



Location Hydraulics Report

This report develops, evaluates and compares the impacts to floodplains and floodways for the Build and No Build Alternatives of the SR 87 Connector Project from US 90 to SR 87 N in Milton.

Santa Rosa County Florida

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1.0 INTRODUCTION

The primary objective of the *SR 87 Connector* project is to extend SR 87S to facilitate north/south traffic movement to more effectively serve freight movement and to provide for a more direct hurricane evacuation route. It also is the intent to reduce congestion in the City of Milton and to alleviate travel demand on the section of US 90 currently shared by SR 87. Versions of this project have gone through ETDM screening as ETDM Project #2861 in 2008. However, that project was much more limited in scope and only evaluated a corridor from SR 87S to Munson Highway. On December 19, 2009, the *SR 87 Connector* project was submitted for ETDM review as Project #12597.

This report provides information about the existing floodplains, explains proposed improvements and includes a statement of the impacts of those improvements to the floodplains.

1.0 INTRODUCTION

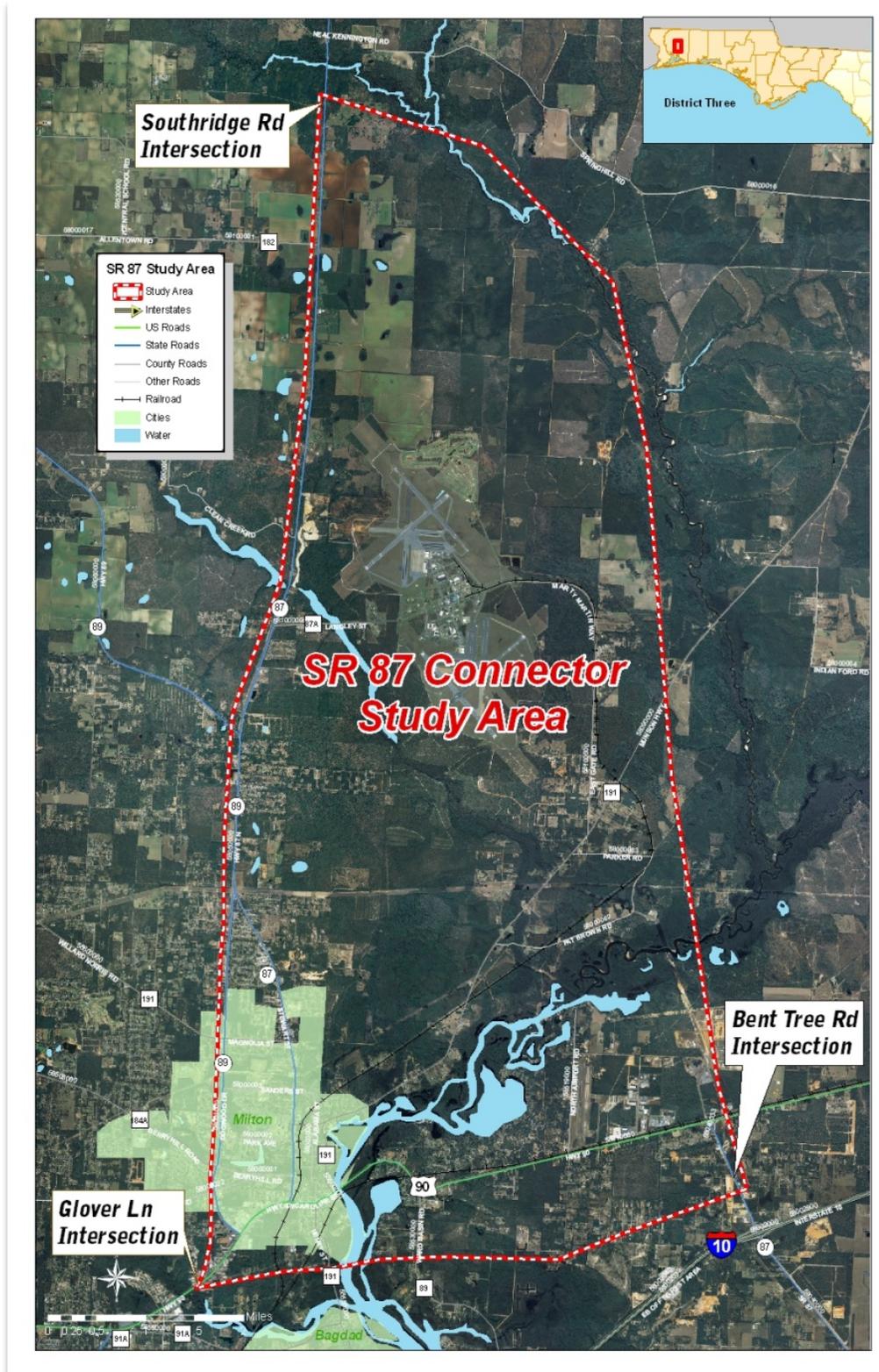


Figure 1: Study Area Map

2.0 NEED FOR IMPROVEMENTS

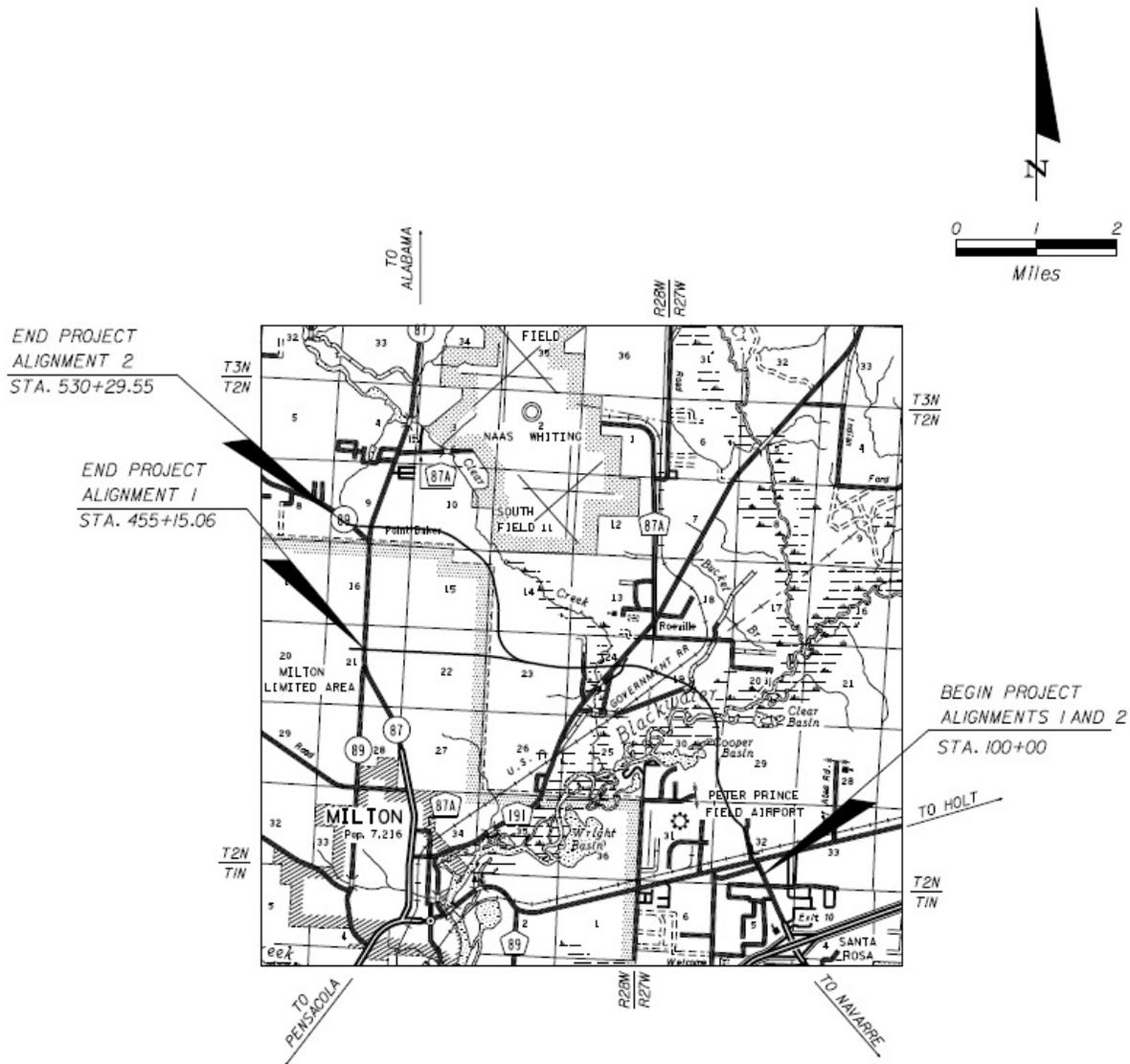


Figure 2: Project Location Map

2.0 NEED FOR IMPROVEMENTS

SR 87 is the main north-south highway of Santa Rosa County. It links Milton at US 90 with US 98 at Navarre to the south, and Alabama (transitions to Alabama 41 en route to Brewton then on to I-65) to the north. It also serves as a corridor for freight traffic north to I-65, as well as a vital evacuation route for northbound traffic. During times of hurricane force winds, both the Escambia Bay Bridge and the Garcon Point Bridge close, leaving SR 87 as the only route out of the beach areas such as Gulf Breeze and Navarre. Also, it is the only access road into the area for



2.0 NEED FOR IMPROVEMENTS

Emergency First Responders. However, with a portion of the current alignment travelling along a congested portion of US 90 through historic downtown Milton, SR 87 cannot function as a contiguous facility. Future growth will continue to constrain this portion of the roadway. As reported in the *Haas Center's Impact of Economic Development in Santa Rosa County*, the County has grown 173% since 1980 and is expected to grow another 92% by 2030. This increase will put further demand on this roadway, making growth and evacuation difficult due to a lack of capacity on US 90. As a result, Santa Rosa County's Capital Improvements Schedule includes Policy 4.1.E.3, "*The County shall continue to request, recommend, and support immediate roadway improvements in order to relieve the congestion on the segment of US 90 between Canal Street and SR 87S*".

This project is needed because it provides a new roadway linking SR 87S with SR 87N. This will serve as an alternative to the existing shared facility of SR 87 and US 90, which is a constrained facility that is currently operating at a failing level of service (LOS F). Therefore, the primary need for this new corridor is to provide additional capacity, and to improve regional connectivity by providing a more direct route from areas of high growth in northern Santa Rosa County, such as the Berryhill Road area, to I-10 and to areas further to the south. Likewise, travel will be improved to and from I-10 for the Whiting Field U.S. Naval Air Station, and the County's Joint Use Planning Area near Whiting Field. It is anticipated that this new roadway facility will provide relief to Ward Basin Road and its intersection with US 90. It is also intended to provide much needed relief to the US 90 Blackwater Bridge.

The overall project goal is to provide a transportation system that meets the travel needs of the region's population by facilitating the movement of goods and people, and contributing to its economic well-being while maintaining the environmental quality.



3.0 PROJECT DESCRIPTION

3.0 PROJECT DESCRIPTION

The project is to construct a 4-lane divided urban/rural highway to bypass the City of Milton. The interim roadway will be a 2-lane urban/rural highway, as discussed in Section 4.3, Typical Sections. The recommended alternatives, Alignment 1 and Alignment 2, share the same alignment for 4.7 miles to a location just west of the proposed Clear Creek Bridge and west of Winston Brown Road. Each alignment has the same two proposed bridges: 1) over Blackwater River and the Blackwater Heritage State Trail, and 2) over Clear Creek.

4.0 PROPOSED ALTERNATIVES

4.1 "No Build" Alternative

The "No Build" alternative serves as a base line for comparison of the build alternative. The "No Build" alternative would increase traffic demands on US 90 and within the City of Milton. The "No Build" has no encroachments and no impacts on floodplain values.

4.2 Build Alternative

In addition to the "No Build" alternative and the Transportation System Management (TSM) alternative along the existing alignment; a number of new alignments were identified and evaluated for improved mobility and safety. Two final alignments were selected for "recommendation".

4.2.1 Alignment 1

This alignment begins just south of the US 90 and SR 87S intersection and continues north for 6.7 miles. The first 4.7 miles of Alignment 1 is also the same for Alignment 2, as discussed in Section 3.0. The end point is a connection to SR 87N near Oakland Drive (approximately 1 mile north of the city limits of Milton). The proposed alignment closely follows the existing alignment of SR 87S near US 90 and East Milton Road, but corrects the horizontal curves, allowing for a normal crown roadway through the intersection. The proposed horizontal alignment provides a safer and "smoother" ride through the US 90 intersection and along East Milton Road.



4.0 PROPOSED ALTERNATIVES

Other components of the project include storm drain collection systems, detention ponds (both dry and wet), bicycle and pedestrian facilities, signing and pavement markings, and signalization modifications at the beginning and ending connection points.

4.2.2 Alignment 2

As discussed in Sections 3.0 and 4.2.1, both alignments have the same alignment for the first 4.7 miles and Alignment 2 splits off to the north for an additional 3.5 miles. Alignment 2's end point connects to SR 87N and SR 89N at Season Drive. The total length of Alignment 2 is 8.2 miles.

4.3 Typical Sections

There are two proposed typical sections for the final build out (4-lane divided highway) which are shown in *Figure 3* and two proposed typical sections for the interim roadway (2-lane undivided highway) as shown in *Figure 4*. The proposed typical sections include an urban typical from the beginning of the project at US 90 and extending to the Blackwater River Bridge. The urban typical is also applicable to the alignments at the end connection to SR 87N. A rural typical section starts north of the Blackwater River Bridge and extends almost to the end of each alignment. The typical sections for the Blackwater River Bridge and Clear Creek Bridge are very similar, as each have the same bridge deck width. Bridge typical sections are shown in *Figures 5 and 6*. The southbound bridges will be built first to serve the interim 2-lane highway. The northbound bridges will be constructed when the roadway is widened for 4-lanes.

The urban 4-lane roadway consists of two 12' lanes in each direction divided by a Type E curbed median, with a 4' outside bicycle lane, Type F curb and gutter on the outside lanes, a 12' multi-use path on the west/south side. The rural 4-lane roadway consists of two 12' lanes in each direction divided by a 40' grassed median, with a 5' outside bicycle lane/paved shoulder, and ditches.

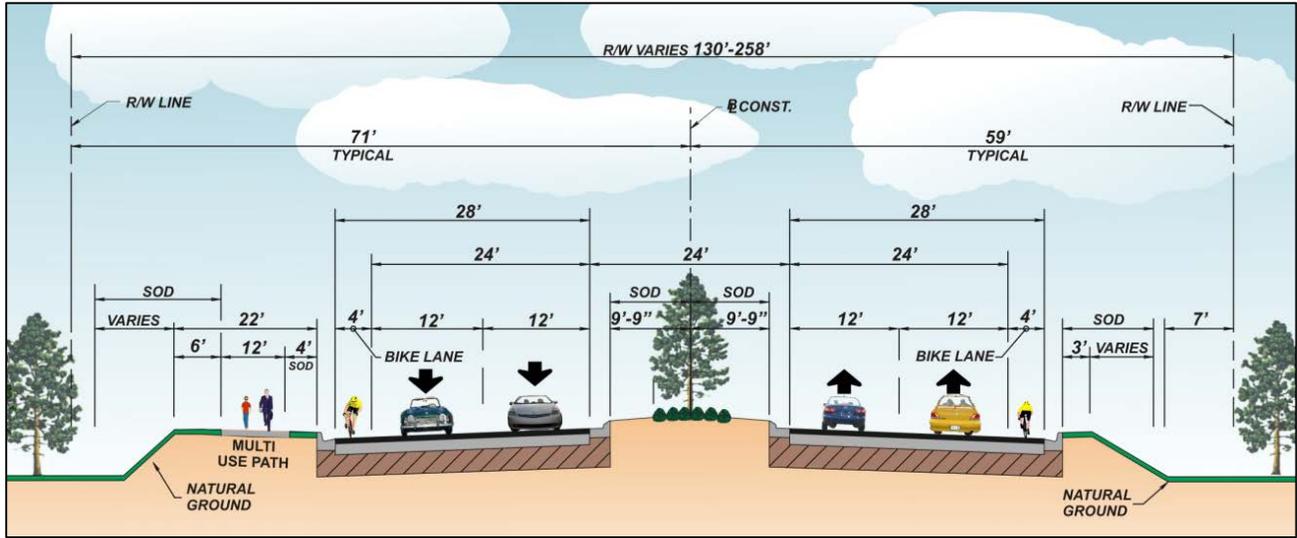


Figure 3: Proposed Urban Build-Out Typical Section

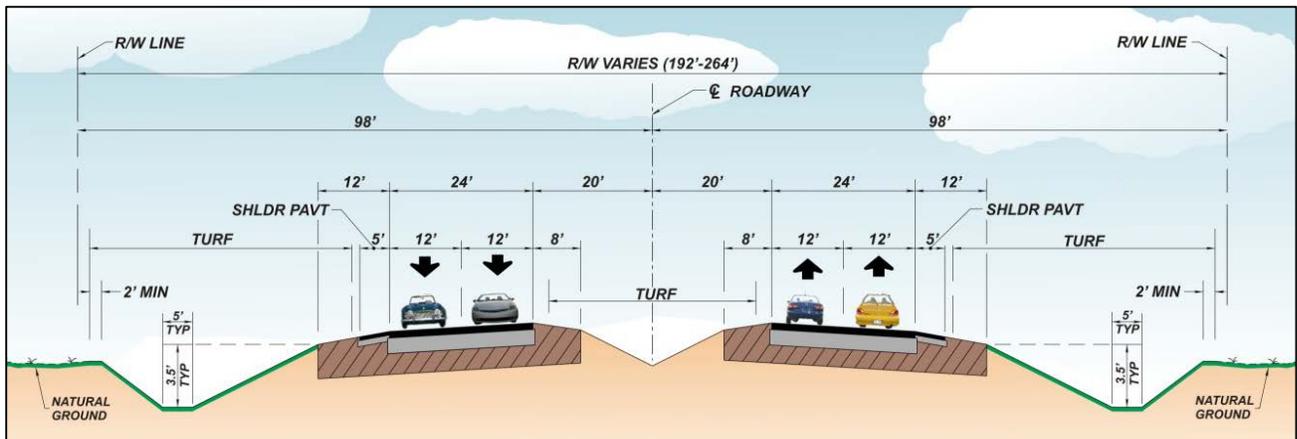


Figure 4: Proposed Rural Build-Out Typical Section

4.0 PROPOSED ALTERNATIVES

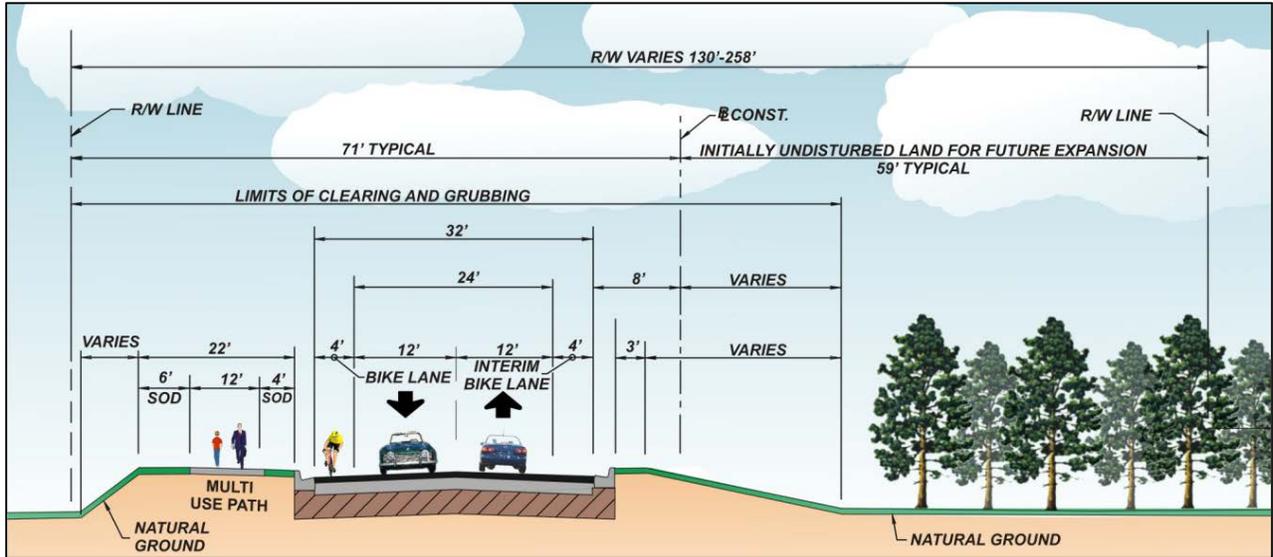


Figure 5: Proposed Interim Urban Typical Section

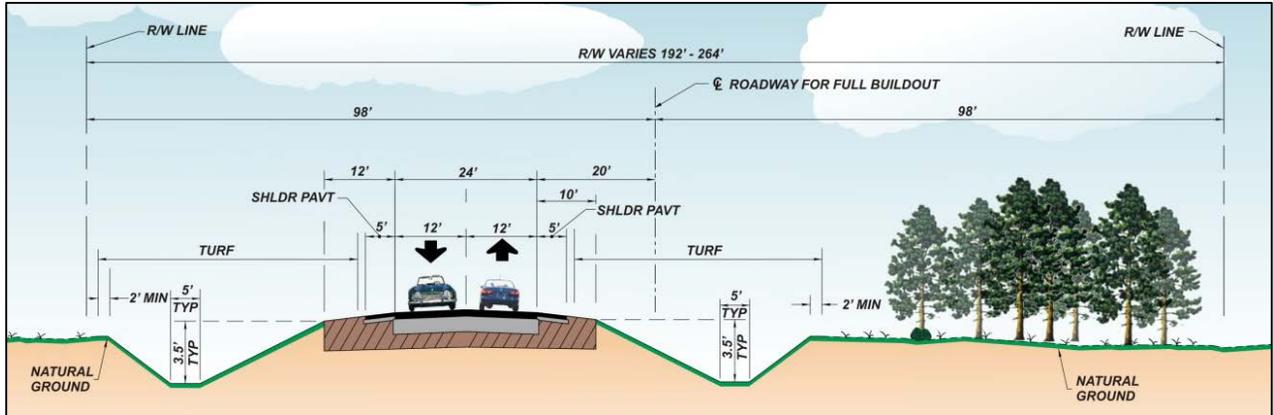


Figure 6: Proposed Interim Rural Typical Section

4.0 PROPOSED ALTERNATIVES

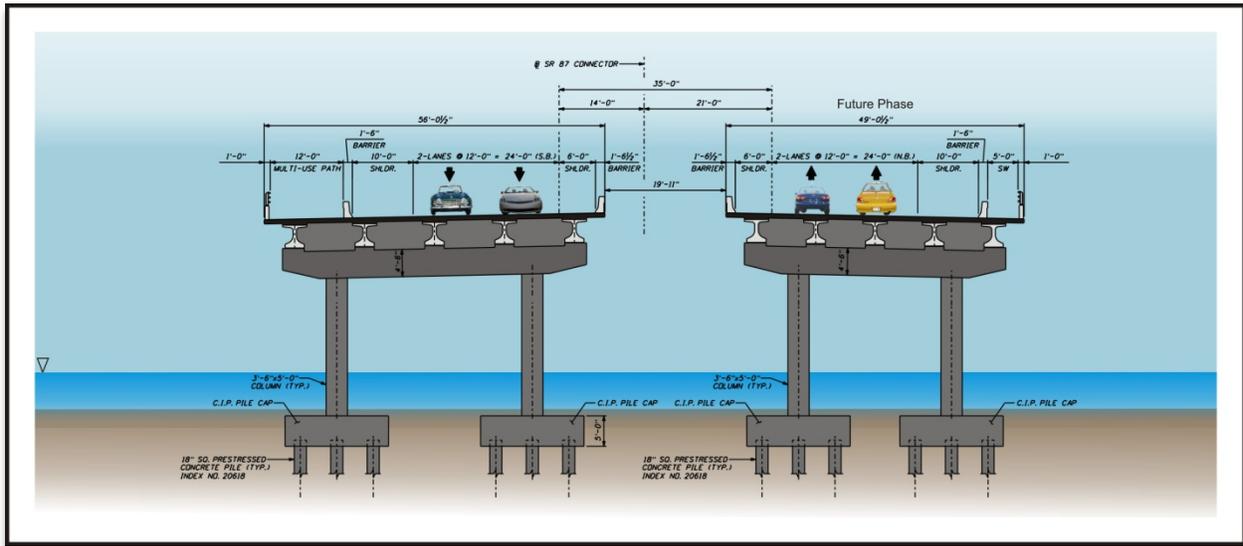


Figure 7: Blackwater River Bridge Typical Section

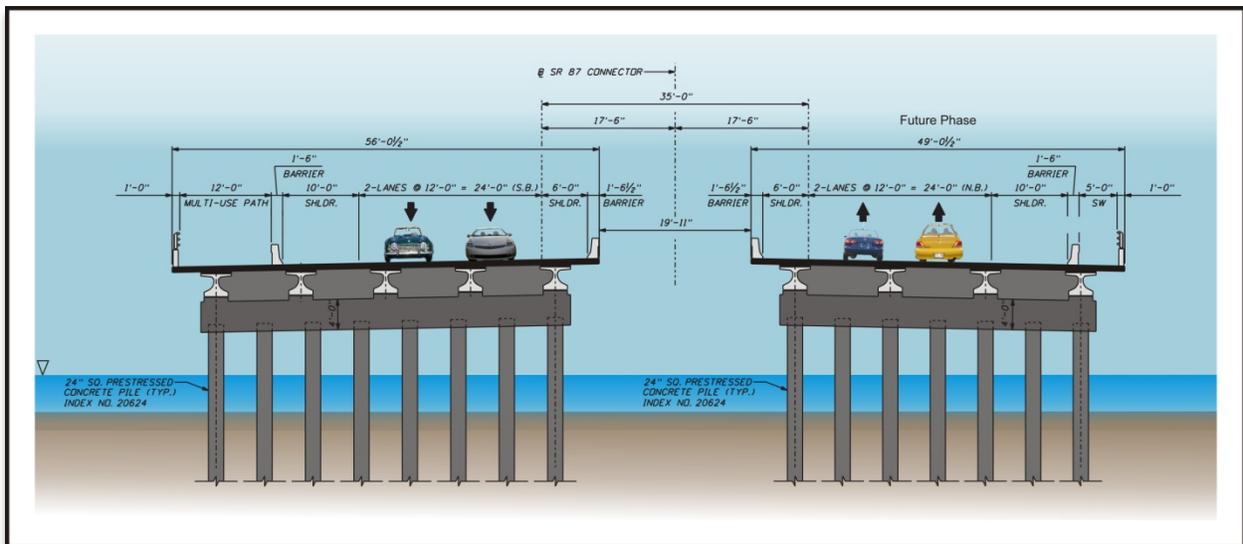


Figure 8: Clear Creek Bridge Typical Section



5.0 FACILITIES AND DRAINAGE SYSTEMS

5.1 Existing Facilities

The existing facilities along this project include urban and rural roadways, pedestrian and bicycle facilities (SR 1 Historic Trail and Blackwater River Heritage Trail), power easements with transmission lines, and a closed stormsewer system along US 90 and SR 87S. There are no existing stormwater treatment facilities within the drainage basins along the new alignments. The existing runoff along SR 87N in the City of Milton and north to the SR 89N split, is collected via a closed drainage system. Roadside ditches collect runoff north of the SR 89N split, and directs it to ponds along the FDOT right-of-way.

5.2 Existing Drainage System

The existing drainage system primarily functions with overland sheet flow, which discharges into wetlands adjacent to Clear Creek and Blackwater River. Currently, there is not any treatment provided prior to discharge, except at the developments near East Milton Road and Season Drive, and along the existing highway systems on SR 87S, US 90 and SR 87N. The majority of the land along the project is used for agricultural purposes, while the southern end along East Milton Road is primarily used for institutional and industrial development. The northern ends of both alignments have a few subdivisions and small commercial sites.

There are five existing drainage basins along each alignment, as shown in Appendix D (which also shows proposed drainage basins). Both alignments include existing basin numbers 1, 2 and 3. Alignment 1 includes existing basin numbers 4 and 5, while Alignment 2 includes basin numbers 6 and 7. In general, the existing basins are in timberland or residential subdivisions and sheet flow to surrounding wetlands. The stormwater runoff from this project outfalls into the Blackwater River, the Pensacola Bay, and ultimately into the Gulf of Mexico.

The soil conditions along the alignment vary significantly depending on location, elevation, and proximity to wetlands and floodplains. The soils reported in the USDA Soil



6.0 HYDROLOGY AND FLOOD ZONES

Survey consist of Loamy Sand, Troup Loamy Sand, Troup Orange, Bibb Kinston, Pactolous Loamy, Lakeland Sand, Kalmia Loamy, Rutlege Loamy, Albany Loamy, Bonifay Loamy, Rains Fine Loamy, and Dothan Fine. Existing water table elevations vary from 0 feet (at surface) to greater than 6 feet, which is consistent with Geotechnical investigations completed for potential pond sites.

5.3 Proposed Drainage System

The proposed drainage system for this project will consist of closed stormwater collection systems and open ditches. The closed collection systems will pipe runoff to, while the open ditches will convey runoff to stormwater ponds for sediment control and water quality treatment prior to discharging into adjacent wetlands or natural discharge points. Both wet and dry ponds will be utilized, depending on the existing groundwater elevation and soil types. Offsite runoff will continue to sheet flow and will be collected at cross drains to bypass the proposed roadway stormwater collection system. This will keep offsite separate from the roadway runoff.

There are eight proposed drainage basins along Alignment 1 and seven proposed basins along Alignment 2, as shown in Appendix D. Both alignments include proposed basin numbers 1, 2, 3 and 4. Alignment 1 also includes proposed basin numbers 5, 7a, 7b and 8; while Alignment 2 includes proposed basin numbers 6, 9 and 10.

The drainage features for this project shall be designed in accordance with the Florida Department of Transportation's drainage standards and procedures. This will ensure that all treatment requirements are met and impacts to floodplains and flood heights are avoided to the fullest extent possible.

6.0 HYDROLOGY AND FLOOD ZONES

The hydrology within the study area varies greatly due to land use and ground elevations. The Blackwater River is 57 miles in length and collects runoff from southern Alabama and northern Santa Rosa County. The river is attributed to a wide floodplain and regulatory floodway at the



6.0 HYDROLOGY AND FLOOD ZONES

proposed roadway and bridge crossing. Clear Creek is a tributary to the Blackwater River, and has a floodplain associated with the creek, however, Clear Creek is not a regulatory floodway. The project also has significant changes in elevation near the Blackwater River and “rolling hills” in the agricultural areas in the northern portion of the project. The majority of the study area has an elevation of 70 feet or greater and is outside flood zones associated with risk from the 500 year event.

Hydraulic evaluations and risk evaluations were performed for this project to show that there are no significant adverse impacts on floodplains and there are minimal encroachments. Hydraulic evaluations were modeled for the 50, 100 and 500 year storm events at the bridge locations, and are provided in the Bridge Hydraulics Report (BHR) for each bridge.

6.1 Flood Risks associated with Minimal Encroachments

This project was determined to be in the category of “minimal encroachments” in regards to the type of encroachment on base floodplain involvement. The recommended alternatives generate minimal rise in base flood elevations and do not increase floodplain limits as indicated in the hydraulic evaluations provided in each BHR. The Blackwater River Bridge spans the limits of the floodway of the channel (Flood Zone AE). The floodway channel must be clear of encroachments so the 1% annual chance flood can be carried through without changes in flood heights. The floodway is kept clear, while the allowable rise within the floodplain is up to 1 foot.

The calculated rise in flood heights associated with the bridges is documented in the Bridge Hydraulics Reports for both Blackwater River and Clear Creek. The flood rise is minimal due to the fact that the floodplain has transverse encroachments and the Blackwater River Bridge spans the entire floodway. Both bridges have up to 30 feet of vertical clearance from the natural ground elevations; allowing for high volumes of water to pass under the proposed bridges. Longitudinal encroachments were avoided by configuring alignments perpendicular to the stream/river crossings. The project is not considered to have significant encroachments because the encroachments do not have a high probability of



6.0 HYDROLOGY AND FLOOD ZONES

loss of human life, will not likely cause future damage that could be substantial in cost or extent, and will not cause adverse impact on natural and beneficial floodplain values.

Mitigation is required for impacts to the floodplain. Floodplain compensation will be provided by excavating (dredging) a portion of “uplands” just upstream of the proposed Blackwater River Bridge. This area will serve as a locale for additional flooding along the river bank and will assist with rise in base flood elevations at the proposed highway facility. Flood maps shall be revised to include the floodplain compensation area as part of the base flood. It should be noted that FEMA is currently in the process of updating flood maps in the study area, and preliminary design documents may require adjustment to account for changes to the floodplain and floodway, if any.

6.1.1 History of Flooding

The FDOT Maintenance does not know of any reoccurring flooding issues on FDOT facilities within the limits of this project. There has been little record of reoccurring flooding with the existing conditions, except during major storm events such as hurricanes. Steven Furman, Assistant Public Works Director for Santa Rosa County, was contacted to determine if there was any history of flooding in the vicinity of the proposed alignments. Mr. Furman stated that he did not know of any flooding on the existing roads within the project limits. He said that Pat Brown Road and Munson Highway, within the project limits, did not have a history of flooding. However, Karen Thornhill, Santa Rosa County Floodplain Manager, stated that the Gulf Power Easement along Pat Brown Road repeatedly floods to the 100 year flood zone line.

According to the National Oceanic and Atmospheric Administration’s (NOAA’s) Storm Surge Interactive Risk Maps, there is risk for storm surge resulting from hurricanes within the project limits. A Category 5 Hurricane has the potential to produce storm surge within the floodplain areas of this project and the limits extend just to the north of the proposed alignment. The storm surge elevations associated with a Category 5 Hurricane are between 2 and 10 feet along the proposed alignments. In addition, a Category 1 Hurricane has storm surge potential up to 2 feet just



6.0 HYDROLOGY AND FLOOD ZONES

southwest of the proposed alignments. Therefore, risk of a storm surge is probable due to a hurricane of any category.

6.1.2 Impacts on Natural Floodplain Values

This project will have minimal impacts on natural floodplain values. The floodplain values considered for potential loss or gain are the natural moderation of floods, water quality maintenance, fish and wildlife habitat, plants, open space and natural beauty, recreation, and aquaculture. Wetlands are avoided to the fullest extent possible, and even bridged over in the vicinity of the Blackwater River Heritage Trail crossing (not in floodplains).

The alignments were selected to avoid impacts to fish and wildlife to the fullest extent possible. This entailed fine tuning the alignment to avoid species of concern and critical habitats. In addition, the alignments closely parallel the already cleared power easements, which are generally less habitable areas and are occasionally utilized by vehicular traffic. There will be little increase of pollutants from runoff of the proposed project compared with the "no build" alternative because this project includes treatment of the stormwater runoff, even runoff from the bridge decks.

6.1.3 Avoidance Alternatives

Each alternative must cross the Blackwater River and Clear Creek, and thus, must cross the floodplains associated with each body of water. The alignment was selected to bridge over the floodways at the narrowest location to minimize impacts to floodplains, particularly the natural features (wetlands avoided to the fullest extent that is practical).

Practicability of Avoidance Alternatives: Floodplains were avoided where practical, although the basis of determining bridge lengths was to provide hydraulic capacity, span wetlands, and span the regulatory floodway. Spanning the entire floodplain and associated wetlands at Blackwater River and Clear Creek would substantially increase the bridge lengths by approximately 2300 feet and 1285 feet, respectively. This is not practical, nor does it substantially reduce flood risk. The Blackwater Bridges over US



6.0 HYDROLOGY AND FLOOD ZONES

90 and I-10 are 615 feet and 3110 feet in length, respectfully, which is consistent with the proposed design for this bridge crossing the Blackwater River. The Blackwater River Bridge will be approximately 5,570 feet long. This length includes areas of avoidance for critical habitat and trail crossings. The Clear Creek Bridge at Munson Highway (CR 191) is located 1,400 feet south of the proposed bridge, and is only 160 feet in length. This is equivalent to the proposed bridge length (180 feet) at Clear Creek.

6.1.4 Floodplain Maps

Flood Insurance Rate Maps (FIRMs), prepared by the Federal Emergency Management Agency (FEMA), were utilized to determine limits of floodplains, determine base flood elevations, and investigate any special conditions required along the proposed alignments. Floodplain maps are located in Appendix A. The alternatives were analyzed to determine the location and extent of impacts to floodplains within the limits of this project (see Appendix B).

The majority of both alignments are outside the 100 year flood zone (Zone X), except in two locations: 1) Blackwater River, and 2) Clear Creek. The Blackwater River is a “Floodway Area” in Zone AE and a “Special Flood Hazard Areas Subject to Inundation by the 1% Annual Chance Flood” in Zone AE. The base flood elevation is 19 feet on the south end of the proposed Blackwater River Bridge and is 20 feet on the north end. Clear Creek is in “Special Flood Hazard Areas Subject to Inundation by the 1% Annual Change Flood” in Zone AE and has a flood plain elevation of 18 feet. Clear Creek is a tributary to Blackwater River; connecting downstream of the proposed Blackwater River Bridge.

Within the limits of the Blackwater River floodplain, the existing ground elevations are between -5.3 feet and 51.8 feet, and the proposed ground/bridge deck elevations are between 30.7 feet and 64.0 feet. The existing ground elevations within the Clear Creek floodplain are from 5.7 feet to 19.9 feet, and the proposed ground/bridge deck elevations are from 23.2 feet to 34.2 feet. Throughout the remainder of the project (in



6.0 HYDROLOGY AND FLOOD ZONES

Flood Zone X), existing ground elevations range from 10.0 feet to 179.0 feet, and the proposed roadway profile grade elevations are 19.2 feet to 179.0 feet.

6.2 Floodplain Construction Activities

The proposed construction activities within floodplains include embankment, cross drains, MSE Retaining Walls, roadbed stabilization, base, asphalt, closed drainage system with curb inlets, and concrete curb and gutter. During construction, wetlands outside of the limits of construction will be protected from impacts using standard construction Best Management Practices (BMPs). Bridge construction will occur from retaining wall to retaining wall to prevent sediment deposition within floodplains and stream systems. Subsoil excavation (removal of unsuitable soils) is not anticipated. In addition, dredging will be done upstream in “uplands” to create floodplain compensation equivalent in volume to the proposed embankment in floodplains.

6.3 Flood Risk Evaluation

The proposed roadway and bridge profile elevations for the alignments are well above the base floodplain elevations; and therefore, the proposed improvements have minimal risk of flooding. Adjacent lands have an increased risk of flooding at the upstream locations of cross drains. SR 87 is a designated “Hurricane Evacuation Route” and should remain open in the event of mandatory evacuation orders. Therefore, it is crucial that the roadway does not overtop in the 100 year flood event.

Even though detailed modeling of each potential cross drain location was not performed, there is potential for flooding upstream from each cross drain. Preliminary cross drain locations have been identified and listed in *Table 1*. Cross drains are required so that offsite runoff can bypass the proposed project. Cross drains shall be designed for peak flows and critical duration storm events. Also, the culverts shall be maintained to provide necessary capacity.



6.0 HYDROLOGY AND FLOOD ZONES

NO.	STATION	ALIGNMENT 1	ALIGNMENT 2	WETLAND CONNECTION	FLOODPLAIN CONNECTION
1	123+60	X	X		
2	146+50	X	X		
3	169+00	X	X		
4	184+00	X	X	X	X
5	195+00	X	X	X	X
6	256+00	X	X	X	
7	270+00	X	X	X	
8	291+60	X	X	X	
9	294+75	X	X		X
10	330+50	X	X	X	
11	343+00	X	X		
12	363+00	X			
13	381+00	X			
14	398+00	X			
15	420+00	X			
16	445+50	X			
17	382+00		X		
18	401+50		X		
19	415+50		X		
20	428+75		X		
21	438+00		X		
22	445+50		X		
23	461+00		X		
24	472+00		X		
25	499+00		X		
26	515+50		X		
27	526+00		X		

Table 1: Cross Drain Locations – Potential Flood Risk Upstream

6.4 “Floodplain” Statement and Summary

This project is on a new alignment with **potential** significant changes in the 100 year flood elevations.

“The construction of the drainage structure(s) proposed for this project will cause changes in flood state and flood limits. These changes will not result in any significant adverse impacts on the natural and beneficial floodplain values or any significant changes in flood risk or damage. These changes have been reviewed by the appropriate regulatory authorities who have concurred with the determination that there will be no significant



7.0 STORMWATER MANAGEMENT

impacts. There will not be significant change in the potential for interruption, or termination, of emergency service or emergency evacuation routes. Therefore, it has been determined that this encroachment is not significant.

7.0 STORMWATER MANAGEMENT

As with any Florida Department of Transportation project, this project will be designed to meet all Northwest Florida Water Management District regulations and criteria for stormwater management. The project will also comply with the FDOT's *Drainage Manual* and *Stormwater Management Facility Handbook*, and Santa Rosa County's *Land Development Code*.

7.1 Water Quality Criteria

As per the *ERP Applicant's Handbook Volume II – Part V, 5.2, 5.3*, treatment is required for the runoff from one inch of rainfall over the contributing area. The treatment volume must be recovered within 72 hours following a storm event. For direct discharges to OFW's, retain an additional 50% of the applicable treatment volume. According to 62.302.700 F.A.C., Blackwater River is an Outstanding Florida Waters, and there are no designated wild and scenic rivers within or adjacent to the project. The stormwater management facilities were preliminarily designed to include this additional 50%, even in areas that do not directly discharge to Blackwater River.

There will be wetland impacts due to the build alternatives. In addition, best management practices will be utilized to limit construction activity impacts and improve stormwater treatment. Coordination and permitting with FDEP will proceed into the design phase of this project.



8.0 CONCLUSION

8.0 CONCLUSION

In summary, the proposed project has minimal impacts to flood zones and provides improvement to water quality for the proposed roadway construction.

The Federal Emergency Management Agency (FEMA) floodplain zones were identified inside of the project area. Construction activity will take place inside flood zones X (outside the 500 year flood event), AE (Floodway Areas), and AE (Base Flood Elevations determined). Floodplain encroachments for this project are classified as “minimal”, meaning that there is floodplain involvement but the impacts on human life, transportation facilities, and natural and beneficial floodplain values are not significant and can be resolved with minimal efforts. (*PD&E Manual, Part II, Chapter 24-2.1*).

Ultimate discharge points for offsite runoff in each existing drainage basin will not be significantly modified. Backwater River surface elevations may have a slight increase in elevations at the proposed cross drains (for offsite runoff to by-pass under the proposed roadway). In addition, runoff from the proposed roadway basins will be collected and treated in retention ponds prior to discharging to natural low areas and/or wetlands. As a result, there will be minimal impacts on natural and beneficial floodplain values. There will be minimal change in flood risk, and there will be an improvement for providing emergency service or emergency evacuation routes in the project vicinity. Therefore, it has been determined that this encroachment is “minimal”.