

Deepwater Port License Application for the
Texas Gulf Terminals Project

Volume II – Environmental Evaluation (Public)

Section 13:
Navigation and Navigation Safety

TABLE OF CONTENTS

ACRONYMS AND ABBREVIATIONS.....	ii
PROJECT OVERVIEW	iv
13.0 NAVIGATION AND NAVIGATION SAFETY	13-1
13.1 Applicable Laws and Regulations	13-1
13.1.1 National Environmental Policy Act	13-1
13.1.2 Convention on the International Regulations for Preventing Collisions at Sea, 1972	13-1
13.1.3 33 Code of Federal Regulations (CFR) Subchapter D International Navigation Rules ...	13-2
13.1.4 33 CFR Subchapter NN Deepwater Ports Subpart D Vessel Navigation	13-2
13.1.5 33 CFR Subchapter NN Deepwater Ports Subpart E - Aids to Navigation (§§ 149.500 - 149.585) and 33 CFR Subchapter NN Deepwater Ports Subpart H Aids to Navigation	13-2
13.1.6 Deepwater Port Act	13-2
13.2 Existing Conditions.....	13-3
13.2.1 Fairways and Channels.....	13-4
13.2.2 Anchorage Areas.....	13-4
13.2.3 Ports	13-5
13.2.4 Tankship Operations	13-5
13.2.5 Under-Keel Clearance.....	13-5
13.2.6 Navigation Restrictions at the DWP	13-6
13.2.7 Aids to Navigation	13-7
13.2.8 Support Vessels	13-8
13.2.9 Marine Traffic	13-8
13.2.10 Anchorage Areas.....	13-8
13.2.11 Vessel Traffic Management	13-9
13.3 Environmental Consequences	13-9
13.3.1 Construction	13-9
13.3.2 Operations.....	13-10
13.3.3 Decommissioning	13-10
13.3.4 Cumulative	13-11
13.4 Mitigation Measures	13-11
13.5 Summary of Potential Impacts	13-13
13.6 References.....	13-15

LIST OF FIGURES

Vicinity Map.....	iv
Project Component Map	v
Figure 13-1: Marine Shipping and Commercial Ports	13-3

Figure 13-2: Illustration of proposed Safety Zone at the DWP 13-6

LIST OF TABLES

Table 13-1 Summary of Potential Navigation Impacts..... 13-13

ACRONYMS AND ABBREVIATIONS

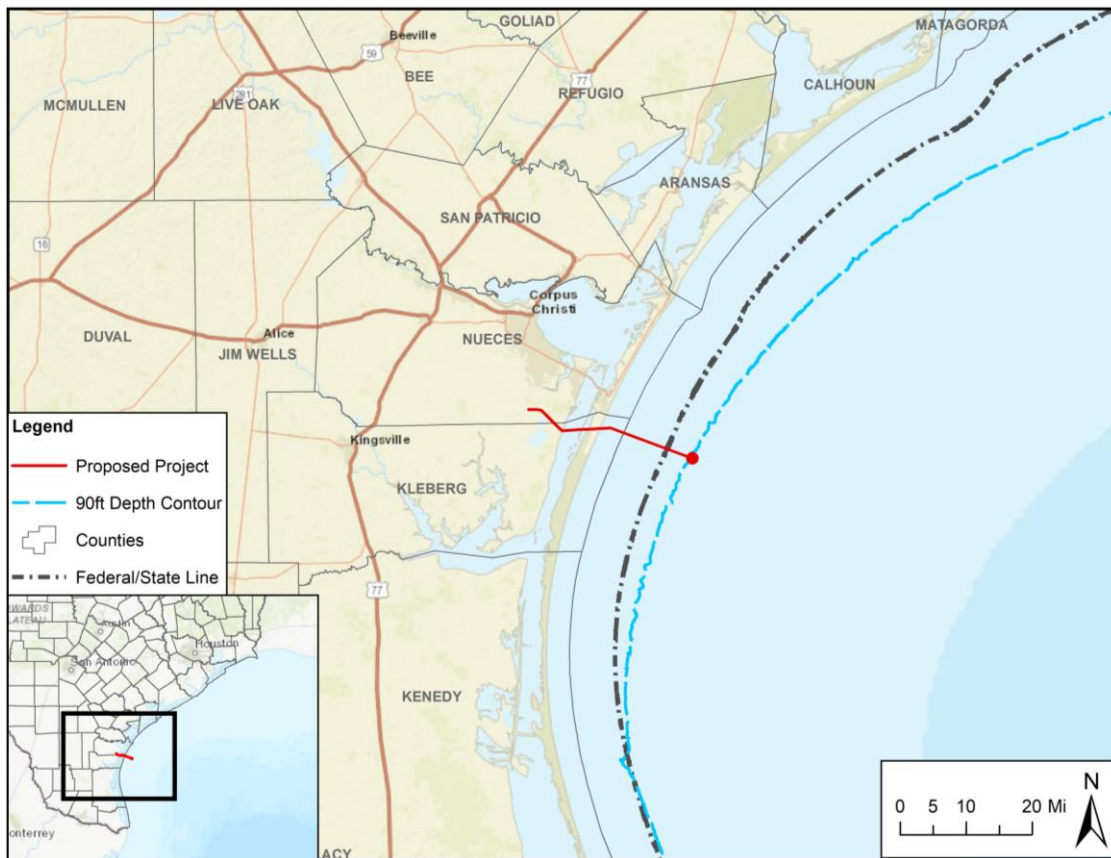
AMS	Area Maritime Security
Applicant	Texas Gulf Terminals Inc.
ATBA	Area to Be Avoided
ATN	Aids to Navigation
BOEM	Bureau of Ocean Energy Management
bph	barrels per hour
CALM	Catenary Anchor Leg Mooring
CCSC	Corpus Christi Ship Channel
CFR	Code of Federal Regulations
72 COLREGS	Convention of the International Regulations for the Preventing of Collisions at Sea of 1972
COTP	Captain of the Port
DWP	Deepwater Port
DWPA	Deepwater Port Act of 1974, as amended
DWPL	Deepwater Port License
EIS	Environmental Impact Statement
FSP	Facility Security Plan
ft.	feet
GIWW	Gulf Intracoastal Waterway
GOM	Gulf of Mexico
HDD	horizontal directional drilling
IMO	International Maritime Organization
LNG	Liquefied natural gas
MARAD	Maritime Administration
MARSEC	Maritime Security
MHT	Mean High Tide
MLLW	Mean Lowest Low Waterline (tidal reference)
NAA	No Anchoring Area
NEPA	National Environmental Policy Act
OSC	Outer Continental Shelf
OSTF	onshore storage terminal facility
PLEM	Pipeline End Manifold
POCC	Port of Corpus Christi
Project	Texas Gulf Terminals Project
RACON	radar beacon
ROV	remotely operated vehicle
SPM	Single Point Mooring
TGTI	Texas Gulf Terminals Inc

TXDOT	Texas Department of Transportation
UKC	Under Keel Clearance
U.S.	United States (of America)
USACE	United States Army Corps of Engineers
U.S.C.	United States Code
USCG	U.S. Coast Guard
VHF	Very High Frequency
VLCC	Very Large Crude Carrier
VTS	Vessel Traffic Service

PROJECT OVERVIEW

Texas Gulf Terminals Inc. (TGTI; also referred to as Applicant) is proposing to construct and operate a deepwater port (DWP), associated pipeline infrastructure, booster station, and an onshore storage terminal facility (OSTF), collectively known as the Texas Gulf Terminals Project (Project), for the safe, efficient and cost-effective export of crude oil to support economic growth in the United States of America (U.S.). The Applicant is filing this Deepwater Port License (DWPL) application to obtain a license to construct, own, and operate the Project pursuant to the Deepwater Port Act of 1974, as amended (DWPA), and in accordance with the U.S. Coast Guard (USCG) and the Maritime Administration’s (MARAD) implementing regulations.

The Applicant is proposing to construct and operate the Project to allow direct and full loading of very large crude carriers (VLCC) at the DWP, via a single point mooring (SPM) buoy system. The proposed Project consists of the construction of a DWP, onshore and inshore pipeline infrastructure, offshore pipelines, and an OSTF. The proposed DWP would be positioned outside territorial seas of the Outer Continental Shelf (OCS) Mustang Island Area TX3 (Gulf of Mexico [GOM]), within the Bureau of Ocean Energy Management (BOEM) block number 823. The proposed DWP is positioned at Latitude N27° 28’ 42.60” and Longitude W97° 00’ 48.43”, approximately 12.7 nautical miles (nm) (14.62 statute miles [mi]) off the coast of North Padre Island in Kleberg County, Texas. Refer to the Vicinity Map depicting the location of the proposed Project.



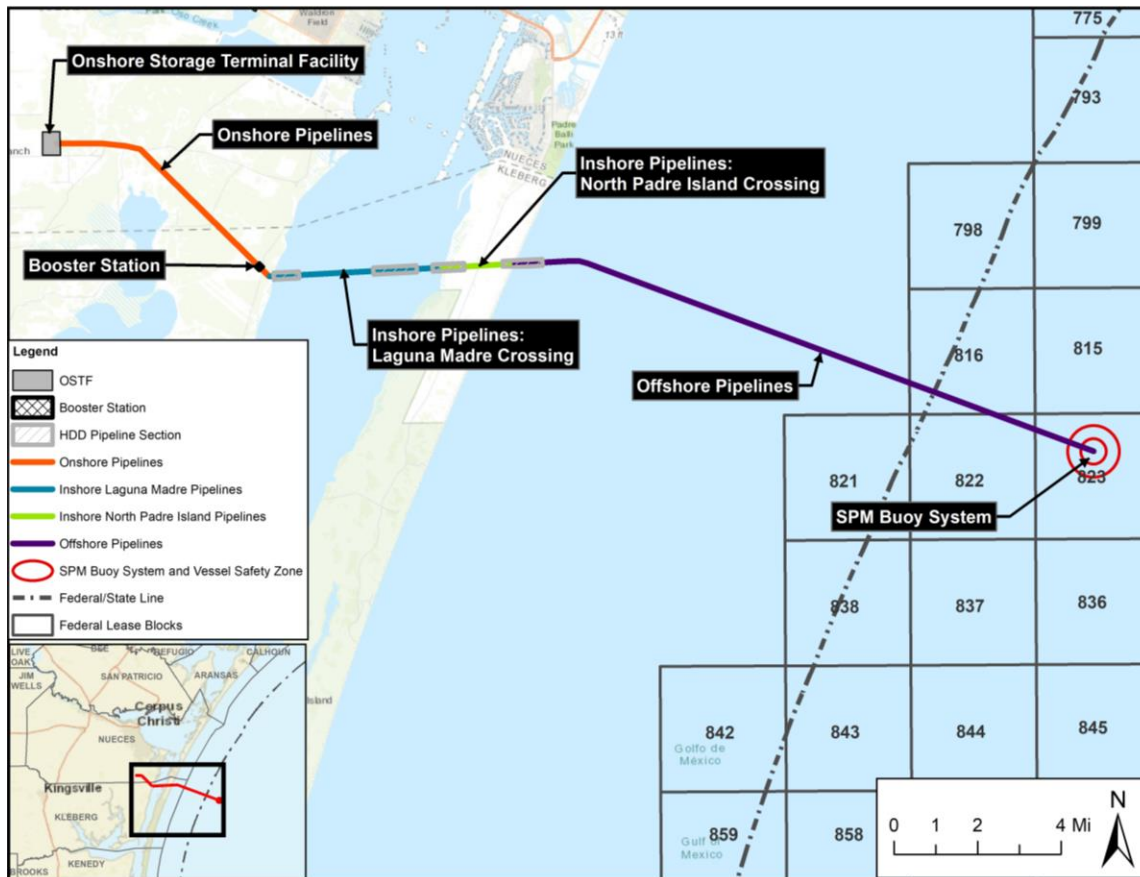
Vicinity Map

The proposed Project involves the design, engineering, and construction of a DWP, 26.81 miles of pipeline infrastructure, booster station, and an OSTF. For the purposes of this DWPL application, the proposed Project is described in three distinguishable segments by locality including “offshore”, “inshore”, and “onshore”.

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.



Project Component Map

13.0 NAVIGATION AND NAVIGATION SAFETY

Navigation refers to the movement of vessels from one place to another. 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. The proposed Project is referred to as the deepwater port (DWP). The offshore DWP is the Single Point Mooring (SPM) buoy and associated safety zones, navigation fairway, floating hoses and mooring equipment within the safety zone.

Due to the location of the various Project components, navigation and navigation safety is discussed in terms of onshore, inshore and offshore habitat. Onshore refers to areas located landward from the western shore of the Laguna Madre. Inshore refers to areas located landward from the mean high tide (MHT) line of North Padre Island. Offshore refers to areas located seaward into the Gulf of Mexico (GOM) from the MHT line of North Padre Island. This section describes the various and the potential Project impacts on navigation and navigation safety. The framework for the evaluation of environmental consequences and cumulative impacts in the Introduction of Volume II of the Deepwater Port License (DWPL) application.

Section 13.0 navigation and navigation safety is structured as follows:

- Section 13.1 Applicable Laws and Regulations: Background on relevant regulatory laws for consideration;
- Section 13.2 Existing Conditions: Information on the existing inshore and offshore aquatic environment in the Project vicinity;
- Section 13.3 Environmental Consequences: An analysis of environmental consequences;
- Section 13.4 Mitigation Measures: Proposed mitigation measures;
- Section 13.5 Summary of Potential Impacts: A summary of potential impacts; and
- Section 13.6 References.

13.1 Applicable Laws and Regulations

The applicant has reviewed the following laws and statutes that relate to water quality and provided a list of applicable regulations required to comply with the Deepwater Port Act (DWPA) during construction and operation of the proposed Project; National Environmental Policy Act of 1969 (NEPA), Pub. L. 91–190, 42 U.S.C. 4321, *et. seq.*, Convention on the International Regulations for Preventing Collisions at Sea, 1972, International Rules (Title 33 United States Code [U.S.C.] Chapter 30) were formalized in the Convention of the International Regulations for the Preventing of Collisions at Sea of 1972 (72 COLREGS) and became effective on July 15, 1977, and Deepwater Port Act Subpart NN.

13.1.1 National Environmental Policy Act

The National Environmental Policy Act (NEPA) requires all federal agencies to consider the potential environmental consequences of their proposals, document the environmental analysis, and make this information available to the public for comment prior to making a permit decision on any major federal action. Issuing permits for construction of the Project would qualify as a major federal action and trigger the requirement for NEPA analysis. Under the DWPA, the USCG would initiate the NEPA process and have federal jurisdiction over the entire Project under NEPA. The USCG and Maritime Administration (MARAD) have determined that an environmental impact statement (EIS) will be prepared to support the NEPA process.

13.1.2 Convention on the International Regulations for Preventing Collisions at Sea, 1972

There are many types of vessel traffic rules. However, the cornerstone of all these are the Navigation Rules: International-Inland. The International Rules (Title 33 United States Code [U.S.C.] Chapter 30) were formalized in the Convention of the International Regulations for the Preventing of Collisions at Sea of 1972 (72 COLREGS) and became effective on July 15, 1977. Following the signing of the Convention, an effort was made to unify and update the various domestic navigation rules. This effort culminated in the enactment

of the Inland Navigation Rules Act of 1980. The current edition of the COLREGS was adopted in 1972 but the Rules have been amended several times since.

72 COLREGS is divided into 6 parts: Part A – General; Part B – Steering and Sailing Rules; Part C – Lights and Shapes; Part D – Sounds and Light Signals; Part E – Exemptions; and, the recently added (January 2016), Part F – Verification of Compliance.

72 COLREGS is applicable to all vessels on waters outside of established navigational lines of demarcation, known as ‘COLREGS Demarcation Lines’. COLREGS Demarcation Lines generally run between major headlands and prominent points of land at the entrance to coastal rivers and harbors. Within the vicinity of the Project, the COLREGS Demarcation Line follows the shoreline, to the east of Padre Island. As a result of this, all Project vessels traversing the offshore elements of the Project will be subject to 72 COLREGS.

13.1.3 33 Code of Federal Regulations (CFR) Subchapter D International Navigation Rules (33 CFR §80-§82)

This subchapter supplements 72 COLREGS and establishes and identifies the lines of demarcation (‘COLREGS Demarcation Lines’) delineating those waters upon which mariners shall comply with the 72 COLREGS definition.

13.1.4 33 CFR Subchapter NN Deepwater Ports Subpart D Vessel Navigation (33 CFR §150.300-§150.385)

This subpart supplements 72 COLREGS and prescribes requirements that apply to the navigation of all vessels at or near a DWP; and, apply to all vessels while in a safety zone, area to be avoided (ATBA), or no anchoring area. The subpart sets requirements for radar surveillance and details when radar surveillance is required.

13.1.5 33 CFR Subchapter NN Deepwater Ports Subpart E - Aids to Navigation (§§ 149.500 - 149.585) and 33 CFR Subchapter NN Deepwater Ports Subpart H Aids to Navigation (33 CFR §150.700-§150.720)

The rules in Title 33, Federal CFR, Part (33 CFR 149) Subpart E, prescribe the aids to navigation (ATN) requirements for DWPs; 33 CFR Subchapter NN Deepwater Ports Subpart H provides requirements for the operation of ATN at a DWP.

In general, the rules call for marking the fixed platforms, SPMs, floating transfer hoses, and installing radar beacons and sound signals on the main platform. The rules also prescribe standards for optional aids, primarily buoys, which might be used to mark maneuvering lanes and the anchorage.

13.1.6 Deepwater Port Act

33 CFR Subchapter NN Deepwater Ports Subchapter J Safety Zones, No Anchoring Areas, and Areas to be Avoided (33 CFR §150.900-§150.940)

The Federal regulations applicable to DWPA provide “requirements for the establishment, restrictions, and location of safety zones, no anchoring areas (NAAs), and ATBAs around deepwater ports.” The specific requirements are described in Title 33 of the CFR (33 CFR) Subchapter NN:

- Subpart D, Vessel Navigation
- Subpart J, Safety Zones, NAA, and ATBA (Part 150.900) (33 CFR 150.900)

These rules address the “vessel navigation and activities permitted and prohibited at deepwater ports” and apply to safety zones, NAAs, ATBAs, and their adjacent waters. The rules supplement the 72 COLREG.

Under 33 CFR 150.940, no vessel or person will be allowed to enter the area encompassed by the safety zone without the express permission of the USCG Captain of the Port (COTP) who has jurisdiction over the area. The DWP regulations allow the person in charge of the DWP to manage traffic within the safety zones. The Safety Zone regulation is enforceable, with a civil penalty for violations, simply by making vessel operators aware of it. No physical USCG police presence is required.

13.2 Existing Conditions

Shipping and navigation resources within the vicinity of the proposed Project include fairways, anchorages areas, dredged navigation channels, intracoastal waterways, and ports. Figure 13-1 identifies the Project in relation to these shipping and navigation resources.

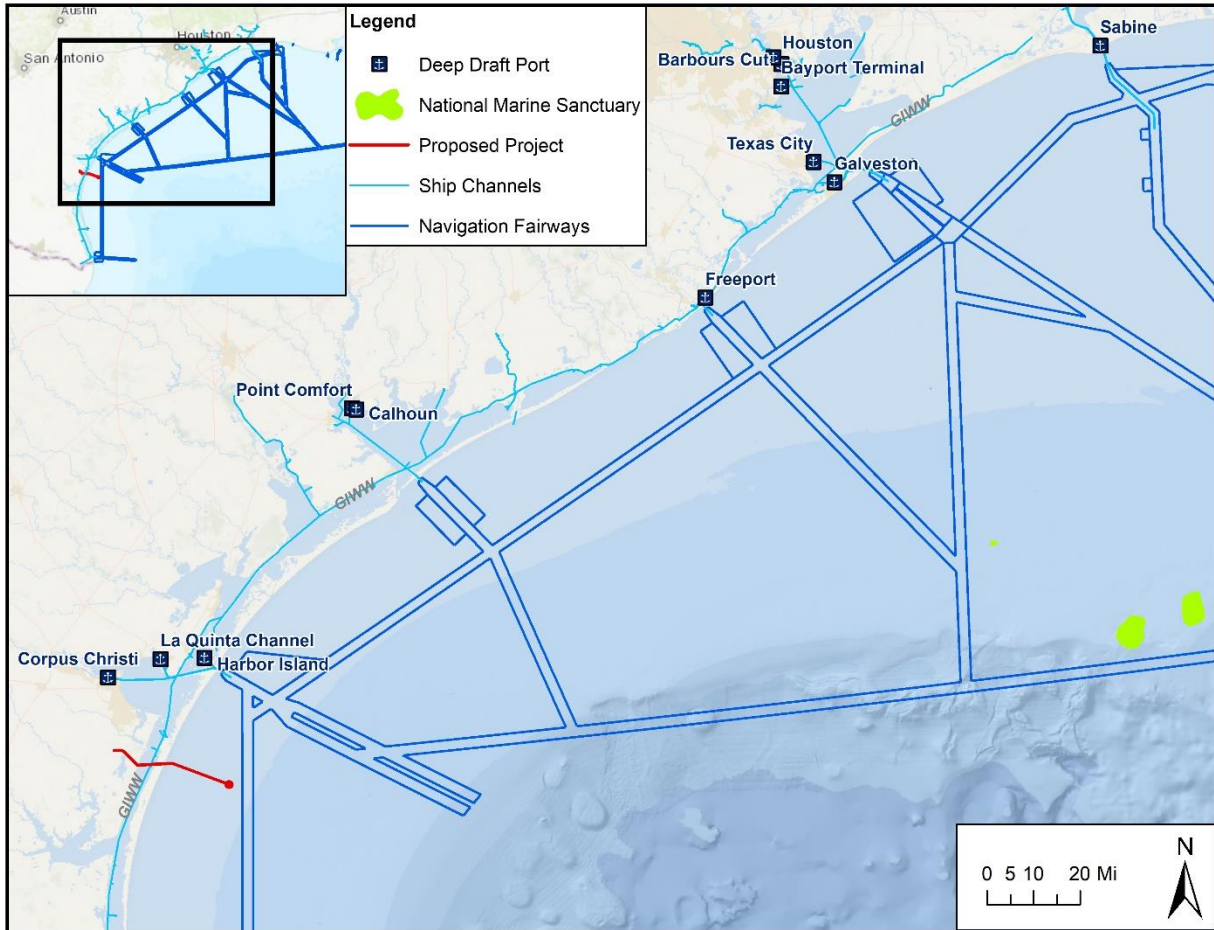


Figure 13-1: Marine Shipping and Commercial Ports

13.2.1 Fairways and Channels

13.2.1.1 Fairways

A fairway is defined in federal law as a lane or navigation corridor in which no artificial island or fixed structure, whether temporary or permanent, will be permitted (Definition of Shipping Safety Fairway, 33 C.F.R. Part 166.105).

Within the GOM 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 the shoreline the fairway is met by another fairway which extends south. This fairway extends south for approximately 21 miles before it passes the Project approximately 5.4 miles to the east. This fairway then continues south for approximately 64 miles where it is met by a fairway extending from the Port of Mansfield Channel, and finally a further approximately 34 miles where it is met by a fairway extending from the Brownsville Ship Channel. (See Figure 13-1)

13.2.1.2 The Gulf Intracoastal Waterway

The Gulf Intracoastal Waterway (GIWW) is a 1,300-mile Federal, shallow-draft, man-made navigation channel that runs along the GOM coastline from Brownsville, Texas, to St. Marks, Florida. The GIWW links Texas ports with the rest of the country and is part of the larger Intracoastal Waterway that includes a stretch on the Atlantic seaboard, from Key West, Florida to Boston, Massachusetts. (TXDOT 2018, USACE 2018)

The 423-mile-long Texas stretch of the GIWW handles more than 50 percent of the GIWW's traffic and up to 90 million tons of freight annually. The GIWW allows ports on the Texas Gulf Coast to be key hubs for shipping throughout North America and to be at the center of the state's multimodal transportation plan that combines trucking, rail and marine shipping (TXDOT 2018, USACE 2018). The proposed Project crosses the GIWW directly to the west of Padre Island in the northern Laguna Madre.

13.2.1.3 The Corpus Christi Ship Channel

The Corpus Christi Ship Channel (CCSC) consists of a 45-foot (ft.) deep (mean lower low water [MLLW]) channel that extends from the Gulf of Mexico, through the jetties in Port Aransas, Texas and across the Corpus Christi Bay. The CCSC has several junctions that connect the Main Channel to other areas; these channels include Rincon Channel, La Quinta Channel, Aransas Channel and the GIWW. (Port Corpus Christi 2018)

13.2.2 Anchorage Areas

Anchorage areas are locations where a boat or vessel can be anchored; a Fairway Anchorage is defined in federal law as an anchorage area contiguous to and associated with a fairway, in which fixed structures may be permitted within certain spacing limitations, as described in 33 CFR Part 166 Subpart B (Definition of Fairway Anchorage, 33 C.F.R. Part 166.105).

There is a Fairway Anchorage, managed by the Corpus Christi-Aransas Pass Pilots Association located approximately 14 nautical miles north of the DWP. The anchorage is east of the approach into Aransas Pass for vessels to await pilots and entry into the bay. This anchorage is also being proposed for the project as a location for tankers calling at the DWP to anchor, if needed. No additional anchorages are being proposed.

13.2.3 Ports

13.2.3.1 The Port of Corpus Christi

The Port of Corpus Christi (POCC) is the nearest Port from the proposed Project, located approximately 19 miles to the North.

The POCC is the closest port to the proposed Project and is the fifth largest port in the United States (U.S.), providing access to the GOM, inland waterways, and offering connections to three railroad systems (POCC 2018). About 14 percent of the vessel calls to Texas ports in 2015 were to the POCC. 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 POCC. Vessels approaching the port from the north would do so via the Aransas Pass to Calcasieu Pass fairway, while the Brazos Santiago Pass to Aransas Pass fairway provides access from the south and is the closest shipping lane to the proposed Project (about 2.9 miles east of the proposed SPM buoy system location). The POCC does not regularly receive cruise ships engaged in multi-day trips, thus, cruise ships do not typically use the shipping safety fairways near the Project.

13.2.3.2 The Ports of Galveston and Houston

The Ports of Galveston and Houston on Galveston Bay are the closest cruise ship departure ports to the proposed Project. 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 located over 180 miles (290 kilometers) north of the proposed Project (see Figure 13-1). (BOEM 2018a, 2018b; A Barrel Full 2018; Maritime Administration 2018)

13.2.4 Tankship Operations

Conditions at the proposed location of the DWP are already acceptable for tankship operations. The maximum size tanker expected at the DWP is a VLCC. Tankships currently navigate these waters and depths (approximately 93 ft.) are acceptable for the tanker size that is expected (see below regarding under keel clearance (UKC)).

There is a safety fairway that runs North/South, east of the DWP that leads to the approach into Aransas Pass and POCC. This would likely be the main route for tankers approaching the DWP.

The DWP is located approximately 2.6 nautical miles from the safety fairway (shown on Nautical Chart 11307). There are no obstructions shown on the chart in the area between the DWP and the safety fairway. This area is proposed to be designated as a fairway for future traffic headed from the safety fairway to the DWP safety zone (see Appendix A and Figure 13-2)

13.2.5 Under-Keel Clearance

UKC is the distance from the bottom, or keel, of the tanker to the sea floor. The UKC changes depending on the draft of the vessel. When the tanker arrives at the DWP, it will be in ballast draft condition. During loading, the draft will change and upon departure from the terminal the tanker will be in a fully loaded draft condition. This is usually the deepest operational draft. Sea water properties, including temperature and density, are factors in calculating the draft. The design drafts for a class of tankers are established during design and are reviewed by the Classification Society.

For a characteristic VLCC size vessel, the maximum size expected to load at the DWP, the tropical load line draft is approximately 71 ft.

The required depth at the offshore DWP for the characteristic VLCC is 80.5 ft. based on a seakeeping analysis at maximum draft, including ship motions, with 5% (3.5ft) UKC margin added, assuming 0 trim.

The depth at the SPM buoy is 93 ft. at MLLW and meets minimum UKC requirements for a 5% and 10% margin and no less than 5 ft. (33 CFR §150.340).

13.2.6 Navigation Restrictions at the DWP

13.2.6.1 Safety Zones

The proposed location of the DWP is not near any existing safety zones. Safety zones, NAAs and ATBAs are established to promote safety of life and property, marine environmental protection, and navigational safety at deepwater ports and adjacent waters. Safety zones are the only federally regulated navigation areas. They accomplish these objectives by preventing or controlling specific activities, limiting access by vessels or persons, and by protecting the living resources of the sea from harmful agents. (33 CFR §150.905)

The Project is proposing a safety zone around the SPM buoy that is a circle with diameter equal to aggregate of 500 meters, length of a characteristic VLCC, hawser length, and the calculated horizontal displacement during the maximum operating environmental condition. Coordinates of the proposed safety zone will be determined during the application review.

Regulations under 33 CFR 150 Subpart D prescribes requirements for all vessels while in the safety zone.

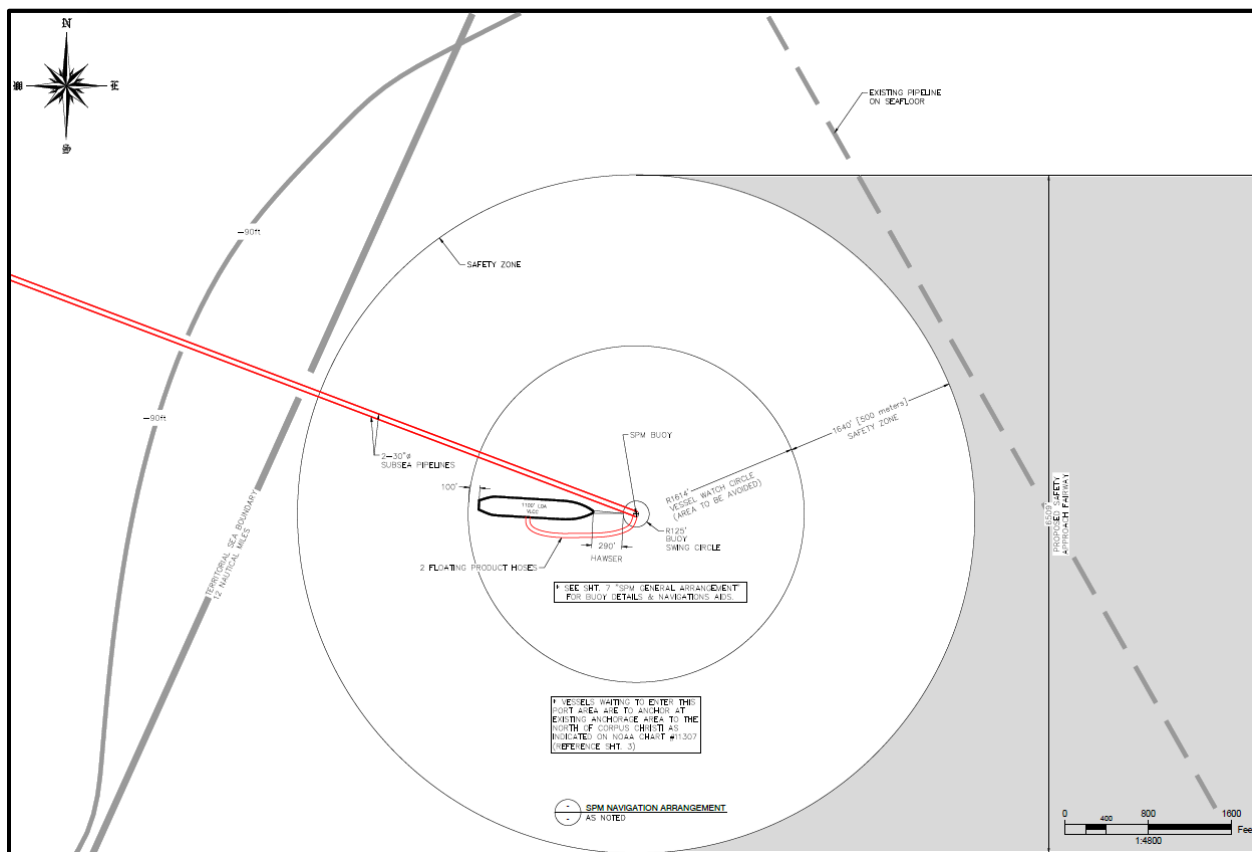


Figure 13-2: Illustration of proposed Safety Zone at the DWP

13.2.6.2 Security Zone

There are currently no security zones at or being considered at the DWP. The proposed Safety Zone, discussed above, will restrict access into the vicinity of the SPM to any vessel without advanced notification. Only tankers and support vessels, with permission from the offshore operations person in charge will be allowed to enter. The Safety Zone, if established, will be enforced by the USCG.

Maritime Security is covered under USCG 33 CFR Subpart H. Maritime security plans and procedures at the facility will be detailed in the Facility Security Plan including requirements in 33 CFR part 106 and 33 CFR 150.15 (x). The DWP will complete a Security Assessment and Develop a Facility Security Plan (FSP), in accordance with the regulations.

Under the regulations in Subpart H for facilities, the DWP operator must ensure the implementation of security measures for access control, newly hired employees, restricted areas, handling cargo, monitors and procedures for handling incidents.

Drill and exercises must test the proficiency of facility personnel in assigned security duties at all Maritime Security (MARSEC) Levels and the effective implementation of the FSP.

MARSEC Levels advise the maritime community and the public of the level of risk to the maritime elements of the national transportation system. Ports, under direction of the local COTP, will respond to changes in the MARSEC Level by implementing the measures specified in the Area Maritime Security (AMS) Plan. Similarly, vessels and facilities shall implement the measures specified in their security plans for applicable MARSEC Levels. Regulations defining MARSEC Levels are in 33 CFR §101.200.

Regulations regarding the Declaration of Security that must be given by the tanker prior to arrival are in 33 CFR §105.245.

13.2.6.3 No Anchor Areas and Areas to be Avoided

The NAAs and ATBAs are established via the International Maritime Organization (IMO). NAAs are established to protect vessels in transit and sub-surface deepwater port components and ATBAs are recommended routing measures.

Currently there are no NAAs or ATBA near the proposed DWP location. There are existing sub-marine pipelines in the vicinity (see Section 11 'Costal Zone Uses, Recreation, and Aesthetics'). Tankers will be advised, in the Operations Manual, to use a designated fairway anchorage area north of the DWP. The DWP location is not in a main traffic lane, near the entrance to a main port or waterway, fishing ground, or other potentially conflicting activity and traffic is expected to be low.

In addition to the proposed safety zone, NAA and ATBAs will be considered, if deemed necessary, in the next phase of engineering, but at this stage are not thought to be necessary.

13.2.6.4 Regulatory Process

Safety zones are developed and designated during the application process for a deepwater port license and may be established or modified through rulemaking. Rulemakings will afford prior public notice and comment, except when there is good cause not to do so, for example due to an imminent threat to the safety of life and property (33 CFR §150.915).

13.2.6.5 Inclusion in Operations Manual

A draft operations manual is included as part of the application for the project (Volume III, Confidential). The Operation Manual includes information necessary for the Master of the tanker to make all notifications required for entry into the DWP safety zone (33 CFR Part 150 Subpart D). The Operations Manual also includes all information required for navigation to/from the DWP, as well as details on the ATN. The Operations Manuals is written in compliance with 33 CFR 150.15.

13.2.7 Aids to Navigation

The existing conditions at the proposed location of the DWP do not include any proposed ATN. The location of the project does not impede any existing aids to navigation or traffic routes.

There will be lights on the buoy and hose, as required by 33CFR. §149.540 and 33 CFR Part 67 Aids to Navigation on Artificial Islands and Fixed Structures. The former requires lights to be at least 10 feet (3 meters) above mean high water. The latter prescribes requirements for lights including lights, sound

signals, and markings. Requirements are based on whether the structure is classified as an A B or C structure by the USCG. The District Commander will take into consideration the following criteria, as a minimum, structure dimensions, water depth, proximity of the structure to vessel routes, the nature and amount of vessel traffic and the effect of background lighting (33 CFR §67.01-15 Classification of structures).

In general, structures farthest from shore are likely to be assigned to Class A and required to have obstruction lights and sound signals that can be detected from the farthest distance. Structures closest to shore are likely to be assigned to Class C and, while subject to requirements to ensure that they are also detectable from a safe distance away, will be required to have the least powerful obstruction lights or sound signals. The location and standards for Class B structures will generally be in between Class A and C structures.

13.2.8 Support Vessels

Support vessels are available by charter to the applicant from several operators within the vicinity of Aransas Pass, the POCC, Galveston, and Houston. The project plans on utilizing existing support vessel operators to provide support to the DWP.

The project will require, at a minimum, 2 support vessels during berthing, hose connection, disconnect and de-berthing operations. A pilot boat may also be in the vicinity to transport the pilot(s) required on board during transit from the main safety fairway to the safety zone of the DWP during arrival and again on departure. No additional operations will be permitted, such as bunkering, stores resupply, or crew change in the safety zone, thus not additional vessels or barges are expected to be in the vicinity for DPW operations.

Operations at the DPW, in the Safety Zone are regulated in 33 CFR §150.380. Transit by vessels other than tankers or support vessels in the Safety Zone is only allowed in an emergency. Anchoring, fishing, drilling and lightering are prohibited. Tanker calls and support vessels movements are permitted when cleared by the person in charge of vessel operations at the deepwater port.

At regularly scheduled intervals, remotely operated vehicle (ROV) or dive inspections will be required for special survey of the buoy and its mooring lines. This may present an additional support vessel for a very short period. This operation will be very carefully planned and will have little to no effect on surrounding navigation and navigation safety as the inspection operation will be confined to safety zone and the buoy mooring lines.

Additional support and construction vessels will be utilized during construction, installation and decommissioning. These vessels will be on site for short periods of time during favorable weather windows to perform such tasks as pipe lay, trenching, pile installation, mooring line connection, towage of the buoy and dive inspections.

13.2.9 Marine Traffic

13.2.9.1 Volume of Traffic

The location of the DWP is south of the main approach to Aransas Pass and outside the safety fairway. The location is not in a main traffic lane, near the entrance to a main port or waterway, fishing ground, or other potential conflicting activity and traffic is expected to be low.

Oil and gas and other activities are discussed in Section 11 'Costal Zone Uses, Recreation, and Aesthetics'.

13.2.10 Anchorage Areas.

There is a "Fairway Anchorage", managed by the Corpus Christi-Aransas Pass Pilots Association located approximately 14 nautical miles north of the DWP. Because the anchorage is far north of the DWP, it is not expected to contribute to marine traffic at the DWP.

13.2.11 Vessel Traffic Management

The purpose of a Vessel Traffic Service (VTS) is to provide active monitoring and navigational advice for vessels in particularly confined and busy waterways. There are two main types of VTS, surveilled and non-surveilled. Surveilled systems consist of one or more land-based sensors (i.e. radar, AIS and closed-circuit television sites), which output their signals to a central location where operators monitor and manage vessel traffic movement. Non-surveilled systems consist of one or more reporting points at which ships are required to report their identity, course, speed, and other data to the monitoring authority (USCG 2018).

The DWP location is outside the nearest USCG VTS area. The nearest VTS location managed by the USCG is the Port of Galveston-Houston. The USCG does regulate the communications in and out of the DWP under 33 CFR. Radio communications offshore are regulated under the Federal Communications Commission.

13.3 Environmental Consequences

Impacts to navigation or navigation safety because of the construction, operation, or decommissioning of the project are discussed in the following section. Refer to Appendix A: Construction, Operation and Decommissioning Procedures, for a detailed description of techniques, procedures, and phases of the Project that were used to evaluate environmental consequences in the following sections.

13.3.1 Construction

13.3.1.1 Offshore

Nearly all the fabrication and construction of equipment will be completed onshore. Construction operations offshore will be comprised of installation of the piles and/or anchors for mooring lines, installation of mooring lines, installation of the PLEM, installation of the buoy, connection of the mooring lines and installation of the under-buoy hoses, and then the connection of loading hoses.

Installation and connection of the equipment described above will likely occur during several separate events and will be tested with water prior to introducing hydrocarbons. Once integrity of the system is confirmed, only then are hydrocarbons introduced.

The installation vessels, type and number are still to be determined, on station present some risk of collision but will be mitigated through careful planning and the restricted access into the safety zones and areas to be avoided. A temporary ATBA could be established during prolonged operation to reduce the risk of marine traffic from entering the area. A communication plan will be strictly enforced during the installation operation to manage vessel movements.

Overall, with mitigation in place, the Project is anticipated to result in an adverse impact of temporary and minor significance to offshore navigation and navigation safety during construction.

13.3.1.2 Inshore

The proposed Project traverses the GIWW directly to the west of Padre Island in the northern Laguna Madre (See Figure 13-1). To minimize potential impacts to the GIWW, the applicant will install the coastal crossing of the inshore pipelines using horizontal directional drilling (HDD), as described within Appendix A: Construction, Operation and Decommissioning Procedures.

The construction of the inshore pipelines will be sequential. During the inshore pipeline construction time, waters in proximity to construction vessels will be inaccessible to other users of the GIWW.

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. Typically, commercial vessels use the established fairway located 2.46 nautical miles to the east of the site (Figure 13-1). Any vessels that would otherwise transit through the Project vicinity would be forced to navigate around the safety zones, increasing the time that it would take them to move through the area and reach their destination. Any

vessels that would have utilized the areas that will be off-limits due to safety zones, could use established fairways or move around that area. It is unlikely that large commercial vessels would be transiting outside of established fairways. However, those that do would be affected only for the short-term duration of the construction period.

With mitigation, such as stakeholder engagement and an ATN system, in place, construction is expected to have negligible effect to inshore navigation and navigation safety during construction.

Potential impacts to recreational boating and fishing are discussed in Section 11 'Costal Zone Uses, Recreation, and Aesthetics'.

13.3.2 Operations

13.3.2.1 Offshore

Vessels operating outside the fairways, including commercial fishing vessels and recreational vessels, will be required to stay clear of the DWP and tankships moored there by the USCG Safety Zone. The location of the DWP and the existence of the safety zones around the DWP components and individual tankships while connected to the SPMs will be published in Notices to Mariners and other marine information sources. The ATN system that will be established at the DWP will also serve to make vessel operators aware of the DWP structure. Further, the DWP Operations Manual will include requirements and guidance for the Port Superintendent to maintain communications with other vessels operating in the area.

With the above mitigation in place, any impact to navigation and navigation safety during Project operation, resulting from the offshore Project elements, is anticipated to be of minor significance.

13.3.2.2 Inshore

The shift of VLCC traffic to the DWP will result in reductions in traffic volumes and reduced lightering offshore, compared to using a port located onshore. More significantly, the Project will result in a significant reduction in overall vessel traffic in the region by reducing the shuttle tanker traffic between the lightering zones and Texas ports which is how crude export is currently being conducted or proposed to occur. Each fully loaded VLCC requires from three to five shuttle tanker transfers to move a full cargo into port. The Project DWP has the capacity to replace this traffic and greatly reduce the volume of traffic using the port approach fairways, CCSC, and the POCC.

Overall during operation, the Project is anticipated to result in a permanent beneficial impact of minor significance to fairways navigation and navigation safety.

During Project operation no impact to navigation and navigation safety is anticipated within the GIWW.

13.3.3 Decommissioning

At the end of its useful life, all offshore components associated with the Project would be disassembled and brought to shore. Project vessels will traverse the Project location removing the decommissioned infrastructure from the Project location to onshore recycling and/or disposal locations.

Impacts to navigation and navigation safety during decommissioning are anticipated to be like those during construction but to a lesser extent as less vessel movements are anticipated during decommissioning than during construction.

Once decommissioning is complete, the safety zone would no longer apply and activities that had been associated with the vicinity of the Project prior to its construction would be allowed to resume.

Overall, with mitigation, such as stakeholder engagement and an ATN system, in place, impacts to navigation and navigation safety during decommissioning are anticipated to be temporary and of minor to negligible significance.

13.3.4 Cumulative

Cumulative impacts represent the incremental effects of the proposed project when added to other projects in the same area of influence. Effects of past and present projects are accounted for in the existing conditions assessments, while effects of reasonably foreseeable projects are estimated in the cumulative impact analyses. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a given period. The Framework for Cumulative Impact Analysis (see Volume II Introduction, Evaluation Framework, and Summary of Impacts), describes the methodology behind the cumulative impact analyses in this application, including in this Section. Potential cumulative impacts to navigation and navigation safety are addressed below.

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. These vessels will likely come from Corpus Christi and utilize the GIWW and offshore waters. Once operational the Project anticipates 96 VLCC marine traffic movements annually, coming from preestablished navigational fairways. As shown in Figure 13-1 the proposed Project will not impede any of the shipping lanes in the vicinity of the Project. The closest shipping lane to the SPM buoy is the Brazos Santiago Pass (about 2.9 miles east).

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.

During operations, approximately 96 VLCCs will call on the SPM buoy per year; if all the projects identified achieve in-service, then by 2022 an additional 1,309 vessels per year will be transiting the shipping/fairways lands in the Western Planning Area. Additionally, a portion of the vessel traffic in the GOM associated with oil and gas exploration and production (an increase between 860 and 10,820 vessels) could occur within the Western Planning Area. 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.

While the vessel transits to the SPM buoy will be subject to a moving security zone during transit, as are liquefied natural gas, LNG vessels in transit to the Corpus Christi LNG Terminal, cumulative impacts on vessel traffic in the Project vicinity are not likely to experience significant delays or be precluded from use of the shipping/fairways lands in the Western Planning Area. Further, safe navigation practices as established through the 1972 Convention on the International Regulations for Preventing Collisions at Sea will mitigate potential impacts from the increased vessel traffic. Any other project for which LNG vessels calls will occur, will be subject to this regulation.

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.

13.4 Mitigation Measures

Site selection: A number of alternative Project locations were considered prior to the selection of the proposed Project location and pipeline route. During the alternatives review and selection process, consideration was given to the avoidance of sensitive resources, such as current navigation fairways. . . Section 2 'Alternative Analysis' of this report offers detailed information regarding the site selection and alternatives review.

HDD: To minimize potential impacts to coastal resources, the coastal crossing of the offshore pipelines will be installed using HDD, as described within Appendix A.

Training and Competent Personnel: Risks associated with navigation and navigation safety will be mitigated with employment of competent personnel and extensive training for those conducting the offshore operations.

Safety Zone: Risks due to other marine traffic in the area, considered low in likelihood, will be mitigated through establishing a safety zone around the DWP. The safety zone restricts vessel movement into the area where offshore operations are being conducted.

Safety Fairway: A Safety fairway is also proposed for transit into and out of the safety zone from the main fairway. This will alert other traffic in the area that tankers may be transiting to/from the DWP and to exercise caution in the area.

Navigation Aids: ATN system will be installed and maintained by the DWP owner/operator in accordance with the regulations in 33 CFR 66. To establish a navigation aid on a DWP, the licensee must apply for approval of the private ATN to the Commandant, U.S. Coast Guard, in accordance with 33 CFR 66.01–5, at least 180 days before the installation of any structure at the site of the DWP.

The DWP will have these types of aids to facilitate navigation and maritime safety:

- Obstruction light on the SPM;
- Lights on floating hose strings;
- Markings SPMs showing the name of the DWP and the name or number identifying the structure;
- A radar beacon (RACON) on the tallest platform; and,
- An approved sound signal.

The specific design and installation requirements and the required characteristics for the aids will be as specified in 33 CFR Parts 62, 66, and 67.

Stakeholder Consultation: During Project installation/commissioning, the applicant will communicate with the USCG and USACE Navigation Branch, and federal pilots regarding offshore Project installation activities. Prior to commencing installation, the applicant will communicate with the appropriate USCG personnel to ensure a Notice to Mariners is issued prior to any installation activity. The Notice to Mariners would alert vessel captains ahead of time about the location of the Project's temporary installation activities and the exact coordinates of restricted-access temporary safety zones around each installation site. Working vessels could also issue very high frequency (VHF) radio broadcasts, as needed, to alert passing vessels about the presence of temporary safety zones around each site of active installation. The temporary safety zones, themselves, would be mitigation measures to temporarily segregate marine uses in the area and prevent collisions, accidents, or other undesired interactions between Project installation activities and non-Project commercial or recreational vessel transits. The mitigation measures employed during decommissioning would be nearly identical to those used during installation, though the duration of decommissioning would be much shorter than installation/commissioning.

13.5 Summary of Potential Impacts

Based on the analysis presented in the sections above, potential impacts to navigation and navigation safety as a result of the Project are summarized in the table below.

Table 13-1 Summary of Potential Navigation Impacts

Project Phase	Impact	Duration	Significance	Mitigation
Construction	Offshore: Additional vessel movements within the vicinity of the Project adversely impacting navigation and navigation safety within the Western Planning Area	Temporary	Minor	<p>Site selection: Current navigation channels, fairways, ports, and other current navigation understanding was taken into consideration in the site selection of the Project.</p> <p>Navigation Aids: An ATN system will be installed and maintained in accordance with the regulations in 33 CFR 66.</p> <p>Stakeholder Consultation: The applicant will communicate Project safety zone boundaries and construction periods with Stakeholders including the Port of Corpus Christi and local marine users.</p> <p>Training and Competent Personnel: Employment of competent personnel and extensive training for those conducting the offshore operations.</p> <p>Safety Zone: Safety zone around the DWP to restrict vessel movement into the area where offshore operations are being conducted.</p> <p>Safety Fairway: A Safety fairway for transit into and out of the safety zone from the main fairway.</p>
Construction	Inshore: Additional vessel movements within the vicinity of the Project adversely impacting navigation and navigation safety within the Western Planning Area	Temporary	Negligible	<p>HDD: HDD will be used install pipeline which traverses the GIWW, as described within Volume II Appendix A: Construction, Operation and Decommissioning Procedures.</p> <p>Stakeholder Consultation: The applicant will communicate Project safety zone boundaries and construction periods with Stakeholders including the Port of Corpus Christi and local marine users.</p>
Operation	Offshore: Additional vessel movements within the vicinity of the Project adversely impacting navigation and navigation safety within the Western Planning Area	Permanent	Minor	<p>Navigation Aids: An ATN system will be installed and maintained in accordance with the regulations in 33 CFR 66.</p> <p>Stakeholder Consultation: The applicant will communicate Project safety zone boundaries and construction periods with Stakeholders including the Port of Corpus Christi and local marine users.</p>
Operation	Inshore: Reduction in volume of traffic using the port approach fairways, CCSC, and the POCC.	Permanent	Minor Beneficial	<p>Navigation Aids: An ATN system will be installed and maintained in accordance with the regulations in 33 CFR 66.</p> <p>Stakeholder Consultation: The applicant will communicate Project safety zone boundaries and construction periods with Stakeholders including the Port of Corpus Christi and local marine users.</p>

Project Phase	Impact	Duration	Significance	Mitigation
Operation	Inshore: Potential impacts to navigation and navigation safety is anticipated within the GIWW	Permanent	No Impact	N/A
Decommissioning	Offshore: Additional vessel movements within the vicinity of the Project adversely impacting navigation and navigation safety within the Western Planning Area	Temporary	Minor	<p>Navigation Aids: An ATN system will be installed and maintained in accordance with the regulations in 33 CFR 66.</p> <p>Stakeholder Consultation: The applicant will communicate Project safety zone boundaries and construction periods with Stakeholders including the Port of Corpus Christi and local marine users.</p> <p>Training and Competent Personnel: Employment of competent personnel and extensive training for those conducting the offshore operations.</p>
Decommissioning	Inshore: Additional vessel movements within the vicinity of the Project adversely impacting navigation and navigation safety within the Western Planning Area	Temporary	Negligible	<p>Safety Zone: Safety zone around the DWP to restrict vessel movement into the area where offshore operations are being conducted.</p> <p>Safety Fairway: A Safety fairway for transit into and out of the safety zone from the main fairway.</p>
Cumulative	Cumulative impact to navigation and navigation safety resulting from the proposed project when added to other projects in the same area of influence.	Temporary/Permanent	Negligible	<p>Navigation Aids: An ATN system will be installed and maintained in accordance with the regulations in 33 CFR 66.</p> <p>Stakeholder Consultation: The applicant will communicate Project safety zone boundaries and construction periods with Stakeholders including the Port of Corpus Christi and local marine users.</p> <p>Training and Competent Personnel: Employment of competent personnel and extensive training for those conducting the offshore operations.</p> <p>Safety Zone: Safety zone around the DWP to restrict vessel movement into the area where offshore operations are being conducted.</p> <p>Safety Fairway: A Safety fairway for transit into and out of the safety zone from the main fairway.</p>

13.6 References

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