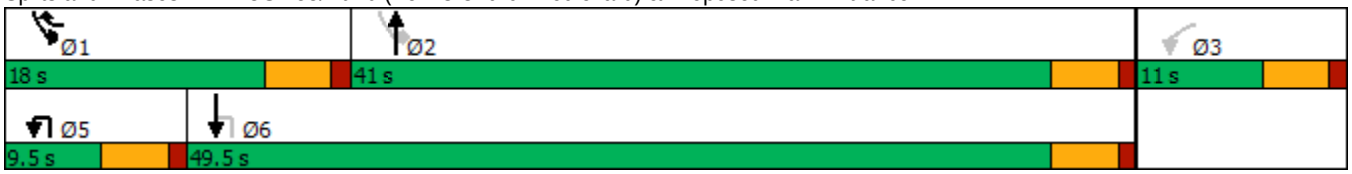
Lane Group	WBL	WBR	NBU	NBT	NBR	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	227	145	13	1503	208	231	1033
Future Volume (vph)	227	145	13	1503	208	231	1033
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	125		300	300	
Storage Lanes	2	1	1		1	1	
Taper Length (ft)	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

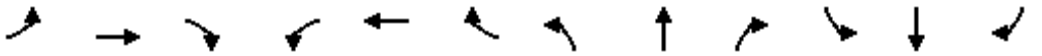
Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 65.1			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.87			
Intersection Signal Delay: 15.1		Intersection LOS: B	
Intersection Capacity Utilization 72.1%		ICU Level of Service C	
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)

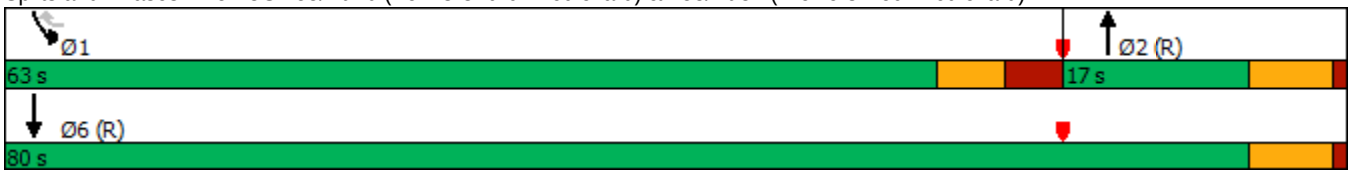


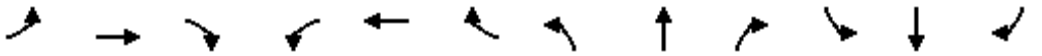
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	1562	0	249	0	876	360	0
Future Volume (vph)	0	0	0	0	0	1562	0	249	0	876	360	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	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)





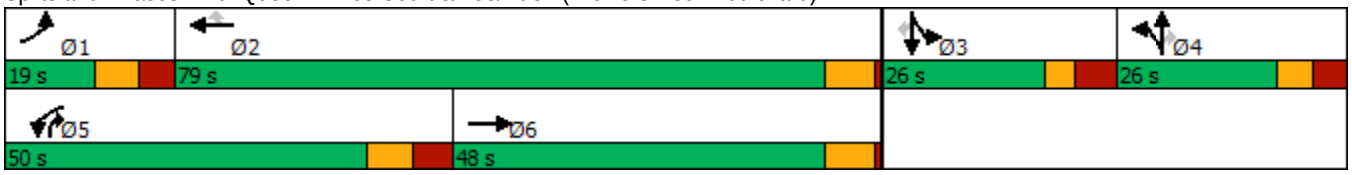
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	919	3	471	1530	14	1	3	250	2	5	7
Future Volume (vph)	9	919	3	471	1530	14	1	3	250	2	5	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		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

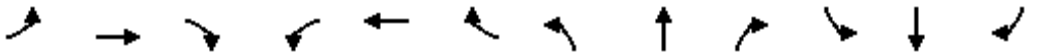
Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	-	-	919	-	0	0	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.94	-	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.32	-	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	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

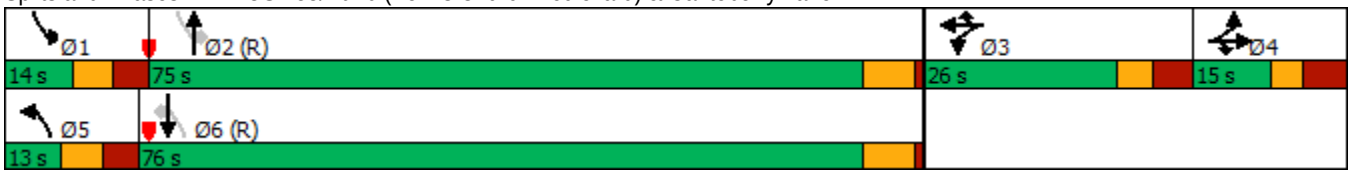


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	28	1	21	117	5	47	16	943	76	60	1309	39
Future Volume (vph)	28	1	21	117	5	47	16	943	76	60	1309	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (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



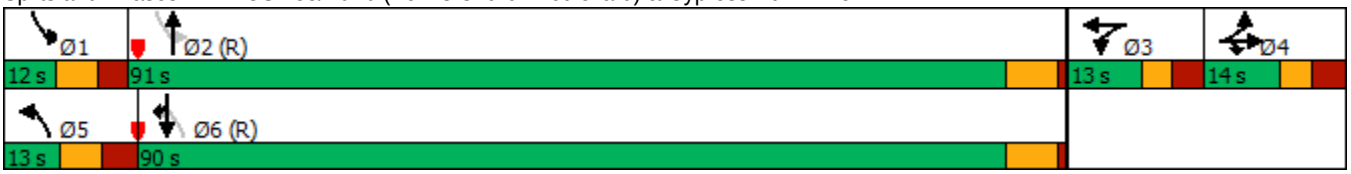
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	0	22	0	0	0	33	871	0	2	1591	34
Future Volume (vph)	5	0	22	0	0	0	33	871	0	2	1591	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		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

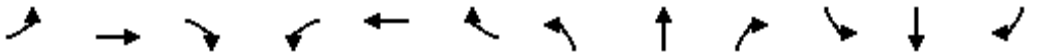
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn		0	0				0	0		0	42	0
Spillback Cap Reductn		0	0				0	0		0	0	0
Storage Cap Reductn		0	0				0	0		0	0	0
Reduced v/c Ratio		0.05	0.11				0.15	0.30		0.00	0.59	0.03

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





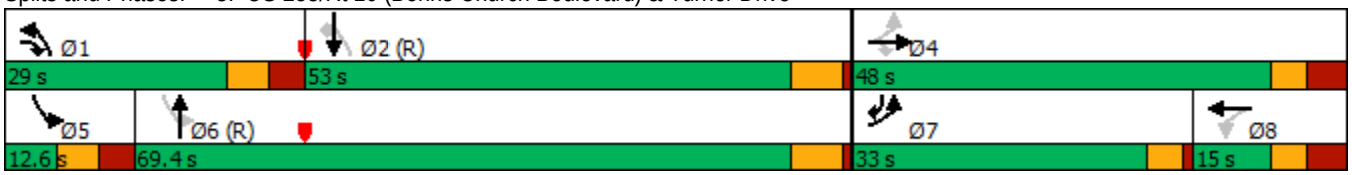
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	211	1	329	1	79	1	299	784	76	7	1081	355
Future Volume (vph)	211	1	329	1	79	1	299	784	76	7	1081	355
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (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



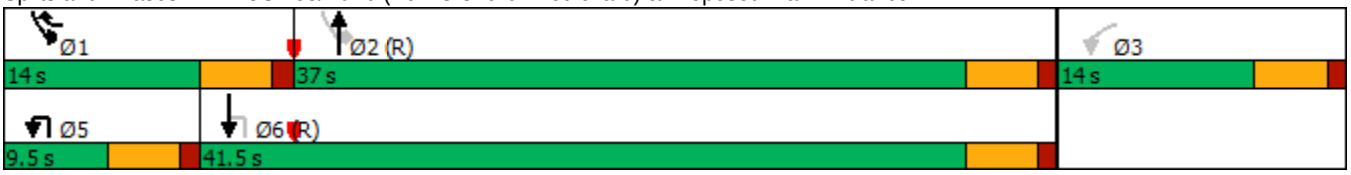
Lane Group	WBL	WBR	NBU	NBT	NBR	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	267	132	16	1122	92	95	1364
Future Volume (vph)	267	132	16	1122	92	95	1364
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	125		300	300	
Storage Lanes	2	1	1		1	1	
Taper Length (ft)	0		0			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

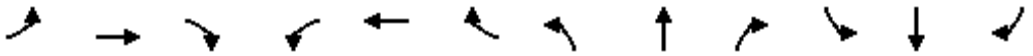
Lane Group	WBL	WBR	NBU	NBT	NBR	SBL	SBT
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.40	0.06	0.61	0.10	0.24	0.61

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



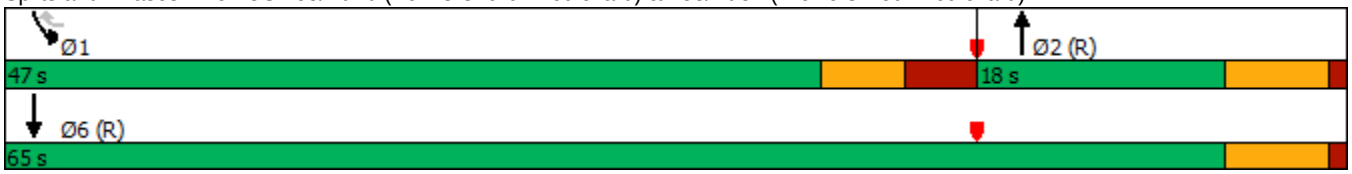


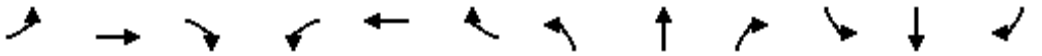
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	879	0	233	0	1287	336	0
Future Volume (vph)	0	0	0	0	0	879	0	233	0	1287	336	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	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

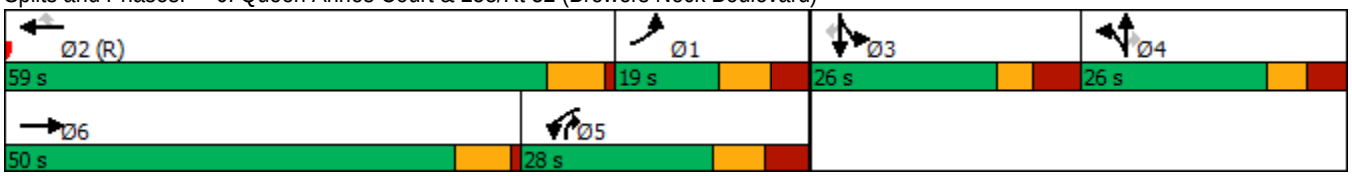
Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 130			
Offset: 20 (15%), Referenced to phase 2:WBT, Start of Green			
Natural Cycle: 150			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.14			
Intersection Signal Delay: 21.1		Intersection LOS: C	
Intersection 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.

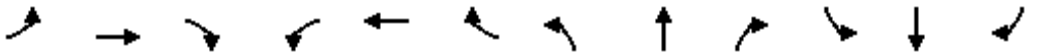
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Queen Annes Court & 258/Rt 32 (Brewers Neck Boulevard)



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	

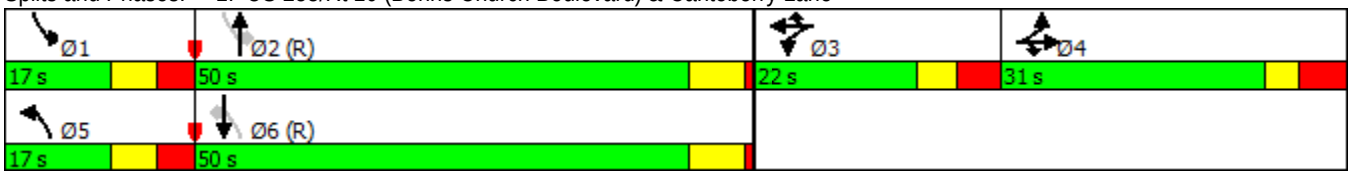
1: US 258/Rt 10 (Benns Church Boulevard) & Canteberry Lane

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

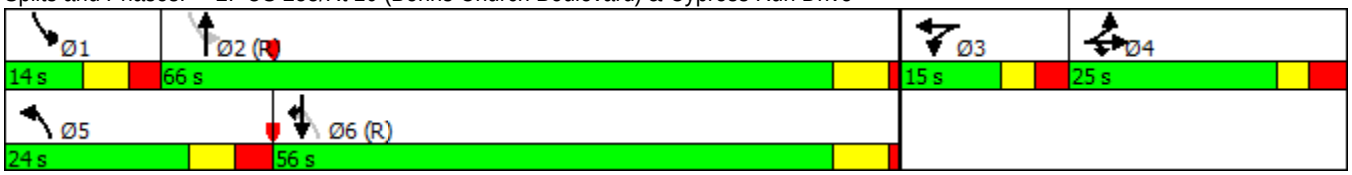
2: US 258/Rt 10 (Benns Church Boulevard) & Cypress Run Drive

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	

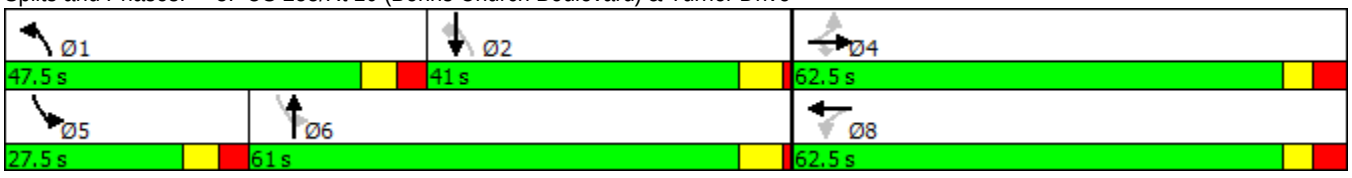
3: US 258/Rt 10 (Benns Church Boulevard) & Turner Drive

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



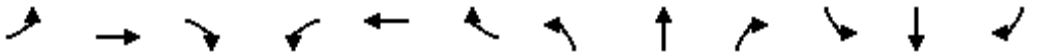
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	5	0	1652	0	0	0
Future Volume (vph)	0	0	0	0	0	0	5	0	1652	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0		125		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

5: US 258/Rt 10 (Benns Church Boulevard) & 258/Rt 32 (Brewers Neck Boulevard)



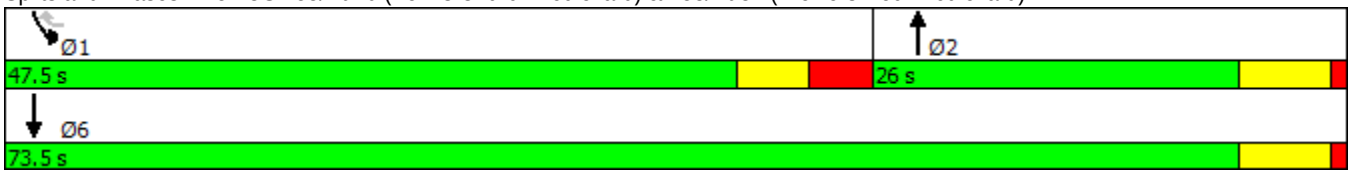
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	1421	0	246	0	797	340	0
Future Volume (vph)	0	0	0	0	0	1421	0	246	0	797	340	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	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	

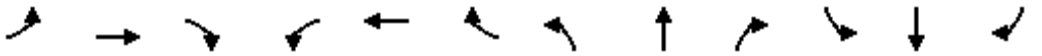
5: US 258/Rt 10 (Benns Church Boulevard) & 258/Rt 32 (Brewers Neck Boulevard)

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	

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 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.

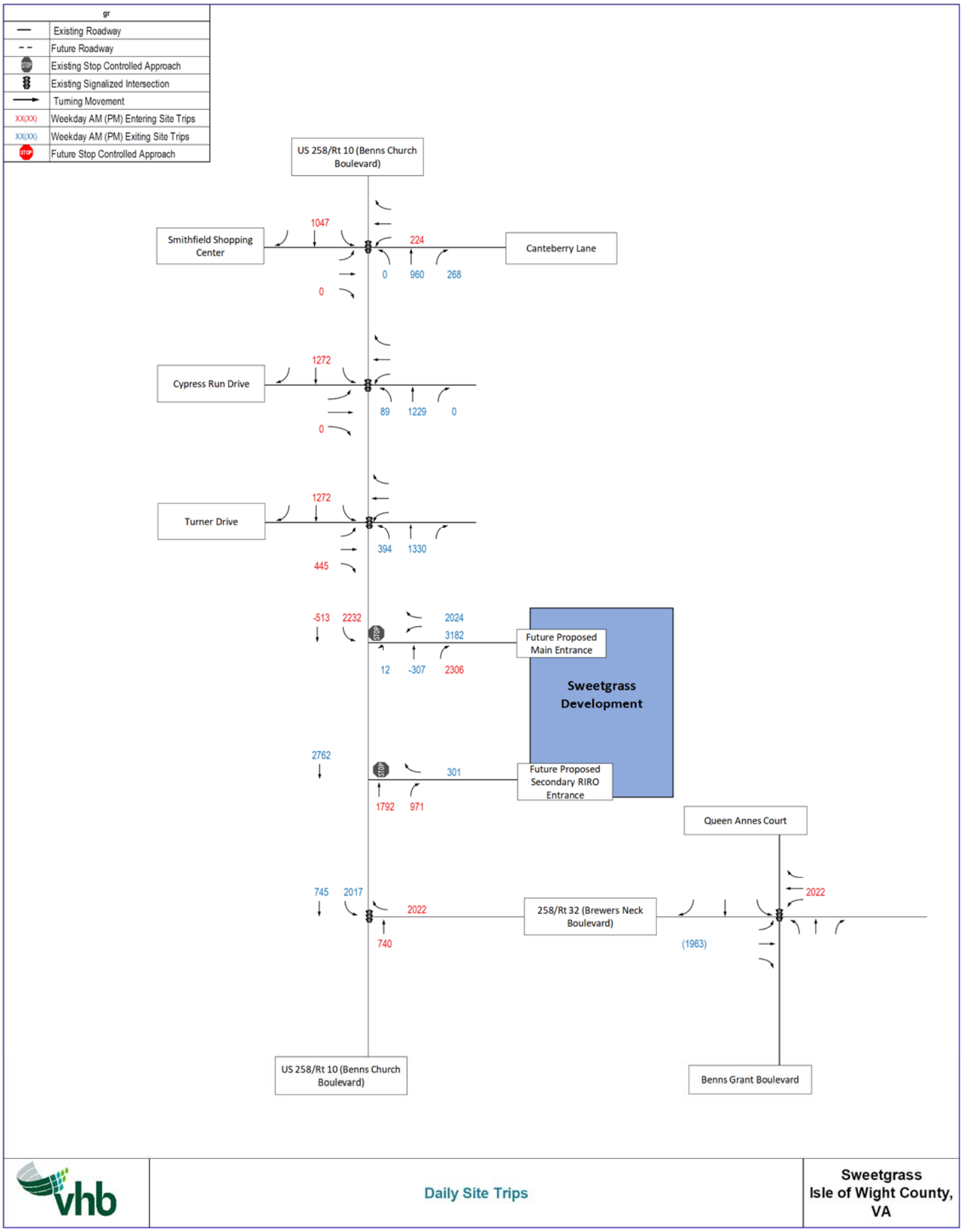
Trip generation for the site was prepared for each individual land use. ITE provides information for single-family detached housing (Land Use 210), low-rise multi-family housing (Land Use 220), public park (Land Use 411), shopping center (Land Use Code 820) and fast food with drive-through (Land Use 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
Fast Food with Drive-Thru	934	5	1000 Sq. Ft. GLA	1177	1,178	2,355
Subtotal				**5,509**	**5,508**	**11,017**
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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

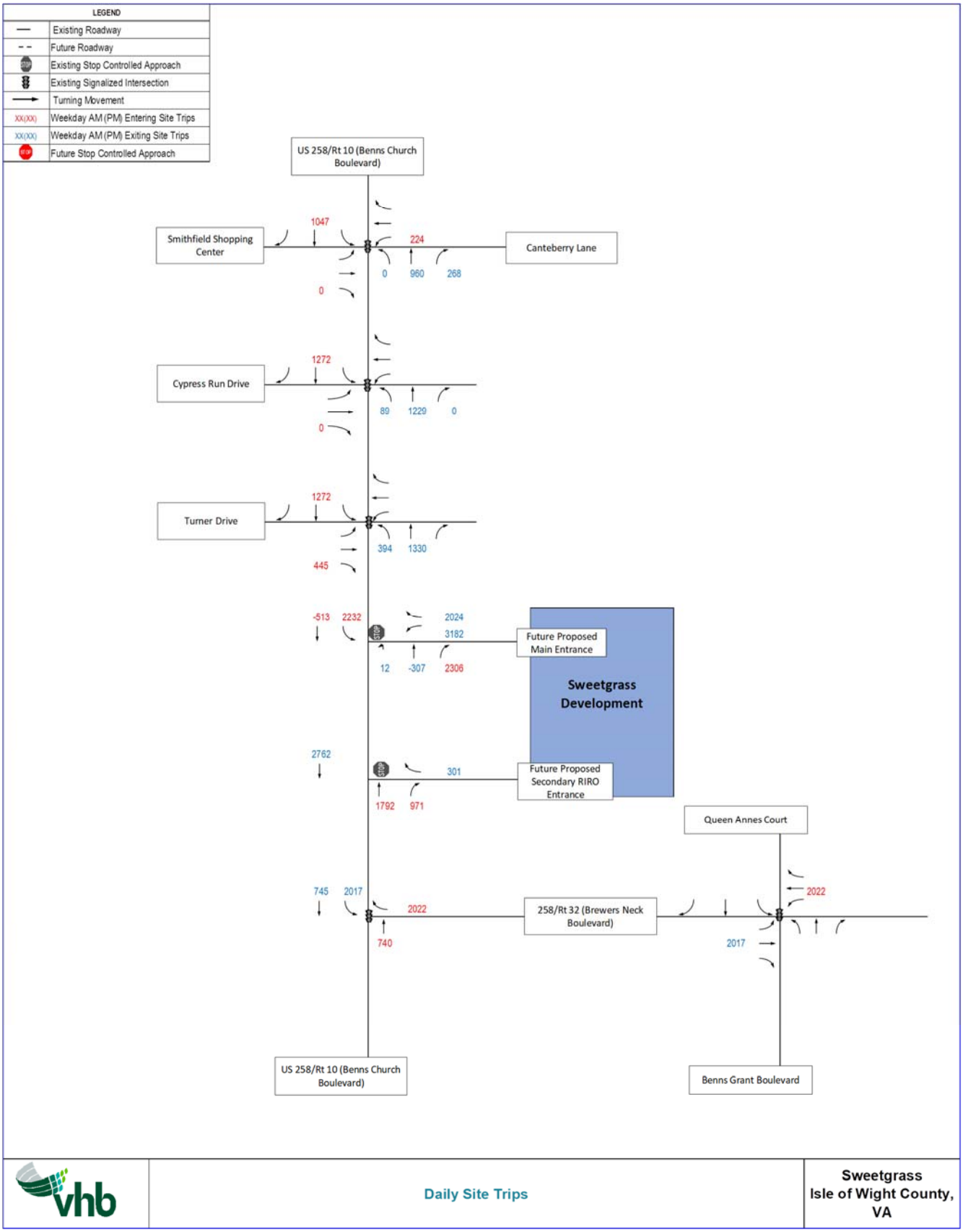

LEGEND
Existing Roadway
Future Roadway
Existing Stop Controlled Approach
Existing Signalized Intersection
Turning Movement
XX(XX) Weekday AM (PM) Entering Site Trips
XX(XX) Weekday AM (PM) Exiting Site Trips
Future Stop Controlled Approach
US 258/Rt 10 (Benns Church Boulevard)
Smithfield Shopping Center
Canteberry Lane
1047
224
0
960
268
0
Cypress Run Drive
1272
89
1229
0
0
Turner Drive
1272
394
1330
445
-513
2232
2024
3182
12
-307
2306
Future Proposed Main Entrance
Sweetgrass Development
2762
301
1792
971
Future Proposed Secondary RIRO Entrance
Queen Annes Court
745
2017
2022
2022
740
258/Rt 32 (Brewers Neck Boulevard)
2022
2017
US 258/Rt 10 (Benns Church Boulevard)
Benns Grant Boulevard
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.

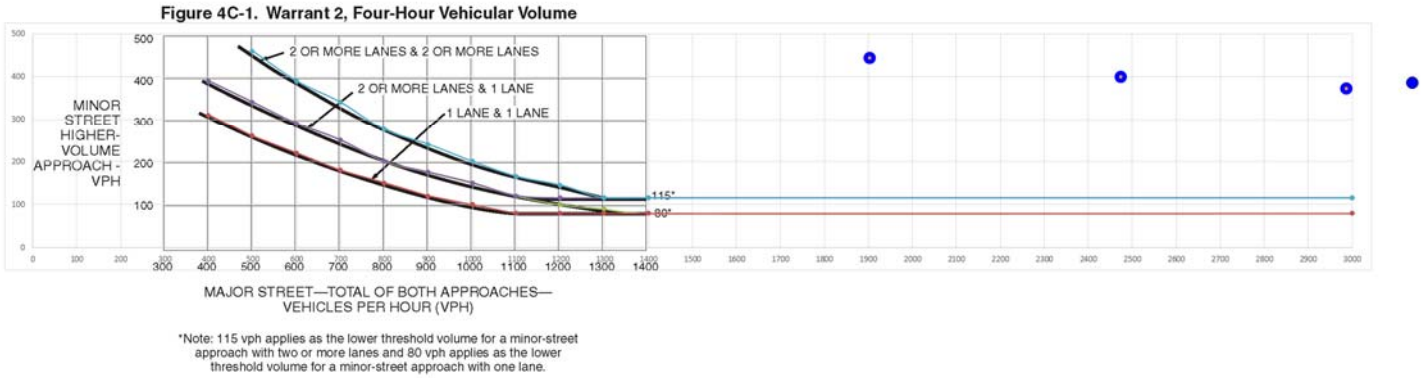
Warrant 2 – Four Hour Vehicular Volume

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	2988	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:

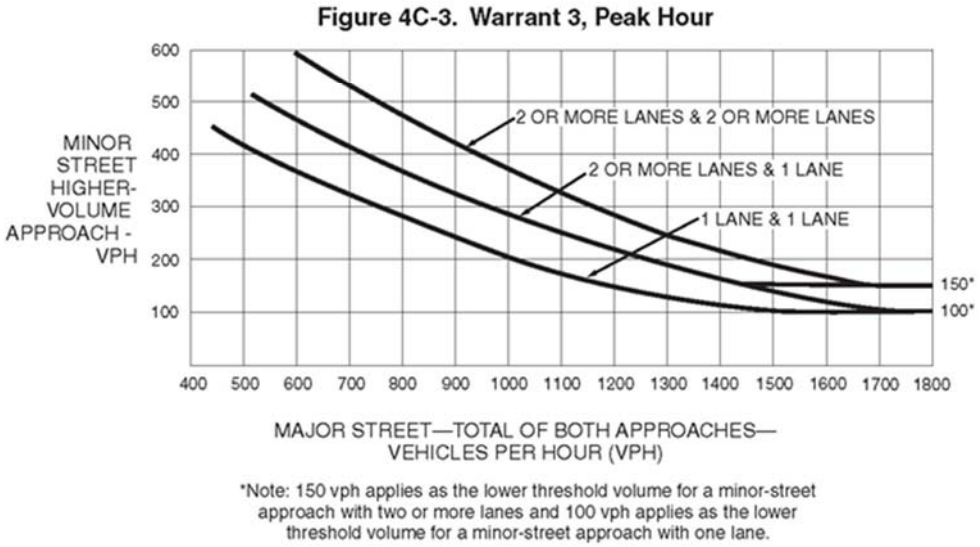
a) The total stopped time delay experienced by the traffic on one minor-street approach controlled by a stop sign equals or exceeds: 4 vehicle-hours for a one-lane approach; or 5 vehicle-hours for a two-lane approach, and

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	2988	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.

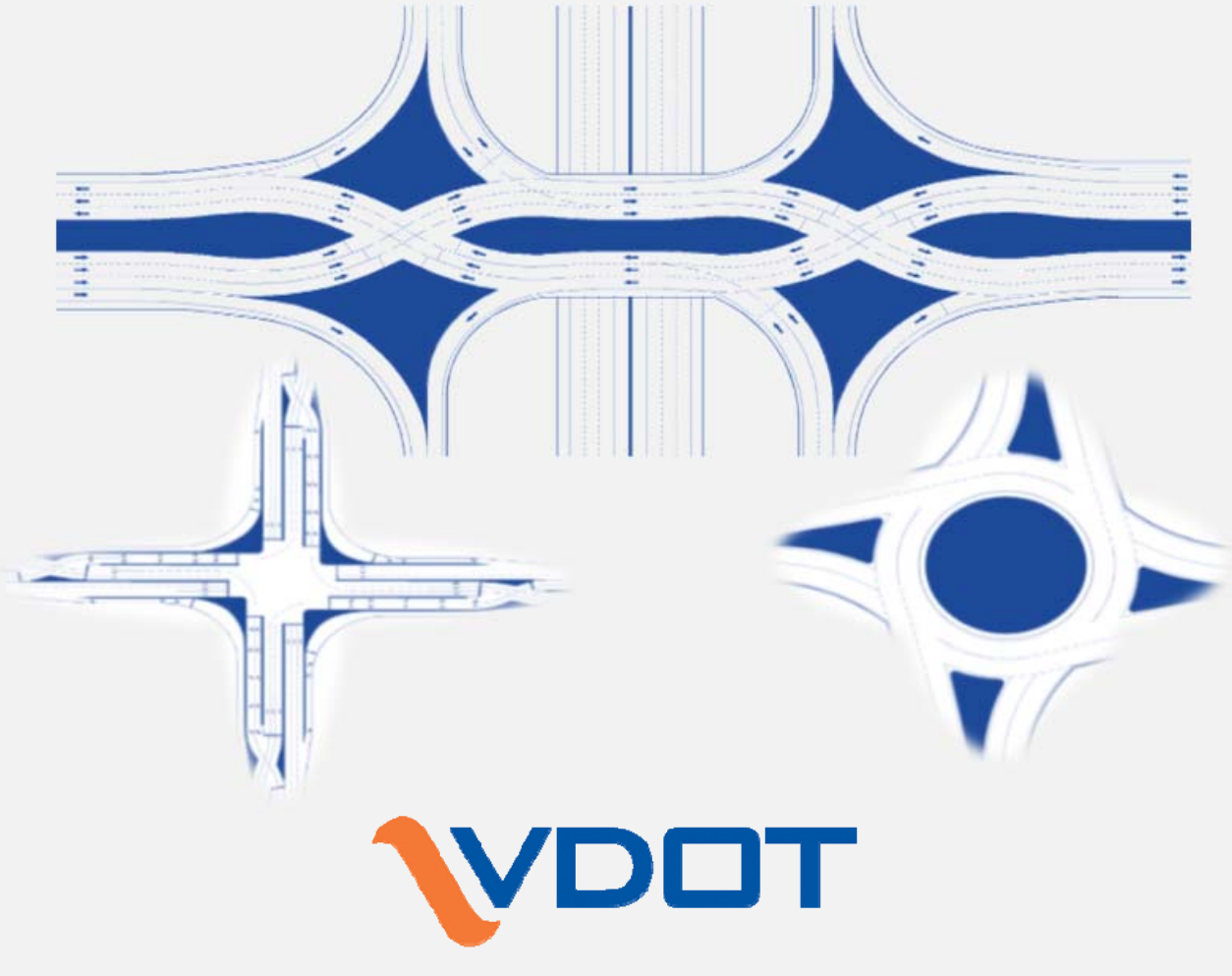
Appendix B:
VJuST Input and Results Worksheets

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

The VDOT Junction Screening Tool ("VJuST") is offered to Users strictly for informational and educational purposes. VJuST is provided as-is, without warranty of any kind, express or implied. VDOT and the Commonwealth assume no liability or responsibility for VJuST's content or any Users' use of VJuST's content. VDOT and the Commonwealth do not endorse any course of action or recommendations adopted by Users as a result of using VJuST. By using VJuST, Users covenant not to sue VDOT or the Commonwealth for any effects arising out of or related to Users' use of VJuST. Users agree to hold VDOT and the Commonwealth harmless from any resulting liability from Users' use of VJuST. Users are strictly prohibited from altering, distributing, selling, or marketing VJuST.

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

The Capacity Analysis for Planning of Junctions (CAP-X) software product is disseminated under the sponsorship of the US Department of Transportation in the interest of information exchange. The United States Government assumes no liability for its content or use thereof. This software product does not constitute a standard, specification, or regulation.

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

The use and testing of the CAP-X software is being done strictly on a voluntary basis. In exchange for the provision of CAP-X software, the user agrees that the Federal Highway Administration, U.S. Department of Transportation, any other agency of the Federal Government or distributor shall not be responsible for any errors, damage or other liability that may result from any and all use of the software, including installation and testing of the software. The user further agrees to hold the FHWA, the Federal Government, and distributor harmless from any resulting liability. The user agrees that this hold harmless provision shall flow to any person to whom or any entity to which the user provides the CAP-X software. It is the user's full responsibility to inform any person to whom or any entity to which it provides the CAP-X software of this hold harmless provision.

DISCLAIMER & ACKNOWLEDGMENTS

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CONSULTANT TEAM (KIMLEY-HORN)

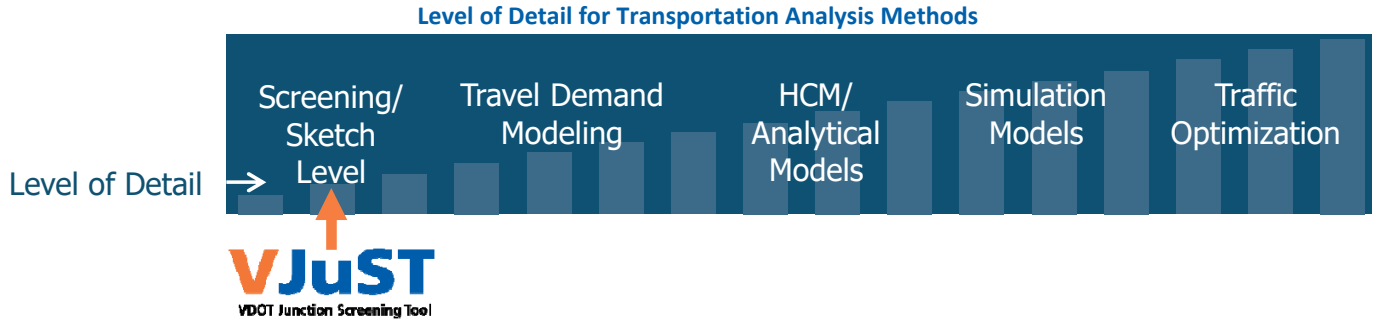
Tim White - Consultant Project Manager
Amanda Harmon
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VJuST
VDOT Junction Screening Tool

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

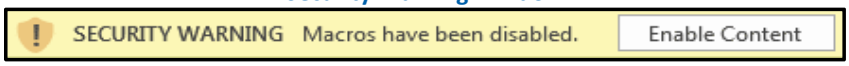
CAP-X	Capacity Analysis of Junctions
CLV	Critical Lane Volume
CGT	Continuous Green-T
DDI	Diverging Diamond Interchange
DLT	Displaced Left Turn
EB	Eastbound
E-W	East-West
FHWA	Federal Highway Administration
HCM	Highway Capacity Manual
Hr	Hour
ICD	Inscribed Circle Diameter
LTAF	Left-Turn Adjustment Factor
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

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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		

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INSTRUCTIONS

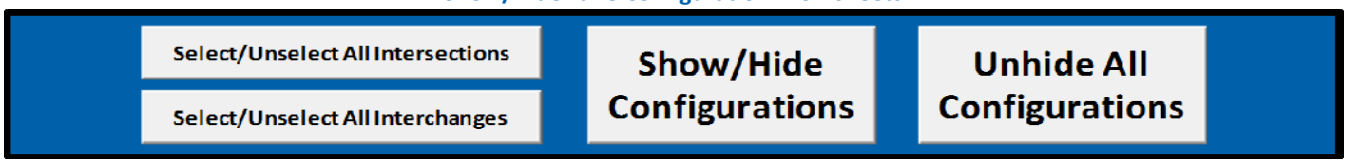
This tool uses adjustment factors to convert turning vehicles to equivalent through vehicles before calculating the CLV. Suggested values for these factors are provided in the tool; however, these values may be changed based on the typical traffic mix, driver behavior, and project location. Input the 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.	

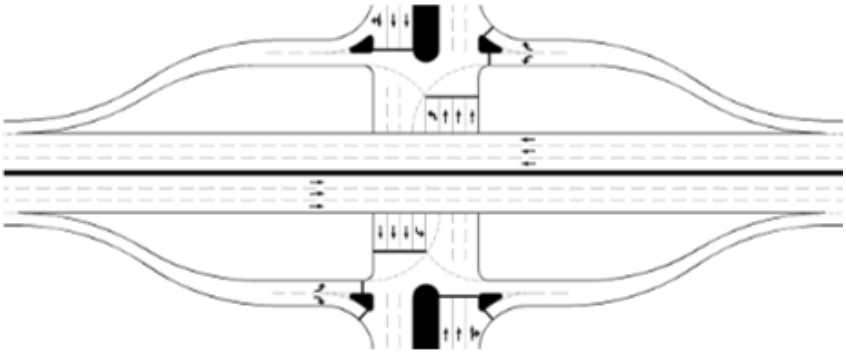
Directional Questions and Options:

- [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

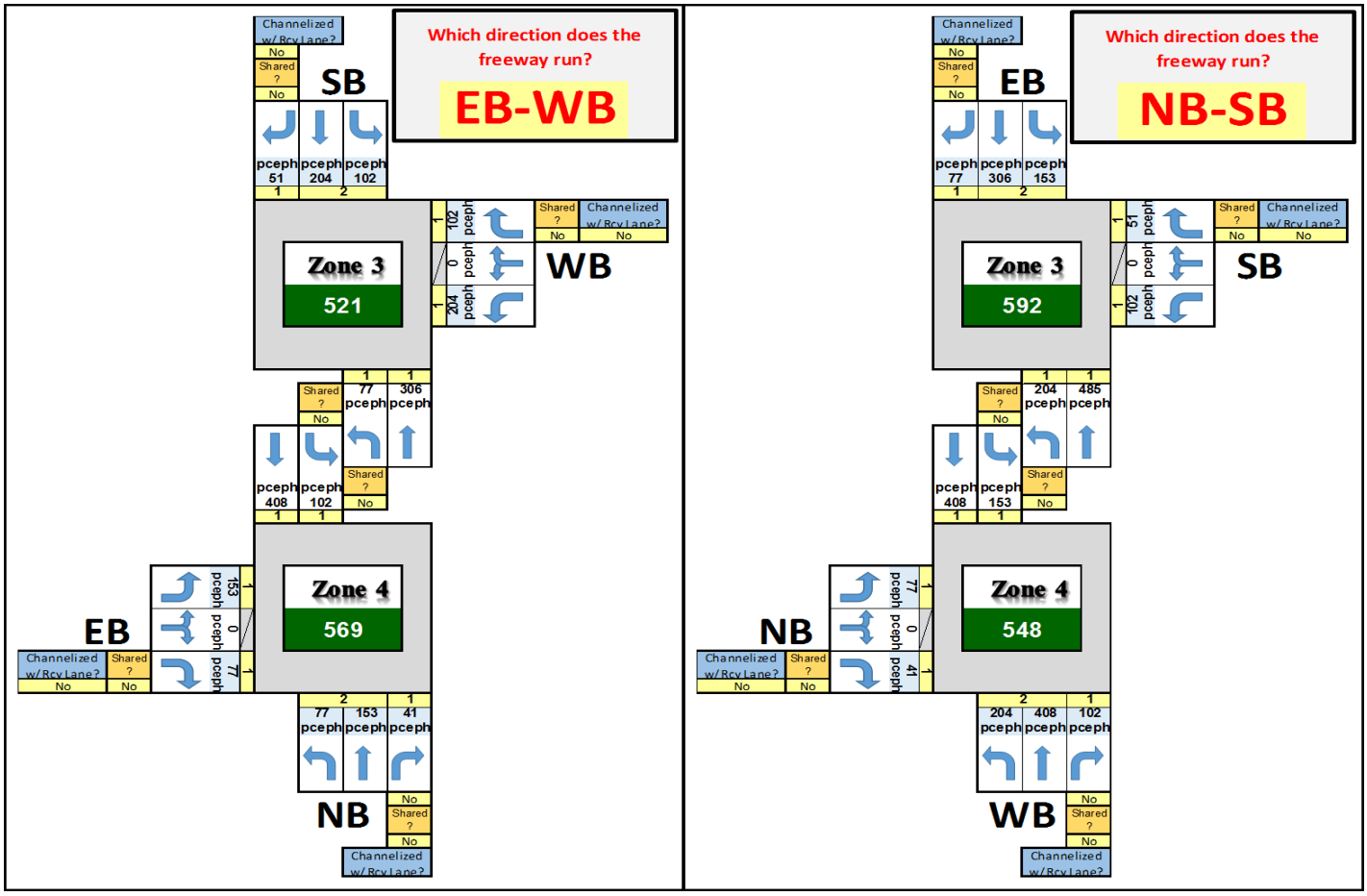
INSTRUCTIONS

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

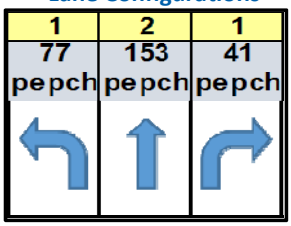
After answering the directional question for all applicable intersection and interchange configurations, enter a base number of through lanes for each travel direction on the **Input Worksheet** as pictured below. The number of through lanes entered here will be applied to each lane configuration worksheet. 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.

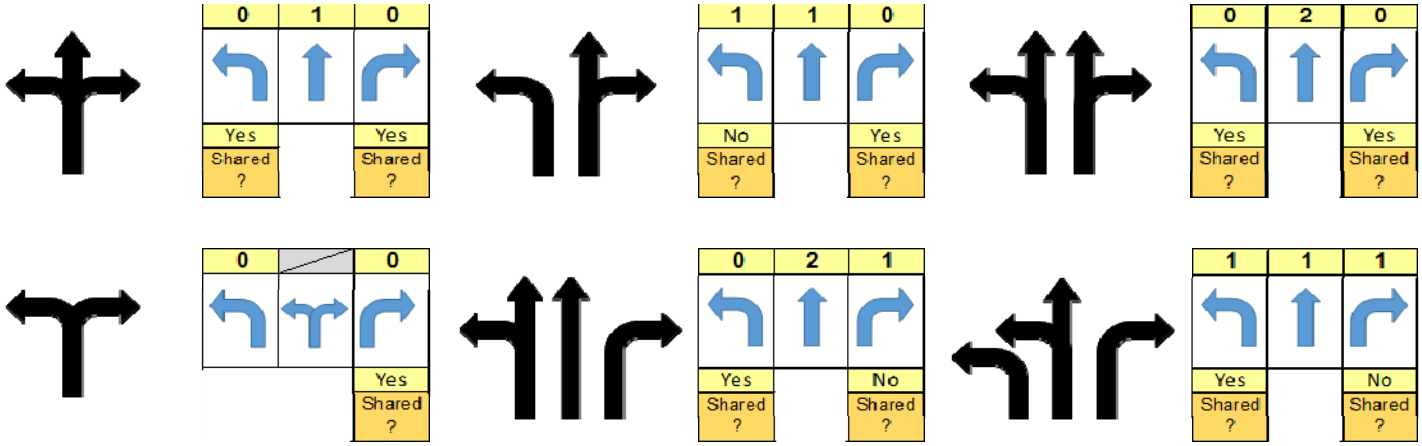
Lane Configurations



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.

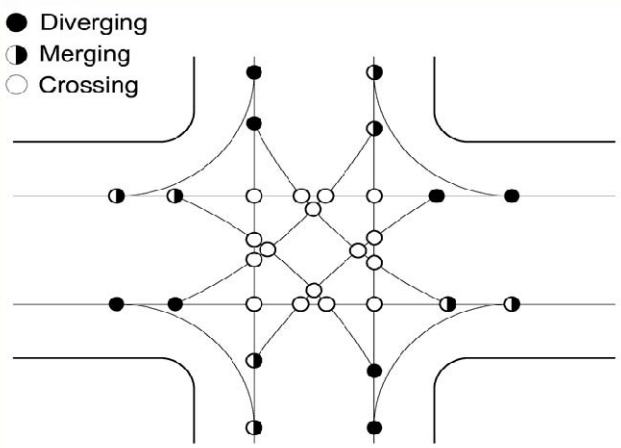
PART 1: CONFLICT POINT DIAGRAM METHODOLOGY

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*

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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

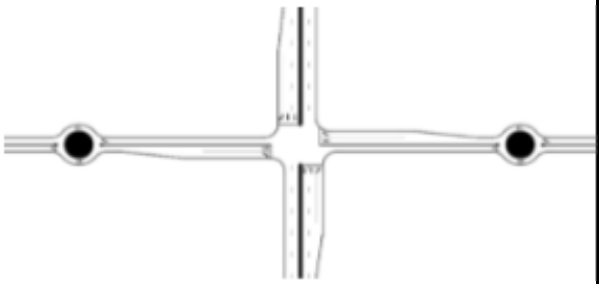
Conflict Point Type	Assigned Weight
Crossing	2
Merging	1
Diverging	1

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DESIGN CONSIDERATIONS

Intersection Designs

Bowtie



Back to Inputs

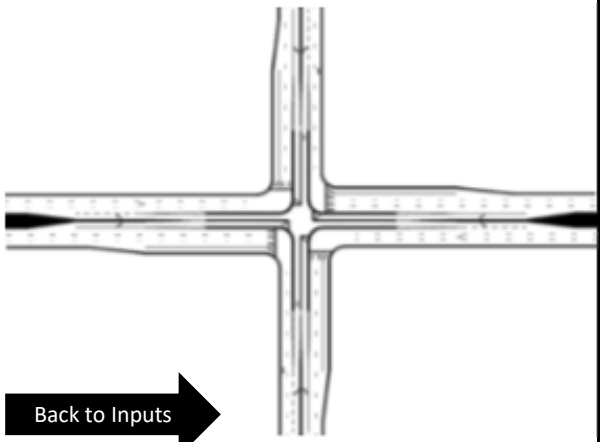
Description

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

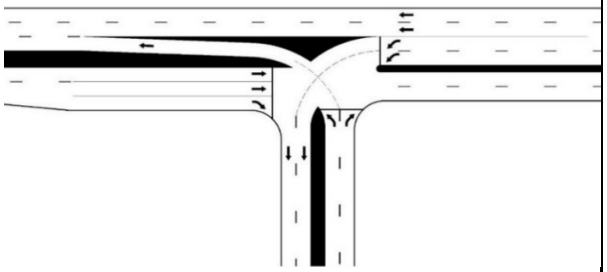
Description

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?

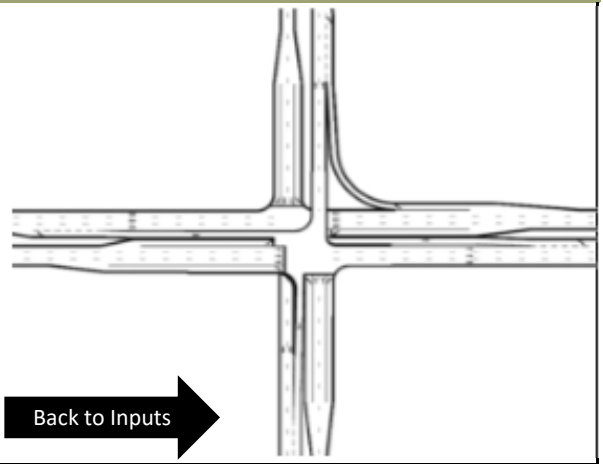
The continuous green-T intersection should be considered at three-leg intersections with moderate to low left-turn volumes on the minor roadway, high through volumes on the major roadway, and few pedestrian crossings.

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DESIGN CONSIDERATIONS

Intersection Designs

Echelon



Back to Inputs

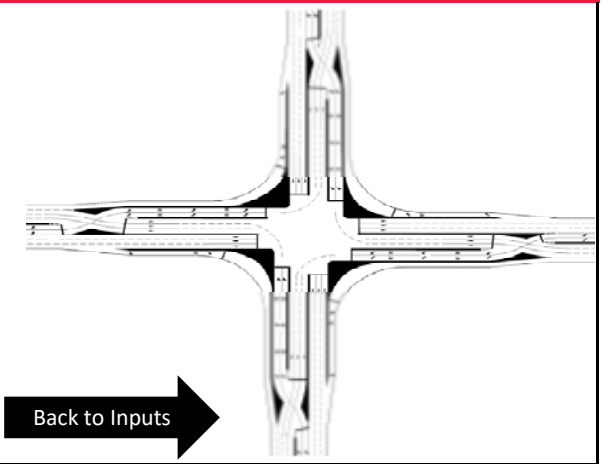
Description

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

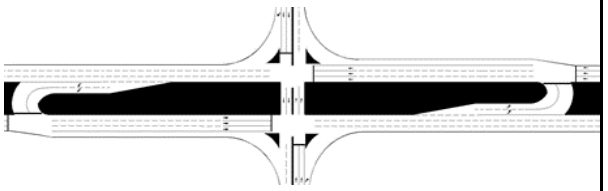
Description

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?

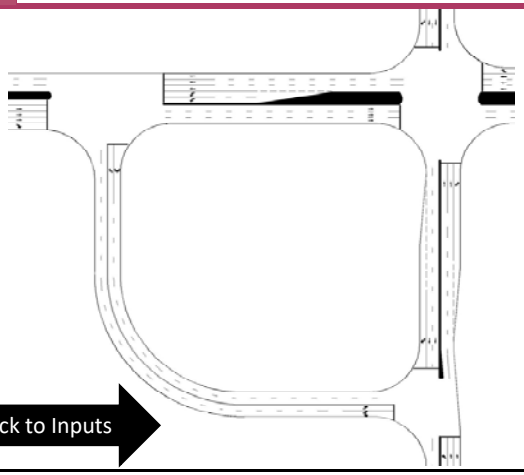
The median U-turn intersection should be considered on high-speed, median-divided highways with moderate left-turn volumes on the major roadway and minor left-turn volumes on the minor roadway.

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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

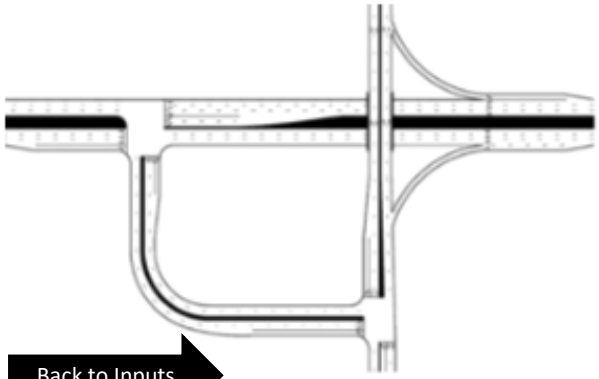
Description

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?

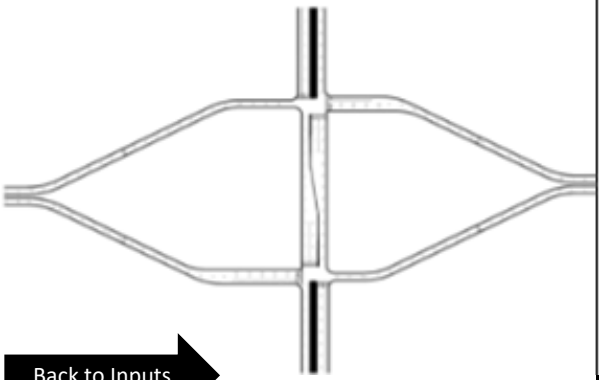
The single loop intersection should be considered for roadways with low to medium left-turn volumes.

VJuST
VDOT Junction Screening Tool

DESIGN CONSIDERATIONS

Intersection Designs

Split Intersection



Back to Inputs

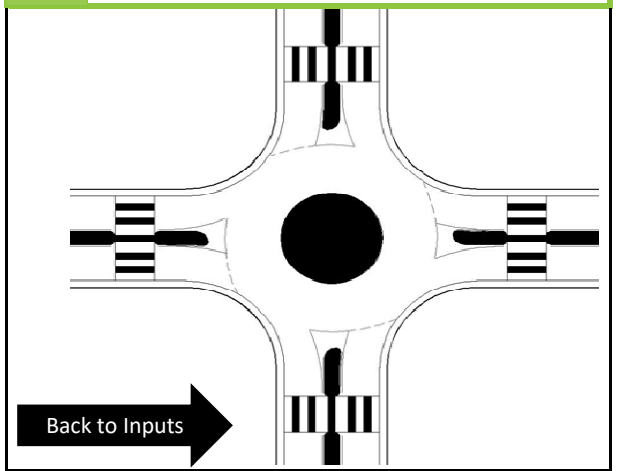
Description

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

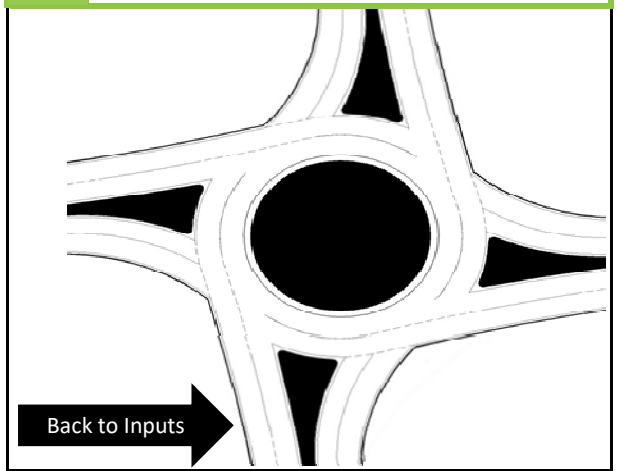
Description

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?

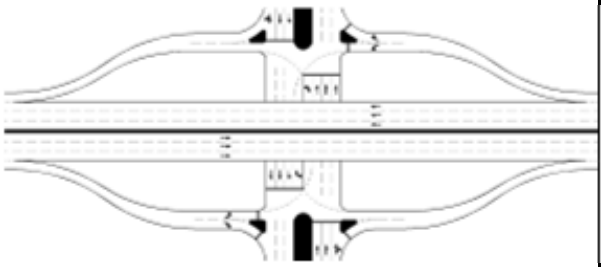
The roundabout should be considered on roadways with a high percentage of turning traffic. Additional information about when roundabouts should be considered may be found on VDOT's website.

VJuST
VDOT Junction Screening Tool

DESIGN CONSIDERATIONS

Interchange Designs

Traditional Diamond (TD)



Back to Inputs

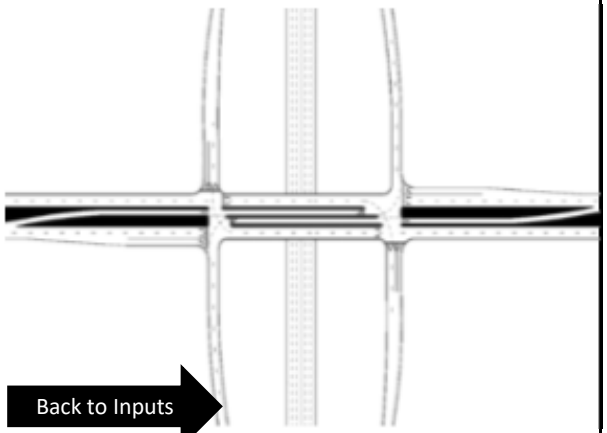
Description

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

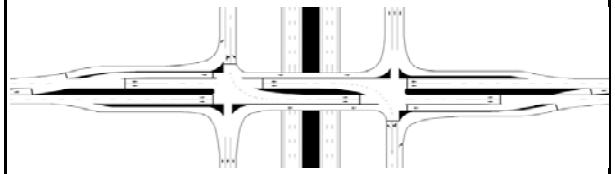
Description

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?

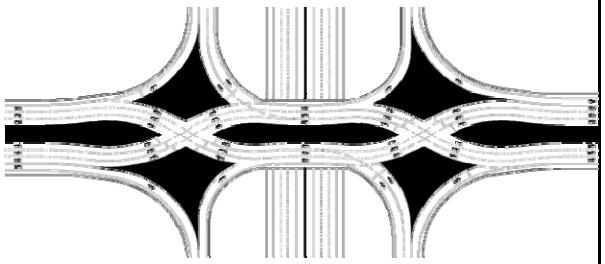
The displaced left turn intersection should be considered if there are high and balanced through volumes on the arterial, moderate to high left-turn volumes to the on-ramps, and low to moderate left-turn volumes from the off-ramps.

VJuST
VDOT Junction Screening Tool

DESIGN CONSIDERATIONS

Interchange Designs

Diverging Diamond (DDI)



Back to Inputs

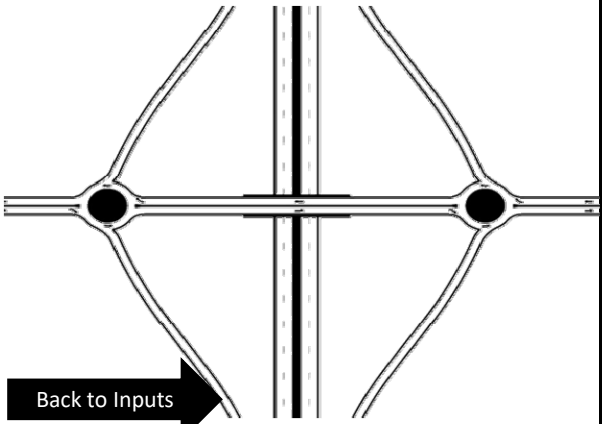
Description

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

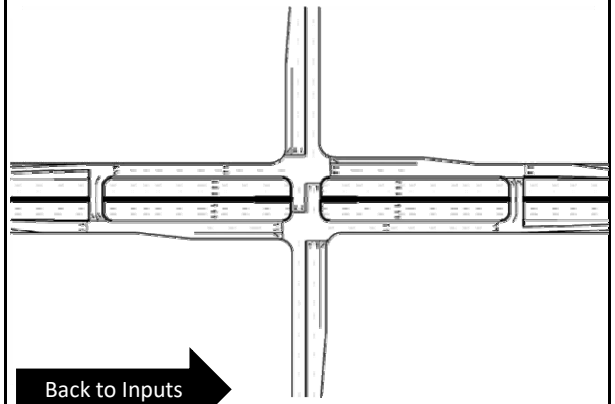
Description

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?

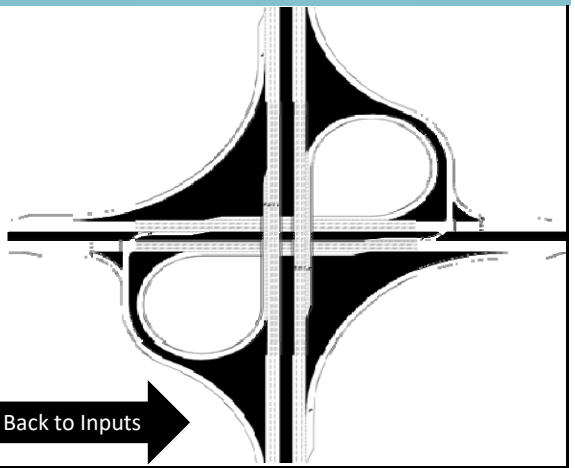
The Michigan urban diamond interchange should be considered for arterials with high through volumes and moderate to low left-turn volumes.

VJuST
VDOT Junction Screening Tool

DESIGN CONSIDERATIONS

Interchange Designs

Partial Cloverleaf (PCL or Parclo)



Back to Inputs

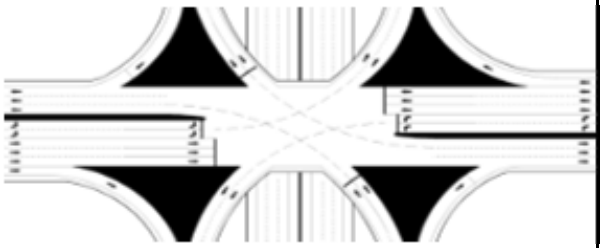
Description

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

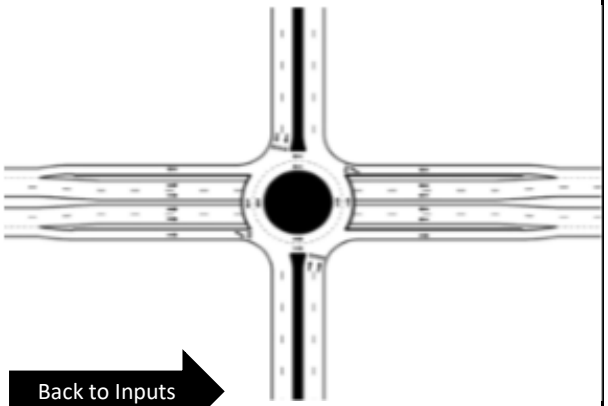
Description

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)				Truck Percent (%)
	U-Turn / Left		Through	Right	
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					
		Congestion	Pedestrian	Safety	Notes
Type	Dir	Maximum V/C	Accommodation Compared to Traditional Diamond	Weighted Total Conflict Points	
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	

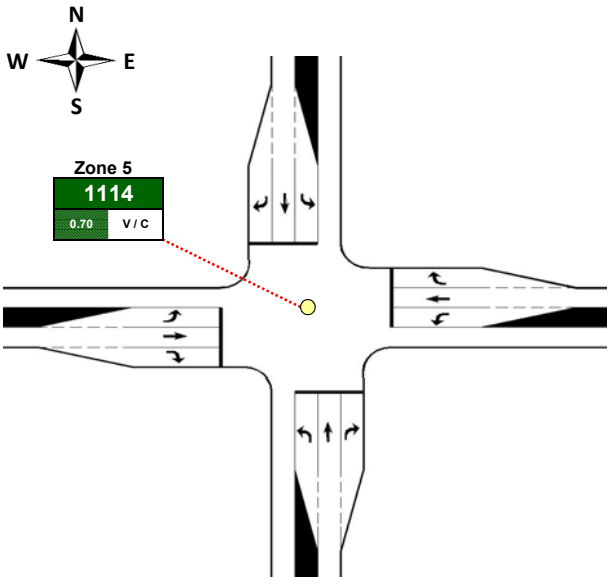
Information	
Congestion	The maximum v/c ratio represents the worst v/c of all zones that make up an intersection.
Pedestrian	Compares the potential of each design to accommodate pedestrians based on safety, wayfinding, and delay. Potential is qualitatively defined as better (+), similar (blank cell), 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

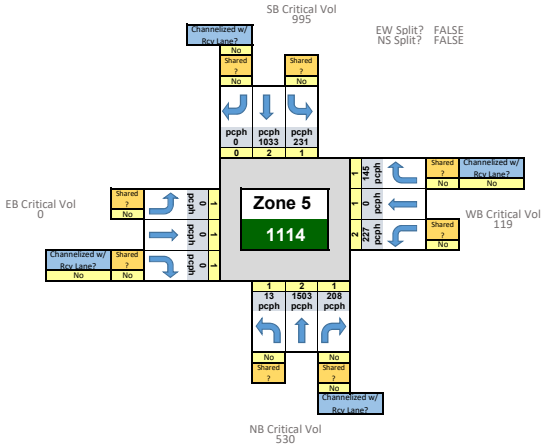


Note: This diagram does not reflect the actual lane configuration of the intersection

Conventional

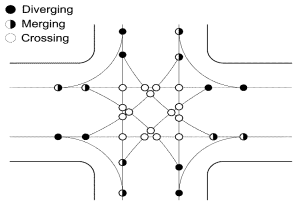
DATA INPUT AND CONFIGURATION

Enter the lane configurations in the yellow cells.



Back to Results

Safety - Conflict Point Diagram



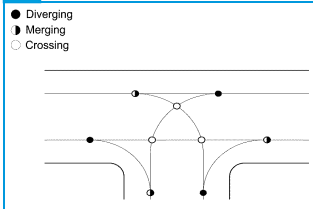
Conflict Type	Count
Crossing	16
Merging	8
Diverging	8
Total	**32**

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

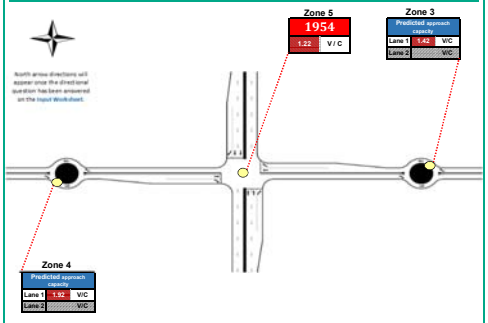
12

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

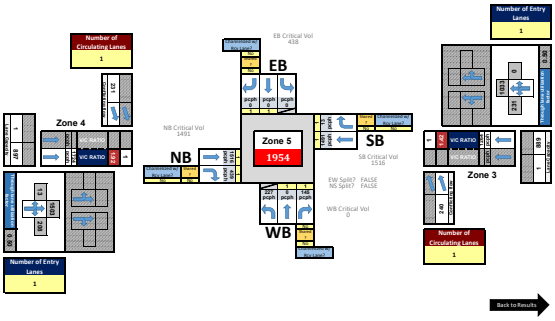


Note: This diagram does not reflect the actual lane configuration of the intersection

Bowtie Intersection

DATA INPUT AND CONFIGURATION

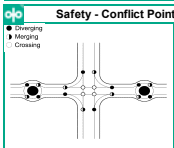
Enter the lane configurations in the yellow cells.



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

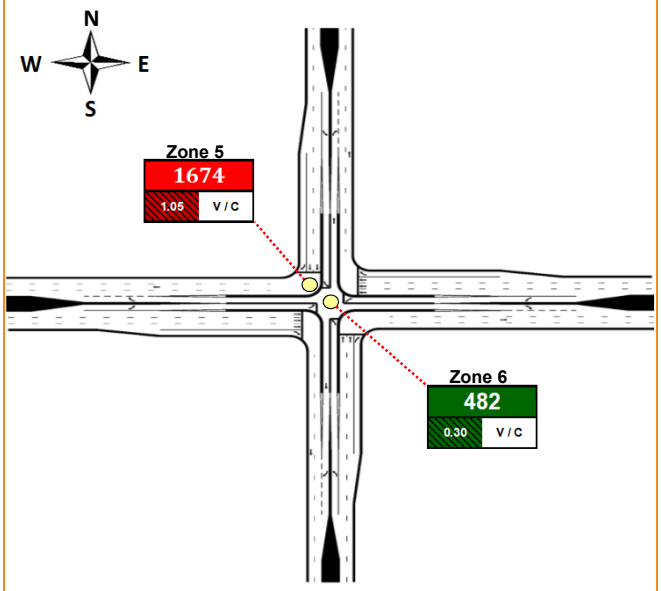
- The roundabouts have only two approaches and exits.
- Since U-turns are not considered, the CUV analysis considers only one location with conflicting volumes for each roundabout.
- The conflict point diagrams include conflict points created by U-turn movements.

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

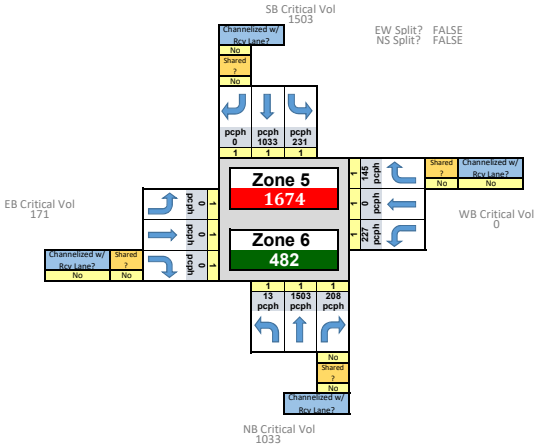


Note: This diagram does not reflect the actual lane configuration of the intersection

Center Turn Overpass Intersection

DATA INPUT AND CONFIGURATION

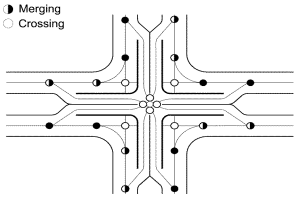
Step 1: Enter the lane configurations in the yellow cells.



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

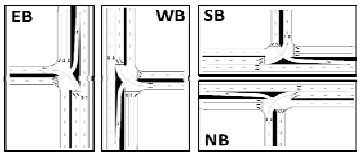
DESIGN AND RESULTS

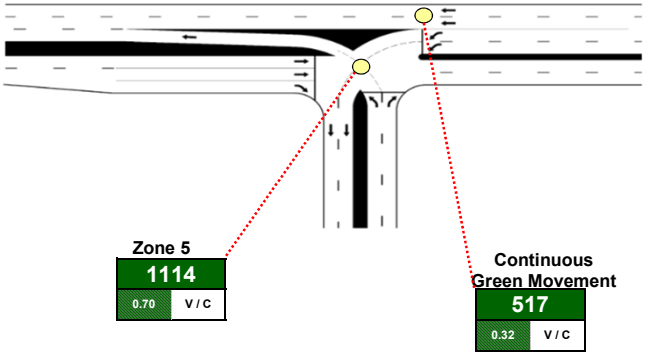
Project Name:	Sweetgrasss
EW Facility:	Primary Entrancd
NS Facility:	Benn's Church Boulevard
Date:	December 17, 2019

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**.



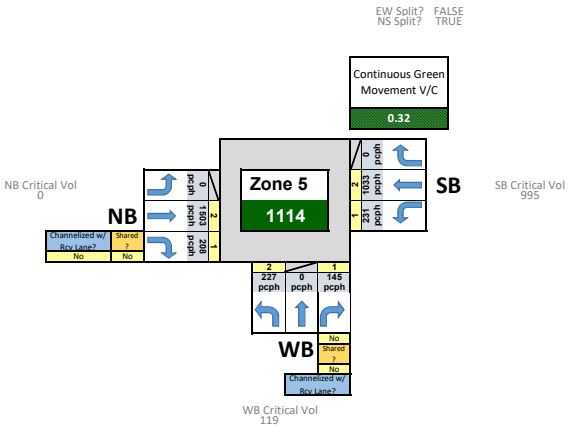


Note: This diagram does not reflect the actual lane configuration of the intersection

Continuous Green-T Intersection

DATA INPUT AND CONFIGURATION

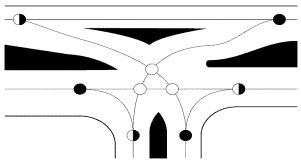
Step 1: Enter the lane configurations in the yellow cells.



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

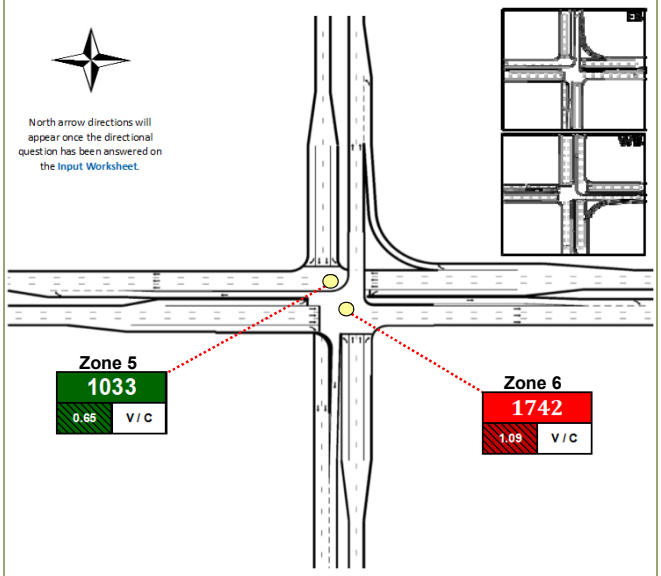
Echelon Intersection

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.

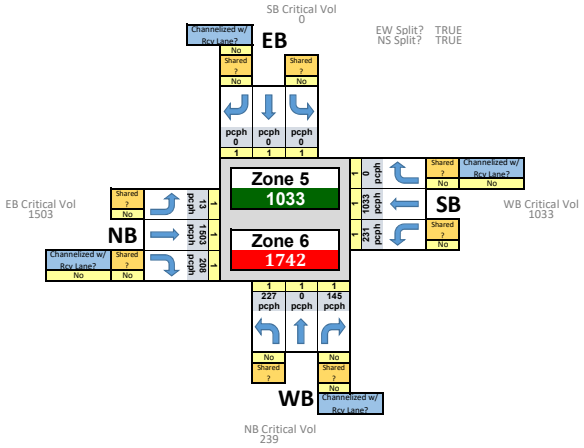


Note: This diagram does not reflect the actual lane configuration of the intersection

Echelon Intersection

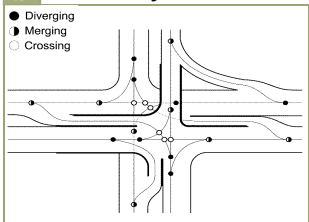
DATA INPUT AND CONFIGURATION

Enter the lane configurations in the yellow cells.



Back to Results

Safety - Conflict Point Diagram



Conflict Type	Count
Crossing	6
Merging	8
Diverging	8
Total	22

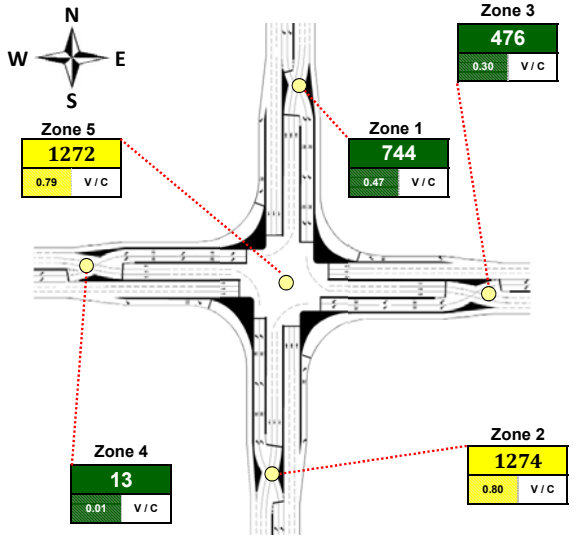
Conflict Type	Weight
Crossing	2
Merging	1
Diverging	1

Weighted Total Conflict Points
28

Full Displaced Left Turn Intersection

DESIGN AND RESULTS

		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:		0.80	
Date:	December 17, 2019				

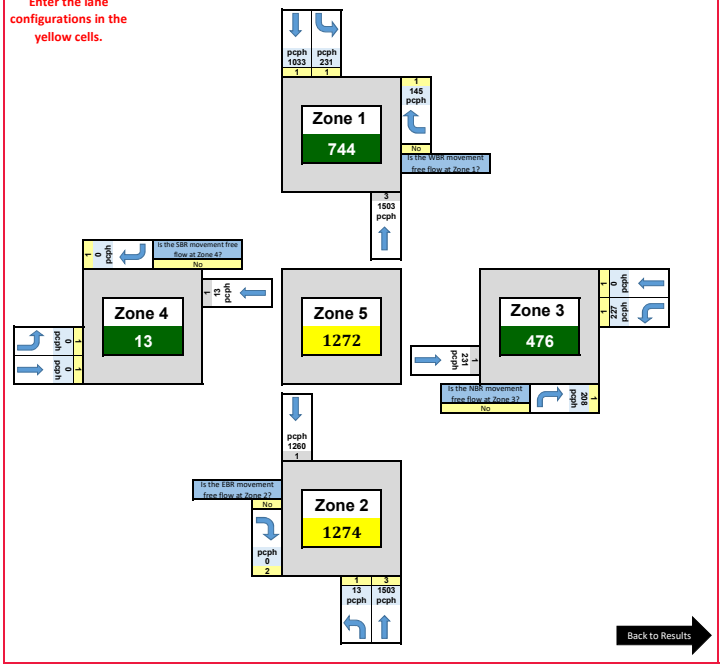


Note: This diagram does not reflect the actual lane configuration of the intersection

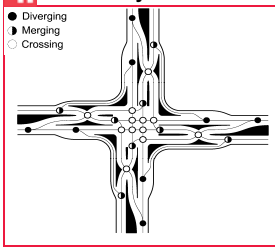
Full Displaced Left Turn Intersection

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.

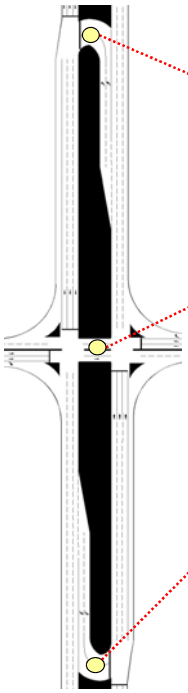
Median U-Turn Intersection

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

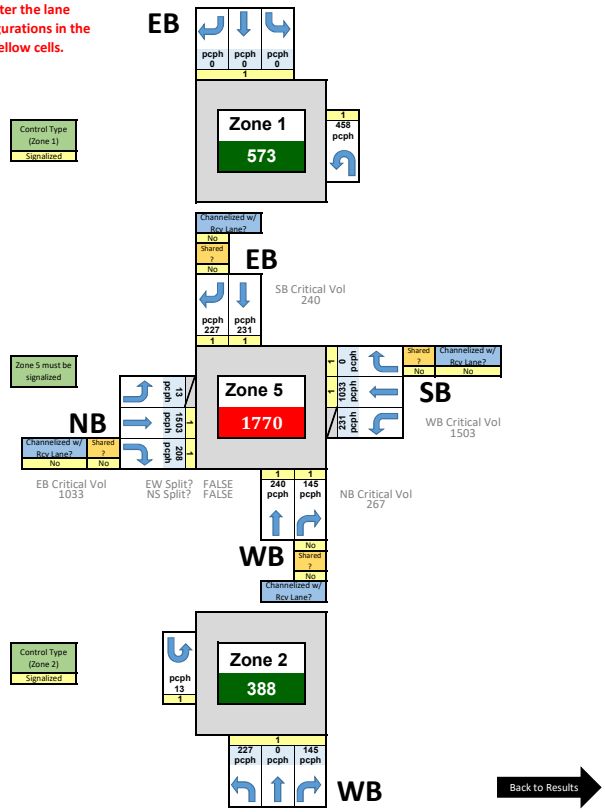
Zone 2: 388 — 0.24 V / C

Note: This diagram does not reflect the actual lane configuration of the intersection

Median U-Turn Intersection

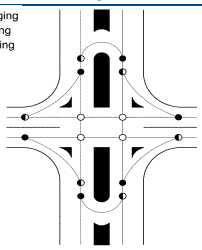
DATA INPUT AND CONFIGURATION

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

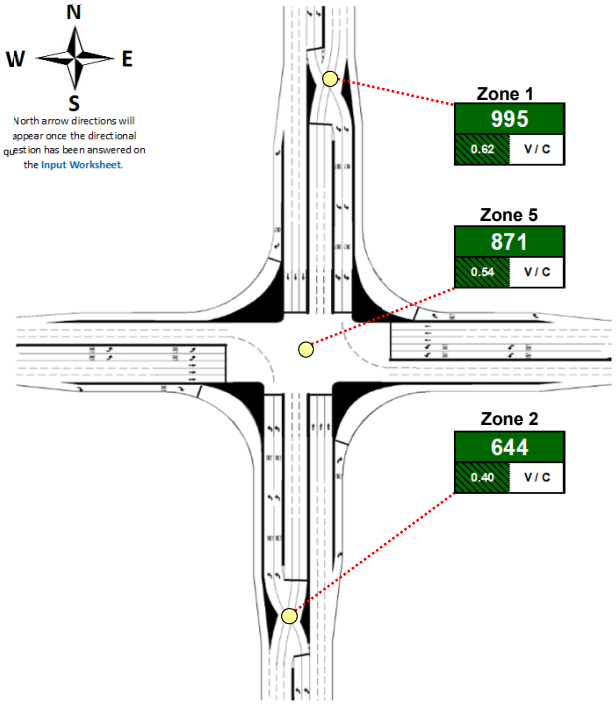
DESIGN AND RESULTS

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

N W E S

North arrow directions will appear once the directional question has been answered on the Input Worksheet.

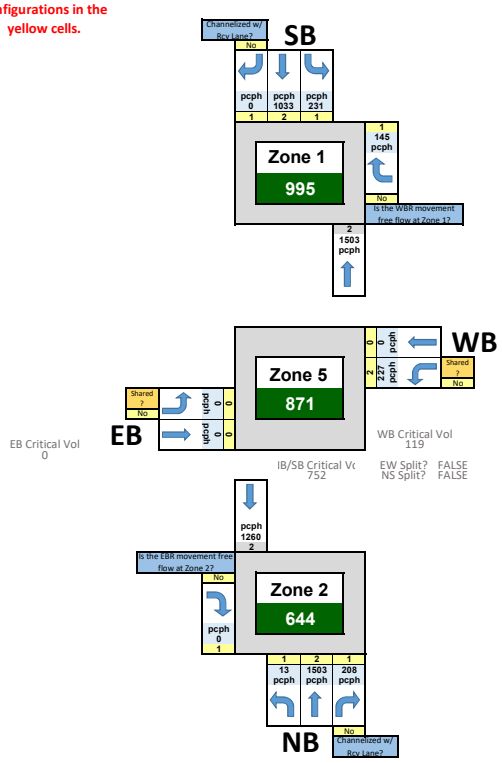


Note: This diagram does not reflect the actual lane configuration of the intersection

Partial Displaced Left Turn Intersection

DATA INPUT AND CONFIGURATION

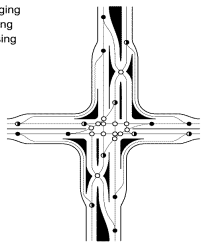
Enter the lane configurations in the yellow cells.



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

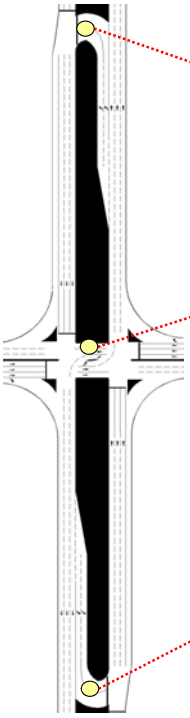
DESIGN AND RESULTS

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

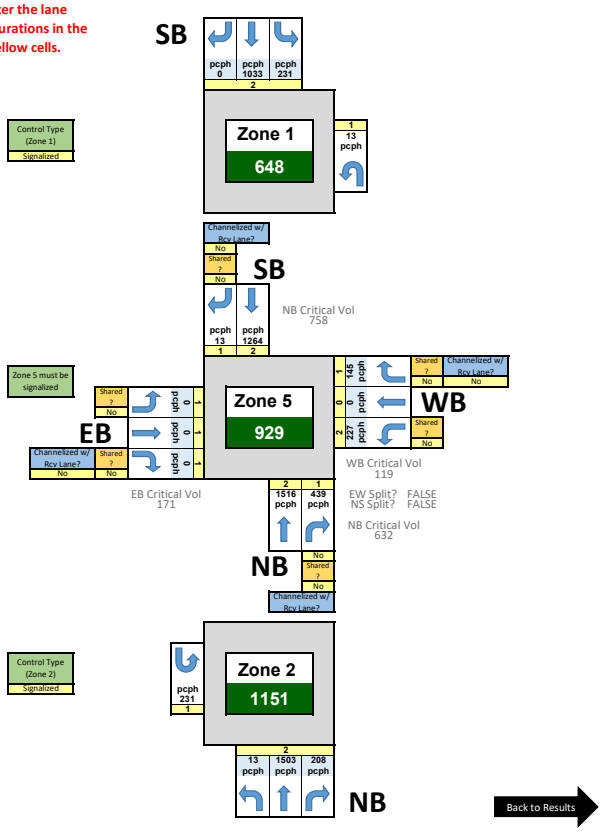
Zone 2: 1151 — 0.72 V / C

Note: This diagram does not reflect the actual lane configuration of the intersection

Patrial Median U-Turn Intersection

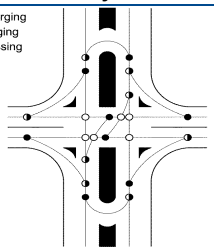
DATA INPUT AND CONFIGURATION

Enter the lane configurations in the yellow cells.



Safety - Conflict Point Diagram

● 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

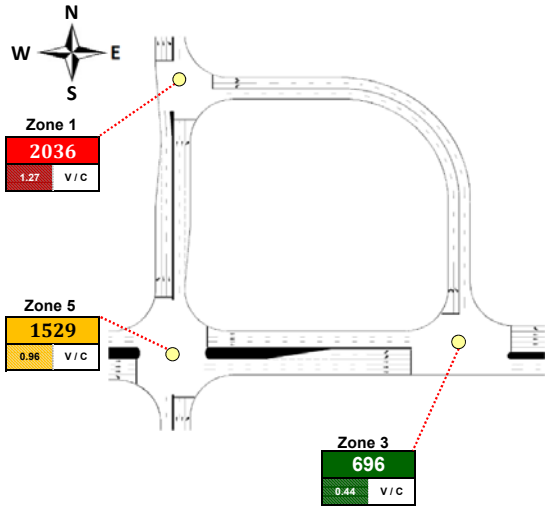
- This worksheet uses the CLV methodology for calculations at signalized zones. These calculations are based on passenger cars per hour.
- This worksheet uses the *HCM, 6th Edition* methodology for calculations at unsignalized zones. These calculations are based on vehicles per hour.

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

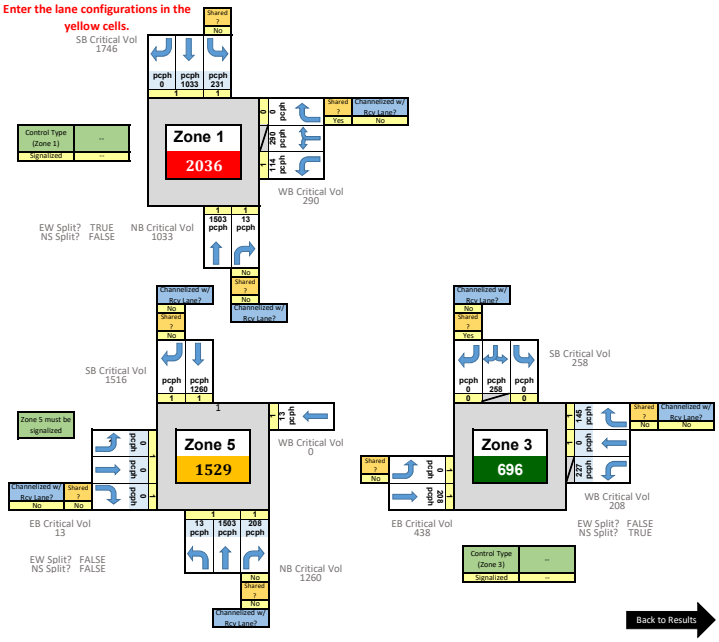


Note: This diagram does not reflect the actual lane configuration of the intersection

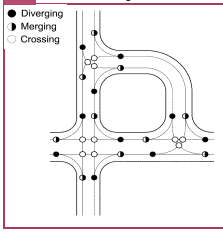
Quadrant Roadway Intersection (N-E)

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

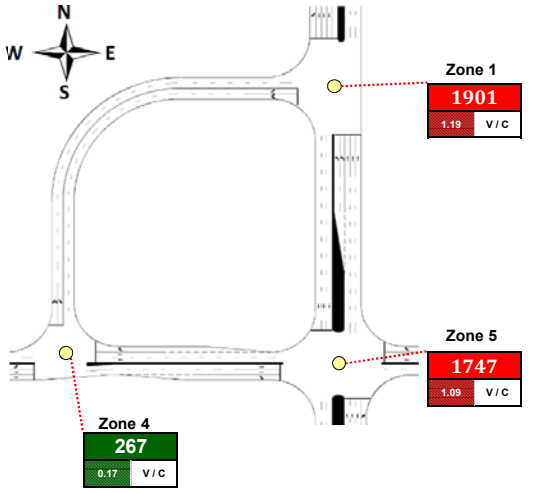
Assumptions

- 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				

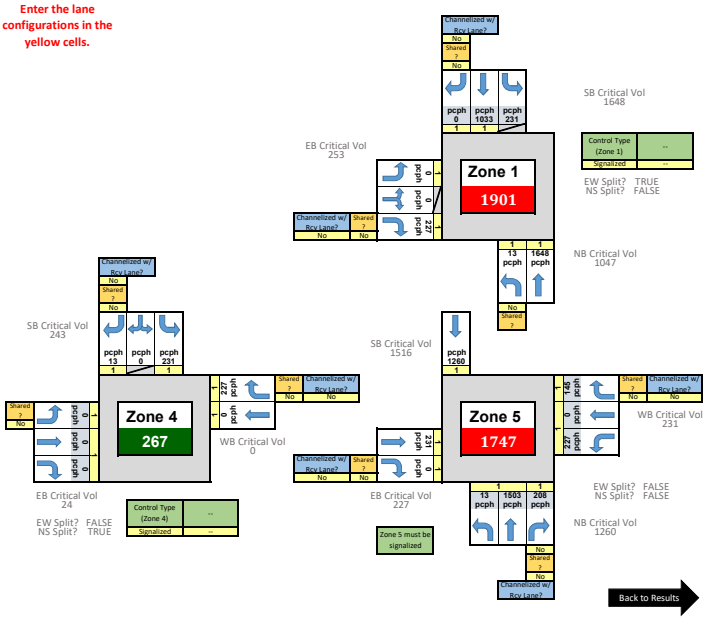


Note: This diagram does not reflect the actual lane configuration of the intersection

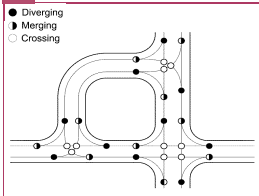
Quadrant Roadway Intersection (N-W)

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

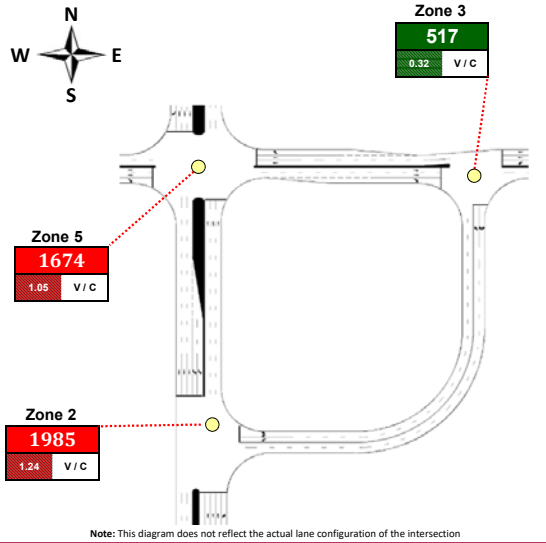
- All right-turning vehicles are assumed to turn right at the first opportunity.
- The westbound left-turning vehicles are assumed to go through Zone 5 and make two right turns before going through Zone 5 again to complete the left-turn movement.
- This worksheet uses the CLV methodology for calculations 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

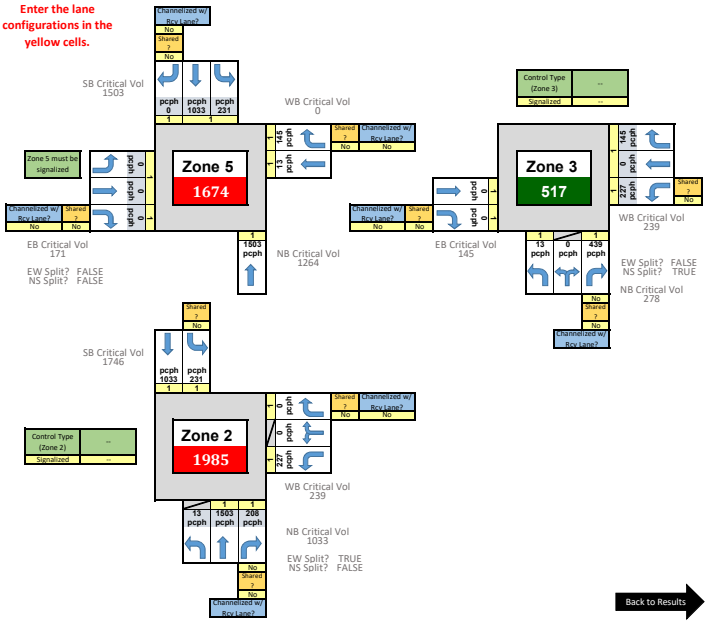


Note: This diagram does not reflect the actual lane configuration of the intersection

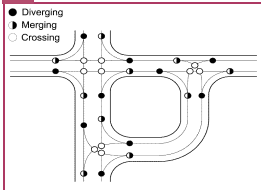
Quadrant Roadway Intersection (S-E)

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

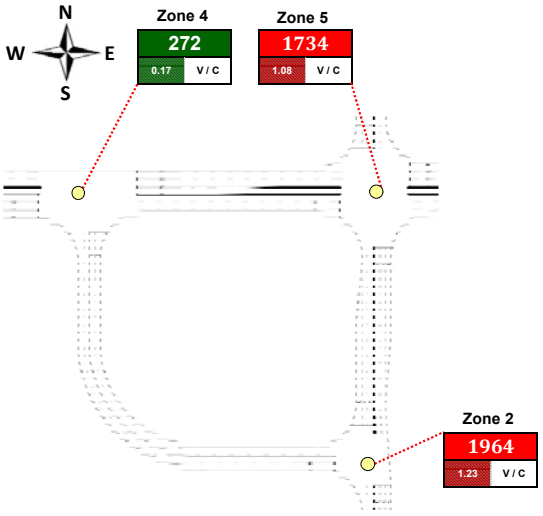
Assumptions

- 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				

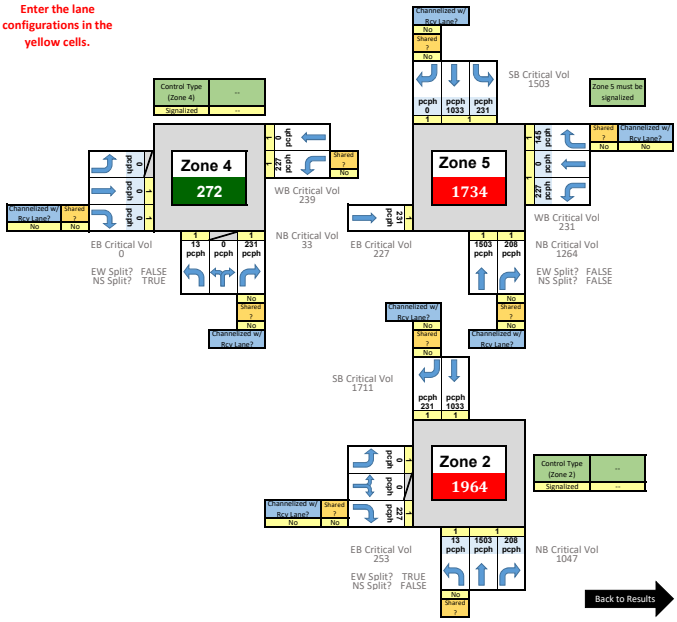


Note: This diagram does not reflect the actual lane configuration of the intersection

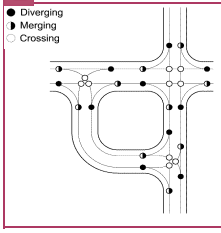
Quadrant Roadway Intersection (S-W)

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.

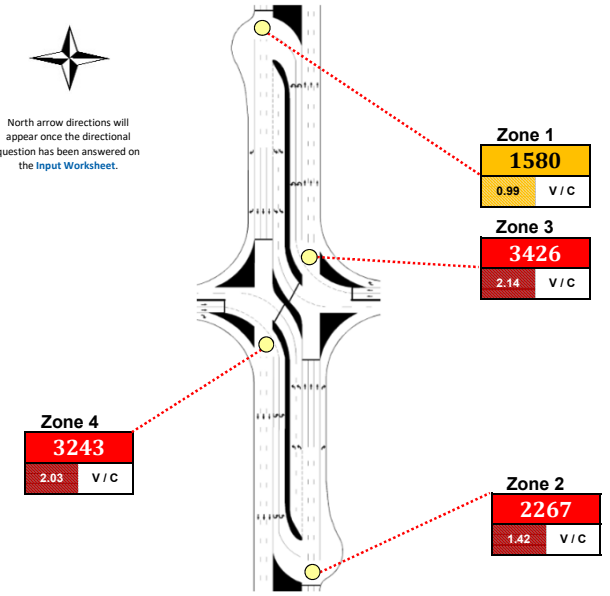
Restricted Crossing U-Turn (RCUT) Intersection

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**.

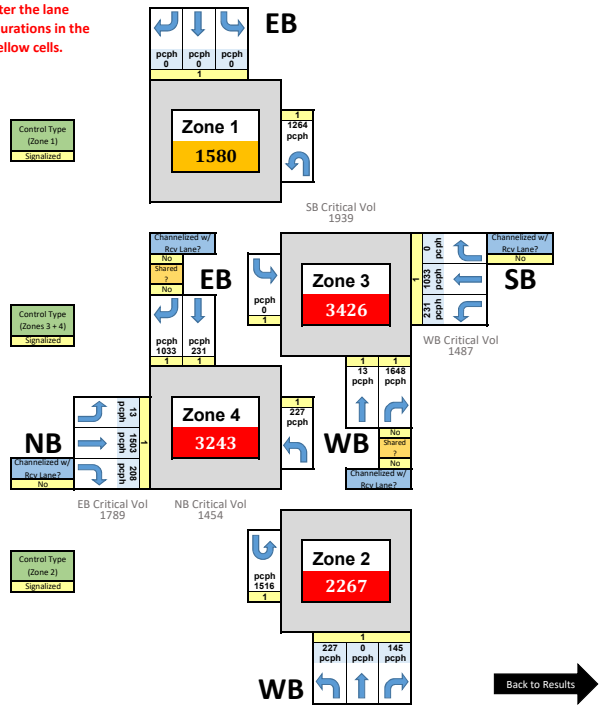


Note: This diagram does not reflect the actual lane configuration of the intersection

Restricted Crossing U-Turn (RCUT) Intersection

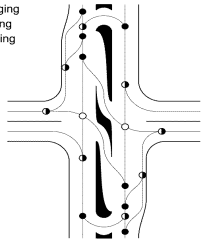
DATA INPUT AND CONFIGURATION

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

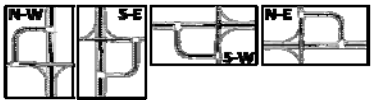
- This worksheet uses the CLV methodology for calculations at signalized zones. These calculations are based on passenger cars per hour.
- This worksheet uses the *HCM, 6th Edition* methodology for calculations at unsignalized zones. These calculations are based on vehicles per hour.

Single Loop Interchange

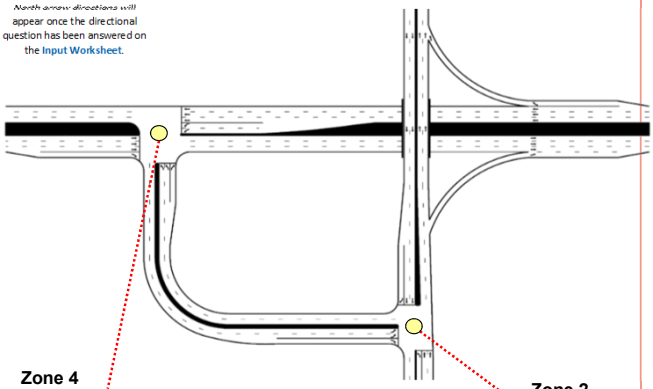
DESIGN AND RESULTS

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**.



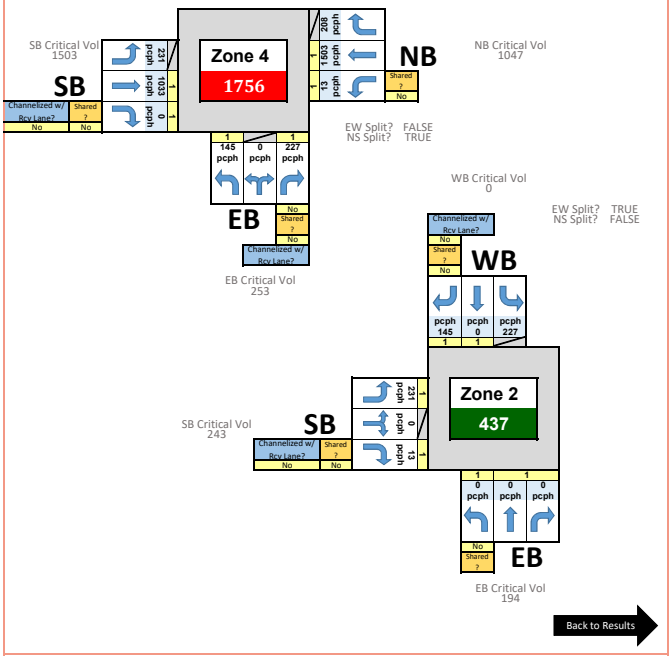
Zone 4
1756
1.10 V / C

Zone 2
437
0.27 V / C

Single Loop Interchange

DATA INPUT AND CONFIGURATION

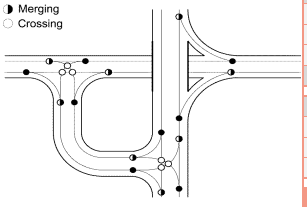
Enter the lane configurations in the yellow cells.



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

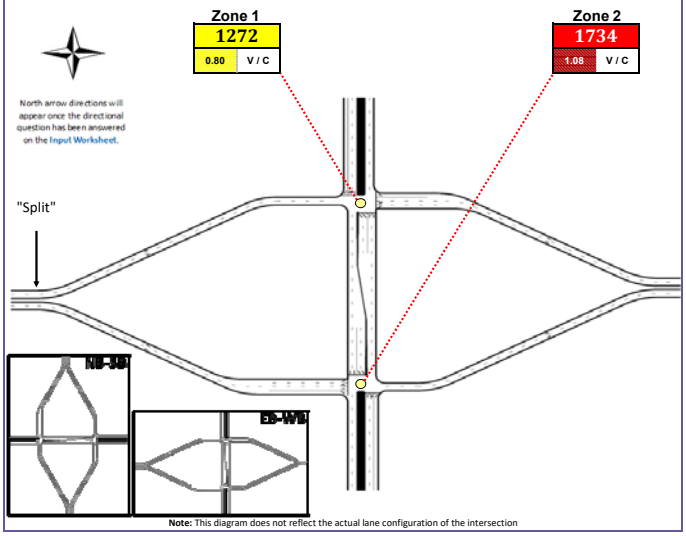
Assumptions

- 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				

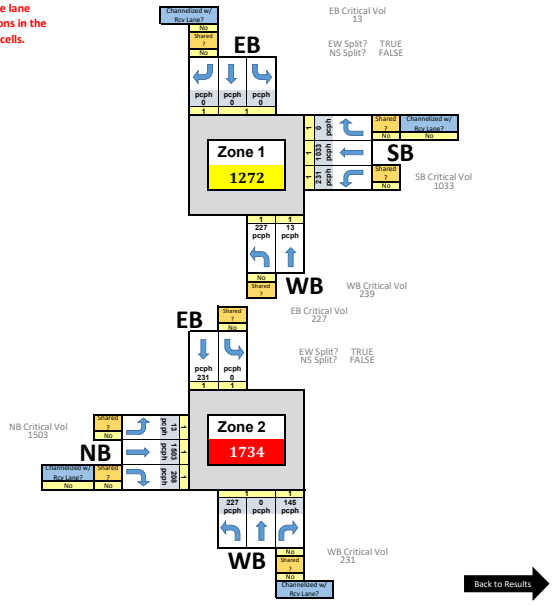


Note: This diagram does not reflect the actual lane configuration of the intersection

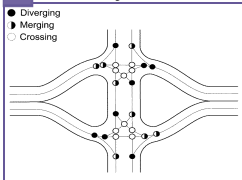
Split Intersection

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

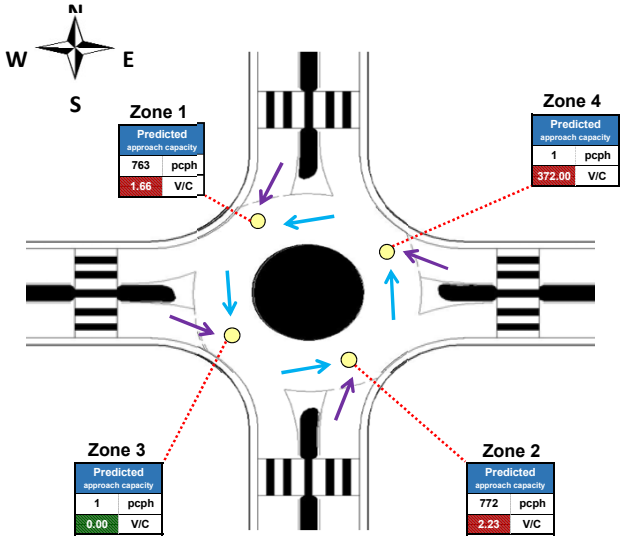
Weighted Total Conflict Points

36

50' ICD Mini-Roundabout

DESIGN AND RESULTS

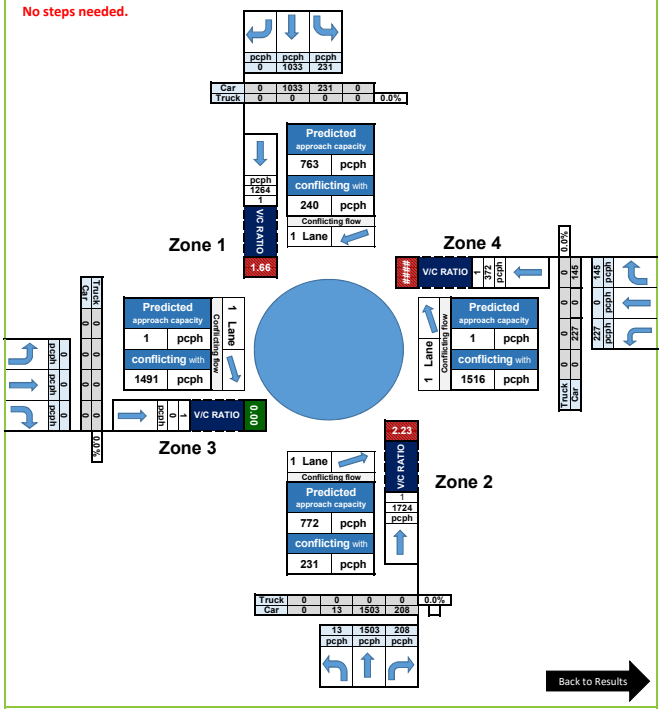
Project Name:	Sweetgrasss	Critical Lane Volume Sum			
EW Facility:	Primary Entrancd	< 1200	1200 - 1399	1400 - 1599	≥ 1600
NS Facility:	Benn's Church Boulevard	VOLUME / CAPACITY RATIO:	372.00		
Date:	December 17, 2019				



50' ICD Mini-Roundabout

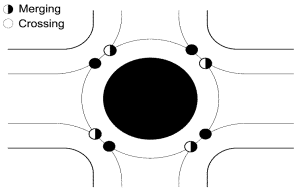
DATA INPUT AND CONFIGURATION

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

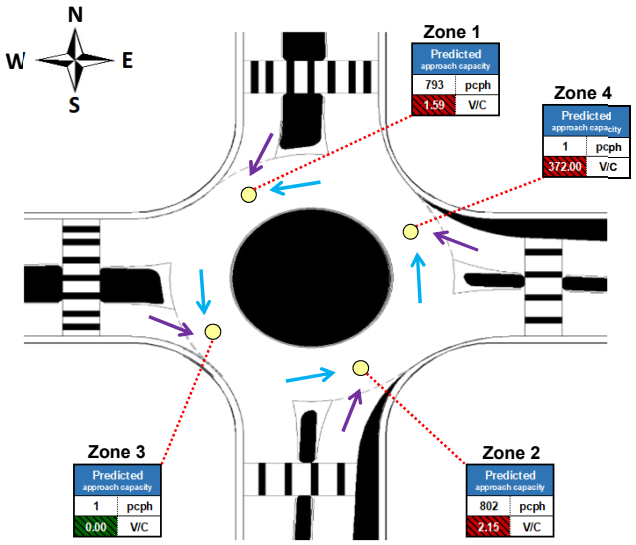
Assumptions

- 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

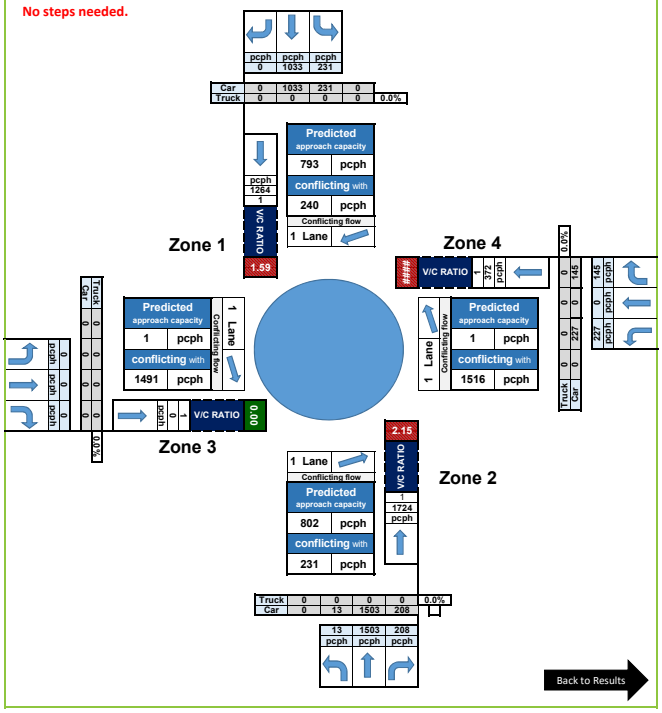
Project Name:	Sweetgrasss	Critical Lane Volume Sum			
EW Facility:	Primary Entrancd	< 1200	1200 - 1399	1400 - 1599	≥ 1600
NS Facility:	Benn's Church Boulevard	VOLUME / CAPACITY RATIO:	372.00		
Date:	December 17, 2019				



75' ICD Mini-Roundabout

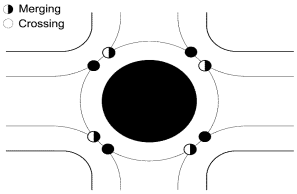
DATA INPUT AND CONFIGURATION

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

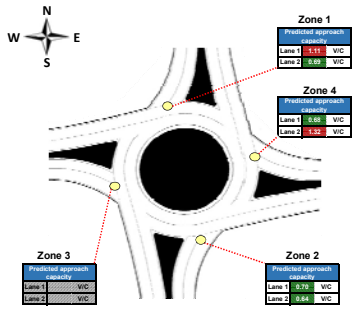
Assumptions

- 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

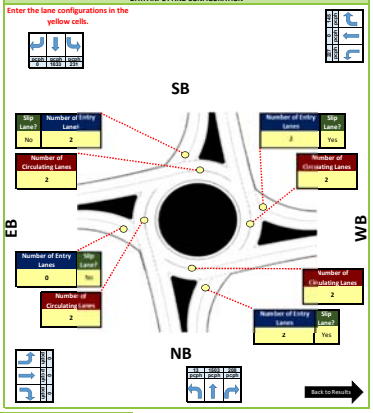
		Critical Lane Volume Sum			
Project Name:	Sweetgrasss	≤ 1200	1200 - 1399	1400 - 1599	≥ 1600
EW Facility:	Primary Entrancd	VOLUME / CAPACITY RATIO:			1.32
NS Facility:	Benn's Church Boulevard				
Date:	December 17, 2019				



Roundabout

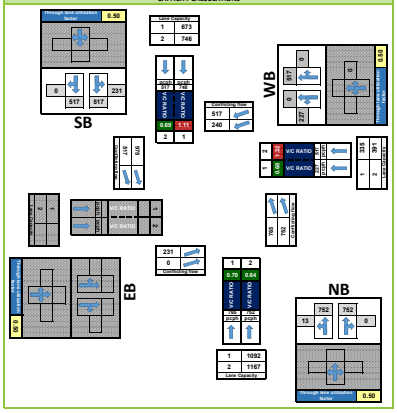
DATA INPUT AND CONFIGURATION

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

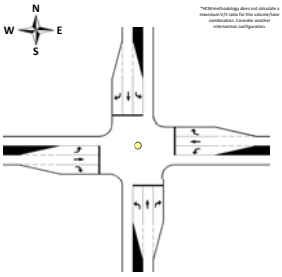
- The number of circulating lanes in one quadrant is assumed to be equal to the number of exiting lanes in the next quadrant.
- The roundabout is limited to a maximum of two entry lanes and two circulating lanes.
- All left-turning vehicles are assumed to stay in the innermost lane until exiting the 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
NW Facility	Primary Entrance	< 500 | 500 - 599 | 600 - 699 | ≥ 700
NE Facility	Beirn'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.

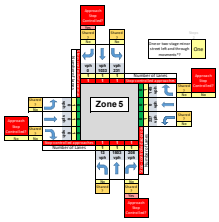


Note: This diagram does not reflect the actual lane configuration of the intersection

Two-Way Stop Control (TWSC)

DATA INPUT AND CONFIGURATION

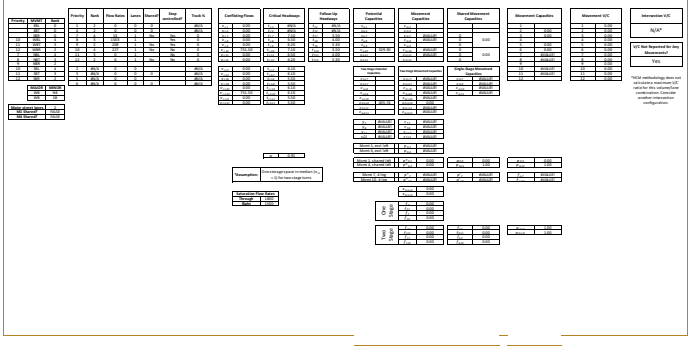
Step 1: Identify which approaches are stop-controlled by selecting "Yes" from the drop-down
Step 2: Enter the lane configurations in the yellow cells.



Back to Results

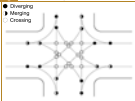
Two-Way Stop Control (TWSC)

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

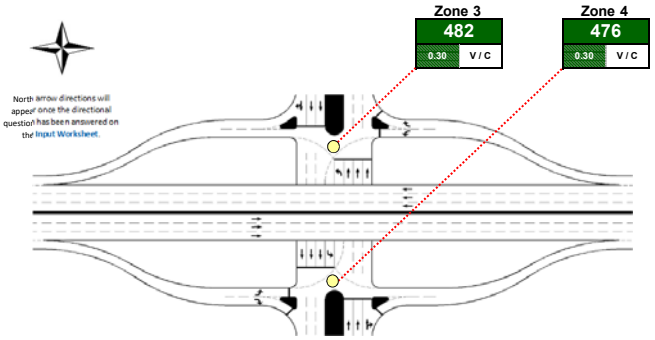
- This worksheet does not use the CLV methodology. The calculations are based on the *HCM, 6th Edition*. The calculations are based on vehicles per hour.

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

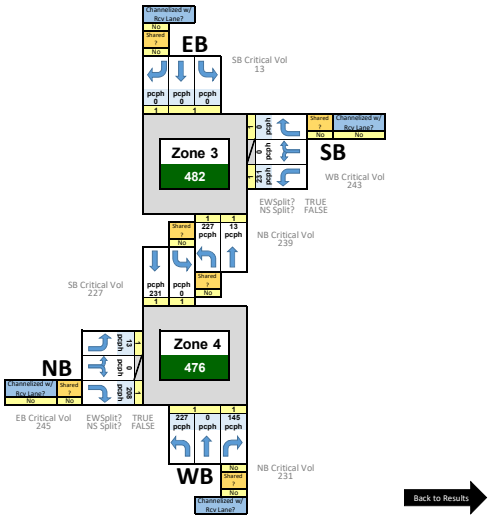


Note: This diagram does not reflect the actual lane configuration of the intersection

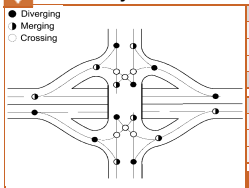
Traditional Diamond Interchange

DATA INPUT AND CONFIGURATION

Enter the lane configurations in the yellow cells.



Safety - Conflict Point Diagram



Conflict Type	Count
Crossing	6
Merging	8
Diverging	8
Total	22

Conflict Type	Weight
Crossing	2
Merging	1
Diverging	1

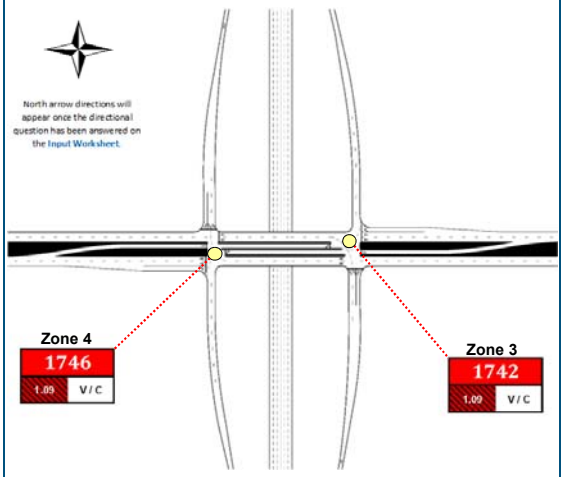
Weighted Total Conflict Points

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				

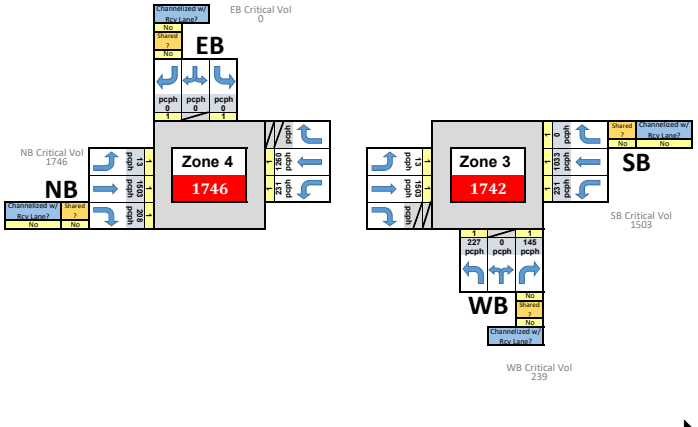


Note: This diagram does not reflect the actual lane configuration of the intersection

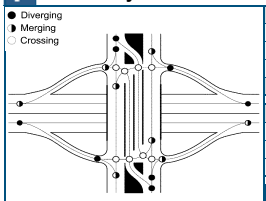
Contraflow Left Interchange

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

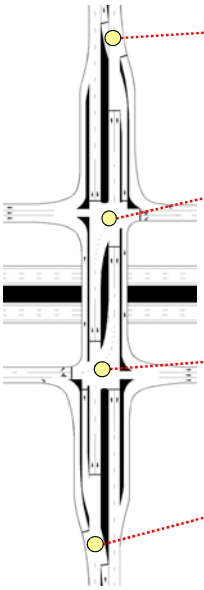
Displaced Left Turn Interchange

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.



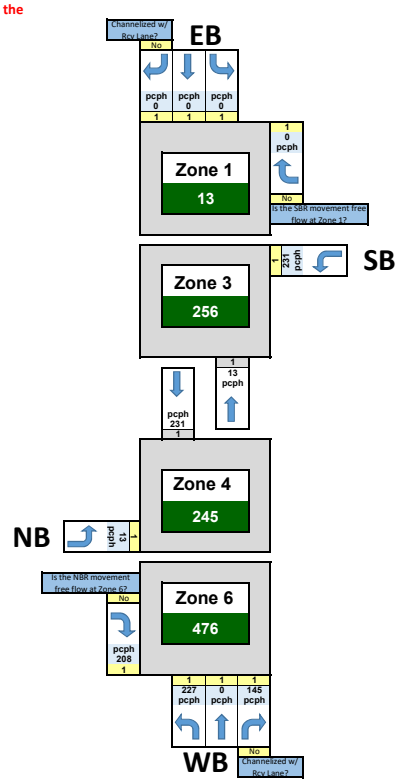
Zone 1	13	0.01 V / C
Zone 3	256	0.16 V / C
Zone 4	245	0.15 V / C
Zone 6	476	0.30 V / C

Note: This diagram does not reflect the actual lane configuration of the intersection

Displaced Left Turn Interchange

DATA INPUT AND CONFIGURATION

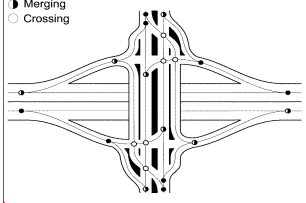
Enter the lane configurations in the yellow cells.



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

Assumptions

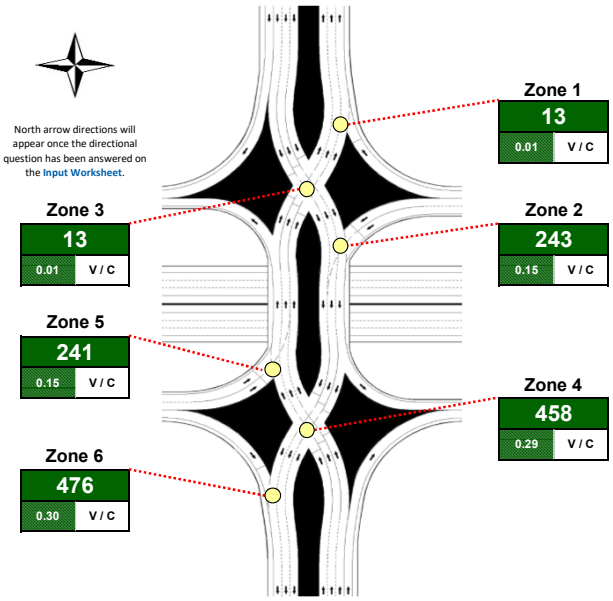
- The number of through lanes entered in one zone is assumed to be equal to the number of through lanes in all zones that the movement passes through.

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.

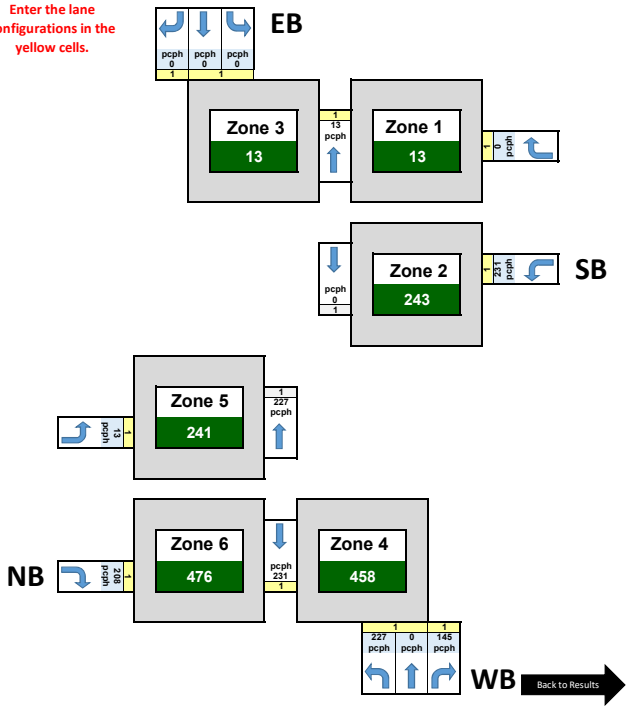


Note: This diagram does not reflect the actual lane configuration of the intersection

Diverging Diamond Interchange (DDI)

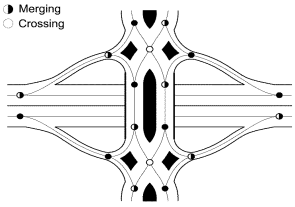
DATA INPUT AND CONFIGURATION

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

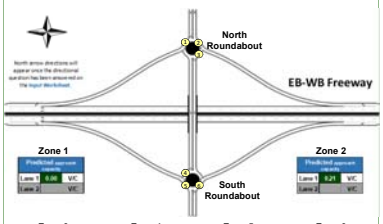
Assumptions

- 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

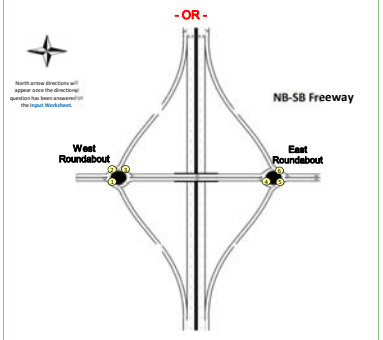
		Critical Lane Volume Sum			
Project Name:	Sweetgrasss	≤ 1200	1200 - 1399	1400 - 1599	≥ 1600
EW Facility:	Primary Entrancd				
NS Facility:	Benn's Church Boulevard	VOLUME / CAPACITY RATIO:			0.27
Date:	December 17, 2019				



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 2		V/C

- OR -

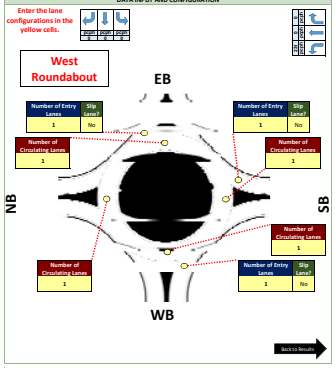


Note: This diagram does not reflect the actual lane configuration of the intersection

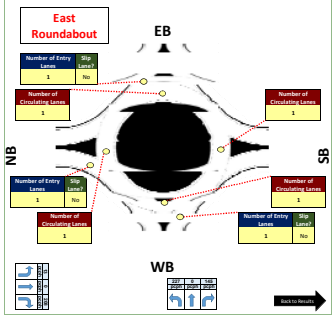
Double Roundabout Interchange

DATA INPUT AND CONFIGURATION

Enter the lane configurations in the yellow cells.

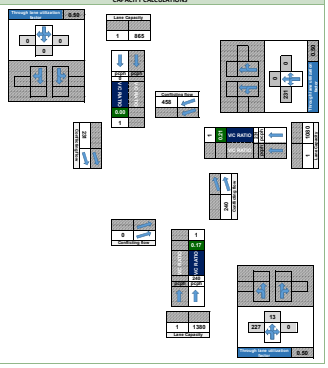


DATA INPUT AND CONFIGURATION

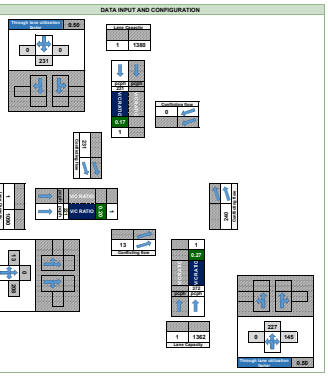


Double Roundabout Interchange

CAPACITY CALCULATIONS



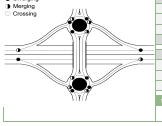
DATA INPUT AND CONFIGURATION



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

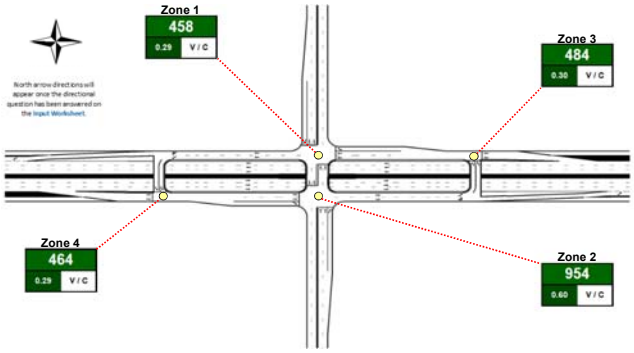
- The number of circulating lanes in one quadrant is assumed to be equal to the number of exiting lanes in the next quadrant.
- The roundabout is limited to a maximum of two entry lanes and two circulating lanes.
- All left-turning vehicles are assumed to stay in the innermost lane until exiting the 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

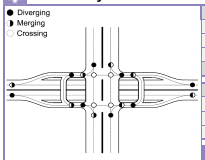
Project Name:	Sweetgrasss
EW Facility:	Primary Entrancd
NS Facility:	Benn's Church Boulevard
Date:	December 17, 2019

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

Safety - Conflict Point Diagram



Conflict Type	Count
Crossing	4
Merging	8
Diverging	8
Total	20

Conflict Type	Weight
Crossing	2
Merging	1
Diverging	1

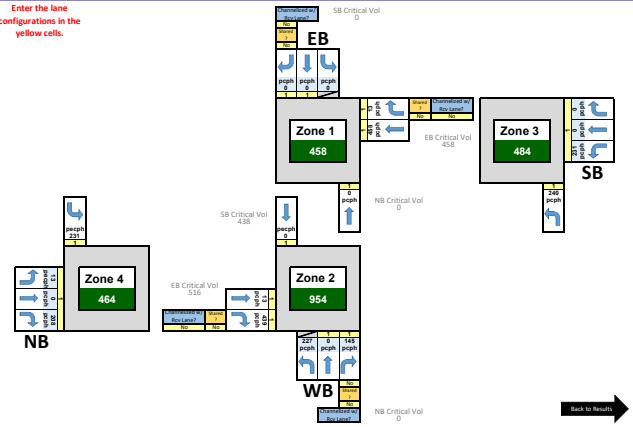
Weighted Total Conflict Points

24

Michigan Urban Diamond Intersection

DATA INPUT AND CONFIGURATION

Enter the lane configurations in the yellow cells.

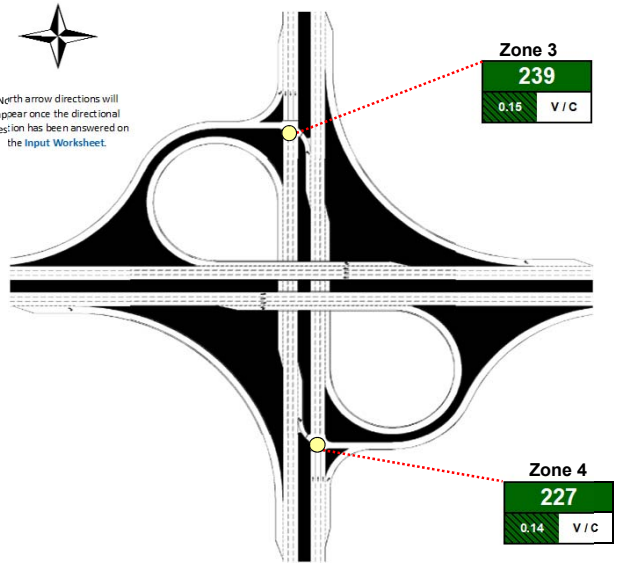


Partial Cloverleaf Interchange

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.

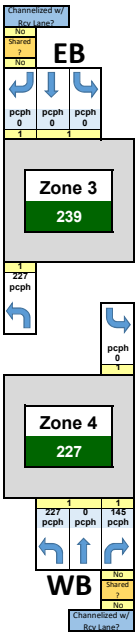


Note: This diagram does not reflect the actual lane configuration of the intersection

Partial Cloverleaf Interchange

DATA INPUT AND CONFIGURATION

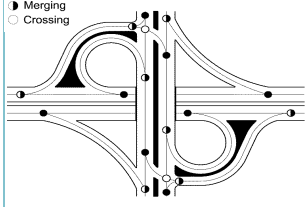
Enter the lane configurations in the yellow cells.



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.

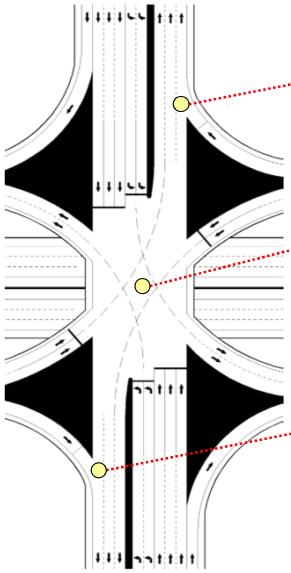
Single Point Urban Interchange (SPUI)

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**.



Zone 1
13
0.01 V / C

Zone 3
482
0.30 V / C

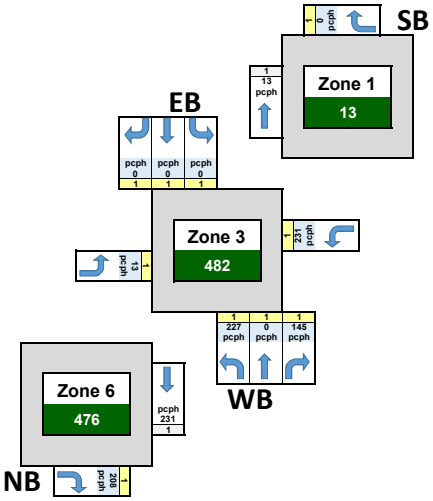
Zone 6
476
0.30 V / C

Note: This diagram does not reflect the actual lane configuration of the intersection

Single Point Urban Interchange (SPUI)

DATA INPUT AND CONFIGURATION

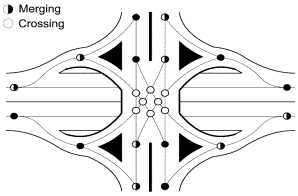
Enter the lane configurations in the yellow cells.



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

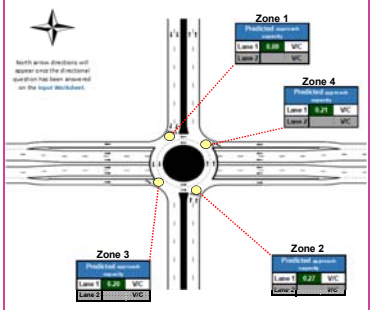
Assumptions

- 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	< 1200	1200 - 1399	1400 - 1599	≥ 1600
EW Facility:	Primary Entrancd	VOLUME / CAPACITY RATIO:			
NS Facility:	Benn's Church Boulevard				0.27
Date:	December 17, 2019				

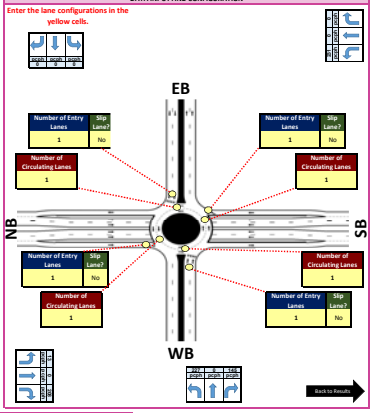


Note: This diagram does not reflect the actual lane configuration of the intersection

Single Roundabout Interchange

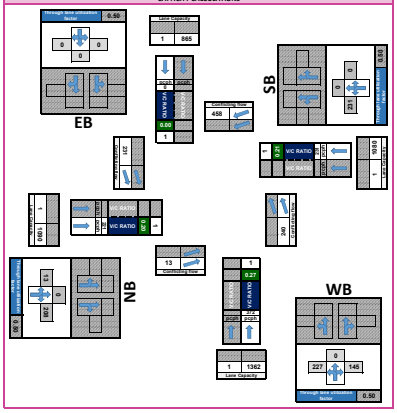
DATA INPUT AND CONFIGURATION

Enter the lane configurations in the yellow cells.



Single Roundabout Interchange

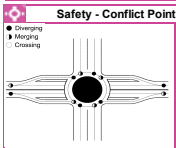
CAPACITY CALCULATIONS



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

November 10, 2021

PRELIMINARY JURISDICTIONAL DETERMINATION

Eastern Virginia Regulatory Section
NAO-2021-1053 (Jones Creek)

Jamie Armentrout
Wetland Studies and Solutions, Inc.
1008 Old Virginia Beach Road, Suite 200
Virginia Beach, Virginia 23451

Dear Mr. Armentrout:

This letter is regarding your request for a preliminary jurisdictional determination of the aquatic resources (e.g., wetlands, streams, and ponds), on an approximately 249-acre parcel located at 14096 Benns Church Road, known as Sweetgrass, in Isle of Wight County, Virginia (tax map parcel #32-01-009) hereinafter referred to as project area.

The map entitled “Wetland Delineation Sweetgrass”, by WSSI dated March 8, 2021, received by the U.S. Army Corps of Engineers (Corps) on April 15, 2021 (copy enclosed) provides the locations of the aquatic resources within the project area referenced above. This letter is not confirming the Cowardin classifications of these aquatic resources.

These aquatic resources exhibit wetland criteria as defined in the 1987 Corps of Engineers Wetland Delineation Manual, and the Atlantic and Gulf Coastal Plain Regional Supplement. This site also contains aquatic resources with an ordinary high-water mark and a high tide line.

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 george.a.janek@usace.army.mil or by standard mail to U.S. Army Corps of Engineers, Norfolk District, CENAO-WR-R, Attn: George Janek, 803 Front Street, Norfolk, VA 23510-1011.

If you have any questions, please contact me by telephone at (757) 201-7135 or by email at george.a.janek@usace.army.mil.

Sincerely,



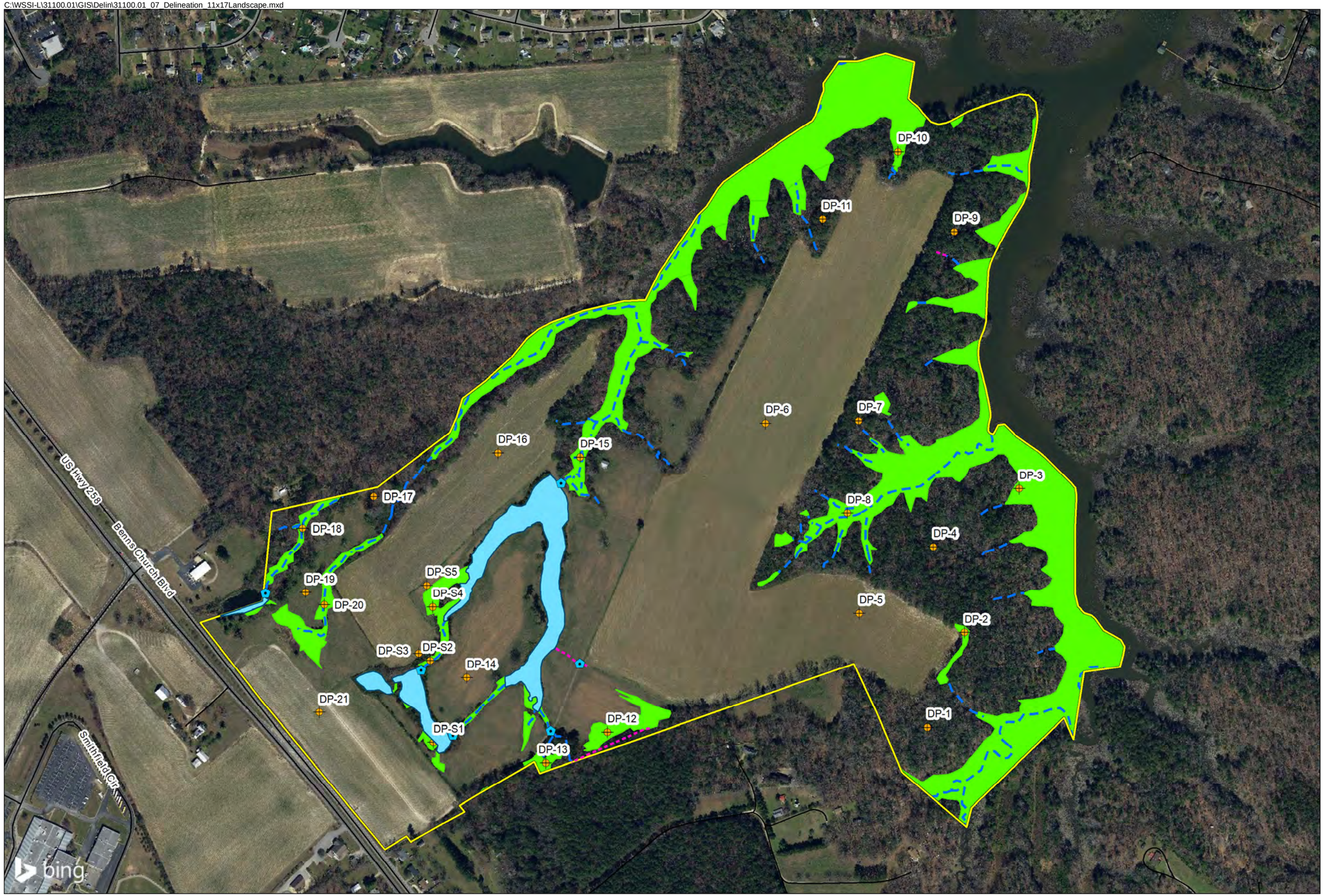
George Janek
Eastern Virginia
Regulatory Section

Enclosure(s):

cc: Henry Layden, Trustee
DEQ
Shaunee A. Beussink, Isle of Wight County

Received by USACE NAO by DGM April 15, 2021

C:\WSSI-L\31100.01\GIS\Delin\31100.01_07_Delineation_11x17Landscape.mxd



Wetland Delineation
Sweetgrass
WSSI #31100.01

NORTH

0 500

Feet

Original Scale:
1 " = 500 '

- Project Area (249.4 ac)
- Wetland Data Points
- Culvert or Outfall
- Wetland (38.75 ac)
- Farm Pond (6.05 ac)
- Stream (15,645 lf)
- Ditch (685 lf)

Delineation Notes:
In-field wetland delineation performed on December 15, 2020 through February 10, 2020 by Jamie Armentrout, PWD.

*Subject to confirmation by the USACE

Aerial Source: Bing

Figure Date: March 8, 2021

Wetland Studies and Solutions, Inc.
a DAVEY company

Figure 7

Appendix 2 - PRELIMINARY JURISDICTIONAL DETERMINATION (PJD) FORM

BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR PJD:

B. NAME AND ADDRESS OF PERSON REQUESTING PJD:

C. DISTRICT OFFICE, FILE NAME, AND NUMBER:

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

State: County/parish/borough: City:

Center coordinates of site (lat/long in degree decimal format):

Lat.: xx.xxx° Long.: yy.yyy°

Universal Transverse Mercator:

Name of nearest waterbody:

E. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):

☐ Office (Desk) Determination. Date:

☐ Field Determination. Date(s):

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)

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.

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:

☐ Maps, plans, plots or plat submitted by or on behalf of the PJD requestor:
Map: _____.

☐ Data sheets prepared/submitted by or on behalf of the PJD requestor.
☐ 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.

☐ U.S. Geological Survey map(s). Cite scale & quad name: _____.

☐ Natural Resources Conservation Service Soil Survey. Citation: _____.

☐ National wetlands inventory map(s). Cite name: _____.

☐ State/local wetland inventory map(s): _____.

☐ FEMA/FIRM maps: _____.

☐ 100-year Floodplain Elevation is: ____. (National Geodetic Vertical Datum of 1929)

☐ Photographs: ☐ Aerial (Name & Date): _____.
or ☐ Other (Name & Date): _____.

☐ 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.

_____
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 requestor to return signed PJD forms. If the requestor 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.

AES
CONSULTING ENGINEERS

5248 Olde Towne Road, Suite 1
Williamsburg, Virginia 23188
Phone (757) 253-0040
Fax (757) 220-8994
aesva.com

Water Quality Impact Assessment

Rezoning

For

Sweetgrass Development

Prepared For

NVR, INC
860 Greenbrier Circle, Suite 100
Chesapeake, Virginia 23320

April 29, 2019
Revised November 2021

AES
CONSULTING ENGINEERS

5248 Olde Towne Road Suite 1
Williamsburg, Virginia 23188
Phone: 757-253-0040
www.aesva.com

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II. EXISTING CONDITIONS 2
III. WATER QUALITY IMPACT ASSESSMENT 3
A. Proposed Conditions 3
B. Identification of Impacts and Required Information for Review 3
C. Hydrologic Impacts 4
IV. PROPOSED MITIGATION 6
V. CONCLUSION 6
VI. APPENDIX 7

APPENDIX

Exhibit A – Impact Map
Exhibit B – Clearing Exhibit

I. INTRODUCTION

On behalf of NVR, Inc. proposes to request Rezoning for a parcel within the Windsor District is to rezone a parcel containing 249.47 acres that is currently zoned (RAC Rural Conservation District) to PD/MX (Planned Development Mixed Use) at 14096 Benns Church Boulevard, Smithfield Virginia.

The site is currently mainly farmed land, with the perimeter and portions for the site furthest from Benns Church Blvd being forested. The site lies completely within the County of Isle of Wight boarding the Smithfield City limits to the North, Jones Creek to the East, Single family subdivision to the South and Benns Church Blvd. (Rt. 10) to the West. The site contains an existing lake and slopes to existing creek known as Jones Creek. The average soils slope 2% to 6%. The site is within the Peanut soils and Water district and has a hydrologic unit code of JL41 and reaches the Pagan River-Jones Creek drainage areas.

The purpose of this assessment is to summarize and organize information about the proposed impacts to the Chesapeake Bay Preservation Area(s) (CBPAs) which are reasonably necessary for the development of this property and to identify proposed mitigation that addresses such impacts. The anticipated duration of the project is five to eight years, with impacts to the RPA occurring during the first year. While the site isn't fully designed, we anticipate ten (10) specific areas of CBPA impacts in the project area. Section 4003 of the Isle of Wight County Chesapeake Bay Ordinance generally categorizes these impacts. Exhibit A, submitted with this report, identifies the relative location of the impacts. Upon approval of the formal exception, the proposed mitigation described in this assessment will be incorporated into the submitted subdivision plans, which are required as part of the development review process.

The total area impacted approximately amounts to 102,483 square feet, in which case this assessment shall be considered a Major Water Quality Impact.

II. EXISTING CONDITIONS

The site is currently mainly farmed land, with the perimeter and portions for the site furthest from Benns Church Blvd being forested. Forested area makes up ± 47% of the site, while cropland makes up ± 36%. The remaining ± 17% of the site is water (i.e. pond and wetlands). Stormwater runoff currently sheet flows to the existing ponds located in the middle of the site and perimeter wetlands. A majority of the site is currently crop land and is moderately sloped, averaging 0-3%, with smaller areas exceeding 10%. A majority of lands sloped greater than 3% are located in RPA buffers and with the exceptions of the impacts listed below shall not be disturbed. The hydrologic soil groups found to be in the areas of proposed development are primarily hydrologic group C that generally indicates a low infiltration rate. The remaining site is predominately hydrologic group D with these soils being located in areas of the RPA buffers and wetlands. Exhibit A and Master Plan sheet 4 more clearly delineates the various soils and their relative hydrological classification, erosive characteristics and typical slopes.

III. WATER QUALITY IMPACT ASSESSMENT

A. Proposed Conditions

This project proposes 400 single family detached lots, 285 townhomes and ±5 acres of commercial area. This development will have two connections to Benns Church Boulevard. This project proposes to clear 20.28 acres of forested area and proposes ±50.40 acres of impervious (21%). The existing pond located on site will be upgrade to meet current DEQ specifications to act as a BMP. This shall include modifications to the embankment, outfall structure, and providing adequate benches.

B. Identification of Impacts and Required Information for Review

RPA Buffer Impact No. 1 (Roadway)
Impact No. 1 is for the construction associated with the road accessing the rear of the property. This impact is required to access the largest developable portion of the property. The area of this impact associated with the roadway is 9,783 square feet or 0.22 acres. ***All impacts are outside the wooded portion of the site.***

RPA Buffer Impact No. 2/8 (BMP and Outfall)
Impact No. 2 is for the construction of the stormwater pond outfall into the existing BMP. Impact No. 8 is for the regrading of the small upstream pond to incorporate it into the larger facility. This upstream pond is not considered perennial and does not have an RPA buffer associated with it. However, it falls within the buffer of the adjacent facility. These impacts are necessary to safely discharge runoff from the development into the stormwater management facilities. The combined area of these impacts is 15,660 square feet or 0.36 acres; 8,699 sf of these impacts will require clearing in the RPA buffer. 1,242 square feet of the required area of clearing within the RPA buffer overlaps the clearing area for RPA Buffer Impact No. 9.

RPA Buffer Impact No. 3/4 (Roadway)
Impact Nos. 3 and 4 are for the construction associated with the road accessing the south side of the property. This road location was aligned to minimize impacts to the RPA and wetlands on the property by crossing the buffers perpendicularly. This impact is necessary in order to access the largest portion of the property; there is a wetland channel that drains across the property from the neighboring site, which feeds into the large existing stormwater lake on the property. The combined area of these impacts is 38,172 square feet or 0.88 acres. ***This impact does not propose clearing in the RPA buffer.***

RPA Buffer Impact No. 5 (BMP Outfall)
Impact No. 5 is for the construction of a BMP outfall across existing farmed areas into the large existing lake. This impact is necessary in order to safely discharge from the BMP into the adjacent lake. The area of this impact is 5,330 square feet or 0.12 acres. ***This impact does not propose clearing in the RPA buffer.***

RPA Buffer Impact No. 6 (BMP Outfall)
Impact No. 6 is for the construction of a BMP outfall across steeply sloped areas into the adjacent wetlands area. This impact is necessary to safely discharge from the BMP and avoid future erosion of the steeper slops adjacent to the pond and existing wetlands. The area of this impact is 4,870 square feet or 0.11 acres; this impact requires clearing in the RPA buffer.

RPA Buffer Impact No. 7 (BMP Outfall)
Impact No. 7 is for the construction of a BMP outfall across steeply sloped areas into the adjacent wetlands area. This impact is necessary to safely discharge from the BMP and avoid future erosion of the steeper slops adjacent to the pond and existing wetlands. The area of this impact is 6,734 square feet or 0.15 acres; this impact requires clearing in the RPA buffer.

RPA Buffer Impact No. 9/10 (Utility Crossing)
Impact Nos. 9 and 10 are for the construction of a sanitary sewer main running between the existing ponds on the property. These impacts are necessary to provide gravity sewer to both halves of the property and eliminate the need for two separate County sanitary sewer lift stations to service the property. Portions of the impacts coincide with impacts associated with stormwater grading, and the remaining portions are designed to avoid wetland impacts. The combined area of these impacts is 8,415 square feet or 0.20 acres; 2,639 sf of these impacts will require clearing in the RPA buffer. 1,242 square feet of the required area of clearing within the RPA buffer overlaps the clearing area for RPA Buffer Impact No. 2.

Careful consideration has been taken to minimize the impacts for the proposed development. Exhibit A, submitted with this report, identifies the location of these impacts. The proposed mitigation described in this assessment will be incorporated into the construction plans for the subdivision, which are required as part of the development review process.

Although not dependent on the review and approval of this assessment, required permits necessary to develop this project include: General Virginia Stormwater Management Program (VSMP) Permit, Corps of Engineers Wetland Disturbance Permit, Virginia Department of Environmental Quality's Virginia Water Protection General Permit, Land-Disturbing Permit and Siltation Agreement. These and any other permits that may be required shall be (if not already) applied for at the appropriate time.

C. Hydrologic Impacts

It should be noted that most of the RPA impacts are currently located within farmed land and do not propose significantly changing the grading of the land or adding impervious cover to the land creating additional runoff. We have looked at each specific impact area and noted any changes to existing land cover and how those changes may impact the hydrology of the system. Any areas of steep slope will be put back with flatter site grades and matting used to stabilize the slopes.

RPA Buffer Impact No. 1 (Roadway)
Impact No. 1 is for the construction associated with the road accessing the south side of the property. This portion of the site is currently farm land, which is a B soil with less than 5% slopes. The existing soil condition likely produces little surface runoff to the adjacent wetlands. The proposed improvements for the roadway would capture the associated runoff and direct it to a stormwater BMP facility to treat and control the runoff before releasing it into the downstream existing lake. This change in the hydrology should have minimal impact on the downstream wetlands in this area and is designed to protect the natural drainage way.

RPA Buffer Impact No. 2/8 (BMP and Outfall)
Impact Nos. 2 and 8 are adjacent to the three existing ponds/lakes on the property. These areas are located along the banks of those facilities, and runoff from the impact areas currently drain directly into those facilities. Portions of the impact areas will be used to create a larger stormwater facility while maintaining existing drainage patterns to the greatest extend possible. This will improve the quality and quantity of the stormwater entering the downstream lake and will protect the natural drainage way.

RPA Buffer Impact No. 3/4 (Roadway)
Impact Nos. 3 and 4 are for the construction associated with the road accessing the south side of the property. This portion of the site is currently farm land, which is a D soil with less than 5% slopes. These soils exist in a natural low area of the site and feed into the downstream pond/lake. The drainage improvements associated with the roadway would redirect the water through a proposed BMP and treat and control the runoff before releasing it into the downstream existing lake. This change in the hydrology should present an improved situation, adding additional treatment and flood controls over the existing drainage patterns.

RPA Buffer Impact No. 5 (BMP Outfall)
Impact No. 5 is for the construction of a BMP outfall. This area is within a flat portion of the site that is currently farmed. These improvements would not significantly impact the natural hydrology, as the area of impact will match the existing drainage patterns and discharge into the downstream existing lake.

RPA Buffer Impact No. 6 (BMP Outfall)
Impact No. 6 is for the construction of a BMP outfall. This area is within a steeply sloped portion of the site. These improvements would not significantly impact the natural hydrology, as the area of impact will match the existing drainage patterns to the greatest extent possible and the slopes will be stabilized to prevent erosion and protect the natural drainage way.

RPA Buffer Impact No. 7 (BMP Outfall)
Impact No. 7 is for the construction of a BMP outfall. This area is within a steeply sloped portion of the site. These improvements should not significantly impact the natural hydrology, as the area of impact will match the existing drainage patterns to the greatest extent possible and the slopes will be stabilized to prevent erosion and protect the natural drainage way.

RPA Buffer Impact No. 9/10 (Utility Crossing)

Impact Nos. 9 and 10 are for the construction of a sanitary sewer main running between the existing ponds on the property. These impacts will not present any permanent change to the existing drainage patterns. Portions of the impacts coincide with impacts associated with stormwater grading, and the remaining portions are designed to avoid wetland impacts. These improvements should not significantly impact the natural hydrology, as the area of impact will match the existing drainage patterns to the greatest extent possible and the slopes will be stabilized to prevent erosion and protect the natural drainage way.

IV. PROPOSED MITIGATION

Mitigation to the grading and impacts noted above shall include setting aside developable open space and revegetation of current crop land within the RPA buffer. Initial mitigation efforts for these impacts shall include E&S measures as described in the Virginia Erosion & Sediment Control Handbook, such as permanent seeding that will incorporate a conservation seed mix applicable to the special requirements of the RPA, super silt fencing, and ECSC-3 straw/coconut turf reinforcement matting (manufactured by East Coast Erosion Control or equal). Final mitigation will involve a detailed landscape restoration plan. Every 400 s.f. of restoration area shall, at a minimum, include 1 canopy tree, 2 understory trees and 3 shrubs; based upon our current anticipated impacts and required buffer restoration the site will require ± 2,137 canopy trees, ± 4,274 understory trees, and ± 6,411 shrubs. Areas between the rear of the lots and the RPA buffers will be set aside in open space equaling no less than 4 acres or two time the RPA impacts, whichever is greater.

V. CONCLUSION

In summary, the findings of this Water Quality Impact Analysis indicate that:

- All measures or methods have been explored to limit any impact to the CBPA. When unavoidable, the impacted area has been minimized to the greatest extent possible.

- Extensive E&SC measures will be employed to minimize the effects of the subsequent discharge of stormwater to the receiving channel and wetlands.

- A Landscape Restoration Plan, conservation seeding and additional natural open space will be provided in order to mitigate for the impacts noted.

- Additional open space of developable land will be set aside to offset impacted areas at a ratio of 2:1.

APPENDIX

EXHIBIT A – IMPACT MAP
EXHIBIT B – CLEARING EXHIBIT

SOIL CHARACTERISTICS - ISLE OF WIGHT COUNTY, VA

SOILS NO.	SOIL NAME	HYDROLOGIC SOIL GROUP	TYPICAL SLOPES	EROSION FACTOR (K_w) WHOLE SOIL	EROSION FACTOR (T)	WATER TABLE UPPER LIMIT (FT)
2	BOHICKET SILTY CLAY LOAM	D	0–1%	0.24–0.28	5	0.0
3	CHICHAHOMINY SILT LOAM	D	0–2%	0.24–0.37	4	0.0–0.5
7	KINSTON LOAM	B/D	0–4%	0.32–0.37	5	0.0–1.0
11E	NEVARC SOILS	C	15–35%	0.20–0.37	3	1.5–3.0
11E	REMLIK SOILS	A	15–35%	0.10–0.20	5	4.0–>6.0
12A	PEAWICK SILT LOAM	D	0–2%	0.24–0.37	4	1.5–3.0
12B	PEAWICK SILT LOAM	D	2–6%	0.24–0.37	4	1.5–3.0
16	RUMFORD LOAMY SAND	B	0–4%	0.17	4	–
18B	SLAGLE FINE SANDY LOAM	C	2–6%	0.24–0.28	3	1.5–3.0
W	WATER	–	–	–	–	–

INFORMATION TAKEN FROM USDA NATURAL RESOURCES CONSERVATION SERVICE, SURVEY AREA VERSION: 10, SURVEY AREA VERSION DATED: 01/25/2010.

SOIL SUSCEPTIBILITY TO EROSION CLASSIFICATION (K)
0.23 AND LOWER – LOW ERODIBILITY
0.23 TO 0.36 – MODERATE ERODIBILITY
0.36 AND UP – HIGH ERODIBILITY

THE MAP SHOWN IS A "BEST FIT MODEL" OF THE SCS MAPS WITH EXISTING BASE INFORMATION.

RPA BUFFER IMPACT TABULATIONS

ROAD IMPACTS:
47,955 S.F.± ; 1.10 AC.±

SANITARY SEWER IMPACTS:
6,876 S.F.± ; 0.16 AC.±

BMP OUTFALL & EMBANKMENT IMPACTS:
32,594 S.F.± ; 0.75 AC.±

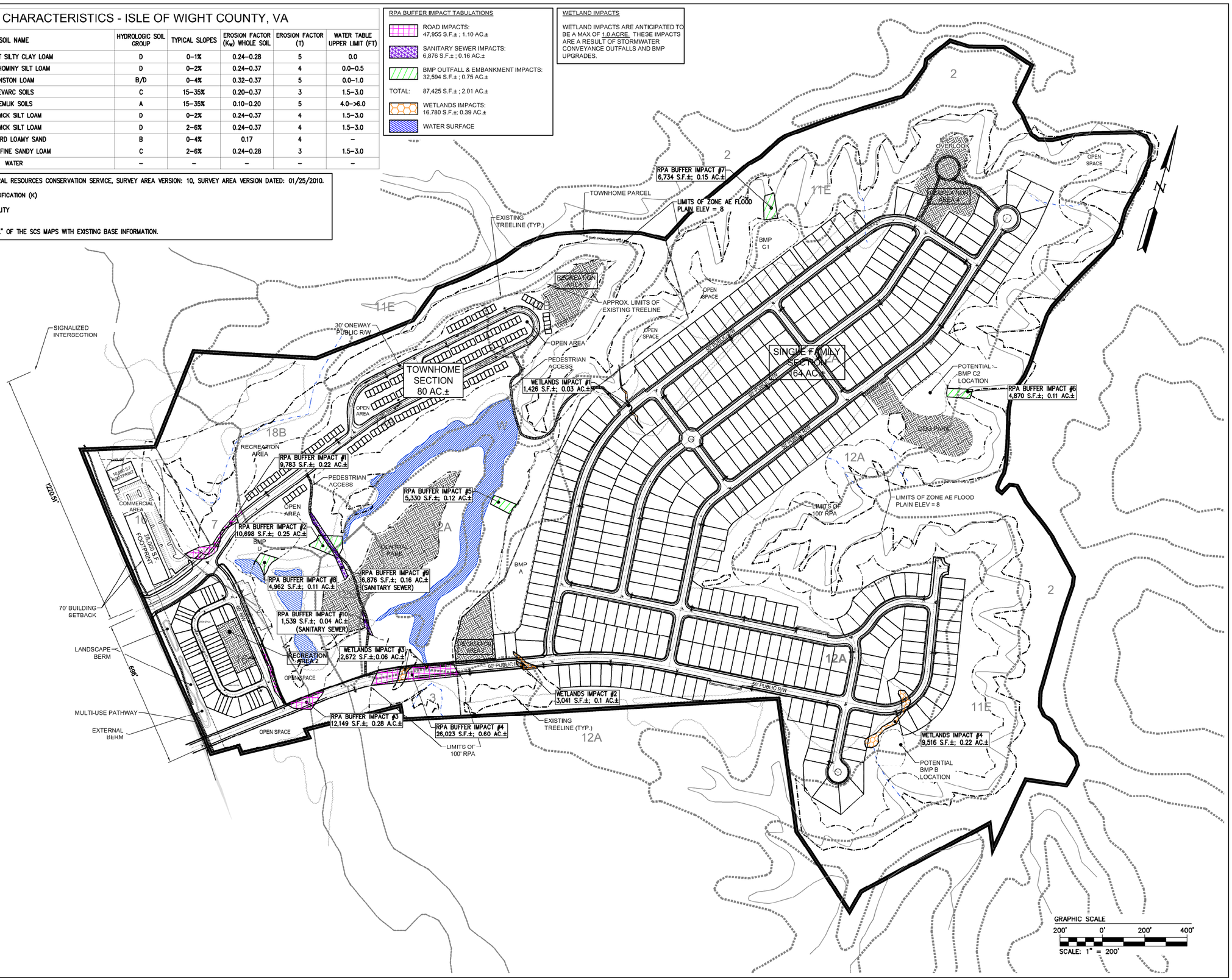
TOTAL: 87,425 S.F.± ; 2.01 AC.±

WETLANDS IMPACTS:
16,780 S.F.±; 0.39 AC.±

WATER SURFACE

WETLAND IMPACTS

WETLAND IMPACTS ARE ANTICIPATED TO BE A MAX OF 1.0 ACRE. THESE IMPACTS ARE A RESULT OF STORMWATER CONVEYANCE OUTFALLS AND BMP UPGRADES.



Remarks By	Description	Date	Rev.

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Middle Peninsula | Central Virginia | Hampton Roads

WATER QUALITY IMPACT ASSESSMENT
SWEETGRASS
REZONING
VIRGINIA
ISLE OF WIGHT COUNTY

Project Contacts:	JAC
Project Number:	W10516-00
Scale: 1"=200'	Date: 04/29/2019
Sheet Title:	WQIA EXHIBIT A

Sheet Number
1 OF 2

EXISTING	
WATER	44.65 AC.
FORESTED	115.88 AC.
CROPLAND	88.94 AC.
TOTAL	249.47 AC.
PROPOSED	
WATER	50.77 AC.
FORESTED	97.85 AC.
IMPERVIOUS	50.40 AC.
MANAGED TURF	50.45 AC.
TOTAL	249.47 AC.

HATCH LEGEND

- LIMITS OF CLEARING = 18.03 ACRES
- IMPACTS TO WOODED RPA BUFFER = 0.22 ACRES
- RPA/WETLAND AREA = 106.05 ACRES

N/F
THOMAS DARDARA T
910 CANTEBERRY LN
PARCEL ID: 22J-02-150
ZONING: SMITHFIELD: N-R

N/F
HENDRIX THOMAS
912 CANTEBERRY LN
PARCEL ID: 22J-02-149
ZONING: SMITHFIELD: N-R

N/F
EVANS ANTHONY
906 CANTEBERRY LN
PARCEL ID: 22J-02-152
ZONING: SMITHFIELD: N-R

N/F
BERLAND EDNA R
916 CANTEBERRY LN
PARCEL ID: 22J-02-147
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
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

OVERLOOK

LIMITS OF ZONE AE FLOOD PLAIN ELEV = 8

APPROX. LIMITS OF EXISTING TREELINE

TOWNHOME PARCEL

N/F
EDWARDS PHILLIP F JR & CONNIE A
BENNS CHURCH BLVD
PARCEL ID: 32-01-096
ZONING: SMITHFIELD: C-C

N/F
CROWN CASTLE GI COMPANY LLC
14005 BENNS CHURCH BLVD
PARCEL ID: 32-01-096B
ZONING: RAC

N/F
ISLE OF WIGHT COUNTY SCHOOL BOARD
14171 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
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: 32-01-067
ZONING: RAC

N/F
GIRARD PATRICIA A
14225 BENNS CHURCH BOULEVARD
PARCEL ID: 32A-02-012
ZONING: RAC

SIGNALIZED INTERSECTION

BENNS CHURCH BLVD

1236.30'

528.74'

70.00' BUILDING SETBACK

LANDSCAPE BERM

LANDSCAPE BERM

LANDSCAPE BERM

MULTI-USE PATHWAY

COMMERCIAL AREA

RECREATION AREA 1

RECREATION AREA

RECREATION AREA 2

RECREATION AREA 3

RECREATION AREA 4

PEDESTRIAN ACCESS

PEDESTRIAN ACCESS

PUBLIC PARK

DOG PARK

BMP A

BMP D

POTENTIAL BMP C1 LOCATION

POTENTIAL BMP C2 LOCATION

POTENTIAL BMP B2 LOCATION

LIMITS OF 100' RPA

LIMITS OF ZONE AE FLOOD PLAIN ELEV = 8

100'RPA

BEECHWOOD LANE

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
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
CARNEY PAMELA D
14125 HAYLOFT LN
PARCEL ID: 32B-01-006
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

N

GRAPHIC SCALE
200' 0' 200' 400'
SCALE: 1" = 200'

Rev.	Date	Description	Revised By
1	9/23/19	REVISED PER COUNTY COMMENTS	JAG

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REZONING MASTER PLAN
FOR
SWEETGRASS

ISLE OF WIGHT COUNTY | WINDSOR DISTRICT | VIRGINIA

Project Contacts:	JAG
Project Number:	W10516-00
Scale: 1"=200'	Date: 06/14/2019

Sheet Title:
CLEARING LIMITS
EXHIBIT B

Sheet Number
2 OF 2

Fiscal Impact Analysis of Sweetgrass

Located in Isle of Wight County, Virginia

Prepared for:

Ryan Homes/NVR

June 21, 2021

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June 2021

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MEMORANDUM

To: Eric Shirey, General Manager, Land, NVR Inc.

From: Julie Herlands, AICP, Vice President, TischlerBise

Date: June 18, 2021

RE: Fiscal Impact Analysis for Sweetgrass in Isle of Wight County, Virginia

TischlerBise is under contract with NVR Inc/Ryan Homes, to conduct a Fiscal Impact Analysis of the proposed Sweetgrass development in Isle of Wight County, Virginia, for submission to Isle of Wight County as part of the applicant's rezoning request. This report provides findings and detail on the Fiscal Impact Analysis.

The overall finding is that the proposed development is fiscally positive to the County in total. The analysis factors in all variable revenues generated by the proposed development. All operating and capital costs attributable to the development are included in the analysis. Comparing available resources to projected costs reveals sufficient revenues to cover the projected expenditures. Operating and capital costs are projected separately to identify specific capital costs attributed to the development.

The twenty-year cumulative net fiscal impact is a surplus of approximately $20.9 million and an annual net surplus of approximately $1.2 million at the project's buildout.

BACKGROUND

TischlerBise is under contract with NVR, Inc. to conduct a fiscal impact analysis of the Sweetgrass development in Isle of Wight County, VA. This report reflects TischlerBise's fiscal impact analysis of the impact of the proposed development.

A fiscal impact evaluation analyzes revenue generation and operating and capital costs to a jurisdiction associated with the provision of public services and facilities to serve new development—residential, commercial, office, or industrial. It includes all direct revenues and costs associated with a specific development proposal. Unlike an economic impact analysis, it does not include spin-off, or indirect, impacts from development but rather identifies whether sufficient revenues will be generated from the new development to cover all related direct costs. For the Sweetgrass Development fiscal impact analysis, all General Fund services and facilities are included in the analysis.

This report intends to provide information to NVR, Inc. related to the fiscal impact of development of the project to identify appropriate values of potential proffers to Isle of Wight County. Any potential proffer would offset a negative fiscal impact on the County—specifically on capital facilities—thereby allowing the County to maintain current levels of service.

PROPOSED DEVELOPMENT PROGRAM

The fiscal impact analysis uses 2021 as the base year with projections over a 20-year period, with years shown throughout the study as "Years 1-20." The development assumptions and absorption were provided by NVR, Inc.

The development is anticipated to include 615 residential units with 390 age-restricted, single family detached units and 225 townhouses. An annual absorption of 65 age-restricted single family units per year and 38 townhouses is assumed in the analysis. This results in completion of the project in Year 6.

Figure 1. Sweetgrass Development Program

Land Use	Housing Units	Market Value	Annual Absorption (Housing Units per Year)
Age-Restricted Single Family Detached	390	$305,200	65
Townhome	225	$258,875	38
Total	**615**	**N/A**	**103**

Source: NVR/Ryan Homes

The above development program projects a growth of 1,458 persons and 52 public school students. A summary of the growth projections is provided below in Figure 2. Demand factors are detailed in the Appendix.

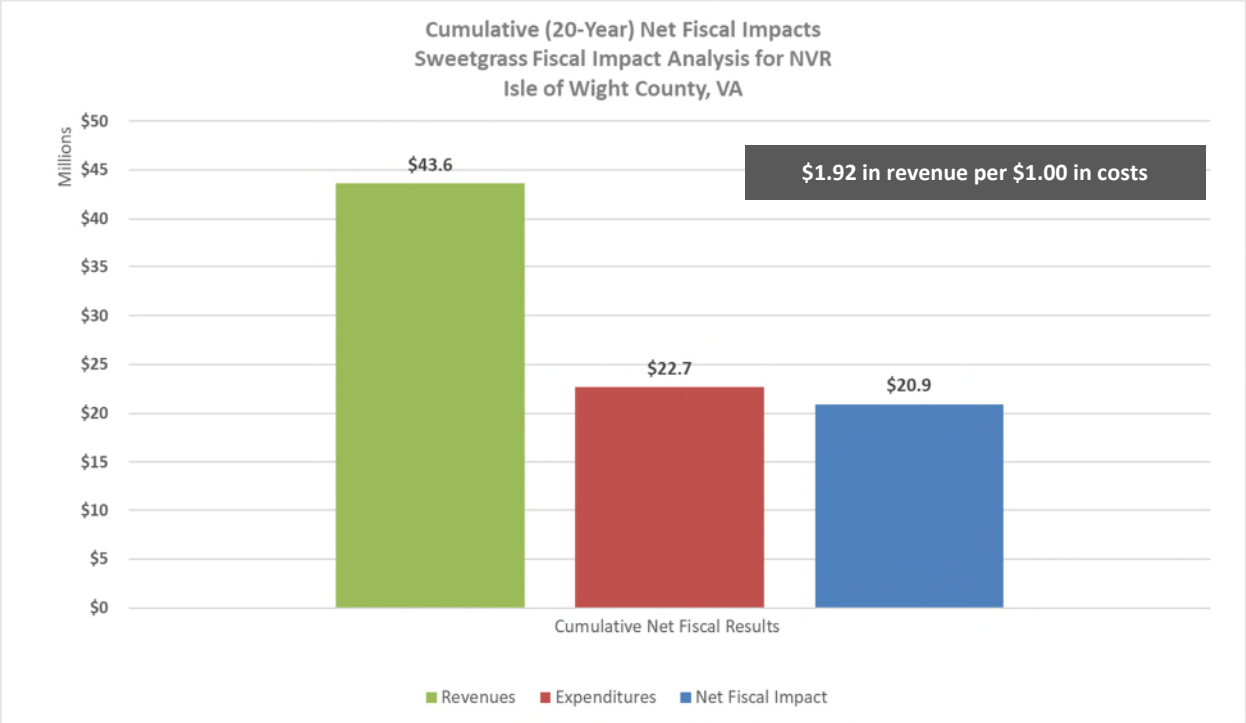
Figure 2. Sweetgrass Development Growth Projection

	Yeoman Tract (NVR)
Residential Units	
AGE-RESTRICTED, SINGLE-FAMILY DETACHED	390
TOWNHOUSE	225
TOTAL UNITS	**615**
POPULATION	**1,458**
TOTAL ENROLLMENT	**52**

SUMMARY OF FISCAL IMPACT ANALYSIS FINDINGS

The fiscal impact analysis determines that the Sweetgrass development generates sufficient revenues to offset projected costs—$1.92 in revenue for every $1.00 of costs. General Fund revenues are projected along with operating and capital impacts from the proposed development program.

Figure 3. Cumulative Net Fiscal Impact Results –Sweetgrass Development: All Revenues and Costs



In early years, lower net surpluses are generated by the Sweetgrass development due to higher ongoing capital expenditures (including debt service) and ongoing operating costs relative to revenues. However, cumulatively development results in fiscally sustainable conditions.

Capital improvements to serve new development are funded from the General Fund. The County has no dedicated capital revenues for non-utility capital improvements. Capital improvements are modeled primarily on an incremental basis and triggered when capacity is needed. A few capital facility categories are based on current or short-term planned improvements from which the proposed development will benefit. All combined, projected revenues are sufficient to cover operating and capital impacts from the development project.

SUMMARY OF APPROACH AND MAJOR ASSUMPTIONS

A fiscal impact analysis determines whether revenues generated by new growth are sufficient to cover the resulting costs for service and facility demands placed on the County. It is based on cost and revenue assumptions that reflect a community's current level of service. TischlerBise analyzed the fiscal impacts of the Sweetgrass Development scenario based on current countywide levels of service and any known infrastructure or service needs. A projection timeline of 20 years is used to show long-term trends.

The fiscal impact analysis conducted by TischlerBise incorporates a hybrid average/marginal cost approach wherever possible. The case study-marginal methodology is used in some instances; however, for smaller areas with discrete land use changes, impacts are often better analyzed using an average cost approach. This is different from a countywide fiscal analysis where facilities and other infrastructure needs are triggered and "built" once a threshold is reached, resulting in "lumpier" fiscal impact results. There are a few exceptions in this analysis, namely for current or planned improvements that are known to be needed due to capacity needs and will serve the growth from the Sweetgrass Development.

The assumptions outlined below are utilized along with the development projections to determine the potential fiscal impact to the County over the 20-year projection period. Calculations are performed using a customized fiscal impact model designed specifically for this assignment.

For this analysis, only costs to serve new growth are included. Both operating and capital costs are modeled. Some costs are not expected to be impacted by demographic changes, and may be fixed in this analysis. For example, this is true for some functions included under the Board of Supervisors budget. Other general items to note in the analysis:

- Operating costs are generally projected on an average basis with demand factors specific to the service being modeled. Personnel costs are modeled to reflect the fact that some types of positions (e.g., directors) are fixed and would not increase regardless of growth.
- Capital costs are projected on an incremental basis for most categories where capacity is needed with the exception of facilities currently being constructed or planned in the short-term. TischlerBise's experience conducting previous cash proffer studies for Isle of Wight County was helpful in this effort.
- Debt financing is assumed for capital improvements that are projected to serve growth.

LEVELS OF SERVICE

Cost projections are based on the "snapshot approach" in which it is assumed the current level of service, as funded in the County's FY2021-2022 budget, will continue through the projection period. Current

demand base data was used to calculate unit costs and service level thresholds. Examples of demand base data include population, dwelling units, employment by industry type, and jobs. In summary, the "snapshot" approach does not attempt to speculate about how levels of service, costs, revenues, and other factors will change over 20 years. Instead, it evaluates the fiscal impact to the County as it currently conducts business under the present budget.

Revenues are projected assuming that the current revenue structure and tax rates, as defined by the FY21-22 budget, will not change during the analysis period. Of particular note are the following:

- County property tax is modeled based on the cumulative assessed value of the planned residential development. The County's FY21-22 adopted tax rate of $.85 per $100 in property value.
- Personal property taxes are projected on a per capita and per job basis (and adjusted for Isle of Wight collections).

Enterprise operations such as the County's water and wastewater utilities are included in this analysis reflecting the portion of utility operating costs that are funded through the General Fund. The fiscal impact analysis assumes the level of operating subsidy continues into the future. Utility capital expenditures are assumed to be covered by private developers and therefore not included as a cost to the County.

Specific assumptions pertaining to any unique treatment of revenue and cost factors are discussed wherever relevant throughout the body of this report.

INFLATION RATE

The rate of inflation is assumed to be zero throughout the projection period, and cost and revenue projections are in constant 2021 dollars. This assumption is in accord with current budget data and avoids the difficulty of forecasting as well as interpreting results expressed in inflated dollars. In general, including inflation is complicated and unpredictable. This is particularly the case given that some costs, such as salaries, increase at different rates than other operating and capital costs such as contractual and building construction costs. And these costs, in turn, almost always increase in variation to the appreciation of real estate. Using constant 2021 dollars reinforces the snapshot approach and avoids these problems.

NON-FISCAL EVALUATIONS

It should be noted that while a fiscal impact analysis is an important consideration in planning decisions, it is only one of several issues that should be considered. Environmental and social issues, for example, should also be considered when making planning and policy decisions. In addition, economic development goals such as the ability to provide suitable locations for future employment growth should be taken into consideration when making land use decisions. The above notwithstanding, this analysis will enable interested parties to understand the fiscal implications of future development and particularly the proposed Sweetgrass development.

PROJECTION FACTORS

Projection methodologies and factors are based on our previous fiscal studies for the County and discussed where applicable in the body of this report. All variable operating costs and revenues are projected. Detail is provided in the Appendix.

FISCAL IMPACT RESULTS

Results of the fiscal impact analysis are provided in this chapter. It should be reiterated that the fiscal results include revenues and costs to serve the proposed development only.

Our results are summarized in several ways:

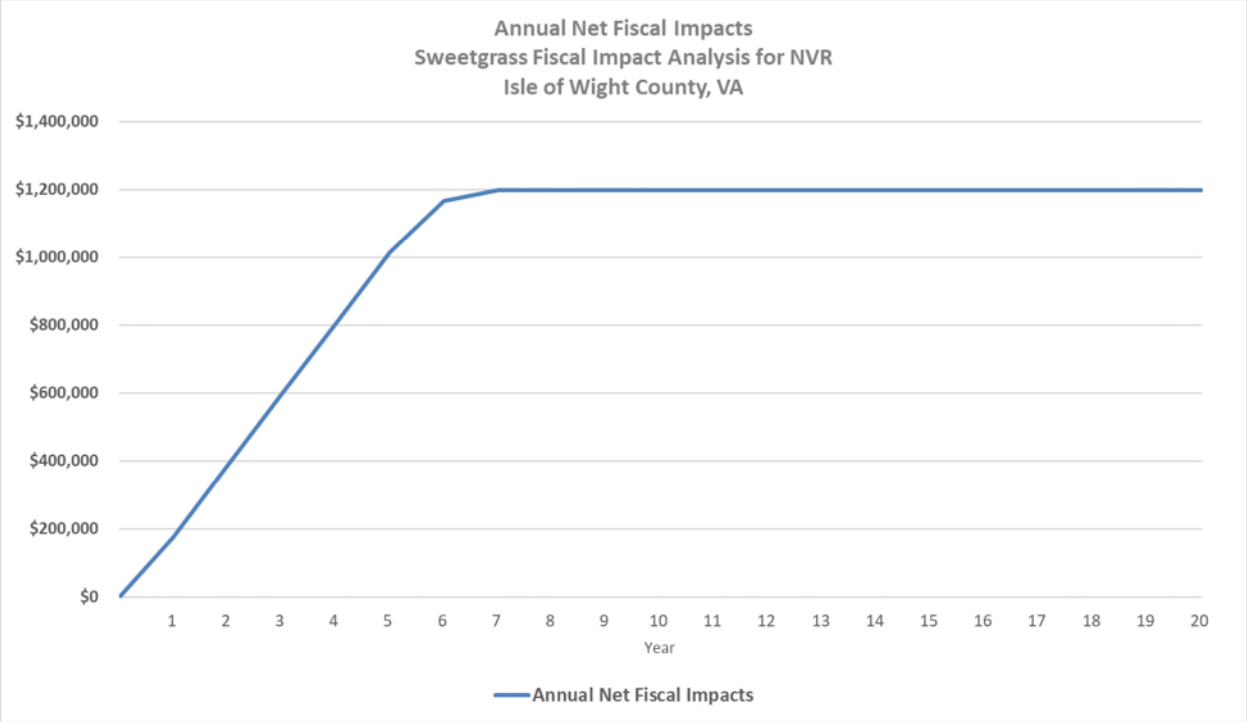
- **Annual** net fiscal results are shown first that include all revenues and costs in the funds included in the analysis in each year. Two charts are provided:
  - Combined operating and capital from the proposed development
  - Revenue compared to operating and capital impacts
- Results are then shown in a series of bar charts depicting **cumulative** net fiscal impact results
  - Cumulative net fiscal impact results convey the projected grand total revenues minus grand total expenditures over the 20-year period from the proposed development.
- The third section provides **average annual** fiscal impact results.
  - The average annual net result conveys an average impact over three time periods (Years 1-10, Years 11-20, and over the entire 20-year period).

ANNUAL NET FISCAL IMPACTS

The charts below show the annual net fiscal results to the County for the two scenarios over the 20-year development period. By showing the annual results, the magnitude, rate of change, and timeline of deficits and revenues can be observed over time. The "bumpy" nature of the annual results during particular years represents the opening of capital facilities and/or major operating costs being incurred.

Net fiscal results are **revenues minus costs in each year**, including operating and capital costs. Data points above the $0 line represent annual surpluses; points below the $0 line represent annual deficits. Surpluses in any one year are not carried forward to the next year.

Figure 4. Annual Net Fiscal Impact Results: Combined Results

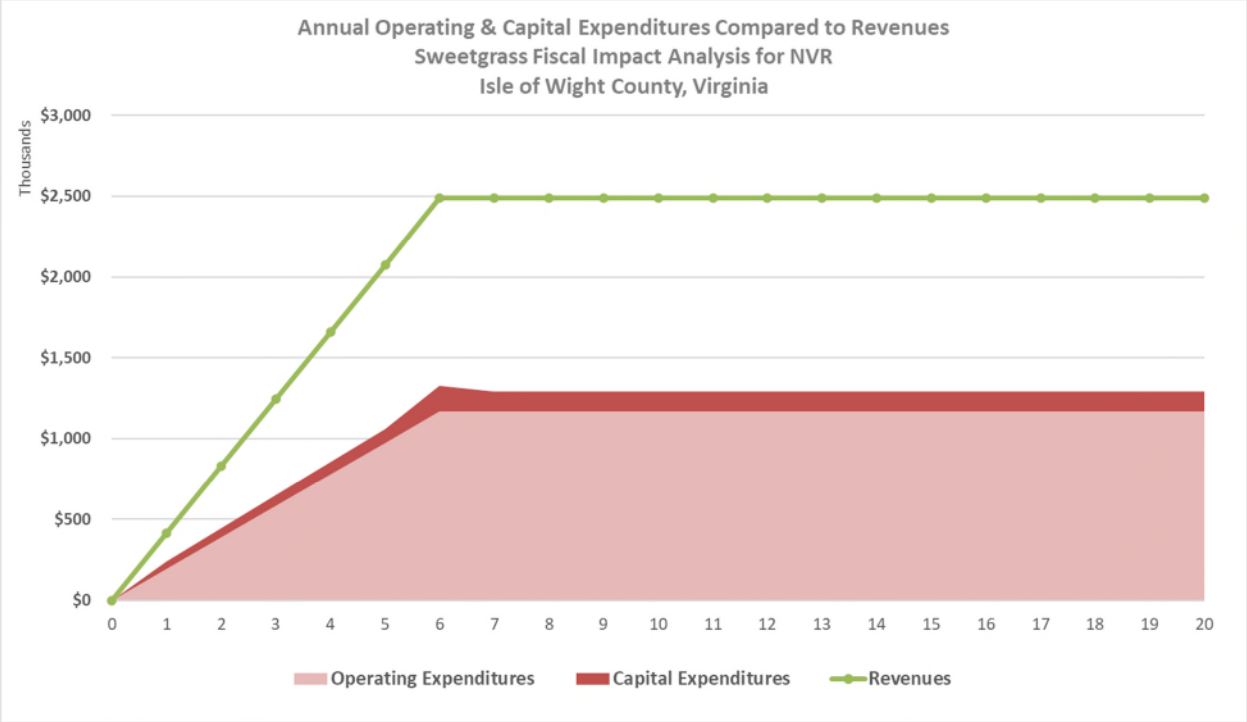


- Revenues are sufficient to cover operating and capital impacts from the proposed development.
- Each year includes the revenues generated from the proposed development minus the operating and capital costs in that same year.
- Capital improvements are assumed to be debt financed with several that are incurred in each year. Those yearly capital expenditures include:
    - Education: New Elementary School, School Administration Facility, School Fleet Bus Garage Addition
    - Sheriff Vehicles; E-911 Communication System
    - Transportation projects
- Some capital impacts are projected at the time of buildout. Year 6 reflects the projected buildout of the project. The capital expenditure triggered at that time are:
    - Parks and Recreational facilities

For further detail, the analysis segregates operating and capital impacts compared to projected revenue generation. The following figure illustrates the comparison between revenues and operating and capital expenditures.

As shown, sufficient revenues are generated in each year to cover operating and capital costs.

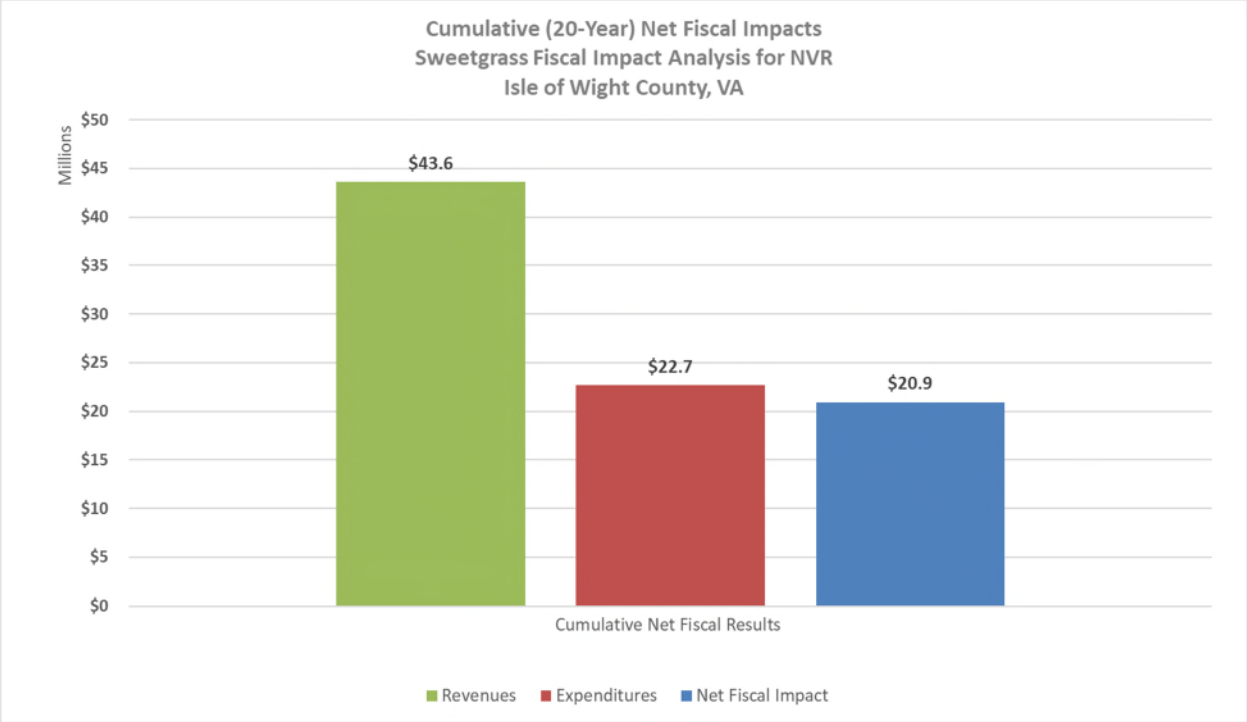
Figure 5. Annual Net Fiscal Impact Results: Revenues Compared to Operating and Capital Costs



CUMULATIVE NET FISCAL IMPACTS

Results are presented on a **cumulative** basis reflecting grand total revenues over the 20-year period minus grand total expenditures over the 20-year period.

Figure 6. Cumulative Net Fiscal Impact Results

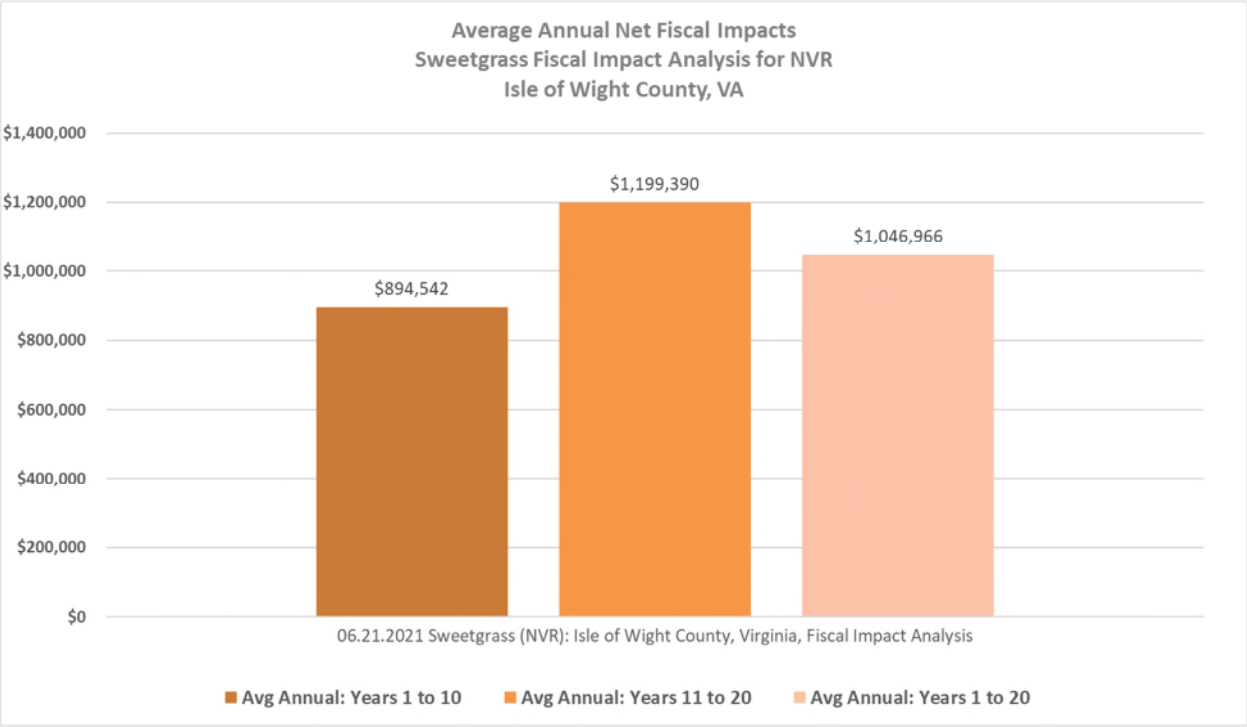


- As shown, $43.6 million in revenue is projected compared to $22.7 million in expenditures over the 20-year projection period. This generates a $20.9 million net surplus.
- Costs include ongoing annual operating expenditures and capital costs that include debt financing with payments that continue beyond the last year in the model projection period.

AVERAGE ANNUAL NET FISCAL IMPACTS

For further information, results are also presented on an **average annual** basis—in three time-period increments (First ten years, second ten years, and then over the total projection period, Years 1-20.)

Figure 7. Average Annual Net Fiscal Impact Results



- As shown in Figure 7, average annual fiscal results average approximately $1.05 million per year over the projection period with the second half of the period generating slightly better fiscal results.
- The first half of the projection period generates lower average annual fiscal results due to higher operating and capital expenditures relative to revenues during this period.

REVENUE AND EXPENDITURE PROJECTIONS

A summary of projected revenues and costs from the proposed Sweetgrass Development to the County are provided below. These figures are based on the development projections as summarized above along with the revenue and cost factors described elsewhere in this report.

Revenues

REVENUE PROJECTION METHODOLOGIES

County General Fund revenues are projected from the proposed development program. A summary of projection methodologies is shown below in Figure 8. Other items to note regarding revenue projections are:

- Property taxes are projected based on average assessed values per housing unit shown below:

Land Use	Housing Units	Market Value	Annual Absorption (Housing Units per Year)
Age-Restricted Single Family Detached	390	$305,200	65
Townhome	225	$258,875	38
Total	**615**	**N/A**	**103**

- Other revenues from the proposed residential development are projected on a per capita or per job basis.(Exceptions and/or adjustments are noted.)
- Some revenues are not affected by growth and are considered "fixed" in this analysis as shown in Figure 8.

Figure 8. Revenue Projection Methodologies

				ALLOCATION APPROACH			
Revenue Category	*Revenue Name*	*FY22 Budget $*	*% of Total*	RESIDENTIAL (Per Capita)	NONRESIDENTIAL (Per Job)	CUSTOM	FIXED
Property Taxes	Real property	$41,170,000	50%			X (Assessed Value)	
	Public service property	$1,759,000	2%				X
	Personal property - vehicles	$11,240,000	14%	X (90% from resid.)			
	Personal property - mobile homes	$167,000	0%				X
	Personal property - boats & airplanes	$108,000	0%				X
	Personal property - machinery & tools	$5,000,000	6%		X		
	Personal property - equipment	$1,905,000	2%		X		
	Penalty & interest on taxes	$570,000	1%			X (Assessed Value)	
Other Local Taxes	Local sales & use	$3,250,000	4%	X	X		
	Communications sales & use tax	$635,000	1%	X (Non-Town)	X (Non-Town)		
	Consumer utility tax	$985,000	1%	X (Non-Town)	X (Non-Town)		
	Consumption tax	$120,000	0%	X (Non-Town)	X (Non-Town)		
	Business license tax	$832,000	1%		X		
	Lodging tax	$64,000	0%				X
	Meals tax	$530,000	1%	X	X		
	Motor vehicles license tax/fee	$1,061,000	1%	X (Non-Town)			
	Cable franchise fees	$0	0%				X
	Bank stock tax	$11,000	0%				X
	Recordation & probate tax	$0	0%	X	X		
	Penalty & interest on taxes	$10,000	0%				X

Licenses, Permits & Fees	Animal license	$40,000	0%	X			
	Land use application fee	$0	0%	X	X		
	Zoning use & subdiv. Ord. fee	$75,000	0%	X	X		
	Building permits & fees	$500,000	1%	X	X		
	Concealed weapon permit fee	$40,000	0%	X			
	Land transfer fees	$1,000	0%	X	X		
	Inspections technology fee	$18,000	0%	X	X		
	Solid waste franchise fee	$30,000	0%	X	X		
Fines & Forfeitures	Court fines & forfeitures	$115,000	0%	X			
	Interest - court fine & forft.	$4,000	0%				X
	County code violations	$10,000	0%	X	X		
Use of Money & Property	Interest revenue	$300,000	0%				X
	Property rental	$185,000	0%				X
	Gain/loss on investments (PACE)	$0	0%				X
Charges for Services	Set off collection feeds	$75,000	0%	X	X		
	Finance administration fee	$1,000	0%	X	X		
	Court security fee	$65,000	0%	X	X		
	Sheriff's fee	$2,000	0%	X	X		
	Sheriff extradition revenue	$7,000	0%	X	X		
	Law library fees	$8,000	0%	X	X		
	Building const. court fees	$15,000	0%	X	X		
	Courthouse constrution fees	$20,000	0%	X	X		
	Reimb. For court appointed atty.	$2,000	0%	X	X		
	Commonwealth attorney's fees	$3,000	0%	X	X		
	Criminal check & incident report	$1,000	0%	X	X		
	Fingerprinting	$1,000	0%	X	X		
	Animal adoption fees	$30,000	0%	X			
	Miscellaneous charges for srvc.	$0	0%	X	X		
	EMS revenue recovery	$900,000	1%			X (Fire and EMS Calls)	
	Walking tours income	$0	0%				X
	Recreation and special event fees	$319,885	0%	X			
	Treasurer admin. Fees	$160,000	0%	X	X		
	Tourism	$9,080	0%	X	X		
Recovered Cost	Insurance reimbursements	$50,000	0%				X
	DSS indirect cost allocation	$387,576	0%				X
	Smithfield tourism recovered cost	$279,892	0%				X
	Smithfield debt service	$51,453	0%				X
	PU indirect cost	$230,722	0%				X
	SW indirect cost	$67,382	0%				X
	Miscellaneous	$0	0%				X
Recovered Cost	Borrow pit contribution	$50,000	0%				X
	Treasurer admin. Fees	$0	0%				X
	RAD-Emergency program	$0	0%				X
	Gifts and donations	$500	0%				X
	Animal control donations	$0	0%				X
	Sale of photocopies/maps	$10,000	0%				X
	P-card rebate	$30,000	0%				X
	Miscellaneous	$10,000	0%				X
	Sale of recyclables	$45,000	0%				X
	E-payables rebate	$11,000	0%				X
	Farmer's market fees + sponsors	$38,475	0%				X
	Vintage Market	$40,775	0%				X
	Build America Subsidy 2010C	$0	0%				X
	2011 QSCB Subsidy	$337,000	0%				X
Noncategorical Aid	Auto rental tax	$35,000	0%	X	X		
	Rolling stock tax	$42,000	0%	X	X		
	Mobile home tilting tax	$45,000	0%				X
	Grantor's tax	$135,000	0%	X	X		
	State PPTR	$5,115,890	6%	X			
Shared Expenses	Commonwealth attorney shared expenses	$421,529	1%				X
	Sheriff shared expenses	$1,332,259	2%				X
	Commissioner shared expenses	$158,295	0%				X
	Treasurer shared expenses	$140,162	0%				X
	Registrar/electoral board shared expenses	$58,290	0%				X
	Clerk of Circuit Court shared expenses	$291,573	0%				X
	Technology trust funds	$40,284	0%				X
State Aid	LOVEworks VTC grant	$0	0%				X
	Crush Friday VTC grent	$0	0%				X
	Fire Programs Fund	$93,000	0%				X
	Four for Life	$47,000	0%				X
	Local Government Challenge grant	$0	0%				X
Federal Aid	Federal grant revenue (Hurricane Matthew)	$0	0%				X
	Homeland Security grant	$0	0%				X
TOTAL		**$81,949,022**	**100%**				

REVENUE PROJECTIONS

Cumulative revenues to the County generated by the project are shown for a twenty-year cumulative period. The revenues shown in Figure 9 reflect all revenues (for operating and capital purposes) projected from the development.

Figure 9. Cumulative County Revenues (Years 1-20)

Cumulative General Fund Revenue Detail (Years 1-20) **06.21.2021 Sweetgrass (NVR): Isle of Wight County, Virginia, Fiscal Impact Analysis**		
	SCENARIO	
Category	**Sweetgrass (NVR)**	**%**
Property Taxes	$33,550,312	77%
Other Local Taxes	$5,125,424	12%
Licenses, Permits & Fees	$387,892	1%
Fines & Forfeitures	$82,659	0%
Use of Money & Property	$0	0%
Charges for Services	$900,006	2%
Recovered Cost	$0	0%
Miscellaneous Services	$0	0%
Noncategorical Aid	$3,552,482	8%
Shared Expenses	$0	0%
State Aid	$0	0%
Federal Aid	$0	0%
TOTAL	**$43,598,775**	**100%**

Expenditures

EXPENDITURE PROJECTION METHODOLOGIES

County operating and capital expenditures are projected from the proposed development program. Projection methodologies are shown below in Figure 10 . Other items to note regarding expenditure projections are:

- School operating expenditures are projected in **Transfers (Schools)** and based on an increase in enrollment from the proposed development. The Appendix includes student generation rate assumptions.

- School costs reflect the **funding provided by Isle of Wight County to the Isle of Wight Public Schools only and does not include state or federal funding** that comprises the full amount of the Public Schools' budget. Funding from the County equals approximately 42 percent of the School District's Operating expenditures.

- Public Safety expenditures are projected based on a projection of calls for service from new development. See the Appendix for further detail.

- Some expenditures are not affected by growth and are considered "fixed" in this analysis as shown in Figure 10.

Figure 10. Expenditure Projection Methodologies

				ALLOCATION APPROACH			
Expenditure Category	*Expenditure Name*	*FY22 Budget $*	*% of Total*	RESIDENTIAL (Per Capita)	NONRESIDENTIAL (Per Job)	CUSTOM	FIXED
General Administration	Board of Supervisors	$329,600	0.4%				X
	County Administrator	$483,251	0.6%	X	X		X
	County Attorney	$575,348	0.7%	X	X		X
	Human Resources	$394,837	0.5%				X
	Registrar	$391,778	0.5%	X			X
Financial Administration	Commissioner of Revenue	$765,696	0.9%	X	X		
	Real Estate Assessment	$288,900	0.3%	X	X		X
	Treasurer	$891,035	1.1%	X	X		X
	Budget and Finance	$802,014	1.0%	X	X		X
	Purchasing	$171,368	0.2%				X
Judicial	Circuit Court	$89,388	0.1%	X			X
	General District Court	$26,066	0.0%	X			
	Western Tidewater Community Corrections	$18,926	0.0%	X			
	Juvenile Accountability Program	$2,500	0.0%	X			
	Juvenile Domestic Relations Court	$12,575	0.0%	X			
	Clerk of Circuit Court	$598,133	0.7%	X			X
	Fifth District Court Services	$200,100	0.2%	X	X		
	Commonwealth Attorney	$840,042	1.0%	X	X		
Public Safety	Sheriff	$5,203,463	6.2%			X (Sheriff Calls for Service)	
	Emergency Services	$516,222	0.6%			X (Fire & EMS Calls for Service)	
	Fire & Rescue	$4,717,530	5.6%			X (Fire & EMS Calls for Service)	
	Western Tidewater Jail	$1,293,333	1.5%	X			
	Inspections	$739,804	0.9%	X	X		
	Animal Control	$594,840	0.7%	X			
Public Works	Public Works Administration	$318,110	0.4%	X	X		
	Public Works Transportation	$283,365	0.3%	X	X		
	Public Works Refuse	$2,902,214	3.5%	X	X		
	Public Works Buildings & Grounds	$1,478,908	1.8%	X	X		
	Public Works Capital Program Inspection	$76,613	0.1%				X
Parks, Recreation, Grounds	Parks & Recreation Administration	$265,736	0.3%	X			
& Cultural	Parks & Recreation Gateways & Grounds	$1,001,054	1.2%	X			
	Parks & Recreation Programs	$750,285	0.9%	X			
	Library	$891,490	1.1%	X			
Community Development	Planning & Zoning	$830,146	1.0%	X	X		
	Economic Development	$1,044,087	1.2%		X		
	Tourism	$577,222	0.7%	X	X		X
	Farmers Market	$42,220	0.1%				X
	Communications	$78,648	0.1%	X	X		
	Cooperative Extension Service	$73,823	0.1%				X
Non-Departmental	Non-Departmental	$3,667,903	4.4%				X
	Transfers (Non-Schools)	$7,056,445	8.4%	X	X		
	Transfers (Schools)	$26,422,734	31.6%	X (Enrollment)			
Debt Service	Debt Service	$13,346,056	16.0%				X^
Other Public Services	Other Public Services	$2,500,400	3.0%	X	X		X
	TOTAL	**$83,554,208**	**100.0%**				

** If "FIXED" marked along with other columns, a portion of the departmental expenditure is assumed to not be affected by the development; this is typically personnel costs.*
^ Capital expenditures projected separately.

EXPENDITURE PROJECTIONS

Cumulative County expenditures generated by the project are shown below cumulatively for Years 1-20. Operating expenditures are shown in Figure 11; capital expenditures are shown in Figure 12.

Figure 11. Cumulative County Operating Expenditures

Cumulative Operating Expenditures (Years 1-20) **06.21.2021 Sweetgrass (NVR): Isle of Wight County, Virginia, Fiscal Impact Analysis**		
	SCENARIO	
Category	**Sweetgrass (NVR)**	**%**
General Administration	$86,865	0.4%
Financial Administration	$307,015	1.5%
Judicial	$468,925	2.3%
Public Safety	$6,134,561	30.0%
Public Works	$2,781,896	13.6%
Education	$4,250,282	20.8%
Parks, Recreation, Grounds & Cultural	$1,860,367	9.1%
Community Development	$514,634	2.5%
Other Public Services	$489,840	2.4%
Debt Service*	$0	0.0%
Non-Departmental^	$3,559,651	17.4%
TOTAL	**$20,454,036**	**100%**

** Capital expenses projected separately*

^ Includes transfer to Public Utilities

Figure 12. Cumulative County Capital Expenditures

20-Year Cumulative Total Capital Expenditures **06.21.2021 Sweetgrass (NVR): Isle of Wight County, Virginia, Fiscal Impact Analysis**		
	SCENARIO	
Category	**Sweetgrass (NVR)**	**%**
Education	$1,135,478	51%
General Government	$0	0%
Parks and Recreation	$757,131	34%
Sheriff	$284,139	13%
Fire	$0	0%
Transportation	$28,675	1%
TOTAL	**$2,205,422**	**100%**

Approach to Modeling Capital Impacts

Capital expenditures are modeled using the following criteria:

- The demand from the development project create a new demand for additional capacity.
- The County does not currently have capacity to accommodate the additional demand.
- There are current/future plans by the County to build or purchase the capital need to provide additional capacity.
- The current or planned capital expenditure is anticipated to be funded by the County (as opposed to being provided by private development or funded from other sources).

A summary of the projected capital improvements and costs are shown below in Figure 13. Additional detail is provided below the figure.

Figure 13. Summary of Capital Needs and Cost

	20-Year Cumulative Total Capital Needs and Costs **06.21.2021 Sweetgrass (NVR): Isle of Wight County, Virginia, Fiscal Impact Analysis**				
	Category	**SCENARIO** **Sweetgrass (NVR)**			
		Unit of Measure	*Demand*	*Capacity Needed*	*Cost ($000s)**
EDUCATION	Elementary School	Seat	30.2	19.4	$1,119,384
	Middle School	Seat	7.0	0.0	$0
	High School	Seat	14.6	0.0	$0
	School Buses	$			$0
	School Admin Facilities	$			$0
	School Fleet Bus Garage Addition	$			$16,094
GEN GOVT	General Government	Sq. Ft.	n/a	0.0	$0
	Court Facility	Sq. Ft.	n/a	0.0	$0
	Capital Maintenance (Growth Share)	$			$0
PARKS & REC / CULTURAL	Improved Park Land	Acre	7.4	7.3	$71,552
	Improved Park Improvements	Acre	7.4	7.3	$580,838
	Recreation Facilities	Sq. Ft.	178.8	178.8	$104,740
	Trails	$			$0
	Vehicles/Equipment	Vehicle	n/a	0.0	$0
SHERIFF	Sheriff Buildings	Sq. Ft.	n/a	0.0	$0
	Animal Control	Sq. Ft.	0.0	0.0	$0
	Sheriff Vehicles/Equipment	Vehicle	1.5	1.5	$106,317
	E-911 Comm System	$			$177,821
FIRE & RESCUE	Fire Stations & Rescue Stations	Sq. Ft.	n/a	0.0	$0
	Fire Apparatus/Equipment	Vehicle	n/a	0.0	$0
	Rescue Apparatus/Equipment	Vehicle	n/a	0.0	$0
TRANSPO.	Transportation Projects	$			$28,675
				TOTAL	**$2,205,422**

** Reflects cumulative capital costs from the project over the 20-year projection period, including principal and interest.*

Education

Additional school capacity needed to serve the Sweetgrass Development is projected based on the above criteria. The schools serving the proposed development are highlighted below. (Note: Enrollment data from the 2020-21 school year is not used because of the likely effects on public school enrollment from COVID-19.)

Figure 14. Isle of Wight Public Schools

	in All Schools[1]	*County School Capacity [2]*	*School Util %*	*Seats Avail*	*PROJ. by Scen*	*$ per Seat [3]*	*Seats Needed by Scen*
ELEM (K-6)	*2,811*	*3,165*	*89%*	*354*			
Carrollton Elem (PreK-3)	710	682	104%	-28	19.4	$43,005	19.4
Carrsville Elem (PreK-5)	247	310	80%	63			
Hardy Elem (PreK-5)	517	657	79%	140			
Westside Elem (4-6)	760	849	90%	89	10.8	$43,005	0
Windsor Elem (PreK-5)	577	667	87%	90			
MS	*1,030*	*1,169*	*88%*	*139*			
Georgie Tyler Middle (6-8)	434	535	81%	101			
Smithfield Middle (7-8)	596	634	94%	38	7.0		0
HS	*1,789*	*2,463*	*73%*	*674*			
Smithfield High (9-12)	1,267	1,588	80%	321	14.6	$45,206	0
Windsor High (9-12)	522	875	60%	353			
Total	***5,630***	***6,797***	***83%***	1,167	**51.8**		**19**

[1] Virginia Dept of Education, Fall Membership Report of Isle of Wight County Schools, 2019-20 (enrollment as of Sept. 30, 2019).
[2] Isle of Wight County Schools Facility Capacity, 02/08/19
[3] Isle of Wight current cost estimates ($2021)

- Isle of Wight in FY 2025-26 plans to construct a new elementary school, valued at approximately $38.8 million
- One support facility for Isle of Wight Public Schools is included in the County FY2020-2029 CIP – Fleet/Bus Garage addition. Costs to serve the proposed Sweetgrass project are based on the cost per student for the County's contribution for the capital project.
    - Fleet Bus Garage: $2,500,000 divided by divided by planned capacity of the system over the life of the CIP 8,0476 (current capacity of 6,797 plus 1,250 additional seats) = $311 per student

General Government

No current or future capacity expansions are anticipated by the County for General Government facilities.

Parks and Recreation

Additional park and recreation improvements are projected to serve the proposed development. The projection is based on the County's current levels of service as follows:

- 5.1 acres per 1,000 persons of active parks (192 acres active parks / 37,945population x 1,000) at $77,500 per acre for land and improvements
- 123 square feet per 1,000 persons of recreation facility space (4,656 / 37,333 population x 1,000) at $508 per square foot for recreational facility expansion.

- Trails expansions are not included as a County cost as projects in the latest County Capital Improvement Program (FY2020-2029) are identified as being funded from private entities.

Sheriff

- Additional sheriff vehicles are projected based on current levels of service of 5.3 vehicles per 1,000 calls for service (48 sheriff vehicles / 9,393 Sheriff calls x 1,000). The cost per vehicle is $60,500 (inflated to 2021 dollars from Isle of Wight Cash Proffer Study, 2012).

Fire and Rescue

No current or future *capacity* expansions are anticipated by the County for Fire and/or Rescue facilities. (Other capital expenditures for replacement (non-growth related) vehicles are listed in the CIP.)

Transportation

The County FY2020-2029 CIP identifies anticipated local expenditures of $900,000 on future system level capacity transportation improvements. To determine the Sweetgrass Development's share of the costs, TischlerBise analyzed future Countywide growth (based on our 2012 Cash Proffer Study) and identified that 50 percent of the costs are due to growth, or $450,000. This cost is allocated to future increase in vehicle trips throughout the County (base year trips are 101,790; a 50 percent increase equals 50,895). The cost per trip allocated to new development is $8.00 (truncated) ($450,000 / 59,344).

The Sweetgrass Project is projected to generate 2,664 trips. Costs are projected based on $8.00 per trip. With debt financing, total 20-year costs equal $21,314.

APPENDIX: DEMOGRAPHIC & DATA ASSUMPTIONS

BASE YEAR DATA

The table below summarizes estimates of the base year population, housing units, employment, nonresidential space, and facility factors in Isle of Wight County. These estimated values serve as the basis for the fiscal impact analysis and are used to determine the cost and revenue factors used in the analysis.

Figure 15. Base Year Input Data

		Base Year->	2021
Population [1]	POPULATION		37,945
	POP AND JOBS		47,638
	NON-TOWN POPULATION		26,758
	NON-TOWN POP AND JOBS		27,926
Housing Units by Type [2]	SINGLE FAMILY		12,507
	TOWNHOUSE		730
	APARTMENTS		1,272
	MOBILE HOME		1,847
	TOTAL HOUSING		16,356
	SF UNITS		15,083
Jobs by Type [3]	OFFICE JOBS		2,577
	RETAIL JOBS		1,908
	INDUSTRIAL JOBS		3,930
	INSTITUTIONAL JOBS		1,125
	HOTEL JOBS		94
	SELF-EMPLOYED JOBS		59
	TOTAL JOBS		9,693
	RETAIL, OFFICE, IND JOBS		8,568
Nonresidential Floor Area [2]	OFFICE SF		775,666
	RETAIL SF		954,000
	INDUSTRIAL SF		1,702,812
	INSTITUTIONAL SF		1,472,197
	HOTEL SF		82,907
	TOTAL NR KSF		4,987,582
Vehicle Trips [4]	RESIDENTIAL TRIPS		73,880
	NONRES TRIPS		27,910
	VEHICLE TRIPS		101,790

Facility Factors	[5]	PARK ACRES	3,068
	[5]	FACILITY SF	321,287
Public Safety Factors	[5]	TOTAL SHERIFF CALLS	9,099
	[5]	TOTAL FIRE CALLS	5,608
		TOTAL EMS CALLS	0
	[5]	TOTAL FIRE AND EMS CALLS	5,608
School Factors [9]		ELEM ENROLLMENT	2,811
		MS ENROLLMENT	1,030
		HS ENROLLMENT	1,789
		TOTAL ENROLLMENT	5,630
Fiscal Factors	[6]	CUMUL AV	$4,646,536,085
		SMITHFIELD JOBS	6358
		WINDSOR JOBS	2,167
	[7]	COUNTY ENROLLMENT	5,630
		COUNTY EMPLOYEES	210

[1] Weldon Cooper Center, July 1, 2020 estimate.
[2] Weldon Cooper Center, July 1, 2020 estimate; percentage distribution from US Census ACS, 2015-2019
[3] QCEW - Bureau of Labor Statistics, 2020 Annual Averages, All establishment sizes.
[4] TischlerBise; ITE.
[5] Isle of Wight County
[6] Isle of Wight County, CAFR FY17
[7] Isle of Wight County Public Schools

HOUSEHOLD SIZE

Household size is used to project population over the planning horizon. Figure 16 shows household size assumptions by type of unit, categorized by type of unit included in the analysis.

Figure 16. Household Size

Household Size
Persons per Housing Unit

Type of Unit	*Persons [3]*	*Housing Units [3]*	*PPHU*	*Households [3]*	*PPHH*	
Single Family [1]	29,698	12,551	2.37	11,676	2.54	80%
Multifamily [2]	3,059	1,358	2.25	1,341	2.28	9%
Mobile Homes	3,613	1,769	2.04	1,570	2.30	11%
Total	**36,370**	**15,678**	**2.32**	**14,587**	**2.49**	100%

[1] Includes Single Family Detached, Attached, and Mobile Homes.
[2] Includes Structures with 2+ Units.
[3] U.S. Census Bureau 2015-2019 American Community Survey 5-Yr Estimates

PUBLIC SCHOOL STUDENTS PER HOUSING UNIT

Student generation rates for Isle of Wight Public Schools are from the study "Isle of Wight County Schools Student Yield & Subdivision Analysis" conducted for the school district by Cooperative Strategies in April 2018. It is assumed that age-restricted single family housing will not generate new students. Rates are shown in Figure 17.

Figure 17. Isle of Wight County Public Schools Pupil Yields per Housing Unit

Student Yields

	Elem (PK-3)	*Elem (4-6)*	*Mid (7-8)*	*High (9-12)*	***TOTAL***
Single Family	0.104	0.080	0.059	0.125	**0.368**
Age-Restricted Single Family	0.000	0.000	0.000	0.000	**0.000**
Town Home	0.086	0.048	0.031	0.065	**0.230**
Multifamily (Apartment)	0.156	0.090	0.037	0.105	**0.388**

Note: Figures may not sum to totals shown due to rounding.
Source: Cooperative Strategies, "Isle of Wight County Schools Student Yield & Subdivision Analysis," April 2018.

VEHICLE TRIPS

Vehicle trips are used to project some operating and capital expenditures in the fiscal impact analysis. Average Weekday Vehicle Trip Ends by type of development (or trip generation rates) are from the reference book, *Trip Generation, 10TH Edition*, published by the Institute of Transportation Engineers (ITE), in 2017. A "trip end" represents a vehicle either entering or exiting a development (as if a traffic counter were placed across a driveway). Trip rates have been adjusted to avoid overestimating the number of actual trips because one vehicle trip is counted in the trip rates of both the origination and destination points. A simple factor of 50 percent has been applied to Residential and the Office and Industrial categories. The Retail category has a trip factor of less than 50 percent because this type of development attracts vehicles as they pass-by on arterial and collector roads. For example, when someone stops at a convenience store on their way home from work, the convenience store is not their primary destination.

Trip rates and adjustment factors are shown in the figure. Using trips generated from single family units as an example, the formula is as follows: 12,507 units x 9.44 vehicle trips per unit x 50% adjustment = 59,032. As shown in Figure 18, residential development accounts for an estimated 73 percent of total daily trips and nonresidential development accounts for an additional 27 percent.

Figure 18. Vehicle Trips

Residential Vehicle Trips on an Average Weekday			
Residential Units	*Assumptions*		
Single Family	12,507		
Townhouse	730		
Apartments	1,272		
Mobile Home	1,847		
Average Weekday Vehicles Trip Ends Per Unit [1]			*Trip Factor*
Single Family	9.44		50%
Townhouse	7.32		50%
Apartments	5.44		50%
Mobile Home	9.44		50%
Residential Vehicle Trip Ends on an Average Weekday			
Single Family	59,032		
Townhouse	2,671		
Apartments	3,461		
Mobile Home	8,716		
TOTAL RESIDENTIAL TRIPS	***73,880***		*73%*
Nonresidential Vehicle Trips on an Average Weekday			
Nonresidential Gross Floor Area (1,000 sq. ft.) [2]	*Assumptions*		
Office	776		
Retail	954		
Industrial	1,703		
Institutional	1,472		
Hotel	83		
Average Weekday Vehicle Trip Ends per 1,000 Sq. Ft. [1]		*Trip Factors*	
Office	9.74		50%
Retail	37.75		34%
Industrial	4.96		50%
Institutional	9.74		50%
Hotel	11.94		50%
Nonresidential Vehicle Trips on an Average Weekday			
Office	3,777		
Retail	12,245		
Industrial	4,223		
Institutional	7,170		
Hotel	495		
TOTAL NONRESIDENTIAL TRIPS	***27,910***		*27%*
TOTAL TRIPS	**101,790**		*100%*

[1] Trip rates are from the Institute of Transportation Engineers (ITE) Trip Generation Manual, 2017.

PUBLIC SAFETY COST ALLOCATION APPROACH

Public safety costs are allocated to residential and nonresidential development using a proportionate share methodology.

Proportionate Share Calculation

A proportionate share calculation allocates demand from residential and nonresidential development based on characteristics of population, labor force, and jobs in the County. Based on this analysis and shown in Figure 19, 77 percent demand is from residential development and 23 percent from nonresidential development.

Figure 19. Proportionate Share Factors

Demand Units						
Residential					***Demand Hours/Day***	***Person Hours***
	Population	37,945				
	Residents Not Working		20,693		20	413,860
	Employed Residents		17,252			
	Employed in Isle of Wight County			3,243	14	45,402
	Employed outside Isle of Wight County			14,009	14	196,126
					Residential Subtotal	655,388
					Residential Share	**77%**
Nonresidential						
	Non-working Residents		20,693		4	82,772
	Jobs Located in Isle of Wight County		10,786			
	Residents Employed in Isle of Wight County			3,243	10	32,430
	Non-Resident Workers (inflow commuters)			7,543	10	75,430
					Nonresidential Subtotal	190,632
					Nonresidential Share	**23%**
					Total	846,020

Source: US Census, OnTheMap Application and LEHD Origin-Destination Employment Statistics, 2018

SHERIFF CALLS FOR SERVICE

Using the above proportionate share methodology, Sheriff calls for service per capita and per nonresidential trip are derived. For Sheriff calls for service, self-initiated calls are netted out of the total number both to derive the cost per call for service and to project future calls for service from the development program.

To project future Sheriff calls for service from new development, the data are used to determine a call per person and call per nonresidential trip. *Note: the development program only includes residential development; therefore, only the call per capita is used in the analysis.*

These factors are then applied to projected population from the development program to project demand for Sheriff services using calls for service. (E.g., for every new person in the County, it is estimated that .1906 Sheriff calls for service are generated.)

Figure 20. Isle of Wight County Sheriff Calls for Service Projection Methodology

SHERIFF DATA INPUT AREA

Sheriff Calls for Service Data [1]

		2018	*2021 (estimated)*	
TOTAL CALLS FOR SERVICE		**9,099**	**9,393**	
	% [2]		*pop/nonres trips*	*Call per capita/nonres trip*
Residential	77%	**7,232**	37,945	0.1906
Nonresidential	23%	**2,160**	27,910	0.0774

Calls per Capita	0.1906
Calls per Nonres. Trip	0.0774

[1] Based on information provided by the Isle of Wight Public Safety; Non-self initiated calls. 2021 estimate obtained by dividing 2018 calls by 2018 housing units, then multiplying by 2021 estimated housing units.
[2] Proportionate share calculation; TischlerBise

FIRE AND EMS CALLS FOR SERVICE

Using the above proportionate share methodology, Fire and EMS calls for service per capita and per nonresidential trip are derived.

To project future Fire and EMS calls for service from new development, the data are used to determine a call per person and call per nonresidential trip. *Note: the development program only includes residential development; therefore, only the call per capita is used in the analysis.*

These factors are then applied to projected population from the development program to project demand for Fire and EMS services using calls for service. (E.g., for every new person in the County, it is estimated that .1138 Fire and EMS calls for service are generated.)

Figure 21. Isle of Wight County Fire and EMS Calls for Service Projection Methodology

FIRE/RESCUE DATA INPUT AREA

Fire/Rescue Calls for Service Data [1]

		2020		
TOTAL CALLS FOR SERVICE		**5,608**		
	% [2]		*pop/nonres trips*	*Call per capita/nonres trip*
Residential	77%	**4,318**	37,945	0.1138
Nonresidential	23%	**1,290**	27,910	0.0462

Calls per Capita	0.1138
Calls per Nonres. Trip	0.0462

[1] Based on information provided by the Isle of Wight Public Safety

[2] Proportionate share calculation; TischlerBise

Figure 22. Detailed Demand Projections

Sweetgrass (NVR) SCENARIO ANNUAL DEMAND BASE

		Base Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	Fiscal Year->	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041
	POPULATION	0	243	486	729	972	1,215	1,458	1,458	1,458	1,458	1,458	1,458	1,458	1,458	1,458	1,458	1,458	1,458	1,458	1,458	1,458
	POP AND JOBS	0	243	486	729	972	1,215	1,458	1,458	1,458	1,458	1,458	1,458	1,458	1,458	1,458	1,458	1,458	1,458	1,458	1,458	1,458
	AGE-RESTRICTED, SINGLE-FAMILY DETACHED	0	65	130	195	260	325	390	390	390	390	390	390	390	390	390	390	390	390	390	390	390
	TOWNHOUSE	0	38	75	113	150	188	225	225	225	225	225	225	225	225	225	225	225	225	225	225	225
	HOUSING UNIT TYPE 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	HOUSING UNIT TYPE 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	HOUSING UNIT TYPE 5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	HOUSING UNIT TYPE 6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	HOUSING UNIT TYPE 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	HOUSING UNIT TYPE 8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL UNITS	0	103	205	308	410	513	615	615	615	615	615	615	615	615	615	615	615	615	615	615	615
$0 Sales Per Sq. Ft.	NONRESIDENTIAL TYPE 1 SF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
$0 Sales Per Sq. Ft.	NONRESIDENTIAL TYPE 2 SF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
$0 Sales Per Sq. Ft.	NONRESIDENTIAL TYPE 3 SF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
$0 Sales Per Sq. Ft.	NONRESIDENTIAL TYPE 4 SF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
$0 Sales Per Sq. Ft.	NONRESIDENTIAL TYPE 5 SF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
$0 Sales Per Sq. Ft.	NONRESIDENTIAL TYPE 6 SF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL SF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NONRESIDENTIAL TYPE 1 JOBS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NONRESIDENTIAL TYPE 2 JOBS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NONRESIDENTIAL TYPE 3 JOBS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NONRESIDENTIAL TYPE 4 JOBS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NONRESIDENTIAL TYPE 5 JOBS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NONRESIDENTIAL TYPE 6 JOBS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL JOBS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RESIDENTIAL TRIPS	0	444	888	1,332	1,776	2,220	2,664	2,664	2,664	2,664	2,664	2,664	2,664	2,664	2,664	2,664	2,664	2,664	2,664	2,664	2,664
	NONRES TRIPS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	VEHICLE TRIPS	0	444	888	1,332	1,776	2,220	2,664	2,664	2,664	2,664	2,664	2,664	2,664	2,664	2,664	2,664	2,664	2,664	2,664	2,664	2,664
0.191	RES SHERIFF CALLS	0	46	93	139	185	232	278	278	278	278	278	278	278	278	278	278	278	278	278	278	278
0.077	NONRES SHERIFF CALLS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL SHERIFF CALLS	0	46	93	139	185	232	278	278	278	278	278	278	278	278	278	278	278	278	278	278	278
0.114	RES FIRE AND RESCUE CALLS	0	28	55	83	111	138	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166
0.046	NONRES FIRE AND RESCUE CALLS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL FIRE AND EMS CALLS	0	28	55	83	111	138	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166
	ELEM ENROLLMENT	0	5	10	15	20	25	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
	MS ENROLLMENT	0	1	2	3	5	6	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
	HS ENROLLMENT	0	2	5	7	10	12	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
	TOTAL ENROLLMENT	0	9	17	26	35	43	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52
	ELEM ENROLLMENT (PRE K-3)	0	3	6	10	13	16	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
	ELEM ENROLLMENT (GR 4-6)	0	2	4	5	7	9	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
			5.03	10.05	15.08	20.10	25.13	30.15	30.15	30.15	30.15	30.15	30.15	30.15	30.15	30.15	30.15	30.15	30.15	30.15	30.15	30.15
	ANNUAL MV	$0	$29,545,813	$29,545,813	$29,545,813	$29,545,813	$29,545,813	$29,545,813	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	CUMUL RES AV	$0	$29,545,813	$59,091,625	$88,637,438	$118,183,250	$147,729,063	$177,274,875	$177,274,875	$177,274,875	$177,274,875	$177,274,875	$177,274,875	$177,274,875	$177,274,875	$177,274,875	$177,274,875	$177,274,875	$177,274,875	$177,274,875	$177,274,875	$177,274,875
	CUMUL NONRES AV	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	CUMUL AV	$0	$29,545,813	$59,091,625	$88,637,438	$118,183,250	$147,729,063	$177,274,875	$177,274,875	$177,274,875	$177,274,875	$177,274,875	$177,274,875	$177,274,875	$177,274,875	$177,274,875	$177,274,875	$177,274,875	$177,274,875	$177,274,875	$177,274,875	$177,274,875
	NET CUMUL AV	$0	$29,545,813	$29,545,813	$29,545,813	$29,545,813	$29,545,813	$29,545,813	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	NON-TOWN POPULATION		243	486	729	972	1,215	1,458	1,458	1,458	1,458	1,458	1,458	1,458	1,458	1,458	1,458	1,458	1,458	1,458	1,458	1,458
	NON-TOWN POP AND JOBS		243	486	729	972	1,215	1,458	1,458	1,458	1,458	1,458	1,458	1,458	1,458	1,458	1,458	1,458	1,458	1,458	1,458	1,458

TischlerBise
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MEMORANDUM

To: Eric Shirey, General Manager, Land, NVR Inc.

From: Julie Herlands, AICP, Vice President, TischlerBise

Date: February 10, 2023

RE: Fiscal Impact Analysis for Sweetgrass in Isle of Wight County, Virginia//Response to Isle of Wight Capital Impacts Finding

TischlerBise conducted a Fiscal Impact Analysis of the proposed Sweetgrass development in Isle of Wight County, Virginia, for NVR Inc/Ryan Homes for submission to Isle of Wight County as part of the applicant's rezoning request. TischlerBise provided a report dated June 21, 2021, to NVR Inc./Ryan Homes.

The overall finding of the Fiscal Impact Analysis is that the proposed development is fiscally positive to the County in total.[1] TischlerBise's analysis factors in all variable revenues generated by the proposed development compared to all operating and capital costs attributable to the development.

Isle of Wight County has a *Capital Impacts Model* that was developed by TischlerBise.[2] The Model was developed specifically for the County to identify capital impacts eligible for mitigation by cash proffers. Isle of Wight County has recently provided NVR with a summary of the Model's capital impact findings for the Sweetgrass development,[3] which total approximately $2.3 million in capital impacts of which $785,285 is cash proffer eligible.

TischlerBise's fiscal impact analysis also identifies capital cost impacts attributed to the development totaling approximately $2.2 million. However, unlike the *Capital Impacts Model*, which does not include revenue offsets,[4] the TischlerBise **Fiscal Impact Analysis** (as requested by the County as part of the rezoning application) captures all revenues attributable to Sweetgrass and is projected to generate sufficient revenues in total to cover projected operating and capital costs.

[1] The twenty-year cumulative net fiscal impact is a surplus of approximately $20.9 million and an annual net surplus of approximately $1.2 million at the project's buildout.
[2] Model transmitted October 28, 2020.
[3] Printout dated 12/14/2022.
[4] Virginia localities fund most locally funded services (including schools) with property tax revenues, which is a general revenue source (i.e., a discretionary revenue that is appropriated by elected officials during the budget process). Property tax revenues are not typically earmarked for specific purposes (other than a locality's full faith and credit obligation to retire debt where applicable or when levied for special tax districts).

Sweetgrass
Product Selection and Market Analysis

The Sweetgrass Community is setup to serve two different buyer profiles, both of which require an active lifestyle and demand a high quality product.

The "Lifestyle" Ranch section provides first floor owner bedrooms and baths that tailor to the "55 and greater" customer. The new construction supply for this product is restrained which continues to drive up prices. Sweetgrass' customers will primarily come from Isle of Wight, however secondary buyers are expected from the Peninsula and City of Suffolk.

Census data reveals those areas having 215,412 people that is age 55 or older. Migration data tells us that 14,219 of those will desire to move this year.

Last year, there was 2,175 first floor owner bedroom homes sold within those areas. Today there is only 505 first floor owner bedroom homes for sale across the broader market and Isle of Wight County specifically has only 54 active listings today (the majority being new construction).

The Sweetgrass Community will sell over 60 ranch homes each year and that is considering the absorption levels of other communities that serve this buyer such as South Harbor in Isle of Wight County and Church Square in the Town of Smithfield.

The "Towns" section provides a tremendous value for families who have been priced out of the market due to inflation, rising interest rates and increased new home sales prices. Sweetgrass will offer townhomes that come equipped with a garage and 3-4 bedrooms. The renters of Isle of Wight will finally have an option to obtain home ownership. Isle of Wight's average price for a home built after the year 2000 and at least 1500 square feet was $465,533. Sweetgrass Towns will provide relief to such pricing pressure by offering elegant and high quality homes from the upper $200's and lower $300's.

Both products at Sweetgrass have tremendous demand in the marketplace, which will equate to a very busy jobsite and fast buildout.



Sweetgrass Elevations - June 15, 2023


Facing North
LEGACY
AT
SWEETGRASS
Sweetgrass Elevations - June 15, 2023


Facing South
TOWNHOMES
Sweetgrass Elevations - June 15, 2023


Facing South
Sweetgrass Elevations - June 15, 2023


Facing West
View over Park
Sweetgrass Elevations - June 15, 2023



Sweetgrass Elevations - June 15, 2023


Facing East
AES
CONSULTING ENGINEERS
Sweetgrass Elevations - June 15, 2023


Sweetgrass Elevations - June 15, 2023


AES
CONSULTING ENGINEERS
Sweetgrass Elevations - June 15, 2023


Facing West
View of Amenity



Sweetgrass Elevations - June 15, 2023


Sweetgrass Elevations - June 15, 2023


Sweetgrass Elevations - June 15, 2023


Sweetgrass Elevations - June 15, 2023


Sweetgrass Elevations - June 15, 2023



Sweetgrass Elevations - June 15, 2023


ES
LTING ENGINEERS
Sweetgrass Elevations - June 15, 2023



Sweetgrass Elevations - June 15, 2023


Sweetgrass Elevations - June 15, 2023



Sweetgrass Elevations - June 15, 2023

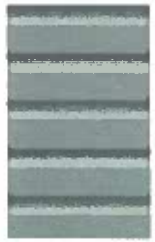

Sweetgrass Elevations - June 15, 2023

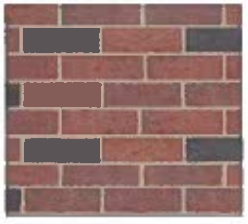


Sweetgrass Elevations - June 15, 2023

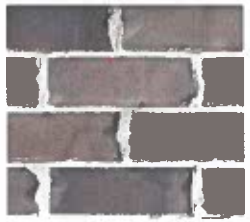
Lake Single Family Detached Color Schemes - Prime, Premium, Premium Plus

Scheme #	Primary Siding (Variform)	Accent Siding (Variform)	Shutter Color	Front Door Paint Color	Brick (GS Salisbury or Equivalent)	Stone (Environmental or Equivalent)	
Lake 1	Dover White	Dover White	Plygem	Sherwin Williams	Savannah Gray	Gray	Prime, Premium, Premium Plus
ESCLB01A - Reflect			Black 	Tricorn Black 			
ESCLB01B - Inspire			Black 	Sundried Tomato 			
Lake 2	Flint	Flint	Plygem	Sherwin Williams	Cordoba	Gray	Prime, Premium, Premium Plus
ESLB02A - Reflect			Black 	Seaworthy 			
ESLB02B - Inspire			Black 	Rain 			

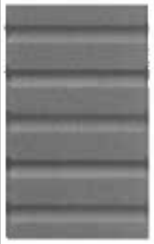
Scheme #	Primary Siding (Variform)	Accent Siding (Variform)	Shutter Color	Front Door Paint Color	Brick (GS Salisbury or Equivalent)	Stone (Environmental or Equivalent)	
Lake 3	Georgian Gray	Dover White	Plygem	Sherwin Williams	Charred Oak	PA Lime	Prime, Premium, Premium Plus
ESLB03A - Reflect			Blue 	Web Gray 			
ESLB03B - Inspire			Blue 	Sequin			
Lake 4	Silver Mist	Silver Mist	Plygem	Sherwin Williams	LaCava	PA Sierra	Prime, Premium, Premium Plus
ESLV04A - Reflect			Blue 	Grizzle Gray 			
ESLV04B - Inspire			Blue 	Salty Dog 			
Lake 5	Irish Thistle	Irish Thistle	Plygem	Sherwin Williams	Savannah Gray	PA Sierra	Prime, Premium, Premium Plus
ELSV05A - Reflect			Dark Navy 	Naval 			
ELSV05B - Inspire			Dark Navy 	Cupola Yellow			

Scheme #	Primary Siding (Variform)	Accent Siding (Variform)	Shutter Color	Front Door Paint Color	Brick (GS Salisbury or Equivalent)	Stone (Environmental or Equivalent)	
Lake 6	Spanish Olive	Silver Mist	Plygem	Sherwin Williams	LaCava	Appalachian	Prime, Premium, Premium Plus
ESLV06A - Reflect			Black 	Rock Bottom 			
ESLV06B - Inspire			Black 	Pewter Green 			
Lake 7	Stone Mountain Clay	Island Pearl	Plygem	Sherwin Williams	Berkshire	Manor	Prime, Premium, Premium Plus
ESLB07A - Reflect			Peppercorn 	Urbane Bronze 			
ESLB07B - Inspire			Peppercorn 	Still Water 			
Lake 8	Sandy Tan	Sandy Tan	Plygem	Sherwin Williams	Olde Columbia	Manor	Prime, Premium, Premium Plus
ESLB08A - Reflect			Gray 	Homburg Gray 			
ESLB08B - Inspire			Gray 	Riverway 			

Sweetgrass Elevations - June 15, 2023

Scheme #	Primary Siding (Variform)	Accent Siding (Variform)	Shutter Color	Front Door Paint Color	Brick (GS Salisbury or Equivalent)	Stone (Environmental or Equivalent)	
Lake 9	Natural Almond	Natural Almond	Plygem	Sherwin Williams	Turner Ridge	Dakota	Prime, Premium, Premium Plus
ESLB09A - Reflect			Gray 	Oyster Bay 			
ESLB09B - Inspire			Gray 	Bunglehouse Blue 			
Lake 10	Island Pearl	Island Pearl	Plygem	Sherwin Williams	Charred Oak	Appalachian	Prime, Premium, Premium Plus
ESLB10A - Reflect			Black 	Slate Tile 			
ESLB10B - Inspire			Black 	Samovar Silver 			
Lake 11	Pewter	Pewter	Plygem	Sherwin Williams	Cordoba	PA Lime	Premium, Premium Plus
ESLB11A - Reflect			Black 	Tricorn Black 			
ESLB11B - Inspire			Black 	Bravado Red 			

Scheme #	Primary Siding (Variform)	Accent Siding (Variform)	Shutter Color	Front Door Paint Color	Brick (GS Salisbury or Equivalent)	Stone (Environmental or Equivalent)	
Lake 12	Wedgewood	Wedgewood			Turner Ridge	Carolina	Premium, Premium Plus
ESLB12A - Reflect			Dark Navy 	In the Navy 			
ESLB12B - Inspire			Dark Navy 	Hubbard Squash			
Lake 13	Sagebrook	Silver Mist			Walnut Grove	Carolina	Premium, Premium Plus
ESLB13A - Reflect			Black 	Tricorn Black 			
ESLB13B - Inspire			Black 	Peppercorn 			
Lake 14	Twilight Shadow	Twilight Shadow			Walnut Grove	Carolina	Premium, Premium Plus
			Black 	Tricorn Black 			
			Black 	Rainwashed			

Scheme #	Primary Siding (Variform)	Accent Siding (Variform)	Shutter Color	Front Door Paint Color	Brick (GS Salisbury or Equivalent)	Stone (Environmental or Equivalent)	
Lake 15	Bayou	Bayou			Cordoba	PA Lime	
ESLB15A - Reflect			Black 	Tricorn Black 			Premium, Premium Plus
ESLB15B - Inspire			Black 	Mineral Deposit 			
Lake 16	Deep Brunswick	Deep Brunswick			LaCava	Appalachian	
ESLB16A - Reflect			Pebblestone Clay 	Chocolate Powder 			Premium Plus
ESLB16B - Inspire			Pebblestone Clay 	Tradewind			
Lake 17	Teak	Dover White			Savannah Gray	Dakota	
ESLB17A - Reflect			Black 	Evergreen Fog 			Premium Plus
ESLB17B - Inspire			Black 	Teal Stencil 			
Lake 18	Sedona Red	Sedona Red			Savannah Gray	Appalachian	

Scheme #	Primary Siding (Variform)	Accent Siding (Variform)	Shutter Color	Front Door Paint Color	Brick (GS Salisbury or Equivalent)	Stone (Environmental or Equivalent)
ESLB18A - Reflect			Black 	Tricorn Black 		
ESLB18B - Inspire			Black 	Anonymous 		

Premium Plus


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WE
Welcome

June 17, 2022

Isle of Wight County Planning and Zoning
17140 Monument Circle, Suite 101
Isle of Wight VA 23397

Via e-mail:

Re: Sweetgrass Cultural Resources Assessment
Parcel Number 32-01-009 (14096 Benns Church Road) (±294.4 acres)
Isle of Wight County, VA

Dear Sir or Madam:

Thunderbird Archeology, a division of Wetland Studies and Solutions, Inc. (WSSI) has completed a desk-based Cultural Resources Assessment on behalf of NVR, Inc. for the Sweetgrass site located in Isle of Wight County, Virginia (see Attachment). The project area includes +/- 249.4 acres of, generally located northeast of Benns Church Blvd and north of Beechwood Lane.

Our research showed that the project area has not been previously subject to cultural resources investigation and no cultural resources have been previously recorded on the property. We feel that the project area has at least a moderate potential to include historic and/or prehistoric period archeological resources. Additionally, one or more standing buildings on the site may be historic (i.e., 50-years or older). Our research found no evidence or other indications that a cemetery or human burials are present on the property.

In our opinion, any prehistoric period archeological sites that may be identified on the property will not likely be significant (i.e., eligible for listing in the National Register of Historic Places) due to the property's history of agricultural use and the likelihood that such sites have been disturbed by plowing. Although significant historic period archeological sites could be identified within the project area and the historic standing buildings thereon could be deemed significant, we anticipate that any such resources could be avoided or mitigated.

If you have any questions or want to discuss the attached report, feel free to contact me at 703.307.6951 or bsipe@wetlands.com.

Sincerely,

WETLAND STUDIES AND SOLUTIONS, INC.

Boyd Sipe, MA, RPA
Manager – Archeology

Enclosures : Attachment

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Cultural Resources Site Assessment
Sweetgrass (±249.4 acres)
Isle of Wight County, Virginia
WSSI #31100.01

INTRODUCTION

This transmittal presents an evaluation of the potential for locating cultural resources on the ±249.4-acre Sweetgrass project area, located at 14096 Benns Church Boulevard, Smithfield, VA (Exhibit 1). The study area is situated on a low-lying terrace bordering Jones Creek on its north-eastern side (Exhibit 2). The project area appears to be generally low in topographic relief, sloping gradually towards and draining into unnamed tributary streams of the Creek to the northwest and the southeast.

The most recent aerial photography of the project area shows most of the project area under cultivation, with forests in the north-eastern section accounting for roughly 20% of the vegetation cover (Exhibit 3). A sheet-metal-roof square structure is visible near the center of the property. Parcel records indicate two improvements on the property, both categorized "Miscellaneous," one constructed in 1960 and the other in 2010. A review of online historic aerial photography suggests that the central structure predates 1972. The historic aerials also indicate at least two other structures, about 450 ft to the north and north-east of the central building, existed on the property until about 2004. The layout and use of the fields has remained consistent since at least 1972. The 1919 United States Geological Survey (USGS) quadrangle covering the project area indicates that buildings stood in the same location as the ones visible in the 1972 photo. It also shows that another structure, demolished before 1972, was once located between 800 and 1000 ft. east of the currently standing building (Exhibit 4).

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KNOWN CULTURAL RESOURCES IN OR NEAR THE PROJECT AREA

The following inventory of previously recorded cultural resources within and near the project area was established by using the Virginia Department of Historic Resources' (DHR) online Virginia Cultural Resource Information System (V-CRIS), as well as examining cultural resource files and reports at the Thunderbird Archeology office in Gainesville, Virginia.

No previous cultural resources investigations have been conducted of the study area, and no archeological or architectural resources have been recorded within the study area. In total, three archeological site and eight architectural resources have been recorded within an approximate one-mile radius of the study area (Tables 1 and 2). One of the archeological sites, 44IW0242, represents a Middle Woodland period campsite, and has been deemed not eligible for inclusion on the National Register of Historic Places (NRHP). The other two archeological sites have not been formally evaluated. 44IW0113 represents another Woodland period Native American artifact scatter, and 44IW0271 represents the St. Luke's Church and Grounds, where prehistoric Native American artifact scatters were found

mixed with deposits associated with the historic Euro-American and African American church and cemetery. It is cross listed as architectural resource 046-0024, which is described in further detail below.

Table 1: Previously Recorded Archeological Sites within a One-Mile Radius of the Project Area

DHR SITE NUMBER	SITE TYPE	TEMPORAL AFFILIATION	NRHP ELIGIBILITY
44IW0271	Artifact scatter, Artifact scatter, Artifact scatter, Cemetery, Church, Lithic scatter	Antebellum Period, Colony to Nation, Early National Period, Middle Archaic Period, Pre-Contact, Early Woodland, Late Woodland, Antebellum Period, Civil War, Colony to Nation, Contact Period, Early National Period, Reconstruction and Growth, The New Dominion, World War I to World War II	Not Evaluated
44IW0242	Camp	Middle Woodland	DHR Staff: Not Eligible
44IW0113	No Data	Early Woodland, Late Woodland, Middle Woodland	Not Evaluated

Table 2: Previously Recorded Architectural Resources within a One-Mile Radius of the Project Area

DHR RESOURCE NUMBER	RESOURCE NAME	TYPE	TEMPORAL AFFILIATION	NRHP ELIGIBILITY
300-0115	Angel on Gravestone Gravestone, 14477 Benns Church Boulevard	Sculpture/Statue	World War I to World War II (1917 - 1945)	Not Evaluated
046-0024	Newport Parish Church Old Brick Church Saint Luke's Church Saint Luke's Smithfield	Church/Chapel	Contact Period (1607 - 1750)	VLR Listing NRHP Listing NHL Listing This property is subject to an easement held by the Board of Historic Resources
046-5250	Farmhouse, 20041 Brewers Neck Boulevard B. J. Hogue Homeplace	Single Dwelling	Early National Period (1790 - 1829)	DHR Staff: Not Eligible
046-5246	Benns Church	Church/Chapel	World War I to World War II (1917 - 1945)	Not Evaluated

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Table 3: Previously Recorded Architectural Resources within a One-Mile Radius of the Project Area

DHR RESOURCE NUMBER	RESOURCE NAME	TYPE	TEMPORAL AFFILIATION	NRHP ELIGIBILITY
046-5276	House, 19514 Casper Circle	Single Dwelling	World War I to World War II (1917 - 1945)	DHR Staff: Not Eligible
046-5274	House, 14564 Benns Church Blvd W.P. Jordan House	Single Dwelling	Reconstruction and Growth (1866 - 1916)	DHR Staff: Eligible
046-5275	House, 14580 Benns Church Boulevard	Single Dwelling	World War I to World War II (1917 - 1945)	DHR Staff: Not Eligible
046-5054	House, 15150 Benns Church Boulevard (Route 10) Jordan Home #1 Margaret Davis House Charles Driver Jordan House	Single Dwelling	Antebellum Period (1830 - 1860)	The Primary Resource is no longer extant.

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Of the eight previously recorded architectural resources located within a mile of the center of the project area, three have been deemed not eligible for NRHP listing (046-5250, 046-5276, 046-5275) and another has already been demolished (046-054) (Table 2); all represent 20th century farms and houses. Two resources have not been evaluated: 046-5246 (Benns Church) and 300-0115 (Angel on Gravestone). The first of these has as its primary resource the building currently housing Benns United Methodist Church, a brick structure erected in 1926 and added to in 1957 and 1967. Its secondary resource is the Benns Church Cemetery. Resource 300-0115 represents a sculpture of an angel on a gravestone dated to c.1921. The text description on file with DHR gives its location as the Benns Church Cemetery, however, its mapped location in VCRIS places it within Saint Luke's Church and Cemetery (046-0024).

DHR Resource 046-0024 (Saint Luke's Church) is listed on the NRHP, Virginia Landmark Registry (VLR), and as a National Historic Landmark (NHL). It represents a colonial period church building constructed between 1632 and 1657. It has been operated as a museum and a non-profit since 1953. The description of the resource in VCRIS indicates that it has maintained its historic character and feel; this increases the chances that nearby development plans would face greater scrutiny from regulators and the public. However, while the current project area is within less than half a mile of this site, it is separated by intervening forested areas, which diminish the possibility of a detrimental visual effect on the resource. Finally, one architectural resource within a mile of the project area, DHR ID#046-5274 (W.P. Jordan House) has been deemed eligible for NRHP listing. It represents a c.1888 Italianate-style Single Family Dwelling and its outbuildings. It was the home of W.P. Jordan, a member of a prominent family who owned most of the land south

of Benns Church to Suffolk in the 19th century. However, the VCRIS file regarding the resource states that W.P. Jordan himself was not associated with any significant historical events.

ARCHEOLOGICAL SITE PROBABILITY

The following presents an assessment of the probability that archeological sites will occur within the study area; this has not been field verified.

The probability for locating prehistoric sites generally depends on the variables of topography, proximity to water, and internal drainage. Sites are more likely on well-drained landforms of low relief near water. The study area has at least a moderate probability for containing prehistoric resources due to its areas of low-relief topography near water sources. If prehistoric sites are present in plowed upland settings, they are not likely to require work beyond the recordation done at the Phase I level as plowing disturbs the context of the Native American sites and reduces the information potential of a particular site. Prehistoric sites found outside of an upland setting (e.g., floodplain) or in unplowed contexts could require additional work if preserved deposits are identified.

The probability for the occurrence of historic period sites largely depends upon the history of settlement in the area, the topography and the proximity of a particular property to historic roads. Historic maps offer insight into habitation of the vicinity; however, the absence of structures on historic maps does not eliminate the possibility of an archeological site being present within the property, as it was common for properties occupied by tenants, enslaved laborers, and freed African Americans to be excluded from these maps. As previously stated, the USGS map from 1919 shows several no-longer-extant buildings within the project area. The project area also borders US Route 258 (Benns Church Boulevard), which has served as the main road between Smithfield and Benns Church for several centuries. These factors increase the overall likelihood for the occurrence of historic period archeological resources within the study area. In our opinion, these maps, and the presence of known archeological sites near the project area indicate a moderate to high likelihood for the occurrence of historic period archeological sites within the study area.

Archeological sites dating from the 17th -19th century, if present within the study area, will likely require archeological work above the Phase I (Identification)-level; this is particularly true of dwellings that were occupied by enslaved African Americans or tenants, as these site types have been less intensively studied. As noted above, sites of these types are not typically represented on historic maps and are typically only identifiable through field investigations. Twentieth-century sites are not likely to be considered significant or require additional archeological work unless they contain unique, intact cultural materials that would contribute new research information.

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CONCLUSIONS AND RECOMMENDATIONS

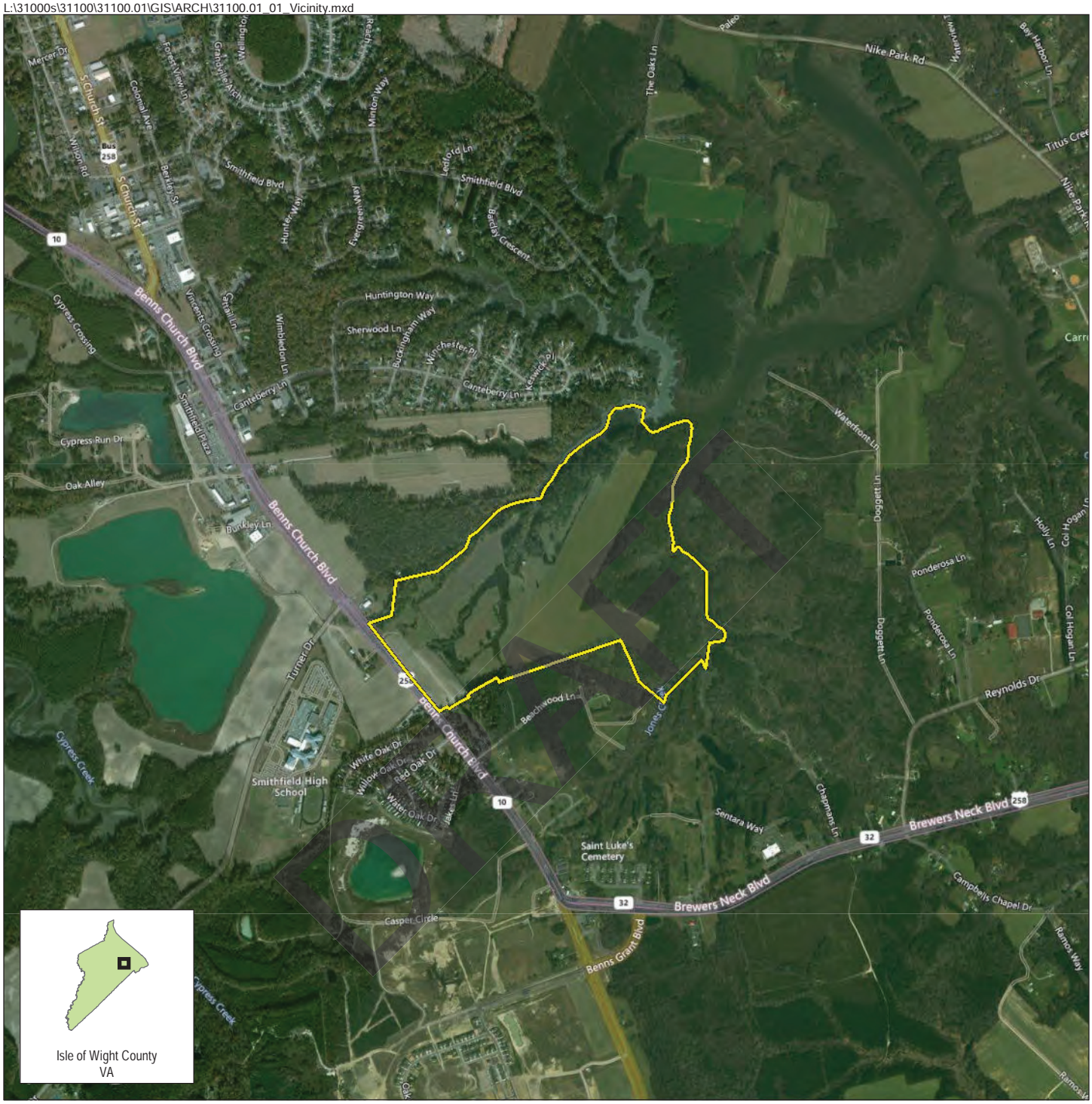
If impacts to Waters of the United States are planned in association with the development of the study area, the U.S. Army Corps of Engineers (USACE) may require that a Phase I cultural resources investigation be completed and reviewed by the DHR to comply with Section 106 of the National Historic Preservation Act (NHPA) of 1966 (as amended) in conjunction with obtaining a Clean Water Act Permit. In this scenario, the DHR would review and provide comments to assist the USACE in fulfilling its obligations under the NHPA but will typically defer to the federal agency regarding definition of APEs, eligibility determinations, and requirements for additional investigations.

Finally, as two previously recorded architectural resources are within an approximate one-mile radius of the project area are either eligible for listing, or already listed in the NRHP, an assessment of the direct adverse effects the development of the project area could have on the viewsheds on these resources (i.e., a Viewshed Study) could also be required if the project is subject to review by local, state, or federal agencies; however, if the project is not subject to review by any local, state, or federal agencies, then an assessment of adverse effects on the viewsheds of these resources would not need to be conducted. Isle of Wight County does not uniformly require cultural resources investigations as part of local land-use review. However, if development of the site requires rezoning or other local government review or approval, cultural resources investigations could be requested or potentially required as a condition of approval. Any cultural resources studies conducted for Section 106 review would almost certainly be adequate for local government review should such studies be requested by the county.

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Project Area: ± 249.5 acres

Vicinity Map
Sweetgrass
WSSI #31100.01

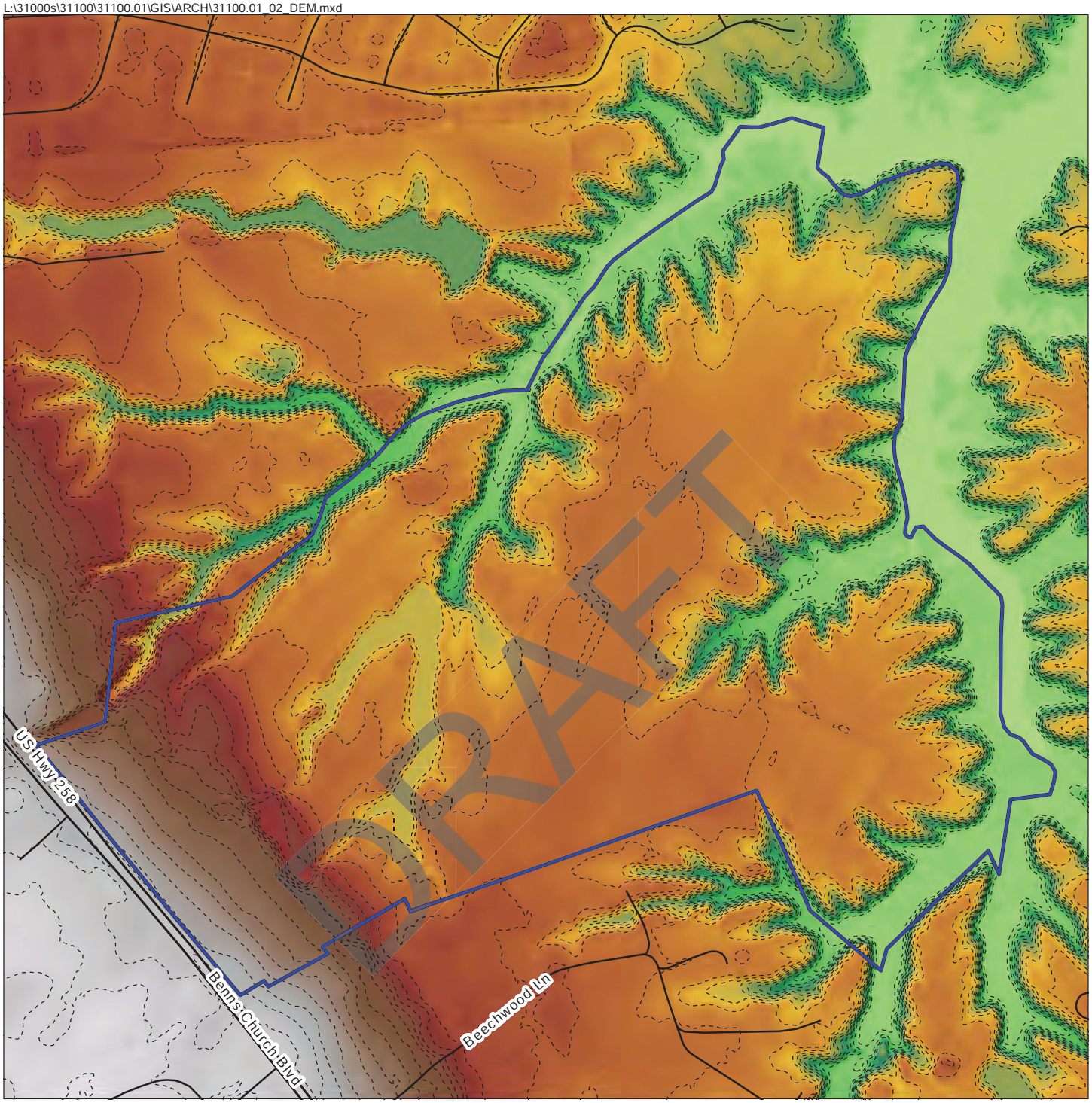
NORTH
0 2,000
Feet
Original Scale:
1 " = 2,000 '

Source: Bing Aerial Hybrid

Wetland Studies and Solutions, Inc.
a DAVEY company

Exhibit 1

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Project Area

2-ft Contours

Elevation (meters)

Value

High : 16.7476

Low : 1.17549e-38

Digital Elevation Model (DEM)
Sweetgrass
WSSI #31100.01

NORTH

0 700

Feet

Original Scale:
1 " = 700 '

Vertical Datum: NAVD88
Source: 2010; USGS

Wetland Studies and Solutions, Inc.
a DAVEY company

Exhibit 2

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Project Area

Spring 2021 Natural Color Imagery
Sweetgrass
WSSI #31100.01

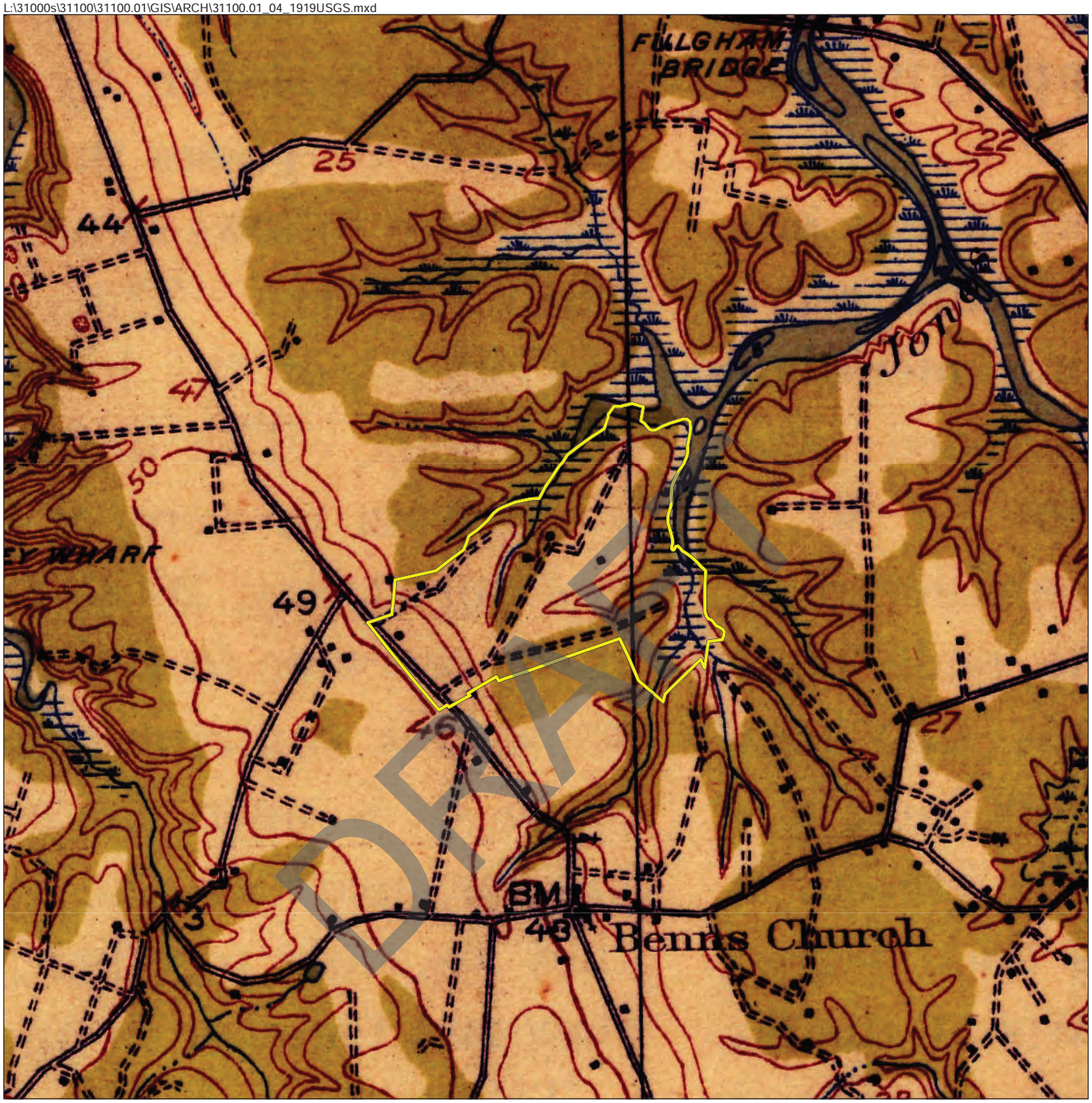
NORTH
0 700
Feet
Original Scale:
1 " = 700 '

Source: VBMP. 2021

Wetland Studies and Solutions, Inc.
a DAVEY company

Exhibit 3

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Project Area

1919 USGS Quad
Sweetgrass
WSSI #31100.01

NORTH
0 2,000
Feet
Original Scale:
1 " = 2,000 '

Benns Church, VA 1919
Latitude: 36°57'1"N
Longitude: 76°35'10"W
Hydrologic Unit Code (HUC): 020802060904
HUC12 Name: Jones Creek-Pagan River
COE Region: Atlantic and Gulf Coastal Plain

Wetland Studies and Solutions, Inc.
a DAVEY company

Exhibit 4

Cultural Resource Forms

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Snapshot

Date Generated: June 02, 2022

Site Name: No Data
Site Classification: Terrestrial, open air
Year(s): 1200 B.C.E - 1606 C.E
Site Type(s): No Data
Other DHR ID: No Data
Temporary Designation: No Data

Site Evaluation Status
Not Evaluated

Locational Information

USGS Quad: BENNS CHURCH
County/Independent City: Isle of Wight (County)
Physiographic Province: No Data
Elevation: No Data
Aspect: No Data
Drainage: No Data
Slope: No Data
Acreage: No Data
Landform: Other
Ownership Status: No Data
Government Entity Name: No Data

Site Components

Component 1

Category: No Data
Site Type: No Data
Cultural Affiliation: Native American
Cultural Affiliation Details: No Data
DHR Time Period: Early Woodland, Late Woodland, Middle Woodland
Start Year: -1200
End Year: 1606
Comments: No Data

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Bibliographic Information

Bibliography:
No Data
Informant Data:
No Data

CRM Events

Event Type: Survey:Phase I/Reconnaissance

Project Staff/Notes:
No Data

Project Review File Number: No Data
Sponsoring Organization: No Data
Organization/Company: Unknown (DSS)
Investigator: MacCord, Howard A.
Survey Date: 6/21/1972
Survey Description:
No Data

Current Land Use	Date of Use	Comments
Other	*No Data*	Wide terrace adjoining spring branch. Large dug away for sand pit.

Threats to Resource: No Data
Site Conditions: Unknown Portion of Site Destroyed
Survey Strategies: Surface Testing
Specimens Collected: No
Specimens Observed, Not Collected: No
Artifacts Summary and Diagnostics:
Pottery and points (VSL #422).
Summary of Specimens Observed, Not Collected:
No Data
Current Curation Repository: No Data
Permanent Curation Repository: No Data
Field Notes: No
Field Notes Repository: No Data
Photographic Media: No Data
Survey Reports: No Data
Survey Report Information:
No Data
Survey Report Repository: No Data
DHR Library Reference Number: No Data
Significance Statement: No Data
Surveyor's Eligibility Recommendations: No Data
Surveyor's NR Criteria Recommendations, : No Data
Surveyor's NR Criteria Considerations: No Data

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Snapshot

Date Generated: June 02, 2022

Site Name: No Data
Site Classification: Terrestrial, open air
Year(s): 300 - 999 C.E
Site Type(s): Camp
Other DHR ID: No Data
Temporary Designation: 44CRI731-5

Site Evaluation Status

DHR Staff: Not Eligible

Locational Information

USGS Quad: BENNS CHURCH
County/Independent City: Isle of Wight (County)
Physiographic Province: Coastal Plain
Elevation: 40
Aspect: No Data
Drainage: James River
Slope: No Data
Acreage: 0.014
Landform: Knoll
Ownership Status: Private
Government Entity Name: No Data

Site Components

Component 1

Category: Domestic
Site Type: Camp
Cultural Affiliation: Native American
Cultural Affiliation Details: No Data
DHR Time Period: Middle Woodland
Start Year: 300
End Year: 999
Comments: No Data

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Bibliographic Information

Bibliography:

No Data

Informant Data:

No Data

CRM Events

Event Type: DHR Staff: Not Eligible

DHR ID: 44IW0242
Staff Name: Kirchen, Roger
Event Date: 10/20/2006
Staff Comment No Data

Event Type: Survey:Phase I/Reconnaissance

Project Staff/Notes:
No Data
Project Review File Number: 2006-0234
Sponsoring Organization: No Data
Organization/Company: Unknown (DSS)
Investigator: Cultural Resources, Invc., Ellen Brady
Survey Date: 9/1/2005
Survey Description:
Phase I- 50 foot interval shovel tests with radials dug at 25 feet intervals around positive shovel tests.

Current Land Use	Date of Use	Comments
Dwelling, single	9/1/2005 12:00:00 AM	*No Data*

Threats to Resource: No Data
Site Conditions: 50-74% of Site Destroyed
Survey Strategies: Subsurface Testing
Specimens Collected: Yes
Specimens Observed, Not Collected: No
Artifacts Summary and Diagnostics:
Mockley Ceramics, primary and secondary chert, quartz and quartzite flakes, quartzite FCR, and plastic
Summary of Specimens Observed, Not Collected:
No Data
Current Curation Repository: CRI-Fredericksburg
Permanent Curation Repository: No Data
Field Notes: Yes
Field Notes Repository: CRI-Fredericksburg
Photographic Media: No Data
Survey Reports: Yes
Survey Report Information:
A Phase I Cultural Resources Survey of Approximately 600 Acres at Benns Church Isle of Wight County, Virginia
Survey Report Repository: CRI-Fredericksburg
DHR Library Reference Number: No Data
Significance Statement: No Data
Surveyor's Eligibility Recommendations: No Data
Surveyor's NR Criteria Recommendations, : No Data
Surveyor's NR Criteria Considerations: No Data

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Snapshot

Date Generated: June 02, 2022

Site Name: St. Luke's Church and Grounds
Site Classification: Terrestrial, open air
Year(s): No Data
Site Type(s): Artifact scatter, Artifact scatter, Artifact scatter, Cemetery, Church, Lithic scatter
Other DHR ID: 046-0024
Temporary Designation: St. Luke's

Site Evaluation Status

Not Evaluated
This property is subject to an easement held by the Board of Historic Resources

Locational Information

USGS Quad: BENNS CHURCH
County/Independent City: Isle of Wight (County)
Physiographic Province: Coastal Plain
Elevation: 40
Aspect: Facing East
Drainage: James River
Slope: 2 - 6
Acreage: 18.500
Landform: Terrace
Ownership Status: Private
Government Entity Name: No Data

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Site Components

Component 1

Category: Funerary
Site Type: Cemetery
Cultural Affiliation: African American, Euro-American
Cultural Affiliation Details: No Data
DHR Time Period: Antebellum Period, Colony to Nation, Early National Period
Start Year: No Data
End Year: No Data
Comments: [2011 Smith]

August 2008: At least one section of the cemetery showed an individual who exhibited some African ancestry.

Component 2

Category: Indeterminate
Site Type: Artifact scatter
Cultural Affiliation: Native American
Cultural Affiliation Details: No Data
DHR Time Period: Middle Archaic Period
Start Year: No Data
End Year: No Data
Comments: August 2008: Native American finds were in disturbed contexts (grave shafts and pipe trenches). A Morrow Mountain projectile point was found.

Component 3

Category: Industry/Processing/Extraction
Site Type: Lithic scatter
Cultural Affiliation: Native American

Cultural Affiliation Details: No Data
DHR Time Period: Pre-Contact
Start Year: No Data
End Year: No Data
Comments: August 2008: Native American finds were in disturbed contexts (grave shafts and pipe trenches). Many undateable artifacts were found but they show that stone tools were being manufactured on site: chunks; initial edging, primary and secondary thinning flakes; a preform; scrapers; fire-cracked rocks.

Component 4

Category: Indeterminate
Site Type: Artifact scatter
Cultural Affiliation: Native American
Cultural Affiliation Details: No Data
DHR Time Period: Early Woodland
Start Year: No Data
End Year: No Data
Comments: August 2008: Native American finds were in disturbed contexts (grave shafts and pipe trenches). Dateable artifacts include Early Woodland pottery from the following periods: Marcey Creek (c. 1,000 B.C. to c. 750 B.C.), Accokeek (c. 900 B.C. to c. 300 B.C.), Popes Creek (c. 500 B.C. to A.D. 300)

Component 5

Category: Indeterminate
Site Type: Artifact scatter
Cultural Affiliation: Native American
Cultural Affiliation Details: No Data
DHR Time Period: Late Woodland
Start Year: No Data
End Year: No Data
Comments: August 2008: Native American finds were in disturbed contexts (grave shafts and pipe trenches). Townsend (A.D. 950 to Contact) pottery found.

Component 6

Category: Religion
Site Type: Church
Cultural Affiliation: Euro-American
Cultural Affiliation Details: No Data
DHR Time Period: Antebellum Period, Civil War, Colony to Nation, Contact Period, Early National Period, Reconstruction and Growth, The New Dominion, World War I to World War II
Start Year: No Data
End Year: No Data
Comments: [2011 Smith] St. Luke's Episcopal Church

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Bibliographic Information

Bibliography:

No Data

Informant Data:

Name: Unknown
Company 1: Historic St. Luke's Restoration, Inc.
Address 1: 14477 Benn's Church Blvd.
City: Smithfield
State: Virginia
ZIP: 23430
Phone 1: 757-357-3367
Owner Relationship: Owner of property

CRM Events

Event Type: Easement: DHR

DHR ID: 44IW0271
Staff Name: Smith, Anthony
Event Date: 3/15/2011
Staff Comment Archaeological work triggered by VDHR historic easement. Excavation of three test units in locations of soil bore tests revealed three intact archaeological features in two units. Excavation of two test units abutting the church foundations revealed disturbed fill (modern) to base of foundation in these locations.

Event Type: Archaeological Monitoring

Project Staff/Notes:

[Record enriched from CRM report "Archaeological Mitigation for a Drainage Trench at St. Luke's Church, Isle of Wight County, Virginia" on 19 June 2014]

Project Review File Number: No Data
Sponsoring Organization: No Data
Organization/Company: DHR Archives Reading Room
Investigator: Alain Outlaw
Survey Date: 7/1/2007
Survey Description:

In July 2007, archaeologists monitored the excavation of a 60' long x 5' wide trench for a new stormwater drainage system which extends from the northwest corner of St. Luke's Church to a nearby pond. The 2' deep trench revealed eleven features. Ten were unmarked graves, and one was a planting hole.

The bones, coffin remains , and personal effects were re-interred in mapped locations, in archaeologically excavated burial shafts and as near as possible to their original graves, but outside the trench corridor. Selected artifacts from the trench were retained for a study collection to be archivally stored and/or exhibited at St. Luke's Church.

Data on burial practices and human osteology were recorded. Unexpectedly, however, archaeological contexts also revealed important architectural information on the building, repair and restoration episodes of the church, as well as a glimpse at the prehistory of these environs.

Current Land Use	Date of Use	Comments
Cemetery	8/1/2008 12:00:00 AM	Church cemetery

Threats to Resource: Development, Other
Site Conditions: Unknown Portion of Site Destroyed
Survey Strategies: Observation, Subsurface Testing
Specimens Collected: Yes
Specimens Observed, Not Collected: Yes
Artifacts Summary and Diagnostics:

Selected artifacts retained for a study collection to be archivally stored and/or exhibited at St. Luke's Church.

Summary of Specimens Observed, Not Collected:

Human remains, coffin remains, and personal effects were reinterred.

Current Curation Repository: St. Luke's Church
Permanent Curation Repository: St. Luke's Church
Field Notes: No
Field Notes Repository: No Data
Photographic Media: No Data
Survey Reports: Yes
Survey Report Information:

CRM report IW-48
DHR File No. 2007-0936

Survey Report Repository: VDHR (Richmond)
DHR Library Reference Number: No Data
Significance Statement: Area immediately surrounding church building already listed on NRHP (1966), expansion of this to include all of church property seems prudent.

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Surveyor's Eligibility Recommendations: No Data
Surveyor's NR Criteria Recommendations, : No Data
Surveyor's NR Criteria Considerations: No Data

Event Type: Other

Project Staff/Notes:
No Data
Project Review File Number: No Data
Sponsoring Organization: No Data
Organization/Company: Unknown (DSS)
Investigator: No Data
Survey Date: No Data
Survey Description:

[2011 Smith] JRIA excavated 1' square test units at three potential soil test bore locations off three corners of St. Luke's Church. The test units off the northeast and northwest corners revealed the edges of apparently linear features oriented east-west and presumably are unmarked burials.

In addition, JRIA excavated a 1' x 4.75' trench against the south wall of the church and a 3.3' x 5' trench against the north wall of the church tower. The trenches were excavated to allow architects to examine the church foundations. The trench against the north church tower wall uncovered the west half of a cellar entrance to a basement under the church tower. Historical records indicate that the basement was added to the church in the late 19th century. The trench againt the south wall of the church discovered a 3'+ wide trench that paralleled the church foundation that was excavated during the 1950's restoration project that enabled brick to be extracted from the face of the below ground foundation and replaced with modern brick while the original salvaged brick was reused elsewhere in the church restoration.

The only artifact recovered during the JRIA testing were modern artifacts and there were not collected.

Current Land Use	Date of Use	Comments
Cemetery	3/15/2011 12:00:00 AM	Expansive active graveyard surrounding church building.
Church	3/15/2011 12:00:00 AM	Active place of worship.

Threats to Resource: Public Utility Expansion
Site Conditions: Intact Cultural Level, Subsurface Integrity, Unknown Portion of Site Destroyed
Survey Strategies: Informant, Subsurface Testing
Specimens Collected: No
Specimens Observed, Not Collected: No
Artifacts Summary and Diagnostics:
No Data
Summary of Specimens Observed, Not Collected:
No Data
Current Curation Repository: No Data
Permanent Curation Repository: No Data
Field Notes: Yes
Field Notes Repository: JRIA
Photographic Media: No Data
Survey Reports: Yes
Survey Report Information:

2012
Matthew Laird, Anthony Smith
Archaeological Testing Associated with a Drainage Installation Project at St. Luke's Church (046-0024/44IW0271), Isle of Wight County, Virginia
---
2011, Matthew Laird, Nicholas Luccketti, Anthony Smith
Archaeological Testing at St. Luke's Church, Isle of Wight County, Virginia

Survey Report Repository: JRIA, DHR
DHR Library Reference Number: IW-062, IW-063
Significance Statement: Area immediately surrounding church building already listed on NRHP (1966), expansion of this to include all of church property seems prudent.
Surveyor's Eligibility Recommendations: Legacy
Surveyor's NR Criteria Recommendations, : A, B, C
Surveyor's NR Criteria Considerations: Birth Place or Grave, Commemorative Property, Moved Property, Reconstructed Property, Significance of less than Fifty Years

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Property Information

Property Names

Name Explanation	Name
Historic	Newport Parish Church
Historic	Old Brick Church
NRHP Listing	Saint Luke's Church
Current	Saint Luke's Smithfield

Property Addresses

Current - 14477 Benn's Church Boulevard Route 10

County/Independent City(s): Isle Of Wight (County)
Incorporated Town(s): *No Data*
Zip Code(s): 23314, 23430
Magisterial District(s): *No Data*
Tax Parcel(s): *No Data*
USGS Quad(s): BENNS CHURCH

Property Evaluation Status

VLR Listing
NRHP Listing
NHL Listing
This property is subject to an easement held by the Board of Historic Resources

Additional Property Information

Architecture Setting: Village
Acreage: 5
Site Description:

1974 Nomination:
The Newport Parish Church is located in the township of Benn's Church, Virginia, not far from Smithfield in Isle of Wight County, and in fact, is often referred to simply as "Saint Luke's Smithfield". Surrounded by a graveyard and a golf course, only part of the former is owned by the Historic Saint Luke's Foundation, and none of the latter. A rather complicated boundary winds through the churchyard, dividing land owned by the church and land owned by the Benn's Church Cemetery, confusingly called Saint Luke's Cemetery.

Land immediately east of the church boundary is used as a golf course and the Foundation has recently purchased 2 acres of land directly behind the church and planted there a stand of pine trees which now contributes significantly to the visual integrity of the site. To the north of the church are a pair of small ponds, and a stream running east-west, a tributary of Jones Creek. A visitors-center building sits to the south and west of Saint Luke's at a distance of perhaps 75 yards. The land between the two is a tree-covered slope falling off towards the church, divided by a dirt road running north-south. Further south is private land used as pasture.

The boundary will include the visitors-center, which is not part of the Landmark of course, but no other buildings than Saint Luke's. Although this will be a site of only about 5 acres, it is laid out in such a way as to present a serene and somewhat bucolic setting for a church whose associations, after all should hearken us back to an era of quiet, rustic charm. From the church, the slope of the hill towards the west and south safeguards our view. To the north, we see the ponds in the near distance, and to the east, a stand of pine trees planted as a screen by the Foundation. All of these features contribute significantly to the integrity of Saint Luke's surroundings.

The grounds are well-maintained near the church by the Foundation, even though a number of the grave lots are in private hands and would otherwise be overgrown.

2010: The church building sits on a level lot covered by grassy lawn as well as mature trees, planting beds, and shrubs. A historic cemetery with a variety of gravestones, tablets, and markers surrounds the church. Although Historic St. Luke’s Restoration, Inc. owns additional acreage in the vicinity, the easement boundaries encompass 1.0 acre and include the historic church and surrounding cemetery. A visitor center with gift shop is situated to the southwest of the church, but outside of the easement property boundaries. Access to the property is made via a brick walkway that leads from the visitor center and parking area to the west elevation of the church building. Three light poles line the brick walkway within the easement boundaries. A formal brick entry area with brick steps, pavers, and metal handrails is located at the west tower entrance. Several garden beds are also located in this area.

Surveyor Assessment:

1936: St. Luke's, or as it was called prior to the Revolution: "The Old Brick Church", was built under the care of Joseph Bridger (died 1686) sometime between 1632 and 1682, in what was then Warrescoyack Parish, later divided in 1642 into Newport and Warrescoyack.

The church is remarkable as the only remaining example of a buttressed Gothic Church of the seventeenth century in America.

The church remained in constant use until about the first quarter of the 18th century when it fell Into disrepair. In 1887 the roof fell in carrying down part of the walls. The building remained in a state of disuse until a restoration was begun in 1890 under the direction of the Rev. David Barr, then rector of the Church. The work was completed about 1897. The present stained glass was set in at this time.

1974 nomination: The Newport Parish Church, more familiarly known as Saint Luke's, is the oldest remaining church of English foundation in the United States. Although there is still some question about the date of the building, research indicates 1632 to be the most likely date of its construction. Its interior appointments are in a later, more Jacobean spirit, now restored, but the fabric of the church places it firmly in the late-medieval English small parish church style. While Saint Luke's is not stylistically coherent, it instead provides examples of various periods of English Gothic architecture. Its entrance for instance, with heavy round arch, is practically

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Romanesque; its brick-traceried lancet window in the east wall suggests high English Gothic, while the crow-stepped gables at either end are suggestive of the Late-Gothic period. In the third storey of the tower, added several decades after the first two, we have a suggestion of the classical style of the English architecture of the late seventeenth century. Saint Luke's belongs as much to the history of Western Architecture as it does to that of early colonial America.

The dating of Saint Luke's has been a challenging task for researchers for some time. Best evidence however places the date at about 1632, with the interior completed only over the course of the next three decades. Colonel Joseph Bridger, who was definitely in the vicinity by 1657, commissioned the Driver brothers to complete the interior after that. The third storey was added to the tower at the west end of Saint Luke's in the late seventeenth century.

With the disestablishment of the Anglican Church in Virginia during the 1780's, Newport Parish Church sank into a decline from which it recovered only in the twentieth century. Its use became intermittent only, over those years.

In 1828, a young deacon renamed the "Old Brick" Saint Luke's, but as Morrison points out, the new name was never validated by consecration or action of the vestry and the most appropriate name remains The Newport Parish Church. The building was again closed four years later.

By the late nineteenth century, the Old Brick had been long-neglected, and during a violent storm in the 1880ts, the roof collapsed and bricks were dislodged from the walls. Several bricks were supposedly found then with the date 1632 incised, settling once and for all the date of the first construction. It didn't.

The roof was rebuilt, but Saint Luke's was neglected again and by 1950 ominous bulges had appeared in the basement walls and the building seemed to be in danger of collapse. A dramatic nationwide appeal was mounted, and sufficient funds were raised to research and restore Saint Luke's to a respectable condition. Headed by James Grote Vanderpool, then Avery Architectural Librarian at Columbia University, an intensive and extended (1953-1957) historical and archeological program was developed to reconstruct much of the interior which had been altered during Georgian and Victorian periods, as well as to stabilize and restore the exterior. The March 1958 issue of the Journal of the Society of Architectural Historians contains an account of the particulars of the work done.

The church and a small amount of land around it is still owned and administered by The Historic Saint Luke's Foundation, which maintains it in excellent condition. The third storey of the tower has recently been filled with de-humidification equipment for the church.

2010 dendrochronology report summary:
Given that the door head and the door lintel have dated to shortly after 1677, and these timbers have been built into the primary brick structure, these dates clearly demonstrate that the church could not have been constructed before this date. Furthermore, there are two additional pieces of supporting evidence which the tree-ring dates support. The first is a date brick of which a poor photograph was published in The American Magazine, Vol. VII, in February 1888. The date is on the side of the brick and was probably scratched in the wet clay by the brickmakers, but not positioned as a publicly visible date. The date had been traditionally interpreted as reading 1632, but a more careful study of the image shows it to be more likely 1682. The brick was removed during a restoration at this time, and was kept in the church, but is now lost.

The other piece of evidence are a number of lead window cames excavated from adjacent to the church in the 1950s restoration. These were unrolled and were found to have a date stamp of 1685, which is consistent with the architectural detailing of the brickwork.

These independent dates are entirely consistent with the dendrochronological dates, when one takes into account between 5 and 10 rings of sapwood missing to the bark edge.

The two dated balusters had no sapwood surviving, and had much earlier last measured ring dates. This does not mean that they are in fact earlier than the rest of the church, but just means that they originated further within the tree when cut out for turning blanks.

The first baluster was taken from the church in May 1845 by a New England visitor and given to the Connecticut Historical Society. The antiquarian John W Barber put a label on it which says: “The banister from the chancel of an ancient church near Smithfield Isle of Wight Co., Virginia, made in England in 1631…” The dendrochronology has here shown that the tree from which the baluster was cut was still growing in at least 1634, and most probably 50 years beyond, and dendro-provenancing has shown that the timber matches with Virginian chronologies, not with English material. The baluster is now in the Museum of Southern Decorative Arts in Winston-Salem.

The second baluster (stc4) is shorter than the first one and was originally a stair baluster. It has been reused upside down in the present communion rail. This had a last measured ring date of 1619, but again it had no sapwood, and clearly about 50 heartwood rings were also lost when converted and turned. There is no reason to think that either balusters could not date to the early 1680s.

All this fits stylistically very well with two other local Virginian churches which date to the 1680s, including the first Bruton Parish Church and the church at Jamestown.

2010 DHR BDR:
Located in Smithfield, Isle of Wight County, Historic St. Luke’s Church has been maintained and operated as a museum/non-profit organization by Historic St. Luke’s Restoration, Inc. since 1953. Historic St. Luke’s Restoration, Inc received a 2005 Save America’s Treasures grant for rehabilitation of the building and donation of an easement is a condition of the grant agreement. Planned rehabilitation work includes repointing and replacement of damaged bricks, repair of interior and exterior woodwork, roof repair, lichen removal, plaster repair, and updates to electrical and security systems.

Designated a National Historic Landmark by the Secretary of the Interior in 1960, St. Luke’s Church stills retains its integrity and form. The property was also individually listed on the Virginia Landmarks Register (1969) and the National Register of Historic Places (1966) for its architectural significance. The architectural evolution of St. Luke’s Church is a distinct and rare example of 17th Century Gothic style architecture in the United States. It is also representative of the religious and political foundations of early America. The property is regularly open to the public for lectures, weddings, tours, and other similar events.

Surveyor Recommendation: *No Data*

Ownership

Ownership Category	Ownership Entity

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Private	*No Data*

Primary Resource Information

Resource Category: Religion
Resource Type: Church/Chapel
NR Resource Type: Building
Historic District Status: *No Data*
Date of Construction: Ca 1682
Date Source: Dendrochronology
Historic Time Period: Contact Period (1607 - 1750)
Historic Context(s): Architecture/Community Planning, Religion
Other ID Number: *No Data*
Architectural Style: Colonial
Form: *No Data*
Number of Stories: 1.0
Condition: Excellent
Interior Plan: Nave
Threats to Resource: None
Cultural Affiliations: *No Data*
Cultural Affiliation Details:

No Data

Architectural Description:

Architecture Summary, 1974 nomination: The Newport Parish Church, or Saint Luke's as it is more familiarly but unofficially known, is the most convincingly Gothic church in America. Erected possibly as early as 1632, this is a small church of the English late-medieval period, with considerable Gothic detailing.

Basically, Saint Luke's is a simple nave plan (29'4 and 3/4" X 65'& 3/4") with a twenty foot square tower at the west end. Its two-foot-thick walls are laid in a rough Flemish bond, including crude tracery in brick, forming pointed lancet windows. The large lancet east wall is a striking exercise in brick tracery. Deep wall buttresses project prominently from three bays of the north and south walls. They have sloping set-offs.

At both the east and west end of the church are crow-stepped gables, while unadorned turrets, corbelled slightly at their bases, decorate the corners of the building.

The tower at the west end of Saint Luke's is one of its most interesting features, with a suggestion on first sight that there may be a suggestion of classical awareness in late 17th century America. The triangular feature over the doorway is a particularly intriguing one which one might think to be a crude example of the forever-used renaissance pediment. However, not only does its heaviness argue against the spirit of the renaissance, but the use of this feature may easily be traced to similar usage in English high-style architecture of the very late sixteenth century.

The shape and depth of the round arch below that triangle, also argues against anything but a traditional outlook by the builders. It is heavy and very three-dimensional (an effect created by cleverly turning the outside wall towards the inside of the arch with moulded bricks) giving the effect more of a Romanesque archivolt than anything classical.

The Newport Parish Church was doubtless planned with a tower but with one of only two storeys, which almost certainly terminated in Gothic crenellation. The quoining of those two storeys, which again could be interpreted as a classical reference, in fact is a feature to be found mixed together with medieval elements in English Architecture as early as the mid-sixteenth century.

Despite these few rebuttals to the arguments of a classical mixture in the tower of Saint Luke's however, it is certainly in fact that. In the third storey of that tower, added in the late seventeenth century, we have something that William Pierson calls ".....precocious.....forming a prophetic prelude of things to come . . . ." A remarkable visual change from the earlier
heavy quoining to much more delicate pilaster strips marks a new awareness of architectural trends acquired by men of increasing cultural pre-occupation. Based upon extensive research compiled by The Historic Saint Luke's Foundation in the 1950's, it seems safe to say that the building program there may be divided into work done before 1657, and work done after that. When compared with the nearby work of the 1660's at Bacon's Castle, which also shows a sense of social ambitiousness, we can see the same cultural self-consciousness in the post-1657 work at Newport Parish Church. The classical pilasters are a limited but definite piece of evidence of that striving.

The interior appointments of Saint Luke's were not added until a number of years after completion of the fabric of the building, and after 1657 Colonel Joseph Bridger commissioned Charles and Thomas Driver to complete the work and add the third storey to the tower. The roof has been rebuilt a number of times and doubtless originally had a steeper, more Gothic, pitch. The tie-beam timber-truss, closed above the collar beam, has also been rebuilt but is based upon the original scheme as verified by research.

Originally, a gallery existed at the west end of the nave, supported by a massive hewn oak beam, and this has been rebuilt, as has been the rood screen in the chancel and the square brick tiles in the floor of the church. The original stained-glass windows were replaced in the nineteenth century and those Victorian windows remain in place today.

While there has been an extensive refitting of the interior, the work has been based upon meticulous research over a period of years and must be considered as 'correct' as humanly possible. This conjectural restoration has not affected the external appearance of the church except for some

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change to the pitch of the roof.

2010 Dendrochronology report: Only two oak timbers remained within the structure at St Luke's Church: the moulded door frame head and lintel above the west door. Although neither of the timbers retained bark edge, both had some sapwood, suggesting that very few rings were lost in the conversion. As such, the dates were entirely consistent with the brick inscribed '1682' (now lost). It is also consistent with the 1685 date found inscribed in lead cames found on the site. Two ex situ balusters, one in the collection of MESDA at Winston-Salem, and the other reused in the present communion rail, were photographed and the sequences dated. Although neither retained any sapwood, the last measured ring dates of 1619 and 1633 were entirely consistent with the presumed early 1680s construction date.

2010 DHR BDR:
Situated in the community of Benn's Church near Smithfield, St. Luke's is a parish church of the late-medieval period with significant gothic detailing. Among its Gothic features are buttresses, quoins, stepped gables, brick-traceried windows, and the medieval tie-beam timber interior roof structure. The church has a simple nave plan with a twenty-foot square three-tiered tower at the west end. Its two-foot thick walls are laid in Flemish and English bond, with brick tracery forming pointed lancet windows. It is thought that a number of years lapsed between construction of the church and completion of its interior architecture. The original temporary forms were replaced with more permanent Jacobean fittings by Colonel Bridger some time in the late 17th Century. Some of these Jacobean interior finishes included Tuscan columns formed from the trunk of a tree and turned balusters of the rood screen and kneeling rail. The design and joinery of the interior architecture is precise and represents highly skilled craftsmanship. Original amber and clear glass windows were replaced in the late 1800's with nineteenth century stained glass. This glass remains today. The building was thoroughly restored in the 1950s, which incorporated replacement of a number of interior features and woodwork.

See BDR for component descriptions.

August 2010

May 2015

Exterior Components

Component	Component Type	Material	Material Treatment
Roof	Gable, Front	Slate	Shingle
Foundation	Solid/Continuous	Brick	Other
Structural System and Exterior Treatment	Masonry	Brick	Bond, Flemish
Windows	Other	Wood	Paired
Windows	Fixed	Stone	Other
Structural System and Exterior Treatment	Other	Brick	Other

Secondary Resource Information

Secondary Resource #1

Resource Category: Funerary
Resource Type: Cemetery
Date of Construction: 1680Ca
Date Source: Date Stone/Cornerstone
Historic Time Period: Contact Period (1607 - 1750)
Historic Context(s): Funerary, Religion
Architectural Style: *No Data*
Form: *No Data*
Condition: Good
Threats to Resource: None
Cultural Affiliations: *No Data*
Cultural Affiliation Details:

No Data

Architectural Description:

Architecture Summary, 1974: In yard surrounding church.

August 2010

May 2015

Current Use: Church/Religious
Historic Religious Affilitation: Other
Ethnic Affiliation: English
Has Marked Graves: True

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Has Unmarked Graves: False
Enclosure Type: None
Number Of Gravestones: 26 - 50
Earliest Marked Death Year: *No Data*
Latest Marked Death Year: *No Data*

Significant Burials

Marked Type	First Name	Last Name	Birth Year	Death Year
Other	Jospeh	Bridger	*No Data*	1686

Historic District Information

Historic District Name: *No Data*
Local Historic District Name: *No Data*
Historic District Significance: *No Data*

CRM Events

Event Type: DHR Staff Site Visit

Project Review File Number: *No Data*
Investigator: Michael J. Pulice
Organization/Company: DHR
Photographic Media: Digital
Survey Date: 11/1/2019
Dhr Library Report Number: *No Data*
Project Staff/Notes:

Exterior photographs taken during brief site visits by DHR's Western Region Preservation Office architectural historian Mike Pulice.
10/30/2019 to Virginia Beach properties
11/1/2019 to St. Luke's Church

Event Type: DHR Staff Site Visit

Project Review File Number: *No Data*
Investigator: Megan Melinat
Organization/Company: DHR
Photographic Media: Digital
Survey Date: 5/28/2015
Dhr Library Report Number: *No Data*
Project Staff/Notes:

Easement staff stewardship visit; complete report available in the easement property file.

Event Type: Easement: DHR

DHR ID: 046-0024
Staff Name: Wendy Musumeci
Event Date: 9/16/2010
Staff Comment

Historic St. Luke's Restoration, Inc. has conveyed an easement over a 1.0-acre portion of the Historic St. Luke's Church property in Isle of Wight County (DHR Easement File No. 046-0024). The easement, recorded on September 16, 2010, was conveyed as a condition of a Save America's Treasures grant.

Located in Smithfield, Isle of Wight County, Historic St. Luke's Church has been maintained and operated as a museum/non-profit organization by Historic St. Luke's Restoration, Inc. since 1953. The building sits on a level lot covered by grassy lawn as well as mature trees, planting beds, and shrubs. A historic cemetery with a variety of gravestones, tablets, and markers surrounds the church. Although the exact date of construction in unknown, Historic Saint Luke's Church, also known as the Newport Parish Church and the Old Brick Church, is one the oldest remaining churches of English foundation in the United States. Situated in the community of Benn's Church near Smithfield, St. Luke's is a parish church of the late-medieval period with significant gothic detailing. Among its Gothic features are buttresses, quoins, stepped gables,

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brick-traceried windows, and the medieval tie-beam timber interior roof structure. The church has a simple nave plan with a twenty-foot square three-tiered tower at the west end. Its two-foot thick walls are laid in Flemish and English bond, with brick tracery forming pointed lancet windows. It is thought that a number of years lapsed between construction of the church and completion of its interior architecture. The original temporary forms were replaced with more permanent Jacobean fittings by Colonel Bridger some time in the late 17th Century. Some of these Jacobean interior finishes included Tuscan columns formed from the trunk of a tree and turned balusters of the rood screen and kneeling rail. The design and joinery of the interior architecture was precise and represented highly skilled craftsmanship. Original amber and clear glass windows were replaced in the late 1800's with nineteenth century stained glass. This glass remains today.

The building was thoroughly restored in the 1950s, which incorporated replacement of a number of interior features and woodwork elements. Designated a National Historic Landmark by the Secretary of the Interior in 1960, St. Luke's Church stills retains its integrity and form. The property was also individually listed on the Virginia Landmarks Register (1969) and the National Register of Historic Places (1966) for its architectural significance. The architectural evolution of St. Luke's Church is a distinct and rare example of 17th Century Gothic style architecture in the United States. It is also representative of the religious and political foundations of early America. The property is regularly open to the public for lectures, weddings, tours, and other similar events.

Event Type: DHR Staff Site Visit

Project Review File Number: *No Data*
Investigator: Wendy Musumeci
Organization/Company: DHR
Photographic Media: Digital
Survey Date: 8/18/2010
Dhr Library Report Number: *No Data*
Project Staff/Notes:
DHR Easement Staff site visit - Baseline Documentation Report

Event Type: NRHP Nomination

DHR ID: 046-0024
Staff Name: James Dillon
Event Date: 10/23/1974
Staff Comment
No Data

Event Type: VLR Listing

DHR ID: 046-0024
Staff Name: VHLC
Event Date: 9/9/1969
Staff Comment
No Data

Event Type: Survey:Phase I/Reconnaissance

Project Review File Number: *No Data*
Investigator: Andrew D. Logan
Organization/Company: VA Dept. of Historic Resources
Photographic Media: Film
Survey Date: 7/27/1967
Dhr Library Report Number: *No Data*
Project Staff/Notes:
Update of HABSI survey

Event Type: NRHP Listing

DHR ID: 046-0024
Staff Name: NPS
Event Date: 10/15/1966
Staff Comment
No Data

Event Type: NHL Listing

DHR ID: 046-0024

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Staff Name: NPS
Event Date: 10/9/1960
Staff Comment
No Data

Event Type: Survey:HABS Inventory

Project Review File Number: *No Data*
Investigator: Robert Wiggins
Organization/Company: National Park Service
Photographic Media: Other
Survey Date: 10/1/1958
Dhr Library Report Number: *No Data*
Project Staff/Notes:
No Data

Event Type: HABS/HALS/HAER Documentation

Project Review File Number: *No Data*
Investigator: Finlay F. Ferguson, Jr.
Organization/Company: National Park Service
Photographic Media: Film
Survey Date: 4/26/1934
Dhr Library Report Number: *No Data*
Project Staff/Notes:
HABS No 11-20

Bibliographic Information

Bibliography:

Name: James River Instit for Archaeology
DHR CRM Report Number: IW-063
Record Type: Report
Bibliographic Notes: Archaeological Testing Associated with Drainage Installation Project at St. Luke's Church, Isle of Wight, VA. February 2012. DHR File No. 2007-0278

Record Type: Report
Bibliographic Notes: Oxford Dendrochronology Laboratory Report 2010/28

The Tree-Ring Dating of Timbers from Newport Parish Church (St Luke's or Old Brick Church), Smithfield, Isle of Wight County, Virginia. Dr. D.W.H. Miles, FSA, and M.J. Worthington

Property Notes:
No Data

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Virginia Dept. of Historic Resources

V-CRIS

Virginia Cultural Resource Information System

Legend

- Architecture Resources
- Architecture Labels
- Individual Historic District Properties
- Archaeological Resources
- Archaeology Labels
- DHR Easements
- USGS GIS Place names
- County Boundaries



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Feet

0 200 400 600 800

1:9,028 / 1"=752 Feet

Title: Architecture Labels **Date: 6/2/2022**

DISCLAIMER:Records of the Virginia Department of Historic Resources (DHR) have been gathered over many years from a variety of sources and the representation depicted is a cumulative view of field observations over time and may not reflect current ground conditions.The map is for general information purposes and is not intended for engineering, legal or other site-specific uses. Map may contain errors and is provided "as-is". More information is available in the DHR Archives located at DHR's Richmond office.

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Property Information

Property Names

Name Explanation	Name
Function/Location	House, 15150 Benns Church Boulevard (Route 10)
Historic	Jordan Home #1
Historic	Margaret Davis House
Historic/Current	Charles Driver Jordan House

Property Evaluation Status

The Primary Resource is no longer extant.

Property Addresses

Current - 15150 Benns Church Boulevard Route 10

County/Independent City(s): Isle Of Wight (County)
Incorporated Town(s): *No Data*
Zip Code(s): 23430
Magisterial District(s): *No Data*
Tax Parcel(s): 32-01-082
USGS Quad(s): BENNS CHURCH

Additional Property Information

Architecture Setting: Rural
Acreage: 103
Site Description:

1937 survey: This property is located 1/2 mile south of Benns Church, 150 yards west of Route 10.

2005 Intensive Survey:
This resource is located on a 103-acre site situated on the west side of Benns Church Boulevard (Route 10/32) south of the village of Benns Church. The area is characterized by farmsteads dating to the 19th century and small mid-20th century dwellings. The site is open with a treestand to the immediate south of the dwelling. A driveway extends west from Benns Church Boulevard toward the dwelling. The driveway is situated to the dwelling's north and bisects the dwelling and shed. It continues to the west beyond the house site. There is a one-and-one-half story shed located to the northwest of the dwelling.

Property Event Type:

Destroyed

Surveyor Assessment:

Start Year: 1857
End Year: 1859
Date Source: Site Visit/Written Data
Type: Original Construction
Notes: This dwelling was erected between 1857 and 1859.

1937 survey:
This tract of land consisted of about 500 acres and was inherited by Margaret Davis from her father. In 1840 she married Charles Driver Jordan. This land was all in virgin timber and they planned to clear up a place and build a nice home. A place was cleared up and two kitchens were built for the workmen and slaves. During this time Charles Jordan and his wife lived with his father near Smithfield. After four years Mrs. Charles Jordan died, leaving one daughter. Mr. Jordan lived in one of the kitchens as a widower, for sixteen years. In 1857 he started a nice home, to be built out of the best materials to be had, in a grove of oak and hickory trees.

In 1858 Charles Jordan married Sophie Ann Cate, a school teacher from New Hampshire, who came to this county as a governess. After the Ware Between the States, Mrs. Jordan had a private school in her yard in one of the old kitchens, this being the first private school in the neighrborhood. After public schools were established she taught one of the first public schools in this section. She first taught in her own yard and received a salary of $30.00 per month; later the county built her a two-room school near Benns Church. Mrs. Jordan was considered a fine teacher and boys and girls from four or five miles came to her school. She also gave lessons on the piano.

From time to time some of this land has been sold, and there is now about 180 acres of land in the present tract, which belongs to the estate of C. S. Jordan. C. S. Jordan was the son of C. D. Jordan. They also had two other children, a boy and a girl. The girl, Mrs. E. A. Morrison, in Suffolk, is the only survivor.

2005 Intensive Survey:
This dwelling is a typical center-passage, single-pile I-house will ell. The I-house has a center-passage plan that gains access to the dwelling through a central hallway flanked by rooms. This building type dates to the period between the eighteenth century and the early twentieth century. The central hallway contains the stair to the upper story or stories and for those dwellings with a basement a stair to this area would be situated under the main stair to the upper story or stories. The plan of the dwelling is one-room deep with most often a parlor and dining room flanking the hall. The upper story or stories comprise a similar configuration with bedrooms above the rooms below. In some cases the area above the main entry has been enclosed containing a small room that served as a small bedroom or was converted in the twentieth-century to an indoor lavatory. The facades of these buildings are symmetrical and are

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usually three- to five-bay, and the building is topped most often by a side gable or hipped roof. Chimneys are situated on the center of the side elevations and fireplaces would be found within each room flanking the hall. Chimneys could be interior or exterior on the side elevations and rise above the common roof. The construction materials used for these buildings range from wood frame, brick, or locally mined stone. Most often they are simple vernacular buildings constructed of wood with wood framing and clad in weatherboard siding. Articulation is minimal and most often comprises a simple boxed cornice on the façade and rear elevation, and cornice returns and a raking cornice on the gable ends. Often found on these dwelling is an ell erected to the rear of the I-house plan containing a service wing for additional space including an indoor kitchen. Most often the ell is wood frame construction topped with a perpendicular gable roof with a gable end chimney or hipped roof with a chimney at the end.

This dwelling was erected by Charles Driver Jordan who had inherited the lands from his wife, Margaret Davis Jordan after her death in 1844. Margaret Davis Jordan had inherited the land from her family in 1836. In 1840 Margaret Davis married Charles Driver Jordan and the couple lived in Smithfield with his father. The lands were comprised of 500 acres and were virgin timber forest. Noted were the erection of two kitchens built for slaves and workman on the lands prior to the construction of the dwelling. Charles Driver Jordan is noted as living in one kitchen after the death of his wife for sixteen years. He began erection of the dwelling in 1857 and used the best material he could obtain on the site of a grove of oak and hickory trees. The plan of the dwelling is similar to other houses owned by the Jordan family in the vicinity of this dwelling. A similar, if not identical dwelling, was situated to the south of this dwelling occupied by another Charles Jordan. In 1858 Charles Driver Jordan married Sophia Ann Cates, a schoolteacher from New Hampshire who had come to Isle of Wight County as a governess. The dwelling was completed in 1859, which included the ell appended to the west. Additional family history notes that Mrs. Sophia Ann Cates Jordan taught private school in one of the kitchens on the house site and after public schools were created in Isle of Wight County, operated a public school in one of the kitchens until a school was built nearby.

The kitchens have since been demolished and the only outbuilding associated with the dwelling is a shed to the northwest. The Jordan, Charles Driver House is eligible for listing in the National Register of Historic Places under Criterion C for its architectural style from the period 1857-1859.

August 2018: This house was torn down in July 2018.

Surveyor Recommendation: Recommended Eligible

Ownership

Ownership Category	Ownership Entity
Private	*No Data*

Associate

Property Associate Name	Property Associate Role
Jordan, Charles Driver	Owner

Primary Resource Information

Resource Category: Domestic
Resource Type: Single Dwelling
NR Resource Type: Building
Historic District Status: *No Data*
Date of Construction: Ca 1857
Date Source: Written Data
Historic Time Period: Antebellum Period (1830 - 1860)
Historic Context(s): Architecture/Landscape, Domestic
Other ID Number: *No Data*
Architectural Style: No Discernable Style
Form: L-Plan
Number of Stories: 2.0
Condition: Demolished
Interior Plan: Central Passage, Single Pile
Threats to Resource: Demolition, Development
Cultural Affiliations: *No Data*
Cultural Affiliation Details:

No Data

Architectural Description:

1937 survey: This two-story, L-shaped, frame single dwelling features a hipped roof constructed of shingles. There are three brick chimneys; one on each end and one in the rear. There are 30 windows; 12 panes 12 x 18" downstairs and 12 panes 12 x 18" upstairs. The shutters have slats and are constructed of wooden pegs. The one-story front porch is approximately 10' x 12' and features square columns. There are six rooms in the house and the approximate ceiling height is 9' 3". The open string stairway features round balusters, handrail, and newel. The four-panel doors are constructed of heart pine. The walls are plastered with baseboards at the bottom.

2005 Intensive Survey:
This dwelling is two-story with a five bay façade topped by a hipped roof. The foundation is a solid brick wall and the structural system is

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frame clad in weatherboard siding. The roof is clad in standing-seam metal and features wide eaves. There are exterior end chimneys on the side elevations of 5-course American bond brick and corbelled bases and shoulders. The windows are 6/6 wood double-hung sash with metal storm windows. The main centrally placed entrance on the façade is double-leaf with two panels. The door is surmounted by a nine-light transom and flanked by sidelights with four lights and a panel. Sheltering the entrance is a one-story one-bay porch with a hipped roof clad in standing-seam metal. The porch roof features a dentiled cornice and is supported by square columns. Appended to the west elevation is a service ell. The ell is two-stories with a solid brick foundation and is wood frame construction clad in weatherboard. The roof is hipped clad in standing-seam metal. There is an exterior end brick chimney on the west elevation of 5-course American bond brick. There is a four panel door on the north elevation and west elevation. Windows punctuate the north, south and west elevations on both stories. Appended to the south elevation of the ell and west elevation of the dwelling is a one-story addition circa 1960. It has a concrete block foundation and is wood frame construction clad in vinyl siding. The roof has a shed form clad in asphalt shingles. There is a metal sliding door on the south elevation off a wood ramp that ascends toward the door from the south. There are metal windows on the west elevation.

The interior of the building is a typical central passage, single pile form. It comprises 2488 square feet of living space. The hall features a half-turn stair with slender balusters and a turned newel, which is situated at the west end of the hall. The rooms flanking the hall are rectangular in shape with fireplace openings on the walls opposite access to the hall. The mantels within the dwelling have been removed and the fireplaces have been filled and converted for stove use. Doors accessing the rooms from the hall are wood with four panels, iron locksets and porcelain door handles. The door and window surrounds are fluted with roundel corner blocks. The flooring is oak covered with wall-to-wall carpeting. The baseboards within the rooms are wide with a bead and the windows in the main rooms on the first story feature wood panels below. The walls are covered with plaster on lathe. There is a double-leaf door under the stair landing accessing the addition. The doors have two panels. There is a door under the stair to a closet with two panels. The ell features a hall from the north wall to the addition. This hall accesses the kitchen situated at the west end of the dwelling. The kitchen floor is covered with early 20th century linoleum with a braided rug pattern. The plaster in this room is missing and the flooring is deteriorated.

The addition appended to the building in the mid-20th century features modern wallboard walls and wall-to-wall carpeting. The space is divided into two areas for a main room and lavatory at the west end. The lavatory fixtures have been removed as well as part of the partition wall. The windows and doors have minimal surrounds.

The second story features a similar plan. An angled stair off the main stair landing accesses the hall within the ell on the second story. Each room has similar features to the first story rooms. There is a lavatory off the ell hallway with early 20th century porcelain fixtures. The walls have been clad in modern wallboard and the flooring has been clad in modern vinyl sheeting.

August 2018: This house was torn down in July 2018.

Exterior Components

Component	Component Type	Material	Material Treatment
Windows	Sash, Double-Hung	Wood	6/6
Porch	1-story, 1-bay	Wood	Columns, Square
Roof	Hipped	Metal	Standing Seam
Chimneys	Exterior End	Brick	Bond, American, 5-course
Foundation	Solid/Continuous	Brick	Bond, Common
Structural System and Exterior Treatment	Frame	Wood	Weatherboard

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Secondary Resource Information

Secondary Resource #1

Resource Category: DSS Legacy
Resource Type: Shed
Date of Construction: 1860Ca
Date Source: Site Visit
Historic Time Period: Antebellum Period (1830 - 1860)
Historic Context(s): Domestic
Architectural Style: No discernible style
Form: Rectangular
Condition: Demolished
Threats to Resource: Demolition, Development
Cultural Affiliations: *No Data*
Cultural Affiliation Details:

No Data

Architectural Description:

2005 Intensive Survey:
This shed dates to the mid-19th century and features a brick pier foundation. The building is mortise and tenon construction with pegged joints. The wood frame building is clad in wide horizontal boards that are not lapped. The roof has a catslide from clad in standing-seam metal. There is a vertical board door on the south elevation. The interior features a divided space with a wood frame wall clad in horizontal boards. The flooring is wide plank and the interior walls are not adorned.

Interior Plan: Undivided Space (non-domestic)

Number of Stories: 1.5

Exterior Components

Component	Component Type	Material	Material Treatment
Structural System and Exterior Treatment	Wood Frame	Wood	Board-and-Batten
Foundation	Piers	Brick	*No Data*

Historic District Information

Historic District Name: *No Data*
Local Historic District Name: *No Data*
Historic District Significance: *No Data*

CRM Events

Event Type: DHR Evaluation Committee: Not Eligible

DHR ID: 046-5054
Staff Name: DHR Evaluation Committee
Event Date: 7/21/2016
Staff Comment

M. Holma presenting:
Charles Driver Jordan House, Isle of Wight County, DHR File Number 046-5054, DHR Project Review File No. 2016-3598
In 2006, the Charles Driver Jordan House was identified as a two-story, five bay I-house with a hipped roof and a rear two-story ell, ca. 1857, situated on approximately 103 acres. The structural system is frame weatherboard, with brick foundation. Windows are 6/6 double-hung sash, though several are not in the window openings, but on floors below the openings. There are two exterior end brick chimneys of five-course American bond on the main house, and one on the rear ell. A one-story, one-bay porch with a hipped roof of standing-seam metal covers the entrance, featuring a dentiled cornice and square columns. The south elevation of the ell was given a one-story addition in 1960, with a concrete block foundation and wood frame construction clad in vinyl siding. A 19th-century, one-and-a-half story shed of wood frame construction stood northwest of the house, on a brick pier foundation. Its catslide roof was covered in standing-seam metal. Two former kitchens for enslaved workers are known to have been demolished on the property; however the property was thought to retain archaeological potential as no disturbance had taken place since then. Mrs. Sophia Ann Cates Jordan, wife of Charles Driver Jordan, taught public school in one of the kitchens until a school was built nearby. The property was evaluated at the local level of significance under Criterion C (Architecture) with a period of significance of 1857-1859. The committee recommended it eligible with 30 points.

Since 2006, much of the property's 103 acres have been subject to gravel and sand mining. Although the dwelling is extant, the historic setting has been lost, as well as the property's archaeology potential. Due to the loss of integrity, the committee recommended that the property is no longer eligible for listing.

Event Type: DHR Evaluation Committee: Deferred

DHR ID: 046-5054
Staff Name: DHR Evaluation Committee
Event Date: 5/18/2006
Staff Comment

Kristin Hill presenting:
Charles Driver Jordan House, Isle of Wight County
The Charles Driver Jordan House is a two-story, five bay I-house with a hipped roof and a rear two-story ell, ca. 1857, situated on approximately 103 acres. The structural system is frame weatherboard, with brick foundation. Windows are 6/6 double-hung sash, though several are not in the window openings, but on floors below the openings. There are two exterior end brick chimneys of five course American bond on the main house, and one on the rear ell. A one-story, one bay porch with a hipped roof of standing seam metal covers the entrance, featuring a dentiled cornice and square columns. The south elevation of the ell was given a one-story addition in 1960, with a concrete block foundation and wood frame construction clad in vinyl siding. A 19th century one-and-a-half story shed of wood frame construction sits northwest of the house, on a brick pier foundation. The catslide roof is covered in standing seam metal. Two former kitchens for slaves and workmen are known to have been demolished on the property. Mrs. Sophia Ann Cates Jordan, wife of Charles Driver Jordan, taught public school in one of the kitchens until a school was built nearby. The property was considered locally significant under Criterion C with a period of significance of 1857-1859. The committee recommended it eligible with 30 points.

Event Type: Survey:Phase I/Reconnaissance

Project Review File Number: 2006-0234
Investigator: Kimble David
Organization/Company: Stantec 2034

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Photographic Media: Film
Survey Date: 10/3/2005
Dhr Library Report Number: IW-042
Project Staff/Notes:

for Cultural Resources, Inc.

Aimee Leithoff, Ellen Brady
A Phase I Cultural Resources Survey of Approximately 600 Acres at Benns Church, Isle of Wight County, Virginia
2005
CRI
IW-042

Surveyor's NR Criteria Recommendations: C - Distinctive Characteristics of Architecture/Construction

Phase II Intensive Survey Integrity Recommendations: Design, Feeling, Location, Materials, Setting, Workmanship

Event Type: HABS/HALS/HAER Documentation

Project Review File Number: *No Data*
Investigator: Florence M. Jordan
Organization/Company: National Park Service
Photographic Media: Film
Survey Date: 1/18/1937
Dhr Library Report Number: *No Data*
Project Staff/Notes:

WPA Virginia Historic Inventory Survey #141

Surveyor's NR Criteria Recommendations: C - Distinctive Characteristics of Architecture/Construction

Phase II Intensive Survey Integrity Recommendations: Design, Feeling, Location, Materials, Setting, Workmanship

Bibliographic Information

Bibliography:

Name: Jordan, Annie A.
Record Type: Oral History/Interview
Bibliographic Notes: Benns Church, Virginia.

Record Type: Personal Papers
Bibliographic Notes: Diary of Charles Driver Jordan.

Stuck, Ken, VDOT Environmental, Hampton Roads District
Wednesday 29 August 2018 email correspondence with DHR Archives
[reporting demolition of the house in July 2018]

Property Notes:

Company 1: Benns Church Properties
Address 1: P O Box 500
City: Carrollton
State: Virginia
ZIP: 23314
2005: Owner of property

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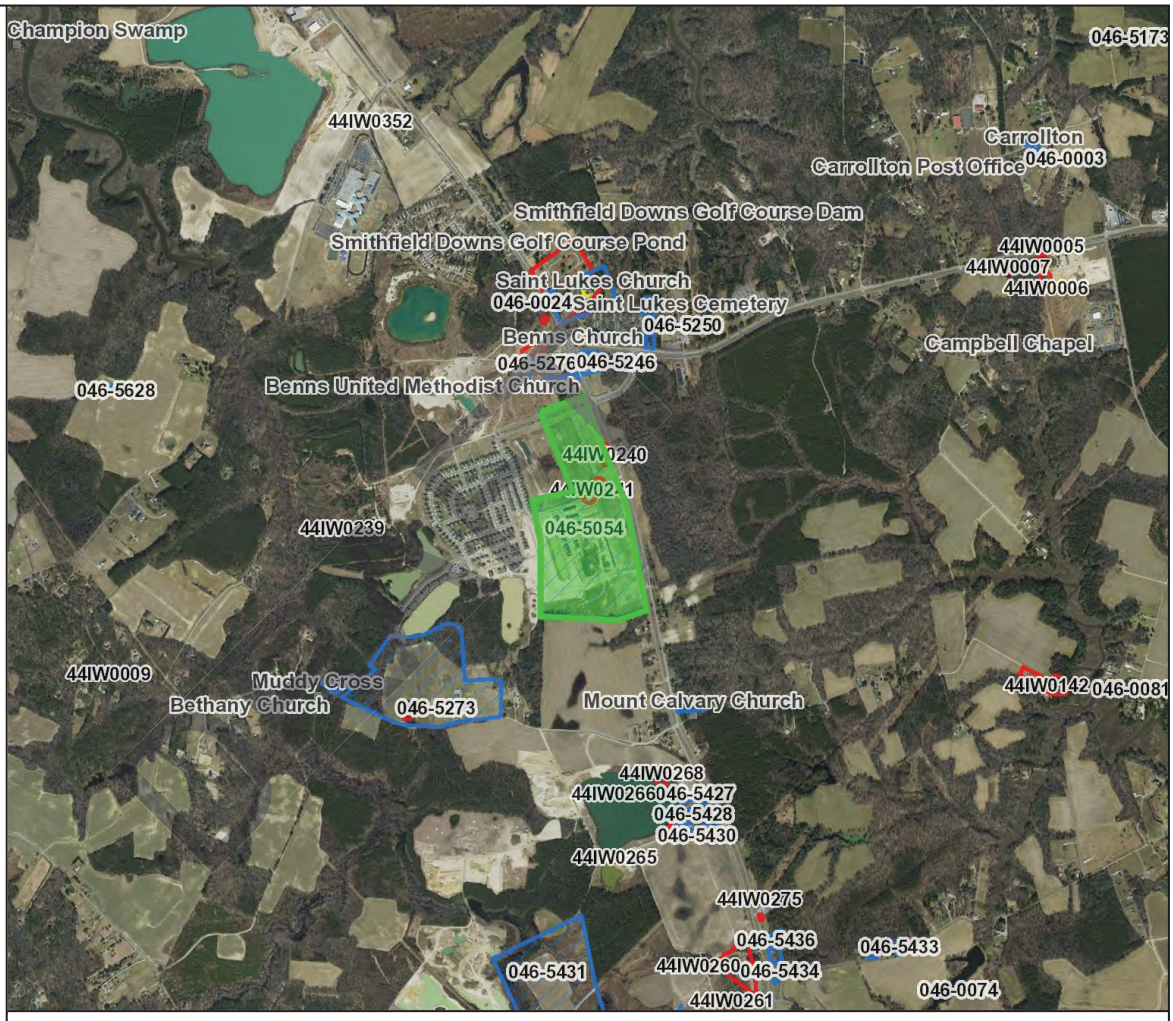
Virginia Dept. of Historic Resources

V-CRIS

Virginia Cultural Resource Information System

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N

Feet

0 600 1200 1800 2400

1:36,112 / 1"=3,009 Feet

Title: Architecture Labels **Date: 6/2/2022**

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Property Information

Property Names

Name Explanation	Name
Historic/Current	Benns Church

Property Evaluation Status

Not Evaluated

Property Addresses

Alternate - State Road 10/32
Current - 14571 Benns Church Boulevard

County/Independent City(s):	Isle of Wight (County)
Incorporated Town(s):	*No Data*
Zip Code(s):	23430
Magisterial District(s):	*No Data*
Tax Parcel(s):	32-01-084
USGS Quad(s):	BENNS CHURCH

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Additional Property Information

Architecture Setting: Village

Acreage: 1

Site Description:

2005:
This building is situated on the southeast corner of the intersection of Benns Church Boulevard (10/32) and Brewers Neck Road (32). The building faces west to Benns Church Boulevard (10/32). The area is characterized by residential properties to the west and commercial properties to the north. The lands to the south are primarily agircutlural. The area has changed over time to accommodate the widening of Benns Church Boulevard (10/32) and Brewers Neck Road (32). The site is generally flat and there are parking lots to the west, north and east.

2005:
To the west of the church is a grave marker. It is a stone slab resting on the ground.

Surveyor Assessment:

2005:
In 1813 George Benn willed the land on which the church stood to the Methodist Convention. This tomb was moved to a spot in the front of the church where the tombstone lies. The brick church was constructed in 1924 and remodeled in 1957 and 1967. This is the oldest Methodist congregation in the area, begun in 1789.

Surveyor Recommendation: *No Data*

Ownership

Ownership Category	Ownership Entity
Private	*No Data*

Primary Resource Information

Resource Category:	Religion
Resource Type:	Church/Chapel
NR Resource Type:	Building
Historic District Status:	*No Data*
Date of Construction:	1924
Date Source:	Site Visit/Written Data
Historic Time Period:	World War I to World War II (1917 - 1945)
Historic Context(s):	Architecture/Community Planning, Religion
Other ID Number:	*No Data*
Architectural Style:	Vernacular
Form:	*No Data*
Number of Stories:	1.0
Condition:	Good

Threats to Resource: None Known

Cultural Affiliations: *No Data*

Cultural Affiliation Details:

No Data

Architectural Description:

2005:
This building is a brick church laid in 6-course American bond. The roof has a gable form with gabled end walls. There is a projecting vestibule on the west elevation. It is also brick construction topped by a gable roof with a gabled brick end wall. The end wall features stretcher bond brick coping. The entrance comprises a double-leaf wood vertical board door with strap hinges. The door is enframed in a rowlock brick blank arch with a rowlock brick surround. The stairs leading to the doors and stoop are brick flanked by brick cheek walls with limestone coping. At the vestibule ends are brick buttresses with limestone caps. There is a date stone situated on the south buttress. The north and south walls have a ribbon window fenestration pattern. The windows are casement wood with stained glass. On the west façade of the main building there is an oculus with stained glass within the gable. The gable end wall is coped in brick stretcher bond. There are stepped buttresses at the building edges. The north and south elevations feature bays divided by stepped brick buttresses. An addition was made in 1957 and additional modifications were made in 1967, which obscure the original east end of the building. The addition retains the general proportion and massing of the original building. The materials are similar and the roof form is also similar. The addition is two stories with a gable roof. The windows on the addition are 6/6 wood double-hung sash.

Exterior Components

Component	Component Type	Material	Material Treatment
Roof	Gable	Slate	Shingle
Structural System and Exterior Treatment	Masonry	Brick	Bond, American, 6-course
Windows	Fixed	Wood	1-light
Foundation	Solid/Continuous	Brick	Bond, American

Secondary Resource Information

Secondary Resource #1

Resource Category: Funerary

Resource Type: Cemetery

Date of Construction: 1924

Date Source: Site Visit/Written Data

Historic Time Period: World War I to World War II (1917 - 1945)

Historic Context(s): Architecture/Community Planning, Religion

Architectural Style: Vernacular

Form: *No Data*

Condition: Good

Threats to Resource: None Known

Cultural Affiliations: *No Data*

Cultural Affiliation Details:

No Data

Architectural Description:

2005:
The grave marker is a stone slab resting on the ground. It reads, “Sacred to the memory of George Benn, Esq. who departed this life on the 9th day of November 1815, Aged 51 years.”

Current Use: *No Data*

Historic Religious Affilitation: *No Data*

Ethnic Affiliation: *No Data*

Has Marked Graves: *No Data*

Has Unmarked Graves: *No Data*

Enclosure Type: *No Data*

Number Of Gravestones: *No Data*

Earliest Marked Death Year: *No Data*

Latest Marked Death Year: *No Data*

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Historic District Information

Historic District Name: *No Data*
Local Historic District Name: *No Data*
Historic District Significance: *No Data*

CRM Events

Event Type: Survey:Phase I/Reconnaissance

Project Review File Number: *No Data*
Investigator: David, Kimble
Organization/Company: Unknown (DSS)
Photographic Media: *No Data*
Survey Date: 3/1/2005
Dhr Library Report Number: *No Data*
Project Staff/Notes:

2004-2005-0001

Project Bibliographic Information:

Name: King, Helen Haverty
Record Type: Book
Bibliographic Notes: Historical Notes on Isle of Wight County, Virginia, 1993.

Name: Virginia, Isle of Wight County
Record Type: Tax Records

Bibliographic Information

Bibliography:

No Data

Property Notes:

Name: Unknown
Company 1: Treasurers Benns Church
Address 1: 14571 Benns Church Boulevard
City: Smithfield
State: Virginia
ZIP: 23430
Owner Relationship: Owner of property

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Virginia Dept. of Historic Resources

V-CRIS

Virginia Cultural Resource Information System

Legend

- Architecture Resources
- Architecture Labels
- Individual Historic District Properties
- Archaeological Resources
- Archaeology Labels
- DHR Easements
- USGS GIS Place names
- County Boundaries



N

Feet

0 50 100 150 200

1:2,500 / 1"=208 Feet

Title: Architecture Labels **Date: 6/2/2022**

DISCLAIMER:Records of the Virginia Department of Historic Resources (DHR) have been gathered over many years from a variety of sources and the representation depicted is a cumulative view of field observations over time and may not reflect current ground conditions.The map is for general information purposes and is not intended for engineering, legal or other site-specific uses. Map may contain errors and is provided "as-is". More information is available in the DHR Archives located at DHR's Richmond office.

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Property Information

Property Names

Name Explanation	Name
Function/Location	Farmhouse, 20041 Brewers Neck Boulevard
Current	B. J. Hogue Homeplace

Property Evaluation Status

DHR Staff: Not Eligible

Property Addresses

Current - 20041 Brewers Neck Boulevard

County/Independent City(s): Isle of Wight (County)
Incorporated Town(s): *No Data*
Zip Code(s): 23314
Magisterial District(s): *No Data*
Tax Parcel(s): 33-01-012C
USGS Quad(s): BENNS CHURCH

Additional Property Information

Architecture Setting: Suburban
Acreage: 4.4

Site Description:

2005:
This farmstead is located on the north side of Brewers Neck Boulevard (US Route 10/32) near the intersection with Benns Church Boulevard (US Route 10). The property comprises 4.41 acres. The dwelling faces south to Brewers Neck Boulevard. The area is characterized by late 20th century suburban developments and a golf course. The property is generally flat and is bound by mature trees on the east and west sides.

October 2006:
This farmstead is located on the north side of Brewers Neck Boulevard (US Route 10/32) near the intersection with Benns Church Boulevard (US Route 10). The property comprises 4.41 acres. The dwelling faces south to Brewers Neck Boulevard. The area is characterized by late 20th century suburban developments and a golf course. The property is generally flat and is bound by mature trees on the east and west sides. There is a tidewater marsh situated at the east and north boundary of the property. The area on the east side of the property has been landscaped with low growth and bridges crossing the tidewater marshes. There is an asphalt-paved driveway leading north toward the dwelling from the main roadway, which terminates in a circle. The driveway continues along the west side of the dwelling toward the barn.

2005:
There were no visible secondary resources viewed on the site visit. It is noted that there is a swimming pool and barn on the property.

October 2006:
There is a barn situated north of the dwelling. There is a swimming pool situated immediately north of the dwelling. The barn served as a garage and now serves as a secondary dwelling.

Surveyor Assessment:

2005:
This dwelling is known as Mrs. Hoggie's Homeplace or the B. J. Houge Homeplace. Constructed circa 1800, it is one of the earlier dwellings located within the immediate area. The general surroundings have been adapted for use as a golf course and small suburban housing developments. The dwelling is an example of a center-passage plan common to Isle of Wight County and the 19th century. It was part of a larger tract of land and only the house site remains.

Center-passage plans appeared in Virginia during the first part of the 18th century. The plan comprises a central hall flanked rooms. Most often this form is one-and-one-half stories or two-stories. In some cases the area under the roof served as additional sleeping or storage space. The dwelling plan most often was one or two rooms deep. The façade of the building was symmetrical and comprised three or five bays. The interior rooms on the first story served as living space while upper stories served as bedchambers. In single-pile dwellings of one room deep the rooms flanking the hall served as the dining room and parlor. In earlier examples the interior finishes varied depending on which room served as the best room or parlor. The hall contained the stair to the upper stories and basement, if constructed with an underground space. The upper stories featured the same floor plan as the first story. In some examples a small room would have been added in the hallway on the second story above the entrance. It served as a small unheated space for storage. Chimneys were situated at the ends of the dwelling. The center-passage single-pile plan was popular during the 1800s. The center-passage double-pile plan is seen as early as the Revolutionary War period. The front rooms off the first story hall served as the parlor and dining room, while the rear rooms served as workrooms and a first story chamber. Most often the kitchen was located in the basement, in an ell off the rear or in a separate building. Most often chimneys were situated on the side elevation at the center of each equally planned room’s wall. In a few cases, the chimneys were erected on the interior of the dwelling and one chimney served two fireplaces that were back-to-back. By the mid-19th century the center-passage double-pile dwelling was erected as a symbol of prosperity among the agricultural society.

October 2006:
This dwelling is known as Mrs. Hoggie's Homeplace of the B. J. Hogue Homeplace. Constructed circa 1800 it is one of the earlier dwellings located within the immediate area. The general surroundings have been adapted for use as a golf course and small suburban

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housing developments. The dwelling is an example of a center-passage plan common to Isle of Wight County and the 19th century. It was part of a larger tract of land and only the house site remains.

The property originally comprised approximately 200 acres in the mid-19th century. The original farm parcel was situated immediately east of St. Luke's Church, the oldest continually used church in the United States. The property had a series of owners through the last half of the 19th century including, Groce, Whitehead, Bunkley, Nock, and Jordan. The Jordan and Bunkleys owned numerous acres in the surrounding area. Upon the property's acquisition by W. G. Bunkley, Jr. in 1899, the property had faced bankruptcy and court ordered sale at least twice in the last half of the 19th century. Between the years 1846 and 1899, the property had six owners. W. G. Bunkley, Jr. owned the property from 1899 to 1944. The Hogue family purchased the property in 1944 and it is often called the B. J. Hogue Homeplace for its association with the Hogue family. The Hogue family sold the property in 1966 for development. Prior to the sale of the property, they subdivided the parcel into three tracts: the farm tract, a smaller tract on the west side of the house, and the house tract (which is the current acreage associated with this submission). The largest farm tract was converted for use as a golf course and the smaller tract on the west side of the house was converted for use as a residential subdivision. The Hogue family erected the pool to the north of the dwelling and erected the barn or garage at the north end of the property. The house tract was sold in 1986 to the Smithfield Hotel Corporation and plans were made for the construction of a hotel. The hotel was never constructed and the parcel was sold in 1991 and then again in 1994 to the current owners, Carlton O'Neal. The site is proposed for development, which includes the demolition of the house and associated outbuilding and pool.

The house is an example of a center-passage house, but was most likely a smaller house at one time that was expanded to the current configuration in the mid-19th century. The difference in the appearance of the chimney on the west elevation and the slight asymmetry of the house reflect that the house may have been a smaller building that was enlarged. This is reinforced by the lack of a fireplace on the second story of the room on the west side of the building. Unfortunately, the foundation is so low that an inspection of the underside of the building was unable to be made, which would potentially yield additional information on the building's construction methods.

Throughout American architectural history the enlargement of permanent dwellings has been common practice. The addition of rooms or wings to smaller houses is a tradition that carries forward to the present day. Early sources of additive construction are mostly found adjacent to the existing building's façade or to the rear. In many cases the early additions are made to the rear maintaining the building's façade and general appearance. The addition made to the side of the building in many cases maintained the scale and massing of the earlier building, serving as an added room or rooms and maintaining a unified façade appearance. Many regions of Virginia have varying characteristics of additions that are common to the region and are not featured in other areas of the Commonwealth. For instance, additive construction common in the Eastern Shore of Virginia is unique to that area most likely due to the remote nature of its location. In the case of Isle of Wight County, there are varying types of additive construction that enlarged earlier dwellings. Most common in the 19th century is the addition of a large building adjacent to the earlier dwelling that does not maintain a consistent façade. In some cases the addition is placed so it projects from the earlier building's façade. The newer building usually has a side-passage plan and is linked to the earlier building by an added hallway with stair to the upper story or stories. The newer portion of the dwelling becomes the formal public space within the dwelling, while the older portion is used as chamber or private spaces. Another type of additive construction found in the county is the addition of a building adjacent to the early building where the newer portion could be a separate dwelling. The newer building may have a hall with adjoining rooms and will abut the earlier dwelling connected by doorways to rooms or hallways in the earlier building. In effect the dwelling becomes two joined independent yet attached dwellings in some cases with two halls, two stairs, and in some cases two separate levels, where one must step up or down into the adjacent building. Efforts to combine these types of buildings in a unified dwelling are in many cases not made, where two doors will be found on the façade.

This type of additive construction is common primarily in the 19th century. From most historical accounts of these dwellings, once a property owner achieved a certain financial status or if a property ownership changed, an addition was made. In these cases the addition becomes the primarily living space and the earlier building becomes secondary providing workspaces. In cases of the addition of rooms to the dwelling, the new portion became the formal living space with ornate mantels and wainscoting, for example. For those additions made where a dwelling with its own hall and stair were added, the newer addition became the formal reception area with ornate mantles. In many cases, the earlier building finishes were updated to the style of the later building construction. In effect the house was updated to the current fashion of the time. The interior configuration of the earlier portion was retained in almost all cases. The only changes noted are those with corner stairs adjacent to the fireplace in a one-room plan, which would have been removed in favor of a new hall and stair, added in the new portion.

Most of these modifications and additions occurred from the period of the early to late 19th century. In some cases additions were made within a twenty- to thirty-year period from the earlier building's construction. In those additions made in the post-Civil War period, more of an effort was made to create a unified façade appearance with the updating of the façade with a common roof, articulation and style. Even with the unification of the façade and style, it is still visually evident that an addition was made from asymmetrical facades and the retention of earlier chimneys. The evolution of the dwelling in the additive construction process seems to be an important element of the making of additions in Isle of Wight County. Though there is no established typology for additive construction, it may be rooted in long and important history of the county and the awareness of the age and history of its residents. Many communities share these methods of additive construction and in most cases the retention of the earlier built environment is quite common.

The house retains a general center-passage single-pile form. Center-passage plans appeared in Virginia during the first part of the 18th century. The plan comprises a central hall flanked rooms. Most often this form is one-and-one-half stories or two-stories. In some cases the area under the roof served as additional sleeping or storage space. The dwelling plan most often was one or two rooms deep. The façade of the building was symmetrical and comprised three or five bays. The interior rooms on the first story served as living space while upper stories served as bedchambers. In single-pile dwellings of one room deep the rooms flanking the hall served as the dining room and parlor. In earlier examples the interior finishes varied depending on which room served as the best room or parlor. The hall contained the stair to the upper stories and basement, if constructed with an underground space. The upper stories featured the same floor plan as the first story. In some examples a small room would have been added in the hallway on the second story above the entrance. It served as a small unheated space for storage. Chimneys were situated at the ends of the dwelling. The center-passage single-pile plan was popular during the 1800s. The center-passage double-pile plan is seen as early as the Revolutionary War period. The front rooms off the first story hall served as the parlor and dining room, while the rear rooms served as workrooms and a first story chamber. Most often the kitchen was located in the basement, in an ell off the rear or in a separate building. Most often chimneys were situated on the side elevation at the center of each equally planned room's wall. In a few cases, the chimneys were erected on the interior of the dwelling and one chimney served two fireplaces that were back-to-back. By the mid-19th century the center-passage double-pile dwelling was erected as a symbol of prosperity among the agricultural society.

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This building was evaluated for its eligibility in the National Register of Historic Places. It was considered under the National Register of Historic Places Criteria and Criteria Exceptions. The evaluation included researching the history of the property and an architectural analysis of the current building form. The property does not meet Criteria A (Event) as there is no historical evidence that there was a historic event that occurred on the property. The property does not meet Criteria B (Person) as it is not associated with a person important in history. The property does not meet Criteria C (Architecture) because it is an example of a common domestic building that has been altered over time. The property does not meet Criteria D (Information Potential) since there is no historic evidence that it would yield information that would be potentially important in history. The property also does not meet the Criteria Exceptions. Based upon the documented research and architectural analysis, the property is not recommended eligible for listing in the National Register of Historic Places.

Surveyor Recommendation: Legacy

Ownership

Ownership Category	Ownership Entity
Private	*No Data*

Primary Resource Information

Resource Category: Domestic
Resource Type: Single Dwelling
NR Resource Type: Building
Historic District Status: *No Data*
Date of Construction: Ca 1800
Date Source: Site Visit/Written Data
Historic Time Period: Early National Period (1790 - 1829)
Historic Context(s): Architecture/Community Planning, Domestic, Subsistence/Agriculture
Other ID Number: *No Data*
Architectural Style: Federal/Adamesque
Form: *No Data*
Number of Stories: 2.0
Condition: Good
Interior Plan: Central Passage, Single Pile
Threats to Resource: Demolition, Development
Cultural Affiliations: *No Data*
Cultural Affiliation Details:

No Data

Architectural Description:

2005:
This single-family dwelling was constructed circa 1800. It has a solid brick foundation and is wood frame clad in aluminum siding. The dwelling is topped by a cross-gable roof clad in asphalt shingles. The foundation is generally low and it appears that the building rests upon the ground. The general ground print is cross-shaped. The façade has five bays with a central entrance. There is a three-bay two-story porch dominating the south façade. The porch is topped by a gable roof with a raking cornice and cornice returns. The porch columns are square with minimal capitals. There is a balustrade on the second story that appears to be a replacement. The porch floor is brick on the first story. The windows on the dwelling are 6/6 double-hung sash with storm windows. Shutters flank the end bay windows. The main entrance on the first story is comprised of a wood single-leaf door with six panels. There are four-light and one-panel sidelights flanking the door. On the second story there is a fifteen-light single-leaf door accessing the second story of the porch. The doors have storm doors. The gable end elevations are marked by massive exterior side brick chimneys with single shoulders. The chimneys have corbelled caps. Additions have been made to the rear. They are two-stories and one-story with open decks.

October 2006:
This single-family dwelling was constructed circa 1800 and is an example of a dwelling that has undergone an expansion dating to the 19th century. It has a solid brick foundation that has been parged and is wood frame clad in vinyl siding. The dwelling is topped by a side-gable roof clad in asphalt shingles. The foundation is generally low and it appears that the building rests upon the ground. The general ground print is cross-shaped. The façade has five bays with a central entrance, but the façade is not symmetrical. It initially appears symmetrical, but the door placement is not central and the windows on the west end of the façade are set slightly farther apart than those on the east end of the facade. There is a three-bay two-story porch dominating the south façade, which was likely added in the 20th century. The porch is topped by a gable roof with a raking cornice and cornice returns. The porch columns are square with minimal capitals. There is a balustrade on the second story that appears to be a replacement. The porch floor is brick framed poured concrete on the first story. The windows on the dwelling are 6/6 double-hung sash with storm windows. Shutters flank the end bay windows. The main entrance on the first story is comprised of a wood single-leaf door with six panels. There are four-light and one-panel sidelights flanking the door. The door and sidelights are framed by a Classical surround comprised a cornice supported by fluted pilasters. On the second story there is a fifteen-light single-leaf door accessing the second story of the porch. The doors have storm doors. The gable end elevations are marked by massive exterior side brick chimneys with single shoulders. The chimneys have corbelled caps. The east chimney is 5-course American bond brick and the west chimney has replacement brick laid 8-course American bond consistent with brick found on the addition chimney on the north elevation. Additions have been made to the rear. There is a two story addition abutting the north elevation. There are one-story additions abutting the west elevation and north elevation of the two story addition. There is a chimney situated at west corner of the north elevation. The one story addition on the west elevation of the ell has a shed roof and the roof of the north one-story addition is gabled. The porch on the one-story addition has a shed roof and plain wood posts. The poured

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concrete porch floor continues the apron around the pool. There is a deck applied to the porch on the east end.

The interior comprises a center passage, single-pile plan. The central passage features a steep stair with a plain wood newel and plain wood balusters. The stairs have wood treads and risers and the stairs are steep. The hall features beaded-board wainscoting. There is a small closet under the stair. The living room was inaccessible and currently serves as storage space. The dining room has a wood chair rail and a mid-19th century fireplace surround. The doors within the dwelling are six panel single-leaf and wood. The flooring is pine tongue-and-groove narrow boards. There are baseboards and plain surrounds on the doors and windows. The walls in the main dwelling have been plastered. The ell contains a bedroom, lavatory, kitchen, and breakfast room. The floor is vinyl sheet in the kitchen and the cabinetry dates to the 1970s. The lavatory has porcelain fixtures and a tile floor. The fixtures and tile date to the 1960s. The bedroom has a wall-to-wall carpeted floor and built in closets at the north end. The breakfast room has similar treatment to the kitchen and there is a closet on the west side with a double-leaf wood louvered door. The den or family room is slightly lower than the ell and main dwelling. The family room features wallboard walls, acoustic tile ceiling, and wall-to-wall carpeted floor. There is a corner fireplace at the northwest corner. The second story is situated within the main dwelling and ell. The bedrooms are situated above the living room and dining room. There are closets situated at the north end rooms of the ell and a lavatory on the east side of the hallway leading to the closets. The flooring is similar to the first story flooring. The walls are plastered and features similar baseboards and window and door surrounds. The door to the west bedroom has three panels and is wood and single-leaf. This door has been pegged together unlike other doors within the dwelling. The east bedroom has wall-to-wall carpeting and a similar mantel to the one found in the dining room. The west bedroom does not have a fireplace. The hall features an open stairwell surrounded by similar newels and balusters found the main stair.

Exterior Components

Component	Component Type	Material	Material Treatment
Roof	Gable	Asphalt	Shingle
Chimneys	Exterior side	Brick	Bond, American
Porch	2-story, 3-bay	Wood	Columns, Square
Windows	Sash, Double-Hung	Wood	6/6
Chimneys	Exterior side	Brick	Bond, American, 5-course
Structural System and Exterior Treatment	Frame	Wood	Siding, Vinyl
Foundation	Solid/Continuous	Brick	Bond, American

Secondary Resource Information

Secondary Resource #1

Resource Category: Social/Recreational
Resource Type: Pool/Swimming Pool
Date of Construction: 1980Ca
Date Source: Site Visit
Historic Time Period: The New Dominion (1946 - 1991)
Historic Context(s): Architecture/Community Planning, Domestic, Subsistence/Agriculture
Architectural Style: Post Modern
Form: *No Data*
Condition: Fair
Threats to Resource: Demolition, Development
Cultural Affiliations: *No Data*
Cultural Affiliation Details:

No Data

Architectural Description:

2005:
There is a pool to the north of the dwelling.

October 2006:
The swimming pool is situated north of the dwelling. It is a concrete pit surrounded by a concrete apron.

Secondary Resource #2

Resource Category: Agriculture/Subsistence
Resource Type: Barn
Date of Construction: 1970Ca
Date Source: Site Visit
Historic Time Period: The New Dominion (1946 - 1991)
Historic Context(s): Architecture/Community Planning, Domestic, Subsistence/Agriculture
Architectural Style: Post Modern

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Form: *No Data*
Condition: Fair
Threats to Resource: Demolition, Development
Cultural Affiliations: *No Data*
Cultural Affiliation Details:

No Data

Architectural Description:

2005:
There is a barn situated at the north end of the property.

October 2006:
The barn has been converted for use a dwelling. The barn is one-and-one-half stories with wings on the east and west elevations. There is a one-story addition on the north side of the barn. The building has a concrete foundation and is wood frame clad in weatherboard. The roof is gable clad in standing-seam metal. The windows in the dwelling are comprised of 1/1 and 6/6 wood double-hung sash. Fifteen-light doors have also been placed within window openings and serve as fixed windows. The interior is comprised of numerous rooms connected by wood single-leaf doors. The main room on the south end of the main building is a kitchen and living space. The flooring is clad in vinyl sheets and the walls are modern wood paneling. The west wing has a dirt floor and is unimproved. The east wing comprises a room with a concrete floor covered in wall-to-wall carpeting. The walls are wood paneled. The windows comprise 15-light doors. The north one-story addition comprises a modern lavatory and a room with a carpeted floor. The attic story is unfinished and the roof rafters are visible. The stair to the attic is situated within the main first story and is accessed from the north end. The stairs are enclosed with wood treads and risers.

Interior Plan: Other
Number of Stories: 1.5

Historic District Information

Historic District Name: *No Data*
Local Historic District Name: *No Data*
Historic District Significance: *No Data*

CRM Events

Event Type: DHR Staff: Not Eligible

DHR ID: 046-5250
Staff Name: DHR
Event Date: 5/3/2007
Staff Comment

Project also reviewed by DHR staff archaeologist Joanna Wilson.

Kristin Kirchen presenting:
B.J. Hogue Homeplace, Isle of Wight County, DHR File Number 046-5250, Project Review Number 2002-1728
The resource is a circa 1800, 2 story, 5 bay frame dwelling covered in vinyl siding, with a central passage, single pile plan. It has a side gable roof covered in asphalt shingles. A 2-story frame addition was built on the rear, with 1-story frame additions on the rear addition's north and west elevations. The rear addition has two interior brick chimneys, and the addition on the north elevation of the rear addition has an exterior brick chimney. Secondary resources include a 1970 frame barn and a 1980 swimming pool. It was evaluated as locally significant under Criterion C (Architecture) with a period of significance of ca. 1800. The committee recommended not eligible with 20 points.

Event Type: Survey:Phase I/Reconnaissance

Project Review File Number: *No Data*
Investigator: David, Kimble
Organization/Company: Unknown (DSS)
Photographic Media: *No Data*
Survey Date: 10/29/2006
Dhr Library Report Number: *No Data*
Project Staff/Notes:

for CRI, Inc.

Project Bibliographic Information:

Record Type: Deed

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Bibliographic Notes: Isle of Wight County Deed Records

Name: King, Helen Haverty
Record Type: Book
Bibliographic Notes: Historical Notes on Isle of Wight County, Virginia, 1993.

Record Type: Tax Records
Bibliographic Notes: Isle of Wight County, Virginia

Surveyor's NR Criteria Recommendations: C - Distinctive Characteristics of Architecture/Construction

Phase II Intensive Survey Integrity Recommendations: Location, Workmanship

Event Type: Survey:Phase I/Reconnaissance

Project Review File Number: *No Data*

Investigator: David, Kimble

Organization/Company: Unknown (DSS)

Photographic Media: *No Data*

Survey Date: 3/1/2005

Dhr Library Report Number: *No Data*

Project Staff/Notes:

2004-2005-0001

Project Bibliographic Information:

Record Type: Deed
Bibliographic Notes: Isle of Wight County Deed Records

Name: King, Helen Haverty
Record Type: Book
Bibliographic Notes: Historical Notes on Isle of Wight County, Virginia, 1993.

Record Type: Tax Records
Bibliographic Notes: Isle of Wight County, Virginia

Surveyor's NR Criteria Recommendations: C - Distinctive Characteristics of Architecture/Construction

Phase II Intensive Survey Integrity Recommendations: Location, Workmanship

Bibliographic Information

Bibliography:

No Data

Property Notes:

Name: Carlton Oneal
Company 1: Bank of Southside VA
City: Smithfield
State: Virginia
ZIP: 23430
Owner Relationship: Owner of property

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N

Feet

0 50 100 150 200

1:2,500 / 1"=208 Feet

Title: Architecture Labels **Date: 6/2/2022**

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Property Information

Property Names

Name Explanation	Name
Function/Location	House, 14564 Benns Church Blvd
Historic	W.P. Jordan House

Property Evaluation Status

DHR Staff: Eligible

Property Addresses

Alternate - State Route 10/32
Current - 14564 Benns Church Blvd

County/Independent City(s): Isle of Wight (County)
Incorporated Town(s): *No Data*
Zip Code(s): 23314
Magisterial District(s): *No Data*
Tax Parcel(s): 32-01-075A
USGS Quad(s): BENNS CHURCH

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Additional Property Information

Architecture Setting: Rural
Acreage: 1

Site Description:

This dwelling is situated on the west side of Benns Church Blvd (SR 10/32) south of the intersection with Brewers Neck Blvd (SR 32). It is set back approximately 150-feet from the roadway. There is a grass driveway that leads to the north of the dwelling. The site is flat with deciduous trees planted around the site. The dwelling faces east.

There is a garage located northwest of the dwelling. There is a workshop located west of the dwelling. There is a well-situated southeast of the workshop. There is a collapsed shed north of the workshop.

Surveyor Assessment:

Start Year: 1880 ca
End Year: 1880 ca
Date Source: Site Visit
Type: Original Construction

This dwelling features an Italianate style common to the mid-19th century. The Italianate style became popular from 1850 to 1880 and was based upon Italian rural architecture. It was one of the romantic styles of the Picturesque movement. The hallmarks of the Italianate style are bracketed cornices, wide eaves, and a vertical emphasis. Additional articulation was added to window surrounds, the addition of entrance towers, articulated rounded-topped doors, and quoins. Like other styles of the 19th century, the Italianate was adaptable to various settings. It was well suited to narrow urban lots, and could be expanded in open rural settings. Modest Italianate houses such as this dwelling can be found among more prominent farmers of the mid- to late-19th century. The style exhibits the patron's knowledge of architectural style and fashion and is not commonly seen in the rural landscape of Isle of Wight County.

This dwelling was part of the Jordan family land holdings near the village of Benns Church. The Jordan family owned most of the lands south of Benns Church extending from Benns Church to the City of Suffolk boundary. The Jordan family owned numerous houses along Benns Church Boulevard and farmed the lands on either side of the road. The lands to the south of this property are mostly still farmed. There is a small cluster of mid-20th century dwellings in the vicinity of Benns Church.

The village of Benns Church was obliterated when Benns Church Boulevard and Brewer's Neck Boulevard were widened in the mid-20th century. There is a gas station and store located at the intersection of Benns Church Boulevard and Brewer's Neck Boulevard, though these were added in the mid- to late-20th century. The village developed at the Brewer's Neck and Benns Church Boulevards intersection around Benns Church and St. Luke's Church in the 19th century. The area is just south of the Town of Smithfield along roadways that connected Isle of Wight County with the City of Suffolk.

This house and surrounding 132 acres was owned by W. P. Jordan in the late 19th century. He mostly likely received the lands from his family in the 19th century as a part of the subdivision of the family's larger landholdings. He died intestate in 1905 and had numerous debts. To pay the debts the family sold the property to George Thomas. Thomas owned the property until his death in 1917. The property was sold through the 20th century and comprised between 125 and 132 acres at one time. The property was subdivided in the late 20th century and only a one acre site remains surrounding the house.

The property is an example of an Italianate-style house of the late 19th century. It retains architectural features of the period, but is not an exemplary example of the house type. The property does not retain its original acreage as a farmstead. Though owned by a member of the Jordan family, W. P. Jordan is not associated with a historic event in Isle of Wight County. Therefore, the house is not recommended as eligible for listing in the National Register of Historic Places.

Surveyor Recommendation: Legacy

Ownership

Ownership Category	Ownership Entity
Private	*No Data*

Associate

Property Associate Name	Property Associate Role
Jordan, W. P.	Owner

Primary Resource Information

Resource Category: Domestic
Resource Type: Single Dwelling
NR Resource Type: Building
Historic District Status: *No Data*
Date of Construction: Ca 1880
Date Source: Site Visit/Written Data
Historic Time Period: Reconstruction and Growth (1866 - 1916)
Historic Context(s): Architecture/Community Planning, Domestic
Other ID Number: *No Data*
Architectural Style: Italianate
Form: *No Data*
Number of Stories: 2.0
Condition: Good
Interior Plan: Side Passage, Double Pile
Threats to Resource: Deterioration
Cultural Affiliations: *No Data*
Cultural Affiliation Details:

No Data

Architectural Description:

This is a circa 1880 Italianate-style single-family dwelling. It rests on a brick foundation and comprises a wood frame structural system clad in weatherboard. The roof has a low-pitched hipped form clad in standing-seam metal. The roof features a wide cornice with a wide frieze and scrolled brackets. The façade of the dwelling is three-bay with a side-passage plan. The windows on the dwelling are 2/2 wood double hung sash with storm windows. Some windows feature wood louvered shutters, but most shutters are missing. The door is single-leaf wood with four panels. The door is flanked by sidelights and topped by a transom. There is a wrap-around porch on the façade that wraps the north elevation. It features chamfered posts with bracketed capitals and a hipped roof clad in standing-seam metal. There is an interior brick chimney on the south elevation near the east façade. It has a square plan and is brick. The cap features decorative brickwork and is coped in metal. Appended to the west elevation is a one-story addition. It is wood frame clad in weatherboard. A second story addition is mounted on the roof of the one-story addition.

The interior of the dwelling reflects a side-passage double-pile plan. The hall comprises one bay of the three bay façade. The hall is oriented east-west and contains the stair. The stair rises to the second story. The stair features turned newels and balusters. There is decorative scrollwork along the stair. The hallway features two entrances; the east façade and the north elevation. The entrances are the same. There is a living room on the southeast end of the building and has a wide opening and wood fireplace mantel. There is a 15-lgiht door between the living and dining room, situated west of the living room. There is a 15-light single-leaf door at the base of the stair accessing the dining room. The dining room has similar features to the living room, including a similar mantel. There is a door in the dining room on the west wall to the addition. At the west end of the hall is the kitchen. The kitchen has modern wood paneling and a vinyl floor. The cabinetry is mid-20th century. The addition has similar modern wood paneling and the flooring is wall-to-wall carpeting. The ceiling is wood boarded. The walls on the first story are plaster in most areas. Some plaster has been replaced with modern painted wall board. The ceilings have been re-clad in drywall. The baseboards and door surrounds are simple and the flooring is tongue-and-groove oak. The second story comprises bedrooms above the living and dining room, and a small room above the hall. The bedrooms above the living and dining room feature wood mantels. All rooms have simplified door and window surrounds. There is some damage to the plaster on the second story from water intrusion. The walls are plastered on the second story mostly with some replacement drywall in areas. The flooring is tongue-and-groove pine board. The lavatory is situated on the west end of the hall and is contained within the addition above the kitchen. The lavatory features mid-20th century fixtures and vinyl tile flooring.

Exterior Components

Component	Component Type	Material	Material Treatment
Windows	Sash, Double-Hung	Wood	2/2
Roof	Hipped	Metal	Standing Seam
Chimneys	Interior	Brick	Bond, American
Porch	1-story	Wood	Other
Foundation	Solid/Continuous	Brick	Bond, American
Structural System and Exterior Treatment	Frame	Wood	Weatherboard

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Secondary Resource Information

Secondary Resource #1

Resource Category: DSS Legacy
Resource Type: Shed
Date of Construction: 1900Ca
Date Source: Site Visit
Historic Time Period: Reconstruction and Growth (1866 - 1916)
Historic Context(s): Architecture/Community Planning, Domestic
Architectural Style: Vernacular
Form: *No Data*
Condition: Deteriorated
Threats to Resource: Development
Cultural Affiliations: *No Data*
Cultural Affiliation Details:

No Data

Architectural Description:

To the north of the workshop is a small shed. It is wood frame clad in vertical board. It has a shed roof clad in standing-seam metal. It is in deteriorated condition and is overgrown with foliage.

Number of Stories: 1

Secondary Resource #2

Resource Category: Domestic
Resource Type: Garage
Date of Construction: 1990Ca
Date Source: Site Visit
Historic Time Period: Reconstruction and Growth (1866 - 1916)
Historic Context(s): Architecture/Community Planning, Domestic
Architectural Style: Post Modern
Form: *No Data*
Condition: Fair
Threats to Resource: Development
Cultural Affiliations: *No Data*
Cultural Affiliation Details:

No Data

Architectural Description:

To the north of the shed is a garage. Constructed circa 1990, it has a wood frame structural system clad in plywood. It features a gable roof clad in asphalt shingles. There is a double-leaf door on the east façade.

Number of Stories: 1

Secondary Resource #3

Resource Category: Agriculture/Subsistence
Resource Type: Workshop
Date of Construction: 1900Ca
Date Source: Site Visit
Historic Time Period: Reconstruction and Growth (1866 - 1916)
Historic Context(s): Architecture/Community Planning, Domestic
Architectural Style: Vernacular
Form: *No Data*
Condition: Fair
Threats to Resource: Development
Cultural Affiliations: *No Data*
Cultural Affiliation Details:

DRAFT

No Data

Architectural Description:

There is a workshop west of the dwelling with a rectangular plan. It features a brick foundation and is wood frame construction clad in wood novelty siding. There is a single leaf door on the east elevation flanked by wood 2-light casement windows. The roof has a catslide form clad in asphalt shingles.

Number of Stories: 1

Secondary Resource #4

Resource Category: Domestic
Resource Type: Well/Well House
Date of Construction: 1890Ca
Date Source: Site Visit
Historic Time Period: Reconstruction and Growth (1866 - 1916)
Historic Context(s): Architecture/Community Planning, Domestic
Architectural Style: Vernacular
Form: *No Data*
Condition: Fair
Threats to Resource: Development
Cultural Affiliations: *No Data*
Cultural Affiliation Details:

No Data

Architectural Description:

There is a brick circular well to the southeast of the workshop. The well is laid in common bond brick and has a concrete cap.

Number of Stories: .5

Historic District Information

Historic District Name: *No Data*
Local Historic District Name: *No Data*
Historic District Significance: *No Data*

CRM Events

Event Type: DHR Staff: Eligible

DHR ID: 046-5274
Staff Name: DHR
Event Date: 10/19/2006
Staff Comment

Kristin Kirchen presenting:
W.P. Jordan House, Isle of Wight County, DHR File Number 046-5274
The house is a circa 1880 2-story, 3-bay Italianate style, side passage, double-pile dwelling. It rests on a brick foundation, and has a frame structure clad in weatherboard. The hipped roof is covered in standing seam metal, and features a wide cornice and frieze with scrolled brackets. The house has 2/2 double-hung windows, some with louvered shutters. A wrap-around 1-story porch covers the north and east sides of the house. It was built by the Jordan family near Benns Church village, part of the extensive Jordan land holdings in this part of Isle of Wight County. The property's original 132 acres were sold piecemeal throughout the 20th century, such that the house now sits on 1 acre. It was evaluated as locally significant under Criterion C with a period of significance of circa 1880, and the committee recommended eligible with 30 points.

DHR strongly encouraged the County to retain this resource in its original location and offer the resource to interested individuals or groups for preservation.

Event Type: Survey:Phase II/Intensive

Project Review File Number: 2006-0234
Investigator: David, Kimble
Organization/Company: Unknown (DSS)

DRAFT

Photographic Media: *No Data*
Survey Date: 8/14/2006
Dhr Library Report Number: IW-42
Project Staff/Notes:

Intensive level survey conducted for Cultural Resources, Inc.

Project Bibliographic Information:

Name: CRI, Inc.
DHR CRM Report Number: IW-42
Record Type: Report
Bibliographic Notes: "A Phase I Cultural Resources Survey of appoximately 600 acres at Benns Church, Isle of Wight County, Virginia."

Prepared by: Aimee J. Leithoff and Ellen M. Bray (PI)

Dated: October 2005

Name: King, Helen Haverty
Record Type: Book
Bibliographic Notes: Historical Notes on Isle of Wight.

Record Type: Deed

Record Type: Tax Records

Surveyor's NR Criteria Recommendations: C - Distinctive Characteristics of Architecture/Construction

Phase II Intensive Survey Integrity Recommendations: Design, Location, Materials, Workmanship

Event Type: DHR Staff: Potentially Eligible

DHR ID: 046-5274
Staff Name: DHR
Event Date: 6/1/2006
Staff Comment

DHR believes that a Phase II evaluation of this property is warranted; the information presented in the Phase I is not sufficient to make a determination of eligibility.

Event Type: Survey:Phase I/Reconnaissance

Project Review File Number: 2006-0234
Investigator: David, Kimble
Organization/Company: Unknown (DSS)
Photographic Media: *No Data*
Survey Date: 10/3/2005
Dhr Library Report Number: IW-42
Project Staff/Notes:

Survey conducted for Cultural Resources, Inc.

Project Bibliographic Information:

Name: CRI, Inc.
DHR CRM Report Number: IW-42
Record Type: Report
Bibliographic Notes: "A Phase I Cultural Resources Survey of appoximately 600 acres at Benns Church, Isle of Wight County, Virginia."

Prepared by: Aimee J. Leithoff and Ellen M. Bray (PI)

Dated: October 2005

Name: King, Helen Haverty
Record Type: Book
Bibliographic Notes: Historical Notes on Isle of Wight.

Record Type: Deed

Record Type: Tax Records

Surveyor's NR Criteria Recommendations: C - Distinctive Characteristics of Architecture/Construction

Phase II Intensive Survey Integrity Recommendations: Design, Location, Materials, Workmanship

DRAFT

Bibliographic Information

Bibliography:

No Data

Property Notes:

Name: Unknown
Company 1: Benns Church Properties
Address 1: P O Box 500
City: Carrollton
State: Virginia
ZIP: 23314
Owner Relationship: Owner of property

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Virginia Dept. of Historic Resources

V-CRIS

Virginia Cultural Resource Information System

Legend

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N

Feet

0 50 100 150 200

1:2,500 / 1"=208 Feet

Title: Architecture Labels **Date: 6/2/2022**

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Property Information

Property Names

Name Explanation	Name
Function/Location	House, 14580 Benns Church Boulevard

Property Evaluation Status

DHR Staff: Not Eligible

Property Addresses

Current - 14580 Benns Church Blvd
Alternate - 14580 State Road 10/32

County/Independent City(s): Isle of Wight (County)
Incorporated Town(s): *No Data*
Zip Code(s): 23314
Magisterial District(s): *No Data*
Tax Parcel(s): 32-01-075A
USGS Quad(s): BENNS CHURCH

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Additional Property Information

Architecture Setting: Rural
Acreage: 1.5

Site Description:

This dwelling is situated on the west side of Benns Church Blvd (SR 10/32) south of the intersection with Brewers Neck Blvd (SR 32). It is set back approximately 150-feet from the roadway. There is a grass driveway that leads to the north of the dwelling. The site is flat with deciduous trees planted around the site. The dwelling faces east.

A secondary dwelling was erected near the street in front of the earlier dwelling.

Surveyor Assessment:

This is an example of a modest house constructed circa 1930. Located a Benns Church a small village south of Smithfield at the intersection of two roadways, the dwelling was added to this area during a growth period. Earlier dwellings dating to the antebellum period lined the roadways. During the post Civil War period, larger farmsteads were subdivided and newly erected houses were interspersed between the earlier farmhouses. In the early 20th century, the area of Benns Church grew with the addition of schools and small businesses. The intersection had been an important location in Colonial Virginia as the St. Paul's Church and Benns Church located here date to the 17th and 18th centuries respectively.

The style is vernacular Colonial Revival, which gained popularity in the late 19th and early 20th century. It is a simple style that employs minimal articulation and can be adapted to modest houses. The style and form of the dwelling are typical of the period in Isle of Wight County. This building is not recommended as eligible for listing in the National Register of Historic Places.

Surveyor Recommendation: *No Data*

Ownership

Ownership Category	Ownership Entity
Private	*No Data*

Primary Resource Information

Resource Category: Domestic
Resource Type: Single Dwelling
NR Resource Type: Building
Historic District Status: *No Data*
Date of Construction: Ca 1930
Date Source: Site Visit/Written Data
Historic Time Period: World War I to World War II (1917 - 1945)
Historic Context(s): Domestic
Other ID Number: *No Data*
Architectural Style: Vernacular
Form: *No Data*
Number of Stories: 1.0

Condition: Fair
Threats to Resource: Development
Cultural Affiliations: *No Data*
Cultural Affiliation Details:

No Data

Architectural Description:

This dwelling is a one-story building with a concrete block foundation. It is wood frame construction clad in wood novelty siding topped with a side-gable roof clad in standing-seam metal. There is a one-bay, gabled-roof porch on the façade supported by plain wood posts. The roof is clad in standing-seam metal and the porch features cornice returns. The porch shelters the main entrance comprise of a single-leaf wood door with a panel and light. There is a wood frame screened door mounted to the main entrance doorframe. To the south of the entrance is a paired 6/6 wood double-hung sash window. To the north of the entrance is a 2/2 wood double-hung sash window. Wood shutters flank the windows. The north window has a pedimented hood. The roof cornice features cornice returns. To the west of the dwelling is an ell with a gable roof clad in standing–seam metal. The windows on the side elevations are similar to the north window on the façade. On the west elevation, there is a hipped-roof porch with wrought-iron posts. The porch shelters a single-leaf entrance. The porch floor is poured concrete and the porch roof is clad in standing-seam metal.

Exterior Components

Component	Component Type	Material	Material Treatment
Windows	Sash, Double-Hung	Wood	2/2
Foundation	Solid/Continuous	Concrete	Block
Windows	Sash, Double-Hung	Wood	6/6
Roof	Gable, Side	Metal	Standing Seam
Porch	1-story, 1-bay	Wood	Other
Structural System and Exterior Treatment	Frame	Wood	Weatherboard

Secondary Resource Information

Secondary Resource #1

Resource Category: Domestic
Resource Type: Secondary Dwelling
Date of Construction: 1978Ca
Date Source: Site Visit/Written Data
Historic Time Period: The New Dominion (1946 - 1991)
Historic Context(s): Domestic
Architectural Style: Post Modern
Form: *No Data*
Condition: Good
Threats to Resource: Development
Cultural Affiliations: *No Data*
Cultural Affiliation Details:

No Data

Architectural Description:

Constructed in 1978, this dwelling is concrete block construction clad in brick veneer. It features a side-gable roof clad in asphalt shingles. he façade is asymmetrical with a projecting shed-roofed porch supported by turned posts. The entrance on the façade is single-leaf flanked by window openings. The windows to the south are comprised of paired wood double-hung windows with 12/12 sashes. The windows to the north are also 8/8 wood sash with a panel below the lower sash. The windows feature rowlock brick sills. An overhead garage door dominates the south end of the façade.

Number of Stories: 1

Historic District Information

Historic District Name: *No Data*
Local Historic District Name: *No Data*
Historic District Significance: *No Data*

DRAFT

CRM Events

Event Type: DHR Staff: Not Eligible

DHR ID: 046-5275
Staff Name: Kirchen, Roger
Event Date: 6/1/2006
Staff Comment

No Data

Event Type: Survey:Phase I/Reconnaissance

Project Review File Number: 2006-0234
Investigator: David, Kimble
Organization/Company: Unknown (DSS)
Photographic Media: *No Data*
Survey Date: 10/3/2005
Dhr Library Report Number: IW-42
Project Staff/Notes:

for Cultural Resources, Inc.

Project Bibliographic Information:

Name: CRI, Inc.
DHR CRM Report Number: IW-42
Record Type: Report
Bibliographic Notes: "A Phase I Cultural Resources Survey of appoximately 600 acres at Benns Church, Isle of Wight County, Virginia."

Prepared by: Aimee J. Leithoff and Ellen M. Bray (PI)

Dated: October 2005

Record Type: Tax Records

Bibliographic Information

Bibliography:

No Data

Property Notes:

Name: Unknown
Company 1: Benns Church Properties
Address 1: P O Box 500
City: Carrollton
State: Virginia
ZIP: 23314
Owner Relationship: Owner of property

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Virginia Dept. of Historic Resources

V-CRIS

Virginia Cultural Resource Information System

Legend

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N

Feet

0 50 100 150 200

1:2,500 / 1"=208 Feet

Title: Architecture Labels **Date: 6/2/2022**

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Property Information

Property Names

Name Explanation	Name
Function/Location	House, 19514 Casper Circle

Property Addresses

Current - 19514 Casper Circle

County/Independent City(s): Isle of Wight (County)
Incorporated Town(s): *No Data*
Zip Code(s): 23314
Magisterial District(s): *No Data*
Tax Parcel(s): 32-01-075B
USGS Quad(s): BENNS CHURCH

Property Evaluation Status

DHR Staff: Not Eligible

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Additional Property Information

Architecture Setting: Rural
Acreage: 2.5
Site Description:

This dwelling is situated on the west side of Benns Church Blvd (SR 10/32) south of the intersection with Brewers Neck Blvd (SR 32). It is set back approximately 300-feet from the roadway. There is a dirt driveway (named Casper Circle) that leads to the north of the dwelling. The site is flat and open with sandy soil. The dwelling faces east.

A large metal warehouse is located west of the dwelling. There are two trailers also situated west of the dwelling and east of the warehouse.

Surveyor Assessment:

This is an example of a modest house constructed circa 1930. Located a Benns Church a small village south of Smithfield at the intersection of two roadways, the dwelling was added to this area during a growth period. Earlier dwellings dating to the antebellum period lined the roadways. During the post Civil War period, larger farmsteads were subdivided and newly erected houses were interspersed between the earlier farmhouses. In the early 20th century, the area of Benns Church grew with the addition of schools and small businesses. The intersection had been an important location in Colonial Virginia as the St. Paul's Church and Benns Church located here date to the 17th and 18th centuries respectively.

The style is vernacular Colonial Revival, which gained popularity in the late 19th and early 20th century. It is a simple style that employs minimal articulation and can be adapted to modest houses. The style and form of the dwelling are typical of the period in Isle of Wight County. The dwelling has been converted to an office. This building is not recommended as eligible for listing in the National Register of Historic Places.

Surveyor Recommendation: *No Data*

Ownership

Ownership Category	Ownership Entity
Private	*No Data*

Primary Resource Information

Resource Category: Domestic
Resource Type: Single Dwelling
NR Resource Type: Building
Historic District Status: *No Data*
Date of Construction: 1931
Date Source: Site Visit/Written Data
Historic Time Period: World War I to World War II (1917 - 1945)
Historic Context(s): Domestic
Other ID Number: *No Data*
Architectural Style: Vernacular
Form: *No Data*

Number of Stories: 1.0
Condition: Good
Threats to Resource: Development
Cultural Affiliations: *No Data*
Cultural Affiliation Details:

No Data

Architectural Description:

This is a one-story wood frame dwelling clad in weatherboard siding. The foundation is brick and the roof is side-gable clad in standing-seam metal. The façade is asymmetrical with a central entrance flanked by window openings. The entrance is comprised of a single-leaf door with storm door. The window opening to the south of the entrance is comprised of paired 6/6 wood double-hung sash windows flanked by shutters. The window to the north of the entrance is comprised of a single 6/6 wood double-hung sash window flanked by shutters. A porch shelters the east façade and is comprised of a shed roof clad in standing-seam metal supported by wrought-iron posts and a concrete floor. Ells were appended to the north and south side elevations. The ell to the south is wood frame construction clad in weatherboard and has a side-gable roof at a lower height than the main dwelling roof. There is a 6/6 wood double-hung sash window on the east façade and a similar window to the south facade. There is a single-leaf entrance on the south elevation containing a three-panel, one-light door. Appended to the west elevation of this ell is a shed-roofed addition. There is a 2/2 window on the south elevation. The north ell comprises a concrete block foundation and is wood frame clad in weatherboard siding. It features 6/6 metal double-hung sash windows and a sliding window. There is a door leading from the west elevation to a wood ramp. Append to the west elevation is an addition with a shed roof extending from the eave of the main roof. It features 6/6 wood double-hung sash windows and an incorporated porch supported by a wood post.

Exterior Components

Component	Component Type	Material	Material Treatment
Windows	Sash, Double-Hung	Wood	6/6
Windows	Sash, Double-Hung	Wood	2/2
Porch	1-story, 1-bay	Wood	Other
Roof	Gable, Side	Metal	Standing Seam
Foundation	Solid/Continuous	Brick	Bond, American
Structural System and Exterior Treatment	Frame	Wood	Weatherboard

Secondary Resource Information

Secondary Resource #1

Resource Category: Industry/Processing/Extraction
Resource Type: Warehouse
Date of Construction: 1990
Date Source: Site Visit
Historic Time Period: *No Data*
Historic Context(s): Domestic
Architectural Style: Post Modern
Form: *No Data*
Condition: Good
Threats to Resource: Development
Cultural Affiliations: *No Data*
Cultural Affiliation Details:

No Data

Architectural Description:

To the west of the dwelling is a large metal warehouse with a rectangular plan. The warehouse is topped by a low-pitched metal clad gable roof. There is a single –leaf door on the north elevation and an oversized double-leaf sliding door on the south elevation. There is an overhead garage doors are located on the east elevation. Situated between the warehouse and dwelling are two mobile trailers.

Number of Stories: 1

Historic District Information

Historic District Name: *No Data*
Local Historic District Name: *No Data*
Historic District Significance: *No Data*

DRAFT

CRM Events

Event Type: DHR Staff: Not Eligible

DHR ID: 046-5276
Staff Name: Kirchen, Roger
Event Date: 6/1/2006
Staff Comment

No Data

Event Type: Survey:Phase I/Reconnaissance

Project Review File Number: 2006-0234
Investigator: David, Kimble
Organization/Company: Unknown (DSS)
Photographic Media: *No Data*
Survey Date: 10/3/2005
Dhr Library Report Number: IW-42
Project Staff/Notes:

for Cultural Resources, Inc.

Project Bibliographic Information:

Name: CRI, Inc.
DHR CRM Report Number: IW-42
Record Type: Report
Bibliographic Notes: "A Phase I Cultural Resources Survey of appoximately 600 acres at Benns Church, Isle of Wight County, Virginia."

Prepared by: Aimee J. Leithoff and Ellen M. Bray (PI)

Dated: October 2005

Record Type: Tax Records

Bibliographic Information

Bibliography:

No Data

Property Notes:

Name: Unknown
Company 1: Benns Church Properties
Address 1: P O Box 500
City: Carrollton
State: Virginia
ZIP: 23314
Owner Relationship: Owner of property

DRAFT

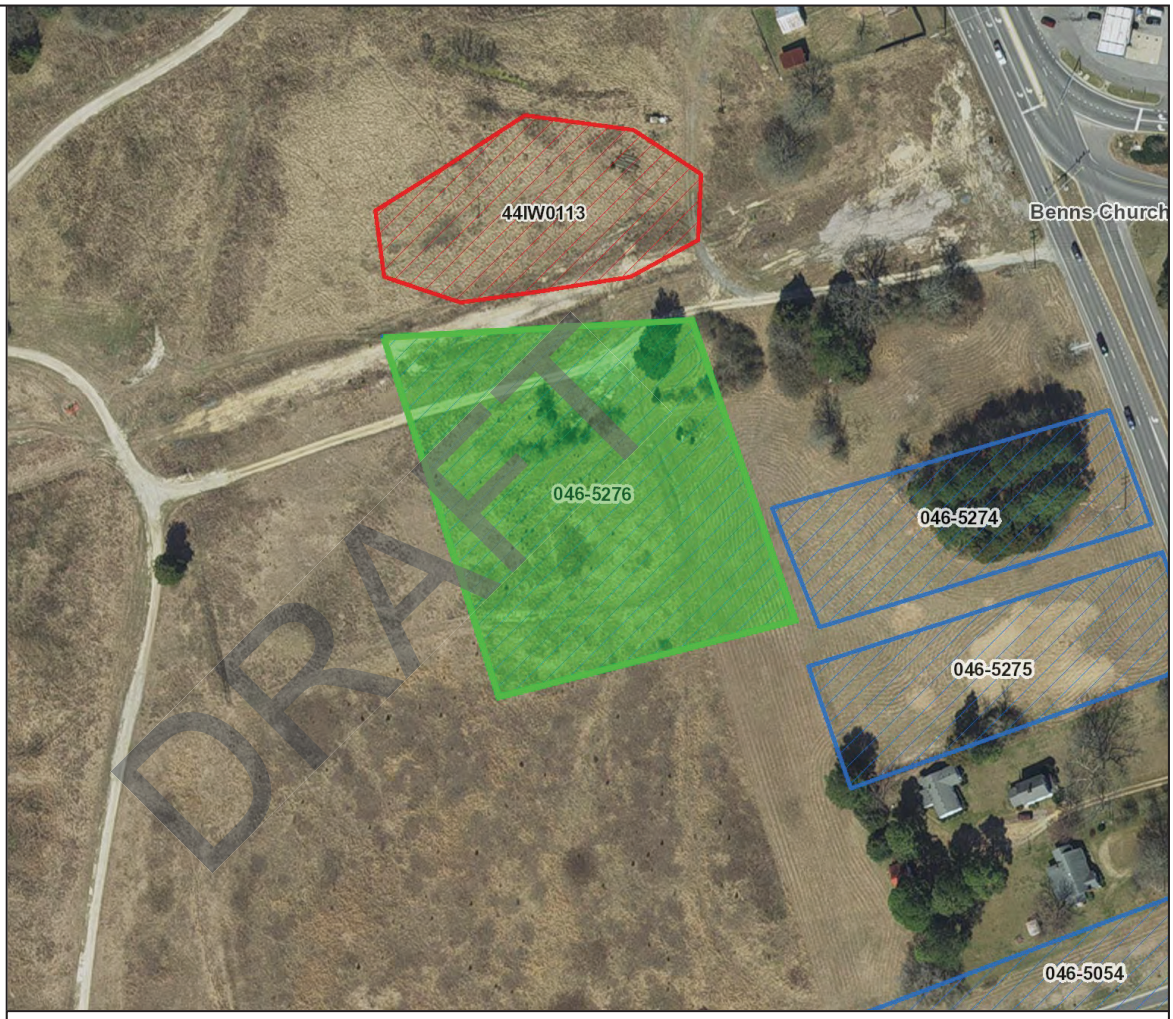
Virginia Dept. of Historic Resources

V-CRIS

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N

Feet

0 50 100 150 200

1:2,500 / 1"=208 Feet

Title: Architecture Labels **Date: 6/2/2022**

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Property Information

Property Names

Name Explanation	Name
Descriptive	Angel on Gravestone
Function/Location	Gravestone, 14477 Benns Church Boulevard

Property Evaluation Status

Not Evaluated

Property Addresses

Current - 14477 Benns Church Boulevard Route 258

County/Independent City(s): Isle Of Wight (County)
Incorporated Town(s): *No Data*
Zip Code(s): 23314
Magisterial District(s): *No Data*
Tax Parcel(s): *No Data*
USGS Quad(s): BENNS CHURCH

Additional Property Information

Architecture Setting: Town
Acreage: *No Data*
Site Description:

Located in the Benns Church cemetery, near a golf club, with overhanging trees or branches nearby.

Surveyor Assessment:

Start Year: 1921 ca
End Year: 1921
Date Source: Site Visit
Type: Original Construction

Surveyor Recommendation: *No Data*

Primary Resource Information

Resource Category: Social/Recreational
Resource Type: Sculpture/Statue
NR Resource Type: Object
Historic District Status: *No Data*
Date of Construction: Ca 1921
Date Source: Site Visit
Historic Time Period: World War I to World War II (1917 - 1945)
Historic Context(s): Funerary
Other ID Number: *No Data*
Architectural Style: *No Data*
Form: *No Data*
Number of Stories: *No Data*
Condition: Poor
Threats to Resource: Deterioration
Cultural Affiliations: *No Data*
Cultural Affiliation Details:

No Data

Architectural Description:

Inscriptions: On Gravestone Front: "Marion E. Briggs Daughter of WlJl & Florence Briggs Sept.25, 1911 Sept.28, 1921." Back of Gravestone: "Our darling one has gone before. To greet us on the blissful shore"
Dimensions: Base: H:3' W:1.5' Depth:1.5'
Sculpture: H:1.5' W:6" Depth:8"
The sculpture depicts a small angel standing, head bowed, arms down, holding a swag below her waist. The angel stands PL leg straight, PR leg

DRAFT

bent and back.

Secondary Resource Information

Historic District Information

Historic District Name: *No Data*
Local Historic District Name: *No Data*
Historic District Significance: *No Data*

CRM Events

Event Type: Other

Project Review File Number: *No Data*
Investigator: Gwaltney, Heather
Organization/Company: Unknown (DSS)
Photographic Media: *No Data*
Survey Date: 10/18/1995
Dhr Library Report Number: *No Data*
Project Staff/Notes:
SOS! Survey

Bibliographic Information

Bibliography:

No Data

Property Notes:

Name: Heather Gwaltney
Address 1: 6067 Beechland Road
City: Elberon
State: Virginia
ZIP: 23846
Phone 1: 804-294-3235
Surveyor Notes: SOS! Survey Volunteer
Owner Relationship: Informant

Name: Richard Austin
Title: Curator
Address 1: 14477 Benns Church Boulevard
City: Smithfield
State: Virginia
ZIP: 23430
Phone 1: 804-357-3367
Surveyor Notes: Richard Austin s the contact person, Benns Church is the owner/administrator.
Owner Relationship: Owner of property

DRAFT

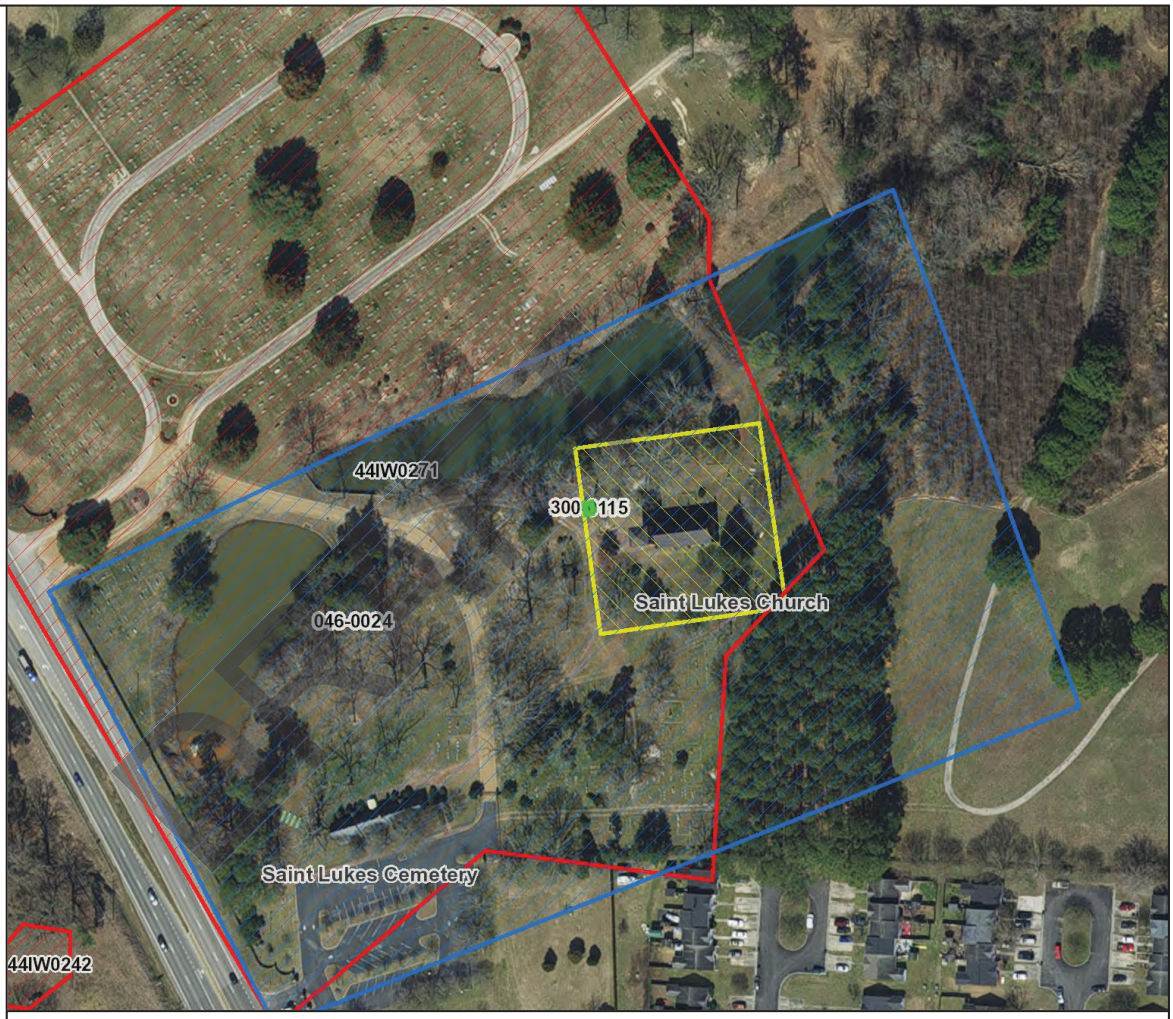
Virginia Dept. of Historic Resources

V-CRIS

Virginia Cultural Resource Information System

Legend

- Architecture Resources
- Architecture Labels
- Individual Historic District Properties
- Archaeological Resources
- Archaeology Labels
- DHR Easements
- USGS GIS Place names
- County Boundaries



N

Feet

0 50 100 150 200

1:2,500 / 1"=208 Feet

Title: Architecture Labels **Date: 6/2/2022**

DISCLAIMER:Records of the Virginia Department of Historic Resources (DHR) have been gathered over many years from a variety of sources and the representation depicted is a cumulative view of field observations over time and may not reflect current ground conditions.The map is for general information purposes and is not intended for engineering, legal or other site-specific uses. Map may contain errors and is provided "as-is". More information is available in the DHR Archives located at DHR's Richmond office.

Notice if AE sites:Locations of archaeological sites may be sensitive the National Historic Preservation Act (NHPA), and the Archaeological Resources Protection Act (ARPA) and Code of Virginia §2.2-3705.7 (10). Release of precise locations may threaten archaeological sites and historic resources.

COMMONWEALTH of VIRGINIA

DEPARTMENT OF TRANSPORTATION
23116 Meherrin Road
COURTLAND, VIRGINIA 23837

July 19, 2023

Amy Ring
Planning and Zoning Department
Isle of Wight County
P. O. Box 80
Isle of Wight, VA 23397

RE: Sweetgrass (formerly Yeoman Farm) – Chapter 527
Benn's Church Boulevard (Route 10/258)
Isle of Wight County

In accordance with §15.2-2222.1 of the Code of Virginia and the Virginia Traffic Impact Analysis Regulations, 24 VAC 30-155 (also known as Chapter 527), the Traffic Impact Study prepared by Vanasse Hangen Brustlin, Inc. (VHB) dated December 17, 2019, along with a supplemental memorandum dated March 25, 2023 and other modified application materials was submitted to the Virginia Department of Transportation (VDOT) for review on June 23, 2023.

Our Evaluation Report is attached to assist the County in their decision making process regarding this rezoning application. The Evaluation Report summarizes the key findings and includes our comments on the accuracy of the methodologies, assumptions, and conclusions presented in the analysis.

It is requested that VDOT's comments be included in the official public records, and to have both this letter and the VDOT Evaluation Report placed in the official file for the subject case. VDOT will make these documents available to the public through various means, including posting them to the VDOT website.

If you have any questions, please contact me at (757) 346-3084 or Jason Fowler@vdot.virginia.gov.

Sincerely,

Jason Fowler, P.E.
Area Land Use Engineer
Virginia Department of Transportation
Franklin Residency

EVALUATION REPORT
Of
Chapter 527 Traffic Impact Analysis

1) We concur with the proposed trip generation rates as provided in the submitted study based on the following development schedule:

Phase 1 Use	No. of Units	Units
Single Family Detached Housing	390	dwelling units
Multi-Family Housing (Low-Rise)	225	dwelling units
Strip Retail Plaza < 40k	18	1000 sq. ft. GLA
General office	55	1000 sq. ft. GLA

The proposed uses have the potential to generate 7,021 daily, 535 AM peak hour, and 732 PM 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 (6,685 daily, 521 AM peak, and 692 PM peak).

2) The trip generation has been reduced from the original 2019 study. There is no proffer that restricts traffic to the numbers used in the study, or otherwise limits the higher traffic generating uses that are allowed by-right with the zoning. Therefore the potential exists for the development to generate substantially more traffic than what is used in the analysis.

3) This is the 2nd TIA memorandum submitted (June 2021), in which trip generation and models have been adjusted. The original TIA has not been amended to incorporate the changes as submitted. The models are still based upon the original 2018 traffic counts, with 2026 and 2032 still used as the Build and Build +6 scenario. Additionally, the Synchro & SimTraffic models were not submitted for review.

4) The proposed 40’ public right of way serving the front residential may be insufficient to incorporate all of the required street design elements (pedestrian facilities, drainage structures, etc.).

5) The provided stubs in the concept plan are required per the SSAR regulations to be built to the property line.

6) Final design will be in accordance with the VDOT Road Design Manual. While it is understood that the development plan sheets submitted are not for construction, the following comments have been provided as a result of a preliminary review of the conceptual plans:

    - Pavement Markings and Sign details need to be submitted on a separate sheet for review in the site plan assembly.

- Construction site plans need to be submitted and include but are not limited to; intersection geometrics, lane configurations, transitions, turn lane warrants, corner radii, intersection site distances, right of way etc.

- AutoTurn analyses of study intersections need to be submitted to this office for review. The AutoTurn analysis will need to include a design vehicle of the largest type to be utilized for this site. This will ensure vehicle clearance as well as curb/median clearances are met.

- Sight distance for entrances and intersections must be evaluated for compliance in accordance with Appendix F of the VDOT Road Design Manual. Refer to Table 2-7.

- VDOT will have final approval of the design and construction of traffic signals, timings, and all equipment used for signal modifications. Intersection modifications and traffic signal design and phasing plans will need to be submitted for review and meet or exceed Eastern Region Operations standards and specifications. All design and construction costs will be the sole responsibility of the developer. A final traffic signal inspection will be completed by Department personnel. All punch list items resulting from this inspection will need to be corrected and re-inspected before the Department will assume responsibility of the traffic signal.

- Any right-of-way acquisition, as well as signal relocation or upgrades that are required for the recommended improvements shall be obtained, designed, and paid for by the developer.

Residential Pipeline Projects as of 10/14/22*

Projects listed below are either currently under construction or have not yet started.

SUBDIVISION NAME & DWELLING TYPE	NUMBER OF UNITS	DATE APPROVED	STATUS
Red Oaks MHP Phase II	191	1978	Dormant
Timber Preserve (aka Crown Creek) SFD	340	1986	Dormant
Cypress Creek PH 6 & 7 (Smithfield) SFD	194	1988	Under Construction
Mallory Point/Scott's Farm (Smithfield) SFD/SFA	812	2021	Dormant
Benns Grant Apartments	240	2009	Under Construction
St. Luke's Village SFD/SFA	179	2005	Dormant
Bridge Point Commons Apartments & Condos	350	2008	Dormant
Brewer's Station Apartments	162	2014	Under Construction
Brewers Station SFD & SFA	88	2014	Dormant
The Crossings Condos	210	2002	Under Construction
Archer's Meade SFD	63	2014	Dormant
South Harbor (Age Restricted) SFD & SFA	340	2020	Under Construction
The Park at Battery (Smithfield) Condos	150	2020	Dormant
Cambridge Villas (Windsor) SFD	212	2010	Dormant
The Heritage Apartments	12	2019	Under Construction
Windsor Station (Windsor)	60	2022	Dormant
James River Crossing (Bartlett Estates)	52	2022	Dormant
TOTAL UNITS	**3655**		
Units Under Construction	**1158**		
Remaining Units Approved but Dormant	**2497**		
2017-21 Avg. Building Permit/Year for Houses**	**230**		

*List includes major subdivisions only & not infill

**All new dwelling units incl. infill lots & family member lots comprising approx. 25% of permits

RESOLUTION NUMBER PC-23-11

ISLE OF WIGHT COUNTY PLANNING COMMISSION
A RESOLUTION TO PRESENT A REPORT AND RECOMMENDATION TO THE BOARD OF SUPERVISORS FOR CONDITIONAL ZONING REQUEST ZA-06-19 FOR APPROXIMATELY 250 ACRES OF TAX MAP NUMBER 32-01-009 ON BENNS CHURCH BOULEVARD (RTE. 10) FROM RURAL AGRICULTURAL CONSERVATION TO CONDITIONAL -PLANNED DEVELOPMENT - MIXED USE TO ALLOW UP TO 390 AGE RESTRICTED SINGLE FAMILY DETACHED RESIDENCES, 225 UNRESTRICTED TOWNHOME RESIDENCES, AND FIVE ACRES OF COMMERCIAL USES

WHEREAS, NVR, Inc., applicant, and Henry Layden, special trustee for the William Grover Yeoman, III Trust, property owner have requested Conditional Zoning (ZA-06-19) for approximately 250 acres of tax map number 32-01-009 located on Benns Grant Boulevard (Rte. 10) from the Rural Agricultural Conservation zoning district to the Conditional - Planned Development - Mixed Use zoning district to allow up to 390 age-restricted single family detached residential units, 225 residential townhomes, and approximately five acres of commercial uses to include up to 18,000 square feet of retail and commercial uses and up to 55,000 square feet of office uses; and

WHEREAS the procedural requirements for the consideration of this request by the Planning Commission have been met.

NOW, THEREFORE, BE IT RESOLVED by the Planning Commission of Isle of Wight County, that:

Section 1. Findings.

_____ A. The Isle of Wight County Planning Commission finds that the proposed amendment to conditional zoning is reasonable and warranted due to a change in circumstances affecting the property and has considered the following factors and finds that the proposed rezoning does not conflict with:

1. the existing use and character of property within the County;

2. the Comprehensive Plan;

3. the suitability of the property for various uses;

4. the trends of growth or change;

5. the current or future requirements of the community as to land for various purposes as determined by population and economic studies and other studies;

6. the transportation requirements of the community;

7. the requirements for airports, housing, schools, parks, playgrounds, recreation areas and other public services;

8. the conservation of natural resources;

9. the preservation of floodplains;

10. the preservation of agricultural and forestal land;

11. the conservation of properties and their values; and

12. the encouragement of the most appropriate use of land throughout the County.

_____ B. The Isle of Wight County Planning Commission does not find that the proposed zoning map amendment is reasonable based on the consideration of the factors listed herein.

Section 2. Recommendation to Board of Supervisors.

The Planning Commission recommends to the Board of Supervisors that the request ZA-6-19 be:

___ a. Granted as submitted, and that the Board of Supervisors adopt the proposed Ordinance without modification.

___b. Denied, and that Board of Supervisors not adopt the proposed Ordinance.

___c. Granted with the proffered conditions set forth on the attached proffer statement, and that the Board of Supervisors adopt the proposed Ordinance with such conditions.

DATE: _____

READ AND PASSED:_____
Chairman, Isle of Wight County Planning Commission

TESTE:_____
Secretary, Isle of Wight County Planning Commission

Approved as to Form:

_____
Robert W. Jones, Jr., County Attorney

Isle of Wight County Schools
PREPARING STUDENTS FOR COLLEGE, CAREER AND LIFE

TO: Amy Ring, Director, Community Development
FROM: Dr. Theo Cramer, Superintendent
DATE: September 25, 2023
RE: Sweetgrass Project Revision: Conditional Zoning Request ZA-6-19; 14096 Benns Church Blvd., Smithfield, VA 23430, Tax Parcel # 32-01-009

Isle of Wight County Schools will see a significant impact from the proposed Sweetgrass development. Using the Tischler Bise Capital Impacts Model from the county, the residential units will generate additional students in the northern end of the county. The division recently rezoned the Sweetgrass area to Hardy Elementary School. Fortunately, Hardy Elementary, along with Westside Elementary, Smithfield Middle and Smithfield High have building space for the additional students.

However, there will be impacts on Isle of Wight County Schools from the enrollment increase. While the buildings may have space for the added students, the current staffing configuration does not. The projected elementary student increase will necessitate hiring at least 1 general education teacher for Hardy Elementary. An additional dedicated bus and driver is also required as the current transportation situation will not accommodate more elementary students.

Our current special education population is approximately 15% of our overall student population. Projecting with those figures, Smithfield High School will need an additional special education teacher and instructional assistant. We also expect to add a special needs bus, driver and assistant for the development.

Other impacts the division will realize include purchasing:

- Teaching resources needed for additional classrooms, teachers and students including but not limited to textbooks, instructional resources and technology resources.
- Furniture to accommodate increased enrollment.

There is the potential for other impacts, as well. IWCS must adhere to the Virginia Standards of Quality regarding class size:

"(i) 24 to one in kindergarten with no class being larger than 29 students; if the average daily membership in any kindergarten class exceeds 24 pupils, a full-time teacher's aide shall be assigned to the class; (ii) 24 to one in grades one, two, and three with no class being larger than 30 students; (iii) 25 to one in grades four through six with no class being larger than 35 students; and (iv) 24 to one in English classes in grades six through 12." § 22.1-253.13:2.

Depending on the grade levels of the new students and their course of study, there may be further staffing needs throughout the division.

In conclusion, Isle of Wight County Schools anticipates a significant financial impact from the proposed development.

Amy Ring

From: Tammie Clary <tclary@smithfieldva.gov>
Sent: Monday, October 16, 2023 10:51 AM
To: Amy Ring
Subject: RE: Sweetgrass PD-MX Conditional Zoning application

Caution: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Good Morning,

Below please find comments from the TOS Planning Commission on the proposed Sweetgrass project:

1. They believe it is a better plan than before; however, they would like to see more green space in the front of the development, removing the rear load dwellings near Recreational Area 2.
2. They would prefer greater side yard setbacks, and greater widths for the lots.
3. They are not in favor of the three house repeat.
4. They would like to see consideration to the roadways, accounting for on street parking on both sides of the street, while still allowing for two-way travel lanes.
5. They would like the opportunity to provide additional comments as the plan progresses.

Please let me know if you have any questions or concerns.

Thank you.

Best,

TAMMIE CLARY
Community Development & Planning Director
Town of Smithfield, Virginia
310 Institute St, Smithfield, VA 23430
1-(757)-365-4200

From: Amy Ring <aring@isleofwightus.net>
Sent: Wednesday, September 13, 2023 11:46 AM
To: Tammie Clary <tclary@smithfieldva.gov>
Subject: Sweetgrass PD-MX Conditional Zoning application

Caution: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Good Morning, Tammy,

You may have received a letter from us recently in regard to the upcoming public hearing for the proposed Sweetgrass conditional Planned Development-Mixed Use project on Route 10 adjacent to the Sherwin Williams paint store. As you recall, you all submitted comments on it previously, and it has since gone through several iterations since 2019. I'll be sending you the narrative, proffer statement, FIA, and TIA for your information via the Wetransfer site due to file size, should you choose to make comment. The staff report will be posted with the agenda next Wednesday evening. Have a good rest of the week, Amy

Amy M. Ring, AICP
Community Development Director
PO BOX 80, Isle of Wight, VA 23397
(757) 365-6210

Amy Ring

From: Christopher A. Morello
Sent: Monday, October 16, 2023 2:23 PM
To: Amy Ring
Cc: Kristi Sutphin
Subject: Comments: ZA-06-19 Conditional Rezoning request

Good afternoon, Amy –

Economic Development supports this conditional rezoning request and Sweetgrass' introduction of new housing that includes more affordable ownership options, hopefully many priced at less than $300,000 when completed. Up to 615 total units represents a potentially strong boost to small businesses in the county, as well. Ideally, the commercial space will be leased to tenants with services important to residents of the Sweetgrass community.

We note the concept plan's positive land use approach of placing commercial buildings close to Benns Church and most parking out of street view. In the Retail Center Design guidelines, an interesting façade is submitted as a sample for the retail. The office building sample, however, is architecturally incongruent with the retail aesthetic, monolithically brick & glass, and looks "dated." We'd recommend change consistent with the retail design and the spirit of the guidelines/standards, as written.

Please let us know if you have any questions about these comments.

- **Chris**

Christopher A. Morello (Chris) | Isle Biz Rocks !
Director, Isle of Wight County Economic Development
Cell: (757) 345-1048 | *Desk:* (757) 356-1969
Chris on LinkedIn | Email Chris

Local Roots, Global Reach

COOPERATIVE STRATEGIES

COMPLETE FINANCIAL & DEMOGRAPHIC PLANNING FOR EDUCATION



ISLE OF WIGHT COUNTY SCHOOLS
2022-23 HOUSING STUDY
OCTOBER, 2023

▶ SUBDIVISION YIELD ANALYSIS

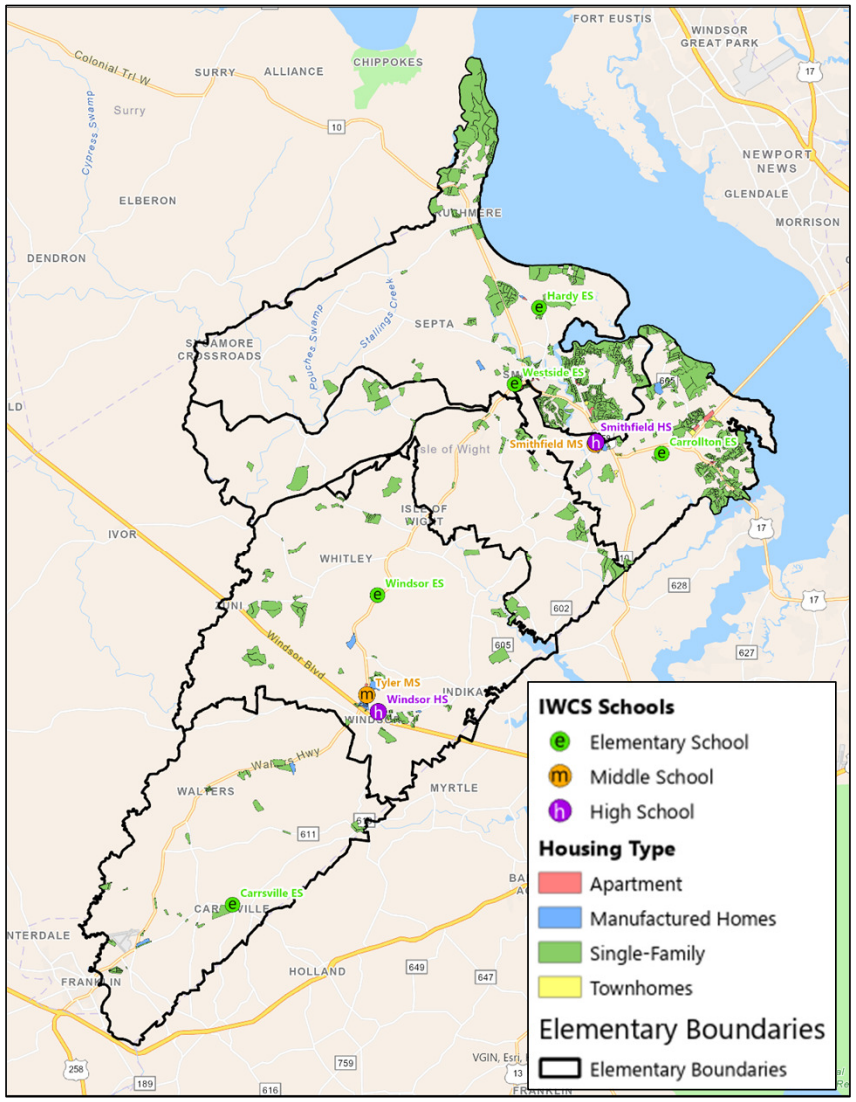
INTRODUCTION

Measures the impact that housing has on student enrollment



Study is based on student yields

- Ratio of students divided by housing units
- 5 students / 10 homes = 0.5 students/unit



▶ SUBDIVISION YIELD ANALYSIS

EXISTING HOUSING

Housing Type	Units	22-23 Students	22-23 Yield
Apartment	1,121	379	0.338
Manufactured Home	1,174	427	0.364
Single Family Home	8,380	2,888	0.345
Townhome	577	172	0.298
Total	**11,252**	**3,866**	**0.344**

▶ SUBDIVISION YIELD ANALYSIS

K-3 Yield by Boundary	Apartment	Manufactured Home	Single Family Home	Townhome
Carrollton/Westside 4-6	0.09	0.12	0.13	0.09
Carrsville ES	-	0.07	0.12	-
Hardy ES/Westside 4-5	-	-	0.04	-
Hardy ES/Westside 4-6	0.15	0.06	0.07	0.16
Windsor ES	0.09	0.12	0.10	-
Windsor ES/Westside 6	-	-	0.05	-
K-3 Subtotal	**0.11**	**0.10**	**0.09**	**0.09**

5-6 Yield by Boundary	Apartment	Manufactured Home	Single Family Home	Townhome
Carrollton/Westside 4-6	0.03	0.04	0.07	0.05
Carrsville ES	-	0.03	0.03	-
Hardy ES/Westside 4-5	-	-	0.01	-
Hardy ES/Westside 4-6	0.03	0.04	0.04	0.04
Windsor ES*	0.05	0.03	0.04	-
Windsor ES/Westside 6	-	-	0.04	-
5-6 Subtotal	**0.04**	**0.03**	**0.05**	**0.05**

*5th only

4th Grade Yield by Boundary	Apartment	Manufactured Home	Single Family Home	Townhome
Carrollton/Westside 4-6	0.02	0.04	0.04	0.02
Carrsville ES	-	0.02	0.02	-
Hardy ES/Westside 4-5	-	-	0.01	-
Hardy ES/Westside 4-6	0.03	0.03	0.02	0.05
Windsor ES	0.05	0.03	0.03	-
Windsor ES/Westside 6	-	-	0.01	-
4th Subtotal	**0.02**	**0.03**	**0.03**	**0.03**

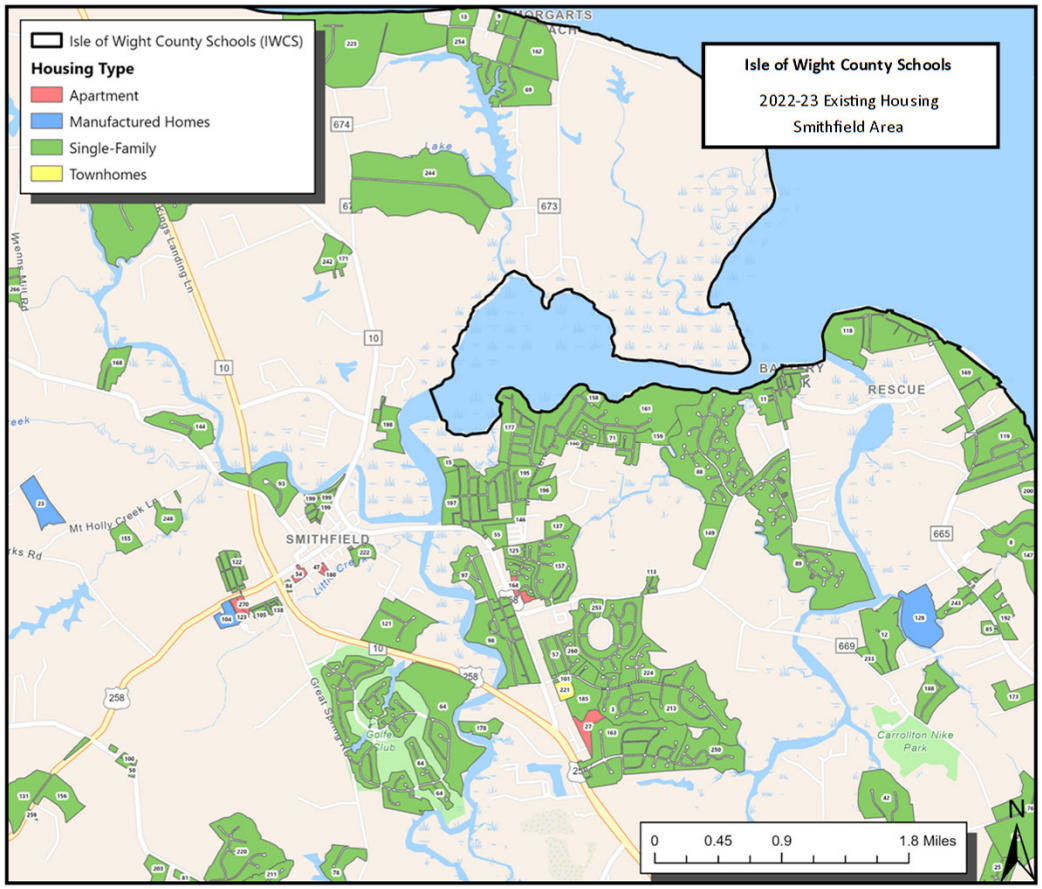
Middle & High School Yield by Boundary	Apartment	Manufactured Home	Single Family Home	Townhome
Optional MS**	-	-	0.05	-
Smithfield MS**	0.06	0.06	0.05	0.04
Tyler MS***	0.06	0.10	0.07	-
Middle Subtotal	**0.06**	**0.08**	**0.06**	**0.04**
Optional HS	-	-	0.09	-
Smithfield HS	0.10	0.12	0.12	0.09
Windsor HS	0.14	0.11	0.10	-
High Subtotal	**0.10**	**0.11**	**0.12**	**0.09**

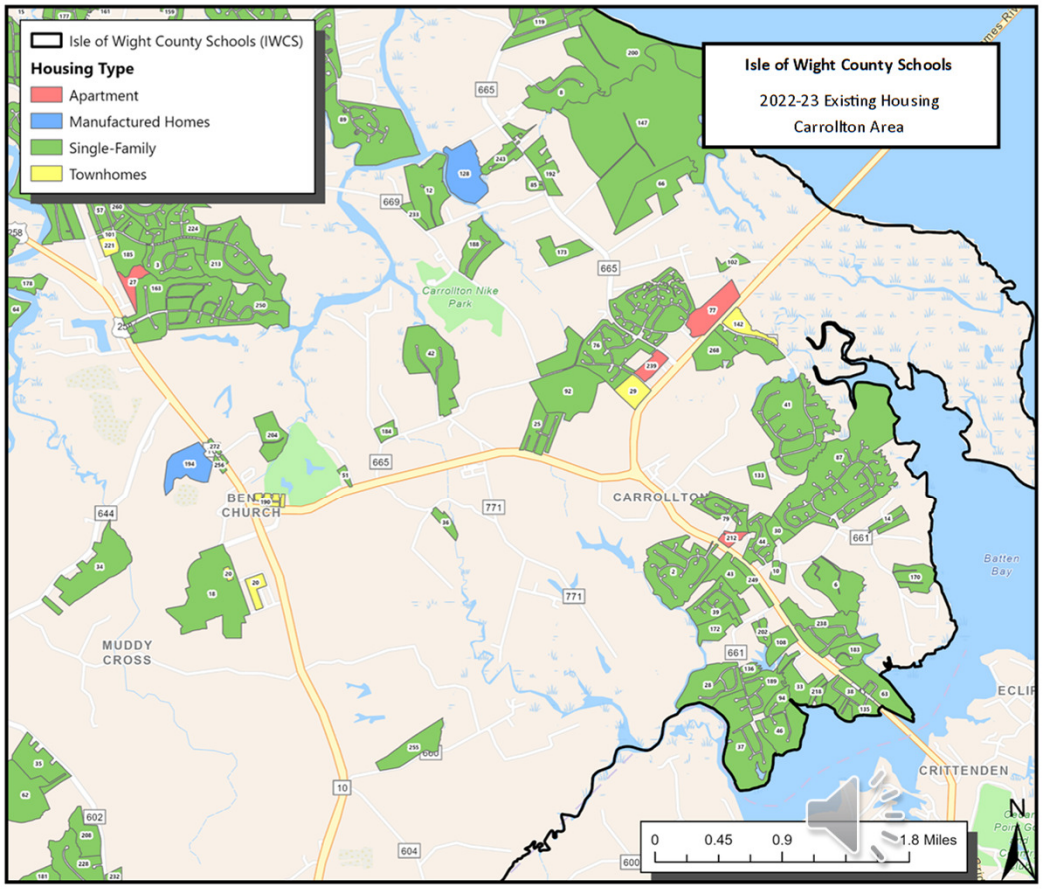
**7th-8th only

***6th-8th

▶ SUBDIVISION YIELD ANALYSIS

EXISTING HOUSING

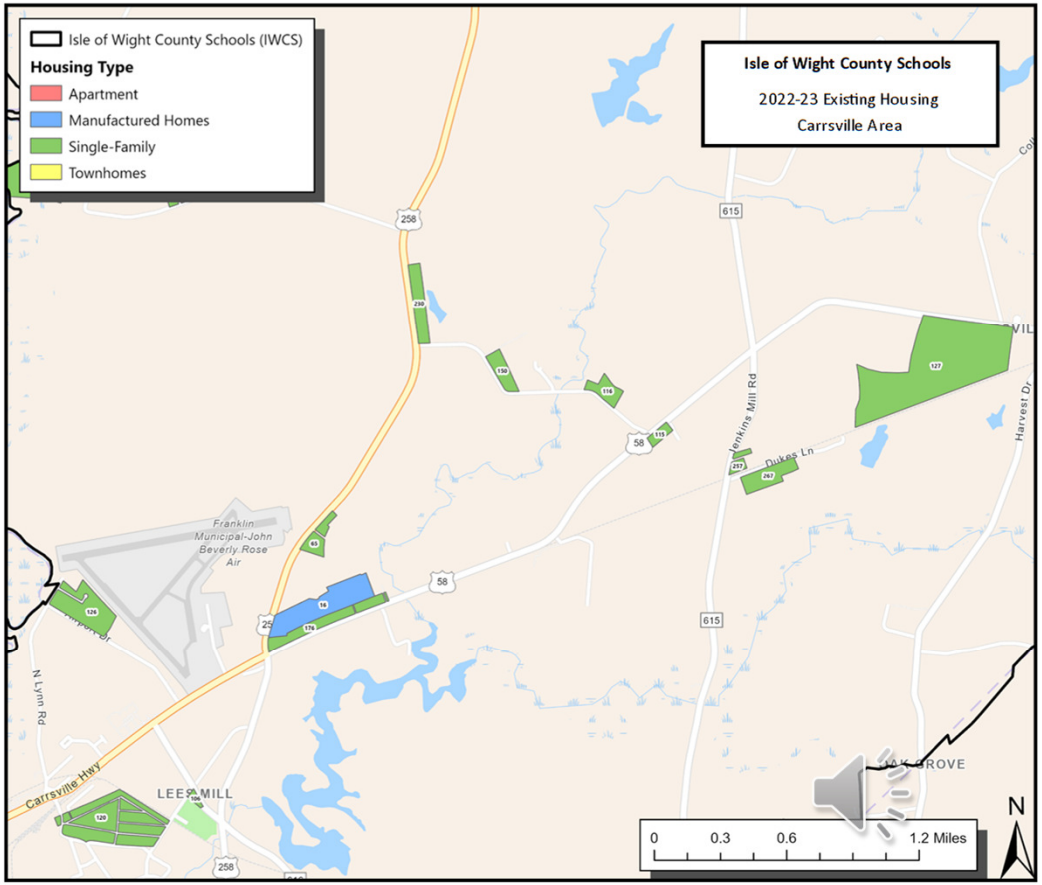




▶ SUBDIVISION YIELD ANALYSIS

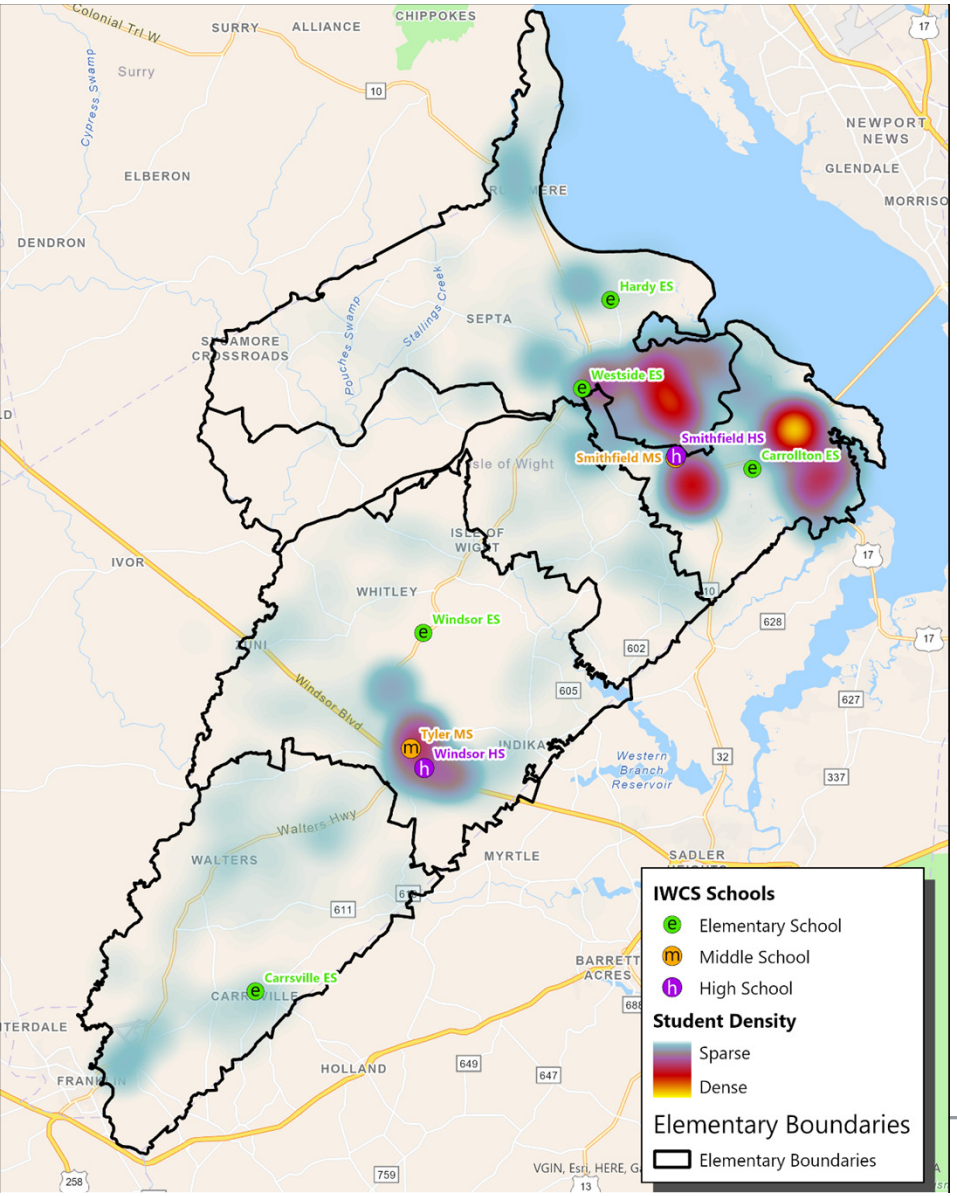
EXISTING HOUSING

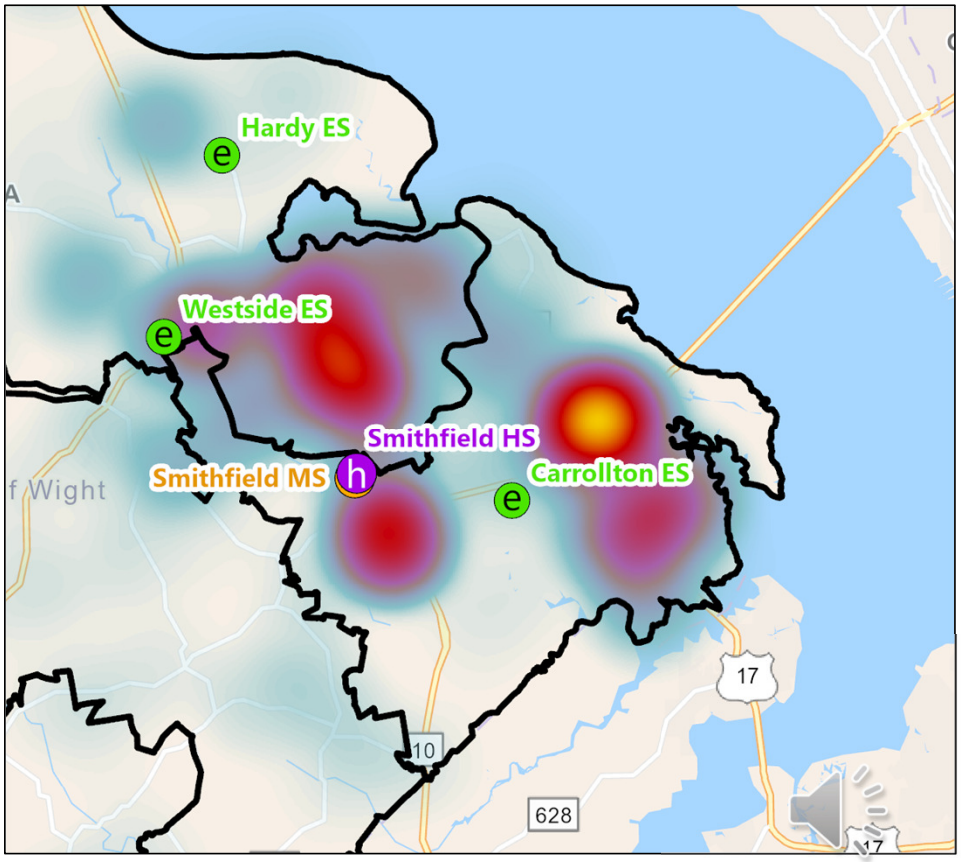




▶ SUBDIVISION YIELD ANALYSIS

STUDENT DENSITY





▶ SUBDIVISION YIELD ANALYSIS

HOUSING DEVELOPMENTS

	Development Information					Student Potential							
	Map ID	Name	Type	Status	Units	ES Boundary	MS/HS Boundary	K-3	4	5-6	7-8	9-12	K-12
Active & Planned Developments	1	The Park at Battery	Condo/Townhome	Approved	150	Hardy ES/Westside 4-6	Smithfield MS/HS	14	4	8	6	13	45
	2	Mallory Point/Scott's Farm	Single-Family	Under Design	614	Hardy ES/Westside 4-6	Smithfield MS/HS	58	17	30	34	71	210
			Duplex		198	Hardy ES/Westside 4-6	Smithfield MS/HS	22	5	8	12	20	67
	3	Timber Preserve	Single-Family	Approved	340	Carrollton/Westside 4-6	Smithfield MS/HS	32	9	17	19	39	116
	4	Benn's Grant	Apartments	Under Construction	240	Carrollton/Westside 4-6	Smithfield MS/HS	27	6	10	14	24	81
	5	St. Luke's Village	Single-Family	Approved	179	Carrollton/Westside 4-6	Smithfield MS/HS	17	5	9	10	21	62
	6	Brewer's Station	Single-Family	Under Construction	99	Carrollton/Westside 4-6	Smithfield MS/HS	9	3	5	6	11	34
	7	The Crossings	Single-Family	Under Construction	262	Carrollton/Westside 4-6	Smithfield MS/HS	25	7	13	15	30	90
	8	Archer's Meade	Single-Family	Under Design	63	Carrollton/Westside 4-6	Smithfield MS/HS	6	2	3	4	7	22
	9	Cypress Creek Phase 6	Single-Family	Under Construction	61	Hardy ES/Westside 4-6	Smithfield MS/HS	6	2	3	3	7	21
	10	Bridge Point Commons	Apartments	Under Design	350	Carrollton/Westside 4-6	Smithfield MS/HS	39	9	14	21	35	118
	Active & Planned Subtotal				**2,556**	-		**255**	**69**	**120**	**144**	**278**	**866**
Proposed	11	The Grange at 10Main	Single-Family	Future	58	Hardy ES/Westside 4-6	Smithfield MS/HS	5	2	3	3	7	20
		The Grange at 10Main	Apartments/Duplex		246	Hardy ES/Westside 4-6	Smithfield MS/HS	28	6	10	15	25	84
	12	Sweetgrass	Single Family	Future	225	Hardy ES/Westside 4-6	Smithfield MS/HS	21	6	11	13	26	77
	13	Kemp's Village East at Carrollton	Condo/Townhome	Future	35	Carrollton/Westside 4-6	Smithfield MS/HS	3	1	2	1	3	10
	Proposed Subtotal				**564**	-		**57**	**15**	**26**	**32**	**61**	**191**

As of Spring 2023:

Active & Planned:

+ 255 K-3
+ 69 4th
+ 120 5-6
+ 144 7-8
+ 278 9-12

Proposed:

+ 57 K-3
+ 15 4th
+ 26 5-6
+ 32 7-8
+ 61 9-12

▶ SUBDIVISION YIELD ANALYSIS

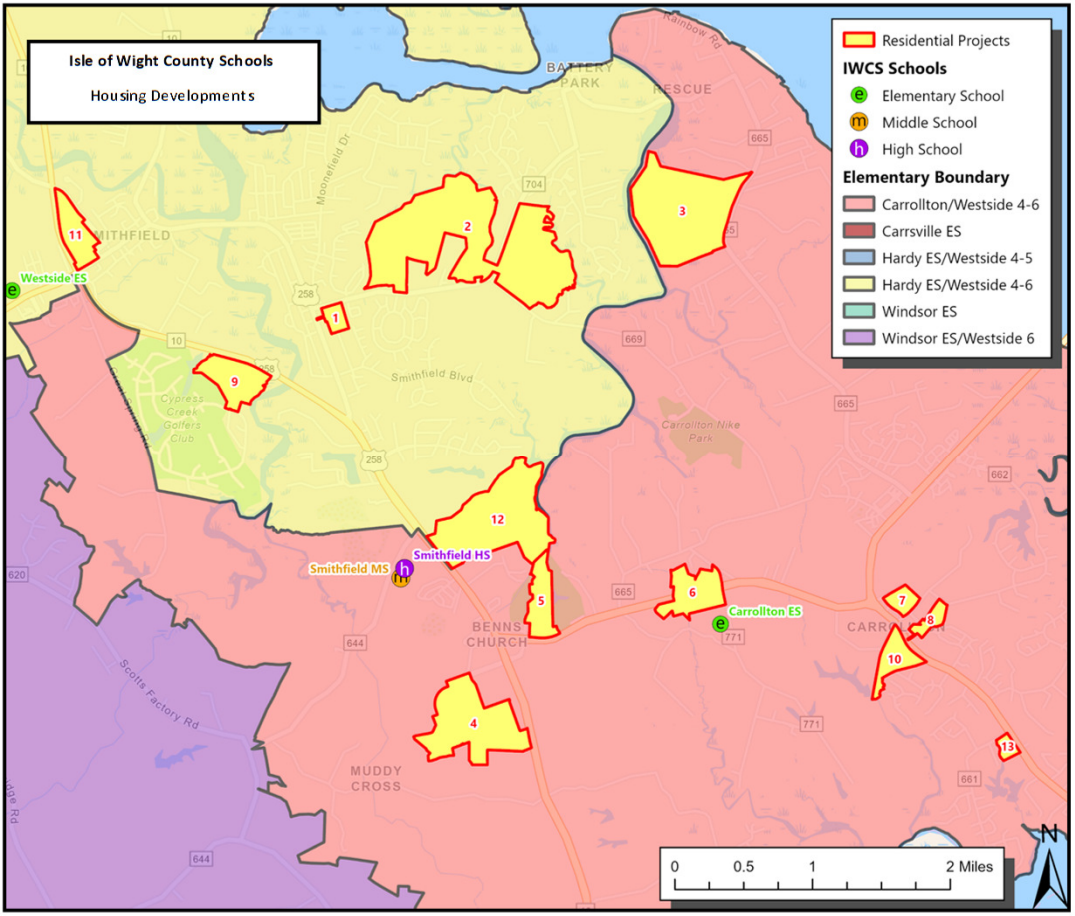
IMPACT TO SCHOOLS

School	Oct 31 Enrollment*	Capacity	Utilization	+ Housing Development	Future Utilization
Carrollton Elementary (PreK-3)	563	674	84%	158	107%
Carrsville Elementary (PreK-5)	246	310	79%		79%
Hardy Elementary (PreK-4)	639	1,011	63%	196	83%
Westside Elementary (4-6)	742	849	87%	188	110%
Windsor Elementary (PreK-5)	610	735	83%		83%
Georgie Tyler Middle (6-8)	366	535	68%		68%
Smithfield Middle (7, 8)	602	634	95%	176	123%
Smithfield High (9-12)	1,305	1,560	84%	339	105%
Windsor High (9-12)	524	875	60%		60%
TOTAL	**5,597**	**7,183**	**78%**	**1,057**	**93%**

*PK enrollment includes VPI, PK SPED, SPED intensive support, & PK Peer Models

▶ SUBDIVISION YIELD ANALYSIS

HOUSING DEVELOPMENTS



Development Concentration:

- Northern Carrollton boundary
- South to mid Hardy boundary

Heavily Impacted Schools:

- Carrollton ES
- Hardy ES
- Westside 4-6
- Smithfield MS
- Smithfield HS

Student Potential by Boundary & Grade Configuration	
Carrollton/Westside 4-6	158
Carrsville ES	0
Hardy ES/Westside 4-5	0
Hardy ES/Westside 4-6	154
Windsor ES	0
Windsor ES/Westside 6	0
K-3 Subtotal	**312**
Carrollton/Westside 4-6	42
Carrsville ES	0
Hardy ES/Westside 4-5	0
Hardy ES/Westside 4-6	42
Windsor ES	0
Windsor ES/Westside 6	0
4th Subtotal	**84**
Carrollton/Westside 4-6	73
Carrsville ES	0
Hardy ES/Westside 4-5	0
Hardy ES/Westside 4-6	73
Windsor ES*	0
Windsor ES/Westside 6	0
5-6 Subtotal	**146**
Optional MS	0
Smithfield MS	176
Tyler MS	0
Middle Subtotal	**176**
Optional HS	0
Smithfield HS	339
Windsor HS	0
High Subtotal	**339**
Total	**1,057**

▶ SUBDIVISION YIELD ANALYSIS

FACILITIES IDEAS

K-6/7-8 Option (requires redistricting)						
School	**23-24 Enrollment**	**Capacity**	**Utilization**	**+ Housing Development**	**Future Utilization**	**Facilities Considerations**
Carrollton Elementary (PreK-6)	2,926	3,579	82%	542	97%	Additions, or construct Westside ES larger than current, or construct new North side elementary
Carrsville Elementary (PreK-6)						
Hardy Elementary (PreK-6)						
Windsor Elementary (PreK-6)						
Westside Elementary (PreK-6)						
Georgie Tyler Middle (7-8)	840	1,169	72%	176	87%	Continue to track enrollment trends
Smithfield Middle (7-8)						
Smithfield High (9-12)	1,824	2,435	75%	339	89%	Continue to track enrollment trends
Windsor High (9-12)						
TOTAL	**5,590**	**7,183**	**78%**	**1,057**	**93%**	-



▶ SUBDIVISION YIELD ANALYSIS

FACILITIES IDEAS

K-5/6-8 Option (requires redistricting)						
School	**23-24 Enrollment**	**Capacity**	**Utilization**	**+ Housing Development**	**Future Utilization**	**Facilities Considerations**
Carrollton Elementary (PreK-5)	2,523	2,730	92%	469	110%	Construct new North side elementary
Carrsville Elementary (PreK-5)						
Hardy Elementary (PreK-5)						
Windsor Elementary (PreK-5)						
Westside Elementary (6-8)	1,243	2,018	62%	249	74%	-
Georgie Tyler Middle (6-8)						
Smithfield Middle (6-8)						
Smithfield High (9-12)	1,824	2,435	75%	339	89%	Continue to track enrollment trends
Windsor High (9-12)						
TOTAL	**5,590**	**7,183**	**78%**	**1,057**	**93%**	-

▶ SUBDIVISION YIELD ANALYSIS

FACILITIES IDEAS

K-3/4-6/7-8 Option (requires redistricting)						
School	**23-24 Enrollment**	**Capacity**	**Utilization**	**+ Housing Development**	**Future Utilization**	**Facilities Considerations**
Carrollton Elementary (PreK-3)	1,681	1,995	84%	312	100%	Addition(s), or construct new North side elementary
Carrsville Elementary (PreK-3)						
Hardy Elementary (PreK-3)						
Windsor Elementary (4-6)	1,245	1,584	79%	230	93%	Addition, or construct Westside ES larger than current
Westside Elementary (4-6)						
Georgie Tyler Middle (7-8)	840	1,169	72%	176	87%	Continue to track enrollment trends
Smithfield Middle (7-8)						
Smithfield High (9-12)	1,824	2,435	75%	339	89%	Continue to track enrollment trends
Windsor High (9-12)						
TOTAL	**5,590**	**7,183**	**78%**	**1,057**	**93%**	-



▶ SUBDIVISION YIELD ANALYSIS

FACILITIES IDEAS

K-4/5-7/8-9/10-12 Option (requires redistricting)						
School	**23-24 Enrollment**	**Capacity**	**Utilization**	**+ Housing Development**	**Future Utilization**	**Facilities Considerations**
Carrollton Elementary (PreK-4)	2,107	1,995	106%	396	125%	Construct new elementary
Carrsville Elementary (PreK-4)						
Hardy Elementary (PreK-4)						
Windsor Elementary (5-7)	1,228	1,584	78%	234	92%	Addition, or construct Westside ES larger than current
Westside Elementary (5-7)						
Georgie Tyler Middle (8-9)	941	1,169	80%	173	95%	Addition(s)
Smithfield Middle (8-9)						
Smithfield High (10-12)	1,314	2,435	54%	254	64%	-
Windsor High (10-12)						
TOTAL	**5,590**	**7,183**	**78%**	**1,057**	**93%**	-

COOPERATIVE STRATEGIES

COMPLETE FINANCIAL & DEMOGRAPHIC PLANNING FOR EDUCATION



THANK YOU

WE APPRECIATE YOUR TIME

MEMORANDUM

TO: Isle of Wight County Planning Commission

CC: Amy Ring and Bobby Jones

FROM: NVR, Inc.

DATE: October 20, 2023

SUBJECT: Sweetgrass Application – Responses to Questions and Comments Received at the September 26, 2023 Planning Commission Meeting

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Thank you for your thoughtful approach to the review of our application. We very much appreciate the time and attention you dedicated to our proposal and feedback we received. We have prepared this memorandum and its attachments in response to your questions and comments, which are listed below with our responses:

Fiscal Impact Analysis

Attached for your review is an updated version of our Fiscal Impact Analysis which reflects the price for the townhomes as $277,000.00 and the price for the age-restricted single-family dwellings as $374,000.00. The project's projected net positive revenue to the County at buildout is expected to be $850,000.00 annually.

Proffers

Attached for your review are updated proffers containing the following changes:

-The addition of a proffer prohibiting short term rentals within the community.
-The deletion of the sentence qualifying the prohibition on residents under the age of 19.
-The addition of a proffer requiring that the landscaping and buffer along the Commercial Area adjoining Rt. 10 be installed prior to issuance of the fiftieth residential certificate of occupancy.

Rt. 10 Viewshed

Attached is an elevation of the townhomes at the front of the Project, which was included in our last submission. Also attached are the following street view renderings:

-Views from Rt. 10 of Recreation Area 2 (the focal green space at the front of the Project).
-Views from Rt. 10 of the end units of the sections of townhomes at the front of the Project.
-A view from Rt. 10 of the Commercial Area landscaping and buffer (prior to commercial development).

The foregoing street view renderings have been added to the respective Design Guidelines for the Project (which are proffered) so that it is clear that consistency with these renderings is a requirement of the Project. We have also added enhanced architectural treatment of the units closest to Rt. 10 to the Residential Design Guidelines. Lastly, we have provided an updated image of an example office building responsive to the Economic Development Director's recent comments.

Master Plan Update

Attached for you review is an updated version of the Master Plan which includes screening of the properties to the south of the front portion of Project along Beechwood Lane.

Phasing and School Children

The below table shows the number of homes anticipated to be built each year and the corresponding projection of the number of school children projected to be generated each year through build out:

Year	Date	Townhomes	Age Restricted Single Family Detached Homes	Total Number of Homes	Elementary School Children	Middle School Children	High School Children	Total School Children	Running Total
1	2026	38	65	103	5	2	2	9	9
2	2027	38	65	103	5	1	3	9	18
3	2028	38	65	103	5	1	2	8	26
4	2029	38	65	103	5	2	2	9	35
5	2030	38	65	103	5	1	3	9	44
6	2031	35	65	100	5	1	2	8	52
Totals		225	390	615	30	8	14	52	

Based upon the most recent school capacity analysis provided to us by the County, it is reported to us by the County that there is adequate capacity to serve the students generated by the Project at the schools for which the Project is zoned in addition to approved and unbuilt projects in the same school zone. This conclusion is supported by a recent analysis of Isle of Wight school enrollment data reported by the Smithfield Times indicating that Isle of Wight schools have been experiencing a decline in enrollment in recent years. Accordingly, under state law, we are not able to offer cash proffers for school impacts. However, the incremental operational expenses of the school system in accommodating the students from our Project (e.g., hiring a new teacher, etc.) are accounted for in the Fiscal Impact Analysis as incremental expenses associated with the Project, and net revenue from the Project at build out is projected to be $850,000.00 annually even after accounting for such expenses (please see specific commentary on this issue in the updated Fiscal Impact Analysis).

Fire & EMS Impacts

We are advised by the County that the County's Fire and EMS services have adequate physical capacity (e.g., stations, trucks, etc.) to serve the increased demand for services generated by the Project. Accordingly, under state law, we are not able to offer cash proffers for Fire and EMS impacts. However, the incremental operational expenses for the County's Fire and EMS services in accommodating the students from our Project (e.g., hiring more paid staff) are accounted for in the Fiscal Impact Analysis as incremental expenses associated with the Project, and net revenue from the Project at build out is projected to be $850,000.00 annually even after accounting for such expenses (please see specific commentary on this issue in the updated Fiscal Impact Analysis).

Attachments:
-Updated Fiscal Impact Analysis
-Updated Proffers
-Street view renderings of the Project from Rt. 10
-Updated Design Guidelines
-Updated Master Plan

PROFFERED CONDITIONS

~~August 18~~October 20, 2023

Conditional Zoning Request ZA-6-19 (the "Application") has been filed by Henry Layden, as Special Trustee of The William G. Yeoman III Trust ("Owner"), the owner of certain real property located within the territorial confines of the County of Isle of Wight, Virginia (the "County") being a portion of that property located at 14096 Benns Church Blvd., Smithfield, VA 23430, Tax Parcel # 32-01-009 (the "Property") more particularly described on **Exhibit A** attached hereto and made part hereof. NVR, INC. ("NVR") is the contract purchaser of the Property. Yeoman and NVR (collectively, the "Owner") filed the Application requesting that the zoning of the Property be changed from RAC to C-PD-MX with proffers in order to permit the development of a mixed use planned development consisting of single-family dwellings, townhouses, and a commercial ~~outparcel~~ area (the "Project").

The Owner and the County have carefully evaluated, among other things, a traffic impact analysis, community impact analysis, and fiscal impact analysis (copies of which are on file with the County's Community Development Department, hereinafter referred to as the "Department") and the on and off site impacts of the Project and have determined (i) the impacts specifically attributable to the Project (the "Impacts"), (ii) certain Impacts create a need (or identifiable portion of a need) for the expansion of existing capacity of public transportation facilities (the "Expansion of Existing Capacity"), (iii) the Project will receive a direct and material benefit from the Expansion of Existing Capacity and Proffer 6 below, and (iv) the provisions of the County's zoning ordinance ("Zoning Ordinance") are inadequate for addressing various of the Impacts and necessitate supplementation by these Proffers.

In furtherance of the Application, the Owner, for itself and its successors and/or assigns, hereby voluntarily proffers the conditions specifically set forth below, in addition to the regulations provided for by the Zoning Ordinance, which proffered conditions are determined by the Owner and, upon acceptance by the Board of Supervisors in connection with the approval of the Application, the County: (i) to be reasonable, (ii) to address impacts specifically attributable to the Project, (iii) to address the need (or identifiable portion of a need) for the Expansion of Existing Capacity, (iv) to directly and materially benefit the Project, (v) to have a reasonable relation to the proposed change in zoning, (vi) to be in conformity with County's adopted comprehensive plan, and (vii) to be in accordance with the provisions of Section 15.2-2296, et seq. of the Code of Virginia (1950), as amended (the "Virginia Code"), Sections 15.2-2303.2 through 15.2-2303.4 of the Virginia Code, and the County Zoning Ordinance. The following proffered conditions apply only to the Property.

1. Plan of Development. A conceptual development plan of the Project entitled "MASTER PLAN FOR SWEETGRASS", dated June 14, 2019, and last revised ~~August 18~~October 17, 2023, prepared by AES Consulting Engineers (the "Master Plan"), has been submitted to the County Planning Division for review by the County in connection with the Application. The Master Plan is on file with the Department. Development of the Property shall be in substantial conformance, as determined by the Community Development Director (the "Director") with the Master Plan.

2. Residential Units. There shall be no more than 615 residential dwellings (the "Residential Units") constructed on the Property, of which no more than 390 of the Residential Units shall be single-family (detached) dwellings, and no more than 225 of the Residential Units shall be townhouses.

3. Non-Residential Use Restrictions. The use of the portion of the Property designated as "COMMERCIAL SECTION 5 AC +/-" on the Mater Plan (the "Commercial Area") shall be limited to (a) inline retail and commercial uses (including accessory uses) comprising no more than 18,000 square feet of floor area, and (b) office uses (including accessory uses) comprising no more than 55,000 square feet of floor area. Notwithstanding the foregoing, the Owner shall not be permitted to develop an amount of non-residential floor area on the Commercial Area that would be projected to exceed 220 p.m. peak hour trips (as determined by the then current edition of the Institute of Transportation Engineers Trip Generation Manual) until the Owner submits for review and approval by the County and the Virginia Department of Transportation ("VDOT") an updated traffic impact analysis including such proposed additional square footage and includes in its site plan for such additional commercial square footage any traffic improvements recommended by the updated traffic impact analysis and not already contained in these Proffers. If not previously installed in connection with the development of the Commercial Area, the landscaping and buffer located on the Commercial Area adjacent to Rt 10 (Benns Church Boulevard) shall be installed prior to issuance of the 50th certificate of occupancy ("CO") for Residential Units on the Property.

4. Design. The Residential Units and clubhouse on the Property shall be constructed by the Owner in substantial conformance with the architectural elevations entitled "Sweetgrass Elevations", dated ~~June 15~~October 20, 2023 (the "Elevations") and the design guidelines entitled "Residential Design Guidelines for Sweetgrass Development", dated ~~June 16~~October 20, 2023 (the "Residential Guidelines"), as determined by the Director. The development within the Commercial Area shall be constructed by the Owner in substantial conformance with the design guidelines entitled "Commercial Center Design Guidelines for Sweetgrass Development", dated August 18, 2023 (the "Commercial Guidelines"), as determined by the Director. A copy of the Elevations, the Residential Guidelines, and the Commercial Guidelines are on file in the Department. The Elevations, Residential Guidelines, and Commercial Guidelines may be modified from time to time provided that such modifications do not alter the basic concept or character of the Elevations, Residential Guidelines, and Commercial Guidelines and provided that such amendments are approved by the Director for consistency with the terms of this proffer.

5. Age Restriction. All of the single-family (detached) dwellings Residential Units shall be occupied solely as "housing for older persons" as such term is defined in Virginia Code Section 36-96.7(A), provided no person under 19 years of age shall be housed or domiciled or shall reside in any Residential Unit. ~~For purposes of the foregoing, a person shall be deemed to be housed, domiciled or to reside in a Residential Unit if he or she stays overnight for more than 75 days in any 90-day period or for more than 90 days in any 12-month period.~~ Such restriction shall be set forth in the Declaration and enforced by the Association (as such terms are defined in Proffer 9 below). Unless otherwise approved by the Director, each age-restricted Residential Unit shall have a first-floor bedroom and full bath.

6. Traffic Improvements.

a. Prior to the issuance of the first certificate of occupancy for Residential Units on the Property (not including model homes), the construction, installation, and/or implementation of the following improvements shall be completed or guaranteed by the Owner in accordance with Virginia Code Section 15.2-2299 or such successor provision (a "Guarantee"):

i. Westbound right turn lane (200-foot storage plus 200-foot taper) into right in/right out proposed secondary Project entrance off of US 258/Rt 10 (Benns Church Boulevard);

ii. Westbound right turn lane (200-foot storage plus 200-foot taper) into proposed main Project entrance off of US 258/Rt 10 (Benns Church Boulevard);

iii. Lengthen the existing eastbound left turn lane to provide 200-foot storage plus 200-foot taper into proposed main Project entrance off of US 258/Rt 10 (Benns Church Boulevard);

iv. Lengthen the existing westbound left turn lane on US 258/Rt 10 to provide 250-foot storage plus 100-foot taper at the intersection of US 258/Rt 10 (Benns Church Boulevard) and Turner Drive (the "Rt. 10/Turner Drive Turn Lane Improvement");

v. Replace the existing 3 section signal head serving the dedicated right turn lane on eastbound Turner Drive at US 258/Rt 10 (Benns Church Boulevard) with a 5 section signal head to provide a protected eastbound right-turn overlap (the "Rt. 10/Turner Drive Signal Improvement 1"); and

vi. Install flashing yellow arrows for the eastbound and westbound left turn lanes at the intersection of US 258/Rt 10 (Benns Church Boulevard) and Canterberry Lane, Cypress Run Drive, and Turner Drive.

b. At such time as deemed warranted by VDOT, but in no event prior to issuance of the 50th ~~certificate of occupancy ("CO")~~ CO for Residential Units on the Property (or the commencement of construction of improvements on the Commercial Area, whichever occurs first), the Owner shall replace the existing 3 section signal head serving the dedicated right turn lane on eastbound US 258/Rt 10 (Benns Church Boulevard) at Turner Drive with a 5 section signal head to provide a protected eastbound right-turn overlap (the "Rt. 10/Turner Drive Signal Improvement 2"). In the event that the Rt. 10/Turner Drive Signal Improvement 2 is not warranted by VDOT prior to the issuance of the final CO for Residential Units on the Property, then Owner's development of the Property (and permits and approvals therefor) may proceed through to the issuance of the final CO for Residential Units on the Property; however, unless waived by the Director based on an agreed upon alternative, the Owner shall pay to the County the then estimated cost of Rt. 10/Turner Drive Signal Improvement 2 (including design, construction, labor, and materials) as approved by the County, and upon such payment shall be deemed to have satisfied all of its obligations under this Proffer 6(b).

c. Notwithstanding the preceding subsections a(iv), a(v), and b, if the County, prior to implementation of the Rt. 10/Turner Drive Turn Lane Improvement, Rt. 10/Turner Drive Signal Improvement 1, and/or the Rt. 10/Turner Drive Signal Improvement 2 (collectively, the "Rt. 10/Turner Drive Proffered Improvements") (i) approves or adopts plans for modification of the intersection of US 258/Rt 10 (Benns Church Boulevard) and Turner Drive that conflict with or supersede one or more of the Rt. 10/Turner Drive Proffered Improvements, or (ii) accepts proffers from or imposes conditions upon another developer(s) for substantially the same obligations as one or more of the Rt. 10/Turner Drive Proffered Improvements (each of such affected Rt. 10 Turner Drive Proffered Improvements being an "Affected Improvement"), then the Owner shall contribute to the County an amount of cash equal to the then estimated cost to complete the Affected Improvement(s) (including design, construction, labor, and materials) as approved by the County multiplied by the Project's proportionate share (assuming the

Project's full buildout) of the vehicle trips associated with such Affected Improvements (as determined by the then current edition of the Institute of Transportation Engineers Trip Generation Manual) (the "Cash in Lieu Payment") no later than ninety (90) days after (1) the award of the construction contract for the construction of such conflicting, superseding, or substantially similar improvement(s), and (2) issuance a written request from the County to the Owner for such Cash in Lieu Payment; provided, however, under no circumstances shall the Cash in Lieu Payment be due prior to issuance of the 50th CO for Residential Units on the Property (or the commencement of construction of improvements on the Commercial Area, whichever occurs first). The payment by the Owner to the County of such Cash in Lieu Payment shall be deemed satisfaction in full of the corresponding portion of the Rt. 10/Turner Drive Proffered Improvements.

d. At such time as deemed warranted by the VDOT, the Owner shall install a traffic signal at intersection of US 258/Rt 10 (Benns Church Boulevard) and the Project's main entrance. Prior to the issuance of the 150th CO for Residential Units on the Property, Owner shall submit to VDOT a traffic signal warrant analysis for the intersection of US 258/Rt 10 (Benns Church Boulevard) and the Project's main entrance. In the event the analysis concludes, and VDOT concurs, that a traffic signal is warranted at this intersection, then the Owner shall Guarantee a traffic signal (including flashing yellow arrows for the eastbound and westbound left turn lanes and any planned pedestrian accommodations at the signal at the intersection of US 258/Rt 10 (Benns Church Boulevard) and the Project's main entrance and shall complete the installation of such signal prior to the issuance of certificates of occupancy for more than 50 additional residences after the date upon which VDOT issues to Owner written confirmation that the signal is warranted.

i. In the event that such traffic signal is not warranted by VDOT in connection with the first traffic signal warrant analysis, then Owner's development of the Property (and permits and approvals therefor) may proceed above the foregoing thresholds; however, prior to the issuance of the 300th CO for Residential Units on the Property, Owner shall submit to VDOT a traffic signal warrant analysis for the intersection of US 258/Rt 10 (Benns Church Boulevard) and the Project's main entrance. In the event the analysis concludes, and VDOT concurs, that a traffic signal is warranted at this intersection, then the Owner shall Guarantee a traffic signal at the intersection of US 258/Rt 10 (Benns Church Boulevard) and the Project's main entrance and shall complete the installation of such signal prior to the issuance of certificates of occupancy for more than 50 additional residences after the date upon which VDOT issues to Owner written confirmation that the signal is warranted.

ii. In the event that such traffic signal is not warranted by VDOT in connection with the second traffic signal warrant analysis, then Owner's development of the Property (and permits and approvals therefor) may proceed above the foregoing thresholds; however, prior to the issuance of the 450th CO for Residential Units on the Property, Owner shall submit to VDOT a traffic signal warrant analysis for the intersection of US 258/Rt 10 (Benns Church Boulevard) and the Project's main entrance. In the event the analysis concludes, and VDOT concurs, that a traffic signal is warranted at this intersection, then the Owner shall Guarantee a traffic signal at the intersection of US 258/Rt 10 (Benns Church Boulevard) and the Project's main entrance and shall complete the installation of such signal prior to the issuance of certificates of occupancy for more than 50 additional

residences after the date upon which VDOT issues to Owner written confirmation that the signal is warranted.

iii. In the event that such traffic signal is not warranted by VDOT in connection with the third traffic signal warrant analysis, then Owner's development of the Property (and permits and approvals therefor) may proceed above the foregoing thresholds; however, prior to the issuance of the 600th CO for Residential Units on the Property, Owner shall submit to VDOT a traffic signal warrant analysis for the intersection of US 258/Rt 10 (Benns Church Boulevard) and the Project's main entrance. In the event the analysis concludes, and VDOT concurs, that a traffic signal is warranted at this intersection, then the Owner shall Guarantee a traffic signal at the intersection of US 258/Rt 10 (Benns Church Boulevard) and the Project's main entrance and shall complete the installation of such signal prior to the issuance of the final certificate of occupancy for the Residential Units on the Property.

iv. In the event that such traffic signal is not warranted by VDOT in connection with the fourth traffic signal warrant analysis, then Owner's development of the Property (and permits and approvals therefor) may proceed through to the issuance of the final CO for Residential Units on the Property; however, unless waived by the Director based on an agreed upon alternative, the Owner shall pay to the County the then estimated cost of the traffic signal (including design and construction labor and materials) as approved by the County, and upon such payment shall be deemed to have satisfied all of its obligations under this Proffer 6(d).

7. Timing of Recreational Amenities. The clubhouse and pool described on the Master Plan shall be completed prior to issuance of the 150th CO for Residential Units constructed on the Property. If not sooner constructed, the pedestrian amenities shown on the Master Plan shall be constructed sequentially by phase when the corresponding phase of the development in when such amenities are shown is constructed.

8. Archaeology. A Phase I Archaeological Site Assessment for the Property shall be submitted to the Director for their review and approval prior to preliminary site plan or subdivision plan submittal. A treatment plan or Phase II Archaeological Site Assessment shall be submitted to, and approved by, the Director for all sites in the Phase I study that are recommended for a Phase II evaluation, and/or identified as being eligible for inclusion on the National Register of Historic Places. If a Phase II study is undertaken, such a study shall be approved by the Director and a treatment plan or Phase III Archaeological Site Assessment for said sites shall be submitted to, and approved by, the Director for sites that are determined to be eligible for inclusion on the National Register of Historic Places and/or those sites that require a Phase III study. If in the Phase II study, a site is determined eligible for nomination to the National Register of Historic Places and said site is to be preserved in place, the treatment plan shall include nomination of the site to the National Register of Historic Places. If a Phase III study is undertaken for said sites, such studies shall be approved by the Director prior to land disturbance within the study area. All Phase I, Phase II and Phase III studies shall meet the Virginia Department of Historic Resources' Guidelines for Preparing Archaeological Resource Management Reports and the Secretary of the Interior's Standard and Guidelines for Archaeological Documentation, as applicable, and shall be conducted under the supervision of a qualified archaeologist who meets the qualifications set forth in the Secretary of the Interior's Professional Qualification Standards. All approved treatment plans shall be incorporated into the

plan of development for the site and shall be adhered to during the clearing, grading and construction activities thereon.

9. Property Owners Association. The Owner shall form one or more Property Owners' Associations and/or a Condominium Unit Owners Associations (each an "Association"), which may include separate or sub-associations for the age restricted and non-age restricted Residential Units, in accordance with Virginia law, with the preparation and execution of a Declaration of Covenants, Conditions and Restrictions or Declaration of Condominium, as applicable (a "Declaration") with the members thereof being the owners of the portions of the Property designated for residential use (the "Residential Property"). The Declaration shall provide for, among other things, the qualifying age restrictions in Proffer 5 above, design review by a design review board, and the conveyance from the Owner to an Association of all of the common areas, open spaces, green areas, recreation areas and facilities and the stormwater management system associated with the Residential Property (collectively, the "Common Elements"). The Owner agrees that it shall retain sole responsibility for the maintenance of the Common Elements until such time as the same are conveyed to an Association, at which time the obligation shall be assigned to an Association. Each Residential Unit owner within the Residential Property shall be a voting member of an Association and be subject to assessments as set forth in the Declaration. The Declaration shall be subject to the approval of the County Attorney for consistency with this proffer and upon approval shall be duly recorded in the Clerk's Office for the Circuit Court of Isle of Wight County. The Declaration shall be recorded in connection with the recordation of the first subdivision (or condominium) plat for the Residential Units on the Property.

10. Short Term Rental Prohibition. No Residential Unit shall be leased for a term of less than one year except as may be necessary to comply with applicable law (e.g., Servicemembers Civil Relief Act). No leases or other temporary occupancy agreements on a daily, weekly or monthly basis shall be permitted for any Residential Unit. No lease of less than all of a Residential Unit shall be permitted.

~~10.~~11. Successors and Assigns. These Proffers shall run with the title to the Property and shall be binding on the parties hereto and their respective successors and assigns; provided, however once a party ceases to own any portion of the Property, such party shall have no continuing liability hereunder.

~~11.~~12. Severability. In the event that (i) the County's approval of the Application and/or acceptance of these Proffers is appealed within 30 days after the date of the Board of Supervisors' action on same, and (ii) any clause, sentence, paragraph, subparagraph, section or subsection of these Proffers shall be judged by any court of competent jurisdiction to be invalid or unenforceable for any reason, including a declaration that it is contrary to the Constitution of the Commonwealth of Virginia or the United States, or if the application thereof to any owner of any portion of the Property or to any government agency is held invalid, then the change in zoning intended to be accomplished by the County's approval of the Application and acceptance of these Proffers shall be deemed void and the zoning of the Property shall automatically revert to that which existed immediately prior to the date of such approval.

~~12.~~13. Headings. All paragraph and subparagraph headings of the Proffers herein are for convenience only and are not part of these Proffers.

~~13.~~14. Conflicts. In the event that there is any conflict between these Proffers and the Zoning Ordinance, the conflict shall be resolved by the County's Director subject to the appeal process to the Board of Zoning Appeals and the Courts as otherwise provided by law.

~~14.~~15. Void if Application not Approved. In the event that the Application is not approved by the County or is overturned by subsequent judicial determination, these Proffers and the Master Plan shall be null and void.

[SIGNATURES LOCATED ON FOLLOWING PAGES]

[SIGNATURE PAGE TO PROFFERS]

WITNESS the following signatures, thereunto duly authorized:

NVR, INC.

By: _____

Print Name: _____

Title: _____

COMMONWEALTH OF VIRGINIA
CITY/COUNTY OF _____, to wit:

The foregoing instrument was acknowledged before me this ____ day of _____, 2023 by _____ as _____ of NVR, Inc.

_____
NOTARY PUBLIC

My commission expires: _____
Registration No.: _____

[SIGNATURE PAGE TO PROFFERS]

THE WILLIAM G. YEOMAN III TRUST :

_____

Henry Layden, special Trustee of the William Grover Yeoman III Trust, dated December 14, 2007, as amended

COMMONWEALTH OF VIRGINIA
CITY/COUNTY OF _____, to wit:

The foregoing instrument was acknowledged before me this ____ day of _____, 2023 by Henry Layden, special Trustee of the William Grover Yeoman III Trust, dated December 14, 2007, as amended.

_____

NOTARY PUBLIC

My commission expires: _____
Registration No.: _____

EXHIBIT A

All that certain tract, piece or parcel of land containing approximately 249.47 acres, situate, lying and being near Benns Church, in Newport Magisterial District, Isle of Wight County, Virginia; lying on the East side of State Highway No. 10, and bounded by said Highway, the lands now or formerly of Daisy M. Bunkley, Phillip F. Edwards, Jones' Creek, the lands now or formerly owned by George Yeoman, Christie Jordan, C.E. Johnson, J.F. Minton and others and being a portion of the same land of which E.K. Batten and Maggie E. Batten, his wife, died seized and possessed.

RESIDENTIAL

DESIGN GUIDELINES

FOR

SWEETGRASS DEVELOPMENT

DATED

October 20, 2023

BUILDING design guidelines seek to create a distinct yet coherent architecture that will foster a unique identity for Sweetgrass and form the backdrop to a rich street level experience. These guidelines will significantly help distinguish the community, help define its character and eventually raise its value in the marketplace. The following set of principles will be applied to each of the buildings, irrespective of its use or location.

1. Build in the tradition of simple yet elegant designs. Building architecture and elevations promote a more contemporary nature through use of simple unifying roof and window lines and careful selection of materials. The building aesthetic should emerge from elevation components and building details rather than from mere ornamentation.

2. Variety- Single family homes immediately adjacent to or across from one another shall have distinct and different elevations. No identical color schemes for single family detached houses shall be repeated within three consecutive lots.

3. Use traditional, high quality and durable materials throughout the community. When walls are constructed of more than one material, changes in material shall be permitted along a horizontal or vertical line and should reinforce a base, middle and top for the building. Building walls shall be of one or more of the following materials:

- Brick- A variety of traditional brick colors and modules and bonding variations are encouraged
- Stone- Natural stone and stone veneer are permitted and shall be laid predominantly rectilinear stones in a horizontal pattern. Cast stone shall be permitted as sills, headers and accents.
- Siding- Cement or fiber board siding or high-quality vinyl or its equivalent is the prescribed siding material where brick or stone is not utilized. Aluminum siding is not permitted. A variance in color and texture is encouraged.

4. Emphasize main entries of each home regardless of elevation. The main entrance to each home should be easily identifiable from the main travel ways through use of materials and forms.

Single Family Detached Lots Guidelines

"The architecture shown herein is a representation of builders' architecture that may be built in Sweetgrass, but does not represent the full sampling of architecture or builders that may be provided
within the community."

In a development like Sweetgrass it is important to capture a broad buyer group including new buyers, upgrade buyers, move-down buyers, etc. Sweetgrass is offering 3 different minimum lot sizes within the community. The minimum lot size of a single family detached lot is 50' wide (measured at the front BSL) x 100'deep.

Minimum Building Setback Line (BSL)

20' front
15' rear
5' side

Architecture Treatments and Materials

Single Family Detached Highly Visible Lots (HV)

Lots on prominent corners will be designated as High Vis or "HV" lots. These prominent corners will be defined as those fronting on multiple public rights of way, or those that directly border any of the defined recreation areas. These lots will be required to have upgraded architectural features on the visible facades.

HV Features required:

- Masonry water table
- Storm shutters or Trimmed windows
- Gable vent or other similar trim

High Visibility "HV" lots must have landscaping placed along the side foundation that faces the street. The corner lot side setback will be 10 from public right of way'.

Elevations and Materials

Creating a unique and diverse streetscape throughout Sweetgrass is a high priority; to continue pursuing this there will be limitations placed on the frequency and location of elevations that can be used on adjacent lots. The following guidelines shall be followed:

- Builder elevations will be reviewed and approved by the developer prior to construction to ensure a cohesive theme throughout the community.
- Lots next to or across the street from each other cannot be the same elevation/model.
- Accent materials shall be varied to create more differentiation between lots.

Traditional, high-quality and durable building materials shall be used throughout the community. Building materials shall meet all current Local, State, and Federal building codes and regulations. Materials include:

- Brick; includes painted brick
- Natural stone
- Stone veneer
- High quality vinyl siding
- Cement or fiber board siding

Fencing, Landscaping, HVAC Equipment, and Height Restrictions

Fences

Fences will be permitted within the Sweetgrass community but must follow the guidelines below and in accordance with County Code:

- Fence material shall be vinyl.
- Vinyl fencing must be white and non-glossy; including vinyl covered picket fencing.
- Maximum fence height shall be six (6) feet.
- No front yard fencing shall be allowed.
- Fencing shall not be used to satisfy upgraded architectural requirements.

Landscaping

Lot landscaping and screening can add a lot of value and create and aesthetically pleasing streetscape throughout the community. The follow guidelines shall be considered:

- Foundation plantings must be included on every house prior to occupancy.
- Corner lots or high vis lots shall have landscape buffers to screen sides of houses from the street.
- Lots that back to other lots shall include landscaping at the rear of the property to create a visual screen between adjacent lots. Buffer shall be located outside drainage or utility easements.

Utility Equipment

- HV lots shall ensure the HVAC equipment is screened from view of the street with a fence or other opaque screen.
- No equipment shall be placed on the side of the house that abuts two public streets.

Height

- No single family detached dwellings median roof height will be taller than 45 feet in height.

Single Family Attached (SFA) Lots Guidelines

"The architecture shown herein is a representation of builders' architecture that may be built in Sweetgrass but does not represent the full sampling of architecture or builders that may be provided within the community."

In a development like Sweetgrass, it is important to capture a broad buyer group including new buyers, upgrade buyers, move-down buyers, etc. Sweetgrass is offering 2 single-family attached Products.

Minimum Lot Size:	Maximum Stories:
Interior Lot: 1400 square feet	3 levels
Exterior Lot: 1800 square feet	

Setbacks

SFA Fee Simple:

Rear Loading Town Home Building Restriction Line (BSL)

Front yard:	5 feet minimum (front door to front property line).
Side yard:	10 feet minimum; 20' minimum building separation between buildings
Rear yard:	Sufficient to accommodate an 18.5 ft parking space (Not to include, right of way or sidewalk)

Front Loading Town Home Building Restriction Line (BSL)

Front yard:	Sufficient to accommodate an 18.5 ft parking space (Not to include, right of way or sidewalk)
Side yard:	10 feet minimum; 20' minimum building separation between buildings
Rear yard:	10 feet minimum (From rear of unit to property line)

SFA Condominium Ownership:

Rear Loading Town Home Building Restriction Line (BSL)

Front yard:	5 feet minimum; 20' minimum building separation between buildings
Side yard:	10 feet minimum; 20' minimum building separation between buildings
Rear yard:	Sufficient to accommodate an 18.5 ft parking space (Not to include, right of way or sidewalk)

Front Loading Town Home Building Restriction Line (BSL)

Front yard:	Sufficient to accommodate an 18.5 ft parking space (Not to include, right of way or sidewalk)
Side yard:	10 feet minimum; 20' minimum building separation between buildings
Rear yard:	10 feet minimum; 20' minimum building separation between buildings

Setback guidelines:

- Every other lot shall be staggered by two (2) feet for each lot located
- The two (2) alternate setback lots must be separated by a Typical front yard setback lot.
- Front porches will be allowed to encroach over the front yard BSL by 3'.

Architecture Treatments and Materials

Single Family Attached (SFA) Highly Visible Lots (HV)

Lots on prominent corners will be designated as High Vis or “HV” lots. These prominent corners will be defined as those fronting on multiple public rights of way, the subdivision entrance road or those that directly border any of the defined recreation areas. These lots will be required to have upgraded architectural features on the visible facades. Features to be included on these lots are outlined below:

Single Family Attached High Vis 1 Lots (HV1)

Features required:

- Masonry water table
- Storm shutters
- Trimmed windows
- Gable vent
- Gable trim
- Siding located in reverse gable shall be architecturally different from main portion of the house. Options include:
    - Tighter spaced siding
    - Shake siding
    - Vertical siding

*Rt 10 HV1 Single Family Attached units

On HV1 lots that face Route 10, all the above HV1 guidelines apply plus the following:

- Garage Entry Door
- Sidewalk from Door to driveway
- Awning above side entry door
- Landscaping buffer between unit and route 10 to shield view. Must match the length of the side elevation. See attached Rt. 10 street view renderings.

Elevations and Materials

Creating a unique and diverse streetscape throughout Sweetgrass is a high priority; to continue pursuing this there will be limitations placed on the frequency and location of elevations that can be used on adjacent lots. The following guidelines shall be followed:

- Builder elevations will be reviewed and approved by the developer prior to construction to ensure a cohesive theme throughout the community.
- Accent materials shall be varied to create more differentiation between elevations.

Traditional, high-quality and durable building materials shall be used throughout the community. Building materials shall meet all current Local, State, and Federal building codes and regulations.

- Materials include:
    - Brick; includes painted brick
    - Natural stone
    - Stone veneer
    - High quality vinyl siding
    - Cement or fiber board siding

Fencing, Landscaping and HVAC Equipment

Fences

Fences will be permitted within the Sweetgrass community but must follow the guidelines below and be in accordance with County Code.

- Fence material shall be vinyl.
- Vinyl fencing must be white and non-glossy
- Maximum fence height shall be six (6) feet.
- For end units side yard fencing shall not extend beyond the middle point of the house.
- Corner lot fencing layout shall be reviewed on a case by case basis, and must meet the minimum County ordinance requirements, to determine the appropriate fence location
- No front yard fencing shall be allowed.
- Fencing shall not be used to satisfy upgraded architectural

requirements. Landscaping

Lot landscaping and screening can add a lot of value and create and aesthetically pleasing streetscape through-out the community. The follow guidelines shall be considered:

- Foundation plantings must be included on every house once constructed.
- Lots with walk-out basements or exposed foundations shall include landscaping to break up large architecture planes.
    - Columnar or taller evergreens shall be used to “soften” the architecture.
- Corner lots or high vis lots shall have landscape buffers to screen rear or sides of houses from the street.
- Lots that back to other lots shall include landscaping at the rear of the property to create a visual screen between adjacent lots. Buffers shall be located outside of drainage and utility easements.

HVAC Equipment

- HVAC units shall be placed in the rear yard.
- High Vis 1 lots shall ensure the HVAC equipment is screened from view of the street with a fence or other opaque screen.
- No equipment shall be placed on the side of end

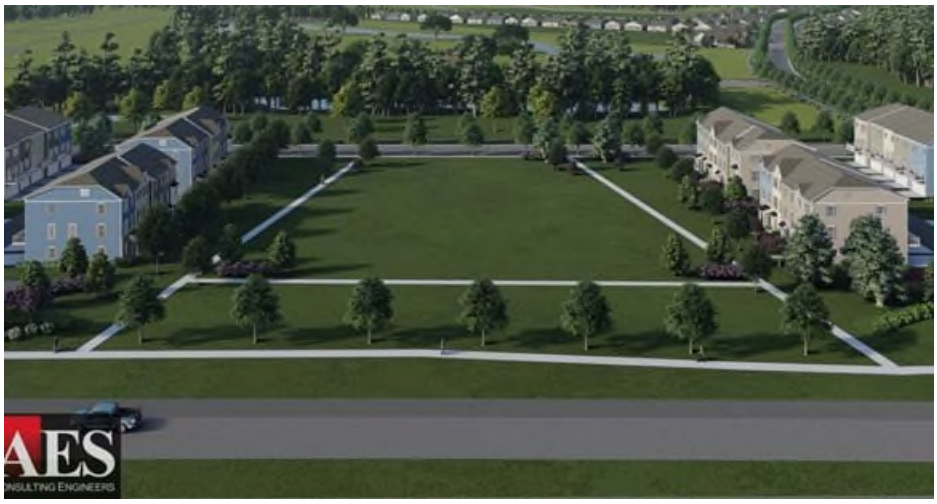
units. Height Restrictions

- No single family attached dwellings median roof height will be taller than 48 feet in height.

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Rt. 10 Streetview

These renderings are merely an illustration of the concept and quality of the buffer at maturity.






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COMMERCIAL CENTER

DESIGN GUIDELINES

FOR

SWEETGRASS DEVELOPMENT

DATED ~~JUNE 16~~October 20,
2023

COMMERCIAL CENTER STANDARDS (Sweetgrass)

1. Introduction

The commercial center within Sweetgrass is located along the frontage of Route 10 on the Town limits of Smithfield. This commercial center establishes the first image and impression of the Sweetgrass Community and the Town of Smithfield to those who pass by or visit from other areas in the region. Architectural character, landscape requirements, parking and service areas, pedestrian interaction, vehicular movement, signage and lighting are all major factors which should be considered in the design of any commercial center.

2. Building Placement & Massing

2.1. Building Orientation

The orientation and massing of a group of buildings or single building within the commercial center should create a positive spatial ensemble rather than occur as free standing random elements. Buildings should be located so that they form an ordered relationship with one another, ideally through the creation of public open space.

2.2. Building Shape and Footprint

Buildings should be predominantly rectangular in shape or composed of simple rectangular pieces.

Where building footprints are larger than 10,000 sf the buildings should be broken up with alternating materials or architectural elements that give the appearance of multiple buildings. Additionally building depths may not be greater than 100' without being divided into what appears to be multiple buildings.

2.3. Building Height

An appropriate building height is desirable to establish a scale to the mixed-use Community and will not exceed the maximum or minimum heights as set forth in the County PDMX ordinance.

2.4. Building Setback Lines/Frontage Zone

- Benn's Church Boulevard BSL: 70' from Right of Way
- Main Entrance Road BSL: 25' from Right of Way
- All other BSL: 50' from Property Line.

3. Visual Character

3.1. Edge Definition and Screening

1. General Provisions

Walls, fences and planting are to be employed to improve the visual environment as well as to reinforce a streetwall condition. These elements are not intended to block views of the fronts of the buildings but to serve two functions: to define street edges and parking areas and to conceal undesirable views into service areas.

Parking lots and landscaped areas of the site should be defined with a continuous hedge, low walls or fences, combined with planting where appropriate, along the property line or established setback line. The walls and fences should be architecturally consistent with the adjacent buildings and should be limited to 60" in height. The canopy of trees planted within the parking areas or other positive features should dominate the view over such walls and fences to soften the effect of parking area along street rights-of-way.

Loading, service and trash areas, as well as mechanical equipment, are to be screened with high walls or fences, a minimum of 5' in height, combined with planting where appropriate, and consistent in character with the buildings or may be screened by the buildings themselves. Walls or fences should have a minimum opacity of 75%.

If not previously installed in connection with the development of the Commercial Area, the landscaping and buffer located on the Commercial Area adjacent to Rt 10 (Benns Church Boulevard) shall be installed prior to the issuance of the 50th C.O.
*Refer to Landscaping Buffer Rendering as example of buffer to be comparable with residential landscaping buffer along route 10.

2. Mechanical Equipment

All roof mounted mechanical equipment, including ductwork, is to be screened from all public view and access.

3.2. Plantings

Planting is encouraged in all setback areas and throughout the parking areas. Within large areas of parking, planting should be designed to break down large parking lots into smaller parking areas. The preservation of existing mature trees within planting and parking areas is encouraged.

3.3. Scale and Articulation

Buildings in the commercial center should not appear monolithic, but should appear consistent with a village character. The use of articulation should be employed to help reduce the overall size of large buildings. Articulation may be expressed through two devices: building massing and architectural elements. Buildings with large profiles may be designed to appear smaller if the overall massing is articulated as a collection of component masses. The use of architectural elements such as bays, balconies, porches, loggias and arcades can add interest to building facades and aid in relating the scale of any building to human dimensions. Roofs may be articulated through the use of dormers, lanterns,

monitors, windows watches and other roof-top elements. Each of these

devices adds character and interest to the buildings of the town which, in turn, reinforces the village character intended by these guidelines.

The building height limitations will be determined by the applicable County ordinance and should utilize simple geometric shapes in plan and elevation, subject to required treatment of 1 story buildings set forth in Chapter 3, Section 3.3 above. The overall massing of any building should be a collection of small and medium simple volumes. Buildings are encouraged to have pitched roofs, especially if they contain residential uses, with attic stories and dormers. Wings and additions should be simple rectangles in plan and oriented parallel or perpendicular to the main body of the building or toward a street frontage.

3.4. Site Lighting

All site lighting should prevent light from shining directly up and should be full cut-off fixtures with the light source fully shielded, except for low wattage and fossil fuel sources, temporary emergency lighting, seasonal lighting, sports field lighting and other special situations. Pedestrian luminaries that permit the limited and controlled visibility of indirect light from the source as an aid to way finding and spatial definition are permitted.

Acceptable light sources include incandescent, fluorescent and metal halide lamps, and should produce a color temperature close to daylight. Mercury vapor sources are not permitted.

The maximum height for on-site fixture poles is 20’.

3.5. Architectural Expression

1. Walls

- Recommended Materials

  - Building walls: brick, with limited use of stucco or synthetic stucco, wood or fiber cement shingle, wood or fiber cement clapboard, board and batten
  - Exposed Foundation Walls: Brick or brick facing, or stucco finished poured concrete block or cast-in-place concrete.

2. Building Elements

- Recommended Materials

  - Chimneys: brick, stucco or synthetic stucco.
  - Arcades and colonnades: brick, stucco, synthetic stucco, wood, or high grade synthetic wood alternative.
  - Porches, columns: painted wood, painted metal
  - Posts, spindles, balusters: painted wood, painted metal- Stoops, exterior stairs: brick, concrete
- Decks: wood
- Signs: wood, painted metal
- Awning and canopies: canvas-covered metal structure, designed to be compatible in configuration and color with the architecture of the buildings.

4. <u>Roofs</u>

- Recommended Materials

- Roofs: Wood shingles, metal standing seam, copper, lead-coated copper, slate, synthetic slate, 40-year architectural asphalt shingle

-Gutters and downspouts: painted metal, copper

-Flashing: copper, lead coated copper, anodized aluminum

- Configurational Standards

Buildings should have a varied character of traditionally shaped

roofs. Items to be considered are:

- Principal Roofs: Gabled, hipped, hipped gables, gabled hips or gambrel in a symmetrical fashion with a slope of 4:12 to 8:12; Buildings with roof areas greater than 12,000 sf may have portions which are flat if concealed from view by sloped roofs of the character described above.
- Secondary Roofs: Shed with minimum slope of 3:12.
- Flat Roofs: Flat roofs are to have parapets or railings.
- Parapets: Horizontal or gabled in elevation
- Dormers: Pitched or eyebrow
- Special roof-top elements: Symmetrically situated or aligned with the rhythm of structural bays and fenestration.
- Roof-top mechanical enclosures: Concealed from view by sloped roofs of the character described above.

5. Openings

- Recommended Materials

- Windows: wood, painted metal
- Bay windows: wood, painted metal, with metal tops
- Doors: painted wood, painted metal
- Storefronts: painted wood, painted metal
- Shutters: wood
- Security doors and grilles: metal

The following photographs are not intended to represent actual users or layouts but merely illustrate



the quality of materials and design that is intended to be required by these guidelines.





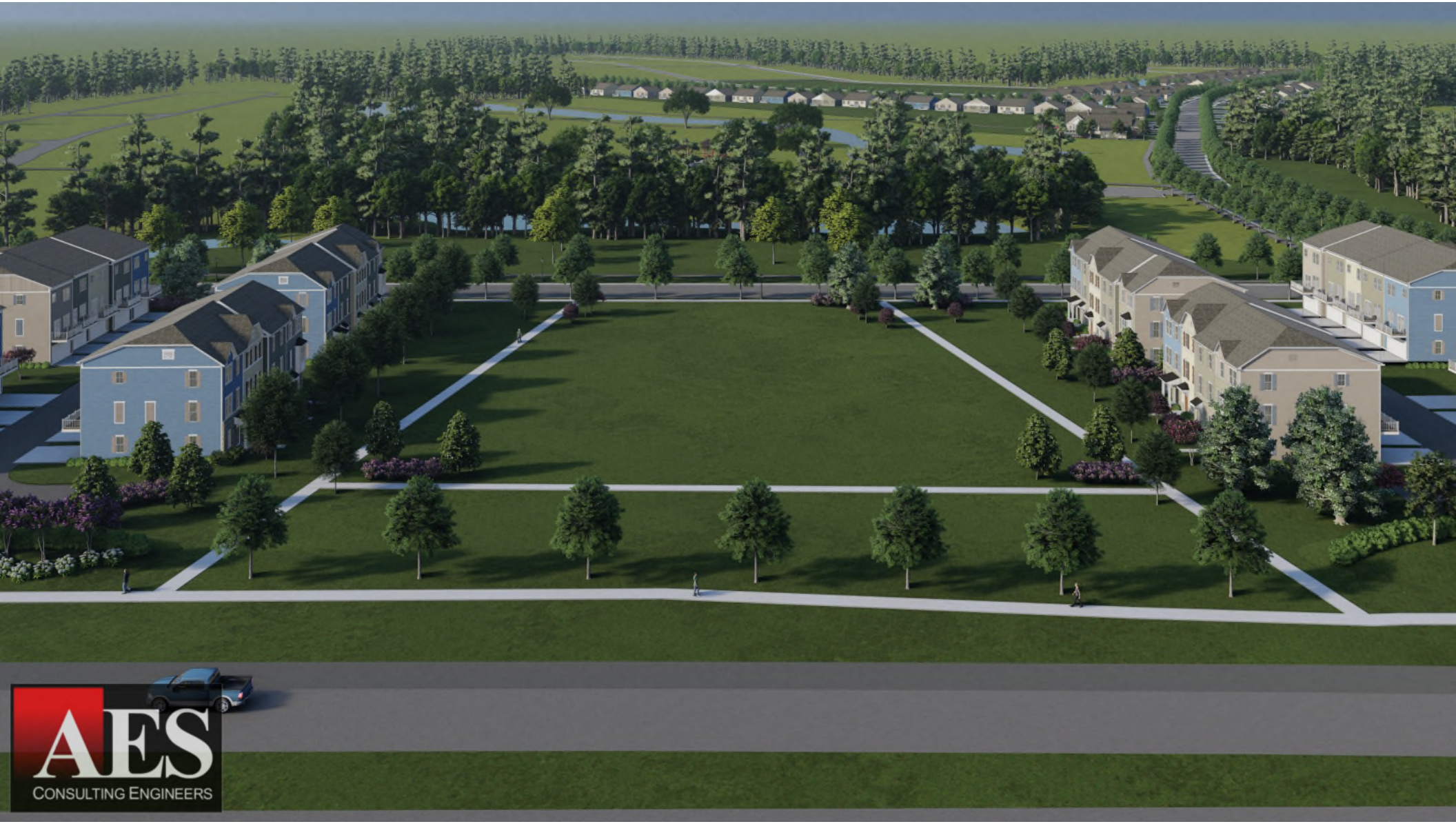


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Landscaping Buffer Rendering:

This rendering is merely an illustration of the concept and quality of the buffer to be installed along Rt. 10 at maturity and represents how it should compare and complement the residential buffer.




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MEMORANDUM

To: Adam Edbauer, General Manager, Land, Ryan Homes

From: Julie Herlands, AICP, Vice President, TischlerBise

Date: October 17, 2023

RE: Fiscal Impact Analysis for Sweetgrass in Isle of Wight County, Virginia: (A) Response to Isle of Wight Planning Commission Remarks; (B) Water Impact Discussion

(A) RESPONSE TO ISLE OF WIGHT PLANNING COMMISSION REMARKS

TischlerBise conducted a Fiscal Impact Analysis of the proposed Sweetgrass development in Isle of Wight County, Virginia, for NVR Inc./Ryan Homes for submission to Isle of Wight County as part of the applicant's rezoning request. TischlerBise provided a report dated June 21, 2021, to NVR Inc./Ryan Homes on the fiscal impact of the proposed Sweetgrass development based on conditions in the county as of 2021 using the adopted Isle of Wight County Fiscal Year 2022 Budget.[1] The analysis is on services and capital improvements funded through the General Fund.

NVR, Inc./Ryan Homes asked TischlerBise to respond to recent comments the applicant has received during the September 26, 2023, Isle of Wight Planning Commission meeting regarding the Fiscal Impact Analysis. Specific items identified are as follows:

- Change to the real property tax rate as of FY24.
- Changes to expenditures in the FY24 Budget.
- Confirmation of the operating expenditures included in the Fiscal Impact Analysis.
- Update to the Fiscal Impact Analysis findings given the above.

This memo provides a response to the above items. It should be noted that this effort did not entail updating the fiscal model with the County's FY2024 budget or other data. Rather, adjustments are made to real property tax revenue projections along with inflationary/budgetary adjustments to other revenue as well as expense outputs.

As was found in 2021, the Sweetgrass development is expected to generate more revenues than costs under the updated assumptions. The updated figures project more revenues than costs at a total of $17 million, or $850,000 per year.

[1] TischlerBise has also provided ongoing support regarding the fiscal impact element including providing a memo to NVR dated February 10, 2023, responding to Isle of Wight County's evaluation of the project's capital impacts.

Real Property Tax Rate and Revenue Adjustments

The FY2024 Isle of Wight County adopted real property tax rate is $.71 per $100 in assessed value. This is a reduction from the FY2022 rate of $.85 per $100 modeled in the 2021 study.

Adjusting the property tax rate for this response also requires an update to the assumed assessed values for the proposed development. See Figure 1.

Figure 1. Sweetgrass Market Value Assumption

Land Use	Housing Units	2021 Market Values	2023 Market Values
Age-Restricted Single Family Detached	390	$305,200	$374,000
Townhome	225	$258,875	$277,000

Source: NVR / Ryan Homes

In addition to the real property tax rate changing, other non-property tax revenues have changed from FY22 to FY24. A summary of budgeted revenues and percent changes is shown in Figure 2.

Figure 2. Isle of Wight County Budgeted Revenues: Change from FY2022 and FY2024

	2022 BUDGET	2024 BUDGET	Change	% Change
Property Taxes	$61,919,000	$71,286,592	$9,367,592	15%
Other Local Taxes	$8,247,000	$9,781,000	$1,534,000	19%
Licenses, Permits & Fees	$704,000	$611,000	($93,000)	-13%
Fines & Forfeitures	$129,000	$84,000	($45,000)	-35%
Use of Money & Property	$485,000	$685,000	$200,000	41%
Charges for Services	$1,620,965	$1,878,064	$257,099	16%
Recovered Cost	$481,345	$699,505	$218,160	45%
Miscellaneous Services	$1,163,930	$1,215,003	$51,073	4%
Noncategorical Aid	$5,372,890	$5,487,890	$115,000	2%
Shared Expenses	$2,442,392	$2,740,577	$298,185	12%
State Aid	$145,500	$145,766	$266	0%
Federal Aid	$0	$0	$0	0%
Other Financing Sources	$1,509,416	$921,717	($587,699)	-39%
Total	**$84,220,438**	**$95,536,114**	**$11,315,676**	**13%**

Source: Isle of Wight County Adopted Budgets, FY2022 and FY2024.

The Fiscal Impact Analysis does not assume all County revenues will be affected by the proposed development. A summary of revenue projections from the 2021 study are shown below in Figure 3 along with the adjusted 2023 amounts, applying the percent changes from above.

Figure 3. 2023 Revenue Update

Cumulative General Fund Revenue Detail (Years 1-20) Sweetgrass (NVR): Isle of Wight County, Virginia, Fiscal Impact Analysis					
	JUNE 21, 2021, REPORT		OCT. 16, 2023, UPDATE [1]		2023 Update Notes
Category	$	% of Total	$	% of Total	
Property Taxes	$33,550,312	77.0%	$33,114,017	74.8%	Modeled with new tax rate and current market values
Other Local Taxes	$5,125,424	11.8%	$6,078,789	13.7%	Adjusted with budgeted change from FY22 to FY24
Licenses, Permits & Fees	$387,892	0.9%	$336,651	0.8%	
Fines & Forfeitures	$82,659	0.2%	$53,824	0.1%	
Use of Money & Property	$0	0.0%	$0	0.0%	
Charges for Services	$900,006	2.1%	$1,042,755	2.4%	
Recovered Cost	$0	0.0%	$0	0.0%	
Miscellaneous Services	$0	0.0%	$0	0.0%	
Noncategorical Aid	$3,552,482	8.1%	$3,628,518	8.2%	
Shared Expenses	$0	0.0%	$0	0.0%	
State Aid	$0	0.0%	$0	0.0%	
Federal Aid	$0	0.0%	$0	0.0%	
TOTAL	**$43,598,775**	**100.0%**	**$44,254,554**	**100.0%**	

[1] *Adjusted based on change from FY2022 to FY2024 Budget (see accompanying figure).*

Expenditure Adjustments

County costs have changed from FY2022 to FY2024 as well. TischlerBise compared line item expenditures from both budgets to derive percent changes to apply to the Sweetgrass Fiscal Impact Analysis expenditure findings.

Figure 4. Isle of Wight County Budgeted Expenditures: Change from FY2022 and FY2024

Expenditure Category	Expenditure Name	2022 BUDGET	2024 BUDGET	Change	% Change
General Administration	Board of Supervisors	$329,600	$372,373	$42,773	13%
	County Administrator	$483,251	$531,119	$47,868	10%
	County Attorney	$575,348	$496,743	($78,605)	-14%
	Human Resources	$394,837	$524,396	$129,559	33%
	Registrar	$391,778	$545,968	$154,190	39%
Financial Administration	Commissioner of Revenue	$765,696	$868,607	$102,911	13%
	Real Estate Assessment	$288,900	$178,500	($110,400)	-38%
	Treasurer	$891,035	$1,135,479	$244,444	27%
	Budget and Finance	$802,014	$895,930	$93,916	12%
	Purchasing	$171,368	$177,831	$6,463	4%
Judicial	Circuit Court	$89,388	$99,400	$10,012	11%
	General District Court	$26,066	$29,612	$3,546	14%
	Western Tidewater Community Correctior	$18,926	$20,316	$1,390	7%
	Juvenile Accountability Program	$2,500	$2,500	$0	0%
	Juvenile Domestic Relations Court	$12,575	$12,902	$327	3%
	Clerk of Circuit Court	$598,133	$735,867	$137,734	23%
	Fifth District Court Services	$200,100	$200,965	$865	0%
	Commonwealth Attorney	$840,042	$1,003,854	$163,812	20%
Public Safety	Sheriff	$5,203,463	$7,917,696	$2,714,233	52%
	Emergency Services	$516,222		$1,583,198	30%
	Fire & Rescue	$4,717,530			
	Fire and Rescue Response		$4,439,527		
	Fire and Rescue Station Services		$1,707,295		
	Fire and Rescue Emerg Mgt and Billing		$670,128		
	Western Tidewater Jail	$1,293,333	$1,259,298	($34,035)	-3%
	Inspections	$739,804	$829,428	$89,624	12%
	Animal Control	$594,840	$745,124	$150,284	25%
Public Works	Public Works Administration	$318,110	$337,251	$19,141	6%
	Public Works Transportation	$283,365	$473,978	$190,613	67%
	Public Works Refuse	$2,902,214	$3,341,499	$439,285	15%
	Public Works Buildings & Grounds	$1,478,908	$1,718,525	$239,617	16%
	Public Works Capital Program Inspection	$76,613	$97,080	$20,467	27%
Parks, Recreation, Ground	Parks & Recreation Administration	$265,736	$278,936	$13,200	5%
	Parks & Recreation Gateways & Grounds	$1,001,054	$1,102,287	$101,233	10%
	Parks & Recreation Programs	$750,285	$904,208	$153,923	21%
	Library	$891,490	$1,046,756	$155,266	17%
Community Development	Planning & Zoning	$830,146	$1,086,051	$255,905	31%
	Economic Development	$1,044,087	$808,393	($235,694)	-23%
	Tourism	$577,222	$649,509	$72,287	13%
	Farmers Market	$42,220	$79,000	$36,780	87%
	Communications	$78,648	$140,639	$61,991	79%
	Cooperative Extension Service	$73,823	$78,934	$5,111	7%
Non-Departmental	Non-Departmental	$3,667,903	$4,636,143	$968,240	26%
	Transfers (Non-Schools)	$7,056,445	$8,232,903	$1,176,458	17%
	Transfers (Schools)	$26,422,734	$30,459,069	$4,036,335	15%
Debt Service	Debt Service	$13,346,056	$12,158,396	($1,187,660)	-9%
Other Public Services	Other Public Services	$2,500,400		$5,299	0%
	Health and Welfare(West Tidewater)		$877,890		
	Local and Regional Orgs		$1,627,809		
	TOTAL	**$83,554,208**	**$95,536,114**	**$11,981,906**	**14%**

Source: Isle of Wight County Adopted Budgets, FY2022 and FY2024.

Note: The pink shaded area is Fire and Emergency Services and reflects changed budget categories from 2022 to 2024 and the difference between the years.

Note: The blue shaded area reflects changed budget categories from 2022 to 2024 and the difference between the years.

The Fiscal Impact Analysis **assumes most County operating expenditures will be affected by the proposed development—including Fire and Emergency Services and Schools.** A detailed list of expenditure projections from the 2021 study are shown below in Figure 5 along with the adjusted 2023 amounts, applying the percent changes from above. As shown, updated operating expenditures are projected at approximately $24.8 million over 20 years, or $1.2 million per year.

Figure 5. Operating Expenditure Update: Detailed Listing

Cumulative Operating Expenditures (Years 1-20): Detail Sweetgrass (NVR): Isle of Wight County, Virginia, Fiscal Impact Analysis					
		JUNE 21, 2021, REPORT		OCT. 16, 2023, UPDATE [1]	
Expenditure Category	Expenditure Name	$	% of Total	$	% of Total
General Administration	Board of Supervisors	$0	0.0%	$0	0.0%
	County Administrator	$8,580	0.0%	$9,430	0.0%
	County Attorney	$30,415	0.1%	$26,260	0.1%
	Human Resources	$0	0.0%	$0	0.0%
	Registrar	$47,870	0.2%	$66,709	0.3%
Financial Administration	Commissioner of Revenue	$163,994	0.8%	$186,035	0.8%
	Real Estate Assessment	$4,048	0.0%	$2,501	0.0%
	Treasurer	$98,213	0.5%	$125,156	0.5%
	Budget and Finance	$40,760	0.2%	$45,533	0.2%
	Purchasing	$0	0.0%	$0	0.0%
Judicial	Circuit Court	$1,142	0.0%	$1,270	0.0%
	General District Court	$15,055	0.1%	$17,103	0.1%
	Western Tidewater Community Corrections	$12,722	0.1%	$13,657	0.1%
	Juvenile Accountability Program	$1,681	0.0%	$1,681	0.0%
	Juvenile Domestic Relations Court	$7,015	0.0%	$7,197	0.0%
	Clerk of Circuit Court	$54,293	0.3%	$66,796	0.3%
	Fifth District Court Services	$107,142	0.5%	$107,605	0.4%
	Commonwealth Attorney	$269,876	1.3%	$322,503	1.3%
Public Safety	Sheriff	$2,294,535	11.2%	$3,491,411	14.1%
	Emergency Services	$219,006	1.1%	$285,255	1.2%
	Fire & Rescue	$2,159,679	10.6%	$2,812,976	11.4%
	Western Tidewater Jail	$869,395	4.3%	$846,517	3.4%
	Inspections	$252,308	1.2%	$282,874	1.1%
	Animal Control	$339,638	1.7%	$425,446	1.7%
Public Works	Public Works Administration	$106,753	0.5%	$113,177	0.5%
	Public Works Transportation	$115,177	0.6%	$192,654	0.8%
	Public Works Refuse	$1,950,906	9.5%	$2,246,199	9.1%
	Public Works Buildings & Grounds	$609,059	3.0%	$707,741	2.9%
	Public Works Capital Program Inspection	$0	0.0%	$0	0.0%
Parks, Recreation, Groun	Parks & Recreation Administration	$113,652	0.6%	$119,297	0.5%
	Parks & Recreation Gateways & Grounds	$672,922	3.3%	$740,972	3.0%
	Parks & Recreation Programs	$476,202	2.3%	$573,897	2.3%
	Library	$597,591	2.9%	$701,670	2.8%
Community Developmer	Planning & Zoning	$404,993	2.0%	$529,838	2.1%
	Economic Development	$0	0.0%	$0	0.0%
	Tourism	$67,530	0.3%	$75,987	0.3%
	Farmers Market	$0	0.0%	$0	0.0%
	Communications	$42,111	0.2%	$75,304	0.3%
	Cooperative Extension Service	$0	0.0%	$0	0.0%
Non-Departmental	Non-Departmental	$0	0.0%	$0	0.0%
	Transfers (Non-Schools)	$3,559,651	17.4%	$4,153,120	16.8%
	Transfers (Schools)	$4,250,282	20.8%	$4,899,555	19.8%
Debt Service	Debt Service	$0	0.0%	$0	0.0%
Other Public Services	Other Public Services	$489,840	2.4%	$490,878	2.0%
	TOTAL	**$20,454,036**	**100.0%**	**$24,764,203**	**100.0%**

[1] *Adjusted based on change from FY2022 to FY2024 Budget (see accompanying figure)*

Fire and Emergency Services

- For **Fire and Emergency Services**, an updated operating impact of $3.1 million over 20 years is projected, or $155,000 per year. This reflects 2.3 percent of the current Fire and Emergency Services budget.

Schools/Education

- For **County-funded Schools operations**, updated costs are projected at $4.9 million, or $245,000 per year, to serve 52 students projected from the development.

- Per Isle of Wight County Schools comment on the Sweetgrass Development Project (see "Schools Review Revised Comments" dated September 25, 2023, attachment to Planning Report), operating impacts are identified as:
  - 1 General Education Teacher
  - 1 Bus Driver
  - 1 Special Education Teacher
  - 1 Special Education Instructional Assistant
  - 1 Special Needs Bus Driver and Assistant

- Estimating costs for the above positions yields a cost of approximately $270,000 to $300,000—slightly higher than the Fiscal Impact finding.

- **However, Isle of Wight County Schools receives funding from sources other than the County. The County provides *40 percent* of Isle of Wight County Schools funding for General Fund operations:**

Schools Budget	General Fund	%
State Funds and Sales Tax	$42,852,755	58%
Local/County Funds	$29,607,666	40%
Federal Funds	$2,048,478	3%
Other Funds	$10,000	0%
Total	**$74,518,899**	**100%**

Source: FY2024 Isle of Wight County Schools Final Budget Book.

- Therefore, the school's identification of operating impacts at an estimated upper range of $300,000 per year could reasonably be assumed to be covered by both County and non-County funding.
  - The non-County cost impact (at 60 percent) totals $180,000.
  - ***The County-funded cost impact can therefore be estimated at $120,000—about half of the $245,000 in County-funded operating costs projected by the Fiscal Impact Analysis.***

A rolled up summary is provided in Figure 6. (This replicates Figure 11 in the 2021 study.) Updated total operating expenditures are projected at $4.3 million more in 2023 than 2021.

Figure 6. Operating Expenditure Update: Summary

Cumulative Operating Expenditures (Years 1-20): Summary by Functional Category Sweetgrass (NVR): Isle of Wight County, Virginia, Fiscal Impact Analysis				
	JUNE 21, 2021, REPORT		OCT. 16, 2023, UPDATE [1]	
Category	$	% of Total	$	% of Total
General Administration	$86,865	0.4%	$102,400	0.4%
Financial Administration	$307,015	1.5%	$359,225	1.5%
Judicial	$468,925	2.3%	$537,811	2.2%
Public Safety	$6,134,561	30.0%	$8,144,479	32.9%
Public Works	$2,781,896	13.6%	$3,259,771	13.2%
Education	$4,250,282	20.8%	$4,899,555	19.8%
Parks, Recreation, Grounds & Cultural	$1,860,367	9.1%	$2,135,836	8.6%
Community Development	$514,634	2.5%	$681,128	2.8%
Other Public Services	$489,840	2.4%	$490,878	2.0%
Debt Service*	$0	0.0%	$0	0.0%
Non-Departmental and Non-Schools Transfers	$3,559,651	17.4%	$4,153,120	16.8%
TOTAL	**$20,454,036**	**100.0%**	**$24,764,203**	**100.0%**

[1] *Adjusted based on change from FY2022 to FY2024 Budget (see accompanying figure)*

Capital costs are also adjusted. A 10 percent factor is applied to capital costs from 2021 based on the Engineering News Record (ENR) Construction Cost Index from July 1, 2021, to July 1, 2023.

- Costs for additional School capacity and buses are projected. Isle of Wight County Schools noted in their September 25, 2023, memo that while building capacity is not needed, buses are. Projected costs reflect those costs.
- Other capital costs for parks and recreation, sheriff, and transportation are projected as well.

Figure 7. Capital Expenditure Update

20-Year Cumulative Total Capital Expenditures Sweetgrass (NVR): Isle of Wight County, Virginia, Fiscal Impact Analysis				
	JUNE 21, 2021, REPORT		OCT. 16, 2023, UPDATE [1]	
Category	$	% of Total	$	% of Total
Education	$1,135,478	51.5%	$1,249,026	51.5%
General Government	$0	0.0%	$0	0.0%
Parks and Recreation	$757,131	34.3%	$832,844	34.3%
Sheriff	$284,139	12.9%	$312,552	12.9%
Fire	$0	0.0%	$0	0.0%
Transportation	$28,675	1.3%	$31,542	1.3%
TOTAL	**$2,205,422**	**100.0%**	**$2,425,964**	**100.0%**

[1] *Adjusted based on Engineering News Record (ENR) Construction Cost Index from 2021 to 2023 (as of July 1), an increase of 10 percent.*

Summary Findings

As was found in 2021, the development is expected to generate more revenues than costs under the updated assumptions. See Figure 8.

Figure 8. Cumulative Fiscal Impact Update

20-Year Total Net Fiscal Impact Sweetgrass (NVR): Isle of Wight County, Virginia, Fiscal Impact Analysis		
	JUNE 21, 2021, REPORT	OCT. 16, 2023, UPDATE
Category	$	$
TOTAL REVENUES	$43,598,775	$44,254,554
TOTAL EXPENDITURES	$22,659,458	$27,190,168
NET FISCAL IMPACT	***$20,939,316***	***$17,064,386***

The updated Fiscal Impact Analysis projects more revenues than costs at a total of $17 million, or $850,000 per year. Furthermore, because the project is expected to generate more revenues than needed to cover cost impacts from the project, any costs in excess of what has been projected by the Fiscal Impact Analysis could be covered by those surplus revenues.

(B) WATER IMPACT DISCUSSION

While utility impacts are not explicitly part of the Fiscal Impact Analysis because utilities operate as enterprise funds (i.e., revenues generated through rates and fees should equal costs incurred), the situation in Isle of Wight County is worth noting.

First, the Public Utility Fund is currently subsidized by the General Fund, with approximately 25 percent of the Public Utilities Fund funded from a transfer from the General Fund. This is reflected as a "cost" in the General Fund (and is captured in the above Fiscal Impact Analysis findings under "Non-Departmental and Non-Schools Transfers" expenditures).

In addition, Isle of Wight County receives a water allocation through a contract between Western Tidewater Water Authority (WTWA) and Norfolk Water. Isle of Wight County receives 2 million gallons per day of the allocation (as of FY2024) for which the County is obligated to either use or pay. Currently, the County is using 680,000 gallons per day of the 2 million gallons per day allocation—and therefore is obligated to pay for the unused portion (at an estimated cost of approximately $750,000 in FY2024 per the Newport Development Service District). Development of the Sweetgrass development would increase water usage in the County, thereby increasing the user-paid portion of the contract and lessening the County's obligation to pay for the unused portion.

MASTER PLAN

FOR

SWEETGRASS

WINDSOR DISTRICT

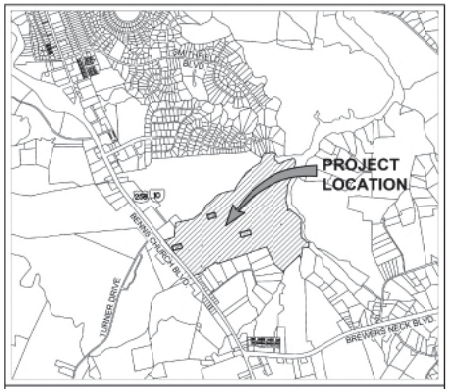
ISLE OF WIGHT, VIRGINIA

APPLICANT INFORMATION:

NVR, INC.
CONTACT: MR. ERIC SHIREY
860 GREENBRIER CIRCLE
CHESAPEAKE, VIRGINIA 23320
PHONE NO.: (757) 603-0802

SITE DATA:

PARCEL ID:	32-01-009
PROPERTY OWNER:	WILLIAM G. YEOMAN III TRUSTEE
PROPERTY ADDRESS:	14096 BENNS CHURCH BOULEVARD
CURRENT ZONING:	RAC, RURAL AGRICULTURAL CONSERVATION DISTRICT
PROPOSED ZONING:	C-PD-MX, CONDITIONAL PLANNED DEVELOPMENT MIXED USE DISTRICT
PROPERTY ACREAGE:	250 AC. ±
OVERLAY DISTRICTS:	NEWPORT DEVELOPMENT SERVICE OVERLAY DISTRICT (DSD) & CHESAPEAKE BAY PRESERVATION AREA OVERLAY DISTRICT



VICINITY MAP
(Approximate Scale: 1"=2,000')

County Project No.: ZA-06-19
Original Submittal Date: JUNE 14, 2019

INDEX OF SHEETS

SHEET NO.	SHEET DESCRIPTION
1	COVER SHEET
2	MASTER PLAN
3	ENVIRONMENTAL INVENTORY

Rev.	Date	Description	Revised By
5	8/18/20	REVISED PER COUNTY COMMENTS	JAG
4	2/13/20	REVISED PER COUNTY COMMENTS	JAG
3	7/2/19	REVISED PER COUNTY COMMENTS	JAG
2	6/21/19	REVISED PER COUNTY COMMENTS	JAG
1	6/14/19	REVISED PER COUNTY COMMENTS	JAG

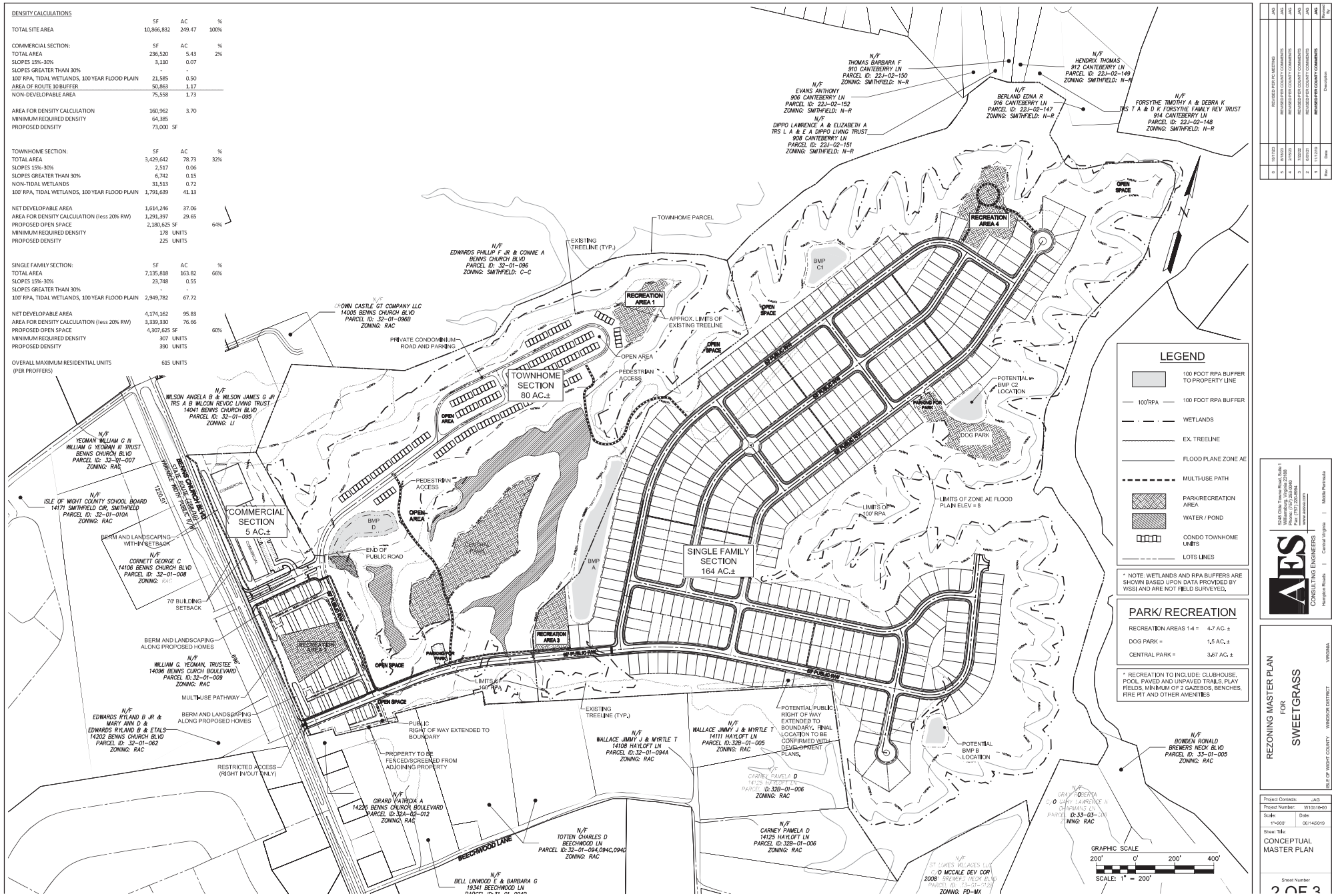
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REZONING MASTER PLAN
FOR
SWEETGRASS
ISLE OF WIGHT COUNTY WINDSOR DISTRICT VIRGINIA

Project Contacts:	JAG
Project Number:	WI1010-00
Scale: AS NOTED	Date: 6/14/19

Sheet Title:
COVER SHEET

Sheet Number:
1 OF 3



No.	Date	Description	By
6	03/17/20	REVISED PER PC MEETING	JAG
5	01/16/20	REVISED PER COUNTY COMMENTS	JAG
4	11/14/19	REVISED PER COUNTY COMMENTS	JAG
3	09/09/19	REVISED PER COUNTY COMMENTS	JAG
2	06/03/19	REVISED PER COUNTY COMMENTS	JAG
1	11/12/18	REVISED PER COUNTY COMMENTS	JAG

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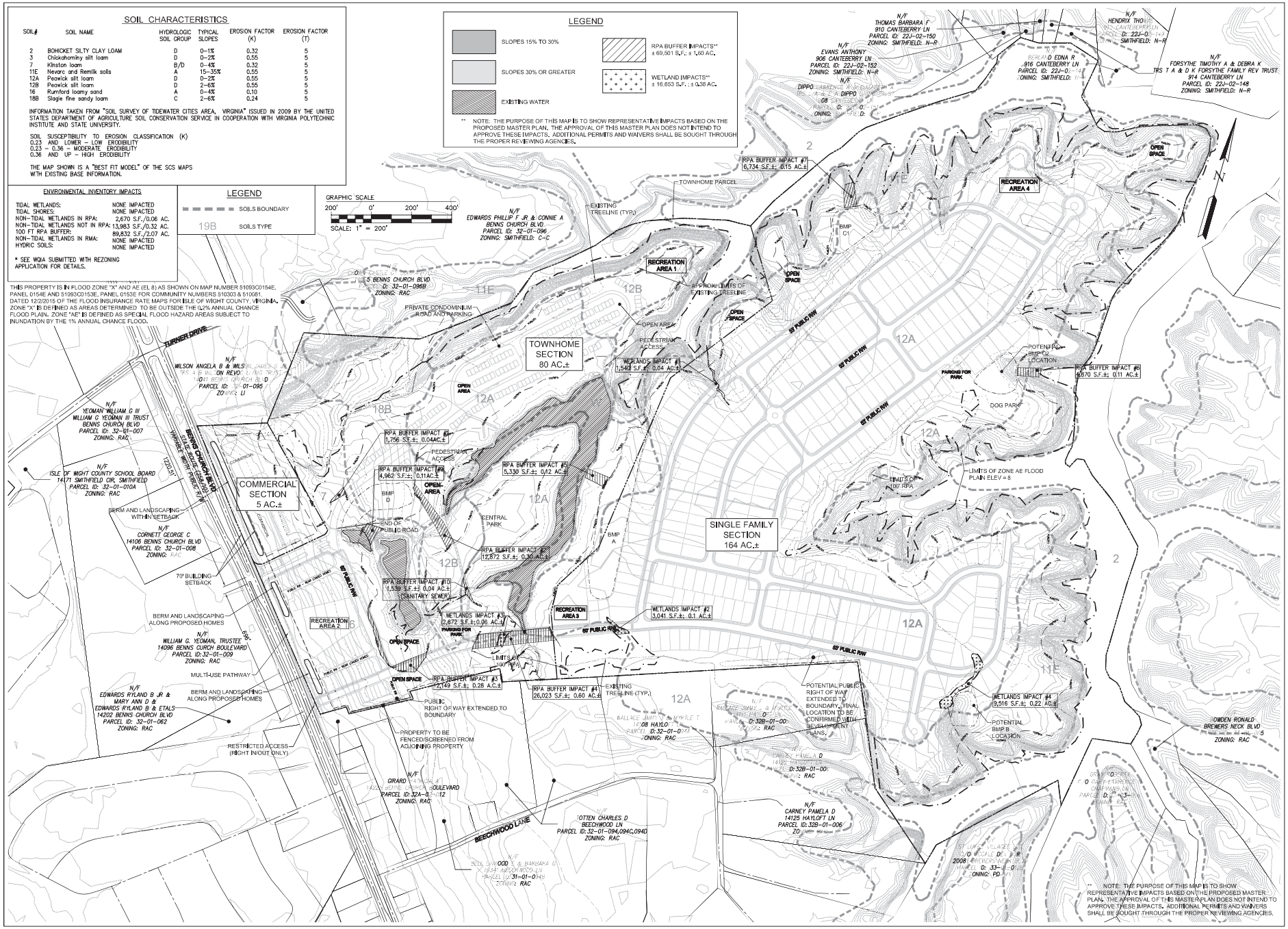
REZONING MASTER PLAN FOR SWEETGRASS

ISLE OF WIGHT COUNTY | WINDSOR DISTRICT | VIRGINIA

Project Contacts:	JAG
Project Number:	W10516-00
Scale: 1"=200'	Date: 06/14/2019

Sheet Title:
CONCEPTUAL MASTER PLAN

Sheet Number
2 OF 3



Rev.	Date	Description	Revised By
6	07/17/20	REVISED PER PC MEETING	JAG
5	6/18/20	REVISED PER COUNTY COMMENTS	JAG
4	5/18/20	REVISED PER COUNTY COMMENTS	JAG
3	2/12/20	REVISED PER COUNTY COMMENTS	JAG
2	8/01/20	REVISED PER COUNTY COMMENTS	JAG
1	1/13/19	REVISED PER COUNTY COMMENTS	JAG

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REZONING MASTER PLAN FOR SWEETGRASS
ISLE OF WIGHT COUNTY WINDSOR DISTRICT VIRGINIA

Project Contacts:	JAG
Project Number:	W10516-00
Scale: 1"=200'	Date: 08/14/2019

Sheet Title: ENVIRONMENTAL INVENTORY

Sheet Number: 3 OF 3