

# US 278 Independent Review

April 2021

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# Introduction

## Purpose

The South Carolina Department of Transportation (SCDOT) is proposing to make improvements to the US 278 corridor between Bluffton and Hilton Head Island in Beaufort County, South Carolina. HDR Engineering Inc. of the Carolinas has been tasked to complete an independent review of the ongoing SCDOT study and alternatives for Beaufort County and the Town of Hilton Head Island. The purpose is to review and verify existing documentation, explore additional options, and make recommendations for additional study. In addition, the purpose was to help address specific questions which include:

#1A – Is the projected growth of 39% peak traffic in 25 years realistic?

#1B – Do the viable alternatives accommodate growth beyond the 2045 design year?

#2 – Are there SAFER alternative designs besides just adding signals and pavement?

#3 – Have all reasonable alternatives been considered and fully evaluated?

The findings are presented in this report to Beaufort County and Town of Hilton Head Island elected officials.

## Coordination Efforts

During this Independent Review, there was continuous coordination between HDR, the Town of Hilton Head Island, Beaufort County, and the Oversight Committee. HDR coordinated with SCDOT via email to obtain initial as well as additional information as needed.

## Oversight Committee

The Oversight Committee was comprised of five community-appointed members, one staff member from Beaufort County, one staff member from The Town of Hilton Head Island, and one alternate member:

- Mike Garrigan, Jenkins Island
- Curtis Driessen, Stoney Community
- Herbert Ford, Stoney Community
- David Johnson, Hilton Head Island
- Risa Prince, Hilton Head Island
- Scott Liggett, Town of Hilton Head Island\*
- Jared Fralix, Beaufort County
- John Taylor, Alternate Member

\*Replaced by Darrin Shoemaker, Town of Hilton Head Island

Meetings were conducted every other Tuesday via WebEx and broadcast on “The County Channel” for Beaufort County. There were five Committee meetings held on the dates below.

- January 19<sup>th</sup>, 2021
- February 2<sup>nd</sup>, 2021
- February 16<sup>th</sup>, 2021
- March 2<sup>nd</sup>, 2021
- March 16<sup>th</sup>, 2021

Meeting minutes with attendance can be found in **Appendix A**.

## SCDOT

The first step in the review process was to request several files and documents from SCDOT and the Project Team including:

- Draft Environmental Assessment with Technical Supporting Documents
- August 2019 Technical Memorandum: Traffic Growth
- March 2020 Technical Memorandum: Phase I Traffic Report
- KMZ (Google Earth) files of Reasonable Alternatives
- KMZ (Google Earth) of Squire Pope / Spanish Wells Area alternatives
- Historical traffic counts
- Synchro files of reasonable alternatives, Jenkins Island alternatives and Squire Pope alternatives
- Draft Public Involvement Plan
- July 2020 Technical Memorandum: US 278-Reversible Lanes Analysis
- July 2020/Revised January 2021 Technical Memorandum: US 278-Alternative Intersection Analysis Along Jenkins Island

A supplementary resource for information was the US 278 Corridor Improvements website ([scdot278corridor.com](http://scdot278corridor.com)). The website included all stakeholder meeting presentations and public involvement materials.

In addition, an update was given to the Oversight Committee by Luana Sellers on the Stoney Community Coordination that had been completed to date by SCDOT. This included exhibits and the Community Mitigation Plan provided in **Appendix B**.

## Items of Review and Analysis

### Growth Rate/Future Traffic

The growth rate used by SCDOT along this corridor was a major question of the Oversight Committee. In response to Question 1A of the scope of services, HDR reviewed the August 2019 Traffic Growth Memo provided by SCDOT. Based on review, a 1.19% annual growth rate along US 278 was deemed acceptable for this stretch of roadway. The growth rate takes into consideration existing and proposed land use/socioeconomic data including population and

employment from the Lowcountry Regional Model (LRM). Based on actual traffic counts, the LRM was originally underpredicting traffic along the corridor. In many locations, 2017 Annual Average Daily Traffic (AADTs) already surpassed the LRM 2040 projected AADTs. Based on the 2010 LRM Traffic Model, the 2040 Average Daily Traffic (ADT) was anticipated to be 53,864 vehicles (veh)/day. However, in 2017 the actual observed traffic was 56,300 veh/day average for the year with a monthly high volume of 62,700 in the month of June. As a comparison of the volume of traffic, the 2018 AADT for I-95 in Jasper County was 57,000 veh/day.

This 2040 LRM AADT was reevaluated based on the high growth rate of Bluffton, the more limited growth rate of Hilton Head Island, and the beach parking on Hilton Head Island. Based on these modifications a 2040 volume of 65,621 was established as the future ADT, which resulted in the 1.19% annual growth rate.

**Table 1. Average Daily Traffic (ADT) Comparison**

2010 Observed ADT	2017 Observed ADT	2040 Adjusted Model ADT
49,600	56,300	65,621

The Oversight Committee members questioned if six-lanes (three lanes in each direction) along US 278 from the Moss Creek intersection to the Cross Island Parkway was necessary based on existing and future traffic and growth projections. Based on both existing and future traffic within the corridor, US 278 should include three lanes in each direction to meet the stated goals of the project. In the March 2020 Traffic Report, SCDOT noted that many segments of US 278 were already experiencing LOS E<sup>1</sup> in 2018 with LOS F in many locations in 2045. SCDOT and Hilton Head Island staff recommended a 2045 goal of LOS D for the design of corridor improvements.

HDR provided a study of 2045 volumes comparing four-lanes with two-phase signal intersection improvements to a six-lane concept with two-phase signal intersections. This analysis utilized SimTraffic software to simulate the traffic for each roadway concept to determine how the changes to the roadway and signal timings impact the congestion on the network. During the simulation, the analysis indicated that the traffic backs up beyond the limits of the model with the four-lane concept as some locations along the corridor do not have enough capacity to support the volumes anticipated. The six-lane concept was found to have potential queues at some points along the corridor, but all queueing was maintained within the model network. Screen captures from the model that show the queues for each concept can be found in **Appendix C**. These captures were taken at the same point in the model run to allow for a proper comparison.

## Crash Data/ Safety

HDR reviewed the crash data provided by SCDOT in the March 2020 Phase I Traffic Report. This data included the raw data as well as heat maps of the crash locations along the corridor. There were 797 crashes along the corridor in the 5 ½ -year study period from January 2013 to June 2018. Based on a Highway Safety Manual model run by SCDOT the roadway is anticipated to experience approximately 45 crashes per year on this section of roadway and 31 crashes at

<sup>1</sup> Level of Service (LOS) is a standard mechanism to determine traffic conditions using a scale of A-F with LOS F being the most congested traffic conditions. Additional diagrams can be seen in **Appendix D**.

intersections. Based on the actual crashes recorded there were 44 crashes per year total, but 37 crashes per year at the intersections. The project currently has a similar percentage of severe crashes as the statewide average with 24% of the crashes having either an injury or fatality involved.

Two noticeable trends were apparent for this Project Area. First, angle crashes were considerable at key intersections, being 14% of all crashes, indicating need to reduce conflict points. The major intersections include Moss Creek Drive, Squire Pope Road, and Spanish Wells Road. Second, rear end crashes occurred frequently throughout the entire corridor, accounting for nearly 64% of crashes. This includes areas of limited intersections, such as on the bridges. These rear end crashes are an indication of congestion, indicating additional lanes are needed even in the current year.

In addition to vehicular safety, the Oversight Committee had concerns of pedestrian and bicycle safety, especially east of the bridges. With an addition of a proposed multiuse pathway on the bridges connecting Hilton Head Island with Bluffton, additional bicycle traffic is expected. Also, pedestrian traffic occurs in the Stoney Community as well as bicycle traffic on the existing pathway system at Spanish Wells Road. The group recommends SCDOT implement improvements at proposed cross walks to include median refuge islands, corridor lighting, and additional pavement markings/signing which is discussed further in the **Roadway Safety and Character Section** of this report.

The Oversight Committee discussed and indicated a concern about the current speed limit in this area of US 278 which varies significantly. Currently the existing speed limit is 45 mph west of the bridges (from Bluffton), 55 mph on the bridges, 50 mph on Jenkins Island, 45 mph east of Jenkins Island and along US 278 Business to the east of the project area. A continuous speed limit throughout this project area would make it simpler for drivers to navigate this area. With the addition of curb and gutter, bike paths and sidewalks along side US 278, HDR recommends a continuous 45 mph speed limit for the entire study area.

## Reversible Lanes

As an alternative to widening to six-lanes, reversible lanes were analyzed. This option would potentially only widen one lane of traffic. A Reversible Lane Analysis Memo from July 2020 provided by SCDOT was reviewed. HDR and the Oversight Committee agree that reversible lanes are not recommended in areas where control of access cannot be obtained and turn lanes are necessary. Reversible lanes are typically used in areas with large peak directional differences and along long stretches of fully controlled access facilities. For a reversible lane to be installed and function correctly, significant additional signing and pavement markings, denoting specific vehicle instruction will need to be included and enforced.

In addition, the future 2045 traffic volumes indicate three lanes would still be necessary in each direction during peak hours.

## Preliminary Alternatives and Matrix

As SCDOT began to study alternatives to meet the purpose and need of the project, 19 preliminary alternatives were studied. Alternatives included locations adjacent to the existing facility as well as locations that connect to different areas on the Island. These locations included different access points to Spanish Wells Road and the Cross Island Parkway. To analyze these alternatives, high level screening criteria was used including GIS mapping of environmental features, wetlands, critical areas, parcels, and neighborhoods. Other analyses included addressing the structural deficiency of the Mackay Creek Eastbound bridge as well as impacts to Pinckney Island Wildlife Refuge. HDR reviewed the SCDOT matrix and concur with the methodology used in selection of the least impactful alternatives that meet the purpose and need of the project, which is to address structural deficiencies at the existing eastbound Mackay Creek bridge and reduce congestion along US 278 from Moss Creek Drive to Spanish Wells Road.

## Reasonable Alternatives and Matrix

Six Reasonable Alternatives were screened from the 19 preliminary alternatives, with three additional alternatives added (4A, 5A, 6A) for total of nine. These alternatives were evaluated on more involved criteria including: Level of service (LOS) along the corridor, wetland impacts, new right-of-way (ROW) necessary, both residential and commercial relocations, neighborhood impacts, cultural resource impacts, seismic design of new bridges, construction duration, and cost.

For this analysis all reasonable alternatives included similar intersection design east of the bridges.

Alternatives 5, 5A, 6, 6A tended to have 50% more wetland impacts, twice as much right-of-way acquisition, and twice as many relocations as Alternatives 1-4A. In addition, these alternatives were in the \$300-\$350M range, while Alternatives 1-4A are estimated in the \$220-\$260M construction cost range.

## Additional New Location Alternatives

It was noted by the Committee that all the alternatives moved forward were primarily along the same US 278 corridor around Jenkins Island and the Stoney Community. By request of the Oversight Committee and in response to Questions 2 and 3 in the introduction of this report, HDR has evaluated two additional options to connect Hilton Head Island to other locations. These additional alternatives could reduce the need to continually make improvements to the existing US 278 Corridor due to growth and tourism demands in the Beaufort County area. As requested, HDR included a high-level cost estimate and description of issues that might arise under these two new location alternatives. These alternatives are shown in **Figure 1** and **Figure 2**.

### NEW LOCATION ALTERNATIVE 1

This alternative generally mimics the Preliminary Alternative 6A-C from SCDOT's preliminary alternative analysis. A new bridge and interchange improvements would connect Bluffton Parkway with the existing Spanish Wells/Cross Island Parkway. The estimated cost of this four-lane bridge and interchange improvements is in the range of \$450 to \$550 million.





**Figure 1. New Location Alternative to Spanish Wells**

While providing another adjacent access onto Hilton Head Island from the Bluffton Parkway, this alternative would require extensive impacts to environmental, residential, commercial and community/cultural properties on both Fording Island (at the end of the Bluffton Parkway) and the Spanish Wells community as a result of the bridge construction and necessary interchange improvements that would be needed to connect the bridge to existing facilities. These impacts would likely include rights-of-way acquisitions, relocations, access modifications and considerable impacts to wetland, marsh and tidal areas that would require time-consuming and costly permitting and mitigation.

**NEW LOCATION ALTERNATIVE 2**

This alternative connects Beach City Road, in the Mitchellville area of Hilton Head Island, with St. Helena Island. This option bridges a deep channel in the Port Royal Sound. While this option connects southern Beaufort County with northern Beaufort County, the road would contribute to additional traffic in the City of Beaufort, which currently has high traffic congestion. To mitigate the additional traffic, improvements would be necessary to Lands End Road. The estimated cost of this project, including the bridge and road improvements on Lands End Road is in the range of \$700 to \$800 million. This type of project would need to be considered as a separate project as it is above and beyond the sales tax referendum description, as well as the State Infrastructure Bank (SIB) application description of improvements.

Alternative 2 provides a direct connection to Hilton Head Island from St. Helena Island, accessing other Beaufort County communities that are otherwise connected via a miles-long route across

Hilton Head Island, the Town of Bluffton and to SC 170 crossing the Broad River into Beaufort. This alternative would also likely have extensive impacts to local communities, Mitchellville at the western end of Beach City Road and Fort Fremont on the east side of St. Helena Island. Roadway improvements and possible mainline relocations of existing facilities may require rights-of-way acquisitions, relocations, and access modifications to residential, commercial, and community/cultural properties. This alternative would also impact pristine beach frontage and access in the Mitchellville area and potentially some areas on St. Helena Island. Costly and time-consuming permitting and mitigation would be required for impacts to wetlands, marshes, and waterways as a result of this alternative.

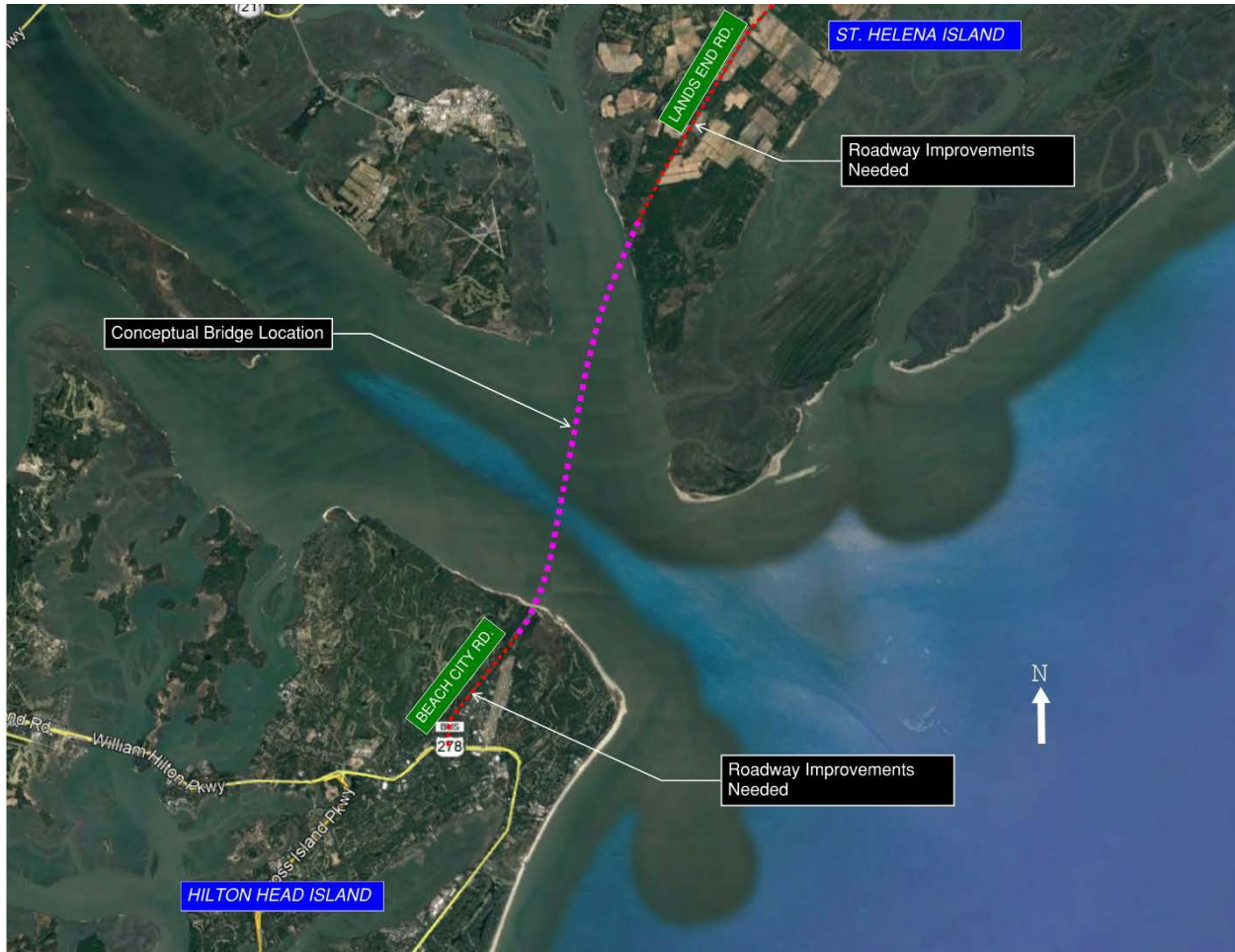


Figure 2. New Location Alternative to St. Helena Island

## Reasonable Funding

\$240 million dollars is currently set aside for engineering and construction of this project. This includes \$40 million from SCDOT to replace the Eastbound Bridge over Mackay Creek, \$80 million from a one cent local option sales tax passed by voters of Beaufort County in 2018, and \$120 million from the State Infrastructure Bank. Beaufort County has been able to secure significant funding for this project, and could potentially secure additional funding, if necessary. With this ability to potentially acquire additional funding, HDR reviewed preliminary cost estimates of alternatives to verify that no alternatives were eliminated due to funding. Based on the cost estimate of the nine Reasonable Alternatives, shown in the Reasonable Alternatives section of this report, it does not appear that overall project cost was the limiting factor in SCDOT studying and evaluating the nine Reasonable Alternatives.

## Intersection Concepts

With most of the reasonable alternatives utilizing the existing US 278 corridor east of the proposed bridges, SCDOT began to look in depth at intersection improvements and minimizing impacts. This process was a key question of the Oversight Committee. Some of the key factors determined by the Oversight Committee and for HDR in determining which intersection concepts to apply included:

- Impacts to the Traditional Cultural Property of the Stoney Community
- Heavy traffic volume on US 278
- Key intersections currently not meeting demand to justify signal control
- Bicycle and pedestrian accommodations with a new multiuse pathway
- Aesthetic feel of the Island
- Impact of toll removal on the Cross Island Parkway
- Local traffic patterns/connectivity

Between the bridges and the Cross Island Parkway are two distinct areas that can be studied independently regarding intersection concepts within the Reasonable Alternative corridors.

### **SCDOT Squire Pope/Spanish Wells Intersections and Matrix**

Fourteen different intersection treatments were screened by SCDOT with four options moving into further evaluation. A matrix from the Fall 2020 Newsletter/Stakeholder meeting was provided that outlined these concepts.

SCDOT had limited information on concepts that allowed for free flow movement of US 278. Concepts include grade-separated interchanges at Spanish Wells and at Squire Pope. HDR sketched some of these options to show the high-level impacts that would be required with full control of access interchanges, reflected in **Figures 3 and 4**. Additional information, to include estimated cost and LOS, should be provided by SCDOT to further document the process of eliminating concepts.



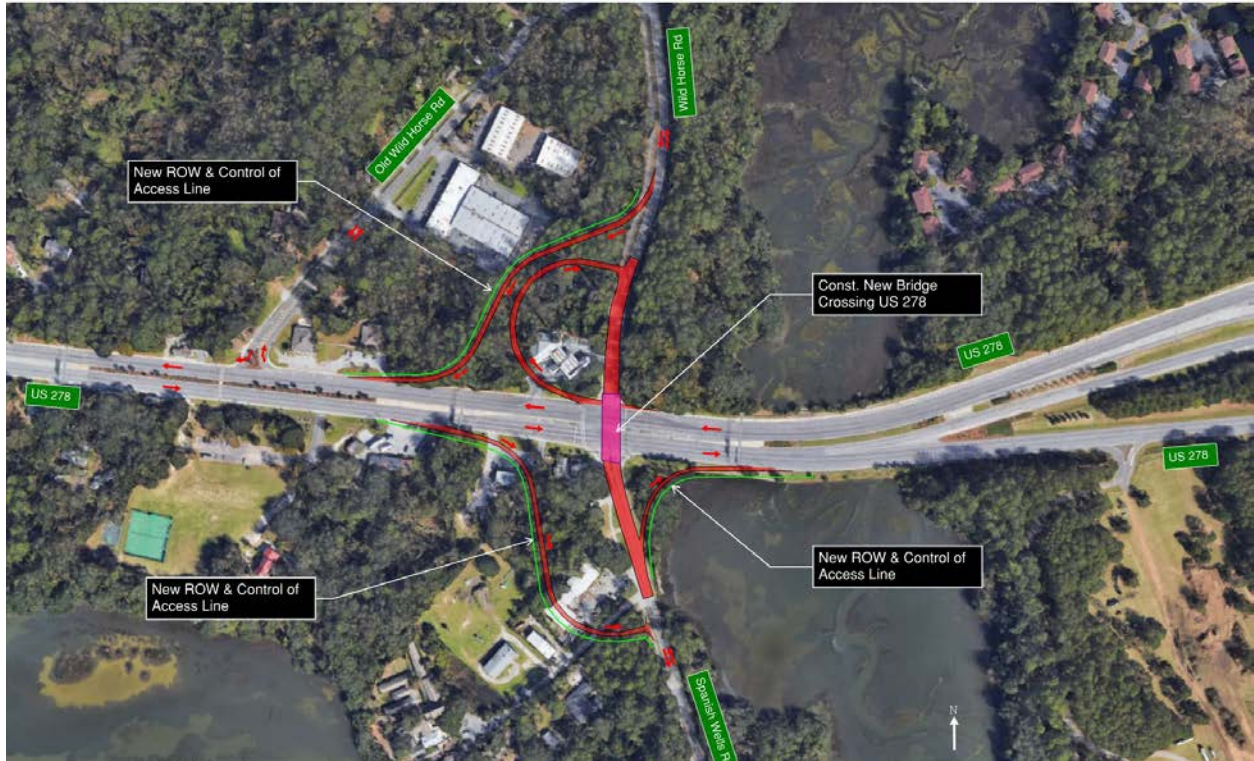


Figure 3. Impacts to Spanish Wells with Grade-Separated Interchange



Figure 4. Impacts to Stoney Community with a Flyover Ramp Interchange

HDR recommends limiting the number of signal phases to accommodate the highest percentage of vehicles, while still providing alternatives to turning movements that are not being allowed with

the new intersection alignment. Other alternatives were shown for consideration, that are discussed in this report.

Pedestrian and bicycle accommodations are important features as well as continued coordination with the local Stoney Community. During the environmental process the State Historic Preservation Office (SHPO) deemed the Stoney Community as a Traditional Cultural Property (TCP). A TCP is eligible for inclusion in the National Register for Historic Places (NRHP) due to its association with cultural practices or beliefs of a living community. Therefore, any planned improvements in the area will need detailed coordination with SHPO, the Stoney Community, and other stakeholders to devise a plan to consider whether the undertaking would adversely affect the qualities of the Community that make it eligible for the NRHP.

### **SCDOT Jenkins Island Intersections**

SCDOT alternatives are derived from a frontage road concept, reducing conflict points, a superstreet concept, and limited ability to meet signal warrant criteria. These options are viable and are shown to handle the capacity of vehicles anticipated on US 278 as well as from the local neighborhoods. Due to the low volume of side street vehicles, a grade-separated interchange would not be cost effective and would produce a high level of impacts.

Based on the alternatives most likely to be finalized, a frontage road to the north of US 278 will be necessary to maintain traffic from Mariners Cove and Blue Heron Point Road. With this road being established during construction, HDR recommends retaining this road and extending it along Jenkins Island to the Gullah Cemetery on the east side of the Island. As a result of feedback from the Oversight Committee, the frontage road concept is well received by the local neighborhoods. Blue Heron Point Road accessibility as well as bicycle/pedestrian accommodations, specifically crossing US 278 need to be further evaluated. Due to the impact on traffic HDR would recommend utilizing a connection under the proposed bridge to access Mariners Cove as well as an access to Windmill Harbour.

Per traffic analysis files provided by SCDOT, it appears that an intersection with more than two-phases will have a volume to capacity ratio greater than one. This will cause queue lengths to back up at the traffic signal during high travel times. Because of the limited local traffic from the sideroads, limiting signals or eliminating signals is recommended.

### **HDR Studied Intersection Concepts**

Based on the Oversight Committee input, HDR reviewed the operational analysis for five additional alternatives. These alternatives included:

- Reduced conflict intersections with two-phase signals
- Free flow along US 278
- Reduced conflict intersection with new connector
- Alternative north of the Stoney Community
- Four-Lane Alternative with intersection improvements

A description with pros and cons of each alternative is provided below:



## REDUCED CONFLICT INTERSECTIONS WITH TWO-PHASE SIGNALS

This option includes limiting the number of phases at each signal to allow for the maximum amount of green time along US 278. By maximizing the thru-movement green time along US 278, the roadway will be able to better process traffic which limits overall delays and queues experienced along the corridor. During the time US 278 traffic is stopped, the goal is to efficiently utilize the limited time and space within the intersection to maximize the number of vehicles entering/exiting the side streets. The proposed concept below attempted to maintain as many movements at the intersections as possible by minimizing the number of vehicles being rerouted and maximizing the limited time US 278 through traffic is stopped. Additionally, this type of Reduced Conflict Intersection provides opportunities for pedestrian and bicyclists to safely cross US 278 at signalized locations.



**Figure 5. Two-Phase Signal Alternative**

## FREE FLOW ALONG US 278

This option removes all signals from US 278 between the bridges and the Cross Island Parkway. This option will require major changes to the Gumtree Road intersection to include a U-turn from eastbound to westbound US 278, dual left turns onto Gumtree Road, as well as new, longer bridges on the Cross Island Parkway over US 278 Business to accommodate turn lanes on US 278 under the bridges. With these improvements, and considering additional traffic using the Cross Island Parkway, the Gumtree Road intersection will still operate as a near failing LOS as well as failing volume to capacity ratio in the 2045 design year. The new travel patterns could mean local traffic may go as far as two additional miles to traverse the same distance as today. At-grade pedestrian cross walks will not be available in this option.





Figure 6. Free Flow Movement Alternative Part 1

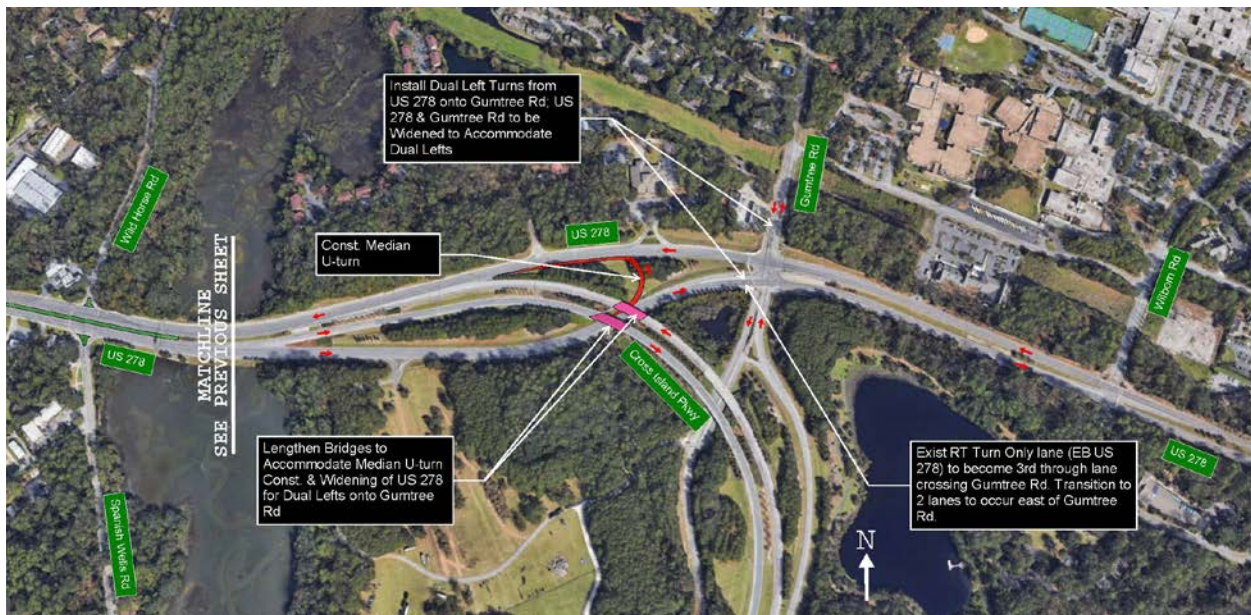
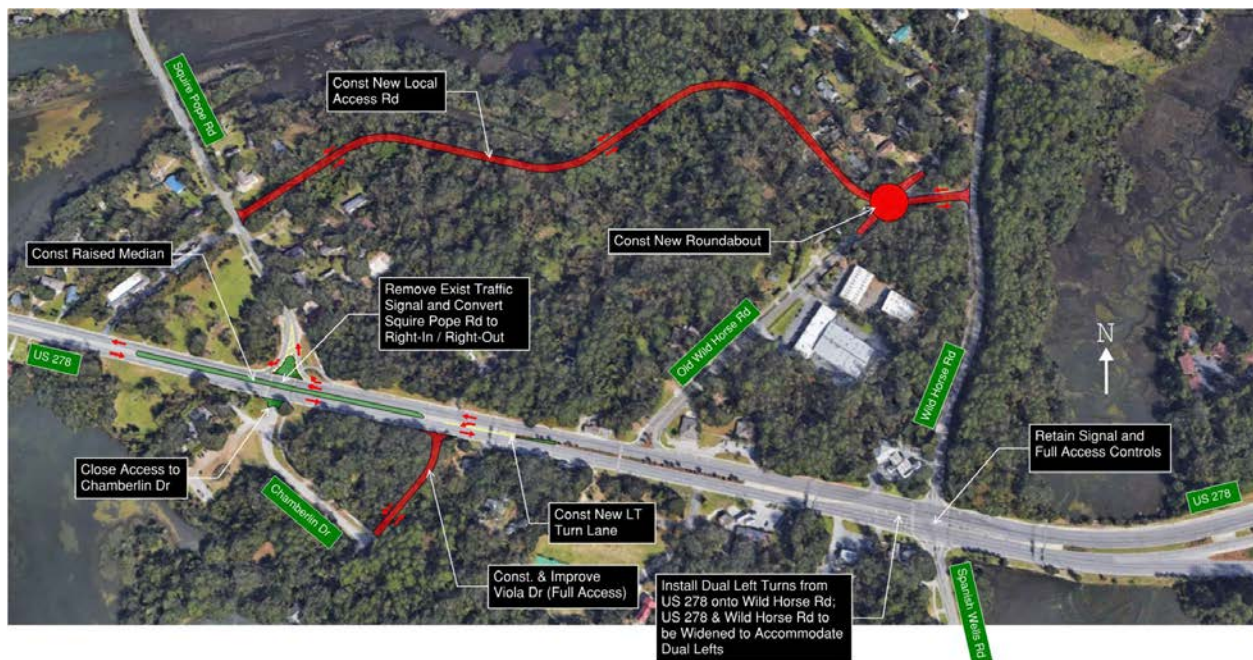


Figure 7. Free Flow Movement Alternative Part 2



## REDUCED CONFLICT INTERSECTION WITH NEW CONNECTOR

This option considers the limited turning movements to/from Squire Pope Road. Except for the right turn from Squire Pope to US 278 and the left turn onto Squire Pope Road from US 278, this current intersection would not meet signal warrants. By transferring left turns to either Wild Horse Road or Old Wild Horse Road, this could eliminate the need for a traffic signal and help to move traffic through the US 278 corridor more efficiently. A new local road could be included to help traffic in the Stoney Community to access their homes and businesses; however, this new roadway could have impacts to properties in the Stoney Community. HDR recommends if this new roadway is deemed necessary by the local community and the Town, it be designed and constructed to local Town design standards to limit impacts. A roundabout at the intersection of the new road with Old Wild Horse Road will help control movements. The exact location and interaction with Wild Horse Road can be evaluated during detailed design. This option would need to include dual left turns from US 278 onto Wild Horse Road. The current traffic signal will result in the roadway functioning at LOS F with volume exceeding the capacity of the intersection and causing delays in the design year.



**Figure 8. Reduced Conflict Alternative at Squire Pope with a New Connector**

## ALTERNATIVE NORTH OF THE STONEY COMMUNITY (ALTERNATIVES 5, 5A, 6, 6A)

These options were reviewed by SCDOT and confirmed by the Oversight Team. While these alternatives have merits and meet the projects Purpose and Need, the environmental impacts (wetlands) and residential and commercial relocations are expected to be much higher for these alternatives compared to other Reasonable Alternatives – making it difficult or unlikely to obtain federal approvals through the NEPA evaluation process.



#### FOUR-LANE ALTERNATIVE WITH INTERSECTION IMPROVEMENTS

As discussed in the **Growth Rate/Future Traffic Section** of the report, HDR provided a figure to the Oversight Committee comparing four-lanes with two-phase signal intersection improvements to a six-lane concept with two-phase signal intersections. It is shown that the traffic backs up beyond the project model with only four-lanes. This shows traffic will be delayed at traffic signals, for multiple cycles and that the four-lane alternative has severe congestion; therefore, it was previously eliminated by SCDOT.

### Emergency Evacuation Accommodation

SCDOT and emergency management currently has in place a lane reversal plan between the Cross Island Parkway and Moss Creek in order to allow three lanes off of Hilton Head Island during emergency evacuations. With a new six-lane facility there is the potential for no lane reversal in this area as three lanes will already be in place leaving the Island. This would also aid in evacuation in the case that several lanes are not usable due to structural damage or other issue. Coordination with the South Carolina Emergency Management Division would need to be conducted to verify exact details of a new evacuation plan.

### Roadway Safety and Character

HDR presented recommendations to the Oversight Committee to make a change in the corridor character around Squire Pope and Spanish Wells Roads in the Stoney Community. These recommendations would provide awareness to vehicle operators to the presence of a local neighborhood and the heightened potential for bicycles and pedestrians. These recommendations would apply to any of the Reasonable Alternatives if chosen as the Preferred Alternative. Potential improvements may include:

- Colored cross walks like those used by Hilton Head Island
- Landscaped medians with low landscaping
- Pathways with at least 8' separation, typical of other locations on the Island
- Low level street lighting

**Figure 9** is an example of improvements recently constructed on Hilton Head Island and include colored crosswalks, landscaped islands, and pathway buffers consistent with the character of Hilton Head Island.



**Figure 9. Colored Crosswalk and Landscaped Island Example**

It is the expectation that a Landscape Architect contracted by the Town of Hilton Head Island to expand on these recommendations for mitigating impacts in the Stoney Community.

## Recommendations for SCDOT Design Team

The following recommendations merit further consideration by the SCDOT design team.

### Two-Phase Signals

Due to the high volumes along US 278, the major through movements would require around 90% of a signal's time to be green. Every additional phase added reduces the amount of available green time as a phase is required to have a set amount of green, yellow, and all-red time to safely operate. In general, the sum of all those safety requirements would necessitate each additional phase to take a minimum of 13 seconds per cycle where a cycle is the length of time it takes to fully serve all the movements at the intersection. For a corridor such as US 278, it could be anticipated that a 180 second cycle would be ideal to minimize delays for all movements. If 180 seconds were selected, this would require approximately 160 seconds be dedicated to US 278 and allow for approximately 20 seconds to be dedicated for any additional phases. If more than one additional phase were allowed at the intersection, the required minimum time would exceed the 20 second maximum threshold and impact the ability to successfully process vehicles along US 278.

## Limit Conflict Points at Intersections

As shown in the crash data, angle crashes are a concern on this corridor. Limiting the number of conflict points will lessen the chance of crashes. HDR recommends alternative intersections, such as signalized U-turns, two-phase signals, and frontage roads that limit conflict points, especially along US 278. This will also decrease the number of phases needed in signals along the corridor.

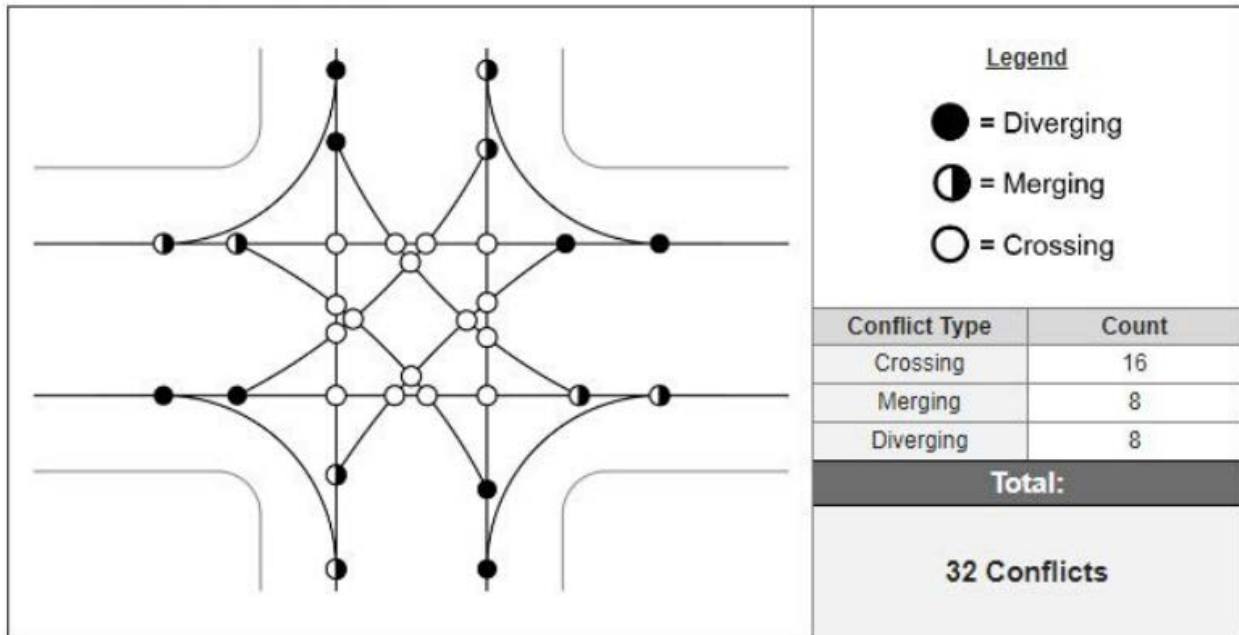


Figure 10. Conventional Intersection Conflict Points

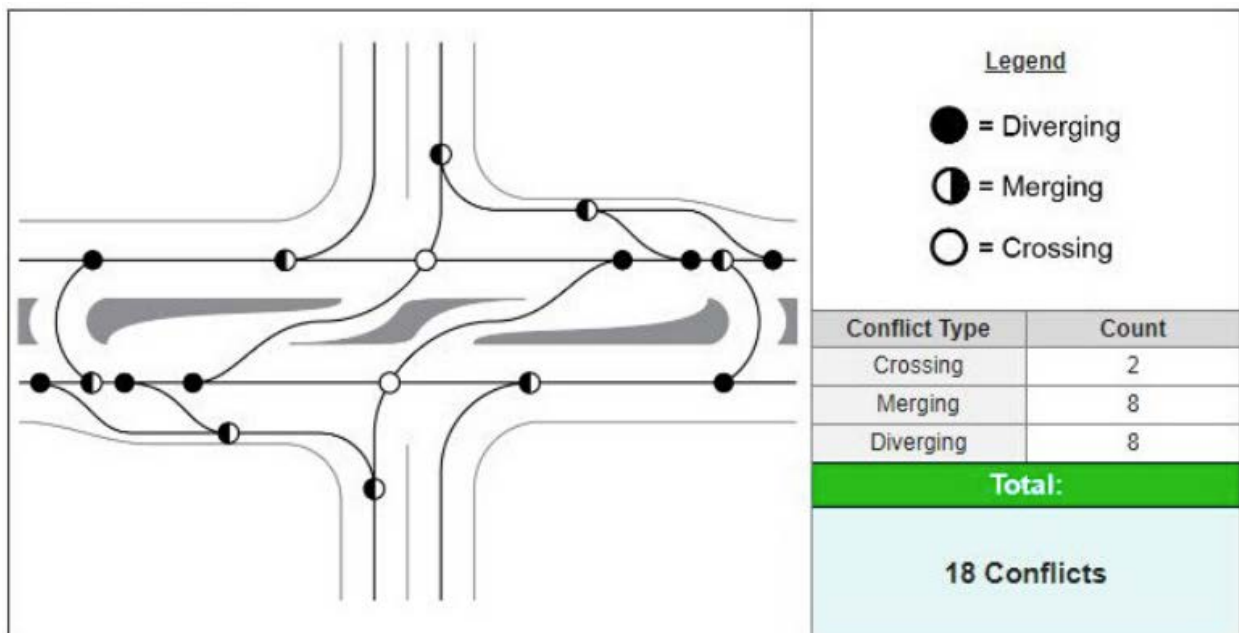


Figure 11. Reduced Conflict Intersection Conflict Points

## **Provide Cost and Level of Service with Travel Time**

By recommendation of the Oversight Committee, HDR recommends SCDOT provide cost estimates for all the reasonable alternatives as well as intersection concepts. This will allow transparency to the public and allow more informed public comments during open comment sessions. Providing LOS for each intersection concept will allow more transparency on improvements that can be anticipated. The Oversight Committee recommends SCDOT perform a corridor arterial travel time analysis to determine the impact of time on the traveling public from Bluffton Parkway to the Cross Island Parkway.

## **Corridor Speed Limit**

With the addition of curb and gutter, bike paths, and sidewalks along side US 278, HDR recommends a continuous 45 mph speed limit for the entire study area.

## **Bicycle and Pedestrian Safety and Connectivity**

With the addition of a multiuse pathway from Bluffton to Hilton Head Island, bicycle and pedestrian volumes are anticipated to increase. HDR has included four safety and aesthetic recommendations in the Roadway Character section of the report. These include:

- Colored cross walks like those used by Hilton Head Island
- Landscaped medians with low landscaping
- Pathways with at least 8' separation, typical of other locations on the Island
- Low level street lighting

## **Roadway Character East of Bridges**

HDR recommends changes in landscaping, lighting, and pedestrian access in the Stoney Community. These recommendations will improve pedestrian access and aesthetics of the proposed improvements. It is the expectation that a Landscape Architect contracted by the Town of Hilton Head Island will expand more on these recommendations and will coordinate with HDR on potential improvements.

## **Additional Areas of Study for Potential Improvements**

Due to improvements along the US 278 Corridor and changes in local traffic patterns, HDR recommends either SCDOT, the County, or the Town look independently, as a separate study, into several locations that may need improvement or could benefit the area with regards to safety and traffic flow. The following areas are proposed for additional study:

- Wild Horse Road/Gumtree Road Intersection Improvements
- Old Wild Horse Road/Wild Horse Road Intersection Improvements
- Parallel local roadway connecting Squire Pope and Wild Horse Road to the north of US 278
- Extending Chamberlin Road to Spanish Wells Road
- Lane configuration for westbound merge of US 278 and the Cross Island Parkway

# Appendices

## Appendix A. Meeting Minutes



# Meeting #1 Minutes

Project:	US 278 Corridor Oversight Committee Beaufort County		
Meeting Location:	Webex Meeting		
Meeting Subject / Date:	Meeting #1 January 19, 2021 @ 11:00 AM		
Notes By:	J. Dayton, P. Hutcherson, A. Blum	Job No:	

**Meeting Purpose:** The purpose of the meeting was to kickoff the US 278 Corridor Oversight Committee.

**Attendees:**

David Johnson	Oversight Committee	Jared Fralix	Beaufort County
John Taylor	Oversight Committee	Brittanee Fields	Beaufort County
Risa Sreden Prince	Oversight Committee	Elisabeth McMillan	Beaufort County
Scott Liggett	Oversight Committee	Jeff Dayton	HDR
Mike Garrigan	Oversight Committee	Phillip Hutcherson	HDR
Herbert Ford	Oversight Committee	Adrienne Blum	HDR

**Summary:** This meeting kicked off with introductions. Mr. Fralix then gave an overview of the purpose of the committee meeting and where SCDOT is in the environmental process. The floor was then open for discussion of the important points the committee would like HDR to consider in the oversight review:

- Are there safer alternatives besides expanding pavement and the addition of signals? Should a slower speed limit be considered due to the residential characteristics of the area?
- Crash data will be requested, if HDR does not have it already to determine how safety is being considered. Safety was given by several oversight committee members as a key objective of the project.
- HDR will review the community input summary from SCDOT to note common themes from the comments and determine how they were addressed.
- SCDOT made assumptions on future traffic. HDR will review the growth rate memorandum for assumptions and what factors went into this calculation.
- The traffic model included adding a third lane in each direction on the bridge. What lead to this decision? HDR will gather information on the expected amount of traffic for a 4-lane facility versus a 6-lane facility.
- Once the project is completed, will there be an increased demand? Has this been taken into consideration?
- Will this review talk about impact to the community? Are some communities being impacted more than others? What were the factors used to impact one neighborhood over another?
- How did the 19 alternatives get reduced to 6? What reasons were they eliminated?
- How do the alternatives impact individual properties that are not directly on US 278, such as the removal of left turn lanes and diverted traffic?

- Windmill Harbor has a super street concept, can HDR look at these concepts and analyze the safety?
- What general assumptions used by the SCDOT design team for the project?
- Determine if study included the Cross Island Parkway, and if so, to what extent.

**Action Items:**

- HDR and Beaufort County will prepare and distribute minutes from the kickoff meeting.
- Next Meeting: Tuesday, February 2<sup>nd</sup> at 11:00 AM.
- HDR will provide an agenda for the meeting on 1/29/21.



# Meeting #2 Minutes

Project:	US 278 Corridor Oversight Committee Beaufort County		
Meeting Location:	Webex Meeting		
Meeting Subject / Date:	Meeting #2 February 2, 2021 @ 1:00 PM		
Notes By:	J. Dayton, P. Hutcherson, A. Blum	Job No:	

**Meeting Purpose:** The purpose of the meeting was to kickoff the US 278 Corridor Oversight Committee.

**Attendees:**

David Johnson	Oversight Committee	Jared Fralix	Oversight Committee
John Taylor	Oversight Committee	Brittanee Fields	Beaufort County
Risa Sreden Prince	Oversight Committee	Jeff Dayton	HDR
Mike Garrigan	Oversight Committee	Phillip Hutcherson	HDR
Robert Bechtold	Oversight Committee	Adrienne Blum	HDR
Luana Sellars	Stoney Community		

**Summary:** Mr. Fralix started by reviewing Meeting #1 and then HDR started outlined what research they had gathered in response to the questions and comments mentioned in the first meeting.

Safety -

- SCDOT provided crash maps along the corridor in the March 2020 Phase I Traffic Report. The report highlighted that there were about 800 crashes in the past 5 years. They were not all in one location, but all along the corridor, as well as crashes at key intersections. Some of these maps have been shown to the Gateway Committee previously.
- It is a high crash corridor for that type of facility. There are a lot of rear end crashes indicating congestion. The alternatives proposed by SCDOT are trying to reduce the conflict points and congestion.
- The project will include crosswalks at key intersections for pedestrians and bikes as well as a multiuse pathway across the bridges.

Communities -

- Ms. Sellars spoke about how the native islanders and the Stoney Community have been involved with the public input and have worked with SCDOT to create alternative access to the Gullah Cemetery, more significant signage defining the community, and a Gullah Pavilion. Conversations regarding mitigation continue to occur.

Growth Rate -



- The approved growth rate for the corridor (1.19%) was discussed and appears in line with the current and expected conditions. HDR will look to determine the lowest growth rate needed to require three lanes, and when that number will occur.

Alternatives -

- HDR requested information on reversible lanes from SCDOT and will discuss this option at the next meeting.
- HDR will research further the elimination process of 19 alternatives down to 6, to help alleviate confusion of eliminating alternatives with only the table provided.
- The current \$240 million reasonably available funds were discussed. HDR will evaluate if any alternative was dismissed due to a potential cost constraint
- HDR will evaluate the Synchro models provided for intersection alternatives around Jenkins Island, Squire Pope and Spanish Wells to determine if the models seem reasonable. HDR will evaluate if other alternatives potential alternatives can be studied.

**Action Items:**

- HDR and Beaufort County will prepare and distribute minutes from the meeting.
- Beaufort County will post the meeting notice on the website.
- Next Meeting: Tuesday, February 16<sup>th</sup> at 11:00 AM
- HDR will provide an agenda for the meeting on Friday, February 12<sup>th</sup>



# Meeting #3 Minutes

Project:	US 278 Corridor Oversight Committee Beaufort County		
Meeting Location:	Webex Meeting		
Meeting Subject / Date:	Meeting #3 February 16, 2021 @ 11:00 AM		
Notes By:	J. Dayton, P. Hutcherson, A. Blum	Job No:	

**Meeting Purpose:** The purpose of the meeting was to continue coordination with the US 278 Corridor Oversight Committee.

**Attendees:**

David Johnson	Oversight Committee	Jared Fralix	Oversight Committee
John Taylor	Oversight Committee	Brittanee Fields	Beaufort County
Risa Sreden Prince	Oversight Committee	Jeff Dayton	HDR
Mike Garrigan	Oversight Committee	Phillip Hutcherson	HDR
Herbert Ford	Oversight Committee	Adrienne Blum	HDR
Darrin Shoemaker	Oversight Committee		

**Summary:** Mr. Fralix started by reviewing Meeting #2 and then HDR reviewed what research they had gathered in response to the questions mentioned in the second meeting. The Committee instructed the Town to verify the study is following the core principles of Hilton Head.

Reversible Lanes -

- Reversible lanes are generally a safety issue when they are not along roadways with limited access control. They also similar impacts to the right-of-way needed compared to a six-lane footprint.

Alternative Matrix -

- The matrix included alternatives for located near the existing alignment as well as new alignments/corridors. The new corridors generally had higher impacts to environment and the communities, which will result in higher costs. These impacts were taken into account when narrowing options to the six Reasonable Alternatives.

Growth Rate -

- The traffic analysis recommended three lanes in the future. Two lanes would not be enough capacity for the next couple of years. The 2018 Existing No-Build analysis indicates LOS E at several times and locations along the corridor.

- Average weekday peak traffic counts and LOS D were the guidelines set by the SCDOT used for the traffic analysis. The traffic counts were calculated pre-COVID, even though the report was written in March 2020.
- Another method of describing traffic besides LOS could be evaluated (V/C ratio) for use in the report.

Squire Pope and US 278 -

- Due to the thru volumes, it was discussed that the intersections should be limited to two phases to maintain proper traffic flow along the corridor. Alternative solutions should be explored for turning movements not handled by the two-phase signals.
- HDR will run additional alternatives in the Synchro traffic model to give further feedback on the proposed alternatives.

Jenkins Island -

- There was discussion on the Jenkins Island alternatives with regards to traffic signal warrant, frontage roads, superstreet and pedestrian access. Access to Mariner's Cove and Blue Herron Point Road both during and after construction was discussed and will be evaluated by HDR.

**Action Items:**

- HDR and Beaufort County will prepare and distribute minutes from the third meeting.
- Next Meeting: Tuesday, March 2<sup>nd</sup> at 11:00 AM
- HDR will provide an agenda for the meeting, an outline of the research and findings to date, and a timeline moving forward on Friday, February 26<sup>th</sup>



# Meeting #4 Minutes

Project:	US 278 Corridor Oversight Committee Beaufort County		
Meeting Location:	Webex Meeting		
Meeting Subject / Date:	Meeting #4 March 2, 2021 @ 11:00 AM		
Notes By:	J. Dayton, P. Hutcherson, A. Blum	Job No:	

**Meeting Purpose:** The purpose of the meeting was to continue the US 278 Corridor Oversight Committee.

**Attendees:**

David Johnson	Oversight Committee	Darrin Shoemaker	Oversight Committee
John Taylor	Oversight Committee	Jared Fralix	Oversight Committee
Risa Sreden Prince	Oversight Committee	Jeff Dayton	HDR
Mike Garrigan	Oversight Committee	Phillip Hutcherson	HDR
Herbert Ford	Oversight Committee	Adrienne Blum	HDR

**Summary:** Mr. Fralix started by reviewing Meeting #3 as well as the scope, including an upcoming schedule of meetings and the final report. HDR began reviewing what research they had gathered in response to the questions mentioned in the third meeting.

Alternatives -

- The alternatives focused for this report will be a representative two-lane alternative, an alternative to the north of the Stoney Community, and alternative similar to those shown with reduced conflict intersections, an alternative with free flow movements along US 278, and the two-phase signals shown in the previous meeting.
- An alternative will be analyzed with both six lanes and four lanes to compare safety, traffic conditions.
- The frontage road on Jenkins Island is an alternative that the community supports and will most likely be included in the design due to potential construction phasing.

Growth Rate -

- HDR will investigate different assumptions of traffic counts from the 30<sup>th</sup> busiest hour versus the 45<sup>th</sup> busiest day.

Speed Limit -

- There are currently multiple speed limits along the corridor ranging from 45-50 mph. The committee discussed the need to lower the speed to 45 mph throughout the corridor. This will be included in the final report.

## Pedestrian Safety -

- Safety along this project was discussed as both pedestrian and vehicle safety. The Committee agrees that safety is an important issue for everyone in the area.
- To bring more awareness to pedestrian crossings, painted crosswalks, lighting and landscaping can be utilized.
- Pedestrian bridges had been discussed previously, but they offer several challenges.
- Additional pedestrians and bicycles are anticipated with the proposed multiuse pathway across the new bridges.

## Action Items:

- HDR and Beaufort County will prepare and distribute minutes from the fourth meeting.
- Next Meeting: Tuesday, March 16<sup>th</sup> at 11:00 AM
- HDR will provide an agenda for the final oversight committee meeting on Friday, March 12<sup>th</sup>



# Meeting #5 Minutes

Project:	US 278 Corridor Oversight Committee Beaufort County		
Meeting Location:	Webex Meeting		
Meeting Subject / Date:	Meeting #5 March 16, 2021 @ 1:00 PM		
Notes By:	J. Dayton, P. Hutcherson, A. Blum	Job No:	

**Meeting Purpose:** The purpose of the meeting was to continue the US 278 Corridor Oversight Committee.

**Attendees:**

David Johnson	Oversight Committee	Jared Fralix	Oversight Committee
Risa Sreden Prince	Oversight Committee	Jeff Dayton	HDR
Mike Garrigan	Oversight Committee	Phillip Hutcherson	HDR
Herbert Ford	Oversight Committee	Adrienne Blum	HDR
Darrin Shoemaker	Oversight Committee		

**Summary:** Mr. Fralix started by reviewing Meeting #4 and then HDR started reviewing what research they had gathered in response to the questions mentioned in the fourth meeting, council meetings, and the letter written by the Oversight Committee.

Traffic -

- HDR presented traffic models for both 4-lanes and 6-lanes along US 278 during AM and PM peak hour traffic for the year 2045. These alternatives emphasized higher congestion and gridlock on the 4-lane model. This led to a discussion on the possibility of these graphics being translated into values for comparison.
- HDR can recommend that SCDOT further analyze the alternatives to determine travel times through the different alternatives. A comparison against the 2045 no build alternative SCDOT has already evaluated as well as a 2045 scenario with four lanes and intersection improvements would be important.

Alternatives -

- The Committee has requested that HDR calculate a high-level cost estimate for a new location alternative that would provide a second entrance/exit to the Island. The Committee does know there have been discussions about a second entrance but it has not been included in any long range transportation plan.
- The frontage road on Jenkins Island is acceptable from the Committee. It eliminates the left turns out that are a safety concerns and the right-of-way in the area is owned by SCDOT and the Town of Hilton Head.

#### Safety -

- The Committee recommended that the report will include discussion on safety, and particularly comparing the number of conflict points per alternative and include design suggestions to improve pedestrian and cyclist safety.

#### Traffic Counts -

- The traffic counts used in this analysis were taken on August 8<sup>th</sup>, 2018. These values were interpolated to the 30<sup>th</sup> highest AM and PM hour volume. After being interpolated, the growth rate was applied to create volumes for the analysis. This method is reasonable to the Committee as it discounts some of the higher periods outside the peak hours to ensure the design is not only for the peak seen in any given year.

#### Speed Limit -

- With the current design alternatives including a raised median and outside curb and gutter, the posted speed along the corridor should not exceed 45 mph.
- Removing the traffic signals to create free flow conditions along US 278 could increase the speed along the corridor and inhibit pedestrian crossings.

#### Impacts -

- The Committee believes that there will be more impacts to the community than just those directly along the corridor. Impacts such as noise will be acknowledged during the NEPA process. HDR will look at noting which side roads could see an increase in traffic and potential need for other improvements.

#### **Action Items:**

- HDR and Beaufort County will prepare and distribute minutes from the fifth and final meeting.
- HDR will submit a draft report to the Oversight Committee by the end of the month for review prior to sending to the Councils.

## Appendix B. Mitigation Exhibits





## DRAFT Community Mitigation Plan

### Background Research

Potential community mitigation options were initially developed based on recommendations presented in the Background and Recommendations Report for the Gullah Geechee Cultural Preservation Project (draft 2019) prepared by the Walker Collaborative. This document provides recommendations for strategies to better preserve Gullah cultural on Hilton Head Island. In September 2019, the Hilton Head Island Town Council approved 13 of the recommendations, which address land preservation, economic opportunities and Town regulations.

### Stoney Community & Stakeholder Involvement

The project team has met with the Stoney Community, Gullah stakeholders, and the Town of Hilton Head on multiple occasions to discuss the project and potential mitigation opportunities. Initial discussions included the potential mitigation options derived from the background research and requested input from the Stoney Community. Potential community mitigation developed through coordination with the Stoney Community include:

- Open-air pavilion on town owned property the near the US 278 and Squire Pope Road intersection
  - highlight history of the Stoney Community and other Gullah neighborhoods on the island
  - seating at the pavilion
- Improvements to access road to Jenkins Island Cemetery
- History of Stoney community video
- Landscaping along US 278 within the Stoney Community
- Improved signage to demarcate Stoney Community
- Seating along multi-use path

### Stoney Community as a Traditional Cultural Property

Based on the detailed cultural report prepared by New South Associates entitled FIRST STEP ON HOME SOIL: A PRELIMINARY TRADITIONAL CULTURAL PROPERTY EVALUATION OF THE STONEY COMMUNITY it is recommended that the Stoney Community be identified as a Traditional Cultural Property (TCP). The approximate proposed TCP boundary is shown in Figure 1. Although it is anticipated that the **US 278**

**Corridor Improvement project would not have an adverse impact on the Stoney Community**, the report recommended the project team “consider Stoney’s historic significance and help promote measures that lead to the preservation and understanding of Native Islander landownership on the Island and the unique circumstances that are reflected in those patterns...honor Stoney’s role as a gateway to the island in project planning in a creative manner. Finally, while tangible remains of Stoney’s history associated with commerce and education are no longer extant, the memories of them are and should be captured and interpreted for those who enter the gateway and want to learn about Hilton Head’s Gullah culture and its communities.”

## Potential Community Mitigation Based on TCP Report

The report recommends that the Stoney Community be designated as a TCP, but that the proposed US 278 Corridor Improvement project would not have an adverse impact. Although the project would not have an adverse impact, it is the goal of the project to provide community mitigation options to preserve and highlight the history of the Stoney Community. Potential mitigation options to further establish or reestablish the Stoney Community as a “gateway” and a “place” include:

- The improved signage to demarcate the Stoney Community could include a more “gateway” entrance/exit to the community based on the boundary established in the TCP Report, refer to Figure 2.
- Consider a gateway entrance sign into the Stoney Community from the mainland (between causeway and The Crazy Crab) and possibly a second gateway sign as you leave the Stoney Community and go onto the Island. The gateway between Hilton Head and Stoney could be the same as coming into the Stoney Community from the mainland
  - the gateway features could be setup as dual function with the reverse sides (depending on direction of travel) demarcating either the Stoney Community (if traveling westbound) or Hilton Head (if traveling eastbound)
- Local Gullah artists installation at the open-air pavilion (i.e. sculptures, statues, painting/mural etc.)
- WiFi at open-air pavilion for Stoney community
- Create a theme based street and multiuse path lighting
- Install flags/signage to the lighting poles along US 278 to indicate they are within the Stoney Community
- Transform the History of Stoney community videos to a “Story Map” to share important historical information about the Stoney Community, Gullah Communities, and Hilton Head Island. It would be an online [interactive map](#) to provide locations and details about historically significant sites, people, and events within the area. Users can learn about the history of the project area and its inhabitants, and historic homes inhabited by early settlers, early roads, farms, industry, cemeteries and other features to document the area’s history.

## Summary of Potential Community Mitigation Options

- Signage to demarcate the Stoney Community to include a more “gateway” entrance/exit to the community based on the boundary established in the TCP Report, refer to Figures 1 and 2.
  - Consider a gateway entrance sign into the Stoney Community from the mainland (between causeway and The Crazy Crab) and possibly a second gateway sign as you leave the Stoney Community and go onto the Island. The gateway between Hilton Head and Stoney could be the same as coming into the Stoney Community from the mainland
  - the gateway features could be setup as dual function with the reverse sides (depending on direction of travel) demarcating either the Stoney Community (if traveling westbound) or Hilton Head (if traveling eastbound)
- Open-air pavilion on town-owned property near the US 278 and Squire Pope Road intersection, refer to Figure 3.
  - highlight history of the Stoney Community and other Gullah neighborhoods on the island
  - seating at the pavilion
  - Local Gullah artists installation at the open-air pavilion (i.e. sculptures, statues, painting/mural etc.)
  - WiFi at open-air pavilion for Stoney community
- Create a theme based street and multiuse path lighting
  - Install flags/signage to the lighting poles along US 278 to indicate they are within the Stoney Community
  - Landscaping along US 278 within the Stoney Community
  - Seating along multi-use path
- Transform the History of Stoney community video to a “Story Map” to share important historical information about the Stoney Community, Gullah Communities, and Hilton Head Island. It would be an online [interactive map](#) to provide locations and details about historically significant sites, people, and events within the area. Users can learn about the history of the project area and its inhabitants, and historic homes inhabited by early settlers, early roads, farms, industry, cemeteries and other features to document the area’s history.
- Improvements to access road to Jenkins Island Cemetery

Figure 1

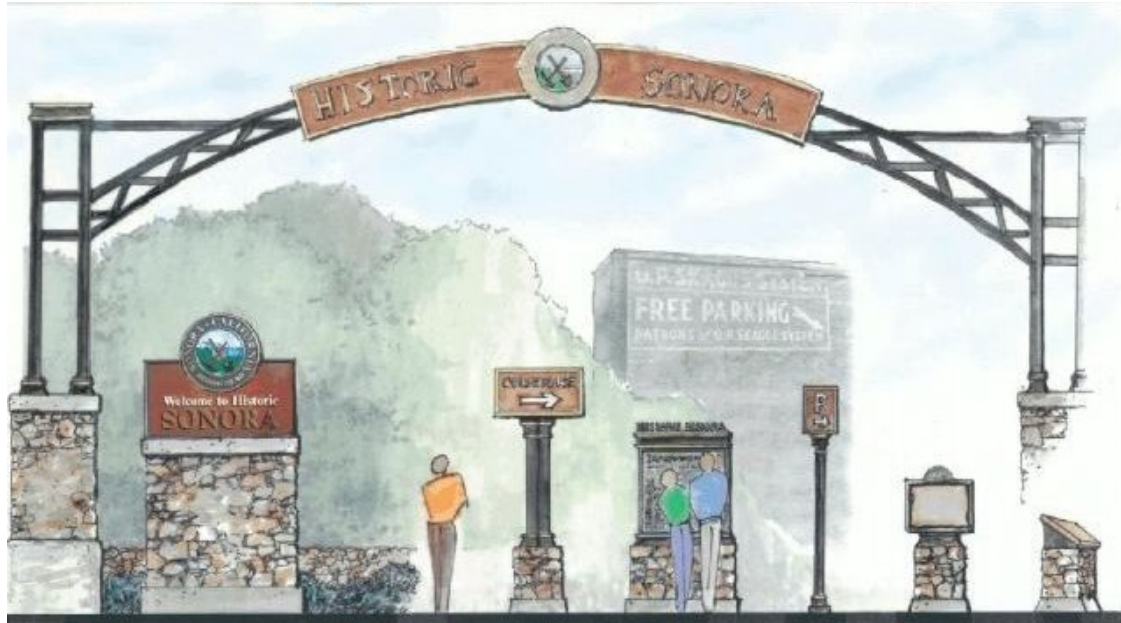
Proposed TCP Boundary





Figure 2: *Examples to show general idea of gateway concept and not intended to be implemented*









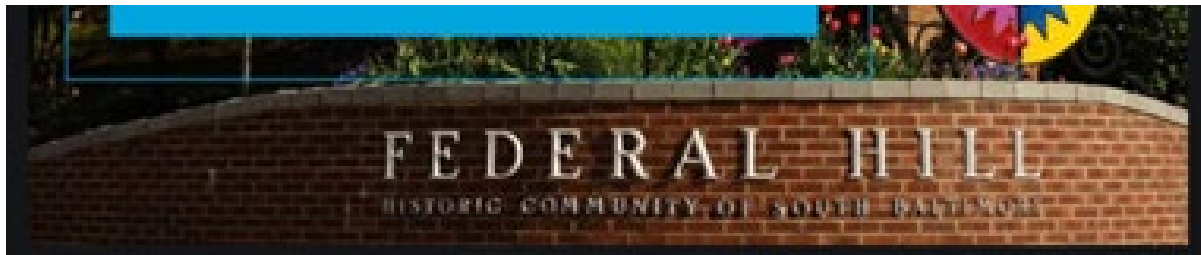




Figure 3: *Example to show general idea of pavilion concept and not intended to be implemented*

The Mount Pleasant Sweetgrass Basket Cultural Arts Pavilion



Replace the bar with the informational displays & replace the bar stools with benches/seating

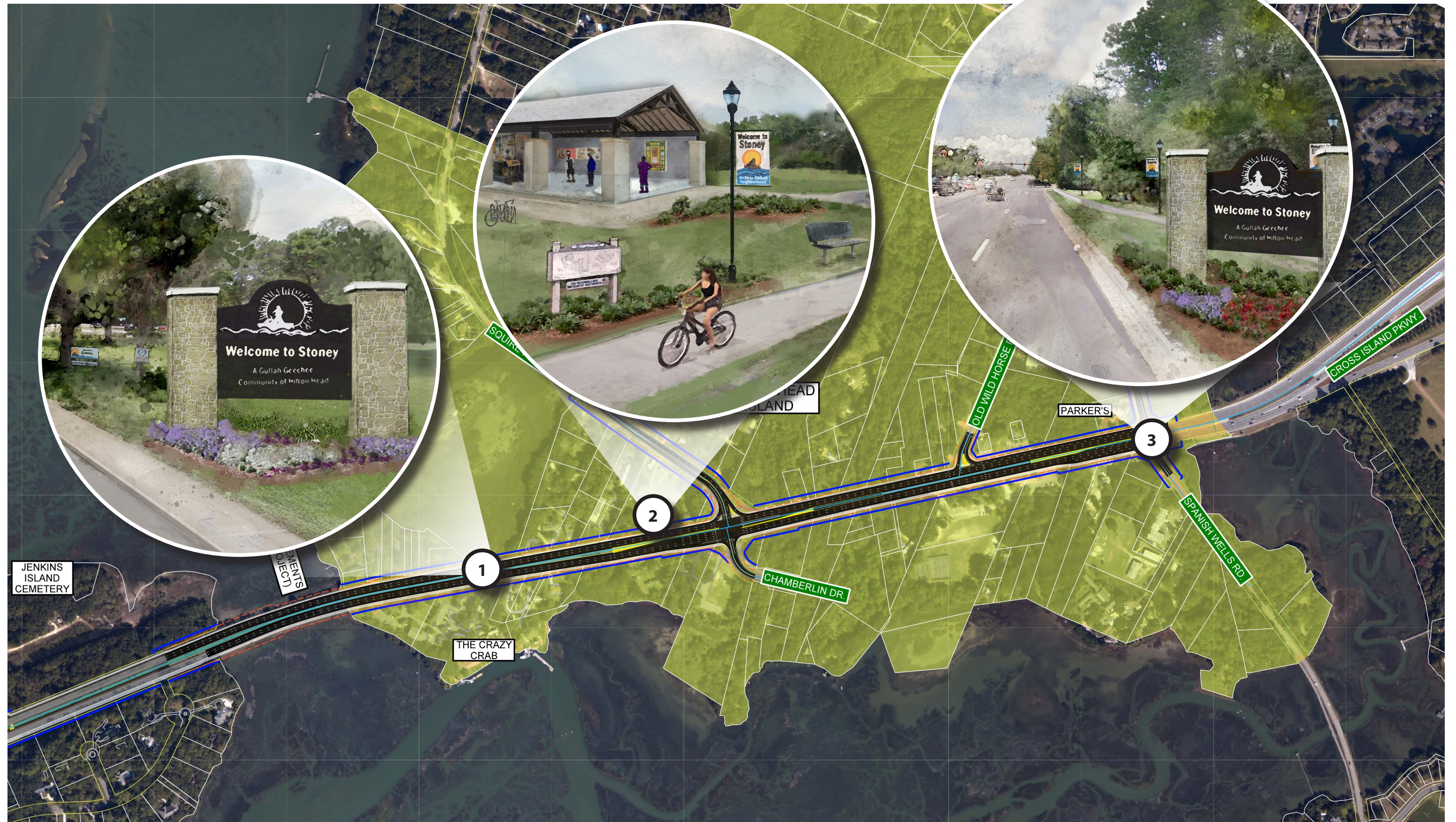


*Rio on the Hudson: Olympic Village in NYC. Two 20' x 25' Del Norte Pavilions in Douglas-fir. We used 2' x 2' x 2' concrete blocks to anchor the structure because it was a temporary installation, then covered the concrete blocks with wooden boxes. Photo Courtesy of A. F. of New York, NY.*



# DRAFT Community Mitigation Plan

## Potential Stoney Community Location Renderings





**Site 1**  
Community Gateway





**Site 1**

Community Gateway - alternate style example





## Site 2

### Pavilion and bike path





**Site 3**  
Community Gateway Westbound

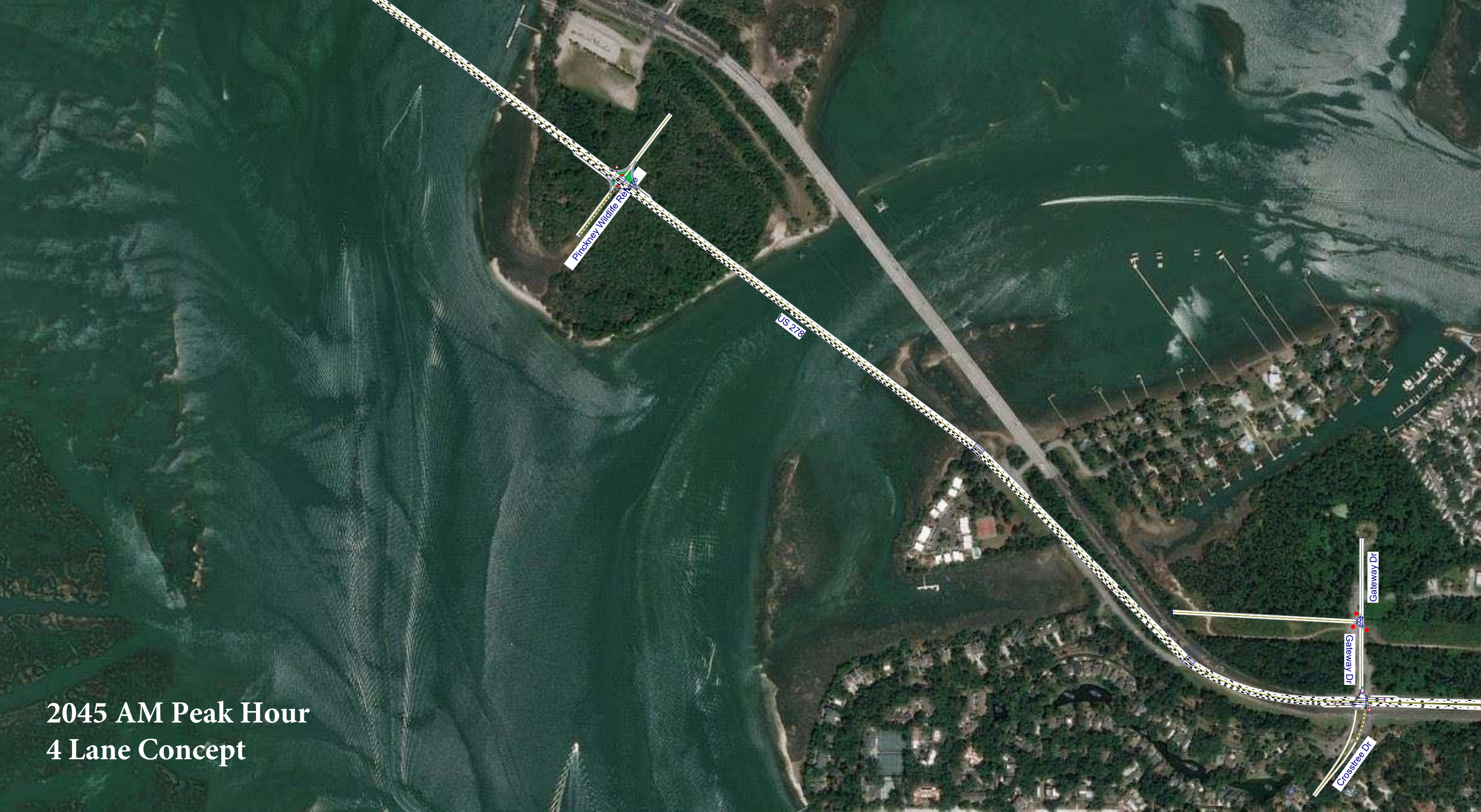




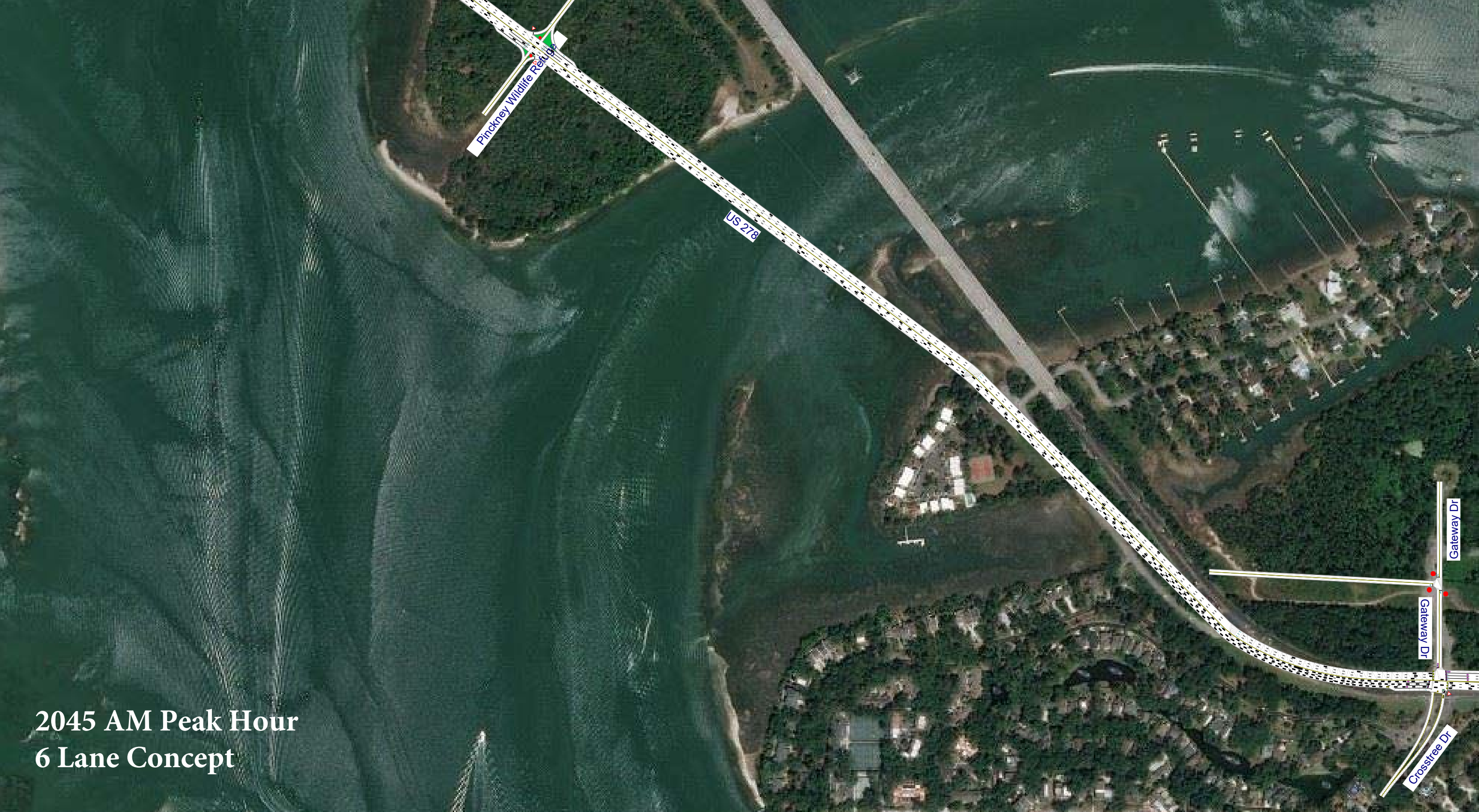
## Appendix C. SimTraffic Screen Captures



2045 AM Peak Hour  
4 Lane Concept







Pinckney Wildlife Refuge

US 278

Gateway Dr

Gateway Dr

Crossree Dr

2045 AM Peak Hour  
6 Lane Concept

## Appendix D. Level of Service (LOS) Explanations

## 6.0 EXISTING TRAFFIC ANALYSIS

### 6.1 INTERSECTION LEVEL OF SERVICE

Intersection level of service (LOS) is defined in terms of average delay per vehicle, which is measured based on variables such as signal phasing, cycle length, and intersection volumes with respect to capacity. **Table 8** shows the LOS criteria for signalized intersections, as described in the Highway Capacity Manual. **Table 9** shows the LOS criteria for unsignalized intersections.

**Table 8: Level of Service Criteria for Signalized Intersections**

Level of Service	Average Control Delay (sec/vehicle)	General Description
A	< 10	Free Flow
B	> 10-20	Stable flow (slight delays)
C	> 20-35	Stable flow (acceptable delays)
D	> 35-55	Approaching unstable flow (tolerable delay, occasionally wait through more than one signal cycle before proceeding)
E	> 55-80	Unstable flow (intolerable delays)
F	> 80	Forced flow (jammed)

**Table 9: Level of Service Criteria for Unsignalized Intersections**

Level of Service	Average Control Delay (sec/vehicle)
A	0-10
B	> 10-15
C	> 15-25
D	> 25-35
E	> 35-50
F	> 50

#### 6.1.1 2018 Existing Intersection Level of Service

The existing geometry, traffic volumes, and signal timings were entered into Synchro to assess the current levels of service experienced at each intersection. **Figure 32** shows the level of service for each movement and the overall level of service and delay for the signalized intersections. **Table 10** summarizes the worst movements at each unsignalized intersection and the overall level of service at the signalized intersections.

**Table 10: 2018 Intersection Level of Service**

Intersection	2018 Existing					
	AM			PM		
	Movement	LOS	Delay	Movement	LOS	Delay
Moss Creek Road	Overall	B	19.6	Overall	C	21.6
Salt Marsh Drive*	SBL	F	215.5	EBL	F	64.5
Fording Island Road*	NBL	F	+	NBL	F	+
Pinckney Wildlife Refuge*	NBL	F	+	NBL	F	+
Blue Heron Point Road*	NEL	F	+	NEL	F	+
Crosstree Drive/ Gateway Drive*	NBL	F	+	NBL	F	+
Jenkins Road*	SBL	F	199.0	SBL	F	+
Squire Pope Road	Overall	A	6.7	Overall	F	87.9
Wild Horse Road/ Spanish Wells Road	Overall	B	14.3	Overall	D	46.8

+ Results are producing unreasonably long delays that are often greater than 360 seconds, but the values are not shown due to software limitations.

\* Unsignalized intersection- the movement with most severe LOS is included

The existing analysis shows that, in general, the signalized intersections are operating at acceptable levels of service. The Squire Pope Road intersection operates at an overall LOS F in the PM peak hour. The unsignalized intersections show that the majority of the opposed movements operate at LOS F in both the AM and PM peak hours. Although many of the left turn movements have very low volumes, the delay experienced is excessive due to the US 278 through volumes.

### 6.2 SEGMENT LEVEL OF SERVICE

Along with intersection level of service, another important aspect to consider is how the segments between the intersections are accommodating traffic volumes. This segment of US 278 most closely operates as a multilane highway as described in the Highway Capacity Manual 2010 (HCM). The HCM states:

*In general, uninterrupted flow may exist on a multilane highway if there are 2 miles or more between traffic signals...Many multilane highways will have periodic signalized intersections, even if the average signal spacing is well over 2 miles. In such cases, the multilane highway segments that are more than 2 miles away from any signalized intersections are analyzed by using the multilane highway methodology and isolated signalized intersections should be analyzed using the signalized intersection methodology.*

While level of service for intersections is based on the average delay of vehicles, the level of service for uninterrupted segments is based on the density of traffic, measured in passenger cars per mile per lane. **Table 11** lists the LOS thresholds for an uninterrupted flow facility, referenced from the HCM.

**Table 11: Level of Service Thresholds for Uninterrupted Flow Facilities**

LOS	Free Flow Speed- FFS (mph)	Density (pc/mi/ln)
A	All	> 0-11
B	All	> 11-18
C	All	> 18-26
D	All	> 26-35
E	60	> 35-40
	55	> 35-41
	50	> 35-43
	45	> 35-45
F	Demand Exceeds Capacity	
	60	> 40
	55	> 41
	50	> 43
	45	> 45

The Bluffton Parkway interchange introduces a ramp segment that needs to be analyzed separate from the multilane highway and intersections. Ramps are designed to permit relatively high-speed merging and diverging maneuvers while limiting the disruption to the main traffic stream. The elements measured in determining ramp operations are the length and type of acceleration and deceleration lanes, the free-flow speed of the ramp and freeway segment, and the proximity of other ramps. The LOS criteria for the merge and diverge segments are listed in **Table 12**.

**Table 12: Level of Service Thresholds for Merge and Diverge Areas**

LOS	Density (pc/mi/ln)	Comments
A	< 10	Unrestricted operations
B	> 10-20	Merging and diverging maneuvers noticeable to drivers
C	> 20-28	Influence area speeds begin to decline
D	> 28-35	Influence area turbulence becomes intrusive
E	> 35	Turbulence felt by virtually all drivers
F	Demand exceeds capacity	Ramp and freeway queues form

### 6.2.1 2018 Existing Segment Level of Service

As mentioned above, this portion of US 278 operates like an uninterrupted multilane highway. The multilane highway function of the Highway Capacity Software (HCS) was used to assess the segment level of service for the existing conditions. **Figure 33** through **Figure 36** illustrate the segmentation of the corridor and the resulting levels of service. The segment LOS is also summarized in **Table 13**.

**Table 13: 2018 Segment Level of Service**

Segment	Eastbound		Westbound	
	AM	PM	AM	PM
Moss Creek Drive to Salt Marsh Drive	B	B	A	B
Salt Marsh Drive to Bluffton Parkway	C	C	B	D
Bluffton Parkway to Pinckney Wildlife Refuge	E	D	C	E
Pinckney Wildlife Refuge to Blue Heron Point Road	E	C	C	D
Blue Heron Point Road to Jenkins Road	E	D	C	E
Jenkins Road to Squire Pope Road	E	C	C	E

According to the HCM, a ramp that connects to a multilane highway may be classified as a freeway ramp for analysis purposes. As shown in **Figure 33** and **Figure 34**, the Bluffton Parkway on- and off-ramps were analyzed separately as a merge and diverge condition in HCS. This analysis shows that the on-ramp operates at LOS D in the AM and LOS C in the PM. The off-ramp operates at LOS A in the AM and LOS C in the PM.

The analysis reflects the existing traffic congestion between the Bluffton Parkway interchange and Squire Pope Road. The eastbound direction shows a LOS E in the AM and the westbound direction shows a LOS E in the PM.