CONSISTENCY DETERMINATION

Louisiana Coastal Use Guidelines

Draft Integrated Feasibility Report and Environmental Impact Statement for the St. Tammany Parish Louisiana, Feasibility Study St. Tammany Parishes, Louisiana

INTRODUCTION

Section 307 of the Coastal Zone Management Act of 1972, 16 U.S.C. 1451 et. seq. requires that "each federal agency conducting or supporting activities directly affecting the coastal zone shall conduct or support those activities in a manner which is, to the maximum extent practicable, consistent with approved state management programs." In accordance with Section 307, a Consistency Determination has been prepared for the Revised Draft Integrated Feasibility Report (DIFR) and Environmental Impact Statement (EIS) for the St. Tammany Parish Louisiana, Feasibility Study. (See Figure 1). Coastal Use Guidelines were written in order to implement the policies and goals of the Louisiana Coastal Resources Program and serve as a set of performance standards for evaluating projects. Compliance with the Louisiana Coastal Resources Program, and therefore, Section 307, requires compliance with applicable Coastal Use Guidelines.

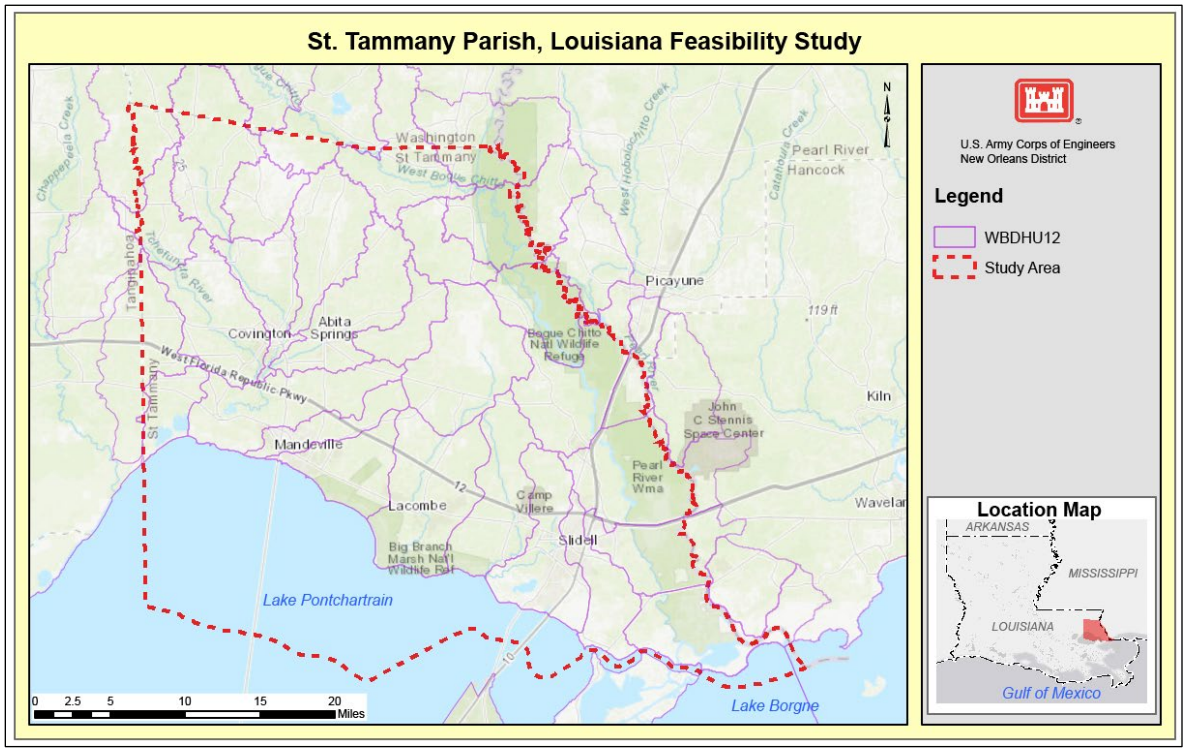

Figure 1. Location map of St. Tammany Parish, Louisiana DIFR EIS. (Source: ESRI)

PURPOSE AND NEED FOR THE PROPOSED ACTION

St. Tammany Parish has experienced repeated, widespread flooding (Figure 2) from rainfall and riverine bank overtopping, waves, and storm surge, including historic impacts during Hurricane Katrina in August of 2005 and recently with the flood of August of 2016. Hurricane Katrina damaged over 48,000 residential structures, causing $1.45 billion in damages (U.S. Department of Housing and Urban Development 2006). The flood of August of 2016, in St. Tammany Parish, caused flood impacts to approximately 900 businesses and 8,000 employees, together with impacts to transportation along both I-10 and I-12. (Louisiana Economic Development 2016), and caused major disruptions, damages, and economic impacts to the Parish. Different locations within the study area experience different flood damages since the sources of flooding vary across the Parish and drainage subbasins. Figure 3 shows repetitive loss areas, flood zones, and frequently flooded roads and also the areas that experience coastal flooding and/or riverine flooding.

Figure 2. Flooding in St. Tammany Parish. Source: St. Tammany Parish Government.

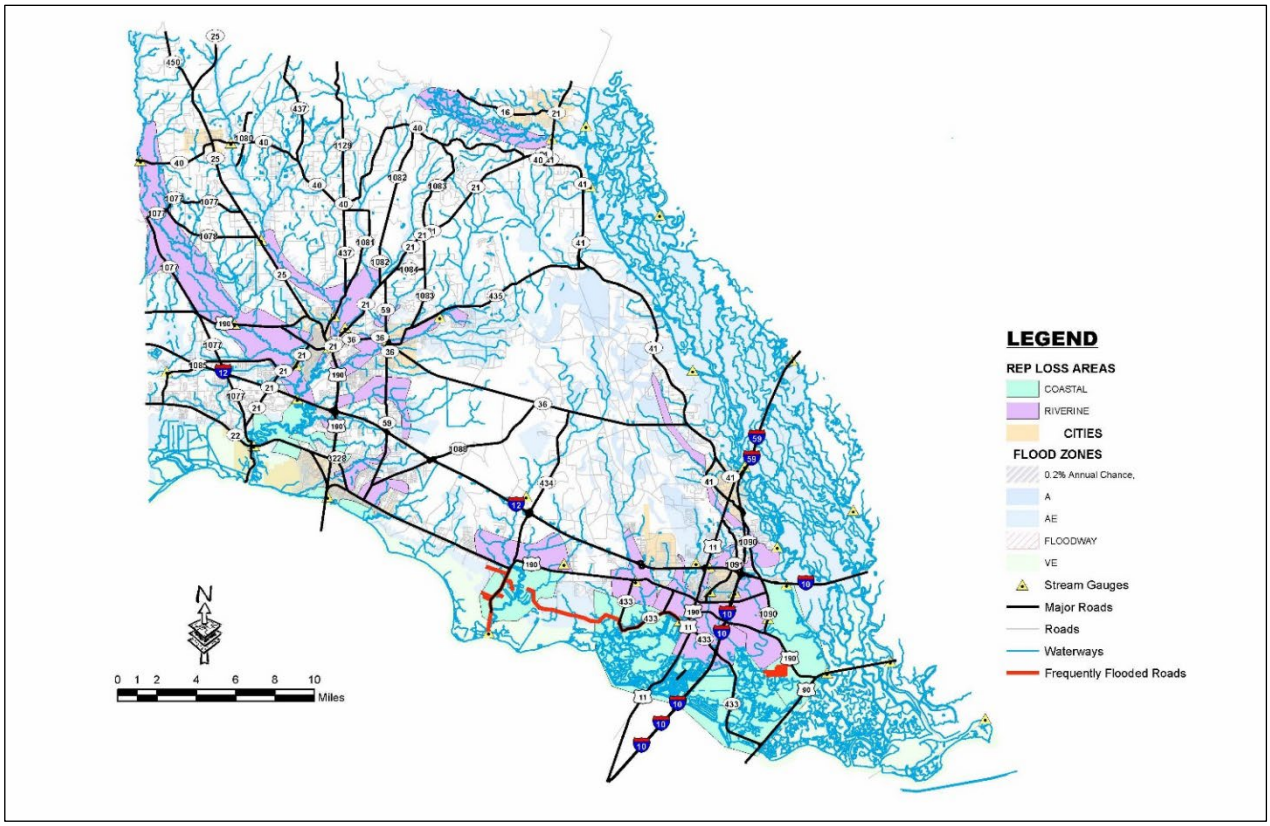

Figure 3. St. Tammany Parish- Repetitive Loss Areas, Flood Zones, and Frequently Flooded Roads (Source STPG 2020).

The headwater flooding from rainfall is intensified by tidal events, resulting in flood damages to industrial, commercial, and agricultural facilities as well as residential structures and critical evacuation routes. Additionally, tidal events can create a backwater effect that does not allow rainfall to drain from within the basin.

There is widespread public support to provide protection to an area that is prone to coastal storm damages from tidal surges, storm surges, and rainfall. Providing this protection would help to reduce the risk to human life, health, and safety by reducing flood impacts to structures, evacuation routes, and critical infrastructure.

In addition to the flooding problem, St. Tammany Parish is host to a dynamic coastal ecosystem that includes numerous state and federally protected wetland habitats, essential fish habitat, and has high fish and wildlife values. The ecosystem provides habitat for migratory birds, wildlife, finfish, shellfish, and other aquatic organisms including threatened or endangered species. See Figure 4 for a habitat map of the study area of St. Tammany Parish, Louisiana.

The overall goal of the St. Tammany Parish Feasibility Study is to reduce the severity of flood damages and risk to public health and safety, caused by heavy rainfall, riverine

flooding, tropical storms, and hurricanes. The Federal objective of water and related land resources project planning is to contribute to national economic development (NED), consistent with protecting the Nation's environment, pursuant to national environmental statutes, applicable executive orders, and other Federal planning requirements. Planning objectives represent desired positive changes to future conditions. All the objectives focus on alternatives within the St. Tammany Parish, Louisiana area and within the 50-year period of analysis from 2032 to 2082.

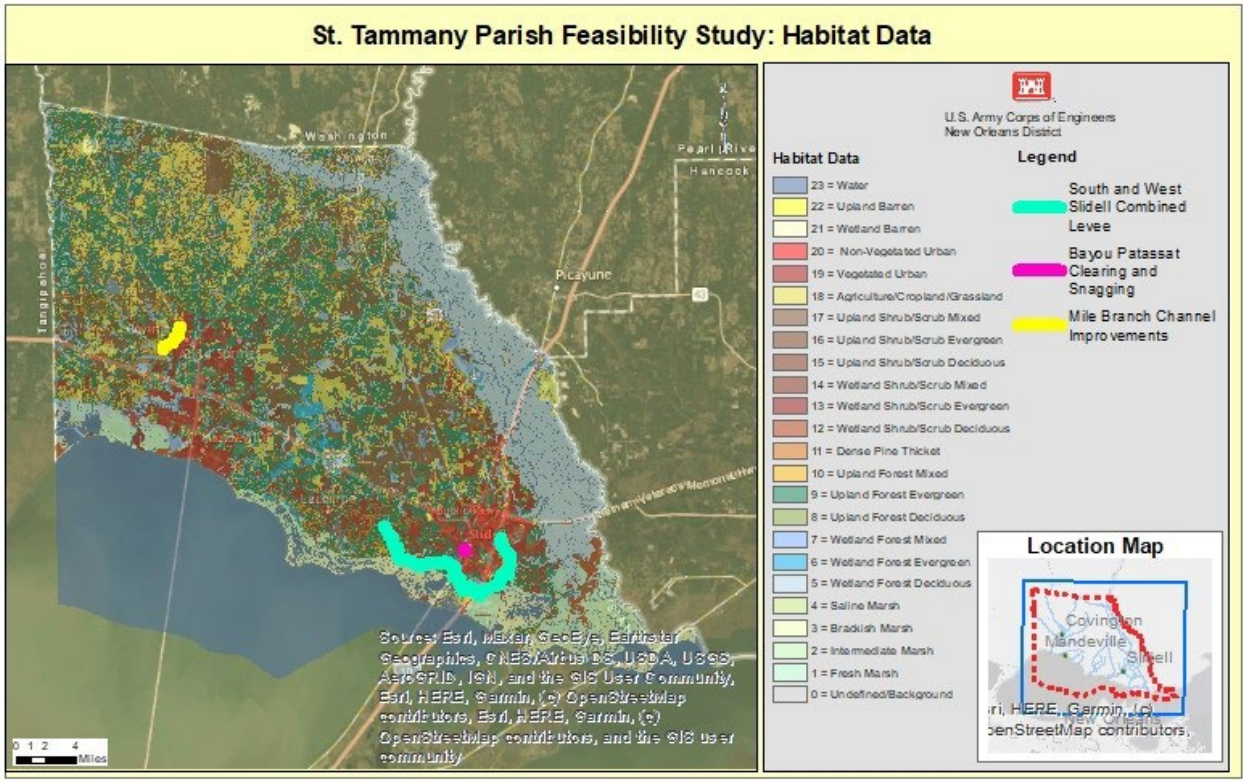

Figure 4. Structural components of the TSP Alternative and Habitat Data (Source: ESRI)

DESCRIPTION OF THE PROPOSED ACTION

The draft IFR-EIS identifying the TSP was released in June 2021 for concurrent ATR, IEPR Policy, and Public Review. Based on the feedback received and additional engineering, economic, and environmental investigations, the draft TSP underwent final feasibility level of design and was optimized and reconfirmed.

The TSP is a comprehensive plan to address flooding parish-wide, which includes structural FRM and CSRM measures and nonstructural measures that address both FRM and CSR and FRM flood risks. The Structural Plan consists of construction of a levee and floodwall system along an alignment in South and West Slidell, Louisiana, and channelization of a portion of the Mile Branch in Covington, Louisiana. The

nonstructural plan spans the entire St. Tammany Parish and consists of elevation of 5,583 structures and floodproofing of 827 structures. Figure 5 illustrates the proposed TSP and Table 1 details the proposed TSP attributes.

A summary of the final feasibility level Optimized TSP is included in this Section. The full engineering project description and assumptions for the Structural Plan are included in Appendix D: Engineering. The Nonstructural Plan is further described in Appendix F: Economics and Appendix H: Nonstructural Implementation Plan.

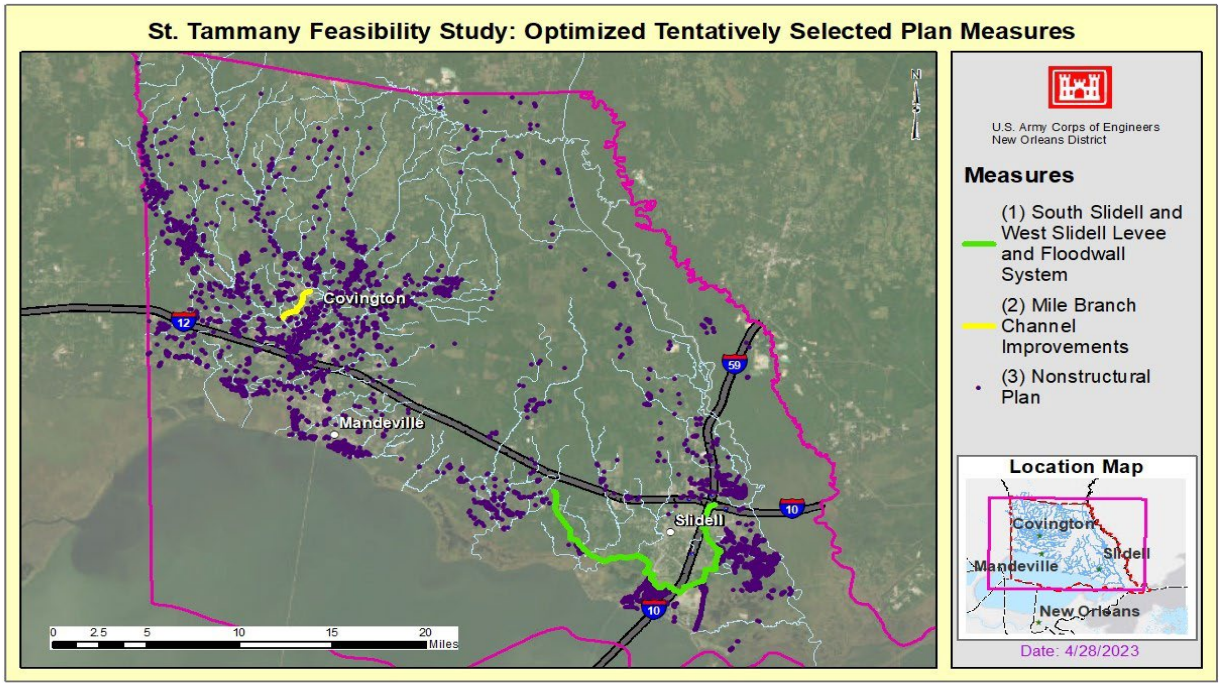

Figure 5. Optimized TSP/NED Plan

Table 1. Optimized TSP/NED Plan Attributes

Attribute	South Slidell and West Slidell Levee and Floodwall System	Mile Branch Channel Improvements	Nonstructural	Total
Total Length of alignment/ improvements	18.5 miles (97,700 feet)	2.15 miles (11,341 feet)	-	-
Length of Floodwall	3.5 miles (18,200 feet)	-	-	-
Length of earthen Levee	15 miles (79,500 feet)	-	-	-
Hydraulic Design Elevation Range (Dependent on location)	13.5 to 16 (year 2032) 17.5 to 20 (year 2082) (depending on location)	-	-	-

Pump Stations	8	-	-	-
Culverts/ Sluice Gates/ Life Gates	13	-	-	-
Number of Vehicular Floodgates	18	-	-	-
Number of Pedestrian Floodgates	1	-	-	-
Number of Railroad Gates	1	-	-	-
Number of Road Ramps	6 (includes the I-10 near Oak Harbor)	-	-	-
Number of staging areas for clearing and grubbing and mechanical dredging and for bridge replacement	-	18 (7 for bridge replacements, 10 for clear and grubbing and mechanical dredging and one that becomes a backwater area)	-	-
Number of Bridge Replacements	-	7	-	-
Fill (Borrow Material) Required	7,079,000 cubic yards (initial construction plus future lifts) 3,000,000 cubic yards for initial construction only	-	-	-
Material to be Mechanically Dredged	-	130,000 cubic yards	-	-
Temporary Acres of Construction Impacts	238 acres (3.34 net acres)	7.3 acres (2.2 acres for bridge replacements and 5.1 acres for clear and grubbing and mechanical dredging)	-	-
Permanent Construction Impacts	352 acres (224 net acres)	38.8 acres (34 acres for clear and grubbing and mechanical dredging and 4.8 acres for one staging area that becomes a backwater area)	-	-
Number of structures benefitted	20,000	250	6,410	26,600
Mitigation Costs	$39,973,512.98	$6,828,1982.82	-	$46,801,711.80
Construction Costs	$2,440,973,000	$77,002,000	$1,934,084,000	$4,452,059,000
Net Benefits	$68,415,000	$368,000	$168,300,00	$237,083,000
B/C Ratio	1.7	1.1	3.5	2.4

TSP NONSTRUCTURAL MEASURES (CSRM AND FRM) ELEVATIONS AND FLOOD PROOFING (OPTIMIZED VERSION OF ALTERNATIVE 2)

The nonstructural measures reduce flood damages without significantly altering the nature or extent of flooding. Damage reduction from nonstructural measures is accomplished by changing the use of the floodplains, or by accommodating existing uses to the flood hazard. nonstructural measures differ from structural measures in that they focus on reducing the consequence of flooding for a specific structure rather than reducing the probability of flooding in that area.

Approximately 5,583 eligible residential structures would be elevated to the future 100-year flood stage up to 13 feet, and 827 eligible nonresidential structures in would be floodproofed up to 3 feet. Eligible structures must have a first-floor elevation (FFE) at or below the 25, 50 or 100 -year storm surge floodplain (depending on location within the study area), based on hydrologic conditions predicted to occur in 2032 (the beginning of the 50-year period of analysis). The analysis and aggregation of the nonstructural plan was refined from the draft TSP which was based on the 50 year flood plan. This sub-

aggregation based on combinations of structures that had the same source of flooding and community characteristics. This included consideration of underserved communities as identified by the Justice 40 criteria. An incremental floodplain or flood frequency analysis was conducted for each of the aggregates. The results showed in Table 4-21 that 16 of the 20 aggregates were economically justified up to the 4% (25 year) AEP Floodplain, coastal Slidell was economically justified up to the 2% (50 year) AEP Floodplain and coastal Lacombe, coastal Mandeville, and coastal Madisonville were economically justified up to the 1% (100 year) floodplain. A depiction of the structures included in the nonstructural plan are included in Figure 6-2.

Additionally, 827eligible nonresidential structures in would be floodproofed up to 3 feet. Dry floodproofing consists of sealing all areas of a structure up to a maximum of approximately 3 feet above ground level to reduce damage caused by coastal storm surge inundation by making walls, doors, windows and other openings resistant to penetration by water. Walls are coated with sealants, waterproofing compounds, or plastic sheeting. Back-flow from water and sewer lines is prevented by installing mechanisms such as drain plugs, standpipes, grinder pumps, and back-up valves. Openings, such as doors, windows, sewer lines, and vents, may also be closed temporarily with sandbags or removable closures, or permanently sealed.

The floodproofing of eligible nonresidential structures would protect structures that are not included in the areas benefitted from the structural measures of the TSP. To be considered preliminarily eligible for participation, a structure must meet the following criteria:

1. Have a first-floor elevation (FFE) at or below the 25, 50 or 100-year storm surge floodplain (floodplain requirements vary depending on structure location), based on hydrologic conditions predicted to occur in 2032 (the beginning of the 50-year period of analysis)
2. Structure must be outside of the area of influence of the structural features recommended in the TSP and not receiving flood risk reduction benefits from the structural features (i.e. outside of the area of influence of the West Slidell, South Slidell Levees, and Mile Branch Channel Improvements).

The nonstructural elevations and floodproofing are voluntary, property owners who have preliminarily eligible structures that wish to participate in the flood proofing measures would be required tosubmit an application and provide a right-of- entry for their structure to undergo site assessment, appraisal, and other inspections and evaluations to determine the final eligibility of the structure.

Further detail on the sub aggregation can be found in Section 4.4.1.4, t, Appendix F: Economics and Appendix H: Nonstructural Implementation Plan. Once the study is complete, detailed plans and specifications for implementing nonstructural measures would be developed as part of the PED phase. The PED phase occurs after Congress authorizes the recommended plan into law and appropriates funds for construction of the

recommended plan. In concert with structural measures, nonstructural measures would be a key component to reducing long term FRM and CSRM to the study area.

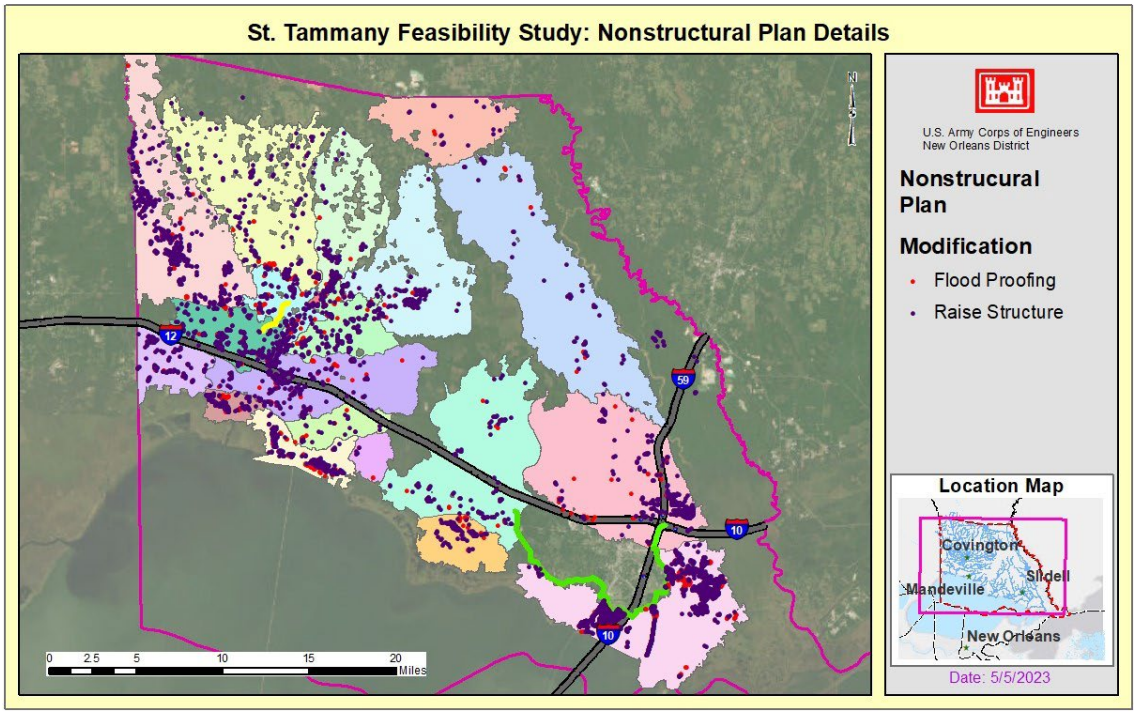

*Figure 6. Nonstructural Plan **Refer to Figure 4-18 for name of subaggregates identified*

TSP CRSM MEASURE-SOUTH SLIDELL AND WEST LEVEE AND FLOODWALL SYSTEM (OPTIMIZED VERSION OF ALTERNATIVE 6C)

The structural plan consists of construction of a levee and floodwall system along an alignment in South and West Slidell and channelization of a portion of the Mile Branch in Covington.

Mile Branch Channel Improvement: This measure consists of channel improvements on the lower 2.15 miles (11,341 ft channel) of Mile Branch in Covington, Louisiana.

The proposed work would consist of approximately 21 acres of channel that would be cleared and grubbed prior to mechanical dredging.

The mechanical dredging would consist of a maximum of 130,000 cubic yards of fill dredged from the channel. For the channel improvements, approximately 38.8 acres of permanent ROW would be needed. This area would include 25 ft on each side of the Mile Branch channel. Included in the 38.8 acres, there would be 4.8 acres for a staging area that would become a backwater area after construction is complete.

For the channel improvements, approximately 5.1 acres temporary ROW would be needed.

There are no surveys available for this area for this study, and no surveys will be conducted during the study phase. The existing elevations used for the hydraulic analysis and design of the Optimized TSP were obtained from the LIDAR raster dataset. Designs are based on existing information gathered from reports provided by the non-Federal sponsors as shown on Table 1.2 in the main report.

Design refinements would occur during PED based on field data collections. For example, future surveys would determine the final channel section and bridge replacements. Based on data collected, the design would be refined to minimize impacts to aquatic and riparian habitat and real estate. Riparian Zone bioengineering techniques and nature-based-solutions (NBS) would be incorporated as appropriate during PED in coordination with the NFS and resource agencies. One of the staging areas would become a backwater area after construction activities are completed. The conceptual backwater area has been proposed by MVN Environmental for Mile Branch. This concept would have to be further developed during PED. MVN Engineering has not performed any design of this concept during the study phase.

Mile Branch improvements would include seven (7) bridge replacements. Approximately 2.2 acres would be required as temporary ROW for staging along the various areas of the bridge replacements.

Table 2 lists the Mile Branch attributes of the TSP for the 50-year period of analysis.

Table 2 Summary of TSP for Mile Branch

Attribute	**Mile Branch Channel Improvements**
Total Length of improvements	2.15 miles (11,341 ft)
Material to be Mechanically Dredged	130,000 cubic yards
New Access Roads for both clearing and for bridge replacement	0 acres
Number of staging areas for clearing and grubbing and mechanical dredging and for bridge replacement	18 (7 for bridge replacements, 10 for clear and grubbing and mechanical dredging and one that becomes a backwater area)
Number of Bridge Replacements	7
Temporary ROW	7.3 acres (2.2 acres for bridge replacements and 5.1 acres for clear and grubbing and mechanical dredging)
Permanent ROW	38.8 acres (34 acres for clear and grubbing and mechanical dredging and 4.8 acres for one staging area that becomes a backwater area)

South and West Slidell Levee and Floodwall Alignment: The levee and floodwall system would consist of a total of approximately 18.5 miles (97,700 ft) of earthen levee and floodwall which includes approximately 15 miles (79,500 ft) of levees constructed in separate (non-continuous) segments, and 3.5 miles (18,200 ft) of separate (non-

continuous) segments of a floodwall. Construction of the levee alignment would impact approximately 521 acres of permanent ROW and it would require approximately 7,239,000 cubic yards of fill, including fill material required for future levee lifts (estimates include a 30 percent contingency). Table 3 provides a summary of the attributes of the South and West Slidell Levee and Floodwall System. Table 4 is a summary of the levee quantities required for the initial construction.

Table 3 Summary of South Slidell and West Slidell Levee and Floodwall System

Attribute	**South Slidell and West Slidell Levee and Floodwall System**
Total Length of alignment	18.5 miles (97,700 ft)
Length of Floodwall	3.5 miles (18,200 ft)
Length of earthen Levee	15 miles (79,500 ft)
Temporary Acres of Construction for Levee and Floodwall system	102 acres
Permanent Acres for Levee and Floodwall system	483 acres
Hydraulic Design Elevation Range (Dependent on location)	13.5 to 16 (year 2032) 17.5 to 20 (year 2082)
Pump Stations	8
Sluice Gates/Lift Gates	13
Number of Vehicular Floodgates	18
Number of Pedestrian Floodgates	1
Number of Railroad Gates	1
Number of Road Ramps	6 (includes the I-10 near Oak Harbor)
Fill (Borrow Material) Required	7,239,000 cubic yards

The existing elevations utilized were obtained from the LIDAR raster dataset. No survey data was obtained at this stage of the study; therefore, a 30% contingency was used for the calculation of the borrow quantities for the South Slidell and West Slidell levee alignment.

Table 4 Summary: TSP Levee Quantities for Initial Construction

Levee Alignment ROW and Levee Quantities Initial Construction (Year 2032)	
WEST SLIDELL	
Permanent ROW	240 acres
Fill Material (includes 30% contingency)	2,007,000 cubic yards
SOUTH SLIDELL	
Permanent ROW	120 acres
Fill Material (includes 30 %contingency)	953,000 cubic yards**
TOTAL	
Permanent ROW	360 acres
Fill Material (includes 30 % contingency)	3,000,000 cubic yards

**includes quantities for I-10 portion of the alignment and the berm on the north end of the South Slidell alignment.

Levee lifts would be required over the 50-yr period of analysis. The levee lift schedule would follow the hydraulic design elevation requirements and thus were divided into 3 geotechnical reaches: Oak Harbor South; I-10 Crossing and Slidell East/Northeast as

illustrated in Table 5. The fourth lift (final lift for the 50-year period of analysis), projected to occur in year 2076 would elevate the levee to a construction elevation of 19 ft (Table 6). It is during the scheduled 4th lift that construction of the Western High Ground Tie-in would be necessary for year 2082. The fill quantities listed for the 4th lift, include quantities for the construction of the Western High Ground Tie-In.

Table 5. TSP Levee Quantities for Future Levee Lifts

	Construction Lift (year)	**Construction Elevation (ft)**	**Permanent ROW (acres)**	**Fill Material (+30% contingency; cubic yards)**
WEST SLIDELL				
First lift	2033	16	N/A	771,000
Second lift	2038	17.5	N/A	901,000
Third lift	2051	19	N/A	685,000
Fourth lift	2076	19	30 *	711,000 *
SOUTH SLIDELL				
Oak Harbor South				
First Lift	2035	17	N/A	106,000
Second Lift	2048	18	N/A	120,000
Third Lift	2064	19	N/A	115,000
I-10 Crossing**				
Slidell East / Northeast				
First Lift	2034	19	N/A	271,000
Second Lift	2047	20.5	N/A	295,000
Third Lift	2064	21.5	N/A	264,000
Total For Future Lifts				
			30	**4,239,000**

***** Includes the levee quantities (192,000 cubic yards) for the Western High Ground Tie-in for Year 2082.
** I-10 Crossing features would be constructed to the 2082 elevation and therefore would not require additional lifts.

Table 6. Summary of Levee Material Quantities for the 50-Year Life of the Project

Levee	**Permanent ROW (acres)**	**Fill Material (+30% contingency; cubic yards)**
Initial Construction	360	3,000,000
Future Lifts	30	4,239,000
Total for Life of the Project	**390**	**7,239,000**

LEVEE AND FLOODWALL SYSTEM DESCRIPTION

The levee and floodwall system consists of a combination of portions of the West Slidell levee alignment and the South Slidell levee alignment. The two alignments would be

connected by a new railroad gate across the existing Norfolk Southern Railway Corporation railroad tracks. The alignment is shown in lime green in Figure 7.

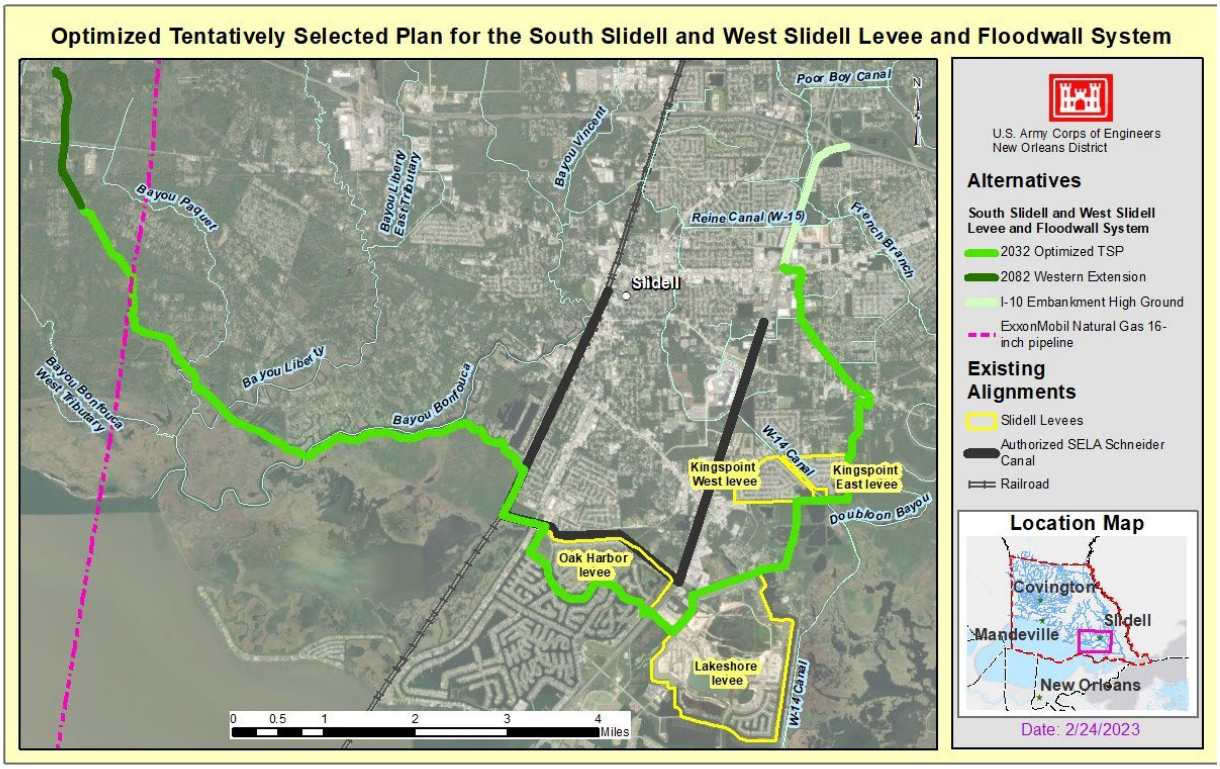

Figure 7. Optimized TSP for the West Slidell and the South Slidell Levee and Floodwall System

LEVEE AND FLOODWALL ALIGNMENT AND STRUCTURES

This section describes the alignment starting on the northwest end and continuing east. All structural components would be constructed during initial construction.

WESTERN HIGH GROUND TIE-IN FOR YEAR 2082

Western Terminus: After initial construction, the western terminus of the levee and floodwall system would be extended north to account for future conditions (Year 2082) using the relative sea level change and subsidence. Updated modeling results, which included the intermediate scenario of sea level rise and subsidence, indicated a higher tie-in elevation would be needed through the period of analysis to continue to provide a 1% risk reduction.

To plan for the conditions expected throughout the 50-year period of analysis, the intermediate scenario of relative sea level change between years 2032 and 2082 was used to develop the 2082 hydraulic design elevations. Based on this information, an

alignment extension with additional length of levee and additional structures was developed that would adapt the project while maintaining a 1% risk reduction.

The Western High Ground Tie-in for Year 2082 is shown in dark green in Figures 8 and 9. Based on modeling, the western extension would not be necessary until the year 2076 when the risk reduction would be needed. It is anticipated that this levee segment would be constructed during the fourth levee lift of the West Slidell alignment.

The alignment would commence north of US Highway 190 in the neighborhood near the intersection of North Tranquility Road and Shannon Drive between two properties. The alignment would be a berm with hydraulic design elevation of 17.5 ft for year 2082. The alignment would switch to levee (hydraulic design elevation of 17.5 ft (Year 2082)) and would continue south on the edge of the properties and cross US Highway 190, the Tammany Trace Bike Trail and South Tranquility Road on the eastern side of Pineridge Road. The alignment would run south southeast an additional 890 ft past the intersection with South Tranquility Road and tie with the existing year 2032 alignment for West Slidell.

WEST SLIDELL ALIGNMENT

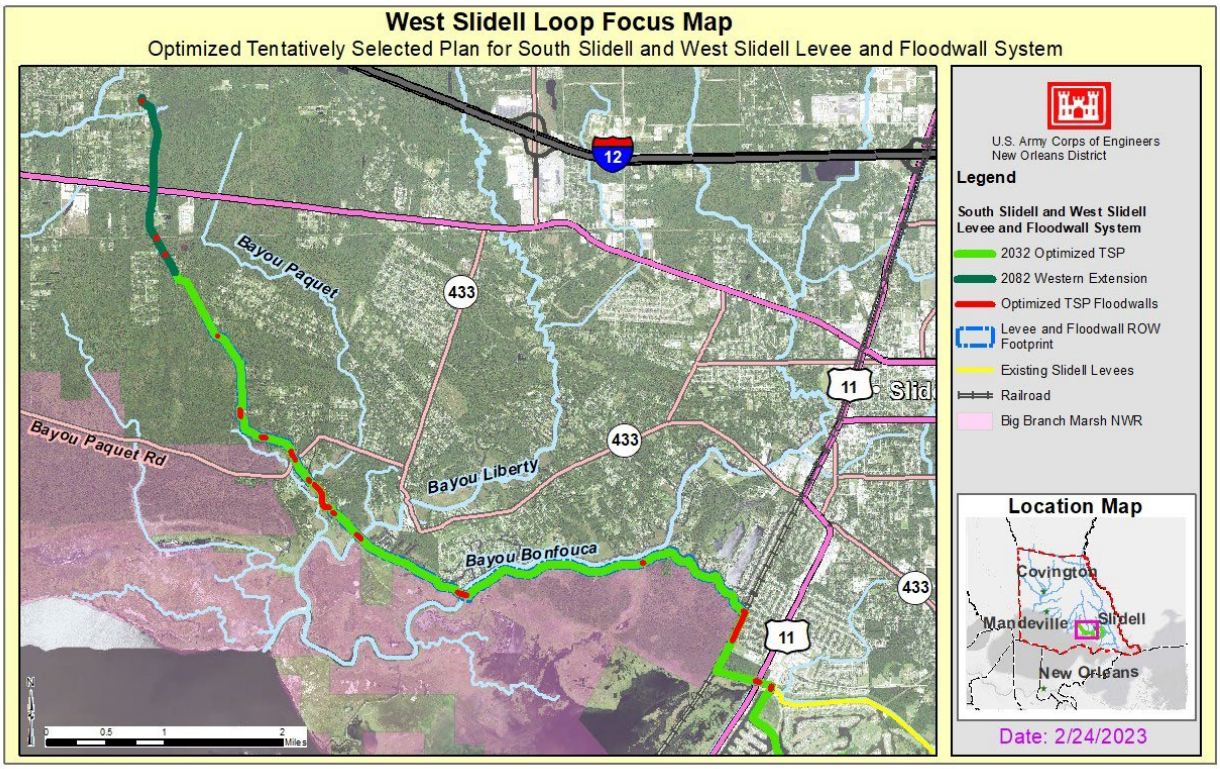

Figure 8. West Slidell Levee and Floodwall System- Optimized Tentatively Selected Plan Focus with Floodwall Segments

West Slidell Levee Segment: Levee construction would commence on the south side of US Highway 190 and South Tranquility Road, and on the eastern side of Pineridge Road. For the West Slidell portion of the alignment, the levee segments would have a hydraulic design elevation of 13.5 ft (Year 2032).

The alignment would run southward and would run on the west side of Tranquility Road (CC Road) and then it would turn in the southeast direction crossing Bayou Paquet Road and would stay on the east side of Bayou Paquet Channel to avoid impact to the Big Branch Marsh National Wildlife Refuge (NWR). The alignment would cross Bayou Paquet and Bayou Liberty and would continue eastward on the northside of the Big Branch Marsh NWR. The alignment would cross Bayou Bonfouca and would continue on the south bank of the bayou (northern side of the refuge) until reaching the Norfolk Southern Railway Corp. railroad tracks west of US Highway 11 in the vicinity of Dellwood Pump Station in Slidell.

SOUTH SLIDELL ALIGNMENT

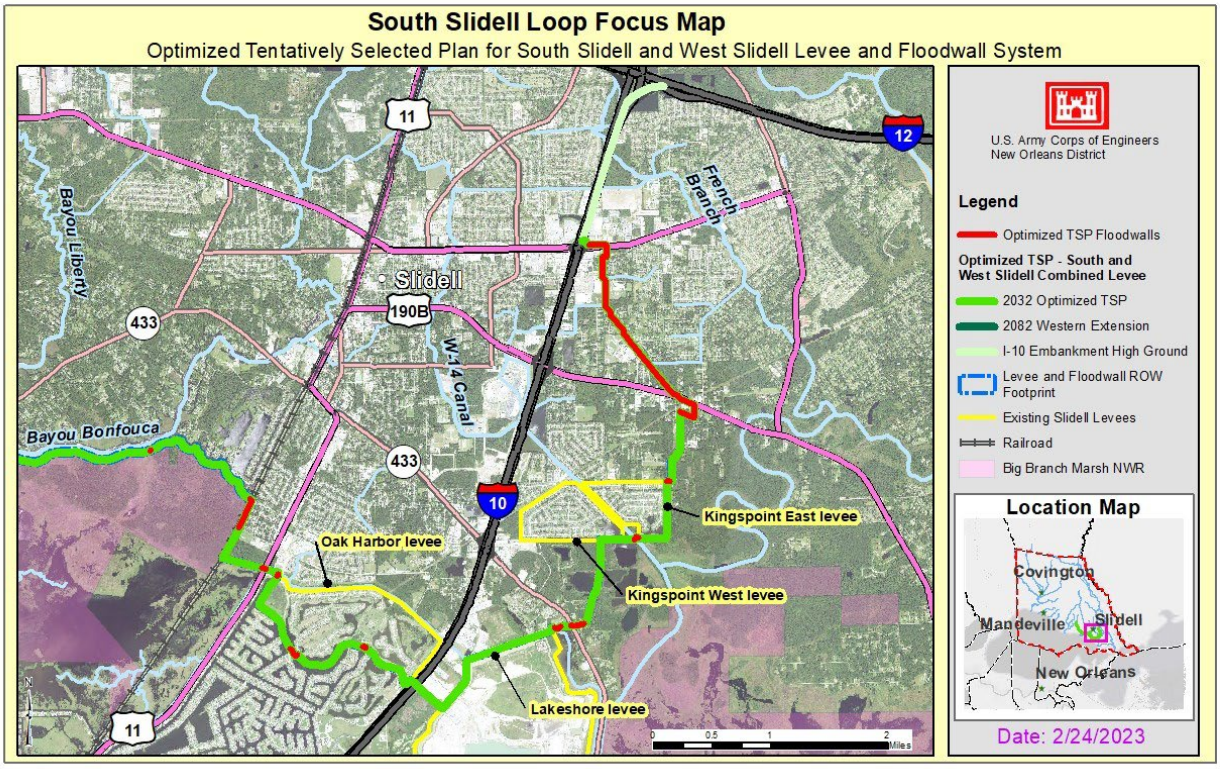

Figure 9. South Slidell Levee and Floodwall System- Optimized Tentatively Selected Plan Focus

South Slidell Levee Segment: The levee and floodwall system alignment from West Slidell would continue to South Slidell. From the railroad gate connecting West Slidell with South Slidell, the alignment would transition to a floodwall running parallel along the east side of the railroad tracks. The floodwall by the railroad tracks would have a hydraulic design elevation of 16.5 ft for year 2082.

The alignment would transition to levee when it turned east toward Highway 11. The alignment would cross Highway 11 and would turn south in the vicinity of the existing Schneider Canal Pump Station and then turn east (on a portion of the existing Oak Harbor ring levee). The alignment would run on the south side of Oak Harbor Boulevard and would cross to the north side immediately past Mariners Cove Boulevard. The levee along the south side of the Oak Harbor would have a hydraulic design elevation of 14 ft for year 2032.

The alignment would run on a portion of the existing Oak Harbor ring levee. The alignment would turn north and then east in the vicinity of the I-10. The I-10 would be raised to ramp over the new levee section (hydraulic design elevation of 18.5 ft for year 2082).

The alignment would continue southeast and would tie to an existing portion of the Lakeshore Estates ring levee. The alignment then would turn north and then east and cross Old Spanish Trail/Highway 433. The alignment would continue north and tie to a portion of the existing King's Point west levee. The section of levee would have a hydraulic design elevation of 16 ft for year 2032.

The alignment would cross the W-14 Canal and would tie to a portion of the existing King's Point east levee and would turn north. The levee would have a hydraulic design elevation of 16 ft for year 2032. The levee would turn east and then north. Immediately south of Highway 190 Business the alignment would turn from levee to floodwall to provide risk reduction to the existing Hardin Road power substation. The floodwall would have a hydraulic design elevation of 18.5 ft for year 2082.

The alignment (floodwall) would cross Highway 190 Business and continue northwest on the west side of the existing CLECO Corporate Holdings, LLC utility corridor. The alignment would cross South Holiday Drive and continue north. The alignment would turn east on Manzella Drive and turn north in the middle of the block between Yaupon Drive and Malbrough Drive.

The alignment (floodwall) would cross Gause Boulevard and would turn west (hydraulic design elevation for floodwall of 18.5 ft for year 2082). There would be a vehicular gate across Gause Boulevard, a vehicular gate for access to a private road, and a vehicular gate for the I-10 Service Road. The floodwall would transition to a berm that would tie-in to the I-10 embankment. There would be a ramp for the on-ramp for the I-10 eastbound at Gause Boulevard.

For the berm, it was assumed a hydraulic design elevation of 16 ft for year 2032 and 19.5 ft for year 2082. The berm was assumed to be 1V:3H. This area of the alignment

would be further developed during PED. The drainage on the grass area where the ramp merges to the I-10 would need to be reworked during PED.

The existing highway embankment would serve as the means of risk reduction in order for the project to form a continuous system up to the elevation required in 2082. There would be floodgates at Reine Canal and French Branch. Refer to light green portion of the alignment in Figure 2-1.

CLECO Corporate Holdings, LLC has right-of-way use requirements pertaining to USACE work around their existing utility lines on the northeast corner of the floodwall alignment that would have to be met to provide clearance for construction activities (i.e., pile driving).

INTERSTATE 10 ELEVATION

The I-10 road surface would be raised to construction elevation 22.0 ft to ramp over the new levee section to stay above the hydraulic design elevation for year 2082, to ensure the entire pavement section remains above the hydraulic design elevation across the interstate. The hydraulic design elevation at this location for year 2082 is 18.5 ft. The pavement section was assumed to have a thickness of 2.5 ft.

The existing elevation of the I-10 at the proposed location is approximately 12.8 ft as per LIDAR raster dataset. This proposed location is the highest elevation of the I-10 in the vicinity of the proposed alignment. The I-10 elevation is lower (approximately 10 ft) on the adjacent areas.

The levee and the Interstate 10 would be lifted during initial construction in year 2032 to construction elevation of 21.5 ft to avoid future disruptions to the traffic on the interstate.

TYPICAL SECTION AND ELEVATIONS

WEST SLIDELL LEVEE DIMENSIONS AND QUANTITIES

The dimensions for the new West Slidell levee may be found in Table 7 and Figure 10.

Geotextile would be placed for West Slidell during initial construction under the levee. Geotextile would be placed 70 ft from the centerline of the levee on the floodside and 40 ft from the centerline of the levee on the land side for a total of 110 ft.

Table 7. West Slidell Levee

West Slidell Levee Initial Construction	
Levee Crown Width	10 ft
Side Slopes of Levee	1V:3H
Floodside Berm Slope	1V:42H
Landside Berm Slope	1V:33H
Construction Elevation	14.5 ft
Geotextile	13,200 lbs/ft

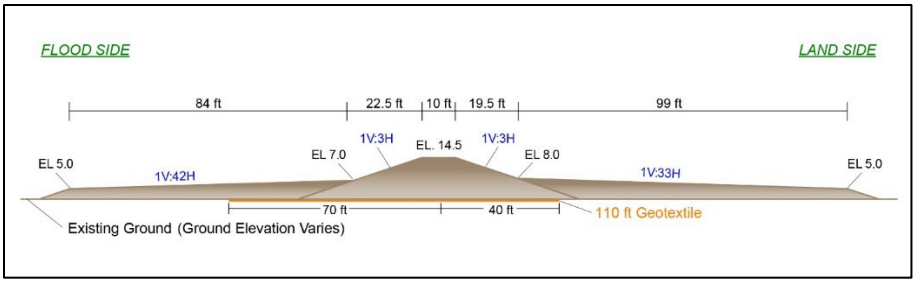

Figure 10. Typical Cross-Section with Berms for West Slidell

The hydraulic design elevations of the new West Slidell levee would be 13.5 ft (year 2032) and the 17.5 ft (year 2082). Right of way for the levee was assumed to be 300 ft wide.

SOUTH SLIDELL DIMENSIONS QUANTITIES

The dimensions for the new South Slidell levee may be found in Table 7 and Figure 11. The construction elevation for the first lift would vary depending on location. This portion of the alignment would not have berms or geotextile.

Table 7. South Slidell Levee

South Slidell Levee Initial Construction	
Levee Crown Width	10 ft
Side Slopes of Levee	1V:3H
Construction Elevation	Varies

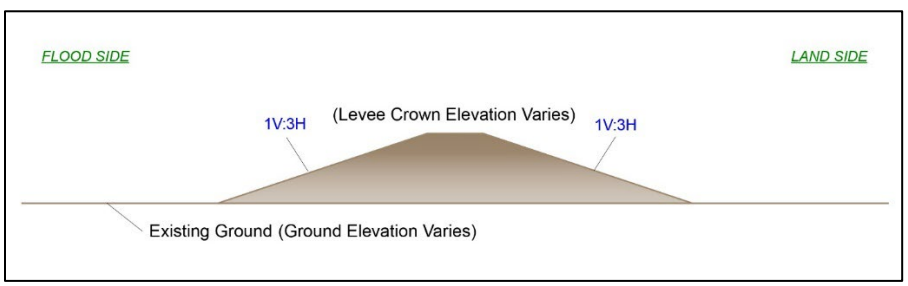

Figure 11. Typical Cross-section for South Slidell

The hydraulic design elevation of the new South Slidell levee would vary between 14 ft and 16 ft (year 2032).

FUTURE LEVEE LIFTS

To maintain the levee crown at or above the base year (2032) and future year (2082) design elevations while accounting for levee settlement and relative sea level rise, levees would be constructed in multiple lifts over the 50-year period of analysis. Both the design elevations and constructed "top of levee" elevations vary by location. Design

elevations vary by levee location because of surge and wave differences due to storm path, wind speeds and direction, etc.

Levee lift schedules were developed to provide an estimate for potential future fill quantities needed to stay above a changing hydraulic grade elevation. Settlement durations and years of lifts are likely to change given future condition changes and could be shifted around for constructability purposes. Schedules could change with the acquisition of site surveys and thorough geotechnical explorations. Soil conditions would change in the future after added stress to the soil following future construction activities. Typically, the need for levee lifts is reevaluated several times throughout the lifetime of a project.

Levee portions of the Optimized TSP would require future lifts to bring the levees to hydraulic design elevations for year 2082.

For West Slidell, four future levee lifts are projected to be needed. The assumed cross-section for these lifts would have a 10 ft wide levee crown and side slopes of 1V:3H. Existing berm sections from initial construction would be in place on both sides of the levee.

For the first lift (Year 2033) and the second lift (Year 2038), it was assumed that in addition to elevating the levee, the berm previously built during initial construction would settle 25 percent. Additional material would be placed on the berms during these two lifts.

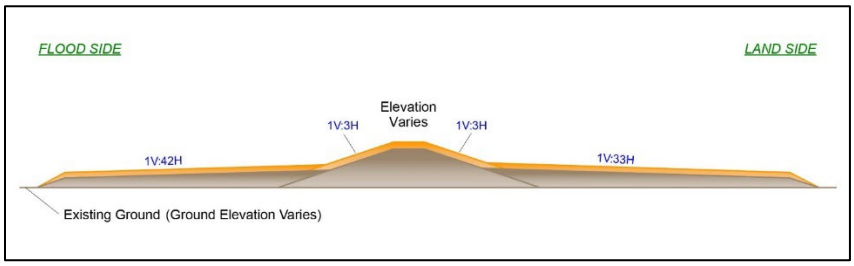

Figure 12. Typical Cross-section with Berms for First and Second Lifts for West Slidell

For the third lift (Year 2051) and the fourth lift (Year 2076), it was assumed that no additional material would be placed on the berms.

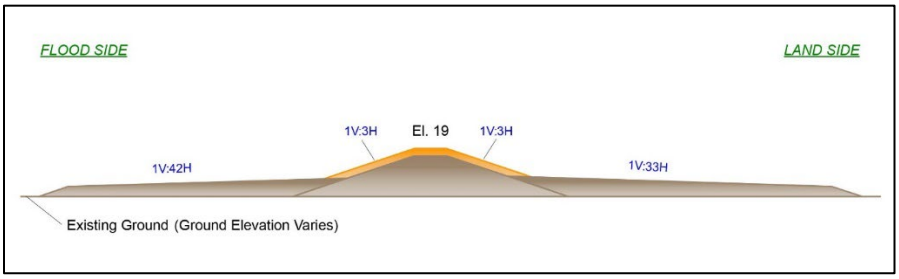

Figure 13. Typical Cross-section with Berms for Third and Fourth Lifts for West Slidell

WESTERN HIGH GROUND TIE-IN LEVEE CONSTRUCTION

The construction of the Western High Ground Tie-In would be performed during the fourth lift for West Slidell which is projected for year 2076. The dimensions for the Western High Ground Tie-In may be found in Table 8 and Figure 14. This portion of the alignment would not have berms or geotextile.

Table 8. Western High Ground Tie-In Levee

Western High Ground Tie-In	
Levee Crown Width	10 ft
Side Slopes of Levee	1V:3H
Construction Elevation	19 ft

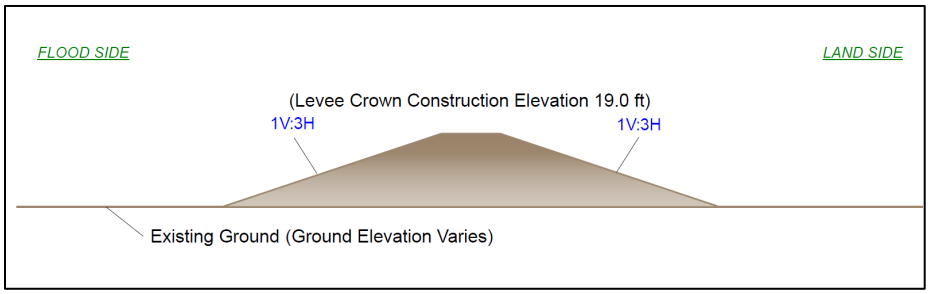

Figure 14. Typical Cross-section for the Western High Ground Tie-in for Year 2082

The lift schedules for West Slidell consisted of one geotechnical reach as shown in Figure 14. The hydraulic design elevation is 13.5 ft for year 2032 and 17.5 ft for year 2082 are shown in the design line in blue. The red lines represent the projected lifts.

SOUTH SLIDELL LEVEE TYPICAL CROSS SECTION FOR FUTURE LIFTS

The future lifts for South Slidell levee would have a 10 ft wide levee crown and side slopes of 1V:3H.

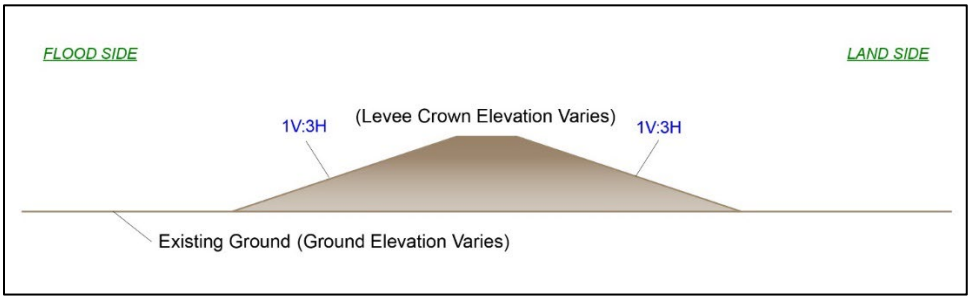

Figure 15. Typical Cross-section for South Slidell for Future Lifts

TYPICAL FLOODWALL SECTION AND ELEVATIONS

The T-wall sections would vary based on location. Table 9 lists the floodwall segment and the various dimensions for each floodwall segment.

Table 9. Floodwall Segment Dimensions

Description of Floodwall Segment	Length of Floodwall Segment (ft)	Base of Slab BOS (ft)	Base of Wall BOW (ft)	Top of Wall TOW (ft)	Stem Height (ft)	Wall Thick (ft)	Slab Width (ft)	Number of piles per row
Western High Ground Tie-in for Year 2082								
N/A								
West Slidell								
Properties at the end of West Doucette	350	1.5	4.5	17.5	**13**	2	15	3
North Side Bayou Paquet Dr.	250	-1.5	1.5	16.5	**15**	2.5	20	4
Bayou Paquet/Mayer Dr.	1400	-1.5	1.5	16	**14.5**	2.5	20	4
South Slidell								
Front Street/ Railroad	1375	-0.5	2.5	16.5	**14**	2.5	20	4
Mariner's Cove Boulevard	500	7.5	10.5	16.5	**6**	1.5	10	2
Oak Harbor Country Club	160	8.5	11.5	16.5	**5**	1.5	10	2
Old Spanish Trail	300	-2.5	0.5	18.5	**18**	2.5	20	4
Esprit du Lac Street	450	1	4	18.5	**14.5**	2.5	20	4
Substation Floodwall	1950	4.5	7.5	18.5	**11**	2	15	3
Highway 190 Business	430	5	8	18.5	**10.5**	2	15	3
Utility Corridor	3530	5	8	18.5	**10.5**	2	15	3
Hollywood Dr. to Yaupon	3700	9	12	18.5	**6.5**	1.5	10	2
Manzella Dr. to Gause	650	10.5	13.5	18.5	**5**	1.5	10	2
Gause Boulevard to I-10	635	13	16	18.5	**2.5**	1.5	10	2

CONCRETE AND PILE QUANTITIES FOR FLOODWALL SEGMENTS

The floodwall segments would require the following concrete and pile quantities during initial construction as shown on Table 10 and Table 11.

Table 10: Concrete Quantities for Floodwall Segments

CONCRETE FLOODWALL SEGMENTS	
Total Concrete Quantities	37,100 cubic yards
Total Sheetpile Quantities	470,400 square ft
Total Slope Paving for floodwall/levees tie-ins	7,300 square ft

Table 11: Pile Quantities for Floodwall Segments

PILES FOR FLOODWALL SEGMENTS	
Type of pile	18-inch pipe
Configuration	1H:2V battered
Length of each pile	101 ft
Total Length of Piles	912,500 linear ft

FLOODGATES DESIGN INFORMATION

The Optimized TSP would include a total of 13 gates. Three (3) gates would be lift gates and one gate would be a sector gate. These gates would allow navigation of recreational vessels. There are nine (9) sluice gates which would be control structures (non-navigable).

During construction of the gated structures, temporary bypass channels would be constructed for recreational vessels in Bayous Paquet, Bonfouca, and Liberty.

Table 13: Floodgate Dimensions

Description of the Floodgate	Type of Gate	Width of Opening of the Gate (ft)	Ground/ Sill Elevation (ft)	Structural Height of Drainage Gate (ft)
Western High Ground Tie-in for Year 2082				
Sluice gate near Shannon Drive	Sluice	4	15.5	2.0
Tammany Trace Sluice Gate	Sluice	15	12	5.5
West Slidell				
Sluice Gate # 7 (Near CC Road)	Sluice	25	8.6	8.9
Sluice Gate # 6 (Bayou Paquet North Tributary)	Sluice	75	0.8	15.2
Bayou Paquet Gate Nav. Gate	Lift	90	-0.5	16.5
Bayou Liberty Nav. Gate	Lift	80	-6.8	22.8
Bayou Bonfouca Nav. Gate	Lift	110	-9	25.0

Sluice Gate # 2 (Bayou Bonfouca Sluice Gate)	Sluice	50	0.4	15.6
South Slidell				
W-14 Canal Nav. Gate	Sector	90	0.1	18.4
Sluice Gate # 8 (Kings Point East)	Sluice	90	4.4	14.1
Sluice Gate # 10 (Near Eastern Terminus)	Sluice	20	10.5	8.0
Reine Canal	Sluice	30	7.5	11.0
French Branch at I-10	Sluice	25	8.3	10.2

The floodgate locations and minimum sizes above (Table 13) are an estimate. A detailed interior drainage design would be provided during PED.

Limited information and estimates of channel depths and widths has been considered in estimates of the minimum gated opening dimensions. An increase in the size of the gated openings would likely benefit environmental conditions and would provide additional flood flow conveyance. Any channel constriction such as a gate has the potential to locally increase velocities, which could erode natural channels.

It is assumed that most of these floodgate locations would need to retain some flood conveyance capacity during construction. During PED, bypass channels would be considered as part of the design.

Temporary Bypass Channel

Temporary bypass channels would be constructed at locations where a pump station or floodgate is proposed within the limits of a channel. The temporary bypass channel would route water around the structure in order for the construction to be done in dewatered conditions.

In order to maintain pre-construction flow conditions and minimize environmental impacts during construction, the temporary bypass channels would be similarly sized to the channels being impacted. After construction, the bypass channel is assumed to be included in the footprint of the structure site and the channel flow would be rerouted through the new structure feature. Navigation of common local vessels would be considered for the bypass channels, and design features of a navigable bypass channel would be developed during PED.

Temporary Retaining Structures (TRS)

Temporary Retaining Structures (cofferdams) are temporary features that facilitate the construction of major structures. Cofferdams allow water or other materials to be removed inside the TRS in order to work in an excavated and/or dewatered condition.

Cofferdams would be required during the construction of the pump stations and floodgates. Qualified designers employed or sub-contracted by the construction contractors would design the TRS for this project.

TYPES OF FLOODGATES

FISH-FRIENDLY LIFT GATE

For Bayou Paquet, Bayou Bonfouca and Bayou Liberty, the proposed navigable gates would be designed to have a small amount of restriction and a gradual slope so that fish and larvae may traverse the structures (Figure 16). The navigable gates would consist of a lift gate which would be raised during open mode to let water and recreational vessels traverse. This design would include smaller sluice gates on both sides of the lift gate to simulate the natural opening of the bayous.

During PED, the PDT would consider additional fish-friendly studies and input provided by the NFS, USFWS and National Marine Fisheries Service criteria, including the rock arch and rock ramp designs.

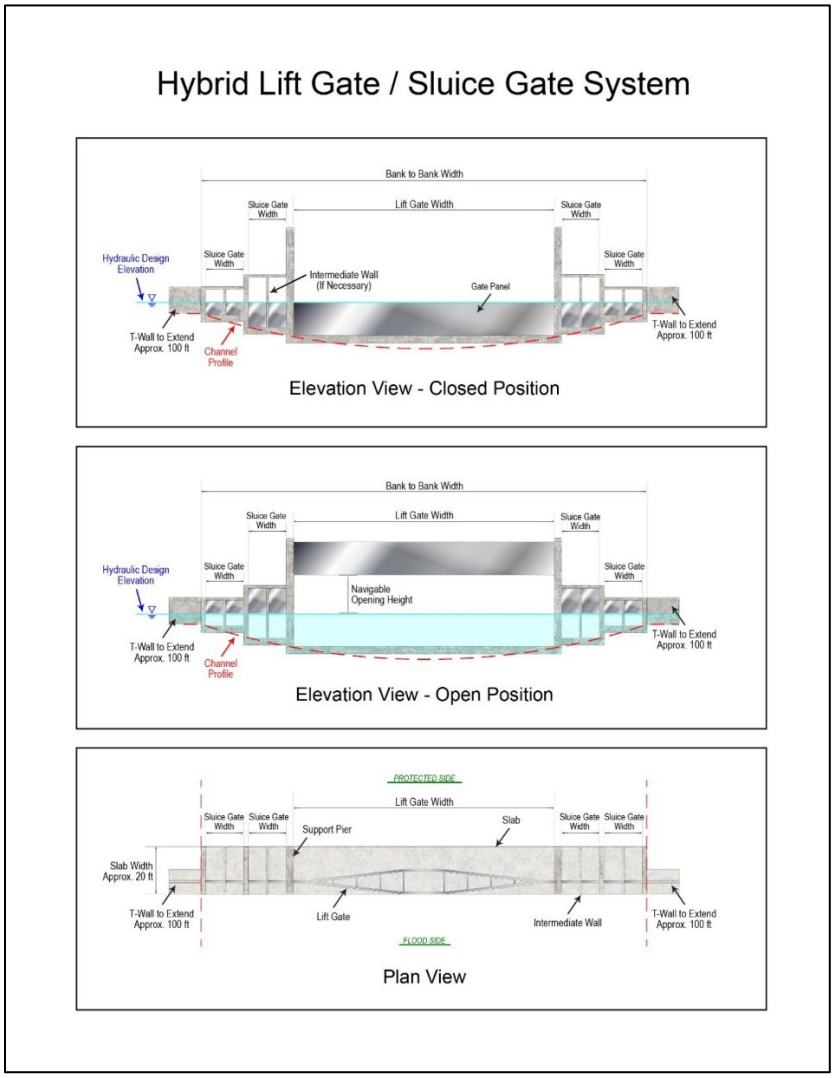

Figure 16. Typical Fish-Friendly Gate - Elevation and Plan Views

SLUICE GATE

A sluice gate is a structure that contains a movable gate or series of movable gates that, when lifted, allow material and water to flow under it (Figure 17 and 18). Generally, sluice gates are not navigable as they do not raise high enough, or they have fixed components that do not allow vessels to pass through."

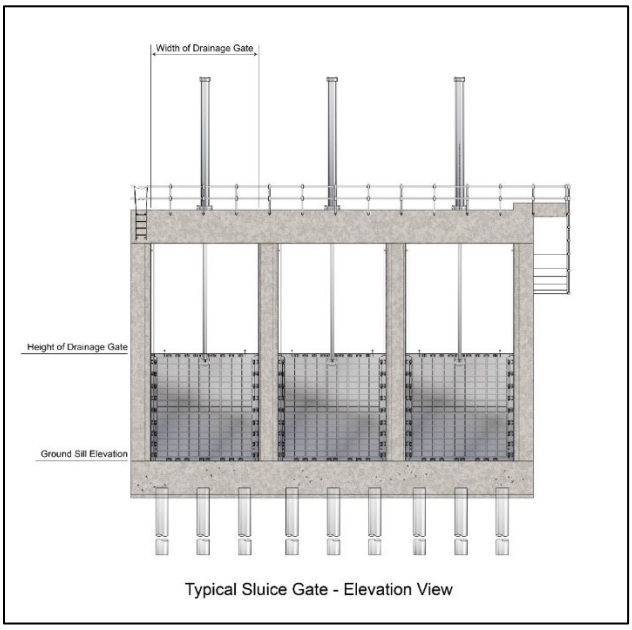

Figure 17. Sluice Gate - Elevation View

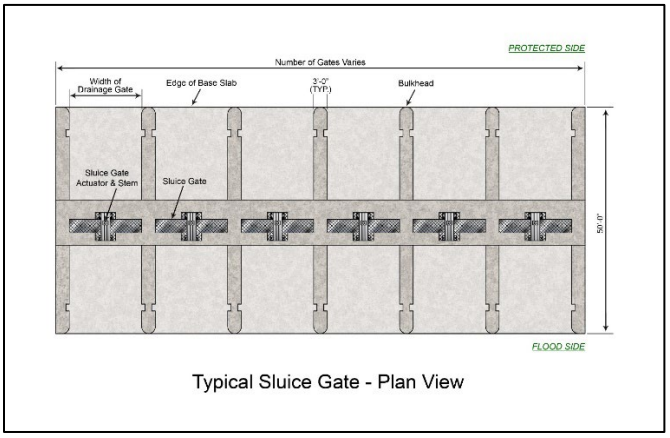

Figure 18. Sluice Gate - Plan View

SECTOR GATE

A sector gate (Figure 19-21) is a pie-slice structure that allows navigation to get through when in the open position.

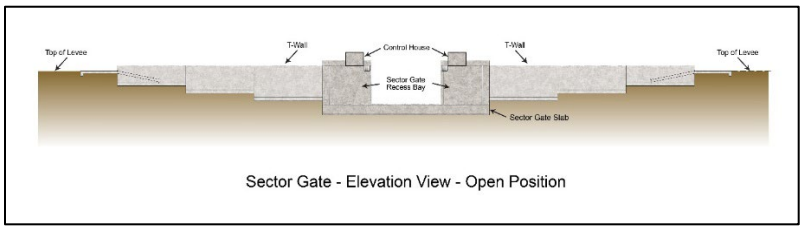

Figure 19. Sector Gate - Elevation View with Gates in Open Position

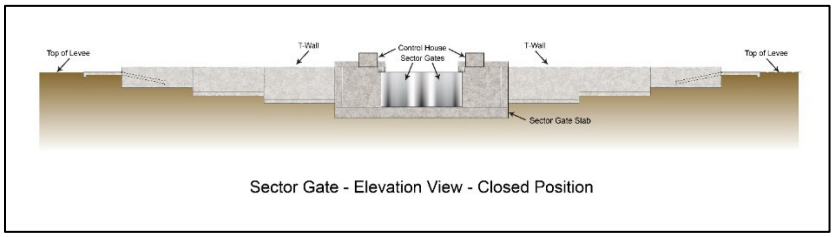

Figure 20. Sector Gate - Elevation View with Gates in Closed Position

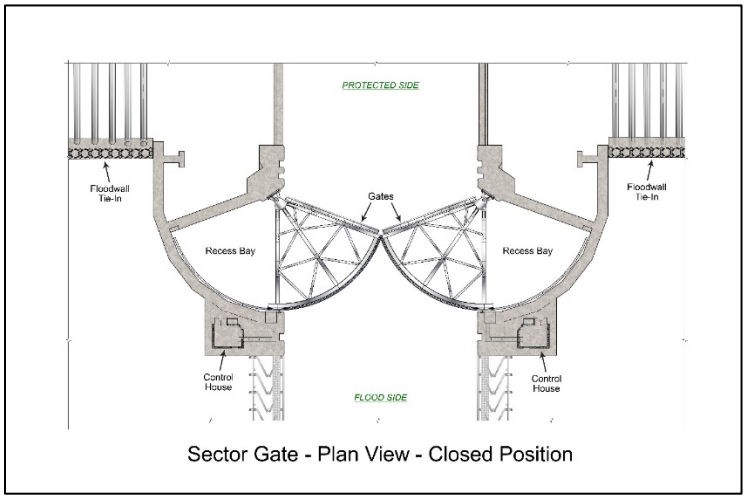

Figure 21. Sector Gate - Plan View

ROLLER GATE

A roller gate (Figure 22 and 23) is a structure that uses rollers for the gate to open and close. The operating motion of the gate is typically parallel to the skin plate face of the gate.

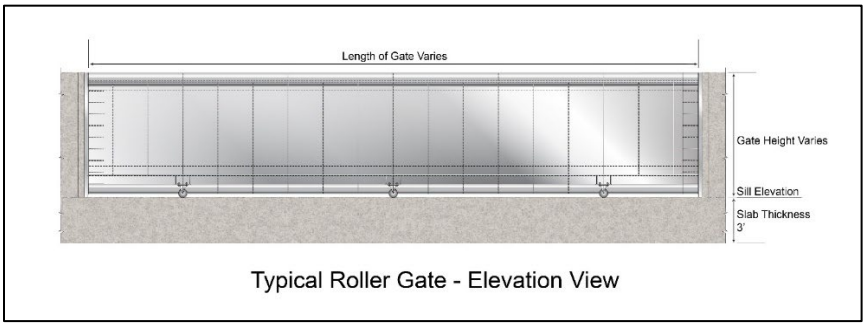

Figure 22. Roller Gate - Elevation View

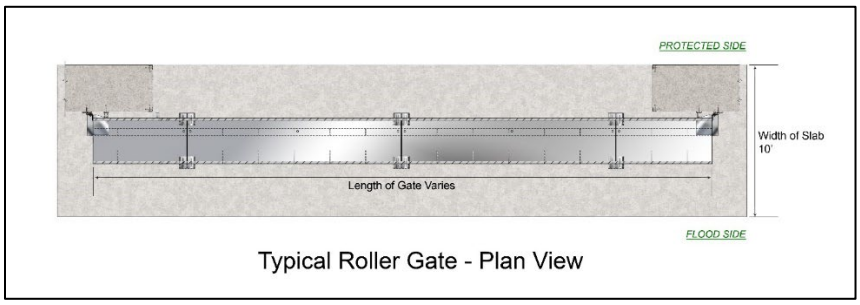

Figure 23. Roller Gate - Plan View

SWING GATE

A swing gate (Figure 24 and 25) is a structure that uses a hinge system to open horizontally. The gate can be actuated through automated mechanical means such as hydraulic arm or manually.

It was assumed that a swing gate would be constructed where the alignment crosses the Southern Railway Corp. railroad tracks. (The analysis for this gate was based on Mississippi River Levee (MRL) Carrollton Railroad Gate.)

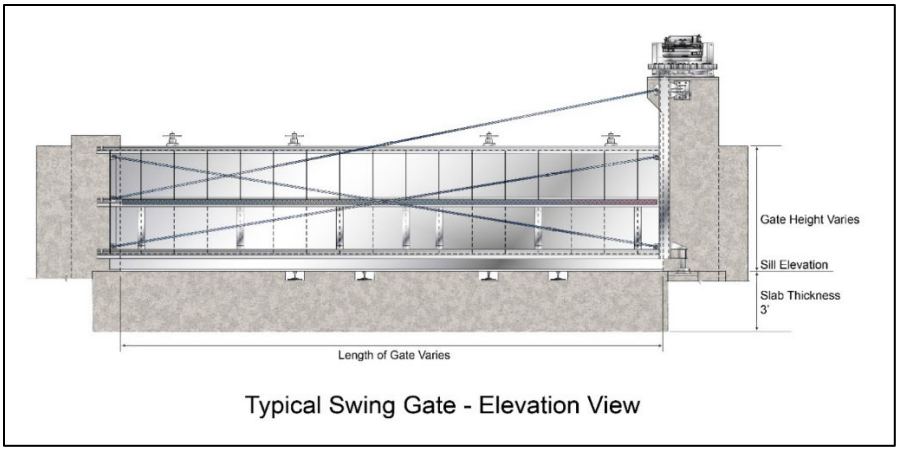

Figure 24. Swing Gate - Elevation View

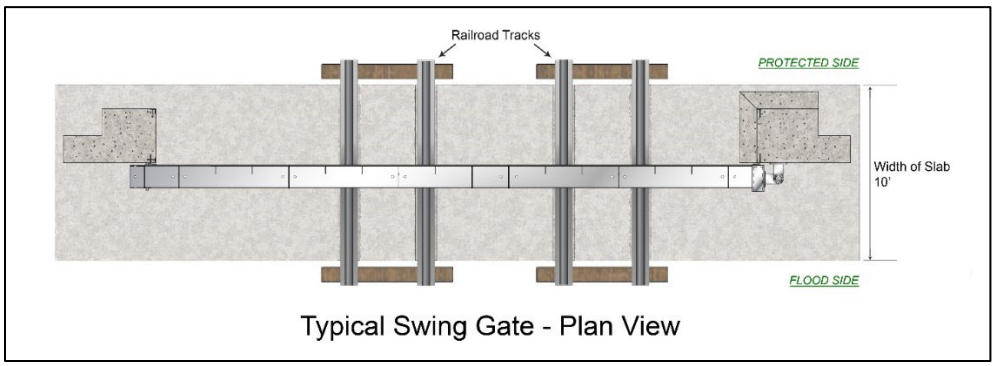

Figure 25. Typical Swing Gate - Plan View

VEHICULAR, PEDESTRIAN AND RAILROAD GATES DESIGN INFORMATION

Table 14 contains the design information for the eighteen (18) vehicular, one pedestrian and one railroad gate for the Optimized TSP.

Table 14: Vehicular, Pedestrian and Railroad Gates

Name	Description	Type	Mode	Width	Ground/ Sill Elevation (ft)	Design Height (ft)	Height of Gate (ft)
Western High Ground Tie-in for 2082							
Tammany Trace Pedestrian Gate and Culvert	10-ft Pedestrian Gate at Tammany Trace with Lift Gate for Culvert on south side	Swing	Pedestrian	10	13	17.5	3.5
Tranquility Road	20-ft Vehicular Gate at Tranquility Road	Roller	Vehicle	20	12	17.5	4.5

Vehicular Gate							
West Slidell							
Bayou Paquet Road Floodgate # 2	60-ft Floodgate at Bayou Paquet Road	Roller	Vehicle	60	3	16	13
Mayer Drive Vehicular Gate	20-ft Vehicular Gate at Mayer Road	Roller	Vehicle	20	2.5	16	13.5
Railroad Floodgate	60-ft floodgate for Railroad	Swing	Railroad	60	0.5	16.5	16
South Slidell							
Hwy 11 Vehicular Gate	75-ft Roller Gate at Hwy 11 (Pontchartrain Drive)	Roller	Vehicle	75	4	16.5	12.5
Mariners Cove Floodwall and Vehicular Gate	500 linear ft of floodwall for narrow section of Oak Harbor levee at Mariners Cove Blvd	Roller	Vehicle	50	10.5	16.5	6
Oak Harbor Vehicular Gate	Floodwall and 20-ft Vehicular Gate for Oak Harbor	Roller	Vehicle	20	11.5	16.5	5
Oak Harbor Country Club Vehicular Gate	Floodwall and 20-ft Vehicular Gate for access to Oak Harbor Country Club	Roller	Vehicle	20	11.5	16.5	5
Old Spanish Trail Floodgate (Hwy 433)	30-ft roller gate at Hwy 433 east crossing (Old Spanish Trail)	Roller	Vehicle	30	3.5	18.5	15
Hardin Rd Substation Gate	20-ft roller gate for access from Hardin Road to power substation	Roller	Vehicle	20	8	18.5	10.5
Hwy 190-B Floodgate (East Floodwall)	50-ft roller gate at Hwy 190-B east crossing (Fremaux Road)	Roller	Vehicle	50	9	18.5	9.5
South Holiday Drive Vehicular Gate	20-ft roller gate at South Holiday Drive	Roller	Vehicle	20	14	18.5	4.5
North Holiday Drive Vehicular Gate	20-ft roller gate at North Holiday Drive	Roller	Vehicle	20	14	18.5	4.5
Jaguar Drive Vehicular Gate	20-ft roller gate at Jaguar Avenue	Roller	Vehicle	20	12	18.5	6.5

Natchez Drive Vehicular Gate	20-ft roller gate at Natchez Avenue	Roller	Vehicle	20	12	18.5	6.5
Kisatchie Drive Vehicular Gate	20-ft roller gate at Kisatchie Avenue	Roller	Vehicle	20	14	18.5	4.5
Manzella Drive Vehicular Gate	20-ft roller gate at Manzella Drive (Added to extend floodwall to 18.5 ft ground elevation south of Hwy 190)	Roller	Vehicle	20	15	18.5	3.5
Gause Boulevard Vehicular Gate	80-ft roller gate crossing Gause Boulevard	Roller	Vehicle	80	16	18.5	2.5
Private Road Vehicular Gate	65-ft roller gate crossing private road north of Gause Boulevard	Roller	Vehicle	65	16	18.5	2.5

PUMP STATIONS DESIGN INFORMATION

The Optimized TSP would include a total of eight (8) pump stations as sown on Table 15. These pump stations are divided into large pumping capacity and small pumping capacity.

In West Slidell there would be two (2) pump stations with large pumping capacity and two (2) pump stations with small pumping capacity. In South Slidell there would be four (4) pump stations with small pumping capacity.

Table 15: Pump Stations

Pump Station Location	**Pump Station Capacity**
Western High Ground Tie-in for 2082	
N/A	
West Slidell	
Bayou Liberty	1,800 cfs
Bayou Bonfouca	2,000 cfs
Bayou Paquet North Tributary	300 cfs
Bayou Paquet	500 cfs
South Slidell	
W-14 Canal	1,000 cfs
Kings Point	200 cfs

Reine Canal	200 cfs
French Branch at the I-10	450 cfs

The Optimized TSP would include two (2) pump stations with large pumping capacity at Bayou Liberty (1,800 cfs) and Bayou Bonfouca (2,000 cfs). These pump stations were assumed to have similar components and configuration as the USACE West Shore Lake Pontchartrain Reserve Relief Canal Pump Station (WSLP Pump Station). The structural quantities from the Reserve Relief Canal Pump Station were scaled accordingly to reflect the size of the pump stations for this study.

Figures 26 and 27 show a typical site plan and a typical layout of a pump station with large pumping capacity, respectively.

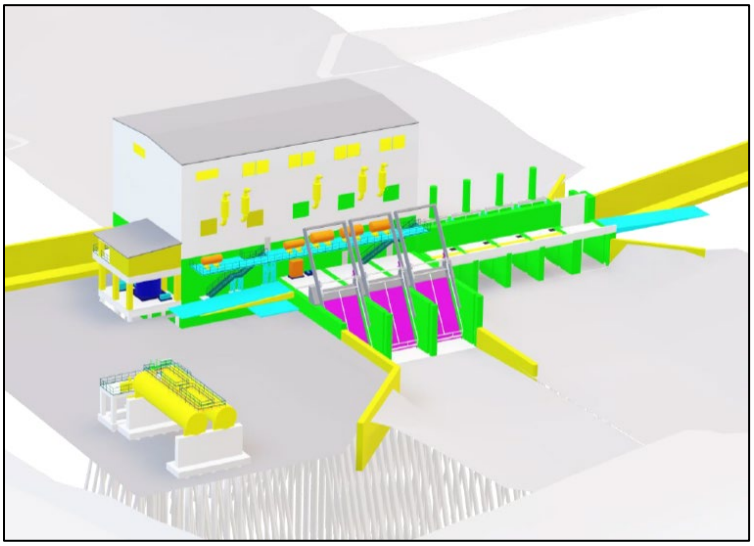

Figure 26. Typical Site Plan of a Pump Station with Large Pumping Capacity

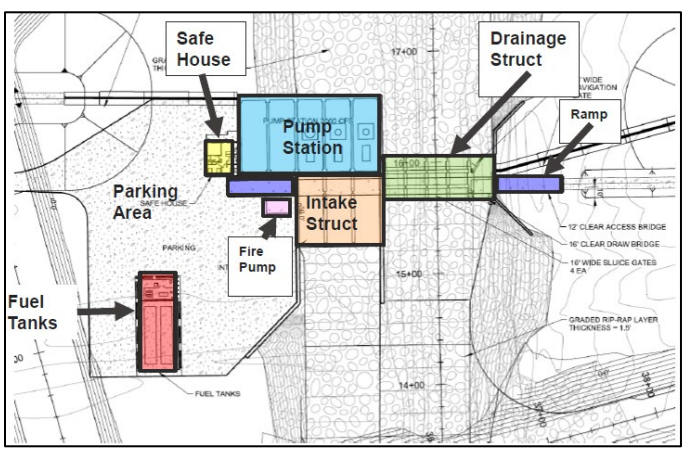

Figure 27. Typical Layout of a Pump Station with Large Pumping Capacity

The TSP would include six (6) pump stations with small pumping capacity at sluice gate #6 on the Bayou Paquet North Tributary (300 cfs), Bayou Paquet lift gate (500 cfs), W-14 Canal (1,000 cfs), sluice gate # 8 at Kings Point (200 cfs), Reine Canal (200 cfs) and at French Branch at the I-10 (450 cfs).

These pump stations would have similar pumping capacities to the Prescott Road Pump Station for the Lake Pontchartrain Lakeshore study. The structural quantities from the Prescott Road Pump Station were scaled accordingly to reflect the size of the pump stations for this study.

Figures 28 and 29 show a typical site plan and a typical layout of a pump station with small pumping capacity, respectively.

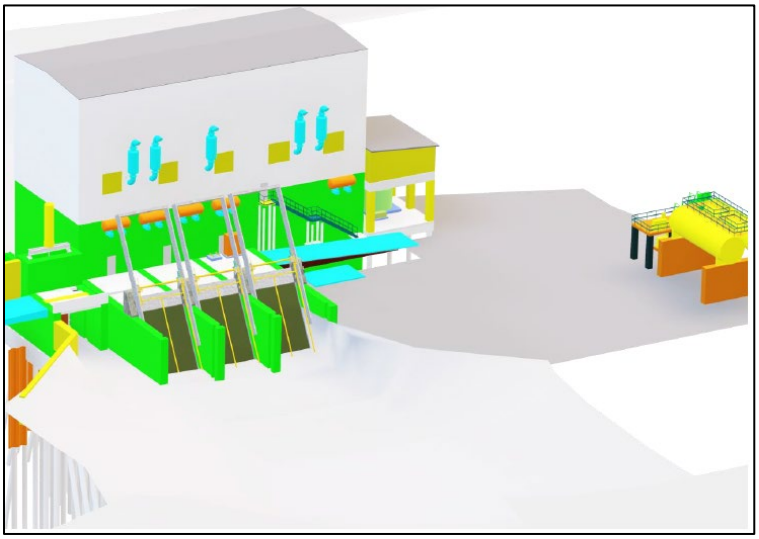

Figure 28. Typical Site Plan of a Pump Station with Small Pumping Capacity

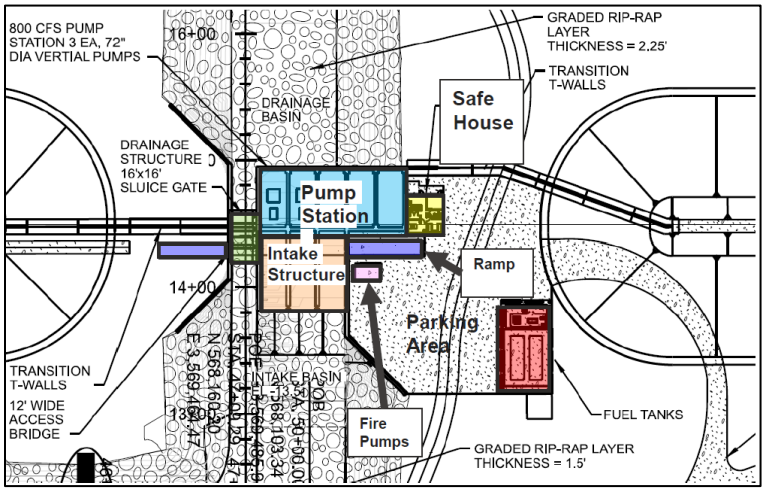

Figure 29. Typical Layout of a Pump Station with Small Pumping Capacity

Note: The schematics for the pump stations with large and small pumping capacities were obtained from a presentation prepared by Stantec.

RAMPS

The Optimized TSP would include the construction of six (6) ramps, which would include the ramp over the I-10 in the vicinity of Oak Harbor and the ramp in the Western High Ground Tie-In. All ramps would be constructed during initial construction with the exception of the ramp in the Western High Ground Tie-In which would be constructed during the fourth levee lift of West Slidell in year 2076.

Table 16 shows the location of the ramps:

Table 16: Ramps

Ramps
Western High Ground Tie-in for 2082
Highway 190
West Slidell
N/A
South Slidell
Oak Harbor Boulevard
Islander Drive
Grand Champions Lane
I-10 would be raised to ramp over the new levee section
I-10 On-Ramp

ACCESS ROUTES AND STAGING AREAS REQUIRED

Tables 17 to 19 provide a summary of the necessary staging areas and permanent ROW required for construction of the levee and floodwall segments for the 50-yr period of analysis. The staging areas required during initial construction of the levee alignment would be the same staging areas required for construction of future levee lifts.

Table 17 Summary of Staging Areas and Permanent ROW for the Levee and Floodwall System

SUMMARY of STAGING AREAS AND PERMANENT ROW		
Levees	**Staging Areas (Acres)**	**Permanent ROW (Acres)**
Western High Ground Tie In	2	30
West Slidell	8.5	240
South Slidell (includes 23 acres for I-10)	30	120
Sub-Total for Levees	**40.5**[1]	**390**
Floodwall Segments		
Western High Ground Tie In	NA	NA
West Slidell	0	4
South Slidell	0.5	23

Sub-Total for Floodwall Segments	**0.5[2]**	**27**
Floodgates and Pump Stations		
Western High Ground Tie In	1.5	2.5
West Slidell	11	21
South Slidell	3.75	6.25
Sub-Total for Floodgates and Pump Stations	**16.25**	**29.75**
Vehicular, Pedestrian, and Railroad Gates		
Western High Ground Tie In	1.5	1.5
West Slidell	2.25	0
South Slidell	11.25	0
Sub-Total for Vehicular, Pedestrian, and Railroad Gates	**15**	**1.5**
Road Ramps		
Western High Ground Tie In	0.5	0
West Slidell	0	0
South Slidell	2	0
Sub-Total for Road Ramps	**2.5**	**0**
Access Roads - New[3]		
Western High Ground Tie In	0	0
West Slidell	0	0.84
South Slidell	0	1.75
Sub-Total New Access Roads	**0**	**2.59**
Access Roads- Existing		
Western High Ground Tie-In	0	0
West Slidell	15.8	0
South Slidell	9.9	0
Sub-Total for Existing Access Roads	**25.7**	**0**
Sub-Total for Access Roads	**25.7**	**2.59**
Total for Levee and Floodwall System for 50-year Period of Analysis	**101**	**450**

[1] The staging areas required during initial construction of the levee alignment would be the same staging areas required for construction of future levee lifts. For Real Estate purposes, the staging areas were included in the permanent ROW.

[2] For floodwall segments, staging areas would be included in the 80-ft wide permanent ROW. Except for the utility corridor on South Slidell, in the vicinity of Northshore Drive, there would be a 0.5 acre staging area outside of the 80-ft wide corridor.

[3] New access roads (acres) do not include areas where the access is within the permanent ROW.

Table 18 provides a summary of the necessary staging areas and permanent ROW required for Mile Branch.

Table 18 Summary of Staging Areas and Permanent ROW for Mile Branch

Mile Branch	**Staging Areas (Acres)**	**Permanent ROW (Acres)**
Mile Branch Channel Improvements and Bridge Replacement	7.3	38.8

Table 19 provides a summary of the necessary staging areas and permanent ROW required for the for the levee and construction and the Mile Branch for the 50-yr period of analysis.

Table 19 Total Acres for 50-year Period of Analysis for the Optimized TSP

Optimized TSP	**Staging Areas (Acres)**	**Permanent ROW (Acres)**
Levee and Floodwall System	101	450
Mile Branch Channel	7.3	38.8
Total Acres for the Optimized TSP for 50-year Period of Analysis	**108.3**	**489**

Table 20 lists the ROW width required per levee or floodwall segment. The width includes a 15 ft of vegetation free zone (VFZ) on each side of the levee/floodwall segment.

Table 20 Typical Widths of Permanent ROW for Levee and Floodwalls Segments

Levee and Floodwall Segments	**Width of Permanent ROW (ft)***
Western High Ground Tie-in	160
West Slidell	300
South Slidell	160
Floodwall Segments	80
Access Roads	NA

*(Includes 15-ft VFZ on both sides)

Note that the permanent ROW for the floodwall on the eastern end of the South Slidell alignment (north of Gause Boulevard) has a width of 50 ft.

ACCESS ROUTES AND STAGING FOR MILE BRANCH

Site access to Mile Branch would be via public roads and public rights of way.

Staging areas are assumed to be dry. Any trees would be removed and hauled away to an approved facility. If necessary, crushed stone would be placed in the staging area prior to construction. After construction, the crushed stone would be removed and the disturbed areas would be fertilized and seeded.

For the bridge replacement work, all staging areas were assumed to be located within the individual structure construction areas. Staging areas are to be tree and vegetation free and covered with crushed stone.

ACCESS FOR OPTIMIZED TSP

Construction access and staging areas would be needed along the alignment for all elements of the Optimized TSP. Project access post-construction for future maintenance would be needed for all elements except the non-structural home raisings. Permanent access would include access to the levee alignment and to the channel improvements. Further development of access would be prepared during PED.

Existing public roads would be utilized for access to the maximum extent as possible. In locations where access cannot be achieved via existing roadways, a new road would be constructed. Construction of new roads would require permanent ROW.

ROW CRITERIA AND ACCESS ROUTES FOR INITIAL CONSTRUCTION AND FUTURE LIFTS

Table 21 lists the ROW width required per levee or floodwall segment. The width includes a 15 ft of vegetation free zone (VFZ) on each side of the levee/floodwall segment.

Table 21Typical Widths of Permanent ROW for Levee and Floodwalls Segments

Levee and Floodwall Segments	Width of Permanent ROW (ft)*
Western High Ground Tie-in	160
West Slidell	300
South Slidell	160
Floodwall Segments	80
Access Roads	NA

*(Includes 15-ft VFZ on both sides)

Note that the permanent ROW for the floodwall on the eastern end of the South Slidell alignment (north of Gause Boulevard) has a width of 50 ft.

LEVEES

The following criteria applies to initial construction and future levee lifts.

STAGING AREAS FOR LEVEES

The staging areas for levee construction would be included in the temporary ROW. The staging areas for levee initial construction would be the same staging areas used for future lifts of the levee. No additional ROW would be needed for future lifts.

*This Temporary ROW is considered “permanent easement” for Real Estate purposes due to future lifts.

For staging areas, crushed stone would be placed (assuming crushed stone for vehicle parking/staging and for path from road to area).

Surveys would be taken prior to disturbing the staging area. Any trees would be removed and hauled away to an approved facility. Material would be processed on-site. Areas would be restored to pre-construction elevation after construction activities are complete.

ACCESS FOR LEVEES

There are locations where an existing road would be used for access. In other locations, a new road would be built. New access roads would be a 40-ft wide footprint (consisting of a 25 ft right-of-way for the access road itself and a 7.5-ft width for VFZ on both sides of the road.

MATERIALS FOR STAGING AREAS AND ACCESS ROADS

For staging areas and new access roads for levee construction, not including area for material processing during levee construction, a 7-inch depth of stone, and 115 lbs/cubic ft stone weight was assumed. This assumption does not apply to the access road on the railroad tracks.

STAGING AREAS LEVEE CONSTRUCTION ON THE INTERSTATE 10

Staging areas for the construction of the I-10 crossing would be in the median and within the DOTD ROW. No additional staging areas would be needed.

LEVEE CONSTRUCTION ON REFUGE AREA

STAGING AREA FOR LEVEE CONSTRUCTION ON REFUGE AREA

There would be one 2-acre staging area on the reach on the refuge land that would be considered a temporary easement. The staging area would be located off the refuge and would be used to process the material prior to building the levee. Staging areas would be required to be continuously accessible. Any trees would be removed and hauled away to an approved facility. The area would be restored to pre-construction elevation that existed prior to impacting the site due to construction activities.

ACCESS FOR LEVEE CONSTRUCTION ON REFUGE AREA

For the construction of the levee on the refuge land (from Bayou Bonfouca to the railroad tracks), the ingress and egress would be at the Norfolk Southern railroad tracks on the east side of Bayou Bonfouca and existing roads on the west side. Access to the refuge is one way in, one way out at the Norfolk Southern Railroad Tracks. There would be no

two-way traffic, so coordination of vehicles entering the site would be required. The USACE would need to obtain permission from the railroad owner (Norfolk Southern Railway Corporation) prior to construction. An access road would be constructed on the protected side of the ROW between the proposed crown of the levee and Bayou Bonfouca. The access road would be a temporary road. Once construction is complete, the area would be cleared of vegetation within the right of way and graded to drain away from the levee. Access during future inspections would be done by driving on the crown of the levee.

RAMPS

Ramps would be constructed to the 2082 hydraulic elevations during the initial construction of the levee alignment. The temporary ROW (during construction) for the construction of ramps would be as follows:

For ramps adjacent to levees or floodwall segments:

Temporary ROW- use 0.5 acres for staging area

FLOODWALL

The width for Permanent ROW for initial construction, which includes 15 ft of vegetation free zone (VFZ) is as follows:

- Floodwall segments - 80 ft (includes staging areas)
- North of Gause Boulevard (South Slidell) – floodwall segment – 50 ft (excludes 30 ft VFZ which is not applicable at this location).

STAGING AREAS FOR CONSTRUCTION OF FLOODWALLS

It was assumed that during construction of the floodwall segments, the staging areas would be within the 80-ft-wide ROW. One exception is at the utility corridor in South Slidell. In the vicinity of Northshore Lane, there would be a 0.5 acre staging area outside of the 80-ft wide corridor.

ACCESS ROADS FOR CONSTRUCTION OF FLOODWALLS

Existing public roads would be utilized for access to the maximum extent as possible. In locations where access cannot be achieved via existing roadways, a new road would be constructed. Construction of new roads would require permanent ROW.

All listed access routes to access structures would each have a 40-ft wide footprint (consisting of a 25 ft right-of-way for the access road itself and a 7.5-ft width for VFZ).

STRUCTURES

The temporary ROW during initial construction of structures, and permanent ROW that would be needed for the pump stations and floodgates would be as follows:

For two larger pump stations and floodgate complexes (Bayou Liberty and Bayou Bonfouca):

Temporary ROW during initial construction - staging area- 4 acres

Permanent ROW - 8 acres

For the rest of the pump stations (small) and floodgate complexes:

Temporary ROW during initial construction - staging area - 0.75 acres

Permanent ROW - 1.25 acres

For smaller floodgates, lift gates, and control gates:

Temporary ROW during initial construction - staging area - 0.75 acres

Permanent ROW - 1.25 acres

For pedestrian gate at Tammany Trace in West Slidell:

Temporary ROW during initial construction - staging area - 0.75 acres

Permanent ROW- 1.5 acres

Note that there are separate temporary and permanent ROW for the sluice gate and the pedestrian gate at Tammany Trace Bike Trail in West Slidell.

For vehicular and railroad gates:

Temporary ROW during initial construction - staging area- 0.75 acres

Permanent ROW - none

This is a change from the original assumptions during the Draft TSP analysis, of using the levee ROW as the staging area.

ACCESS ROADS FOR STRUCTURES

Existing public roads would be utilized for access to the maximum extent as possible. In locations where access cannot be achieved via existing roadways, a new road would be constructed. Construction of new roads would require permanent ROW.

New access roads would be a 40-ft wide footprint (consisting of a 25 ft right-of-way for the access road itself and a 7.5-ft width for VFZ on both sides of the road. Access roads would be constructed using crushed stone for the road surface.

PERMANENT ROW FOR THE EASTERN TERMINUS BY THE INTERSTATE-10

For Reine Canal and for French Branch, the permanent ROW would be within the existing highway ROW.

STAGING AREAS FOR RAMPS

For the six (6) ramps, the temporary ROW (during construction) would be as shown in Table 22:

Table 22: ROW for Ramps

Ramps	Temporary ROW (Staging Area (Acres))
Western High Ground Tie-in for 2082	
Highway 190	0.5
West Slidell	
N/A	N/A
South Slidell	
Oak Harbor Boulevard	0.5
Islander Drive	0.5
Grand Champions Lane	0.5
I-10 would be raised to ramp over the new levee section	0
I-10 On-Ramp	0.5
Total for Ramps	**2.5**

ACCESS ROUTES AND STAGING AREAS FOR FLOODWALL SEGMENTS

For the fourteen (14) floodwall segments, the temporary ROW (during construction) would be as shown in Table 23 below.

Table 23: ROW for Floodwall Segments

Floodwall Segments	Temporary ROW (Staging Area (Acres)
Western High Ground Tie-in for 2082	
N/A	
West Slidell	
Properties west of Doucette Road	0
North Side Bayou Paquet Drive	0
Bayou Paquet/Mayer Drive	0
South Slidell	
Front Street/Railroad	0
Mariners Cove Boulevard	0
Oak Harbor Country Club	0
Old Spanish Trail	0
Esprit du Lac Street	0
Substation Floodwall	0
Highway 190 Business	0
Utility Corridor	0.5
Hollywood Drive to Yaupon	0
Manzella Drive to Gause Boulevard	0
Gause Boulevard to I-10	0
Total	**0.5**

ACCESS ROUTES AND STAGING AREAS FOR FLOODGATES AND PUMP STATIONS

For the floodgates and pump stations, the temporary ROW (staging area during construction) and the permanent ROW would be as shown in Table 24.

Table 24: ROW for Floodgates and Pump Stations

Floodgates and Pump Stations	Pump Station	Pumping Capacity (cfs)	Staging Area (Acres)	Permanent Area (Acres)
Western High Ground Tie-in for 2082				
Sluice gate near Shannon Drive	No		0.75	1.25
Sluice gate at Tammany Trace	No		0.75	1.25
West Slidell				
Sluice Gate # 7 (Near CC Road)	No		0.75	1.25
Sluice Gate # 6 (Bayou Paquet North Tributary)	Yes	300	0.75	1.25
Bayou Paquet Navigable Gate and Pump Station	Yes	500	0.75	1.25
Bayou Liberty Navigable Gate and Pump Station	Yes	1800	4	8
Bayou Bonfouca Navigation Gate and Pump Station	Yes	2000	4	8
Sluice Gate # 2 (Bayou Bonfouca Sluice Gate)	No		0.75	1.25
South Slidell				
W-14 Canal Navigable Gate and Pump Station	Yes	1000	0.75	1.25
Sluice Gate # 8 (Kings Point East) and Pump Station	Yes	200	0.75	1.25
Sluice Gate # 10 (Near East Terminus)	No		0.75	1.25
Reine Canal and Pump Station	Yes	200	0.75	1.25
French Branch at I-10 and Pump Station	Yes	450	0.75	1.25
Total for Floodgates and Pump Stations			**16.25**	**29.75**

ACCESS ROUTES AND STAGING AREAS FOR VEHICULAR, PEDESTRIAN AND RAILROAD GATES INITIAL CONSTRUCTION

For the vehicular, pedestrian and railroad gates, the temporary ROW (staging area during construction) and the permanent ROW would be as shown in Table 24.

Table 25: ROW for Vehicular, Pedestrian and Railroad Gates

Name	Staging Area (Acres)	Permanent ROW (Acres)
Western High Ground Tie-in for 2082		
Tammany Trace Pedestrian Gate	0.75	1.5
Tranquility Road Vehicular Gate	0.75	0
West Slidell		
Bayou Paquet Road Floodgate # 2	0.75	0
Mayer Drive Vehicular Gate	0.75	0
Railroad Floodgate	0.75	0
South Slidell		
Hwy 11 Vehicular Gate	0.75	0
Mariners Cove Floodwall and Vehicular Gate	0.75	0
Oak Harbor Vehicular Gate	0.75	0
Oak Harbor Country Club Vehicular Gate	0.75	0
Old Spanish Trail Floodgate (Hwy 433)	0.75	0
Hardin Road Substation Gate	0.75	0
Hwy 190-B Floodgate (East Floodwall)	0.75	0
South Holiday Drive Vehicular Gate	0.75	0
North Holiday Drive Vehicular Gate	0.75	0
Jaguar Drive Vehicular Gate	0.75	0
Natchez Drive Vehicular Gate	0.75	0
Kisatchie Drive Vehicular Gate	0.75	0
Manzella Drive Vehicular Gate	0.75	0
Gause Boulevard Vehicular Gate	0.75	0
Private Road Vehicular Gate	0.75	0
I-10 Service Road Vehicular Gate	0.75	0
Total	**15**	**1.5**

MILE BRANCH CHANNEL IMPROVEMENTS

The proposed work at Mile Branch would be located in a heavily populated area. There are properties in close proximity of the Mile Branch. Figure 30 provides the location of this work.

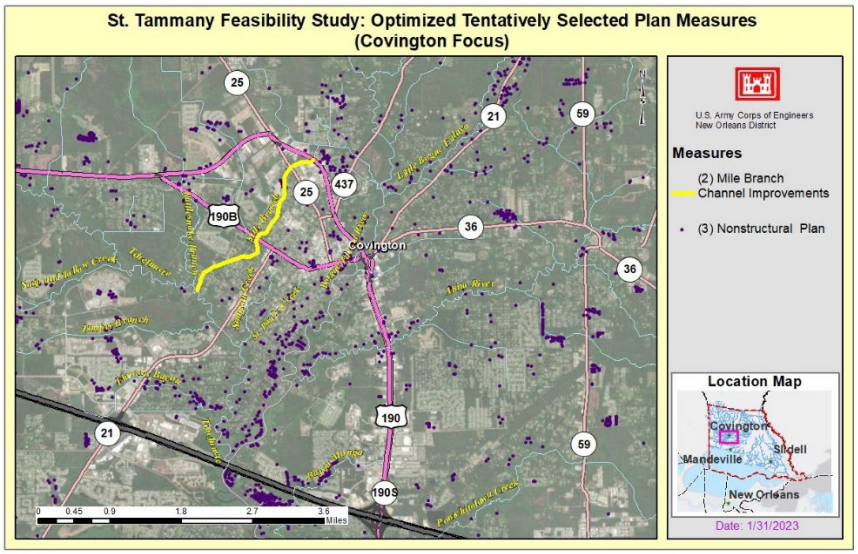

Figure 30. Optimized Tentatively Selected Plan Alternatives- Covington Focus

The Mile Branch channel improvements would start at the intersection of Mile Branch and Highway 190, crossing Highway 190 Business, and end at the confluence of Mile Branch and the Tchefuncte River. Refer to Figure 31.

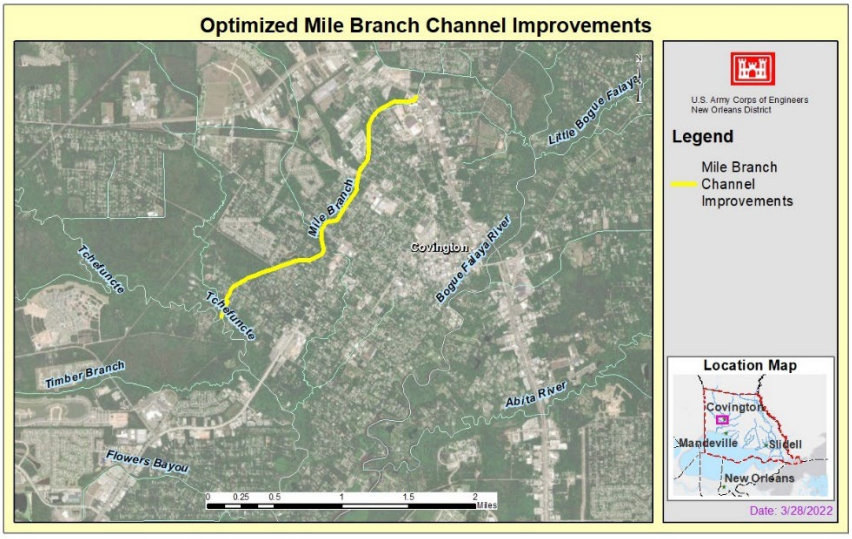

Figure 31. Optimized Mile Branch Channel Improvements

The preliminary design assumes an existing bank elevation of 1 ft, a 10-ft bottom width at elevation (-) 5 ft. The bank is at 1V:3H slope. The improvements would include clearing

and grubbing and mechanical dredging of the channel. The channel would be widened as well as deepened. The channel bottom would be lowered by 5 ft. Assumptions for channel improvements included a 65-ft from the centerline of each side of the channel for ROW as a general guideline (total width of 130 ft). Refer to Figure 32 for typical cross-section.

All work would be performed from the bank. The trees located close to the bank would be removed. Work would be done by excavators or small skid steers.

Material removed may include sediment, trees, debris, or other obstructions within the waterway. Removed material would be trucked off-site and disposed at a facility licensed to handle the material. Site access to Mile Branch would be via public roads and public rights of way.

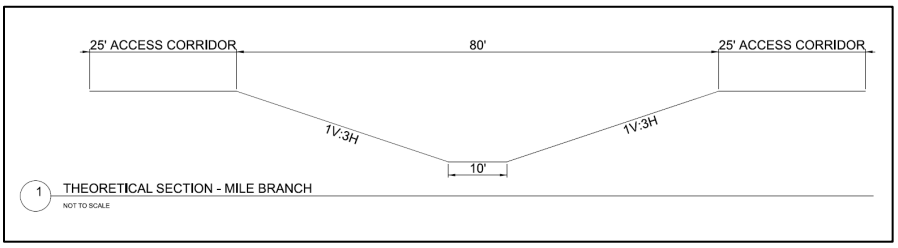

Figure 32. Mile Branch Improvements- Typical Cross-Section

4.1 STRUCTURAL IMPROVEMENTS

The Mile Branch channel improvements for the Optimized TSP would include seven (7) bridge replacements (starting from north to south) at vehicular bridges on W. 29th, W. 28th, W. 25th, W. 23rd, W. 21st, and W.19th Avenues and the pedestrian bridge at W. 27th Avenue. No work is anticipated at the W. 15th and W. 11th Avenue channel crossings as those bridges have been replaced prior to this study.

Additional refinements would occur during PED. Future surveys would determine final channel section and bridge replacements. Impacts to habitat and real estate would also be minimized.

4.2 ACCESS ROUTES AND ROW CRITERIA FOR MILE BRANCH

Figure 34 provides the locations of the Mile Branch channel improvements including the structural improvements.

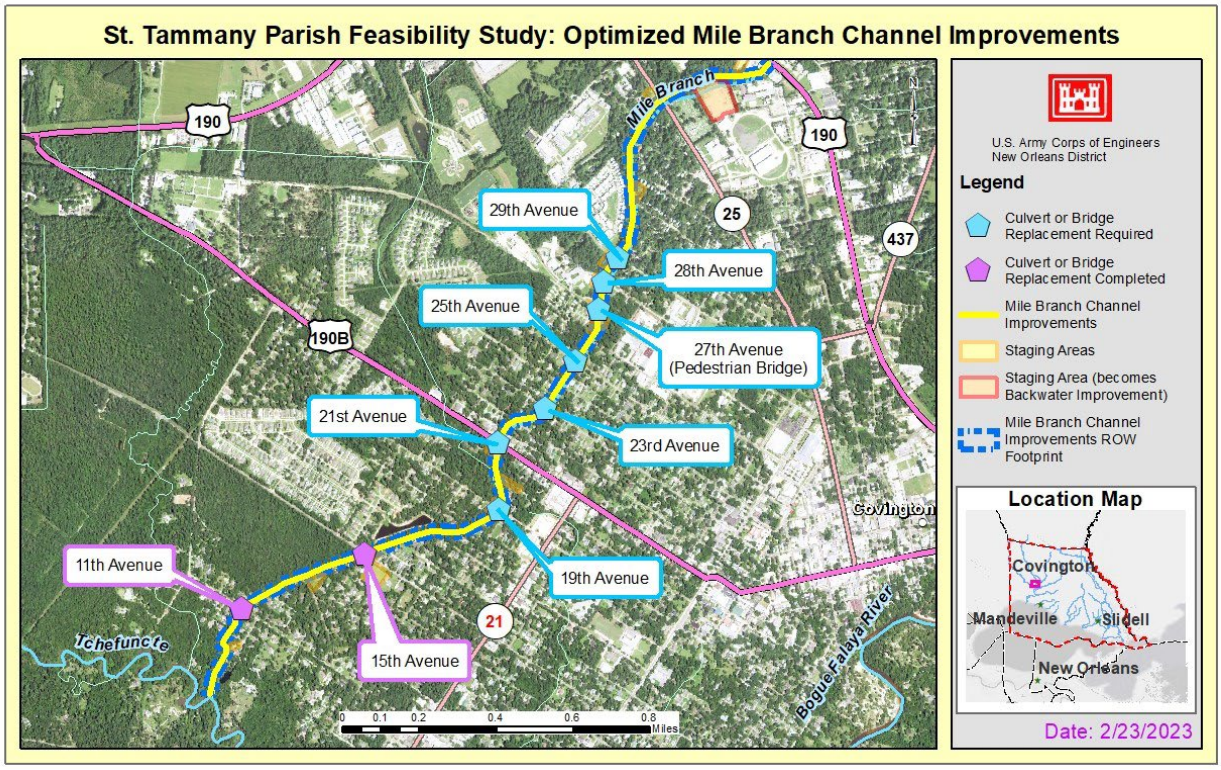

Figure 34. Optimized Mile Branch Improvements- Structural Improvements

Reference Table 26 for a listing of bridge replacement and acres of staging area required and Table 27 for a listing the location of staging areas and acres required for the structural replacements for Mile Branch. It was assumed that all access would be through public lands.

Location of Bridge Replacement	**Temporary ROW Staging Area (Acres)**
W. 29th Avenue	0.37
W. 28th Avenue	0.35
W. 27th Avenue (Pedestrian)	0.38
W. 25th Avenue	0.2
W. 23rd Avenue	0.21
W. 21st Avenue	0.36
W. 19th Avenue	0.36
Total	**2.23**

Table 25 provides the acres for a total of 11 staging areas for channel improvements (10 staging areas plus one staging area that becomes a backwater area).

Table 25: Staging Areas for Channel Improvements

Location of Staging Areas for Channel Improvements	Temporary ROW Staging Area (Acres)	Permanent ROW (Acres)
Staging area that becomes backwater area		
North of Columbia Street		4.8
Staging Areas		
US Hwy 190 (North Collins Boulevard)	0.8	
Polders Lane and Highway 437	0.45	
West 31st Ave	0.45	
West 29th Ave	0.3	
North Pierce Street	0.06	
Hope Lane	0.15	
South Taylor Street	0.45	
West 15th Ave (2 areas)	1.6	
President Drive	0.6	
Brooke Hollow Lane	0.24	
Total for all staging areas including backwater area	**5.1**	**4.8**

BORROW

The evaluation of borrow sites led to the identification of three sites in St. Tammany Parish and two sites in Hancock County, Mississippi as potential borrow sources (See Figure 35 to 36). These sites include land cleared of vegetation and previously investigated HSDRRS borrow sources.

Environmental resource assessments were performed on five sites (ST-5, ST-6, ST-9, MS-1 and MS-2). The borrow sites have been previously investigated and partially or fully cleared for Cultural Resources. See IER 19, 23 and 31 for sites MS-1 and MS-2 and SHPO report #'s 22-3725, 22-5346 and 22-3151 for the St Tammany sites. These five potentials borrow site options contain approximately 27.3 million cubic yards of borrow where only 1.5 million cubic yards is estimated to be needed for construction of the TSP and follows environmental operating principles to reduce impacts. The potentially affected resources include uplands, prime and unique farmland, wildlife, noise, and aesthetics. The five proposed borrow sites avoid impacts to wetlands and are not expected to require compensatory mitigation. A Phase I ESA will be conducted

by the CEMVN on proposed borrow sites. Any additional potential borrow sites will require supplemental environmental evaluations in accordance with the NEPA.

The final borrow sources will be selected prior to acquisition and may include borrow material from all sites, from just one of the identified sites or a combination of sites depending on the suitability of the sites. The necessary right of entry and onsite surveys to get the additional information needed for site selection including geologic profiles, borings, and Cone Penetration Test would be obtained.

Transportation routes and mechanisms for the delivery of borrow material have been examined and can be achieved using highways including Interstate-10, Highway 190, Highway 433 and Highway 11. Sensitive areas such as schools and hospital would be avoided. These actions are expected to avoid and minimize transportation, noise and socioeconomic impacts. Staging areas and haul roads would be contained within the borrow site and construction footprints.

The final borrow site(s) design would include slopes, depths, drainage, environmental design considerations. Best management practices would be developed and would address the installation of signage, construction fencing and gates, and erosion control. A stormwater pollution prevention plan (SWPPP) would be prepared in accordance with EPA and state regulations. The SWPPP will outline temporary erosion control measures, such as silt fences, retention ponds, and dikes. The construction contract will include permanent erosion control measures, such as turfing and placement of riprap or filter material.

Table 26. Potential Borrow Site Identification for the St. Tammany Parish Feasibility Study. Bolded highlighted sites were moved forward.

Site #	Site Name	Location	Estimated Borrow Pit Acreage	Estimated Fill Volume (cubic yards)	Screening/Notes	Source	Haul Distance (Approximate distance in miles)
STP-5	**Cleared Site 5**	**Lacombe, LA**	**73**	**1,817,700**	**Carried Forward- barren, land with no vegetation, existing retention pond- potential to increasing the retention capacity at this site-beneficial location, falls within defined soil/environmental parameters, and already has a similar land use**	**PDT identified based on previously cleared lands and available soil data**	**2**
STP-6	**Cleared Site 6**	**Slidell, LA**	**10**	**249,000**	**Carried Forward, cleared barren land with no vegetation**	**PDT identified based on previously cleared lands and available soil data**	**3.5**
STP-9	**Cleared Site 9**	**Slidell, LA**	**17**	**423,3 00**	**Carried Forward, previously cleared land with no vegetation**	**PDT-cleared lands**	**3**
MS-1	**Pearlington**	**Hancock County, MS**	**326**	**8,000,000**	**Carried forward- 3 potential sites at location (2 approved). Potential commercial site. Remaining borrow available at each needs to be determined. Pearlington Phase 3 site has wetlands but wetland areas would be avoided**	**HSDRRS IER 19 and IER 23 (2008)**	**9.5**
MS-2	**Port Bienville**	**Hancock County, MS**	**677**	**16,857,300**	**Carried Forward- HSDDRS approved site- Potential commercial site previously planted in pine for commercial harvesting, mixture of overgrown pine habitat and cleared areas. Remaining borrow available needs to be determined, potential commercial site**	**HSDRRS IER 31 (2010)**	**11**

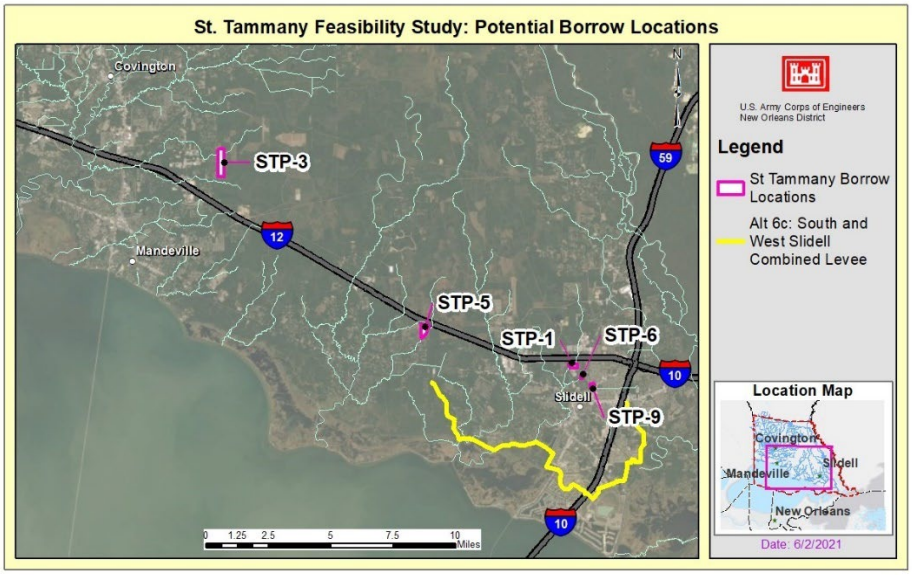

Figure 35 Borrow Locations STP-1, STP-3, STP-5, STP-6, and STP-9

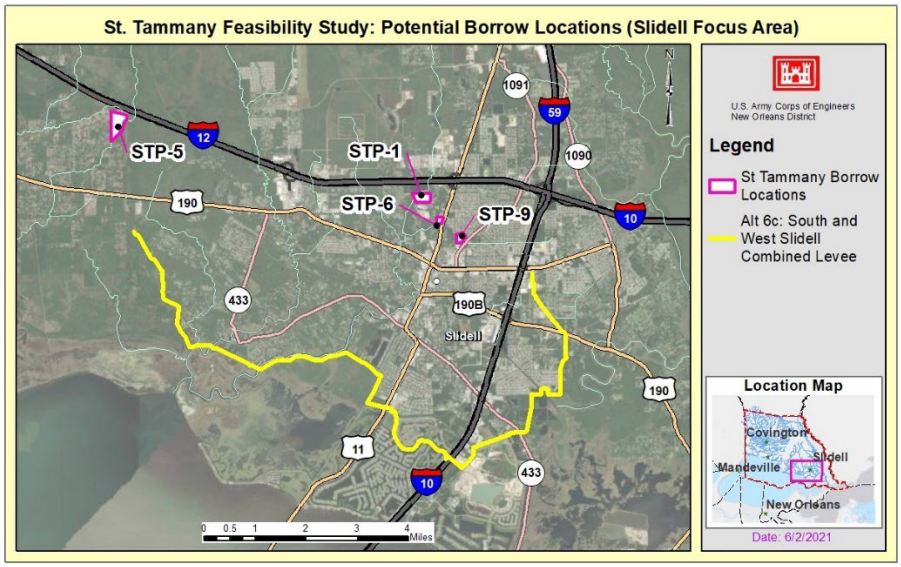

Figure 36 Closer Look at Borrow Locations STP-1, STP-5, STP-6, and STP-9

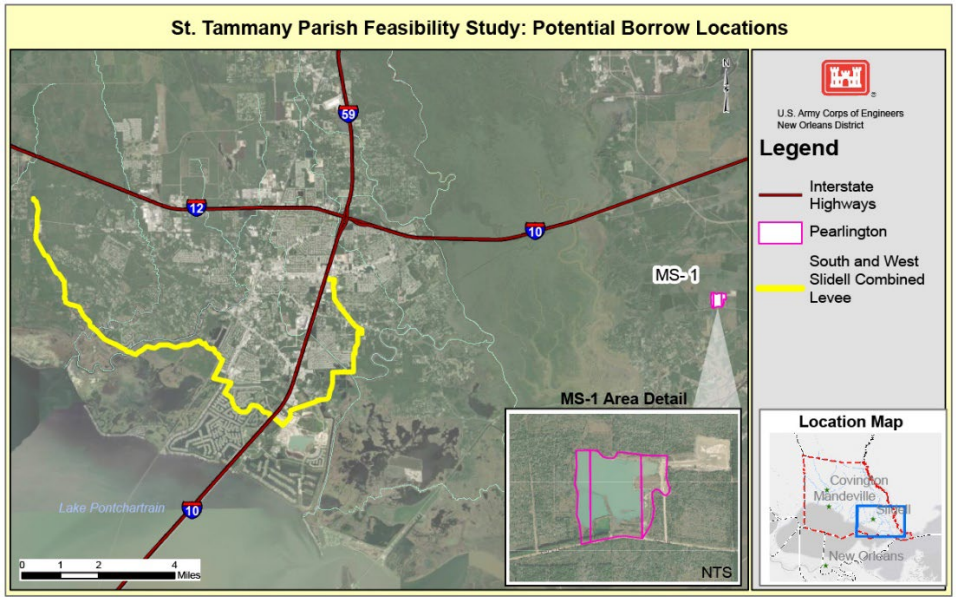

Figure 37 Borrow Site MS-1

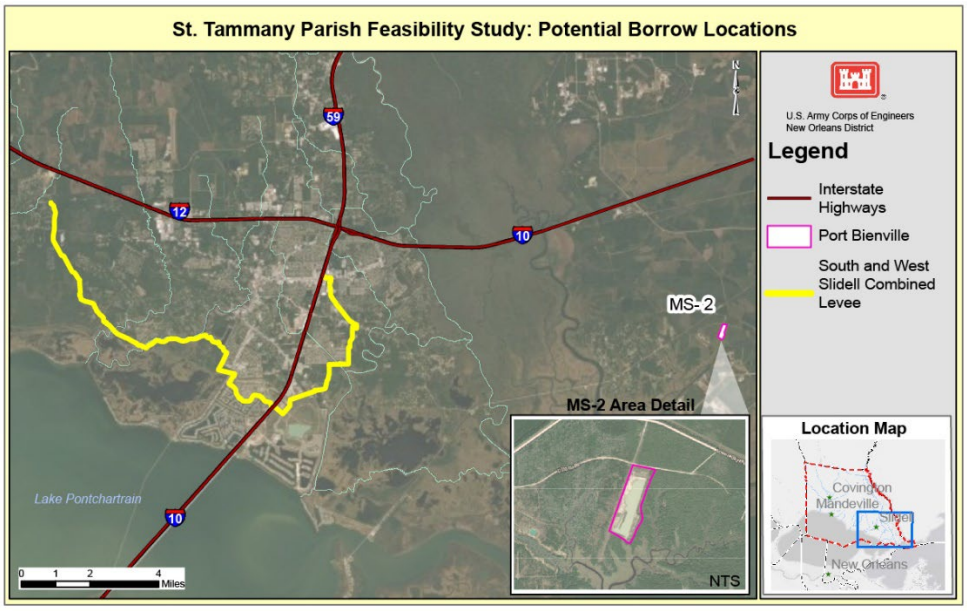

Figure 38 Borrow Site MS-2

Louisiana Administrative Code

Title 43

NATURAL RESOURCES

Part I. Office of the Secretary

Chapter 7. Coastal Management

Subchapter B. Coastal Use Guidelines

Coastal use guidelines as approved by the House Natural Resources Committee on July 9, 1980, the Senate Natural Resources Committee on July 11, 1980, and the governor on July 24, 1980.

§701. Guidelines Applicable to All Uses

A. The guidelines must be read in their entirety. Any proposed use may be subject to the requirements of more than one guideline or section of guidelines and all applicable guidelines must be complied with.

B. Conformance with applicable water and air quality laws, standards and regulations, and with those other laws, standards and regulations which have been incorporated into the coastal resources program shall be deemed in conformance with the program except to the extent that these guidelines would impose additional requirements.

C. The guidelines include both general provisions applicable to all uses and specific provisions applicable only to certain types of uses. The general guidelines apply in all situations. The specific guidelines apply only to the situations they address. Specific and general guidelines should be interpreted to be consistent with each other. In the event there is an inconsistency, the specific should prevail.

D. These guidelines are not intended to nor shall they be interpreted so as to result in an involuntary acquisition or taking of property.

E. No use or activity shall be carried out or conducted in such a manner as to constitute a violation of the terms of a grant or donation of any lands or water bottoms to the state or any subdivision thereof. Revocations of such grants and donations shall be avoided.

F. Information regarding the following general factors shall be utilized by the permitting authority in evaluating whether the proposed use is in compliance with the guidelines:

1. type, nature, and location of use;

2. elevation, soil, and water conditions and flood and storm hazard characteristics of site;

3. techniques and materials used in construction, operation, and maintenance of use;

4. existing drainage patterns and water regimes of surrounding area including flow, circulation, quality, quantity, and salinity; and impacts on them;

5. availability of feasible alternative sites or methods of implementing the use;

6. designation of the area for certain uses as part of a local program;

7. economic need for use and extent of impacts of use on economy of locality;

8. extent of resulting public and private benefits;

9. extent of coastal water dependency of the use;

10. existence of necessary infrastructure to support the use and public costs resulting from use;

11. extent of impacts on existing and traditional uses of the area and on future uses for which the area is suited;

12. proximity to and extent of impacts on important natural features such as beaches, barrier islands, tidal passes, wildlife and aquatic habitats, and forest lands;

13. the extent to which regional, state, and national interests are served including the national interest in resources and the siting of facilities in the coastal zone as identified in the coastal resources program;

14. proximity to, and extent of impacts on, special areas, particular areas, or other areas of particular concern of the state program or local programs;

15. likelihood of, and extent of impacts of, resulting secondary impacts and cumulative impacts;

16. proximity to and extent of impacts on public lands or works, or historic, recreational, or cultural resources;

17. extent of impacts on navigation, fishing, public access, and recreational opportunities;

18. extent of compatibility with natural and cultural setting;

19. extent of long term benefits or adverse impacts.

G. It is the policy of the coastal resources program to avoid the following adverse impacts. To this end, all uses and activities shall be planned, sited, designed, constructed, operated, and maintained to avoid to the maximum extent practicable significant:

1. reductions in the natural supply of sediment and nutrients to the coastal system by alterations of freshwater flow;

2. adverse economic impacts on the locality of the use and affected governmental bodies;

3. detrimental discharges of inorganic nutrient compounds into coastal waters;

4. alterations in the natural concentration of oxygen in coastal waters;

5. destruction or adverse alterations of streams, wetland, tidal passes, inshore waters and water bottoms, beaches, dunes, barrier islands, and other natural biologically valuable areas or protective coastal features;

6. adverse disruption of existing social patterns;

7. alterations of the natural temperature regime of coastal waters;

8. detrimental changes in existing salinity regimes;

9. detrimental changes in littoral and sediment transport processes;

10. adverse effects of cumulative impacts;

11. detrimental discharges of suspended solids into coastal waters, including turbidity resulting from dredging;

12. reductions or blockage of water flow or natural circulation patterns within or into an estuarine system or a wetland forest;

13. discharges of pathogens or toxic substances into coastal waters;

14. adverse alteration or destruction of archaeological, historical, or other cultural resources;

15. fostering of detrimental secondary impacts in undisturbed or biologically highly productive wetland areas;

16. adverse alteration or destruction of unique or valuable habitats, critical habitat for endangered species, important wildlife or fishery breeding or nursery areas, designated wildlife management or sanctuary areas, or forestlands;

17. adverse alteration or destruction of public parks, shoreline access points, public works, designated recreation areas, scenic rivers, or other areas of public use and concern;

18. adverse disruptions of coastal wildlife and fishery migratory patterns;

19. land loss, erosion, and subsidence;

20. increases in the potential for flood, hurricane and other storm damage, or increases in the likelihood that damage will occur from such hazards;

21. reduction in the long term biological productivity of the coastal ecosystem.

Response to §701.A - G. These guidelines have been read in their entirety. The proposed action would be in conformance with all applicable state laws, regulations, and standards. Therefore, the proposed action is consistent with these guidelines.

H. 1. In those guidelines in which the modifier "maximum extent practicable" is used, the proposed use is in compliance with the guideline if the standard modified by the term is complied with. If the modified standard is not complied with, the use will be in compliance with the guideline if the permitting authority finds, after a systematic consideration of all pertinent information regarding the use, the site and the impacts of the use as set forth in Subsection F above, and a balancing of their relative significance, that the benefits resulting from the proposed use would clearly outweigh the adverse impacts resulting from noncompliance with the modified standard and there are no feasible and practical alternative locations, methods, and practices for the use that are in compliance with the modified standard and:

a. significant public benefits will result from the use; or

b. the use would serve important regional, state, or national interests, including the national interest in resources and the siting of facilities in the coastal zone identified in the coastal resources program, or;

c. the use is coastal water dependent.

2. The systematic consideration process shall also result in a determination of those conditions necessary for the use to be in compliance with the guideline. Those conditions shall assure that the use is carried out utilizing those locations, methods, and practices which maximize conformance to the modified standard; are technically, economically, environmentally, socially, and legally feasible and practical; and minimize or offset those adverse impacts listed in §701.G and in the Subsection at issue.

I. Uses shall to the maximum extent practicable be designed and carried out to permit multiple concurrent uses which are appropriate for the location and to avoid unnecessary conflicts with other uses of the vicinity.

J. These guidelines are not intended to be, nor shall they be, interpreted to allow expansion of governmental authority beyond that established by R.S. 49:214.21-49:214.42, as amended; nor shall these guidelines be interpreted so as to require permits for specific uses legally commenced or established prior to the effective date of the coastal use permit program nor to normal maintenance or repair of such uses.

Response: Guidelines for §701.H – J. have been read in their entirety and are acknowledged. These guidelines have been addressed through the preparation of responses to the guidelines contained within the specific use guidelines.

AUTHORITY NOTE: Promulgated in accordance with R.S. 49:214.27

HISTORICAL NOTE: Promulgated by the Department of Natural Resources, Office of the Secretary, LR 6:493 (August 1980).

§703. Guidelines for Levees

A. The leveeing of unmodified or biologically productive wetlands shall be avoided to the maximum extent practicable.

Response: Concur. Measures were taken to avoid to the maximum extent possible impacts to wetlands and then modify impacts to wetlands to the greatest degree possible and still meet the project purpose. The proposed Optimized TSP represents the least environmentally damaging alternative. None the less , there are unavoidable impacts to wetlands resulting from construction and implementation from the project. A compensatory mitigation plan has been developed and is attached for your reference.

B. Levees shall be planned and sited to avoid segmentation of wetland areas and systems to the maximum extent practicable.

Response: Concur. Measures were taken to avoid and minimize to the greatest extent possible segmenting wetland systems in developing the proposed Optimized TSP levee alignment. However, some wetlands and systems will be segmented. A compensatory mitigation plan has been developed and is attached for your reference. The mitigation plan was developed and shared with the habitat evaluation team.

C. Levees constructed for the purpose of developing or otherwise changing the use of a wetland area shall be avoided to the maximum extent practicable.

Response: Concur. The proposed levee system was not designed to enclose and develop existing wetlands. Rather, the proposed plan is to provide risk reduction to hurricane and storm surges. The current measures are consistent with this guideline.

D. Hurricane and flood protection levees shall be located at the non-wetland/wetland interface or landward to the maximum extent practicable.

Response: Measures were taken to avoid to the maximum extent possible impacts to wetlands and then modify impacts to wetlands to the greatest degree possible and still meet the project purpose. The proposed Optimized TSP represents the least environmentally damaging alternative. None the less , there are unavoidable impacts to wetlands resulting from construction and implementation of the project. A compensatory mitigation plan has been developed and is attached for your reference.

E. Impoundment levees shall only be constructed in wetland areas as part of approved water or marsh management projects or to prevent release of pollutants.

Response: Concur. The proposed project is for a hurricane and storm risk reduction levee instead of an impoundment levee. The structural features of this storm risk reduction levee were located to minimize to the extent practicable project-induced wetland impacts by locating project features crossing existing rights-of-way and incorporating drainage structures, gates, and pump stations into the design to maintain hydrologic connections.

F. Hurricane or flood protection levee systems shall be designed, built and thereafter operated and maintained utilizing best practical techniques to minimize disruptions of existing hydrologic patterns, and the interchange of water, beneficial nutrients, and aquatic organisms between enclosed wetlands and those outside the levee system.

Response: Concur. The proposed hurricane and storm damage risk reduction system will be constructed utilizing the best management practices (BMPs) to minimize disruption of existing hydrologic patterns and the interchange of water, beneficial nutrients, and aquatic organisms between the enclosed wetlands and those outside the risk reduction system. The current project as proposed is consistent with this guideline.

AUTHORITY NOTE: Promulgated in accordance with R.S. 49:214.27.

HISTORICAL NOTE: Promulgated by the Department of Natural Resources, Office of the Secretary, LR 6:493 (August 1980).

§705. Guidelines for Linear Facilities

A. Linear use alignments shall be planned to avoid adverse impacts on areas of high biological productivity or irreplaceable resource areas.

Response: Concur. Impacts to areas of high biological productivity, such as marsh, pine savannas, swamp and bottomland hardwood (BLH) habitats, were avoided and then minimized to the maximum extent possible. The 2017 Master Plan projects for Flood Risk Management (FRM) and Coastal Storm Risk Management (CSRM) in St. Tammany Parish were included in the development of management measures and alternatives. The PDT has been in contact with the CPRA Master Plan team to better ensure coordination and consistency between this study and newly released 2023 Master Plan. Planning opportunities and objectives were identified to protect the function and increase the resiliency of the ecosystem to reduce flood damages as well as to increase resiliency of coastal and riparian habitats as natural resources to reduce flood damages. The Optimized TSP follows these planning guidelines to the maximum extent practicable.

B. Linear facilities involving the use of dredging or filling shall be avoided in wetland and estuarine areas to the maximum extent practicable.

Response: Concur. Unavoidable placement of fill material on wetlands would occur as a part of the proposed action. Measures to avoid and minimize impacts to the extent possible were employed. A compensatory mitigation plan has been developed and is attached for your reference.

C. Linear facilities involving dredging shall be of the minimum practical size and length.

Response: Concur. The proposed floodgates are designed to minimize impacts to water bottoms to the maximum extent possible while meeting the project purpose and need. The Optimized TSP would include a total of 13 gates. Three (3) gates would be lift gates and one gate would be a sector gate. During construction of the gated structures, temporary bypass channels would be constructed for recreational vessels in Bayous Paquet, Bonfouca, and Liberty. The floodgate locations and minimum sizes are an estimate. A detailed interior drainage design would be provided during PED. There is no proposed dredging for the construction of the earthen levees and floodwalls. Levee/floodwalls are designed to be of minimum practical size and length to meet the project purpose. Dredging is proposed for channel improvements to Mile Branch however those activities are outside the coastal zone.

D. To the maximum extent practicable, pipelines shall be installed through the "push ditch" method and the ditch backfilled.

Response: This guideline is not applicable with the proposed action.

E. Existing corridors, rights-of-way, canals, and streams shall be utilized to the maximum extent practicable for linear facilities.

Response: Concur. The levee system would be constructed parallel to existing corridors, ROWs, canals, and streams to the maximum extent practicable.

F. Linear facilities and alignments shall be, to the maximum extent practicable, designed and constructed to permit multiple uses consistent with the nature of the facility.

Response: The proposed levee alignment, floodwalls, and floodgates purpose is to provide flood risk reduction from hurricanes and named storm events. There would be no other permitted use for the designed facilities.

G. Linear facilities involving dredging shall not traverse or adversely affect any barrier island.

Response: This guideline is not applicable as there are no barrier islands pertaining to the proposed action.

H. Linear facilities involving dredging shall not traverse beaches, tidal passes, protective reefs, or other natural gulf shoreline unless no other alternative exists. If a beach, tidal pass, reef, or other natural gulf shoreline must be traversed for a non-navigation canal, they shall be restored at least to their natural condition immediately upon completion of construction. Tidal passes shall not be permanently widened or deepened except when necessary to conduct the use. The best available restoration techniques which improve the traversed area's ability to serve as a shoreline shall be used.

Response: This guideline is not applicable as none of the listed features pertain to the proposed action.

I. Linear facilities shall be planned, designed, located, and built using the best practical techniques to minimize disruption of natural hydrologic and sediment transport patterns, sheet flow, and water quality and to minimize adverse impacts on wetlands.

Response: Concur. The proposed levee alignment includes measures to decrease disruption of natural hydrologic and sediment transport patterns, sheet flow, and water quality and to minimize adverse impacts on wetlands. These include multiple pumps and gates to help reduce hydrologic disruption.

J. Linear facilities shall be planned, designed, and built using the best practical techniques to prevent bank slumping and erosion, and saltwater intrusion, and to minimize the potential for inland movement of storm-generated surges. Consideration shall be given to the use of locks in navigation canals and channels which connect more saline areas with fresher areas.

Response: Concur. The proposed action would reduce the potential for inland movement of storm-generated surges. Best management practices would be used to prevent bank slumping and erosion during construction, operations, and maintenance.

K. All nonnavigation canals, channels, and ditches which connect more saline areas with fresher areas shall be plugged at all waterway crossings and at intervals between crossings in order to compartmentalize them. The plugs shall be properly maintained.

Response: This guideline is not applicable with the proposed action.

L. The multiple use of existing canals, directional drilling, and other practical techniques shall be utilized to the maximum extent practicable to minimize the number and size of

access canals, to minimize changes of natural systems, and to minimize adverse impacts on natural areas and wildlife and fisheries habitat.

Response: Proposed access to project features including delivering borrow to the proposed marsh mitigation site would utilize existing canals and corridors to access the project construction site.

M. All pipelines shall be constructed in accordance with Parts 191, 192, and 195 of Title 49 of the Code of Federal Regulations, as amended, and in conformance with the Commissioner of Conservation's Pipeline Safety Rules and Regulations and those safety requirements established by R.S. 45:408, whichever would require higher standards.

Response: This guideline is not applicable with the proposed action.

N. Areas dredged for linear facilities shall be backfilled or otherwise restored to the pre-existing conditions upon cessation of use for navigation purposes to the maximum extent practicable.

Response: The proposed bypass channels to be dredged to maintain recreational vessel navigation would be backfilled and returned to pre-construction condition once construction of the floodgates are complete and operations.

O. The best practical techniques for site restoration and revegetation shall be utilized for all linear facilities.

Response: The levees constructed as would be revegetated with suitable grass and turf upon construction completion. A mitigation plan outlining proposed compensatory mitigation is attached to this determination.

P. Confined and dead end canals shall be avoided to the maximum extent practicable. Approved canals must be designed and constructed using the best practical techniques to avoid water stagnation and eutrophication.

Response: This guideline is not applicable with the proposed action.

AUTHORITY NOTE: Promulgated in accordance with R.S. 49:214.27.

HISTORICAL NOTE: Promulgated by the Department of Natural Resources, Office of the Secretary, LR 6:493 (August 1980).

§707. Guidelines for Dredged Spoil Deposition

A. Spoil shall be deposited utilizing the best practical techniques to avoid disruption of water movement, flow, circulation, and quality.

Response: Concur.

B. Spoil shall be used beneficially to the maximum extent practicable to improve productivity or create new habitat, reduce or compensate for environmental damage done

by dredging activities, or prevent environmental damage. Otherwise, existing spoil disposal areas or upland disposal shall be utilized to the maximum extent practicable rather than creating new disposal areas.

Response: Dredged spoil for the bypass channels would be stockpiled adjacent to the bypass channel and utilized for backfilling of the channel when construction is complete. There is no beneficial use of dredge material planned. While Mile Branch is not in the coastal zone, dredged material from the channel improvements would be disposed at an approved landfill.

C. Spoil shall not be disposed of in a manner which could result in the impounding or draining of wetlands or the creation of development sites unless the spoil deposition is part of an approved levee or land surface alteration project.

Response: Spoil from the Mile Branch channel improvements shall be placed at an approved landfill. Spoil from the construction of bypass channels would be stockpiled in a manner that would reduce impacts to wetlands. The stockpiled material would be utilized to restore the channel once construction was complete.

D. Spoil shall not be disposed of on marsh, known oyster or clam reefs, or in areas of submersed vegetation to the maximum extent practicable. Any identified impacts to wetlands will require mitigation.

Response: Impacts to wetlands resulting from the stockpiling of dredged material from constructing the bypass channel would be minimized to the maximum extent possible. A mitigation plan is attached to this document outlining compensatory mitigation measures.

E. Spoil shall not be disposed of in such a manner as to create a hindrance to navigation or fishing, or hinder timber growth.

Response: No spoil material would be disposed of in the waterways or in a manner that would create a hinderance to navigation, fishing or timber growth. Bypass channels are proposed during construction of the floodgates that would afford recreational vessels to continue to navigate the waterways.

F. Spoil disposal areas shall be designed and constructed and maintained using the best practical techniques to retain the spoil at the site, reduce turbidity, and reduce shoreline erosion when appropriate.

Response: Dredged spoil from construction of the bypass channels would be stockpiled adjacent to the construction site as utilized to fill in the bypass channel when construction of the FG is complete. BMPs would be followed, and a Stormwater Pollution Prevention Plan would be prepared and followed during construction.

G. The alienation of state-owned property shall not result from spoil deposition activities without the consent of the Department of Natural Resources.

Response: No alienation of state-owned property would result from the proposed Project. Spoil from the channel improvements shall be placed at an approved landfill. There will be temporary impacts to state owned property in the direct project area during construction

but should cease after construction completion. The fill for the structural features of the TSP storm risk reduction levee were located to minimize impacts to the extent practicable by locating project features crossing existing rights-of-way and incorporating drainage structures, and navigable gates, and pump stations into the design to maintain hydrologic connections. CEMVN is working closely with the nonfederal sponsor CPRAB for any real estate issues or concerns and is coordinating with LDNR with this Coastal Zone Consistency Determination.

AUTHORITY NOTE: Promulgated in accordance with R.S. 49:214.27.

HISTORICAL NOTE: Promulgated by the Department of Natural Resources, Office of the Secretary, LR 6:493 (August 1980).

§709. Guidelines for Shoreline Modification

Response: These guidelines are not applicable as the actions proposed for the TSP will not occur along shorelines therefore do not include shoreline alteration.

§711. Guidelines for Surface Alterations

A. Industrial, commercial, urban, residential, and recreational uses are necessary to provide adequate economic growth and development. To this end, such uses will be encouraged in those areas of the coastal zone that are suitable for development. Those uses shall be consistent with the other guidelines and shall, to the maximum extent practicable, take place only:

1. on lands 5 feet or more above sea level or within fast lands; or

2. on lands which have foundation conditions sufficiently stable to support the use, and where flood and storm hazards are minimal or where protection from these hazards can be reasonably well achieved, and where the public safety would not be unreasonably endangered, and:

a. the land is already in high intensity of development use; or

b. there is adequate supporting infrastructure; or

c. the vicinity has a tradition of use for similar habitation or development.

Response: This guideline is not applicable with the proposed action. However, the TSP as proposed FRM and CSRM project when implemented will reduce the risk for flooding for industrial, commercial, urban, residential, and recreational use within the project area.

B. Public and private works projects such as levees, drainage improvements, roads, airports, ports, and public utilities are necessary to protect and support needed development and shall be encouraged. Such projects shall, to the maximum extent practicable, take place only when:

1. they protect or serve those areas suitable for development pursuant to §711.A; and

2. they are consistent with the other guidelines; and

3. they are consistent with all relevant adopted state, local, and regional plans.

Response: Concur. The proposed action is consistent with this guideline as it is consistent with the other guidelines and with all relevant adopted state, local, and regional plans including the state master plan.

C. Reserved.

D. To the maximum extent practicable wetland areas shall not be drained or filled. Any approved drain or fill project shall be designed and constructed using best practical techniques to minimize present and future property damage and adverse environmental impacts.

Response: Concur. All unavoidable project-related impacts to wetland areas would be fully mitigated for by the plan described in the draft environmental impact statement (EIS) in coordination with LDNR and the interagency team.

H. Coastal water dependent uses shall be given special consideration in permitting because of their reduced choice of alternatives.

Response: This guideline is not applicable with the proposed action.

I. Areas modified by surface alteration activities shall, to the maximum extent practicable, be revegetated, refilled, cleaned, and restored to their predevelopment condition upon termination of the use.

Response: Concur. Temporary staging areas and access will be restored to predevelopment condition upon termination of use. Revegetation of the alignment would occur during construction and operations and maintenance (O&M).

J. Site clearing shall to the maximum extent practicable be limited to those areas immediately required for physical development.

Response: Concur. The proposed action would impact open water, coastal marsh, swamplands, and bottomland hardwood habitathabitat. Clearings would be limited to those areas immediately required for the proposed TSP project.

K. Surface alterations shall, to the maximum extent practicable, be located away from critical wildlife areas and vegetation areas. Alterations in wildlife preserves and management areas shall be conducted in strict accord with the requirements of the wildlife management body.

Response: Concur. The proposed action is located within the Big Branch Marsh NWR and coordination on the impacts with US Fish and Wildlife and LA Department of Wildlife and Fisheries is ongoing.

L. Surface alterations which have high adverse impacts on natural functions shall not occur, to the maximum extent practicable, on barrier islands and beaches, isolated cheniers,

isolated natural ridges or levees, or in wildlife and aquatic species breeding or spawning areas, or in important migratory routes.

Response: Concur. Surface alterations in the proposed action fall within the Mississippi Flyway but would not result in high adverse impacts to migratory birds. Impacts to aquatic species and EFH are being coordinated with USFWS and NMFS.

M. The creation of low dissolved oxygen conditions in the water or traps for heavy metals shall be avoided to the maximum extent practicable.

Response: Acknowledged. The proposed action TSP will create minor, localized impacts to dissolved oxygen levels in adjacent waters may occur during placement of construction and backfill materials. These impacts would be expected to last the duration of construction activities. Floodgates when operated would have the potential to temporarily alter dissolved oxygen levels, by restricting or eliminating surface water flows during construction activities. Upon reopening of gates following a storm event, changes in dissolved oxygen levels associated with the temporary gate closure would diminish. Additionally, pump station operation during a storm event would pump fresh water from the land to the flood side of the alignment. This would likely alter DO levels on flood side.

N. Surface mining and shell dredging shall be carried out utilizing the best practical techniques to minimize adverse environmental impacts.

Response: This guideline is not applicable with the proposed action.

O. The creation of underwater obstructions which adversely affect fishing or navigation shall be avoided to the maximum extent practicable.

Response: This guideline is not applicable with the proposed action.

P. Surface alteration sites and facilities shall be designed, constructed, and operated using the best practical techniques to prevent the release of pollutants or toxic substances into the environment and minimize other adverse impacts.

Response: Concur. A SWPPP would be followed and Best Management Practices would be utilized during all activities associated with the Proposed Action to minimize the impacts of these actions to adjacent areas.

Q. To the maximum extent practicable only material that is free of contaminants and compatible with the environmental setting shall be used as fill.

Response: Concur. Only compatible material will be used as fill to the maximum extent practicable. A clean water act 404(b)(1) evaluation is being prepared and will be finalized with the final EIS.

AUTHORITY NOTE: Promulgated in accordance with R.S. 49:214.27.

HISTORICAL NOTE: Promulgated by the Department of Natural Resources, Office of the Secretary, LR 6:493 (August 1980).

§713. Guidelines for Hydrologic and Sediment Transport Modifications

Response: These guidelines are not applicable as the actions taken did not involve hydrologic or sediment transport modifications.

§715. Guidelines for Disposal of Wastes

Response: These guidelines are not applicable as the actions taken did not involve the disposal of wastes.

§717. Guidelines for Uses that Result in the Alteration of Waters Draining into Coastal Waters

A. Upland and upstream water management programs which affect coastal waters and wetlands shall be designed and constructed to preserve or enhance existing water quality, volume, and rate of flow to the maximum extent practicable.

Response: This guideline is not applicable with the proposed action. However, channel improvement modifications proposed as part of the TSP could be beneficial for upstream waterways but are intended to improve water quality, volume and flow for existing waterways.

B. Runoff from developed areas shall to the maximum extent practicable be managed to simulate natural water patterns, quantity, quality, and rate of flow.

Response: The structural and nonstructural components of the proposed action would be designed to maintain current tidal exchange to the maximum extent practicable. A SWPPP would be followed and BMPs implemented for the proposed TSP.

C. Runoff and erosion from agricultural lands shall be minimized through the best practical techniques.

Response: The proposed plan would not involve alteration or management of agricultural lands and, therefore, this guideline is not applicable.

AUTHORITY NOTE: Promulgated in accordance with R.S. 49:214.27.

HISTORICAL NOTE: Promulgated by the Department of Natural Resources, Office of the Secretary, LR 6:493 (August 1980).

§719. Guidelines for Oil, Gas, and Other Mineral Activities

Response: The actions taken did not involve oil, gas, and other mineral activities and, therefore, these guidelines are not applicable.

AUTHORITY NOTE: Promulgated in accordance with R.S. 49:214.27.

HISTORICAL NOTE: Promulgated by the Department of Natural Resources, Office of the Secretary, LR 6:493 (August 1980).

OTHER STATE POLICIES INCORPORATED INTO THE PROGRAM

Section 213.8A of Act 361 directs the Secretary of DOTD, in developing the LCRP, to include all applicable legal and management provisions that affect the coastal zone or are necessary to achieve the purposes of Act 361 or to implement the guidelines effectively. It states:

"The Secretary shall develop the overall state coastal management program consisting of all applicable constitutional provisions, laws and regulations of this state which affect the coastal zone in accordance with the provisions of this Part and shall include within the program such other applicable constitutional or statutory provisions, or other regulatory or management programs or activities as may be necessary to achieve the purposes of this Part or necessary to implement the guidelines hereinafter set forth."

The constitutional provisions and other statutory provisions, regulations, and management and regulatory programs incorporated into the LCRP are identified and described in Appendix 1 of the LCRP Environmental Impact Statement (1980). A description of how these other authorities are integrated into the LCRP and coordinated during program implementation is presented in Chapter IV of the LCRP EIS. Since all of these policies are incorporated into the LCRP, federal agencies must ensure that their proposed actions are consistent with these policies as well as the coastal use guidelines. (CZMA, Section 307).

CONSISTENCY DETERMINATION

Based on this evaluation, the U. S. Army Corps of Engineers, New Orleans District, has determined that the action is consistent, to the maximum extent practicable, with the State of Louisiana's Coastal Resources Program.