# Interchange Study Final Report

## Savannah MPO Interchange Traffic Study, I-16 at Little Neck Road

## PI NO. 0015850-PLN

### Chatham County, GA

Report Prepared:
December 2019

Prepared for:
CORE MPO
110 East State Street
P.O. Box 8246
Savannah, GA 31412

Prepared by:
VHB
1355 Peachtree Street NE, Suite 100
Atlanta, GA 30309

With:
RS&H
Edwards-Pitman Environmental
Symbioscity

# Table of Contents

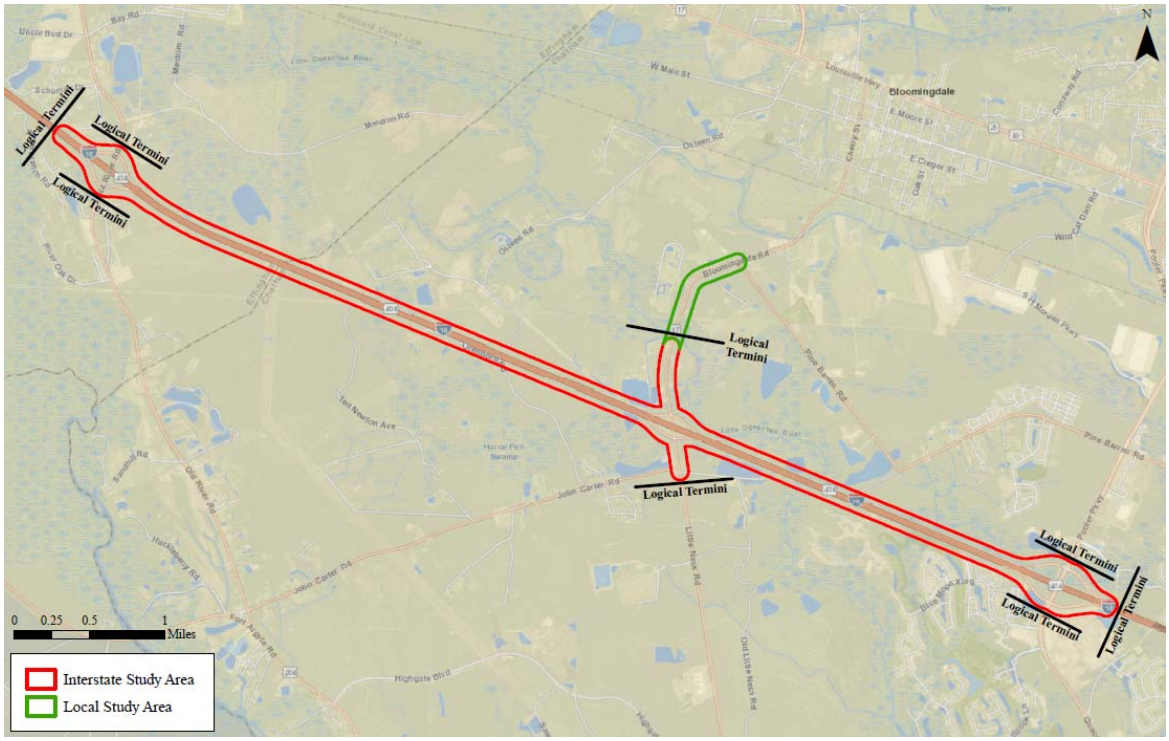
# List of Tables

# List of Figures

# Executive Summary:

The Coastal Region MPO (CORE) has proposed improvement to the interchange located at I-16 at SR 17/Little Neck Road/Jimmy DeLoach Parkway within Chatham County GA. This project has been initiated in response to the modification and extension of Jimmy DeLoach Parkway (PI 522790) as well as several major Developments of Regional Impact (DRIs) that have been planned nearby. As a result of these anticipated changes within the MPO, this report has been created to document the estimated impacts of future development and the assessment of potential interchange improvement concepts. **ES Figure 1** depicts the project study area which includes the two immediately adjacent interchanges on I-16, Pooler Parkway to the south and Old River Road to the north.

**ES FIGURE 1: STUDY AREA**




This document presents an analysis of the proposed improvements by comparing three build alternatives to the Future (2050) No-Build alternative. The three alternatives and the No-Build alternative are described as follows and depicted in **Appendix A**:

- No Build – Unmodified Existing Diamond Interchange
    - No-Build Alternative is the existing diamond configuration with limited stop control and four ingress/egress points.

- Alternative 1 – Diamond Interchange (Modified from exiting conditions)
    - Alternative 1 is a standard diamond configuration with two signalized intersections at the convergence of the ingress/egress ramps. Four ramps will remain in this alternative.
- Alternative 2 – Diverging Diamond Interchange (DDI)
    - Alternative 2 is a diverging diamond interchange with two stop-controlled intersections at the convergence of the ingress/egress ramps. These stop-controlled intersections will also facilitate the diverging traffic movement which will be contained almost entirely over the existing bridge. The diverging movement will allow for more efficient flow onto the I-16 ingress ramps. Four ramps will remain in this alternative.
- Alternative 3 – Partial Cloverleaf Interchange.
    - Alternative 3 is a partial cloverleaf interchange that will have the most significant modification in the southwestern corner of the interchange. This alternative will utilize four ingress/egress ramps but will supplement those with a loop in the southwestern quadrant of the interchange, thereby, creating an additional I-16 ingress point. This loop will serve SR 17/Little Neck Road southbound traffic flow onto the I-16 eastbound lanes.

## FHWA Policy Points

The addition of a new interchange or modification of and existing interchange requires approval from the Federal Highway Administration (FHWA). Any proposed changes or addition of access to the interstate system must provide the justification and the documentation necessary to meet the standards of the Policy of Access to the Interstate System.

## Policy Point 1

Pursuant to Policy Point 1, the suggested interchange alternatives are anticipated to improve safety and level-of-service (LOS) conditions of the study area based on design year (2050) traffic projections.

### Safety:

Currently both SR 17/Little Neck Road and I-16 have been experiencing higher than state average crash rates. With the proposed nearby developments and road expansions, the traffic volumes and crash rates are expected to increase into the future. Each of the proposed alternatives is anticipated to more effectively and safely manage the projected additional traffic volumes.

As summarized below and in the Projected Alternative Performance Section, the existing (No Build) interchange will result in failing levels of service in not only the build year of 2030 but also the design year of 2050. Based on the results of the operations projections, traffic conditions and level of service (LOS) are anticipated to improve with any of the three alternatives.

Below is a description of the 2050 Design year traffic operations if no changes are implemented to the existing interchange. The results of the operations analysis for the proposed alternatives has been summarized in **ES Table 1,** while the detailed operations analysis for the study area can be found in **Appendix B.**

### 2050: I-16 AM/PM Peak Hour Traffic Operations

Under 2050 No – Build conditions, both AM and PM peak hours will experience higher delays resulting from the eastbound/westbound divergence with LOS of E/F. If any of the three alternatives is implemented, the anticipated LOS for both peak hours will be improved, with a maximum anticpated LOS of C.

### 2050: SR 17/Little Neck Road AM/PM Peak Hour Traffic Operations

The AM peak hour for SR17/Little Neck Road at the intersection with I-16 is anticipated to reach LOS F by 2050 for the eastbound and westbound directions while the PM peak hour will reach LOS D and E. If no improvements are made to the interchange, it is anticipated to operate with failing levels of service.

Alternatives 2 and 3 are anticipated to reach a maximum of LOS B in both directions and both peak hours. However, Alternative 1 the Diamond interchange is anticipated to reach LOS C (westbound) and D (eastbound) during the AM peak hour. The average speed at the intersection is anticipated to be under 8 mph for the No-Build alternative and greater than 45 mph for all three alternatives. Based upon these results, each of the three alternatives is expected to significantly improve the projected congestion during the 2050 design year when compared against the 2050 No-Build Alternative.

## ES TABLE 1: ALTERNATIVE OPERATIONS – EXISTING AND 2050 DESIGN YEAR CONDITIONS

| Intersection Operations | | | | | 2050 Alternatives | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 2018 Existing Conditions | | No Build | | Diamond Interchange | | Diverging Diamond Interchange | | Partial Cloverleaf Interchange | |
| | | | AM Peak | PM Peak | AM Peak | PM Peak | AM Peak | PM Peak | AM Peak | PM Peak | AM Peak | PM Peak |
| **Intersection** | | | **LOS** | **LOS** | **LOS** | **LOS** | **LOS** | **LOS** | **LOS** | **LOS** | **LOS** | **LOS** |
| SR 17 at I-16 WB | | | A | A | F | D | C | B | B | B | B | B |
| SR 17 at I-16 EB | | | A | A | F | E | D | B | B | B | B | B |
| **Freeway Operations** | | | | | 2050 Alternatives | | | | | | | |
| **Freeway** | **Dir** | **Type** | **LOS** | **LOS** | **LOS** | **LOS** | **LOS** | **LOS** | **LOS** | **LOS** | **LOS** | **LOS** |
| I-16 @ SR 17/Little Neck Road | EB | Diverge | A | A | E/F | E/F | B | B | B | B | B | B |
| | | Merge | B | A | A | A | B | B | C | B | C | B |
| | WB | Diverge | A | B | E/F | E/F | B | B | B | B | B | B |
| | | Merge | A | A | A | A | A | B | A | B | A | B |

## Policy Point 2

### Policy Point 2 Discussion:

Pursuant to Policy Point 2, the provision for all travel directions will remain at this interchange under all proposed alternatives. The existing configuration is a full diamond interchange with SR 17/Little Neck Road crossing I-16 supplemented with four access ramps. Each of the three proposed alternatives will provide access to all facilities/directions and SR 17/Little Neck Road will continue to cross over I-16. There are no interchange ramp access reductions proposed for the No-Build or the proposed alternatives; therefore, no access improvements will be necessary as access will remain for all current travel directions.

Signage will likely be used to reduce the likelihood of traffic using the wrong ramps to enter/exit I-16. Standard signage and/or signals will be utilized for Alternatives 1 and 3; however, additional and more specific signage/signalization will be necessary to accommodate Alternative 2. Diverging Diamond Interchanges (DDIs) are less common than standard full diamonds or partial cloverleaf interchanges. Due to their less conventional movement, the DDIs will require additional driver education / familiarization, signage/signalization and pavement markings to guide motorists through the less common interchange design.

## Evaluation of Alternatives

Each of the three alternatives were ranked using a set of 14 criteria ranging from project coast to a reduction in crashes. A scoring system was developed using both qualitative and quantitative values to best represent the various interchange alternatives. These criteria were compiled into an evaluation matrix to score and rank the alternatives. For criteria in which a numerical number could be used, the best performing score was given a value of "3" and the others were ranked accordingly decreasing to a minimum score of "1". Theses ranks were used to identify the highest performing alternative as described below.

### Highest Performing Alternative – Alternative 2 Diverging Diamond Interchange

Using the available information and the methodologies identified within this report, Alternative 2 is the highest scored alternative. Alternative 2 has the highest benefit to cost ratio, lowest environmental impact, lowest estimated cost and has features very similar to the existing conditions. Alternatives 1 and 3 both represent effective improvements to the existing interchange; however, their scores were not as high as Alternative 2.

# Introduction

This report documents and evaluates the suggested alternatives for the I-16 at Little Neck Road/Jimmy DeLoach Parkway Interchange Study. The purpose of this study is to provide an evaluation and understanding of the proposed improvements to the interchange. Interchange improvements will be necessary accommodate the anticipated increased travel demands resulting from the future connection of the interchange to Jimmy DeLoach Parkway (PI 522790) and future development. This document discusses the potential improvements to the interchange while explaining current and projected roadway conditions.

# Project Background and Justification

The interchange of I-16 and SR 17/Little Neck Road currently functions as a conventional diamond rural interchange consisting of two stop-controlled intersections at the ramp termini. SR 17/Little Neck Road is a 2-lane undivided minor arterial roadway that carries less than 6,000 vehicles per day on a bridge crossing over I-16. The interchange of I-16 at SR 17/Little Neck Road will serve as the future terminus of the Jimmy DeLoach Parkway Extension project (GDOT PI No. 522790), which will widen SR 17 from two to four lanes north of the interchange. Phase 2 of the project is the last section of the Jimmy DeLoach corridor to be completed and will provide direct, alternative access between the Georgia Ports Authority and I-16. Completion of this connection, scheduled for October 2021, will result in increased vehicle traffic volumes which will exacerbate congestion and safety concerns at the interchange. A preliminary analysis was performed for this interchange as part of the Jimmy DeLoach at US 80 interchange project and results indicated that the existing interchange would operate at LOS F in 2038 even without the construction of Jimmy DeLoach Parkway.

The influence area of the interchange was determined to extend one interchange upstream and down I-16 from the study interchange, and also include local intersections within 0.5 miles of the study interchange. The limits of the study extend north along SR 17 to the north driveway of Morgan's Mobile Home Park - Lakeside on the west side of the road, south along Little Neck Road to D.O.T. Barn Road, east along I-16 to the adjacent interchange of I-16 and Pooler Parkway, and west along I-16 to the adjacent interchange of I-16 and Old River Road. The portion of SR 17 from the north driveway to Pine Barren Road will also be assessed for impacts to the local roadway network.

The performance goals of this project are to mitigate future expected congestion due to additional traffic from Jimmy DeLoach Parkway extension, as well as improve safety at the interchange. This study will recommend improvements and give guidance on timing to assist Chatham County, GDOT, and CORE MPO staff with planning and budgeting for any recommended improvements at

the interchange. The results of this study may also be used to facilitate a future Interchange Access Report (IAR), if required.

# Study Area

This study concentrates on the interchange of I-16 and SR 17/Bloomingdale Road/Little Neck Road in Chatham County, GA. The logical termini of the study extend north along SR 17 to the north driveway of Morgan's Mobile Home Park – Lakeside, south along Little Neck Road to D.O.T. Barn Road, east along I-16 to the adjacent interchange of I-16 and Pooler Parkway, and west along I-16 to the adjacent interchange of I-16 and Old River Road. The roadway segment north of the study area from the north driveway of Morgan's Mobile Home Park – Lakeside to Pine Barren Road will also be included in the analysis. The full extents of the study area is shown in **FIGURE 1** and the primary study interchange is shown in **FIGURE 2**.

**FIGURE 1: STUDY AREA**

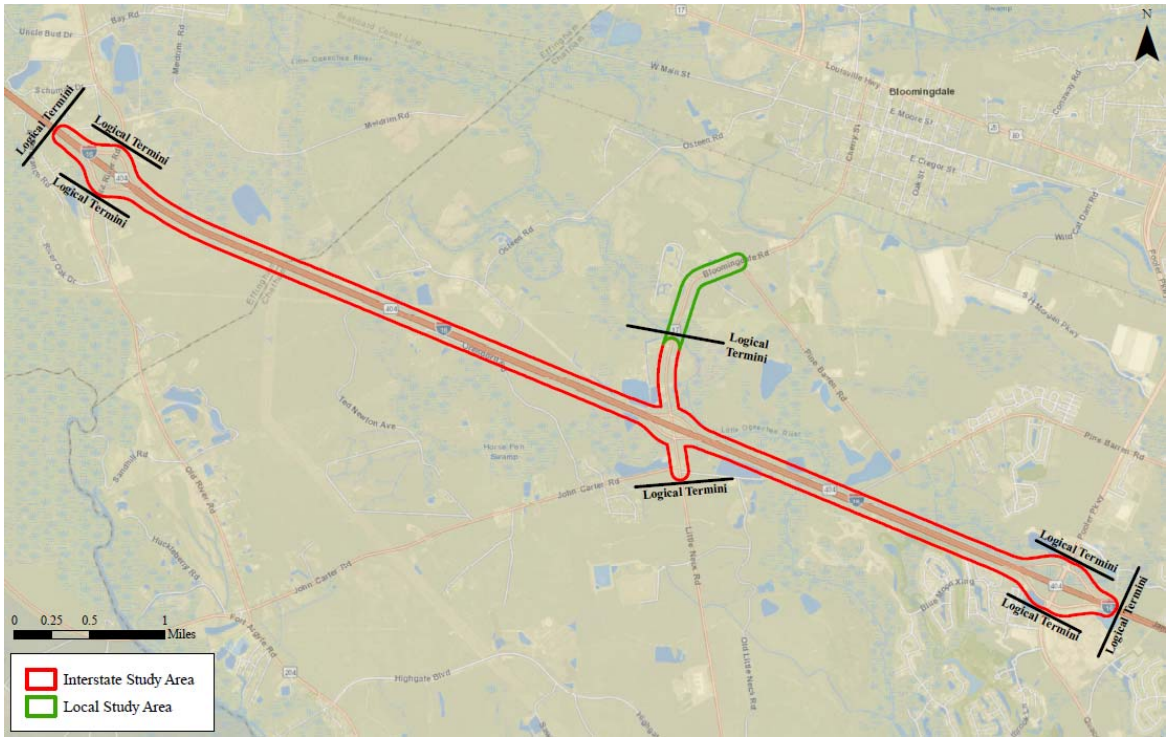


**FIGURE 2: STUDY INTERCHANGE – SR 17/LITTLE NECK RD AND I-16**


# FHWA Policy Points

The addition of a new interchange or modification of and existing interchange requires approval from the Federal Highway Administration (FHWA). Any proposed changes or addition of access to the interstate system must provide the justification and the documentation necessary to meet the standards of the Policy of Access to the Interstate System. FHWA updated its Policy on *Access to the Interstate System* in May of 2017 which identified two main considerations/requirements hereinafter referred to as Policy Point 1 and Policy Point 2. As a result, State Departments of Transportation are required to submit requests to their FHWA Division office for review as described by 23 U.S.C 106 and 111(a), and 23 CFR 625.2(a). The division office will review the request and ensure that the information is present for FHWA to evaluate and act upon the request as necessary.

## Policy Point 1

*An operational and safety analysis has concluded that the proposed change in access does not have a significant adverse impact on the safety and operation of the Interstate facility (which includes mainline lanes, existing, new, or modified ramps, and ramp intersections with crossroad) or on the local street network based on both the current and the planned future traffic projections. The analysis should, particularly in urbanized areas, include at least the first adjacent existing or proposed interchange on either side of the proposed change in access (Title 23, Code of Federal Regulations*

*(CFR), paragraphs 625.2(a), 655.603(d) and 771.111(f)). The crossroads and the local street network, to at least the first major intersection on either side of the proposed change in access, should be included in this analysis to the extent necessary to fully evaluate the safety and operational impacts that the proposed change in access and other transportation improvements may have on the local street network (23 CFR 625.2(a) and 655.603(d)). Requests for a proposed change in access should include a description and assessment of the impacts and ability of the proposed changes to safely and efficiently collect, distribute, and accommodate traffic on the Interstate facility, ramps, intersection of ramps with crossroad, and local street network (23 CFR 625.2(a) and 655.603(d)). Each request should also include a conceptual plan of the type and location of the signs proposed to support each design alternative (23 U.S.C.*
*109(d) and 23 CFR 655.603(d)).*

### Safety:

In evaluating the suggested interchange modifications, a crash history analysis was conducted within the project study area as described in **Appendix C.** The crash rates between 2013 and 2017 have been analyzed and SR 17/Little Neck Road was above the statewide average for total crashes in 2013, 2015, and 2016. I-16 experienced crash rates lower than the statewide average with the exception of fatal crashes and actual fatalities, which were above statewide averages. (2016 fatality figures were much higher due to a head on collision that resulted in five fatalities) The three proposed alternatives are anticipated to reduce the overall number and intensity of crashes associated with the project interchange. Each of the alternatives proposes changes to the existing interchange layout and adding stop locations, pavement markings, and signage that should reduce vehicle crashes in the area.

### I-16 Mainline Traffic Operations

Alternatives 1 and 2 will have very little impact on the mainline operations of I-16, however, Alternative 3 proposes an additional access point to the interstate. The partial clover being proposed in Alternative 3 requires the development of an additional merging area onto eastbound I-16. This merging area will be necessary to accommodate the loop access onto I-16 from southbound SR 17/Little Neck Road. Each of the proposed Alternatives is anticipated to improve upon the No-Build alternative.

### SR 17/Little Neck Road Mainline Operations

Though each of the alternatives has suggested changes to the operations along SR 17/Little Neck Road, the most significant change will be as a result of the widening/extension of the Jimmy DeLoach Parkway (PI 522790). This project will add two additional travel lanes and provide a direct connection with the Georgia Ports Authority. This direct connection is anticipated to increase traffic and freight volumes using the route to gain access to I-16. These increased volumes are anticipated to primarily impact the northern side of the interchange and I-16. The southern side of the interchange will likely see increase in traffic volumes but it is anticipated that the majority will utilize the Jimmy DeLoach Parkway Extension to access I-16.

In the No-Build alternative, the average speed at the intersection is anticipated to be below 8 mph while the alternatives are projected to average speeds greater than 45 mph. As mentioned above, congestion will lead to LOS issues if the current interchange is not improved.

## Policy Point 2

*The proposed access connects to a public road only and will provide for all traffic movements. Less than "full interchanges" may be considered on a case-by-case basis for applications requiring special access, such as managed lanes (e.g., transit or high occupancy vehicle and high occupancy toll lanes) or park and ride lots. The proposed access will be designed to meet or exceed current standards (23 CFR 625.2(a), 625.4(a)(2), and 655.603(d)). In rare instances where all basic movements are not provided by the proposed design, the report should include a full-interchange option with a comparison of the operational and safety analyses to the partial-interchange option. The report should also include the mitigation proposed to compensate for the missing movements, including wayfinding signage, impacts on local intersections, mitigation of driver expectation leading to wrong-way movements on ramps, etc. The report should describe whether future provision of a full interchange is precluded by the proposed design.*

The three proposed alternatives represent "full interchanges" that provide for all traffic movements and make the connection between the public facilities of I-16 and SR 17/Little Neck Road.

Currently, this interchange exists as a conventional diamond interchange with stop controls on the access ramps at the SR 17/Little Neck Road. SR 17/Little Neck Road is conveyed over I-16 via a two-lane bridge with no paved shoulder. The three proposed alternative concepts will all accommodate the anticipated increase in vehicle volumes associated with the extension of Jimmy DeLoach Parkway and retain the bridge over I-16.

Each of the proposed alternatives suggests changes to vehicle movement and the development of additional stop locations to promote safer and more efficient travel through the interchange. Existing signage, stop controls, and traffic movement improvements are proposed within each of the alternatives. Alternatives 1 and 3 represented more conventional interchange configurations while Alternative 2 is less common with only three diverging diamond interchanges in the Savannah area. Public involvement and an outreach campaign may be necessary prior to the implementation of diverging diamond interchanges to increase awareness and reduce potential crashes. Along with the outreach, additional signage/signalization and pavement markings will be required to facilitate the diverging movement.

As the surrounding area continues to be developed and additional roads are expanded, the traffic operations will begin having failing level of service (LOS) in the build year (2030) and beyond if improvements are not implemented.

# Existing Conditions

SR 17/Bloomingdale Road/Little Neck Road is a 2-lane undivided minor arterial roadway. The speed limit is 45 miles per hour within the study limits. The surrounding land use is primarily single-family residential and agriculture/forestry.

I-16 is a 4-lane median-divided interstate. The speed limit is 70 miles per hour.

## Site Visit

A project site visit was conducted in August 2018. The site visit confirmed the existing lane configuration, intersection control types, and speed limits at the study interchange. SR 17/Bloomingdale Road/Little Neck Road is a 2-lane undivided roadway and there are no turn lanes at the interchange, as seen in **Figure 3**. All ramps are single-lane roadways with channelizing islands at the intersection with SR 17. The speed limit along SR 17/Bloomingdale Road/Little Neck Road is 45 mph. Drop gates were observed on the I-16 eastbound on and off-ramps which are used during evacuations to facilitate contra-flow of I-16 eastbound lanes allowing evacuees to travel westbound in the eastbound lanes. The drop gates can be seen in **Figure 4.**


**FIGURE 3: I-16 AT SR 17/LITTLE NECK ROAD INTERCHANGE, NORTHBOUND**

FIGURE 4: I-16 AT SR 17/LITTLE NECK ROAD INTERCHANGE, WESTBOUND

## Roadway Network

I-16 is the major roadway within the study area with Little Neck Rd/Bloomingdale being the second largest facility. Apart from smaller neighborhood roads John Carter Rd (to the south) and Pine Barren Road (to the north) are the largest roads closest to the project interchange. Within the Study area, Old River Rd (to the west) and Pooler Pkwy (to the east) represent the closest interchanges. **Table 1** depicts the types of major roadways within the area.

TABLE 1: ROADWAY NETWORK DESCRIPTION

| Roadway | Functional Class | Travel Lanes | Posted Speed (MPH) | Hurricane Evacuation Route |
|---|---|---|---|---|
| I-16 | Urban Interstate | 4 | 70 | Yes |
| Little Neck Rd/Bloomingdale Rd | Principle Arterial (North) Minor Arterial (South) | 2 | 45 | No |
| John Carter Rd | Minor Arterial | 2 | 45 | No |
| Pine Barren Rd | Major Collector | 2 | 45 | No |
| Pooler Pkwy | Minor Arterial | 4 | 45 | No |
| Old River Rd | Major Collector | 2 | 50 | No |

## Interchange Spacing

There are two existing interchanges within the study area north and south of the project interchange, I-16 at Little Neck Road. Both interchanges are full access providing north and southbound access via ramps.

**TABLE 2: INTERCHANGE SPACING**

| Nearby I-16 Interchanges | Full Access | Distance to Project Interchange (Miles) |
|---|---|---|
| Project Interchange | Yes | N/A |
| I-16 at Old River Road | Yes | 4.12 |
| I-16 at Pooler Parkway | Yes | 2.77 |

Following GDOT Policy 3140-1, the project interchange is located within the local Metropolitan Planning Organization (MPO) boundary; therefore, designated as urbanized by the US Census, despite the limited development immediately adjacent. By classifying this as an urban interchange, the GDOT Guidelines state that interchange spacing may be no less than one mile, and with an average spacing of two miles must be maintained. Each of the closest interchanges are greater than one mile away, with an average of 3.45 miles between all three interchanges. Based on this information, the proposed interchange modification meets the standards for urban interchange spacing.

## Existing Traffic Analysis

### Data Collection

Average daily traffic (ADT) and turning movement counts (TMC) were collected for the study area in May 2018. Forty-eight hour bi-directional classification counts were collected on Wednesday, May 2nd through Thursday, May 3rd or Wednesday, May 9th through Thursday, May 10th. TMCs were collected on either Thursday, May 3rd or Thursday, May 10th. Count locations of each count type and The GDOT Traffic Projections/Review Request form and a map of count locations is included in **Appendix D**. The raw data from each count location is included in **Appendix E**.

#### *November Re-Count*

Traffic count data was originally collected for this project on May 2-3, 2018 and May 9-10, 2018. On May 2, 2018, a plane crashed near the intersection of SR 21 and Crossgate Road, near the Savannah/Hilton Head International Airport, resulting in the closure of a portion of SR 21 for several weeks. This section summarizes the analysis undertaken to determine if the closure of SR 21 affected traffic volumes within the study area of this project.

The site of the plane crash and project interchange are shown relative to each other in **Figure 5**. The site of the plane crash is approximately nine miles from the project interchange.

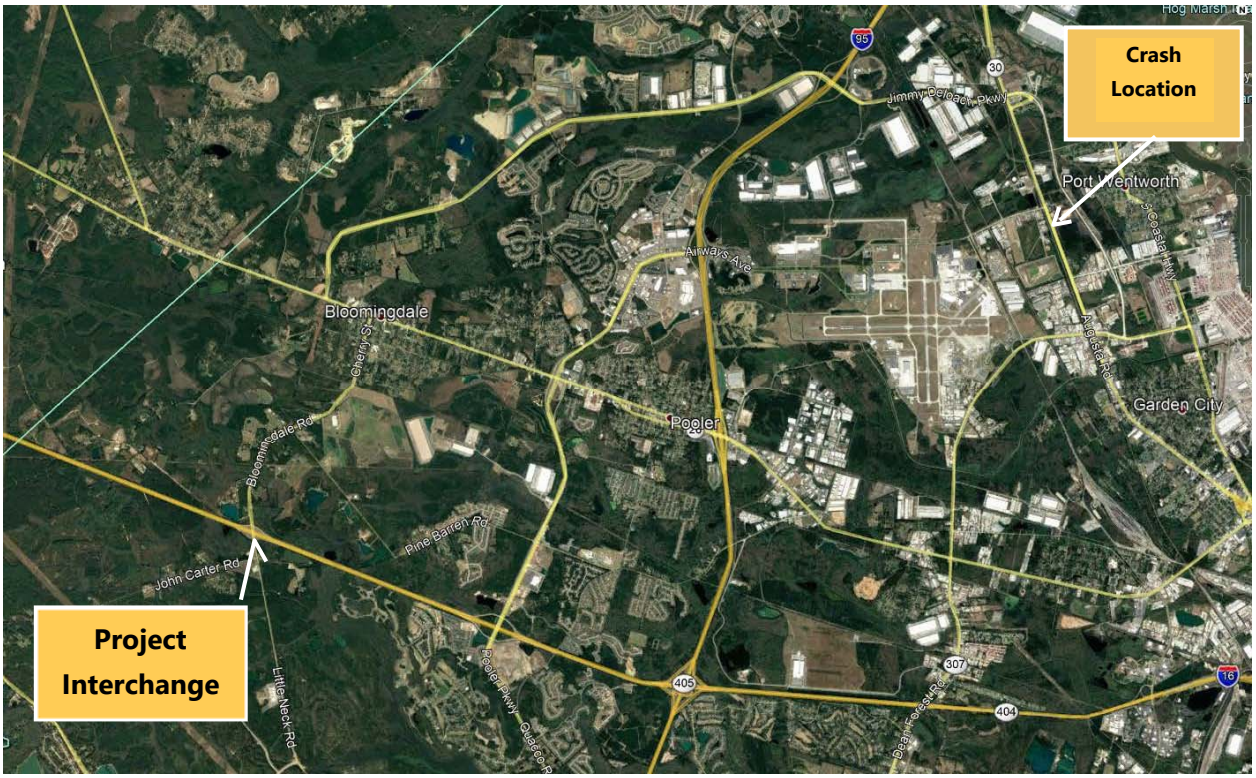



**FIGURE 5: CRASH SITE AND PROJECT INTERCHANGE MAP**

Additional counts were collected on November 7-8, 2018. Appropriate monthly, daily, and axle factors were applied to the raw counts to calculate AADT. After the updated count there was a significant variation in AADT's calculated from the raw counts in two locations:

Because of these discrepancies, the May and November calculated AADT volumes were also compared to GDOT AADT data at these two locations. Using the 2017 GODT AADT data, these volumes were grown at a rate of 2.0% per year to calculate a conservative estimate of 2018 AADT values, shown in **Table 3**.

- I-16 between Old River Road and SR 17/ Bloomingdale Road
- SR 17/Bloomingdale Road south of the Little Ogeechee River (north of I-16)

**TABLE 3: GDOT AADT**

| Count Location | | GDOT AADT | |
|---|---|---|---|
| | | 2017 | 2018 (Calc.) |
| E/F | I-16 Between Old River Rd & SR 17/Bloomingdale Rd | 36,300 | 37,025 |
| G | SR 17/Bloomingdale Rd S/O Little Ogeechee River | 5,180 | 5,280 |

In both cases, the original May AADT values are much closer to GDOT's AADT values than the November AADTs. This comparison shows that the counts collected in May are a reasonable

estimate of actual average daily volumes and that the plane crash did not have a significant impact on traffic volumes in the study areas.

## Existing Traffic Volumes

### *Annual Average Daily Traffic Volumes*

Data collected in the field was converted into AADT volumes by applying applicable monthly, daily, and axle factors to the average ADT volumes. Detailed AADT calculations can be found in **Appendix F.** Link volumes were distributed at intersections following procedures outlined in NCHRP 765 and using an average of the AM and PM peak hour turning movements counts to estimate proportions of vehicles making each movement.

### *Design Hourly Volumes*

Raw volumes were used to calculate peak hour (K) factors and directional (D) factors on each roadway. The morning and afternoon peak hours used for analysis were 6:45 AM and 4:45 PM, respectively. A summary of the K-factors and D-factors calculated at each location can be found in **Appendix G**. K-factor and D-factors on the same roadway were reviewed to determine an average K and D-factor to use for the entire road. The chosen K-factors and D-factors for each road are listed in **Table 4**.

**TABLE 4: K-FACTOR AND D-FACTOR SUMMARY**

| Roadway | AM Peak Hour | | PM Peak Hour | |
|---|---|---|---|---|
| | K-Factor | D-Factor | K-Factor | D-Factor |
| SR 17/Bloomingdale Rd/Little Neck Road | 0.10 | 0.55 | 0.10 | 0.60 |
| I-16 WB Ramps at SR 17/Bloomingdale Rd/Little Neck Road | 0.06 | 1.00 | 0.13 | 1.00 |
| I-16 EB Ramps at SR 17/Bloomingdale Rd/Little Neck Road | 0.12 | 1.00 | 0.07 | 1.00 |
| Old River Road | 0.06 | 0.65 | 0.11 | 0.70 |
| I-16 WB Ramps at Old River Road | 0.04 | 1.00 | 0.14 | 1.00 |
| I-16 EB Ramps at Old River Road | 0.13 | 1.00 | 0.07 | 1.00 |
| Pooler Parkway | 0.07 | 0.55 | 0.09 | 0.50 |
| I-16 WB Ramps at Pooler Parkway | 0.05 | 1.00 | 0.11 | 1.00 |
| I-16 EB Ramps at Pooler Parkway | 0.10 | 1.00 | 0.07 | 1.00 |
| I-16 | 0.07 | 0.65 | 0.08 | 0.65 |
| John Carter Road | 0.09 | 0.60 | 0.09 | 0.75 |

K-factors and D-factors were applied to the AADT volumes calculated from raw traffic volumes to obtain Design Hourly Volumes (DHVs) on each link. Link volumes were distributed at intersections following procedures outlined in NCHRP 765 and using the AM and PM peak hour turning movements counts collected in the field to determine the proportion of vehicles making each movement.

### *Truck Percentages*

Raw volumes were used to calculate AM peak hour, PM peak hour and daily truck percentages on each roadway. Truck percentages were separated into single unit (FHWA classes 4 – 7) and multi-unit trucks (FHWA classes 8 – 13). A summary of the results are included with the K and D-factor summary in **Appendix G**. Truck percentages to be used for this forecasting effort are presented in **Table 5** on the following page.

### *Existing Conditions Volume Diagrams*

Existing conditions volume diagrams are included within **Appendix H**. The same layout used for the existing conditions will be used for future conditions volumes as well because no geometric changes have been proposed at the interchange at this point in the planning process.

**TABLE 5: TRUCK PERCENTAGE SUMMARY**

| Roadway | AM Peak Hour | | | PM Peak Hour | | | Daily | | |
|---|---|---|---|---|---|---|---|---|---|
| | S.U. | Comb. | Total | S.U. | Comb. | Total | S.U. | Comb. | Total |
| SR 17/Bloomingdale Rd N/O I-16 | 14.5% | 2.0% | 16.5% | 13.0% | 2.5% | 15.5% | 15.0% | 3.5% | 18.5% |
| Little Neck Rd S/O I-16 | 10.0% | 1.0% | 11.0% | 7.5% | 1.5% | 9.0% | 10.5% | 2.0% | 12.5% |
| I-16 WB Off-Ramp at SR 17/Bloomingdale Rd/Little Neck Road | 7.5% | 1.0% | 8.5% | 4.0% | 1.5% | 5.5% | 7.0% | 3.5% | 10.5% |
| I-16 WB On-Ramp at SR 17/Bloomingdale Rd/Little Neck Road | 9.0% | 0.0% | 9.0% | 3.5% | 4.5% | 8.0% | 6.5% | 6.0% | 12.5% |
| I-16 EB Off-Ramp at SR 17/Bloomingdale Rd/Little Neck Road | 15.0% | 1.5% | 16.5% | 9.5% | 2.5% | 12.0% | 16.0% | 5.5% | 21.5% |
| I-16 EB On-Ramp at SR 17/Bloomingdale Rd/Little Neck Road | 5.5% | 1.5% | 7.0% | 3.5% | 1.0% | 4.5% | 7.5% | 2.5% | 10.0% |
| Old River Road N/O I-16 | 7.5% | 3.0% | 10.5% | 6.0% | 2.0% | 8.0% | 7.5% | 6.0% | 13.5% |
| Old River Road S/O I-16 | 11.0% | 2.5% | 13.5% | 9.5% | 2.5% | 12.0% | 10.0% | 5.5% | 15.5% |
| I-16 WB Off-Ramp at Old River Road | 4.5% | 17.5% | 22.0% | 4.0% | 3.0% | 7.0% | 7.0% | 9.0% | 16.0% |
| I-16 WB On-Ramp at Old River Road | 9.5% | 1.5% | 11.0% | 7.0% | 4.0% | 11.0% | 9.0% | 6.5% | 15.5% |
| I-16 EB Off-Ramp at Old River Road | 6.0% | 2.0% | 8.0% | 6.0% | 1.5% | 7.5% | 5.0% | 3.5% | 8.5% |
| I-16 EB On-Ramp at Old River Road | 24.0% | 2.5% | 26.5% | 20.5% | 9.0% | 29.5% | 22.0% | 9.0% | 31.0% |
| Pooler Parkway N/O I-16 | 5.5% | 3.0% | 8.5% | 4.5% | 3.0% | 7.5% | 5.0% | 3.0% | 8.0% |
| Pooler Parkway S/O I-16 | 5.0% | 2.5% | 7.5% | 4.5% | 2.5% | 7.0% | 4.5% | 2.0% | 6.5% |
| I-16 WB Off-Ramp at Pooler Parkway | 7.0% | 3.5% | 10.5% | 5.5% | 1.0% | 6.5% | 6.0% | 2.5% | 8.5% |
| I-16 WB On-Ramp at Pooler Parkway | 8.0% | 0.5% | 8.5% | 8.0% | 1.0% | 9.0% | 8.0% | 2.0% | 10.0% |
| I-16 EB Off-Ramp at Pooler Parkway | 9.5% | 2.0% | 11.5% | 6.5% | 2.0% | 8.5% | 7.5% | 2.5% | 10.0% |
| I-16 EB On-Ramp at Pooler Parkway | 8.0% | 1.0% | 9.0% | 11.0% | 3.0% | 14.0% | 10.5% | 3.0% | 13.5% |
| I-16 West of SR 17/Bloomingdale Road/Little Neck Road | 14.5% | 14.5% | 29.0% | 9.5% | 9.5% | 19.0% | 11.0% | 16.5% | 27.5% |
| I-16 East of SR 17/Bloomingdale Road/Little Neck Road | 9.0% | 11.5% | 20.5% | 7.5% | 8.5% | 16.0% | 8.5% | 14.0% | 22.5% |
| John Carter Road | 7.5% | 1.0% | 8.5% | 14.5% | 1.5% | 16.0% | 12.0% | 2.5% | 14.5% |

## Existing Operational Analysis

An analysis of the existing 2018 conditions was conducted for the project interchange. This analysis took into account the mainline roadways, and interstate ramps to gain an understanding of how the interchange is currently being used and what to expect if no changes are made. The traffic conditions are graded on the Level of Service (LOS) scale (A-F) in which A represents a highly efficient and functioning roadway and F equates to a congested and overloaded roadway. **Tables 6 and 7** depict the existing conditions and the anticipated 2050 No-Build conditions at the interchange. The LOS designations for this project have been determined using the LOS Criteria within the *Highway Capacity Manual: 6th Edition:*

- LOS A – describes primarily free flow operation
- LOS B – describes reasonably unimpeded operation
- LOS C – describes stable operation
- LOS D – indicates a less stable condition in which small increases in flow may cause substantial delay and decreases in travel speed
- LOS E – is characterized by unstable operation and significant delay
- LOS F – is characterized by flow at extremely low speed

**TABLE 6: 2018 EXISTING CONDITIONS**

| **Intersection Operations** | | | | | | |
|---|---|---|---|---|---|---|
| **Intersection** | | | **2018 Existing Conditions** | | | |
| | | | **AM Peak** | | **PM Peak** | |
| | | | **Delay (s/veh)** | **LOS** | **Delay (s/veh)** | **LOS** |
| SR 17 at I-16 WB | | | 2.7 | A | 3.5 | A |
| SR 17 at I-16 EB | | | 2.8 | A | 1.6 | A |
| **Freeway Operations** | | | | | | |
| **Freeway** | **Dir** | **Type** | **Density** | **LOS** | **Density** | **LOS** |
| I-16 @ SR 17/Little Neck Road | EB | Diverge | 9.7 | A | 6.8 | A |
| | | Merge | 11.8 | B | 8.1 | A |
| | WB | Diverge | 6.4 | A | 14.5 | B |
| | | Merge | 4.6 | A | 9.9 | A |

### 2050 No-Build Conditions – Existing Diamond Interchange

No-Build – Jimmy DeLoach Parkway is completed, no interchange modification to the existing conventional diamond interchange. Under these conditions the majority of the project area is anticipated to experience slowdowns and congestion in the year 2050.

**TABLE 7: 2050 NO-BUILD CONDITIONS**

| Intersection Operations | | | | | | |
|---|---|---|---|---|---|---|
| **Intersection** | | | **2050 No-Build** | | | |
| | | | **AM Peak** | | **PM Peak** | |
| | | | **Delay (s/veh)** | **LOS** | **Delay (s/veh)** | **LOS** |
| SR 17 at I-16 WB | | | 50.1 | F | 27.2 | D |
| SR 17 at I-16 EB | | | 51.5 | F | 41.3 | E |
| **Freeway Operations** | | | | | | |
| **Freeway** | **Dir** | **Type** | **Density** | **LOS** | **Density** | **LOS** |
| I-16 @ SR 17/Little Neck Road | EB | Diverge | 167.2 | E/F | 139.7 | E/F |
| | | Merge | 7.4 | A | 8.2 | A |
| | WB | Diverge | 158.9 | E/F | 117.8 | E/F |
| | | Merge | 2.0 | A | 5.8 | A |

## Crash History

Five-year historical crash data was obtained from the Georgia Electronic Accident Reporting System (GEARS). The data includes crashes on the 7.45-mile segment of I-16 from Old River Road to Pooler Parkway, a 1.5-mile segment of SR 17/Little Neck Road from D.O.T. Barn Road to Pine Barren Road, as well as crashes on Pooler Parkway in the immediate vicinity of the I-16 interchange. A map showing crash density within the study area is shown in in **Figure 3** Crash data on the SR 17/Little Neck Road and I-16 segments are analyzed in this report. Crashes on Pooler Parkway were not analyzed further because it is outside the scope of this study.

**FIGURE 3: STUDY AREA CRASH DENSITY, 2013-2017**


## SR 17/Little Neck Road – Crash Analysis

Crash data for the SR 17/Little Neck Road segment is summarized in **Table 8** below.

**TABLE 8: CRASHES BY MANNER AND SEVERITY - SR 17/LITTLE NECK ROAD FROM D.O.T. BARN ROAD TO NORTH DRIVEWAY**

| Crash Type | 2013 | | 2014 | | 2015 | | 2016 | | 2017 | | 2013-2017 Crashes | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Angle** | 2 | 50% | 1 | 100% | 1 | 14% | 4 | 57% | 1 | 100% | 9 | 45% |
| **Not A Collision with Motor Vehicle** | 0 | 0% | 0 | 0% | 2 | 29% | 0 | 0% | 0 | 0% | 2 | 10% |
| **Rear End** | 1 | 25% | 0 | 0% | 4 | 57% | 2 | 29% | 0 | 0% | 7 | 35% |
| **Sideswipe-Opposite Direction** | 0 | 0% | 0 | 0% | 0 | 0% | 1 | 14% | 0 | 0% | 1 | 5% |
| **Sideswipe-Same Direction** | 1 | 25% | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 0% | 1 | 5% |
| **Total Crashes** | **4** | **100%** | **1** | **100%** | **7** | **100%** | **7** | **100%** | **1** | **100%** | **20** | **100%** |
| **Injury Crashes** | 1 | | 0 | | 1 | | 1 | | 0 | | 3 | |
| **Injuries** | 1 | | 0 | | 1 | | 3 | | 0 | | 5 | |
| **Fatal Crashes** | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | |
| **Fatalities** | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | |

Crashes per 100 million vehicle miles traveled (VMT) were calculated from the data to compare the segments to other similarly classified roadway segments around the state. AADTs required to calculate the crash rate on each segment were obtained from the nearest count station available from GDOT's Traffic Analysis & Data Application (TADA) database. Historic count data from Count Site 051-0101 (SR 17 north of Pine Barren Road) was used for SR 17/Little Neck Road. SR 17/Little Neck Road is classified as a Minor Arterial roadway and is located in a rural setting; therefore, crash rates were compared with statewide crash rates in the "Minor Arterial, Rural" category. Calculated crash rates on SR 17/Little Neck Road and corresponding statewide average rates are presented in **Table 9** below. Study segment crash rates that are higher than statewide averages are shown in bold red font**.** Statewide average crash rates were not available for 2017 at the time this report was finalized.

**TABLE 9: CALCULATED CRASH RATES VERSUS STATEWIDE AVERAGE CRASH RATES - SR 17/LITTLE NECK ROAD**

| Year | AADT | Location | All Crashes | Injury Crashes | Injuries | Fatal Crashes | Fatalities |
|---|---|---|---|---|---|---|---|
| **2013** | 4,120 | Study Segment | **177** | 44 | 44 | 0 | 0 |
| | | Statewide | 151 | 47 | 71 | 1.67 | 1.81 |
| **2014** | 4,550 | Study Segment | 40 | 0 | 0 | 0 | 0 |
| | | Statewide | 164 | 50 | 74 | 1.96 | 2.23 |
| **2015** | 4,700 | Study Segment | **194** | 39 | 39 | 0 | 0 |
| | | Statewide | 152 | 48 | 74 | 2.13 | 2.42 |
| **2016** | 5,140 | Study Segment | **249** | 36 | **107** | 0 | 0 |
| | | Statewide | 145 | 49 | 74 | 2.42 | 2.74 |
| **2017** | 5,400 | Study Segment | 34 | 0 | 0 | 0 | 0 |
| | | Statewide | N/A | N/A | N/A | N/A | N/A |

Key observations from the crash data analysis include the following:

- Angle and rear end crash types account for 80% of crashes that occurred on SR 17 from 2013 to 2017.
- There were 3 injury crashes that resulted in 5 injuries and no fatalities during the study period. The injuries occurred due to angle, rear end, and sideswipe in the same direction crash types.
- The total crash rate on SR 17/Little Neck Road was higher than the statewide average in 2013, 2015 and 2016. The rate of injuries was also higher than the statewide average in 2016 due to one angle crash that resulted in 3 injuries.

## I-16 – Crash Analysis data for the I-16 segment is summarized in Table 10.

**TABLE 10: CRASHES BY MANNER AND SEVERITY - I-16 FROM OLD RIVER ROAD TO POOLER PARKWAY**

| Crash Type | 2013 | | 2014 | | 2015 | | 2016 | | 2017 | | 2013-2017 Crashes | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Angle** | 1 | 1% | 4 | 5% | 5 | 5% | 6 | 6% | 0 | 0% | 16 | 3% |
| **Head On** | 3 | 4% | 2 | 3% | 1 | 1% | 2 | 2% | 0 | 0% | 8 | 2% |
| **Not A Collision with Motor Vehicle** | 20 | 28% | 15 | 20% | 16 | 16% | 18 | 19% | 21 | 18% | 90 | 19% |
| **Rear End** | 45 | 63% | 50 | 66% | 73 | 71% | 62 | 66% | 84 | 71% | 314 | 68% |
| **Sideswipe-Opposite Direction** | 0 | 0% | 0 | 0% | 0 | 0% | 1 | 1% | 1 | 1% | 2 | 0% |
| **Sideswipe-Same Direction** | 1 | 1% | 4 | 5% | 7 | 7% | 4 | 4% | 12 | 10% | 28 | 6% |
| **Unknown/Other** | 1 | 1% | 1 | 1% | 1 | 1% | 1 | 1% | 0 | 0% | 4 | 1% |
| **Total Crashes** | **71** | **100%** | **76** | **100%** | **103** | **100%** | **94** | **100%** | **118** | **100%** | **462** | **100%** |
| **Injury Crashes** | | 21 | | 21 | | 25 | | 22 | | 24 | | 113 |
| **Injuries** | | 27 | | 31 | | 33 | | 29 | | 26 | | 146 |
| **Fatal Crashes** | | 1 | | 0 | | 1 | | 2 | | 2 | | 6 |
| **Fatalities** | | 1 | | 0 | | 1 | | 6 | | 2 | | 10 |

Historic count data from Count Sites 051-0363 (I-16 west of SR 17) and 051-0365 (I-16 east of SR 17) were averaged to calculate the AADT on I-16 and data from Count Site 051-0101 (SR 17 N/O Pine Barren Road). I-16 is classified as an interstate and is located within the CORE MPO region; therefore, crash rates were compared with statewide crash rates in the "Interstate, urbanized" category. Calculated crash rates on I-16 and corresponding statewide average rates are presented in **Table 11**. Study segment crash rates that are higher than statewide averages are shown in bold red font. Statewide average crash rates were not available for 2017 at the time of writing.

**TABLE 11: CALCULATED CRASH RATES VERSUS STATEWIDE AVERAGE CRASH RATES - I-16**

| Year | AADT | Location | All Crashes | Injury Crashes | Injuries | Fatal Crashes | Fatalities |
|---|---|---|---|---|---|---|---|
| **2013** | 33,400 | Study Segment | 78 | 23 | 30 | **1.1** | **1.1** |
| | | Statewide | 143 | 35 | 50 | 0.55 | 0.61 |
| **2014** | 35,400 | Study Segment | 79 | 22 | 32 | 0 | 0 |
| | | Statewide | 163 | 39 | 56 | 0.4 | 0.45 |
| **2015** | 35,500 | Study Segment | 107 | 26 | 34 | **1.04** | **1.04** |
| | | Statewide | 183 | 46 | 66 | 0.48 | 0.52 |
| **2016** | 39,300 | Study Segment | 88 | 21 | 27 | **1.87** | **5.61** |
| | | Statewide | 190 | 45 | 67 | 0.5 | 0.55 |
| **2017** | 40,700 | Study Segment | 107 | 22 | 23 | 1.81 | 1.81 |
| | | Statewide | N/A | N/A | N/A | N/A | N/A |

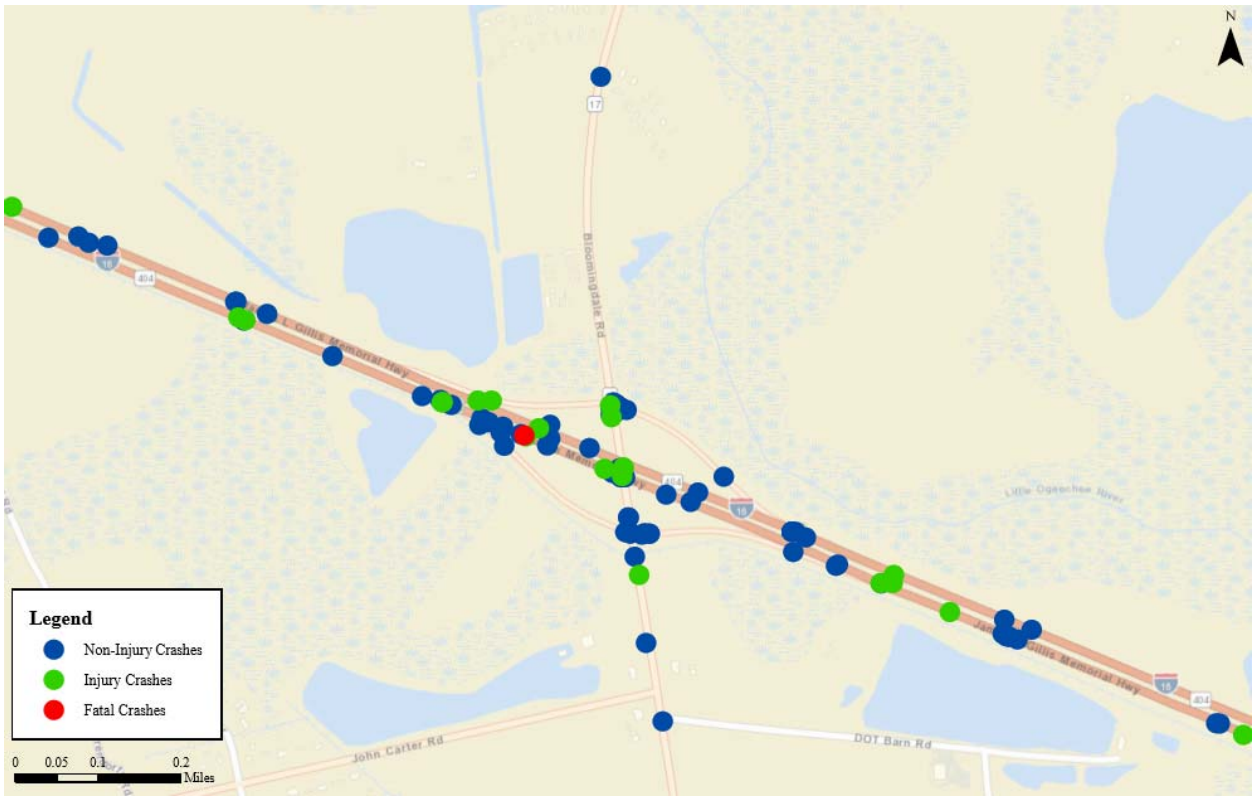
Key observations from the crash data analysis include the following:

- 462 crashes occurred on the I-16 study segment from 2013 to 2017. Of these, 113 crashes resulted in a total of 146 injuries while six fatal crashes resulted in 10 deaths on the road.
- Rates of fatal crashes and fatalities on this segment were higher than statewide averages in 2013, 2015, and 2016. The fatality rate was much higher in 2016 due to a head-on collision that resulted in five fatalities. Of the six fatal crashes, four occurred at night, one at dawn, and one during the daytime.
- Rear end crashes are the most common crash type with 68% of all crashes followed by single car crashes at 19%.

## I-16 at SR 17/Little Neck Road Interchange – Crash Analysis

**Figure 4** shows crashes that occurred at the study interchange from 2013 to 2017.

**FIGURE 4: I-16 AT SR 17/LITTLE NECK ROAD CRASH DATA, 2013-2017**




One fatal crash occurred on I-16 near the interchange in 2017. This was a sideswipe crash in the same direction. It is not clear if the interchange design was a contributing factor to the crash.

Crashes clustered at the ramp intersections with SR 17/Little Neck Road were isolated and analyzed to identify potential interchange improvements.

- Fourteen (14) crashes occurred at the intersection of SR 17/Little Neck Road and the westbound I-16 ramps between year 2013 to 2017. Of these crashes, 12 were rear-end s (six involving northbound vehicles and six involving westbound vehicles) and the remaining two were an angle, and sideswipe crash respectively, in the same direction. All crashes occurred during daylight.
- Thirteen (13) crashes occurred at the intersection of SR 17/Little Neck Road and the eastbound I-16 ramps during the same time period. Of these crashes, seven were angle crashes, two were rear-end, two were single vehicle crashes, and two were sideswipe crashes in the opposite direction. Four of the seven angle crashes occurred at night or at dawn, times with diminished visibility.

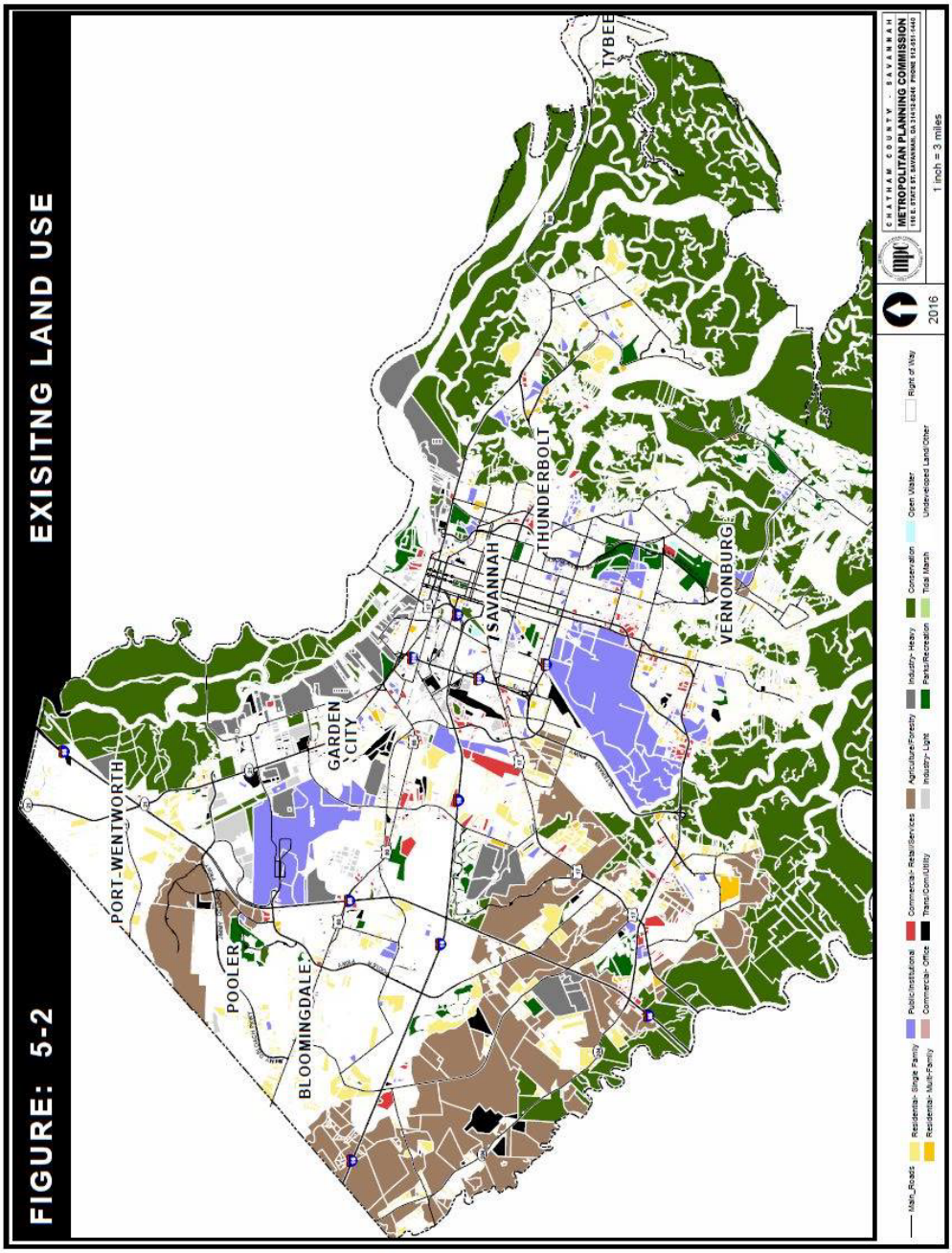
## Existing Land Use

The City of Bloomingdale incorporated limits completely encompass the interchange and each of the proposed three alternatives. The Chatham County – Savannah Metropolitan Planning Commission (MPC) maintains land use maps for the area, although does not provide planning and development for the City of Bloomingdale. Zoning classification from the City of Bloomingdale show zoning surrounding the project intersection as RA-1, designated as agriculture and recreation -based upon the description. Reviewing the existing land uses and development adjacent to the intersection, the area is primarily undeveloped with several land use types nearby. The nearby land use types include:

- Commercial – southwest quadrant
- Residential – north of the intersection
- Transportation/Communications/Utilities – southeast of the intersection

Using satellite imagery, the areas directly adjacent to the interchange are primarily undeveloped. A mobile home park is located just north of the interchange and a small number of single-family homes are located just to the south. Based on the alternative concept designs, none of the alternatives are anticipated to significantly impact the developed properties nearby. As the County continues to develop, traffic volumes are expected to increase in the nearby areas. Traffic analysis indicates that each of the proposed interchange alternatives will outperform the No-Build alternative as it relates to volume and congestion management. **Figure 5** below depicts the existing land uses as identified within the *Chatham County-Savannah Comprehensive Plan* (2017).

**FIGURE 5: MPC EXISTING LAND USE MAP**




*Source: Chatham County-Savannah Comprehensive Plan (2017)*

## Population and Employment

Using the 2011-2015 American Community Survey, and the Environmental Protection Agency (EPA) EJSCREEN Mapping Tool, residential areas within the study area that have a significant percentage of "Households Below Poverty Level". Low-Income populations have been identified within the 50-60 percentile north of the interchange and the 50-percentile south of the interchange. Additionally, minority populations below the 50-percentile category are present in the

area. A full environmental review will be required as with advancement of any proposed modification to the interchange.

No known employment centers were identified within the environmental analysis area; however, the existing land use map shows the area between John Carter Road and I-16 as "Commercial/Retail". There is no existing development within these land uses but the area will need to be further assessed with advancement of any proposed modification to the interchange.

# Future Conditions and Traffic Forecast

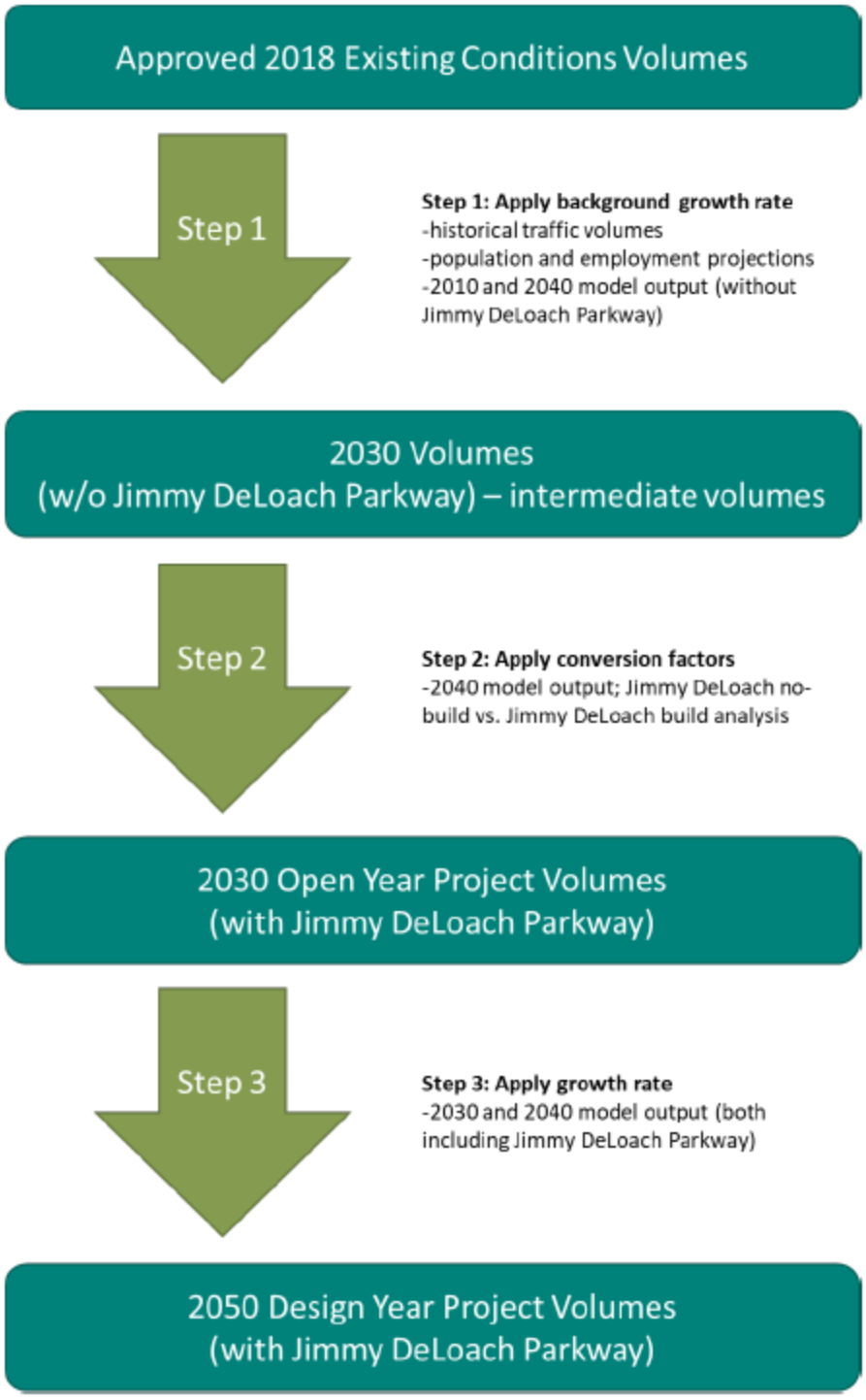
## Overview

In order to better understand the needs of an interchange modification at this location, existing information needed to be projected into future years. For this interchange project the build year is 2030 and the design year is 2050. Looking to the future, the conditions of the roadway and the movement of vehicles need to handle the anticipated loads within the year 2050.

## Traffic Forecasting Methodology

The product of the forecasting process for this project will be 2030 Open Year and 2050 Design Year AADT and DHV volumes. There will not be separate No-Build and build conditions volumes because the safety and operational improvement recommendations that will result from this planning study will not generate any additional traffic demand at the interchange. As this is a planning study, once future volumes are approved several different geometric alternatives will be assessed at the interchange therefore different lane alignments for No-Build and build conditions are not feasible for the purposes of this project. The forecasting methodology for this project has been broken down into three steps, which are illustrated in **Figure 6** and described in detail in the following sections.

**FIGURE 6: FORECASTING METHODOLOGY FLOW CHART**




## Step 1

The first step is to apply background growth factors, which will not take the new Jimmy DeLoach Parkway connection into account, to the existing conditions volumes to calculate 2030 volumes

assuming Jimmy DeLoach Parkway is not constructed. This is an intermediate step to developing the 2030 Open Year volumes that will be submitted for approval. Forecasting will use an annual growth rate developed by considering historical traffic volume data, projected population and employment forecasts for Chatham County, and model output from the 2010 and 2040 (No Build) regional travel demand model, both of which do not include Jimmy DeLoach Parkway.

### *Historical Traffic Volumes*

Historical traffic volumes are available online from GDOT's Traffic Analysis and Data Application[1]. Historical data from count stations in the vicinity of the project area and on roadways of a similar functional classification were analyzed to calculate an average 15, 10, and 5-year growth rate. Rates were calculated using "actual" counts and "estimated" counts were not used in the analysis. Growth rates were only calculated if at least two years of "actual" counts were collected during the timeframe. The results of these calculations are shown in **Table 12**. The average 15, 10, and 5-year growth rates weighted by volume are 3.5%, 3.8%, and 3.9%, respectively. The growth rate calculations and data from each count location included in the analysis are presented in **Appendix J.**

**TABLE 12: GROWTH RATES BASED ON HISTORICAL TRAFFIC DATA**

| GDOT Count Location | Location Description | Growth Rate (15-Year) | Growth Rate (10-Year) | Growth Rate (5-Year) |
|---|---|---|---|---|
| 051-r201 | I-16 @ SR 17 EB Off-Ramp | 1.8% | 1.7% | 13.5% |
| 051-r202 | I-16 @ SR 17 EB On-Ramp | 2.5% | 3.4% | 3.0% |
| 051-r801 | I-16 @ SR 17 WB Off-Ramp | 3.2% | 3.6% | 4.7% |
| 051-r802 | I-16 @ SR 17 WB On-Ramp | 0.3% | 0.2% | 10.2% |
| 051-0101 | SR 17 N/O Pine Barren Rd | 0.9% | 2.5% | 5.3% |
| 051-0255 | SR 17 S/O US 80 | 0.9% | 8.0% | - |
| 051-1083 | Pine Barren Rd E/O SR 17 | - | 7.3% | 14.0% |
| 051-0415 | John Carter Rd W/O Little Neck Rd | - | 4.2% | - |
| 051-0414 | John Carter Rd W/O Orendorff Rd | -0.1% | -4.2% | - |
| 051-0363 | I-16 W/O SR 17 | 5.6% | - | - |
| 051-0365 | I-16 E/O Pooler Pkwy | 2.2% | 2.4% | 4.0% |
| | **Weighted Average Growth Rate** | **3.5%** | **3.8%** | **3.9%** |

[1] https://gdottrafficdata.drakewell.com/publicmultinodemap.asp

### *Population and Employment Projections*

Population projections for Chatham County were obtained from the Governor's Office of Planning and Budget and are presented in **Table 13**. The 5, 15, and 25-year growth rates calculated from this data are shown in **Table 14**. Based on these projections the population in Chatham County is expected to grow at an average rate of 1.2%.

**TABLE 13: CHATHAM COUNTY POPULATION PROJECTIONS**

| Location | 2015 | 2020 | 2030 | 2040 |
|---|---|---|---|---|
| Chatham County | 285,958 | 304,482 | 339,092 | 371,973 |

**TABLE 14: GROWTH RATE BASED ON POPULATION PROJECTIONS**

| Location | Growth 2020 | Growth 2030 | Growth 2040 | Average |
|---|---|---|---|---|
| Chatham County | 1.3% | 1.1% | 1.1% | **1.2%** |

Long-term employment projections for Coastal Georgia, which includes Chatham County and surrounding counties, were obtained from the Georgia Department of Labor (DOL) website. The data includes an assessment of existing conditions (2014) jobs and the projected number of jobs in the future (2024). The total number of jobs in Coastal Georgia for each year and the resulting growth rate are shown in **Table 15**. Employment in Coastal Georgia is expected to grow at an average rate of 1.1%. The data table downloaded from the DOL website is included in **Appendix K.**

**TABLE 15: GROWTH RATE BASED ON EMPLOYMENT PROJECTIONS**

| Location | 2014 | 2024 | Growth Rate |
|---|---|---|---|
| Coastal Georgia | 276,460 | 307,060 | **1.1%** |

### *Model Output (2010 and 2040 without Jimmy DeLoach Parkway)*

Output from CORE MPO's regional travel demand model was used to calculate annual growth rates on segments from 2010 to 2040. In this case, the Jimmy DeLoach Parkway project was not included in the 2040 model so that a baseline, linear growth rate could be calculated to scale volumes up from existing conditions, which do not include Jimmy DeLoach Parkway. **Table 16** presents the model volumes for selected study segments. Raw model output for the 2010 scenario is included in **Appendix L** and raw model output for the 2040 scenario without Jimmy DeLoach Parkway is included in **Appendix M**.

**TABLE 16: GROWTH RATES BASED ON PROJECTED TRAFFIC VOLUMES (STEP 1)**

| Model Link | CORE TDM – Daily Volume 2010 | 2040 (w/o JDP) | Growth Rate |
|---|---|---|---|
| SR 17/Bloomingdale Road N/O I-16 | 4,091 | 9,249 | 2.8% |
| SR 17/Bloomingdale Road N/O Pine Barren Road | 3,939 | 8,424 | 2.6% |
| SR 17/Bloomingdale Road S/O US 80 | 4,230 | 9,096 | 2.6% |
| Little Neck Road S/O I-16 | 4,356 | 11,896 | 3.4% |
| Little Neck Road S/O John Carter Road | 2,293 | 7,318 | 3.9% |
| John Carter Road W/O Little Neck Road | 2,275 | 6,980 | 3.8% |
| Pooler Pkwy S/O I-16 | 12,570 | 16,885 | 1.0% |
| Pooler Pkwy N/O I-16 | 15,585 | 27,768 | 1.9% |
| Pooler Pkwy N/O Pine Barren Road | 13,714 | 25,157 | 2.0% |
| Old River Road S/O I-16 | 3,785 | 7,929 | 2.5% |
| Old River Road N/O I-16 | 4,339 | 9,376 | 2.6% |
| I-16 E/O Pooler Pkwy | 36,645 | 51,398 | 1.1% |
| I-16 Between Pooler Pkwy and SR 17/Jimmy DeLoach Pkwy | 28,991 | 44,936 | 1.5% |
| I-16 Between SR 17/Jimmy DeLoach Pkwy and Old River Rd | 27,225 | 47,243 | 1.9% |
| I-16 W/O Old River Rd | 26,718 | 46,464 | 1.9% |
| **SUM / AVERAGE GROWTH RATE** | **190,756** | **330,119** | **1.8%** |

The overall average annual growth rate predicted by the model output of 1.8% is in line with what would be expected given the 1.2% and 1.1% annual growth rate of the population and employment projections in Chatham County, respectively, and the high 5-year historical growth rate of 3.9% near the project area.

### *Step 1 Recommended Growth Rates*

The model output shows variations in growth rate in different sections of the study network, the following suggested growth rates for step 1 are based on the model output and take the historical growth rate and projected population and employment figures into consideration as well.

- *SR 17 north of I-16: 2.5%*
- *Little Neck Road south of I-16 and John Carter Road: 3.5%*
- *Pooler Parkway north of I-16: 2.0%*
- *Pooler Parkway south of I-16: 1.0%*
- *Old River Road: 2.5%*
- *I-16: 1.5%*
- *Side Streets: 0.5%*

## Step 2

This step will apply conversion factors to the intermediate 2030 volumes calculated in Step 1 to convert them to 2030 Open Year Project Volumes that assume the construction of Jimmy DeLoach Parkway. These conversion factors are based on the comparison of two 2040 regional travel demand models, one of which does not include Jimmy DeLoach Parkway (denoted as "NB" in tables) and the other which does (denoted as "Bd" in the tables). Raw model output for the 2040 scenario with Jimmy DeLoach Parkway is included in **Appendix N**.

### *Model Output (2040 without Jimmy DeLoach Parkway and 2040 with Jimmy DeLoach Parkway)*

For this analysis, roadways were broken into segments to better assess the impact of the construction of Jimmy DeLoach Parkway on traffic volumes within different zones of the study network.

**Table 17** presents the model volumes for roadway links on SR 17 north of I-16. Volumes on these links are expected to more than double due to the increased capacity and demand created by the construction of Jimmy DeLoach Parkway on the section of roadway.

**TABLE 17: VOLUME DISTRIBUTION DUE TO JIMMY DELOACH PARKWAY - SR 17 NORTH OF I-16**

| | CORE Travel Demand Model Output (Daily Volume) | | |
|---|---|---|---|
| **Model Link** | **2040 - NB** | **2040 - Bd** | **% Change** |
| SR 17 S/O Jimmy DeLoach/SR 17 split | 9,141 | 19,664 | 115.1% |
| SR 17/Jimmy DeLoach Pkwy N/O I-16 | 9,249 | 19,640 | 112.3% |
| **Average** | | | **113.7%** |

**Table 18** presents the model volumes for roadway links on Little Neck Road south of I-16. Volumes on these links are expected to slightly increase due to the construction of Jimmy DeLoach Parkway. Volumes on Little Neck Road increase by just over 10% while volumes on John Carter Road are minimally affected by the new construction.

**TABLE 18: VOLUME DISTRIBUTION DUE TO JIMMY DELOACH PARKWAY - LITTLE NECK ROAD SOUTH OF I-16**

| | CORE Travel Demand Model Output (Daily Volume) | | |
|---|---|---|---|
| **Model Link** | **2040 - NB** | **2040 - Bd** | **% Change** |
| Little Neck Road S/O I-16 | 11,896 | 13,266 | 11.5% |
| Little Neck Road S/O John Carter Road | 7,318 | 8,262 | 12.9% |
| John Carter Road W/O Little Neck Road | 6,980 | 7,174 | 2.8% |
| **Average** | | | **9.7%** |

**Table 19** presents the model volumes for roadway links on Pooler Parkway north of I-16. The construction of Jimmy DeLoach Parkway is expected to relieve traffic volumes on this roadway by about 15% due to the new direct connection from I-95 to I-16, bypassing the I-16 and I-95 interchange.

**TABLE 19: VOLUME DISTRIBUTION DUE TO JIMMY DELOACH PARKWAY - POOLER PARKWAY NORTH OF I-16**

| | CORE Travel Demand Model Output (Daily Volume) | | |
|---|---|---|---|
| **Model Link** | **2040 - NB** | **2040 - Bd** | **% Change** |
| Pooler Pkwy N/O I-16 | 27,768 | 23,491 | -15.4% |
| Pooler Pkwy N/O Pine Barren Road | 25,157 | 20,596 | -18.1% |
| **Average** | | | **-16.7%** |

**Table 20** presents the model volumes for roadway links on Pooler Parkway south of I-16. The construction of Jimmy DeLoach Parkway is not expected to have a significant impact on traffic volumes on this section of roadway.

**TABLE 20: VOLUME DISTRIBUTION DUE TO JIMMY DELOACH PARKWAY - POOLER PARKWAY SOUTH OF I-16**

| | CORE Travel Demand Model Output ( Daily Volume) | | |
|---|---|---|---|
| **Model Link** | **2040 - NB** | **2040 - Bd** | **% Change** |
| Pooler Pkwy S/O I-16 | 16,885 | 16,550 | -2.0% |
| **Average** | | | **-2.0%** |

**Table 21** presents the model volumes for Old River Road north of I-16. The construction of Jimmy DeLoach Parkway is not expected to have a significant impact on traffic volumes on this section of roadway.

**TABLE 21: VOLUME REDISTRIBUTION DUE TO JIMMY DELOACH PARKWAY - OLD RIVER ROAD NORTH OF I-16**

| | CORE Travel Demand Model Output (Daily Volume) | | |
|---|---|---|---|
| **Model Link** | **2040 - NB** | **2040 - Bd** | **% Change** |
| Old River Road N/O I-16 | 9,376 | 9,112 | -2.8% |
| **Average** | | | **-2.8%** |

**Table 22** presents the model volumes for Old River Road south of I-16. The construction of Jimmy DeLoach Parkway is not expected to have a significant impact on traffic volumes on this section of roadway.

**TABLE 22: VOLUME REDISTRIBUTION DUE TO JIMMY DELOACH PARKWAY - OLD RIVER ROAD SOUTH OF I-16**

| | CORE Travel Demand Model Output (Daily Volume) | | |
|---|---|---|---|
| **Model Link** | **2040 - NB** | **2040 - Bd** | **% Change** |
| Old River Road S/O I-16 | 7,929 | 8,182 | 3.2% |
| **Average** | | | **3.2%** |

**Table 16** presents the model volumes on I-16 throughout the study area. The construction of Jimmy DeLoach Parkway is expected to result in slightly lower volumes between SR 17/Jimmy DeLoach Parkway and Pooler Parkway, otherwise traffic volumes on I-16 are expected to increase slightly.

**TABLE 16: VOLUME REDISTRIBUTION DUE TO JIMMY DELOACH PARKWAY – I-16**

| | CORE Travel Demand Model Output (Daily Volume) | | |
|---|---|---|---|
| **Model Link** | **2040 - NB** | **2040 - Bd** | **% Change** |
| I-16 E/O Pooler Pkwy | 51,398 | 52,961 | 3.0% |
| I-16 Between Pooler Pkwy and SR 17/Jimmy DeLoach Pkwy | 44,936 | 43,156 | -4.0% |
| I-16 Between SR 17/Jimmy DeLoach Pkwy and Old River Rd | 47,243 | 49,048 | 3.8% |
| I-16 W/O Old River Rd | 46,464 | 50,007 | 7.6% |
| **Average** | | | **2.9%** |

### *Step 2 Recommended Conversion Factors*

The following suggested conversion factors for step 2 are based on the comparison of the 2040 Jimmy DeLoach Parkway No-Build and build conditions model output. Factors were calculated for links that are expected to have a significant impact due to the construction of Jimmy DeLoach Parkway, defined for the purposes of this study as an average percent change of approximately 10% or greater. These factors will be applied to corresponding roadway segment volumes to calculate the future 2030 volumes for this project, which assumes the completion of Jimmy DeLoach Parkway.

- *SR 17 north of I-16: 2.2*
- *Little Neck Road south of I-16: 1.2*
- *John Carter Road: 0.0*
- *Pooler Parkway north of I-16: 0.8*
- *Pooler Parkway south of I-16: 0.0*

- *Old River Road: 0.0*
- *I-16: 0.0*
- *Side Streets: 0.0*

## Step 3

This step will use growth rates estimated using output from 2030 and 2040 regional model output, both of which assume the construction of Jimmy DeLoach Parkway, to calculate 2050 Design Year Volumes for the project.

### *Model Output (2030 and 2040 with Jimmy DeLoach Parkway)*

Output from CORE MPO's regional travel demand model was used to calculate annual growth rates on segments from 2030 to 2040 assuming the completion of the Jimmy DeLoach Parkway project. **Table 23** presents the model volumes output for selected study segments.

**TABLE 23: GROWTH RATES BASED ON PROJECTED TRAFFIC VOLUMES (STEP 3)**

| Model Link | CORE TDM – Daily Volume 2030 (w/ JDP) | CORE TDM – Daily Volume 2040 (w/ JDP) | Growth Rate |
|---|---|---|---|
| SR 17/Jimmy DeLoach Parkway N/O I-16 | 15,012 | 19,664 | 2.7% |
| Jimmy DeLoach Parkway N/O SR 17 split | 15,057 | 19,640 | 2.7% |
| SR 17/Bloomingdale Road N/O Jimmy DeLoach Parkway split | 5,237 | 7,550 | 3.7% |
| SR 17/Bloomingdale Road N/O Pine Barren Road | 3,420 | 5,394 | 4.7% |
| SR 17/Bloomingdale Road S/O US 80 | 4,173 | 6,065 | 3.8% |
| Little Neck Road S/O I-16 | 11,705 | 13,266 | 1.3% |
| Little Neck Road S/O John Carter Road | 6,657 | 8,262 | 2.2% |
| John Carter Road W/O Little Neck Road | 7,110 | 7,174 | 0.1% |
| Pooler Pkwy S/O I-16 | 16,636 | 16,550 | -0.1% |
| Pooler Pkwy N/O I-16 | 23,248 | 23,491 | 0.1% |
| Pooler Pkwy N/O Pine Barren Road | 20,335 | 20,596 | 0.1% |
| Old River Road S/O I-16 | 8,045 | 8,182 | 0.2% |
| Old River Road N/O I-16 | 8,731 | 9,112 | 0.4% |
| I-16 E/O Pooler Pkwy | 53,010 | 52,961 | 0.0% |
| I-16 Between Pooler Pkwy and SR 17/Jimmy DeLoach Pkwy | 41,464 | 43,156 | 0.4% |
| I-16 Between SR 17/Jimmy DeLoach Pkwy and Old River Rd | 43,020 | 49,048 | 1.3% |
| I-16 W/O Old River Rd | 40,912 | 50,007 | 2.0% |
| **SUM / AVERAGE GROWTH RATE** | **323,772** | **360,118** | **1.1%** |

### *Step 3 Recommended Growth Rates*

The model output shows variations in growth rate in different sections of the study network, the following suggested growth rates for step 3 are based on the model output and take the historical growth rate and projected population and employment figures into consideration as well.

- *Jimmy DeLoach Parkway north of I-16: 2.5%*
- *Little Neck Road south of I-16: 1.5%*
- *Pooler Parkway north of I-16: 0.5%*
- *Pooler Parkway south of I-16: 0.5%*
- *Old River Road: 0.5%*
- *I-16: 1.0%*
- *Side Streets: 0.5%*

## Future Land Use and Development

Looking to the future development in the area is a necessary step recommendation of an interchange alternative. As part of this analysis, nearby roadway projects and existing land development plans were reviewed. The City of Bloomingdale does not currently have a future land use map available, however, the 2007 Southwestern Chatham County Sector Plan shows areas of potential development located just to the south of the project interchange. The Sector Plan anticipated several planned unit developments (PUDs) in the area south of the interchange. The Sector Plan was completed at the beginning stages for the 2000s recession so much of the planned development in the area has not been developed. With the construction and extension of the Jimmy Deloach Parkway, it is assumed that both residential and commercial development will follow. The areas directly surrounding the interchange are primarily vacant, but with the current zoning/land uses and nature of the roadway development, it is likely that this area will see additional growth.

# Description of Alternatives

Through the development of this report, four conditions have been developed for consideration for the future of this interchange (No-Build and three alternatives). The projected traffic operations for the 2018 existing conditions and the 2050 design year have been included below. It should be noted that a roundabout design was initially screened out of potential alternatives due to operational deficiency by 2050, design not conducive to heavy truck volumes, and the footprint leading to significant right-of-way and environmental impacts.

# No Build

## 2018 Existing Conditions

The existing conditions are a standard diamond interchange with stop control located on the egress ramps.

**TABLE 24: 2018 EXISTING CONDITIONS**

| Intersection Operations | | | | | | |
|---|---|---|---|---|---|---|
| **Intersection** | | | **2018 Existing Conditions** | | | |
| | | | **AM Peak** | | **PM Peak** | |
| | | | **Delay (s/veh)** | **LOS** | **Delay (s/veh)** | **LOS** |
| SR 17 at I-16 WB | | | 2.7 | A | 3.5 | A |
| SR 17 at I-16 EB | | | 2.8 | A | 1.6 | A |
| **Freeway Operations** | | | | | | |
| **Freeway** | **Dir** | **Type** | **Density** | **LOS** | **Density** | **LOS** |
| I-16 @ SR 17/Little Neck Road | EB | Diverge | 9.7 | A | 6.8 | A |
| | | Merge | 11.8 | B | 8.1 | A |
| | WB | Diverge | 6.4 | A | 14.5 | B |
| | | Merge | 4.6 | A | 9.9 | A |

## 2050 No-Build Conditions – Existing Diamond Interchange

No-Build – Jimmy DeLoach Parkway is completed, no interchange modification to the existing conventional diamond interchange

**TABLE 25: 2050 NO-BUILD CONDITIONS**

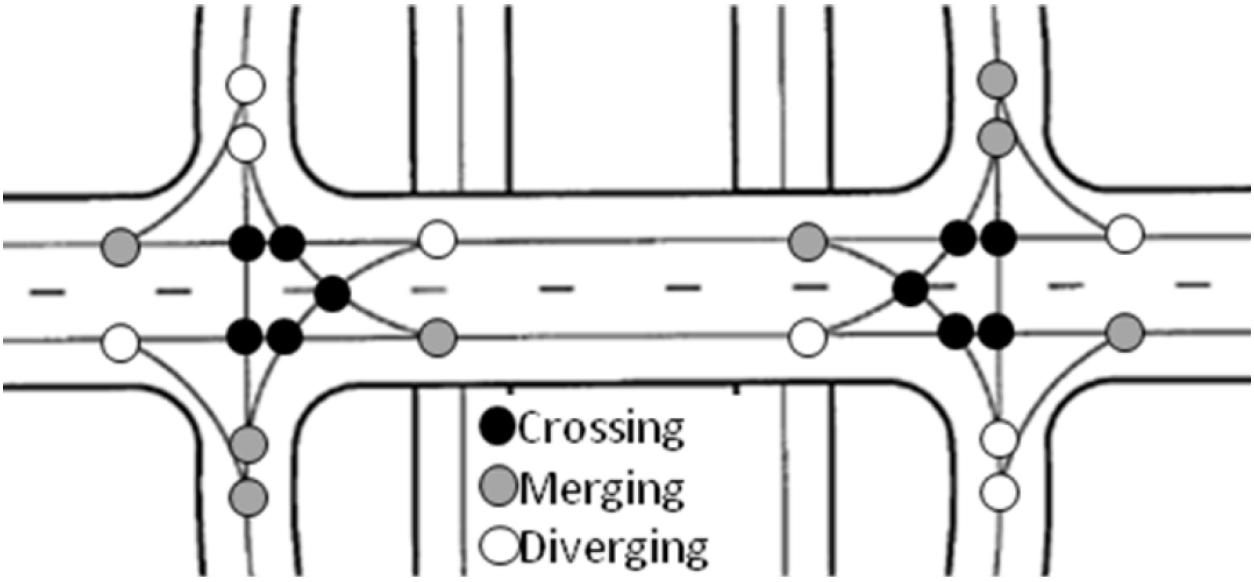
| Intersection Operations | | | | | | |
|---|---|---|---|---|---|---|
| **Intersection** | | | **2050 No-Build** | | | |
| | | | **AM Peak** | | **PM Peak** | |
| | | | **Delay (s/veh)** | **LOS** | **Delay (s/veh)** | **LOS** |
| SR 17 at I-16 WB | | | 50.1 | F | 27.2 | D |
| SR 17 at I-16 EB | | | 51.5 | F | 41.3 | E |
| **Freeway Operations** | | | | | | |
| **Freeway** | **Dir** | **Type** | **Density** | **LOS** | **Density** | **LOS** |
| I-16 @ SR 17/Little Neck Road | EB | Diverge | 167.2 | E/F | 139.7 | E/F |
| | | Merge | 7.4 | A | 8.2 | A |
| | WB | Diverge | 158.9 | E/F | 117.8 | E/F |
| | | Merge | 2.0 | A | 5.8 | A |
| | WB | Basic | 147.9 | E/F | 120.3 | E/F |

## Build Alternatives

### Alternative 1 – Conventional Diamond Concept

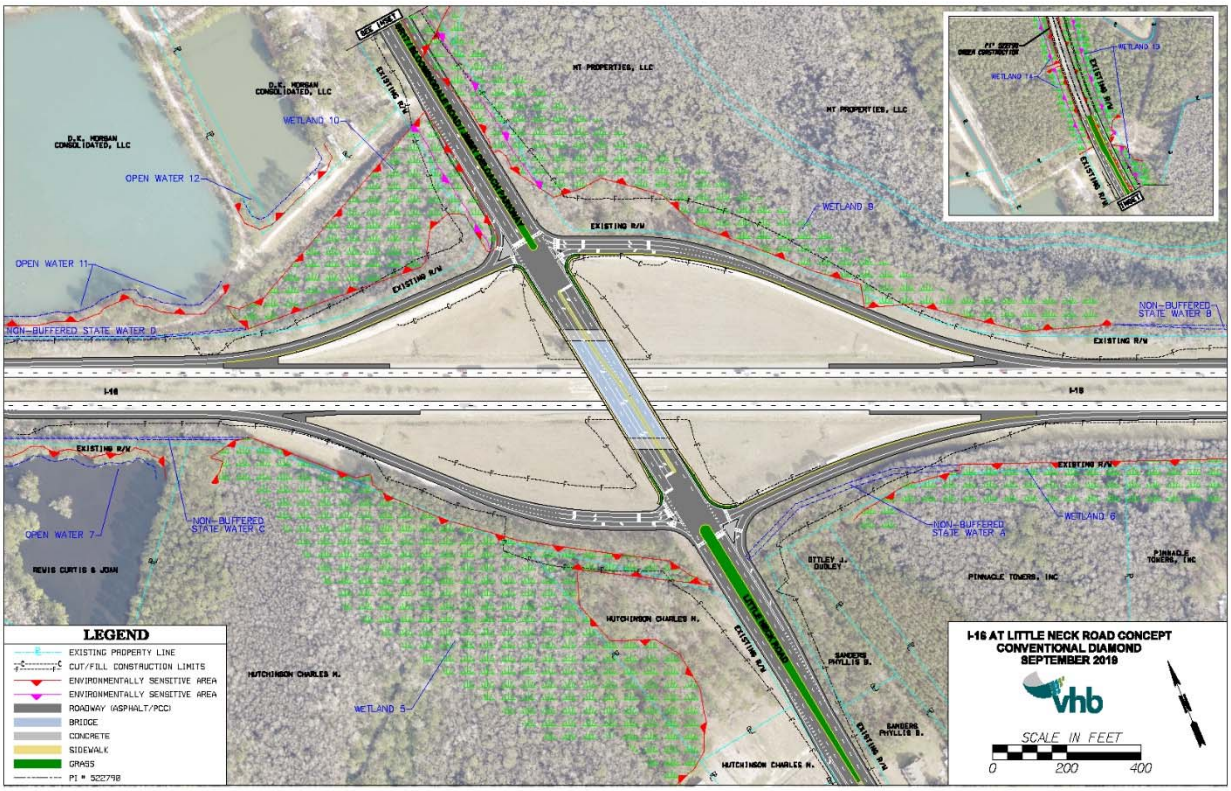
Alternative 1 Conventional Diamond Interchange – The mainline operations for SR 17/Little Neck Road are not expected to change much as a result of Alternative 1. The access points and traffic movement will remain very similar to existing conditions. **Figure 7** shows a typical Diamond interchange with the traffic movement and conflict points identified. **Figure 8** below depicts the suggested alignment for Alternative 1.

**FIGURE 7: CONVECTIONAL DIAMOND INTERCHANGE AND CONFLICT POINTS**




*Source: FHWA 09060 Alternative Intersections –Interchanges Informational Report*

**FIGURE 8: ALTERNATIVE 1 - CONVENTIONAL DIAMOND CONCEPT**




## 2050 Build Conditions Alternative 1 – Diamond Interchange

Alternative 1 – Diamond Interchange (modification of existing diamond interchange)

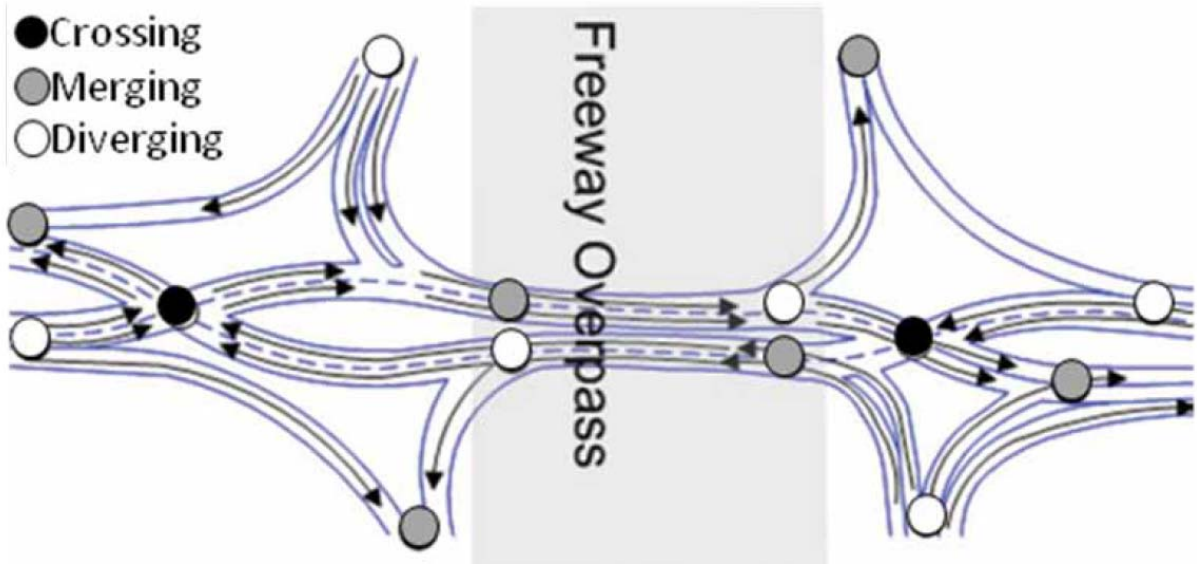
**TABLE 26: ALTERNATIVE 1 - DIAMOND INTERCHANGE**

| Intersection Operations | | | | | | |
|---|---|---|---|---|---|---|
| **Intersection** | | | **2050 Diamond Interchange** | | | |
| | | | **AM Peak** | | **PM Peak** | |
| | | | **Delay (s/veh)** | **LOS** | **Delay (s/veh)** | **LOS** |
| SR 17 at I-16 WB | | | 32.5 | C | 15.0 | B |
| SR 17 at I-16 EB | | | 39.1 | D | 16.1 | B |
| **Freeway Operations** | | | | | | |
| **Freeway** | **Dir** | **Type** | **Density** | **LOS** | **Density** | **LOS** |
| I-16 @ SR 17/Little Neck Road | EB | Diverge | 15.5 | B | 13.1 | B |
| | | Merge | 17.5 | B | 13.3 | B |
| | WB | Diverge | 11.2 | B | 19.1 | B |
| | | Merge | 8.8 | A | 13.7 | B |

## Alternative 2 – Diverging Diamond Interchange

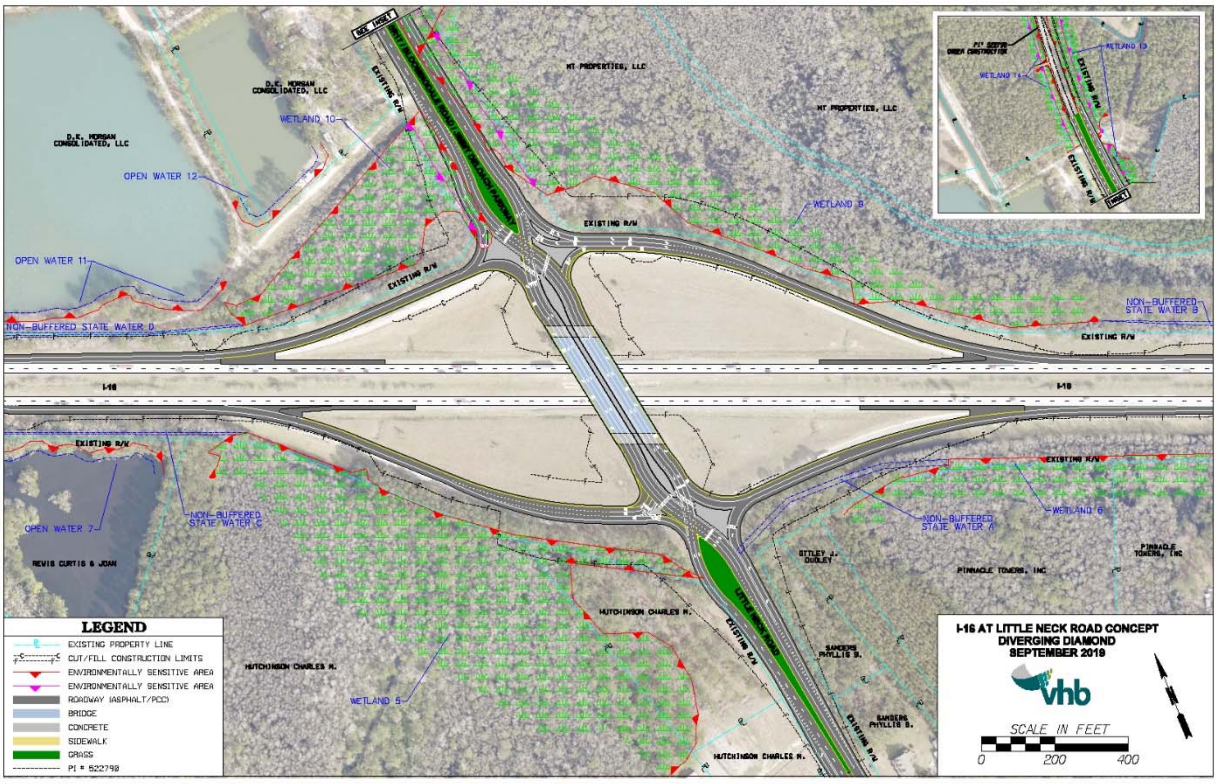
Alternative 2 –Diverging Diamond Interchange: The mainline operations along SR 17/Little Neck Road will be less conventional as a result of Alternative 2. Similar to Alternative 1, the interstate access points will remain the same, however, the SR 17 travel lanes will diverge in order to provide more direct access to the ingress/egress ramps. This diverging action is less common than the other two alternatives and will be different than the standard travel lanes that are currently in place. Public outreach and education are recommended when implementing diverging diamond interchanges. **Figure 9** below depicts a typical diverging diamond interchange and how the traffic movement is conducted, while **Figure 10** below depicts the suggested alignment for alternative 2.

**FIGURE 9: DIVERGING DIAMOND INTERCHANGE CONFLICT POINTS**




*Source: FHWA 09060 Alternative Intersections –Interchanges Informational Report*

**FIGURE 10: ALTERNATIVE 2 - DIVERGING DIAMOND CONCEPT**




## 2050 Build Conditions Alternative 2 – Diverging Diamond Interchange

Alternative 2 – Diverging Diamond Interchange, using four total ingress/egress ramps

**TABLE 27: ALTERNATIVE 2 - DIVERGING DIAMOND INTERCHANGE**

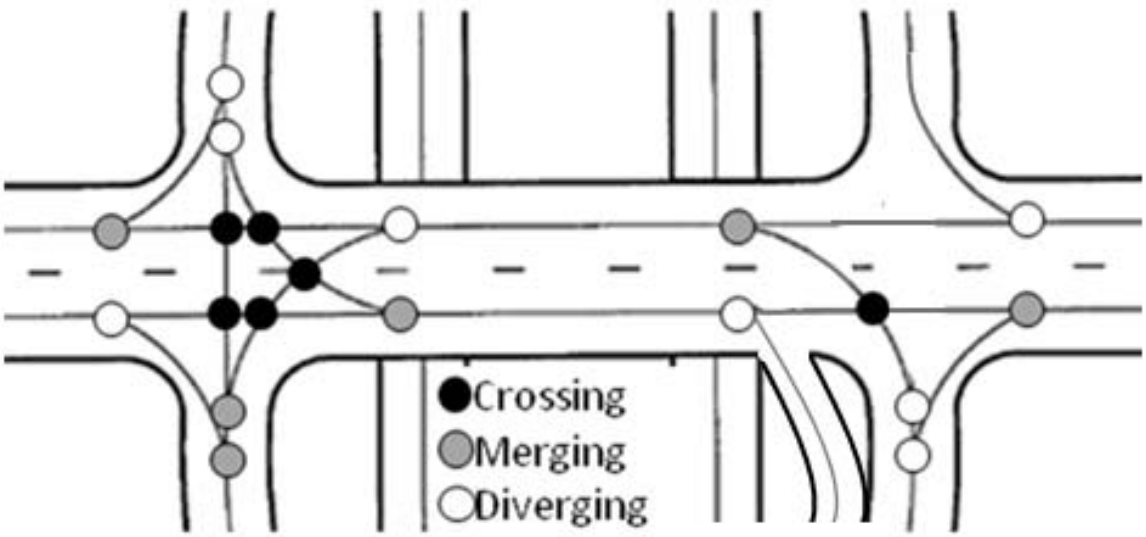
| **Intersection Operations** | | | | | | |
|---|---|---|---|---|---|---|
| **Intersection** | | | **2050 Diverging Diamond Interchange** | | | |
| | | | **AM Peak** | | **PM Peak** | |
| | | | **Delay (s/veh)** | **LOS** | **Delay (s/veh)** | **LOS** |
| SR 17 at I-16 WB | | | 16.9 | B | 14.7 | B |
| SR 17 at I-16 EB | | | 13.1 | B | 11.9 | B |
| **Freeway Operations** | | | | | | |
| **Freeway** | **Dir** | **Type** | **Density** | **LOS** | **Density** | **LOS** |
| I-16 @ SR 17/Little Neck Road | EB | Diverge | 15.6 | B | 13.1 | B |
| | | Merge | 22.3 | C | 14.9 | B |
| | WB | Diverge | 11.2 | B | 19.3 | B |
| | | Merge | 9.0 | A | 14.6 | B |

## Alternative 3 – Partial Cloverleaf Interchange

Alternative 3 - Partial Cloverleaf Interchange – The mainline operations for Alternative 3 will be similar to the existing operations with the exception of an additional interstate access point. This alternative suggests the development of a new loop which provides uninterrupted flow from SR 17/Little Neck Rd. The partial cloverleaf provides eastbound access to I-16 from southbound SR 17/Little Neck Road. **Figure 11** shows the conflict points associated with a partial clover leaf interchange. **Figure 12** below depicts the suggested alignment for Alternative 3.

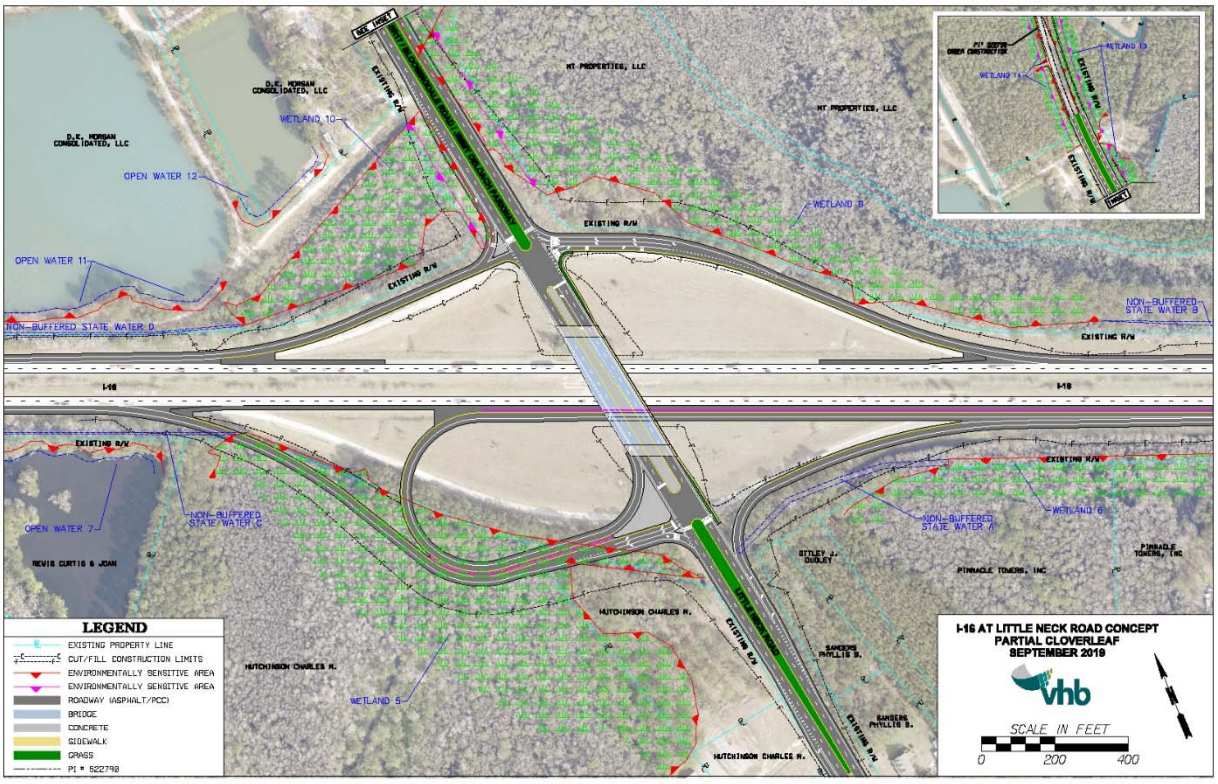
Based upon the build year (2030) and design year (2050) traffic operations analysis results, each of the three alternatives is anticipated to greatly improve the LOS at the interchange and throughout the study area. The Projected Alternative Performance Section below details how the traffic operations are projected to perform in the 2050 design year.

**FIGURE 11: PARTIAL CLOVERLEAF CONFLICT POINTS**




*Source modified from: FHWA 09060 Alternative Intersections –Interchanges Informational Report*

**FIGURE 12: ALTERNATIVE 3 - PARTIAL CLOVERLEAF INTERCHANGE**




## 2050 Build Conditions Alternative 3 – Partial Cloverleaf Interchange

Alternative 3 – Partial Cloverleaf Interchange using four ingress/egress ramps with the addition of a new I-16 ingress loop from southbound SR 17/Little Neck Rd.

**TABLE 28: ALTERNATIVE 3 - PARTIAL CLOVERLEAF INTERCHANGE**

| **Intersection Operations** | | | | | | |
|---|---|---|---|---|---|---|
| **Intersection** | | | **2050 Partial Cloverleaf Interchange** | | | |
| | | | **AM Peak** | | **PM Peak** | |
| | | | **Delay (s/veh)** | **LOS** | **Delay (s/veh)** | **LOS** |
| SR 17 at I-16 WB | | | 15.3 | B | 16.5 | B |
| SR 17 at I-16 EB | | | 18.9 | B | 13.2 | B |
| **Freeway Operations** | | | | | | |
| **Freeway** | **Dir** | **Type** | **Density** | **LOS** | **Density** | **LOS** |
| I-16 @ SR 17/Little Neck Road | EB | Diverge | 14.5 | B | 12.2 | B |
| | | Merge | 24.6 | C | 16.6 | B |
| | WB | Diverge | 11.3 | B | 19.3 | B |
| | | Merge | 8.6 | A | 13.6 | B |

## Cost Estimates

As part of this study, planning level cost estimates have been developed for each of the proposed alternatives. The estimated costs for these alternatives are below:

**TABLE 29: ALTERNATIVE COST ESTIMATES**

| Interchange Alternatives | Est. Construction Cost | Est. PE Cost | Est. Utility Cost | Est. Mitigation Cost | Est. Right of Way Cost | Est. Total Cost |
|---|---|---|---|---|---|---|
| No-Build | N/A | N/A | N/A | N/A | N/A | N/A |
| Conventional Diamond | $25,185,000 | $2,200,000 | $350,000 | $180,550 | $270,000 | **$28,185,550** |
| Diverging Diamond | $26,979,000 | $2,400,000 | $350,000 | $193,200 | $275,000 | **$30,197,200** |
| Partial Cloverleaf | $28,434,000 | $2,700,000 | $400,000 | $340,480 | $300,000 | **$32,174,480** |

# Environmental Screening

As part of this study, and environmental screening was conducted in the area surrounding the interchange to identify potential environmental concerns. Figures identifying the limits and full environmental screening have been included in **Appendix P.**

## Historic and Archaeological Resources

The archeological review identified four archeological sites within a 1 km radius of the screening area, however, they have been recommended as ineligible for the National Register of Historic Places. (NRHP)

The historical review identified two historic liner resources, I-16 and SR 17/Little Neck Road, that may be considered eligible for listing on the National Register (NR). Consultation with Georgia's state historic preservation office (SHPO) is needed to determine final eligibility. While there are no NR-listed historic resources within the environmental screening area it was noted that at least two mobile home parks are visible on aerial photography from 1971 and while tax records indicate that all mobile home parks within the screening area are non-historic, additional research and documentation are required before an adequate assessment of each property's NR eligibility can be made.

## Wetlands and Streams

The ecology screening identified ten wetlands, four open waters, and five non-buffered state waters (canals). Any impacts to the wetlands or open waters would require a permit from the United States Corps of Engineers and recommends Regional Permit 30 (RP 30) as a possible applicable permit.

## Protected Species

The ecology screening also identified potential habitat for four protected species. The screening report recommends further examination of these habitats during project development to determine the suitability of the habitats to the identified species.

## Hazardous Materials

No underground storage tanks or hazardous materials sites have been identified in the area.

## Environmental Justice

Based on the 2011-2015 American Community Survey, and the Environmental Protection Agency (EPA) EJSCREEN Mapping Tool, there are a number of residential areas along the entire proposed project corridor that have a significant percentage of "Households below Poverty Level". Low income populations in the 50-60 percentile range north of I-16, and less than 50 percent south of the interstate. Minority populations are the less than 50-percentile category around the interchange. An EJ analysis should be conducted for the proposed alternative once developed to determine any impacts to these communities.

## Community Impacts and Public Understanding

Though the surrounding area is lightly populated, several planning studies have been conducted in the Southwest Chatham County area that have identified and assessed the transportation needs associated with future development. Previous outreach efforts indicate that the public is in favor of growth in the area and transportation improvements to mitigate congestion impacts from new growth. As a result of these existing studies and proposed development, the public and stakeholders have been given the opportunity to provide feedback on the future of the Southwest Sector.

Fortunately, the proposed interchange alternatives will primarily use the existing right-of-way (ROW) associated with the existing interchange design with limited additional impacts anticipated. Alternative 3 is anticipated to require additional right-of-way and wetland mitigation than the other alternatives to accommodate the partial cloverleaf. Though each of the alternatives utilizes a different design concept, the general purpose and vehicular access to the interchange will remain unchanged. Outside of the projected LOS benefits, changes to the interchange are not anticipated to negatively impact the public with the exception of temporary disturbances caused by construction, if an alternative is implemented.

Though each of the proposed interchange alternatives are standard and conform to GDOT and FHWA rules and regulations, Alternative 2 suggests a less conventional vehicular movement and may require additional public involvement prior to implementation. A diverging diamond interchange (Alternative 2) requires traffic to diverge from its normal pattern and to travel on the left side of the road for a short distance before returning to more conventional movement.

The resulting divergence helps reduce the number of conflict points at the intersection but requires additional signage, signaling, and pavement markings to implement. In order to improve public opinion and understanding of a diverging diamond interchange, an outreach/educational campaign should be implemented prior to opening. This campaign will help users navigate this unconventional interchange and improve the safety of the area.

Regardless of the chosen alternative, it has become apparent through previous studies and outreach that the residents of Chatham County are interesting in the growth and development within the Southwest Chatham County area. The proposed modifications to this interchange will help support the suggested development and should perform in a way that little to no negative impacts will be felt by the average traveler.

### Potential to Effect

The No-Build alternative is the only alternative that is anticipated to have no impact to the nearby environmental features, however, each of the alternatives are not likely to have significant impacts. Each of the alternatives primarily modify existing and disturbed right-of-way and is unlikely to have significant impacts to nearby environmental features. Wetlands in the area may be impacted depending upon the preferred alternative but these impacts are anticipated to be under 8 acres.

### Environmental Next Steps

As the project moves forward, a more advanced environmental review will likely be necessary. The project will likely be subject to NEPA guidelines which will require the development of an Environmental Assessment for a more thorough analysis of the existing conditions.

# Justification of Interstate Modification

### Recommendation

Based on the information contained within this report, improvement to this interchange is recommended to safely and efficiently mitigate the expected future 2050 design year traffic. Without improvement by year 2050, the existing alignment is projected to operate at deficient levels of service (LOS F) conditions. Based upon the project interchange evaluation matrix presented in this document, Alternative 2 – Diverging Diamond is recommended for advancement as it best meets the project evaluation criteria.

### Correspondence with FHWA Policy Points

Each of the three alternatives evaluated meets the criteria set forth by both FHWA Policy Point 1 and 2 presented below.

- *Policy Point 1 – Each of the alternatives are anticipated to improve safety conditions and levels of service at the project interchange when compared to the No-Build alternative*
- *Policy Point 2 – The alternatives connect only to public roads and will continue to provide for all traffic movements thereby maintaining a "full interchange" with appropriate signage and wayfinding.*

The No-Build alternative is anticipated to exhibit failing Levels of Service and higher crash rates when compared to the three build alternatives. Each of the alternatives is anticipated to improve the future travel conditions at this interchange while continuing to function as a "full" interchange" as required by Policy Point 2.

## Evaluation Methodology

The alternatives have been prioritized to determine the most beneficial option using available data, traffic analysis and cost estimates completed as part of this assessment. The project evaluation process including the assessment of existing and 2050 traffic design year conditions within the study area and planning level cost estimates. Using available data and information, each of the alternatives have been analyzed and compared using the designated project evaluation criteria. Each of the three alternatives was scored using a low/medium/high rating system corresponding to a value of 1, 2 or 3, respectively. The alternatives were (first?) evaluated for an applicability to the criteria using a yes/no, system. For the applicable criteria, a numeric value of "3" was assigned to the best performing alternative and the others were given a score between "1" and "3".

Using the available information, the No-Build alternative and the three alternatives were compared using a series of criteria intended to identify the most beneficial outcome. Fourteen (14) criteria were utilized as part of the project evaluation framework and are presented in **Table 30**. The full evaluation matrix can be seen in **Table 31**.

**TABLE 30: ALTERNATIVES EVALUATION CRITERIA**

| Primary Criteria | Secondary Criteria |
|---|---|
| Addresses Project Need/Purpose | N/A |
| Preliminary Cost | N/A |
| Overall Benefit/Cost* | N/A |
| Traffic Operations | Interchange Spacing |
| | Level of Service |
| | Travel Time Savings |
| Operational Safety | Crash Reductions |
| | Conflict Point Reductions |
| Improved Access | Increased Freight Access |
| | Increased Regional Access |
| Consistency with Planned/Programed Projects | N/A |
| Impacts*** | Community |
| | Environmental |
| Public Support | N/A*** |

* Benefit/cost values were calculated using the table found in **Appendix Q**

** Impacts where identified based upon the *Environmental Screening Report* in **Appendix P**

*** Public Support and the relationship to previous studies can be found in **Appendix R**

## Evaluation Results

The results of this alternatives evaluation indicate Alternative 2 (Diverging Diamond) is the best based upon the evaluation criteria. All three of the alternatives exhibit both positive and negative impacts, but Alternative 2 ranks the highest given the analysis described herein.

## TABLE 31: EVALUATION MATRIX

| | | | | Alternatives | | | Ranking | | |
|---|---|---|---|---|---|---|---|---|---|
| **Evaluation Criteria** | **Evaluation Sub Criteria** | Criteria Metrics | Criteria Notes | **Alternative 1** | **Alternative 2** | **Alternative 3** | **Score Positive =3; Medium =2; Negative =1 Yes = 3; No = 1 Scores with decimals represent a percentage from the top score (3)** | | |
| **Type of Improvement** | **Improvement Description** | | | Diamond Interchange (Modified) | Diverging Diamond Interchange | Partial Cloverleaf Interchange | **ALT 1** | **Alt 2** | **Alt 3** |
| **Addresses Project Need and Purpose** | | Yes/No | Alternatives are anticipated to address the project need and purpose. | Yes | Yes | Yes | 3.00 | 3.00 | 3.00 |
| **Preliminary Cost** | | Low/Med/High | | $28,185,550 | $30,197,200 | $32,174,480 | 3.00 | 2.80 | 2.63 |
| **Overall Benefit / Cost** | | Low/Med/High | Analysis considering the value of vehicle travel time and estimated costs | High (7.09) | Medium (6.64) | Medium (5.99) | 3.00 | 2.81 | 2.53 |
| **Traffic Operations** | **Sufficient Interchange Spacing** | Yes/No | Each alternative is proposed at the current interchange, spacing will not be an issue. | Yes | Yes | Yes | 3.00 | 3.00 | 3.00 |
| | **Level of Service** | Low(A-B) / Med(LOS C) / High(LOS D or higher) | Average taken from the Applicable LOS Scores | Low-Med | Low | Low | 2.00 | 3.00 | 3.00 |
| | **Vehicle Delay Savings** | Low/Med/High | Average of AM and PM travel delay (s/veh) High = Less Time Traveling; Low = More Time Traveling | Medium (72.3) | High (59.4) | Medium (77.2) | 2.46 | 3.00 | 2.31 |
| **Operational Safety** | **Reduced crashes Based on predicted crash costs** | Yes/No | Alternatives are anticipated to reduce crashes | Yes | Yes (3) | Yes | 0.96 | 3.00 | 1.03 |
| | **Reduced conflict points** | Yes/No | Only alternative 2 will reduce conflict points | No | Yes | No | 1.62 | 3.00 | 1.62 |
| **Improved Access** | **Increased Freight Access** | Yes/No | Alternatives are anticipated to increase Freight Access | Yes | Yes | Yes | 3.00 | 3.00 | 3.00 |
| | **Increased Regional Access** | Yes/No | Alternatives are anticipated to increase Regional Access | Yes | Yes | Yes | 3.00 | 3.00 | 3.00 |
| **Consistency with Programmed/Planned Projects** | **Yes/No** | Yes | Each of the alternatives will coincide with the planned and programmed projects in the area | Yes | Yes | Yes | 3.00 | 3.00 | 3.00 |
| **Impacts** | **Community** | Low/Med/High | EJ communities, land use/zoning, Historic Places, Archeological Sites, and Community Facilities such as churches, hospitals, schools, etc. | Low | Low | Low | 3.00 | 3.00 | 3.00 |
| | **Environmental** | Low/Med/High | Wetlands (total impacted acreage) | High (4.12 wetland acres) | Medium (4.41 wetland acres) | High (7.78 wetland acres) | 3.00 | 2.80 | 1.59 |
| **Public Support** | **Yes/No** | | All projects are anticipated to be accepted by the public | Yes | Yes | Yes | 3.00 | 3.00 | 3.00 |
| **Overall Rating** | | | | **Second** | **First** | **Third** | **37.04** | **41.41** | **35.71** |

# Recommended Interim Improvements

The opening of the extension of Jimmy DeLoach Parkway (PI 522790) which will tie in directly to the north leg of the interchange and is set to open by 2021. Once this roadway opens, the interchange will experience a significant increase in traffic, almost immediately, as this becomes a primary route between I-16 and the Georgia port area. The impact of the traffic increase from the Jimmy DeLoach opening will need to be addressed prior to full construction of the Little Neck Interchange project. The following summarizes the recommended interim improvements that can be implemented prior to the construction and opening of the Little Neck interchange rebuild. The Little Neck Interchange improvements are identified to open to traffic by the year 2030, so the interim improvements discussed herein must provide adequate level of service until then. The planning, design, and construction of these recommended interim improvements will take approximately two years to complete, so action taken to address these improvements should take place soon.

## Jimmy DeLoach Parkway Extension Open Year (2021) Conditions

**Figure 13** below shows the forecasted traffic volumes at the interchange in year 2021, after the Jimmy DeLoach project (PI 522790) has opened to traffic. These volumes were used to conduct an operational analysis, using Synchro software, of the ramp terminal intersections in the existing condition (i.e., single lane approaches, no turn lanes, minor stop-controlled). The results of the No Build analysis are shown in **Table 32** below.

**FIGURE 13: 2021 TRAFFIC VOLUMES**

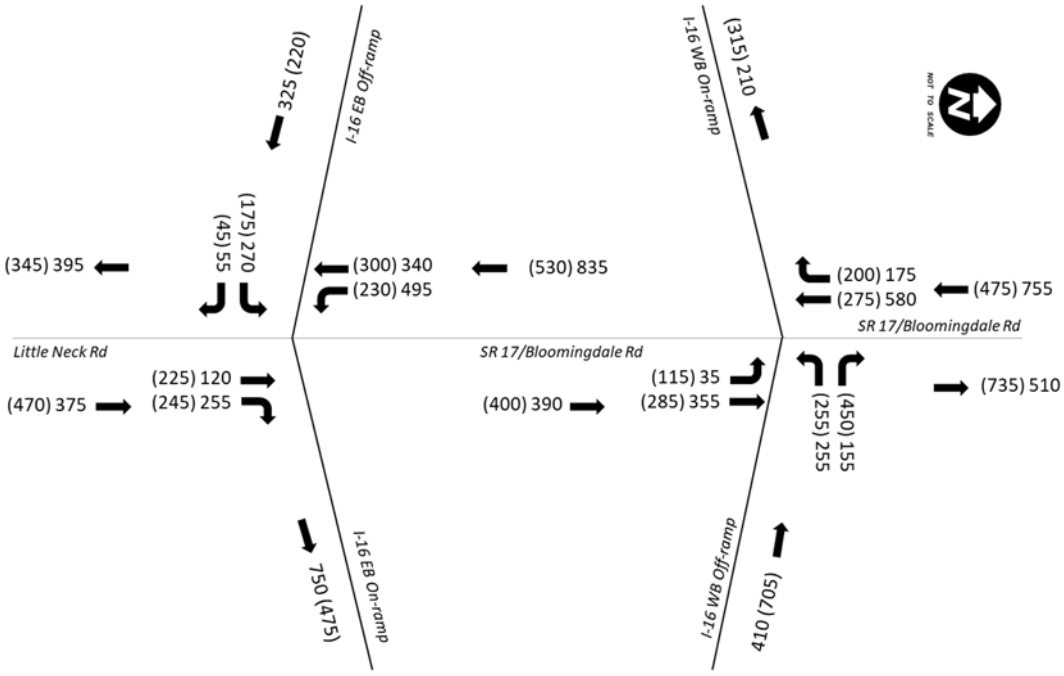


**TABLE 32: NO BUILD LOS**

| Intersection | Movement | AM Peak | | PM Peak | |
|---|---|---|---|---|---|
| | | Delay (sec/veh) | LOS | Delay (sec/veh) | LOS |
| I-16 EB Ramps at Little Neck Rd (unsignalized) | EB LT | 438.4 | F | 88.5 | F |
| I-16 WB Ramps at Little Neck Rd (unsignalized) | WB LT | 39.3 | E | 39.2 | E |

As can be seen in the table, the I-16 eastbound ramp intersection will operate at a deficient LOS in 2021 with the opening of the Jimmy DeLoach Parkway extension.

## Recommended Interim Improvements

In order to maintain acceptable operations and LOS at the interchange, the following improvements should be implemented:

1. Add right turn lanes on the ramp approaches to the intersections.
2. Convert the intersections to signalized control.

**Table 33** below shows the results of the Synchro analysis for year 2021 with the addition of the above intersection improvements. As can be seen in the table, these improvements will result in acceptable LOS at the opening of Jimmy DeLoach Parkway extension.

**TABLE 33: INTERIM IMPROVEMENTS LOS, 2021**

| Intersection | AM Peak | | PM Peak | |
|---|---|---|---|---|
| | Delay (sec/veh) | LOS | Delay (sec/veh) | LOS |
| I-16 EB Ramps at Little Neck Rd (signalized) | 16.7 | B | 9.4 | A |
| I-16 WB Ramps at Little Neck Rd (signalized) | 17.2 | B | 14.2 | B |

With the assumed opening of the Little Neck interchange reconstruction to occur by the year 2030, it is necessary to analyze the operations of the interim improvements up until that time. **Table 34** below shows the results of the Synchro analysis for year 2030 with the interim improvements.

**TABLE 34: INTERIM IMPROVEMENTS LOS, 2030**

| Intersection | AM Peak | | PM Peak | |
|---|---|---|---|---|
| | Delay (sec/veh) | LOS | Delay (sec/veh) | LOS |
| I-16 EB Ramps at Little Neck Rd (signalized) | 19.3 | B | 16.7 | B |
| I-16 WB Ramps at Little Neck Rd (signalized) | 44.1 | D | 10.3 | B |

The southbound approach at the WB ramp intersection will experience LOS D conditions by 2030. Assuming consistent background growth, this intersection will experience insufficient LOS E on the southbound approach by 2032 – validating the case for completing the ultimate design alternative for the interchange by 2030.

## Traffic Signal Warrant Analysis

In order to justify the installation of traffic signals at the ramp intersections, VHB conducted a signal warrant analysis using the projected 2021 volumes when Jimmy DeLoach Parkway Extension opens. This analysis was done in accordance with the MUTCD for the following warrants:

- Warrant 1A (8-hour, Minimum Vehicular Volume)
- Warrant 1B (8-hour, Interruption of Continuous Traffic)
- Warrant 2 (4-hour, Vehicular Volume)
- Warrant 3 (Peak Hour)

Because the location of this interchange is in a rural, isolated community area, the warrants were evaluated at 70% threshold values as described in the MUTCD. Additionally, the right-turning traffic was removed from the volumes used in the warrant analysis. The results of the warrant analysis for the EB and WB interchange ramps are shown below in **Table 35**.

**TABLE 35: SIGNAL WARRANT ANALYSIS**

| Intersection | Signal Warrant Conditions Met | | | | |
|---|---|---|---|---|---|
| | 1A – 70% | 1B – 70% | 1A+1B – 56% | 2 | 3 |
| I-16 EB ramps | no | **YES** | **YES** | **YES** | **YES** |
| I-16 WB ramps | **YES** | no | **YES** | **YES** | **YES** |

## Summary of Recommended Interim Improvements

Based on the analysis conducted and presented in this section, the following interim improvements are recommended:

1. Add right turn lanes on the ramp approaches to the intersections.
2. Convert the intersections to signalized control.

These improvements are based on the results of the traffic operational analysis performed using Synchro software, and verification of the signal installation using the signal warrant analysis methodology from MUTCD. The estimated cost of implementing these interim improvements will be approximately $2.5 million, which includes design and construction costs. At the opening year of the Jimmy Deloach Parkway Extension project, the interchange intersections will meet Warrants 1A, 1B, 2, and 3. These improvements will allow acceptable traffic operations at the Little Neck interchange all the way up to and including the Open Year of the interchange improvements expected in 2030.

# Public Engagement

A community open house was held on Tuesday, December 3, 2019 from 4 p.m. to 6 p.m. The event was held at the City of Bloomingdale City Hall, located at 8 West Highway 80, which is in close proximity to the project area. The meeting was advertised in the Savannah Morning News on Sunday, November 24 with a public notice legal ad. In addition, the City of Bloomingdale shared the meeting notice on the city's website and Facebook page. The notice was also provided to the CORE MPO and Chatham County for distribution to their networks. Nine members of the community attended the open house, including two members of the City of Bloomingdale City Council.

The open house consisted of project display boards which illustrated the three design alternatives and provided additional information about the cost-benefit ratios and other criteria utilized for evaluation of the alternatives. Representatives were available to speak with meeting attendees and answer questions. In addition to the project displays, a four-page handout was available which provided an overview of the project, evaluation criteria, and detailed layout of each of the three alternatives.

In order to gather feedback from the community, a comment form was provided at the open house and made available through an online survey. Two survey forms were completed and returned. Both respondents live in the City of Bloomingdale and use the interchange daily. Both respondents also prefer the Diverging Diamond Interchange alternative. Additional comments:

- "There is already a lot of traffic from John Carter to 17. When you widen 17 past John Carter you will need a light to allow safe entry to 17."
- "We need an opening (in the safety cable) east and west on I-16 for emergency use only."

In addition to the community open house, presentations were made to the CORE MPO on several occasions. Presentations were provided to the Technical Coordinating Committee (TCC) on 10/18/18, 6/20/19, and 10/17/19 and to the CORE MPO Policy Board on 6/26/19 and 10/30/19.

# Next Steps

This study has provided a template for the subsequent FHWA process of conducting an Interchange Modification Report (IMR), containing the necessary information to modify the existing interchange configuration. The IMR procedure is fully detailed in GDOT *Policy #3140-1-Responsibility and Procedures for Interchange Justifications IJR and Interchange Modifications IMR Reports*. The IMR guidelines will address the local entities' request for this modification. Since the interchange modification is a function of design issues, the design office managing the project is responsible for the preparation of the IMR. Preparation of the IMR and supporting material should be incorporated in the Department's design/concept contracts as a deliverable. The process of the IMR will lead to a selected Preferred Alternative for the interchange based on evaluation of operational, safety, and cost measures. Once the IMR has been approved by FHWA, a Concept Report can be undertaken consistent with the requirements of the GDOT Plan Development Process for the design and evaluation of the selected Preferred Alternative.