Town of Hilton Head Island

William Hilton Parkway Gateway Corridor Independent Review Advisory Committee Meeting

Wednesday, May 8, 2024, 1:00 PM
1 Town Center Court, Hilton Head Island, SC
Benjamin M. Racusin Council Chambers

The meeting can be viewed on the Town's YouTube Channel, the Beaufort County Channel, and Spectrum Channel 1304.

1. **Call to Order**
2. **Approval of the Minutes**
   - **a.** Regular Meeting Minutes of April 10, 2024
   - **b.** Special Meeting Minutes of April 22, 2024
3. **Unfinished Business**
   - **a.** Update on Project Progress
   - **b.** Update on Committee Requests
   - **c.** Presentation of Findings - SCDOT Seismic Study Review
   - **d.** Presentation of Finding - Technical Report
   - **e.** Review of Overall Evaluation Matrix for 4 Alternatives
   - **f.** Observations Related to Southern "Bypass" Alternative
4. **Appearance by Citizens**
5. **New Business**
6. **Adjournment**

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requirements of the Town of Hilton Head Island.

In accordance with the requirements of Title II of the Americans with Disabilities Act of 1990 ("ADA"), the Town of Hilton Head Island will not discriminate against qualified individuals with disabilities on the basis of disability in its services, programs, or activities. Auditory accommodations are available. Any person requiring further accommodation should contact the Town of Hilton Head Island ADA Coordinator as soon as possible but no later than 48 hours before the scheduled event.

Municipal Association of South Carolina (MASC) Civility Pledge:
“I pledge to build a stronger and more prosperous community by advocating for civil engagement, respecting others and their viewpoints, and finding solutions for the betterment of my city or town.”

Town of Hilton Head Island
WILLIAM HILTON PARKWAY GATEWAY CORRIDOR INDEPENDENT REVIEW ADVISORY COMMITTEE MEETING
Wednesday, April 10, 2024, 1:00 PM
Minutes

1. Call to Order

Mayor Perry called the meeting to order at 2:00 PM. Those present were: Mayor Alan Perry, Chairman; Edward C. Warner, Jr.; Charles P. Walczak, PE; William Young; and Diederik Advocaat, attending remotely. Herbert Ford, Alternate, was not present.

2. Approval of the Minutes

a. Regular Meeting Minutes of March 27, 2024

Mayor Perry noted a change to be made to the March 27, 2024, minutes in that Charles P. Walczak, PE, should have been shown as present. The minutes have been corrected and are now before the members for review. There being no further changes, a motion to approve the minutes as corrected was made by Mr. Warner and seconded by Mr. Walczak. The motion passed unanimously.

3. Unfinished Business

a. Update on Project Scope of Work

Shawn Colin, Assistant Town Manager - Community Development, noted the update on the scope of work and a continuation of the initial findings would be presented in the Lochmueller presentation, which will follow.

b. Presentation of Findings for the System Assessment of the William Hilton Parkway Gateway Corridor Project

i. Comparative Assessment of Corridor Alternatives

Nate Nohren, Project Manager for Lochmueller, introduced other members of the Lochmueller Group joining the meeting remotely - Kate Swinford, leading the technical components of the traffic engineering analyses and corridor study; Michelle Romine, a lead Traffic Engineer, assisting Ms. Swinford; Lorne Jackson, Chief Roadway Engineer; and Chad Costa, Environmental Design Engineer. Mr. Nohren outlined the agenda for their presentation, as shown on the PowerPoint included in the agenda packet and updated for the meeting as posted on the Town's website. He reported overall project

progress as of April 5, 2024, is 50% complete; Task #1, Project Initiation and Coordination is now 75% complete; Task #2 is 100% complete; Task #3 is 55% complete; Task #4 will commence immediately following today's meeting; and the final summary of findings to be presented to Town Council at a date to be determined.

Ms. Swinford gave a brief overview of the 4 Alternatives being discussed and then outlined details of each as shown on updated slides, which have been posted on the Town's website. These included: Alternative 1 - SCDOT Modified Recommended Preferred; Alternative 2 - Bowties at Squire Pope Road and Spanish Wells; Alternative 3 - Echelon/Center Turn Overpass, Grade Separated Intersection at either Squire Pope or Spanish Wells; and Alternative 4 - the Lochmueller version of the Elevated Bypass, citing pros and cons and a summary of forecasted operating conditions. Comparisons to 2045 no-build for each Alternative scenario were noted, including travel time, traffic and operations overview matrix scoring, bike/pedestrian impact, safety impacts, roadway/additional ROW impacts, and right of way and cost matrix scoring. Questions from the Committee members were addressed by Ms. Swinford and Ms. Jackson.

Mr. Jackson gave a brief overview of the right of way impacts for each of the various Alternatives as shown on slides and reviewed the right of way and cost matrix, with a final overall scoring and ranking among the 4 alternatives.

Mr. Costa continued the presentation with an environmental overview and noted the State's EA (Environmental Assessment) did a good job of providing baseline resources, both ecological and social, within their defined project area. He explained the intent of the environmental overview is to look beyond that area at a very high GIS level to identify potential areas of concern or "red flags" associated with the Alternatives being considered. He reviewed maps showing "red flags" within with the 4 Alternatives, generally associated with physical encroachments or additional right of way thought to be needed for each Alternative, and reviewed in detail the overview matrix comparing the data for each Alternative, along with scoring/ranking. He reviewed additional slides not included in the agenda packet, but posted to the Town's website, showing environmental overview mapping for ecological and social impacts, individual environmental overview risk assessments for each Alternative, and a compilation of environmental overview risk weight and mitigation. The importance of understanding how the Alternatives affect those residents in the Stoney area was stressed, and Mr. Costa noted the final report would indicate right of way property that is privately owned and right of way property owned by public entities. Concerns were raised about noise, and Mr. Costa indicated that while noise is a consideration, it is not something that can be factored in, as it is outside the scope of their work.

c. Update on Delivery of Report of Findings for System Assessment

Ms. Swinford concluded the presentation with the overall scoring matrix for all 4 Alternatives, totaling the scores outlined for each and ranking them according to those scores. This resulted in Alternatives 1 and 4 tied with the highest ranking, Alternative 2

ranked third, and Alternative 3 ranked fourth. She indicated that this represents the close of their analysis for Task #3, and allows them to move forward into the SYNCHRO analysis, which is further calibrating one of the Alternatives, and providing the final 5-10% of confidence needed for one of the Alternatives when placed in the VISSIM model. She noted that the written scope of the project was dependent upon one clear winner to move forward into Task #4 to place in the VISSIM model. However, with two tied Alternatives, the Lochmueller Group could move both Alternatives 1 and 4 forward into Task #4 of their scope of work. It would mean less flexibility to do multiple iterations of different configurations at some of the other intersections not yet considered, such as Indigo Run or Sea Pines Circle; however, based on their initial analysis of those locations, they do not seem to have as many congestion problems as the portion of the corridor being focused on thus far. She asked for questions and for a determination of whether they should move forward into Task #4 with one Alternative or two. A discussion followed among the Committee members, Mr. Colin, and members of the Lockmueller Group concerning the need for more information before a definitive decision could be made and the impact on timing. Additional criteria requested from Lochmueller included the right of way impact broken down between privately-owned and Town-owned land and an initial evaluation of cost for each Alternative for comparison purposes. Lochmueller agreed to provide the additional information timely, with a decision by the Committee to be made at a later date.

4. New Business

None.

5. Appearance by Citizens

Public comments concerning agenda items were to be submitted electronically via the Open Town Hall Portal. No comments were received through the Portal, and no requests were received to appear before the Committee regarding non-agenda items. The following citizens present at the meeting made comments:

Steve Baer made several points. He noted that Alternative #1 does not carry sufficient traffic since it stops at Spanish Wells Road and completely avoids critical connections leading to delays. Any of the other Alternatives having a good connection to the Cross Island Expressway and local 278 in both directions will impact workers in and out traffic and save approximately 14 minutes. One of the criteria used in differentiating between plans should be whether it saves a significant amount of time. He asked Lochmueller to provide the calculations for 2045 traffic during peak hours, and asked that horizontal bypasses be considered.

Steve Robinson noted that the percentage of Town-owned property vs. privately owned property should not be a consideration for delaying the decision. He noted that a similar bow-tie alternative failed in Indianapolis and was replaced with a system that works very well and should be explored with turn lanes.

A citizen who had attended a Town meeting at the Hilton Head Library noted that the Gullah

Geechee community who reside in the Stoney and other native Islander areas do not want all of this construction either on 278 or the side roads such as Squire Pope, Spanish Wells, and Wild Horse Road that is being proposed a a part of this huge project, and Hilton Head Island residents are clearly not in favor of a 11-lane, 130' wide super slab as an entrance to our beautiful Island. He urged that continued consideration of a bypass, whether horizontal or elevated. He pointed out that it appears that neither the voices of the residents of Hilton Head Island nor the Gullah Geechee are not being heard, and urged the Comittee to do so.

Thomas Boxley, Executive Director of the Gullah Geechee Historic Neighborhoods Community Development Corporation, urged the Committee to err towards the side of not acquiring more property from private owners in the Stoney Community. He also urged that safety be a major component to be considered, and the need for crosswalks for pedestrians and bikers to cross the road safely. He was followed by Ms. Cohen, who expressed a similar request that the heritage of the Stoney Community be spared.

Mayor Perry concluded the meeting by seeking agreement from the Committee members that additional information from Lochmueller and cost involved was needed before a decision was made on which Alternative(s) to move forward, and that the need for a special meeting as soon as possible was in order. A quick poll taken among the Committee members resulted in no clear consensus. The effect of delays in the schedule on running the VISSIM were discussed.

6. Adjournment

The meeting was declared adjourned at 3:04 PM.

Approved:

The recording of this Meeting can be found on the Town's website at www.hiltonheadislandsc.gov

Town of Hilton Head Island
WILLIAM HILTON PARKWAY GATEWAY CORRIDOR INDEPENDENT REVIEW ADVISORY COMMITTEE MEETING
Monday, April 22, 2024, 1:00 PM
Minutes

1. Call to Order

Mayor Perry called the meeting to order at 1:00 PM. Those present were: Mayor Alan Perry, Chairman; Diederik Advocaat; Edward C. Warren, Jr.; Charles P. Walczak, PE; and Willie Young. Absent was: Herbert Ford, Alternate.

2. Approval of the Minutes

a. Meeting Minutes of April 10, 2024 will be approved at the next regular meeting.

Mr. Advocaat stated he had appeared remotely at the April 10, 2024, meeting; however, he had technical issues with his microphone and was unable to pose questions or comments. Therefore, he would like his points to be recorded. **Point 1**: At the last meeting, there was no discussion or opinion made concerning the bridges - one span vs. two spans. If you have a 1 span, 11 lane bridge, is that technically feasible or make sense? **Point 2**: The on-grade bypass option needs to be given serious consideration. It is less obtrusive environmentally, has less impact on Stoney, can be a quick connection to the Cross Island Parkway, has the lowest cost option, and cuts the commute time. **Point 3**: The grading matrix produced in my opinion is really comparing apples and oranges, and you cannot add numbers and come to a conclusion. **Point 4**: The bike lane - a cost/benefit analysis should be done, its usage, and whether funds for a bike lane can be better allocated elsewhere. **Point 5**: The adaptive management system - you are still working in clusters at the end of 278, there has to be a way these 2 can be connected during peak hours to create a better flow, and disabling the Windmill Harbour light during peak hours should be explored. **Point 6**: I question whether the bow tie alternative would actually work, and should be tested in your simulation models. **Point 7:** What is the cost picture for the elevated bypass, does it makes sense at all, and has it been discussed with SCDOT as a potential solution, and what is their opinion? **Point 8**: The $425M which has been mentioned as a number, which is a 50% increase. Where does that come from and how is that put together. All these points I would like Lochmueller to consider, take them into account, and where applicable, add onto the simulation models.

3. Unfinished Business

Shawn Colin, Assistant Town Manager - Community Development, thanked everyone for their appearance on such a short notice. He explained that at the last meeting Lochmueller

had presented 4 viable Alternatives to advance for additional evaluation. A comparative assessment was presented for each of those Alternatives, and the Committee asked for additional information related to cost, and property impact to both public and private lands. Lochmueller has developed that additional information, along with a third element relating to the construction period, based on their professional opinion of the project. He turned the presentation over to Nate Nohren and his Lochmueller team, with Brad Strader and Brian Kinzelman available remotely.

Mr. Colin clarified for the Committee that with regard to Mr. Advocaat's points, the matter of additional funding for this project is not within the scope of work for Lochmueller.

a. Additional Details on Property Impacts, Cost, and Construction Period for Alternatives.

Nate Nohren, Project Manager for Lochmueller, introduced his team joining the meeting remotely: Kate Swinford and Michelle Romaine, Traffic Engineering Leads; Chad Costa, Chief Environental Engineer; Lorne Jackson, Chief Roadway Engineer. He noted this meeting is designed to present the additional information requested at the April 10 meeting, which included delineating between public and private parcels, providing high order of magnitude cost estimates as well as estimates for the construction duration, and a matrix incorporating everything provided.

Mr. Nohren presented slides of the Alternatives, which slides are a part of the presentation contained in the agenda packet. He briefly outlined on the slides Alternative #1, Alternative #2, Alternative #3, and Alternative #4. He pointed out the travel time comparison when compared to 2045 No Build for each Alternative completed in Synchro for the Hilton Parkway corridor between Moss Creek and Indigo Run. Questions from the Committee members were answered by Mr. Nohren, Mr. Jackson, and Mr. Colin. Discussion ensued about whether SCDOT or Beaufort County has reviewed the Lochmueller plans. Mr. Colin reminded the Committee that a part of the scope for Lochmueller was a provision to refrain from any communication with the County or SCDOT during the engineering evaluations and assessments until the Committee identifies Alternatives to be advanced, at which point any design modifications would then be shared with both the County and SCDOT for consideration. He also raised the issue of where additional funding would come from above the original project cost for the deficient bridge and funding sources from the State Infrastructure Bank, grant, and referendum, leaving a current deficit of $100M+. While there have been communications, he noted none were specifically about SCDOT vetting all of the engineering solutions. Mr. Colin indicated he would like to have the benefit of this meeting's results and the Committee's position so that he can schedule further conversations this week.

Mr. Nohren concluded his presentation with slides detailing the additional right of way required for each Alternative, with estimated cost ranging from $426M to $575M, and estimated construction duration ranging from 36 to 48 months, with the resulting scoring and ranking. A lengthy discussion followed concerning the scoring system and matrix, how impact was determined for additional right of way acreage needed, difficulties and

delays that could result, whether a sufficient right of way exists in Stoney to accommodate a larger paved roadway, and the review being made Lochmueller's structural engineers of the seismic study,with the initial analysis indicating no feasible way to retrofit an existing bridge to meet SEE requirements.

Mr. Colin stated that after the last meeting when Lochmueller presented its evaluation and comparative assessment of the alternatives, the goal was to identify an Alternative that would be the preferred Alternative to put through the VISSIM model so they could then perform the deeper analysis and evaluation, and they could move beyond the current study area, as well, to look at the full end-to-end that was requested down to Sea Pines Circle and to Wilborn and Indigo Run. Therefore, with the additional information presented today as requested plus construction duration, they would like the Committee to weigh in on the Alternative or Alternatives to continue to move forward and advance. He asked for the Committee's feedback at this time. Each Committee member stated their current choices and reasoning involved, but no clear consensus was reached.

Discussion continued among the Committee members and Mr. Nohren concerning keeping a 4-lane bridge, and Mr. Nohren indicated the analyses done by them and other studies reviewed, indicate this is not practical. Mayor Perry noted there are questions concerning whether the State Infrastructure Bank, the State House, or other source would grant the additional funding for the Alternative chosen, and conversations with these entities needed to be held soon. Mr. Colin agreed that with a potential shortfall in the current funding, and the failure of the Committee to narrow down the Alternatives for Lochmueller to proceed into the VISSIM model, it would be appropriate to share the Alternatives presented by Lochmueller with Beaufort County officials and SCDOT to determine feasibility and funding availability. The Committee members indicated their support for that plan, with Mr. Colin to schedule meetings and report back soon.

4. Appearance by Citizens

No citizens have requested to appear before the Committee regarding items not on the agenda. No comments were received through the Open Town Hall Portal.

A citizen remarked that the traffic lights are not synchronized nor optimized at Spanish Wells and Squire Pope Road intersections. He also mentioned that cost/value for benefit gained in minutes should be a consideration.

Christopher Cliffe noted he had attended 32 committee meetings since November 2018 chaired by David Johnson, 12 or more joint broadcasts of Beaufort County and the Town, numerous Town Council meetings, and at no time during those meetings until recently has cost come up as a determining factor. He questioned how the construction duration was computed, where the idea of pedestrian and bike paths originated, whether construction costs were based on 2022 numbers, and whether there were certain aspects of the bridge that would be the Town's responsibility.

An Indigo Run resident stressed the need for a fair, transparent, and independent analysis

free from political manipulation, but he questioned whether that is the case. He stated too much attention is being placed on an oversize bridge and not enough on traffic lights, which are the real cause of our congestion problems. Better and cheaper options, with less community impact on the Gullah community, have been suggested and ignored. The Town's decision will be one of the most consequential decision in years and will impact our Town for decades.

Louise Miller Cohen, a native of Hilton Head Island, stated God had given her a job to keep the Gullah Geechee culture alive on Hilton Head Island. All that is remaining is the land left by their ancestors and passed down to the current generation. She expressed her gratitude to everyone who feels their pain, and asked the members to put themselves in their shoes and help them keep their land, their culture, and their community.

5. New Business

None.

6. Adjournment

The meeting was declared adjourned at 2:42 PM.

Approved:

The recording of this Meeting can be found on the Town's website at www.hiltonheadislandsc.gov

TOWN OF HILTON HEAD ISLAND

Willliam Hilton Parkway
Gateway Corridor Advisory Committee

TO:	Advisory Committee
FROM:	Shawn Colin, Assistant Town Manager
DATE:	May 8, 2024
SUBJECT:	Transmittal of Meeting Materials from the Lochmueller Group Agenda

RECOMMENDATION:

This memo serves as the transmittal document to cover the materials submitted for consideration by the Lochmueller Group. This material will be covered at the May 8, 2024 meeting of the William Hilton Parkway Gateway Corridor Advisory Committee.

ATTACHMENTS:

1. The Lochmueller Group Document Transmittal Memo – dated May 3, 2024
2. Presentation by the Lochmueller Group – dated May 8, 2024
3. Four Lane Viability Review Technical Memo Task 1.3.3 – dated May 3, 2024
4. Summary of Findings Memo (Task 3.6) – dated May 3, 2024

TRANSMITTAL

LOCHMUELLER GROUP

To: Shawn Colin, AICP – Town of Hilton Head Island

From: Nate Nohren, PE, PTOE

Date: May 3, 2024

Subject: Copies of Presentation Materials for 5/8/2024 Advisory Committee Meeting

RE: William Hilton Parkway Gateway Corridor Independent Review

Hi Shawn,

Attached please find a PDF copy of the power point slides we will be presenting at the May 8, 2024, Advisory Committee meeting. The content provided within our presentation can be summarized as follows:

- **Update on Project Progress** – we will provide the Committee an update on what our team has been working on and/or completed since the April 22 Committee meeting. We also provide current status of percent-of-work completed to date, as well as on-going or upcoming work subtasks, relative to Tasks 1, 2, 3, and 4 as described in the Town approved Scope of Services Addendum (9/29/2023).
- **Presentation of Findings Related to SCDOT Seismic Study Review (Task 1.8)** – we will present slides that speak to the cursory, high-level review of SCDOT's US 278 Bridge Seismic Study (dated April 2020) we performed, and provide our professional opinion regarding the feasibility of seismic retrofit & structural rehab options for existing bridges vs. constructing new bridges.
- **Presentation of Findings Related to 4-Lane Viability Technical Memo (Task 1.3.3)** – we will present slides that summarize our findings related to the technical memorandum we prepared that provides our professional opinion regarding the feasibility of William Hilton Parkway being able to remain a four lane facility within areas between Moss Creek Drive and Squire Pope Road, if one or more of select strategies were implemented. These strategies include the implementation of a second bridge; modifications to the existing mass transit system; implementation of a new ferry system; and the implementation of a facility usage fee.
- **Cursory Observations Related to "Southern Bypass" Alternative** – we will present slides that speak to the cursory, high-level observations we have noted related to traffic, geometric, ROW, and environmental challenges associated with the "Southern Bypass" alternative that has been brought up by citizens and/or Committee members. The primary purpose for sharing this information with the Committee and others in attendance is to provide reasoning as to why we did not include this "Southern Bypass" alternative as one of the four alternatives that were thoroughly evaluated as a part of our independent study.
- **Review of Overall Scoring Matrix for All Alternatives** – we will once again present our updated overall scoring matrix, which considers all key contributing factors associated with this project, and provides a ranking of the four Alternatives.

Also attached are PDF copies of the 4-Lane Viability technical memorandum (formal deliverable for Task 1.3.3), as well as the Draft Summary of Findings memorandum related to four (4) corridor alternatives for intersections within the modified original project study area (formal deliverable for Task 3.6). Please let me know if you have any questions regarding the information shared above. Otherwise, we look forward to speaking with you all on May 8.

Sincerely,

Nate Nohren, PE, PTOE

William Hilton Parkway Gateway Corridor Independent Review Advisory Committee Meeting

May 8th, 2024

LOCHMUELLER GROUP

Agenda

- Update on Project Progress
- Presentation of Findings Related to SCDOT Seismic Study Review (Task 1.8)
- Presentation of Findings Related to 4-Lane Viability Technical Memo (Task 1.3.3)
- Cursory Observations Related to “Southern Bypass” Alternative
- Review of Overall Scoring Matrix for All Alternatives

Update on Project Progress

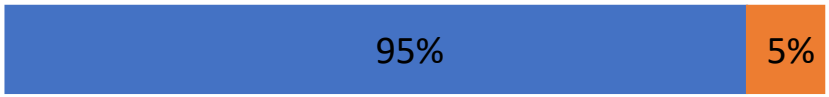
(*Key Tasks Completed & Continuing to Work on Since Last Meeting*)

- ✓ Completed review of SCDOT seismic study (Task 1.8)
- ✓ Completed tech memo RE: potential transportation demand strategies (Task 1.3.3)
- ✓ Completed Draft Summary of Findings memo RE: 4 Alternatives (Task 3.6)
- ✓ Began traffic analyses and Synchro and VISSIM modeling RE: 2045 Build Year conditions at intersections downstream of CIP (Tasks 4.1 & 4.2)

Update on Overall Project Progress (as of 5/3/24)

Overall ~60% Complete

- **Task #1: Project Initiation and Coordination**
  - **~95% Complete**

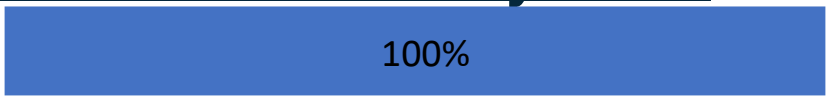


  - Key Subtasks On-Going:
    - Remaining scheduled meetings with Town (Bi-Weekly) staff and Committee (Monthly)

Update on Overall Project Progress (as of 5/3/24)

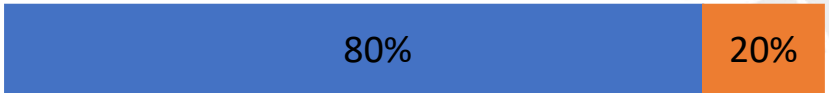
Task #2: Review of Travel Demand Model & Evaluation of 2023 Existing Operating Conditions (Entire Study Area)

- **100% Complete**



Update on Overall Project Progress (as of 5/3/24)

- **<u>Task #3: Traffic Model and Operational Update – Modified Original Project Study Area</u>**
  - **~80% Complete**



  - Key Subtasks On-Going:
    - Finalize Summary of Findings Memo RE: Task #3, after receiving feedback from Town staff and Committee
  - Key Subtasks Forthcoming:
    - Final Summary of Findings Memo RE: Task #3 Alternatives Analysis to be presented to Town Council (June 2024, date TBD)

Update on Overall Project Progress (as of 5/3/24)

- **<u>Task #4: Traffic Model and Operational Update – Entire Project Study Area</u>**
  - **~10% Complete**

  - Received direction from Town staff on 5/1 to begin modeling Alternative 1 in Synchro and VISSIM, with following modifications:
    - Single EBLT and SBRT at Squire Pope Road
    - Modified median access location for WBLT into Crazy Crab
  - Key Subtasks On-Going:
    - Continue traffic analyses and modeling (Synchro & VISSIM) RE: 2045 Build Year conditions at intersections downstream of CIP.

Update on Overall Project Progress (as of 5/3/24)

- **Task #5: Final Report**
    - Will commence immediately following Task 4

SCDOT Seismic Study Review Findings (Task 1.8)

- **Objective: Perform cursory, high-level review of seismic study and offer professional opinion regarding feasibility of seismic retrofit & structural rehab existing bridges vs. constructing new bridge**
  - PDF copy of SCDOT approved US 278 Bridge Seismic Study (dated April 2020) provided to Lochmueller on 4/15/24.
  - Study included evaluation of options to retrofit, widen, or replace the existing US 278 bridges onto HHI, and provided information to SCDOT to implement best replacement strategy, as well as detailed Life Cycle Costs Analysis (LCCA) results, considering following three Options:
    - **Option #1** – Construct new EB bridge over Mackay Creek & Skull Creek; widen existing WB bridge over Mackay Creek; modify existing Skull Creek bridges for WB movements.
    - **Option #2** – Construct new EB bridge over Mackay Creek & Skull Creek; replace existing WB bridge over Mackay; modify existing Skull Creek bridges for WB movements.
    - **Option #3** – Construct new 6-lane bridge; remove all existing bridges

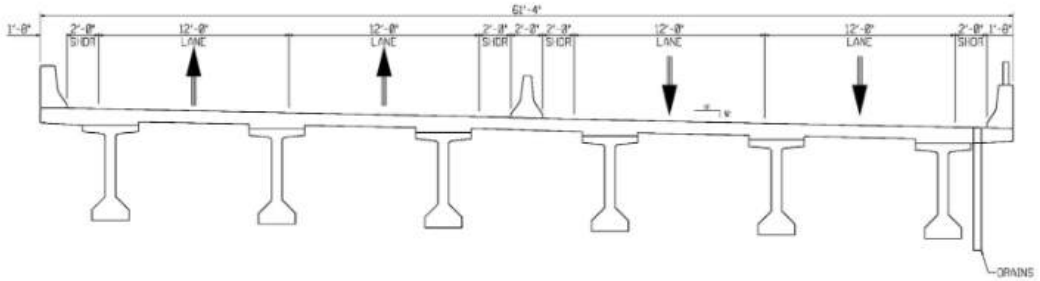
SCDOT Seismic Study Review Findings (Task 1.8)

- With each Option, a new EB bridge will be constructed
  - Designed to SCDOT standards to withstand seismic events
  - Serve as a "lifeline" bridge in case of significant seismic event for Options 1 or 2

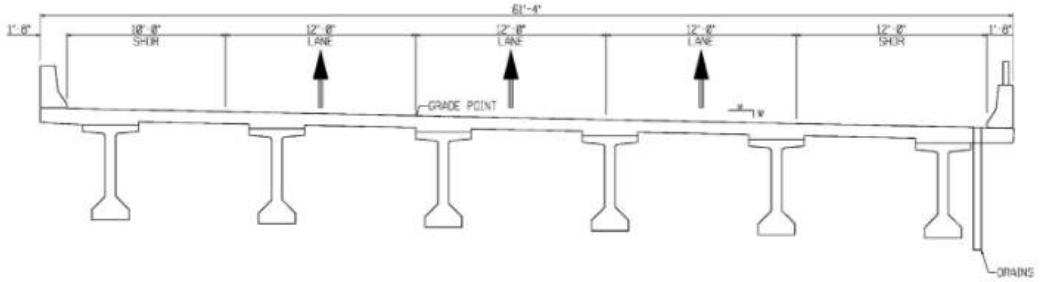
- Assumed Construction Sequence
  - **Options #1 or #2**:
    - New EB structure constructed wide enough to accommodate 4-Lanes, 2-Way traffic in temporary condition & 6-Lanes in permanent condition.
    - All traffic moved to new EB structure, while demolition / seismic retrofits / structural repairs & replacements take place on existing structures.
    - Traffic then moved in to final positions
    - If necessary, traffic can be returned to the 4-Lanes, 2-Way traffic pattern on EB structure
  - **Option #3**:
    - Entire new 6-Lane structure can constructed with traffic retained in existing patterns

SCDOT Seismic Study Review Findings (Task 1.8)

Figure 3.2-1: Option 1 & 2 – New EBL over Skull Creek & Mackay Creek



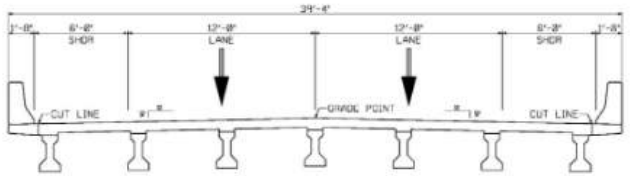
PROPOSED SECTION
US 278 OVER SKULL CREEK & MACKAY CREEK
(TEMPORARY PATTERN)



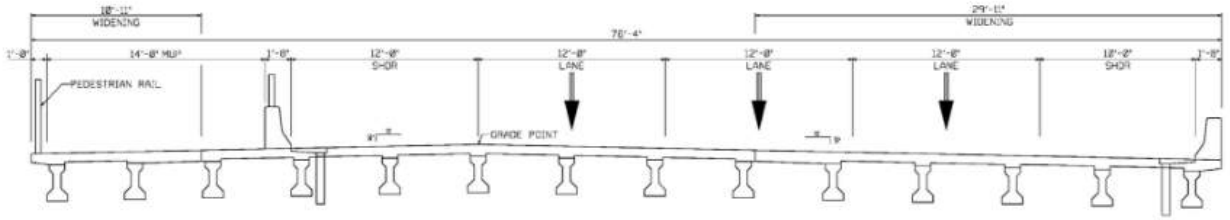
PROPOSED EBL SECTION
US 278 OVER SKULL CREEK & MACKAY CREEK

SCDOT Seismic Study Review Findings (Task 1.8)

Figure 3.2-2: Option 1 – Widen WBL Mackay Creek



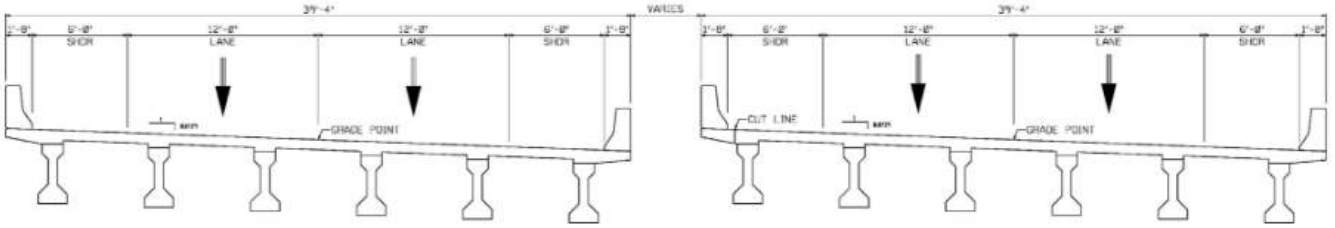
EXISTING WBL SECTION
US 278 OVER MACKAY CREEK



PROPOSED WBL SECTION
US 278 OVER MACKAY CREEK

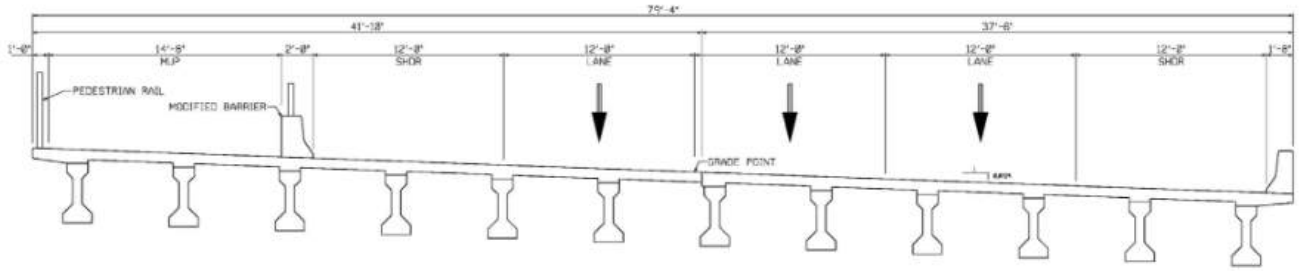
SCDOT Seismic Study Review Findings (Task 1.8)

Figure 3.2-3: Option 1 & 2 - Combine Skull Creek Bridges
(Information for Spans 1-6)



EXISTING WBL SECTION
US 278 OVER SKULL CREEK
(Remove Spans 1 to 6)

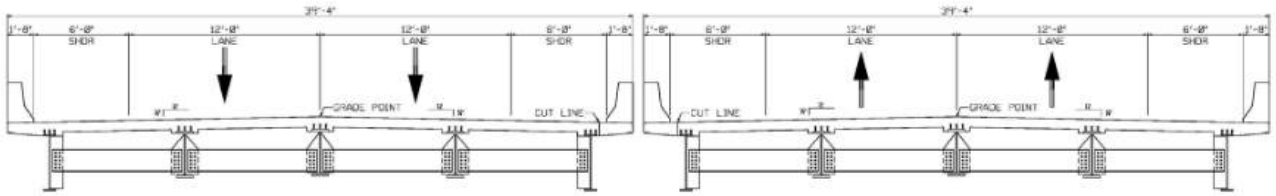
EXISTING EBL SECTION
US 278 OVER SKULL CREEK
(Retain)



PROPOSED WBL SECTION
US 278 OVER SKULL CREEK
(Spans 1 to 6)

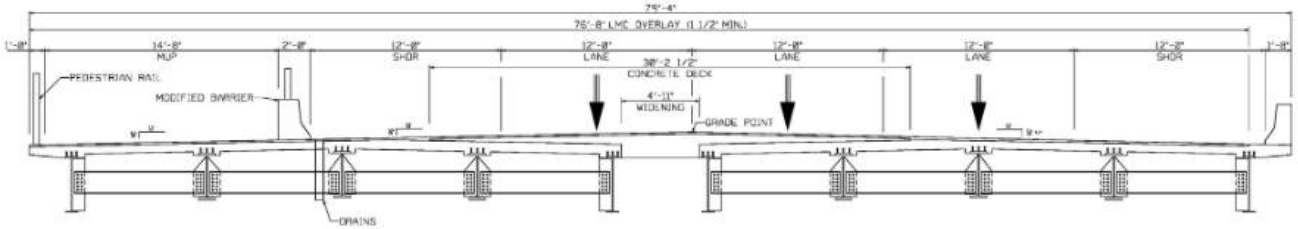
SCDOT Seismic Study Review Findings (Task 1.8)

Figure 3.2-4: Option 1 & 2 - Combine Skull Creek Bridges
(Information for Spans 7-26)



EXISTING WBL SECTION
US 278 OVER SKULL CREEK

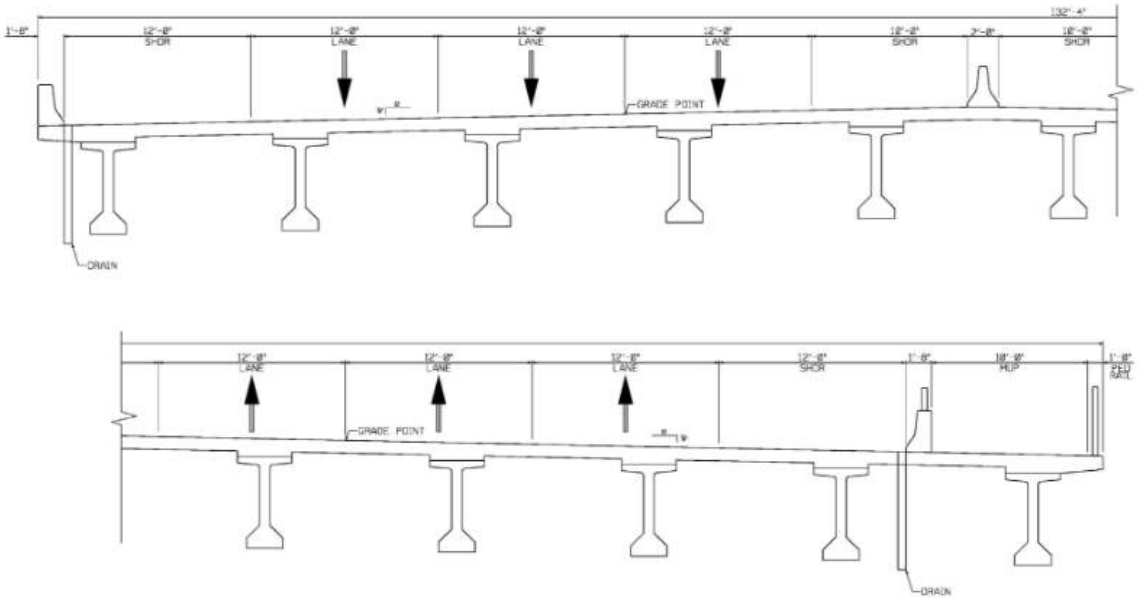
EXISTING EBL SECTION
US 278 OVER SKULL CREEK



PROPOSED WBL SECTION
US 278 OVER SKULL CREEK
(Spans 7 to 26)

SCDOT Seismic Study Review Findings (Task 1.8)

Figure 3.2-5: Option 3 - New 6-Lane Structure over Mackay Creek & Skull Creek



PROPOSED SECTION
US278 OVER SKULL CREEK & MACKAY CREEK

SCDOT Seismic Study Review Findings (Task 1.8)

- **<u>Key Assumptions/Findings Noted by SCDOT Design Team:</u>**
  - All existing bridges designed and constructed prior to SCDOT's implementation of seismic analysis and detailing. Therefore, **all existing bridges are considered inadequate when compared to today's seismic design standards**.
  - In order to model existing structures, SCDOT design team assumed minimum level of seismic retrofits would be performed. Design team did not determine if existing structures could withstand any seismic event without minimum retrofits being performed.
  - SCDOT design team intended to evaluate the bridges for two seismic events as required by SCDOT Seismic Design Specifications (SDS):
    - **Functional Evaluation Earthquake (FEE)** = lower magnitude earthquake event that has higher chance of occurrence during life of the bridge.
    - **Safety Evaluation Earthquake (SEE)** = higher magnitude earthquake event that has lower chance of occurrence during life of the bridge.
    - <u>NOTE</u>: US 278 Bridges assigned highest SCDOT SDS classification rating OC 1; therefore, <u>must</u> meet FEE design thresholds at a minimum

SCDOT Seismic Study Review Findings (Task 1.8)

- **<u>Key Assumptions/Findings Noted by SCDOT Design Team (cont.):</u>**
  - It was determined that soils around and below the existing bridge foundations and roadway approaches can liquefy at ground accelerations just above the FEE event:
    - This liquefaction could cause bridges/roadways to settle, slide or collapse during and/or after seismic event.
    - Design team recognized that mitigation for liquefaction (i.e., add'l foundations, deep soil mixing, etc.) would likely exceed costs for new construction, and would greatly increase environmental disturbance.
    - Design team therefore elected to limit structural improvements through seismic retrofits to FEE level, w/ SCDOT concurrence.
    - New bridges can be constructed to meet SEE requirements; existing bridges only will be able to attain FEE requirements at best.

SCDOT Seismic Study Review Findings (Task 1.8)

- **Key Assumptions/Findings Noted by SCDOT Design Team (cont.):**
  - SCDOT Design team prepared LCCA, for Options 1/2/3, as shown below.
    - Costs are in 2020 dollars, assume annual inflation of 2% for future costs.
    - Construction costs developed from historical data, as well as correspondence w/ local Contractors. **Widening existing structures over water ~1.5 to 2 times more expensive than new construction.**
    - User Costs developed from SCDOT provided data, based on cost/lane/day.
    - Maintenance costs based on existing bridge details and assumed new bridges.
    - NOTE: LCCA costs only reflect rehabilitation related costs (e.g., widening, maintenance, cosmetic improvements), and do **not** include retrofit related costs (e.g., seismic related improvements). Therefore, **true costs to attain FEE standards for Options 1 & 2 would be significantly higher than those shown in the table below**.

	Option 1	Option 2	Option 3
Initial Construction Cost	$ 129,560,000.00	$ 137,837,000.00	$ 171,108,500.00
Future Construction Cost	$ 85,233,000.00	$ 53,151,000.00	$ -
User Cost	$ 10,920,000.00	$ 10,920,000.00	$ -
Maintenance Cost	$ 22,900,000.00	$ 20,850,000.00	$ 11,350,000.00
Total LCCA Cost	$ 248,613,000.00	$ 222,758,000.00	$ 182,458,500.00
Construction Schedule	60 Months	60 Months	36 Months

SCDOT Seismic Study Review Findings (Task 1.8)

- **Key Assumptions/Findings Noted by SCDOT Design Team (cont.):**
  - SCDOT Design team evaluated benefits & risks of Options 1/2/3

Benefits / Risks of Options 1, 2 and 3

Option 1	Initial Construction Cost	Least (assumed)	Initial cost of retrofits and widening may be less than the cost of a new structure and demolition.
	Utility Relocation	Least	Every option will require the relocation of the 24" diameter waterline as well as the fiber optic line. May require the relocation of the power line on poles. Avoids the power lines on towers.
	Constructability	Hardest	New EBL built off alignment from ground, barge and temporary work trestle. Skull Creek will be challenging to retrofit, especially in curved sections. Mackay Creek widening will follow demolition of existing EBL bridge.
	Future Maintenance	Greatest	WBL Mackay and Skull Creek bridges will be 50 year old bridges at completion of project and require more substantial maintenance. Steel bridges also require additional maintenance versus concrete bridges.
	Pickney Island Access	Worst	Island access still tied to existing (improved) interchange along US 278. New bridge could include ramps to access island.
	Environmental Impact	Least	The new EBL bridge and widening of WBL over Mackay Creek will increase impacts. The removal of existing EBL will reduce impacts.
	Seismic Response	FEE / SEE	The new EBL bridge will be designed for the SEE event. WBL Skull Creek may only withstand the FEE event. Mackay Creek may not be able to withstand the FEE event within acceptable performance limits.

SCDOT Seismic Study Review Findings (Task 1.8)

- **Key Assumptions/Findings Noted by SCDOT Design Team (cont.):**
  - SCDOT Design team evaluated benefits & risks of Options 1/2/3 (cont.)

Option 2	Initial Construction Cost	Middle	Replacing WBL Mackay Creek bridge may cost more than widening and retrofit. All other costs are similar.
	Utility Relocation	Least	Same as Option 1.
	Constructability	Middle	WBL Mackay Creek will be constructed after demolition is performed, increasing construction schedule. Existing EBL Mackay Creek bridge may be used for construction access.
	Future Maintenance	Middle	Skull Creek bridges will be 50 year old bridges at completion of project and require more substantial maintenance. Steel bridges also require additional maintenance versus concrete bridges. New Mackay Creek WBL will reduce maintenance versus Option 1.
	Pickney Island Access	Worst	Same as Option 1.
	Environmental Impact	Middle	There will be a slight increase in environmental impact due to new construction versus widening for Option 1.
	Seismic Response	FEE / SEE	The new WBL Mackay Creek bridge and new EBL bridge will be designed for the SEE event. WBL Skull Creek bridges may only withstand the FEE event within acceptable performance limits.
Option 3	Initial Construction Cost	Most	Replacing all bridges will be most expensive initial construction cost.
	Utility Relocation	Most	Power lines south of the Skull Creek bridges will need to be relocated in addition to the waterline and fiber optic line. This may be the same for all 3 options.
	Constructability	Easiest	Bridge will be constructed off alignment. Provides the shortest construction schedule.
	Future Maintenance	Least	All bridges will be new.
	Pickney Island Access	Best	A new interchange can be constructed with right-in, right-out only access. Existing Skull Creek bridges could be modified to maintain Pinckney Island access while US 278 bypasses the island.
	Environmental Impact	Most	A new 6 lane alignment will have highest impacts. Removal of existing bridges and causeway will reduce impacts.
	Seismic Response	SEE	All bridges will be designed for SEE event.

SCDOT Seismic Study Review Findings (Task 1.8)

- **Key Observations by Lochmueller Group:**
  - SCDOT Design Team's structural analysis findings; LCCA results; and noted benefits/risks associated with Options 1/2/3 appear valid and appear to follow standard engineering practices.

	Option 1	Option 2	Option 3
Initial Construction Cost	$ 129,560,000.00	$ 137,837,000.00	$ 171,108,500.00
Future Construction Cost	$ 85,233,000.00	$ 53,151,000.00	$ -
User Cost	$ 10,920,000.00	$ 10,920,000.00	$ -
Maintenance Cost	$ 22,900,000.00	$ 20,850,000.00	$ 11,350,000.00
Total LCCA Cost	$ 248,613,000.00	$ 222,758,000.00	$ 182,458,500.00
Construction Schedule	60 Months	60 Months	36 Months

  - LCCA results do not account for costs that would be required to improve seismic conditions for Options 1 & 2. Therefore, **true costs associated with Options 1 & 2 would be significantly higher to implement, than what is shown in the LCCA table above**.

  - Options 1 & 2 would take ~ 2 years longer to construct vs Option 3. **The rehabilitated structures would still need to be replaced at some point, and time required to do so is not accounted for in this table.**

SCDOT Seismic Study Review Findings (Task 1.8)

- **Key Observations by Lochmueller Group (cont.):**

	Option 1	Option 2	Option 3
Initial Construction Cost	$ 129,560,000.00	$ 137,837,000.00	$ 171,108,500.00
Future Construction Cost	$ 85,233,000.00	$ 53,151,000.00	$ -
User Cost	$ 10,920,000.00	$ 10,920,000.00	$ -
Maintenance Cost	$ 22,900,000.00	$ 20,850,000.00	$ 11,350,000.00
Total LCCA Cost	$ 248,613,000.00	$ 222,758,000.00	$ 182,458,500.00
Construction Schedule	60 Months	60 Months	36 Months

  - Existing bridge structures would be ~50 years old after improvements made by Options 1 or 2, with rehab efforts likely to extend life of existing structures by ~25 to 35 years. By comparison, **typical design life for Option 3 newly constructed bridges ~ 75 to 100 years**.

  - Options 1 & 2 being pursued for use solely as temporary condition would require >$130M to construct initially (using 2020 costs), and **these costs do not account for needed FEE improvements**. Depending upon when remaining structures were replaced, the future/user/maintenance costs req'd over that time would assuredly lead to higher overall cost than building new at outset.

SCDOT Seismic Study Review Findings (Task 1.8)

- **Key Observations by Lochmueller Group (cont.):**

	Option 1	Option 2	Option 3
Initial Construction Cost	$ 129,560,000.00	$ 137,837,000.00	$ 171,108,500.00
Future Construction Cost	$ 85,233,000.00	$ 53,151,000.00	$ -
User Cost	$ 10,920,000.00	$ 10,920,000.00	$ -
Maintenance Cost	$ 22,900,000.00	$ 20,850,000.00	$ 11,350,000.00
Total LCCA Cost	$ 248,613,000.00	$ 222,758,000.00	$ 182,458,500.00
Construction Schedule	60 Months	60 Months	36 Months

  - **Options 1 & 2** would put maintenance/replacement schedules of the structures on varying timeframes, which **would cause additional user disruptions in the future**.

  - **Existing structures under Options 1 & 2 would never meet SEE seismic design requirements**. New structures can be built to meet SEE seismic design requirements.

  - In summary, Lochmueller does not recommend rehabilitation and/or retrofit options be pursued.

4-Lane Viability Technical Memo (Task 1.3.3)

- **Objective: Perform cursory, high-level review to determine if one or more select strategies could be implemented to allow for 4-lane section of WHP between Moss Creek and Squire Pope Road.**

  - Study included evaluation of the following strategies:
    - **Second bridge**
    - **Modifications to the existing mass transit system**
    - **Implementation of a new ferry system**
    - **Implementation of a facility usage fee (congestion pricing)**

4-Lane Viability Technical Memo (Task 1.3.3)

- **Traffic Operations Key Findings:**
  - Travel times were calculated using VISSIM, which is a microsimulation tool that accurately replicates individual vehicles and their interactions within complex traffic streams.
  - It currently takes approximately 19 minutes to travel along US 278 between Moss Creek Drive and Indigo Run Drive during the AM peak hour and 21 minutes to travel along US 278 between Indigo Run Drive and Moss Creek Drive during the PM peak hour today.
  - This section of road is approximately 8.2 miles. Based on the travel times, the existing average speed along this corridor is 26 miles per hour (mph) during the AM peak hour and 23 mph during the PM peak hour. This is well below the posted speed limits of 45 mph and 55 mph along the corridor.

Corridor		2023 Existing Simulated travel time (secs)		2045 No Build Simulated travel time (secs)		% Difference	
		AM	PM	AM	PM	AM	PM
Hilton Parkway between Moss Creek and Indigo Run	EB	1157	619	1579	642	**36.47%**	**3.72%**
	WB	572	1252	584	1544	**2.10%**	**23.32%**

4-Lane Viability Technical Memo (Task 1.3.3)

- **<u>Traffic Operations Key Findings:</u>**
  - Significant congestion currently exists throughout the study area. This congestion is expected to be exacerbated by 2045 with the forecasted growth.
  - 2023 existing traffic volumes would need to be reduced by approximately 30% for the current 4-lane configuration to operate acceptably.
  - Based on an annual growth rate of 0.56%, 2045 traffic volumes would need to be reduced by approximately 40% for the current 4-lane configuration to operate acceptably.

4-Lane Viability Technical Memo (Task 1.3.3)

- **Second Bridge Key Findings:**
  - A second bridge has been discussed locally
  - A new bridge could take up to 20 years to construct once all the studies, planning, design, and construction is complete
  - The operating conditions today already show significant congestion
  - Our focus is to mitigate the existing and forecasted conditions, and as shown in 20 years, the congestion along the corridor will be significant
  - It is our opinion that a 6-lane section is needed independently of a second bridge

4-Lane Viability Technical Memo (Task 1.3.3)

- **Modifications to Existing Transit System Key Findings :**
  - Transit currently provided:
    - Palmetto Breeze
    - Breeze Trolley (seasonal)
    - On-Demand Van Service
    - Beach Parking Shuttle
  - Transit across all services only provides a fraction of the total regional trips. Transit would need to be more robust in terms of service span (number of trips daily and days per year of service) and coordinated to be most effective.
  - In 2021, the transit mode share was less than 1% in the region and would therefore have to grow exponentially to be effective enough to reduce the need for six lanes along US 278 in the area under study.
  - Therefore, it is Lochmueller's opinion that even if significant modifications were made to the existing Palmetto Breeze transit system, it would be highly unlikely these modifications alone could account for enough trips and the mode share percentage needed to sufficiently reduce the number of trips across the US 278 bridges, such that a four-lane facility could be maintained.

4-Lane Viability Technical Memo (Task 1.3.3)

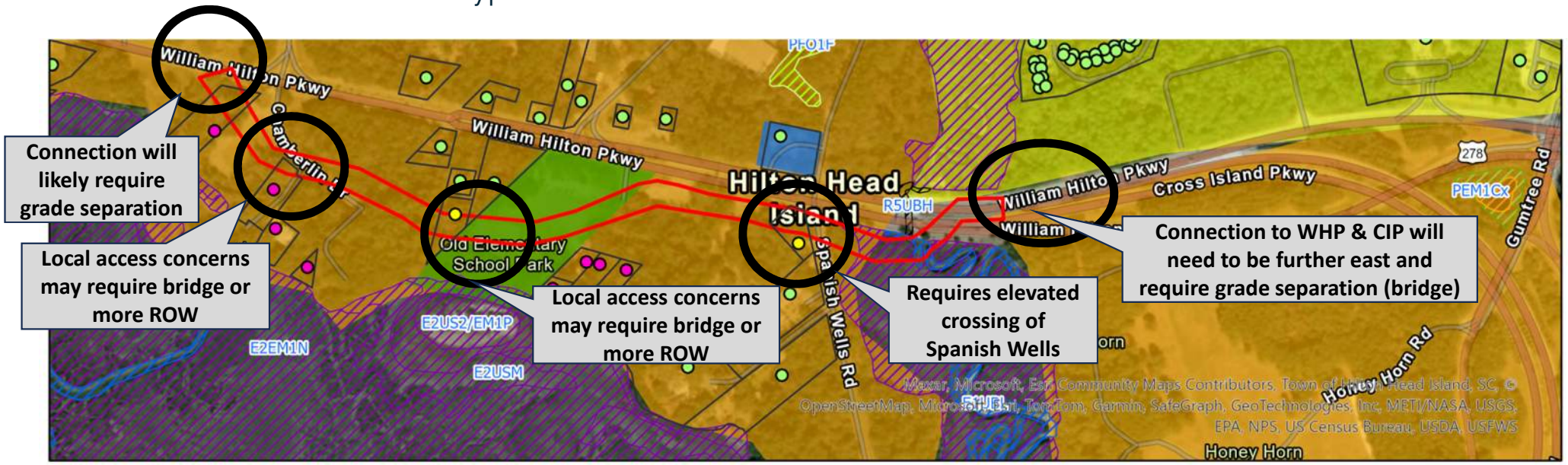
- **Ferry System/Facility Usage Fee Key Findings :**
  - Ferry System:
    - No formal studies of a high-speed ferry system have been initiated.
    - Therefore, it is reasonable to assume that a high-speed ferry system would not be fully operational within the next 10-15 years.
    - Even still, if/when a ferry system is implemented, it is highly unlikely that the resulting reduction in traffic would allow for a four-lane section.
  - Facility Usage Fee:
    - South Carolina State laws prohibit tolls/fees from being implemented on existing roads. Only new roads may instate tolls/fees.
    - If a facility usage fee could be implemented, the fee would largely impact commuters, not tourists, who enter and exit the island for work, as the majority of traffic during the AM and PM peak hours is a result of commuter traffic.
    - Even still, if a facility usage fee could be implemented, it is highly unlikely the resulting reduction in traffic would allow for a four-lane section to be maintained.

4-Lane Viability Technical Memo (Task 1.3.3)

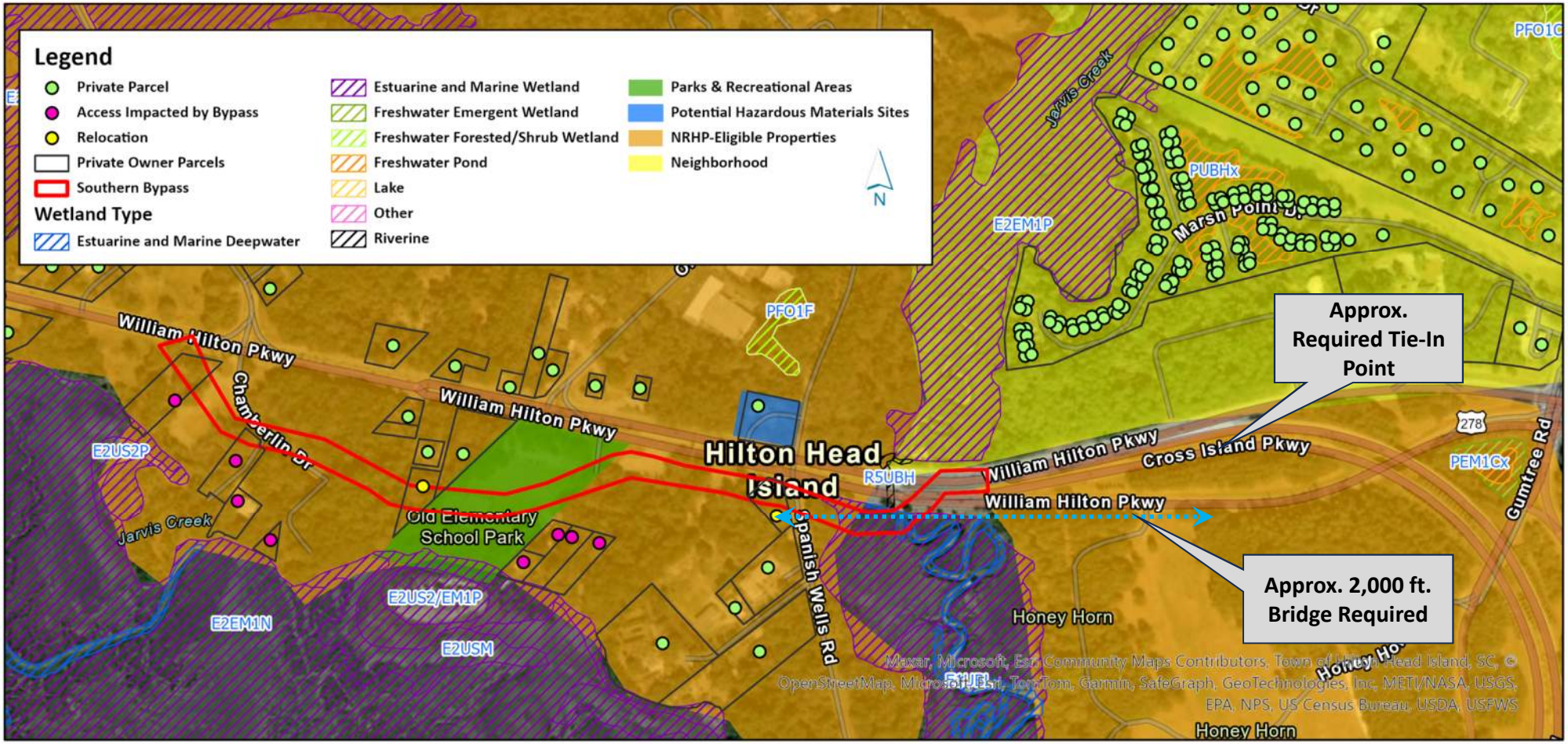
- **Overall Findings :**
  - In order for the existing four-lane section to operate acceptably, the total reduction in vehicles from mass transit, a new ferry system, and the implementation of a facility usage fee would need to be between 30-40%.
  - While implementing the aforementioned types of transportation strategies would help slow future traffic growth on US 278, it is Lochmueller's opinion that even if all of these strategies are implemented, the reduction in vehicles would not reach 30%.
  - Furthermore, these strategies would not address the structural issues associated with the existing bridges over Mackay Creek and Skull Creek.
  - Consequently, it is Lochmueller's opinion that these strategies should not be considered as viable alternatives to be used individually and/or collectively to solely address traffic congestion and mobility related concerns along US 278 within the project study area, that could allow a four-lane section to be maintained along US 278 within the study area.

“Southern Bypass” | Cursory Traffic Overview

- At 12/12/23 Committee meeting, Committee members prioritized limiting impacts to ROW (any public and/or private parcels) as guidance to Lochmueller when selecting potential Alternatives. Topic re-emphasized at 3/27/24 Committee meeting.
- The “Southern Bypass” is not anticipated to improve the operating conditions of Gumtree Road, as there is no way to effectively bypass Gumtree at-grade.
- While the bypass has the opportunity to remove most of the through traffic from US 278, if the bypass is at grade, then it will still need to cross several streets as shown below, reducing the effectiveness of the bypass.



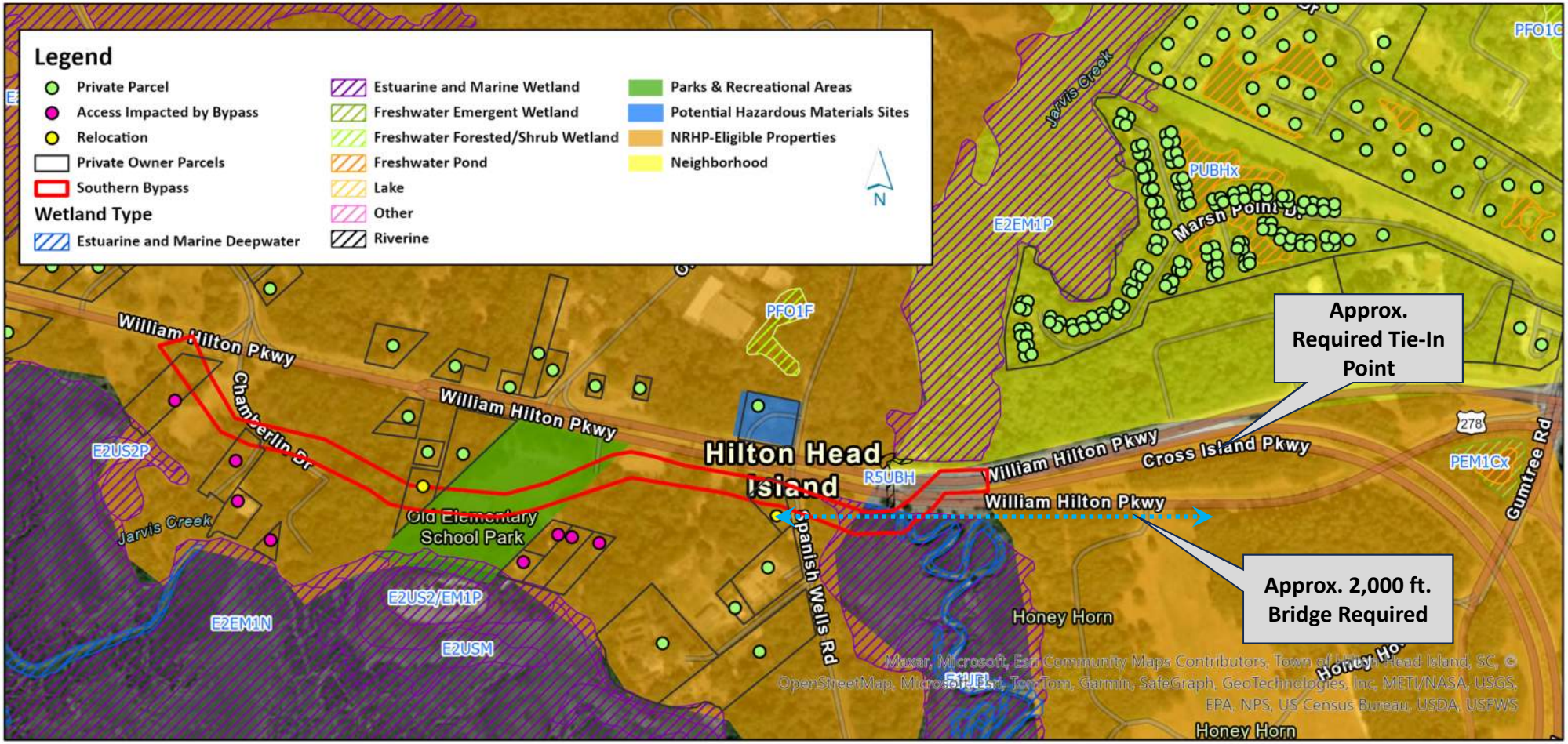
“Southern Bypass” | Cursory Overview Map



“Southern Bypass” | Cursory Engineering Overview

Categories	Prior SCDOT Findings / Considerations	Southern Bypass Constraints / Issues	Southern Bypass Overall Risks
Engineering Feasibility	• Concept not considered	• The horizontal alignment to the east tying back into US 278, as presented, is not feasible • Current at-grade alignment creates access issues at Chamberlin Drive that requires consideration (i.e., bridge) • Tie-in point requires moving east to the Cross Island Parkway ramp (US 278 East)	• Challenges in addressing the horizontal and vertical alignments need to be addressed – affects time and cost • New bridge, approximately 2,000 ft. in length required between Spanish Wells Road and Cross Island Parkway ramp
Right-of-Way	• Total of 34 acres of right-of-way required for the recommended preferred alternative	• Estimated 6 additional acres required • Eliminates approximately 1.2 acres from SCDOTs proposed right-of-way needed for recommended preferred alternative 4(a) • 23 total parcels impacted (18 publicly owned 5 privately owned) • Creates 8 private parcels with access concerns (2 of which are partially impacted)	• Additional right-of-way increases impacts to sensitive environmental resources • Additional time necessary to address access issues with the 8 parcels (total purchase or additional access road to Spanish Wells Road)
Relocations	• Two commercial relocations	• Results in at least 2 additional relocations	• Additional impacts to Stoney TCP

“Southern Bypass” | Cursory Overview Map



“Southern Bypass” | Cursory Environmental Overview

Categories	Prior SCDOT Findings / Considerations	Southern Bypass Constraints / Issues	Southern Bypass Overall Risks
Section 106 (Cultural)	• “Adverse Effect” finding for the project due to impacts to Archaeological Site 38BU66; “No Adverse Effect” for Stoney TCP	• Greater impacts to Stoney TCP • New impacts to Honey Horn Plantation if tie-in corrected	• Change in effect finding for Stoney TCP to “Adverse Effect” • New “Adverse Effect” likely for Honey Horn Plantation • Amendment to the Memorandum of Agreement likely
Section 4(f)	• De *minimis* impact finding for both Stoney TCP and the Old Elementary School Park • Honey Horn Plantation was not impacted	• Additional “use” of Stoney TCP & Old Elementary School Park • New “use” of Honey Horn Plantation	• Additional use of non-transportation land from Stoney TCP & the Old Elementary School Park likely to elevate to an Individual 4(f) evaluation • Time and cost expended to complete the Individual evaluation ≠ a feasible & prudent option
Environmental Justice / Community Impacts	• 1 EJ community identified – Stoney • Determined project effects are not disproportionately high & adverse compared to non-EJ areas	• New impacts to the EJ Stoney community requires: ✓ Outreach & engagement ✓ Benefits & burdens analysis ✓ Noise considerations	• New terrain route introduces potential added benefits & burdens to evaluate • Potential unacceptance by the EJ community • Added mitigation costs
Ecological Impacts	• Impacts 22.9 acres of wetlands / streams • Impacts 145 acres of floodplain • “May Affect – Not Likely to Adversely Affect” finding for threatened & endangered from U.S. Fish & Wildlife Service	• Creation of segmented forest block (Approx. 4 acres of tree clearing) • Approx. 0.7 acre of NWI wetland impact; 140 linear ft. of stream impact • Approx. 1 acre of floodplain impact	• Agency concerns with added forest, wetland, stream, & floodplain impacts • Potential elevation in Threatened & Endangered Species finding • Added mitigation costs

Right of Way and Cost Matrix – Data & Scoring

Resource/Category	Alternative 1 (Mod. SCDOT Recommended Preferred)	Alternative 2 (Bowties at Squire Pope and Spanish Wells)	Alternative 3 (Echelon / Center Turn Overpass)	Alternative 4 (Elevated Bypass)
Est. Add'l Right of Way Acres – Public Est. Add'l Right of Way Acres – Private **Approx. TOTAL Add'l Right of Way Acres**	0.2 ac 0.0 ac **0.2 ac**	0.9 ac 0.2 ac **1.1 ac**	0.7 ac* 0.4 ac* **1.1 ac***	0 ac
Right of Way Score	2	4	4	1
Estimated Cost	$426M**	$430M***	$440M to $450M***	$545M to $575M**
Cost Score	1	2	3	4
Estimated Construction Duration	36 months	38 months	42 months	48 months
Construction Duration Score	1	2	3	4
TOTAL	**4**	**8**	**10**	**9**
RANK	**1**	**2**	**4**	**3**

* Denoted change in ROW impacts, as compared to results shown during 4/22 Committee meeting (i.e., 4/22 data showed 0.86 ac public + 0.54 ac private = 1.4 ac total), due to add'l GIS parcel data rec'd from Town GIS staff on 4/24.

** Denoted estimated cost provided by Beaufort County ($425M) + proposed Gum Tree improvements recommended by Lochmueller ($1M).

*** Denoted estimated cost generated by Lochmueller Group; based upon assumed percent differential in cost, in comparison to Alternative 1.

Overall Scoring Matrix

Resource/Category	Alternative 1 (Mod. SCDOT Recommended Preferred)	Alternative 2 (Bowties at Squire Pope and Spanish Wells)	Alternative 3 (Echelon / Center Turn Overpass)	Alternative 4 (Elevated Bypass)
Traffic Operations (Throughput and Traffic Simulations)	4	3	3	1
ROW Impact	2	4*	4	1
Environmental Impact	1	3**	4	2**
Safety	4	3	3	1
Bike/Pedestrian Impact	4	3	1	2
Community and Social Impact	1	3	4	2
Aesthetic	2	1	3	4
Cost	1	2	3	4
Construction Duration	1	2	3	4
TOTAL	**20**	**24*** **	**28**	**21*** **
RANK	**1**	**3**	**4**	**2**** **

1 = Highest Ranking

* Denoted change for Alternative 2, as compared to results shown during 4/22 Committee meeting (i.e., 4/22 data showed Alternative 2 having a ROW Impact score of "3"), due to add'l GIS parcel data rec'd from Town GIS staff on 4/24.

** Denoted changes for Alternatives 2 & 4, as compared to results shown during 4/22 Committee meeting (i.e., 4/22 data showed Alternative 2 having an Env. Impact score of "2" and Alternative 4 having score of "3"), due to add'l GIS parcel data rec'd from Town GIS staff on 4/24.

*** Denoted changes for Alternatives 2 & 4, as compared to results shown during 4/22 Committee meeting (i.e., 4/22 data showed Alternatives 2 & 4 each having a total scores of "22"), due to current scoring summations.

**** Denoted change for Alternative 4 rank, as compared to results shown during 4/22 Committee meeting (i.e., 4/22 data showed Alternative 4 having a tied ranking of "3" with Alternative 2), due to Alternative 2 total scoring now at "24" vs. Alternative 4 total scoring now at "21".

QUESTIONS?

https://www.islandpacket.com/news/local/traffic/article235209867.html

MEMO

To: Town of Hilton Head, South Carolina

From: Lochmueller Group

Date: May 3, 2024

Subject: Independent Study of the William Hilton Parkway Gateway Corridor
Four Lane Viability Review Technical Memorandum – Task 1.3.3

Lochmueller Group (Lochmueller) is preparing an independent study that evaluates congestion and mobility challenges along the William Hilton Parkway Gateway Corridor. As part of this independent study, Lochmueller evaluated the viability of several strategies in order to determine if they should be included or excluded from further consideration as part of this project. These items include the viability of maintaining four lanes along William Hilton Parkway (US 278) between Windmill Harbour and Squire Pope Road; the implementation of a second bridge; modifications to the existing mass transit system; implementation of a new ferry system; and the implementation of a facility usage fee. It should be noted that an in-depth detailed analysis of any of these items was excluded from the scope of work.

The intention of this memorandum is to provide the Town of Hilton Head with Lochmueller's professional opinion regarding the feasibility of William Hilton Parkway being able to remain a four lane facility within areas between Moss Creek Drive and Squire Pope Road, if one or more of these strategies were implemented.

Viability of Maintaining Four Lanes Between Windmill Harbour and Squire Pope Road

Lochmueller evaluated the viability of maintaining four lanes between Windmill Harbour and Squire Pope Road. Currently, the intersection of Squire Pope Road and US 278 experiences significant congestion, specifically during the PM peak hour. The westbound approach has failing conditions and queues which extend 2,500 feet from Squire Pope past Spanish Wells. This congestion is expected to be exacerbated by 2045 with the forecasted growth.

Travel times were calculated using VISSIM, which is a microsimulation tool that accurately replicates individual vehicles and their interactions within complex traffic streams, such as interchanges, freeways, and expressway corridors with signalized intersections. A robust amount of data and field observations were conducted to calibrate VISSIM to reproduce field conditions.

The travel time results are provided in **Table 1.** As shown, it currently takes approximately 19 minutes to travel along US 278 between Moss Creek Drive and Indigo Run Drive during the AM peak hour, and it takes approximately 21 minutes to travel along US 278 between Indigo Run Drive and Moss Creek Drive during the PM peak hour today.

US 278 between Moss Creek Drive and Indigo Run Drive is approximately 8.2 miles. Based on the travel times, the existing average speed along this corridor is 26 miles per hour (mph) during the AM peak hour and 23 mph during the PM peak hour. This is well below the posted speed limits of 45 mph and 55 mph along the corridor.

Huntington Tower, 201 W Springfield Avenue, Suite 1012
Champaign, Illinois 61820
PHONE: 217.673.7633

These travel times are expected to increase by approximately 36% during the AM peak hour and by approximately 23% during the PM peak hour in the year 2045 with the anticipated background growth. It is evident based on the travel times that the existing four-lane section already struggles to accommodate the 2023 traffic volumes, and the 2045 forecasted traffic volumes would be expected to significantly deteriorate operating conditions along the corridor.

TABLE 1. VISSIM 2023 EXISTING AND 2045 NO BUILD TRAVEL TIME RESULTS

Corridor		2023 Existing Simulated travel time (secs)		2045 No Build Simulated travel time (secs)		% Difference	
		AM	PM	AM	PM	AM	PM
William Hilton Parkway between Moss Creek and Indigo Run	EB	1157	619	1579	642	**36.47%**	**3.72%**
	WB	572	1252	584	1544	**2.10%**	**23.32%**

A preliminary analysis was completed in an effort to determine how much the 2023 existing and 2045 no build traffic volumes would need to be reduced in order for the existing four-lane section to operate acceptably. It was determined that the 2023 existing traffic volumes would need to be reduced by approximately 30% for the current four-lane configuration to operate acceptably. Furthermore, based on an annual growth rate of 0.56%, the 2045 traffic volumes would need to be reduced by approximately 40% for the current four-lane configuration to operate acceptably.

Implementation of a Second Bridge

Lochmueller was asked to evaluate the implementation of a second bridge and/or point of access onto Hilton Head Island from the mainland. It is Lochmueller's understanding that a second bridge or point of access has been discussed locally to address congestion along US 278. A new bridge could take up to twenty years to come to fruition once all studies, planning, environmental, design, and construction is complete.

While there are clear benefits to providing a second bridge, such as redundancy, the operating conditions along US 278 are already congested today. As previously stated, the 2023 existing traffic volumes would need to be reduced by approximately 30% and the 2045 traffic volumes would need to be reduced by approximately 40% for the current four-lane configuration to operate acceptably. Given the congestion already experienced along this corridor today and the time it would take to construct a second bridge, it is our opinion that a six-lane section of US 278 onto Hilton Head Island is needed independently of a second bridge.

Modifications to Existing Transit System

Lochmueller evaluated whether modifications to the existing mass transit system and its services, or the implementation of a new mass transit system, could provide enough benefit to maintain the needed levels of efficiency and operations of a four-lane section between Windmill Harbour and Squire Pope Road.

Based on data provided by the Lowcountry Regional Transportation Authority (LRTA), transit service in the region has been on the decline. It should be noted that the transit service does show signs of rebounding; however, it remains to be seen what the new normal or equilibrium state may mean and if this is sustainable and long lasting for passenger volumes as transit agencies struggle with driver shortages, funding gaps and other operational challenges.

The following ridership data was provided from the LRTA:

- The Palmetto Breeze commuter bus's yearly unlinked trips peaked in 2019 at 196,978
- Trips declined to 129,160 in 2021 (post pandemic)
- Trips increased by 4.45% to 134,916 in 2022 according to the Federal Transit Administration (FTA) National Transit Database (NTD) data

The transit service in the region is fragmented by service area and type (commuter/worker, worker/tourist) and serves different markets with limited coordination. According to the LRTA, they currently have 72,963 yearly unlinked trips or 201 unlinked trips daily across all the routes that serve Hilton Head, with 363 service days and one AM and PM trip respectively. The Breeze Trolley, a seasonal service had 34,600 unlinked trips (2023) across 143 service days or 242 trips per day with 18 daily runs Sunday to Thursday and 20 runs on Friday and Saturday. The trolley runs April through Labor Day from 1 PM to 10 PM daily, with extended service to 11 PM Friday and Saturday.

There is an on-demand van service countywide with trips to Hilton Head. However, the ridership is unknown, and a 24 hour prior reservation is needed to make a trip. The is also a Beach Parking shuttle which operates 47 days per year from 10 AM to 4:30 PM on Friday, Saturday, Sunday and holidays from Memorial Day to Labor Day, with 3,980 riders (2023).

The fixed route Breeze transit option, as currently structured, only largely addresses the employment side to/from the island, and the trolley partially addresses trips of visitors, residents and likely some workers once they are on the island. The Breeze service does provide long distance routes. The on-island trolley is seasonal and has limited service hours. Overall, there is little coordination between the transit service types (commuter bus and trolley/shuttle), and there is service gap from Labor Day to April when the trolley does not currently run.

Based upon Lochmueller's evaluations, it appears transit across all services currently only provides a fraction of the total regional trip making to and from, and on, the island. In the future, transit would need to be more robust in terms of service span (number of trips daily and days per year of service) and coordinated to be most effective, with some sort of travel time advantage and way to address the last mile distribution once passengers are on the island.

As described in the preceding sections of this memorandum, the 2023 existing traffic volumes would need to be reduced by approximately 30% and the 2045 traffic volumes would need to be reduced by approximately 40% for the current 4-lane configuration to operate acceptably. By comparison, in 2021, the transit mode share was less than 1% in the region[1] , and would therefore have to grow exponentially to be effective enough to reduce the need for six lanes along US 278 in the area under study.

[1] https://datausa.io/profile/geo/hilton-head-island-bluffton-towns-beaufort-city-puma-sc#housing

Therefore, it is Lochmueller's opinion that even if significant modifications were made to the existing Palmetto Breeze transit system, it would be highly unlikely these modifications alone could account for enough trips and the mode share percentage needed to sufficiently reduce the number of trips across the US 278 bridges, such that a four-lane facility could be maintained.

Ferry System/Facility Usage Fee

In addition to expanding the existing mass transit system, Lochmueller evaluated whether the implementation of a new ferry system or the implementation of a facility usage fee, also commonly known as congestion pricing, would provide enough benefit to maintain the existing four-lane section across the US 278 bridges and/or between Windmill Harbour and Squire Pope Road.

In regard to the implementation of a new ferry system, it is our understanding that during the development of the 2045 Lowcountry Area Transportation Study (LATS) Long Range Transportation Plan (LRTP), long-term transit considerations were discussed with the public and stakeholders. One of these considerations included implementing high-speed ferry services between Hilton Head Island and Beaufort or Port Royal to the north, and Savannah or Tybee Island to the south.

It should be noted, however, that no formal studies have been initiated by the LATS Policy Committee or other governing bodies to determine the feasibility of implementing and/or maintaining a high-speed ferry system to/from Hilton Head Island. Therefore, it is reasonable to assume that a high speed ferry system to/from Hilton Head Island would not be fully operational within the next ten to fifteen years. If/when a new ferry system is implemented, it is highly unlikely the resulting reduction in traffic would allow for a four-lane section to be maintained along US 278 across the bridges and/or between Windmill Harbour and Squire Pope Road (e.g., 30% reduction in 2023 traffic or 40% reduction in traffic by 2045), given that the existing Palmetto Breeze transit system accounts for less than 1% of the region's transit mode share today.

In regard to the implementation of a facility usage fee, it is our understanding that laws within the State of South Carolina only allow tolls/fees to be implemented on new roads within the State system. As such, implementing facility usage fees on any of the existing roadways that are within the William Hilton Parkway Gateway Corridor Study area would be prohibited. It should be noted that, even if a facility usage fee could be implemented, the fee would largely impact commuters, not tourists, who enter and exit the island for work, as the majority of traffic during the AM and PM peak hours is a result of commuter traffic. Therefore, even if a facility usage fee could be implemented, it is highly unlikely the resulting reduction in traffic would allow for a four-lane section to be maintained along US 278 across the bridges and/or between Windmill Harbour and Squire Pope Road (e.g., e.g., 30% reduction in 2023 traffic or 40% reduction in traffic by 2045).

Conclusions

Lochmueller evaluated the viability of maintaining four lanes along William Hilton Parkway (US 278) between Windmill Harbour and Squire Pope Road; the implementation of a second bridge; modifications to the existing mass transit system; implementation of a new ferry system; and the implementation of a facility usage fee. These evaluations were completed by Lochmueller to determine feasibility of maintaining a four lane section along William Hilton Parkway between Moss Creek Drive and Squire Pope Road, if one or more of these strategies were implemented.

As noted in this technical memorandum, the existing traffic volumes already create significant congestion along US 278, and the congestion is expected to be exacerbated by 2045 with the forecasted background growth. Based on a preliminary analysis, the existing traffic volumes would need to be reduced by approximately 30%, and the 2045 traffic volumes would need to be reduced by approximately 40%, in order for a four-lane section to operate acceptably.

Based on Lochmueller's evaluations, it was concluded that it would be highly unlikely that modifications to the existing transit system alone could account for enough trips and the mode share percentage needed to sufficiently reduce the number of trips across the US 278 bridges, such that a four-lane facility could be maintained, given that the current transit mode share within the region is less than 1%, and would therefore have to increase exponentially to reach the target goal. In addition, neither the implementation of a new ferry system, nor the implementation of a facility usage fee (if there were a legal way to implement said fee), would be able to significantly reduce the number of vehicles along US 278 within the study area to allow for a four-lane section to be maintained.

In order for the existing four-lane section to operate acceptably, the total reduction in vehicles from mass transit, a new ferry system, and the implementation of a facility usage fee would need to be between 30-40%. While implementing the aforementioned types of transportation strategies would help slow future traffic growth on US 278, it is Lochmueller's opinion that even if all of these strategies are implemented, the reduction in vehicles would not reach 30%. Furthermore, these strategies would not address the structural issues associated with the existing bridges over Mackay Creek and Skull Creek. Consequently, it is Lochmueller's opinion that these strategies should not be considered as viable alternatives to be used individually and/or collectively to solely address traffic congestion and mobility related concerns along US 278 within the project study area, that could allow a four-lane section to be maintained along US 278 within the study area.

In regard to implementing a second bridge and/or point of access onto Hilton Head Island from the mainland, while it is acknowledged there are clear benefits to providing a second bridge (e.g., redundancy during natural disasters), Lochmueller's evaluations show that operating conditions along US 278 are already congested today. Given the congestion that is already experienced along this corridor today, the amount of traffic that would need to be removed from the existing traffic stream to be able to maintain four lanes across the bridge (i.e., 30% reduction in 2023 traffic or 40% reduction in traffic by 2045), and the time it would take to construct a second bridge, it is our opinion that a six-lane section of US 278 onto Hilton Head Island is needed independently of a second bridge.

MEMO

To: Town of Hilton Head, South Carolina

From: Lochmueller Group

Date: May 3, 2024

Subject: Independent Study of the William Hilton Parkway Gateway Corridor
Corridor Alternatives Analysis Memorandum – Task 3.6

Lochmueller Group (Lochmueller) has prepared the following memorandum pertaining to the Independent Study of the William Hilton Pkwy Gateway Corridor. This memorandum summarizes the findings related to the 2023 existing conditions and 2045 no build conditions for the entire project area which includes US 278 from Moss Creek Drive to Indigo Run Drive, as well as US 278 (Palmetto Bay Road) from Cross Island Pkwy to Sea Pines Circle. **Figure 1** shows the entire project area which was used for the 2023 existing conditions and 2045 no build analysis. This memorandum also provides a summary of the four alternatives considered for the 2045 build conditions for the modified original project area which extends along US 278 from Moss Creek Dr to Gumtree Road. **Figure 2 s**hows the modified original project area which was used for the 2045 alternatives analysis. The intention of this memorandum is to provide the Town of Hilton Head with the findings of the 2023 existing, 2045 no build, and 2045 alternatives analysis.

Huntington Tower, 201 W Springfield Avenue, Suite 1012
Champaign, Illinois 61820
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FIGURE 1. ENTIRE PROJECT STUDY AREA

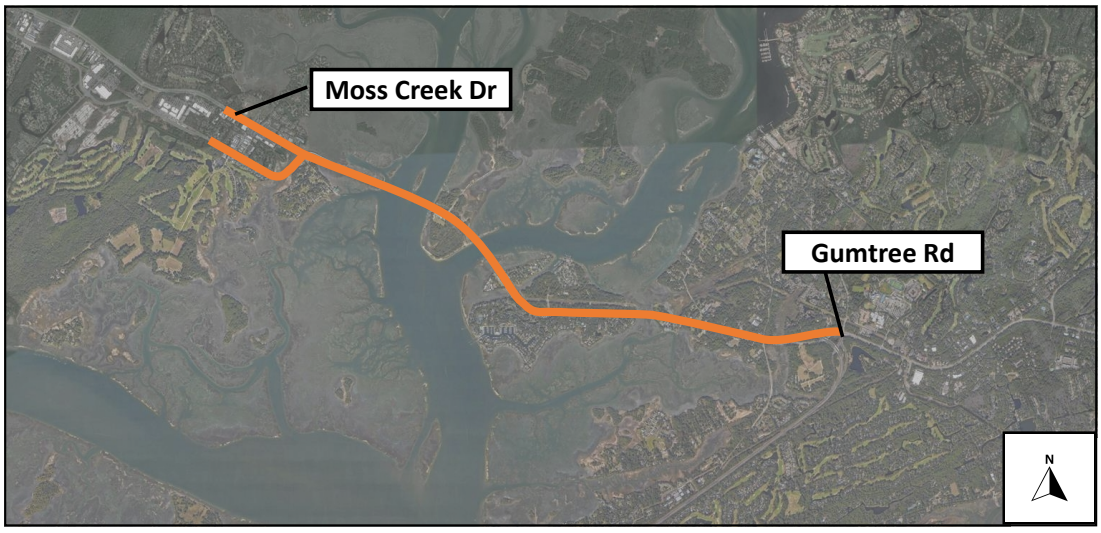


FIGURE 2. MODIFIED ORIGINAL PROJECT STUDY AREA

2023 Existing Conditions

The 2023 existing conditions analysis is intended to reflect current conditions. This scenario provides a baseline to ensure accurate calibration of the models as well as serve as a comparison to the future 2045 no build and 2045 alternatives analyses.

2023 Existing Traffic Volumes

Traffic volumes were collected by others at the following intersections on March 22, 2023:

- Buckingham Plantation Dr and Bluffton Pkwy
- Buckingham Plantation Dr and US 278
- Moss Creek Dr and US 278
- WB Bluffton Pkwy Ramp and WB US 278
- EB Bluffton Pkwy Ramp and EB US 278
- Fording Island Rd Extension and US 278
- Pinckney Wildlife Refuge and US 278
- Blue Heron Point Rd and US 278
- Crosstree Dr and US 278
- Jenkins Rd and US 278
- Squire Pope Rd and US 278
- Spanish Wells Rd and US 278
- Cross Island Pkwy Diverge and EB US 278
- Cross Island Pkwy Merge and WB US 278
- Gumtree Rd and Cross Island Pkwy Off and On Ramps
- Gumtree Rd and Business US 278
- Jarvis Park Rd and Business US 278
- Pembroke Dr and Business US 278
- Indigo Run Dr and Business US 278
- Marshland Rd and Spanish Wells Rd
- Marshland Rd and SB Cross Island Pkwy Ramps
- Marshland Rd and NB Cross Island Pkwy Ramps
- Arrow Rd and US 278
- Target Rd and US 278
- Sea Pines Circle and US 278

This study evaluates conditions during the morning and evening peak periods of a typical weekday, as these periods represent the most critical times of day for traffic operations within the study area for commuter peaks. If traffic can be accommodated during these peak periods, it stands to reason that adequate capacity would be available throughout the remainder of the day.

Corridor studies often reference the 30th highest day for traffic volumes to ensure that the volumes used in the analysis reflect peak conditions, while not over- or under-estimating the traffic volumes. Therefore, it was necessary to ensure that the counts collected accurately reflect the 30th highest day. Historical traffic data was obtained from SCDOT from the most recent 365 days. Given that the study focuses on commuter peak hours, the hourly data from 6:00 AM – 6:00 PM was referenced. After reviewing the traffic volumes throughout the year, it was determined that March 30, 2023 was the 30th highest day out of the year for traffic volumes. The counts collected on March 22, 2023 were grown by the percent difference between the two dates to bring them up to the estimated traffic volumes on March 30, 2023 (30th highest day). The resulting 2023 traffic volumes used in this study are provided in **Appendix A.**

2023 Existing Traffic Analysis

The 2023 existing traffic analysis was completed using the volumes provided in Appendix A at the study intersections shown in Figure 1. The 2023 existing traffic analysis includes the adaptive signal improvements approved by The Town of Hilton Head and implemented by Q-Free in the fall of 2023.

Synchro Analysis

This preliminary analysis was completed using Synchro 11 traffic modeling software, which is based upon the methodologies outlined in the "Highway Capacity Manual" (HCM) published by the Transportation Research Board. Intersection performance or traffic operations are quantified by six Levels of Service (LOS), which range from LOS A ("Free Flow") to LOS F ("Fully Saturated"). LOS D is considered acceptable for peak period conditions in urban and suburban areas. However, at side-street stop-controlled intersections, a LOS E or even a LOS F is a common occurrence for peak period conditions in urban and suburban areas as it is typical for delays to be longer for vehicles along the side-street as they wait to find acceptable gaps in the traffic to turn left into the traffic stream.

Levels of service for intersections are determined based on the average delay experienced by motorists. Signalized intersections reflect higher delay tolerances as compared to unsignalized and roundabout locations because motorists are accustomed to and accepting of longer delays at signals. For signalized and all-way stop intersections, the average control delay per vehicle is estimated for each movement and then aggregated for each approach and the intersection as a whole. For intersections with partial (side-street) stop control, the delay is calculated for the minor movements only (side-street approaches and major road left-turns) since thru traffic on the major road is not required to stop.

Table 1 summarizes the criterion for both signalized and unsignalized intersections, as defined by the Highway Capacity Manual (HCM) 6th Edition, last updated in 2016 by the Transportation Research Board.

TABLE 1: INTERSECTION LEVEL OF SERVICE THRESHOLDS

Level of Service	Control Delay per Vehicle (sec/veh)	
	Signalized	Unsignalized/Roundabout
A	≤ 10	0-10
B	> 10-20	> 10-15
C	> 20-35	> 15-25
D	> 35-55	> 25-35
E	> 55-80	> 35-50
F	> 80	> 50

Operating conditions at the study intersections were evaluated using Synchro 11 and are summarized in **Table 2.** The measures of effectiveness reported include LOS, delay, queue, and volume-to-capacity ratio (v/c). The delay is reported in seconds per vehicle. The queue is reported in feet as the 95th percentile queue. The v/c ratio compares vehicle demand to the capacity of an associated lane group. A v/c ratio of 1.0 represents a road segment that is at full capacity.

As shown, eastbound traffic experiences significant congestion during the AM peak period, whereas westbound traffic experiences significant congestion during the PM peak period. This is consistent with the commuter traffic patterns in the Town of Hilton Head.

While several intersections experience long delays and queue lengths during the AM peak hour, the PM peak hour appears to have overall worse operating conditions. Long delays occur along side-streets at

unsignalized intersections throughout the entire study area. Additionally, a rolling queue begins at Wilborn Rd and continues in the westbound lanes of US 278 over the bridge during the PM peak hour. The westbound queue length reaches up to approximately 2,500 ft (101 cars) at Squire Pope during the PM peak hour. It is evident that the study area currently experiences congestion during both the AM and PM peak periods.

TABLE 2. 2023 EXISTING OPERATING CONDITIONS (SYNCHRO)

Intersection & Movements	LOS (Delay, sec) [95th Queue Length, ft] <v/c ratio>	
	AM Peak Hour	PM Peak Hour
1: Buckingham Plantation Dr & Bluffton Pkwy (signal)		
Overall Intersection	**B (10.4)**	**B (15.3)**
Eastbound Approach	A (7.1) [196] <0.37>	A (9.1) [166] <0.29>
Westbound Approach	B (12.4) [146] <0.21>	B (17.5) [346] <0.46>
Northbound Approach	D (41.9) [63] <0.14>	C (34.2) [48] <0.15>
Southbound Approach	B (18.4) [55] <0.25>	C (24.3) [m81] <0.30>
2: Buckingham Plantation Dr/Moss Creek Dr & William Hilton Pkwy (signal)		
Overall Intersection	**B (19.2)**	**C (29.6)**
Eastbound Approach	B (15.0) [413] <0.56>	B (19.5) [391] <0.64>
Westbound Approach	B (14.6) [291] <0.36>	C (26.8) [710] <0.71>
Northbound Approach	D (45.5) [126] <0.67>	E (75.9) [103] <0.56>
Southbound Approach	E (59.4) [107] <0.57>	F (81.3) [#174] <0.91>
3: Salt Marsh Dr/Moss Creek Village & William Hilton Pkwy (signal)		
Eastbound Left Turn	C (16.5) [<25] <0.03>	E (43.4) [<25] <0.22>
Westbound Left Turn	D (33.5) [<25] <0.05>	D (26.6) [<25] <0.15>
Northbound Approach	D (26.5) [<25] <0.23>	C (21.7) [<25] <0.23>
Southbound Approach	D (30.8) [45] <0.41>	F (165.4) [150] <0.99>
4: Fording Island Rd Ext & William Hilton Pkwy (un-signalized)		
Westbound Left Turn	C (18.0) [<25] <0.02>	B (14.8) [<25] <0.04>
Northbound Approach	F (242.4) [75] <0.81>	F ($744.7) [168] <1.97>
5: Boat Landing Driveway/Wildlife Refuge Driveway & William Hilton Pkwy (un-signalized)		
Eastbound Left Turn	C (15.4) [<25] <0.01>	E (45.1) [<25] <0.05>
Westbound Left Turn	No volumes observed	C (22.7) [<25] <0.01>
Northbound Approach	E (38.1) [<25] <0.02>	F ($2538.4) [68] <2.99>
Southbound Approach	No volumes observed	F (50.4) [<25] <0.17>

6: Blue Heron Point Rd & William Hilton Pkwy (un-signalized)		
Westbound Left Turn	No volumes observed	C (23.8) [<25] <0.01>
Northbound Approach	F ($794.0) [58] <1.19>	F ($2033.9) [118] <3.51>
7: Crosstree Dr (Windmill Harbour) & William Hilton Pkwy (signal)		
Overall Intersection	**B (15.5)**	**E (59.1)**
Eastbound Approach	C (21.2) [#1701] <0.97>	B (10.3) [697] <0.82>
Westbound Approach	A (5.2) [291] <0.62>	F (93.2) [#2084] <1.16>
Northbound Approach	D (38.0) [65] <0.42>	E (68.0) [105] <0.72>
Southbound Approach	0 (0.0) [<25] <0.01>	0 (0.0) [<25] <0.00>
8: Jenkins Rd & William Hilton Pkwy (un-signalized)		
Eastbound Left Turn	C (15.6) [<25] <0.02>	F (56.9) [<25] <0.13>
Southbound Approach	F ($469.6) [45] <0.73>	F ($7285.9) [158] <12.12>
5: Boat Landing Driveway/Wildlife Refuge Driveway & William Hilton Pkwy (un-signalized)		
Eastbound Left Turn	C (15.4) [<25] <0.01>	E (45.1) [<25] <0.05>
Westbound Left Turn	No volumes observed	C (22.7) [<25] <0.01>
Northbound Approach	E (38.1) [<25] <0.02>	F ($2538.4) [68] <2.99>
Southbound Approach	No volumes observed	F (50.4) [<25] <0.17>
6: Blue Heron Point Rd & William Hilton Pkwy (un-signalized)		
Westbound Left Turn	No volumes observed	C (23.8) [<25] <0.01>
Northbound Approach	F ($794.0) [58] <1.19>	F ($2033.9) [118] <3.51>
7: Crosstree Dr (Windmill Harbour) & William Hilton Pkwy (signal)		
Overall Intersection	**B (15.5)**	**E (59.1)**
Eastbound Approach	C (21.2) [#1701] <0.97>	B (10.3) [697] <0.82>
Westbound Approach	A (5.2) [291] <0.62>	F (93.2) [#2084] <1.16>
Northbound Approach	D (38.0) [65] <0.42>	E (68.0) [105] <0.72>
Southbound Approach	0 (0.0) [<25] <0.01>	0 (0.0) [<25] <0.00>
8: Jenkins Rd & William Hilton Pkwy (un-signalized)		
Eastbound Left Turn	C (15.6) [<25] <0.02>	F (56.9) [<25] <0.13>
Southbound Approach	F ($469.6) [45] <0.73>	F ($7285.9) [158] <12.12>
9: Chamberlin Dr/Squire Pope Rd & William Hilton Pkwy (signal)		
Overall Intersection	**B (12.5)**	**F (101.4)**
Eastbound Approach	A (6.3) [530] <0.66>	B (14.4) [#387] <0.93>
Westbound Approach	A (9.4) [264] <0.55>	F (140.5) [~2514] <1.26>
Northbound Approach	C (24.0) [<25] <0.03>	E (79.9) [70] <0.22>

Southbound Approach	F (97.3) [#319] <1.01>	F (296.1) [#709] <1.61>
10: Old Wild Horse Rd & William Hilton Pkwy (un-signalized)		
Southbound Approach	C (21.5) [28] <0.28>	F (53.5) [<25] <0.13>
11: Spanish Wells Rd/Wild Horse Rd & William Hilton Pkwy (signal)		
Overall Intersection	**C (30.1)**	**D (36.0)**
Eastbound Approach	C (26.2) [1224] <0.85>	B (16.7) [383] <0.62>
Westbound Approach	B (18.2) [274] <0.66>	C (25.2) [862] <0.80>
Northbound Approach	E (61.8) [223] <0.62>	F (214.3) [#667] <1.46>
Southbound Approach	F (117.7) [#284] <1.00>	E (65.7) [187] <0.36>
12: Gumtree Rd & William Hilton Pkwy (signal)		
Overall Intersection	**E (59.1)**	**E (66.1)**
Eastbound Approach	E (64.3) [#1177] <0.98>	E (65.7) [763] <0.90>
Westbound Approach	C (33.6) [#412] <0.93>	D (54.5) [648] <1.00>
Northbound Approach	E (72.0) [#312] <0.89>	E (61.5) [351] <0.86>
Southbound Approach	F (90.7) [#418] <0.90>	F (115.5) [#517] <1.07>
13: Jarvis Park Rd/Wilborn Rd & William Hilton Pkwy (signal)		
Overall Intersection	**C (22.1)**	**C (30.8)**
Eastbound Approach	B (16.6) [m516] <0.74>	C (20.5) [m596] <0.73>
Westbound Approach	B (11.3) [316] <0.50>	C (25.6) [#1420] <0.98>
Northbound Approach	F (99.7) [143] <0.61>	F (108.7) [146] <0.76>
Southbound Approach	E (65.5) [262] <0.77>	E (67.9) [223] <0.96>
14: Pembroke Dr/Museum St & William Hilton Pkwy (signal)		
Overall Intersection	**B (19.7)**	**C (29.6)**
Eastbound Approach	B (11.2) [560] <0.73>	B (18.0) [546] <0.60>
Westbound Approach	A (9.0) [155] <0.44>	C (22.9) [508] <0.82>
Northbound Approach	F (101.1) [#317] <0.86>	F (89.3) [324] <0.84>
Southbound Approach	D (39.8) [78] <0.39>	D (49.2) [95] <0.60>
15: Central Ave & William Hilton Pkwy (un-signalized)		
Eastbound Left Turn	B (10.7) [<25] <0.01>	B (14.9) [<25] <0.01>
Westbound Left Turn	C (16.0) [<25] <0.02>	B (12.3) [<25] <0.01>
Northbound Right Turn	C (18.3) [<25] <0.02>	B (14.5) [<25] <0.03>
Southbound Right Turn	B (12.8) [<25] <0.05>	C (17.1) [<25] <0.02>

16: Hatton Pl/Merchant St & William Hilton Pkwy (un-signalized)		
Northbound Right Turn	C (17.6) [<25] <0.04>	C (16.1) [<25] <0.17>
Southbound Right Turn	B (12.7) [<25] <0.02>	C (17.5) [<25] <0.04>
17: Indigo Run Dr/Whooping Crane Way & William Hilton Pkwy (signal)		
Overall Intersection	**C (31.1)**	**D (42.1)**
Eastbound Approach	C (27.3) [693] <0.65>	C (30.8) [634] <0.71>
Westbound Approach	B (16.2) [343] <0.41>	C (31.3) [891] <0.75>
Northbound Approach	E (70.1) [112] <0.48>	E (68.9) [205] <0.68>
Southbound Approach	E (70.3) [#188] <0.78>	F (96.0) [#247] <0.98>
18: Cross Island Pkwy SB Ramp/Gumtree Rd & Honey Horn Rd (un-signalized)		
Eastbound Approach	B (11.0) [<25] <0.00>	B (12.8) [<25] <0.15>
19: Cross Island Pkwy SB Ramp & Marshland Rd (un-signalized)		
Westbound Left Turn	A (8.9) [<25] <0.12>	A (8.4) [<25] <0.14>
Southbound Left Turn	C (17.2) [<25] <0.08>	D (33.6) [35] <0.35>
Southbound Right Turn	A (9.2) [<25] <0.04>	B (12.9) [<25] <0.16>
20: Cross Island Pkwy NB Ramp & Marshland Rd (un-signalized)		
Eastbound Left Turn	A (8.2) [<25] <0.11>	A (8.4) [<25] <0.05>
Northbound Left Turn	B (14.5) [<25] <0.17>	C (23.0) [100] <0.61>
Northbound Right Turn	A (9.2) [<25] <0.07>	B (10.2) [<25] <0.20>
21: Palmetto Bay Rd & Bay Pines Rd (un-signalized)		
Eastbound Left Turn	-	F (209.4) [30] <0.40>
Eastbound Right Turn	C (18.7) [<25] <0.02>	B (14.9) [<25] <0.03>
Northbound Left Turn	C (16.4) [<25] <0.02>	B (13.0) [<25] <0.05>
22: Palmetto Bay Rd & Point Comfort Rd/Arrow Rd (signal)		
Overall Intersection	**B (13.8)**	**C (21.1)**
Eastbound Approach	D (43.3) [175] <0.70>	C (30.2) [101] <0.38>
Westbound Approach	C (28.0) [74] <0.44>	D (46.9) [249] <0.88>
Northbound Approach	A (5.4) [75] <0.30>	B (17.8) [756] <0.66>
Southbound Approach	B (11.5) [535] <0.61>	B (15.4) [432] <0.65>
23: Palmetto Bay Rd & Genesta St (un-signalized)		
Westbound Approach	D (33.1) [<25] <0.08>	F (84.2) [<25] <0.19>
Southbound Left Turn	A (9.6) [<25] <0.02>	B (14.6) [<25] <0.01>

24: Palmetto Bay Rd & Palmetto Business Park Rd (un-signalized)		
Westbound Approach	D (33.8) [<25] <0.08>	F (61.2) [<25] <0.20>
Southbound Left Turn	A (9.6) [<25] <0.03>	B (14.6) [<25] <0.01>
25: Palmetto Bay Rd & Bow Cir (un-signalized)		
Westbound Left Turn	C (23.7) [<25] <0.03>	E (41.3) [<25] <0.10>
Westbound Right Turn	B (11.1) [<25] <0.01>	C (16.7) [<25] <0.03>
Southbound Left Turn	A (9.8) [<25] <0.05>	B (14.6) [<25] <0.03>
26: Palmetto Bay Rd & Archer Rd (un-signalized)		
Westbound Left Turn	C (24.7) [<25] <0.06>	E (41.3) [<25] <0.10>
Westbound Right Turn	B (11.2) [<25] <0.01>	C (16.7) [<25] <0.03>
Southbound Left Turn	A (9.9) [<25] <0.07>	B (14.6) [<25] <0.03>
27: Palmetto Bay Rd & Target Rd (signal)		
Overall Intersection	**B (10.6)**	**B (18.6)**
Eastbound Approach	D (39.4) [82] <0.32>	E (59.5) [247] <0.80>
Westbound Approach	E (56.6) [154] <0.68>	C (33.7) [119] <0.49>
Northbound Approach	A (8.7) [199] <0.31>	B (15.3) [530] <0.59>
Southbound Approach	A (3.9) [102] <0.58>	A (8.7) [155] <0.53>
28: Palmetto Bay Rd & Dunnagans Alley (un-signalized)		
Westbound Left Turn	D (26.5) [<25] <0.03>	E (40.3) [<25] <0.24>
Westbound Right Turn	B (11.4) [<25] <0.02>	C (17.1) [<25] <0.18>
Southbound Left Turn	B (10.6) [<25] <0.16>	B (13.0) [<25] <0.02>
29: Palmetto Bay Rd & William Hilton Pkwy (Sea Pines Circle, RAB)		
Overall Intersection	**D (25.8)**	**C (24.4)**
Eastbound Approach	D (34.2) [200] <0.81>	E (45.6) [300] <0.92>
Westbound Approach	C (16.4) [125] <0.64>	E (36.6) [75] <0.85>
Northbound Approach	B (12.1) [75] <0.54>	D (32.4) [275] <0.88>
Southbound Approach	F (59.4) [500] <1.03>	E (39.2) [375] <0.94>

– 95th Percentile volume exceeds capacity
$ – Delay more than 300 seconds
m – Upstream metering is in effect

VISSIM Analysis

In addition to Synchro, the traffic analysis was also completed using VISSIM, which is a microsimulation tool that accurately replicates individual vehicles and their interactions within complex traffic streams, such as interchanges, freeways, and expressway corridors with signalized intersections. A robust amount of data and field observations were conducted to calibrate VISSIM to reproduce field conditions.

Field observations were conducted over the course of two weekdays in December 2023 and included both the AM and PM peak periods. Travel time runs and average speeds were conducted during the AM and PM peak periods along William Hilton Pkwy between Moss Creek and Indigo Run, as well as from William Hilton Pkwy at Moss Creek Dr to Cross Island Pkwy at Sea Pines Circle, to aid in the calibration of the VISSIM model.

As part of the calibration criteria, it was determined that the travel times reported in the VISSIM model should be within 10% of the travel times recorded in the field. The travel times calculated in the VISSIM model were inflated by 15% to account for higher volumes in March versus in December when the travel times were collected. The travel time results are provided in **Table 3.** As shown all of the travel times were within 10%, therefore all travel time targets were satisfied.

TABLE 3. 2023 EXISTING VISSIM CALIBRATION TRAVEL TIME RESULTS

Corridor		Observed travel time (secs)		Simulated travel time (secs)		% Difference	
		AM	PM	AM	PM	AM	PM
William Hilton Pkwy between Moss Creek and Indigo Run	EB	1108	672	1157	619	4.42%	-7.91%
	WB	605	1202	572	1252	-5.50%	4.17%
William Hilton Pkwy @Moss Creek to **Cross Island Pkwy** @Sea Pine	SB	1378	821	1356	857	-1.58%	4.37%
	NB	800	1516	826	1520	3.20%	0.25%

In addition to travel time calculations, traffic volumes were also used to help calibrate the VISSIM model. Similar to the travel times, it was determined that the traffic volumes reported in the VISSIM model should be within 10% of the 2023 existing traffic volumes provided in Appendix A. The traffic volume results are provided in **Table 4.** As shown all of the traffic volumes were within 10%, therefore all traffic volume targets were satisfied.

TABLE 4. 2023 EXISTING VISSIM CALIBRATION TRAFFIC VOLUMES RESULTS

Location	Observed traffic volumes (vehicles)		Simulated traffic volumes (vehicles)		% Difference	
	AM	PM	AM	PM	AM	PM
William Hilton Pkwy west of Squire Pope EB	2774	2237	2970	2240	7.07%	0.13%
William Hilton Pkwy west of Squire Pope WB	1639	3030	1650	2898	0.67%	-4.36%
William Hilton Pkwy east of Spanish Wells EB	2729	1991	2929	1955	7.33%	-1.81%
William Hilton Pkwy east of Spanish Wells WB	1408	2623	1423	2614	1.07%	-0.34%
Cross Island Pkwy north of Marshland Rd NB	975	1422	964	1371	-1.13%	-3.59%
Cross Island Pkwy north of Marshland Rd SB	1416	1190	1486	1167	4.94%	-1.93%

The VISSIM traffic models evaluate conditions during the morning and afternoon peak hours and provide performance measures as outputs. The LOS criteria for signalized and unsignalized intersections are the same as Table 1. The measures of effectiveness (MOE) reported include levels of service, delay, average queue length, and maximum queue length. The delay is reported in seconds per vehicle and the queue is reported in feet.

The 2023 existing operating conditions based on the VISSIM model are summarized in **Table 5.** As shown, the traffic operations largely agree with those shown in Table 2 from the Synchro analysis. The PM peak hour appears to have overall worse operating conditions. The long delays presented in the Synchro analysis along side-streets at unsignalized intersections throughout the entire study area were confirmed in this VISSIM analysis. Therefore, it can be concluded that the study area currently experiences significant congestion during both the AM and PM peak periods.

TABLE 5. 2023 EXISTING TRAFFIC OPERATIONS (VISSIM)

Intersection & Movements	LOS (Delay, sec) [95th Queue Length, ft] {Max Queue, ft}	
	AM Peak Hour	PM Peak Hour
1: Buckingham Plantation Dr & Bluffton Pkwy (signal)		
Overall Intersection	**B (12.2)**	**B (11.4)**
Eastbound Approach	B (12.5) [43] {324}	B (11.7) [<25] {178}
Westbound Approach	A (8.3) [<25] {171}	A (9.3) [<25] {234}
Northbound Approach	D (38.1) [<25] {73}	C (32.2) [<25] {65}
Southbound Approach	A (9.0) [<25] {68}	B (12.6) [<25] {84}
2: Buckingham Plantation Dr/Moss Creek Dr & William Hilton Pkwy (signal)		
Overall Intersection	**D (47.2)**	**B (19.5)**
Eastbound Approach	E (70.7) [807] {1620}	B (15.6) [65] {522}
Westbound Approach	B (14.4) [35] {353}	B (19.1) [100] {633}
Northbound Approach	D (35.9) [37] {263}	D (53.6) [<25] {104}
Southbound Approach	D (42.4) [<25] {92}	C (33.6) [29] {161}
3: Salt Marsh Dr/Moss Creek Village & William Hilton Pkwy (un-signalized)		
Eastbound Left Turn	E (35.3) [720] {1302}	C (19.7) [<25] {47}
Westbound Left Turn	F (414.9) [37] {107}	B (11.2) [<25] {41}
Northbound Approach	B (10.1) [<25] {61}	A (7.3) [<25] {55}
Southbound Approach	C (19.7) [<25] {76}	A (8.0) [<25] {73}
4: Fording Island Rd Ext & William Hilton Pkwy (un-signalized)		
Westbound Left Turn	E (40.7) [46] {102}	C (16.8) [<25] {28}
Northbound Approach	F (591.0) [120] {186}	C (17.5) [<25] {41}

5: Boat Landing Driveway/Wildlife Refuge Driveway & William Hilton Pkwy (un-signalized)		
Eastbound Left Turn	C (21.4) [691] {1658}	D (33.1) [<25] {<25}
Westbound Left Turn	No volumes observed	C (20.9) [<25] {<25}
Northbound Approach	F (270.5) [<25] {38}	C (20.8) [<25] {46}
Southbound Approach	No volumes observed	C (18.2) [<25] {39}
6: Blue Heron Point Rd & William Hilton Pkwy (un-signalized)		
Westbound Left Turn	No volumes observed	D (27.7) [<25] {<25}
Northbound Approach	F (1,270.4) [123] {228}	C (23.8) [<25] {60}
7: Crosstree Dr (Windmill Harbour) & William Hilton Pkwy (signal)		
Overall Intersection	**B (10.4)**	**A (8.2)**
Eastbound Approach	A (8.4) [335] {1093}	A (5.4) [62] {890}
Westbound Approach	B (10.7) [53] {655}	A (7.5) [292] {1626}
Northbound Approach	E (67.8) [30] {164}	E (79.0) [52] {214}
Southbound Approach	B (17.3) [<25] {<25}	A (0.0) [<25] {<25}
8: Jenkins Rd & William Hilton Pkwy (un-signalized)		
Eastbound Left Turn	A (8.2) [<25] {<25}	F (98.0) [<25] {54}
Southbound Approach	F (51.8) [<25] {44}	F (109.4) [<25] {92}
9: Chamberlin Dr/Squire Pope Rd & William Hilton Pkwy (signal)		
Overall Intersection	**D (39.2)**	**E (67.3)**
Eastbound Approach	E (56.8) [451] {1334}	B (19.3) [283] {1132}
Westbound Approach	A (7.0) [39] {618}	F (104.8) [874] {1383}
Northbound Approach	C (31.9) [<25] {38}	E (78.6) [<25] {76}
Southbound Approach	C (21.7) [<25] {147}	F (91.6) [220] {638}
10: Old Wild Horse Rd & William Hilton Pkwy (un-signalized)		
Southbound Approach	A (1.3) [<25] {<25}	A (6.4) [<25] {25}
11: Spanish Wells Rd/Wild Horse Rd & William Hilton Pkwy (signal)		
Overall Intersection	**C (29.8)**	**F (240.4)**
Eastbound Approach	C (26.6) [270] {1027}	B (17.1) [103] {622}
Westbound Approach	C (21.9) [87] {471}	F (415.7) [892] {989}
Northbound Approach	E (57.1) [85] {321}	F (395.1) [1241] {1288}
Southbound Approach	F (89.0) [103] {319}	E (63.9) [58] {242}

12: Gumtree Rd & William Hilton Pkwy (signal)		
Overall Intersection	**D (40.7)**	**E (66.4)**
Eastbound Approach	D (40.6) [765] {1592}	D (49.9) [203] {779}
Westbound Approach	C (30.3) [136] {357}	E (75.2) [961] {1610}
Northbound Approach	C (29.0) [75] {291}	D (45.2) [175] {338}
Southbound Approach	E (77.2) [182] {579}	F (93.4) [234] {779}
9: Chamberlin Dr/Squire Pope Rd & William Hilton Pkwy (signal)		
Overall Intersection	**D (39.2)**	**E (67.3)**
Eastbound Approach	E (56.8) [451] {1334}	B (19.3) [283] {1132}
Westbound Approach	A (7.0) [39] {618}	F (104.8) [874] {1383}
Northbound Approach	C (31.9) [<25] {38}	E (78.6) [<25] {76}
Southbound Approach	C (21.7) [<25] {147}	F (91.6) [220] {638}
10: Old Wild Horse Rd & William Hilton Pkwy (un-signalized)		
Southbound Approach	A (1.3) [<25] {<25}	A (6.4) [<25] {25}
11: Spanish Wells Rd/Wild Horse Rd & William Hilton Pkwy (signal)		
Overall Intersection	**C (29.8)**	**F (240.4)**
Eastbound Approach	C (26.6) [270] {1027}	B (17.1) [103] {622}
Westbound Approach	C (21.9) [87] {471}	F (415.7) [892] {989}
Northbound Approach	E (57.1) [85] {321}	F (395.1) [1241] {1288}
Southbound Approach	F (89.0) [103] {319}	E (63.9) [58] {242}
12: Gumtree Rd & William Hilton Pkwy (signal)		
Overall Intersection	**D (40.7)**	**E (66.4)**
Eastbound Approach	D (40.6) [765] {1592}	D (49.9) [203] {779}
Westbound Approach	C (30.3) [136] {357}	E (75.2) [961] {1610}
Northbound Approach	C (29.0) [75] {291}	D (45.2) [175] {338}
Southbound Approach	E (77.2) [182] {579}	F (93.4) [234] {779}
13: Jarvis Park Rd/Wilborn Rd & William Hilton Pkwy (signal)		
Overall Intersection	**C (21.8)**	**C (25.8)**
Eastbound Approach	B (17.1) [178] {929}	B (13.8) [67] {754}
Westbound Approach	B (17.9) [73] {543}	C (34.2) [668] {1285}
Northbound Approach	F (81.1) [45] {168}	E (77.4) [43] {186}
Southbound Approach	D (45.4) [72] {233}	C (21.7) [28] {120}

14: Pembroke Dr/Museum St & William Hilton Pkwy (signal)		
Overall Intersection	**B (18.7)**	**C (33.7)**
Eastbound Approach	B (12.6) [134] {991}	B (14.3) [76] {754}
Westbound Approach	B (12.7) [39] {443}	D (42.4) [645] {1261}
Northbound Approach	E (72.0) [84] {274}	E (69.4) [93] {310}
Southbound Approach	D (37.3) [<25] {91}	D (42.2) [<25] {115}
15: Central Ave & William Hilton Pkwy (un-signalized)		
Eastbound Left Turn	A (8.5) [<25] {<25}	F (55.9) [<25] {50}
Westbound Left Turn	C (16.5) [<25] {<25}	A (9.7) [<25] {<25}
Northbound Right Turn	C (21.6) [<25] {27}	B (12.4) [<25] {32}
Southbound Right Turn	B (11.3) [<25] {41}	F (165.1) [<25] {65}
16: Hatton Pl/Merchant St & William Hilton Pkwy (un-signalized)		
Northbound Right Turn	B (11.5) [<25] {25}	A (7.7) [<25] {61}
Southbound Right Turn	B (10.6) [<25] {46}	F (93.1) [<25] {72}
17: Indigo Run Dr/Whooping Crane Way & William Hilton Pkwy (signal)		
Overall Intersection	**C (23.3)**	**D (44.1)**
Eastbound Approach	B (18.9) [115] {848}	C (30.6) [116] {772}
Westbound Approach	B (15.3) [40] {333}	D (44.8) [592] {1536}
Northbound Approach	D (54.0) [29] {103}	E (58.6) [46] {190}
Southbound Approach	D (49.7) [52] {187}	E (73.4) [83] {324}
18: Cross Island Pkwy SB Ramp/Gumtree Rd & Honey Horn Rd (un-signalized)		
Eastbound Approach	A (9.1) [<25] {45}	B (10.9) [<25] {61}
19: Cross Island Pkwy SB Ramp & Marshland Rd (un-signalized)		
Westbound Left Turn	A (3.7) [<25] {63}	A (2.1) [<25] {60}
Southbound Left Turn	A (8.8) [<25] {47}	B (10.6) [<25] {77}
Southbound Right Turn	A (6.1) [<25] {80}	A (7.9) [<25] {110}
20: Cross Island Pkwy NB Ramp & Marshland Rd (un-signalized)		
Eastbound Left Turn	A (1.3) [<25] {36}	A (1.4) [<25] {<25}
Northbound Left Turn	B (10.8) [<25] {69}	C (21.3) [31] {193}
Northbound Right Turn	A (6.0) [<25] {94}	A (7.0) [46] {218}
21: Palmetto Bay Rd & Bay Pines Rd (un-signalized)		
Eastbound Left Turn	No volumes observed	E (40.7) [<25] {33}
Eastbound Right Turn	B (14.3) [<25] {25}	B (12.5) [<25] {31}
Northbound Left Turn	A (9.0) [<25] {<25}	A (7.1) [<25] {34}

22: Palmetto Bay Rd & Point Comfort Rd/Arrow Rd (signal)		
Overall Intersection	**B (13.2)**	**B (16.9)**
Eastbound Approach	C (33.3) [52] {191}	C (32.0) [37] {175}
Westbound Approach	B (18.8) [<25] {106}	C (23.2) [56] {261}
Northbound Approach	B (10.5) [29] {261}	B (15.7) [92] {612}
Southbound Approach	B (10.9) [94] {873}	B (14.2) [67] {606}
23: Palmetto Bay Rd & Genesta St (un-signalized)		
Westbound Approach	C (17.1) [<25] {50}	C (18.1) [<25] {52}
Southbound Left Turn	A (3.2) [<25] {<25}	B (13.2) [<25] {<25}
24: Palmetto Bay Rd & Palmetto Business Park Rd (un-signalized)		
Westbound Approach	C (18.0) [<25] {53}	C (17.4) [<25] {53}
Southbound Left Turn	A (4.0) [<25] {37}	A (7.5) [<25] {<25}
25: Palmetto Bay Rd & Bow Cir (un-signalized)		
Westbound Left Turn	D (27.5) [<25] {<25}	D (30.0) [<25] {35}
Westbound Right Turn	A (8.4) [<25] {58}	B (13.1) [<25] {68}
Southbound Left Turn	A (3.6) [<25] {40}	B (11.0) [<25] {26}
26: Palmetto Bay Rd & Archer Rd (un-signalized)		
Westbound Left Turn	D (30.6) [<25] {27}	D (32.8) [<25] {39}
Westbound Right Turn	A (8.8) [<25] {63}	B (11.4) [<25] {75}
Southbound Left Turn	A (4.3) [<25] {98}	B (11.9) [<25] {<25}
27: Palmetto Bay Rd & Target Rd (signal)		
Overall Intersection	**B (16.0)**	**B (17.6)**
Eastbound Approach	C (33.3) [<25] {110}	D (41.8) [62] {248}
Westbound Approach	D (37.1) [35] {151}	C (29.4) [38] {149}
Northbound Approach	A (9.7) [28] {214}	B (13.3) [71] {508}
Southbound Approach	B (15.4) [287] {1309}	B (13.9) [99] {742}
28: Palmetto Bay Rd & Dunnagans Alley (un-signalized)		
Westbound Left Turn	F (184.7) [<25] {50}	F (65.5) [<25] {75}
Westbound Right Turn	A (9.1) [<25] {84}	B (13.1) [<25] {110}
Southbound Left Turn	B (10.4) [112] {512}	B (12.5) [<25] {383}

29: Palmetto Bay Rd & William Hilton Pkwy (Sea Pines Circle, RAB)		
Overall Intersection	**E (37.0)**	**F (51.8)**
Eastbound Approach	F (208.4) [615] {814}	F (51.0) [285] {770}
Westbound Approach	A (7.5) [<25] {263}	F (168.3) [1635] {1658}
Northbound Approach	A (4.2) [<25] {223}	D (30.8) [228] {738}
Southbound Approach	B (12.9) [194] {461}	A (8.4) [85] {460}

2045 No Build Conditions

The 2045 no build conditions analysis is intended to reflect future conditions within the study area while accounting for an increase in "background" traffic. No modifications were made to the lane configurations. However, the 2045 no build scenario does include the effects of the adaptive signal system implemented in the fall of 2023.

2045 No Build Traffic Volumes

In order to evaluate traffic conditions through the year 2045, it was necessary to forecast the anticipated growth within the study area based on an increase in "background" traffic resulting from increasing population and commercial and employment growth in The Town of Hilton Head.

An annual background growth rate of 0.56% was determined after careful consideration of the Lowcountry Area Transportation Study (LATS) Travel Demand Model (TDM), census data, Beaufort County historic growth trends, historic traffic growth on the US 278 bridge, sale and restaurant tax revenue, public parking revenue, and short term rental data. A memorandum detailing the methodology behind the 0.56% growth rate is provided an **Appendix B.** The 2023 existing traffic volumes (Appendix A) were grown annually by 0.56% to 2045 in order to produce the 2045 no build traffic volumes which are provided in **Appendix C.**

2045 No Build Traffic Analysis

Similar to the 2023 existing conditions, the 2045 no build traffic analysis was completed using both Synchro and VISSIM. The 2045 no build operating conditions were evaluated using the same methodology applied to the 2023 existing conditions.

Synchro Analysis

The 2045 no build operating conditions at the study intersections were evaluated using Synchro 11 and are summarized in **Table 6.** As shown, the previously failing conditions and congestion experienced in the 2023 existing conditions are expected to be exacerbated by 2045 with the forecasted growth. Significant congestion is expected throughout the study area. Therefore, it can be concluded that the study intersections cannot accommodate the forecasted traffic growth in their existing state.

TABLE 6. 2045 NO BUILD OPERATING CONDITIONS (SYNCHRO)

Intersection & Movements	LOS (Delay, sec) [95th Queue Length, ft] <v/c ratio>	
	AM Peak Hour	PM Peak Hour
1: Buckingham Plantation Dr & Bluffton Pkwy (signal)		
Overall Intersection	**B (17.6)**	**C (25.5)**
Eastbound Approach	B (15.1) [298] <0.54>	B (16.0) [207] <0.50>
Westbound Approach	C (25.4) [202] <0.38>	D (36.7) [#496] <0.86>
Northbound Approach	B (15.9) [37] <0.08>	B (15.7) [30] <0.11>
Southbound Approach	A (9.9) [m23] <0.18>	A (6.1) [m21] <0.23>
2: Buckingham Plantation Dr/Moss Creek Dr & William Hilton Pkwy (signal)		
Overall Intersection	**B (18.2)**	**C (26.9)**
Eastbound Approach	B (16.9) [443] <0.64>	B (17.1) [345] <0.75>
Westbound Approach	B (17.9) [290] <0.51>	C (28.1) [#644] <0.89>
Northbound Approach	C (21.2) [98] <0.56>	D (49.7) [m#76] <0.74>
Southbound Approach	C (31.2) [70] <0.45>	E (60.9) [#123] <0.88>
3: Salt Marsh Dr/Moss Creek Village & William Hilton Pkwy (un-signalized)		
Eastbound Left Turn	C (18.8) [<25] <0.03>	F (65.8) [33] <0.33>
Westbound Left Turn	E (44.8) [<25] <0.08>	D (34.9) [<25] <0.22>
Northbound Approach	D (34.4) [33] <0.31>	D (26.7) [30] <0.30>
Southbound Approach	F (57.0) [88] <0.63>	F (649.6) [273] <2.05>
4: Fording Island Rd Ext & William Hilton Pkwy (un-signalized)		
Westbound Left Turn	C (21.6) [<25] <0.02>	C (17.0) [<25] <0.06>
Northbound Approach	F (684.9) [115] <1.63>	F ($1880.2) [225] <4.10>
5: Boat Landing Driveway/Wildlife Refuge Driveway & William Hilton Pkwy (un-signalized)		
Eastbound Left Turn	C (17.8) [<25] <0.01>	F (67.3) [<25] <0.08>
Westbound Left Turn	No volumes observed	C (28.7) [<25] <0.01>
Northbound Approach	F (50.7) [<25] <0.03>	D (32.3) [<25] <0.09>
Southbound Approach	No volumes observed	F (74.9) [<25] <0.26>
6: Blue Heron Point Rd & William Hilton Pkwy (un-signalized)		
Westbound Left Turn	No volumes observed	D (30.2) [<25] <0.01>
Northbound Approach	F ($1763.6) [73] <2.35>	F ($5024.3) [145] <8.33>

7: Crosstree Dr (Windmill Harbour) & William Hilton Pkwy (signal)		
Overall Intersection	**E (67.8)**	**F (92.1)**
Eastbound Approach	F (105.5) [#2262] <1.19>	C (33.3) [#1547] <1.00>
Westbound Approach	A (5.9) [320] <0.64>	F (133.8) [~2456] <1.26>
Northbound Approach	B (14.6) [34] <0.39>	E (77.5) [#106] <0.86>
Southbound Approach	0 (0.0) [<25] <0.01>	0 (0.0) [<25] <0.00>
8: Jenkins Rd & William Hilton Pkwy (un-signalized)		
Eastbound Left Turn	C (18.3) [<25] <0.03>	F (91.5) [<25] <0.22>
Southbound Approach	F ($1398.4) [65] <1.86>	F (151.3) [73] <.69>
9: Chamberlin Dr/Squire Pope Rd & William Hilton Pkwy (signal)		
Overall Intersection	**C (23.4)**	**F (144.6)**
Eastbound Approach	B (15.2) [918] <0.81>	B (12.6) [370] <0.91>
Westbound Approach	C (31.1) [625] <0.74>	F (233.2) [m#2394] <1.49>
Northbound Approach	B (13.0) [<25] <0.02>	E (70.6) [67] <0.29>
Southbound Approach	E (69.0) [#286] <0.92>	F (231.6) [#577] <1.46>
10: Old Wild Horse Rd & William Hilton Pkwy (un-signalized)		
Southbound Approach	D (26.7) [40] <0.36>	F (77.9) [<25] <0.20>
11: Spanish Wells Rd/Wild Horse Rd & William Hilton Pkwy (signal)		
Overall Intersection	**D (37.5)**	**D (45.1)**
Eastbound Approach	D (38.7) [#1280] <1.02>	C (20.5) [381] <0.89>
Westbound Approach	C (24.0) [345] <0.91>	D (45.2) [m909] <0.99>
Northbound Approach	D (51.5) [214] <0.60>	F (171.7) [#606] <1.35>
Southbound Approach	F (94.1) [#306] <0.97>	D (49.3) [168] <0.34>
12: Gumtree Rd & William Hilton Pkwy (signal)		
Overall Intersection	**F (84.2)**	**F (80.1)**
Eastbound Approach	F (94.6) [~1146] <1.16>	D (54.0) [#842] <0.99>
Westbound Approach	D (43.1) [#391] <0.90>	D (44.6) [m539] <0.97>
Northbound Approach	F (113.6) [#372] <1.13>	F (137.9) [#466] <1.29>
Southbound Approach	F (119.0) [#473] <1.09>	F (178.8) [#506] <1.33>
13: Jarvis Park Rd/Wilborn Rd & William Hilton Pkwy (signal)		
Overall Intersection	**C (20.2)**	**E (57.5)**
Eastbound Approach	B (16.0) [257] <0.90>	A (7.6) [m262] <0.76>
Westbound Approach	B (12.0) [306] <0.69>	D (38.2) [#1335] <1.01>
Northbound Approach	F (82.7) [136] <0.58>	F (259.8) [#208] <1.33>

Southbound Approach	D (52.5) [249] <0.73>	F (250.2) [#358] <1.61>
14: Pembroke Dr/Museum St & William Hilton Pkwy (signal)		
Overall Intersection	**C (27.8)**	**D (38.3)**
Eastbound Approach	B (15.6) [#1252] <0.91>	B (13.7) [351] <0.71>
Westbound Approach	D (36.7) [681] <0.55>	D (47.7) [1072] <0.89>
Northbound Approach	E (73.6) [254] <0.76>	F (86.1) [#355] <0.89>
Southbound Approach	C (32.7) [74] <0.36>	D (49.5) [93] <0.68>
15: Central Ave & William Hilton Pkwy (un-signalized)		
Eastbound Left Turn	B (11.4) [<25] <0.01>	B (17.2) [<25] <0.02>
Westbound Left Turn	C (18.7) [<25] <0.02>	B (13.6) [<25] <0.01>
Northbound Right Turn	C (21.0) [<25] <0.03>	C (15.9) [<25] <0.04>
Southbound Right Turn	B (13.8) [<25] <0.06>	C (19.5) [<25] <0.03>
16: Hatton Pl/Merchant St & William Hilton Pkwy (un-signalized)		
Northbound Right Turn	C (17.6) [<25] <0.04>	C (16.1) [<25] <0.17>
Southbound Right Turn	B (12.7) [<25] <0.02>	C (17.5) [<25] <0.04>
17: Indigo Run Dr/Whooping Crane Way & William Hilton Pkwy (signal)		
Overall Intersection	**B (18.0)**	**D (36.4)**
Eastbound Approach	A (3.5) [<25] <0.79>	B (16.9) [#297] <0.93>
Westbound Approach	B (19.2) [407] <0.51>	D (38.4) [#951] <0.92>
Northbound Approach	E (62.2) [112] <0.52>	E (70.5) [#245] <0.82>
Southbound Approach	D (54.9) [178] <0.71>	E (67.7) [212] <0.86>
18: Cross Island Pkwy SB Ramp/Gumtree Rd & Honey Horn Rd (un-signalized)		
Eastbound Approach	B (11.5) [<25] <0.00>	B (13.8) [<25] <0.19>
19: Cross Island Pkwy SB Ramp & Marshland Rd (un-signalized)		
Westbound Left Turn	A (9.1) [<25] <0.14>	A (8.6) [<25] <0.17>
Southbound Left Turn	C (19.7) [<25] <0.1>	E (49.9) [58] <0.49>
Southbound Right Turn	A (9.4) [<25] <0.05>	B (14.1) [<25] <0.19>
20: Cross Island Pkwy NB Ramp & Marshland Rd (un-signalized)		
Eastbound Left Turn	A (8.3) [<25] <0.12>	A (8.6) [<25] <0.06>
Northbound Left Turn	C (16.2) [<25] <0.21>	D (34.1) [160] <0.75>
Northbound Right Turn	A (9.4) [<25] <0.08>	B (10.6) [<25] <0.23>

21: Palmetto Bay Rd & Bay Pines Rd (un-signalized)		
Eastbound Left Turn	No volumes observed	F ($454) [50] <0.74>
Eastbound Right Turn	C (21.7) [<25] <0.03>	C (16.5) [<25] <0.04>
Northbound Left Turn	C (19.4) [<25] <0.03>	B (14.5) [<25] <0.06>
22: Palmetto Bay Rd & Point Comfort Rd/Arrow Rd (signal)		
Overall Intersection	**B (17.1)**	**C (26.9)**
Eastbound Approach	D (46.0) [171] <0.71>	C (24.5) [102] <0.35>
Westbound Approach	C (23.8) [73] <0.44>	E (55.3) [#376] <0.94>
Northbound Approach	A (9.7) [136] <0.37>	C (21.7) [443] <0.86>
Southbound Approach	B (15.2) [670] <0.73>	C (24.3) [434] <0.88>
23: Palmetto Bay Rd & Genesta St (un-signalized)		
Westbound Approach	E (46.3) [<25] <0.13>	F (159.5) [30] <0.37>
Southbound Left Turn	B (10.0) [<25] <0.02>	C (16.8) [<25] <0.02>
24: Palmetto Bay Rd & Palmetto Business Park Rd (un-signalized)		
Westbound Approach	E (47.3) [<25] <0.13>	F (114.3) [33] <0.37>
Southbound Left Turn	B (10.1) [<25] <0.04>	C (16.7) [<25] <0.02>
25: Palmetto Bay Rd & Bow Cir (un-signalized)		
Westbound Left Turn	D (27.7) [<25] <0.04>	F (54.8) [<25] <0.14>
Westbound Right Turn	B (11.6) [<25] <0.01>	C (19.0) [<25] <0.04>
Southbound Left Turn	B (10.3) [<25] <0.07>	C (16.7) [<25] <0.04>
26: Palmetto Bay Rd & Archer Rd (un-signalized)		
Westbound Left Turn	D (29.0) [<25] <0.07>	F (54.8) [<25] <0.14>
Westbound Right Turn	B (11.7) [<25] <0.01>	C (19.0) [<25] <0.04>
Southbound Left Turn	B (10.5) [<25] <0.08>	C (16.7) [<25] <0.04>
27: Palmetto Bay Rd & Target Rd (signal)		
Overall Intersection	**B (10.8)**	**B (18.7)**
Eastbound Approach	C (33.2) [81] <0.31>	D (51.4) [241] <0.82>
Westbound Approach	D (48.8) [152] <0.69>	C (30.4) [115] <0.50>
Northbound Approach	B (10.9) [240] <0.37>	B (19.0) [585] <0.72>
Southbound Approach	A (4.6) [149] <0.69>	A (7.3) [233] <0.66>
28: Palmetto Bay Rd & Dunnagans Alley (un-signalized)		
Westbound Left Turn	D (33.5) [<25] <0.09>	F (55.4) [<25] <0.33>
Westbound Right Turn	B (12.0) [<25] <0.02>	C (20.0) [<25] <0.24>
Southbound Left Turn	B (11.5) [<25] <0.21>	B (14.6) [<25] <0.03>

29: Palmetto Bay Rd & William Hilton Pkwy (Sea Pines Circle, RAB)		
Overall Intersection	**F (56.0)**	**F (60.3)**
Eastbound Approach	F (83.3) [375] <1.04>	F (117.9) [550] 0.98>
Westbound Approach	D (26.1) [200] <0.79>	F (92.4) [425] <1.08>
Northbound Approach	C (16.4) [125] <0.65>	F (78.2) [525] <0.98>
Southbound Approach	F (134.4) [900] <1.23>	F (94.3) [675] <1.13>

– 95th Percentile volume exceeds capacity
$ – Delay more than 300 seconds
m – Upstream metering is in effect

VISSIM Analysis

The travel time calculations and traffic volumes between the 2023 existing conditions and 2045 no build conditions were evaluated. As shown in **Table 7** and **Table 8**, several corridors and locations have negative percent differences and the 2045 no build simulated volumes are less than the 2023 simulated volumes. This is due to over-saturation of the study area and results in vehicles not being able to enter the network to process through each intersection. During the AM peak hour, the eastbound travel time is expected to increase by approximately 36% along Hilton Pkwy between Moss Creek and Indigo Run and by approximately 46% along Hilton Pkwy at Moss Creek to Cross Island Pkwy at Sea Pines Circle. During the PM peak hour, the westbound travel time is expected to increase by approximately 23% along Hilton Pkwy between Moss Creek and Indigo Run and by approximately 62% along Hilton Pkwy at Moss Creek to Cross Island Pkwy at Sea Pines Circle. Therefore, it is evident that the study area is expected to experience significant congestion through the year 2045.

TABLE 7. 2045 NO BUILD VISSIM CALIBRATION TRAVEL TIME RESULTS

Corridor		Existing Simulated travel time (secs)		2045 No Build Simulated travel time (secs)		% Difference	
		AM	PM	AM	PM	AM	PM
William Hilton Pkwy between Moss Creek and Indigo Run	EB	1157	619	1579	642	**36.47%**	**3.72%**
	WB	572	1252	584	1544	**2.10%**	**23.32%**
William Hilton Pkwy @Moss Creek to **Cross Island Pkwy** @Sea Pine	SB	1356	857	1984	873	**46.31%**	**1.87%**
	NB	826	1520	823	2465	**-0.36%**	**62.17%**

TABLE 8. 2045 NO BUILD VISSIM CALIBRATION TRAFFIC VOLUMES RESULTS

Location	Existing Simulated volume results (vehicles)		2045 No Build Simulated volume results (vehicles)		% Difference	
	AM	PM	AM	PM	AM	PM
William Hilton Pkwy west of Squire Pope EB	2970	2240	2783	2524	**-6.30%**	**12.68%**
William Hilton Pkwy west of Squire Pope WB	1650	2898	1843	2754	**11.70%**	**-4.97%**
William Hilton Pkwy east of Spanish Wells EB	2929	1955	2748	2198	**-6.18%**	**12.43%**
William Hilton Pkwy east of Spanish Wells WB	1423	2614	1570	2413	**10.33%**	**-7.69%**
Cross Island Pkwy north of Marshland Rd NB	964	1371	1065	919	**10.48%**	**-32.97%**
Cross Island Pkwy north of Marshland Rd SB	1486	1167	1440	1299	**-3.10%**	**11.31%**

The 2045 no build operating conditions at the study intersections were evaluated using VISSIM and are summarized in **Table 9**. As shown, the operating conditions largely agree with those shown in the 2045 no build Synchro operating conditions (Table 6) and validate the travel time and volume conclusions above. Significant congestion is expected throughout the study area through the year 2045. The congestion that currently exists throughout the study area is expected to be exacerbated by 2045 with the forecasted growth.

TABLE 9. 2045 NO BUILD OPERATING CONDITIONS (VISSIM)

Intersection & Movements	LOS (Delay, sec) [95th Queue Length, ft] {Max Queue, ft}	
	AM Peak Hour	PM Peak Hour
1: Buckingham Plantation Dr & Bluffton Pkwy (signal)		
Overall Intersection	**C (22.3)**	**B (15.9)**
Eastbound Approach	C (26.6) [123] {700}	B (18.5) [43] {241}
Westbound Approach	B (14.0) [<25] {168}	B (14.4) [32] {218}
Northbound Approach	B (14.1) [<25] {68}	B (14.5) [<25] {53}
Southbound Approach	A (6.6) [<25] {56}	A (8.5) [<25] {83}

2: Buckingham Plantation Dr/Moss Creek Dr & William Hilton Pkwy (signal)		
Overall Intersection	**E (74.1)**	**B (18.6)**
Eastbound Approach	F (146.0) [1628] {1658}	B (16.6) [86] {567}
Westbound Approach	B (14.1) [37] {302}	B (18.4) [86] {474}
Northbound Approach	C (26.4) [25] {186}	D (39.3) [<25] {91}
Southbound Approach	D (35.8) [<25] {88}	C (24.4) [<25] {119}
3: Salt Marsh Dr/Moss Creek Village & William Hilton Pkwy (un-signalized)		
Eastbound Left Turn	F (54.8) [1075] {1304}	C (18.8) [<25] {55}
Westbound Left Turn	F (4,646.8) [142] {214}	B (12.4) [<25] {45}
Northbound Approach	B (12.3) [<25] {63}	A (7.4) [<25] {62}
Southbound Approach	D (29.4) [49] {107}	A (8.1) [<25] {77}
4: Fording Island Rd Ext & William Hilton Pkwy (un-signalized)		
Westbound Left Turn	F (3,675.2) [85] {146}	C (19.0) [<25] {34}
Northbound Approach	F (3,448.2) [171] {189}	C (18.4) [<25] {43}
5: Boat Landing Driveway/Wildlife Refuge Driveway & William Hilton Pkwy (un-signalized)		
Eastbound Left Turn	C (20.9) [902] {1658}	D (26.6) [<25] {<25}
Westbound Left Turn	No volumes observed	C (21.4) [<25] {<25}
Northbound Approach	F (426.9) [<25] {38}	C (20.6) [<25] {47}
Southbound Approach	No volumes observed	C (17.5) [<25] {42}
6: Blue Heron Point Rd & William Hilton Pkwy (un-signalized)		
Westbound Left Turn	No volumes observed	F (131.6) [<25] {<25}
Northbound Approach	F (2,505.2) [214] {351}	E (49.9) [<25] {74}
7: Crosstree Dr (Windmill Harbour) & William Hilton Pkwy (signal)		
Overall Intersection	**A (9.5)**	**B (13.4)**
Eastbound Approach	B (11.3) [433] {1093}	B (10.6) [216] {1092}
Westbound Approach	A (5.3) [26] {601}	A (6.0) [86] {913}
Northbound Approach	D (41.6) [<25] {138}	F (237.4) [193] {326}
Southbound Approach	A (9.8) [<25] {<25}	A (0.0) [<25] {<25}
8: Jenkins Rd & William Hilton Pkwy (un-signalized)		
Eastbound Left Turn	B (14.4) [<25] {<25}	D (32.0) [<25] {33}
Southbound Approach	D (29.2) [<25] {47}	E (43.5) [<25] {62}

9: Chamberlin Dr/Squire Pope Rd & William Hilton Pkwy (signal)		
Overall Intersection	**C (26.8)**	**E (70.7)**
Eastbound Approach	D (38.4) [361] {1332}	B (13.9) [235] {1106}
Westbound Approach	A (8.4) [55] {700}	F (128.0) [1018] {1383}
Northbound Approach	C (21.2) [<25] {42}	E (67.4) [<25] {73}
Southbound Approach	B (19.2) [<25] {189}	F (80.3) [228] {693}
10: Old Wild Horse Rd & William Hilton Pkwy (un-signalized)		
Southbound Approach	A (1.4) [<25] {26}	A (8.0) [<25] {29}
11: Spanish Wells Rd/Wild Horse Rd & William Hilton Pkwy (signal)		
Overall Intersection	**C (30.3)**	**F (328.8)**
Eastbound Approach	C (25.2) [169] {787}	B (15.1) [98] {668}
Westbound Approach	B (15.5) [80] {365}	F (637.7) [896] {989}
Northbound Approach	E (63.1) [122] {407}	F (510.5) [1241] {1288}
Southbound Approach	F (147.4) [192] {319}	D (49.1) [51] {243}
12: Gumtree Rd & William Hilton Pkwy (signal)		
Overall Intersection	**D (51.9)**	**E (76.0)**
Eastbound Approach	D (43.1) [838] {1562}	D (50.4) [254] {711}
Westbound Approach	C (31.2) [128] {375}	E (76.3) [1203] {1623}
Northbound Approach	D (38.8) [166] {334}	F (92.7) [280] {356}
Southbound Approach	F (143.1) [1039] {1452}	F (121.3) [657] {1380}
13: Jarvis Park Rd/Wilborn Rd & William Hilton Pkwy (signal)		
Overall Intersection	**C (22.3)**	**C (33.4)**
Eastbound Approach	B (17.7) [169] {962}	B (12.6) [51] {552}
Westbound Approach	C (21.5) [106] {673}	D (42.5) [907] {1289}
Northbound Approach	E (67.4) [42] {178}	F (281.4) [153] {297}
Southbound Approach	D (36.9) [65] {225}	C (25.8) [32] {153}
14: Pembroke Dr/Museum St & William Hilton Pkwy (signal)		
Overall Intersection	**C (22.1)**	**E (55.1)**
Eastbound Approach	B (17.8) [227] {1081}	B (18.9) [99] {679}
Westbound Approach	B (19.5) [72] {553}	D (54.5) [998] {1279}
Northbound Approach	D (52.8) [71] {260}	F (260.2) [397] {719}
Southbound Approach	C (31.1) [<25] {87}	D (43.2) [<25] {114}

15: Central Ave & William Hilton Pkwy (un-signalized)		
Eastbound Left Turn	B (13.4) [<25] {<25}	C (21.6) [87] {146}
Westbound Left Turn	C (22.4) [<25] {25}	C (21.8) [<25] {<25}
Northbound Right Turn	C (16.2) [<25] {29}	B (12.6) [<25] {31}
Southbound Right Turn	B (12.3) [<25] {44}	F (2,448.4) [87] {171}
16: Hatton Pl/Merchant St & William Hilton Pkwy (un-signalized)		
Northbound Right Turn	A (8.1) [<25] {<25}	A (6.9) [<25] {64}
Southbound Right Turn	B (11.0) [<25] {36}	F (1,211.0) [123] {244}
17: Indigo Run Dr/Whooping Crane Way & William Hilton Pkwy (signal)		
Overall Intersection	**C (24.5)**	**E (66.7)**
Eastbound Approach	B (19.7) [107] {764}	C (34.5) [115] {636}
Westbound Approach	B (17.3) [53] {371}	E (75.8) [1341] {1658}
Northbound Approach	E (55.2) [32] {110}	E (76.4) [65] {265}
Southbound Approach	D (47.7) [57] {203}	F (126.4) [327] {1023}
18: Cross Island Pkwy SB Ramp/Gumtree Rd & Honey Horn Rd (un-signalized)		
Eastbound Approach	A (9.7) [<25] {45}	B (12.1) [<25] {72}
19: Cross Island Pkwy SB Ramp & Marshland Rd (un-signalized)		
Westbound Left Turn	A (4.5) [<25] {62}	A (2.4) [<25] {67}
Southbound Left Turn	A (9.8) [<25] {53}	B (11.1) [<25] {79}
Southbound Right Turn	A (6.1) [<25] {86}	A (7.9) [<25] {112}
20: Cross Island Pkwy NB Ramp & Marshland Rd (un-signalized)		
Eastbound Left Turn	A (1.6) [<25] {49}	A (1.5) [<25] {<25}
Northbound Left Turn	B (11.9) [<25] {77}	D (27.8) [46] {252}
Northbound Right Turn	A (6.0) [<25] {102}	A (8.0) [62] {277}
21: Palmetto Bay Rd & Bay Pines Rd (un-signalized)		
Eastbound Left Turn	No volumes observed	E (48.5) [<25] {35}
Eastbound Right Turn	C (15.6) [<25] {<25}	B (13.9) [<25] {32}
Northbound Left Turn	B (12.8) [<25] {<25}	A (7.8) [<25] {31}
22: Palmetto Bay Rd & Point Comfort Rd/Arrow Rd (signal)		
Overall Intersection	**B (14.0)**	**B (18.2)**
Eastbound Approach	C (30.2) [51] {187}	C (29.0) [38] {164}
Westbound Approach	B (17.3) [<25] {108}	C (28.2) [79] {337}
Northbound Approach	B (12.4) [38] {311}	B (15.5) [94] {596}
Southbound Approach	B (11.6) [91] {737}	B (16.3) [90] {601}

23: Palmetto Bay Rd & Genesta St (un-signalized)		
Westbound Approach	E (41.7) [<25] {57}	D (25.4) [<25] {53}
Southbound Left Turn	A (5.5) [37] {255}	A (8.8) [<25] {<25}
24: Palmetto Bay Rd & Palmetto Business Park Rd (un-signalized)		
Westbound Approach	F (65.1) [<25] {75}	C (21.0) [<25] {59}
Southbound Left Turn	A (5.7) [35] {176}	B (12.8) [<25] {<25}
25: Palmetto Bay Rd & Bow Cir (un-signalized)		
Westbound Left Turn	F (69.4) [46] {98}	E (40.7) [<25] {48}
Westbound Right Turn	A (9.1) [59] {131}	B (13.1) [<25] {81}
Southbound Left Turn	C (16.2) [551] {1040}	B (14.1) [<25] {67}
26: Palmetto Bay Rd & Archer Rd (un-signalized)		
Westbound Left Turn	F (1,234.0) [40] {69}	D (31.8) [<25] {34}
Westbound Right Turn	B (11.6) [62] {105}	B (11.5) [<25] {70}
Southbound Left Turn	C (16.2) [228] {469}	B (12.0) [<25] {28}
27: Palmetto Bay Rd & Target Rd (signal)		
Overall Intersection	**C (26.9)**	**B (18.6)**
Eastbound Approach	C (26.5) [<25] {105}	D (37.6) [62] {250}
Westbound Approach	C (34.2) [32] {157}	C (26.1) [38] {144}
Northbound Approach	B (12.5) [39] {235}	B (15.4) [83] {522}
Southbound Approach	C (33.5) [1209] {1511}	B (15.6) [129] {820}
28: Palmetto Bay Rd & Dunnagans Alley (un-signalized)		
Westbound Left Turn	F (872.0) [62] {148}	F (87.7) [<25] {97}
Westbound Right Turn	E (36.3) [88] {182}	B (13.0) [30] {132}
Southbound Left Turn	C (20.8) [258] {513}	B (13.1) [<25] {416}
29: Palmetto Bay Rd & William Hilton Pkwy (Sea Pines Circle, RAB)		
Overall Intersection	**F (60.5)**	**F (81.8)**
Eastbound Approach	F (314.7) [808] {838}	F (168.2) [805] {838}
Westbound Approach	B (14.3) [56] {434}	F (200.4) [1645] {1658}
Northbound Approach	A (4.2) [<25] {207}	F (61.1) [534] {794}
Southbound Approach	C (34.4) [297] {461}	A (8.2) [88] {460}

Alternative Analysis

As shown in both the 2023 existing and 2045 no build analysis, it is evident that improvements are needed within the study area to accommodate the expected growth within the area. Therefore, Lochmueller Group studied four alternatives to help improve the US 278 corridor. In determining the most beneficial and appropriate alternatives, the following guiding principles, as stated by the Town of Hilton Head, were top of mind:

- Fix the transportation issues in the corridor in a way that improves the safety and quality of life for all residents, workers, and visitors to Hilton Head Island
    a) Address transportation needs for natural disasters and resiliency of island access
    b) Consider future transportation alternatives
- Improve the safety and quality of life for the residents of the neighborhoods and businesses directly impacted by the US 278 corridor
    a) Stoney Community
    b) Neighborhoods on Jenkins and Hog Islands (including but not limited to Windmill Harbor)
- Have a gateway to and from Hilton Head Island that the region will be proud of:
    a) Aesthetically pleasing and reflecting the Hilton Head Island/Low County values
    b) Safe and functional pathways for pedestrians and cyclists
    c) Minimizes environmental impacts and enhances the national asset of Pinckney Island

With the guiding principles in mind, the following four alternatives are recommended for further study:

- Alternative 1: SCDOT Modified Recommended Preferred
- Alternative 2: Bowties at Squire Pope and Spanish Wells
- Alternative 3: Echelon / Center Turn Overpass
    a) Grade Separated Intersection at either Squire Pope or Spanish Wells, but not both
- Alternative 4: Elevated Bypass

As agreed upon with the Town of Hilton Head, the alternative analysis was completed for the modified original project study area shown in Figure 2.

2045 Alternative 1: SCDOT Modified Recommended Preferred

Alternative 1 considers the SCDOT Modified Recommended Preferred alternative with adaptive signals in place and improvements at Gumtree Rd. The improvements at Gumtree Rd include keeping the intersections at-grade, completely reconfiguring the intersection to improve its efficiency, and providing dual left-turn lanes for the westbound, northbound, and southbound approaches. **Figure 3** shows the improvements recommended as part of Alternative 1, as provided by SCDOT. It should be noted that the improvements at Gumtree Rd are not reflected in the figure provided by SCDOT.

2045 Alternative 1 Traffic Volumes

The traffic volumes used for the 2045 Alternative 1 analysis were largely similar to the 2045 no build traffic volumes provided in Appendix C. However, some intersections were combined in this alternative, requiring traffic diversions. The 2045 Alternative 1 traffic volumes are provided in Appendix D.

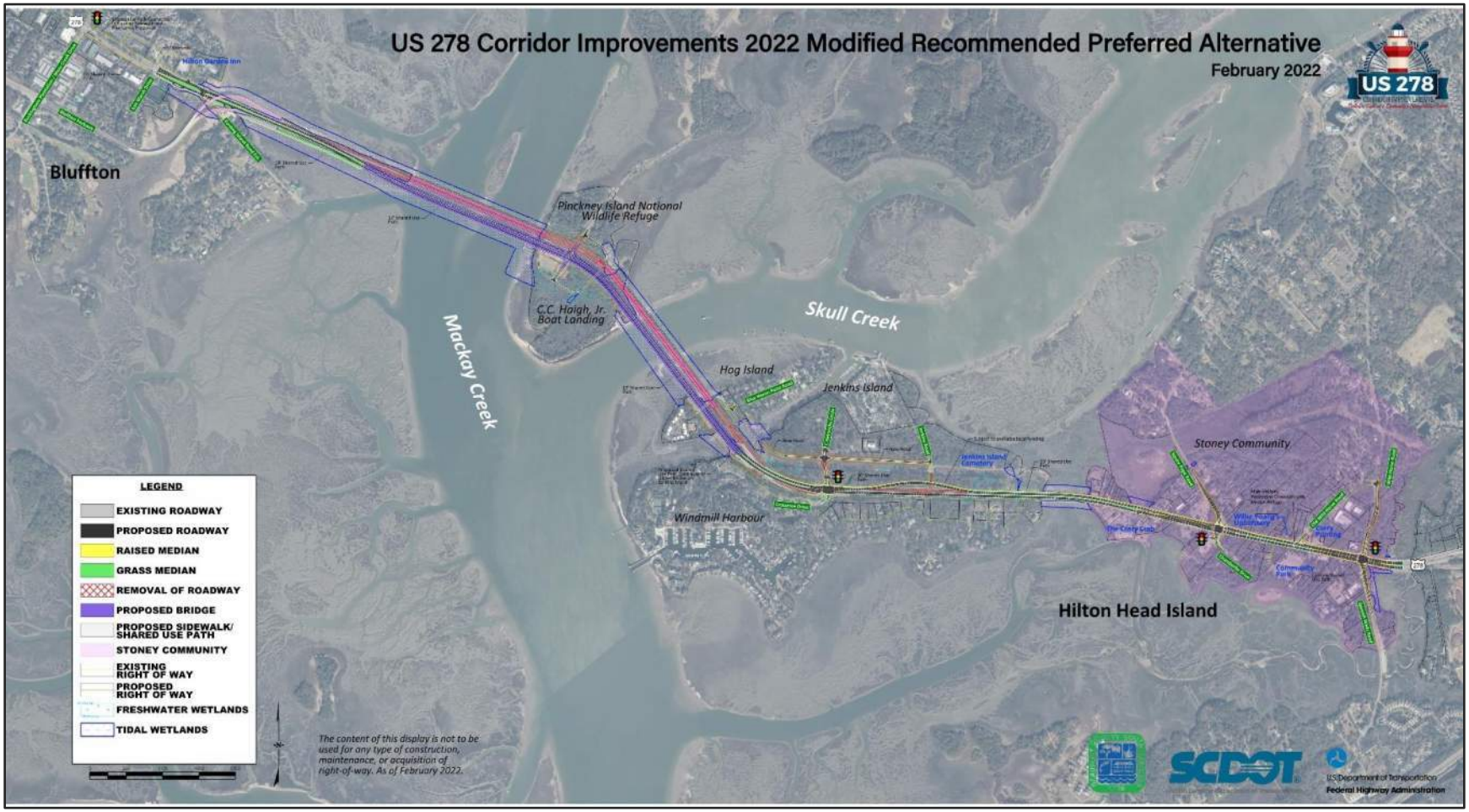


FIGURE 3. ALTERNATIVE 1: SCDOT MODIFIED RECOMMENDED PREFERRED

2045 Alternative 1 Traffic Analysis

As agreed upon with The Town of Hilton Head, the traffic analysis was completed using Synchro 11. The 2045 Alternative 1 operating conditions were evaluated using the same methodology applied to the existing and no build conditions. The operating conditions for the 2045 Alternative 1 scenario are shown in **Table 10.**

As shown, overall the study intersections are expected to operate acceptably under Alternative 1. Each signalized intersection is expected to operate with a LOS D or better overall. However, side-street and unsignalized approaches may still experience long delays. This is to be expected given the heavy volumes experienced along the mainline of William Hilton Pkwy and the inability of side-street traffic to find gaps in the mainline traffic to complete their movement.

TABLE 10. 2045 ALTERNATIVE 1 TRAFFIC OPERATING CONDITIONS (SYNCHRO)

Intersection & Movements	LOS (Delay, sec) [95th Queue Length, ft] <v/c ratio>	
	AM Peak Hour	PM Peak Hour
1: Buckingham Plantation Dr & Bluffton Pkwy (signal)		
Overall Intersection	**B (16.9)**	**B (12.9)**
Eastbound Approach	B (16.2) [361] <0.54>	A (8.7) [254] <0.50>
Westbound Approach	C (20.4) [180] <0.38>	B (12.1) [291] <0.86>
Northbound Approach	B (17.1) [49] <0.08>	D (47.7) [77] <0.11>
Southbound Approach	A (7.2) [55] <0.18>	C (27.1) [137] <0.23>
2: Buckingham Plantation Dr/Moss Creek Dr & William Hilton Pkwy (signal)		
Overall Intersection	**B (14.8)**	**C (19.1)**
Eastbound Approach	B (13.1) [283] <0.64>	B (14.0) [274] <0.75>
Westbound Approach	B (13.9) [223] <0.51>	C (21.1) [348] <0.89>
Northbound Approach	C (24.5) [120] <0.56>	D (38.2) [97] <0.74>
Southbound Approach	C (24.4) [80] <0.45>	D (27.4) [169] <0.88>
3: Salt Marsh Dr/Moss Creek Village & William Hilton Pkwy (un-signalized)		
Eastbound Left Turn	C (18.9) [27] <0.04>	F (65.8) [33] <0.33>
Westbound Left Turn	E (44.8) [<25] <0.08>	D (34.9) [<25] <0.22>
Northbound Approach	B (14.2) [59] <0.31>	C (11.4) [59] <0.30>
Southbound Approach	B (17.0) [91] <0.63>	F (173.4) [305] <2.05>
4: Fording Island Rd Ext & William Hilton Pkwy (un-signalized)		
Westbound Left Turn	D (27.4) [<25] <0.06>	B (17.7) [34] <0.13>
Northbound Approach	E (37.7) [53] <0.58>	F (99.8) [127] <1.26>

5: Boat Landing Driveway/Wildlife Refuge Driveway & William Hilton Pkwy (un-signalized)		
Northbound Right-Turn	A (3.0) [<25] <0.00>	A (1.3) [<25] <0.00>
Southbound Right-Turn	No volumes observed	A (2.9) [<25] <0.00>
6: Blue Heron Point Rd & William Hilton Pkwy (un-signalized)		
	Intersection combined with Crosstree Dr	
7: Crosstree Dr (Windmill Harbour) & William Hilton Pkwy (signal)		
Overall Intersection	**B (15.4)**	**B (14.6)**
Eastbound Approach	B (18.6) [338] <0.82>	B (11.6) [283] <0.70>
Westbound Approach	A (8.4) [166] <0.45>	B (19.6) [280] <0.92>
Northbound Approach	D (52.9) [93] <0.35>	E (60.4) [108] <0.72>
Southbound Approach	C (31.0) [<25] <0.06>	D (48.9) [30] <0.14>
8: Jenkins Rd & William Hilton Pkwy (un-signalized)		
	Intersection combined with Crosstree Dr	
A: The Crazy Crab & William Hilton Pkwy (un-signalized)		
Westbound Left-Turn	F (169.2) [<25] <0.05>	F (77.1) [<25] <0.02>
Northbound Right-Turn	F (95.8) [<25] <0.02>	E (39.3) [<25] <0.01>
9: Chamberlin Dr/Squire Pope Rd & William Hilton Pkwy (signal)		
Overall Intersection	**B (18.1)**	**C (23.3)**
Eastbound Approach	B (13.3) [852] <0.75>	B (11.1) [467] <0.71>
Westbound Approach	A (3.2) [91] <0.48>	B (18.0) [522] <0.97>
Northbound Approach	E (70.6) [263] <0.07>	F (84.1) [#464] <0.29>
Southbound Approach	D (52.9) [151] <0.58>	E (65.6) [281] <0.70>
10: Old Wild Horse Rd & William Hilton Pkwy (un-signalized)		
Southbound Approach	C (17.0) [74] <0.36>	E (43.2) [32] <0.20>
11: Spanish Wells Rd/Wild Horse Rd & William Hilton Pkwy (signal)		
Overall Intersection	**C (26.0)**	**C (20.9)**
Eastbound Approach	B (11.7) [354] <0.99>	B (10.1) [216] <0.85>
Westbound Approach	A (8.7) [350] <0.91>	C (28.3) [1107] <0.99>
Northbound Approach	E (73.5) [459] <0.66>	E (70.9) [#609] <0.95>
Southbound Approach	E (58.6) [411] <0.76>	E (57.7) [430] <0.77>

12: Gumtree Rd & William Hilton Pkwy (signal)		
Overall Intersection	**D (38.8)**	**D (38.4)**
Eastbound Approach	C (32.3) [655] <0.77>	C (31.3) [489] <0.93>
Westbound Approach	D (40.4) [310] <0.75>	D (43.6) [554] <0.97>
Northbound Approach	E (57.4) [375] <0.41>	D (54.5) [319] <0.93>
Southbound Approach	E (60.8) [293] <0.87>	E (74.3) [298] <0.90>

In addition to the Synchro operating conditions, travel time calculations were performed in Synchro along the William Hilton Pkwy corridor between Moss Creek and Indigo Run. It should be noted that VISSIM provides more accurate travel time results than Synchro. However, for the purposes of comparing alternatives, the Synchro results are shown as they still provide a reasonable comparison. The scope of work will include a VISSIM analysis for the preferred alternative in which the travel time calculations will be finalized. It is acknowledged that the travel time results from Synchro may understate the travel time calculations when compared to VISSIM.

Table 11 shows the changes in travel time for the 2045 Alternative 1 scenario when compared to the 2045 no build scenario. As shown, Alternative 1 is expected to improve the travel time along eastbound William Hilton Pkwy by approximately 16% during the AM peak period and westbound William Hilton Pkwy by approximately 34% during the PM peak period.

It should be noted that westbound William Hilton Pkwy during the AM peak period and eastbound William Hilton Pkwy during the PM peak period are not expected to experience significant congestion in the 2045 no build scenario, as traffic patterns in the study area largely follow the commuter traffic. Therefore, the increase in travel time shown is not expected to significantly impact the operating conditions of the study area.

TABLE 11. TRAVEL TIME COMPARISON FOR ALTERNATIVE 1

Scenario		Difference in Travel Time (seconds) when Compared to 2045 No Build		% Difference	
		AM	PM	AM	PM
2045 Alternative 1: SCDOT Modified Recommended Preferred	EB	-109	+18	**-16.1%**	**2.7%**
	WB	+43	-276	**6.3%**	**-34.2%**

2045 Alternative 1 Right-of-Way Impacts

The proposed modifications to the SCDOT Preferred Alternative in this alternative involve reconfiguring the Gumtree Rd intersection to providing dual left-turn lanes for the westbound, northbound, and southbound approaches. These improvements will require a strip of additional right of way of approximately 0.2 acre on Town owned land, in the northeast quadrant to accommodate the additional southbound left turn lane. The lane additions on the Westbound and northbound approaches can be accommodated within existing right of way.

2045 Alternative 1 Environmental Analysis

As noted above, Alternative 1 would require 0.2 acre of additional ROW. The additional ROW impacts are located within the Squire Pope neighborhood. The additional ROW to be acquired is owned by the Town of Hilton Head. The SCDOT Environmental Assessment (EA) determined that this area is an environmental justice community. One hazardous material site, Shell Food Mart Station 101 (165 William Hilton Pkwy), is located near the alternatives. No impacts to the site are anticipated as a result of Alternative 1. The SCDOT recommended preferred alternative was determined to have a "may affect- not likely to adversely affect" finding for threatened and endangered species. Alternative 1 is not anticipated to alter this finding. Coordination with the USFWS and the NOAA National Marine Fisheries Service (NMFS) will need to occur to affirm this finding. Alternative 1 would not result in additional impacts to NWI wetlands, streams, floodplains, or essential fish habitat types. No additional relocations would occur as a result of Alternative 1. No additional impacts to cultural resources or Section 4(f) properties would occur as a result of Alternative 1. Please refer to the Technical Environmental Overview in **Appendix H** for additional details.

2045 Alternative 2: Bowties at Squire Pope and Spanish Wells

Alternative 2 considers bowties at Squire Pope Rd and Spanish Wells Rd with adaptive signals in place and improvements at Gumtree Rd. The improvements at Gumtree Rd are the same as what was included in Alternative 1, which keeps the intersections at-grade, reconfigures the intersection to improve its efficiency, and provides dual left-turn lanes for the westbound, northbound, and southbound approaches.

A bowtie intersection removes left-turns from the intersection and requires vehicles to make a right-turn at the signal rather than a left-turn. Vehicles must then navigate through roundabouts along the side-street to return to the signal and continue through. **Figure 4** shows an example of a bowtie intersection. Note that this is only an example and not a schematic drawing of William Hilton Pkwy.

FIGURE 4. EXAMPLE BOWTIE INTERSECTION (PROVIDED BY VIRGINIA DOT)

Bowtie intersections provide several benefits. They improve safety as fewer conflicting vehicle and pedestrian movements are allowed. Bowtie intersections have 12 fewer conflict points when compared to traditional intersections, which have 32 conflict points. Bowtie intersections also encourage lower vehicle speeds through the roundabouts. The size of main intersections can be reduced as left-turn lanes are removed. Lastly, bowtie intersections increases the efficiency of the signalized intersections as more of the signal time can go to the main through movements, improving traffic operations.

However, bowtie intersections require a change in decision making for drivers as all left-turn movements would be required to navigate the adjacent roundabouts at Squire Pope Rd and Spanish Wells Rd. Bowtie intersections also increases the amount of travel time for left-turning vehicles and require additional ROW for the roundabouts.

2045 Alternative 2 Traffic Volumes

The traffic volumes used for the 2045 Alternative 2 analysis were largely similar to the 2045 no build traffic volumes provided in Appendix C. However, given that the left-turns along William Hilton Pkwy were removed at Squire Pope Rd and Spanish Wells Rd, some traffic diversions were necessary. The 2045 Alternative 2 traffic volumes are provided in Appendix E.

It should be noted that Lochmueller agrees with the improvements proposed along William Hilton Pkwy between Moss Creek Dr and Crosstree Dr in Alternative 1. Therefore, those improvements were included in Alternative 2. As such, the traffic volumes at those intersections would be the same between Alternative 2 and Alternative 1.

2045 Alternative 2 Traffic Analysis

As agreed upon with The Town of Hilton Head, the traffic analysis was completed using Synchro 11. The 2045 Alternative 2 operating conditions were evaluated using the same methodology applied to the existing and no build conditions. The operating conditions for the 2045 Alternative 2 scenario are shown in **Table 12.**

As shown, the bowties at Squire Pope and Spanish Wells are expected to improve operations throughout the study area. Overall, the study intersections are expected to operate acceptably under Alternative 2. Each signalized intersection is expected to operate with a LOS D or better overall. However, side-street and unsignalized approaches may still experience long delays. Similar to Alternative 1, this is to be expected given the heavy volumes experienced along the mainline of William Hilton Pkwy and the inability of side-street traffic to find gaps in the mainline traffic to complete their movement.

TABLE 12. 2045 ALTERNATIVE 2 TRAFFIC OPERATING CONDITIONS (SYNCHRO)

Intersection & Movements	LOS (Delay, sec) [95th Queue Length, ft] <v/c ratio>	
	AM Peak Hour	PM Peak Hour
9: Chamberlin Dr/Squire Pope Rd & William Hilton Pkwy (signal)		
Overall Intersection	**B (16.3)**	**B (13.6)**
Eastbound Approach	B (15.8) [394] <0.82>	B (14.7) [301] <0.65>
Westbound Approach	B (11.5) [253] <0.45>	B (11.3) [507] <0.95>
Northbound Approach	E (60.4) [277] <0.78>	D (44.0) [535] <0.94>
Southbound Approach	B (12.2) [87] <0.62>	D (51.8) [369] <0.82>
9A: Squire Pope North Bowtie (Roundabout)		
Overall Intersection	**A (4.5)**	**A (5.5)**
Eastbound Approach	A (3.7) [<25]	A (4.4) [<25]
Westbound Approach	A (3.4) [<25]	A (3.9) [<25]
Northbound Approach	A (4.2) [25]	A (5.1) [25]
Southbound Approach	A (4.7) [25]	A (5.9) [50]

9B: Chamberlin Dr South Bowtie (Roundabout)		
Overall Intersection	**A (4.2)**	**A (4.9)**
Eastbound Approach	A (3.4) [<25]	A (3.8) [<25]
Northbound Approach	A (3.5) [<25]	A (4.0) [<25]
Southbound Approach	A (4.2) [25]	A (5.0) [25]
10: Old Wild Horse Rd & William Hilton Pkwy (un-signalized)		
Southbound Approach	C (17.0) [80] <0.36>	F (51.5) [33] <0.20>
11: Spanish Wells Rd/Wild Horse Rd & William Hilton Pkwy (signal)		
Overall Intersection	**C (23.7)**	**C (21.2)**
Eastbound Approach	C (23.8) [519] <0.87>	B (15.5) [348] <0.69>
Westbound Approach	A (5.7) [118] <0.39>	B (16.9) [357] <0.94>
Northbound Approach	D (54.4) [486] <0.88>	E (58.9) [560] <0.94>
Southbound Approach	D (42.8) [369] <0.79>	C (29.4) [245] <0.81>
11A: Wild Horse Rd North Bowtie (Roundabout)		
Overall Intersection	**A (6.1)**	**A (6.6)**
Eastbound Approach	A (4.4) [<25]	A (4.7) [<25]
Northbound Approach	A (6.3) [50]	A (6.8) [50]
Southbound Approach	A (5.7) [25]	A (6.1) [25]
11B: Spanish Wells Rd South Bowtie (Roundabout)		
Overall Intersection	**A (7.2)**	**A (6.2)**
Eastbound Approach	A (4.7) [<25]	A (4.0) [<25]
Northbound Approach	A (7.9) [50]	A (6.9) [50]
Southbound Approach	A (6.6) [50]	A (5.4) [25]
12: Gumtree Rd & William Hilton Pkwy (signal)		
Overall Intersection	**D (35.1)**	**D (36.5)**
Eastbound Approach	D (40.2) [465] <0.88>	C (29.7) [360] <0.93>
Westbound Approach	B (19.4) [314] <0.41>	D (32.9) [455] <0.97>
Northbound Approach	C (32.2) [208] <0.75>	D (44.2) [341] <0.93>
Southbound Approach	E (57.8) [244] <0.86>	E (57.9) [275] <0.90>

In addition to the Synchro operating conditions, travel time calculations were performed in Synchro along the William Hilton Pkwy corridor between Moss Creek and Indigo Run. It should be noted that VISSIM provides more accurate travel time results than Synchro. However, for the purposes of comparing alternatives, the Synchro results are shown as they still provide a reasonable comparison. The scope of work will include a VISSIM analysis for the preferred alternative in which the travel time calculations will

be finalized. It is acknowledged that the travel time results from Synchro may understate the travel time calculations when compared to VISSIM.

Table 13 shows the changes in travel time for the 2045 Alternative 2 scenario when compared to the 2045 no build scenario. As shown, Alternative 2 is expected to improve the travel time along eastbound William Hilton Pkwy by approximately 15% during the AM peak period and westbound William Hilton Pkwy by approximately 36% during the PM peak period.

TABLE 13. TRAVEL TIME COMPARISON FOR ALTERNATIVE 2

Scenario		Difference in Travel Time (seconds) when Compared to 2045 No Build		% Difference	
		AM	PM	AM	PM
2045 Alternative 2: Bowties at Squire Pope and Spanish Wells	EB	**-104**	**-39**	**-15.3%**	**-6.6%**
	WB	+9	-290	**1.4%**	**-36.4%**

As previously noted, bowtie intersections may increase the total travel time for left-turning vehicles as they must alter their course to make a right-turn at the intersection and navigate through a roundabout to complete their movement. Therefore, the expected change in travel time was calculated in Synchro to better determine the additional time for the displaced left-turn movements. The changes in travel time are shown in **Table 14**. As shown, it could take an additional two minutes for a vehicle making a northbound left-turn at Squire Pope Rd to navigate through the bowtie intersection. However, several left-turning movements, such as the eastbound left-turn at Spanish Wells Rd, are actually expected to experience a decrease in travel time. This is likely due to the long delay those movements are expected to experience in the 2045 no build scenario.

TABLE 14. EXPECTED CHANGE IN TRAVEL TIME FOR LEFT-TURNING VEHICLES

Intersection		Difference in Travel Time (seconds) for Left-Turning Vehicles	
		AM	PM
Squire Pope	EB Left-Turn	**+63**	**+42**
	WB Left-turn	+82	+81
	NB Left-Turn	+101	+120
	SB Left-Turn	+44	+4
Spanish Wells	EB Left-Turn	-10	-26
	WB Left-turn	-13	-7
	NB Left-Turn	+89	-42
	SB Left-Turn	+43	+61

2045 Alternative 2 Right-of-Way Impacts

The proposed Bowtie configurations of Alternative 2 will require the 0.2 acre of additional right of way at Gumtree Rd as well as additional right of way along the crossroads to accommodate the construction of the roundabouts.

At the Squire Pope Rd intersection, the north roundabout would be located along Squire Pope Rd at Old Stony Ln, requiring approximately 0.2 acres of additional right of way from privately owned land. The south roundabout would be located at the end of Chamberlin Rd and would require approximately 0.4 acre of additional right of way from Town owned land.

At the Spanish Wells Rd intersection, the north roundabout would be located along Wild Horse Rd at Old Wild Horse Rd, requiring approximately 0.2 acre of additional right of way from Town owned land. The south roundabout would be located south of Humane Way and would require approximately 0.1 acre of additional right of way from Town owned land.

This alternative could potentially reduce the right of way required for the widening of William Hilton Pkwy by 0.5 acre or more due to the elimination of the left turn lanes at the intersections.

2045 Alternative 2 Environmental Analysis

As noted above, Alternative 2 would require 1.10 acres of additional ROW. The Town of Hilton Head owns 0.9 acre of the ROW that would need to be acquired. The additional ROW impacts are located within the Stoney and Squire Pope neighborhoods. The SCDOT EA determined that the Stoney neighborhood is an environmental justice community. The Squire Pope neighborhood was outside of the SCDOT EA investigation area but is also a Gullah community. The Gullah people are the only African American population in the US that have maintained a separate language and a distinct culture. Therefore, Squire Pope is likely an environmental justice community. The SCDOT recommended alternative was determined to have a “may affect- not likely to adversely affect” finding for threatened and endangered species. Alternative 2 is not anticipated to alter this finding. Coordination with the USFWS and the NOAA-NMFS would need to occur to affirm this finding. Alternative 2 would require additional impacts to the Stoney Traditional Cultural Property (TCP). The SCDOT identified the Stoney community as a TCP and as a resource eligible for inclusion in the National Register of Historic Places (NRHP). As a NRHP-eligible resource, it is also considered a Section 4(f) property. Alternative 2 would not result in additional impacts to hazardous materials sites, NWI wetlands, streams, floodplains, or essential fish habitat types. No additional relocations would occur as a result of Alternative 2. Please refer to the Technical Environmental Overview in Appendix H for additional details.

2045 Alternative 3: Echelon / Center Turn Overpass

Alternative 3 considers either an echelon or a center turn overpass at either Squire Pope Rd or Spanish Wells Rd. Echelons at both Squire Pope Rd and Spanish Wells Rd were not considered because there is not enough room for both intersections to be grade separated. The same can be said for why center turn overpasses were not considered at both Squire Pope and Spanish Wells.

Alternative 3 includes the adaptive signals in place as well as the previously detailed improvements at Gumtree Rd. The improvements at Gumtree Rd are the same as what was included in Alternative 1, which keeps the intersections at-grade, reconfigures the intersection to improve its efficiency, and provides dual left-turn lanes for the westbound, northbound, and southbound approaches.

An echelon is a grade-separate intersection where one approach on both roadways is elevated. For example, the northbound and eastbound approaches would be elevated and the southbound and westbound approaches would remain at-grade to create two intersections. Both intersections would be signalized and all pedestrian and bicycle movements would remain at-grade. **Figure 5** shows an example of an echelon. Note that this is only an example and not a schematic drawing of William Hilton Pkwy.

An echelon improves safety as fewer conflicting vehicle and pedestrian movements are allowed. Echelon intersections have 10 fewer conflict points when compared to traditional intersections (32 conflict points). They do not require a change in decision making for drivers as all movements would remain at Squire Pope Rd and Spanish Wells Rd. Echelons increase the efficiency of the signalized intersections as more of the signal time can go to the main through movements, improving traffic operations. While each approach would likely need the same lane configurations as shown in Alternative 1, only two approaches would conflict.

However, echelons do require grade separation of intersections and large intersections would likely remain as all movements (left-turn, through, and right-turn) are still allowed.

A center turn overpass is also a grade-separated intersection which raises only the left-turn movements from the main intersection using ramps to create two intersections. Both intersections would be signalized and all pedestrian and bicycle movements would remain at-grade. **Figure 6** shows an example of a center turn overpass. Note that this is only an example and not a schematic drawing of William Hilton Pkwy.

A center turn overpass improves safety as fewer conflicting vehicle and pedestrian movements are allowed. Center turn overpass intersections have 8 fewer conflict points when compared to traditional intersections (32 conflict points). They increase the efficiency of the signalized intersections as more of the signal time can go to the main through movements, improving traffic operations and they reduce the size of intersections as left-turn lanes are removed at-grade.

However, similar to echelons, center turn overpasses require grade separate and large intersections would likely remain as all movements (left-turn, through, and right-turn) are still allowed.

FIGURE 5. EXAMPLE ECHELON (PROVIDED BY VIRGINIA DOT)

FIGURE 6. EXAMPLE CENTER TURN OVERPASS (PROVIDED BY VIRGINIA DOT)

2045 Alternative 3 Traffic Volumes

The traffic volumes used for the 2045 Alternative 3 analysis were largely similar to the 2045 no build traffic volumes provided in Appendix C. However the traffic volumes for the intersections impacted by Alternative 3 are provided in Appendix F.

It should be noted that Lochmueller agrees with the improvements proposed along William Hilton Pkwy between Moss Creek Dr and Crosstree Dr in Alternative 1. Therefore, those improvements were included in Alternative 3. As such, the traffic volumes at those intersections would be the same between Alternative 3 and Alternative 1.

2045 Alternative 3 Traffic Analysis

As agreed upon with The Town of Hilton Head, the traffic analysis was completed using Synchro 11. The 2045 Alternative 3 operating conditions were evaluated using the same methodology applied to the existing and no build conditions. The operating conditions for the 2045 Alternative 3 scenario are shown in **Table 15** through **Table 18.**

As shown, overall the study intersections are expected to operate acceptably under Alternative 3. Each signalized intersection is expected to operate with a LOS D or better overall for either configuration. Similar to the previous scenarios, side-street and unsignalized approaches may still experience long delays. The long queues and delay that are expected under the 2045 No Build Scenario would be expected to be improved overall.

It should be noted that while operating conditions overall would be expected to improve when compared to the 2045 no build conditions, some movements would be expected to experience failing levels of service. When considering an echelon at Squire Pope Rd, the southbound approach at Squire Pope Rd is expected to fail. This is caused by a reduction in green time for the heavy southbound right-turns. Additionally, when considering a center turn overpass at Squire Pope Rd, the northbound approach at Spanish Wells Rd is expected to experience failing operating conditions. This is due to the limited amount of green time allowed for this movement under this scenario. However, overall each option in Alternative 3 is an improvement when compared to the 2045 no build scenario.

TABLE 15. 2045 ALTERNATIVE 3 TRAFFIC OPERATING CONDITIONS – ECHELON AT SPANISH WELLS (SYNCHRO)

Intersection & Movements	LOS (Delay, sec) [95th Queue Length, ft] <v/c ratio>	
	AM Peak Hour	PM Peak Hour
9: Chamberlin Dr/Squire Pope Rd & William Hilton Pkwy (signal)		
Overall Intersection	**B (11.2)**	**C (20.4)**
Eastbound Approach	B (12.4) [236] <0.75>	C (24.4) [478] <0.89>
Westbound Approach	A (7.7) [159] <0.48>	B (15.5) [332] <0.94>
Northbound Approach	D (41.3) [29] <0.03>	E (62.3) [77] <0.28>
Southbound Approach	B (16.7) [102] <0.57>	C (26.9) [274] <0.83>
10: Old Wild Horse Rd & William Hilton Pkwy (un-signalized)		
Southbound Approach	A (4.2) [37] <0.36>	A (4.8) [<25] <0.17>
11A: Wild Horse Rd & William Hilton Pkwy (signal) - Echelon		
Overall Intersection	**B (10.8)**	**B (12.8)**
Westbound Approach	A (7.2) [134] <0.38>	B (11.5) [249] <0.82>
Southbound Approach	C (34.5) [138] <0.58>	C (32.8) [131] <0.53>
11B: Spanish Wells Rd & William Hilton Pkwy (signal) - Echelon		
Overall Intersection	**B (18.3)**	**B (12.4)**
Eastbound Approach	B (17.3) [474] <0.95>	A (9.4) [288] <0.75>
Northbound Approach	C (28.1) [147] <0.72>	C (29.1) [233] <0.77>
12: Gumtree Rd & William Hilton Pkwy (signal)		
Overall Intersection	**D (44.6)**	**D (44.2)**
Eastbound Approach	D (53.1) [449] <0.88>	D (42.5) [406] <0.93>
Westbound Approach	C (30.0) [479] <0.38>	D (42.1) [824] <0.97>
Northbound Approach	C (33.3) [213] <0.75>	D (46.0) [356] <0.93>
Southbound Approach	E (59.5) [239] <0.86>	D (54.4) [274] <0.90>

TABLE 16. 2045 ALTERNATIVE 3 TRAFFIC OPERATING CONDITIONS - ECHELON AT SQUIRE POPE (SYNCHRO)

Intersection & Movements	LOS (Delay, sec) [95th Queue Length, ft] <v/c ratio>	
	AM Peak Hour	PM Peak Hour
9A: Squire Pope Rd & William Hilton Pkwy (signal) - Echelon		
Overall Intersection	**A (3.6)**	**C (35.0)**
Westbound Approach	A (2.2) [57] <0.51>	A (8.4) [258] <0.95>
Southbound Approach	B (6.6) [156] <0.62>	F (250.5) [858] <1.02>
9B: Chamberlin Dr & William Hilton Pkwy (signal) - Echelon		
Overall Intersection	**C (25.9)**	**A (4.6)**
Eastbound Approach	C (25.9) [263] <0.66>	A (4.1) [167] <0.54>
Northbound Approach	C (26.9) [151] <0.05>	D (37.9) [66] <0.19>
10: Old Wild Horse Rd & William Hilton Pkwy (un-signalized)		
Southbound Approach	C (17.6) [85] <0.36>	B (12.7) [<25] <0.17>
11: Spanish Wells Rd/Wild Horse Rd & William Hilton Pkwy (signal)		
Overall Intersection	**D (35.5)**	**D (39.6)**
Eastbound Approach	D (45.0) [906] <0.99>	B (17.4) [369] <0.67>
Westbound Approach	B (11.8) [168] <0.69>	D (52.5) [984] <0.93>
Northbound Approach	D (43.2) [167] <0.51>	E (67.8) [239] <0.90>
Southbound Approach	E (61.3) [214] <0.98>	D (47.1) [166] <0.37>
12: Gumtree Rd & William Hilton Pkwy (signal)		
Overall Intersection	**D (35.5)**	**D (42.4)**
Eastbound Approach	D (44.9) [464] <0.87>	D (35.6) [399] <0.87>
Westbound Approach	B (17.1) [204] <0.41>	D (42.8) [801] <0.83>
Northbound Approach	C (28.7) [202] <0.75>	D (43.3) [364] <0.89>
Southbound Approach	D (52.7) [230] <0.77>	E (55.1) [260] <0.77>

TABLE 17. 2045 ALTERNATIVE 3 TRAFFIC OPERATING CONDITIONS - CENTER TURN OVERPASS AT SPANISH WELLS

Intersection & Movements	LOS (Delay, sec) [95th Queue Length, ft] <v/c ratio>	
	AM Peak Hour	PM Peak Hour
9: Chamberlin Dr/Squire Pope Rd & William Hilton Pkwy (signal)		
Overall Intersection	**B (12.6)**	**C (26.8)**
Eastbound Approach	B (11.4) [210] <0.75>	D (39.0) [620] <0.81>
Westbound Approach	B (14.5) [306] <0.48>	B (16.3) [456] <0.96>
Northbound Approach	D (49.0) [<25] <0.07>	E (63.9) [64] <0.26>
Southbound Approach	B (14.7) [99] <0.58>	C (24.5) [292] <0.77>
10: Old Wild Horse Rd & William Hilton Pkwy (un-signalized)		
Southbound Approach	B (13.6) [78] <0.36>	E (46.6) [36] <0.20>
11A: Spanish Wells Rd/Wild Horse Rd & William Hilton Pkwy (signal)		
Overall Intersection	**B (12.9)**	**A (8.8)**
Eastbound Approach	B (13.8) [346] <0.87>	A (8.6) [271] <0.62>
Westbound Approach	A (5.9) [139] <0.64>	A (5.7) [135] <0.75>
Northbound Approach	C (32.4) [209] <0.81>	C (34.6) [146] <0.62>
Southbound Approach	E (59.8) [146] <0.51>	E (56.6) [186] <0.69>
11B: Spanish Wells Rd/Wild Horse Rd & William Hilton Pkwy (signal) – Center Turn Overpass		
Overall Intersection	**B (19.1)**	**B (17.9)**
Eastbound Approach	B (16.3) [58] <0.07>	B (12.2) [55] <0.08>
Northbound Approach	C (20.1) [102] <0.22>	B (19.2) [176] <0.46>
Southbound Approach	B (18.8) [32] <0.02>	B (16.9) [68] <0.11>
12: Gumtree Rd & William Hilton Pkwy (signal)		
Overall Intersection	**D (36.7)**	**D (35.4)**
Eastbound Approach	D (48.2) [465] <0.87>	C (31.9) [347] <0.93>
Westbound Approach	B (17.1) [337] <0.41>	C (30.9) [571] <0.97>
Northbound Approach	C (28.6) [203] <0.75>	D (37.4) [286] <0.93>
Southbound Approach	D (51.2) [234] <0.77>	E (58.8) [249] <0.90>

TABLE 18. 2045 ALTERNATIVE 3 TRAFFIC OPERATING CONDITIONS - CENTER TURN OVERPASS AT SQUIRE POPE (SYNCHRO)

Intersection & Movements	LOS (Delay, sec) [95th Queue Length, ft] <v/c ratio>	
	AM Peak Hour	PM Peak Hour
9A: Chamberlin Dr/Squire Pope Rd & William Hilton Pkwy (signal)		
Overall Intersection	**A (3.2)**	**A (9.3)**
Eastbound Approach	A (3.5) [40] <0.78>	A (4.8) [139] <0.64>
Westbound Approach	A (2.0) [42] <0.43>	A (7.4) [234] <0.93>
Northbound Approach	D (37.3) [21] <0.05>	E (68.1) [67] <0.11>
Southbound Approach	A (6.1) [149] <0.77>	D (48.3) [387] <0.89>
9B: Chamberlin Dr/Squire Pope Rd & William Hilton Pkwy (signal) – Center Turn Overpass		
Overall Intersection	**B (17.2)**	**B (10.0)**
Eastbound Approach	B (15.9) [108] <0.21>	A (3.9) [70] <0.65>
Westbound Approach	B (10.6) [<25] <0.00>	A (4.1) [<25] <0.95>
Northbound Approach	B (18.8) [<25] <0.00>	E (56.2) [<25] <0.94>
Southbound Approach	C (21.8) [64] <0.10>	D (40.9) [77] <0.82>
10: Old Wild Horse Rd & William Hilton Pkwy (un-signalized)		
Southbound Approach	C (17.4) [77] <0.36>	E (42.4) [29] <0.20>
11: Spanish Wells Rd/Wild Horse Rd & William Hilton Pkwy (signal)		
Overall Intersection	**C (32.4)**	**C (31.3)**
Eastbound Approach	D (39.0) [771] <0.98>	B (17.6) [369] <0.68>
Westbound Approach	B (12.6) [149] <0.91>	C (22.1) [446] <0.99>
Northbound Approach	D (44.0) [162] <0.64>	F (157.4) [766] <1.28>
Southbound Approach	E (62.8) [220] <0.82>	E (57.9) [152] <0.85>
12: Gumtree Rd & William Hilton Pkwy (signal)		
Overall Intersection	**D (35.8)**	**D (36.4)**
Eastbound Approach	D (45.7) [473] <0.87>	C (32.5) [387] <0.93>
Westbound Approach	B (17.4) [263] <0.41>	C (33.5) [651] <0.97>
Northbound Approach	C (28.3) [199] <0.75>	D (36.4) [277] <0.93>
Southbound Approach	D (52.7) [228] <0.77>	E (56.5) [262] <0.90>

In addition to the Synchro operating conditions, travel time calculations were performed in Synchro along the William Hilton Pkwy corridor between Moss Creek and Indigo Run. It should be noted that VISSIM provides more accurate travel time results than Synchro. However, for the purposes of comparing alternatives, the Synchro results are shown as they still provide a reasonable comparison. The scope of work will include a VISSIM analysis for the preferred alternative in which the travel time calculations will be finalized. It is acknowledged that the travel time results from Synchro may understate the travel time calculations when compared to VISSIM.

Table 19 shows the changes in travel time for the 2045 Alternative 3 scenario when compared to the 2045 no build scenario. As shown, between the four options provided in Alternative 3, the travel time calculations indicate that the travel time along eastbound William Hilton Pkwy would improve between approximately 18-32% during the AM peak period and westbound William Hilton Pkwy would improve between approximately 41-60% during the PM peak period.

TABLE 19. TRAVEL TIME COMPARISON FOR ALTERNATIVE 3

Scenario		Difference in Travel Time (seconds) when Compared to 2045 No Build		% Difference	
		AM	PM	AM	PM
2045 Alternative 3: Echelon at Squire Pope	**EB**	**-191**	**-68**	**-32.1%**	**-12.1%**
	WB	-79	-407	**-13.9%**	**-60.0%**
2045 Alternative 3: Echelon at Spanish Wells	EB	-140	-11	**-21.6%**	**-1.8%**
	WB	-15	-331	**-2.3%**	**-44.0%**
2045 Alternative 3: Center Turn Overpass at Squire Pope	EB	-122	+23	**-18.4%**	**3.5%**
	WB	-21	-319	**-3.3%**	**-41.6%**
2045 Alternative 3: Center Turn Overpass at Spanish Wells	EB	-134	-17	**-20.6%**	**-2.9%**
	WB	-16	-339	**-2.5%**	**-45.4%**

2045 Alternative 3 Right-of-Way Impacts

The proposed Echelon or Center Turn Overpass configurations of Alternative 3 would still require the 0.2 acres of additional right of way at Gumtree Rd as well as additional right of way along William Hilton Pkwy for turn lanes and additional right of way along the crossroads to accommodate the construction of the turn arounds and/or roundabouts to maintain full access to parcels near the intersections.

At the Squire Pope Rd intersection, the north roundabout would be located along Squire Pope Rd at Old Stony Ln, requiring approximately 0.2 acres of additional right of way from privately owned land. The south roundabout would be located at the end of Chamberlin Rd and would require approximately 0.4 acres of additional right of way from Town owned land. Widening of Chamberlin Rd would require approximately 0.05 acres of additional right of way from private land and 0.05 acres of right of way from

Town owned land. Widening along the north side of William Hilton Pkwy will require approximately 0.1 acres of additional right of way from Town owned land.

At the Spanish Wells Rd intersection, the north roundabout would be located along Wild Horse Rd at Old Wild Horse Rd, requiring approximately 0.2 acres of additional right of way from Town owned land. The south turn around would require approximately 0.35 acres of additional right of way from private land. Widening along the south side of William Hilton Pkwy would require approximately 0.3 acres of additional right of way from Town owned land and approximately 0.05 acres of additional right of way from private land.

2045 Alternative 3 Environmental Analysis

The environmental impacts for Alternative 3 were evaluated for an echelon at the Squire Pope Road intersection and an echelon at the Spanish Wells Road/Wild Horse Road intersection. A center turn overpass would result in more impacts than an echelon at either intersection. Therefore, a center turn overpass was dismissed from further consideration.

An echelon at the Squire Pope intersection would require the 1.0 acre of additional ROW. The Town of Hilton Head owns 0.75 acre of the ROW that would need to be acquired. The additional ROW impacts are located within the Stoney and Squire Pope neighborhoods. The SCDOT EA determined that the Stoney neighborhood is an environmental justice community. The Squire Pope neighborhood is a Gullah community and is likely an environmental justice community. The SCDOT recommended preferred alternative was determined to have a “may affect- not likely to adversely affect” finding for threatened and endangered species. An echelon at the Squire Pope intersection is not anticipated to alter this finding. Coordination with the USFWS and the NOAA-NMFS would need to occur to affirm this finding. An echelon at Squire Pope Road would result in additional impacts to the Stoney TCP, a cultural resource and Section 4(f) property. The addition of a grade separated intersection at Squire Pope Road also has the potential to create visual barriers within the Stoney TCP. It would not result in additional impacts to hazardous materials sites, NWI wetlands, streams, floodplains, or essential fish habitat types. No additional relocations would occur as a result of Alternative 3.

An echelon at the Spanish Wells Road/ Wild Horse Road intersection would require 1.1 acres of additional ROW. The Town of Hilton Head owns 0.7 acre of the ROW that would need to be acquired. The additional ROW impacts are located within the Stoney and Squire Pope neighborhoods. The SCDOT EA determined that the Stoney neighborhood is an environmental justice community. The Squire Pope neighborhood is a Gullah neighborhood and likely an environmental justice community. The SCDOT recommended preferred alternative was determined to have a “may affect- not likely to adversely affect” finding for threatened and endangered species. An echelon at the Spanish Wells Road intersection is not anticipated to alter this finding. Coordination with the USFWS and the NOAA-NMFS would need to occur to affirm this finding. An echelon at Spanish Wells Road would result in 0.29 acre of additional impacts to floodplains. It would result in additional impacts to the Stoney TCP, a cultural resource and Section 4(f) property. It would also result in 0.03 acre of additional impacts to the public park at 152 William Hilton Pkwy, a Section 4(f) property. The addition of a grade separated intersection at Spanish Wells Road / Wild Horse Road also has the potential to create visual barriers within the Stoney TCP. An echelon at Spanish Wells Road would not result in additional impacts to hazardous materials sites, NWI wetlands, streams, or essential fish habitat types. No relocations would occur as a result of Alternative 3.

Please refer to the Technical Environmental Overview in Appendix H for additional details.

2045 Alternative 4: Elevated Bypass

Alternative 4 considers an elevated bypass which would begin west of Squire Pope Rd and end east of Gumtree Rd. The elevated bypass will take the four internal lanes, two in each direction, and elevate them over the study intersections. This would allow free-flow for the eastbound and westbound through traffic from just east of the Jenkins Island causeway to just west of Wilborn Road. One lane in each direction along William Hilton Parkway will remain at grade along with a separate eastbound right-turn lane at Squire Pope Rd, and left-turn lanes at Squire Pope Rd and Spanish Wells Rd. This allows for full access to be maintained at Squire Pope Rd and Spanish Wells Rd. Full access could also be provided at Old Wild Horse Rd, which is currently a right-in/right-out intersection, in this scenario.

The elevated bypass will directly connect to the Cross Island Pkwy. In the eastbound direction, the two eastbound lanes will expand to provide one lane to the Cross Island Pkwy, one lane to William Hilton Pkwy at-grade for access to Gumtree Rd, and two lanes will continue along the elevated bypass and connect to the at-grade section just east of Gumtree Rd, allowing through vehicles to also bypass Gumtree Rd. In the westbound direction, two lanes will be provided along William Hilton Pkwy just east of Gumtree Rd. These lanes will be reduced to one lane prior to the merge with the westbound Cross Island Pkwy ramp. The westbound Cross Island Pkwy ramp and the single elevated westbound bypass ramp will then merge into a two-lane elevated section.

Alternative 4 has the adaptive signals in place. However, the improvements needed at Gumtree Rd in Alternatives 1, 2, and 3 would no longer be needed. In fact, the Gumtree Rd intersection would be able to be reduced in size as most of the eastbound and westbound through traffic would remain on the bypass rather than navigating through the intersection. Similarly, the at-grade intersections at Squire Pope Rd and Spanish Wells Rd would also be able to be reduced in size. An elevated bypass would improve safety as fewer through vehicles would remain at grade, reducing the conflicts between vehicles and pedestrians. In addition, the efficiency of the at-grade signalized intersections would be increased despite the reduction in the size of the intersection. Lastly, the alternative provides the most room for growth along the corridor.

However, this alternative would be the most expensive and would result in the largest construction impact. Alternative 4 also requires grade separation and a change in decision making as drivers looking to continue traveling eastbound or westbound would need to enter the bypass, rather than go through the local intersections of Squire Pope Rd, Old Wildhorse Rd, and Spanish Wells Rd as they do today. Full access would still be provided at-grade. **Figure 7** through **Figure 10** provide an example of the elevated bypass.

FIGURE 7. EXAMPLE OF ELEVATED BYPASS - 01

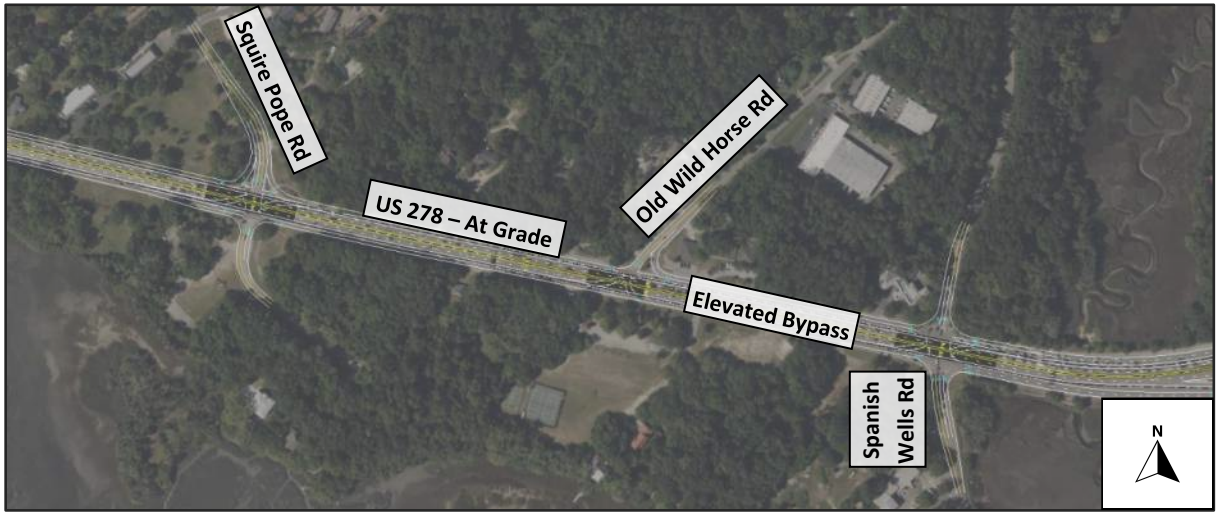


FIGURE 8. EXAMPLE OF ELEVATED BYPASS - 02

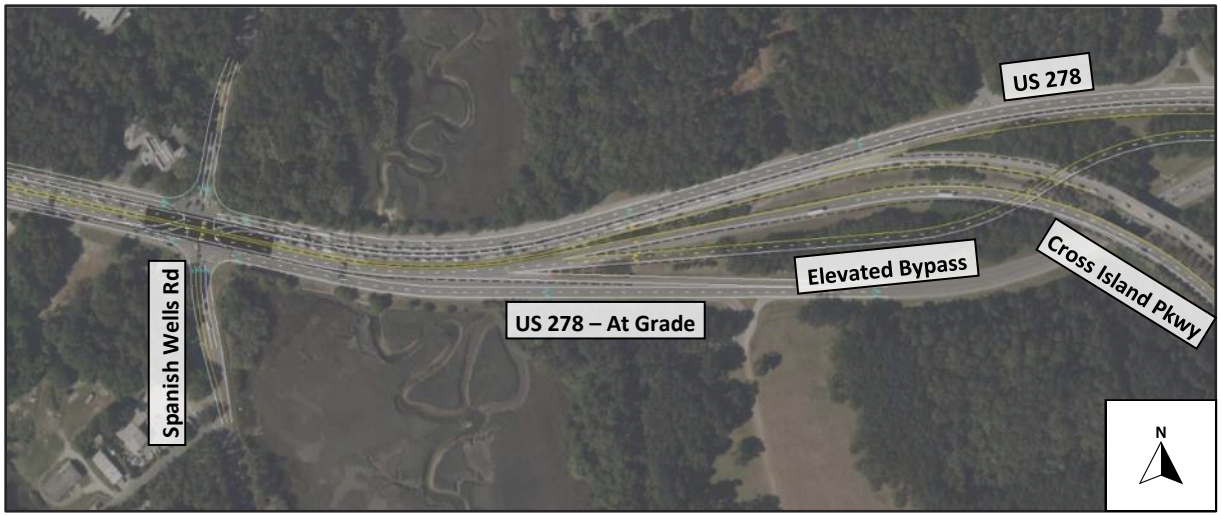


FIGURE 9. EXAMPLE OF ELEVATED BYPASS - 03

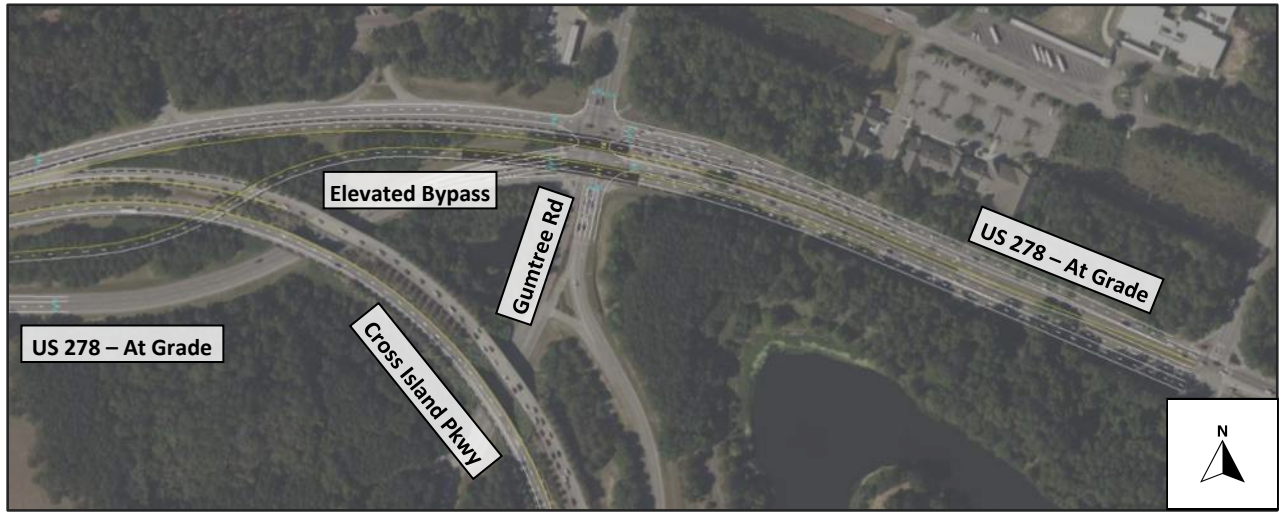


FIGURE 10. EXAMPLE OF ELEVATED BYPASS - 04

2045 Alternative 4 Traffic Volumes

The traffic volumes used for the 2045 Alternative 4 analysis were largely similar to the 2045 no build traffic volumes provided in Appendix C. However the traffic volumes for the intersections impacted by Alternative 4 are provided in Appendix G.

It should be noted that Lochmueller agrees with the improvements proposed along William Hilton Pkwy between Moss Creek Dr and Crosstree Dr in Alternative 1. Therefore, those improvements were included in Alternative 4. As such, the traffic volumes at those intersections would be the same between Alternative 4 and Alternative 1.

2045 Alternative 4 Traffic Analysis

As agreed upon with The Town of Hilton Head, the traffic analysis was completed using Synchro 11. The 2045 Alternative 4 operating conditions were evaluated using the same methodology applied to the existing and no build conditions. The operating conditions for the 2045 Alternative 4 scenario are shown in **Table 20.**

As shown, Squire Pope, Spanish Wells, and Gumtree would be expected to operate at an overall LOS C or better. Overall, the study intersections are expected to operate acceptably under Alternative 4. The signalized intersections throughout the corridor are expected to operate with a LOS C or better overall. Similar to the previous scenarios, side-street and unsignalized approaches throughout the corridor may still experience long delays. It should be noted that the results provided are for the at-grade intersections only and the operating conditions for the elevated bypass traffic are not provided in Synchro.

TABLE 20. 2045 ALTERNATIVE 4 TRAFFIC OPERATING CONDITIONS (SYNCHRO)

Intersection & Movements	LOS (Delay, sec) [95th Queue Length, ft] <v/c ratio>	
	AM Peak Hour	PM Peak Hour
9: Chamberlin Dr/Squire Pope Rd & William Hilton Pkwy (signal)		
Overall Intersection	**A (7.5)**	**A (9.6)**
Eastbound Approach	A (4.1) [71] <0.23>	A (4.7) [75] <0.42>
Westbound Approach	A (6.5) [75] <0.27>	A (6.5) [120] <0.46>
Northbound Approach	A (6.7) [<25] <0.01>	C (31.8) [38] <0.19>
Southbound Approach	B (12.6) [58] <0.52>	B (16.1) [103] <0.74>
10: Old Wild Horse Rd & William Hilton Pkwy (un-signalized)		
Southbound Approach	B (3.3) [<25] <0.11>	B (11.9) [<25] <0.02>
11: Spanish Wells Rd/Wild Horse Rd & William Hilton Pkwy (signal)		
Overall Intersection	**C (28.1)**	**C (27.9)**
Eastbound Approach	B (13.2) [63] <0.43>	B (15.0) [71] <0.44>
Westbound Approach	C (24.6) [100] <0.60>	B (13.2) [55] <0.32>
Northbound Approach	C (27.0) [102] <0.65>	D (39.6) [132] <0.78>
Southbound Approach	D (47.1) [161] <0.75>	D (46.5) [136] <0.73>

12: Gumtree Rd & William Hilton Pkwy (signal)		
Overall Intersection	**C (26.0)**	**C (28.5)**
Eastbound Approach	B (17.1) [115] <0.25>	C (29.9) [142] <0.28>
Westbound Approach	B (10.9) [142] <0.33>	B (17.3) [205] <0.54>
Northbound Approach	C (30.4) [212] <0.70>	C (33.6) [266] <0.81>
Southbound Approach	D (42.9) [250] <0.80>	C (34.1) [211] <0.83>

In addition to the Synchro operating conditions, travel time calculations were performed in Synchro along the William Hilton Pkwy corridor between Moss Creek and Indigo Run. It should be noted that VISSIM provides more accurate travel time results than Synchro. However, for the purposes of comparing alternatives, the Synchro results are shown as they still provide a reasonable comparison. The scope of work will include a VISSIM analysis for the preferred alternative in which the travel time calculations will be finalized. It is acknowledged that the travel time results from Synchro may understate the travel time calculations when compared to VISSIM.

Table 21 shows the changes in travel time for the 2045 Alternative 4 scenario when compared to the 2045 no build scenario. As shown, Alternative 4 is expected to improve the travel time along the remaining at grade eastbound William Hilton Pkwy by approximately 19% during the AM peak period and at grade westbound William Hilton Pkwy by approximately 44% during the PM peak period. It should be noted that the travel times reflect operations of at-grade intersections only. VISSIM software will allow for modeling of bypass itself and will therefore yield greater reductions in travel times than those shown in the table.

TABLE 21. TRAVEL TIME COMPARISON FOR ALTERNATIVE 4

Scenario		Difference in Travel Time (seconds) when Compared to 2045 No Build		% Difference	
		AM	PM	AM	PM
2045 Alternative 4: Elevated Bypass	**EB**	-126	27	**-19.1%**	**4.1%**
	WB	+4	-330	**0.5%**	**-43.7%**

2045 Alternative 4 Right-of-Way Impacts

The proposed Elevated Bypass Alternative can be constructed within the proposed right of way footprint of the SCDOT Preferred alternative and, unlike the other alternatives, would not adding turn lanes to the Gumtree Rd intersection and the additional strip of right of way required by those improvements, resulting in no additional right of way being required for this alternative.

2045 Alternative 4 Environmental Analysis

Alternative 4 would impact an additional 0.03 acre of National Wetland Inventory (NWI) wetlands and an additional 0.03 acre of essential fish habitats. Approximately 65 linear feet of Jarvis Creek would be impacted. Alternative 4 would require no additional ROW. The SCDOT recommended preferred alternative was determined to have a “may affect- not likely to adversely affect” finding for threatened

and endangered species. Alternative 4 is not anticipated to alter this finding. Coordination with the USFWS and the NOAA-NMFS would need to occur to affirm this finding.

The Honey Horn Plantation is a collection of historic farm buildings and landscape and would be considered a Section 4(f) resource. It is also home to the Coastal Discovery Museum, which educates the public on the region's cultural and natural history. Alternative 4 intersects the current boundary of Honey Horn plantation according to the South Carolina Department of Archives and History website. This is unlikely to be considered a Section 4(f) use as the proposed improvements associated with this alternative would occur entirely within existing transportation ROW. Therefore, there is likely no conversion of the resource from a non-transportation use to a transportation one. The current boundary of the site extends into the existing footprint of U.S. 278. However, this part of the site has likely been disturbed by previous construction. Further investigation and coordination with the applicable agencies would be needed to determine the exact cultural and Section 4(f) impacts to this site. No additional relocations would be required. The addition of an elevated bypass lane on a combination of fill or structure also has the potential to create visual barriers within the Stoney TCP. However, this alternative would not result in additional encroachment on the Stoney TCP and, as such, is not quantified as a direct impact. No additional impacts to hazardous materials sites, neighborhoods, or environmental justice communities are anticipated. No impacts to floodplains are anticipated. Please refer to the Technical Environmental Overview in Appendix H for additional details.

Summary of Alternative Analysis

Based on the preceding analysis, a detailed matrix was prepared for each subcategory to compare alternatives. The matrix for traffic operations is presented in **Table 22.**

TABLE 22. TRAFFIC OPERATIONS OVERVIEW MATRIX

Resource/Category	Alternative 1 (Mod. SCDOT Recommended Preferred)	Alternative 2 (Bowties at Squire Pope and Spanish Wells)	Alternative 3 (Echelon / Center Turn Overpass)	Alternative 4 (Elevated Bypass)
Travel Time along US 278	4	4	2	1
Overall Intersection Operations	4	3	3	1
Side-Street Operations	4 Movements with a LOS F at a signalized intersection: Squire Pope: • Northbound approach (PM)	2 No movements have a LOS F at a signalized intersection. However, some movements are expected to have a LOS E at signalized intersections between Squire Pope and Gumtree.	4 Movements with a LOS F at a signalized intersection: <u>Echelon at Squire Pope:</u> Squire Pope: • Southbound approach (PM) <u>Center Turn Overpass at Squire Pope:</u> • Spanish Wells: Northbound Approach (PM)	1 All movements are expected to have a LOS D or better at signalized intersections between Squire Pope and Gumtree.
TOTAL	**12**	**9**	**9**	**3**
RANK	**4**	**3**	**3**	**1**

The matrix for bicycle and pedestrian impact is presented in **Table 23.**

TABLE 23. BICYCLE AND PEDESTRIAN OVERVIEW MATRIX

Resource/Category	Alternative 1 (Mod. SCDOT Recommended Preferred)	Alternative 2 (Bowties at Squire Pope and Spanish Wells)	Alternative 3 (Echelon / Center Turn Overpass)	Alternative 4 (Elevated Bypass)
Pedestrian Crossing Distance	Longest pedestrian crossing distances.	Reduced pedestrian crossing distances and exposure to motor vehicle traffic.	Reduced pedestrian crossing distances and exposure to motor vehicle traffic.	Reduced pedestrian crossing distances and exposure to motor vehicle traffic.
Potential for Refuge Islands	No refuge islands on north-south crossings.	Potential for median refuge island on east and west crosswalk legs at Squire Pope	Refuge islands between directional traffic allow pedestrians to more comfortably navigate the complex intersection.	Refuge islands between directional traffic allow pedestrians to more comfortably navigate the complex intersection; HOWEVER, multiple refuge islands per leg and long end-to-end crossing distances increase intersection complexity and the likelihood of pedestrians needing two or more stages to complete a north-south crossing.
Conflict Points	Multiple turning movements and potential conflict points along each leg.	Fewer ped/vehicle conflict points and vehicle turning movements.	Fewer ped/vehicle conflict points and vehicle turning movements.	Fewer ped/vehicle conflict points and vehicle turning movements.

The matrix for right-of-way impact is presented in **Table 24.**

TABLE 24. RIGHT-OF-WAY OVERVIEW MATRIX

Resource/Category	Alternative 1 (Mod. SCDOT Recommended Preferred)	Alternative 2 (Bowties at Squire Pope and Spanish Wells)	Alternative 3 (Echelon / Center Turn Overpass)	Alternative 4 (Elevated Bypass)
Estimated Additional Right of Way Acres – Public Estimated Additional Right of Way Acres – Private **Approx. TOTAL Additional Right of Way Acres**	0.2 ac 0.0 ac **0.2 ac**	0.9 ac 0.2 ac **1.1 ac**	0.7 ac 0.4 ac **1.1 ac**	0 ac
Right of Way Score	2	4	4	1
Estimated Cost	$426	$430M	$440M to $450M	$545M to $575M
Cost Score	1	2	3	4
Estimated Construction Duration	36 months	38 months	42 months	48 months
Construction Duration Score	1	2	3	4
TOTAL	**4**	**8**	**10**	**9**
RANK	**1**	**2**	**4**	**3**

The matrix for environmental impacts is presented in **Table 25.**

TABLE 25. ENVIRONMENTAL OVERVIEW MATRIX

Resource/Category	Alternative 1	Alternative 2	Alternative 3	Alternative 4
NWI Wetlands	1	1	1	4
Streams	1	1	1	4
Floodplains	1	1	4	1
Essential Fish Habitat	1	1	1	4
Threatened & Endangered Species	1	1	1	1
Hazardous Material Sites	1	1	1	1
Relocations	1	1	1	1
Right-of-Way	2	4	4	1
Neighborhoods	2	4	4	1
Environmental Justice	2	4	4	1
Cultural Resources	1	4	4	4
Section 4(f) Resources	1	3	4	1
Total	**15**	**26**	**30**	**24**
Rank	**1**	**3**	**4**	**2**

Conclusions

Lochmueller Group evaluated the 2023 existing conditions, 2045 no build conditions, and four alternatives for the year 2045. Based on the preceding analysis, an overall matrix was prepared to compare each alternative. A score of 1 is the highest ranking, whereas a score of 4 is the lowest ranking. As shown, in **Table 26,** Alternative 1 ranked first with a total score of 20. Alternative 4 ranked second with a total score of 21. Alternative 2 ranked third with a total score of 24, and Alternative 3 ranked last with a total score of 28.

TABLE 26. OVERALL SCORING MATRIX

Resource/Category	Alternative 1 (Mod. SCDOT Recommended Preferred)	Alternative 2 (Bowties at Squire Pope and Spanish Wells)	Alternative 3 (Echelon / Center Turn Overpass)	Alternative 4 (Elevated Bypass)
Traffic Operations (Throughput and Traffic Simulations)	4	3	3	1
ROW Impact	2	4	4	1
Environmental Impact	1	3	4	2
Safety	4	3	3	1
Bike/Pedestrian Impact	4	3	1	2
Community and Social Impact	1	3	4	2
Aesthetic	2	1	3	4
Cost	1	2	3	4
Construction Duration	1	2	3	4
TOTAL	**20**	**24**	**28**	**21**
RANK	**1**	**3**	**4**	**2**

Appendix

Appendix A. 2023 Existing Traffic Volumes

Appendix B. Growth Rate Memorandum

Appendix C. 2045 No Build Traffic Volumes

Appendix D. 2045 Alternative 1 Traffic Volumes

Appendix E. 2045 Alternative 2 Traffic Volumes

Appendix F. 2045 Alternative 3 Traffic Volumes

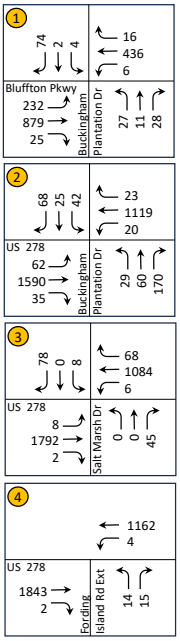
Appendix G. 2045 Alternative 4 Traffic Volumes

Appendix H. Technical Environmental Overview Memo

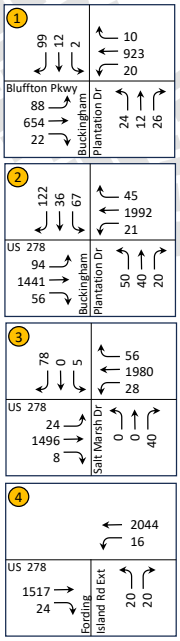
Appendix A. 2023 Existing Traffic Volumes

2023 Existing Traffic Volumes

AM Peak Hour Volumes



PM Peak Hour Volumes



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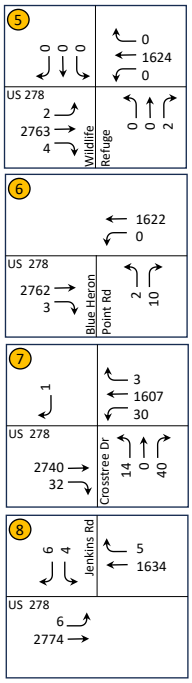

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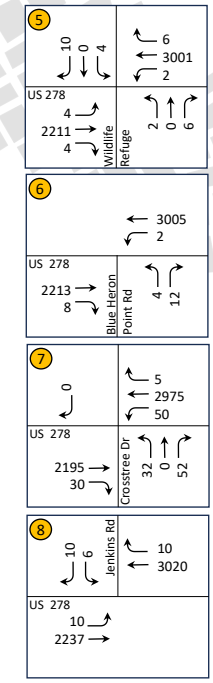

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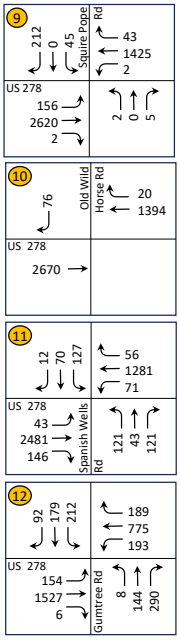

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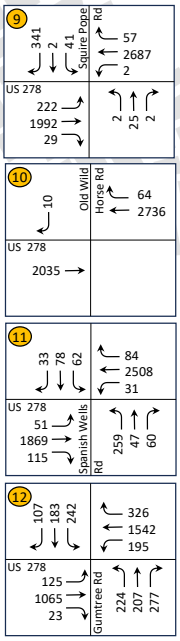

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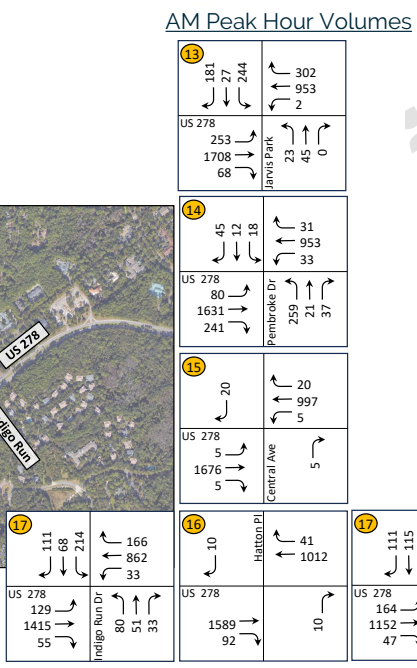

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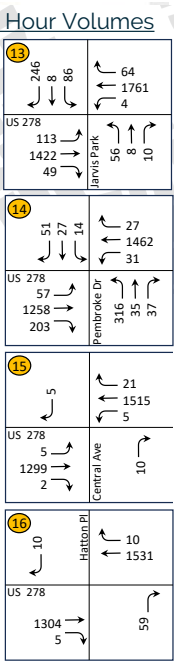

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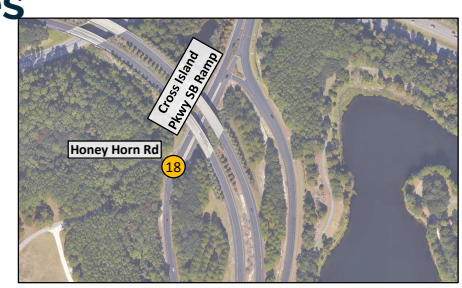

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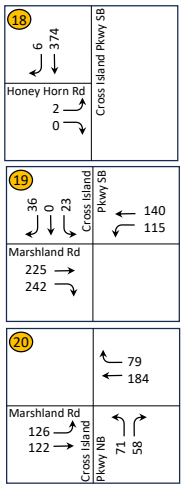

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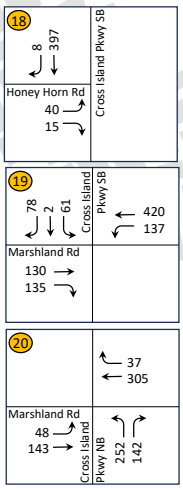

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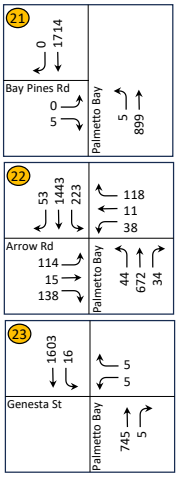

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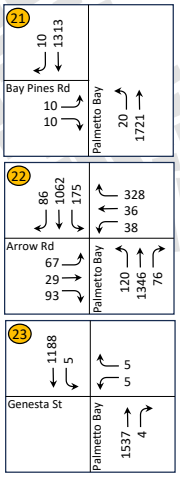

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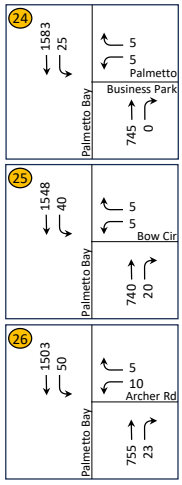

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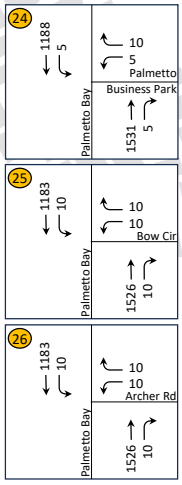

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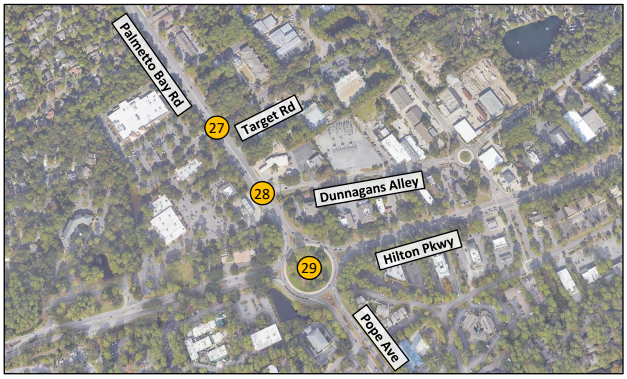

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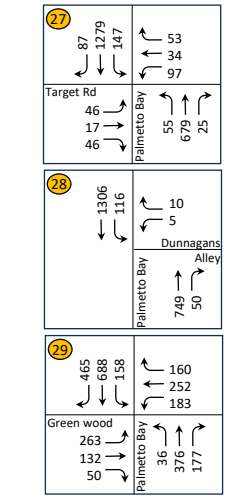

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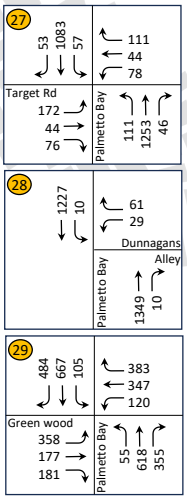


Appendix B. Growth Rate Memorandum

MEMORANDUM

LOCHMUELLER GROUP
411 North 10th Street, Suite 200
St. Louis, Missouri 63101
PHONE: 314.621.3395

To:	Shawn Colin, AICP (Town of Hilton Head)
Cc:	Bryan McIlwee, PE (Town of Hilton Head) Jim Iwanicki, PE (Town of Hilton Head)
From:	Nate Nohren, PE, PTOE Sharif Ullah, PE, PTP
Date:	February 12, 2024
Subject:	Independent Study of WHP Gateway Corridor Traffic Forecasting Memorandum

Lochmueller Group (Lochmueller) was retained by the Town of Hilton Head Island to conduct an independent study of the William Hilton Parkway (WHP) Gateway Corridor. This memorandum summarizes the review of the existing Lowcountry Area Transportation Study (LATS) Travel Demand Model (TDM) and recommends future traffic growth at the William Hilton Parkway Bridge connecting Hilton Head Island with the mainland. The future traffic growth estimation was based on a thorough review of historic traffic volumes, socio-economic trends for Jasper and Beaufort Counties, and accommodation and restaurant tax revenues collected per year by the Town of Hilton Head.

LATS TDM Evaluation

The Lowcountry TDM was updated in December 2021 with a new base year, 2019, and a new horizon year, 2045. Lochmueller completed a thorough review of the TDM to determine its ability to forecast traffic growth along WHP.

The detailed review of the LATS TDM revealed the following:

- The latest update was limited/minor in nature and did not include any major model changes.
- 2045 Horizon year roadway network did not include all future planned projects.
- Socio-economic (e.g., population, household, employment) growth for the horizon year 2045 was forecasted by simply extrapolating 2040 attributes of the previous version of the TDM.
- Socio-economic projections did not consider recent land-use plan updates from municipalities within the TDM boundaries.
- The TDM update did not include a complete model re-estimation and re-calibration.
- The LATS Long-Range 2045 Transportation Plan forecasts 48,500 more future population in Jasper and Beaufort Counties than incorporated into the TDM.

Based on these findings, Lochmueller staff determined the LATS TDM may not provide accurate traffic forecasts for WHP. To that end, alternative methods of traffic forecasting were investigated. First, key data indicators of traffic growth were researched.

Socio-Economic Trends for Hilton Head Island, Jasper County, and Beaufort County

Hilton Head Island is located in Beaufort County. Beaufort and neighboring Jasper County experienced significant growth over the last 20 years. **Table 1** shows population growth trends for Beaufort and Jasper Counties and Hilton Head Island based on the US Census. This data reflects permanent residents.

Table 1: Population Trends[1]

Geographic Unit	Year			Annual Growth (%) (2000 -2010)	Annual Growth (%) (2010 -2020)
	2000	2010	2020		
Beaufort County	120,937	162,233	187,117	3.0	1.4
Jasper County	20,678	24,777	28,791	1.8	1.5
Hilton Head Island	33,862	37,099	37,661	0.9	0.2

As shown in **Table 1**, both Beaufort and Jasper Counties experienced significant population growth since 2000. However, population growth was much slower between 2010 and 2020 compared to 2000 to 2010. Hilton Head Island experienced a modest growth rate of 0.2% from 2010 and 2020.

Table 2 shows the total employment for Beaufort and Jasper Counties and Hilton Head Island for 2010 and 2020.

Table 2: Total Employment Trend[1]

Geographic Unit	Year		Annual Growth (%) (2010 -2020)
	2010	2020	
Beaufort County	51,761	62,001	1.8
Jasper County	6,522	9,819	4.2
Hilton Head Island	21,346	21,854	0.2

As can be seen in **Table 2**, both Jasper and Beaufort Counties experienced significant growth in jobs between 2010 and 2020. Overall job growth in Hilton Head Island was small and similar to the island's population growth rate.

Population Growth Projections for Beaufort and Jasper Counties

Population growth estimates are a key element in forecasting traffic growth for a region. For this study, Lochmueller staff researched reliable population growth estimates for Beaufort and Jasper counties. The State of South Carolina's Revenue and Fiscal Affairs Office provides population growth estimates for all counties within the state through 2035. **Table 3** shows the population projections for Beaufort and Jasper Counties for 2035 and the corresponding growth rates.

Table 3: Population Growth Projections[2]

County	Year		Annual Growth Rate (%)
	2020	2035	
Beaufort	187,691	204,374	**0.56**
Jasper	29,073	34,046	**1**
Total	216,764	238,420	**0.6**

Historic Annual Average Daily Traffic Volume Trends at the WHP Bridge

Lochmueller staff obtained Annual Average Daily Traffic (AADT) volumes on WHP near the WHP Bridge (Site ID #0035) from the South Carolina Department of Transportation's Traffic Data Site[3]. **Table 4** shows the AADT volumes by year. These volumes effectively represent the volume of traffic entering and exiting Hilton Head Island via US 278.

As shown in **Table 4**, there was a significant reduction in growth between 2019 and 2020 and a significant increase in growth between 2020 and 2021. Such sudden changes were attributed to COVID-19 pandemic-related restrictions. Overall traffic growth on WHP from 2010 to 2023 was approximately 16.5%.

Table 4: AADT Volumes on WHP near the WHP Bridge[3]

Year	AADT	Annual Growth (%)
2010	49,600	
2011	49,900	0.60%
2012	50,700	1.60%
2013	52,200	2.96%
2014	53,200	1.92%
2015	54,700	2.82%
2016	54,700	0.00%
2017	56,300	2.93%
2018	56,100	-0.36%
2019	57,100	1.78%
2020	51,400	-9.98%
2021	57,400	11.67%
2022	57,400	0.00%
2023	57,800	0.70%

Short-Term Rental Permit and Tax Revenue Data

Lochmueller staff received information on the short-term rental units per year and the accommodation (hotel) and restaurant tax revenues collected by the Town of Hilton Head. The short-term rental unit information was available only for 2023. Thus, this information was not used in statistical analysis. The accommodation and restaurant tax revenue information was available from 2018 to 2023. Lochmueller staff evaluated the revenue data to test any relation between revenues and the volume of traffic entering and exiting Hilton Head Island. These measures are intended to represent the visitor population as compared to permanent residents reflected in the Census data. **Table 5** shows the annual accommodation and restaurant tax revenue information for the Town of Hilton Head Island.

Table 5: Annual Accommodation and Hospitality Tax (Source: Town of Hilton Head Island)

Year	Tax Revenue (2021 USD)	
	Accommodation Tax	Hospitality Tax
2018	$3,827,423	$7,419,881
2019	$3,964,475	$6,807,961
2020	$3,624,196	$6,598,684
2021	$5,561,900	$8,051,256
2022	$6,534,674	$9,213,533
2023	$6,260,297	$8,905,425

As shown in **Table 5**, the tax revenues have increased significantly since 2020 after a reduction due to Covid-19 Pandemic-related impacts. These increases have outpaced traffic growth on WHP entering/exiting the island and can be at least partially attributed to factors beyond the number of visitors to the island, such as high rates of inflation in recent years.

Traffic Growth Estimation Using Available Data

Lochmueller staff performed regression analyses utilizing the preceding available socio-economic and revenue information data as indicators of traffic on WHP at the WHP bridge. The regression analyses considered AADT volumes as the dependent variable and evaluated whether different independent variables (e.g., population, employment, tax revenue) had a statistically significant influence on the AADT volumes.

In regression analysis, the coefficient of determination (R^2) and the P-values were used to identify independent variables with significant impact on the dependent variable. R^2 values explain to what degree an independent variable (e.g., population) explains the variation of the dependent variable (AADT). R^2 values range from 0 to 1. An R^2 value of 0.7 indicates that 70% of the variation in the output variable can be explained by the independent variable(s).

The P-value is the probability that the observed difference between the dependent and independent variables is due to chance. Its value ranges from 0 to 1. A P-value close to 0 means that any observed difference in the dependent variable is more likely due to the independent variable (not by chance). For regression analysis with a 95% confidence interval, a P-value less than 0.05 would represent a strong correlation between the dependent and independent variables.

Table 6 shows the simple regression analysis (95% Confidence Interval) results in terms of R^2 and P-values for various independent variables relative to the dependent variable (AADT).

Table 6: Simple Regression Analysis Results with Different Independent Variables

Independent Variable	Co-efficient of Determination (R^2)	P-Value
Total Population of Beaufort and Jasper Counties	**0.95**	**1.5E-08**
Total Employment in Beaufort and Jasper Counties	**0.9**	**8.1E-07**
Accommodation Tax	0.64	0.1
Hospitality Tax	0.37	0.28

As shown in **Table 6,** the total population and total employment in Beaufort and Jasper Counties clearly influence the AADT volumes. P-values in both of these cases are very close to zero, which confirms the differences in AADT are influenced by changes in population and employment numbers in the two counties. On the other hand, there is no clear correlation between hospitality tax and AADT and between accommodation tax and AADT.

Lochmueller staff also completed a more complex multiple regression analysis combining both independent variables (population and employment). With the multiple regression analysis, the adjusted R^2 value showed almost no improvement. Therefore, the simple regression analysis using the total population of Beaufort and Jasper Counties was utilized to formulate an equation for estimating AADT on WHP as a function of population in the counties. **Equation 1** shows the regression equation for the AADT estimate.

Equation 1: Regression Equation for AADT Estimate

AADT = 0.262684*(Total Population of Beaufort and Jasper Counties) + 830

Equation 1 was then used to forecast future traffic on WHP based on anticipated population growth. Lochmueller estimated the 2045 population of Beaufort and Jasper Counties utilizing the following assumptions:

- Annual population growth in Hilton Head Island from 2020 to 2045 will be very small (0.1%). As the population within Hilton Head Island is stable and available land for development is very limited. Moreover, population growth in Hilton Head Island from 2010 to 2020 was only 0.2% per year.
- Annual population growth from 2020 and 2045 for the rest of Beaufort County and Jasper County will be 0.6%, as suggested by the State of South Carolina's Revenue and Fiscal Affairs Office, referenced in **Table 3**.

Based on the above-mentioned population growth assumptions, **Table 7** shows the projected 2045 population for the Beaufort and Jasper Counties.

Table 7: Projected Population

Geographic Unit	Projected Annual Growth Rate	Population	
		2020	2045
Hilton Head Island	0.10%	37,661	38,614
Jasper County and Beaufort County (Excluding Hilton Head Island)	0.60%	178,247	207,000
Total		**215,908**	**245,614**

As shown in **Table 7**, the total population in 2045 for Beaufort and Jasper Counties was estimated at 245,614. Applying **Equation 1**, that population number would translate to 65,349 AADT on WHP at the WHP Bridge.

Table 8 shows the estimated annual traffic growth rate from 2023 to 2045 based on the 2045 forecast of 65,425 compared to the 2023 traffic count.

Table 8: Projected Traffic Growth Rate at the WHP Bridge

Year	AADT	Annual Growth Rate (%)
2023	57,800	0.56
2045	65,349	

Conclusion

Lochmueller determined that the LATS TDM may not be a reliable source of future traffic on WHP. Through careful application of statistical analysis, an alternative method for forecasting traffic on WHP was developed using the population of Beaufort and Jasper Counties as the key indicator. Based on this method, traffic on WHP at the WHP Bridge is expected to increase by 0.56 percent annually, resulting in an AADT forecast of 65,349 daily vehicles in 2045.

Lochmueller Group appreciates the opportunity to serve the Town of Hilton Head by performing this independent analysis to determine the appropriate annual background growth rate that should be utilized for the overall corridor study. Should you have any questions regarding the information shared within this technical memorandum, please do not hesitate to contact us at nnohren@lochgroup.com or 217-821-8435.

Reference

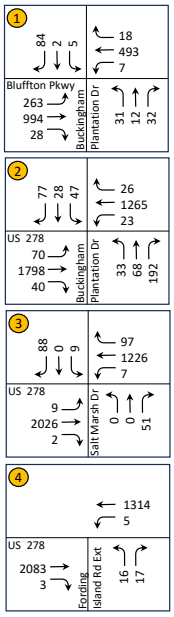
1. U.S. Census Bureau (www.census.gov)
2. South Carolina Revenue and Fiscal Affairs Office. (www.rfa.sc.gov).
3. South Carolina Department of Transportation Traffic Counts Website. (www.scdot.org/travel/travel-trafficdata.aspx)

Appendix C. 2045 No Build Traffic Volumes

2045 No Build Traffic Volumes

- 0.56% Annual Growth Rate Applied

AM Peak Hour Volumes



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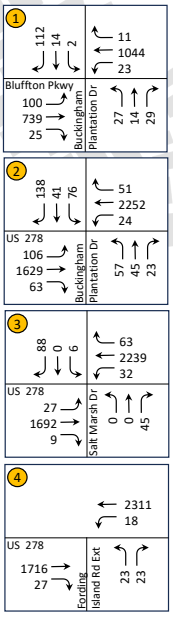

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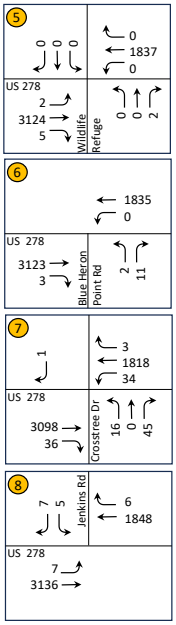

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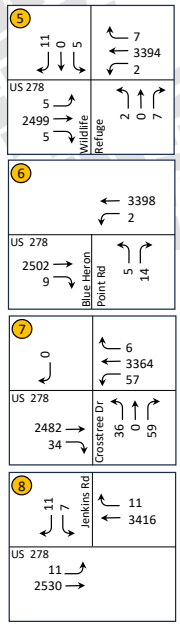

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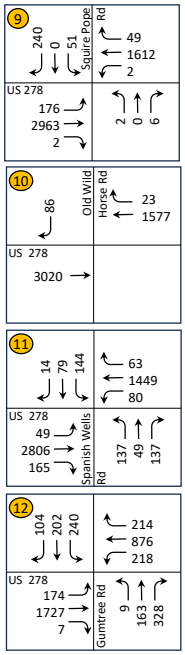

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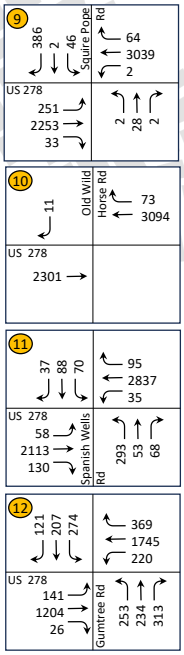

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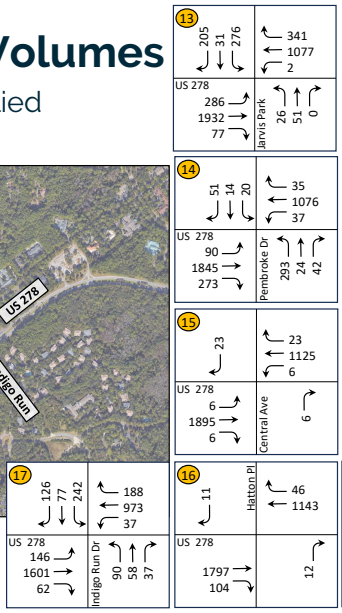

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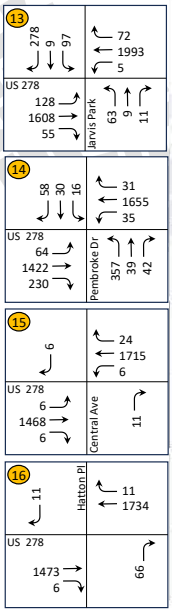

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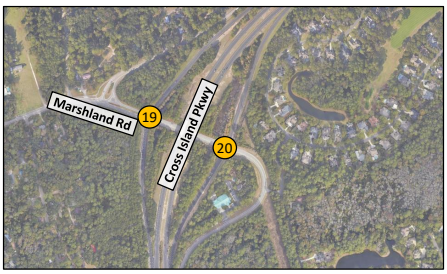

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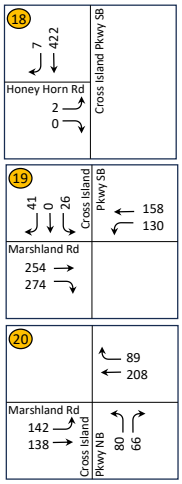

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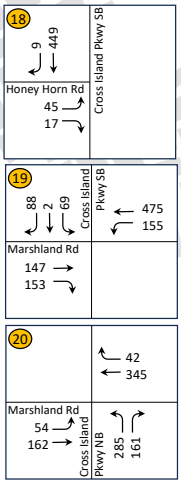

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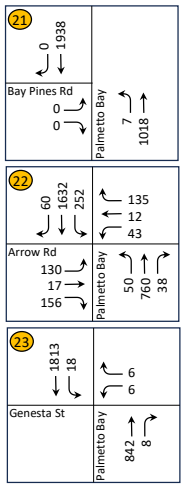

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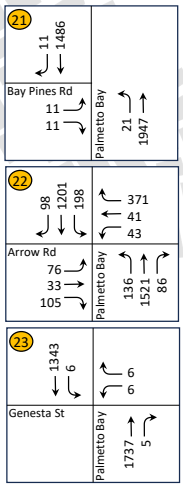

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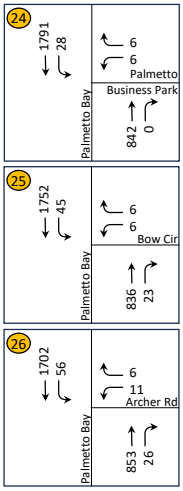
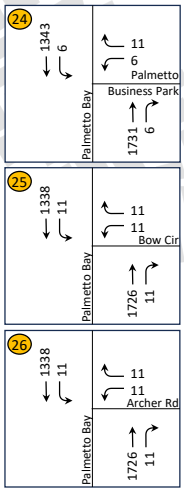
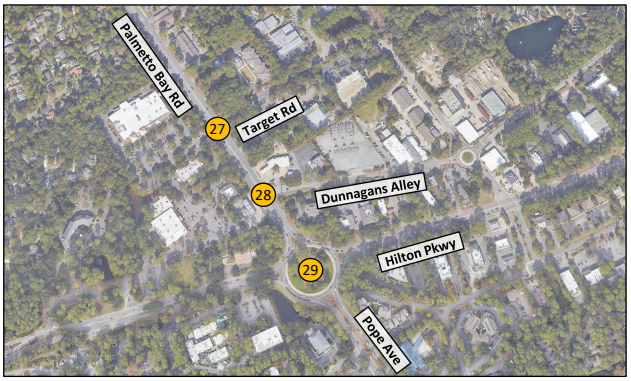


PM Peak Hour Volumes

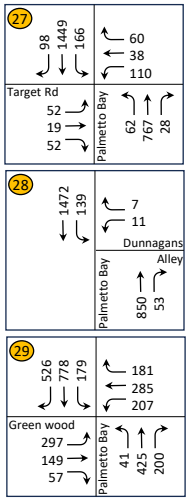


2045 No Build Traffic Volumes

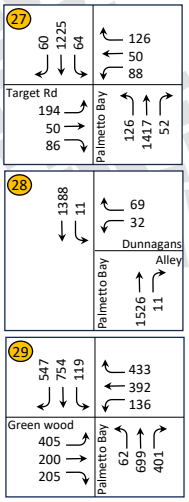
- 0.56% Annual Growth Rate Applied



AM Peak Hour Volumes



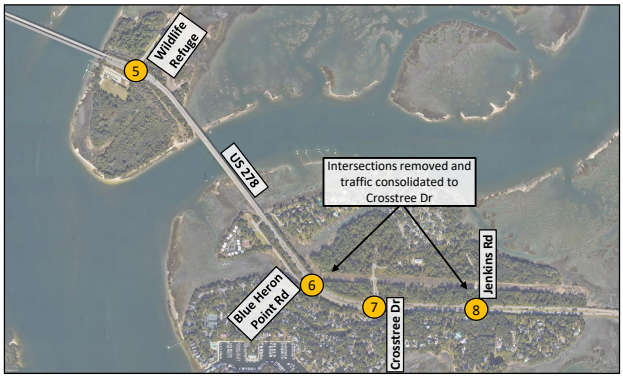
PM Peak Hour Volumes



Appendix D. 2045 Alternative 1 Traffic Volumes

*Note: Volumes not shown are the same as the 2045 No Build Traffic Volumes

2045 Alternative 1. Modified Recommended Traffic Volumes



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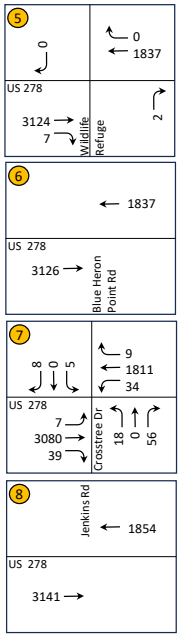
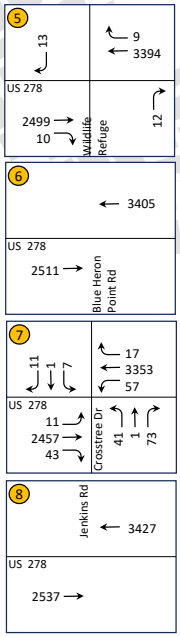


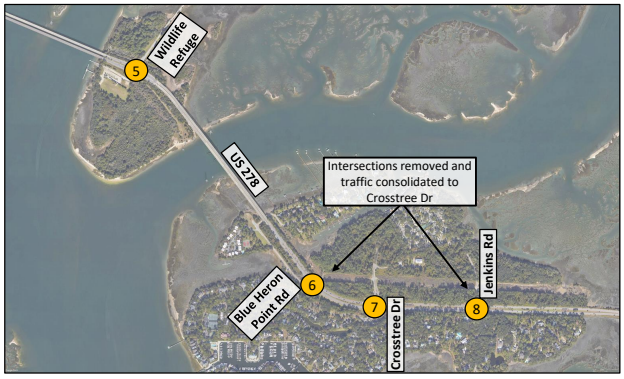
PM Peak Hour Volumes



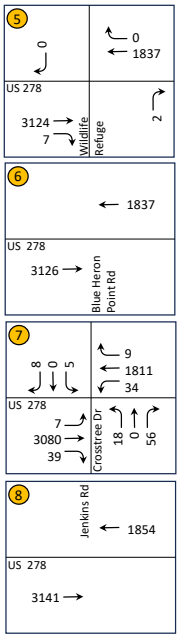
Appendix E. 2045 Alternative 2 Traffic Volumes

*Note: Volumes not shown are the same as the 2045 No Build Traffic Volumes

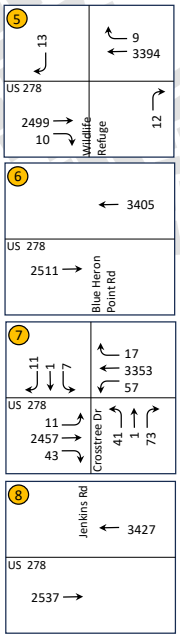
2045 Alternative 2. Bowties at Spanish Wells and Squire Pope Traffic Volumes



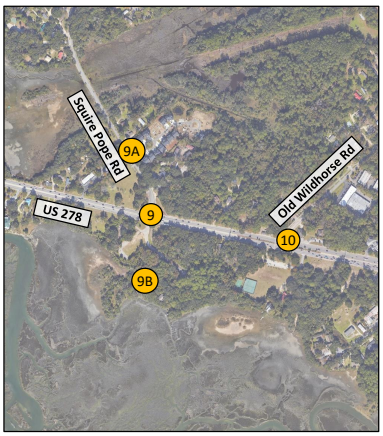
AM Peak Hour Volumes



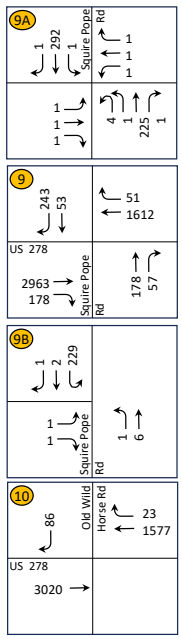
PM Peak Hour Volumes



2045 Alternative 2. Bowties at Spanish Wells and Squire Pope Traffic Volumes



AM Peak Hour Volumes



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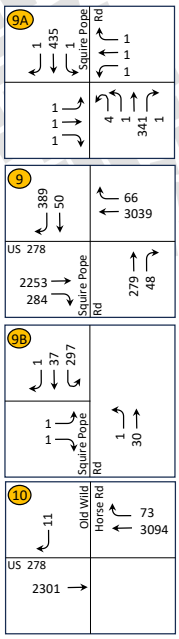
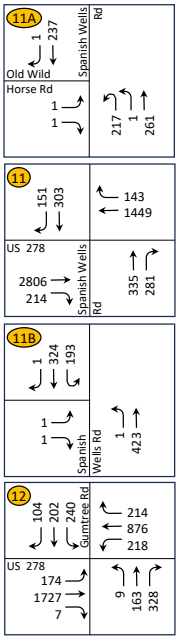
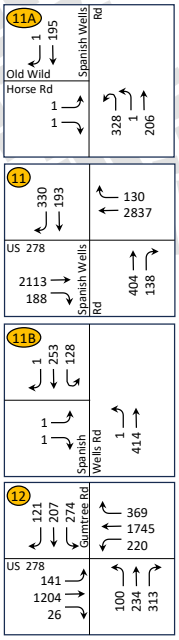


2045 Alternative 2. Bowties at Spanish Wells and Squire Pope Traffic Volumes

AM Peak Hour Volumes



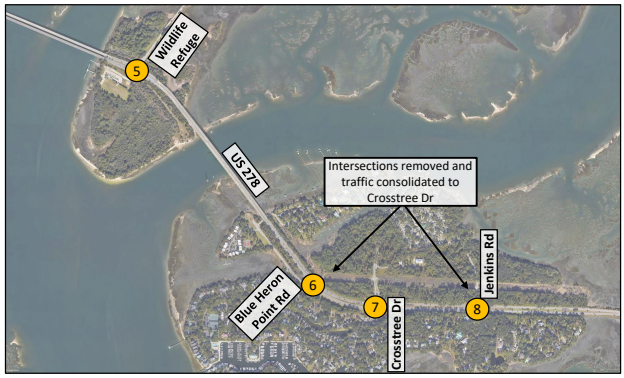
PM Peak Hour Volumes



Appendix F. 2045 Alternative 3 Traffic Volumes

*Note: Volumes not shown are the same as the 2045 No Build Traffic Volumes

2045 Alternative 3. Echelon at Spanish Wells Traffic Volumes



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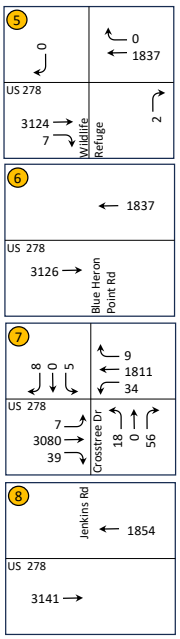
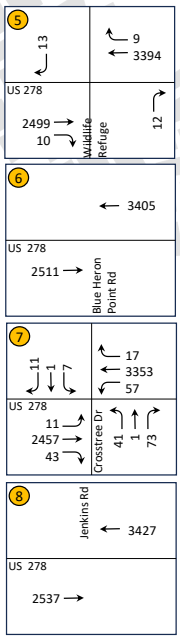
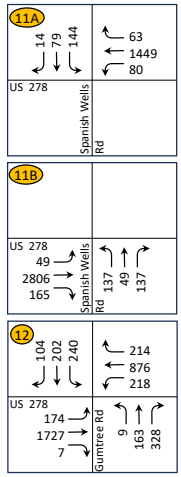


PM Peak Hour Volumes

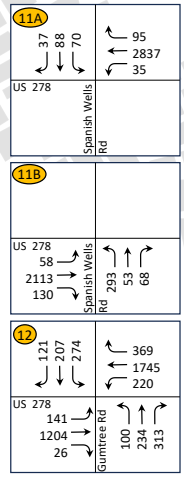


2045 Alternative 3. Echelon at Spanish Wells Traffic Volumes

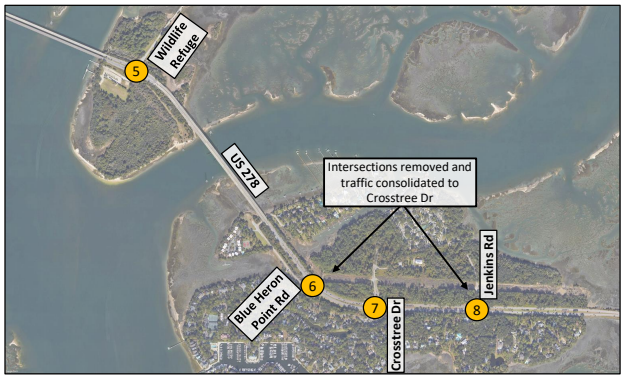
AM Peak Hour Volumes



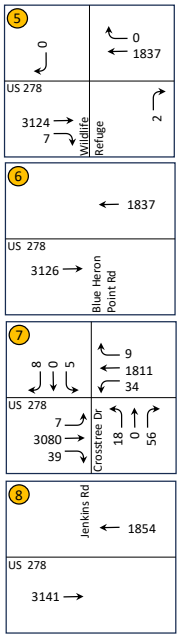
PM Peak Hour Volumes



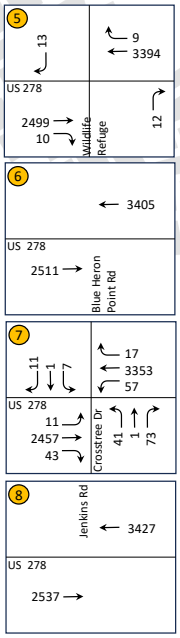
2045 Alternative 3. Echelon at Squire Pope Traffic Volumes



AM Peak Hour Volumes

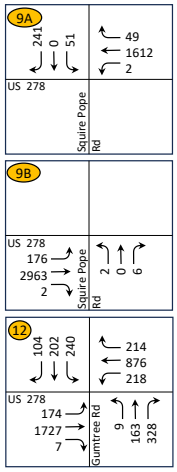


PM Peak Hour Volumes

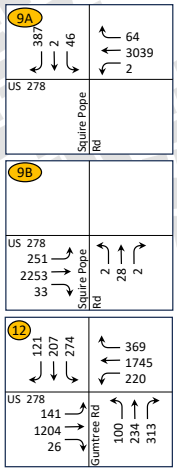


2045 Alternative 3. Echelon at Squire Pope Traffic Volumes

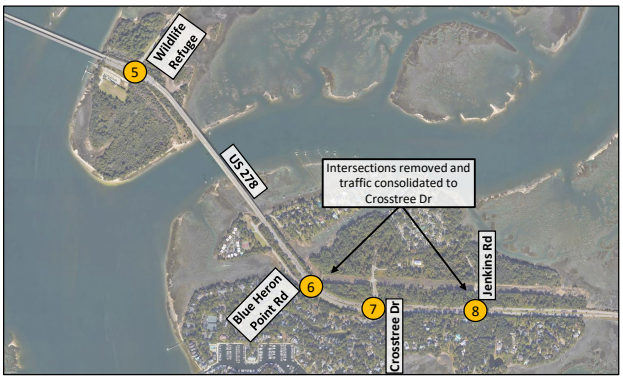
AM Peak Hour Volumes



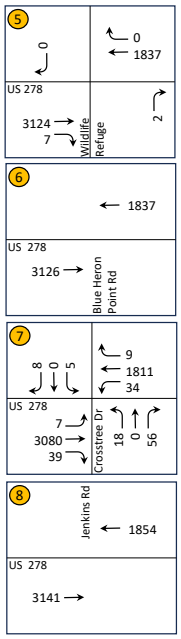
PM Peak Hour Volumes



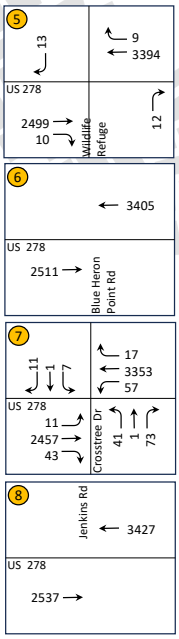
2045 Alternative 3. Center Turn Overpass at Spanish Wells Traffic Volumes



AM Peak Hour Volumes

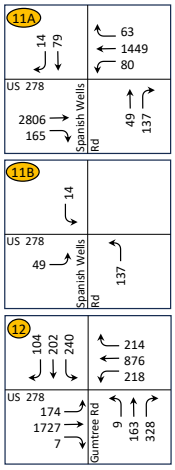


PM Peak Hour Volumes

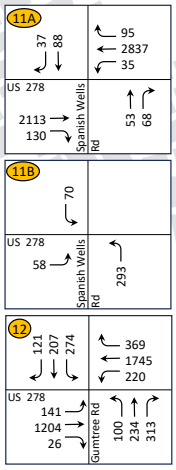


2045 Alternative 3. Center Turn Overpass at Spanish Wells Traffic Volumes

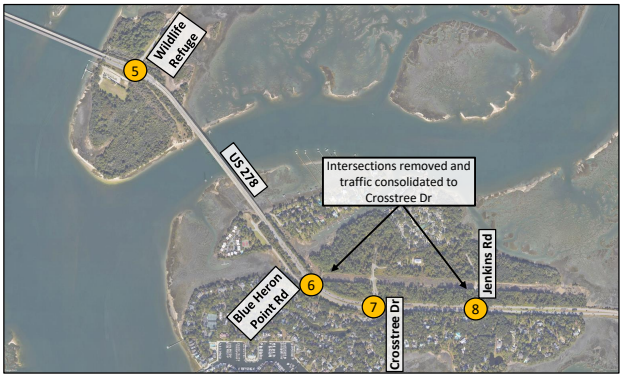
AM Peak Hour Volumes



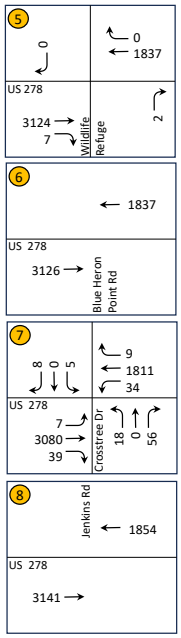
PM Peak Hour Volumes



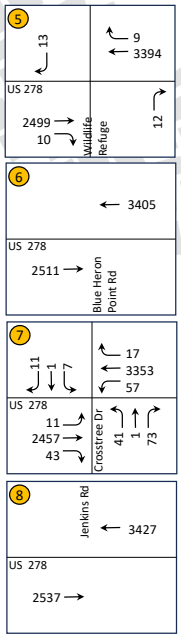
2045 Alternative 3. Center Turn Overpass at Squire Pope Traffic Volumes



AM Peak Hour Volumes

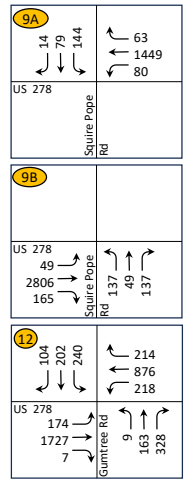


PM Peak Hour Volumes

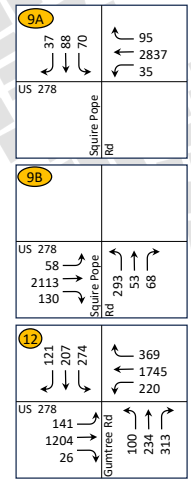


2045 Alternative 3. Center Turn Overpass at Squire Pope Traffic Volumes

AM Peak Hour Volumes



PM Peak Hour Volumes

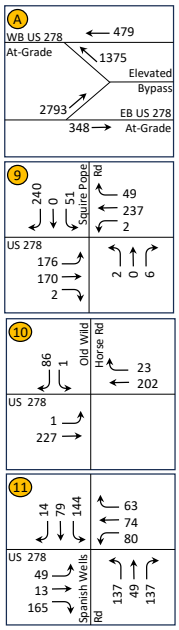


Appendix G. 2045 Alternative 4 Traffic Volumes

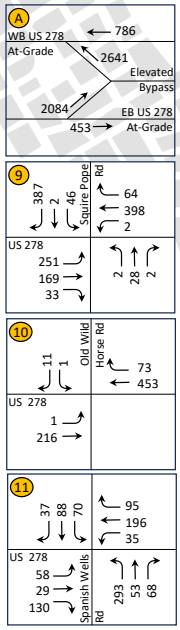
*Note: Volumes not shown are the same as the 2045 No Build Traffic Volumes

2045 Alternative 4. Elevated Bypass

AM Peak Hour Volumes

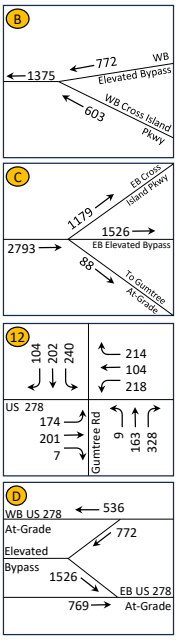


PM Peak Hour Volumes

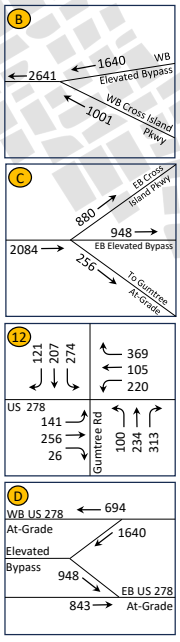


2045 Alternative 4. Elevated Bypass

AM Peak Hour Volumes



PM Peak Hour Volumes



Appendix H. Technical Environmental Overview Memo

MEMO

To: Nathan Nohren, PE, PTOE, Senior Traffic Engineer

From: Chad Costa, Environmental Department Manager, Ashley Taylor, Environmental Specialist, and Samantha Beaupre, Environmental Specialist

Date: May 3, 2024

Subject: William Hilton Parkway Gateway Corridor – Technical Environmental Overview

1.0 Regulation Overview

This section encompasses a brief description of the applicable laws and regulations pertaining to the human and natural environment, which help shape the decision-making process for projects with Federal funding.

1.1 National Environmental Policy Act

The Federal Highway Administration (FHWA) is required by the National Environmental Policy Act (NEPA) to evaluate potential impacts to the social, economic, and natural environments for the proposed reasonable alternatives. According to the NEPA federal government website (www.nepa.gov), Section 101 (42 U.S.C. §4331(a)) of NEPA sets forth a national policy "to use all practicable means and measures, including financial and technical assistance, in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans." Section 102 (42 U.S.C. §4332(2)(C)) of NEPA "establishes procedural requirements, applying that national policy to proposals for major Federal actions significantly affecting the quality of the human environment by requiring Federal agencies to prepare a detailed statement on: (1) the environmental impact of the proposed action; (2) any adverse effects that cannot be avoided; (3) alternatives to the proposed action; (4) the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity; and (5) any irreversible and irretrievable commitments of resources that would be involved in the proposed action."

1.2 Clean Water Act

The Clean Water Act (CWA) (33 U.S.C. §1251) establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating quality standards for surface waters.

1.3 Endangered Species Act

The Federal Endangered Species Act (ESA) of 1973 (16 U.S.C. §1531) is the federal regulation whose goal is "to protect and recover imperiled species and the ecosystems upon which they depend." The U.S. Fish and Wildlife Service (USFWS) manages terrestrial and freshwater organisms while the National Oceanic and Atmospheric Administration (NOAA) Fisheries manages marine and anadromous species. Both administer the ESA and establish a list of protected species.

1.4 Marine Mammal Protection Act

The Marine Mammal Protection Act (MMPA) of 1972 (16 U.S.C. 1361) prohibits, the "take" of marine mammals in U.S. waters and by U.S. citizens on the high seas, and the importation of marine mammals and marine mammal products into the U.S. Jurisdiction for MMPA is shared by USFWS and NOAA Fisheries.

1.5 Section 106 of the National Historic Preservation Act

Section 106 of the National Historic Preservation Act (NHPA) (16 U.S.C. §470) requires Federal agencies to take into account the effect of federal undertakings on historic properties and provide the Advisory Council of Historic Preservation (ACHP) an opportunity to comment on the undertaking. The NHPA established the National Register of Historic Places (NRHP). Items considered for the NRHP include districts, sites, buildings, structures, and objects significant in American history, architecture, archaeology, and culture, which possess national, state, or local significance. The NHPA also provides funding for the State Historic Preservation Officer (SHPO) and staff to conduct surveys and develop comprehensive preservation planning standards for state programs.

1.6 Section 4(f) of the U.S. Department of Transportation Act

Section 4(f) of the U.S. Department of Transportation (USDOT) Act of 1966 states that USDOT-funded projects are prohibited from using land from certain properties unless there is no feasible and prudent alternative to the use of the Section 4(f) resource. The proposed action must also include planning to minimize harm to the property that would result from such use. The purpose of Section 4(f) is to protect historic sites and publicly owned park and recreation lands and wildlife and waterfowl refuges. Section 4(f) properties are defined by 23 U.S.C. §138 and the Section 4(f) Policy Paper as "any publicly owned land from a public park, recreation area, of wildlife and waterfowl refuge of national, state, or local significance as determined by the federal, state, or local officials having jurisdiction thereof, or any land from an historic site of national, state, or local significance as so determined by such officials." The law prevents agencies within the USDOT from approving a project that "uses" land from publicly owned parks, recreational areas, wildlife and waterfowl refuges, or public and private historical sites providing, 1) there is no feasible and prudent alternative to the use of the resource, 2) the project includes measures to minimize harm to the resource, or 3) the agency determines the use of the resource is considered to be a *de minimis* impact. A "use" is considered to be the conversion of a Section 4(f) property from a non-transportation use to a transportation use.

1.7 Environmental Justice

Executive Order (EO) 12898 was signed in 1994 and requires Federal actions to identify and address potentially disproportionately high and adverse human health or environmental impacts among minority and low-income populations which may occur as part of the proposed project. EO 13985 was signed in 2021 and expanded in EO 12898 to consider not only minority and low-income populations, but assess "equity with respect to race, ethnicity, religion, income, geography, gender identity, sexual orientation, and disability." The order also expanded to evaluate whether "underserved communities and their members face systemic barriers in accessing benefits and opportunities available."

2.0 Methodology

2.1 Limitations and Exceptions

There were several limitations and exceptions considered as part of this independent environmental overview, which are described in more detail below. Lochmueller Group has applied generally accepted professional practices and standards and exercised its professional judgment, skill, and care in a manner consistent with that of other professionals performing similar work under similar conditions.

2.1.1 Independent Study

As part of the overall independent study, this document represents an overview that evaluates reasonably foreseeable environmental implications associated with conceptual alternatives for possible incorporation by the South Carolina Department of Transportation (SCDOT) into a larger recommended preferred alternative for the William Hilton Parkway Gateway Corridor project along United States (U.S.) Highway 278 within the town of Hilton Head Island, Beaufort County, South Carolina. This document discusses conceptual layouts of alternatives, which would require further agency coordination, field investigation, public involvement, and evaluation if advanced for adoption into the SCDOTs recommended preferred alternative. This document does not replicate or replace the Environmental Assessment (EA) prepared by the SCDOT. Additionally, this overview is not intended to serve as a NEPA document or even comply with NEPA requirements either independently or in conjunction with SCDOTs project.

2.1.2 Desktop Review of Environmental Resources and Constraints

The environmental impacts are based on a preliminary desktop review of potential resources located within the project area. Environmental resources were not field verified as part of this study. The environmental resources identified during the desktop review were assumed to be present, and each alternative evaluated potential impacts to those resources. These resources would need to be field delineated and evaluated under the existing EA before an alternative could be pursued.

2.1.3 Coordination Efforts

This independent overview of potential environmental implications did not complete any agency, stakeholder, or public involvement and outreach, which is a necessary component to the NEPA process. It is expected that the necessary coordination with applicable agencies, stakeholders, and the public would be undertaken by the SCDOT and their consultant as part of the NEPA evaluation for the William Hilton Parkway Gateway Corridor project.

2.1.4 Noise Analysis

A noise analysis was not conducted for this independent overview of potential environmental implications. Before an alternative could be pursued, a noise analysis would be required to determine the impacts of each alternative to the surrounding communities and whether any noise mitigation measures would be deemed necessary.

2.1.5 Reasonably Ascertainable, Publicly Available, and Practically Reviewable Information

This independent overview of potential environmental implications associated with the William Hilton Parkway Gateway Corridor Project was solely based on information that was publicly available, practically reviewable, and reasonably ascertainable. That is, the content of this overview is based on records that are feasibly retrieved for review, information that is readily available to the public upon request, and obtainable from a source within a reasonable time and cost constraint. As of the date of this independent overview, information sought from the SCDOT regarding access to specific data relating to their recommended preferred alternative (i.e., proposed right-of-way limits) and the resources identified through technical environmental studies (i.e., delineated wetlands) was not furnished to Lochmueller Group. While the absence of this information is unlikely to have affected the overall results of this overview, it does present a limiting factor in the data provided herein.

2.2 Sources Reviewed

In association with the Federal Highway Administration (FHWA) and Beaufort County, the SCDOT developed an Environmental Assessment (EA) to document the proposed U.S. Route 278 Corridor Improvements (https://www.scdot278corridor.com/environmental-assessment). The EA was released in June 2021 for public review and was reviewed as a part of this investigation. Information regarding hazardous material sites was retrieved from the EPA Envirofacts website (https://enviro.epa.gov/) and the South Carolina Department of Health and Environmental Control website (https://scdhec.gov/, https://apps.dhec.sc.gov/Environment/USTRegistry). Information about the Honey Horn Plantation site was found on the Hilton Head Island website (https://hiltonheadislandsc.gov/parks/HoneyHorn/).

In addition, several publicly available geographic information systems (GIS) were reviewed. The GIS resources reviewed are summarized in the table below.

Table 1. GIS Resources Reviewed

Database	Map Service	Data Retrieved	Link
Hilton Head Island Open Data	Town-Owned Property Dashboard & Property Viewer	Property data	https://opendata.hiltonheadislandsc.gov/
South Carolina Department of Natural Resources (SDNR)'s Geospatial Data	SCDNR Public Lands Map, South Carolina Public Water Access, SC Public Boat Ramps, Recreational Shellfish Map Application, & Shellfish Management Layers Public View	Public Lands, public water access, and state shellfish grounds	https://data-scdnr.opendata.arcgis.com/
National Oceanic and Atmospheric Administration (NOAA)'s GeoPlatform	Essential Fish Habitat	Essential fish habitat	https://noaa.maps.arcgis.com/home/gallery.html?sortField=relevance&sortOrder=desc
U.S. Geological Survey (USGS) National Hydrography Dataset (NHD)	The National Map Downloader	NHD lines	https://www.usgs.gov/national-hydrography/access-national-hydrography-products
Federal Emergency Management Agency (FEMA)'s Flood Map Service Center	NFHL_45013C	floodways	https://msc.fema.gov/portal/home
SC Arch Site	Subscriber View Map	Cultural resources	http://www.scarchsite.org/default.aspx
U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI)	Wetlands Data Layer	NWI wetlands	https://www.fws.gov/program/national-wetlands-inventory/wetlands-data

3.0 Alternatives Analysis on Potentially Affected Resources

Four conceptual alternatives were evaluated as part of this overview. Publicly available GIS data was used to evaluate potentially affected resources for each of the conceptual alternatives in an effort to identify potential implications associated with each. These resources were separated into two categories: 1) ecological and 2) community and social impacts (i.e., the human environment). Ecological resources included NWI wetlands, streams, floodplains, essential fish habitat types, and threatened and endangered species. Community and social impacts included relocations, right-of-way (ROW) acquisition, hazardous materials sites, neighborhood impacts, environmental justice impacts, impacts to cultural resources, and impacts to Section 4(f) resources. All alternatives identified result in some level of impact to identified resources. However, some conceptual alternatives may result in a reduction of impacts to some resources compared to the approved EA. The impacts discussed below are additional impacts anticipated as a result of each conceptual alternative and are independent of quantities identified in SCDOTs Environmental Assessment (EA). In order to be considered cumulative impacts, the quantities presented here must be added to those of the recommended preferred alternative advanced by SCDOT in the EA for the project. However, there are some extenuating issues associated with this in that resources identified in the EA have been verified through field surveys, coordination with agencies, and/or through the results of public engagement. Quantities presented in this overview are largely based on unverified resources unless reasonably obtainable from the EA in combination with available GIS resources.

3.1 Alternative 1

Alternative 1 is the SCDOT Modified Recommended Preferred Alternative. Alternative 1 would require 0.2 acre of additional ROW. The additional ROW impacts are located within the Squire Pope neighborhood. The additional ROW to be acquired is owned by the Town of Hilton Head. The SCDOT EA determined that this area is an environmental justice community. One hazardous material site, Shell Food Mart Station 101 (165 William Hilton Parkway), is located near the alternatives. No impacts to the site are anticipated as a result of Alternative 1. The SCDOT recommended preferred alternative was determined to have a “may affect- not likely to adversely affect” finding for threatened and endangered species. Alternative 1 is not anticipated to alter this finding. Coordination with the USFWS and the NOAA National Marine Fisheries Service (NMFS) would need to occur to affirm this finding. Alternative 1 would not result in additional impacts to NWI wetlands, streams, floodplains, or essential fish habitat types. No additional relocations would occur as a result of Alternative 1. No additional impacts to cultural resources or Section 4(f) properties would occur as a result of Alternative 1.

Table 2. Alternative 1 Additional Impact Summary			
Resource/Category		Units	Impacts
Ecological	NWI Wetlands	Acres	0
	Streams	Linear Feet	0
	Floodplains	Acres	0
	Essential Fish Habitat Types	Acres	0
	Threatened & Endangered Species	Finding	May Affect, Not Likely to Adversely Affect*
Community & Social	Hazardous Material Sites	No.	0
	Relocations	No.	0
	Right-of-Way	Acres No. of Tracts	0.2 1
	Right-of-Way Owned by Town	Acres No. of Tracts	0.2 1
	Neighborhoods	No.	1 (Squire Pope)
	Environmental Justice	No.	1 (Squire Pope)
	Cultural Resources	No.	0
	Section 4(f) Resources (Hist. Properties/Public Recreational Areas/Wildlife Refuges)	No.	0

*Anticipated finding, pending coordination with USFWS and NOAA-NMFS

3.2 Alternative 2

Alternative 2 would involve the construction of bowties along both Squire Pope Road and Spanish Wells Road/Wild Horse Road. Alternative 2 would require 1.10 acres of additional ROW. The Town of Hilton Head owns 0.9 acre of the ROW that would need to be acquired. The additional ROW impacts are located within the Stoney and Squire Pope neighborhoods. The SCDOT EA determined that the Stoney neighborhood is an environmental justice community. The Squire Pope neighborhood was outside of the SCDOT EA investigation area but is also a Gullah community. The Gullah people are the only African American population in the US that have maintained a separate language and a distinct culture. Therefore, Squire Pope is likely an environmental justice community. The SCDOT recommended alternative was determined to have a “may affect- not likely to adversely affect” finding for threatened and endangered species. Alternative 2 is not anticipated to alter this finding. Coordination with the USFWS and the NOAA-NMFS would need to occur to affirm this finding. Alternative 2 would require additional impacts to the Stoney Traditional Cultural Property (TCP). The SCDOT identified the Stoney community as a TCP and as a resource eligible for inclusion in the National Register of Historic Places (NRHP). As a NRHP-eligible resource, it is also considered a Section 4(f) property. Alternative 2 would not result in additional impacts to hazardous materials sites, NWI wetlands, streams, floodplains, or essential fish habitat types. No additional relocations would occur as a result of Alternative 2.

Table 3. Alternative 2 Additional Impact Summary			
Resource/Category		Units	Impacts
Ecological	NWI Wetlands	Acres	0
	Streams	Linear Feet	0
	Floodplains	Acres	0
	Essential Fish Habitat Types	Acres	0
	Threatened & Endangered Species	Finding	May Affect, Not Likely to Adversely Affect*
Community & Social	Hazardous Material Sites	No.	0
	Relocations	No.	0
	Right-of-Way	Acres No. of Tracts	1.1 11
	Right-of-Way Owned by Town	Acres No. of Tracts	0.9 8
	Neighborhoods	No.	2 (Stoney & Squire Pope)
	Environmental Justice	No.	2 (Stoney & Squire Pope)
	Cultural Resources	No.	1 (Stoney TCP)
	Section 4(f) Resources (Hist. Properties/Public Recreational Areas/Wildlife Refuges)	No.	1 (Stoney TCP)

*Anticipated finding, pending coordination with USFWS and NOAA-NMFS

3.3 Alternative 3

Alternative 3 would involve an echelon or center turn overpass at either Squire Pope Road or Spanish Wells Road/Wild Horse Road intersection with William Hilton Parkway (US 278). The environmental impacts for Alternative 3 were evaluated for an echelon at the Squire Pope Road intersection and an echelon at the Spanish Wells Road/Wild Horse Road intersection. A center turn overpass would result in more impacts than an echelon at either intersection. Therefore, a center turn overpass was dismissed from further consideration.

An echelon at the Squire Pope intersection would require 1.0 acre of additional ROW. The Town of Hilton Head owns 0.75 acre of the ROW that would need to be acquired. The additional ROW impacts are located within the Stoney and Squire Pope neighborhoods. The SCDOT EA determined that the Stoney neighborhood is an environmental justice community. The Squire Pope neighborhood is a Gullah community and is likely an environmental justice community. The SCDOT recommended preferred alternative was determined to have a “may affect- not likely to adversely affect” finding for threatened and endangered species. An echelon at the Squire Pope intersection is not anticipated to alter this finding. Coordination with the USFWS and the NOAA-NMFS would need to occur to affirm this finding. An echelon at Squire Pope Road would result in additional impacts to the Stoney TCP, a cultural resource and Section 4(f) property. The addition of a grade separated intersection at Squire Pope Road also has the potential to create visual barriers within the Stoney TCP. It would not result in additional impacts to hazardous

materials sites, NWI wetlands, streams, floodplains, or essential fish habitat types. No additional relocations would occur as a result of Alternative 3.

Table 4. Alternative 3 (Echelon at Squire Pope Road) Additional Impact Summary			
Resource/Category		Units	Impacts
Ecological	NWI Wetlands	Acres	0
	Streams	Linear Feet	0
	Floodplains	Acres	0
	Essential Fish Habitat Types	Acres	0
	Threatened & Endangered Species	Finding	May Affect, Not Likely to Adversely Affect*
Community & Social	Hazardous Material Sites	No.	0
	Relocations	No.	0
	Right-of-Way	Acres No. of Tracts	1.0 12
	Right-of-Way Owned by Town	Acres No. of Tracts	0.75 7
	Neighborhoods	No.	2 (Stoney & Squire Pope)
	Environmental Justice	No.	2 (Stoney & Squire Pope)
	Cultural Resources	No.	1 (Stoney TCP)
	Section 4(f) Resources (Hist. Properties/Public Recreational Areas/Wildlife Refuges)	No.	1 (Stoney TCP)

*Anticipated finding, pending coordination with USFWS and NOAA-NMFS

An echelon at the Spanish Wells Road/ Wild Horse Road intersection would require 1.1 acres of additional ROW. The Town of Hilton Head owns 0.7 acre of the ROW that would need to be acquired. The additional ROW impacts are located within the Stoney and Squire Pope neighborhoods. The SCDOT EA determined that the Stoney neighborhood is an environmental justice community. The Squire Pope neighborhood is a Gullah neighborhood and likely an environmental justice community. The SCDOT recommended preferred alternative was determined to have a “may affect- not likely to adversely affect” finding for threatened and endangered species. An echelon at the Spanish Wells Road intersection is not anticipated to alter this finding. Coordination with the USFWS and the NOAA-NMFS would need to occur to affirm this finding. An echelon at Spanish Wells Road would result in 0.29 acre of additional impacts to floodplains. It would result in additional impacts to the Stoney TCP, a cultural resource and Section 4(f) property. It would also result in 0.03 acre of additional impacts to the public park at 152 William Hilton Parkway, a Section 4(f) property. The addition of a grade separated intersection at Spanish Wells Road / Wild Horse Road also has the potential to create visual barriers within the Stoney TCP. An echelon at Spanish Wells Road would not result in additional impacts to hazardous materials sites, NWI wetlands, streams, or essential fish habitat types. No relocations would occur as a result of Alternative 3.

Table 5. Alternative 3 (Echelon at Spanish Wells Road/Wild Horse Road) Additional Impact Summary			
Resource/Category		Units	Impacts
Ecological	NWI Wetlands	Acres	0
	Streams	Linear Feet	0
	Floodplains	Acres	0.3
	Essential Fish Habitat Types	Acres	0
	Threatened & Endangered Species	Finding	May Affect, Not Likely to Adversely Affect*
Community & Social	Hazardous Material Sites	No.	0
	Relocations	No.	0
	Right-of-Way	Acres No. of Tracts	1.1 9
	Right-of-Way Owned by Town	Acres No. of Tracts	0.7 5
	Neighborhoods	No.	2 (Stoney & Squire Pope)
	Environmental Justice	No.	2 (Stoney & Squire Pope)
	Cultural Resources	No.	1 (Stoney TCP)
	Section 4(f) Resources (Hist. Properties/Public Recreational Areas/Wildlife Refuges)	No.	2 (Stoney TCP & Park at 152 William Hilton Parkway)

*Anticipated finding, pending coordination with USFWS and NOAA-NMF

3.4 Alternative 4

Alternative 4 would involve the construction of an elevated bypass lane generally within the center of the existing William Hilton Parkway (US 278) roadway section (i.e., no additional widening of the mainline). Alternative 4 would impact an additional 0.03 acre of National Wetland Inventory (NWI) wetlands and an additional 0.03 acre of essential fish habitats. Approximately 65 linear feet of Jarvis Creek would be impacted. Alternative 4 would require no additional ROW. The SCDOT recommended preferred alternative was determined to have a “may affect- not likely to adversely affect” finding for threatened and endangered species. Alternative 4 is not anticipated to alter this finding. Coordination with the USFWS and the NOAA-NMFS would need to occur to affirm this finding.

The Honey Horn Plantation is a collection of historic farm buildings and landscape and would be considered a Section 4(f) resource. It is also home to the Coastal Discovery Museum, which educates the public on the region’s cultural and natural history. Alternative 4 intersects the current boundary of Honey Horn plantation according to the South Carolina Department of Archives and History website. This is unlikely to be considered a Section 4(f) use as the proposed improvements associated with this alternative would occur entirely within existing transportation ROW. Therefore, there is likely no conversion of the resource from a non-transportation use to a transportation one. The current boundary of the site extends into the existing footprint of U.S. 278. However, this part of the site has likely been disturbed by previous construction. Further investigation and coordination with the applicable agencies would be needed to determine the exact cultural and Section 4(f) impacts to this site. No additional relocations would be required. The addition of an elevated bypass lane on a combination of fill or structure also has the

potential to create visual barriers within the Stoney TCP. However, this alternative would not result in additional encroachment on the Stoney TCP and, as such, is not quantified as a direct impact in the table below. No additional impacts to hazardous materials sites, neighborhoods, or environmental justice communities are anticipated. No impacts to floodplains are anticipated.

Table 6. Alternative 4 Additional Impact Summary

Resource/Category		Units	Impacts
Ecological	NWI Wetlands	Acres	0.03
	Streams	Linear Feet	65
	Floodplains	Acres	0
	Essential Fish Habitat	Acres	0.03
	Threatened & Endangered Species	Finding	May Affect, Not Likely to Adversely Affect*
	Hazardous Material Sites	No.	0
Community & Social	Relocations	No.	0
	Right-of-Way	Acres No. of Tracts	0 0
	Neighborhoods	No.	0
	Environmental Justice	No.	0
	Cultural Resources	No.	1 (Honey Horn Plantation)
	Section 4(f) Resources (Hist. Properties/Public Recreational Areas/Wildlife Refuges)	No.	0

*Anticipated finding, pending coordination with USFWS and NOAA-NMFS

3.5 Summary

An overall summary of the environmental impacts for each of the alternatives can be seen in Table 7:

Table 7. Additional Environmental Impacts Summary

Resource/Category	Units	Alternative 1	Alternative 2	Alternative 3 (Echelon at Squire Pope)	Alternative 3 (Echelon at Spanish Wells)	Alternative 4
NWI Wetlands	Acres	0	0	0	0	0.03
Streams	Linear Feet	0	0	0	0	65
Floodplains	Acres	0	0	0	0.29	0
Essential Fish Habitat	Acres	0	0	0	0	0.03
Threatened & Endangered Species	Finding	May Affect, Not Likely to Adversely Affect*	May Affect, Not Likely to Adversely Affect*	May Affect, Not Likely to Adversely Affect*	May Affect, Not Likely to Adversely Affect*	May Affect, Not Likely to Adversely Affect*
Hazardous Material Sites	No.	0	0	0	0	0
Relocations	No.	0	0	0	0	0
Right-of Way	Acres No. of Tracts	0.2 1	1.1 11	1.0 12	1.1 9	0 0
Right-of-Way Owned by Town	Acres No. of Tracts	0.2 1	0.9 8	0.75 7	0.7 5	0 0
Neighborhoods	No.	1 (Squire Pope)	2 (Stoney & Squire Pope)	2 (Stoney & Squire Pope)	2 (Stoney & Squire Pope)	0
Environmental Justice	No.	1 (Squire Pope)	2 (Stoney & Squire Pope)	2 (Stoney & Squire Pope)	2 (Stoney & Squire Pope)	0
Cultural Resources	No.	0	1 (Stoney TCP)	1 (Stoney TCP)	1 (Stoney TCP)	1 (Honey Horn Plantation)
Section 4(f) Resources	No.	0	1 (Stoney TCP)	1 (Stoney TCP)	2 (Stoney TCP & Park at 152 William Hilton Parkway)	0

*Anticipated finding, pending coordination with USFWS and NOAA-NMFS

Each environmental impact was ranked in order from least impactful (1) to most impactful (4) across the four different alternatives. The total of these rankings was calculated for each alternative and this was used to rank the alternatives from least impactful (1) to most impactful (4).

Table 8. Additional Environmental Impacts- Alternatives Ranking				
Resource/Category	Alternative 1	Alternative 2	Alternative 3	Alternative 4
NWI Wetlands	1	1	1	4
Streams	1	1	1	4
Floodplains	1	1	4	1
Essential Fish Habitat	1	1	1	4
Threatened & Endangered Species	1	1	1	1
Hazardous Material Sites	1	1	1	1
Relocations	1	1	1	1
Right-of-Way	2	4	4	1
Neighborhoods	2	4	4	1
Environmental Justice	2	4	4	1
Cultural Resources	1	4	4	4
Section 4(f) Resources	1	3	4	1
Total	**15**	**26**	**30**	**24**
Rank	**1**	**3**	**4**	**2**

4.0 Risk Assessment

The largest risk for implementing any alternative beyond those identified within the existing NEPA document is the additional time required to complete field investigations of new areas added, coordinate with appropriate regulatory agencies, and complete additional community outreach and engagement opportunities. Therefore, the project schedule would be delayed in order to complete these activities. In addition to time, there will be an added cost to complete these activities and update the existing NEPA document.

Alternatives 1 and 2 are not anticipated to change the cultural resources or Section 4(f) findings compared to the existing EA. However, additional outreach may be necessary within the Stoney and Squire Pope communities. Alternatives 3 and 4 may elevate the cultural resources finding from a No Adverse Effect (NAE) to Adverse Effect (AE) finding due to additional impacts to the Stoney Traditional Cultural Property (TCP). Additional Section 106 investigations and documentation would be required to determine if this

finding would be elevated or not. Alternatives 3 and 4 have additional involvement with Section 4(f) resources, which is not anticipated to be a “use.” However, additional evaluation and concurrence with appropriate agencies would be required for any changes to impacts to Section 4(f) resources. The specific risks associated with each alternative are summarized in Table 9.

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Table 9: Summary of Risk Considerations for Each Alternative

Resource/Category Type		Alt. 1: Risk Considerations	Alt. 2: Risk Considerations	Alt. 3: Risk Considerations	Alt. 4: Risk Considerations
Ecological	Wetlands, Streams, Floodplains, Threatened & Endangered Species	Additional time will be necessary for field investigations of new areas added and coordination with the appropriate regulatory agencies.			
	Permits	Since no impacts to wetlands, streams, or floodplains are anticipated, no water resource permits are anticipated.		Water resource permits are anticipated due to impacts to the floodplain.	Water resource permits are anticipated due to impacts to wetlands, streams, and essential fish habitat.
Community & Social	Relocations	None			
	Right-of-Way	Risks same as noted in ecological.			None
	Neighborhoods	New impacts to Squire Pope community	Additional impacts within Stoney and new impacts to Squire Pope community. Turning limitations will bring additional traffic into neighborhood at bowtie locations.	Additional impacts within Stoney and new impacts to Squire Pope community. Echelons within Stoney creates potential barriers.	While no additional ROW acquired, the elevated bypass lane within Stoney creates a potential barrier dividing community.
		All impacts to neighborhoods require additional outreach and engagement opportunities to inform the public of project updates.			
	Environmental Justice	Risks are the same as noted in the neighborhoods section.			
	Cultural Resources	Current Section 106 finding is "Adverse Effect" for impacts to archaeological site 38BU66; no change in finding is expected. Additional project elements at Gum Tree may require consideration of Squire Pope as a TCP.	Current Section 106 finding is "Adverse Effect" for impacts to archaeological site 38BU66; additional ROW from Stoney; no change in finding is expected. Additional project elements at Gum Tree may require consideration of Squire Pope as a TCP.	Additional ROW from Stoney and elevated project elements creates visual effects, which may elevate Stoney TCP from NAE to AE finding and require a MOA amendment. Additional project elements at Gum Tree may require consideration of Squire Pope as a TCP.	Elevated project elements within Stoney TCP create visual effects, which may elevate Stoney TCP from NAE to AE finding and require a MOA amendment. New impacts to Honey Horn Plantation require consideration.
	Section 4(f) Resources	No change expected to current 4(f) findings in EA. Potential for Squire Pope to be considered a TCP. ROW required unlikely to be considered a conversion ("use").	No change expected to current 4(f) findings in EA. Potential for Squire Pope to be considered a TCP. ROW required unlikely to be considered a conversion ("use").	Additional "use" at Stoney & park at 152 WHP; likely AE at Stoney TCP may require additional 4(f) evaluations. Potential for Squire Pope to be considered a TCP. ROW required unlikely to be considered a conversion ("use").	Likely AE at Stoney TCP, when added to impacts identified in EA, may require additional 4(f) evaluations. Project elements within Honey Horn Plantation unlikely to be considered a conversion ("use").

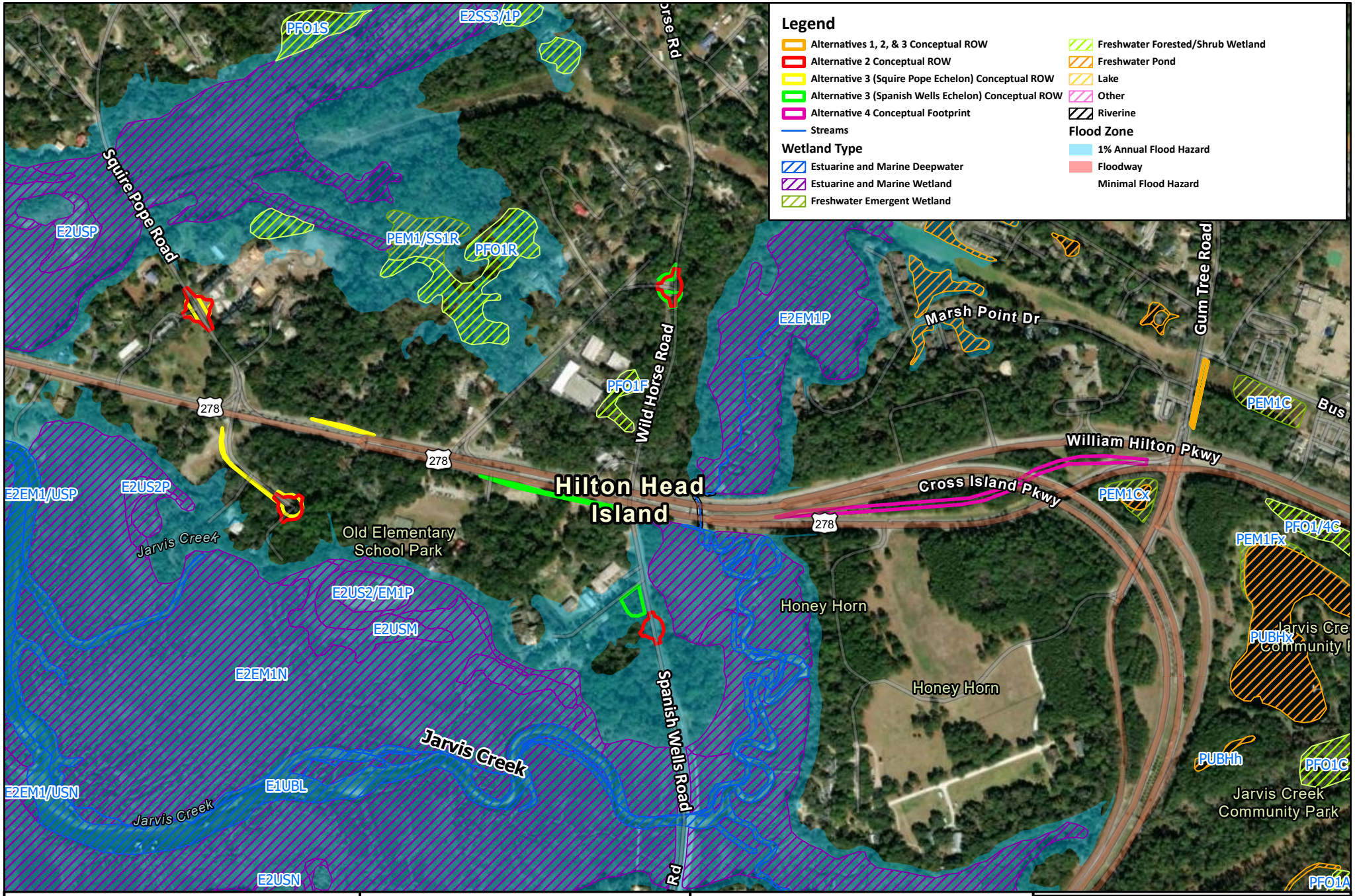
5.0 Conceptual Mitigation Strategies

For alternatives where impacts to ecological resources such as wetlands, streams, and floodplains are unavoidable, mitigation would be determined during the permitting phase of the project and in context with the overall project impacts. For alternatives where impacts to Section 106, Section 4(f), and the local communities are unavoidable, mitigation may become necessary.

Based on the risks associated with Alternative 1, additional mitigation considerations are unlikely to be required. Alternative 2 is unlikely to require mitigation for Section 106 and Section 4(f) impacts. However, mitigation measures such as traffic calming measures, inclusion of Gullah art in bowties, or the creation of a unique gateway may be necessary to address any community impacts. Alternatives 3 and 4 have higher associated risk and impacts to the surrounding communities. Mitigation strategies could include a variety of different approaches focusing on the Gullah community. This may include interpretive signage, incorporation of community art, a walking tour pamphlet, or a video documentary about the Gullah. Additionally, elements would focus on encouraging connectivity of the community on either side of U.S. 278. The specific risk level and mitigation strategies associated with each alternative are summarized in Table 10.

Table 10: Summary of Environmental Risk Levels and Potential Mitigation Strategies

Alternative		Risk Categories (related to cost and schedule implications to the NEPA process)		
		Section 106 (Cultural Resources)	Section 4(f)	Community & Social Impacts
Alt. 1 – Mod. SCDOT Rec. Preferred Alt.	Risk Considerations	Moderate	Low	Low
	Mitigation	Unlikely additional mitigation considerations would be required for this alternative.		
Alt. 2 – Bowties at Squire Pope and Spanish Wells	Risk Considerations	Moderate	Moderate	Moderate
	Mitigation	Mitigation for Section 106 and Section 4(f) unlikely. Community impacts may require mitigation. Concepts could include traffic calming measures, inclusion of Gullah art in bowties, or creation of unique gateway.		
Alt. 3 – Echelon/Center Turn Overpass	Risk Considerations	High	High	Moderate
	Mitigation	Interpretive signage about Gullah community along trails. Incorporation of Gullah art into the transportation infrastructure (crosswalks, wall murals, lighting, asphalt painting, sculptures). Walking tour pamphlet or video documentary about the Gullah. Include design elements that encourage connectivity of community on either side of U.S. 278 and traffic calming on intersecting roadways. Evaluate context sensitive design opportunities.		
Alt. 4 – Elevated Bypass	Risk Considerations	High	High	High
	Mitigation	Same as Alternative 3.		



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Ecological Resources Map

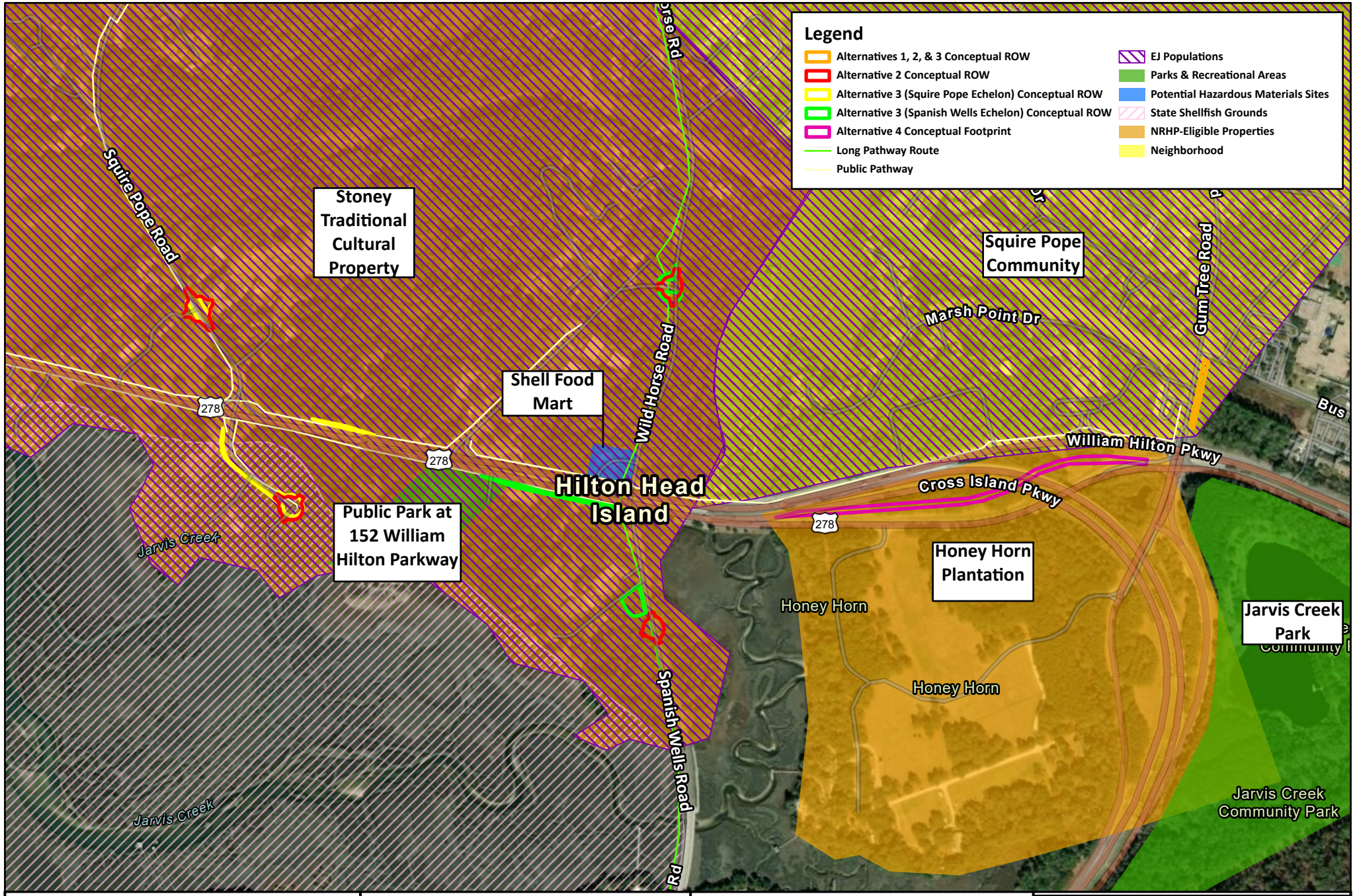
0 500 1,000 Feet

N

County: Beaufort
City: Hilton Head Island
State: South Carolina

Created: 5/3/2024, SBeaupre

Source(s): Maxar, Esri Community Maps Contributors, Town of Hilton Head Island, SC, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, USFWS



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Community Resources Map

0 500 1,000 Feet

N

County: Beaufort
City: Hilton Head Island
State: South Carolina

Created: 4/24/2024, SBeaupre

Source(s): Maxar, Esri Community Maps Contributors, Town of Hilton Head Island, SC, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, USFWS