

Deepwater Port License Application for the  
**Texas Gulf Terminals Project**

**Volume II – Environmental Evaluation (Public)**

Introduction, Evaluation Framework,  
and Summary of Impacts

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## ACRONYMS AND ABBREVIATIONS

APE	Area of potential effects
ATBA	area to be avoided
bcf/d	billion cubic feet per day
BOEM	Bureau of Ocean Energy Management
CALM	catenary anchor leg mooring
CCSC	Corpus Christi Ship Channel
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CMP	Coastal Migratory Pelagic
CWA	Clean Water Act
DOE	Department of Energy
DPLA	Deepwater Port License Application
DWP	Deepwater Port
DWPA	Deepwater Port Application
ESA	Endangered Species Act
EFH	essential fish habitat
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FMP	Fishery Management Plan
FRP	Facility Response Plan
FTA	Free-Trade Agreement
GLO	General Land Office
GOM	Gulf of Mexico
HUC	hydrologic unit codes
LNG	liquefied natural gas
MARAD	Maritime Administration
MARPOL	International Convention for the Prevention of Pollution from Ships
MHT	mean high tide
MLLW	Mean lower low water
MTPA	metric tonnes per annum
mya	million years ago
NAA	no anchoring area
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
NSA	noise sensitive area
OCS	Outer Continental Shelf
OSTF	onshore storage terminal facility
PAMA	Port Aransas Marina Association
PEM	Palustrine emergent
PINS	Padre Island National Seashore

PLEM	Pipeline end manifold
SPCC	Spill Prevention and Control, Countermeasure
SPM	single point mooring
TGTI	Texas Gulf Terminals Inc (Applicant)
TPWD	Texas Parks and Wildlife Department
TXGLO	Texas General Land Office
U.S.	United States of America
USACE	United States Army Corps of Engineers
USCG	United States Coast Guard
U.S.C.	United States Code
USDOT	United States Department of Transportation
USEPA	U.S. Environmental Protection Agency
VCP	Valley Crossing Pipeline
VLCC	very large crude carrier
WCD	worst-case discharge
WOTUS	Waters of the United States

## 1.0 Introduction

### 1.1 Deepwater Port License

Texas Gulf Terminals Inc. (TGTI; Applicant) has prepared an Environmental Evaluation of the proposed Texas Gulf Terminals Project, a Deepwater Port (DWP), in support of this Deepwater Port License Application (DPLA). The role of this Environmental Evaluation is to provide the primary information to determine whether the proposed DWP meets the elements of the Secretary of Transportation's purpose and need.

The Deepwater Port Act (DWPA) requires the Secretary of Transportation to approve, approve with conditions, or deny an application for a deepwater port license. In issuing this decision, the Secretary of Transportation must carry out the congressional intent of the DWPA (33 United States Code [U.S.C.] §1501), which is to:

- "...authorize and regulate the location, ownership, construction, and operation of deepwater ports in waters beyond the territorial limits of the United States."
- "...provide for the protection of the marine and coastal environment to prevent or minimize any adverse impact which might occur as a consequence of the development of such ports."
- "...protect the interests of the United States and those of adjacent coastal States in the location, construction, and operation of deepwater ports."
- "...protect the rights and responsibilities of States and communities to regulate growth, determine land use, and otherwise protect the environment in accordance with law."
- "...promote the construction and operation of deepwater ports as a safe and effective means of importing oil and natural gas into the United States and transporting oil and natural gas from the outer continental shelf while minimizing tanker traffic and the risks attendant thereto." And,
- "...promote oil and natural gas production on the outer continental shelf by affording an economic and safe means of transportation of outer continental shelf oil and natural gas to the United States mainland."

The Congressional intent is codified in nine requirements set forth in 33 U.S.C. §1503(c), as follows:

- The Applicant is financially responsible and will meet the requirements of the DWPA.
- The Applicant can and will comply with applicable laws, regulations, and license conditions.
- Construction and operation of the deepwater port will be in the national interest and consistent with national security and other national policy goals and objectives, including energy sufficiency and environmental quality.
- The deepwater port will not unreasonably interfere with international navigation or other reasonable uses of the high seas, as defined by treaty, convention, or customary international law.
- The Applicant has demonstrated that the deepwater port will be constructed and operated using best available technology so as to prevent or minimize adverse impact on the marine environment.
- The Secretary has not been informed, within 45 days of the last public hearing on a proposed license for a designated application area, by the Administrator of the U.S. Environmental Protection Agency (USEPA) that the deepwater port will not conform with all applicable provisions of the Clean Air Act, as amended (42 U.S.C. §7401 et seq.); the Federal Water Pollution Control Act, as amended (33 U.S.C. §1251 et seq.); or the Marine Protection, Research and Sanctuaries Act, as amended (16 U.S.C. §1431 et seq., §1447 et seq.; 33 U.S.C. §1401 et seq., §2801 et seq.).

- The Secretary has consulted with the Secretaries of the Army, State, and Defense to determine their views on the adequacy of the application, and its effect to programs within their respective jurisdictions.
- The Governor of the Adjacent Coastal State or States approves, or is presumed to approve, issuance of the license.
- The Adjacent Coastal State to which the deepwater port is to be directly connected by pipeline has developed, or is making at the time the application is submitted, reasonable progress toward developing an approved coastal zone management program pursuant to the Coastal Zone Management Act of 1972 (16 U.S.C. §1451 et seq.).

## **1.2 Environmental Evaluation**

The Environmental Evaluation assesses the potential environmental effects associated with installation/commissioning (“construction”), routine operations, potential upsets/accidents, and decommissioning of the proposed Project. This document has been prepared in anticipation of compliance with NEPA requirements, the Council on Environmental Quality regulations for implementing NEPA (40 CFR §§1500-1508), U.S. Department of Transportation Order 5610.1C Procedures for Considering Environmental Impacts), and USCG policy (Commandant’s Instruction [COMDINST] M16475.1D).

The primary objectives of the Environmental Evaluation document are to:

- Provide an environmental analysis sufficient to support the Secretary of Transportation’s licensing decision;
- Demonstrate that the DWP would be located, constructed, and operated in a manner that represents the best available technology necessary to prevent or minimize any adverse effects to the environment;
- Aid in the USCG’s and MARAD’s compliance with NEPA; and
- Facilitate public involvement in the decision-making process.

The Environmental Evaluation analyzes the potential consequences of the proposed Project and the alternatives that have been identified and deemed reasonable. The assessment is based on available data and literature, project surveys, and desktop studies. In cases where limited data is available, the assessment is based on qualitative judgment through the understanding of the local and regional setting; understanding the proposed actions; and predicting effects from similar actions, agency positions on these, and/or published science. In addition, the Environmental Evaluation proposes measures to mitigate potentially adverse environmental consequences of different project activities. Where applicable, this document also considers safety but does not function as the final safety screening.

The Environmental Evaluation contains the following sections and appendices:

**Volume II - Environmental Evaluation**

Introduction, Evaluation Framework, and Summary of Impacts

- 1.0 Project Description, Purpose, and Need
- 2.0 Alternatives Analysis
- 3.0 Water Quality
- 4.0 Wetlands and Waters of the US
- 5.0 Inshore and Offshore Aquatic Environment
- 6.0 Commercial and Recreational Fisheries
- 7.0 Wildlife and Protected Species
- 8.0 Cultural Resources
- 9.0 Socioeconomics
- 10.0 Geological Resources
- 11.0 Coastal Zone Use, Recreation, And Aesthetics
- 12.0 Meteorology, Air Quality, And Noise
- 13.0 Navigation and Navigation Safety
- 14.0 Safety and Security
- 15.0 List of Preparers

**Volume II - Appendices**

- Appendix A – Construction, Operation, and Decommissioning Procedures
- Appendix B – Agency Coordination and Governing Laws and Regulations
- Appendix C – Wetland Delineation Report - Inshore
- Appendix D – Wetland Delineation Report - Onshore
- Appendix E – Benthic Survey Report
- Appendix F – Submerged Aquatic Vegetation Impact Analysis
- Appendix G – Essential Fish Habitat Assessment
- Appendix H – Threatened and Endangered Species Report
- Appendix I – Threatened and Endangered Species Report – Onshore
- Appendix J – Piping Plover and Red Knot Survey Report
- Appendix K – Air Quality Supporting Information
- Appendix L – Air Quality Analysis



## 2.0 Project Description

The project description is fully detailed in Section 1.0 of the Environmental Evaluation: Project Description and Purpose and Need. Section 2.0: Alternatives Analysis defines and details the process by which the project was developed and sited according to the project objectives described in Section 1.0. In order to clarify the following section concerning the framework for environmental evaluation and cumulative impacts, the overall project location and description of project components must be defined.

As further discussed in Section 1.0, the purpose of the proposed Project is to provide a safe and reliable solution for the global export of crude oil from North America to support the economic growth of the United States of America (U.S.). The construction and operation of the proposed project would fulfill the need for a safe, efficient, and cost-effective logistical solution for the export of domestic crude oil for existing and future oil fields located in North America. Based on the need for the proposed Project, as described in the following sections, and the alternatives analysis conducted for the Project (Volume II, Section 2), the Applicant proposes to construct the proposed Project Texas Gulf Terminals Project to allow for the loading of very large crude carriers (VLCCs) at the proposed deepwater port (DWP) via a single point mooring (SPM) buoy system. Refer to Figure 1 for a Vicinity Map detailing the location of the proposed Project.

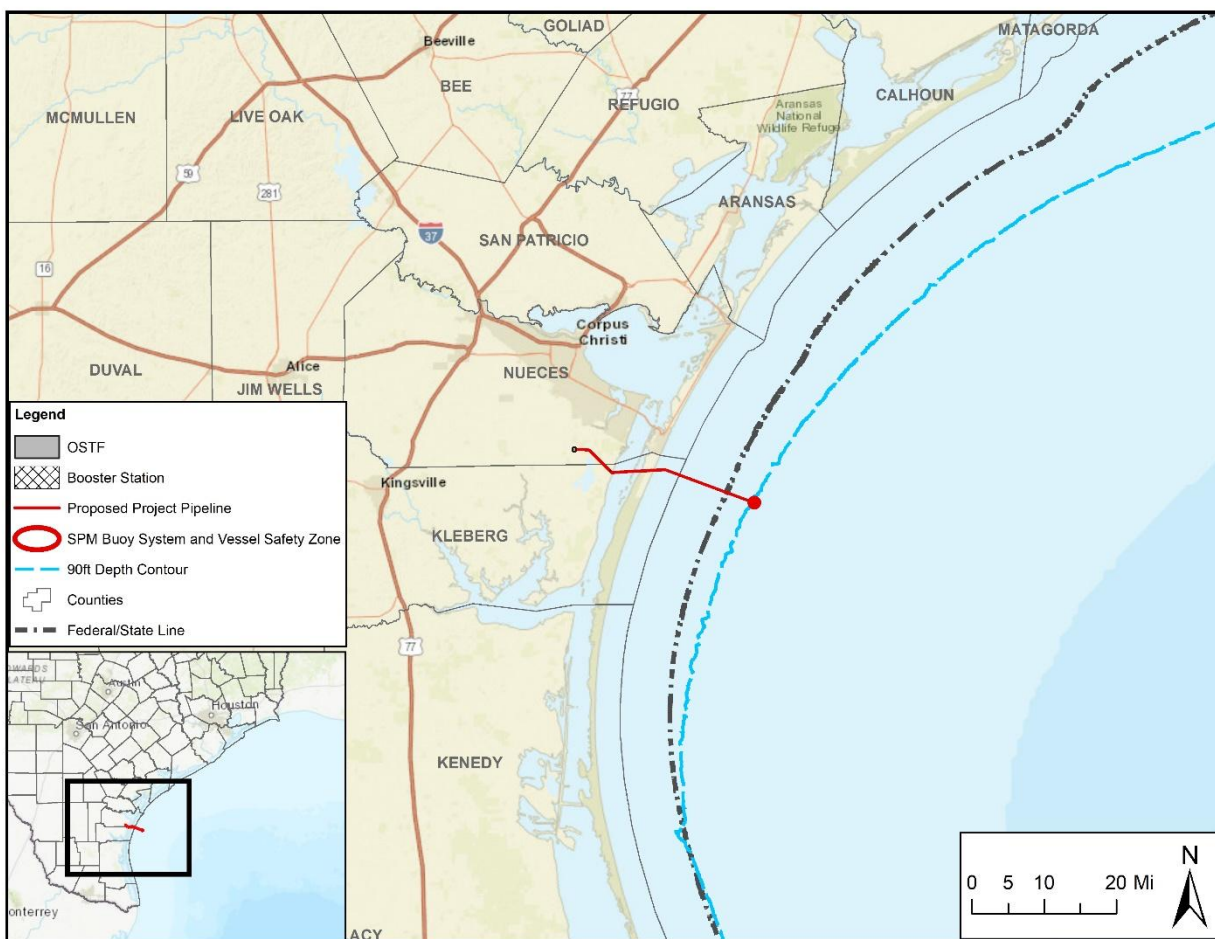


Figure 1: Project Vicinity Map

The operation of the proposed Project as described within this DWPL application requires the installation and operation of DWP, 26.81 miles of pipeline infrastructure, booster station, and onshore storage terminal facility (OSTF) to allow for the loading of vessels at the proposed DWP. The proposed Project components are described in three distinguishable segments based on locality including “offshore”, “inshore”, and “onshore”. Refer to Figure 1-2 for a Project Component Map detailing the locations of the onshore, inshore, and offshore components associated with the proposed Project.

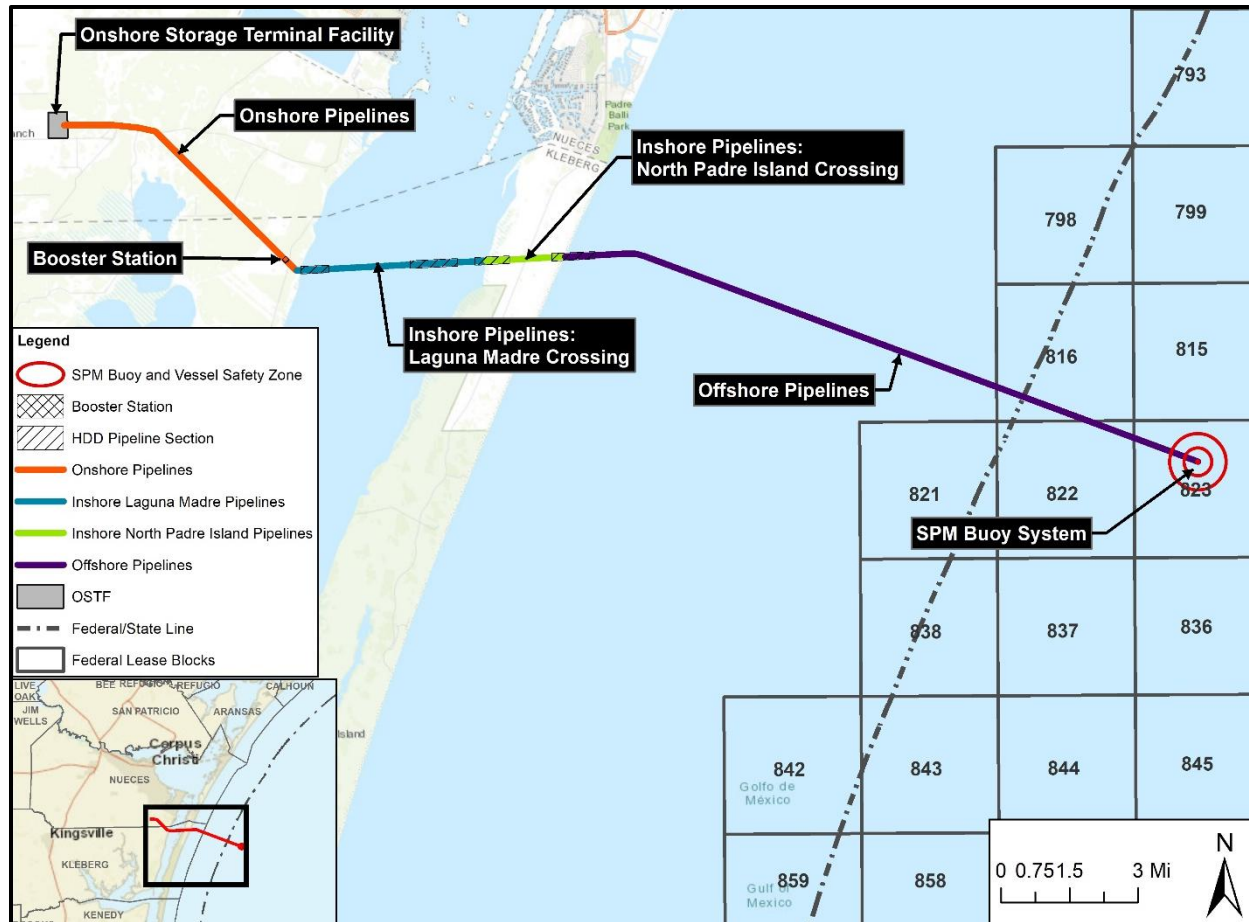


Figure 2: Project Component Overview Map

Onshore Project components includes an approximate 150-acre (ac) (60.7 hectares [ha]) OSTF, an 8.25 ac (3.3 ha) booster station, and approximately 6.36 mi of two (2) new 30-inch-diameter crude oil pipelines extending from the OSTF located in Nueces County, to the booster station located in Kleberg County, and continue to the landward side of the mean high tide (MHT) line of the Laguna Madre. The proposed OSTF will serve as the primary collection and storage terminal of crude oil to be directly pumped through the proposed pipeline infrastructure to the DWP. Outbound flow rates from the OSTF to the DWP are anticipated to be approximately 60,000 barrels per hour (bph).

Inshore components associated with the proposed Project are defined as those components located between the western Laguna Madre MHT line and the MHT line located at the interface of North Padre Island and the GOM; this includes approximately 5.74 mi of two (2) new 30-inch-diameter crude oil pipelines and an onshore block valve station located on North Padre Island. The onshore valve station will serve as the primary conjunction between the proposed onshore and offshore pipeline infrastructure.

Offshore components associated with the proposed Project include the DWP and offshore pipelines. Principle structures associated with the proposed DWP includes one SPM buoy system consisting of the SPM buoy, pipeline end manifold (PLEM), sub-marine hoses, mooring hawsers, and floating hoses to

allow for the loading of crude oil to vessels moored at the proposed DWP. The proposed SPM buoy system will be of the Catenary Anchor Leg Mooring (CALM) type permanently moored with a symmetrically arranged six-leg anchor chain system extending to pile anchors fixed on the seafloor. Offshore pipeline infrastructure associated with the proposed Project consist of approximately 14.71 mi of two (2) new 30-inch-diameter pipelines extending from MHT line on North Padre Island to the SPM buoy system located at the proposed DWP. Refer to the Project Components Map below for a depiction of the location of the Project components discussed above.

Details of each project component are further described in Section 1.0: Project Description and Purpose and Need.

### 3.0 Framework for Environmental Evaluation

This section describes the framework and methodology used to identify the project-related environmental consequences and evaluate their level of impact to environmental resources as described in the Environmental Evaluation technical sections (Sections 3 through 14) and the cumulative impacts sections of this DWPL Application. This section identifies the consequence-producing factors, describes criteria used to assess the significance of impacts, and defines terminology of effects and significance.

#### 3.1 Consequence-Producing Factors

Consequence-producing factors are those aspects of the Project that have potential to result in consequences to the environmental resources identified for evaluation by the DWPA, in compliance with the NEPA. Due to the vast nature of the Project, it is not practicable to individually identify and evaluate all possible consequence-producing factors. Therefore, those key features that would potentially affect the majority or all of the DWPA-identified resources, have been identified and used throughout the evaluation process. Instances where certain aspects of the Project would have a greater degree of impact on specific resources will be identified in appropriate Sections.

To provide a consistent framework for evaluation throughout all resource sections, three distinct phases of this Project have been identified: Construction, Operation, and Decommissioning. Table 1 identifies the consequence-producing factors inherent to each Phase of the Project.

**Table 1: Consequence-Producing Factors**

<b>Construction Phase</b>
Onshore storage terminal facility construction / installation
Onshore pipeline installation
Inshore pipeline installation
Offshore pipeline installation
DWP pile driving and installation
Hydrostatic testing (pipelines)
Construction vessel operations (air emissions, wastewater discharges, noise, traffic)
Onshore support operations
Facilities commissioning
Personnel/staffing
<b>Operation Phase</b>
VLCC approach / departure at DWP
VLCC mooring
VLCC presence (aesthetics)
VLCC carrier ballast discharge
VLCC discharges (wastewater, domestic, processed drainage, closed and open separated drainage, bilge separated drainage, non-contact engine cooling water, and fire deluge system test water)
Support vessel mooring and ancillary operations
Other vessel discharges (wastewater, sanitary drainage, domestic, closed and open separated drainage, bilge drainage, ballast, non-contact engine cooling water, and fire deluge system test water)
Restricted operation zones: safety zones

Minor/Major Petroleum liquids release
Petroleum Liquids pipeline release
Minor hydrocarbon release
<b>Decommissioning Phase</b>
Onshore storage terminal facility removal
Onshore pipeline removal / abandonment
Inshore pipeline removal / abandonment
Offshore pipeline abandonment/removal
DWP removal

### 3.2 Assessment Criteria

Assessment criteria consistent with 40 CFR §1508 was developed to provide a standardized framework for assessing impacts to the environmental resources considered in this Volume. Table 6-2 presents the criteria used for classifying the consequences and determining the magnitude of impact: significant, moderate, or negligible/minor.

**Table 2: Assessment Criteria**

Criteria	Value
Quality	Beneficial / Adverse
Effect	Direct / Indirect
Intensity	Negligible / Minor / Moderate / Significant
Probability	Unlikely / Possible / Likely
Temporal	Short-term / Long-term
Permanence	Reversible / Irreversible
Context	Local / Regional / National

### 3.3 Level of Significance - Definitions

The level of significance is the fundamental element of the environmental impact assessment process upon which agencies prepare decision documents under the auspices of the NEPA. In addition to the criteria in Table 2, criteria specific to individual resources are discussed where applicable to assess consequences and determine level of significance.

The resource baselines and evaluations provided in this document were prepared by qualified and experienced professionals using the best available scientific information, Project-specific modeling/data, professional judgement, and in close consultation with appropriate state and federal resource agencies. Determining the level(s) of significance of consequences is based on CEQ NEPA guidelines. Terminology used in this DWP Application is as follows:

- Direct effects - caused by the action and occur at the same time and place.
- Indirect effects - caused by the action; occur later in time or farther removed in distance but are still reasonably foreseeable (may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems).

The determination of “significance” includes evaluating the intensity or severity of the various factors that come into consideration for each specific resource. Intensity encompasses such distinct elements as:

- Degree to which the proposed action affects public health or safety.
- Proximity to unique environmental resources.

- Potential for highly controversial effects on the quality of the human environment.
- Degree to which effects on the human environment are highly uncertain or involve unique or unknown risks.
- Degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.
- Whether the action is related to other actions with individually insignificant but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.
- Degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources.
- Degree to which the action may adversely affect an endangered or threatened species or critical habitat under the ESA.
- Significant: Includes components of context, intensity, and duration. An effect to a substantive area (local, regional, national), unique resource or particularly valued interests; is either highly intense in a short term or continues long-term; and is predominantly irreversible by natural means. May also include exceedance of specific thresholds or standards set by regulatory authorities.
- Moderate: An effect to limited area, with little or no affect to unique resource or valued interests, is temporary, and reversible by natural means.
- Minor: An effect to limited area that slightly alters the site condition, with no affect to unique resource or valued interests, is short term, and reversible by natural means.
- Negligible: An effect to limited area that is barely perceptible, with no affect to unique resource or valued interests, is short term, and reversible by natural means.

### 3.4 The Consequences Assessment Process

A detailed description of construction, operations, and decommissioning procedures and set of detailed exhibits has been prepared to aid in the evaluation environmental consequences of the Project and can be referenced in Appendix A: Construction, Operation, and Decommissioning Procedures. The following general steps are used to assess environmental consequences:

1. The specific and applicable consequence-producing factors to be evaluated are identified for each resource.
2. Potential consequences are evaluated for each resource using the assessment criteria described above.
3. Resources with specific threshold criteria (i.e., air and/or water quality thresholds as set by agency standards) will be assessed utilizing the above criteria and also the agency standards/thresholds to determine significance.
4. Mitigation measures that are incorporated into the Project to avoid and minimize impacts are considered as part of the assessment process to determine the level/magnitude of significance.

## 4.0 Framework for Cumulative Impact Analysis

### 4.1 Cumulative Impact Analysis

In accordance with the National Environmental Policy Act of 1969 (NEPA), the United States Maritime Administration is required to conduct a cumulative impact analysis for the Project. The Council on Environmental Quality defines cumulative impacts as impacts on the environment resulting from incremental impacts of an action in conjunction with other past, present, and reasonably foreseeable future actions (40 CFR 1508.7).

Cumulative effects generally refer to impacts that are additive or synergistic in nature and result from the construction of multiple actions in the same vicinity and time frame. Cumulative impacts can result from individually minor, but collectively significant actions, taking place over a period of time. In general, small-scale projects with minimal impacts of short duration do not significantly contribute to cumulative impacts.

Below we describe the methodology, geographic range, and cumulative impacts of existing and reasonably foreseeable projects included in this analysis. The impacts associated with the proposed Deepwater Port (the Project) are also summarized below, as well as the incremental effects of the proposed Project when added to other past, present, or reasonably foreseeable actions, regardless of the agency or party undertaking such actions.

### 4.2 Cumulative Impact Scope of Analysis

Our cumulative impact analysis for the Project generally follows the methodology set forth in relevant guidance (CEQ 2005; USEPA 1999) and is consistent with the format and methodology of previous cumulative impact analyses published by MARAD for similar actions. Under these guidelines, inclusion of other actions in the analysis is based on identification of impacts on environmental resources from other actions that would directly or indirectly result in similar effects as the proposed Action. The cumulative impacts analysis includes those past, present, and reasonably foreseeable projects meeting the following three criteria:

- significantly impacts a resource potentially affected by the Project;
- causes this impact within all, or part of, the timespan for potential impacts of the Project (25 years); and
- impacts a resource within all or part of the same geographic range affected by the proposed Project. The geographic range considered varies depending on the resource being discussed and includes the general area in which the projects could contribute to cumulative impacts on that resource (geographic scope of analysis).

Projects included in this cumulative analysis were identified by reviewing publicly available documents, including press releases and agency planning documents from BOEM, USACE, FERC, and USDOT, as identified in Table 4. Local projects were also identified through correspondence with regulatory and planning boards. Projects identified during these reviews are included in the cumulative impacts assessment when they meet the following standards:

1. an application has been submitted to a regulatory agency for permit review,
2. available press releases indicate that a project is moving forward, and
3. the project is within the appropriate geographic range (as identified below) of the proposed Project.

Because detailed information about future projects, actions, or facilities was limited in many cases, quantitative assessments of potential cumulative impacts were not possible; therefore, qualitative assessments were completed where applicable. In addition, there is a level of uncertainty when evaluating the potential cumulative impacts of in-progress and proposed projects, since projects can be delayed, abandoned, or altered between the time they are announced and the time they are completed or

abandoned. The specific sources for each project included in this analysis are noted in Table 4. Past actions are considered to be captured in the baseline evaluation of impacts.

The coastal bend of Texas, namely Nueces and San Patricio Counties have changed considerably over the last 50 years with industrialized development associated with oil and gas infrastructure and the establishment of multiple Port authorities. Recently completed development includes the Nueces River Rail Yard, the M&G Plant, the Oxy Ingleside Energy Center Terminal, as well ongoing maintenance and improvements in waterways to access these facilities (e.g., within the La Quinta Channel and Corpus Christi Ship Channel [CCSC]) (Port of Corpus Christi 2018a; Guidry News Service 2018).

As previously noted, the geographic ranges assessed for the cumulative assessment vary based on the resource being considered. The western Gulf of Mexico (GOM), specifically BOEM's West Planning Area defines the geographic range for offshore projects, while the coast of Texas defines the geographic range for large onshore oil and gas projects. A maximum 31-mile (50-kilometer) buffer is used to identify other projects that could contribute to cumulative impacts on resources in proximity to the Onshore Storage Facility and Inshore Pipelines. Table 3 provides the resource-specific geographic ranges considered in the cumulative analysis for the Project's onshore components. These projects have been compiled into eight groups to facilitate discussion and the cumulative analysis (see Table 4 and Figure 1):

- offshore oil and gas terminals;
- oil and gas exploration and production;
- onshore gas storage and terminals<sup>1</sup>;
- marine traffic (e.g., cruise ships, recreational and commercial fishing vessels);
- waterway improvement projects;
- pipeline projects;
- other industrial, commercial, and residential developments; and
- non-jurisdictional facilities.

Potential cumulative effects on each resource are evaluated individually; these discussions can be found in the respective Sections of the Environmental Evaluation (Volume II).

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<sup>1</sup> No new onshore oil storage or terminal facilities or existing facilities with approved or planned expansions/modifications were identified in the geographic range defined for this cumulative analysis.



**Table 3: Geographic Range for Cumulative Impact Analysis for the Project’s Onshore Components**

<b>Environmental Resource</b>	<b>Geographic Scope and Justification</b>
Geologic Resources	Construction workspaces – impacts on geological resources and soils would be highly localized and primarily limited to the respective project footprints during active construction
Water Quality, Wetlands, Vegetation, Wildlife	HUC 12 watershed – impacts on water resources, including wetlands, are traditionally assessed on a watershed level. The watershed can also serve as a geographic proxy for impacts to vegetation and wildlife, and provides a natural boundary, as recommended by the CEQ. Also, to include potential overlapping impacts from sedimentation, turbidity, and general water quality impacts for surface water resources.
Cultural Resources	Overlapping impacts within the APE – direct impacts on cultural resources are highly localized, cumulative impacts would only occur if other projects are constructed in the same place or impact the same historic properties impacted by the proposed Project
Land Use and Recreation	1-mile radius – to encompass any large areas with specialized or recreational uses
Visual	0.25 mile and existing visual access points (e.g., road crossings) – to include the surrounding area from where a new facility could be visible
Noise - Operations	Overlapping NSAs up to 0.5 mile from the aboveground facilities – to include the maximum distance for noise assessments that are traditionally required for aboveground facilities
Noise - Construction	0.25 mile from pipeline or aboveground facilities due to the localized effects of construction activities. 0.5 mile from horizontal direction drill or direct pipe installation – due to the longer duration of sustained noise from this type of construction activity
Air Quality – Operation	Within 31 miles of the proposed Onshore Storage Facility
Air Quality – Construction	0.25 mile from pipeline or aboveground facilities – construction emissions are highly localized
Socioeconomics	Affected counties and municipalities – due to the projects’ limited regional scope and relative short construction duration
Reliability and Safety	5-mile radius, nearest similar facility is within 5 miles

**Table 4: Regional Projects Identified for Consideration in the Cumulative Impacts Analysis**

Project Number	Project (Owner)	Location within Project Area	Estimated Timeframe (Construction / Operation)	Potential Impact Area	Closest Known Distance to Project (miles/km)	Vessel Transits <sup>a</sup> (Construction / Operation)	Description	Resource(s) Potentially Cumulatively Affected
1	Annova LNG Brownsville (Annova LNG Common Infrastructure, LLC, Annova LNG Brownsville A, LLC, Annova LNG Brownsville B, LLC, and Annova LNG Brownsville C, LLC)	Brownsville, TX	2018 / 2021	731 acres	102.4 / 164.8	288 / 250	The applicants are proposing to construct and operate a liquefaction and LNG export terminal to include six LNG trains, two 160,000 m3 LNG storage tanks, and a marine berth. The project would be located along the Brownsville Ship Channel in Cameron County, Texas.	Biological Resources, Coastal Zone Uses, Recreation, and Aesthetics
2	Corpus Christi LNG (Cheniere)	Corpus Christi, TX	Under construction / 2022	2,000 acres	23.7 / 38.1	Unknown / 500	Corpus Christi LNG, LLC is currently constructing an LNG export terminal in San Patricio County, Texas, along the northeast side of Corpus Christi Bay. Upon completion the terminal will include three LNG trains, three 160,000-m3 LNG storage tanks, and two LNG berthing docks (CP12-507). Also, currently under FERC review is a proposal for two additional LNG trains, one additional LNG storage tank, an about 22-mile-long natural gas pipeline with one compressor station (PF15-26).	All Resources, less geology and cultural resources
3	Freeport LNG Dev. (Cheniere)	Freeport, TX	Under construction / 2022	661.4 acres	144.1 / 231.9	Between 600 and 940 / an additional 150 (incremental increase for anticipated upgrades)	FLNG Expansion and FLNG LNG, LLC are currently constructing LNG, storage, and export facilities at the existing Freeport LNG Terminal on Quintana Island in Brazoria County, Texas. The terminal was originally approved as an import facility. Also, currently under FERC review is a proposal for one additional LNG train and additional supporting infrastructure, utility, and auxiliary facilities, as well as an increase in the total LNG production from the previously authorized 13 MTPA to 15.3 MTPA.	Biological Resources, Coastal Zone Uses, Recreation, and Aesthetics
4	Golden Pass (ExxonMobile)	Sabine Pass, TX	Unknown	919 acres	245.4 / 394.9	7,300 / 200 <sup>b</sup>	Expansion of the existing terminal (located on 447 acres) near Sabine Pass, Jefferson County, Texas, on the western shore of the Sabine Pass Channel. Upon completion the terminal will include three LNG trains; a 2.6-mile-long, 24-inch diameter pipeline; three compressor stations; and modifications to existing facilities to allow for bi-directional flow (CP14-517).	Biological Resources, Coastal Zone Uses, Recreation, and Aesthetics

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5	Port Arthur LNG (Port Arthur LNG, LLC and PALNG Common Facilities Company, LLC)	Port Arthur, TX	2018 / 2023	890 acres	245.1 / 394.5	2,920 / 360	The applicants are proposing to construct an LNG export terminal to include two LNG trains, three 160,000-m <sup>3</sup> LNG storage tanks, an NGL and refrigerant storage area, truck loading/unloading facility, and two LNG vessel berths. The project would be on the west side of the Sabine-Neches Waterway in Jefferson County, Texas.	Biological Resources, Coastal Zone Uses, Recreation, and Aesthetics
6	Rio Grande LNG (Rio Grande LNG and Rio Bravo Pipeline)	Brownsville, TX	2018 / 2022	770 acres	101.2 / 162.8	1,760 / 624	The applicant is proposing to construct an LNG export terminal to include six liquefaction trains, a marine berth capable of receiving two LNG carriers at a time, and four 180,000 m <sup>3</sup> LNG storage tanks. The project would be located along the Brownsville Ship Channel in Cameron County, Texas.	Biological Resources, Coastal Zone Uses, Recreation, and Aesthetics
7	Texas LNG Brownsville (Texas LNG)	Brownsville, TX	2018 / 2022	625 acres	99.5 / 160.0	218 / 150	The applicant is proposing to construct an LNG export terminal to include two LNG trains, two 210,000 m <sup>3</sup> LNG storage tanks, and a marine berth to accommodate one LNG vessel. The project would be located along the Brownsville Ship Channel in Cameron County, Texas.	Biological Resources, Coastal Zone Uses, Recreation, and Aesthetics
8	Improvement of the confluence of Corpus Christi Ship Channel and the Aransas Pass Channel (Port Aransas Marina Association)	Port Aransas, TX	Unknown	70 linear foot extension 0.26 acre (of fill)	23.1 / 37.2	Unknown	The Port Aransas Marina Association is seeking authorization to install a sheetpile breakwater extension at the confluence of the CCSC and the Aransas Pass Channel (SWG-1998-02486).	All Resources, less cultural resources
9	Valley Crossing Pipeline	Nueces and Kleberg Counties, TX	Under construction/ 2018	168 miles	26.6 / 42.8	None expected	A 168-mile natural gas pipeline with peak day capacity of 2.6 Bcf/d to provide new market opportunities for Texas gas producers. The project includes two new compressor stations in Agua Dulce and Brownsville, Texas, and a 14-mile fiber optic cable.	Socioeconomics and Air Quality
10	EPIC NGL Pipeline	Nueces County, TX	2018 / 2019	700 miles	22.4 / 36.1	None expected	A natural gas liquids pipeline with initial capacity of 300 thousand barrels per day to provide producers access to Permian and Eagle Ford reserves. The pipeline route is adjacent to EPIC's Crude Pipeline.	Socioeconomics and Air Quality
11	EPIC Crude Pipeline	Nueces County, TX	2018 / 2019	700 miles	22.4 / 36.1	None expected	A crude oil pipeline with initial capacity of 590 thousand barrels per day from the Permian and Eagle Ford Basins. The pipeline route is adjacent to EPIC's NLG Pipeline.	Socioeconomics and Air Quality

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12	Fractionation Facility	Robstown, TX	Unknown	Unknown	22.4 / 36.1	None expected	A complex with multiple fractionators receiving product from the EPIC pipelines.	Socioeconomics and Air Quality
13	Industrial Recycling and Production Facility	Aransas Pass, TX	Unknown	138 acres	24.1 / 38.8	Unknown	Construction of a concrete industrial recycling and production facility.	Socioeconomics and Air Quality
14	Corpus Christi Ship Channel - Channel Improvement Project (Port of Corpus Christi Authority)	Corpus Christi area of Texas	Under construction / Unknown	widen 530 feet 7-foot increase in depth	19.6 / 31.5	Unknown	The Port of Corpus Christi Authority is constructing ecosystem restoration features along the CCSC. The PCCE is also seeking authorization to widen and deepen the channel and add Barge Shelves across the bay.	All Resources, less cultural resources
15	Redfish Bay Breakwater	Port Ingleside, TX	Unknown	Site 1: 2,268 cubic yards Site 2: 525,172 cubic yards	19.8 / 31.9	Unknown	Construction of nearshore breakwaters at two locations, as well as a beneficial use area at one of the locations.	Socioeconomics and Air Quality
16	Tule Lake Docks	Corpus Christi, TX	Unknown	49 acres	19.4 / 31.3	Unknown	Construction of Public Docks 20, 21, and 22 along the inner harbor of the Port of Corpus Christi adjacent to the Corpus Christi Shipping Channel.	Socioeconomics and Air Quality
17	Lake Padre Development (Unknown)	Padre Island (north), TX	Under construction / Unknown	100 acres	4.1 / 6.6	Unknown	Expansion of Lake Padre and development of a 100-acres stretch.	Water Quality, Wetlands, Vegetation, Wildlife, Socioeconomics, and Air Quality
18	Padre Isles (water oriented, recreational community) (Padre Isles Property Owners Association)	Padre Island (north), TX	Under construction / Unknown	3,700 acres <sup>c</sup>	2.2 / 3.5	None expected	Ongoing development of a water oriented, recreational community on North Padre Island. About 3,550 lots have not been developed.	Water Quality, Wetlands, Vegetation, Wildlife, Socioeconomics, and Air Quality
19 <sup>d</sup>	Oil and Gas Exploration & Production (Various)	Western Planning Area	2017 / 2022	75,400,000 acres <sup>e</sup>	0.7 <sup>f</sup> / 1.1	Between 1,720 and 21,640 <sup>g</sup>	BOEM's lease program proposes 10 lease sales over a five-year period. Activities associated with these leases could include seismic surveys, drilling oil, and natural gas exploration and installation of infrastructure such as on and offshore platforms and pipelines, as well as marine traffic to transportation of equipment and people and associated with support services.	All Resources, less cultural resources

20 <sup>h</sup>	Recreation, cruise ships, etc. (Various)	Various Ports in TX	ongoing	unknown	2.9 <sup>i</sup> / 4.7	Unknown	Nearby ports provide access to the Gulf of Mexico associated with mineral exploration, cruises, recreational fishing, diving, and military training. Established shipping lanes govern the movement of these vessels (33 CFR 166), the closest of which is the Brazos Santiago Pass to Aransas Pass Safety Fairway.	All Resources, less geology and cultural resources
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Note: Land Use, Recreation, and Aesthetics include both land- and water-based activities

- Construction transits are based on the total number of vessel transits (one-way) required for the entire construction period. Operation transits are the expected number of vessel transits each year the project is in operation.
- These vessel transits were authorized under the initial import terminal order (FERC docket CP04-386-000), the currently approved but not yet constructed project (FERC docket CP14-517) will not result in an increase in transits during operation.
- Approximate size of the community, which includes previously and yet to be developed areas.
- BOEM's preferred alternative is a lease program for any inactive lease block, as depicted in Figure 8.2-1, such that future activity associated with oil and gas exploration and production could occur throughout the Western, Central, and Eastern Planning Areas, with exception of those blocks within the marine sanctuaries and as noted in BOEM 2017.
- This is the total area available for lease as of January 2017 (BOEM 2018).
- Distance from the proposed Project to the closest existing pipeline. The closest existing platform is 7.6 mile (12.2 kilometer).
- This estimate is for transits throughout the GOM, so is not representative of activities exclusively within the Western Planning Area. In total this increase in transits represents a less than 2 percent increase in traffic in the GOM.
- Recreational activities, in particular diving, occur with the marine sanctuaries depicted in Figure 8.2-1. Recreational activities including: fishing, boating, and diving also occur throughout the near and offshore waters within the Project area.
- Distance from the proposed buoy location to the closest shipping lane.

Sources by Project Number:

- FERC Docket via <https://www.ferc.gov/docs-filing/elibrary.asp>, docket no. CP16-480.
- Cheniere Energy, Inc. 2018 and FERC Docket via <https://www.ferc.gov/docs-filing/elibrary.asp>, docket no. CP12-507.
- FERC Docket via <https://www.ferc.gov/docs-filing/elibrary.asp>, docket nos. CP03-75, CP12-509, and CP17-470.
- FERC Docket via <https://www.ferc.gov/docs-filing/elibrary.asp>, docket nos. CP04-386 and CP14-517.
- FERC Docket via <https://www.ferc.gov/docs-filing/elibrary.asp>, docket no. CP17-20.
- FERC Docket via <https://www.ferc.gov/docs-filing/elibrary.asp>, docket no. CP16-454.
- FERC Docket via <https://www.ferc.gov/docs-filing/elibrary.asp>, docket no. CP16-116.
- USACE 2017.
- Enbridge 2018.
- & 11. EPIC, LP 2018.
- Acosta 2017.
- USACE 2018a.
- Port of Corpus Christi 2018a.
- USACE 2018b.
- USACE 2018c.
- KRIS Communications 2018.
- Padre Isles 2017.
- & 20. BOEM 2017 and 2018.

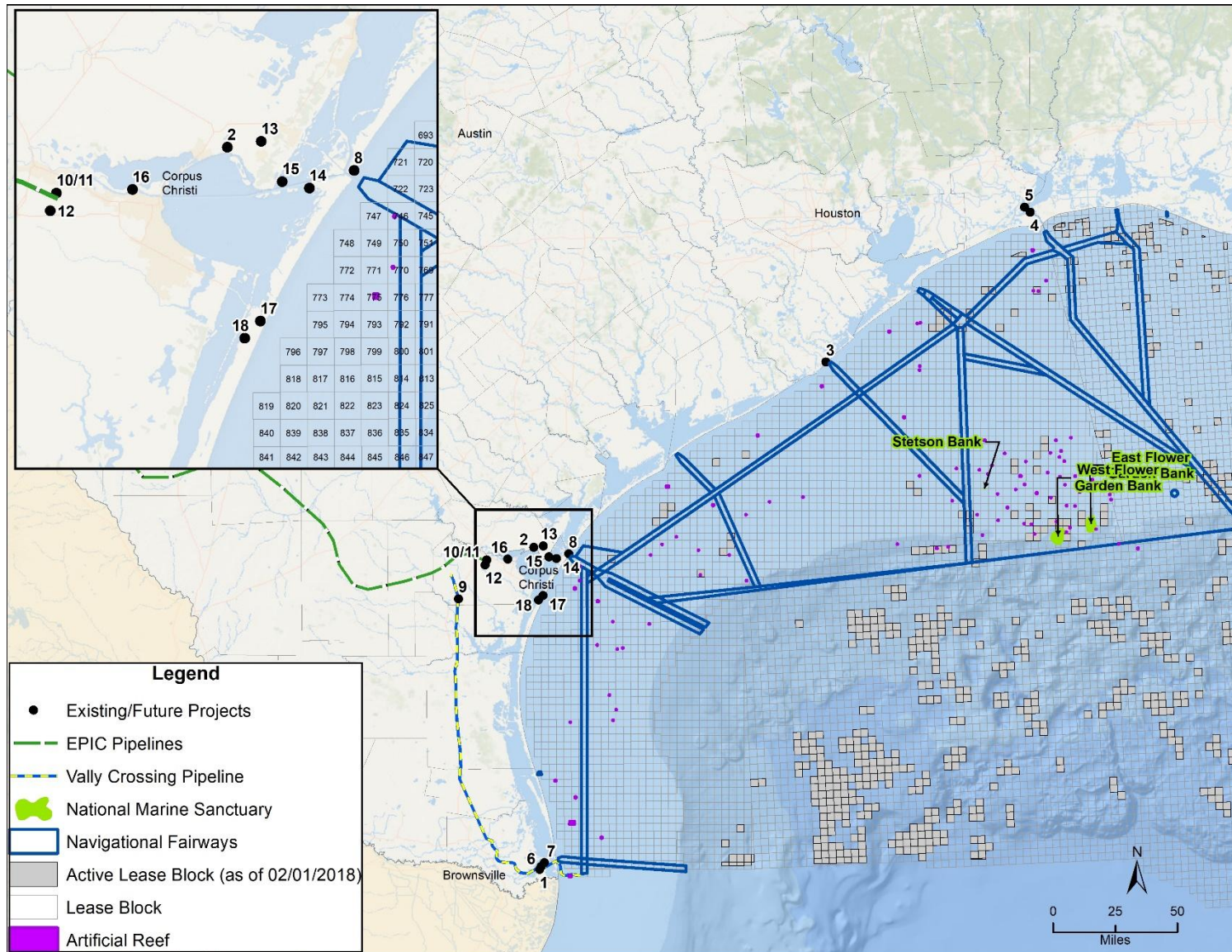


Figure 3: Projects Identified for Consideration in the Cumulative Impacts Analysis for the Project

#### 4.2.1 Offshore Oil and Gas Terminals

Several planned offshore LNG terminals have been approved but subsequently cancelled (4); in two instances the applicant withdrew the project application prior to authorization, and one LNG terminal was decommissioned in 2012 (A Barrel Full 2018; Excelebrate Energy 2018).

There are no offshore terminals in BOEM's Western Planning Area. Currently the only offshore terminal in operation within the GOM is the Louisiana Offshore Oil Port, which is located in BOEM's Central Planning Area (BOEM 2017). Since this port is outside the geographic range of the proposed Project it is excluded from our cumulative impact analysis.

#### 4.2.2 Oil and Gas Exploration and Production

BOEM manages oil and gas leases in the GOM OCS, which encompasses the Western and Central Planning Areas, and portions of the Eastern Planning Area. Currently there are 1,031 platforms and 6,554 miles of pipeline in the Western Planning Area (BOEM 2018). Additionally, there are 82 platforms in the state waters of Texas.

BOEM's lease program proposes 10 lease sales over a five-year period. Oil and gas development associated with these sales would help meet domestic demand for liquid hydrocarbon products such as gasoline, aviation, and diesel fuel, as well as enhancing national economic security.

Information on reasonably foreseeable actions in the Western Planning Area was obtained from BOEM's final environmental impact statement for 2017-2022 as summarized in Table 8.2-2. BOEM's projected future lease sales in the Western Planning Area would include the following activities:

- exploration and delineation of between 354 and 1,032 wells;
- development and production of between:
  - 330 and 764 oil wells and
  - 903 and 2,291 gas wells;
- installation of between 561 and 1,788 production structures;
- removal of between 740 and 1,892 production structures;
- installation of between 3,049 and 6,930 miles (4,907 and 11,153 kilometers) of pipeline;
- between 830,000 and 3,085,000 service-vessel trips; and
- between 3,214,000 and 18,941,000 helicopter trips.

#### 4.2.3 Onshore Gas Storage and Terminals

As discussed in section 10.2, existing oil and gas storage and terminals such as the Ingleside Energy Center Terminal in Corpus Christi, Texas, are captured in the baseline evaluation of impacts. Therefore, the projects described below are greenfield facilities or existing facilities that have approved or proposed expansion or modifications. Applying these criteria, no onshore oil storage or terminal facilities were identified for inclusion in this analysis. Thus, the following projects are all under FERC jurisdiction, and the project name, proponent, and FERC docket number are provided below:

##### Approved/Under Construction

- Corpus Christi LNG / Cheniere (CP12-507) – Corpus Christi, Texas;
- Expansion/modifications to Freeport LNG / Sempra (CP12-509; CP15-518) – Freeport, Texas;

##### Proposed

- Annova LNG / Annova LNG (CP16-480) – Brownsville, Texas.
- Expansion/modifications, Freeport LNG / Sempra (CP14-470) – Freeport, Texas;
- Expansion/modifications, Golden Pass / Exxon (CP14-517) – Sabine Pass, Texas;
- Port Arthur LNG / Port Arthur LNG (CP17-20) – Port Arthur, Texas.
- Rio Grande LNG Terminal/ Rio Grande LNG (CP16-454) – Brownsville, Texas
- Texas LNG Brownsville / Texas LNG (CP16-116) – Brownsville, Texas.

The locations of these facilities relative to the proposed Project are depicted in Figure 1 and are discussed in greater detail below.

### **Annova LNG Brownsville Project**

Annova is planning a liquefaction and LNG export terminal that would be located along the Brownsville Ship Channel (BSC) in Cameron County, Texas. The Annova LNG Brownsville project (Annova project) would be located about 102.4 miles (164.8 kilometers) south of the proposed Project with an overall LNG capacity of about 6 MTPA and berthing facilities to accommodate one LNG vessel at a time. Annova filed its formal application with FERC in 2016 under Docket No. CP16-480 and anticipates that construction of the project will begin in 2018, with an in-service date of 2021.

### **Corpus Christi LNG**

Corpus Christi LNG, LLC (Corpus Christi) is constructing an LNG export terminal about 23.7 miles (38.1 kilometers) northwest of the Project. The LNG export terminal is located in San Patricio County, Texas, along the northeast side of Corpus Christi Bay.

Originally, Corpus Christi was authorized as an import terminal; however, due to market changes, the import terminal was never constructed. On December 30, 2014, the FERC issued an Order authorizing Corpus Christi's LNG export project (CP12-507-000) and construction began in February 2015. The facility is designed to have a cumulative 13.5 MTPA send-out capacity. The project also includes two compressor stations and an approximately 23-mile-long, 48-inch-diameter pipeline which connects the Corpus Christi LNG Terminal to five inter- and intrastate gas transmission lines which originate in south Texas. Additional expansions to increase the send out capacity to achieve a cumulative capacity of 23.5 MTPA are currently planned and under FERC's review as part of the pre-filing process (PF15-26-000). If approved, Cheniere Corpus Christi anticipates the project would begin operations in 2021.

### **Freeport LNG Terminal**

The Freeport LNG Terminal and related expansion projects include three separate applications to DOE and/or FERC, including the original import terminal (CP03-75-000) and two LNG export terminal expansions (CP12-509-000 and CP17-470-000).

The Freeport LNG Terminal is located on Quintana Island in Brazoria County, Texas, about 144.1 miles (231.9 kilometers) northeast of the proposed Project. The import terminal commenced operations in 2008 but was subsequently granted authorization to re-export foreign-sourced LNG with a maximum send out capability of approximately 1.5 Bcf/d of natural gas product. Expansion of the facility is currently underway and will provide an export capacity of about 13 MPTA (1.8 Bcf/d of vaporized natural gas). FLNG anticipates that facilities associated with this expansion effort will be completed in 2019.

Also, currently under FERC review is a proposal to increase capacity of the terminal (about 5.1 MTPA), as well as increase the total LNG production from the previously authorized 13 MTPA to 15.3 MTPA (2.1 Bcf/d of vaporized natural gas). If approved, Freeport Development anticipates the project would enter into service in 2021.

### **Golden Pass LNG Terminal**

The Golden Pass LNG Terminal is an operational LNG import terminal (CP04-386-000) located near Sabine Pass, Jefferson County, Texas, on the western shore of the Sabine Pass Channel, approximately 245.4 miles (394.9 kilometers) northeast of the proposed Project. The terminal has a maximum send out capacity of 2.5 Bcf/d and has two LNG vessel berths. Golden Pass is currently proposing to construct LNG export facilities at its existing Terminal (CP14-517) to allow for bi-directional transportation of 2.6 Bcf/d of natural gas for LNG to achieve a cumulative send out capacity of 15.6 MTPA.

The DOE has approved export of 15.6 MTPA (2 Bcf/d) of LNG to FTA countries, however approval to export LNG to non-FTA countries is pending. FERC issued an Order authorizing the project in 2016. Construction of the project has not begun as of the date of this report.



### **Port Arthur LNG**

Port Arthur LNG, LLC and Port Arthur Pipeline, LLC (collectively Port Arthur) are currently proposing to construct an LNG export terminal on the west side of the Sabine-Neches Waterway in Jefferson County, Texas. This project would be located about 245.1 miles (394.5 kilometers) northeast from the proposed Action. As designed, the export terminal would have a cumulative send out capacity of 12.0 MTPA and the ability to accommodate transport by truck or LNG vessel.

Port Arthur has received DOE approval for the export to FTA countries over a 25-year period, but approval to export to non-FTA countries is pending, as is FERC's approval. Port Arthur anticipates an in-service date of 2021, if all approvals are received.

### **Rio Grande LNG Terminal**

Rio Grande LNG, LLC (RG LNG) is proposing to construct and operate a new LNG export terminal that would be located along the BSC in Cameron County, Texas as part of its Rio Grande LNG Project. The Rio Grande LNG Project would be capable of producing 27 MTPA of LNG for export and receiving two LNG carriers at a time. The Rio Grande LNG Project would be located 101.2 miles (162.8 kilometers) south of the proposed Project.

The formal application for the project was filed with FERC in 2016 under Docket No. CP16-480-000. Rio Grande LNG, LLC anticipates beginning construction of the Rio Grande LNG Project in 2017 with the first liquefaction train operational by 2020 and the remainder of the project complete by 2024.

### **Texas LNG Brownsville**

Texas LNG Brownsville LLC (Texas LNG) is planning a liquefaction and LNG export terminal that would be located on the BSC in Cameron County, Texas bordering the northeast boundary of the Rio Grande LNG Terminal site. As designed the terminal will have an overall LNG capacity of about 4.0 MTPA and berthing facilities to accommodate one LNG vessel at a time. The Texas LNG Brownsville Project would be located 99.5 miles (160.3 kilometers) south of the proposed Project.

Texas LNG filed its formal application with FERC in 2016 (Docket No. CP16-116) and anticipates construction of the project will begin in 2018 with an in-service date of 2022.

#### **4.2.4 Marine Traffic**

Marine traffic in the western planning area and state waters of Texas occurs within areas of "federally designated shipping safety fairways and anchorage areas" (33 CFR 166) as depicted in Figure 8.2-1. In 2015, over 12,500 vessels calls were made to ports in Texas via these fairways (Maritime Administration 2018). Tankers were the predominate vessel type (57 percent) utilizing the fairways but also included dry bulk (13 percent), cargo (11 percent), container and gas (8 percent each), and Roll on – Roll off cargo ships (3 percent). In 2012 the Houston Ship Channel and Sabine-Neches Waterway handled the greatest vessel traffic in Texas, about 238 thousand and 137 thousand short tons, respectively (BOEM 2017).

The Port of Corpus Christi is the closest port to the proposed Project and is the fifth largest port in the U.S., providing access to the GOM, inland waterways, and offering connections to three railroad systems (Port of Corpus Christi 2018b). About 14 percent of the vessel calls to Texas ports in 2015 were to the Port of the Corpus Christi. Vessel calls to this port were also comprised mostly of tankers (67 percent) and included dry bulk (16 percent), gas (9 percent), and cargo (8 percent). Aransas Pass Safety Fairway provides access to the Port of Corpus Christi. Vessels approaching the port from the north would do so via Aransas Pass to Calcasieu Pass, while the Brazos Santiago Pass to Aransas Pass provides access from the south and is the closest shipping lane to the proposed Project (about 2.9 miles east of the proposed buoy location).

In addition to marine vessel traffic associated with oil and gas activity in the Western Planning Area, state waters of Texas, and onshore terminals and ports, marine vessel traffic may also be associated with mineral exploration, recreation (cruises, diving, and fishing), and military training. Recreational activities such as fishing, boating, and diving in the Project area occur in Aransas Bay, Corpus Christi Bay, Laguna

Madre, as well as in near shore and offshore locations. The marine sanctuaries depicted in Figure 8.2-1, are also well-known destinations for recreational fishing and diving and can be assessed by private boat or charter (NOAA 2017).

Between 2004 and 2007, about 1,050 cruise ships departed from the Ports of Galveston and Houston (Maritime Administration 2018). However, in subsequent years (2008 through 2012), departures in Texas have occurred exclusively from the Port of Galveston and during this time the number of departures has continued to decline. These ports are over 180 miles (290 kilometers) north of the proposed Project, see Figure 8.2-1.

#### **4.2.5 Waterway Improvement Projects**

Several dredging and waterway maintenance efforts were identified as having the potential to contribute to cumulative impacts within the defined geographic range of northern Padre Island (Port of Corpus Christi 2018a). The Port of Corpus Christi Authority (PCCA) is currently constructing ecosystem restoration features along the CCSC to protect endangered species, wetlands, and seagrass. Also, the PCCA is seeking authorization to widen the CCSC between Port Aransas to the Harbor Bridge (up to 530 feet), deepen the CCSC to a depth of 54 feet mean lower low water (MLLW), and add barge shelves at 14 feet MLLW across Corpus Christi Bay.

On December 21, 2017, the USACE issued a Public Notice for work proposed by the Port of Aransas Marina Association (PAMA) at the confluence of the CCSC and the Aransas Pass Channel (USACE 2018). PAMA is seeking authorization to install a sheetpile breakwater extension to the existing concrete breakwater on the west side of the inlet. In addition, PAMA is proposing to install scour protection along 130 feet of the bulkhead on the east side of the inlet, which will involve placement of about 0.26 acres of fill material.

A Public Notice for the Redfish Bay Breakwater Project was issued by USACE on July 17, 2017. TPWD is seeking approval to construct nearshore rock breakwaters at two locations (Sites 1 and 2) within the Redfish Bay State Scientific Areas, as well as a beneficial use area at Site 2 (USACE 2018b). The rock breakwater at Site 1 would be constructed with riprap scour protection parallel to the shoreline and would require shallow water barges to transport rock. A similar nearshore, rock breakwater would be constructed at Site 2 and would involve similar construction procedures. In addition, a 28-acre containment site would be created to accept suitable dredge material to serve as a beneficial use site and containment levees would be constructed within the site using materials excavated during construction. These waterway improvement projects are in or near the CCSC, about 19.6 and 23.1 (31.5 and 37.2) northwest of the proposed landfall location, see Figure 8.2-1.

#### **4.2.6 Pipeline Projects**

##### **Valley Crossing Pipeline**

Valley Crossing Pipeline, LLC, a subsidiary of Enbridge, is constructing a 168-mile intrastate pipeline to supply gas to Comisión Federal de Electricidad, Mexico's stated-owned utility (Enbridge 2018). The Valley Crossing Pipeline (VCP), which originates near the Agua Dulce Hub in Nueces County, Texas is currently under construction. The terminus of the pipeline will be about 9 miles offshore of the Brownsville Shipping Channel and it is expected to be operational in October 2018. The VCP is about 34 miles west of the proposed Project's land-based facilities.

##### **EPIC Projects**

EPIC L.P, a Texas-based firm, is currently constructing a natural gas liquids pipeline and crude oil pipeline to provide producers on the Gulf Coast access to reserves in the Permian and Eagle Ford Basins (EPIC 2018). The pipelines, which are being constructed adjacent to one another for about 700 miles, will provide initial capacities of 300 thousand and 590 thousand barrels per day, respectively. The NGL Pipeline will have an initial in-service in 2018 and both pipelines are expected to be fully operational by 2019. Plans for a fractionation complex to receive the pipelines' volume are underway and anticipated to be built east of Robstown along Violet Road in Nueces County, Texas. As part of the approved tax

abatement agreement, the company is required to maintain at least 10 new full-time positions during operation of the facility (Acosta 2017).

#### **4.2.7 Other Industrial, Commercial, and Residential Developments**

On June 20, 2017, USACE issued a public notice for a project that would be located on about 138 acres adjacent to McCampbell Slough in Aransas Pass, Texas (USACE 2018a). The proposed Industrial Recycling and Production Facility would provide municipalities and the public with increased demand for such services in San Patricio County. Construction of the facility would involve discharge of fill material (about 33,700 cubic yards) into waters of the United States.

The proponent is proposing to construct and operate public docks on about 22 acres of land and 27 acres of open water along the Tule Lake Channel in Nueces County, Texas (USACE 2018c). The public notice for this project was issued on November 9, 2017. The primary project components include a 40-foot by 40-foot barge dock, three barge breasting dolphins, about 4,155 feet of bulkhead, and about 2,924 feet of elevated concrete wharf platform. Construction of these project components would require excavation and dredging of a 37-acre area, in total about 2.9 million cubic yards of material would be disturbed. The project, which would provide public docks waterborne commerce, would be about 19.5 miles northwest of the proposed Project,

Two development projects were identified as having the potential to contribute to cumulative impacts. Padre Isles, a water oriented, recreational community on North Padre Island was established in 1965 and currently has 5,408 lots, of a total of 8,950, to be developed. The community is comprised of single-family lots, multi-family residential units, and commercial and recreational facilities including an 18-hole golf course and country club, a fire station, charter schools, banks, and restaurants.

A multi-phase development effort on the man-made Lake Padre is currently underway to enlarge the lake and establish boating routes through connecting canals and to Schlitterbahn Beach Resort (KRIS Communications 2018). The first phase of the project involved 8,000 cubic yards of sand per day to be removed from around the lake, to allow for development of a 100-acre area and bulkheading the lake. Future phases of development will focus on the establishment of infrastructure such as restaurants, a marina, a hotel, and a condominium. These developments are on Padre Island, 2.2 and 4.1 miles (3.5 and 6.6 kilometers) northwest of the propose landfall location, see Figure 8.2-1.

#### **4.2.8 Non-Jurisdictional Facilities**

As described in in Section 1, “Project Description”, the proposed Project will require non-jurisdictional facilities such as the onshore storage facility. These services do not fall under the jurisdiction authority afforded to MARAD and USCG. However, each of these projects has been included in our cumulative impacts analysis.

## 5.0 Summary of Environmental Evaluation

The Environmental Evaluation assesses the potential environmental effects associated with installation/commissioning (“construction”), routine operations, potential upsets/accidents, and decommissioning of the proposed Project. A detailed description of construction, operations, and decommissioning procedures and set of detailed exhibits has been prepared to aid in the evaluation environmental consequences of the Project and can be referenced in Appendix A: Construction, Operation, and Decommissioning Procedures.

The Environmental Evaluation analyzes the potential consequences of the proposed Project and the alternatives that have been identified and deemed reasonable. The assessment is based on available data and literature, project surveys, and desktop studies. In cases where limited data is available, the assessment is based on qualitative judgment through the understanding of the local and regional setting; understanding the proposed actions; and predicting effects from similar actions, agency positions on these, and/or published science. Each section also considers how the Project meets or complies with applicable laws, regulations, standards, or guidelines associated with the discussed resource. A complete list of governing laws and regulations that were considered in the Environmental Evaluation of the Project can be found in Appendix B. Applicable agencies and authorizations, permits, and consultations that maintain authority over any part of the proposed Project are summarized in Table 5.

**Table 5: Summary of Environmental Laws**

Agency	Authorization/Permit/Consultation
<b>Federal</b>	
USCG	<ul style="list-style-type: none"> <li>• DWPA license application processing, post-licensing design, construction, operations and oversight</li> <li>• National Environmental Policy Act (NEPA) lead agency for preparation of a single Environmental Impact Statement for the onshore and offshore DWP facilities (collectively, the Project)</li> <li>• Certification that navigational aids for the DWP meet the applicable requirements</li> </ul>
U.S. Department of Transportation (DOT), Maritime Administration (MARAD)	<ul style="list-style-type: none"> <li>• DWP license application processing, jointly with USCG</li> <li>• Approval of DWP</li> </ul>
DOT, Pipeline and Hazardous Material Safety Administration (PHMSA)	<ul style="list-style-type: none"> <li>• Project pipeline safety regulation (DOT and DWP)</li> <li>• NEPA consultation</li> </ul>
USACE	<ul style="list-style-type: none"> <li>• RHA, Section 10 authorization</li> <li>• CWA (Section 404) Permit (Dredge and Fill Permit)</li> <li>• CWA (Section 401) Water Quality Certification</li> <li>• NEPA consultation</li> </ul>
U.S. Environmental Protection Agency (EPA)	<ul style="list-style-type: none"> <li>• CWA, National Pollutant Discharge Elimination System (NPDES) permit (OSTF only)</li> <li>• Clean Air Act (CAA), New Source Review (NSR) permit (40 CFR Part 52) (DWP only)</li> <li>• CAA Title V operating permit (40 Code of Federal Regulations (CFR) Part 70)</li> <li>• Marine Protection Research and Sanctuaries Act consultation</li> <li>• Beaches Environmental Assessment and Coastal Health Act</li> <li>• NEPA consultation</li> </ul>
U.S. Department of Commerce, National Oceanic and Atmospheric Administration (NOAA), National Marine Fisheries Service (NMFS)	<ul style="list-style-type: none"> <li>• Endangered Species Act (ESA) Section 7 consultation</li> <li>• Marine Mammal Protection Act (MMPA) consultation</li> <li>• Magnuson-Stevens Fishery Conservation and Management Act consultation</li> <li>• National Invasive Species Act Consultation</li> <li>• NEPA consultation</li> </ul>
Advisory Council on Historic Preservation (ACHP)	<ul style="list-style-type: none"> <li>• National Historic Preservation Act (NHPA) Section 106 consultation</li> </ul>

U.S. Department of the Interior (DOI), BOEM	<ul style="list-style-type: none"> <li>• Outer Continental Shelf Land Act of 1953 (OCSLA) consultation re potential impacts on OCS lease blocks, pipeline right-of-way and survey coordination on the OCS, and archaeological coordination</li> <li>• NEPA consultation</li> </ul>
DOI, Bureau of Safety and Environmental Enforcement (BSEE)	<ul style="list-style-type: none"> <li>• OCSLA consultation</li> <li>• Oil Pollution Act of 1990 liability adjustment consultation</li> <li>• NEPA consultation</li> </ul>
DOI, U.S. Fish and Wildlife Service (USFWS)	<ul style="list-style-type: none"> <li>• NEPA Consultation</li> <li>• ESA consultation</li> <li>• Fish and Wildlife Coordination Act consultation</li> <li>• Migratory Bird Treaty Act consultation</li> <li>• Bald and Golden Eagle Protection Act</li> <li>• Coastal Barrier Resources Act consultation</li> <li>• National Invasive Species Act Consultation</li> </ul>
U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS)	<ul style="list-style-type: none"> <li>• National Invasive Species Act Consultation</li> </ul>
U.S. Geological Survey	<ul style="list-style-type: none"> <li>• Nonindigenous Aquatic Nuisance Species Control and Prevention Act of 1990</li> </ul>
MARPOL	<ul style="list-style-type: none"> <li>• Act to Prevent Pollution from Ships</li> </ul>
<b>State of Texas</b>	
Texas, Office of the Governor	<ul style="list-style-type: none"> <li>• Consent of the Governor</li> </ul>
Texas General Land Office, Coastal Management Program	<ul style="list-style-type: none"> <li>• Coastal Zone Management Act (CZMA) consistency determination</li> <li>• Submerged land lease</li> </ul>
Texas, Railroad Commission	<ul style="list-style-type: none"> <li>• Water Quality Certification</li> <li>• Pipeline Safety</li> </ul>
Texas Historical Commission	<ul style="list-style-type: none"> <li>• Section 106 National Historical Preservation Act Consultation</li> <li>• Antiquities Code of Texas</li> </ul>
Texas Commission on Environmental Quality	<ul style="list-style-type: none"> <li>• State Water Quality Standards</li> </ul>

As the lead agencies for administration of the DWP Application, the USCG and MARAD are responsible for processing the application and if granted, issuance of the license for the Project. The issuance of the license is the federal action required to comply with NEPA. As such, the USCG and MARAD must ensure that issuance of a DWP license complies with the provisions of other environmental laws that require consultations with federal and state agencies concerning specific environmental resources. A summary of Agency Coordination can be referenced in Appendix B.

A summary of each section of the Environmental Evaluation (Volume II) prepared in support of this DPLA follows:

### 5.1 Project Description, Purpose, and Need

Section 1 provides a detailed overview of the Project’s purpose and need, project objectives, and project description.

The Applicant proposes to construct the proposed Texas Gulf Terminals Project to allow for the loading of VLCCs at the proposed DWP via a single point mooring (SPM) buoy system. The construction and operation of the proposed project would fulfill the need for a safe, efficient, and cost-effective logistical solution for the export of crude oil from the U.S. to support the continued economic growth of the U.S. The proposed project allows for the fulfillment of the purpose and need while meeting the environmental and Project objectives which serve as the basis for considerations throughout the alternatives analysis process detailed in Section 2.0. The proposed Project fulfills the required Project objectives including:

- The need for a safe, efficient, and cost-effective export of U.S. crude oil to support U.S. economic growth.

- The Environmental objectives and any additional HSSE impacts identified.
- The need to safely, fully and directly load a VLCC; and,
- The need to support loading rates of approximately 60,000 barrels per hour (bph) for the loading of approximately 8 VLCC's per month.

## 5.2 Alternatives Analysis

Pursuant to NEPA, governmental decision-makers must consider reasonable alternatives to a proposed action that could result in significant environmental effects. To be reasonable, the alternatives must:

- Satisfy the proposed project's basic purpose and need;
- Avoid or substantially lessen a project's potential effects;
- Be technically and economically feasible and practical; and
- Can meet the proposed project's objectives.

Identifying and evaluating alternatives helps to ensure that decisions concerning the license are well founded and, as required by the DWPA, are in the nation's best interest, and that they are consistent with national security, energy sufficiency, and environmental quality policy goals and objectives.

Section 2 presents a range of reasonable alternatives to the proposed action in accordance with the requirements of NEPA. These requirements; however, do not call for the consideration of every possible alternative; rather, only a reasonable number of examples, covering the full spectrum of alternatives. This analysis focuses on reasonable alternatives, even if these alternatives are not within the capability of the Applicant or could be costlier. The alternatives evaluation considers energy source alternatives, as well as siting and system technology alternatives.

The selected range of alternatives is intended to facilitate meaningful discussion among decision-makers and the public regarding the best means to satisfy the need to provide a safe, efficient and cost-effective logistical solution for the export of crude oil to support the continued economic growth of the United States of America (U.S).

The applicant has identified critical Project objectives required for the fulfillment of the purpose and need of the proposed Project which will serve as the basis for consideration throughout the alternatives analysis process detailed in Section 2.0. The overall Project objectives have been defined as follows:

### Environmental Objectives

- Minimizes impacts to waters of the U.S. (WOUS), including wetlands, and special aquatic resources
- Minimizes impacts to threatened and endangered (T&E) species and their associated habitats
- Minimizes impacts to cultural resources
- Minimizes impacts to navigation and navigation safety
- Minimizes impacts to commercial and recreational fisheries and essential fish habitat (EFH)
- Existing land use compatibility, availability, and suitable for the proposed Project
- Project location within proximity of existing and planned crude oil infrastructure, thereby reducing Project footprint and environmental impacts
- Project design that allows for the maximization of offsite fabrication in a controlled setting thereby minimizing offshore impact as a result of on-site construction activities

### Project Objectives

- Provides a logistical solution for the safe, efficient, and cost-effective export of crude oil to support U.S. economic growth
- Minimizes any additional Health, Safety, Security, and Environmental (HSSE) impacts not listed in the Environmental Objectives

- Ability to safely, fully, and directly load a VLCC
- Ability of infrastructure to support loading rates of approximately 60,000 barrels per hour (bph) for the loading of approximately 8 VLCC's per month

The proposed Project was selected based on the alternatives analysis framework and is considered the least environmentally damaging practicable alternative to address the purpose and needs of the project.

### 5.3 Water Quality

Section 3 includes information on the current status and potential impacts to water and sediment quality near the Project site. Water Quality includes biological, chemical, and physical characteristics of waterbodies across a diverse set of habitats that occur within and adjacent to the Project area.

During construction and operation of the proposed Project, all operating vessels would be required to comply with the International Convention for the Prevention of Pollution from Ships, adopted in 1973 and modified by the Protocol of 1978 (MARPOL). The Convention includes regulations aimed at preventing and minimizing pollution from ships, both accidental pollution and that resulting from routine operations.

The Federal Water Pollution Control Act Amendments of 1972, known as the Clean Water Act (CWA) authorizes the U.S. Environmental Protection Agency (USEPA) to issue National Pollutant Discharge Elimination System (NPDES) permits. The Railroad Commission of Texas (RRC) has jurisdictional authority over the transportation and storage of crude oil in the State of Texas; however, the RRC has not been delegated authority by USEPA to administer the NPDES program for non-exempt oil and gas operations.

Based on input from USEPA Region 6, the onshore portion of the facility would not be exempt from the Clean Water Act 402(l)(2) for uncontaminated stormwater discharges from oil and gas exploration, production, processing, or treatment operations or transmission facilities. Hence, the onshore storage terminal facility (OSTF) will be required to obtain authorization to discharge stormwater during construction activities and normal operation. While a NPDES permit would be required for operation of the proposed onshore components of the proposed Project; the offshore SPM buoy system would operate in federal waters, outside state of Texas waters. The SPM buoy system would not result in any discharges during operations and the vessels be connected to the SPM buoy system would be operating in the capacity as a means of transportation. Therefore, it is the Applicants understanding that neither the SPM nor the vessels loading crude oil will come under the jurisdiction of the EPA's NPDES Permit Program.

Short-term, minor, adverse impacts on the water quality would result from bottom sediment disturbance activities during construction. An increase in turbidity would be associated with disturbance of soft bottom sediments. These impacts would be localized, reversible, and limited to the time of construction. After construction is complete, turbidity is expected to return to pre-trenching levels. Duration for this post-excavation recovery may extend for days or weeks, depending on the amount of disturbance and the size of disturbed particles. Turbidity increases would be localized and temporary in nature during the construction phase of the proposed Project. The proposed offshore and inshore pipelines would be hydrostatically tested to ensure their integrity before being placed into service. The hydrotest fill water would not be treated with a biocide. Negative effects on water quality are not expected in connection with hydrostatic testing of the proposed inshore and offshore pipelines. Adverse direct impacts on water quality would be expected from accidental releases of fuel, oil, and other chemicals. The degree of impact is directly proportional to the amount of spill and how long it continues. Impacts could be short-term if the spill is minor, or adverse and significant and not mitigatable if the spill is major. All oil in the water must be recorded and/or reported, based on the quantity. Tankers, under IMO regulations are required to keep an oily water discharge record book and any oily water quantities accounted for that are discharged overboard. There are audit requirements for the book to hold operators accountable. Any oil greater than 15 ppm must remain onboard and cannot be discharged. Any amount of oil over 15ppm in water or any oil that goes into the water must be reported to the appropriate authorities. Both the deepwater port and the tankers will have Emergency Response Plans that follow specific steps in reporting and initiating the response to an oil spill. Tanker and port operators are required by law to have

a contract with an Oil Spill Response Operator that owns and operates recourses to respond to a spill and mitigate the potential impacts. All measures necessary will be taken to mitigate the likelihood of a spill into design and through competency and training of operations personnel.

During vetting process, it is the applicant's intent to restrict the vessels discharges types when they have entered the DWP safety zone or designated approach fairway. Discharges from vessels transiting to the DWP can impact water quality in the surrounding waters, even though discharges are not permitted to occur while at the DWP. Treated discharged would meet all USEPA and USCG requirements and thus would not significantly affect water quality. Crude oil transfer carriers would operate under MARPOL Convention standards. Impacts to water quality associated with ballast water intake and discharge in the offshore environment would not be significant. Overall, potential impacts to water quality as a result of engine cooling water/bilge discharge during Project operation are anticipated to be long-term but negligible. The SPM does not have any exposed process areas and will not be discharging any contaminants. Vessel process areas, where there is a potential for oil contamination, would be curbed. Vessel equipment that has the potential to release hydrocarbons would be designed to include drain pans to capture hydrocarbons and rainwater. The open drain system would collect rainwater, wash water, and other fluids, which would be gravity drained to slop tanks/oil water separators. Slop tanks and/or oil/water separators would treat oily water by gravity separation. Based on the first- flush principle, the first half inch of rainfall would be diverted to the vessel slop tank for treatment. All Project-related activities during construction, operation and decommission would comply with federal regulations to control the discharge of operational wastes such as bilge and ballast waters, trash and debris, and sanitary and domestic waste that would be generated from vessels associated with the Project. In addition, as per USCG and USEPA regulations, an Emergency Response Plan will be developed for the Project. Because impacts to water quality in the Gulf of Mexico are considered negligible, no mitigation measures, other than those noted above, are proposed.

Overall, the cumulative impacts of the proposed Project when considered with other projects will be short-term (during construction) to permanent (within the footprint of the SPM buoy system), and minor. Temporary, minor impacts on water quality in nearshore locations of North Padre Island could occur if construction of the proposed Project and the projects discussed above are concurrent. The proposed Project and other projects will be required to comply with the CWA to minimize impacts on surface water quality. Therefore, while the proposed Project will contribute to cumulative impacts on water quality along with other projects in the geographic range, this impact will be negligible.

#### **5.4 Wetlands and Waters of the US**

Section 4 describes the wetlands and other waters of the US that are affected by the proposed Project. The Clean Water Act (CWA), as amended in 1977, establishes the basic structure for regulating discharges of dredged or fill material into waters of the U.S. (WOUS), including wetlands and other "special aquatic sites." Wetland delineations were completed for both inshore and onshore Project areas and can be referenced as Appendix C and D, respectively. A total of 16 wetland areas were delineated within the inshore project survey area, and 3 wetland areas were delineated within the onshore project survey area. Additionally, surveys identified two waterbodies in the survey areas as well as one estuarine unconsolidated shore and one mudflat area. There are no above ground structures or fill proposed within floodplain areas.

The environmental consequences identified in the environmental evaluation of wetlands and waters of the US include temporary impacts to approximately 3.792 acres of palustrine emergent wetlands. Short term, minor adverse impacts will be caused by the construction of the pipeline components of the Project, which will occur in a 75-foot construction corridor on onshore and inshore lands. No impacts are anticipated for the special flood hazard area, Zone VE, present along the shorelines of the action area, as horizontal directional drilling (HDD) will be utilized; however, construction of the proposed onshore pipelines would result in temporary impacts to 7.986 acres of Zone X floodplains. Operational impacts could be caused by monitoring of the pipeline right of way or in the case of an accidental spill or pipeline leak. Decommissioning would result in short term, minor adverse impacts with the removal of above ground project components located near or within delineated wetlands and waters of the US. All impacts



will be temporary as the project site will be returned to pre-construction elevations and grade and vegetation restored after construction is completed. An Emergency Response Plan will be implemented throughout the project to mitigate accidental oil spill or pipeline leaks.

Cumulative impacts to wetland and waters of the US were assessed based on the Framework for Cumulative Impact Analysis. Overall, the cumulative impacts of the proposed Project when considered with other projects will be short-term (during construction) to permanent (within the footprint of the SPM buoy system), and minor. Temporary, minor impacts on water quality in nearshore locations of Padre Island could occur if construction of the proposed Project and the projects discussed above are concurrent. The proposed Project and other projects will be required to comply with the CWA to minimize impacts on wetlands and surface water quality of waters of the US. Therefore, while the proposed Project will contribute to cumulative impacts on wetlands and water quality along with other projects in the geographic range, this impact is anticipated to be insignificant.

## 5.5 Inshore and Offshore Aquatic Environment

Section 5 describes the existing marine environment, including the physical and oceanographic attributes and existing unique habitats resulting from these factors, within the Gulf of Mexico and Laguna Madres. The aquatic environment includes a diverse set of habitats that occur within and adjacent to the Project area. Due to the location of the various Project components, the aquatic environment is discussed in terms of inshore and offshore habitat. Inshore habitat refers to aquatic environments located landward from the Mean High Tide line of North Padre Island. Offshore habitat refers to the aquatic environment located seaward into the Gulf of Mexico (GOM) from the MHT line of North Padre Island. This section describes the various aquatic habitats and the potential Project impacts on these resources. A Benthic Survey Report and Submerged Aquatic Vegetation Impact Analysis were completed to support the environmental evaluation of the inshore and offshore aquatic environment. These reports can be reference as Appendix E and F, respectively.

The environmental consequences identified in the environmental evaluation of the inshore and offshore aquatic environment include the temporary impact of approximately 9.79 acres of seagrass within Laguna Madres and the temporary impact of 61.61 acres of soft-bottom marine habitat in the Gulf of Mexico due to pipeline construction and installation. The permanent removal of approximately 130 square feet of benthic habitat will occur as a result of installation of the SPM buoy system piles and PLEM. Temporary impacts to water quality of the marine environment will occur during construction but sedimentation and turbidity impacts will be mitigated for through the use of BMPs such as weighted turbidity curtains and sediment storage barges. HDD will also be utilized to avoid certain areas of impact to minimize adverse impacts to the aquatic environment. Operational impacts will be minor or negligible and include disturbance of the water column by vessels at the SPM buoy system or the unlikely event of a hydrocarbon release.

Cumulative impacts were assessed based on the Framework for Cumulative Impact Analysis. Overall, the cumulative impacts of the proposed Project when considered with other projects will be short-term (during construction) to permanent (within the footprint of the SPM buoy system), and minor. Activities that could impact the aquatic environment in the Project area include offshore oil and gas exploration and production; waterway improvement projects, and marine traffic associated with the oil and gas industry, as well as recreation. Offshore oil and gas exploration activities can include installation/removal of mooring platforms and laying of pipelines and associated anchoring activities, service vessel operations, supporting infrastructure discharges, and oil spills. Many platforms have discharges of drilling wastes, produced water, and other industrial wastewater streams that have adverse impacts on water quality. The primary cumulative effect from exploration and production activities would be the installation of platforms and other permanent structures, which would simultaneously remove soft-bottom habitat and provide hard structure for faunal communities. Waterway improvement projects are generally short-term and their effects (turbidity and sedimentation, with the potential for limited habitat loss for new construction) would typically be limited to the area where these activities take place. Ongoing marine traffic associated with recreational activities and offshore oil and gas exploration have the potential for inadvertent releases of petroleum products, which could result in impacts on the aquatic environment similar to those described for the Project. Given the low probability of a spill associated with the proposed Project, and the

implementation of federal regulations, the potential for cumulative impacts due to inadvertent releases of petroleum is unlikely and would be minor.

## 5.6 Commercial and Recreational Fisheries

Section 6 provides information on Gulf commercial and recreational fisheries – some of the most productive fisheries in the world. The Gulf of Mexico’s marine habitats, ranging from coastal marshes to the deep-sea abyssal plain, support a varied and abundant faunal assemblage. Commercially fished areas of the Gulf include the proposed Project area and coastal Texas.

The Project will be located in both estuarine and offshore habitats. The Inshore Pipelines will traverse the estuarine Laguna Madre between Padre Island and the shore of the mainland. The Offshore Pipelines will begin at the seaward boundary of Padre Island and extend to the SPM buoy system at a depth of 93 ft (28 m). Estuarine and estuarine-dependent species, as well as fishermen targeting those species, will be present in the Laguna Madre. Fish species likely to be found in the vicinity of the offshore Project components are characterized as demersal and coastal pelagic; however, certain life stages of estuarine and reef species will also be present in the vicinity of the offshore Project components. Potential impacts to commercial and recreational fisheries resources can result from impacts to habitat that support species within a fishery, including essential fish habitat (EFH).

Construction and installation of the Project components would likely result in a short-term and negligible to minor impact on commercial and recreational fisheries related to habitat modification. The only measurable impact to commercial or recreational fishing activities would be the proposed safety zone around the Project, which would result in beneficial, but minor, impacts on fishery populations. However, this approximately 760 acre area of the GOM surrounding the proposed SPM buoy system represents a very small percentage of all of the area available to fishers throughout the northern GOM. During both construction and decommissioning, specific areas may be closed to fishermen due to safety concerns, but these impacts would be only temporary and would not affect fishers’ ability to fish elsewhere, nor affect fisheries populations. Based on the Project location (away from unique fishing habitat) and design (minimal footprint), impacts to commercial and recreational fisheries would be negligible and no additional mitigation measures are proposed.

Cumulative impacts were assessed based on the Framework for Cumulative Impact Analysis. Overall, the cumulative impacts of the proposed Project when considered with other projects will be short-term (during construction) to permanent (within the footprint of the SPM buoy system), and minor. Cumulative impacts to the fisheries could be caused by projects located within the Western Planning Area of the GOM, as well as the adjacent state waters. These include channel improvement and maintenance projects, as well as minor coastal projects in and around Corpus Christi; oil and gas exploration activities; and recreational boating. These projects are generally short-term and their effects (turbidity and sedimentation, with the potential for limited habitat loss for new construction) would typically be limited to the area where dredging/construction takes place. As a result, the cumulative effects of construction of the Project, when considered with these projects would be negligible. The primary cumulative effect from exploration and production activities would be the installation of platforms and other permanent structures within designated fishing areas. In the event of a spill, operators would be required to implement oil spill response procedures in accordance with applicable federal regulations to remove oil from the environment and mitigate impacts. Given the low probability of a spill associated with the proposed Project, and the implementation of federal regulations, the potential for cumulative impacts due to inadvertent releases of petroleum is unlikely and would be minor.

## 5.7 Wildlife and Protected Species

Section 7 provides information on wildlife and protected species, including marine mammals, migratory birds, threatened and endangered species, essential fish habitat, and invasive species. The Project area includes a diverse set of habitats that include onshore terrestrial habitat in Kleberg and Nueces County, Texas and aquatic habitat in Laguna Madres and the Gulf of Mexico. This section describes the various habitats and species potentially located within the Project area, and the potential Project impacts on these resources. Potential impacts to commercial and recreational fisheries resources can result from impacts

to habitat that support species within a fishery, including essential fish habitat (EFH). An Essential Fish Habitat assessment was completed in support of this section and can be referenced as Appendix G. Threatened and Endangered Species surveys and reports were completed for both inshore and onshore Project areas. These reports can be reference as Appendix H and I, respectively. Additionally, a species-specific survey and report was completed for the endangered Red Knot and Piping Plover and can be referenced as Appendix J.

Construction and installation of the Project components would likely result in a short-term and minor impacts to terrestrial species through loss of habitat, noise related impacts, increase in turbidity in aquatic habitats, and increased vessel traffic. Impacted wildlife communities would include those that use upland areas, coastal dune areas, and the identified wetland areas onshore and across Padre Island. Increased turbidity and suspended solid levels could also adversely affect fish eggs and juvenile fish survival, benthic community diversity and health, foraging success, and suitability of spawning habitat. Sediments in the water column could be deposited on nearby substrates, burying benthic invertebrates. The most sensitive portion of the offshore pipeline route is near shore, where it passes through shallow water and makes landfall on Padre Island. To avoid impacts on the coast of the barrier island, which includes wetlands and sensitive coastal dune habitat, the offshore pipelines will be installed by HDD at this location. Nekton and marine mammals are highly mobile and can avoid areas of increased turbidity; therefore, turbidity impacts are not anticipated for mobile nekton species (including most fish) and dolphins. Therefore, impacts are anticipated to be minimal and short-term.

Pile-driving will be used for installation of six anchor piles for the SPM buoy system and four PLEM foundation piles, and will occur in depths of approximately 93 ft. (28 m). The most prevalent sources of continuous underwater sound associated with installation of the SPM buoy system will be the vessels used for construction, during construction activity and transit. Impacts from and underwater sound due to these continuous sources will be negligible and are unlikely to result in temporary noise levels that are injurious to marine species. However, impulsive sound from pile-driving will exceed thresholds established by NOAA for the protection of marine species. As estimated sound levels for pile-driving exceed the threshold for behavioral effects and injury to fishes, pile-driving activities could result in the mortality, injury, or disturbance of fishes that are present in the vicinity of pile-driving activity. Because pile-driving for the Project would be limited to the 5-week period required for construction of the SPM buoy system, and given the small size of the ZOIs, impacts are expected to be short-term and minor, and would not result in population-level effects. Noise from pile-driving would be audible to sea turtles in the Project vicinity; potential physical and behavioral effects on sea turtles are described above. Noise created by pile driving at the SPM buoy system is expected to exceed the levels of behavioral and physical effects designated by NMFS for the protection of sea turtles. Temporary increases in noise associated with installation of the Project facilities, including airborne noise from pile-driving, could result in temporary impacts on birds in the vicinity of construction. Because marine birds are highly mobile, they would likely avoid areas of active construction. Given the distance from shore, noise would not impact coastal birds. Therefore, impacts on birds from construction of the Project are anticipated to be temporary and minor.

Impacts on wildlife and protected species during operation of the Project would generally be limited to presence of the SPM buoy system, port calls by the VLCCs (eight per month), the sporadic transit of support vessels and helicopters to and from the offshore port, and the presence of the restricted zones. Once installed, the pipelines would be buried a minimum of 5 ft. (2 m) below the seafloor; although the habitats and respective faunal communities disturbed during construction would take various amounts of time to recover to pre-construction levels, no additional impacts would be incurred during operations. Although not anticipated to occur, a release of petroleum products from the SPM buoy system or pipelines would also impact the aquatic environment.

Cumulative impacts were assessed based on the Framework for Cumulative Impact Analysis. Overall, the cumulative impacts of the proposed Project when considered with other projects will be short-term (during construction) to permanent (within the footprint of the SPM buoy system), and minor. Activities that could impact the marine environment in the Project area include offshore oil and gas exploration and production; waterway improvement projects, and marine traffic associated with the oil and gas industry,

as well as recreation. Although activities associated with land-based projects can impact the marine environment, it is more than likely that these onshore projects will not result in additive negative impacts when combined with the Texas Gulf Terminals Project. It has been determined that the Proposed Action will have no effect on smalltooth sawfish, humpback whale, Bryde's whale, sperm whale, bald eagle, interior least tern, Gulf Coast jaguarundi, ocelot, black-laced cactus, south Texas ambrosia, and slender rush pea. It has also been determined that the Proposed Action may affect, but is not likely to adversely affect the largetooth sawfish, Nassau grouper, oceanic white-tipped shark, green sea turtle, Kemp's ridley sea turtle, hawksbill sea turtle, loggerhead sea turtle, leatherback sea turtle, Sei whale, blue whale, fin whale, West Indian manatee, red knot, piping plover, whooping crane, and Northern aplomado falcon. Given the temporary, minor effects of Project implementation protected species, and given that other projects would also be subject to the ESA, it is expected that the cumulative impacts of the Project on protected species, combined with the multiple projects listed above, would also be minimal and temporary in nature.

## 5.8 Cultural Resources

Section 8 includes the cultural resources component of this environmental evaluation serves to identify the setting and potential location of both prehistoric and historic sites within the Project area in accordance with Bureau of Ocean Energy Management (BOEM) and all applicable federal and state laws and guidelines. This section also serves to assess the potential impacts to cultural resources and discusses the mitigation measures that would serve to avoid or minimize these impacts. Cultural resource evaluations are based upon findings from historical research, predictive modeling, and geotechnical and geophysical field surveys conducted within the project area.

The BOEM has completed a series of archaeological baseline studies to define those areas of the OCS that have potential for historic and/or prehistoric archaeological resources. The BOEM considers the entire Gulf Coast to be a high-probability area. Marine archaeological surveys and reports are required for those areas defined as having archaeological potential prior to approval of any BOEM-permitted activities. Archeological survey reports are included as part of the deepwater port license application as Appendices within Volume III – Confidential Appendices.

No known cultural resources are present in or within 1000 ft. (304.8 m) of the terrestrial inshore or offshore portions of the Project area. However, one potentially significant magnetic anomaly, possibly representing a historic resource, has been identified buried within the submerged parts of the inshore portion of the Project area. However, western horizontal directional drilling (HDD) location has been extended from the original location such that construction will bore beneath Anomaly 1. Construction equipment will not encroach within 164 ft. (50 m) of the potential historic site, and the pipeline will be installed at least 10 ft. (3.0 m) below the seafloor in the vicinity of the anomaly. Maintenance and access to the pipeline corridor and valve site during normal operation would be conducted within the existing pipeline corridor, and would thus have no impact on cultural resources. Due to the lack of anchorage at the DWP, no ground or seafloor disturbing impacts would be expected. As no cultural resources are located within the viewshed of the Project, no impacts to the environment of cultural resources are to be expected from the operation of the Project.

Cumulative impacts were assessed based on the Framework for Cumulative Impact Analysis. Cumulative impacts can result from individually minor, but collectively significant actions, taking place over a period of time. In general, small-scale projects with minimal impacts of short duration do not significantly contribute to cumulative impacts. The proposed Project will not permanently impact historic properties listed on or considered eligible for listing on the NRHP. Therefore, any potential incremental increase in cumulative impacts on cultural resources from the other projects in consideration with the Project will be negligible.

## 5.9 Socioeconomics

Section 9 examines the baseline socioeconomic conditions in the vicinity of the Project, and the Project's potential impacts on those conditions during installation/commissioning, routine operations, upsets and accidents, and decommissioning. Socioeconomics refers to the basic attributes associated with the human environment, and the socioeconomic attributes addressed in this section are population;

workforce, income, and employment; housing; public services; taxes, revenues, and economic base; and environmental justice. The socioeconomic impact area was loosely defined as the coastal bend of Texas including the three county region of Nueces, Kleberg, and San Patricio counties. Included at the end of the potential impacts assessment is an Environmental Justice analysis. The Project was not found to cause disproportionate impacts to potential Environmental Justice communities.

A primary industry within Texas and the Coastal Bend region is centered on the production and transport of oil and gas, both onshore and offshore. Thus, the Oil and Gas Industry in Texas and in the Coastal Bend region is one of the major employers. There are numerous recreational and tourist amenities in the socioeconomic impact area. Due to the coastal environment, many of the recreational activities are tied to the Gulf of Mexico and water activities. The beaches at Port Aransas and Padre Island are well known. The Padre Island National Seashore (PINS) is known throughout the country for its sandy beaches, vegetation, and birding activities. The maritime industry is essentially comprised of enterprises that engage in designing, manufacturing, operating, repairing, or supplying vessels and their component parts. It also includes managing and operating shipping lines, shipyards, dry docks, and marine railways.

Installation and commissioning of the proposed project will require engineering, construction management, and construction personnel with specialized skill sets for both onshore and offshore oil and gas storage, pipeline, and transfer facilities. Specialized marine equipment will also be necessary. As noted, Texas has a strong work force in the oil and gas industry and Corpus Christi is a major maritime entity. Therefore, it is anticipated that the majority of workers needed for installation and commissioning will come from within the state, region, and socioeconomic impact area.

There are no anticipated requirements for socioeconomic resources' mitigation for the project. There will be no residential relocations as a result of the project's implementation. Ongoing communication with local stakeholders, including local businesses and those involved in fishing and the tourism industry, will be important to help identify and resolve any potential adverse impacts to socioeconomics. The local economy and labor force would benefit from the long-term and temporary employment. There would also be a temporary increase in the local population due to construction. Best management practices would be used to ensure that impacts from construction would be minimized.

Of the projects identified in the cumulative impact analysis, those with the greatest potential to contribute to cumulative impacts on socioeconomic factors such as population, housing, employment, and tourism are the Corpus Christi LNG Terminal, offshore oil and gas exploration and production, waterway improvement projects, and the commercial and residential development projects. The proposed Project will have negligible socioeconomic impacts during operation and therefore is likely to have a negligible contribution to cumulative impacts on population, employment, and local services.

## **5.10 Geological Resources**

Section 10 provides information on the geological resources present within the proposed Project area. The Project will be located in both estuarine and offshore habitats. The Inshore Pipelines will traverse the estuarine Laguna Madre between Padre Island and the shore of the mainland. The Offshore Pipelines will begin at the seaward boundary of Padre Island and extend to the SPM buoy system at a depth of 93 ft (28 m). Adverse impacts on geological resources may occur when an activity is likely to damage or disturb a unique geological feature, induce soil erosion, modify seafloor stability, affect sediments, or affect mineral resources. Except for the dunes located on the eastern portion of the inshore Project area and localized normal faults, there are no unique geological features present in the study areas for the Project. In addition, the Project is likely to affect soils and sediments within the Project area. Seafloor stability will be protected using careful Project siting. Apart from affecting the sediment itself, sediment disturbance would likely result in minor impacts on water quality and marine resources.

The environmental consequences identified in the environmental evaluation include disturbance to seafloor sedimentary processes is expected due to sediment displacement, increased turbidity, and increased scour from the presence of equipment and materials at or near the seafloor. Upon the completion of the Project, pipeline trenches are expected to backfill naturally, returning the seafloor to the pre-excavation contours, and consequently, to the pre-floor seafloor sedimentary regime. The proposed

Project would not affect the occurrence of faulting, gas hydrate formation, or subsidence. Soil liquefaction may be affected by the presence of the pipeline and DWP anchor and foundation pilings, but the effect would be minor to negligible.

During construction, minor, adverse impacts on soils and sediments within the pipeline construction corridor can be expected. Disturbance of soils within the terrestrial portion of the Project area would result in the increased potential for erosion, compaction, and mixing of topsoil. Disturbance of sediments and increases in turbidity within the submerged portions of the Project area can be expected by pipeline installation, anchor piling installation, and through the direct contact of anchors or supports from jack up work boats. These impacts would be temporary, minor, and reversible. Due to the lack of anchorage at the DWP, no seafloor disturbing impacts would be expected from the operation of the DWP. However, scour, or the removal of granular bed material by hydrodynamic forces, could occur when hydrodynamic stresses are greater than sediment shear stresses. Scour can cause changes in local turbidity concentrations and result in sediment disruption and movement due to changing tides and currents.

The methodology for evaluating impacts to coastal zone resources has identified consequence-producing factors within three distinct phases of the Project, including Construction, Operation, and Decommissioning. Consequences are assessed to determine the magnitude of impact. Cumulative impacts were assessed based on the Framework for Cumulative Impact Analysis. Overall, the cumulative impacts of the proposed Project when considered with other projects will be minimal or negligible. While activities necessary in offshore oil and gas exploration and production, including the decommissioning of existing infrastructure, carry the potential for impacting local geological resources, activities present in the Western Planning Area have not demonstrated any adverse cumulative impact on geologic resources, with the potential exception of regular resource reserve reduction. Overall the proposed Project will not adversely affect geological resources; therefore, it will not contribute to any potentially adverse cumulative impacts on the geologic resources in the Western Planning Area.

### **5.11 Coastal Zone Use, Recreation, and Aesthetics**

Section 11 discusses the Coastal Zone land and marine uses, recreation and aesthetics of the project area and anticipated impacts to such from the construction and operation of the DWP.

The methodology for evaluating impacts to coastal zone resources has identified consequence-producing factors within three distinct phases of the Project, including Construction, Operation, and Decommissioning. Consequences are assessed to determine the magnitude of impact. The development of the onshore storage facility will result in a permanent take of land in the footprint of the facility. The land use in the region of the onshore storage facility is generally agriculture, however, the land where the onshore storage facility will be located does not currently have any farming activity. Impacts to local land use as a result of the inshore pipeline crossing are anticipated to be permanent and of negligible significance. The Texas RRC database indicated that there is one gas transmission pipeline (owned by Mustang Island Gathering, LLC) that transects the proposed offshore pipeline corridor at the northwest/2 of Mustang Island Large Block 818. Based on a review of records, the existing pipeline to be crossed is not currently operational. No other offshore pipelines or other submerged infrastructure has been identified within the pipeline ROW.

The entirety of the proposed Project is within the Texas Coastal Management Zone. To minimize potential impacts to coastal resources, the Applicant will install the coastal crossing of the offshore pipelines using horizontal directional drilling (HDD). Given the amount of boating opportunities in the near and offshore waters in the area, impacts on boaters will be temporary and negligible. Once operational, the Project is anticipated to have a no impact to recreational parks and beaches. Since the nature of the land use surrounding the onshore storage facility is primarily rural and/or vacant with limited sensitive receptors, and as Project pipelines will be buried and land re-vegetated, no impact to aesthetics and visual amenity resulting from the onshore Project activities during operation is anticipated. Upsets or accidents, such as a vessel collision or minor hydrocarbon release, may cause temporary negligible impacts to offshore commercial uses. The effects may occur for a limited period and would be naturally reversible.

Cumulative impacts were assessed based on the Framework for Cumulative Impact Analysis. Overall the proposed Project's contribution to cumulative impacts on marine transportation would be long-term and negligible, as the VLCCs and service vessels calling on the SPM Buoy will result in a nominal increase in the current vessel traffic transiting the area. The entirety of the proposed project is within the Texas Coastal Management Zone. During the alternatives review and selection process, consideration was given to the avoidance of sensitive resources, such as sensitive and protected ecological areas and residential areas. While it is likely there would be some level of impact to coastal zone uses, recreation, and viewshed resulting from implementation of the proposed project, due to historic and ongoing oil and gas activity in this region, with mitigation in place, the overall residual impact is anticipated to be minor. Several cumulative effects on commercial fishing could be associated with development of offshore projects. These include a decrease in the amount of unrestricted water, a localized increase in vessel traffic, and alteration of natural viewsheds. Given the size of offshore projects relative to the GOM, these impacts are considered minor but long term. The proposed Project would have permanent but negligible impacts on water-based recreation, primarily associated with the small 1500 ft. operational safety zone around the SPM buoy system. It is unlikely that the additional installation of the Project would cause a significant visual impact that is inconsistent with the typical views in the GOM. Overall, the cumulative effect of the concurrent projects on the viewshed in the region of the Gulf shared by the Project would be negligible.

## 5.12 Meteorology, Air Quality, and Noise

Section 12 includes the meteorology, air quality, and noise components of the Environmental Evaluation. It serves to identify existing meteorological conditions, existing air quality and noise. This section identifies potential impacts to local and regional air quality as well as impacts from noise due to the Project. Since air emissions and noise can be affected by meteorology, meteorological conditions are presented to describe the general setting of the Project. Air quality and noise evaluations are based on USEPA, BOEM, and other applicable federal and state laws and guidelines. This section also discusses the mitigation measures that would serve to avoid or minimize these impacts. Air quality evaluations for construction and operation are based upon emission estimates developed from project equipment specifications, emission factors, predictive modeling, and comparison to applicable air quality standards. Appendix K presents the Air Quality Information documents, supporting information for the EIS. This document is summarized in the following sections. Emissions from onshore and offshore were evaluated for the Deepwater Port License (DWPL) application and an Air Quality Analysis is presented as Appendix L of this volume. Impacts from the onshore facility are summarized in the TCEQ Authorizations for Onshore Facilities included in Volume I.

Similarly, noise evaluations for construction and operation account for existing noise conditions, with potential impacts based on equipment noise profiles, predictive modeling, and comparison to applicable noise limits.

During construction, short-term, minor noise impacts will occur in the vicinity of the Project facilities. Noise-generating activities will include operation of construction equipment to install the onshore storage facility and pipelines; HDD activity; vessel traffic associated with pipe-laying and transport of equipment, materials, and workers; and pile-driving. Due to the distribution of construction activity along the pipeline length, distance from the nearest NSAs, and short-term nature of construction, impacts will not be significant. In addition, the Safety Zone will exclude any recreational vessels from the immediate vicinity of the SPM buoy system, where operational noise impacts will be greatest. Vessel activity planned for the Project will be consistent with other, ongoing activity in the GOM. Therefore, overall operational noise impacts will be long-term and negligible. During operations, equipment at the onshore storage facility will result in localized, minor noise increases; however, noise from the onshore storage facility is not expected to be audible at the nearest NSAs. A combination of short- and long-term predominantly minor adverse impacts on air quality would be expected during construction, operation, and decommissioning of the proposed Project. Based on the analysis presented in the sections above, potential impacts on ambient noise are summarized in the table below.

Direct impacts to air quality are assumed to be limited to VOC emissions from marine loading operations. Indirect impacts to air quality are assumed to be caused by operation of the crude carrier when moored to

the SPM buoy system, and the ancillary sources on the crude carrier deck (such as crane engine, cargo pump, ballast pump, boiler, and fugitives). The air quality impact is considered to be minor and long-term based on the air dispersion modeling analysis and the BACT analysis included in these appendices. Detailed tables of air emissions are provided in Appendix K. The DWP will be constructed and operated using the best available technology, thereby preventing or minimizing adverse impacts to the air quality to the extent possible.

As described in the Volume II Introduction, cumulative impacts were assessed based on the Framework for Cumulative Impact Analysis. Cumulative impacts are the combined result of the impacts of an action that, when considered with the impacts of other actions, would result in a resource impacts. It is assumed that representative background concentrations for the region may account for the impacts from other offshore sources in the absence of additional information. Emissions from these sources could overlap with air quality impacts from operation of the DWP. Based on the limited onshore noise contribution from the Project and the localized nature of offshore noise, cumulative noise effects will only occur where another project is in close proximity to the proposed Project. Given the expected attenuation of noise from operation of the onshore storage facility and SPM buoy system, as well as the distance between these facilities and NSAs, operation of the Project facilities will not contribute to cumulative noise impacts. However, vessel activity during construction and operation of the Project will contribute to cumulative sound levels. Given the level of existing commercial vessel traffic in the GOM, the contribution of the Project to cumulative vessel traffic consistent with existing uses of the waterways transited by these vessels. Therefore, associated noise impacts will be negligible.

### **5.13 Navigation and Navigation Safety**

Section 13 includes the navigation and navigation safety components of the Environmental Evaluation. This Section aims to identify the current, existing navigation paths, statistics, and trends within the vicinity of the proposed Project, and how they are anticipated to be impacted by the proposed Project.

Shipping and navigation resources within the vicinity of the proposed Project include fairways, anchorages areas, dredged navigation channels, intracoastal waterways, and ports. Within the Gulf of Mexico there is an extensive network of fairways radiating off the shoreline and crossing GOM. Within the vicinity of the Project, the nearest fairway radiating from the shore extends from the Aransas Channel, approximately 22.5 miles along the shoreline, north from the Project. At 7.5 miles off of the shoreline the fairway is met by another fairway which extends south. The proposed location of the DWP is not in the vicinity of any existing safety zones. Safety zones, no anchoring areas, and areas to be avoided, are established to promote safety of life and property, marine environmental protection, and navigational safety at deepwater ports and adjacent waters. Establishment of a temporary safety zone during installation of the Project is not likely to significantly affect commercial shipping or activities at the Port of Corpus Christi.

As described in the Volume II Introduction, cumulative impacts were assessed based on the Framework for Cumulative Impact Analysis. During construction of the Project, an increase in marine traffic movements are expected to occur during the 2019 – 2020 construction period due to construction vessels and supply barges accessing the project location. When combined with expected vessel service associated with construction of the other projects, as identified in the Framework for Cumulative Impact Analysis, and in combination with other projects for which the number of deliveries is not publicly known, concurrent construction of these projects will increase the number of vessels transiting the shipping channels and fairways in the Western Planning Area. While this change in vessel traffic may be noticeable for some users of the waterways in the Project vicinity, impacts on these users from vessel traffic associated with construction will be consistent with existing use of the waterway. Collectively operation of these projects will increase traffic in the Western Planning Area, however, the increase in transits will be spread geographically from the Port of Brownsville to Port Arthur and throughout the GOM.

Further, safe navigation practices as established though the 1972 Convention on the International Regulations for Preventing Collisions at Sea will mitigate potential impacts from the increased vessel traffic. Aids to Navigation system will be installed and maintained by the DWP owner/operator in accordance with the regulations in 33 CFR 66. With mitigation in place, the overall residual impact to



navigation and navigation safety within the vicinity of the Project is anticipated to be of minor adverse significance during construction, and minor beneficial significance during operation.

#### **5.14 Safety and Security**

Section 14 includes the safety and security components of the Environmental Evaluation. Discussions of the various safety issues associated with the construction and operation of the proposed Project, including potential mitigation to enhance safety. This section includes detailed discussions of the properties of crude oil along with a chronology of historical incidents associated with crude oil.

Section 14 reviews recent studies conducted on the subject of crude oil and crude oil export including the use of advanced modeling techniques to estimate risk to the public from large releases of crude oil on the water. In order to quantify the impacts of a potential oil spill at the DWP and associated offshore components and the subsequent response requirements, oil spill trajectory modeling was completed. A tactical response plan was also completed to detail the equipment and the deployed locations that would be required to mitigate the impacts of a worst-case scenario oil spill on the coast near the DWP. It is important to understand that the trajectory modeling is done assuming no response team is deployed, meaning that no oil is being recovered or diverted in the model. In a real-life situation, teams would be mobilized immediately to start mitigation efforts. The discharge volume is also a calculated volume based on the entire content of the sub-marine pipeline, irrespective of the system features designed to reduce the released volume during a failure in the system, such as shut-off valve locations and settings, sea bed bathymetry, and pipeline depth and routing. Two simulation releases (at two different rates) were modeled for each season. The two releases add up to the calculated volume for the worst-case discharge (WCD). The worst-case discharge was calculated based on a very unlikely event that the subsea pipeline suffers a full-bore rupture AND all the contents of the 14-mile-long pipeline is evacuated.

Each deterministic seasonal model run was analyzed to determine any potential environmental and/or socioeconomic impacts. The trajectory modeling shows what could be impacted. In order to determine potential impacts, an expansive data search was conducted to identify the sensitive areas in and around Corpus Christi. These areas are presented in the report. The report also has maps that illustrate the shoreline impacts relative to these areas. The main threat from an oil spill offshore is on marine life and on the coastal environment, if the spill were to make landfall. Threats and the overall impact of oil in water are dependent on the amount of oil spilled and the environmental conditions during the response efforts.

#### **5.15 List of Preparers**

Section 15 includes a detailed list of all entities and individuals involved in the development of this DPLA.

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