

Appendix F

Real Estate



**U.S. Army Corps
of Engineers**

**Galveston District
Southwestern Division**

Appendix F

Real Estate Plan for Coastal Texas Protection and Restoration Study Integrated Feasibility Report and Environmental Impact Statement

October 2018

This Real Estate Plan has been prepared in accordance with ER 405-1-12 dated May 1, 1998.

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Acronyms and Abbreviations

CBRA	Coastal Barrier Resources Act
CBRS	Coastal Barrier Resources Systems
CCRs	Covenants, Conditions, and Restrictions
CSRM	Coastal Storm Risk Management
DIFR-EIS	Draft Integrated Feasibility Report and Environmental Impact Statement
ER	Ecosystem Restoration
GCCPRD	Gulf Coast Community Protection and Recovery District
GIWW	Gulf Intracoastal Waterway
GLO	Texas General Land Office
Gulf	Gulf of Mexico
HOA	Homeowner's Association
HTRW	hazardous, toxic, radioactive waste
LERRD	land, easements, rights-of-way, relocation, and disposal areas
MLS	Multiple Listing Service
NFS	non-Federal Sponsor
OMRR&R	operation, maintenance, repair, replacement, and rehabilitation
PL	Public Law
PDT	Project Development Team
PPA	Project Partnership Agreement
REP	Real Estate Plan
RSLR	relative sea level rise
SLR	Sea level rise
TRRC	Texas Railroad Commission
TSP	Tentatively Selected Plan
TXOBA	Texas Open Beaches Act
UASFLA	Uniform Appraisal Standards for Federal Land Acquisitions
USACE	U.S. Army Corps of Engineers
USC	United States Code
USPAP	Uniform Standards of Professional Appraisal Practice

1.0 GENERAL BACKGROUND

This Real Estate Plan (REP) is the real estate work product of the U.S. Army Corps of Engineers (USACE), Galveston District, Real Estate Division that supports project plan formulation for the Coastal Texas Protection and Restoration Feasibility Study. It identifies and describes the lands, easements, and rights-of-way required for the construction, operation and maintenance of the proposed project, including those required for relocations (i.e., Public Law [PL] 91-646 relocations and utility/facility relocations), borrow material, and dredged or excavated material disposal (land, easements, rights-of-way, relocation, and disposal areas [LERRD]). Furthermore, the REP describes the estimated LERRD value, together with the estimated administrative and incidental costs attributable to providing LERRD, and the acquisition process. The information contained herein is tentative in nature and intended for planning purposes only. This project contains two major components that have been designed to give the most protection to the Texas coast. The Coastal Storm Risk Management (CSRMM) and Ecosystem Restoration (ER) features that when completed will work together giving the most populated areas two levels of protection. Both components will have challenges throughout the different stages of the project such as different types of real estate requirements and multiple levels of coordination with local, State, and Federal agencies. The CSRMM component will impact highly developed and populated areas in the Houston-Galveston areas impacting thousands of tracts and ownerships. The ER component will be mainly located along the coast impacting mostly State and Federal lands.

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2.0 PROJECT TYPE AND APPLICABILITY

The USACE Galveston District is currently conducting a feasibility study to investigate CSRM and ER opportunities on the Texas Gulf coast. The study area encompasses 18 counties along 400 miles of the Gulf coast. The footprint area consists of the entire Texas Gulf coast from the mouth of the Sabine River to the mouth of the Rio Grande and includes the Gulf of Mexico (Gulf) and tidal waters, barrier islands, estuaries, coastal wetlands, rivers and streams, and adjacent areas that make up the interrelated ecosystem along the coast of Texas. The area is highly populated with over 6 million people and contains vital infrastructure that supports maritime trade, national security, and other Federal investment. Texas Gulf coast ports handle more than 563 million tons of foreign and domestic cargo in 2015, approximately 22 percent of all U.S. port tonnage. Texas ports generate \$368.7 billion in economic activity in the state and \$6.9 billion in state and local taxes per year, according to the Texas Ports Association. The Port of Galveston ranked as the fourth largest U.S. cruise market based on embarkation, with more than 834,000 passengers in 2015. Refineries in the study area account for more than 25 percent of the Nation's total refining capacity. In addition to the port activity there are 3.9 million acres of wetlands, and 235,000 acres of seagrass making Coastal Texas one of the richest shorelines in terms of aquatic resources of national significance.

2.1 PROJECT AUTHORIZATION

Authorization for the study is under Section 4091, Water Resources Development Act of 2007 PL 110-114, which states:

Sec. 4091. Coastal Texas Ecosystem Protection and Restoration, Texas.

(a) In General.—The Secretary shall develop a comprehensive plan to determine the feasibility of carrying out projects for flood damage reduction, hurricane and storm damage reduction, and ecosystem restoration in the coastal areas of the State of Texas.

(b) Scope.—The comprehensive plan shall provide for the protection, conservation, and restoration of wetlands, barrier islands, shorelines, and related lands and features that protect critical resources, habitat, and infrastructure from the impacts of coastal storms, hurricanes, erosion, and subsidence.

(c) Definition.—For purposes of this section, the term “coastal areas in the State of Texas” means the coastal areas of the State of Texas from the Sabine River on the east to the Rio Grande River on the west and includes tidal waters, barrier islands, marshes, coastal wetlands, rivers and streams, and adjacent area.

2.2 PROPOSED PROJECT ALTERNATIVES

2.3 MEASURES CONSIDERED

The Project Development Team (PDT) developed a comprehensive set of risk reduction alternatives to manage coastal storm risk and ER alternatives to restore habitat within the study area. Greater detail on the plan formulation process, including screening criteria, measure comparisons, and identification of the Tentatively Selected Plan (TSP) is presented in the Plan Formulation Appendix (Appendix A) and the Draft Integrated Feasibility Report and Environmental Impact Statement (DIFR-EIS). The following problems were identified within the study area for the formulation process.

2.3.1 Altered, Degraded or Lost Habitat

Healthy bays, wetlands, and estuaries provide the critical foundation for sustainable environments and thriving economies. These coastal habitats help maintain wildlife and plant populations, improve water quality, support fishing activities, enhance local tourism, and maintain community resilience by reducing the impact of coastal hazards, such as flooding and storm surge. Coastal population growth, development, and relative sea level rise (RSLR) adversely impact coastal habitats, and this effect will continue unless restoration projects are implemented.

2.3.2 Gulf Beach Erosion and Dune Degradation

Approximately 65 percent of the Texas Gulf shoreline is considered an eroding area. An eroding area is defined by state regulation as a portion of the shoreline eroding at a rate of greater than 2 feet per year. Natural or restored Gulf beaches and dunes provide recreation areas and habitat for wildlife, including threatened and endangered species, such as sea turtle and piping plovers. Beach and dunes also serve as a natural first line of defense from storm surge for inland populations and infrastructure by absorbing the impact of high waves and by stopping or delaying intrusion of water inland. Erosion is a threat to public beach use and access and provide property and infrastructure, fish and wildlife habitat, and public health and safety. The combined effects of erosion are amplified by coastal population growth and increased development.

2.3.3 Bay Shore Erosion

Bay shorelines are experiencing many of the same issues as the Gulf-facing shoreline. Bay shore areas function as buffers, protecting upland habitats from erosion and storm damage, and adjacent wetlands and waterways from water quality degradation. The loss of these bay shorelines from coastal development, vessel wakes along the Gulf Intracoastal Waterway (GIWW), RSLR, and wind and wave erosion contribute to habitat loss, water quality degradation, loss of property, and reduced protection from storm surge and other coastal hazards.

2.3.4 Existing and Future Coastal Storm Surge Damage

Maintaining the coast's natural protective features is critical to minimizing the impact of future storms and hurricanes, and their associated human, infrastructure, and economic losses. Coastal storms present a major threat

to people and property living near the coast, with many long-lasting impacts on community infrastructure, the natural environment and the local, state, and national economies. Increased coastal development, erosion, RSLR, and wetland loss contribute to increased risk and exposure to coastal storm events.

2.3.5 Coastal Flood Damage

Much of the Texas coastal zone lies in a floodplain susceptible to storm and nuisance flooding that impacts and disrupts coastal communities, damages property and natural environments, and poses risk to human health and safety. The impacts of coastal flooding may be exacerbated by increased floodplain development, wetland loss, and ongoing processes such as erosion, subsidence, and sea level rise (SLR). Continued landscape changes increase risk and exposure to hazards, even in areas not previously prone to flooding.

2.3.6 Impacts on Water Quality and Quantity

Increased urban development and water use places demands on water resources and can negatively impact water quality and quantity. Poor water quality leads to habitat and wildlife degradation, health and safety issues, and negative economic impacts on coastal communities, tourism, recreation, and fishing. When coupled with the fact that Texas is a drought-prone state, freshwater inflows to Texas' watersheds and bays are threatened. Adequate inflows are essential to support healthy coastal habitats and wildlife, water quality, salinity, recreation, and commercial activities, such as farming and fishing.

2.3.7 Impacts on Coastal Resources

The coastal zone of Texas boasts an abundance of resources, including oyster, turtles, birds, fish, crabs, and several endangered species that are sensitive to environmental changes. These resources are important to maintain the health of coastal systems, but also for the economy, as they support ecotourism and recreational and commercial fisheries, all of which generate tax revenue for the coastal communities and the state. These resources are impacted by various natural and human disturbances, including population growth, increase resource extraction, habitat loss from development, degraded habitat, and water quality from pollution, reduced freshwater inflows, invasive species, disease, storms, and salinity changes.

2.4 TENTATIVELY SELECTED PLN

The planning process for this study was driven by the overall objective of developing a comprehensive plan that will help manage risks associated with coastal storms within the study counties while avoiding and minimizing impacts to the region's environmental resources.

The CSR and ER measures were developed and evaluated through several iterations of screening and assembled into alternatives to address specific needs for the Texas coast. Consistent with the USACE Specific, Measurable, Attainable, Risk Informed, and Timely (SMART) planning concepts, screening and evaluation of these alternatives relied largely on available existing information. The final array consists of a No-Action Alternative and two final alternatives, which each include three components: one to addresses storm surge in the upper Texas

coast, one to address erosion in the lower Texas coast, and an ER plan for areas along the coast. The primary difference between the two final alternative plans is the alignment of the CSRMs in the upper Texas coast. The features to address erosion in the lower Texas coast and ecosystem degradation along the coast do not vary across the final two alternatives.

The Coastal Barrier Alternative includes a combination of CSRMs structural features along the seaward portion of the study area in addition to a Galveston ring levee, a nonstructural feature on the west side of Galveston Bay, beachfill in the lower Texas coast, and ER along the coast. The upper Texas coast CSRMs system begins at High Island, Texas, and crosses Bolivar Peninsula and Galveston Island with a storm surge barrier across Bolivar Roads.

The Bay Rim Alternative includes a combination of CSRMs features along the West Galveston bay rim and extending westward around Texas City, in addition to a Galveston ring levee, beachfill in the lower Texas coast and ER along the coast. The West Galveston bay rim CSRMs system begins at Baytown and extends down the entire westside of Galveston Bay, around Texas City, ending near the Galveston-Brazoria county line.

The most critical component of the CSRMs plan and the features with the most significant possible impacts are proposed to address storm surge in the upper Texas coast. Therefore, the engineering analysis presented in this appendix supported conceptual development of the distinct alignments, originally Alternative A and Alternative D2, features to achieve CSRMs and assess impacts of those features. The beachfill feature proposed to address erosion within the lower Texas coast is detailed within Appendix C of the DIFR-EIS.

Nonstructural and structural measures were considered as part of the study analysis and were developed to address study objectives. The nonstructural measures considered include buyouts or relocations, structure raising, flood warning systems, and floodplain management. The structural measures include new coastal and inland structural barriers, improved existing hurricane risk reduction systems, and construction of new hurricane risk reduction systems, raising roads, Gulf shoreline restoration (beach and dune restoration, nearshore breakwaters), GIWW erosion protection, marsh restoration, oyster reef restoration/creation, and salinity/water control structures.

This DIFR-EIS presents the results of the CSRMs and ER alternatives analysis and selection of the TSP through an iterative process based on economic, engineering, social, and environmental factors. The performance of the CSRMs and ER Final Array of Alternatives was measured, then evaluated and compared against other CSRMs or ER alternatives to identify a TSP. The evaluation included a comparison of the future without-project condition and the future with-project condition.

2.4.1 Coastal Storm Risk Management

Alternative A: Coastal Barrier/Nonstructural System, Galveston Ring levee and South Padre Island (Figure 1)

- This alternative was developed to address storm surge flooding and the Gulf interface and also to include the highest number of structures and critical facilities within the project area. This would provide risk reduction to the critical GIWW, by maintaining the existing geomorphic features along Bolivar Peninsula and Galveston Island. A strategy including preventing storm

surge from entering the Galveston Bay with a barrier system across Bolivar Peninsula, a closure at the pass at Bolivar Roads, improvements to the Galveston Seawall, and a barrier along the west end of Galveston Island. To address wind-driven surges in the bay, which could impact both the back side of Galveston Island and the upper reaches of the bay, nonstructural measures, ring levees, and closures on key waterways are also being investigated. It also includes a beachfill along a portion of South Padre Island to reduce risk of erosion.

As with the other alternatives, the PDT is also investigating the nexuses between ER and CSRM features by reviewing the beach and dune restoration features along Bolivar Peninsula and Galveston Island. The ER features should also increase the resiliency of the CSRM features.

2.4.2 Ecosystem Restoration

Alternative 1 – Coastwide All-Inclusive Restoration (Figure 2)

- This alternative proposes all the measures. This is the largest alternative that would restore natural features, which provide habitat within the coastal ecology and support natural conditions to withstand coastal storm conditions that cause land and habitat loss. Table 2-1 lists the measures for Alternative 1, which are further described below.

Table 2-1
ER Measures of Alternative 1

Alternative 1 Coastwide All-Inclusive Restoration Alternative	
ER Measure	Name
G-5	Bolivar Peninsula/Galveston Island Gulf Beach and Dune Restoration
G-28	Bolivar Peninsula and West Bay GIWW Shoreline and Island Protection
B-2	Follets Island Gulf Beach and Dune Restoration
B-12	Bastrop Bay, Oyster Lake, West Bay, and GIWW Shoreline Protection
CA-5	Keller Bay Restoration
CA-6	Powderhorn Shoreline Protection and Wetland Restoration
M-8	East Matagorda Bay Shoreline Protection
SP-1	Redfish Bay Protection and Enhancement
W-3	Port Mansfield Channel and Island Rookery Restoration

Described below are the nine different measures that make up the different ER alternatives:

G-5: Bolivar Peninsula/Galveston Island Gulf Beach and Dune Restoration (Figure 3)

- A beach nourishment and dune restoration that will restore Gulf shoreline from High Island to the Galveston East Jetty and shoreline west of the Galveston seawall. Protecting beaches and dunes along the shoreline from breaches and erosion caused by storm surge and SLR. Protect inland wetlands and habitat, which would be harmed if the Gulf shoreline and dune system were breached. This measure also protects State Highway 87, which is the only road

accessing and providing evacuation capability on Bolivar Peninsula and Farm-to-Market Road 3005, and is the only road accessing and providing evacuation capability to the west from Galveston Island.

G-28: Bolivar Peninsula and West Bay GIWW Shoreline and Island Protection (Figure 3)

- This measure features wetland and marsh restoration, breakwaters, island restoration, and marsh nourishment in out-years. Construction of rock breakwaters would reduce erosion of unprotected segments of shoreline along the GIWW on Bolivar Peninsula and shoreline along the north shore of West Bay. Sediment would be used to restore an island that once protected sections of the GIWW and the mainland in West Bay.

B-2: Follets Island Gulf Beach and Dune Restoration (Figure 4)

- This measure features beach nourishment and dune restoration on the Gulf shoreline on Follets Island in Brazoria County. This project also protects State Highway 257, which is the only road accessing and providing evacuation capability to the east towards Galveston Island and to the west towards Freeport. Follets Island protects Bastrop, Christmas, and Drum bays, and the Brazoria National Wildlife Refuge on the mainland behind this bay system.

B-12: West Bay and Brazoria GIWW Shoreline Protection (Figure 4)

- This measure features shoreline protection and restoration (breakwaters, etc.) and oyster reef creation on the western side of West Bay and Cow Trap Lakes, and along selected segments of the GIWW in Brazoria County.

CA-5: Keller Bay Restoration (Figure 5)

- This measure features shoreline protection and restoration (breakwaters) of the Matagorda Bay shoreline adjacent to Keller Bay and oyster reef creation along the western shoreline along Sand Point in Lavaca Bay by installing oyster reef balls in nearshore waters.

CA-6: Powderhorn Shoreline Protection and Wetland Restoration (Figure 5)

- This measure features wetland restoration, shoreline protection and restoration (breakwaters, etc.) along the Matagorda Bay shoreline fronting the community of Indianola and the Powderhorn Lake estuary by restoring marsh at three areas protecting estuarine bays and bayous between Powderhorn Lake and Port O'Connor. The shoreline in the northern part of this area is mainly crushed shell with a little sand, becoming more of a sandy shoreline moving south to Port O'Connor.

M-8: East Matagorda Bay Shoreline Protection (Figure 6)

- This measure features rock breakwaters on unprotected segments of the GIWW shoreline and associated marsh along the Big Boggy National Wildlife Refuge shoreline and eastward to the end of East Matagorda Bay, restoration of shoreline directly in front of Big Boggy National Wildlife Refuge, and the placement of oyster cultch on the bayside of the island.

SP-1: Redfish Bay Protection and Enhancement (Figure 7)

- This measure features restoration of the island complex of Dagger, Ransom, and Stedman islands in Redfish Bay, construction of breakwaters along unprotected GIWW shorelines along the backside of Redfish Bay, and adding oyster reef balls between the breakwater and island complex.

W-3: Port Mansfield Channel, Island Rookery, and Hydrologic Restoration (Figure 8)

- This measure features nourishment of the Gulf shoreline north of the Port Mansfield Channel, protect and restore Mansfield Island with rock breakwater and island restoration, and restore and maintain the hydrologic connection between Brazos Santiago Pass and the Port Mansfield Channel.

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3.0 PURPOSE AND SCOPE

Houston is the fourth most populated city in the United States with the second largest port in terms of tonnage (Port of Houston). Houston is also home to some of the most important oil and gas production and critical infrastructure in the Nation, and the Houston region is highly vulnerable to coastal storm damage. The purpose of this feasibility study is to identify critical infrastructure and recommend a comprehensive strategy for reducing coastal storm flood risk through structural and nonstructural measure in the event of coastal storms such as hurricanes.

Some of the highest rates of Gulf shoreline erosion in Texas occurs in Jefferson County and to the west end of the Galveston Seawall. Much of the Galveston Island dune system that was washed out by Hurricane Ike has still not recovered, leaving the Houston-Galveston area vulnerable to the next major storm. Restoration of beaches and dunes provides renourishment of sediment to beach and dune complexes to address erosion, shoreline loss, and limited sediment supply.

3.1 PREVIOUS STUDIES

Sabine Pass to Galveston Bay Feasibility Study, 2016: The study encompasses six coastal counties on the upper Texas Gulf coast: Orange, Jefferson, Chambers, Harris, Galveston, and Brazoria.

Storm Surge Suppression Study, by the Gulf Coast Community Protection and Recovery District (GCCPRD), 2014 to 2016: A technical, scientific based effort to investigate opportunities to alleviate the vulnerability of the upper Texas coast to storm surge and flooding.

Texas Coastal Resiliency Master Plan, by Texas General Land Office (GLO), 2016 to 2017: A study to provide a framework of community, socioeconomic, ecologic, and infrastructure protection from coastal hazards, including short-term direct impact (e.g., flooding, storm surge) and long-term gradual impacts (e.g., erosion, habitat loss).

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4.0 REAL ESTATE REQUIREMENTS

4.1 EXISTING REAL ESTATE REQUIREMENTS

4.1.1 Existing USACE Interest

The Galveston District has many perpetual easements within the vicinity of the proposed CSRSM and ER footprint. Once the TSP is determined, the exact locations for the Galveston District’s interests within in the project footprint will be illustrated.

4.2 REAL ESTATE REQUIREMENTS

4.2.1 CSRSM Real Estate Requirements

The footprint for CSRSM Alternative A will require approximately 1,662 acres in perpetual easements and 545 acres in temporary work area easements, impacting a total of 1,709 tracts and 1,214 owners. Table 4-1 provides the expected easements and types of estates needed for each of the measures within in the footprint. A tract register listing parcel, land ownership information, or more-detailed real estate mapping were not included in this report due to the level of design at this stage of the report. Upon further refinement on design, a tract register and detailed real estate maps will be included.

Table 4-1
Estimated Land Impacts for CSRSM Alternative A

Alternative	Measure	Feature	Land Use	Est. Owners	Est. Tracts	Perpetual Easements (acres)	Temporary Work Area Easements (acres) ¹
Alternative A (Coastal Barrier/Nonstructural System with Galveston Ring Levee)	Coastal Barrier	Floodwall ²	C/G/I/O/P/R/ UNK/UDN/V	90	128	24.3	27.9
	Coastal Barrier	Levee ³	C/P/R/UND/ UNK/V	914	1,332	1,440.9	143.4
	Galveston Ring	Floodwall	C/G/I/O/P/R/ UND/UNK/V	137	161	27.3	343.4
	Galveston Ring	Levee	C/G/I/O/P/R/ UND/UNK/V	67	80	164.1	26.3
	Clear Lake Gates	Navigation Gate ⁴	C/A/E	6	8	5.4	3.5

C=Commercial, G=Gov/Med/Edu, I=Industrial, O=Other, P=Parks/Open Spaces, R=Residential, Unk=Unknown, UND=Undevelopable, V=Vacant Developable, A=Agricultural Land, E=Electric Company.

¹ Standard Estate#15

² Standard Estate #9

³ Standard Estate #1

⁴ Navigational Servitude

4.2.1.1 Borrow Material

Currently it is contemplated that the borrow material required for the levee features of the CSRM will be acquired commercially, rather than obtained from a borrow area under Federal control, which is the standard approach pursuant to regulation and policy. If this approach is adopted, the costs associated with the acquisition of the borrow material will be a construction cost, and the non-Federal sponsor (NFS) will not be eligible for LERRD crediting for these costs. The PDT will conduct additional research, post TSP, into borrow area locations and costs due to quantity of material needed for CSRM features.

4.2.1.2 Access/Staging Areas

There is currently an estimate of 545 acres required for access/staging areas for the CSRM portion of the project. Once the alternatives are finalized, the REP will be updated to clearly depict the necessary lands required as well as durations for any temporary work area easements necessary as described in Section 4.2.1 of this REP.

4.2.1.3 MITIGATION

All environmental impacts identified for the Recommended Plan are associated with the CSRM Plan, and the associated land requirements will be the responsibility of the GLO. The proposed mitigation plan to restore approximately 8,226 acres for CSRM Alternative A is in the conceptual stages. Once the TSP is finalized, the required mitigation and locations will be updated accordingly, which will result in additional real estate requirements and costs.

4.2.1.4 Coastal Barrier Resources Act

The Coastal Barrier Resources Act (CBRA) of 1982 established the John H. Chafee Coastal Barrier Resources Systems (CBRS), a defined set of geographic units along the Atlantic, Gulf, Great Lakes, U.S. Virgin Islands, and Puerto Rico coasts. Most new Federal expenditures and financial assistance are prohibited within the CBRS, unless those activities qualify for an exception under Section 6 of CBRA (16 United States Code [USC] § 3505).

The Section 6 exceptions are divided into two groups. The first group only requires that the proposed funding is in fact for a project or action that is listed exception. The second group requires that the exception also meet the three purposes of the CBRA. Those purposes are to minimize the loss of human life, wasteful expenditures of Federal revenues, and the damage to fish, wildlife, and other natural resources associated with coastal barriers.

A Federal expenditure is allowable within the CBRS, if it meets any of the following exceptions (16 USC § 3505(a)(1)-(5)):

- Any use or facility necessary for the exploration, extraction, or transportation of energy resources, which can be carried out only on, in, or adjacent to the coastal water area, because the use of facility requires access to the coastal waterbody.
- The maintenance or construction of improvements of existing Federal navigation channels (including the GIWW) and related structures (such as jetties), including the disposal of dredge materials related to such maintenance or construction. A Federal navigation channel or a related structure is an existing channel or structure, respectively, if it was authorized before the date on which the relevant system unit or portion of the system unit was included with the CBRS.
- The maintenance, replacement, reconstruction, or repair, but not the expansion of publicly owned or publicly operated roads, structures, or facilities that are essential links in a larger network or system.
- Military activities essential to national security.
- The construction, operation, maintenance, and rehabilitation of U.S. Coast Guard facilities and access thereto.

Additional information on the exceptions applying to Federal navigation channels, highways in Michigan, and CBRS unit T11 are listed under 16 USC § 3505 (b), (c), and (d).

A Federal expenditure is allowable within the CBRS if it meets any of the following exceptions (16 USC § 3505(a)(6)) and is also consistent with the three purposes of the CBRA:

- Projects for the study, management, protection, and enhancement of fish and wildlife resources and habitats, including acquisition of fish and wildlife habitats, and related lands, stabilization project for fish and wildlife habitats, and recreational projects.
- Establishment, operation, and maintenance of air and water navigation aids and devices, and for access thereto.
- Project under the Land and Water Conservation Fund Act of 1965 (16 USC § 460I-4 through 11) and Coastal Zone Management Act of 1972 (16 USC § 1451 et seq.).
- Scientific research, including aeronautical, atmospheric, space, geologic, marine, fish and wildlife, and other research, development, and applications.
- Assistance for emergency actions essential to the saving of lives and protection of property and the public health and safety, if such actions are performed pursuant to sections 5170a, 5170b, and 5192 of title 42 and section 1362 of the National Flood Insurance Act of 1968 (42 USC § 4103) and are limited to actions that are necessary to alleviate the emergence.
- Maintenance, replacement reconstruction, or repair but not the expansion (except with respect to U.S. Route 1 in the Florida Keys), of publicly owned or publicly operated roads, structures, and facilities.
- Nonstructural projects for shoreline stabilization that are designed to mimic, enhance, or restore a natural stabilization system.

Figure 17 shows CBRS system units within the CSRM Alternative A footprint, and Figures 18 through 23 show CBRS system units within the ER Alternative 1 footprint. CBRA has been discussed in length regarding the proposed alternatives. For additional information regarding opinions, see preliminary CBRA opinion prepared by Planning to accompany the draft report.

4.2.2 Ecosystem Restoration Real Estate Requirements

The footprint for ER Alternative 1 will require approximately 51,878 acres in fee impacting a total of 5,550 tracts and 2,766 owners. Standard Estate #1 will be required for all ER features on lands that are not beach and dunes. In the event that ER features impact state-owned land, which will not allow the acquisition of land in fee, a request for approval of a non-standard estate will be submitted to Headquarters. Non-standard language has not been determined due to the level of design and stage of the report. Standard Estate #21 will be required for ER features located along the banks of the GIWW. Standard Estate# 26 will be required for all ER features located on beach and dunes. Table 4-2 lists the land impacts for each of the measures within in the footprint.

Table 4-2
Estimated Land Impacts for ER Alternative 1
All Real Estate to be Acquired in Fee (except state-owned lands)

Alternative	Measure	Est. Tracts	Est. Owners	Submerged Land (acres)	Beach (acres)	Dunes (acres)	Wetlands (acres)	Buildable (acres)
Alternative 1 (Coastwide All-Inclusive Restoration Alternative)	G-28	428	111				16,675	289
	G-28 (Out-year)	574	251				5,458	548
	G-5	3,671	2,066	513	613	588		
	B-2	227	21	642	372	11		
	B-12	239	28				825	958
	B-12 (Out-year)	169	111				15,120	
	M-8	16	6				52	5,881
	M-8 (Out-year)	27	7					
	CA-5	137	124		87			
	CA-5 (Out-year)	4	2				869	
	CA-6	57	38				378	12
	SP-1	0	0	407				
	W-3	1	1			1,580		

4.2.2.1 Borrow Material

Materials required for ER features will be sourced from offshore locations, the GIWW, or navigation channels crossing the GIWW subject to the proximate wetland, marsh, and island restoration locations.

4.2.2.2 Coastal Barrier Resources Act

CBRA has been discussed in length regarding the proposed alternatives. For additional information regarding opinions, see preliminary CBRA opinion prepared by Planning to accompany the draft report.

4.3 ESTATE NEEDED FOR REAL ESTATE REQUIREMENTS

The NFS is responsible for acquiring and furnishing all required LERRD for the project. Lands needed for this project will be acquired through a combination of fee, permanent levee easement, temporary work area easements required for the CSRM features, and a nonstandard estate for any state-owned lands needed for the ER features. The real estate requirements for the project must support construction as well as the continued operation and maintenance of the project. The majority of the acreage affected by the project consists of residential, commercial, industrial, vacant/undeveloped, and wetland/marsh land.

The real estate interests for this project are as follows. The following USACE Standard Estates are applicable:

Standard Estate #1. Fee

The fee simple title to (the land described in Schedule A) (Tracts Nos. _____, _____ and _____) subject, however, to existing easements for public roads and highways, public utilities, railroads and pipelines.

Standard Estate #6. Flowage Easement (Occasional Flooding)

The perpetual right, power, privilege and easement occasionally to overflow, flood and submerge (the land described in Schedule A) (Tracts Nos. _____, _____ and _____), (and to maintain mosquito control) in connection with the operation and maintenance of the project as authorized by the Act of Congress approved _____, together with all right, title and interest in and to the structure; and improvements now situate on the land, except fencing⁵ (and also excepting (here identify those structures not designed for human habitation which the District Engineer determines may remain on the land))⁶; provided that no structures for human habitation shall be constructed or maintained on the land, that no other structures shall be constructed or maintained on the land except as may be approved in writing by the representative of the United States in charge of the project, and that no excavation shall be conducted and no landfill placed on the land without such approval as to the location and method of excavation and/or placement of landfill; ⁷the above estate is taken subject to existing easements for public roads and highways, public utilities, railroads and pipelines; reserving, however, to the landowners, their heirs and assigns, all such rights and privileges as may be used and enjoyed without interfering with the use of the project for the purposes authorized by Congress or abridging the rights and easement hereby acquired; provided further that any use of the land shall be subject to Federal and State laws with respect to pollution.

Standard Estate #9. Flood Protection Levee Easement

A perpetual and assignable right and easement in the land described to construct, maintain, repair, operate, patrol and replace a flood protection levee, including all appurtenances thereto; reserving, however, to the owners, their heirs and assigns, all such rights and privileges in the land as may be used without interfering with or abridging the rights and easement hereby acquired; subject, however, to existing easements for public roads and highways, public utilities, railroads and pipelines.

Standard Estate #15. Temporary Work Area Easement

A temporary easement and right-of-way in, on, over and across (the land described in Schedule A) (Tracts Nos. _____, _____ and _____), for a period not to exceed _____, beginning with date possession of the land is granted to the United States, for use by the United States, its representatives, agents, and contractors as (borrow area) (work area), including the right to (borrow and/or deposit fill, spoil and waste material thereon) (move, store and remove equipment and supplies, and erect and remove temporary structures on the land and to perform any other work necessary and incident to the construction of the _____ Project, together _____ with the right to trim, cut, fell and remove therefrom all trees, underbrush, obstructions, and any other vegetation, structure, or obstacles within the limits of the right-of-way; reserving, however, to the landowners, their heirs and assigns, all such rights and privileges as may be used without interfering with or abridging the rights and easement hereby acquired; subject, however, to existing easements for public roads and highways, public utilities, railroads and pipelines.

Standard Estate #21. Bank Protection Easement

A perpetual and assignable easement and right-of-way in, on, over and across the land hereinafter described for the location, construction, operation, maintenance, alteration, repair, rehabilitation and replacement of a bank protection works, and for the placement of stone, riprap and other materials for the protection of the bank against erosion; together with the continuing right to trim, cut, fell, remove and dispose therefrom all trees, underbrush, obstructions, and other vegetation; and to remove and dispose of structures or obstructions within the limits of the right-of-way; and to place thereon dredged, excavated or other fill material, to shape and grade said land to desired slopes and contour, and to prevent erosion by structural and vegetative methods and to do any other work necessary and incident to the project; together with the right of ingress and egress for such work; reserving, however, to the landowners, their heirs and assigns, all such rights and privileges as may be used without interfering with or abridging the rights and easement hereby acquired; subject, however to existing easements for public roads and highways, public utilities, railroads and pipelines.

Standard Estate #26. Perpetual Beach Storm Damage Reduction Easement

A perpetual and assignable easement and right-of-way in, on, over and across (the land described in Schedule A) (Tract No. _____) for use by the (Project Sponsor), its representatives, agents, contractors, and assigns, to construct; preserve; patrol; operate; maintain; repair; rehabilitate; and replace; a public beach [a dune system] and other erosion control and storm damage reduction measures together with appurtenances thereto, including the right to deposit sand; to accomplish any alterations of contours on said land; to construct berms [and dunes]; to nourish and renourish periodically; to move, store and remove equipment and supplies; to erect and remove temporary structures; and to perform any other work necessary and incident to the construction, periodic renourishment and maintenance of the (Project Name), together with the right of public use and access; [to plant vegetation on said dunes and berms; to erect, maintain and remove silt screens and sand fences; to facilitate preservation of dunes and vegetation through the limitation of access to dune areas;] to trim, cut, fell, and remove from said land all trees, underbrush, debris, obstructions, and any other vegetation, structures and obstacles within the limits of the easement (except _____); [reserving, however, to the grantor(s), (his) (her) (its) (their) (heirs), successors and assigns, the right to construct dune overwalk structures in accordance with any applicable Federal, State or local laws or regulations, provided that such structures shall not violate the integrity of the dune in shape, dimension or function, and that prior approval of the plans and specifications for such structures is obtained from the (designated representative of the Project

Sponsor) and provided further that such structures are subordinate to the construction, operation, maintenance, repair, rehabilitation and replacement of the project; and further] reserving to the grantor(s), (his) (her) (its) (their) (heirs), successors and assigns all such rights and privileges as may be used and enjoyed without interfering with or abridging the rights and easements hereby acquired; subject however to existing easements for public roads and highways, public utilities, railroads and pipelines.

4.3.1 Access/Staging Areas

There is currently an estimate of 545 acres required for access/staging areas for the CSRM portion of the project. Once the alternatives are finalized, the REP will be updated to clearly depict the necessary lands required as well as durations for any temporary work area easements necessary as described in Section 4.2.1 of this REP.

4.4 RECREATION FEATURES

The proposed project does not have any recreation features.

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5.0 NON-FEDERAL SPONSOR

The USACE Galveston District is responsible for the overall management of the study. The NFS for the study and construction is the GLO. The GLO has been actively involved throughout the study process and has the ability to acquire LERRD for this project, as discussed in Section 13 of this REP. The GLO will not be responsible for operation, maintenance, repair, replacement, and rehabilitation (OMRR&R). A separate local sponsor will be sought for certain identified portions of project features to be responsible for OMRR&R. The OMRR&R NFS must have the ability to own the necessary land interests to perform this work, which will require a non-standard Project Partnership Agreement (PPA). Once the OMRR&R NFSs has been identified, the REP will be updated to reflect the specific areas of responsibility for each identified NFS.

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6.0 **FEDERALLY OWNED LAND AND EXISTING FEDERAL PROJECT**

6.1 **CSRM IMPACTS ON FEDERALLY OWNED LANDS**

The CSRM features will be impacting Federally owned lands at the Galveston Entrance Channel (Figure 24) and Eastern Tie-In Reach (Figure 25). The environmental gate at Galveston Entrance Channel will be impacting two tracts of the Galveston Harbor Channel Project in which the government owns the fee interest, and the sector gate at Eastern Tie-In Reach will be impacting three tracts of the GIWW Project in which the Government holds perpetual easements. As designs of the subject gates develop, the PDT will coordinate closely with the Galveston District Operations Division to minimize Federal project impacts. The features of both CSRM and ER alternatives impact several Federally owned lands (Figures 9 through 18).

6.2 **ER IMPACTS ON FEDERALLY OWNED LANDS**

A few measures of the ER footprint currently lie on the interest either in fee or perpetual easement of tracts controlled by the Galveston District. Table 6-1 shows a breakdown of the estimated number of tracts or placement areas controlled and/or maintained by the Galveston District that will be impacted. It is assumed that after the TSP milestone the footprint will be moved to not impact lands currently used for navigation purposes.

Table 6-1
ER Measures Impact of the Galveston District Interest

Measures	Features	Number of Galveston District Tracts Impacted	Number Galveston District Placement Areas Impacted
G-28	Wetlands, Revetment/ Breakwaters, Out-Year Nourishment, Island Restoration	82	4
B-12	Wetlands, Revetment/ Breakwaters, Out-Year Nourishment	47	14
M-8	Wetlands, Revetment/ Breakwaters, Out-Year Nourishment, Island Restoration	1	7
SP-1	Wetlands, Revetment/ Breakwaters, Submerged Aquatic Vegetation, Island Restoration	2	7
W-3	Dune/Beach Restoration, Revetment/ Breakwaters, Island Restoration	1	1

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7.0 NON-FEDERAL SPONSOR OWNED LAND

Portions of CSRM gate features will lie within submerged land owned by the GLO. At this level of design and stage of the report, it is anticipated that navigational servitude will apply for the construction of the gate features. After final project features and alignment have been completed, a final determination of navigational servitude will be made. The GLO also owns lands located in multiple ER measures in Alternative 1 totaling 1,562 acres as stated in Table 4-2 above.

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8.0 NAVIGATION SERVITUDE

Portions of the project structures, specifically two navigation gates located in Clear Lake and Dickenson Bayou, one sector gate at the Eastern Tie-In Reach (Highway 124 at GIWW), and one environmental gate located at the Galveston Entrance Channel, will lie within navigational waters of the U.S. When properly exercised, the navigation servitude operates as an exception to the Fifth Amendment's Takings Clause, and no compensation is required for actions that would otherwise constitute a taking. Whether the navigation servitude is available for a coastal storm damage reduction project depends on the project's relationship to navigation. For example, coastal storm damage reduction measures may be related to navigation if the measures contribute to preventing or mitigating damage caused by navigation measures, involve the placement of material dredged from navigation channels, or otherwise have an impact on navigation. The TSP, Alternative A, will include gates at Clear Lake (Figure 26), Dickenson Bayou (Figure 27), Eastern Tie-In Reach (Figure 28), and the Galveston Entrance Channel (Figure 29). A District Counsel legal opinion will be requested to address the application of servitude for these gate features.

CSRMs for this project were developed to protect severe erosion and coastal damage along the Texas coast. Clear Lake and Dickenson Bayou are waterways located on the west rim of Galveston Bay. These areas are surrounded by many residential and commercial structures. These businesses bring in the majority of commerce in their areas. The sector gate at Highway 124 and the GIWW is a major intersection that brings in local and foreign commerce to the region.

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9.0 INDUCED FLOODING

Both CSRM alternatives have the potential to increase stages to the areas exterior to the levee. With the TSP, the potential of induced flooding is limited to the structures on Bolivar Peninsula and Galveston Island. There is a margin of error in both the economic model and the storm surge modeling (ADCIRC) when it comes to induced stages. There are approximately 1,000 structures outside of the current levee/floodwall proposed alignment, which could be subject to induced stages. Additional investigation would be needed in these populated areas to investigate the potential risk for induced stages. It is important to note that the planning team is currently focused on the general geographic location of the barriers. Once an overall strategy for the risk reduction system has been selected, the study team will focus on the scale and final detailed alignment of TSP in the future planning and design phases.

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10.0 BASELINE COST ESTIMATE FOR REAL ESTATE

10.1 CSRM COST

The baseline cost estimate for CSRM lands was calculated by using Appendix G.1, the Cost Estimation of the Storm Surge Suppression Study, Phase 2 Report prepared by the GCCPRD in accordance with U.S. Senator John Cornyn, Corps Obligation to Assist in Safeguarding Texas Act of 2016, S.2856, 114th Cong. (2015-2016), which requires the USACE to expedite the completion of the Coastal Texas Protection and Restoration Study by taking into consideration information developed by the GCCPRD. The report states that the land cost methodology was determined by using the Galveston and Harris County Appraisal Districts' Tax Appraisal Values and applying a 30 percent markup for property owners not willing to sell their property. These values were further verified by the Zillow's Zestimate on the Zillow website. Additional administration fees were added based on the amount of tracts such as appraisal, survey, title commitment, appraisal reviews, etc. Due to the uncertainty of the cost estimation provided by the GCCPRD, a contingency cost of 40–55 percent was included into the baseline cost estimate. Once a gross appraisal is completed, the REP and the baseline cost estimate will be updated. Table 10-1 is the baseline cost estimate for Alternative A of CSRM, and Table 10-2 is the baseline cost estimate for South Padre Island CSRM.

10.1.1 South Padre Island CSRM Cost

The land acquisition costs were determined by using the local appraisal district's data, previous appraisals, and the Local Multiple Listing Service (MLS). This method of determining land value is not the preferred method and is known for being inaccurate. Additionally, this method does not meet the requirements described within Engineer Circular (EC 405-1-04), Uniform Appraisal Standards for Federal Land Acquisitions (UASFLA), and/or the Uniform Standards of Professional Appraisal Practice (USPAP) used for Federal land acquisition. This cost analysis assumes that no residential, commercial, or industrial structures will be purchased, and no PL 91-646 costs are anticipated. Prior to Agency Decision Milestone, a gross appraisal will be conducted. Prior to acquisition, all properties within the project footprint require an appraisal that must meet requirements laid out in both UASFLA and USPAP.

To obtain fee, the land must be free of all covenants to include subdivisions and Covenants, Conditions, and Restrictions (CCRs) and homeowner's association (HOA) covenants. To clear title, the covenants will have to be condemned removing these rights from the land being acquired. A cost of \$35,000, per subdivision, was used to determine the overall costs to condemn the covenants. There is an estimate of two subdivisions that will require condemnation according to the information obtained from the local appraisal districts. The number of subdivisions may vary once the properties to be acquired have been surveyed, and the local covenants are determined.

Table 10-1
Baseline Cost Estimate for Coastal Storm Risk Management Alternative A

Alternative A			
Account	Description	Amount	
non Federal	0102	Acquisition Labor for Relocation Assistance, Homeowner Negotiations, LERRD Submission (provided by GCCPRD) (40 hrs x \$125/hr per tract)	\$8,545,000.00
	0103	Condemnation Subdivisions (\$35,000 per subdivision)	\$700,000.00
	0103	Condemnation (\$90,000 per tract, 17% of the private tract and 1% of County and Sponsor Land)	\$30,762,000.00
	0105	Appraisals (\$2,500 per tract)	\$4,272,500.00
		Survey (\$4,000 per tract)	\$6,836,000.00
	0112	Temporary ROW, Permits, License (\$500 per owner)	\$607,000.00
		Office Administration and Management Oversight (8 hrs x \$125/hr per tract)	\$213,625.00
	01-1501	Land Value Estimate (Estimated values for Private, Federal, State, County, and Sponsor Owned Lands)	\$418,476,999.00
	01-0117	Relocations	\$42,901,391.00
		Title Commitment (\$1,000 per tract)	\$1,709,000.00
	Subtotal	\$515,023,515.00	
	Contingency	\$128,755,878.00	
Non Federal Total		\$643,779,393.75	
Account	Description	Amount	
Federal	0102	Acquisition Labor for reviewing RE Planning Documents, Verifying Ownership, Relocation Assistance, LERRD Crediting, Mapping (10 hrs x \$125/hr per tract)	\$2,136,250.00
	0105	Appraisal Reviews (10 hrs x \$150/hr per tract)	\$2,563,500.00
	0112	Office Administration and Management Oversight (6 hrs x \$125/hr per tract)	\$1,281,750.00
	01-0117	Attorney's Opinion (\$3,300 per tract)	\$5,639,700.00
		Subtotal	\$11,621,200.00
	Contingency	\$2,905,300.00	
Federal Total		\$14,526,500.00	
GRAND TOTAL		\$658,305,893.75	

Table 10-2
Baseline Cost Estimate for South Padre Island CSRM Feature

South Padre Island CSRM			
Account	Description	Amount	
non Federal	0102	Acquisition Labor for Relocation Assistance, Homeowner Negotiations, LERRD Submission (40 hrs x \$125/hr per tract)	\$490,000.00
	0103	Condemnation Subdivisions (\$35,000 per subdivision)	\$70,000.00
	0103	Condemnation (\$90,000 per tract, 17% of the private tract and 1% of County and Sponsor Land)	\$44,100.00
	0105	Appraisals (\$2,500 per tract)	\$245,000.00
		Survey (\$4,000 per tract)	\$196,000.00
	0112	Temporary ROW, Permits, License (\$500 per owner)	\$44,000.00
		Office Administration and Management Oversight (8 hrs x \$125/hr per tract)	\$98,000.00
	01-1501	Land Value Estimate (Estimated values for Private, Federal, State, County, and Sponsor-Owned Lands)	\$186,000.00
	01-0117	Relocations	\$98,000.00
		Title Commitment (\$1,000 per tract)	\$1,471,100.00
		Subtotal	\$294,220.00
		Contingency	\$1,765,320.00
Non Federal Total			
Account	Description	Amount	
Federal	0102	Acquisition Labor for reviewing RE Planning Documents, Verifying Ownership, Relocation Assistance, LERRD Crediting, Mapping (10 hrs x \$125/hr per tract)	\$122,500.00
	0105	Appraisal Reviews (10 hrs x \$150/hr per tract)	\$147,000.00
	0112	Office Administration and Management Oversight (6 hrs x \$125/hr per tract)	\$73,500.00
	01-0117	Attorney's Opinion (\$3,300 per tract)	\$323,400.00
			Subtotal
		Contingency	\$133,280.00
Federal Total			\$799,680.00
GRAND TOTAL			\$2,565,000.00

10.2 ECOSYSTEM RESTORATION COST

10.2.1 Land Acquisition Costs

The land acquisition costs were determined by using the local appraisal district's data, previous appraisals, and the Houston MLS. This method of determining land value is not the preferred method and is known for being inaccurate. Additionally, this method does not meet the requirements described within Engineer Circular (EC 405-1-04), UASFLA, and/or the USPAP used for Federal Land Acquisition. This cost analysis assumes that no residential, commercial, or industrial structures will be purchased, and no PL 91-646 costs are anticipated. Prior to the Agency Decision Milestone, a gross appraisal will be conducted. Prior to acquisition, all properties within the project footprint require an appraisal that must meet requirements laid out in both UASFLA and USPAP.

10.2.2 Subdivisions and Covenants, Conditions, and Restrictions

To obtain fee, the land must be free of all covenants to include subdivisions and CCRs and HOA covenants. To clear title, the covenants will have to be condemned removing these rights from the land being acquired. A cost of \$35,000, per subdivision, was used to determine the overall costs to condemn the covenants. There is an estimate of 21 subdivisions that will require condemnation according to the information obtained from the local appraisal districts. The number of subdivisions may vary once the properties to be acquired have been surveyed, and the local covenants are determined.

10.2.3 Acquiring Beach Properties

Some of the beach property to be acquired within these contemplated measures are encumbered by the Texas Open Beaches Act (TXOBA) and Texas 65th legislation. The TXOBA, passed in 1959, protects public access to the 367 miles of Texas coastline along the Gulf.

Salient information from the Texas 65th Legislation p. 2478, ch. 871, art. I, Sec. 1, eff. Sept. 1, 1977:

Sec. 61.012 "beach" means state-owned beaches to which the public has the right of ingress and egress bordering on the seaward shore of the Gulf of Mexico or any larger area extending from the line of mean low tide to the line of vegetation bordering on the Gulf of Mexico if the public has acquired a right of use or easement to or over the area by prescription, dedication, or has retained a right by virtue of continuous right in the public.

Sec. 61.013. PROHIBITION. (a) It is an offense against the public policy of this state for any person to create, erect, or construct any obstruction, barrier, or restraint that will interfere with the free and unrestricted right of the public, individually and collectively, lawfully and legally to enter or to leave any public beach or to use any public beach or any larger area abutting on or contiguous to a public beach if the public has acquired a right of use or easement to or over the area by prescription, dedication, or has retained a right by virtue of continuous right in the public.

Storm surge caused by Hurricane Ike in 2008 affected multiple structures and sediment movement along the coast line. The TXOBA was considered in the cost estimate; however, the Galveston beach coastline has moved inward leaving sections of the beach and submerged land owned by private landowners, according to the local county appraisal district.

Due to data obtained from the local appraisal district, the following breakdown was used on each area of the project and utilized to determine the real estate baseline cost estimate.

G-5 Bolivar Peninsula/Galveston Island Gulf Beach and Dune Restoration

Submerged Land

Property that is currently submerged along the Texas coast line was evaluated at \$ 0.0125 per square foot. This amount was determined by using an average square footage for residential lot of 8,000 square feet and dividing it by a nominal amount of \$100 for each tract of land as proposed by the local county appraisal district for value of submerged land within the Galveston.

Beach Property

The buying and selling of beach property that is encumbered by TXOBA is not available on the local MLS. The cost determination was based on the remaining utility being between the value of a wetland cost of \$0.022956 per square foot and submerged land at \$0.0125 per square foot. The beach tracts owned by private landowners is estimated at \$0.018 per square foot. This evaluation is for the beach only and does not include the dunes along the beach line.

Acquiring Dunes on Galveston Island

The dunes along the coast line are owned by the private landowners. However, the dunes are protected by State and local legislation and cannot be delineated or built upon. The current market value for property on the beach, which includes dunes, is between \$21.15 and \$26.28 per square foot. Table 10-3 below includes recently sold lots from the local MLS. The mean price per square foot is \$23.26, which is the amount used for evaluating the cost of the dunes.

Table 10-3
MLS for Dunes on Galveston Island

Location (Street Name)	Size (acres)	Price (\$/acre)	Sold Price (\$)	Sold Date	Price (\$/sq. ft.)
E. Sand Hill Dr.	0.345	\$1,144,924.54	\$395,000.00	6/14/2014	\$26.28
Sand Hill Dr.	0.3234	\$1,020,408.16	\$330,000.00	5/24/2017	\$23.43
Flamingo Dr.	0.259	\$965,250.97	\$250,000.00	7/6/2017	\$22.16
Flamingo Dr.	0.2497	\$291,105.33	\$230,000.00	3/31/2016	\$21.15
Average Price (\$/sq. ft.)					\$23.36

Acquiring Dunes on Bolivar Peninsula

Similar to the dunes on Galveston Island, the dunes along the coast line of Bolivar Peninsula are owned by the private landowners and protected by State and local legislation. The dunes cannot be delineated or built upon. The current market value for property on the beach, which includes dunes, is between \$6.50 and \$34.42 per square foot. Table 10-4 below includes recently sold lots from the local MLS. The mean price per square foot is \$19.90, which is the amount used for evaluating the cost of the dunes.

Table 10-4
MLS for Dunes on Bolivar Peninsula

Street	Date Sold	List Price (\$)	Lot Size (sq. ft.)	Price (\$/sq. ft.)
San Luis Pass Road	03/31/2017	39,000	6,000	6.50
Lot 1 Gulf	10/02/2017	90,000	6,435	13.99
Gulf Drive	1/16/2017	90,000	7,800	11.54
Sea Urchin	12/09/2016	115,000	4,725	24.34
Conch	12/16/2016	122,500	5,339	22.94
John Reynolds	03/31/2017	140,000	5,225	26.79
Lot 82 Grand Ave	06/09/2017	155,000	8,400	18.45
LT 23 Kennedy Dr	10/12/2017	160,000	7,400	21.62
West De Vaca Lane	02/21/2017	175,000	15,764	11.20
Maison Rogue	02/10/2017	177,500	6,104	29.08
Pelican Lane	02/17/2017	180,500	8,607	20.97
Kahala Drive	10/10/2017	187,500	14,356	13.06
Beachside	05/09/2017	245,000	7,118	34.42
E De Vaca	2/17/2017	285,000	32,017	8.90
Kahala Drive E	11/8/2017	287,500	24,571	11.70
Kahala Drive E	11/08/2017	287,500	24,507	11.73
Sandhill Drive	5/4/2017	330,000	14,089	23.42
E Sand Hill Drive	6/17/2017	395,000	15,028	26.28
Beachside Dr.	9/15/2017	450,000	20,726	21.71
Sunbather Ln.	1/20/2017	470,000	23,918	19.65
Beachside Dr.	8/16/2017	481,000	15,518	31.00
Beachside Dr.	10/18/2017	542,000	19,025	28.49
Average Price (\$/sq. ft.)				\$19.90

Follets Island Gulf Beach and Dune Restoration

This measure is located south of Bluewater Highway on Follets Island, which is south of Galveston Island.

Submerged Land

Property that is currently submerged along the Texas coast line was evaluated at \$ 0.0125 per square foot. This amount was determined by using an average square footage for residential lot of 8,000 square feet and dividing it by a nominal amount of \$100 for each tract of land.

Beach Property

The buying and selling of beach-owned property that is encumbered by TXOBA is not available on the local MLS. The cost determination was based on the remaining utility being between the value of a wetland cost of

\$0.022956 per square foot and submerged land at \$0.0125 per square foot. The beach tracts owned by private landowners are estimated at \$0.018 per square foot.

Acquiring Dunes

Sixteen sold listings were evaluated for cost of land within the project area. The listings consists of lots ranging between 0.117 of an acre to 0.92 of an acre and sold between November 18, 2016 and October 9, 2017. MLS number 77900587 has a square footage price of \$0.48, which is \$2.31 lower than the next lowest dollar per square foot sold property. This property is considered an outlier and was removed from the list of sold properties. The remaining 15 listings consists of a range between \$2.79 and \$14.66 per square foot with an average value of \$9.07 a square foot. This amount was applied to the dune section being purchased from parcels within the project foot print.

Table 10-5 is the list of comparables used to determine the value of parcels along the dune line. Table 10-6 is the baseline cost estimate for ecosystem restoration alternative.

Table 10-5
MLS for Dunes on Follets Island

Lot Size (acres)	Closed Date	Closed Price (\$)	Sold Price (\$/acre)	Sold Price (\$/sq.ft.)
0.1234	4/11/2017	15,000	121,555.92	2.79
0.1286	8/21/2017	17,000	132,192.85	3.03
0.1148	11/18/2016	38,000	331,010.45	7.60
0.1148	4/21/2017	41,500	361,498.26	8.30
0.1371	12/12/2016	42,000	306,345.73	7.03
0.1148	8/2/2017	42,888	373,588.85	8.58
0.3444	7/3/2017	50,000	145,180.02	3.33
0.117	3/29/2017	57,000	487,179.49	11.18
0.1366	10/9/2017	63,000	461,200.59	10.59
0.2143	3/12/2017	75,000	349,976.67	8.03
0.118	12/22/2016	120,000	1,016,949.15	23.35
0.1957	3/3/2017	125,000	638,732.75	14.66
0.2334	3/31/2017	125,000	535,561.27	12.29
0.9203	6/8/2017	250,000	271,650.55	6.24
Average Price (\$/sq. ft.)				9.07

CA-5 Kelly Bay Restoration and CA-6 Powderhorn Shoreline Protection and Wetland Restoration

The majority of the property in this measure consists of wetlands that cannot be built upon. There is currently only one active listing for a buildable lot, with no utilities, consisting of 6,098 square feet for a list price of \$6,400 (MLS 19681536) or \$1.05 per square foot. There were zero sold listings in the area from the last 10 years based on the Houston MLS. In 2015, a mass appraisal was conducted on the Sabine to Galveston feasibility study and found wetlands to be in a range of \$300 to \$900 an acre. Using the cost price index, the 2015 range was adjusted

upward to a range of \$316.63 to \$949.89 an acre. The local County Appraisal District has an evaluation of \$300 to \$1,700 per acre with a mean of \$1,000 per acre. Based on this information an amount of \$1,000 per acre or \$0.0230 per square foot was used for wetland properties.

W-3 Port Mansfield Channel and Beach Restoration

This measure consists of hydrology within Laguna Madre and dredging the Port Mansfield Channel. The dredge material will be placed on the beach by the entrance of the channel. With the use of navigation servitude, the Texas Coastal Erosion Planning and Response Act and Memorandum of Agreement between USACE and the GLO for placement of dredge material on the beaches of Texas, dated July 27, 2001, the real estate costs will be minimal for this measure. The beach is owned by Padre Island National Seashore.

SP-1 Redfish Bay Protection and Enhancement

This measure is within the bay between Ingleside and Port Aransas. This measure is covered by navigation servitude and will not require any real estate acquisitions, however an amount of \$5,000 was added as a cost for administration fees that may occur.

B-12 Brazoria County GIWW Shoreline Protection (Freeport)

The majority of land in these area appears to be wetlands. A cost of \$1,000 per acre or \$0.0230 per square foot has been applied to this section of the measure.

M-8 East Matagorda Bay Shoreline Protection

The majority of land in these area appears to be wetlands. A cost of \$1,000 per acre or \$0.0230 per square foot has been applied to this measure.

G-28 West Bay GIWW Shoreline Protection

The majority of land in these area appears to be wetlands. A cost of \$1,000 per acre or \$0.0230 per square foot has been applied to this measure.

G-28 Bolivar Peninsula

There is an estimated 3,653 acres that are within the footprint on Bolivar Island. An assumption was made that sections that affect physical structures, residential or commercial, will not be acquired for this environmental restoration measure. Of the 3,653 acres, it is assumed that 85 percent consists of wetlands, 365 acres or 10 percent make up the lower end of the comparable sales, 182 acres or 5 percent make up the higher end of the comparable land sales.

Table 10-6
Baseline Cost Estimate for ER Alternative 1

Alternative 1			
Account	Description	Amount	
Non Federal	0102	Acquisition Labor for Relocation Assistance, Homeowner Negotiations, LERRD Submission (40 hrs x \$125/hr per tract)	\$27,145,000.00
	0103	Condemnation Subdivisions (\$35,000 per subdivision)	\$1,225,000.00
	0103	Condemnation (\$90,000 per tract, 17% of the private tract and 1% of County and Sponsor Land)	\$66,071,700.00
	0105	Appraisals (\$2,500 per tract)	\$13,572,500.00
		Survey (\$4,000 per tract)	\$21,716,000.00
	0112	Temporary ROW, Permits, License (\$500 per owner) Office Administration and Management Oversight (8 hrs x \$125/hr per tract)	\$1,384,000.00 \$5,429,000.00
	01-1501	Land Value Estimate (Estimated values for Private, Federal, State, County, and Sponsor Owned Lands)	\$1,055,707,447.25
	01-0117	Title Commitment (\$1,000 per tract)	\$5,429,000.00
		Subtotal	\$1,197,679,647.25
		Contingency	\$299,419,911.81
non-Federal Total		\$1,744,386,743.00	
Federal	0102	Acquisition Labor for reviewing RE Planning Documents, Verifying Ownership, Relocation Assistance, LERRD Crediting, Mapping (10 hrs x \$125/hr per tract)	\$6,786,250.00
	0105	Appraisal Reviews (10 hrs x \$150/hr per tract)	\$7,807,500.00
	0112	Office Administration and Management Oversight (6 hrs x \$125/hr per tract)	\$4,171,750.00
	01-0117	Attorney's Opinion (\$3,300 per tract)	\$17,176,500.00
		Subtotal	\$35,942,000.00
	Contingency	\$8,985,500.00	
Federal Total		\$44,927,500.00	
GRAND TOTAL		\$1,542,027,059.06	

Below are the totals for Federal and non-Federal real estate baseline cost estimates for CSRM Alternative 1, SPI, and ER features.

	non-Federal	Federal	Total
CSRM	\$643,779,393.75	14,526,500.00	658,305,893.75
SPI	\$1,765,320.00	799,680.00	2,565,000.00
ER	\$1,497,099,559.06	44,927,500.00	1,542,027,059.06

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11.0 PUBLIC LAW 91-646 RELOCATION ASSISTANCE

The benefits of Title II of the Uniform Relocation Assistance and Real Property Acquisition Policy Act of 1970 (PL 91-646), as amended, are applicable for this project. Title II requires that persons and businesses displaced by a Federal project be given advisory services and assistance in the location of replacement dwellings and/or businesses. According to GCCPRD's Phase 2 Report Appendix G.2, there are an estimated 1,080 dwellings and/or businesses identified for possible replacement. This estimate was derived by GCCPRD and was not verified. After the TSP milestone, a gross appraisal will be completed, and actual numbers of potential dwellings and/or businesses impacted will be updated in the REP.

Under Title II, displaced persons are entitled to reimbursement for actual and reasonable moving of personal property, differential housing payment, and incidental costs associated with the relocation. Differential housing payment is a payment made by the Government when the compensation paid for the property being acquired is not sufficient to cover the costs of a replacement dwelling for the displaced persons. Differential payments are capped at \$34,000 for homeowners and \$10,200 for tenants. Commercial businesses are entitled to receive advisory services, reimbursement for actual reasonable moving costs, reestablishment costs, which are capped at \$10,000, and certain reasonable and necessary incidental costs associated with the relocation. For purposes of this study, the estimate of relocation for business includes all of these costs and was estimated to be approximately \$100,000 per industrial business and \$50,000 per commercial business. The NFS will be required to perform and pay for PL 91-646 relocations, which will be eligible for LERRD crediting.

The cost estimates for the CSRSM alternatives were developed with input from the GCCPRD report, in accordance with U.S. Senator John Cornyn, Corps Obligation to Assist in Safeguarding Texas Act of 2016, S.2856, 114th Cong. (2015-206), which requires the USACE to expedite the completion of the Coastal Texas Protection and Restoration Study by taking into consideration information developed by the GCCPRD.

These costs included home relocation costs, which the real estate team relied upon as mandated in the Texas Act described above. The GCCPRD report states that development of the relocation cost adhered to Uniform Relocation Assistance and Real Property Acquisition Policies Act that Congress passed in 1970, and amended in 1987. GCCPRD's actual number of residential, commercial, and industrial structures to be relocated could not be extrapolated from their data. This was a known risk Galveston District-Real Estate Division was aware of when developing the CSRSM baseline cost estimate. Therefore, a contingency cost of 40–55 percent was included into the real estate cost. To mitigate this risk, a formal gross appraisal will be done post TSP, which will include the total number of residential, commercial, and industrial structures needing to be relocated.

When developing the real estate baseline cost estimate for ER features, it was assumed by the PDT during development of the ER footprint, that any residential, commercial, and industrial structures will be avoided. Therefore, PL 91-646 relocation assistance costs are not included.

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12.0 MINERAL AND ENERGY ACTIVITY

Preliminary research was conducted to identify mineral and energy activity that may impact project features. This research was done utilizing the Texas Railroad Commission (TRRC) website. There are multiple areas within the vicinity of the project features where mineral extraction activity is occurring, mostly oil and gas. The majority of the proposed alignment for the CSR features are located mainly in highly developed areas within the Harris-Galveston areas. In these areas, mineral extraction is largely completed. It is anticipated that if any future extraction were to take place, directional drilling from the existing well sites would be employed in order to reduce extraction costs and avoid existing structures not impacting the project. ER features are mainly located along the Texas coastline and are mostly owned by State or Federal agencies, which have strict regulations regarding the surface extraction of minerals. As stated above, if third-party extraction were to occur, directional extraction technology would likely be used in the area, resulting in minimal onsite surface impacts. In addition, to the extent that 33 USC 408 applies, the USACE, through its permission process, will have an opportunity to affect any proposed mineral extraction that would impact the Federal project so as to prevent injury to the public interest or impairment to the usefulness of the project.

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13.0 ASSESSMENT OF NON-FEDERAL SPONSOR LAND ACQUISITION CAPABILITIES

An assessment of each NFS's Real Estate Capabilities has not been sent to the NFS at this phase of the study. An assessment of each NFS's Real Estate Capabilities will be conducted post TSP. An example of the assessment survey is shown on Figure18 below.

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14.0 ZONING IN LIEU OF ACQUISITION

There are no zoning in lieu of acquisition anticipated for this project.

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15.0 ACQUISITION SCHEDULE

An acquisition schedule has not been determined at this time. It is assumed that the project will be constructed in sections. A detailed acquisition schedule will be prepared during PED once the 95 percent plans and specifications are prepared for each section of the project. The NFS will be required to acquire all LERRD for the Recommended Plan CSRM features, after a PPA has been signed and prior to the advertisement for construction, such that the features can be constructed and available for use as scheduled. Additional days were added to the milestone table (Table 15-1) to account for the number of tracts needing to be acquired. Description of acquisition milestones for the NFS are listed below. The milestones listed are a per contract basis and based on perfect conditions for land acquisitions.

Table 15-1
Land Acquisition Schedule

Land Acquisition Schedule Per Contract	
Milestone*	Approximate Duration
Transmittal of ROW drawings and estate(s)	30 days after PPA signed
Obtain surveys	120 days after transmittal of ROW drawings and estate(s)
Obtain title evidence	120 days after obtaining surveys
Obtain appraisals and reviews	120 days after obtaining titles
Authorization to proceed with offer	30 days after obtaining appraisals and reviews
Conclude negotiations	90 days after negotiations begin
Conduct closings	90 days after conducting closings
Conclude condemnations	365 days after condemnation process begins
Attorney certify availability of LERRD	30 days after condemnation concludes
USACE certifies availability of LERRD	30 days after NFS Attorney certifies LERRD
Review LERRD credit request	120 days after receiving LERRD documentation
Approve or Deny LERRD Credit Requests	120 days after concluding review of LERRD documentation

*Milestones are based on the Project Partnership Agreement (PPA) being signed.

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16.0 FACILITIES/UTILITIES/PIPELINE RELOCATION AND REMOVALS

Information on pipelines crossing the CSR features alignments was obtained from an oil and gas Geographic Information System (GIS) database maintained by the TRRC and from the GCCPRD database. This information included the pipeline's approximate location and orientation by coordinates, system and subsystem names, ownership, operator, diameter, and product carried. However, it did not provide the pipeline depth. Because only a nominal amount of the project areas is within USACE's regulatory domain, no information on pipeline depth was immediately available. There was no other expedient vehicle by which the pipeline depths could be readily assessed. Most oil and gas pipelines are typically buried at a depth of 3 to 6 feet, as reported by the industry. Table 16-1 below lists the subject pipelines that may be impacted by the CSR features.

Table 16-1
Pipelines Present within CSR Alt A Footprint

Feature	Size/Type	Owner
Bolivar	6" Natural Gas	CENTANA INTRASTATE PIPELINE, LLC
Bolivar	4" Crude	BP PIPELINES (NORTH AMERICA),INC
Bolivar	4" Crude	BP PIPELINES (NORTH AMERICA),INC
Bolivar	6" Natural Gas	CENTANA INTRASTATE PIPELINE, LLC
Bolivar	16" Natural Gas	WILLIAMS FIELD SERVICES COMPANY
Bolivar	10" Natural Gas	GATEWAY OFFSHORE PIPELINE CO.
Bolivar	8" Natural Gas	IMPACT MIDSTREAM, LLC
Bolivar	24" Crude	ENTERPRISE PRODUCTS OPERATING LLC
Galveston	6" Natural Gas	EMERALD GATHER AND TRANS, LLC
Galveston	14" Natural Gas	AMOCO PIPELINE COMPANY
Galveston	0 Natural Gas	NICOR EXPLORATION COMPANY
Galveston	14" Natural Gas	AMOCO PIPELINE COMPANY
Galveston	14" Crude	PANTHER OPERATING COMPANY, LLC
Galveston	6" Natural Gas	EMERALD GATHER AND TRANS, LLC
Galveston	14" Natural Gas	AMOCO PIPELINE COMPANY
Galveston	4" Natural Gas	HOUSTON PIPE LINE COMPANY LP

* NICOR EXPLORATION COMPANY was listed in the TRRC database as 0-inch diameter natural gas pipeline that is in service during preliminary research. Additional investigation will be done to verify pipeline data at which point the REP will be updated.

Attorney Opinions of Compensability were not done at this phase of the study. The NFSs will perform these relocations as a part of their responsibility under the PPA. The Government will make a final determination of the relocations necessary for the construction, operation, or maintenance of the project during the design phase and will complete Final Attorney Opinions of Compensability as required by Chapter 12 of Engineer Regulation 405-1-12.

“ANY CONCLUSION OR CATEGORIZATION CONTAINED IN THIS REAL ESTATE PLAN, OR ELSEWHERE IN THIS PROJECT REPORT, THAT AN ITEM IS A UTILITY OR FACILITY RELOCATION TO BE PERFORMED BY THE NON-FEDERAL SPONSOR AS PART OF ITS LERRD RESPONSIBILITY IS PRELIMINARY ONLY. THE GOVERNMENT WILL MAKE A FINAL DETERMINATION OF THE RELOCATIONS NECESSARY FOR THE CONSTRUCTION, OPERATION, OR MAINTENANCE OF THE PROJECT AFTER FURTHER ANALYSIS AND COMPLETION AND APPROVAL OF FINAL ATTORNEY’S OPINIONS OF COMPENSABILITY FOR EACH OF THE IMPACTED UTILITIES AND FACILITIES.”

17.0 HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE OR OTHER ENVIRONMENTAL CONTAMINATES

Database searches were performed to identify potential sites of concern located within the proposed project area. This investigation indicates no hazardous, toxic, radioactive waste (HTRW) areas are within or adjacent to the proposed project areas that could impact this project. Based upon these findings, the potential of encountering HTRW within the proposed project area is considered low. A more-detailed description of HTRW can be found in the HTRW Appendix (Appendix C-7).

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18.0 SPONSOR NOTIFICATIONS OF RISKS.

Since there has yet to be identified NFSs for proposed project beyond the GLO, a letter has not been sent to the NFS advising of the risks of acquiring lands prior to the signing of the PPA. An example of this letter is provided on Figure 30 below.

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19.0 TIMBER RIGHTS

Timber rights do not apply to this project.

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20.0 LANDOWNER ATTITUDES

At this time the content of the information presented to the public has been conceptual and general in nature. It is reasonable to suggest that the general public is in favor of flood risk reduction and environmental restoration projects; however, until more-detailed alignments are available, which will more definitively determine which landowners are impacted, attempting to realize actual landowner attitudes at this time is premature.

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Figure 1: Coastal Storm Risk Management Alternative A

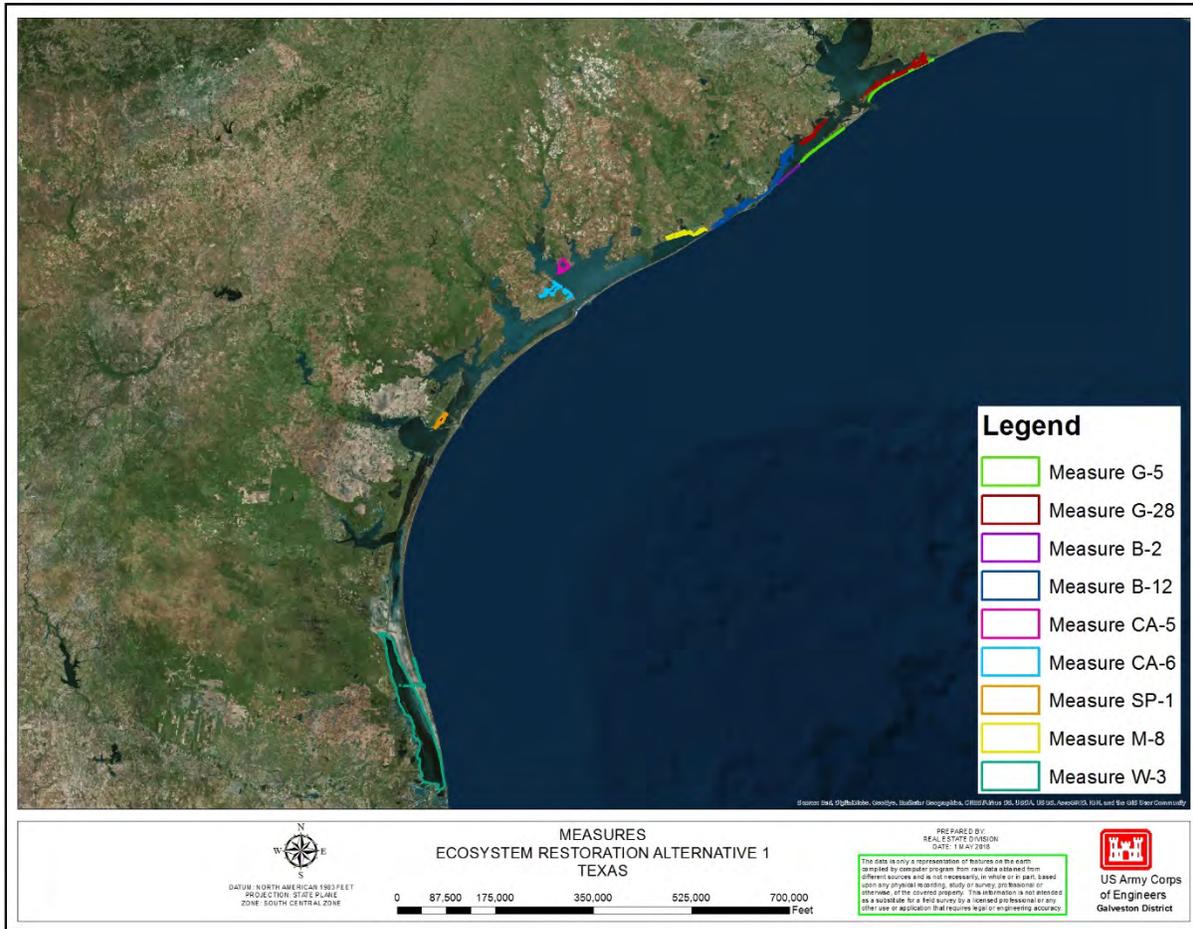


Figure 2: Ecosystem Restoration Alternative 1

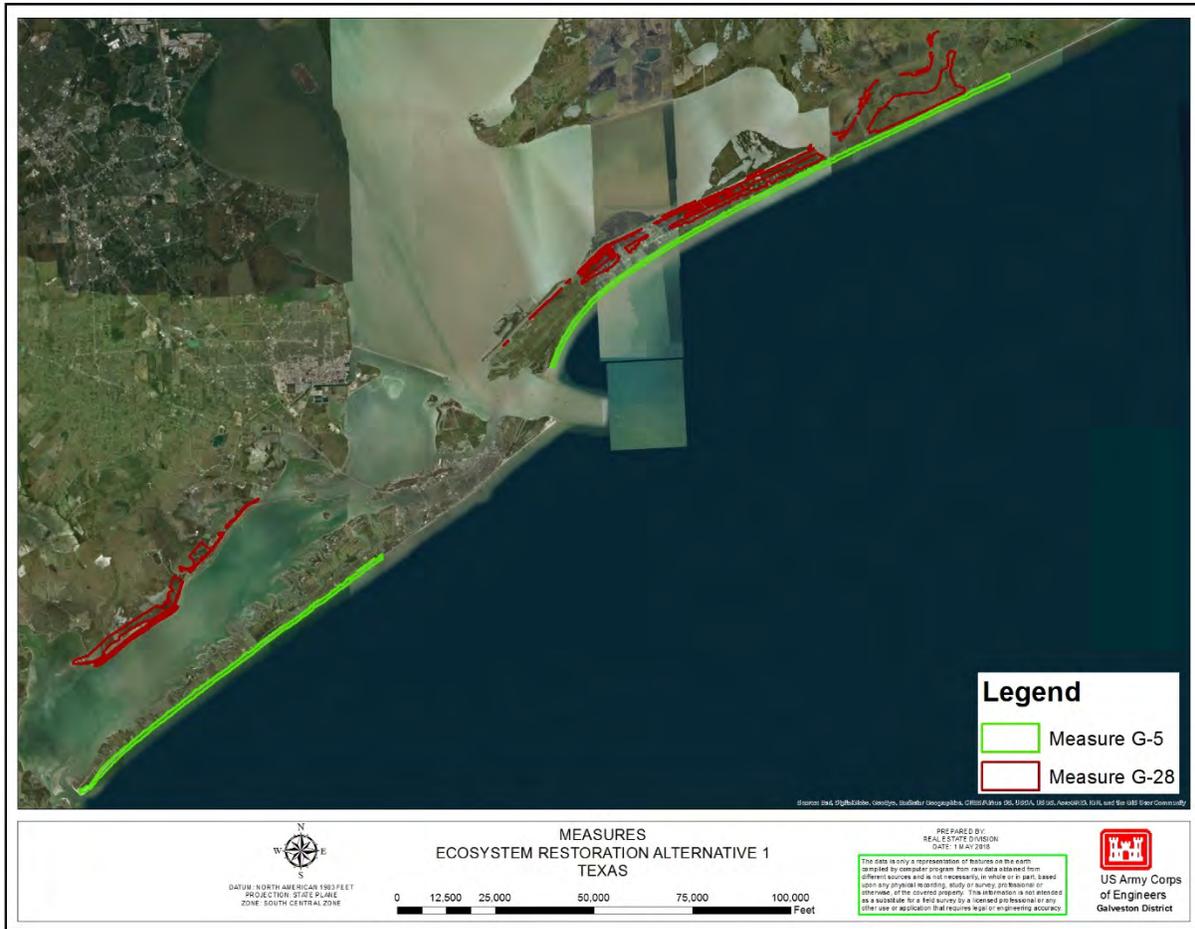


Figure 3: Ecosystem Restoration Measure G-5 and G-28

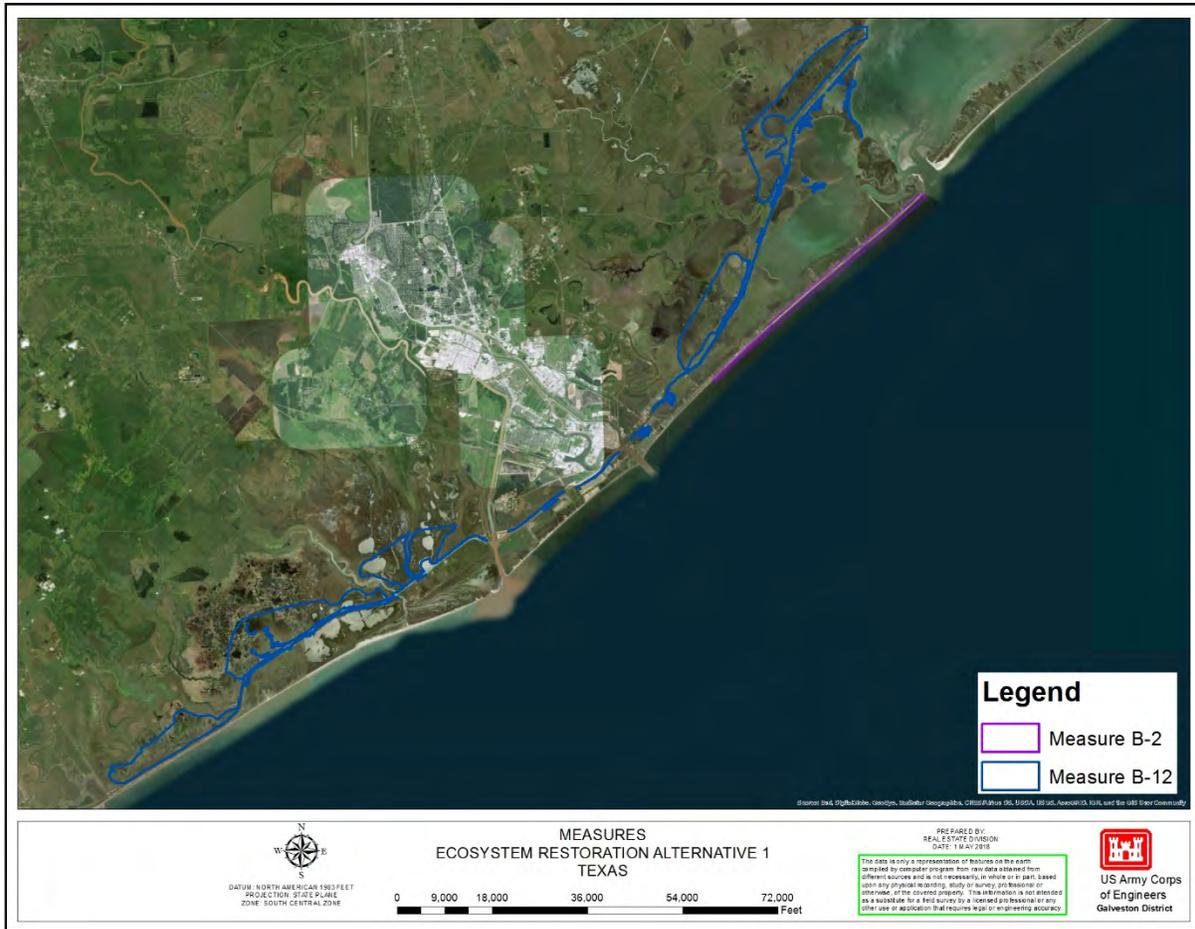


Figure 4: Ecosystem Restoration Measure B-28 and B-12



Figure 5: Ecosystem Restoration Measure CA-5 and CA-6



Figure 6: Ecosystem Restoration Measure M-8

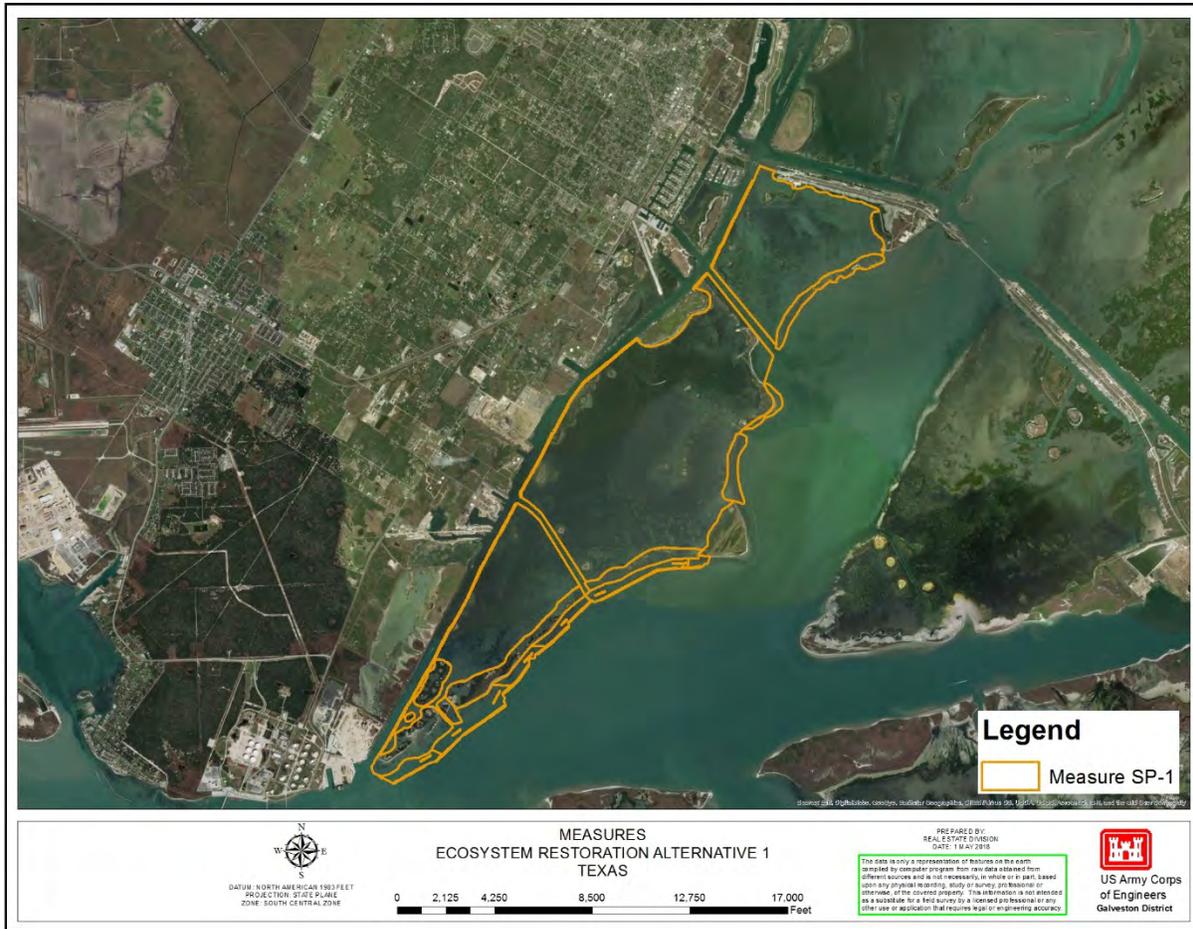


Figure 7: Ecosystem Restoration Measure SP-1

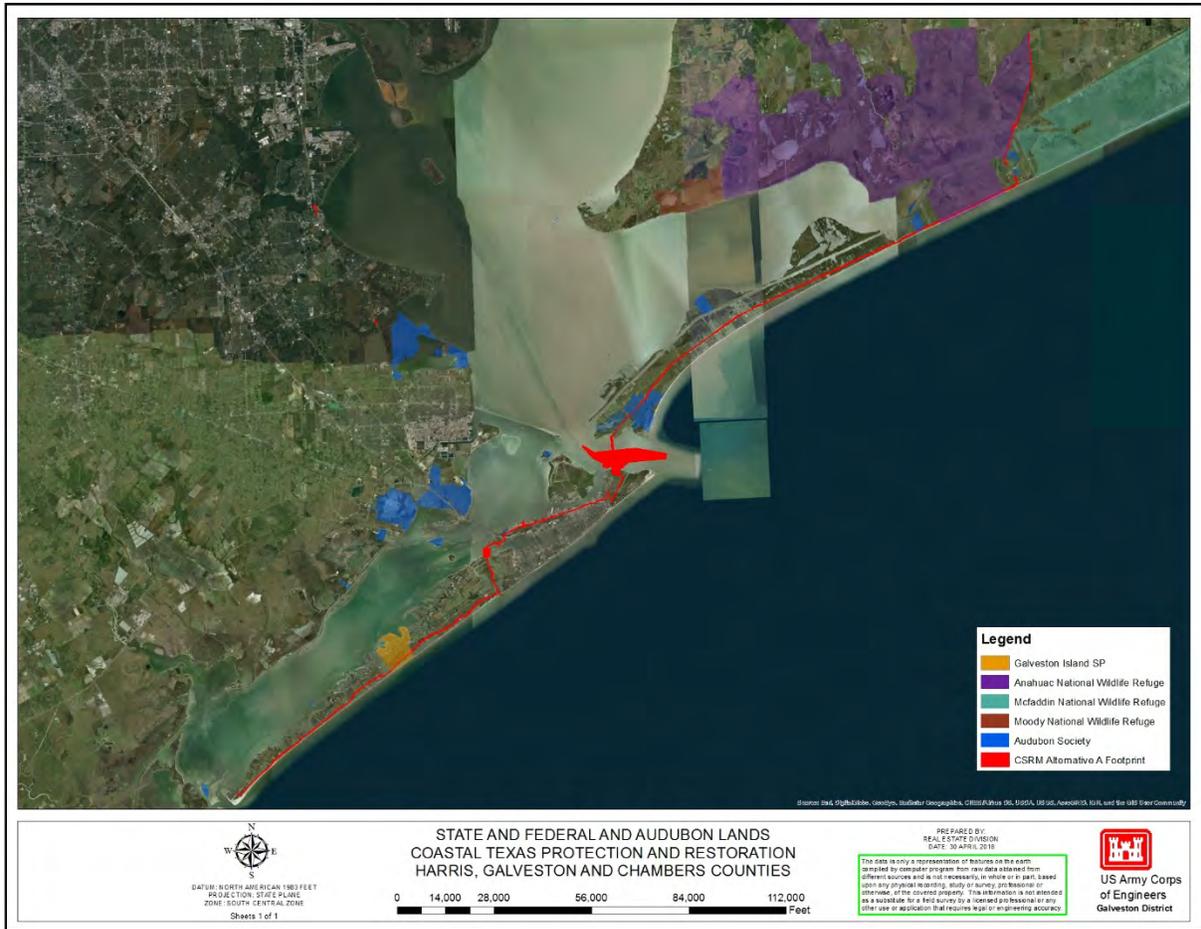


Figure 9: State and Federal Lands within CSRM Alternative A

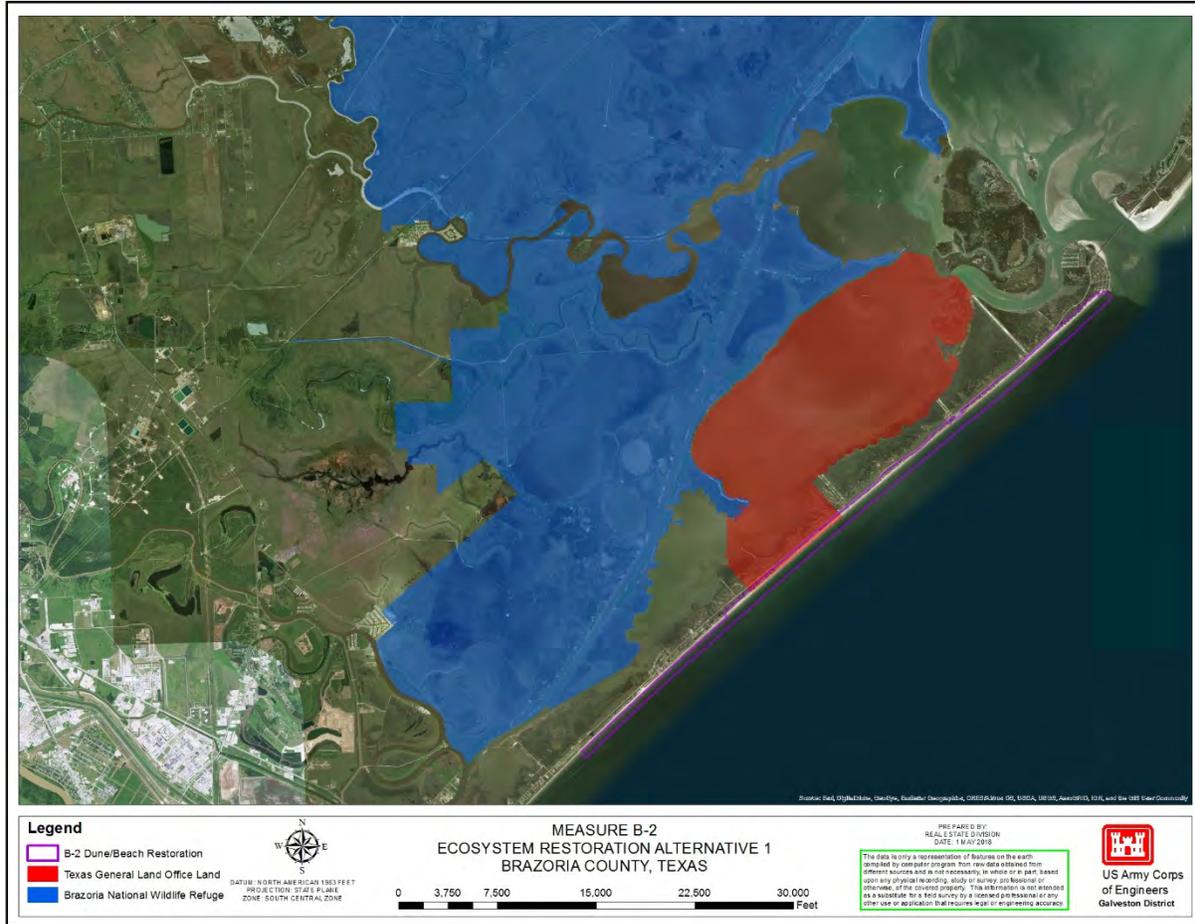


Figure 10: State and Federal Lands within ER Measure B-2

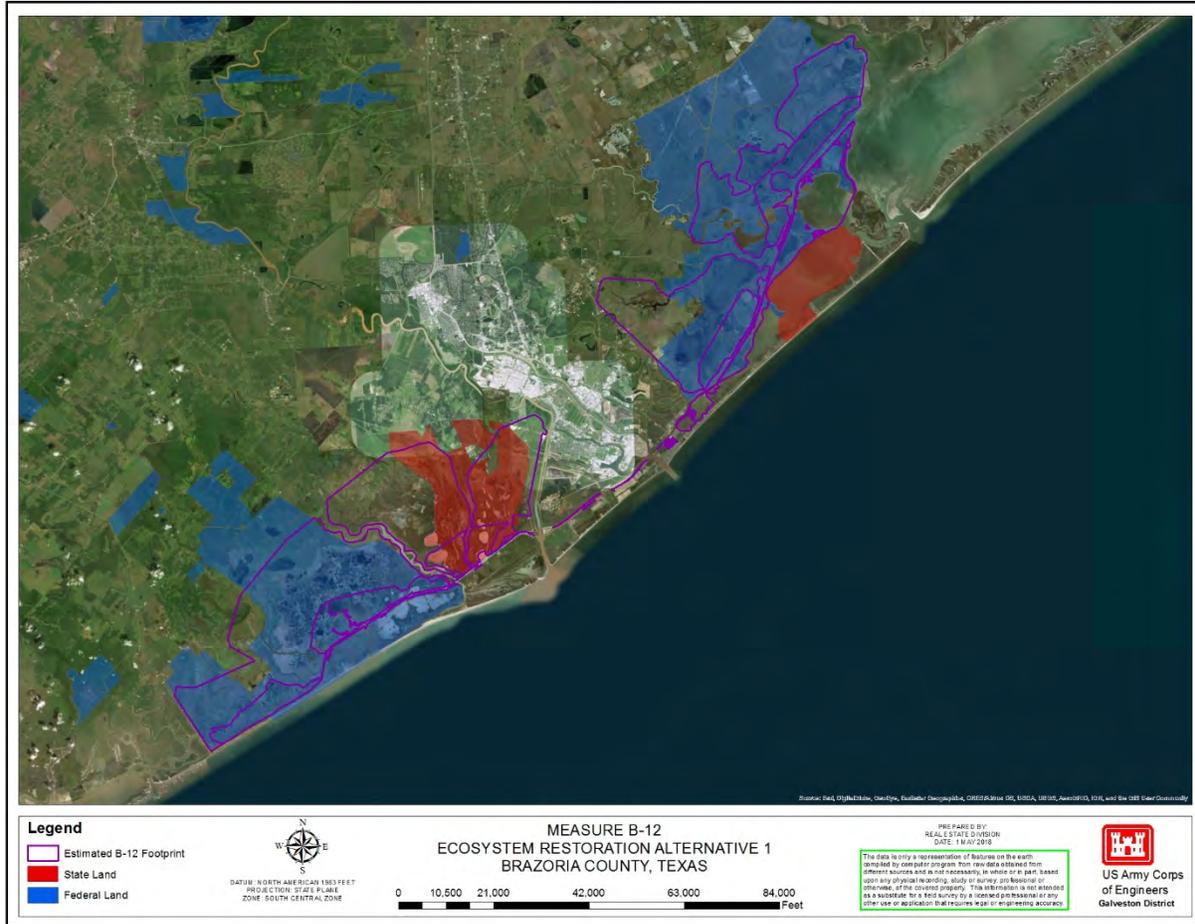


Figure 11: State and Federal Lands within ER Measure B-12

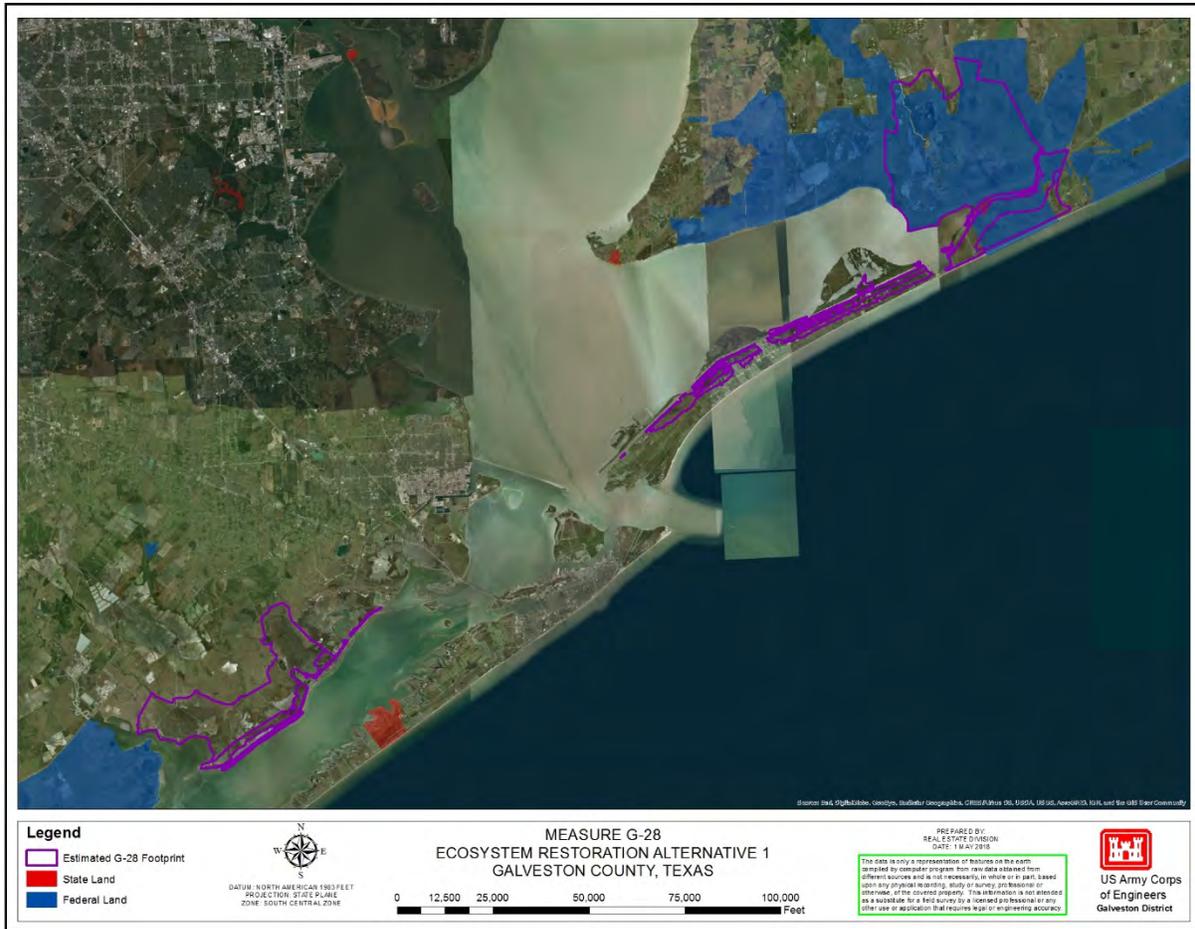


Figure 13: State and Federal Lands within ER Measure G-28

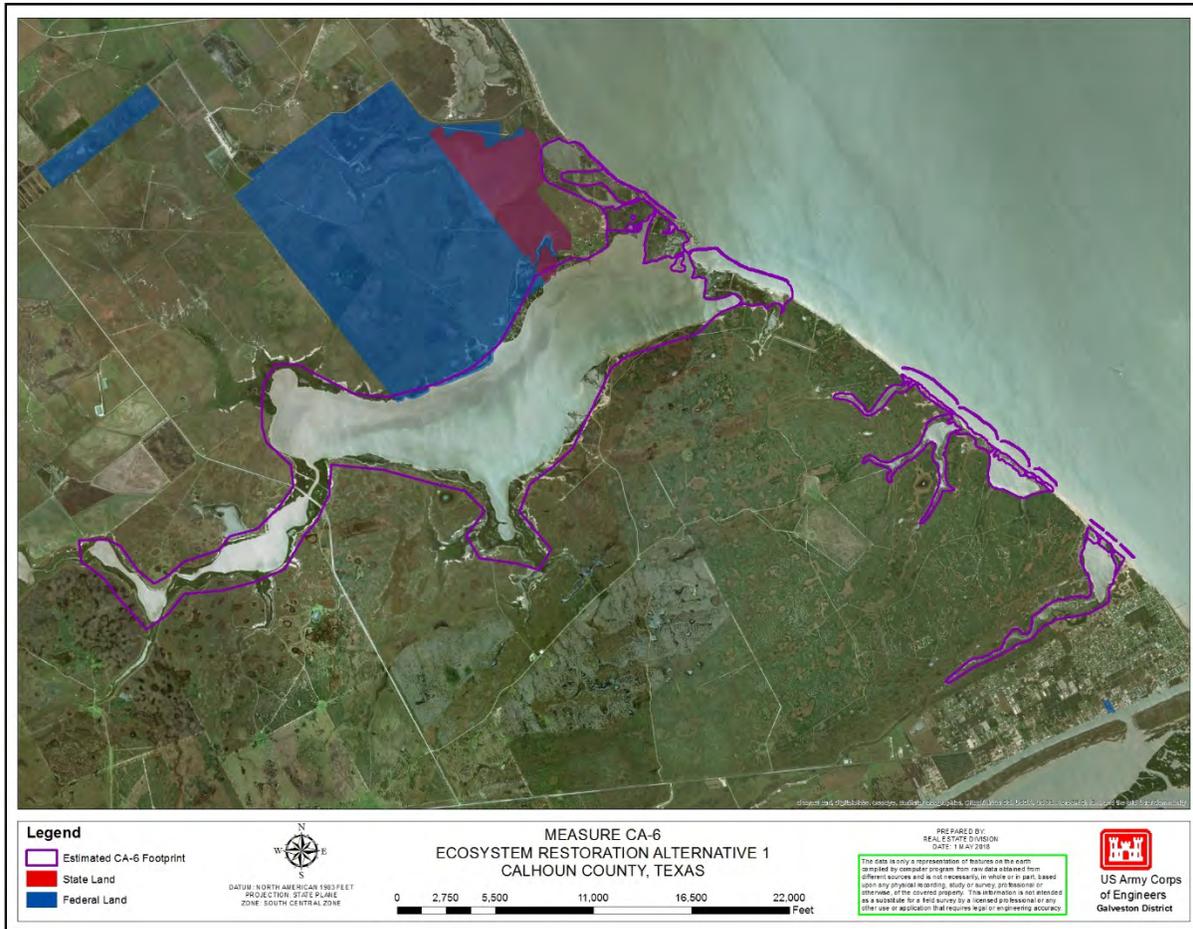


Figure 14: State and Federal Lands within ER Measure CA-6

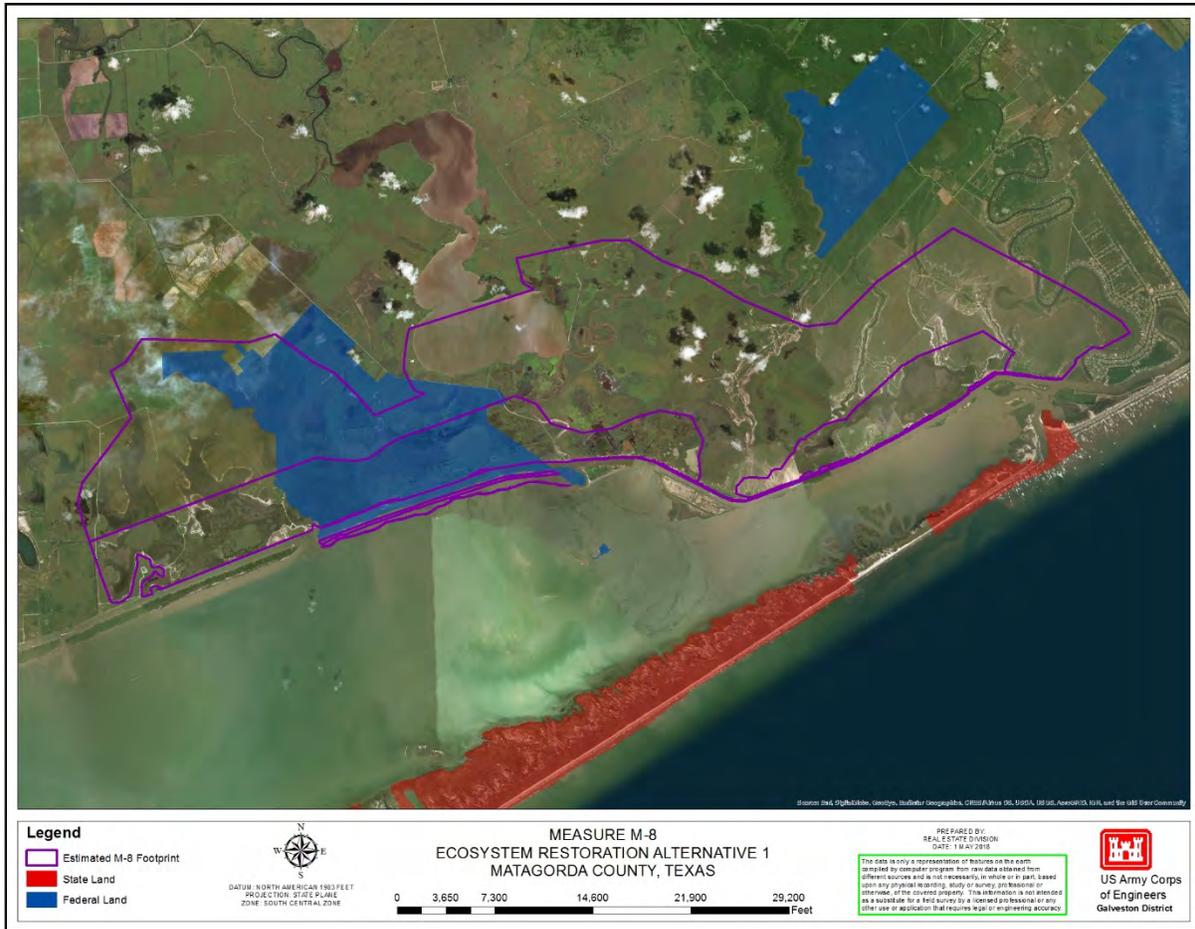


Figure 15: State and Federal Lands within ER Measure M-8

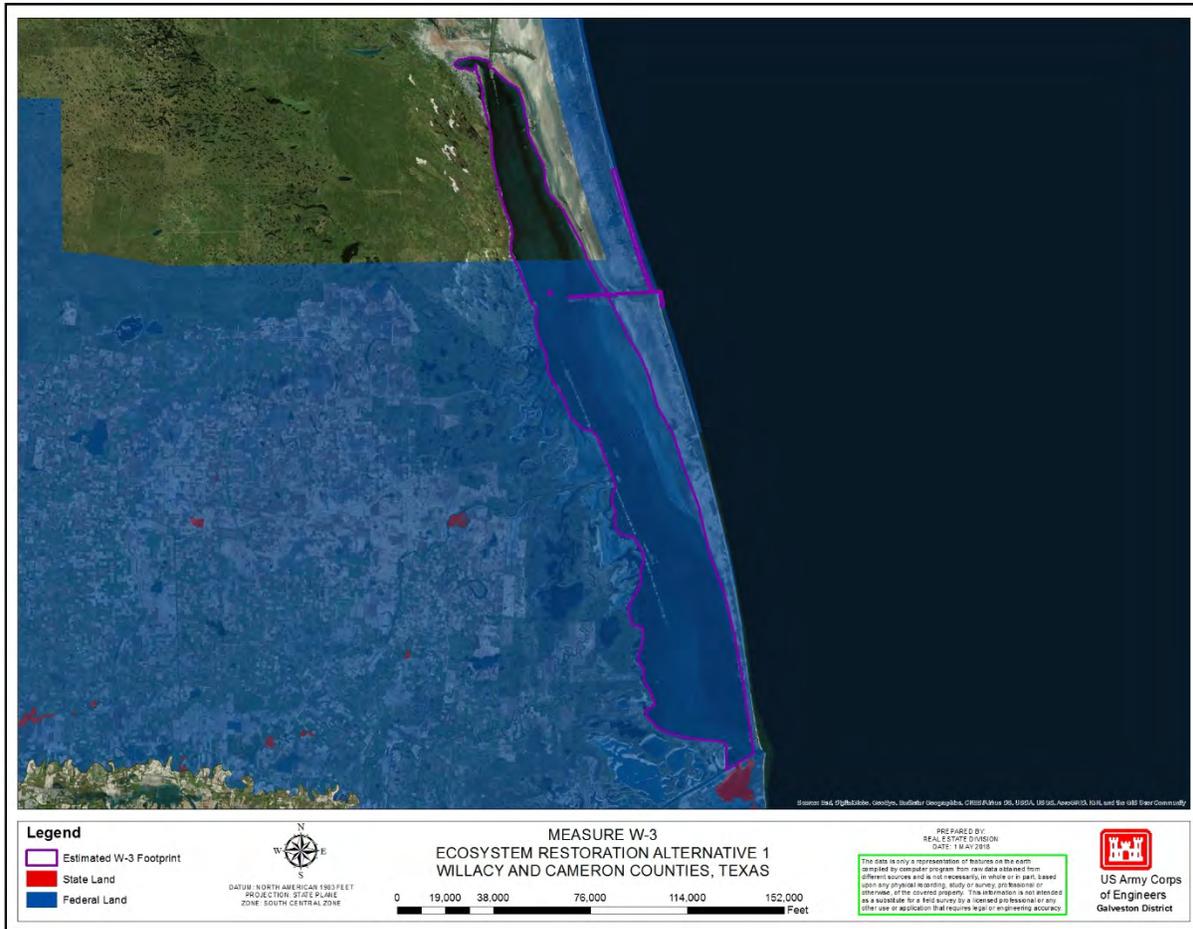


Figure 16: State and Federal Lands within ER Measure W-3

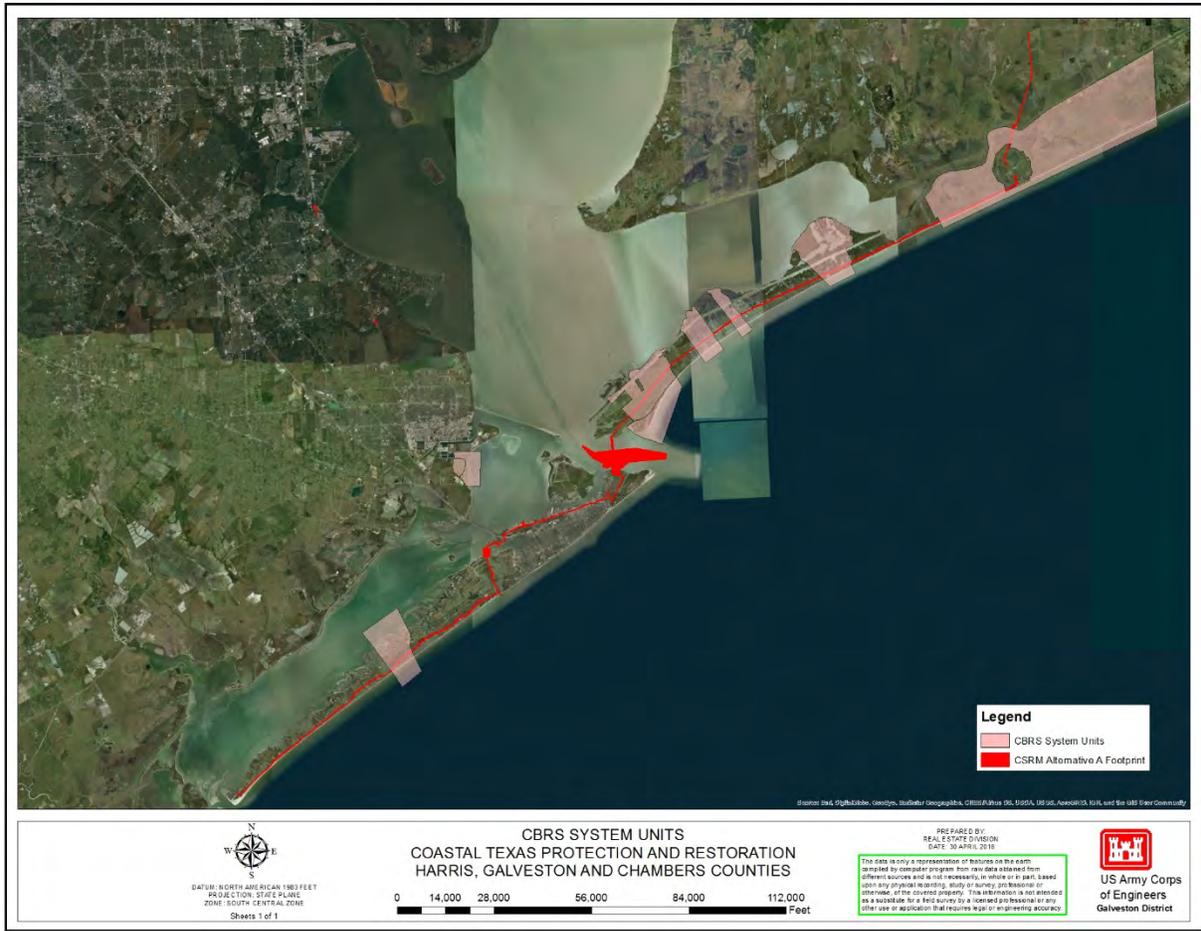


Figure 17: CBRS System Units within CSRM Alternative A

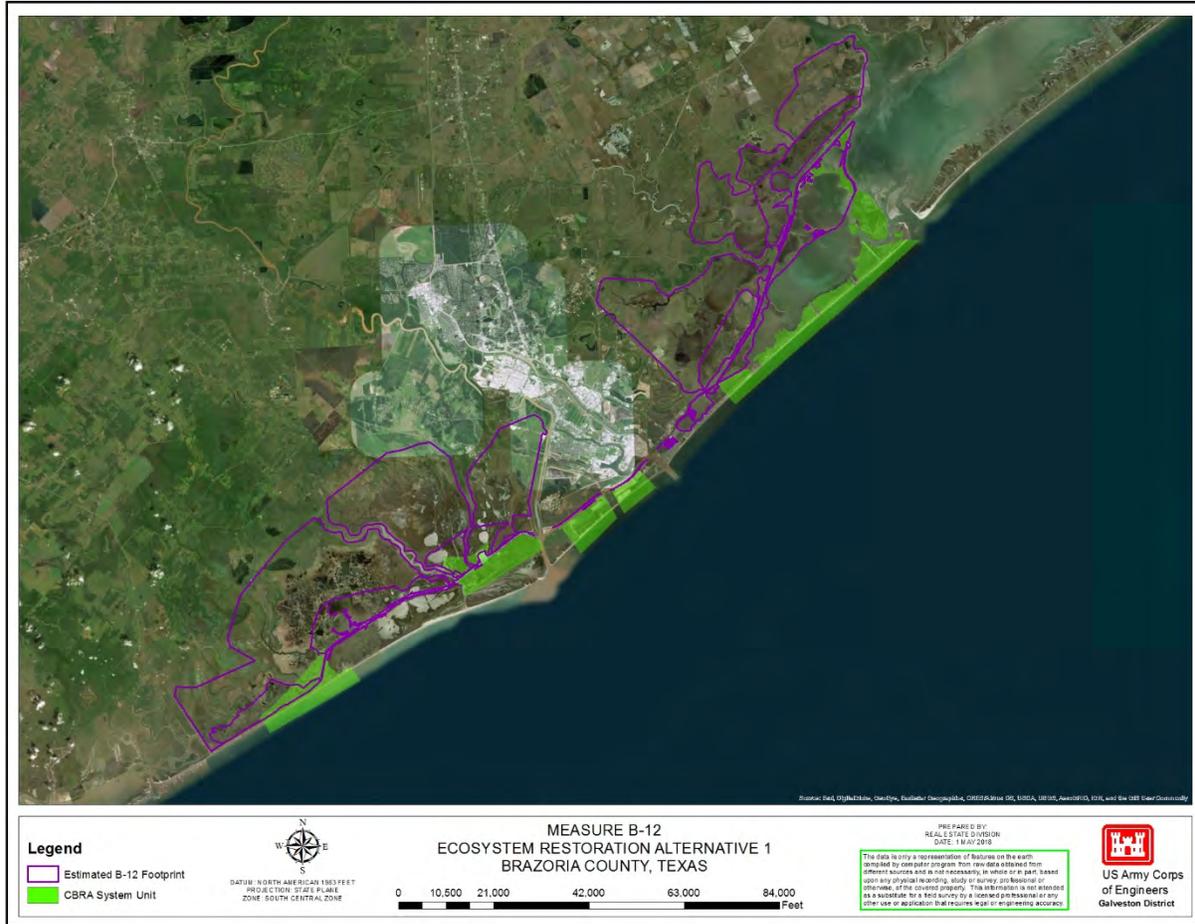


Figure 18: CBRS System Units within ER Measure B-12

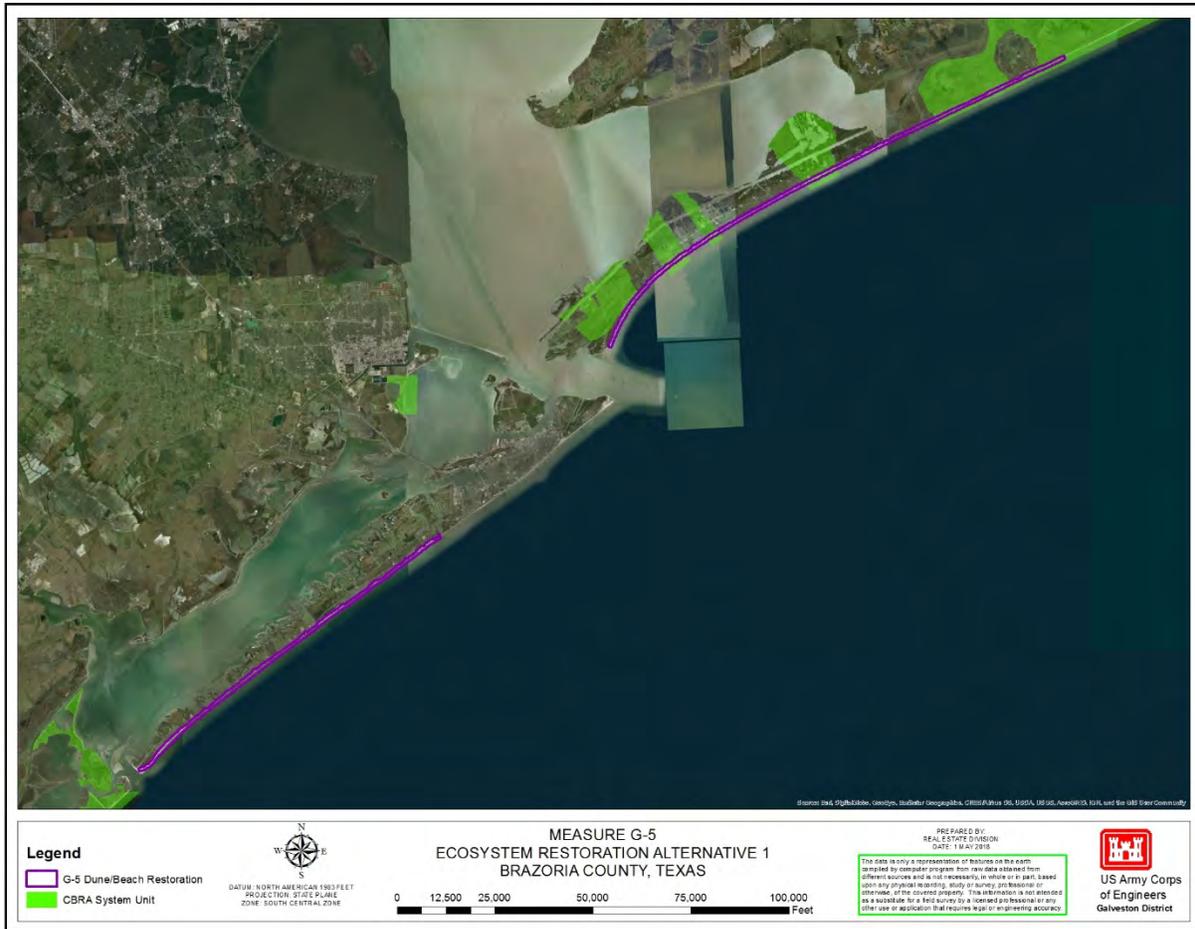


Figure 19: CBRS System Units within ER Measure G-5

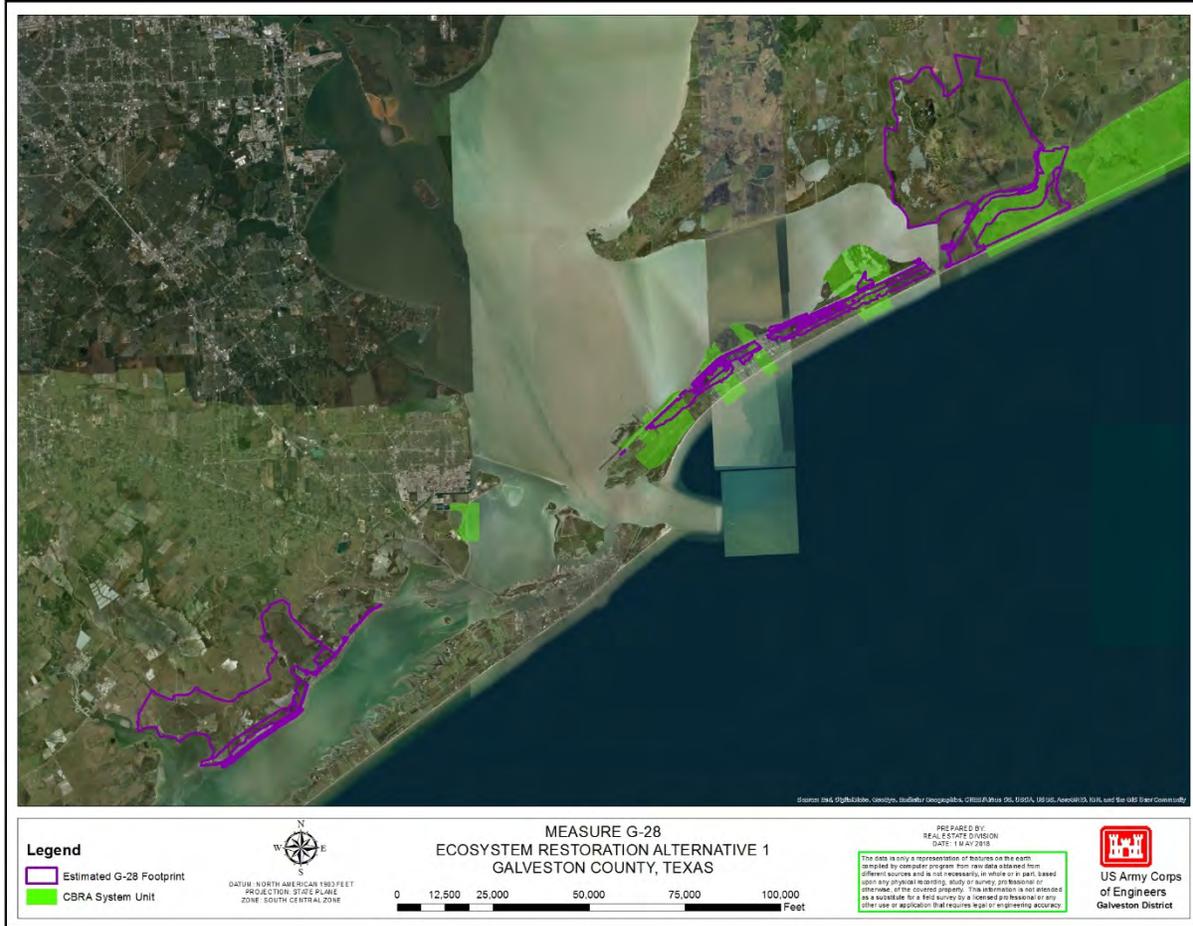


Figure 20: CBRS System Units within ER Measure G-28

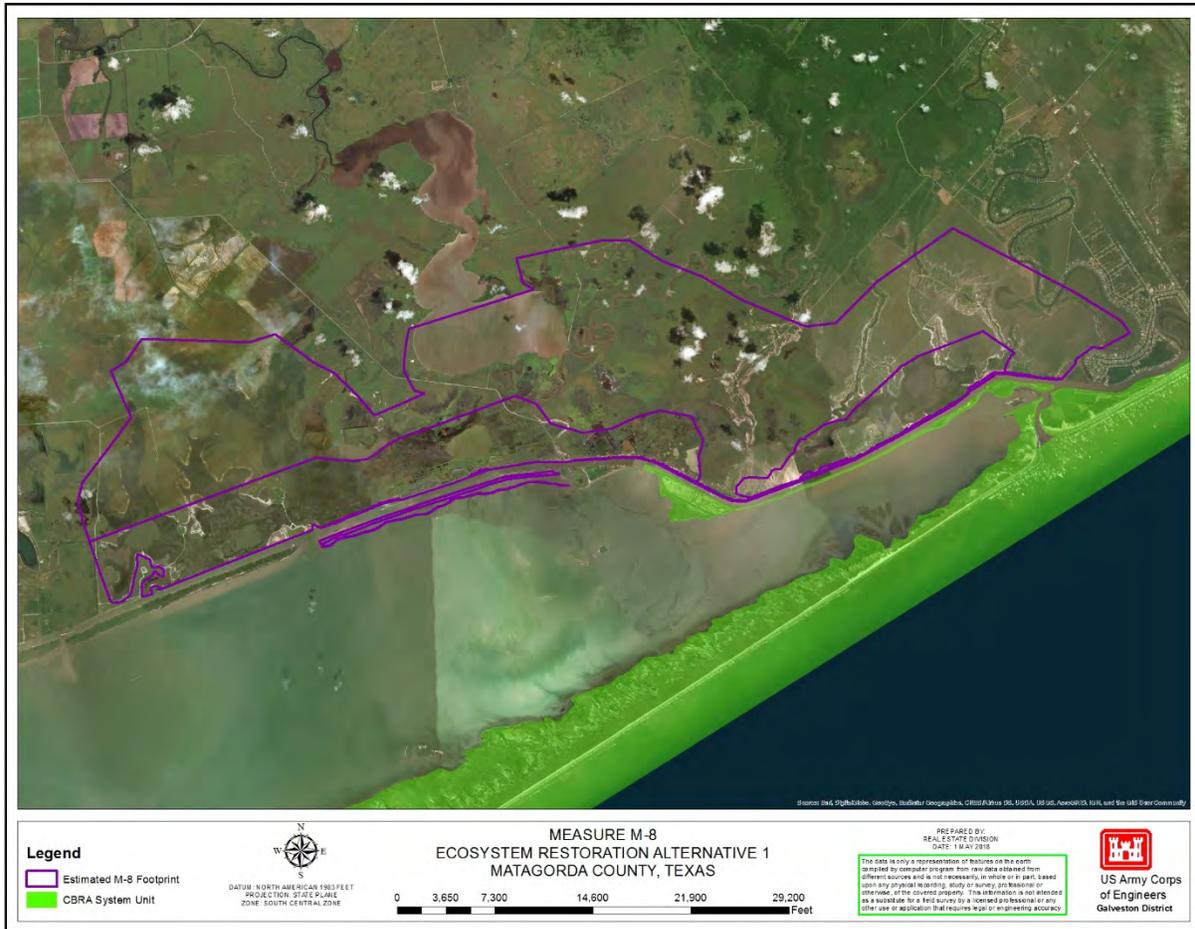


Figure 21: CBRS System Units within ER Measure M-8

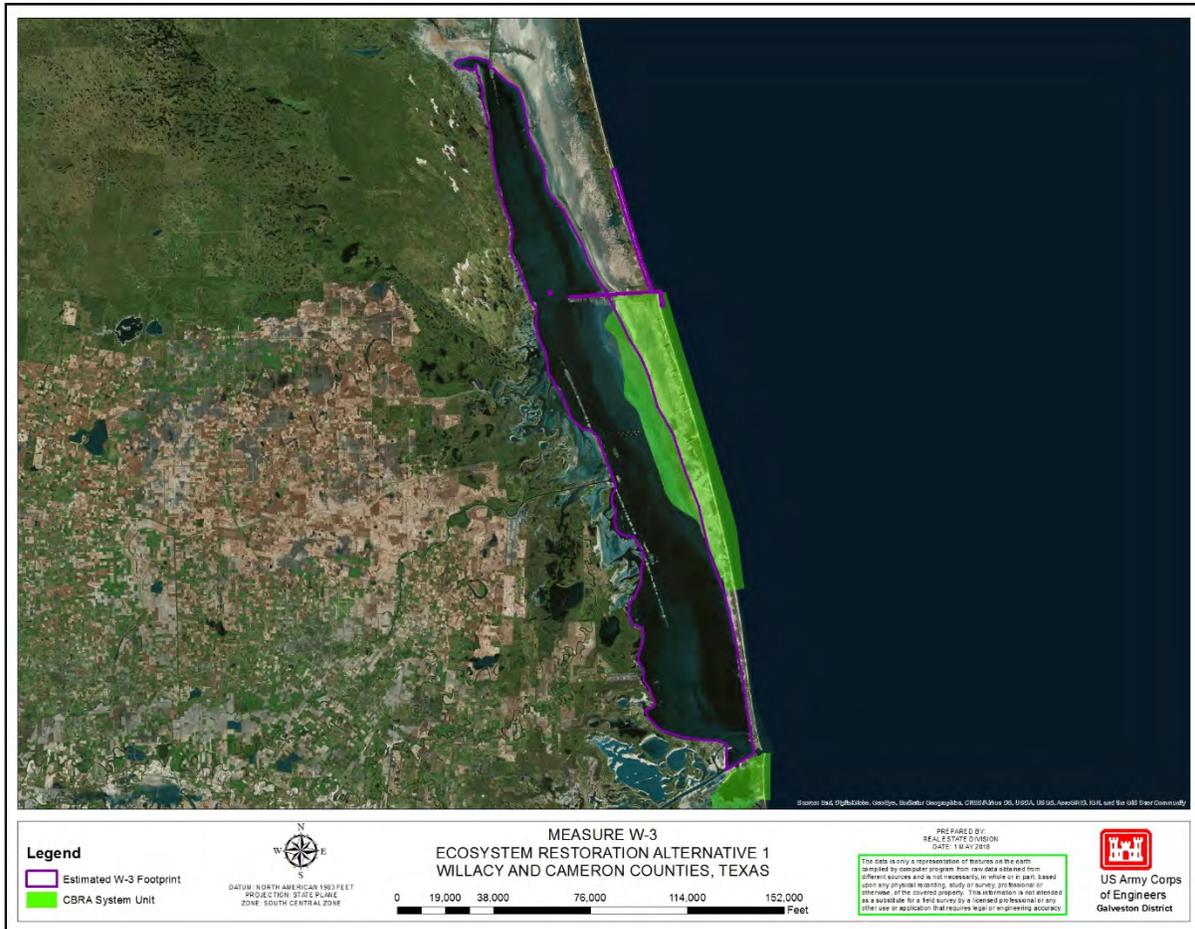


Figure 22: CBRS System Units within ER Measure W-3

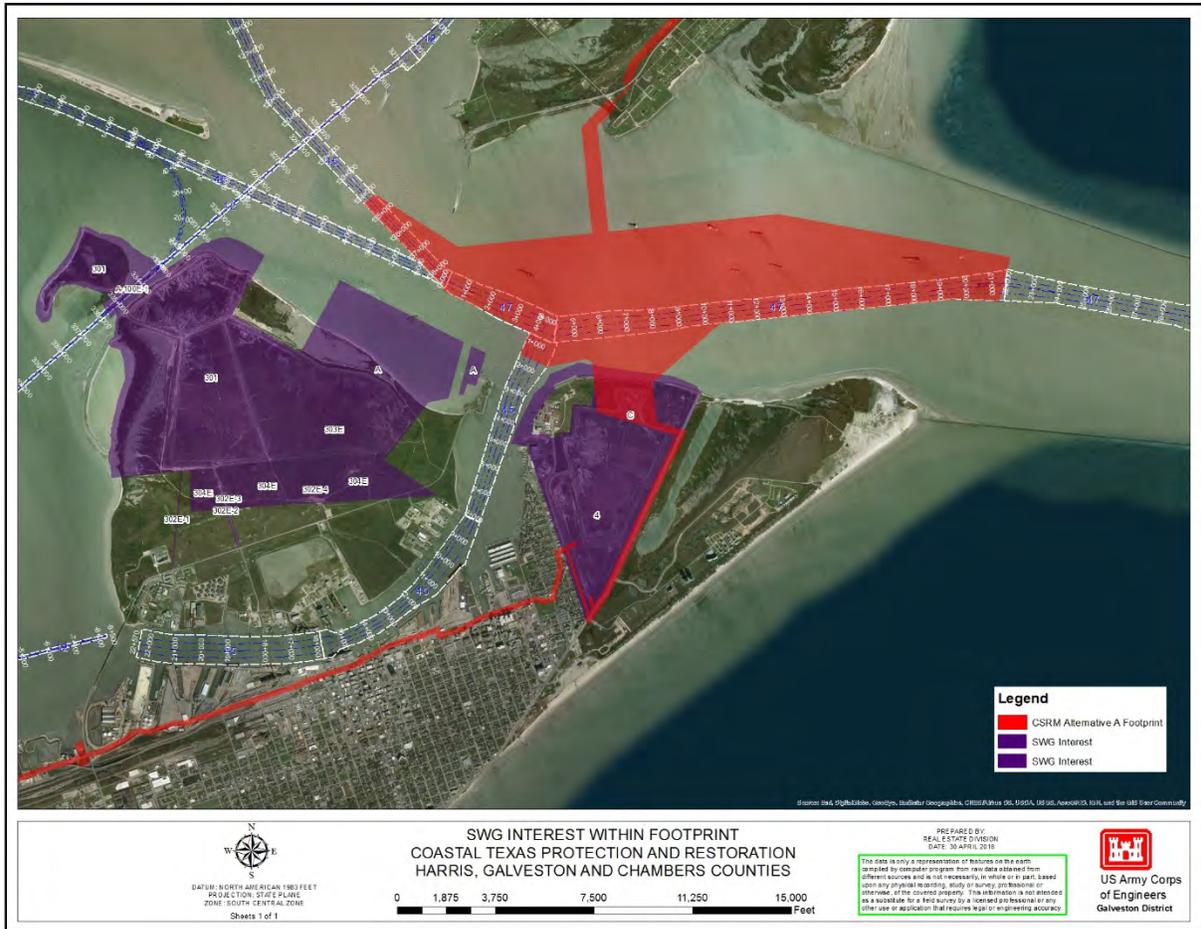


Figure 23: SWG Interest within Footprint

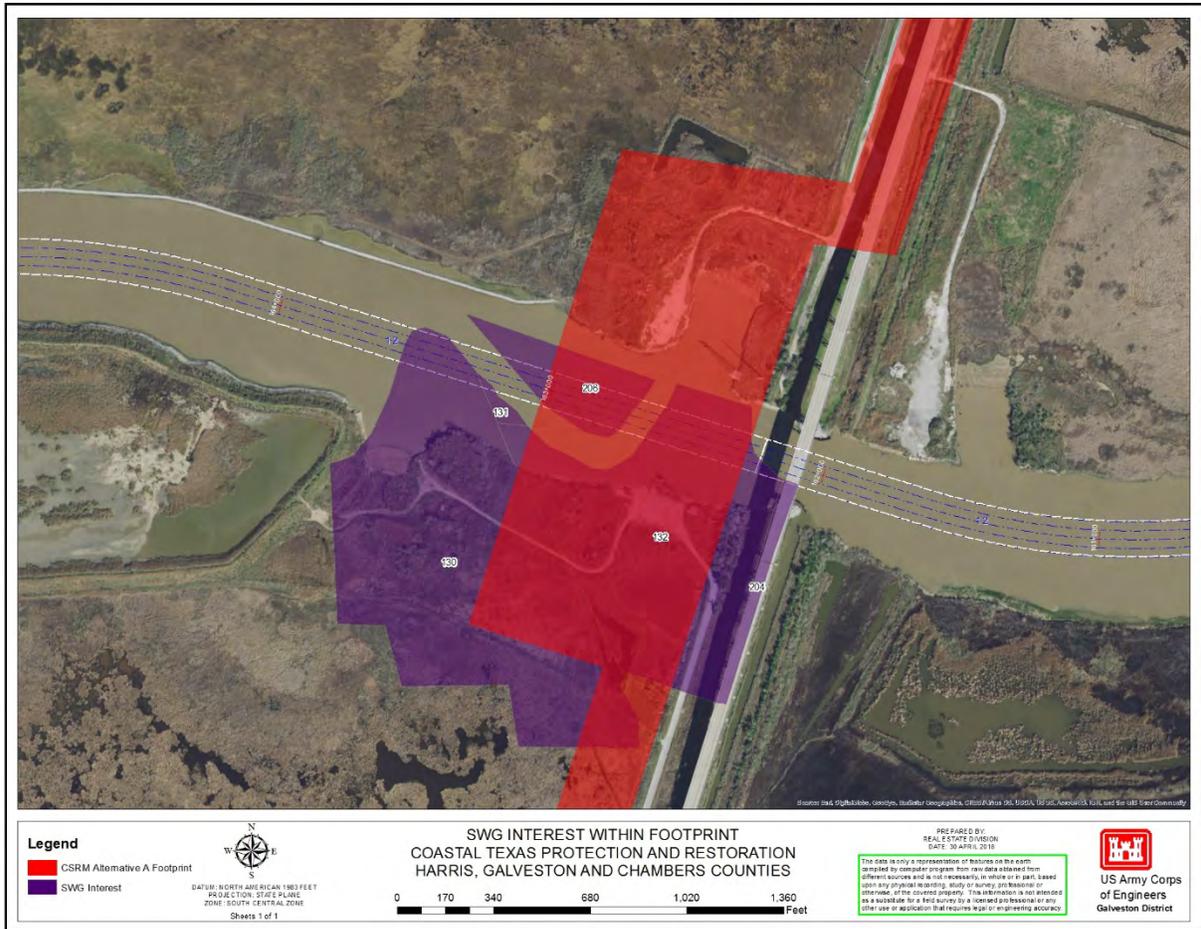


Figure 24: SWG Interest within Footprint



Figure 25: Clear Lake Gates

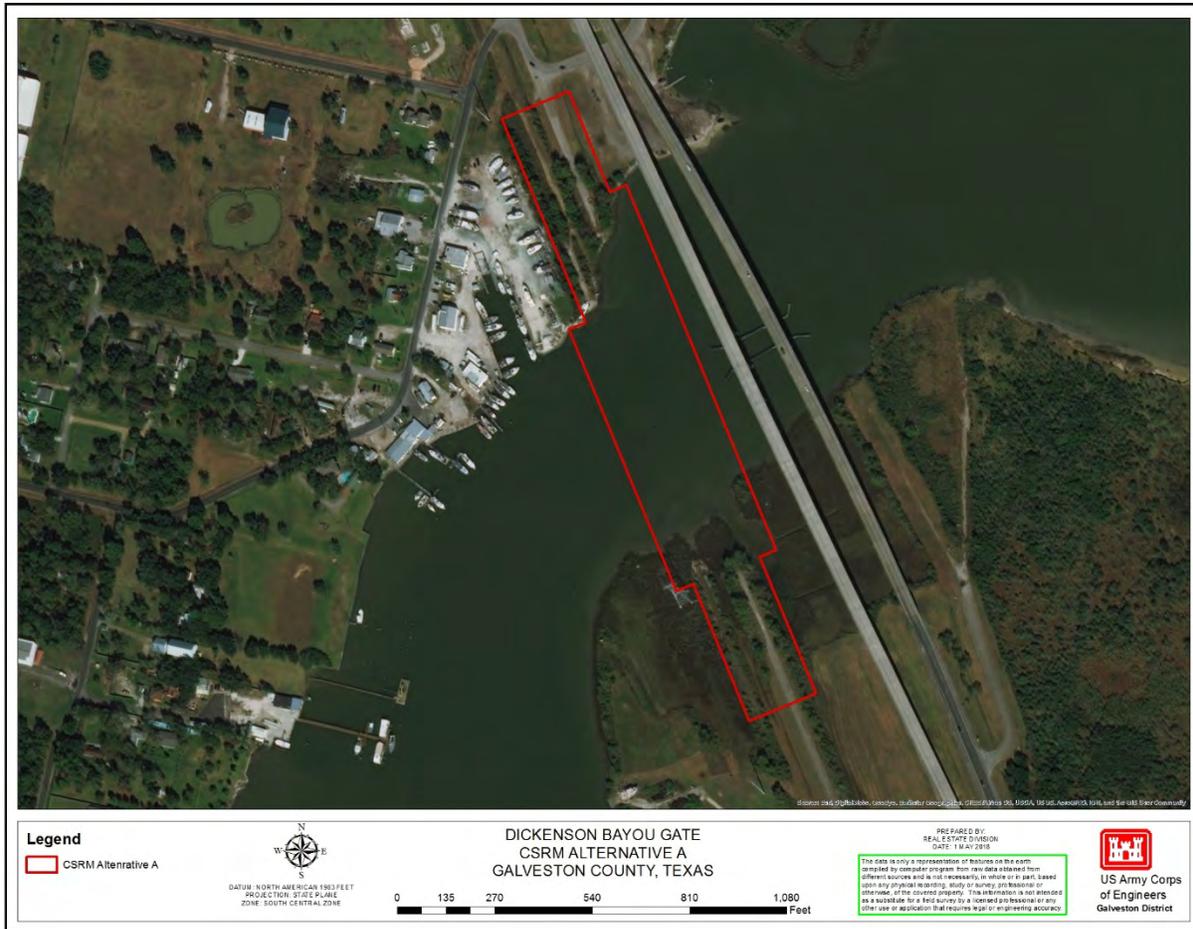


Figure 26: Dickenson Bayou Gates



Figure 27: Galveston Entrance Channel Gate

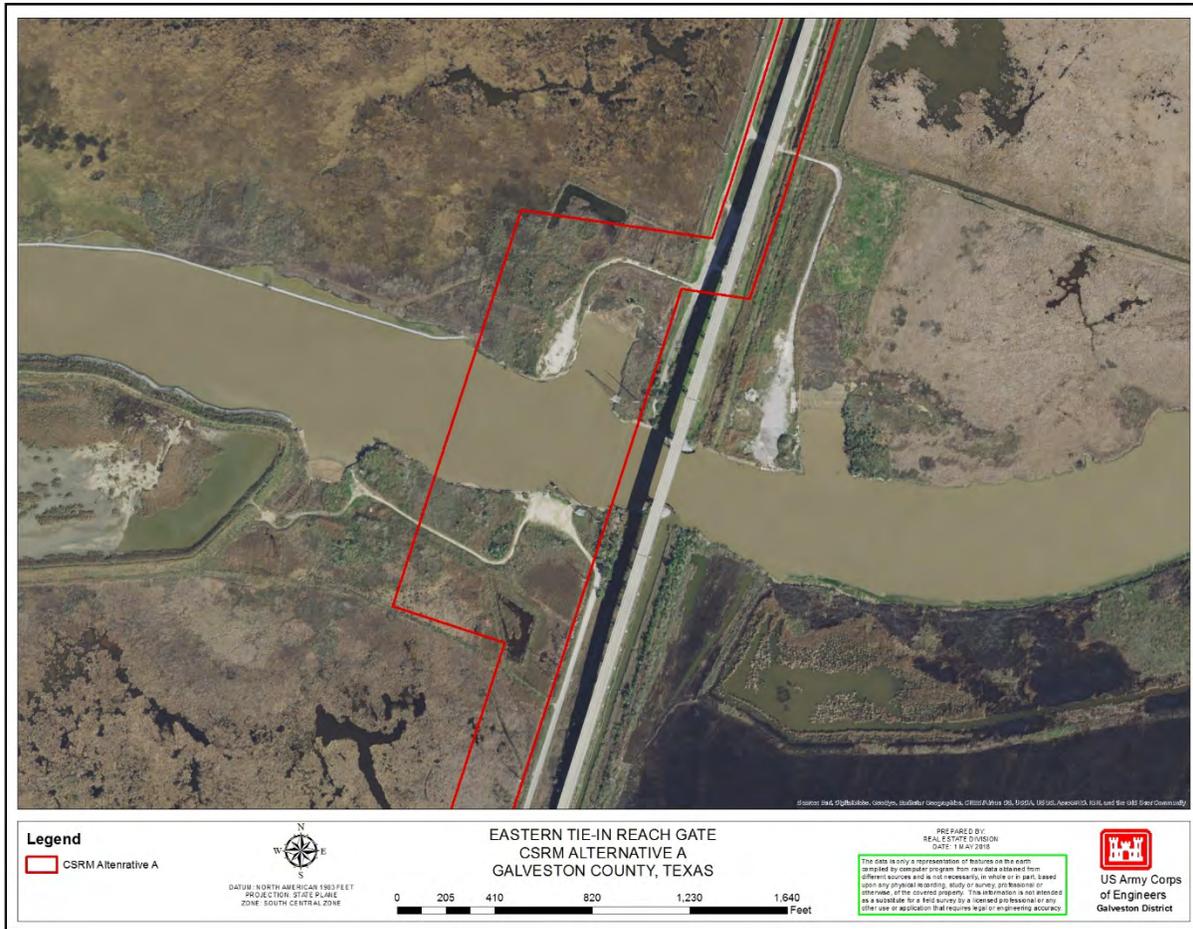


Figure 28: Eastern Tie-In Reach Gate



DEPARTMENT OF THE ARMY
GALVESTON DISTRICT, CORPS OF ENGINEERS
P. O. BOX 1229
GALVESTON, TEXAS 77553-1229

Real Estate Division

Name
Title
Texas General Land Office (TXGLO)
1700 Congress Ave.
Austin, TX 78701-1495

Dear Sirs/Madam:

It is our understanding that TXGLO is the construction sponsor of the Texas Coastal Project and will have the responsibility to furnish all Lands, Easements, Right of Ways, Relocations, and Disposals LERRDs. The purpose of this letter is to advise the risks to TXGLO if lands are acquired prior to the signing of prior to execution of a Project Partnership Agreement (PPA) with the Federal Government. We appreciate your support for this proposed project, but our regulations require us to inform you that **IF FOR ANY REASON, THE PPA NEVER GETS SIGNED OR IF CONGRESS FAILS TO AUTHORIZE OR FUND THE PROJECT, ANY LAND YOU ACQUIRED OR ANY MONEY YOU SPEND IN YOUR EFFORTS TO ACQUIRE LAND WILL BE AT THE SOLE RISK OF TXGLO.** Furthermore, for any property that qualifies for Federal participation in the project, your acquisition efforts must be in compliance with all of the provisions of P.L. 91-646, the Federal Relocation Assistance Law.

Please ensure that records are kept regarding purchase price and real estate administrative expenses such as title evidence, surveys and appraisal fees. This will be necessary for you to receive credit in the event of Federal Authorization. Please be advised that regulations dictate that credit will not be given for real estate administrative costs for any properties acquired five or more years prior to execution of a PPA.

If you have any questions, please contact Mr. Kenny Pablo at (409) 766-3816 or Kenneth.Pablo@usace.army.mil.

Sincerely,

Timothy J. Nelson
Chief, Real Estate Division
Galveston District
U.S. Army Corps of Engineers

Figure 29: Sample Risk Letter