Federal Energy Regulatory Commission

Office of Energy Projects

FERC/FEIS-0333 **July 2023**

CP2 LNG and CP Express Project

FINAL ENVIRONMENTAL IMPACT STATEMENT

Venture Global CP2 LNG, LLC — Docket No. CP22-21-000

Venture Global CP Express, LLC — Docket No. CP22-22-000

Abstract:

The staff of the Federal Energy Regulatory Commission (Commission) prepared a final environmental impact statement (EIS) for the CP2 LNG and CP Express Projects proposed by Venture Global CP2 LNG, LLC (CP2 LNG) and Venture Global CP Express, LLC (CP Express). CP2 LNG and CP Express are seeking authorization to construct, install, own, operate, and maintain certain liquefied natural gas (LNG) facilities in Cameron Parish, Louisiana and certain pipeline facilities in Cameron and Calcasieu Parishes, Louisiana and Jasper and Newton Counties, Texas. CP2 LNG states that the purpose of the proposed project is to liquefy, store, and export a nameplate liquefaction capacity of 20 million tonnes per annum (MTPA) of LNG, with approximately 28.0 MTPA capacity possible under optimal conditions, to overseas markets by ocean-going vessels. CP Express states that the purpose of the pipeline system (about 91 miles) is to create the firm transportation capacity needed to transport 4.4 billion cubic feet per day of feed gas required for the proposed LNG export operations from natural gas supply points in east Texas and southwest Louisiana to the Terminal Facilities. CP2 LNG and CP Express proposed impact avoidance, minimization, and mitigation measures and Commission staff recommend additional measures in this EIS. Commission staff conclude that construction and operation of the project would result in adverse environmental impacts. For most resources, impacts on the environment would be less than significant. Commission staff determined that construction and operation of the project would have significant adverse effects on the visual resources of the surrounding areas, including cumulative visual impacts, and visual impacts on environmental justice communities in the region. Lastly, climate change impacts are not characterized in the EIS as significant or insignificant.

Estimate of Staff's Time Spent in Preparation of this EIS: $303,015.00
Cooperating agencies cost: $15,667.00
There were no direct contract costs.

Contact: Office of External Affairs, (866) 208-FERC
Federal Energy Regulatory Commission
Office of Energy Projects
Washington, DC 20426

Cooperating agencies:

U.S. Department of Energy

U.S. Army Corps of Engineers

U.S. Coast Guard

National Oceanic Atmospheric Administration - National Marine Fisheries Service

U.S. Department of Transportation

FEDERAL ENERGY REGULATORY COMMISSION

OFFICE OF ENERGY PROJECTS

<u>In Reply Refer To:</u>
OEP/DG2E/Gas Branch 1
Venture Global CP2 LNG, LLC
Venture Global CP Express, LLC
CP2 LNG and CP Express Projects
Docket Nos. CP22-21-000 and
CP 22-22-000

TO THE INTERESTED PARTY:

The staff of the Federal Energy Regulatory Commission (FERC or Commission) has prepared a final environmental impact statement (EIS) for the CP2 LNG and CP Express Projects (Project), proposed by Venture Global CP2 LNG, LLC (CP2 LNG) and Venture Global CP Express, LLC (CP Express) in the above-referenced docket. CP2 LNG and CP Express request authorizations to construct, install, own, operate, and maintain certain liquefied natural gas (LNG) facilities in Cameron Parish, Louisiana and certain pipeline facilities in Cameron and Calcasieu Parishes, Louisiana and Jasper and Newton Counties, Texas.

The final EIS assesses the potential environmental effects of the construction and operation of the Project in accordance with the requirements of the National Environmental Policy Act (NEPA). The FERC staff concludes that approval of the proposed project, with the mitigation measures recommended in the EIS, would result in some adverse environmental impacts. However, most of these impacts would be less-than-significant, with the exception of visual resources, including cumulative visual impacts, and visual impacts on environmental justice communities in the region. Climate change impacts are not characterized in the EIS as significant or insignificant. As part of the analysis, Commission staff developed specific mitigation measures (included in the final EIS as recommendations). Staff recommend that these mitigation measures be attached as conditions to any authorization issued by the Commission.

The U.S. Army Corps of Engineers New Orleans and Galveston Districts, U.S. Department of Energy, U.S. Coast Guard, U.S. Department of Transportation's Pipeline and Hazardous Materials Safety Administration, and National Marine Fisheries Service participated as cooperating agencies in the preparation of the EIS. Cooperating agencies have jurisdiction by law or special expertise with respect to resources potentially affected by the proposal and participate in the NEPA analysis. The U.S. Army Corps of Engineers New Orleans and Galveston Districts will adopt and use the EIS to consider compliance with Section 404 of the Clean Water Act of 1972, as amended and Section 10 of the Rivers and Harbors Act of 1899. Although the cooperating agencies provided input to the conclusions and recommendations presented in the EIS, the agencies will present their own conclusions and recommendations in their respective Records of Decision for the Project.

The final EIS addresses the potential environmental effects of the construction and operation of the following project facilities:

- a liquefaction plant consisting of 18 liquefaction blocks and ancillary support facilities, each block having a nameplate capacity of about 1.1 million tonnes per annum of LNG;
- six pretreatment systems, each including an amine gas-sweetening unit to remove carbon dioxide (CO_2) and a molecular sieve dehydration system to remove water;
- four 200,000 cubic meter aboveground full containment LNG storage tanks with cryogenic pipeline connections to the liquefaction plant and the berthing docks;
- carbon capture and sequestration facilities, including carbon capture equipment within the terminal site as well as a non-jurisdictional CO_2 send-out pipeline outside of the terminal site;[1]
- a combined cycle natural gas turbine power plant with a nameplate capacity of 1,470 megawatts;
- two marine LNG loading docks and turning basins and three cryogenic lines for LNG transfer from the storage tanks to the docks;
- administration, control, maintenance, and warehouse buildings and related parking lots;
- 85.4 miles of 48-inch-diameter natural gas pipeline (CP Express Pipeline);
- 6.0 miles of 24-inch-diameter natural gas lateral pipeline connecting to the CP Express Pipeline in northwest Calcasieu Parish (Enable Gulf Run Lateral);
- one 187,000-horsepower natural gas-fired compressor station (Moss Lake Compressor Station);
- six meter stations (five at interconnects with existing pipelines and one at the terminus of the CP Express Pipeline within the Terminal Site); and
- other appurtenant facilities.[2]

The Commission mailed a copy of the *Notice of Availability* to federal, state, and local government representatives and agencies; elected officials; environmental and public interest groups; Native American tribes; potentially affected landowners and other interested individuals and groups; and newspapers and libraries in the project area. The final EIS is only available in electronic format. It may be viewed and downloaded from the FERC's website (www.ferc.gov), on the natural gas environmental documents page (https://www.ferc.gov/industries-data/natural-

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[1] CP2 LNG anticipates this pipeline would be installed under the southern portion of the Terminal Site floodwall and terminate at a non-jurisdictional offshore platform in State of Louisiana waters.

[2] The LNG terminal would also include the following non-jurisdictional facilities: electrical transmission line and substation, water pipeline, septic system, and stormwater facilities/outfalls.

gas/environment/environmental-documents). In addition, the final EIS may be accessed by using the eLibrary link on the FERC's website. Click on the eLibrary link (https://elibrary.ferc.gov/eLibrary/search), select "General Search", and enter the docket number in the "Docket Number" field (i.e. CP22-21 or CP22-22). Be sure you have selected an appropriate date range. For assistance, please contact FERC Online Support at FercOnlineSupport@ferc.gov or toll free at (866) 208-3676, or for TTY, contact (202) 502-8659.

Additional information about the project is available from the Commission's Office of External Affairs, at **(866) 208-FERC**, or on the FERC website (www.ferc.gov) using the eLibrary link. The eLibrary link also provides access to the texts of all formal documents issued by the Commission, such as orders, notices, and rulemakings.

The Commission's Office of Public Participation (OPP) supports meaningful public engagement and participation in Commission proceedings. OPP can help members of the public, including landowners, environmental justice communities, Tribal members and others, access publicly available information and navigate Commission processes. For public inquiries and assistance with making filings such as interventions, comments, or requests for rehearing, the public is encouraged to contact OPP at (202) 502-6595 or OPP@ferc.gov.

In addition, the Commission offers a free service called eSubscription which allows you to keep track of all formal issuances and submittals in specific dockets. This can reduce the amount of time you spend researching proceedings by automatically providing you with notification of these filings, document summaries, and direct links to the documents. Go to https://www.ferc.gov/ferc-online/overview to register for eSubscription.

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ACRONYMS AND ABBREVIATIONS

AADT	annual average daily traffic
ACHP	Advisory Council on Historic Preservation
AEGL	Acute Exposure Guideline Level
AIChE	American Institute of Chemical Engineers
AOI	area of impact
APE	area of potential effect
API	American Petroleum Institute
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
AST	alligator snapping turtle
ASTM	American Society for Testing and Materials
ATWS	additional temporary workspace
AQCR	Air Quality Control Region
AVERT	AVoided Emissions and Generation Tool
BACT	best available control technology
BCC	Birds of Conservation Concern
Bcf/d	billion cubic feet per day
BCR	Bird Conservation Region
BFE	base flood elevation
BG	block group
BGEPA	Bald and Golden Eagle Protection Act
BLEVE	boiling liquid expanding vapor explosion
BMP	best management practice
BOG	boil-off gas
BPVC	Boiler and Pressure Vessel Code
Btu/ft2-hr	British thermal units per square foot per hour
BUDM	beneficial use of dredged material
°C	degrees Celcius
CAA	Clean Air Act of 1963
CCPS	Center for Chemical Process Safety
CCS	carbon capture sequestration
CEQ	Council on Environmental Quality
Certificate	Certificate of Public Convenience and Necessity
CFR	Code of Federal Regulations
CH4	methane
CMP	Compensatory Mitigation Plan
Coast Guard	U.S. Coast Guard
CO	carbon monoxide
CO2	carbon dioxide
CO2e	carbon dioxide-equivalent
COE	U.S. Army Corps of Engineers
Commission	Federal Energy Regulatory Commission

COTP	Captain of the Port
CP2 LNG	Venture Global CP2 LNG, LLC
CP Express	Venture Global CP Express, LLC
CPT	cone penetration test
CT	census tract
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
dB	decibel
dBA	A-weighted decibel scale
dBPEAK	peak decibels
dBRMS	root mean square decibels
dBSEL	sound exposure level decibels
DHS	Department of Homeland Security
DOD	Department of Defense
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
E2EM	estuarine intertidal emergent
E2SS	estuarine scrub-shrub
EBR	Eastern black rail
EC	Exposure Concentration
ECD	erosion control device
EFH	essential fish habitat
EI	environmental inspector
EIS	Environmental Impact Statement
El.	elevation
Entergy	Entergy Louisiana, LLC
EPA	U.S. Environmental Protection Agency
EPAct	Energy Policy Act
ERP	Emergency Response Plan
ERPG	Emergency Response Planning Guidelines
ESA	Endangered Species Act of 1973, as amended
ESD	emergency shutdown
EUB	estuarine unconsolidated bottom
°F	degrees Fahrenheit
FAA	Federal Aviation Administration
FECM	Office of Fossil Energy and Carbon Management
FEED	front-end-engineering-design
FEMA	Federal Emergency Management Administration
FERC	Federal Energy Regulatory Commission
FGT	Florida Gas Transmission
FHWA	Federal Highway Administration
FMP	fisheries management plan
fps	feet per second
FR	Federal Register

FSA	Facility Security Assessment
FSP	Facility Security Plan
FTA	Free Trade Agreements
FWS	U.S. Fish and Wildlife Service
g	gravity
GCU	gas combustion unit
GHG	greenhouse gas
gpm	gallons per minute
GMFMC	Gulf of Mexico Fishery Management Council
GWP	global warming potential
H2S	hydrogen sulfide
HAP	hazardous air pollutant
HAZID	Hazard Identification
HAZOP	Hazard and Operability Review
HCA	high consequence area
HDD	horizontal directional drill
HHRA	Human Health Risk Assessment
HHRAP	Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities
HIPPS	high integrity pressure protection system
HMB	heat and material balance
HP	horsepower
HQ	Hazard Quotient
HUC	hydrologic unit code
IBA	Important Bird Area
IBC	International Building Code
IMO	International Marine Organization
IPaC	Information for Planning and Consultation
IPCC	Intergovernmental Panel on Climate Change
ISA	International Society for Automation
Jeff Davis	Jeff Davis Electric Co-op, Inc.
km	kilometers
kW/m2	kilowatts per square meter
LAC	Louisiana Administrative Code
lb/hr	pounds per hour
LDEQ	Louisiana Department of Environmental Quality
LDNR	Louisiana Department of Natural Resources
LDOTD	Louisiana Department of Transportation and Development
LDWF	Louisiana Department of Wildlife and Fisheries
Ldn	day-night sound level
Leq	equivalent sound level
LFL	lower flammable limit
Lmax	maximum sound level observed during a measurement period or noise event

LNG	liquefied natural gas
LOD	Letter of Determination
LOI	Letter of Intent
LOR	Letter of Recommendation
LOS	level of service
LPDES	Louisiana Pollutant Discharge Elimination System
LPG	liquefied petroleum gas
m3	cubic meters
M&N	Moffatt & Nichol
MAOP	maximum allowable operating pressure
MBTA	Migratory Bird Treaty Act
MCE	Maximum Considered Earthquake
MEOW	maximum envelope of water
mg/L	milligrams per liter
MLV	mainline valve
MMBtu/hr	million British Thermal Units per hour
MMPA	Marine Mammal Protection Act
MMT	million metric tons
MOU	Memorandum of Understanding
MP	milepost
mph	miles per hour
MR	mixed refrigerant
MSA	metropolitan statistical area
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
MSL	mean sea level
MTPA	million tonnes per annum
MTSA	Maritime Transportation Security Act
MW	megawatt
N2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NAVD 88	North American Vertical Datum of 1988
NDD	Natural Diversity Database
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NFPA	National Fire Protection Association
NGA	Natural Gas Act
NGO	non-governmental organization
NGVD 29	National Geodetic Vertical Datum of 1929
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NO2	nitrogen dioxide
NOx	nitrogen oxides

NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NSA	noise sensitive area
NSPS	New Source Performance Standards
NSR	New Source Review
NVIC	Coast Guard’s Navigation and Vessel Inspection Circulars
NWI	National Wetlands Inventory
NWR	National Wildlife Refuge
O3	ozone
OBE	operating basis earthquake
OCM	Office of Coastal Management
OEP	Office of Energy Projects
P&ID	piping and instrumentation diagram
P&R	park and ride
PEAK	peak sound pressure level
PEM	palustrine emergent
PFD	process flow diagram
PFO	palustrine forested
PGA	peak ground acceleration
PHMSA	Pipeline and Hazardous Materials Safety Administration
Plan	FERC’s Upland Erosion Control, Revegetation, and Maintenance Plan
PM	particulate matter
PM2.5	particulate matter with an aerodynamic diameter less than or equal to 2.5 microns
PM10	particulate matter with an aerodynamic diameter less than or equal to 10 microns
ppb	parts per billion
ppmv	parts per million by volume
Procedures	FERC’s Wetland and Waterbody Construction and Mitigation Procedures
PSD	Prevention of Significant Deterioration
psi	pounds per square inch
psig	pounds per square inch gauge
PSS	palustrine scrub-shrub
PTE	potential to emit
PVB	pressure vessel burst
RCW	red-cockaded woodpecker
RHA	River and Harbors Act
RMP	risk management plan
RMS	root-mean-square pressure level
RPT	rapid phase transition
RRC	Texas Railroad Commission
RV	recreational vehicle

SAFMC	South Atlantic Fishery Management Council
SAV	submerged aquatic vegetation
SCPT	seismic cone penetration test
Secretary	Secretary of the Commission
SEI	Structural Engineering Institute
SEL	sound exposure level
SELCUM	cumulative sound exposure level
SH	State Highway
SHPO	State Historic Preservation Officer
SIL	significant impact level
SIP	state implementation plan
SLOSH	Sea, Lake and Overland Surges from Hurricanes
SPCC	Spill Prevention, Control, and Countermeasure
SO2	sulfur dioxide
SOPEP	Shipboard Oil Pollution Emergency Plan
SSE	safe shutdown earthquake
SWEL	Stillwater Flood Elevation
SWPPP	Stormwater Pollution Prevention Plan
TAC	Texas Administrative Code
TAP	toxic air pollutant
TCEQ	Texas Commission on Environmental Quality
TPWD	Texas Parks and Wildlife Department
tpy	tons per year
TSA	Transportation Security Administration
TWDB	Texas Water Development Board
TWIC	Transportation Worker Identification Credential
µg/m3	micrograms per cubic meter
µPa	micropascal
UFL	upper flammable limit
USC	U.S. Code
USGCRP	U.S. Global Change Research Program
USDA	U.S. Department of Agriculture
USGS	U.S. Geological Survey
VIDA	Vessel Incidental Discharge Act
VOC	volatile organic compound
Vs	velocity
WDP	Wildlife Diversity Program
WMA	Wildlife Management Area
WSA	Water Suitability Assessment
YOY	young-of-year

EXECUTIVE SUMMARY

On December 2, 2021, Venture Global CP2 LNG, LLC and Venture Global CP Express, LLC (CP2 LNG and CP Express, respectively) filed applications with the Federal Energy Regulatory Commission (Commission or FERC) pursuant to Section 3(a) and Section 7(c) of the Natural Gas Act (NGA). CP2 LNG and CP Express are seeking authorization to construct, install, own, operate, and maintain certain liquefied natural gas (LNG) facilities in Cameron Parish, Louisiana and certain pipeline facilities in Louisiana and east Texas. CP2 LNG and CP Express' applications were assigned Docket Nos. CP22-21-000 and CP22-22-000, and they are collectively referred to as the "Project" in this Environmental Impact Statement (EIS). The Commission issued a Notice of Application for the Project on December 16, 2021, and the notice appeared in the Federal Register (FR) on December 23, 2021. Prior to filing their applications, CP2 LNG and CP Express participated in the Commission's pre-filing process under Docket No. PF21-1-000.

As part of the Commission's consideration of these applications, we[1] prepared this EIS to assess the potential environmental impacts resulting from construction and operation of the proposed Project in accordance with the requirements of the National Environmental Policy Act of 1969, as amended (NEPA).

The Energy Policy Act of 2005, as amended, states that the FERC shall act as the lead federal agency for coordinating all applicable authorizations related to jurisdictional natural gas facilities and for the purposes of complying with NEPA. The FERC, as the "lead federal agency," is responsible for the preparation of this EIS. This effort was undertaken with the participation and assistance of five "cooperating agencies," as defined by NEPA. Cooperating agencies have jurisdiction by law or special expertise with respect to environmental impacts involved with a proposal. The cooperating agencies for this Project include the U.S. Army Corps of Engineers (COE) New Orleans and Galveston Districts, U.S. Department of Energy, U.S. Coast Guard (Coast Guard), U.S. Department of Transportation's (DOT) Pipeline and Hazardous Materials Safety Administration (PHMSA), and National Marine Fisheries Service (NMFS).

PROPOSED ACTION

The Project would involve the construction of a new LNG terminal in Cameron Parish, Louisiana and associated pipeline facilities from Jasper County, Texas to the LNG terminal, which includes a liquefaction plant consisting of 18 liquefaction blocks (9 per phase) and ancillary support facilities, six pretreatment systems (three per phase), each including an amine gas-sweetening unit to remove carbon dioxide (CO_2) and a molecular sieve dehydration system to remove water, four 200,000 cubic meter (m^3) aboveground full containment LNG storage tanks (two per phase) with cryogenic pipeline connections to the liquefaction plant and to the berthing docks, carbon capture and sequestration facilities, a combined cycle natural gas turbine power plant, and administration, control, maintenance, and warehouse buildings and related parking lots.[2] The Project would also involve the construction of two marine LNG loading docks and accompanying turning basins and three cryogenic pipelines for LNG transfer from the storage tanks to the docks (collectively referred to as the Marine Facilities). The liquefaction, storage and Marine Facilities are collectively referred to as the Terminal Facilities or Terminal Site. Additionally, the Project includes the construction of 85.4 miles of 48-inch-diameter natural gas pipeline (CP Express Pipeline), 6.0 miles of 24-inch-diameter natural gas lateral pipeline connecting to the CP Express Pipeline near milepost (MP) 26.2 in northwest Calcasieu Parish (Enable Gulf Run Lateral), one 187,000-horsepower natural gas-fired compressor station in Calcasieu Parish (Moss Lake Compressor Station), six meter stations (five at

1 "We," "us," and "our" refer to the environmental and engineering staff of the FERC's Office of Energy Projects.

2 The Terminal Site would also include non-jurisdictional facilities, such as an electrical transmission line and substation, water pipeline, septic system, and stormwater facilities/outfalls.

interconnects with existing pipelines and one at the terminus of the CP Express Pipeline within the Terminal Site), and other appurtenant facilities (collectively referred to as the Pipeline System).

The Project would be constructed in two phases. Phase 1 would include the construction of all proposed facilities, except for nine liquefaction blocks, three pretreatment systems, and two full containment LNG storage tanks, which would be constructed during Phase 2. CP2 LNG and CP Express propose to begin construction of Phase 1 upon receipt of all required permits and authorizations. This phase is anticipated to take three years to complete. Construction of the Phase 2 facilities is expected to follow the start of Phase 1 construction by 12 months; therefore, all construction activities (Phase 1 and Phase 2 combined) are anticipated to take a total of 4 years to complete. CP2 LNG and CP Express anticipate construction would start in the fourth quarter of 2023. Once fully completed, the Pipeline System would be capable of transporting up to 4.4 billion cubic feet per day (Bcf/d) of natural gas (with about 50 percent capacity upon completion of Phase 1) to provide feed gas to the Terminal Facilities from points of interconnection with existing pipelines in east Texas and southwest Louisiana.

PUBLIC INVOLVEMENT

On January 21, 2021, CP2 LNG and CP Express filed a request with the FERC to use our pre-filing review process. This request was approved on February 17, 2021, and pre-filing Docket No. PF21-1-000 was established in order to place information filed by CP2 LNG and CP Express, documents issued by the FERC, as well as comments from the public, agencies, tribes, organizations, and other stakeholders into the public record. The pre-filing review process provides opportunities for interested stakeholders to become involved early in project planning, facilitates interagency cooperation, and assists in the identification and resolution of issues prior to a formal application being filed with the FERC.

CP2 LNG and CP Express provided landowners and stakeholders, including federal, tribal, state, and local agencies with permitting and/or consultation authority for the Project, with an introductory informational letter on February 24, 2021. CP2 LNG and CP Express continued to meet with various groups and individuals regarding the Project, as outlined in the Public Participation Plan referenced in the CP2 LNG and CP Express pre-filing request letter. CP2 LNG and CP Express held three virtual open houses on April 6, 7, and 8, 2021, respectively, to provide information to the public about the CP2 LNG and CP2 Express Project. FERC staff participated in the open houses, describing the FERC environmental review process and providing information on how to file comments with the FERC. During pre-filing, CP2 LNG and CP Express, FERC staff, and interested agencies engaged in bi-weekly Project calls to discuss the application and permitting processes. The bi-weekly call minutes are available for viewing on the FERC eLibrary under Docket No. PF21-1-000.

On April 27, 2021, the FERC issued a *Notice of Scoping Period Requesting Comments on Environmental Issues for the Planned CP2 LNG and CP Express Project and Notice of Public Scoping Sessions*. This notice was sent to about 2,700 interested parties, including federal, state, and local officials; agency representatives; conservation organizations; non-governmental organizations; Native American Tribes; local libraries and newspapers; and property owners in the vicinity of the proposed Project. Publication of the notice established a 30-day public scoping period for the submission of comments, concerns, and issues related to the environmental aspects of the Project; the scoping period closed on May 27, 2021. We received 13 comment letters in response to the notice and 1,719 individual form letters in opposition to the Project.

The FERC conducted three virtual public scoping sessions via telephone on May 11, 12, and 13, 2021 for the proposed Project to provide an opportunity for the public to learn more about the CP2 LNG and CP Express Project and to participate in our analysis by providing oral comments on environmental issues to be included in the EIS. Each scoping session had representatives from the FERC staff that were available to answer questions and take comments related to the FERC environmental review process and the Project. During the scoping sessions, 16 individuals provided oral comments on the Project. CP2 LNG and CP Express submitted responses to the scoping comments on June 10, 2021.[3] Transcripts of the public scoping sessions, as well as the written comment letters, were entered into the public record and are available for viewing on the FERC's online eLibrary system.[4]

On December 2, 2021, CP2 LNG and CP Express filed applications with the FERC, in Docket Nos. CP22-21-000 and CP22-22-000, to construct and operate the Terminal Facilities and Pipeline System. The Commission issued a Notice of Application for the Project on December 16, 2021, and the notice appeared in the FR on December 23, 2021. On February 9, 2022, the FERC issued a *Notice of Intent to Prepare an Environmental Impact Statement for the Proposed CP2 LNG and CP Express Project, Request for Comments on Environmental Issues, and Schedule for Environmental Review*. We received a total of three comments from individuals unaffiliated with organizations; two comments from unions; five comments from federal and state agencies; and 12 comments from companies and other non-governmental organizations (NGOs) following the filing of CP2 LNG and CP Express' applications.

In total, we received 17 comments from NGOs, 12 comments from federal and state agencies, 23 comments from individuals unaffiliated with organizations (16 of which were oral comments), 2 comments from unions, 2 comments from Native American Tribes, and 1,719 individual form letters during the pre-filing and application processes for the Project. The primary issues raised by the commenters related to potential Project impacts on climate change, water quality and wetlands, wildlife, aquatic resources, threatened and endangered species, recreational activities, local infrastructure, environmental justice communities, and air quality. A listing of all comments received prior to issuance of the draft EIS is provided in appendix A.

On January 19, 2023, the draft EIS was filed with the U.S. Environmental Protection Agency (EPA), and the *Notice of Availability* of the draft EIS was mailed to federal, state, and local government agencies; elected officials; Native American tribes; affected landowners; local libraries and newspapers; intervenors in FERC's proceeding; and other interested parties (i.e., individuals who provided scoping comments or asked to be on the mailing list). The distribution list for the *Notice of Availability* of the draft EIS was provided in appendix B of that document; appendix B has been updated accordingly to reflect the issuance of the final EIS. A formal notice indicating that the draft EIS was available for review and comment was published in the FR on January 26, 2023.[5] The notice listed the dates of two public comment sessions and established a closing date of March 13, 2023 for receiving comments on the draft EIS.

We held two public comment sessions in the Project area to solicit and receive comments on the draft EIS on March 1 and 2, 2023.[6] The sessions provided the public an opportunity to present oral comments to a court reporter on the environmental analysis described in the draft EIS. A total of 36 individuals provided oral comments. In addition, we received written comments from 3 federal agencies, 2 state agencies, 11 companies/NGOs, and 9 individuals. We also received a copy of one form letter associated with an online petition, which had 83 signatures at the time of filing. All comments received and a representative copy of the form letter/petition are included in our comment responses contained in

[3] This document can be viewed on the FERC eLibrary under accession no. 20210610-5118.

[4] These transcripts can be viewed on the FERC eLibrary under accession nos. 20210527-4004, 20210527-4005, 20210527-4006, and 20210623-4000.

[5] 88 FR 4995

[6] Transcripts of the public scoping sessions are available for viewing in the FERC eLibrary (www.ferc.gov) under accession no. 20230316-4000.

appendix N. Substantive environmental issues identified through this public review process are addressed in this EIS.[7]

PROJECT IMPACTS AND MITIGATION

We evaluated the potential impacts of construction and operation of the Project on geology; soils and sediments; water resources; wetlands; vegetation; wildlife and aquatic resources; threatened, endangered, and other special status species; land use, recreation, and visual resources; socioeconomics and environmental justice communities; cultural resources; air quality and noise; reliability and safety; and cumulative impacts, including climate change. In addition to the no-action alternative, we identified potential system, Terminal Site, pipeline route, and compressor station site alternatives. Where necessary, we recommend additional mitigation measures to minimize or avoid these impacts. Sections 5.1 and 5.2 of the EIS contain our conclusions and a compilation of our recommended mitigation measures, respectively.

Construction of the Terminal Site would affect approximately 631.7 acres of land south and east of Venture Global Calcasieu Pass, LLC's Calcasieu Pass LNG Terminal and 38.3 acres associated with the temporary yards. CP2 LNG would restore approximately 87.9 acres of temporary construction workspace associated with the Terminal Site and all of the acres associated with the temporary yards (38.3 acres) to approximate preconstruction conditions following construction. An approximately 122.2-acre area on the southwest side of Monkey Island (i.e., the Marine Facilities) would include the LNG carrier loading docks and accompanying turning basins. The LNG transfer lines, boil-off gas (BOG) pipeline, and utilities would affect an additional 31.6 acres. CP2 LNG would retain a nominal 150-foot-wide permanent easement between the Terminal Site and Marine Facilities boundaries for the LNG transfer lines, BOG pipeline, and utilities, affecting 15.6 acres.

Construction of the Pipeline System rights-of-way would require a total of 1,440.0 acres (CP Express Pipeline right of way [1,384.6 acres] and Enable Gulf Run Lateral right-of-way [55.4]) of land. Of this, 546.5 acres (CP Express Pipeline [510.3 acres] and Enable Gulf Run Lateral [36.2 acres]) would be retained for operation and maintenance of the Pipeline System rights-of-way. Approximately 45 percent (approximately 41.6 miles) of the Pipeline System would be collocated with, or parallel to, existing pipeline, powerlines, roadway, railways, and canals (see table 2.2.2-1).

Based on our analysis, Project scoping, agency consultations, and public comments, the primary Project construction and operational impacts would be on geologic resources and soils; waterbodies and wetlands; vegetation; wildlife and aquatic resources; federally listed species; land use, recreation, and visual resources; socioeconomics; environmental justice; air quality and noise; reliability and safety; and cumulative impacts, including climate change.

Geologic Resources

This section describes natural geologic hazards with respect to the Pipeline System. Natural geologic hazards associated with the Terminal Facilities are summarized in the Reliability and Safety section below and discussed in detail in section 4.13. Coastal land loss is an ongoing process, which includes discrete (hurricanes) and continuous (subsidence and sea level rise) processes. In the vicinity of the Project, along the 9-mile stretch of the coastal shoreline from the Calcasieu Ship Channel to approximately 2 miles west of Holly Beach, shoreline erosion is typically between 5 to 30 feet per year. Eustatic sea level rise modeling predicts that sea level rise for the Gulf of Mexico region by the year 2100 may be up to 6.5 feet. The portion of the Pipeline System closest to the shoreline would be where the CP

[7] Transcripts of the public scoping sessions and all written comments are part of the FERC's public record and are available for viewing in the FERC eLibrary (www.ferc.gov) under Docket Nos. CP22-21-000 and CP22-22-000.

Express Pipeline enters the Terminal Site Gas Gate Station, which is within the Terminal Site. The southern boundary of the proposed Terminal Site Gas Gate Station is over 1,000 feet north of the shoreline at the closest point. The additional protective measures that CP2 LNG has incorporated into the Terminal Site design (see section 4.13) would greatly reduce the erosion rate at this location, and we conclude that the Pipeline System would not be affected by erosion of the Gulf of Mexico shoreline.

Pipeline System aboveground facilities buildings are designed to be elevated above base flood elevations with service facilities designed and/or located to prevent water from entering or accumulating within the components. Flood protection measures also include anchoring systems to prevent floatation, collapse, and lateral movement; fencing to prevent flood debris damage; concrete or structural steel supports; and elevated platforms or site grading. Project pipelines would be buried with a minimum of 3 feet of cover in upland and wetland areas and a minimum of 4 feet of cover in open water areas, which would protect the pipelines from the direct physical forces of storm surges and floodwater. The pipelines would have a concrete coating or other anti-buoyancy measures to prevent the pipelines from floating.

CP Express has committed to filing results of geotechnical investigations at each of the proposed horizontal directional drill (HDD) crossing locations for the Director of the Office of Energy Project’s review and approval. Since issuance of the draft EIS, we have updated our recommendation for CP Express and CP2 LNG to file the outstanding feasibility/hydrofacture assessments prior to construction. Additionally, we have included a recommendation for CP2 LNG to file an HDD monitoring, inadvertent return response, and contingency plan for the proposed HDDs for the LNG transfer lines, BOG pipeline, and utilities. We conclude that construction and operation of the Pipeline System in accordance with CP Express’ proposed contingency measures would not result in a significant impact on mineral or geological resources. In addition, with the implementation of the measures outlined above, we conclude that overall impacts from geologic hazards would be low.

Waterbodies

Construction and operation of the Terminal Site would permanently fill 2.0 acres of waterbodies at the Terminal. Construction and operation of the Terminal Facilities would also impact water quality within the vicinity of the Project resulting from dredging, maintenance dredging, marine traffic, and stormwater runoff. However, through implementation of CP2 LNG’s Project-specific *Wetland and Waterbody Construction and Mitigation Procedures* (Procedures), best management practices (BMP), and adherence to applicable permit regulations, we conclude that potential construction and operation impacts resulting from stormwater runoff, or the discharge of hydrostatic test water, would be adequately minimized and would not be significant. Impacts on surface waters related to dredging would be temporary and would not substantially increase turbidity levels above general ambient conditions within the Calcasieu Ship Channel.

The Pipeline System would cross 96 perennial waterbodies, 95 intermittent waterbodies, 79 ephemeral waterbodies, and 113 open water waterbodies. CP Express proposes the use of HDD, open-cut, and push method for pipeline installation. Construction of the Pipeline System could result in impacts from waterbody crossings; hydrostatic testing; and spills or leaks of hazardous materials. Waterbodies that would be crossed by the pipelines using the open-cut methods would experience temporary decreases in water quality resulting from increased turbidity, sedimentation, and overall bed and bank disturbance. Further, crossing the waterbodies would risk spills of hazardous liquids and inadvertent returns of HDD drilling mud within the waterbodies. With implementation of the mitigation measures identified above and CP Express’ Project-specific Procedures and HDD Monitoring and Contingency Plan, we have determined that the Project would not significantly impact surface waters.

Wetlands

Construction of the Terminal Facilities would impact a total of 394.4 acres of wetlands, of which 355.0 acres would be permanent. Construction of the Terminal Site would result in impacts on 286.8 acres of palustrine emergent (PEM) wetlands, 32.7 acres of palustrine scrub-shrub (PSS) wetlands, 1.7 acres of palustrine forested (PFO) wetlands, and 7.8 acres of estuarine intertidal emergent (E2EM) wetlands. Of these wetlands, 274.8 acres of PEM wetlands, 32.0 acres of PSS wetlands, 1.7 acres of PFO wetlands, and 5.3 acres of E2EM wetlands would be permanently impacted (permanent loss). The construction of the LNG transfer lines would result in temporary impacts on 11.3 acres of PEM wetlands, 12.9 acres of PSS wetlands, and permanent conversion of 0.1 acre of PSS to PEM. The remaining wetlands, which are associated with temporary workspace outside the Terminal Site perimeter floodwalls, would be restored after construction. Construction of the Marine Facilities would result in the permanent loss of 41.2 acres of PEM, PSS, PFO, and E2EM wetlands, the majority of which would be converted to open water in the dredge prism for the berthing area.

Construction of the Pipeline System would affect approximately 1,026.3 acres of wetlands. Construction of the aboveground facilities and permanent access roads would result in the permanent fill/loss of approximately 39.3 acres of E2EM, PEM, PFO, and PSS wetlands. An additional 58.4 acres would be converted from PSS and PFO wetlands to PEM wetlands within the CP Express Pipeline and Enable Gulf Run Lateral permanent pipeline easements. Approximately 23.2 acres of wetlands within the pipeline rights-of-way would be avoided during construction by implementing the HDD crossing method. The remaining 905.2 acres of wetlands would be temporarily affected by construction of the Pipeline System. Following construction of the CP Express Pipeline and Enable Gulf Run Lateral, CP Express would restore wetlands temporarily affected by construction to pre-construction conditions by allowing the wetlands to revegetate naturally or by re-seeding in accordance with the Project-specific Procedures.

To mitigate unavoidable wetland impacts in Louisiana, CP2 LNG and CP Express would purchase wetland mitigation bank credits at a ratio specified by the COE and Louisiana Department of Natural Resources (LDNR) Office of Coastal Management (OCM). To mitigate unavoidable wetland impacts in Texas, CP2 LNG and CP Express would purchase wetland mitigation bank credits at a ratio specified by the COE. If sufficient credits are not available, CP Express would provide a mitigation plan to the COE. CP2 LNG and CP Express have also developed and submitted a draft Compensatory Mitigation Plan and Beneficial Use of Dredged Material (BUDM) Plan for review to the LDNR OCM and COE. The determination of appropriate wetland mitigation bank credits and/or development of a Compensatory Mitigation Plan and/or BUDM Plan falls under the jurisdiction of the COE. As such, the COE will determine whether or not the applicant's Compensatory Mitigation Plan and/or BUDM plan is appropriate to satisfy, in part, compliance with the Clean Water Act (CWA) of 1972. Through implementation of the measures in CP2 LNG and CP Express' Project-specific Procedures and compliance with the CWA (e.g., proposed mitigation bank credits), we conclude that the impacts on wetlands would be adequately minimized and sufficiently mitigated for, in accordance with the requirements of the federal and state agencies.

Vegetation

Construction of the Terminal Facilities and Pipeline System would temporarily impact a total of 2,308.1 acres of vegetation. Following construction, approximately 1,113.2 acres would be restored to pre-construction conditions. A total of 1,194.9 acres would be impacted by the operational footprint of the Project, of which 701.3 acres would be permanently converted to developed land and 493.4 acres would generally be maintained as herbaceous or scrub-shrub vegetation.

Construction of the Terminal Facilities would temporarily impact a total of 732.2 acres of land, including 647.5 acres of vegetated land that would be permanently converted to industrial use associated with the operation of the Terminal Facilities. Construction of the Pipeline System would temporarily impact a total of 1,575.8 acres, of which 493.4 acres would be utilized as the pipeline rights-of-way and 53.8 acres would be permanently impacted for construction of the aboveground facilities.

CP2 LNG would implement its Project-specific *Upland Erosion Control, Revegetation, and Maintenance Plan* (Plan) and Procedures and Spill Prevention, Control, and Countermeasure Plan during construction to minimize impacts on adjacent vetetation communities. CP2 LNG would be required to implement additional mitigation to comply with the CWA for impacts on wetlands and associated vegetation. In general, CP Express would minimize disturbance impacts on vegetation resources by collocating 45 percent of the Pipeline System with existing disturbance. CP Express would further minimize the duration of impacts on upland vegetation by implementing the measures outlined in its Project-specific Plan, including topsoil segregation and replacement, mitigation of compacted soils, and use of erosion controls. After construction, temporarily disturbed areas along the Pipeline System route would be returned to their preconstruction contours to the extent practicable and the temporary right-of-way would be revegetated according to CP Express' Revegetation Plan. We conclude that collocation of the pipelines with existing maintained rights-of-way and implementation of the measures outlined in CP Express' Project-specific Plan and Procedures and Noxious Weed and Invasive Species Management Plan would adequately minimize impacts on upland vegetation resources and impacts would not be significant.

Wildlife and Aquatic Resources

Wildlife Resources

Wildlife habitat is more generally defined by cover type and is based on desktop analysis and field surveys conducted by CP2 LNG and CP Express. The wildlife habitat types present in the vicinity of the Project include wetlands, agricultural land (i.e., cultivated crops and pasture/hay), barren lands, herbaceous areas, open water, forests, developed lands, and scrub shrub. With the exception of barren lands and developed lands, each of these cover types provide nesting, cover, and foraging habitat for a variety of wildlife species. Construction and operation of the Project would result in various short- and long-term impacts on wildlife. Impacts would vary based on specific habitat requirements of a species and the level and duration of Project impacts on each habitat type. A total of about 2,640.6 acres of wildlife habitat would be impacted by the footprint of the Terminal Facilities and Pipeline System (including the 18.2-acre area of open water within the Calcasieu Ship Channel that would be dredged for the Marine Facilities). Following construction, approximately 1,350.9 acres would be restored to pre-construction conditions. A total of 1,289.7 acres would be within the operational footprint of the Project, of which 743.2 acres would be permanently converted to developed land. A total of 546.5 acres would be maintained as herbaceous or scrub-shrub land within the pipeline rights-of-way.

The Project is crossed by two migratory bird flyways: the Central flyway and the Mississippi flyway. The portion of the Project in Texas (CP Express Pipeline MP 0.0 to MP 20.0) is within the Central flyway. The portion of the Project in Louisiana (CP Express Pipeline MP 20.0 MP to 85.4, the Enable Gulf Run Lateral, and the Terminal Facilities) is within the Mississippi flyway. The Project would additionally cross the Coastal Prairie Important Bird Area between the CP Express Pipeline MP 28.0 to MP 45.5, which includes the Moss Lake Compressor Station. However, the Project would not cross coastal prairie habitat identified by the Louisiana Department of Wildlife and Fisheries (LDWF) Wildlife Diversity Program. CP2 LNG and CP Express would implement measures as necessary to decrease the risk of impacts on and the loss of habitat for migratory birds. In addition, we believe that CP2 LNG and CP Express would appropriately minimize impacts on sensitive bird species along the Pipeline System and Terminal Facilities through use of the Fish and Wildlife Service (FWS)-recommended clearing window. Although we realize that use of the clearing window may not be fully practicable for Project facilities, we believe that the loss of bird nests would be limited with the implementation of applicable measures in the Migratory Bird Nesting Impact Mitigation Plan. We note that CP2 LNG and CP Express has stated that support for the Migratory Bird Nesting Impact Mitigation Plan would be confirmed during ongoing consultations with the FWS and LDWF.

CP2 LNG and CP Express would minimize impacts on wildlife and habitat by implementing its mitigation plans for impacts on wildlife habitat, by following the measures outlined in the Project-specific Plan and Procedures, and by adhering to avoidance and minimization methods recommended by the FWS and LDWF. We conclude that constructing and operating the Project would not significantly affect wildlife populations and wildlife habitat.

Aquatic Resources

The predominant impacts on fish habitat are associated with construction of the Marine Facilities, which would involve excavating and dredging approximately 6.4 million cubic yards of material. Limited maintenance dredging would also be needed during operations and would be subject to any applicable permit regulations. Dredging would be required to create the turning basins and berthing area. Excavating and dredging for the Marine Facilities would be conducted in accordance with federal and state permits, as well as other applicable laws and regulations. Dredging is not expected to impact submerged aquatic vegetation due to the lack of habitat and absence during CP2 LNG's 2021 surveys, as further discussed in section 4.7.3.3.

Most of the dredging and excavation of Monkey Island would convert existing terrestrial habitat into marine habitat. Physical injury or mortality may occur as a result of excavation and dredging, particularly in the case of less mobile marine species. Pilings for the LNG loading docks would be installed in the excavated and dredged area.

The LNG transfer lines and utilities constructed between the Terminal Site and the Marine Facilities would be completed using a combination of conventional and trenchless (HDD) construction techniques. However, CP2 LNG would install the LNG transfer lines, BOG line, and utilities under Calcasieu Pass using the HDD technique, which would avoid disturbing the bed and banks of the waterbody.

Periodic maintenance dredging by CP2 LNG would be required at the Marine Facilities during operation to maintain the depths required for LNG carriers and this activity would be consistent with periodic maintenance dredging by the COE in the Calcasieu Ship Channel and Calcasieu Pass. If CP2 LNG's proposed maintenance dredging occurs concurrently with COE's maintenance dredging of the Calcasieu Ship Channel and Calcasieu Pass, cumulative adverse impacts on essential fish habitat (EFH) and benthic habitat in the Project area may occur (see section 4.14). Temporary increases in turbidity in the water column may affect the health of fish, shrimp, and other marine fauna through gill blockage caused by increased suspended sediment. Impacts on marine species (e.g., zooplankton, shrimp, fish, benthic organisms) as a result of Project maintenance dredging during operation are not expected to exceed impacts caused by current periodic COE maintenance dredging; therefore, the current impact profile would not change.

Noise created by pile driving activities can physically injure animals or change animal behavior in the affected areas. Animals can be physically injured in two ways. First, immediate adverse effects can occur if a single noise event exceeds the threshold for direct physical injury. Second, adverse physical effects can result from prolonged exposure to noise levels that exceed the daily cumulative sound exposure level for the animals. Noise can also interfere with an animal's behavior, such as migrating, feeding, resting, or reproducing, and such disturbances could constitute adverse behavioral effects. Noise propagation would be constrained by the surrounding shoreline and the Calcasieu Ship Channel's stone jetties where it opens into the Gulf of Mexico, meaning that the zone of noise effects would be restricted to the ship channel and a cone-shaped impact area. Much of the sound energy would likely be absorbed by the channel bed, surrounding shorelines, and jetties before reaching the threshold distances that are used to determine the maximum distances of potentially harmful underwater noise impacts to federally-listed sea turtles, fish species, and marine mammals. In order to mitigate the potential impacts on marine fauna caused by pile installation, CP2 LNG would implement the use of ramp-up procedures (i.e., a soft start) at the beginning of each pile installation or when a delay of 15 minutes or more has occurred to minimize its impact on marine species. CP2 LNG would also utilize double bubble curtains around the 144-inch and 120-inch diameter piles to reduce underwater sound pressure levels produced by pile driving. CP2 LNG may also utilize additional mitigation measures, such as modification of pile impact frequency, and placement of cushion blocks consisting of wood, nylon, or micarta between the pile and hammer. CP2 LNG would also utilize biological monitors to monitor for the West Indian manatee, giant manta ray, and marine turtle species during marine construction. A 150-foot buffer would be established around all dredging or marine pile driving locations, where dedicated observers would maintain watch for sea turtles and other protected species. If a sea turtle or other protected species is spotted within the buffer zone, in-water work would not start or, if underway, would be halted until the animal moves outside of the buffer zone or has not been observed in the area for 30 minutes.

Based on consultation with NMFS, the proposed Project is not likely to adversely affect marine species occurring in the Project vicinity during the in-water construction period. We anticipate that the implementation of soft starts and double bubble curtains would minimize harassment of marine species during pile driving activities and any impacts would be temporary; therefore, with the implementation of noise mitigation measures that were developed in consultation with NMFS (per our recommendation in the draft EIS and discussed further in section 4.7.2.2), we conclude that the overall impacts on marine species would not be significant. CP2 LNG would continue to coordinate with NMFS on potential impacts and mitigation for marine mammal species and would adhere to any requirements or requests for additional monitoring after consultation is complete.

The highest potential for Project impacts on aquatic resources would stem from activities associated with construction of the Terminal Facilities. Dredging and pile driving during construction of the Terminal Facilities could cause increased sedimentation, turbidity, and noise levels in the Calcasieu Ship Channel. However, with our recommendation for CP2 LNG to adhere to NMFS-recommended measures to mitigate noise impacts on aquatic species in the vicinity of pile driving activities, we conclude that impacts on aquatic resources from construction of the Terminal Facilities would not be significant. Aquatic species would be expected to populate the area shortly after construction. Species that prefer only shallow-water habitat would be displaced, but given the abundance of similar shallow water habitat immediately upriver of the Project, we do not expect this to cause population-wide impacts on these species. Otherwise, Project construction impacts on aquatic resources would be temporary to short-term in duration.

Construction of the Terminal Site would affect 7.6 acres of estuarine EFH associated with estuarine wetlands along the southern boundary of the Terminal Site. Of these 7.6 acres, 5.3 acres would be permanently impacted and 2.3 acres would be temporarily impacted. Construction of the Marine Facilities would permanently impact 14.2 acres of estuarine EFH and 0.5 acre of waterbody EFH, associated with habitat loss and conversion due to dredging, excavation, fill, and pile installation. Approximately 6.4 million cubic yards of soil and sediment would be excavated and dredged from Monkey Island for the LNG carrier turning basins and berth. As a result, within the 97.5-acre dredge prism, approximately 19.1 acres of existing estuarine unconsolidated bottom (EUB) EFH at the Marine Facilities would be deepened from a water depth of about −1 foot (based on Light Detection and Ranging data) and maintained at a water depth of −44.3 feet North American Vertical Datum of 1988 (or 42 feet below Mean Low Gulf datum) to accommodate LNG vessels, with the remaining 78.4 acres converted to open water from estuarine emergent wetland, waterbodies, non-EFH wetlands, and upland habitat. Of the 78.4 acres, approximately 59.1 acres (including 12.5 acres of estuarine EFH and 0.2 acre of waterbody EFH) would be permanently converted to EUB EFH and 19.0 acres of submerged riprap would be installed to form the new sloping shoreline. Approximately 1.5 acres of estuarine EFH would be replaced by submerged riprap. Land-based facilities would occupy approximately 24.7 acres adjacent to the 97.5-acre dredge prism. Construction of the land-based facilities would permanently impact 1.6 acre of estuarine EFH and 0.3 acre of waterbody EFH.

Periodic maintenance dredging by CP2 LNG would be required at the Marine Facilities during operation to maintain the depths required for LNG carriers and this activity would be consistent with periodic maintenance dredging by COE in the Calcasieu Ship Channel and Calcasieu Pass. If CP2 LNG's the proposed maintenance dredging occurs concurrently with COE's maintenance dredging of the Calcasieu Ship Channel and Calcasieu Pass, cumulative adverse impacts on EFH and benthic habitat in the Project area may occur (see section 4.14). Temporary increases in turbidity in the water column may affect the health of fish, shrimp, and other marine fauna through gill blockage caused by increased suspended sediment. Impacts on marine species (e.g., zooplankton, shrimp, fish, benthic organisms) as a result of Project maintenance dredging during operation are not expected to exceed impacts caused by current periodic COE maintenance dredging; therefore, the current impact profile would not change. We conclude that dredging operation of the Terminal Facilities would have short-term and not significant impacts on fisheries resources.

During Terminal Facilities operations, the noise associated with visiting LNG carriers and tug boats would be consistent with existing conditions given the numerous large ships that travel though the adjacent heavily used section of the Calcasieu Ship Channel. The mobility of marine species and their ability to leave any area of noise disturbance would minimize impacts from vessel traffic and the construction of the Marine Facilities. Due to the temporary and intermittent nature of these noise sources, we conclude that construction operational noise impacts from vessel traffic on fisheries would not be significant.

CP2 LNG is continuing to consult with agencies to finalize their Beneficial Use of Dredged Material Plan; the final dredged material disposal plan would be included in the COE and LDNR/OCM permit applications for dredge and fill activities in waters of the United States and development in the coastal zone, respectively. The final dredged material disposal plan would also be provided to FERC. As with dredging, dredge spoil disposal could result in direct mortality of benthic organisms, including managed species and invertebrates. Additionally, turbidity plumes caused by dredging may result in adverse impacts on pelagic eggs and larval life stages. These losses would be temporary and the benthic community would rebound within a few seasons as these species are highly prolific and mobile.

The Pipeline System would temporarily affect about 402.2 acres of estuarine and palustrine EFH and 19.6 acres of waterbody EFH (421.8 acres total). Impacts on estuarine EFH have been minimized through use of the HDD crossing method to install the pipeline under Calcasieu Lake, the Intracoastal Waterway, and about 2 miles of estuarine EFH. An inadvertent return of drilling mud could occur during the HDD process, during which drilling mud could reach the overlying EFH and affect benthic habitat and organisms, as discussed previously for the Terminal Facilities with respect to dredging. To minimize the risk of an inadvertent release of drilling mud and to undertake effective cleanup should one occur, CP Express would implement the Project's HDD Monitoring and Contingency Plan during construction.

The majority of EFH impacts resulting from the Pipeline System would be short-term and would occur during pipeline construction. However, development of Mainline Valve 5 and its associated access road would result in the permanent loss of 0.3 acre of estuarine EFH. Should the pipeline need to be accessed for maintenance or repair, temporary impacts on EFH could occur through sediment disturbance and increased turbidity during pipe excavation. However, impacts would be minor because they would be short-term and restricted to the maintenance or repair site.

In conclusion, construction of the Project would result in permanent, minor impacts on EFH and the species and life stages that use EFH through the alteration of habitat and the mortality or displacement of individuals. Impacts would be adequately minimized by implementation of mitigation measures proposed by CP2 LNG and CP Express, and our recommendations in section 4.7.2.2 for aquatic resources. As part of the consultation under the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), NMFS may provide recommendations to FERC regarding further measures that can be taken to conserve EFH. We would respond to any such recommendations per the requirements of the MSFCMA.

Threatened, Endangered, and Other Special Status Species

A total of 18 federally listed threatened or endangered species, one candidate species, one species proposed for listing, and one species under review are potentially present in the Project vicinity. Of these species, nine are under the jurisdiction of the FWS, six are under the jurisdiction of NMFS, and six live in habitats that fall within an area where both services manage the species.

We conclude the Project would have *no effect* or would be *not likely to adversely affect* 12 federally listed species, would not contribute to a trend toward federal listing for the 1 species proposed as threatened, would not contribute to a trend toward federal listing for the 1 species under federal review and 1 candidate species, and is *likely to adversely affect* the threatened eastern black rail. Regarding federally listed sea turtles, NMFS shares *Endangered Species Act* authority with the FWS. The Project would have *no effect* on the 5 federally listed species of sea turtles with potential to occur in the Project area when under FWS jurisdiction and is *not to likely adversely affect* the 5 federally listed species of sea turtles when under NMFS jurisdiction. To assist with finalizing formal section 7 of the Endangered Species Act consultation, we requested that the FWS and NMFS consider the draft EIS as our official Biological Assessment for the Project. Section 7 consultation with NMFS and FWS is ongoing and we are recommending that CP2 LNG and CP Express should not begin construction until FERC staff completes consultation.

Land Use, Recreation, and Visual Resources

The Project site is within the Louisiana Coastal Zone. All activities or developments that may affect Louisiana's coastal zone require a federal consistency review under the National Coastal Zone Management Program and must obtain a Coastal Use Permit from the LDNR. To ensure compliance with this federal requirement, we recommend that CP2 LNG and CP Express file the consistency determination with FERC prior to any Project construction.

Construction of the Project would affect a total of 2,640.6 acres of land over a 4-year construction period. Of this, 1,1289.7 acres would be permanently affected by operation of the Project or within the permanent right-of-way, and 1,350.9 acres would be allowed to revert to the existing land use type after the completion of construction activities.[8] CP2 LNG and CP Express would conduct reseeding of temporarily disturbed areas and routine monitoring in accordance with the Project-specific Plan and Procedures and Revegetation Plan.

Several recreational and special interest sites are near the proposed Project site and may experience indirect impacts such as change in viewshed and/or increases in traffic in the area. The Sabine Island Wildlife Management Area (WMA) would be crossed by approximately 0.6 mile of the CP Express Pipeline using the HDD method with the entrance and exit locations approximately 2,170 feet east and 760 feet west of the WMA, respectively. Therefore, no noise, traffic, or disturbance-related wildlife impacts that would interfere with hunting, boating, or other recreational activities would occur from construction of the Project.

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8 Areas within the permanent right-of-way of the CP Express Pipeline and the Enable Gulf Run Lateral would be allowed to revert to existing land uses (e.g., hay/pasture, cultivated crops and herbaceous land).

The Cameron Prairie National Wildlife Reserve (NWR) East Cove Unit is expected to experience some temporary impacts during construction due to its proximity to the Project. Construction could generate dust, noise, and traffic, which could be a nuisance to recreational users, and could generally interfere with or diminish the quality of the recreational experience by affecting wildlife movements or disturbing hunters and boaters. The Creole Nature Trail (State Highway 27) would be crossed twice by the CP Express Pipeline at MP 48.0 and MP 84.5. The designated roadway would be crossed using the conventional bore method at MP 48.0 and the HDD method at MP 84.5; therefore, there would be no direct impacts on road pavement or traffic. Disturbance adjacent to the byway would be short-term (until revegetation is established) and the landscape would be returned to preconstruction conditions. To minimize disturbances to these natural areas, CP Express would implement the Project-specific Plan and Procedures and Traffic, Noxious Weed, and Fugitive Dust Control Plan. A portion of the Creole Nature Trail also runs adjacent to the Terminal Facilities. Based on the surrounding terrain, we estimate that at least some portion of the Terminal Facilities would be visible to motorists along the byway between the Lake Charles Pilots Boat Dock and approximately 5 miles east of Cameron.

The proposed Terminal Facilities would be visible to varying degrees to users of the Calcasieu Ship Channel; visitors to the Jetty Pier Facility (currently closed to the public until further notice), the new Lighthouse Bend Park, which would include a marina, market, RV parking, a family restaurant, an event pavilion, and open-air flex space for the community, and nearby beaches; employees and operators of industrial facilities along Davis Road; motorists along the Creole Nature Trail; and other areas surrounding the Project site. Although the addition of the facility would be consistent with the general character of the area, the addition of the Terminal Facilities at this location would represent a significant impact on the viewshed of boaters, beachgoers, tourists, and local residents, as it would detract from the overall quality of the scenic views of this portion of the region.

The CP Express Pipeline would cross the Creole Nature Trail by the HDD or bore constrution method, as discussed above. In addition, the Cameron Prairie NWR East Cove Unit and the Sabine Island WMA are within 0.25 mile of the Pipeline System, but impacts would be temporary given the CP Express Pipeline would be buried near these resources. In general, construction of the Pipeline System would result in impacts on recreational and special interest areas that would be temporary and limited to the period of active construction, which typically would last only several days to several weeks in any one area. We received a comment from a nearby landowner concerned with the impacts of ambient lighting of the Moss Lake Compressor Station. Based on our recommendation in the draft EIS, CP Express would install vegetative screening along the northern and northwestern sides of the facility, which could reduce the impacts of ambient lighting from the facility (see section 4.9.5.2). Additionally, in compliance with its location within a floodplain, CP Express would construct a 12-foot-high floodwall surrounding the facility. For areas in proximity to the Pipeline System, CP Express would implement the requirements and mitigation included in its Project-specific Plan and Procedures. As described throughout this EIS, implementation of these requirements would generally minimize, and mostly mitigate, potential impacts on resources and activities in recreation and special use areas.

Socioeconomics

Construction of the Project would result in minor positive economic impacts due to increases in construction jobs, payroll taxes, purchases made by the workforce, and expenses associated with the acquisition of material goods and equipment. Construction of the Project would not have a significant adverse impact on local populations, employment, provision of community services, housing, or property values. Construction of the Pipeline System would result in minor, temporary impacts on traffic in the Project area. Construction of the Terminal Facilities would have short-term and less than significant impacts on roadway transportation, based on the proposed mitigation measures included in CP2 LNG's

Traffic Study provided in response to our recommendation in the draft EIS and CP2 LNG's Traffic Management Plan (see section 4.10.8.1).

Operation of the Project would have a minor positive effect on the local governments' tax revenues due to the increase in property taxes that would be collected. Operation of the Terminal Facilities would have permanent but minor impacts on roadway transportation and operation of the Pipeline System would not result in significant impacts on traffic or roadways.

During the draft EIS comment period, we received several comments from individuals expressing concern regarding the impact of the Project on commercial fisheries and shrimping. Based on consultations between FERC and LDWF, impacts on shrimping vessels would be greatest near the Terminal south of the Firing Line where shrimping occurs year-round and vessel traffic and dredging associated with the Terminal Facilities would occur. CP2 LNG committed to continuing the development of an Engagement Plan for Local Commercial Shrimp Fishery[9] to minimize impacts on shrimping vessels and would provide updates on its engagement effort and on Community Advisory Group meetings within the monthly construction reports.

Environmental Justice

The proposed Project would have a range of impacts on the environment and on individuals living in the vicinity of the Project facilities, including environmental justice populations. Seventeen block groups out of 31 block groups within the geographic scope of the Project are environmental justice communities. Of the 17 block groups, five block groups[10] within the Project's area of review are identified as environmental justice communities based on the minority population that either exceeds 50 percent or is meaningfully greater than their respective counties/parishes. Eight block groups[11] within the Project's area of review are identified as environmental justice communities based on a low-income population that is equal to or greater than their respective counties/parishes. Four block groups[12] within the Project's area of review have both minority and low-income populations that are equal to or greater than their respective counties/parishes. For the Terminal Facilities, six block groups (two based on the minority threshold alone [CT 9701.02, BG 1 and CT 9701.01, BG 1] three based on the low-income threshold alone [CT 9702.02, BG 2; CT 9701.01, BG 2; CT 9702.03, BG 2] and one based on both the minority and low-income thresholds [CT 9702.03, BG 1]) out of eight are considered environmental justice block groups. For the CP Express Pipeline and Enable Gulf Run Lateral, six block groups (one based on the minority threshold alone [CT 9701.02, BG 1] and five based on the low-income threshold alone [CT 9701.01, BG 2; CT 9702.02, BG 2; CT 34, BG 1; CT 9504, BG 1; CT 36.02, BG 1]) out of 15 are considered environmental justice block groups. For the contractor yards, six of the block groups (three based on the low-income threshold alone [CT 34, BG 1; CT 35, BG 2; and CT 35, BG 4], two based on the minority threshold alone [CT 16, BG 3 and CT 17, BG 4], and one based on both the minority and low-income thresholds [CT 16, BG 1]) are considered environmental justice block groups. The Moss Lake Compressor Station is within one mile of only one block group (CT 32, BG 2), which is not considered an environmental justice community. For the meter stations, three block groups (one based on the minority threshold alone [CT 35, BG 1] and two based on the low-income threshold alone [CT 9702.02, BG 2 and CT 36.02, BG 1) out of eight are considered environmental justice block groups. For the three park and ride locations, all four of the block groups (one based on the low-income threshold alone [CT 9702.02, BG 2] one based on the

9 See attachment EIR 10 Socioeconomics-2 at accession number 20230522-5195.

10 Census Tract (CT) 35, Block Group (BG) 1; CT 9701.01, BG 1; CT 9701.02, BG 1; CT 16, BG 3; and CT 17, BG 4

11 CT 34, BG 1; CT 36.02, BG 1; CT 9504, BG 1; CT 9701.01, BG 2; CT 9702.02, BG 2; CT 9702.03, BG 2; CT 35, BG 2; and CT 35, BG 4

12 CT 9702.03, BG 1; CT 17, BG 5; CT 17, BG 6; and CT 16, BG 1

minority threshold alone [CT 9701.01, BG 1] and two based on both the minority and low-income thresholds [CT 17, BG 5 and CT 17, BG 6]) are considered environmental justice block groups.

Temporary and permanent adverse impacts on environmental justice communities from construction and operation of the Terminal Facilities include impacts associated with water resources, wetlands, socioeconomic, recreational and commercial fishing, traffic, air quality, noise, and visual resources. The construction and operation of the Terminal Facilities would have a disproportionately high and adverse impact on environmental justice communities because the impacts are predominately borne by those communities. Visual impacts on environmental justice communities near the Terminal would be significant, but would be minimized by vegetative screening (see section 4.9.5.1). In addition, as discussed in section 4.14.2.8, the Project would contribute to significant cumulative visual impacts on environmental justice communities. The remainder of the temporary and permanent adverse impacts on environmental justice communities associated with the construction and operation of the Terminal Facilities would be less than significant.

Temporary adverse impacts on environmental justice communities from construction of the Pipeline System include impacts associated with water resources, wetlands, socioeconomic, recreational and commercial fishing, traffic, air quality, and construction noise. Operation of the Pipeline System would include an increase in noise levels at the Florida Gas Transmission Meter Station, Enable Interconnect Meter Station, CPX Meter Station; however, there are no NSAs within identified environmental justice block groups within 0.5 mile of the meter stations. Permanent adverse impacts on visual resources in environmental justice communities would occur as a result of operation of the Pipeline System, including removal of forested vegetation and periodic vegetation clearing within the permanent right-of-way. Permanent adverse impacts on visual resources would occur as a result of the CPX Meter Station, Enable Interconnect Meter Station, and Florida Gas Transmission Interconnect Meter Station; however, these changes would not be visible from nearby residences. The construction and operation of the Pipeline System (including meter stations, contractor yards, and park & ride locations) would cross environmental justice communities and would have a disproportionately high and adverse impact on these communities, but the impacts would be less than significant.

Air Quality and Noise

Construction of the Project facilities would result in short-term increases in emissions of some air pollutants due to the use of equipment powered by diesel fuel or gasoline and the generation of fugitive dust due to the disturbance of soil and other dust-generating activities. In general, construction activities would increase air pollutant emissions and ambient concentrations in the vicinity of the Project site at various points during the approximate 48-month construction period. The magnitude of the effect on air quality would vary with time due to the construction schedule (i.e., intensity of construction activities), mobility of the sources, the variety/type of construction equipment, and the overlap of emissions from Phase 1 commissioning and operation and Phase 2 construction activities. There may be localized minor to moderate elevated levels of fugitive dust and tailpipe emissions in the vicinity of construction areas during periods of peak construction activity. Considering these factors, we determine that construction of the Project would impact local air quality on an intermittent basis. However, construction emissions would not have any long-term, significant impacts on air quality. Additionally, CP2 LNG committed to develop and implement a Project Ambient Air Quality Mitigation and Monitoring Plan to measure, monitor, and potentially mitigate, as necessary, ambient concentrations of inhalable particulate matter and nitrogen dioxide during construction and commissioning.

Impacts on air quality during operation of the Project would result from emissions related to the CP2 LNG Terminal Facilities and CP Express Moss Lake Compressor Station and pipeline, (e.g., combustion turbines, heaters, flares, oxidizers, fugitive sources) and marine vessels (e.g., LNG carriers and tugs). Operational-phase emissions from these sources would be permanent (lasting the life of the Project). CP2 LNG and CP Express conducted air quality dispersion modeling analyses for the LNG Terminal (including mobile sources such as LNG carriers and tugs) and the Moss Lake Compressor Station. The dispersion modeling results indicate that the ambient pollutant concentrations that would result from the emissions at the LNG Terminal and the Moss Lake Compressor Station would not lead to violations of any ambient air quality standard or exceedance of any other air quality impact criterion. Based on this analysis, we find that the Project, including the LNG Terminal and the CP Express aboveground facilities, would not cause or contribute to an exceedance of the National Ambient Air Quality Standards, which are established to be protective of human health, including sensitive populations such as children, the elderly, and those with compromised respiratory function, i.e., asthmatics. While the Project would have minor impacts on local air quality during operation, the Project would not result in significant impacts on air quality.

Noise would affect the local environment and nearby noise sensitive areas (NSA) during both construction and operation of the Project facilities. At the Terminal Site, construction noise sources include pile driving, dredging, and heavy construction machinery. With the exception of pile driving (which CP2 LNG would not conduct between the hours of 7:00 pm and 7:00 am), CP2 LNG proposes to conduct general construction activities at the LNG Facilities 24 hours per day for the duration of construction of both Phase 1 and Phase 2, which is estimated to last up to 4 years in total. To ensure noise levels are appropriately mitigated, we include several recommendations in section 4.12.2.3 for CP2 LNG to file a nighttime noise mitigation and a pile driving mitigation plan, and to monitor noise levels during nighttime construction to ensure noise impacts are less than 55 A-weighted decibels (dBA) day-night sound level (L_{dn}) at nearby NSAs (48.6 dBA equivalent sound level). Noise generated during Terminal Facilities construction also has the potential to affect terrestrial and aquatic wildlife species. Specifically, pile driving and dredging during construction would result in increased underwater noise levels within the Calcasieu Shipping Channel and nearshore environment. However, based on the short-term nature of construction, CP2 LNG's commitment to limit pile driving to daytime hours, and our recommendations in section 4.12.2.3 limiting construction noise, we conclude that noise impacts during Terminal construction would not be significant.

For CP Express, construction noise sources include heavy construction machinery and drilling equipment. Noise associated with construction of pipelines would be temporary at any given location because of the assembly-line method of pipeline installation, during which construction activities are concentrated in one area while the pipeline is installed and continue in a linear fashion along the pipeline route. CP Express would conduct construction primarily during daytime hours, with the exception of HDD pullback operations, hydrostatic testing, limited pipeline tie-in work, and testing and commissioning of aboveground facilities. CP Express would implement noise mitigation measures as outlined in their HDD noise mitigation plan to minimize noise during HDD. Based on the temporary nature of construction, and CP Express' commitments to noise mitigation, we conclude that pipeline, compressor station, and meter station construction would not result in significant impacts on nearby residents or NSAs.

Operation of the Terminal Facilities would produce noise on a continuous basis. Calculated sound levels attributable to the CP2 LNG facility are below FERC's requirement to be less than 55 dBA L_{dn} at the existing NSAs with all the liquefaction trains in full load operation. We recommend in section 4.12.2 that CP2 LNG complete several noise surveys to ensure that the total noise levels of the phased-in liquefaction blocks are below 55 dBA L_{dn} at the nearest NSAs. Therefore, based on our analysis and our recommendations, we conclude that noise impacts due to LNG Terminal operation would not be significant.

Operation of the Moss Lake Compressor Station and CP Express' meter stations would produce noise on a continuous basis. The noise attributable to the operation of the two meter stations with NSAs within 0.5 mile would be less than 55 dBA L_{dn} at the nearest NSA and, therefore, in compliance with FERC requirements; therefore, impacts from the meter stations on nearby NSAs or residents would not be significant. CP Express is required to limit noise from the Moss Lake Compressor Station to contribute less than 55 L_{dn} dBA at all nearby NSAs during full load; therefore, we conclude the Project would not result in significant impacts on nearby residents or NSAs.

Reliability and Safety

As part of the NEPA review and NGA determinations, Commission staff assesses the potential impact to the human environment in terms of safety and whether the proposed facilities would operate safely, reliably, and securely.

As a cooperating agency, the DOT assists the FERC by determining whether CP2 LNG Project's proposed design would meet the DOT's 49 Code of Federal Regulations (CFR) 193 Subpart B siting requirements. The PHMSA provided a Letter of Determination on the Project's compliance with 49 CFR 193 Subpart B on June 28, 2023. This determination is provided to the Commission as further consideration on its decision to authorize or deny the Project. If the Project is authorized, constructed, and operated, the facility would be subject to the DOT's inspection and enforcement program and final determination of whether a facility is in compliance with the requirements of 49 CFR 193 would be made by the DOT PHMSA.

As a cooperating agency, the Coast Guard also assisted the FERC staff by reviewing the proposed LNG terminal and the associated LNG marine vessel traffic. The Coast Guard reviewed a Waterway Suitability Assessment (WSA) submitted by CP2 LNG that focused on the navigation safety and maritime security aspects of LNG marine vessel transits along the affected waterway. On December 17, 2021, the Coast Guard issued a Letter of Recommendation that recommended the Calcasieu River Ship Channel be considered suitable for accommodating the type and frequency of LNG marine traffic associated with this Project based on the WSA and in accordance with the guidance in the Coast Guard's Navigation and Inspection Circular 01-11. If the Project is authorized, constructed, and operated, the facilities would be subject to the Coast Guard's inspection and enforcement program to ensure compliance with the requirements of 33 CFR 105 and 33 CFR 127.

FERC staff conducted a preliminary engineering and technical review of the CP2 LNG Project design, including potential external impacts based on the site location. Based on this review, we recommend a number of mitigation measures, which would ensure continuous oversight prior to initial site preparation, prior to construction of final design, prior to commissioning, prior to introduction of hazardous fluids, prior to commencement of service, and throughout life of the facility to enhance the reliability and safety of the facility to mitigate the risk of impact on the public. With the incorporation of these mitigation measures and oversight, FERC staff concluded that the CP2 LNG Project design would include acceptable layers of protection or safeguards that would reduce the risk of a potentially hazardous scenario from developing into an event that could impact the offsite public.

The Pipeline System and associated aboveground facilities would be constructed, operated, and maintained in compliance with DOT standards published in 49 CFR 192. These regulations are intended to minimize the potential for natural gas facility accidents and protect the public and environment. The DOT specifies material selection and qualifications; minimum design requirements; and protection from internal, external, and atmospheric corrosion. Because the Pipeline would be constructed according to the DOT regulations, we conclude that the Pipeline System would not have a significant impact on public safety.

Cumulative Impacts

Our analysis of cumulative impacts includes other projects in the vicinity of the proposed Project that could affect the same resources as the Project in the same approximate timeframe. We generally conclude that the potential impacts of the Project, when combined with the impacts from the other projects considered in the geographic scopes, would not result in a significant impact on resources. CP2 LNG and CP Express proposed mitigation measures would minimize or offset Project impacts on local resources. Additionally, concurrent construction and operation of the Project and the other projects in the area would have a beneficial cumulative effect on revenues for the state and the local parishes resulting from increased expenditures from the workforce and their families and increased property taxes.

The exceptions to this conclusion are the Project's impacts on visual resources. Construction of the Terminal Facilities would create temporary visual impacts associated with construction activities occurring during the period of active construction. During operation, the Terminal Site would be partially screened by the floodwall which, per our recommendation in section 4.9.5, would have vegetative screening alongside it, that would help to limit the visual impact on those traveling on nearby roads; however, the addition of the Terminal Facilities at this location would represent a significant impact on the viewshed of boaters, beachgoers, tourists, and local residents, as it would detract from the overall quality of the scenic views of this portion of the region. The Commonwealth LNG Facility, Calcasieu Pass LNG Terminal, and the proposed Terminal Facilities would result in several industrial sites in a concentrated area and would contribute to cumulative visual impacts on users of the Calcasieu Ship Channel; users of the Jetty Pier Facility, Lighthouse Bend Park, and nearby beaches; residents in the town of Cameron; and motorists along the Creole Nature Trail. The Jetty Pier Facility, a recreational facility, is situated at the confluence of the Calcasieu Ship Channel and the Gulf of Mexico and was closed to the public in 2019 (it was supposed to reopen in 2022, but is still currently closed). Lighthouse Bend Park is scheduled to open in the summer of 2023. Lighthouse Bend Park is adjacent to the north of the Terminal Site on Calcasieu Pass. For users visiting these facilities, the Terminal Facilities, in addition to the Calcasieu Pass LNG Terminal and potentially the Commonwealth LNG Facility, would be visible and add to permanent visual impacts. During Project operation, the Terminal Facilities, including flares, lighting, and storage tanks, may be visible for several miles. The extent of these impacts would vary depending on the proximity to the sites. Motorists along the approximate 2-mile stretch of road between the Commonwealth LNG Facility and the Cameron Ferry West Landing and those traveling along the 2.5-mile stretch between the Cameron Ferry East Landing through the town of Cameron would have direct views of all three facilities and associated structures. Due to the addition of these three facilities, cumulative visual impacts in this area would be significant.

Construction and operation of the Pipeline System would add incrementally to the cumulative visual impacts through the clearing of vegetation and installation of aboveground facilities. Residences and businesses adjacent to new aboveground facilities would likely experience moderate visual impacts. We included a recommendation in the draft EIS that CP Express provide visual screening at the Moss Lake Compressor Station and Kinder Morgan Meter Station to minimize visual impacts. CP Express' proposed vegetative screening, in addition to the construction of a 12-foot-high floodwall, should provide a visual buffer of these facilities. Minor to moderate visual impacts would also occur where residences and businesses are adjacent to a new pipeline corridor or where new aboveground facilities or developments are constructed. However, we conclude that the proposed vegetative screening and the overall contribution of CP Express would be relatively minor given that the majority of the Pipeline System facilities, as well as the other FERC-regulated pipeline projects in the cumulative impacts area, would be buried (i.e., the pipeline), the impact would not be significant.

Based on the scope of the Project and our analysis of the Project's impacts on the environment as described throughout this EIS, we have determined Project-related impacts on wetlands, surface water, visual resources, socioeconomics, recreational and commercial fishing, traffic, noise, and air quality may adversely affect the identified environmental justice communities. Therefore, cumulative impacts on environmental justice communities could occur for these resources.

Finally, the Project would increase the atmospheric concentration of greenhouse gases (GHG) in combination with past, current, and future emissions from all other sources and would contribute incrementally to future climate change impacts. This EIS is not characterizing the Project's GHG emissions as significant or insignificant.

Alternatives

We evaluated several alternatives to the proposed Project, including the No-Action Alternative; system alternatives; and Terminal Site, pipeline route, and compressor station site alternatives. The No-Action Alternative would eliminate the short- and long-term environmental impacts identified in the EIS. We have prepared this EIS to inform the Commission and stakeholders about the expected impacts that would occur if the Project were constructed and operated. The Commission will determine the Project need and could choose the no-action alternative.

We reviewed LNG and pipeline system alternatives to evaluate the ability of other facilities to meet the stated objectives of the CP2 LNG and CP Express Project and to determine if a system alternative exists that would have less significant adverse environmental impacts than those associated with the proposed Project. The LNG system alternatives identified include both existing LNG terminals with planned, proposed, or authorized expansions, as well as new LNG terminals planned, proposed, or authorized on greenfield sites. These systems alternatives offer no significant environmental advantage over the proposed Project and are therefore not recommended. Pipeline system alternatives would use existing, modified, or proposed pipeline systems to meet the purpose and need of the Project. Although modifications or additions to existing or proposed pipeline systems may be required, implementation of a system alternative would deem it unnecessary to construct all or part of the Project. We identified two pipeline system alternatives that meet these criteria: the TransCameron Pipeline and Creole Trail Pipeline. However, these pipeline system alternatives did not provide a significant environmental advantage relative to the proposed pipeline system and are therefore not recommended.

We evaluated six Terminal Site alternatives. We note that the proposed Terminal Site would result in a longer pipeline by about 30 miles than three alternative sites considered and therefore would result in additional acres of impact as compared to the other Terminal sites with shorter pipeline routes required. However, upon review of the environmental and technical factors, we conclude that the alternative site options do not provide a significant environmental advantage over the proposed site. In addition, we did not identify any significant environmental issues with the proposed Terminal Site.

We evaluated six major pipeline route alternatives (the proposed pipeline route and five alternatives) that would utilize substantially different pathways from the receipt and delivery points. Based on our review and despite the shorter routes, we find that the alternatives considered would not provide a significant environmental advantage over the proposed pipeline route. Compliance with the FERC Procedures, which were developed in consultation with state and federal agencies (e.g., COE), would ensure that impacts on wetlands (especially herbaceous wetlands) within the construction right-of-way are largely short-term until wetland vegetation is re-established. In addition, there are provisions in the Procedures to ensure restoration is completed.

We evaluated four alternative compressor station sites. Upon review of the environmental and technical factors, we conclude that the alternative site options do not provide a significant environmental advantage over the proposed site. In addition, we did not identify any significant environmental issues.

MAJOR CONCLUSIONS

As described in this executive summary and throughout the environmental analysis section of this final EIS, we conclude that construction and operation of the Project would result in adverse environmental impacts; however, for most resources, impacts on the environment would be less than significant. Our conclusions are based on implementation of CP2 LNG and CP Express' proposed impact avoidance, minimization, and mitigation measures and the additional measures recommended by FERC staff. The exceptions to these findings are related to visual resources. Through our analyses, we determined construction and operation of the Project would have significant adverse effects on the visual resources of the surrounding areas, including cumulative visual impacts, and visual impacts on environmental justice communities in the region.

Additionally, construction and operation of the Project would increase the atmospheric concentration of GHGs, in combination with past, current, and future emissions from all other sources and would contribute incrementally to future climate change impacts. This EIS is not characterizing the Project's GHG emissions as significant or insignificant. We based our conclusions upon information provided by CP2 LNG and CP Express and through data requests; field investigations; literature research; alternatives analysis; public comments and scoping sessions; and coordination with federal, state, and local agencies and Indian Tribes.

In addition, we developed recommendations that CP2 LNG and/or CP Express should implement to further reduce the environmental impacts that would otherwise result from construction and operation of the Project. We determined that these measures are necessary to reduce adverse impacts associated with the Project and, in part, are basing our conclusions on implementation of these measures. We will recommend that these mitigation measures be attached as conditions to any authorization issued by the Commission. These recommended mitigation measures presented throughout section 4 of the final EIS in bulleted, bold text and are summarized in section 5.2.

1.0 INTRODUCTION

Vertical lines in the margins of this document identify text that is new or modified in the final EIS and differs materially from corresponding text in the draft EIS. Changes were made to address comments from cooperating agencies and other stakeholders on the draft EIS, update information included in the draft EIS, and incorporate information filed by CP2 LNG and CP Express in response to our recommendations in the draft EIS.

On December 2, 2021, Venture Global CP2 LNG, LLC and Venture Global CP Express, LLC (CP2 LNG and CP Express, respectively) filed applications with the Federal Energy Regulatory Commission (Commission or FERC) pursuant to Section 3(a) and Section 7(c) of the Natural Gas Act (NGA). CP2 LNG and CP Express are seeking authorization to construct, install, own, operate, and maintain certain liquefied natural gas (LNG) facilities in Cameron Parish, Louisiana and certain pipeline facilities in Louisiana and east Texas. CP2 LNG and CP Express' applications were assigned Docket Nos. CP22-21-000 and CP22-22-000, and they are collectively referred to as the "Project" in this Environmental Impact Statement (EIS). The Commission issued a Notice of Application for the Project on December 16, 2021, and the notice appeared in the Federal Register (FR) on December 23, 2021. Prior to filing their applications, CP2 LNG and CP Express participated in the Commission's pre-filing process under Docket No. PF21-1-000.

As part of the Commission's consideration of these applications, we[13] prepared this EIS to assess the potential environmental impacts resulting from construction and operation of the proposed Project in accordance with the requirements of the National Environmental Policy Act of 1969, as amended (NEPA).

Herein, we refer to all of the facilities that comprise the LNG facilities associated with the Project as the "Terminal Facilities." The Terminal Facilities includes the Terminal Site (i.e., the permanent mainland-based portion of the Project that would include: pretreatment facilities, a liquefaction plant and support facilities, LNG storage tanks, power generation facilities, and ancillary facilities) and the Marine Facilities (i.e., LNG carrier loading docks and accompanying turning basins). The pipeline and all of its associated facilities (i.e., the compressor station, meter stations, and contractor yards) are herein referred to as the "Pipeline System." CP2 LNG's proposed development includes a two-phased construction (Phase 1 and Phase 2) for the 20 million tonnes per annum (MTPA) of nameplate[14] liquefaction capacity for export from the Terminal Facilities. The Terminal Facilities would be constructed on approximately 823.8 acres of the mainland and shoreline of Monkey Island. CP Express would construct approximately 85.4 miles of new, 48-inch-diameter natural gas pipeline (the CP Express Pipeline); 6.0 miles of new, 24-inch-diameter lateral pipeline (the Enable Gulf Run Lateral); and associated aboveground facilities in Texas and Louisiana, which would also be constructed in two phases. The Pipeline System would connect the Terminal Facilities to the existing natural gas pipeline grid in east Texas and southwest Louisiana.

CP2 LNG plans to initiate construction of Phase 1 in the fourth quarter of 2023, upon receipt of all required authorizations, and Phase 2 would be constructed 12 months after the start of Phase 1 construction. The Project facilities that would be constructed in Phase 1 and Phase 2 are described in section 2.0.

[13] "We," "us," and "our" refer to the environmental and engineering staff of the FERC's Office of Energy Projects.

[14] 20 MTPA of LNG would be the production capacity of the Terminal when operating under design conditions; the maximum production capacity of the Terminal when operating under optimal conditions is not anticipated to exceed 28 MPTA.

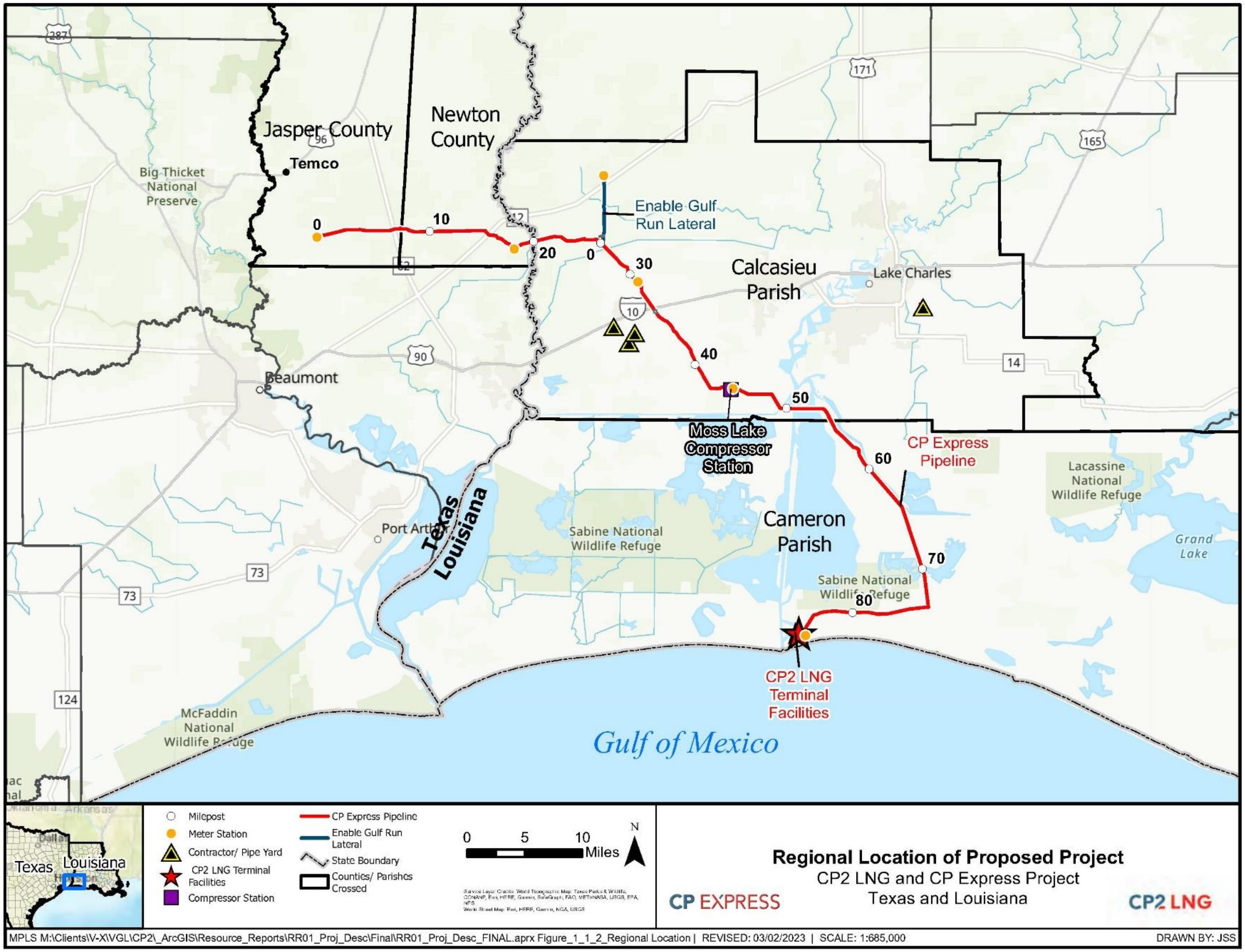

Figure 1.1.2.1-1 Regional Location of the Proposed Project

1.1 PURPOSE AND NEED

The Council on Environmental Quality's (CEQ) regulations for implementing NEPA at Title 40 Code of Federal Regulations (CFR) Part 1502.13[15] recommend that an EIS briefly address the underlying purpose and need for a project. CP2 LNG states that the purpose of the proposed Project is to liquefy, store, and export a nameplate liquefaction capacity of 20 MTPA of liquefied LNG, with approximately 28.0 MTPA capacity possible under optimal conditions, to overseas markets via marine transport by ocean-going vessels. CP2 LNG also states that conversion of natural gas to LNG would promote a global natural gas trade and greater diversification of global supplies. CP Express states that the purpose of the Pipeline System is to create the firm transportation capacity needed to transport 4.4 billion cubic feet per day (Bcf/d) of feed gas required for the proposed LNG export operations from natural gas supply points in east Texas and southwest Louisiana to the Terminal Facilities.[16, 17] Based on CP2 LNG's Application for Long-term Authorization to Export LNG to Free Trade and Non-Free Trade Agreement Nations, submitted to the U.S. Department of Energy (DOE) and pending approval, CP2 LNG has entered into a precedent agreement, initially lasting 20 years, with CP Express to subscribe to 100 percent of its firm capacity.[18] Additionally, CP2 LNG has entered into 20-year LNG Sales and Purchase Agreements with four counter-parties (affiliates of New Fortress Energy, ExxonMobil, and Chevron, as well as one of the largest energy companies in Germany, EnBW Energie Baden-Württemberg AG).[19]

We received multiple comments from the public during scoping periods and in response to the draft EIS stating that the Commission should not approve the Project due to a narrow purpose and need, the high number of other LNG export terminals either currently operating, under construction, or proposed for construction in the United States and Project area, a lack of demonstrated need for such infrastructure, and a lack of local or national benefit provided by the Project when compared to the environmental impacts, as perceived by the commenters. We also received a comment stating that the natural gas used for liquefaction would be better used in fertilizer plants to manufacture ammonia fertilizer. The FERC does not plan, design, build, or operate natural gas transmission infrastructure. As an independent regulatory commission, the FERC reviews proposals to construct and operate such facilities. Accordingly, the project proponent is the source for identifying the purpose for developing, constructing, and operating a project. CP2 LNG's and CP Express' purpose and objective in proposing the Project were defined in its application with the Commission. The Commission's purpose for reviewing the Project is based on its obligations under Section 3(a) and Section 7(c) of the NGA, which are described further in section 1.2.1 below.

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15 On April 20, 2022, CEQ issued a final rule, *National Environmental Policy Act Implementing Revisions* (Phase 1: Final Rule, 87 FR 23,453), which was effective as of May 20, 2022. Therefore, we are using the new regulations in the preparation of this EIS.

16 CP Express would construct five meter stations located at interconnects with existing pipelines and one will be located at the terminus of the CP Express Pipeline within the Terminal Site (see table 2.2.1). Meter stations would be in all counties crossed by the Project (Jasper and Newton Counties, Texas and Calcasieu and Cameron Parishes, Louisiana).

17 Note that the Commission will consider as part of its decision to authorize natural gas facilities, all factors bearing on the public interest including a project's purpose and need. Specifically, regarding whether to authorize import or export natural gas facilities, the FERC shall authorize the proposal unless it finds that the proposed facilities would not be consistent with the public interest. Additional information regarding the Commission's process and considerations regarding the project's purpose and need are provided in section 1.2.1.

18 CP2 LNG's Application for Long-Term Authorization to Export LNG to Free Trade and Non-Free Trade Agreement Nations is available on the website of the Department of Energy/Office of Fossil Energy and Carbon Management at https://www.energy.gov/sites/default/files/2021-12/21-131-LNG.pdf.

19 Available on the website of the Department of Energy/Office of Fossil Energy and Carbon Management at https://www.energy.gov/fecm/articles/cp2-lng-facility.

1.2 PURPOSE AND SCOPE OF THIS EIS

The analysis in this EIS focuses on the facilities that are under FERC's jurisdiction (that is, the Terminal Facilities and Pipeline System proposed by CP2 LNG and CP Express). We also identify the non-jurisdictional facilities that are related to the development of the Project (see detailed discussion in section 1.4).

Our principal purposes in preparing this EIS are to:

- identify and assess the potential direct, indirect, and cumulative impacts on the natural and human environment that would result from construction and operation of the Project;
- describe and evaluate reasonable alternatives to the Project that would avoid or minimize adverse impacts on environmental resources;
- recommend mitigation measures, as necessary, that could be implemented by CP2 LNG and CP Express to reduce impacts on specific environmental resources; and
- encourage and facilitate involvement by the public and interested agencies in the environmental review process.

This EIS addresses topics including geology; soils; groundwater and surface water; wetlands; vegetation; fish and wildlife; threatened, endangered, and other special-status species; land use and recreation; visual resources; socioeconomics (including environmental justice); cultural resources; air quality and noise; climate change; reliability and safety; and cumulative impacts. This EIS describes the affected environment as it currently exists based on a combination of data sources such as scientific literature, regulatory agency reports, information from resource and permitting agencies, scoping comments, and field data collected by CP2 LNG and CP Express; addresses the environmental consequences of the Project; compares the Project's potential impacts to those of various alternatives; and presents our conclusions and recommended mitigation measures.[20]

The Energy Policy Act (EPAct) of 2005, as amended, states that the FERC shall act as the lead federal agency for coordinating all applicable authorizations related to jurisdictional natural gas facilities and for the purposes of complying with NEPA. The FERC, as the "lead federal agency," is responsible for the preparation of this EIS. This effort was undertaken with the participation and assistance of five "cooperating agencies," as defined by NEPA. Cooperating agencies have jurisdiction by law or special expertise with respect to environmental impacts involved with a proposal. The cooperating agencies for this Project include the U.S. Army Corps of Engineers (COE) New Orleans and Galveston Districts, DOE, U.S. Coast Guard (Coast Guard), U.S. Department of Transportation's (DOT) Pipeline and Hazardous Materials Safety Administration (PHMSA), and National Marine Fisheries Service (NMFS). The roles of FERC and the cooperating agencies in the Project review process are described below.

In accordance with CEQ regulations implementing NEPA, no agency decision on a proposed action may be made until 30 days after the U.S. Environmental Protection Agency (EPA) publishes a notice of availability of the final EIS in the FR. However, the CEQ regulations provide an exception to this rule when an agency decision is subject to a formal internal appeal process that allows other agencies or the

[20] The "recommendations" in the EIS text are not recommendations to CP2 LNG and CP Express (i.e., they are not mere suggestions to the project sponsors). Rather, they are FERC staff's recommendations to the Commission for inclusion as mandatory conditions to any authorization it may issue for the Project. Please see section 5.2 of the EIS for how these conditions would appear in a FERC Order.

public to make their views known. In such cases, the agency decision may be made at the same time the notice of the final EIS is published, allowing both periods to run concurrently. The Commission decision for this proposed action is subject to a 30-day rehearing period.

1.2.1 Federal Energy Regulatory Commission

The Commission has authority over the siting, construction, and operation of onshore LNG terminals under Section 3 of the NGA. In the case of the Project, the FERC also has jurisdiction over the Pipeline System under Section 7 of the NGA. As the lead federal agency (based on its authority under the NGA and EPAct of 2005), the FERC has prepared this document in compliance with the requirements of NEPA; the CEQ regulations implementing procedural provisions of NEPA in 40 CFR 1500-1508; and the FERC's regulations implementing NEPA in 18 CFR 380.

The Commission will consider the findings in this EIS during its review of CP2 LNG and CP Express' application. The identification of environmental impacts related to Project construction and operation and the mitigation of those impacts, as disclosed in this EIS, will be components of the Commission's decision-making process, which will be described in its Order. If the Project is approved, the Order would specify that the Terminal Facilities can be constructed and operated under the authority of Section 3 of the NGA. The Commission may accept the application in whole or in part and can attach engineering and environmental conditions to the Order that would be enforceable actions to assure that the proper mitigation measures are implemented.

Under section 7(c) of the NGA, the Commission determines whether interstate natural gas transportation facilities are in the public convenience and necessity and, if so, grants a Certificate of Public Convenience and Necessity (Certificate) to construct and operate them. The Commission bases its decisions on both economic issues, including need, and environmental impacts.

The FERC will use this document to consider environmental, safety, and reliability impacts that could result if it issues an authorization to CP2 LNG and CP Express under Sections 3 and 7 of the NGA.

In accordance with Section 3A(e) of the NGA (added by Section 311 of the EPAct of 2005), the act stipulates that in any order authorizing an LNG terminal, the Commission must require the LNG terminal operator to develop an Emergency Response Plan (ERP) in consultation with the Coast Guard and state and local agencies. The final ERP would need to be evaluated by the appropriate emergency response personnel and officials. Section 3A(e) of the NGA, as amended by EPAct of 2005, also requires that the ERP include a Cost-Sharing Plan that contains a description of any direct cost reimbursements the applicant agrees to provide to any state and local agencies with responsibility for security and safety at the LNG terminal and in proximity to LNG marine carriers that serve the facility.

1.2.2 United States Department of Energy

Section 3(c) of the NGA requires that proposed imports and/or exports of natural gas, including LNG, in applications to DOE's Office of Fossil Energy and Carbon Management (FECM), requesting authorization of imports and/or exports from and/or to nations with which there are in effect Free Trade Agreements (FTA), requiring national treatment for trade in natural gas (FTA nations), be deemed consistent with the public interest and granted without modification or delay. In the case of applications to export LNG to non-FTA nations, NGA Section 3(a) requires DOE to conduct a public interest review and grant authority to export unless DOE finds that the proposed exports would not be consistent with the public interest. Additionally, NEPA requires DOE to consider the environmental effects of its decisions regarding applications to export natural gas to non-FTA nations.

On December 2, 2021, CP2 LNG submitted an application, supplemented on December 17, 2021, in DOE/FECM Docket No. 21-131-LNG, requesting authorization to export up to the equivalent of 1,446 billion cubic feet per year[21] of natural gas as LNG to FTA nations and non-FTA nations for a term extending through December 31, 2050. DOE granted CP2 LNG's application to export to FTA nations on April 22, 2022. CP2 LNG's application to export to non-FTA nations is pending with DOE.

1.2.3 United States Coast Guard

The Coast Guard is the federal agency responsible for determining the suitability of waterways for LNG marine traffic. The Coast Guard exercises regulatory authority over LNG facilities that affect the safety and security of port areas and navigable waterways under Executive Order 10173; the Magnuson Act of 1950 (Title 50 of the U.S. Code [USC], Part 191 [50 USC 191]); the Ports and Waterways Safety Act of 1972, as amended (33 USC 1221 et seq.); and the Maritime Transportation Security Act of 2002 (46 USC 701). The Coast Guard is responsible for matters related to navigation safety, vessel engineering and safety standards, and all matters pertaining to the safety of facilities or equipment in or adjacent to navigable waters up to the last valve immediately before the receiving LNG tanks.

The Coast Guard also has authority for LNG facility security plan reviews, approval and compliance verifications as provided in 33 CFR 105, and siting as it pertains to the management of vessel traffic in and around LNG facilities to a point 12 nautical miles seaward from the coastline (within the territorial seas). As appropriate, the Coast Guard (acting under the authority in 33 USC 1221 et seq.) also would inform the FERC of design- and construction- related issues identified as part of safety and security assessments. If the CP2 LNG and CP Express Project is approved, constructed, and operated, the Coast Guard would continue to exercise regulatory oversight of the safety and security of the LNG Terminal facilities, in compliance with 33 CFR 127.

As required by its regulations, the Coast Guard is responsible for issuing a Letter of Recommendation (LOR) and an LOR Analysis regarding the suitability of the waterway for LNG marine traffic following a Waterway Suitability Assessment (WSA) submitted by CP2 LNG. Following submittal to the Coast Guard of its initial Letter of Intent (LOI), CP2 LNG performed both a Preliminary and Follow-on WSA, as required by 33 CFR 127.007 and the Coast Guard's Navigation and Inspection Circular (NVIC) – *Guidance Related to Waterfront Liquefied Natural Gas (LNG) Facilities* (NVIC 01-11). After reviewing the information in the LOI and WSA and completing an evaluation of the waterway in consultation with a variety of state and local port stakeholders, the Coast Guard issued its LOR on December 17, 2021, recommending that the Calcasieu Ship Channel be considered suitable for LNG marine traffic associated with the proposed Project.

1.2.4 United States Army Corps of Engineers

The COE has jurisdictional authority pursuant to Section 404 of the Clean Water Act of 1972, as amended (CWA) (Title 33 of the USC, Section 1344 [33 USC 1344]); Section 10 of the Rivers and Harbors Act of 1899, as amended (RHA) (33 USC 403); Section 408 policy (Section 14 of the RHA; 33 USC 408); and Section 103 of the Marine Protection Research Sanctuaries Act of 1972, if applicable. The COE must comply with the requirements of NEPA before issuing permits under these statutes. The COE would adopt this EIS per 40 CFR 1506.3(c) if, after independent review of the document, it concludes that the EIS sufficiently provides information to support decision making under its statutory authorities. Regulations implementing Section 404 of the CWA and Section 10 of the RHA are defined in 33 CFR Parts 320-332.

[21] Approximately 28 MTPA; The CP2 LNG terminal's nameplate liquefaction capacity of 20 MTPA reflects a number of conservative design features and is the minimum output expected to be guaranteed by the Project's contractors.

In its regulatory capacity, the COE is neither a proponent nor an opponent of projects seeking COE authorization. As stated in 33 CFR 320.19(b)(4), the COE is also required to review actions in accordance with regulations developed by the EPA under the CWA Section 404(b)(1) guidelines, including a determination of the least environmentally damaging practicable alternative. The CWA Section 404(b)(1) guidelines restrict the COE from issuing a permit for any alternative other than the least environmentally damaging practicable alternative. The term practicable means available and capable of being done after taking into consideration cost, existing technology, and logistics, considering the overall purpose of the Project.

Although this EIS addresses environmental impacts associated with the Project as they related to the COE's jurisdictional permitting authority, it does not serve as public notice for any COE permits or take the place of the COE's permit review process. The COE would issue a Record of Decision to formally document its decisions on the proposed action, including Section 404(b)(1) analyses and required environmental mitigation commitments, if permits are issued for the Project.

1.2.5 United States Department of Transportation's Pipeline and Hazardous Materials Safety Administration

The DOT's PHMSA has prescribed the minimum federal safety standards for natural gas pipelines and LNG facilities in compliance with 49 USC 1671 et seq. and 49 USC 60101, respectively. Those standards are codified in 49 CFR Parts 192 and 193 and apply to safety regulations and standards related to the design, construction, operation, and maintenance of natural gas pipelines and the siting, design, construction, operation, maintenance, and security of LNG facilities, respectively. The 2001 edition of National Fire Protection Association (NFPA) Standard 59A, *Standard for the Production, Storage, and Handling of Liquefied Natural Gas,* is incorporated into 49 CFR Part 193 by reference, with regulatory preemption in the event of conflict.

In accordance with the 1985 Memorandum of Understanding (MOU) on LNG facilities and the 2004 Interagency Agreement on the safety and security review of waterfront import/export LNG facilities, PHMSA participates as a cooperating agency and assists in assessing any mitigation measures that may become conditions of approval for any project. In addition, the August 31, 2018 MOU between FERC and PHMSA provides guidance and policy on each agency's respective statutory responsibility to ensure that each agency works in a coordinated and comprehensive manner. In the 2018 MOU, PHMSA agreed to issue a Letter of Determination (LOD) stating whether LNG facilities would be capable of complying with location criteria and design standards contained in Subpart B of Part 193. PHMSA would issue LOD stating whether the CP2 LNG facilities would be capable of complying with these standards, which would serve as one of the considerations in the Commission's decision-making process.

The pipeline facilities would be designed, constructed, operated, and maintained in accordance with PHMSA regulations found in *Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards* (49 CFR 192). Among other design standards, these regulations specify pipeline material selection; minimum design requirements; protection from internal, external, and atmospheric corrosion; and qualification procedures for welders and operations personnel. Any modifications to the provisions of 49 CFR 192 regulations would be addressed through PHMSA special permits in accordance with 49 CFR 190.341, *Pipeline Safety Enforcement and Regulatory Procedures*.

1.2.6 National Marine Fisheries Service

The NMFS is serving as a cooperating agency pursuant to 40 CFR 1501.6 because the scope of the proposed action and alternatives involve activities that have the potential to affect marine resources under their jurisdiction by law and the agency has special expertise in this field. As applicable, permits and authorizations are issued pursuant to the Endangered Species Act of 1973, as amended (ESA) (16 USC 1531 et seq.) and the regulations governing the taking, importing, and exporting of threatened and endangered species (50 CFR Parts 222 to 226), as well as the Marine Mammal Protection Act of 1972 (MMPA) (16 USC 1361 et seq.) and the regulations governing the taking and importing of marine mammals (50 CFR 216). NMFS has additional responsibilities to conserve and manage fishery resources of the United States, which includes the authority to engage in consultations with other federal agencies pursuant to the Magnuson-Stevens Fishery Conservation and Management Act of 1976, as amended (MSFCMA) and 50 CFR 600 when proposed actions may adversely affect essential fish habitat (EFH).

1.3 PUBLIC REVIEW AND COMMENT

1.3.1 Pre-filing Process and Scoping

On January 21, 2021, CP2 LNG and CP Express filed a request with the FERC to use our pre-filing review process. This request was approved on February 17, 2021, and pre-filing Docket No. PF21-1-000 was established in order to place information filed by CP2 LNG and CP Express, documents issued by the FERC, as well as comments from the public, agencies, tribes, organizations, and other stakeholders into the public record. The pre-filing review process provides opportunities for interested stakeholders to become involved early in project planning, facilitates interagency cooperation, and assists in the identification and resolution of issues prior to a formal application being filed with the FERC.

CP2 LNG and CP Express provided landowners and other stakeholders with an informational letter on February 24, 2021. Additionally, CP2 LNG and CP Express sent informational letters to federal, tribal, state, and local agencies with permitting and/or consultation authority for the Project. CP2 LNG and CP Express continued to meet with various groups and individuals regarding the Project, as outlined in the Public Participation Plan referenced in the CP2 LNG and CP Express pre-filing request letter dated January 21, 2021.

CP2 LNG and CP Express held three virtual open houses on April 6, 7, and 8, 2021, respectively, to provide information to the public about the CP2 LNG and CP2 Express Project. FERC staff participated in the open houses, describing the FERC environmental review process and providing information on how to file comments with the FERC.

During pre-filing, CP2 LNG and CP Express, FERC staff, and interested agencies engaged in bi-weekly Project calls to discuss the application and permitting processes. The bi-weekly call minutes are available for viewing on the FERC eLibrary under Docket No. PF21-1-000.

On April 27, 2021, the FERC issued a *Notice of Scoping Period Requesting Comments on Environmental Issues for the Planned CP2 LNG and CP Express Project and Notice of Public Scoping Sessions*. This notice was sent to about 2,700 interested parties, including federal, state, and local officials; agency representatives; conservation organizations; Native American Tribes; local libraries and newspapers; non-governmental organizations, and property owners in the vicinity of the proposed Project. Publication of the notice established a 30-day public scoping period for the submission of comments, concerns, and issues related to the environmental aspects of the Project; the scoping period closed on May 27, 2021. We received 13 comment letters in response to the notice and 1,719 individual form letters in opposition to the Project.

The FERC conducted three virtual public scoping sessions via telephone on May 11, 12, and 13, 2021 for the proposed Project to provide an opportunity for the public to learn more about the CP2 LNG and CP Express Project and to participate in our analysis by providing oral comments on environmental issues to be included in the EIS. Each scoping session had representatives from the FERC staff that were available to answer questions and take comments related to the FERC environmental review process and the Project. During the scoping sessions, 16 individuals provided oral comments on the Project. CP2 LNG and CP Express submitted responses to the scoping comments on June 10, 2021.[22] Transcripts of the public scoping sessions, as well as the written comment letters, were entered into the public record and are available for viewing on the FERC's online eLibrary system.[23]

On December 2, 2021, CP2 LNG and CP Express filed applications with the FERC, in Docket Nos. CP22-21-000 and CP22-22-000, to construct and operate the Terminal Facilities and Pipeline System. The Commission issued a Notice of Application for the Project on December 16, 2021, and the notice appeared in the FR on December 23, 2021. On February 9, 2022, the FERC issued a *Notice of Intent to Prepare an Environmental Impact Statement for the Proposed CP2 LNG and CP Express Project, Request for Comments on Environmental Issues, and Schedule for Environmental Review (NOI)*. We received a total of three comments from individuals unaffiliated with organizations; two comments from unions; five comments from federal and state agencies; and 12 comments from companies and other non-governmental organizations (NGOs) following the filing of CP2 LNG and CP Express' applications.

We received multiple scoping comments from Healthy Gulf requesting a full environmental analysis in the form of a programmatic EIS. In addition, in response to the draft EIS, RESTORE stated that FERC needs to look holistically at what it is allowing to happen in Southwest Louisiana; these activities justify and require a Comprehensive Regional Environmental Impact Study and Statement. The CEQ regulations do not require broad or "programmatic" NEPA reviews. CEQ's guidance provides that such a review may be appropriate where an agency is: (1) adopting official policy; (2) adopting a formal plan; (3) adopting an agency program; or (4) proceeding with multiple projects that are temporally and spatially connected.[24] The Supreme Court has held that a NEPA review covering an entire region (that is, a programmatic review) is required only if there has been a report or recommendation on a proposal for major federal action with respect to the region.[25] We note the Commission does not have a program to direct the development of the natural gas industry's infrastructure, either on a broad regional basis or in the design of specific projects, and does not engage in regional planning exercises. Natural gas infrastructure projects subject to the Commission's jurisdiction do not share sufficient elements in common to narrow future alternatives or expedite the current detailed assessment of each particular project.[26] As the Commission acts on individual applications, we provide a project-specific analysis here.

On July 7, 2022, the Commission suspended the environmental review schedule for the Project pending adequate responses from CP2 LNG and CP Express to Commission staff data requests. Based upon CP2 LNG's and CP Express' commitment to provide complete responses to the outstanding data requests by August 30, 2022, the Commission staff issued a revised schedule for environmental review of the Project on August 23, 2022.

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22 This document can be viewed on the FERC eLibrary under accession no. 20210610-5118.

23 These transcripts can be viewed on the FERC eLibrary under accession nos. 20210527-4004, 20210527-4005, 20210527-4006, and 20210623-4000.

24 Memorandum from CEQ to Heads of Federal Departments and Agencies, *Effective Use of Programmatic NEPA Reviews* 13-15 (Dec. 24, 2014) (citing 40 C.F.R. § 1508.18(b)).

25 *Kleppe v. Sierra Club*, 427 U.S. 390 (1976) (holding that a broad-based environmental document is not required regarding decisions by federal agencies to allow future private activity within a region).

26 *Atlantic Coast Pipeline, LLC*, 161 FERC ¶ 61,042 at P284 (2017).

1.3.2 Summary of Submitted Alternatives, Information, and Analyses

In total, we received 17 comments from NGOs, 12 comments from federal and state agencies, 23 comments from individuals unaffiliated with organizations (16 of which were oral comments), 2 comments from unions, 2 comments from Native American Tribes, and 1,719 individual form letters during the pre-filing and scoping processes for the Project. Table 1.3.2-1 lists the environmental issues identified during the scoping process described above, and indicates the section of this EIS in which each issue is addressed. All comments received at least two weeks prior to the issuance of this EIS have been addressed in our analysis and included in table 1.3.2-1 below. Primary issues raised by the commenters related to potential Project impacts on climate change, water quality and wetlands, wildlife, aquatic resources, threatened and endangered species, recreational activities, local infrastructure, environmental justice communities, and air quality. A listing of all comments received prior to the issuance of the draft EIS is provided in appendix A.

Table 1.3.2-1

Issues Raised During Public Scoping for the CP2 LNG and CP Express Project and from Comments on the Draft EIS

Issue/Concern	EIS Section Addressing Issue
General	
Need for Project has not been established; no local benefit of the Project.	1.1
General concern regarding environmental impacts of the Project; general statements opposing the Project.	1.3
General comments in support of the Project.	1.3
Carbon capture and sequestration facilities should be included in analysis.	1.4, 2.1.1.6
Alternatives	
Identify and fully consider alternative locations and system alternatives for the Project.	3.0
Identify whether the global demand for natural gas outweighs the local benefits of the No-Action alternative.	3.2
Identify and fully consider alternative Project capacity, origins, and routes.	3.3, 3.5
Geology	
Potential for the Project to exacerbate flooding in surrounding areas.	4.2.3.4, 4.13
Vulnerability of the Project to flooding and shoreline erosion caused by rising sea levels.	4.2.3.4, 4.13
Soils and Sediments	
Potential to resuspend and reintroduce contaminated sediments during construction.	4.3
Potential for Project to cause shoreline erosion in the Calcasieu Ship Channel.	4.3, 4.13
Concern for erosion and sedimentation resulting from construction.	4.3.3
Water Resources	
Impacts on water quality and use of the Chicot aquifer,	4.4.1.4
Impacts on water quality of the surrounding waterways.	4.4
Impacts on hydrological function of the surrounding waterbodies and wetlands.	4.4
Wetlands	
Impacts on wetlands, including their hydrologic functions and associated compensatory mitigation plans.	4.5
Vegetation	
Impacts on vegetation communities of special concern, including the Coastal Live Oak Hackberry Forest.	4.6
Wildlife and Aquatic Resources	

Table 1.3.2-1	
Issues Raised During Public Scoping for the CP2 LNG and CP Express Project and from Comments on the Draft EIS	
Issue/Concern	**EIS Section Addressing Issue**
Impacts on important coastal wildlife habitats, including the Chenier Plain coastal ecosystem.	4.7
Impacts on migratory bird populations, including colonial bird rookeries.	4.7.1.3
Impacts on aquatic species and habitat.	4.7.2.2, 4.7.3
Impacts on essential fish habitat.	4.7.3
Threatened and Endangered Species	
Impacts on federally and state-listed threatened and endangered species and species of special concern.	4.8
Land Use, Recreation, and Visual Resources	
Concerns regarding eminent domain and unjust compensation for landowners.	4.9
Impacts on recreational fishing, swimming, and boating along the shore of the Calcasieu River.	4.9
Concerns regarding ambient lighting at the Moss Lake Compressor Station	4.9.5
Socioeconomics	
Impacts on environmental justice communities.	4.10.10
Impacts on roadway and marine vessel traffic.	4.10.8
Economic benefits of the Project for the surrounding communities, including the Project’s local economic benefit	4.10, 4.10.6
Jobs that would be created for the Project are temporary.	4.10.2.2
Verify claims of socioeconomic benefits of the Project.	4.10
Cultural Resources	
Impacts on cultural resources.	4.11
Air Quality and Noise	
Greenhouse gas emissions from Project construction and operation.	4.12.1
Impacts on air quality in the vicinity of the Terminal Facilities.	4.12.1
Climate change-related impacts of Project, upstream and downstream greenhouse gas emissions caused by production of fossil fuel and other life cycle emissions for the Project’s production and transportation of LNG.	4.12.1
Climate Resiliency	4.2.3.4 and 4.13
Impacts of increased noise levels in the vicinity of the Project.	4.12.2
Reliability and Safety	
Vulnerability of the Terminal Facilities to coastal processes, including hurricanes, tropical storms, and storm surges.	4.13
Pipeline leaks and explosions.	4.13
Cumulative Impacts	
Consider a thorough discussion on past, present, and reasonably foreseeable cumulative impacts.	4.14
Climate change-related impacts.	4.14.2.13

1.3.3 Public Review of the Draft EIS

On January 19, 2023, the draft EIS was issued by the Commission and filed with the EPA. The Commission’s *Notice of Availability* of the draft EIS was mailed to federal, state, and local government agencies; elected officials; Native American tribes; affected landowners; local libraries and newspapers;

intervenors in FERC's proceeding; NGOs, and other interested parties (i.e., individuals who provided scoping comments or asked to be on the mailing list). The Commission's *Notice of Availability* provided instructions for accessing the document and submitting comments, and listed the dates of two public comment sessions. The distribution list for the *Notice of Availability* of the draft EIS was provided in appendix B of that document; appendix B has been updated accordingly to reflect the issuance of the final EIS. The EPA's notice indicating that the draft EIS was available for review and comment was published in the Federal Register on January 27, 2023,[27] and established a closing date of March 13, 2023, for receiving comments on the draft EIS.

On March 1 and 2, 2023, we held two public sessions in the Project area to solicit and receive comments on the draft EIS. The sessions provided the public an opportunity to present oral comments to a court reporter on the environmental analysis described in the draft EIS. A total of 36 individuals provided oral comments. In addition, during the draft EIS public comment period and including all comments received up to the issuance of this final EIS, we received written comments from 3 federal agencies, 2 state agencies, 11 companies/non-governmental organizations, and 9 individuals. We also received a copy of one form letter associated with an online petition, which had 83 signatures at the time of filing. All unique comments received and a representative copy of the form letter/petition are included in our comment responses contained in appendix N. Transcripts from the public sessions were entered into the public record and are available for viewing on FERC's eLibrary website (www.ferc.gov).[28]

This EIS addresses all substantive environmental comments submitted to the FERC or made at scoping sessions, interagency meetings, and public comment sessions on the draft EIS. Issues identified are summarized in table 1.3.2-1, along with the EIS section that addresses each topic. Primary issues raised by the commenters relate to potential Project impacts on wetlands, wildlife, aquatic resources, threatened and endangered species, air quality, Terminal safety, flooding and tropical storm systems, and greenhouse gases and climate change.

1.3.4 Final EIS

The Commission mailed a copy of the *Notice of Availability* of the final EIS to agencies, individuals, companies/organizations, NGOs, and other parties identified in the distribution list provided as appendix B. Additionally, the final EIS was filed with the EPA for issuance of a Notice of Availability in the Federal Register.

1.4 NON-JURISDICTIONAL FACILITIES

Under the NGA, the FERC is required to consider, as part of its decision to authorize interstate natural gas facilities, all factors bearing on the public convenience and necessity. Occasionally, proposed projects have associated facilities that do not come under the jurisdiction of the Commission. As such, FERC has no authority or jurisdiction over the siting, permitting, licensing, construction, or operation of these facilities. These "non-jurisdictional" facilities may be integral to the need for the proposed facilities (e.g., a power plant at the end of a FERC-jurisdictional pipeline) or they may be merely associated as minor, non-integral components of the jurisdictional facilities that would be constructed and operated as a result of the Certification of the proposed facilities.

During construction, electric power for the Terminal Site would be provided by tying into an existing temporary electric utility line that was installed for Venture Global Calcasieu Pass, LLC's Calcasieu Pass LNG Terminal facilities (Calcasieu Pass LNG) under Docket No. CP15-550-000. This

27 88 FR 5336

28 See accession no. 20230316-4000.

electric line is adjacent to Davis Road. The tie-in point(s) for a drop-down line would be determined closer to construction, but would be within the CP2 LNG Terminal Facilities footprint, and would only be needed during construction. Approximately 500 feet of overhead electrical line would be constructed to deliver power from the existing line to the new CP2 LNG substation. The temporary electric utility line ties into the Jeff Davis Electric Co-op, Inc. (Jeff Davis) electric distribution line along Marshall Street (State Highway [SH] 27). During operation of the Terminal Facilities, CP2 LNG would source electric power from two on-site generating plants providing 1,470 megawatts (MW). No additional areas outside the CP2 LNG construction footprint would be disturbed to provide electrical power. Jeff Davis would be responsible for obtaining the necessary authorizations to construct and operate the expanded facilities; however, both the extended power line and the substation would be within the footprint of the Terminal Site. As such, they would be constructed on land operated by CP2 LNG and their associated permits.

Additionally, the Terminal Facilities would require a permanent sanitary waste utility connection. The sanitary waste collection system would be within the Terminal Site and would connect to an existing forced main sewer line that parallels Davis Road in the site's immediate vicinity and discharges to the local wastewater treatment facility, operated by Cameron Parish Water and Wastewater District 1. The connection would be accomplished by a short section of approximately 4-inch-diameter underground polyvinyl chloride pipe, which would be confined to the Terminal Site footprint and the utility right-of-way along Davis Road. The design and construction of this tie-in section would be subject to approval by Cameron Parish and any impacts on wetlands or waterbodies outside the CP2 LNG construction footprint would be subject to CWA Section 404 and coastal use permit authorizations.

CP Express' non-jurisdictional facilities would include utilities at the Pipeline System aboveground facilities. CP Express would construct a permanent electric power line, substation, permanent fiber optic cabling, a permanent water line, and a permanent sanitary waste disposal line to provide service connections to the Moss Lake Compressor Station. Permanent electric power lines and permanent fiber optic cabling would also be constructed to provide service connections to the five meter stations and four mainline valve (MLV) sites. Electric utility power for the Moss Lake Compressor Station would be provided by Entergy Louisiana, LLC (Entergy), via an interconnect with an existing distribution line that is parallel to the property. The service line interconnect at the proposed Moss Lake Compressor Station substation would not entail ground disturbance outside of the Moss Lake Compressor Station boundary. Both the substation and the associated power line tie-in are included in the Project's Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA) consultation, Section 7 ESA consultation, CWA Section 404 permit application, and pipeline Coastal Use Permit application. Entergy or other service provider(s) would be responsible for permitting the off-site power line sections and fiber optic cabling for all aboveground facilities on the Pipeline System.

CP2 LNG's Project includes carbon capture and sequestration (CCS) facilities to capture and sequester about 500,000 tons of carbon dioxide (CO_2) emissions per year. The CCS facilities includes carbon capture equipment within the Terminal Site as well as a CO_2 send-out pipeline outside of the Terminal Site, anticipated to be installed under the southern portion of the Terminal Site floodwall and terminate at an offshore platform in State of Louisiana waters. We received comments from multiple NGOs during scoping periods and in response to the draft EIS requesting FERC analyze the proposed CCS system. The proposed CCS system would be permitted separately under the EPA's Underground Injection Control Class VI program.[29] As such, for purposes of the NEPA analysis, we evaluate the portion of the CCS system within the LNG Terminal footprint as FERC jurisdictional components of the Project; while the proposed CO_2 pipeline and ancillary facilities under EPA's jurisdiction are considered non-FERC jurisdictional in this EIS. It is anticipated that the CO_2 send-out pipeline would be installed under the

[29] Publicly available information regarding the status of CP2 LNG's Underground Injection Control Class VI Permit application is not available as of the time this EIS being written.

southern portion of the Terminal Site's floodwall. The CO_2 pipeline would continue south approximately 3 miles to an offshore platform in State of Louisiana waters. The wellhead for an injection well would be at the platform, where the CO_2 would be injected into underground pore space for permanent storage. The pipeline alignment, platform location, and well location are in the siting stage of project development.

The CCS facilities within the Terminal Facilities footprint are described further in section 2.1 (Proposed Facilities), and potential environmental impacts associated with all non-jurisdictional facilities located outside of the Project footprint are discussed in section 4.14 (Cumulative Impacts).

As further described in section 4.3.3.1, CP2 LNG proposes to dredge up to about 6.4 million cubic yards of material from the Calcasieu Ship Channel to construct the Marine Facilities. CP2 LNG and CP Express propose to transport the sediments dredged during construction to a beneficial use of dredged materials (BUDM) site at the East Cove Unit of the U.S. Fish and Wildlife Service (FWS) Cameron Prairie National Wildlife Refuge (NWR).[30] This dredged material would be transported by a temporary slurry pipeline to the Cameron Prairie NWR, a portion (893,600 cubic yards) of which would be placed in a contained area to create/restore the appropriate offset acreage of marsh for compensatory wetlands mitigation and the remainder (5,505,000 cubic yards) placed peripherally in a wider, semi-contained area to promote additional marsh growth. CP2 LNG and CP Express would install the temporary slurry pipeline from the dredge area to the marsh creation/restoration area using a combination of floating, submerged, bored, and aboveground pipe sections. From the dredging area, the pipeline route runs south and east for about 0.6 mile along the southern tip of Monkey Island, continuing up Calcasieu Pass along the eastern shore of Monkey Island for about 2.0 miles. The route then trends to the northeast for about 0.7 mile, crossing Calcasieu Pass to move on shore and extend west of the Town of Cameron. The pipeline would continue aboveground east for 2.9 miles, then head north for 0.7 mile to the southern edge of the Cameron Prairie NWR. The overall length of the route as described is approximately 6.9 miles. Access to the marsh creation/restoration area would be across open water in the refuge itself (figure 1.4-1). CP2 LNG and CP Express anticipate that four booster pumps would be located along the route, to maintain spoil flow during pipeline operation. One of the booster pumps would be on a floating platform in Calcasieu Pass; the other three would be on the land-based portion of the slurry line route between the shoreline of Calcasieu Pass and the southern perimeter of the Cameron Prairie NWR. The proposed booster pump locations along the slurry pipeline route are identified in figure 1.4-1. The BUDM site, and associated disposal pipeline are non-jurisdictional to the Commission. However, because they are closely related to the project, we have included them in our analysis within the applicable resource sections.

There are no other non-jurisdictional facilities proposed as part of the Project.

[30] CP2 LNG and CP Express' April 2023 draft Compensatory Mitigation and Beneficial Use Plan can be viewed on the FERC eLibrary as attachment EIR9-2d under accession number 20230428-5528.

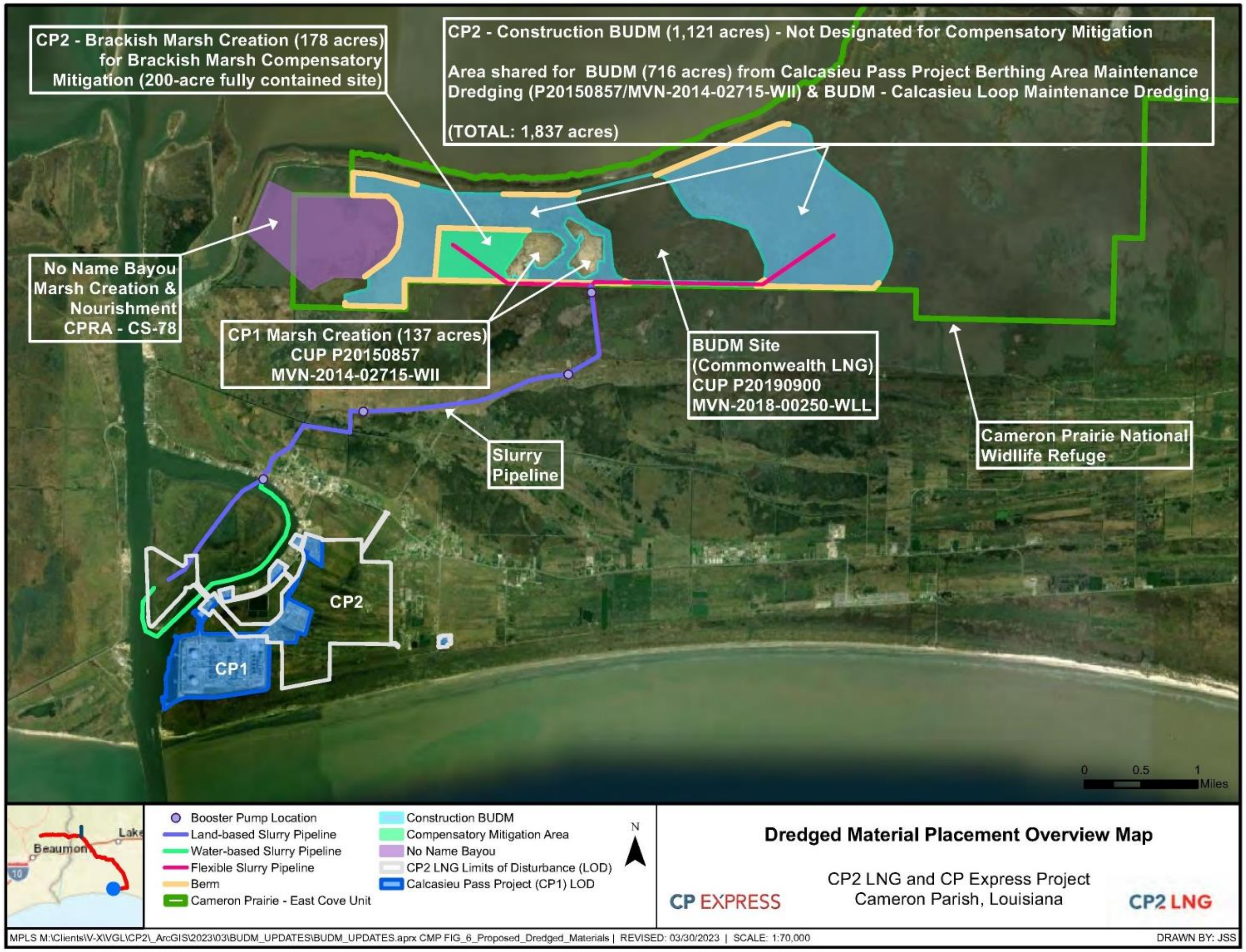

Figure 1.4-1 Dredged Material Placement Overview Map

1.5 PERMITS AND APPROVALS

As the lead federal agency for the environmental review of the Project, the FERC is required to comply with Section 7 of the ESA, the MSFCMA, Section 106 of the NHPA, and Section 307 of the Coastal Zone Management Act of 1972, as amended (CZMA). Each of these statutes has been taken into account in the preparation of this EIS.

Major permits, approvals, and consultations for the Project are identified in table 1.5-1 and discussed below. CP2 LNG and CP Express would be responsible for obtaining all permits and approvals required to construct and operate the Project, regardless of whether they appear in this table. The FERC encourages cooperation between applicants and state and local authorities, but this does not mean that state and local laws may prohibit or unreasonably delay the construction and operation of facilities approved by the FERC. Any state or local permits issued with respect to jurisdictional facilities must be consistent with the conditions of any authorizations issued by FERC.

Table 1.5-1

Permits, Approvals, and Consultations

Agency	Permit/Approval	Project Facility Applicability	Status
FEDERAL			
FERC	Authorization to Construct and Operate Facilities under section 3(a) and section 7(c) of the NGA	Terminal Facilities and Pipeline System	Application Filed: December 2, 2021; Authorization pending
DOE/FECM	Authorization to export LNG by vessel to FTA and non-FTA nations	Terminal Facilities	Application to Export LNG to FTA and non-FTA Nations Filed: December 2, 2021 FTA authorization issued: April 22, 2022 Non-FTA authorization: Pending
Coast Guard	Waterfront Facilities Handling Liquefied Natural Gas and Liquefied Hazardous Gas (33 CFR 127), which includes Letter of Intent submission (33 CFR 127.007). WSA consultation, and LOR from the Coast Guard (33 CFR 127.009).	Terminal Facilities	Letter of Intent and Preliminary WSA Sent: January 8, 2021; Letter of Recommendation issued: December 17, 2021
	Notification to Mariners of Dredging Activities		To be filed prior to beginning of dredging activities
	Approval of Facility Security Plan		To be filed 60 days prior to beginning operations per 33 CFR 105.410
	Examination of Operations Manual (33 CFR 127.019)		To be filed at least 30 days prior to transferring LNG
	Examination of Emergency Manual (33 CFR 127.019)		To be filed at least 30 days prior to transferring LNG

Table 1.5-1 Permits, Approvals, and Consultations			
Agency	**Permit/Approval**	**Project Facility Applicability**	**Status**
EPA – Region VI, Dallas, TX	Consultation role to the Louisiana Department of Environmental Quality on air emissions permitting. Floodplain management and protection of wetlands (44 CFR 9). Review of wetlands impacts for COE Clean Water Act Section 404 permit CWA, Section 402 National Pollutant Discharge Elimination System	Terminal Facilities and Pipeline System	Introductory Letter Sent: January 15, 2021; Anticipated receipt of Construction Stormwater Discharge Permit (Texas): Fourth quarter of 2023
COE – Galveston and New Orleans	Clean Water Act Section 404 Permit for impacts on waters of the United States, including wetlands (33 USC §1344) Rivers and Harbors Act Section 10 Permit for construction and operation of structures in and across federally navigable waters (33 USC § 403)	Terminal Facilities and Pipeline System	Section 404/10 Permit Applications Filed: November 12, 2021; Updates to Section 404/10 Permit Submitted to New Orleans District: December 16, 2022; Updates to Section 404/10 Permit Application Submitted to Galveston District: January 17, 2023; Anticipated receipt of Section 404/10 permits: Pending
NMFS	MMPA Consultation (16 USC §1382) ESA Section 7 Consultation (16 USC §1856 et seq.) MSFCMA EFH Consultation (50 CFR 600) Fish and Wildlife Coordination Act Consultation (16 USC § 661 et seq.)	Terminal Facilities and Pipeline System	Informal Consultation Initiated: February 7, 2022; Section 7 Consultation: Pending Draft EFH Assessment (EFHA) Submitted: November 5, 2021; Revised EFHA Submitted: June 30, 2022; Revised draft EFHA: August 15, 2022; EFH Consultation: Pending
U.S. Fish and Wildlife Service, Southwest Region 2, Southeast Region 4	ESA Section 7 Consultation (16 USC § 1536) Migratory Bird Treaty Act (16 USC § 703 et seq.) Fish and Wildlife Coordination Act Consultation (16 USC § 661 et seq.)	Terminal Facilities and Pipeline System	Informal Consultation Initiated: February 7, 2022; Draft Biological Assessment for the Eastern Black Rail Submitted to Southeast Region 4: December 9, 2022; Consultation: Pending
Federal Aviation Administration (FAA)	FAA regulations at 14 CFR 77	Terminal Facilities	Anticipated Submittal of Notice: April 2023; Anticipated receipt of FAA approval: Pending
STATE			
Railroad Commission of Texas (RRC)	Section 401 Water Quality Certification	Pipeline System	Introductory Letter Sent: January 15, 2021; Request for Water Quality Certification Submitted: May 5, 2023; Anticipated receipt of water quality certification: Pending

Table 1.5-1 Permits, Approvals, and Consultations			
Agency	**Permit/Approval**	**Project Facility Applicability**	**Status**
	Hydrostatic Test Water Discharge Permit (Uplands)		Anticipated receipt of permit: First quarter 2024
Texas Commission on Environmental Quality (TCEQ)	Temporary Water Use Permit Hydrostatic Test Water Discharge Permit (Surface Waters)	Pipeline System	Introductory Letter Sent: January 15, 2021; Anticipated receipt of permits: First quarter 2024
Texas Parks and Wildlife Department (TPWD)	State-Listed Species Clearance	Pipeline System	Introductory Letter Sent: January 15, 2021; Pending
	Sand & Gravel Permit		Anticipated receipt of permit: Fourth quarter 2023
Texas Historical Commission State Historic Preservation Office	Consultation under Section 106 of the NHPA (36 CFR 800)	Pipeline System	Introductory Letter Sent: January 15, 2021; Anticipated completion of Section 106 consultation for areas requiring landowner survey permission: Pending
Louisiana Department of Environmental Quality – Water Permits Division	Section 401 Water Quality Certification (33 USC §1341)	Terminal Facilities and Pipeline System	Introductory Letter Sent: January 15, 2021; Request for Water Quality Certification Submitted: May 5, 2023; Anticipated receipt of water quality certification: Pending
	Louisiana Pollutant Discharge Elimination System - Hydrostatic Test Water Discharge General Permit (LA R.S. 30:2001 et seq.)		Anticipated receipt of hydrostatic test permit (Terminal): First quarter 2024 Anticipated receipt of hydrostatic test permit (Pipeline): First quarter 2024
	Louisiana Pollutant Discharge Elimination System - Construction Stormwater Discharge Permit (LA R.S. 30:2001 et seq.)		Anticipated receipt of Construction Stormwater Discharge Permit (Louisiana): Fourth quarter 2023
	Louisiana Pollutant Discharge Elimination System – Industrial Wastewater Discharge Permit (LA R.S. 30:2001 et seq.)		Anticipated receipt of Industrial Wastewater Discharge Permit (Louisiana): Fourth quarter 2025
Louisiana Department of Environmental Quality – Office of Environmental Quality	Title V and Prevention of Significant Deterioration (PSD) Air Permits (40 CFR 70)	Terminal Facilities and Pipeline System	Submittal of Title V and PSD Air Permit Applications: July 29, 2022; Anticipated receipt of permits: Third quarter 2023
Louisiana Department of Natural Resources, Pipeline Division	Notice of Construction	Pipeline System	Introductory Letter Sent: January 15, 2021; Anticipated notice of construction: Fourth quarter 2023

Table 1.5-1 Permits, Approvals, and Consultations			
Agency	**Permit/Approval**	**Project Facility Applicability**	**Status**
Louisiana Department of Natural Resources – Office of Coastal Management (LDNR OCM)	Coastal Use Permit (CUP), a Joint Permit Application with the COE (R.S. 49:214.25)	Terminal Facilities and Pipeline System	Submittal of CUP Application: December 3, 2021; Updates to Joint Permit Applications (Pipeline and Terminal) Submitted: November 3 and 4, 2022; Anticipated receipt of CUPs: Pending Compensatory Mitigation Plan and BUDM Plan: Submitted as part of CUP Application in October 2022; Updates to CUP and BUDM Plan Submitted: April 2023; Anticipated approval: Pending
Louisiana Department of Wildlife and Fisheries (LDWF)	State-Listed Species Clearance	Terminal Facilities and Pipeline System	Introductory Letter Sent: January 15, 2021 Anticipated receipt of listed species clearance: Third quarter 2023
	Fill Materials License		Anticipated receipt of fill materials license: Third quarter 2023
	Letter of Authorization – Sabine Island Wildlife Management Area	Pipeline System	Received: June 29, 2022
Louisiana Department of Culture, Recreation and Tourism, Division of Archaeology	Consultation under Section 106 of the NHPA (36 CFR 800)	Terminal Facilities and Pipeline System	Introductory Letter Sent: January 15, 2021 Section 106 consultation complete for the Terminal Facilities December 2021 (Terminal Site) and February 2022 (Marine Facilities) Anticipated completion of Section 106 consultation for Pipeline System: Second quarter 2023
Louisiana Office of State Lands – Land and Waterbottom Management Section	Permit and Lease for State Water Bottoms (LA R.S. 41:1701-1714)	Terminal Facilities and Pipeline System	Introductory Letter Sent: January 15, 2021; Anticipated receipt of permit/lease: Second quarter 2023

1.5.1 Clean Water Act

The CWA, as amended, regulates the discharges of pollutants into waters of the United States and regulates the quality standards for surface waters. Both the EPA and the COE have regulatory authority under the CWA. The EPA has implemented pollution control programs, including setting wastewater standards for industry and creating water quality standards for all contaminants in surface waters. Section 401 of the CWA requires that an applicant for a federal permit who conducts any activity that may result in a discharge to waters of the United States must provide the federal regulatory agency with a Section 401 certification, which declares that the discharge would comply with applicable provisions of the act, including state water quality standards. Section 402 of the CWA authorizes the EPA to operate the National

Pollutant Discharge Elimination System (NPDES) permit program, which regulates point source discharges by industrial, municipal, and other facilities that directly enter surface waters. The EPA delegates Section 401 certification and NPDES permitting to the jurisdiction of the state in which the discharge occurs (e.g., the Louisiana Department of Environmental Quality [LDEQ] or Texas Railroad Commission [RRC]) but may assume authority if the state program is not functioning adequately or at the request of the state. Section 404 of the CWA regulates the discharge of dredge or fill material into waters of the United States and is under the jurisdiction of the COE. However, the EPA has the authority to review and veto the COE decisions on Section 404 permits. The status of the Section 401, 402, and 404 permitting requirements are further addressed in sections 4.4 and 4.5.

1.5.2 Rivers and Harbors Act

The RHA pertains to activities in navigable waters of the United States as well as harbor and river improvements. Section 10 of the RHA prohibits the unauthorized obstruction or alteration of any navigable water of the United States. Construction of any structure or the accomplishments of any other work affecting course, location, condition, or physical capacity of waters of the United States must be authorized by the COE. Section 14 of the RHA authorizes the Secretary of the Army to grant permission to any private, public, tribal, or other federal entity to temporarily or permanently alter or use a COE Civil Works project (e.g., federally maintained navigation channel) if the alteration or use would not be injurious to the public interest and would not impair the usefulness of the Civil Works project (see section 4.4 for the status of compliance with the RHA).

1.5.3 U.S. Department of Defense

The EPAct of 2005 and Section 3 of the NGA require us to consult with the Department of Defense (DOD) Siting Clearinghouse to determine whether there would be any impacts associated with the Project on military training or activities on any military installations. The FERC sent a letter to the DOD on March 8, 2022 requesting their comments on whether the proposed Project could potentially have an impact on the testing, training, or operational activities of any active military installation. On April 5, 2022, the FERC received a response letter from the DOD Siting Clearinghouse stating that the proposed CP2 LNG and CP Express Project would have minimal impact on military operations conducted in this area.

1.5.4 Clean Air Act

The Clean Air Act of 1963 (CAA), as amended, regulates air emissions from stationary and mobile sources, and defines the EPA's responsibilities for protecting and improving the nation's air quality and the stratospheric ozone (O_3) layer. Among other things, the law authorizes the EPA to establish National Ambient Air Quality Standards (NAAQS) to protect the public health and welfare, sets limits on certain air pollutants, and limits emissions of air pollutants coming from sources, such as industrial facilities.

The EPA has regulatory authority under the CAA and has delegated the federal permitting process for the CAA to the LDEQ. Section 309 of the CAA directs the EPA to review and comment in writing on environmental impacts associated with all major federal actions. On November 8, 2010, the EPA signed a rule that finalized reporting requirements for the petroleum and natural gas industry under 40 CFR 98. Section 4.12.1 of this EIS has a detailed discussion of air quality issues and applicable regulations.

1.5.5 Endangered Species Act

Section 7 of the ESA states that any project authorized, funded, or conducted by any federal agency (in this case, the FERC) should not "…jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species which is determined…to be critical…" (16 USC 1536(a)(2)(1988). The FERC, as the lead federal agency for the Project, or CP2 LNG and CP Express as FERC's nonfederal representative, is required to consult with the FWS and NMFS to determine whether any federally listed or proposed endangered or threatened species or their designated critical habitats would be affected by the Project. If the FERC determines that these species or habitats may be impacted by the Project, the FERC is required to prepare a Biological Assessment to identify the nature and extent of adverse impact, and to recommend measures to avoid or reduce potential impacts on the habitat and/or species. Additional information is provided in section 4.8.

1.5.6 Federal Aviation Administration

The DOT's Federal Aviation Administration (FAA) is the federal agency responsible for civil aerospace travel, including the regulation and development of civil aviation, air traffic control, and regulation of U.S. commercial space transportation. CP2 LNG anticipates receiving FAA approval is pending.

1.5.7 Magnuson-Stevens Fishery Conservation and Management Act

The MSFCMA, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), establishes procedures designed to identify, conserve, and enhance EFH for those species regulated under a federal fisheries management plan (FMP). Section 305(b)(2) of the MSFCMA requires federal agencies to consult with NMFS on any action authorized, funded, or undertaken that may adversely affect EFH. The EFH consultation process begins with a determination of adverse effect by the action or authorizing (lead) agency. If an action may adversely affect EFH, an EFH assessment is required per 50 CFR 600.920(e). EFH has been designated within the proposed footprint of the Project. An EFH Assessment for the Project is provided as section 4.7.3.

1.5.8 Coastal Zone Management Act

The CZMA calls for the "effective management, beneficial use, protection, and development" of the nation's coastal zone and promotes active state involvement in achieving those goals. As a means to reach those goals, the CZMA requires participating states to develop management programs that demonstrate how they would meet their obligations and responsibilities in managing their coastal areas. In the state of Louisiana, the Louisiana Department of Natural Resources (LDNR) Office of Coastal Management (OCM) is responsible for administering the Coastal Zone Management Program. The Project is not within the coastal zone in Texas. Section 307 of the CZMA requires federal agency activities to be consistent to the maximum extent practicable with the enforceable policies of a Coastal Zone Management Program. CP2 LNG and CP Express have applied for a Coastal Use Permit from the OCM and would construct the Project following conditions stipulated in the permit to ensure compliance with the Coastal Zone Management Program. Section 4.4.2 summarizes the Project's compliance with the CZMA.

1.5.9 National Historic Preservation Act

Section 106 of the NHPA (54 USC 3001 et seq.), as amended, requires the FERC to consider the effects of its undertakings on historic properties and afford the Advisory Council on Historic Preservation an opportunity to comment. Historic properties include precontact or historic sites, districts, buildings, structures, objects, or properties of traditional religious or cultural importance listed in or eligible for listing in the National Register of Historic Places (NRHP). In accordance with the regulations for implementing Section 106, at 36 CFR 800.2(a)(3), the FERC staff are using the services of the applicant to prepare information, analyses, and recommendations. However, we remain responsible for all findings and determinations. Section 4.11 summarizes the status of our compliance with the NHPA.

2.0 PROPOSED ACTION

2.1 PROPOSED FACILITIES

The Project would involve the construction of a new LNG terminal in Cameron Parish, Louisiana and associated pipeline facilities from Jasper County, Texas to the LNG terminal (figure 1.1.2.1-1). The Project would be constructed in two phases. Phase 1 would include the construction of all proposed facilities, except for nine liquefaction blocks, three pretreatment systems, and two full containment LNG storage tanks, which would be constructed during Phase 2. CP2 LNG and CP Express plan to initiate construction of Phase 1 upon receipt of all required authorizations and Phase 2 would be constructed 12 months after the start of Phase 1 construction. Once fully completed, the Pipeline System would be capable of transporting up to approximately 4.4 Bcf/d of natural gas (with about 50 percent capacity upon completion of Phase 1) to provide feed gas to the Terminal Facilities from points of interconnection with existing pipelines in east Texas and southwest Louisiana. The primary components of the Project are summarized here and detailed in the following sections:

- a liquefaction plant consisting of 18 liquefaction blocks (9 per phase) and ancillary support facilities, each block having a nameplate capacity of about 1.1 MTPA of LNG;
- six pretreatment systems (three per phase), each including an amine gas-sweetening unit to remove CO_2 and a molecular sieve dehydration system to remove water (feed gas would be processed in the pretreatment systems before being directed to the LNG liquefaction blocks);
- four 200,000 cubic meters (m^3) aboveground full containment LNG storage tanks (two per phase) with cryogenic pipeline connections to the liquefaction plant and to the berthing docks;
- CCS facilities, including carbon capture equipment within the Terminal Site as well as a non-jurisdictional CO_2 send-out pipeline outside of the Terminal Site, anticipated to be installed under the southern portion of the Terminal Site floodwall and terminate at a non-jurisdictional offshore platform in State of Louisiana waters;
- a combined cycle natural gas turbine power plant with a nameplate capacity of 1,470 MW (750 MW for Phase 1 and 720 MW for Phase 2);
- two marine LNG loading docks and turning basins;
- three cryogenic lines for LNG transfer from the storage tanks to the docks[31];
- administration, control, maintenance, and warehouse buildings and related parking lots;[32]
- 85.4 miles of 48-inch-diameter natural gas pipeline (CP Express Pipeline);
- 6.0 miles of 24-inch-diameter natural gas lateral pipeline connecting to the CP Express Pipeline near milepost (MP) 26.2 in northwest Calcasieu Parish (Enable Gulf Run Lateral);
- one 187,000-horsepower (HP) natural gas-fired compressor station (Moss Lake Compressor Station; 69,600 HP for Phase I and 117,400 HP for Phase 2);
- six meter stations (five at interconnects with existing pipelines and one at the terminus of the CP Express Pipeline within the Terminal Site); and

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[31] Three LNG transfer lines, one BOG pipeline, and two communications lines would be installed between the Terminal Site and the Marine Facilities.

[32] The Terminal Facilities would also include the following non-jurisdictional facilities: electrical transmission line and substation, water pipeline, septic system, and stormwater facilities/outfalls.

- other appurtenant facilities.

Figure 1.1.2.1-1 depicts the general location of the Project and the location of the Pipeline System and its key components. Figure 2.1-1 depicts the location of the key components of the Terminal Facilities. Figure 2.1-2 depicts the location of the Moss Lake Compressor Station along the route of the CP Express Pipeline. Detailed maps of the aboveground facilities and alignment sheets are in appendix C.

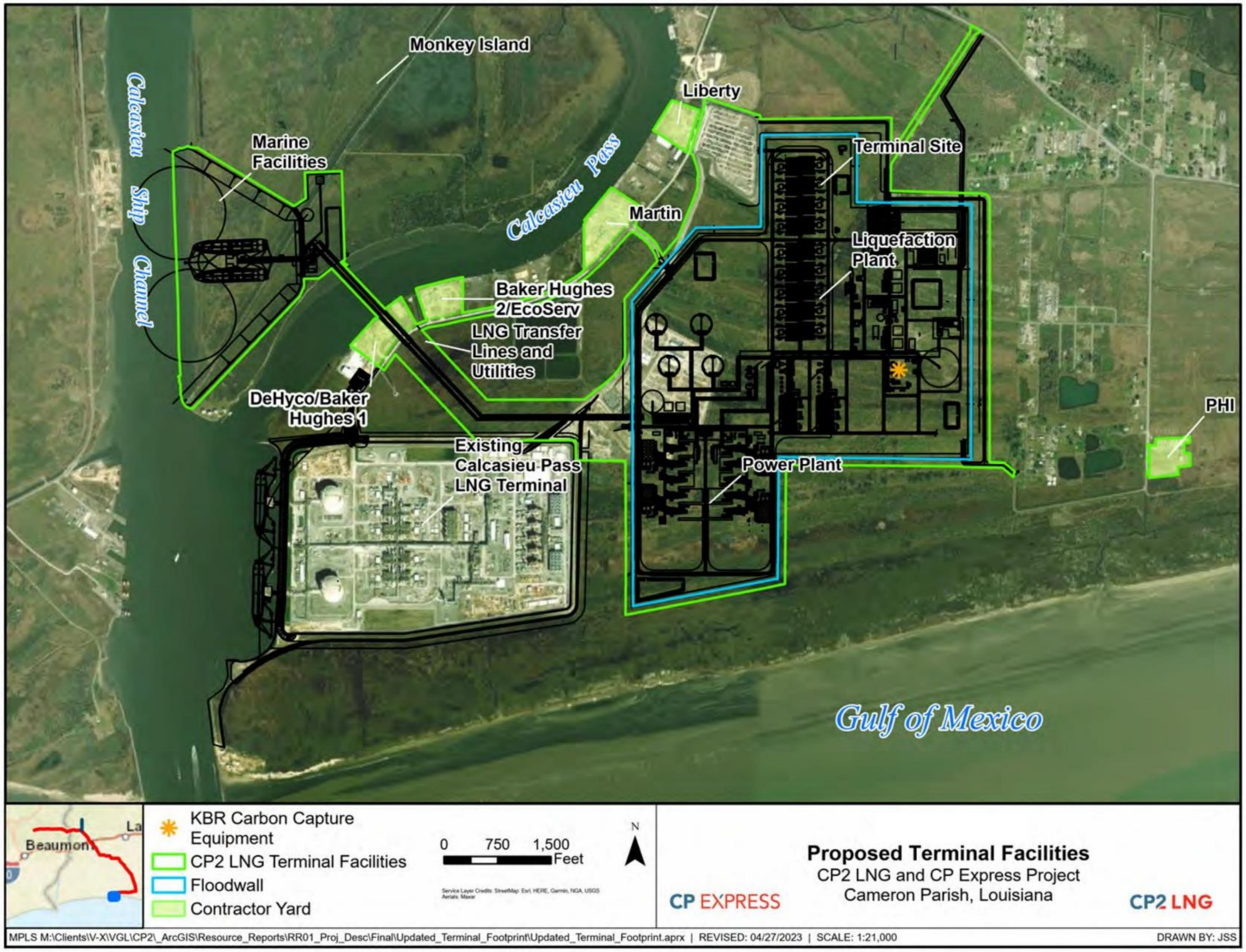

Figure 2.1-1 Terminal Facilities Overview

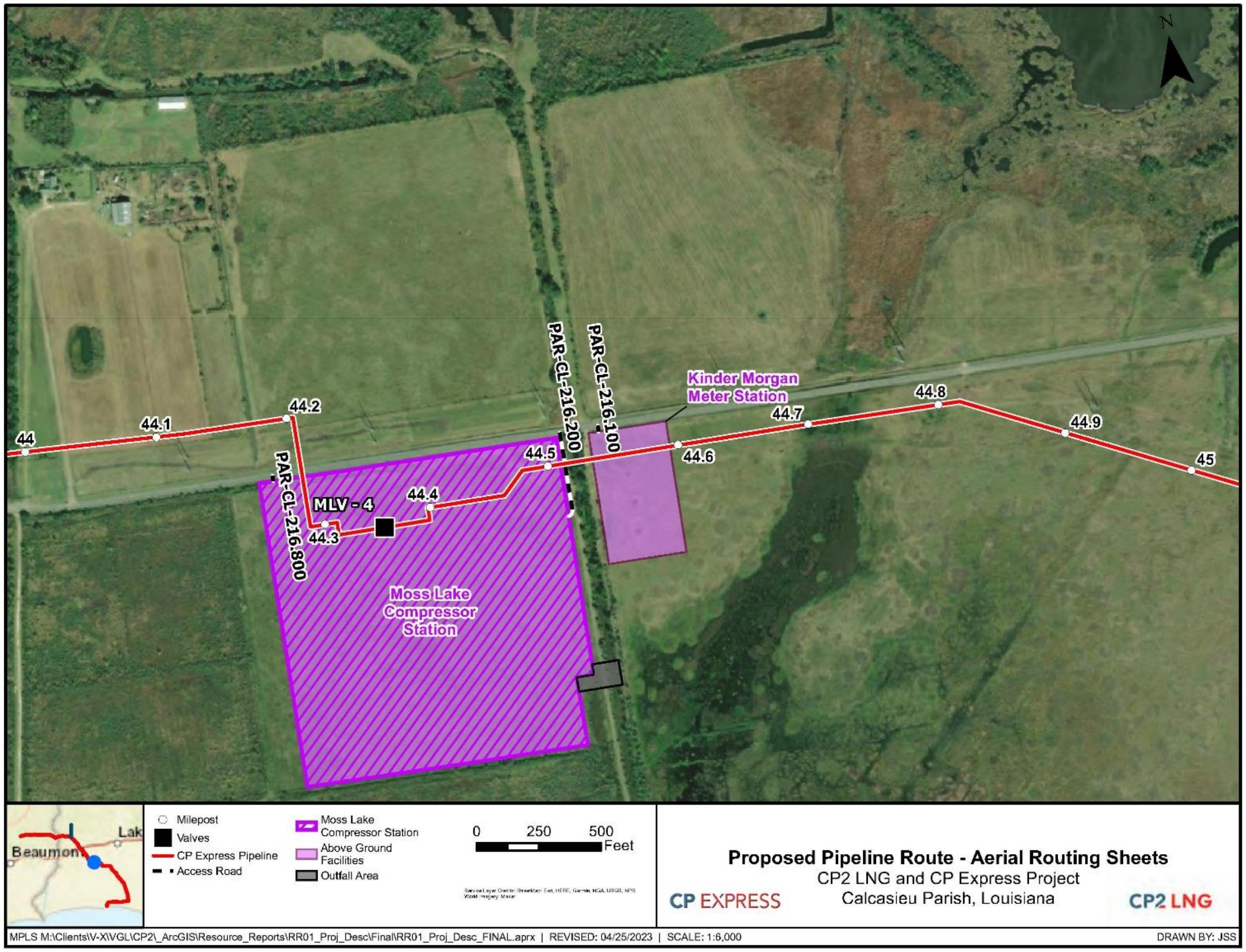

Figure 2.1-2 Aerial Routing Map Including the Moss Lake Compressor Station

2.1.1 Terminal Facilities

2.1.1.1 Gas Gate Station and Interconnect Facility

Upon arrival at the Terminal Site, the feed gas would enter the gas gate station (i.e., CP Express Meter Station) where it would split into two streams, one for process feed to the liquefaction plant and the other for the fuel gas supply[33] to the electric power generation system.

2.1.1.2 Liquefaction Plant

The Terminal Site would include a liquefaction plant comprised of 18 liquefaction blocks (9 per phase) and ancillary support facilities, each block having a nameplate capacity of 1.1 MTPA of LNG.

Pretreatment Process Description

The pipeline-quality natural gas delivered to the Terminal Site would be composed primarily of methane, and would also contain ethane, propane, butane, and other heavy-end hydrocarbons (between 2 and 3 percent), in addition to small quantities of nitrogen, oxygen, CO_2, and water. Natural gas typically contains very small quantities of these constituents, the presence of which has no significant effect on operational efficiency when the gas is used as an energy source for domestic, commercial, or industrial applications. However, these constituents can negatively affect liquefaction equipment and product purity when such gas is used as feed stock for LNG production. The pretreatment process is designed to remove trace constituents from the feed gas to enable the liquefaction process to proceed and to meet customer specifications for LNG quality.

After passing through the gas gate station at the Terminal Site, the feed gas would be sent to the pretreatment facilities. The pretreatment plant contains a mercury removal unit, an acid gas removal unit, a hydrogen sulfide (H_2S) removal unit, and a dehydration unit which would remove trace components of mercury, CO_2, H_2S, and water. A more detailed description of this process is provided below.

The trace amounts of CO_2 present in natural gas would freeze in the cryogenic liquefaction process and block the cryogenic exchangers if not removed beforehand. H_2S is removed to meet LNG specification requirements and to reduce sulfur dioxide emissions. The concentration of CO_2 in the pipeline-quality natural gas supplies in the Project area is not expected to ever exceed the two percent threshold.

Mercury Removal Unit

The mercury removal unit would treat the feed gas containing up to 200 micrograms/m^3 mercury. Treated gas would contain no more than 10 nanograms/m^3 mercury. Sulfur impregnated activated carbon is the most commonly used technology to adsorb the mercury. There would be two 50 percent capacity adsorption beds. Upstream of the beds are two 100% coalescer filters collect any free hydrocarbon liquid. Downstream of the beds are two 100% particulate filters to capture any fine dust particles from the carbon beds. The feed gas stream then flows to the acid gas removal unit for further cleanup.

Acid Gas Removal Unit

The acid gas removal unit would treat the feed gas containing up to 2 percent mole CO_2 and up to 3 parts per million by volume (ppmv) H_2S. Treated gas would contain no more than 50 ppmv CO_2 and no more than 3 ppmv H_2S. Activated methyldiethanolamine technology would be used, primarily due to its

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[33] Natural gas feed used for power generation would be supplemented with boil-off gas and other fuel gas streams generated in the liquefaction plant.

ability to remove CO_2 to very low levels, cause less corrosion issues, and because of its lower foaming tendencies. There would be three 50 percent capacity acid gas removal blocks. Antifoam injection would be provided, as well as storage and make-up facilities for amine and water. The low-pressure CO_2-rich acid gas stream with some H_2S and residual hydrocarbons content would be sent to the thermal oxidizer for destruction.

H_2S Removal Unit

The H_2S removal unit would be downstream of the acid gas removal unit. The concentrated acid gas stream from the acid gas removal unit, containing up to 231 ppmv H_2S, would be fed to the non-regenerative H_2S removal beds to remove H_2S to lower sulfur dioxide emission. Potential carryover of absorbent particles would be removed in the H_2S absorber after filters. The treated gas would be sent to the acid gas removal unit for further treatment.

Dehydration Unit

The dehydration unit would be downstream of the acid gas removal unit and is designed to remove water and heavier hydrocarbons from the feed gas leaving the amine tower after the acid gases have been removed. Water and heavier hydrocarbons in the feed gas would freeze during natural gas liquefaction if not removed beforehand. The gas dehydration system would consist of five molecular sieve vessels. The process flow would be routed through a valve system to three of the vessels while the other two vessels' sieve material would be regenerated with a small flow of dry, hot gas. At any given time, three molecular sieve beds would be in adsorption mode, while the other would be in regeneration mode. The regeneration gas is heated by a hot oil system. The water content of the gas is reduced to less than 1.0 ppmv. The natural gas then flows to the liquefaction blocks.

Liquefaction Process Description

Each of the 18 liquefaction blocks (2 liquefaction units in each block) would utilize the Single Mixed Refrigerant process to produce a nameplate capacity of approximately 1.1 MTPA of LNG (collectively 20.0 MTPA of LNG). However, the Project's peak liquefaction capability would be approximately 28.0 MTPA.

When the pretreated gas enters the liquefaction unit, it is desuperheated[34], condensed to liquid, then sub-cooled to near -260 degrees Fahrenheit (°F) in aluminum plate-fin heat exchangers, which are enclosed and insulated with perlite powder in steel cold-boxes, under a nitrogen purge. Refrigeration for this process is produced by a specially designed single loop mixed refrigerant (MR) system. The refrigerant, a mixture of hydrocarbon gases (e.g., methane, ethylene, propane, butane, and pentane) and nitrogen, is pressurized by a multi-stage electric motor-driven compressor and then partially condensed in air-cooled heat exchangers. The resultant cooled and pressurized vapors and liquids are separated into various streams and continue to be condensed and sub-cooled in the cold-box plate-fin heat exchangers. The cooling source for these MR streams and the natural gas liquefaction stream is created by flashing cold MR to lower pressures then passing those colder MR streams in a counter current direction to the streams to be cooled in the plate-fin heat exchangers. The lower pressure MR is warmed to near ambient temperature and returned to the suction of the compressors to complete the cycle.

Each liquefaction unit would contain a refrigerant make-up system with gas analyzers and controls that maintain the refrigerant components in proper proportion. The refrigerant make-up system is also designed to recover refrigerant during equipment shutdown. Distribution piping would connect vessels in the common refrigerant storage area to each liquefaction unit. Except for certain safety systems, one

[34] The process by which superheated steam is restored to its saturated state or the superheat temperature is reduced.

distributed control system in the liquefaction plant control building, with multiple equipment redundancies, would be used for all process and power control.

When the LNG exits the cold-box, it is depressurized and delivered near ambient pressure to the LNG storage tanks.

LNG Storage

The four LNG storage tanks would be approximately 290 feet in outer tank inner diameter and 176 feet in height from grade to the top of the dome roof, with a net usable capacity of approximately 200,000 m^3. The tanks would be a full containment design featuring a 9 percent nickel steel inner tank, a reinforced and post-tensioned concrete outer tank, a low temperature carbon steel liner, and an aluminum suspended deck for insulation support. The LNG storage tanks are designed and would be constructed so that the self-supporting primary containment and the secondary containment would be capable of independently containing the LNG. The storage tanks, like all of the facilities at the LNG terminal, would be built to the requirements of the NFPA Standard 59A, DOT regulations at 49 CFR 193, American Petroleum Institute (API) Standard 620, American Concrete Institute 376, and API 625. From the LNG storage tanks, the liquefied natural gas would be pumped through cryogenic transfer piping onto LNG carriers at the LNG loading docks.

Marine Facilities and LNG Carrier Loading

Liquefied natural gas would be pumped from the LNG storage tanks to LNG carriers for export. The Marine Facilities would include two LNG loading docks, each designed to accommodate LNG carriers ranging from 120,000 to 210,000 m^3 of cargo capacity, and accompanying turning basins within a shared recessed area along the southwest shoreline of Monkey Island, on the east side of the Calcasieu Ship Channel. Dredging would be required to create the turning basins and berths, as described in more detail in section 2.5.1.4.

Each marine loading dock would include:

- a common pipe and roadway trestle;
- a common loading platform;
- a gangway;
- four marine loading arms;
- associated aids to navigation;
- four berthing dolphins; and
- six mooring dolphins.

A marine vapor control structure approximately 70 feet tall would be constructed at the Marine Facilities for LNG carrier gas-up/cool-down operations. Additionally, a utility dock would be constructed on the eastern side of the Marine Facilities north of and immediately adjacent to the LNG transfer line easement. The dock would facilitate crew boat service between the Marine Facilities on Monkey Island and an existing dock at the DeHyco/Baker Hughes 1 Yard at the mainland Terminal Site. The waterfront facilities would be designed to meet the Coast Guard regulations at 33 CFR 127 and all other applicable standards and codes.

To achieve the proposed maximum loading rate for LNG carriers (12,000 m^3 per hour), the LNG transfer lines from the LNG storage tanks to the loading dock platforms would be nominally sized at

34 inches inside diameter. Each LNG loading platform would support three 16-inch-diameter LNG loading arms and one 16-inch-diameter vapor return arm. Each loading arm would be equipped with the following:

- a hydraulic quick connect/disconnect coupler;
- a hydraulic double-ball, valve-powered emergency release coupler;
- swivel joints with nitrogen purge;
- a mechanical locking device for arm stowing; and
- nitrogen purge and drain connections.

LNG Transfer Lines, Boil-off Gas Pipeline, and Associated Utilities

CP2 LNG would install pipeline facilities between the Terminal Site and Marine Facilities to transfer liquefied natural gas from the LNG storage tanks to LNG carriers. These facilities would consist of the following:

- pipe-in-pipe LNG transfer lines (42-inch outside diameter; 34-inch inside diameter);
- boil-off gas (BOG) pipeline; and
- utilities pipeline that would include a fiber optic and power line.

Construction techniques used to install these facilities are discussed in section 2.5.1.3; more detailed engineering information is provided in section 4.13.

2.1.1.3 LNG Carriers

LNG carriers would access the Terminal Facilities from the Gulf of Mexico through the existing 400-foot-wide navigation channel in the Calcasieu Ship Channel.[35] To approach the Calcasieu Ship Channel, inbound LNG carriers would proceed to the navigational buoy (identified as the CC buoy), which is approximately 30 miles off the coast of Louisiana and designates the Safety Fairway (a regulated corridor, 2 miles wide at the CC buoy and reserved for ship navigation). Once the LNG carrier reaches the CC buoy, a navigational pilot would board the LNG carrier and navigate the carrier inbound to the LNG loading dock. When the ship departs, the pilot would again navigate the ship outbound through the safety fairway to the CC buoy. Once the LNG carrier has cleared the safety fairway, the navigational pilot would depart and the ship master may choose any number of routes based on weather, traffic, or other considerations.

CP2 LNG estimates that its nameplate production volumes would be able to accommodate approximately three to four LNG carrier calls per week at the Marine Facilities after the Phase 1 facilities are placed in service and approximately seven to eight LNG carrier calls per week after the Phase 2 facilities are placed in service (a maximum of 200 carrier calls per year following completion of Phase 1 and a maximum of 400 carrier calls per year following completion of Phase 2). The marine berths on Monkey Island would accommodate LNG carriers ranging in size from 120,000 to 210,000 m^3, with the smallest carriers docking at the Marine Facilities for an average of 24 hours and the largest for an average of 36 hours. The Commission has no jurisdiction over the proposed LNG carriers.

[35] The 400-foot-wide by 40-foot-deep Calcasieu Ship Channel is designed to accommodate deep-draft vessels (Port of Lake Charles, 2021a). The stated dimensions represent the federally managed and authorized component of the channel.

2.1.1.4 Flare System

At the Terminal Site, CP2 LNG would install a warm/cold flare structure approximately 197-feet-tall containing two separate flare headers to handle cold relief fluids and wet/warm relief fluids, a low-pressure vent flare structure approximately 70 feet tall for low-velocity, low pressure flaring, and a marine vapor control unit for marine flaring activities. More information regarding flaring is provided in sections 4.11 and 4.12.

2.1.1.5 Storm Protection and Stormwater Drainage Systems

CP2 LNG would construct a storm protection system to encompass the majority of the Terminal Facilities. Perimeter steel floodwalls would be constructed to protect the site against storm surge and potential wave action, as shown in figure 2.1-1. Further information regarding the storm protection system of the Terminal Facilities is provided in section 4.12.

Stormwater from the main plant area would be discharged to receiving waters near the Terminal Site. LDEQ would regulate the outfalls under the Louisiana Pollutant Discharge Elimination System (LPDES) program, as further discussed in section 4.4.2.1.

2.1.1.6 Carbon Capture and Sequestration Facilities

CP2 LNG would construct a system that contains equipment to capture and sequester an estimated 500,000 tons per year of CO_2 emissions for transport and injection into saline aquifers.[36] The CCS system would be within and outside of the Terminal Site.

The carbon capture equipment within the Terminal Site would route CO_2 from the acid gas removal unit vent stream to three electric-driven compressors with interstage coolers and vessels for water knock-out. After compression to supercritical pressure, pumps would raise the pressure sufficient to enter a pipeline for transport offsite. CP2 LNG would install an aeroderivative simple cycle combustion turbine as part of the Terminal Site's electric generation facilities to provide the additional electric capacity required to operate the three electric equipment units associated with the CCS system.

The CCS facilities described above would be subject to regulation by the EPA as well as other federal and state agencies. For purposes of our NEPA analysis, we evaluate the CCS facilities within the footprint of the LNG Terminal as FERC jurisdictional components of the Project. CCS Facilities outside of the Terminal Site are evaluated as non-FERC jurisdictional facilities in this EIS, and are described further in section 1.4.

2.1.1.7 Buildings and Facility Roads

The Terminal Facilities would include separate permanent buildings for administration, control rooms, a workshop, a warehouse, electrical equipment, and other support structures. The Terminal Site would be accessed by road from Lake Charles via SH 27 from either the east or the west, connecting to Davis Road. No access roads would be constructed for the Terminal Site.

[36] The wellhead for the injection well will be at the platform, where the carbon dioxide will be injected into underground pore space that is expected to be authorized for use via an operating agreement that has been negotiated with the State of Louisiana for permanent storage; final approval with the state is pending.

2.1.1.8 Construction Staging Areas

CP2 LNG would use four marine contractor yards along the shoreline of Calcasieu Pass for construction of the Terminal Site. The yards would be used for staging of equipment and materials, vehicle parking, and barge deliveries of construction equipment and materials.[37] Crew boat transport between the Terminal Site and the Marine Facilities would occur between the existing dock at the DeHyco/Baker Hughes 1 Yard and a new dock to be constructed on the eastern side of the Marine Facilities north of and immediately adjacent to the LNG transfer line easement.

2.1.1.9 Water, Power, and Communications

Electric power for the Terminal Facilities would be generated by new combined cycle gas turbine electric generation facilities, sized to reliably meet the Terminal Facilities' design requirements. The main power load would be consumed by compressor electric motor drivers in the liquefaction plant (two compressors per liquefaction unit, 36 compressors total). Other plant loads would include LNG pumps, BOG and boost compressors, and the multiple fan motors for air cooling during the liquefaction process. The power plant would supply its own auxiliary electric loads, including fans in the air-cooled steam condenser, and would have multiple generators for black start capability. During construction and until the power plant is operational, power for the Terminal Site would be provided by temporary generators and an existing temporary electrical utility line that was previously installed for the recently constructed Calcasieu Pass LNG facilities (FERC Docket No. CP15-550-000). This line, which is adjacent to the floodwall on the western side of the Terminal Site, would remain in place for use during construction. The temporary electric utility line ties into the Jeff Davis electric distribution line along Marshall Street (SH 27). No additional areas would be disturbed to provide electrical power. Once the Terminal Site's power plant is operating, the connection to the local utility would be discontinued.

CP2 LNG would construct new potable water wells within the Terminal Site that meet applicable water quality requirements. Potable water would typically serve the following uses:

- water supply for administration buildings, control rooms, and maintenance buildings;
- make-up water; and
- production of demineralized water.

The firewater tank at the Terminal Site would be filled with water from the fresh water tank, which would obtain water from onsite groundwater wells. The Marine Facilities firewater would be sourced directly from the Calcasieu River in the event of an emergency. The Terminal Facility's sanitary waste disposal system would tie-in to the local wastewater treatment system.

The Terminal Site's communication system would include a telephone exchange, a public address and general alarm system, a ship-to-shore radio system, a computer network and email system, a plant telecommunication network, a telemetry system for data transfer to/from the Terminal Site, and a closed-circuit television system. In addition, a radio tower (height less than 110 feet, including the foundation), would be constructed at the Terminal Site.

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37 The dock at the Baker Hughes 2/EcoServ Yard would not be used for Project-related purposes.

2.1.2 Pipeline System

2.1.2.1 CP Express Pipeline and Enable Gulf Run Lateral

The CP Express Pipeline consists of 85.4 miles of 48-inch-diameter natural gas pipeline in Jasper and Newton Counties, Texas and Calcasieu and Cameron Parishes, Louisiana. The 6.0-mile-long, 24-inch-diameter Enable Gulf Run Lateral would connect to the CP Express Pipeline near MP 26.2 in northwest Calcasieu Parish. The maximum allowable operating pressure (MAOP) for the Class 900 CP Express Pipeline would be 2,100 pounds per square inch gauge (psig) north of the Moss Lake Compressor Station and 2,100 psig south of the Moss Lake Compressor Station. The MAOP for the Enable Gulf Run Lateral would be 1,440 psig.

The pipe for both CP Express Pipeline and Enable Gulf Run Lateral would be made of carbon steel manufactured in accordance with API and/or American Society of Mechanical Engineers specifications. The pipelines would be designed to comply with DOT safety regulations contained in 49 CFR 192. The pipeline and associated appurtenances would be painted above grade and coated below grade with fusion-bonded epoxy, liquid epoxy, or an equivalent protective coating; in some areas, the pipeline would be coated with a second layer of fusion-bonded epoxy or an abrasive resistance overlay for horizontal directional drills (HDD) and road bores. In the water-saturated or inundated areas, those sections of pipeline may be coated with an approximately 4-inch-thick layer of concrete or other approved buoyancy measures such as PipeSaks® or screw anchors, providing negative buoyancy to counteract the tendency of the pipeline to rise.

2.1.2.2 Aboveground Facilities

CP Express proposes to construct one new compressor station (Moss Lake Compressor Station) in Calcasieu Parish, Louisiana; five meter stations at interconnects with existing pipelines; pig launchers and receivers[38]; MLVs, and a gas gate station (i.e., a meter station) at the Terminal Site. Aboveground facilities associated with the Pipeline System are described in the sections below.

Compressor Station

The Moss Lake Compressor Station, in Calcasieu Parish, Louisiana, would be constructed near MP 44.4 of the CP Express Pipeline and contain five natural gas turbine-driven compressor units (34,800 HP each) plus one natural gas-driven booster compressor (13,000 HP) for a total of 187,000 HP. Two units would be installed in Phase 1 (69,900 HP of compression) and the three remaining units and booster compressor would be installed in Phase 2 (117,400 HP of compression). Associated separators, discharge air coolers, valves, and utility systems that would be required for operation and maintenance purposes would also be constructed. Additionally, a 48-inch-diameter pig launcher and receiver would be constructed within the compressor station. A 12-foot-high floodwall would be constructed around the facility, as required by CP Express' building permit under jurisdiction of the Calcasieu Parish Police Jury. The general construction and operation procedures for the compressor station are discussed in sections 2.5.5 and 2.6, respectively.

Meter Stations

Five meter stations would be constructed at interconnects with existing pipelines and one will be located at the terminus of the CP Express Pipeline within the Terminal Site. The meter stations would

[38] Pig launchers and receivers are facilities where internal pipeline cleaning and inspection tools, referred to as "pigs," could be inserted or retrieved from the pipeline.

utilize ultrasonic meters to provide accurate and continuous gas measurement; pressure regulation would also be included.

Pig Launchers and Receivers

In addition to the pig launcher and receiver proposed within the Moss Lake Compressor Station, CP Express would install a 48-inch-diameter pig launcher at the Transco & CJ Express Meter Station in Jasper County, Texas, and a 24-inch-diameter pig launcher station at the Enable Receiver, a 24-inch-diameter pig receiver at the Enable Interconnect Meter Station, and a 48-inch-diameter pig receiver at the Terminal Site Gas Gate Station, all in Calcasieu Parish, Louisiana.

Mainline Valves

CP Express would construct a total of eight MLVs, six of which would be constructed as part of the CP Express Pipeline in Jasper and Newton Counties, Texas, and Calcasieu and Cameron Parishes, Louisiana and two of which would be constructed as part of the Enable Gulf Run Lateral in Calcasieu Parish, Louisiana.

Cathodic Protection System

Cathodic protection would be provided by an impressed current system on the pipelines for external corrosion control, according to the requirements in 49 CFR 192, Subpart I. Deep well anode ground beds and rectifiers would be installed approximately 15 miles apart. Each rectifier would be attached to a power pole and connected to the local electric distribution system. The cathodic protection facilities, including the anode beds, would be installed within the permanent right-of-way or inside the aboveground facilities sites.

2.2 LAND REQUIREMENTS

Construction of the Project would require 2,640.6 acres of land, including 823.8 acres associated with construction of the Terminal Facilities and 1,816.8 acres for the Pipeline System. Following construction, 1,289.7 acres of land would be permanently maintained for operation and maintenance of the facilities, including 681.6 acres for the Terminal Facilities and 608.1 acres for the Pipeline System. Table 2.2-1 summarizes the land requirements for the Project. Section 4.9 provides a more detailed description and breakdown of land requirements and use.

Table 2.2-1

Summary of Project Land Requirements

Facilities	Approximate Milepost	Land Affected During Construction (acres) [a]	Land Affected During Operation (acres) [b]
TERMINAL FACILITIES			
Terminal Site	N/A	631.7	543.8
Terminal Site Yards		38.3	0.0
Marine Facilities	N/A	122.2 [c]	122.2 [c]
LNG Transfer Lines and Utilities [d]	N/A	31.6	15.6
Terminal Facilities Total	**--**	**823.8[e]**	**681.6**
PIPELINE SYSTEM			
CP Express Pipeline [f]			

Table 2.2-1

Summary of Project Land Requirements

Facilities	Approximate Milepost	Land Affected During Construction (acres) [a]	Land Affected During Operation (acres) [b]
Pipeline Facilities			
Pipeline Right-of-Way	0.0 – 85.4	1,384.6	510.3
Additional Temporary Workspace	Various	151.7	0.0
Contractor Yards and Staging Areas	N/A	92.1	0.0
Pipeline Facilities Subtotal	**--**	***1,628.4***	***510.3***
Aboveground Facilities			
Moss Lake Compressor Station, MLV 4, and Pig Launcher/Receiver	44.4	33.7	33.7
Terminal Site Gas Gate Station (i.e., CPX Meter Station), Trap/MLV 7, and Pig Receiver [g]	85.4	0.0 [g]	0.0 [g]
Kinder Morgan Meter Station	44.6	3.8	3.8
Florida Gas Transmission Interconnect Meter Station	31.0	2.2	2.2
TETCO & Boardwalk Interconnect Meter Station	18.1	4.1	4.1
Transco & CJ Express Interconnect Meter Station, Trap/MLV 1, and Pig Launcher	0.0	3.1	3.1
MLV 2	14.9	0.2	0.2
MLV 5	53.2	0.2	0.2
MLV 6	72.7	0.2	0.2
Aboveground Facilities Subtotal	**--**	***47.5***	***47.5***
Access Roads	Various	62.1	8.9
CP Express Pipeline Subtotal	**--**	**1,738.0**	**566.7**
Enable Gulf Run Lateral Pipeline Facilities			
Pipeline Right-of-Way	0.0 – 6.0	55.4	36.2
Additional Temporary Workspace	Various	10.3	0.0
Pipeline Facilities Subtotal	**--**	***65.7***	***36.2***
Aboveground Facilities			
Enable Receiver, MLV 3 Site, and Pig Launcher	0.0 (MP 26.2 of CP Express Pipeline)	1.0	1.0
Enable Interconnect Meter Station, Trap/MLV E2, and Pig Receiver	6.0	2.6	2.6
Aboveground Facilities Subtotal	**--**	***3.6***	***3.6***
Access Roads	Various	9.5	1.6
Enable Gulf Run Lateral Subtotal	**--**	**78.8**	**41.5**
Pipeline System Total	**--**	**1,816.8**	**608.1**
Project Total	**--**	**2,640.6**	**1,289.7**

[a] Construction impacts includes both temporary construction impacts and permanent operational impacts.
[b] Operational impacts include permanent impacts and/or impacts within the operational footprint only.
[c] Includes the portion of the Marine Facilities on Monkey Island that would be excavated and converted to water for the LNG loading docks, turning basins, and berthing area.
[d] Based on a 500-foot-wide construction corridor, where standard construction techniques are used along the land-based portion of the LNG transfer line and utility installation, and a nominal 150-foot-wide permanent easement.

Table 2.2-1 Summary of Project Land Requirements			
Facilities	**Approximate Milepost**	**Land Affected During Construction (acres) [a]**	**Land Affected During Operation (acres) [b]**

e This subtotal includes 99.5 acres of the Terminal Site and LNG transfer line workspace used during construction of the Calcasieu Pass LNG Terminal via an access agreement with CP2 LNG (see section 2.2.1 regarding areas of overlap between the existing Calcasieu Pass LNG Terminal and Terminal Facilities)

f The CP Express Pipeline would cross through a portion of the Terminal Site permanent workspace from MP 85.0 to MP 85.4. Therefore, the land requirements associated with the pipeline's 50-foot-wide permanent easement are accounted for in the Terminal Site footprint at this location.

g This 3.5-acre facility would be constructed entirely within the CP2 LNG Terminal Site; therefore, the temporary/permanent impacts are accounted for in the Terminal Site land requirement.

Note: Totals may not match the sum of addends due to rounding.

2.2.1 Terminal Facilities

Construction of the Terminal Site would affect approximately 631.7 acres of land south and east of Calcasieu Pass and 38.3 acres associated with the temporary yards[39]. Approximately 87.9 acres of temporary construction workspace associated with the Terminal Site and all of the acres associated with the yards (38.3 acres) would be restored to approximate preconstruction conditions following construction. The Marine Facilities would occupy an approximately 122.2-acre area on the southwest side of Monkey Island and would include the LNG carrier loading docks and accompanying turning basins. The LNG transfer lines, BOG pipeline, and utilities would affect an additional 31.6 acres. A nominal 150-foot-wide permanent easement would be retained over the LNG transfer lines, BOG pipeline, and utilities, affecting 15.6 acres between the Terminal Site and Marine Facilities boundaries.

Of the 631.7 acres required for the Terminal Site, there are 1770.3 acres of overlap between the existing Calcasieu Pass LNG Terminal, currently being commissioned, and the proposed Terminal Site. These areas include:

- approximately 77.9 acres associated with the Calcasieu Pass LNG Terminal eastern temporary workspace and access roads;
- approximately 32.2 acres associated with the existing, fully developed marine offloading facilities along the eastern shoreline of the Calcasieu Pass; and
- approximately 67.2acres associated with the Liberty, Helms Road, and PHI Park and Ride (P&R) facilities.

There is no overlap in the design spill exclusion zones for either facility and no overlap of any other spacing requirements included in 49 CFR 193.

39 Of the 38.3 acres associated with the contractor yards, approximately 6.1 acres is associated with the PHI Yard, which would be used for material/equipment staging during early construction phases of Terminal Facilities construction and would be utilized as a park and ride (P&R) facility during peak construction.

2.2.2 Pipeline System

2.2.2.1 Pipeline Right-of-Way

Construction of the Pipeline System rights-of-way would require a total of 1,440.0 acres (CP Express Pipeline right of way [1,384.6 acres] and Enable Gulf Run Lateral right-of-way [55.4]) of land. Of this, 546.5 acres (CP Express Pipeline [510.3 acres] and Enable Gulf Run Lateral [36.2 acres]) would be retained for operation and maintenance of the Pipeline System rights-of-way. Approximately 45 percent (approximately 41.6 miles) of the Pipeline System would be collocated with, or adjacent or parallel to, existing pipeline, powerlines, roadway, railways, and canals (see table 2.2.2-1), including 37.4 miles along the CP Express Pipeline and 4.2 miles along the Enable Gulf Run Lateral. In these cases, the pipeline would not be installed within an existing right-of-way, but may utilize the existing utility right-of-way for temporary construction workspaces. Typical right-of-way cross sections in uplands and wetlands are provided in appendix D.

CP Express states that construction of the proposed 48-inch-diameter CP Express Pipeline would require a 150-foot-wide construction right-of-way in upland areas, which includes 50 feet on the spoil side and 100 feet on the working side of the trench, and a 125-foot-wide construction right-of-way in non-saturated wetland areas to provide sufficient space to store excavated soil for later restoration, particularly in areas of unconsolidated soils, while allowing adequate space for automatic welding operations and safe passage of construction equipment and vehicles. CP Express states that these right-of-way widths are necessary to accommodate the Class 900 pipeline, which has twice the wall thickness and twice the weight as comparable pipelines. Additionally, CP Express states that 88 percent of the CP Express right-of-way would be considered by the Occupational and Safety Administration as Type C soils. Type C soils are much less cohesive than unsaturated soils and require wider and more shallow trench slopes to prevent safety concerns due to sloughing of the trench walls. Lateral spoil piles must be set back at least two feet from the edge of the trench and a gap left between the piles and the edge of the right-of-way. Where the trench spoil is saturated, some of the spoil may need to be stored along the working side of the right-of-way. In upland areas and non-saturated wetlands, CP Express states that sufficient space on the working side of the right-of-way would be required to string/bend the pipe, conduct mainline automatic welding operations with shacks, operate side-booms, lower-in the pipe, utilize the travel lane, and store topsoil or excess subsoil. In saturated wetlands or open water, CP Express states that a sufficient right-of-way is needed to accommodate the use of large amphibious excavators, or excavators on semi-submersible mats, for trench excavation and back-filling and to ensure safe and efficient handling of the pipelines due to the size and weight of the pipeline.[40]

Construction of the proposed 24-inch-diameter Enable Gulf Run Lateral would require a 90-foot-wide construction right-of-way in upland areas and a 75-foot-wide construction right-of-way in wetland areas.

Following construction, CP Express would retain a nominal 50-foot-wide permanent easement for pipeline operations. A 25-foot-wide corridor centered over the pipeline would be maintained in an herbaceous state in uplands. A corridor not exceeding 10 feet in width centered over the pipeline would be maintained in an herbaceous state in wetlands. Additionally, trees within 15 feet of the pipeline that have roots that could compromise the integrity of the pipeline coating may be cut and removed from the permanent right-of-way. The remainder of the construction right-of-way would be restored to approximate preconstruction conditions. Section 2.5 further describes construction procedures.

[40] Additional justification for the right-of-way width is provided in accession nos. 20220805-5137 and 20221013-5133.

Table 2.2.2-1

Summary of Collocated Facilities Along the Pipeline System [a]

Pipeline Facility/ Co-located Utility Company	Co-located Utility Type	Begin Milepost	End Milepost	Paralleled Length (miles)	Paralleled Length (feet) [a]
CP Express Pipeline					
Williams/Transcontinental Gas Pipeline Corporation (Transco)	Pipeline	0.2	2.6	2.4	12,589
Entergy Louisiana, LLC	Power line	2.6	6.4	3.9	20,320
Entergy Louisiana, LLC	Power line	8.2	14.8	6.5	34,555
Entergy Louisiana, LLC/CLECO	Power line	16.5	17.6	1.2	6,258
County Road 4213	Roadway	17.8	18.1	0.3	1,369
Enbridge, Inc.	Pipeline	18.2	18.5	0.4	1,967
Entergy Louisiana, LLC	Power line	18.6	22.4	3.9	20,395
Kinder Morgan Company	Pipeline	23.7	24.6	0.9	4,720
Parish Road/Old No. 7 Road	Roadway	26.3	27.8	1.5	7,754
Parish Canal	Canal	36.6	37.6	1.0	5,231
Targa Resources	Pipeline	37.6	38.0	0.4	1,898
Targa Resources	Pipeline	39.4	39.8	0.4	2,247
Kinder Morgan Company	Pipeline	42.5	42.9	0.4	2,325
Entergy Louisiana, LLC	Powerline	42.9	43.3	0.4	2,134
Entergy Louisiana, LLC	Powerline	43.5	44.2	0.7	3,865
Kinder Morgan Company	Pipeline	44.6	44.8	0.2	1,176
Entergy Louisiana, LLC	Powerline	44.8	45.1	0.3	1,332
Parish Road/Ellis Moss Road	Roadway	47.1	48.0	0.9	4,963
Columbia Gulf Pipeline	Pipeline	49.9	53.3	3.4	18,185
Kinetica Partners, LLC	Pipeline	73.4	78.5	5.2	27,200
TC Energy	Pipeline	81.6	82.2	0.6	3,221
OH Power line	Powerline	82.2	83.4	1.1	5,966
TransCameron Pipeline, LLC	Pipeline	83.4	84.7	1.4	7,128
			Subtotal	**37.4**	**196,800**
Enable Gulf Run Lateral					
Golden Pass Pipeline, LLC	Pipeline	1.0	3.1	2.1	10,906
Golden Pass Pipeline, LLC	Pipeline	3.5	5.2	1.7	9,147
Entergy Louisiana, LLC	Powerline	5.5	6.0	0.4	2,327
			Subtotal	**4.2**	**22,380**
TOTAL				**41.6**	**219,180**

[a] Totals may not match the sum of addends due to rounding.

2.2.2.2 Additional Temporary Workspace

Additional temporary workspace (ATWS) outside of the temporary construction rights-of-way would be required for road and waterbody crossings, existing utility line crossings, bends (also known as points of inflection) along the route, staging areas, spread breaks, pipeline and high-voltage power line crossings, reverse lay sections, hydrostatic test section breaks, MLVs and other facilities, areas where special construction methods would be implemented (e.g., the HDD or guided bore drilling method), and areas where additional space is needed for storage of stripped topsoil. When construction is complete, all ATWS would be restored to approximate preconstruction condition. Table 2.2.2-2 provides a summary of the ATWS required during construction of the Project by county/parish.

Table 2.2.2-2

Summary of Additional Temporary Workspace for the Pipeline System

Pipeline Facility/ County or Parish, State	Additional Temporary Workspace Area (acres) [a]
CP Express Pipeline	
Jasper County, TX	6.6
Newton County, TX	15.6
Calcasieu Parish, LA	56.0
Cameron Parish, LA	73.4
CP Express Pipeline Subtotal	**151.7**
Enable Gulf Run Lateral	
Calcasieu Parish, LA	10.3
Enable Gulf Run Lateral Subtotal	**10.3**
TOTAL	**162.0**

[a] Totals may not match the sum of addends due to rounding.

2.2.2.3 Aboveground Facilities and Associated Appurtenances

Aboveground facilities and associated appurtenances associated with the Pipeline System would include the Moss Lake Compressor Station, six meter stations (five at interconnects with existing pipelines and one at the terminus of the CP Express Pipeline within the Terminal Site), taps/MLVs, and pig launchers/receivers.

2.2.2.4 Contractor Yards and Staging Areas

CP Express would utilize a total of four temporary contractor and/or pipe yards during construction of the Pipeline System for various purposes, such as pipe fabrication, concrete coating operations, construction staging operations, construction materials storage, equipment parking, and temporary construction offices. Following construction, the land affected by the temporary contractor yards and staging areas would be returned to preconstruction conditions.

2.2.2.5 Access Roads

Access roads are used to transport construction workers, equipment, and materials to the construction work area from public interstate, state, county, and local highways/roads. CP Express has proposed the use of 55 roads (including 44 temporary and 11 permanent access roads). A detailed list of the access roads is included as appendix E. These access roads include some private roads and/or two-track roads that may require modification or improvement and construction of new access roads. Existing access roads would be improved by widening where needed up to 25 feet. CP Express would identify any other necessary improvements upon field review of each road. Following project construction, temporary access roads would be returned to preconstruction conditions.

2.3 CONSTRUCTION SCHEDULE AND WORKFORCE

CP2 LNG and CP Express propose to begin construction of Phase 1 upon receipt of all required permits and authorizations and is anticipated to take three years to complete. Construction of the Phase 2 facilities are expected to follow the start of Phase 1 construction by 12 months; therefore, all construction activities (Phase 1 and Phase 2 combined) are anticipated to take a total of 4 years to complete. CP2 LNG and CP Express anticipate construction would start in the fourth quarter of 2023.

During the peak of construction at the Terminal Facilities, an estimated 6,000 onsite workers would be required during overlap of Phase 1 and Phase 2 (a peak of 3,000 workers per Phase). The period of overlap between Phase 1 and Phase 2 is expected to last about 6 months. However, the number of workers present at various stages of construction would vary significantly. Initial mobilization would involve about 300 onsite workers for Phase 1 and Phase 2, respectively. As construction activities at the Terminal Facilities increase, the workforce is expected to average over 1,600 workers for each phase, increasing during construction and decreasing as facilities near completion and pre-commissioning, commissioning, and plant start-up take place. Approximately 125 permanent workers would be employed at the Terminal Facilities after completion of Phase 1, with an additional 125 permanent workers employed after the completion of Phase 2.

For the Terminal Facilities, nighttime work would be required for the duration of construction of both Phase 1 and Phase 2. CP2 LNG states that nighttime construction would allow activities to be synchronized such that they can be spread out more effectively over time, which would reduce congestion and allow more hours for work to be completed, thereby creating a safer work environment. CP2 LNG also states that many aspects of plant testing are best suited for work at night, when areas can be controlled with a lower density of workers (e.g., pressure tests, non-destructive testing, and specific system cleaning operations). Additionally, startup and commissioning operations would be a continuous process, requiring a 24-hour workforce. Additional information regarding nighttime work is provided in sections 4.7 and 4.9.5 regarding lighting and section 4.12.2 regarding noise impacts.

Pipeline System Phase 1 construction would occur over a period of 18 months. Similar to the Terminal Facilities, the number of workers present would vary depending upon the stage of construction. Initial mobilization would involve about 450 workers to the pipeline spreads and 50 workers to the compressor station and meter stations, for a combined total of 500 initial workers. As Phase 1 pipeline construction activities increase, the workforce would have a peak of 1,425 workers and would average 750 workers, but the number of workers would decrease as the Pipeline System is completed. This estimate includes those working on the construction of the pipelines and concurrent construction of the Moss Lake Compressor Station, meter stations, and other facilities associated with Phase 1. Phase 2 construction would occur over a period of 12 months would include installation of additional horsepower at the Moss Lake Compressor Station. The estimated peak workforce for Phase 2 construction is 125 workers and would average 80 workers. The workforce required for Phase 2 of the Pipeline System is anticipated to be small in comparison to the workforce required for Phase 1 due to the limited scope of work associated with Phase 2; therefore, workforce overlap would be minimal. Approximately 10 permanent workers would be employed to operate the Pipeline System (both after Phase 1 and Phase 2 construction).

CP Express states that nighttime construction may be required for the Pipeline System, but would be limited primarily to HDD operations, hydrostatic testing, limited pipeline tie-in work, and testing and commissioning of aboveground facilities. Noise considerations for night-time construction is further discussed in sections 4.7 and 4.9.5 regarding lighting and section 4.12.2 regarding noise.

2.4 ENVIRONMENTAL COMPLIANCE

FERC may impose conditions on any Certificate or authorization that it grants for the Project. These conditions include additional requirements and mitigation measures recommended in this EIS to minimize the environmental impact that would result from construction and operation of the Project (see sections 4.1 through 4.12 and section 5.2). We recommend that these additional requirements and mitigation measures (presented in **bold** type in the text of the EIS) be included as specific conditions to any approving Certificate or authorization issued for the Project. We also recommend that CP2 LNG and CP Express be required to implement the mitigation measures proposed as part of the Project unless specifically modified by other Certificate or authorization conditions. CP2 LNG and CP Express would be required to incorporate all environmental conditions and requirements of the FERC authorization, and associated construction permits into the construction documents for the Project.

CP2 LNG and CP Express would implement the measures and procedures identified in its *Project-specific Upland Erosion Control, Revegetation, and Maintenance Plan* (Plan) and *Project-specific Wetland and Waterbody Construction and Mitigation Procedures* (Procedures)[41], which incorporate the FERC's Plan and Procedures with proposed modifications. The FERC Plan and Procedures (FERC, 2013a, 2013b) are a set of baseline construction and mitigation measures developed to minimize the potential environmental impacts of the construction of pipeline projects in general. CP2 LNG and CP Express have requested minor modifications to the FERC Procedures involving locating extra work areas, equipment, and hazardous materials in the vicinity of wetlands and waterbodies. We discuss CP2 LNG and CP Express' requested modifications further in section 4.5.2.3. CP2 LNG and CP Express would also implement its Revegetation Plan, which includes measures to address workspace cleanup, soil compaction mitigation, revegetation of areas disturbed by construction activities, and the monitoring and maintenance of the revegetated areas.

Should CP2 LNG and CP Express receive Commission approval for the Project, any changes to the authorized Project that CP2 LNG and CP Express may request would require approval from FERC staff. Examples of Project changes could include route realignments, shifting or adding new ATWS, adding access roads, modifying construction methods, or implementing adaptive management strategies in the event originally proposed minimization or mitigation measures are ineffective due to site-specific field conditions. We have developed a variance process for evaluating and approving or denying such requested changes.

CP2 LNG would employ at least one environmental inspector (EI) for the Project to monitor construction activities at the LNG Facilities in accordance with its Plan. CP Express would employ at least one EI per pipeline spread to monitor construction activities at the Pipeline System. The EIs' duties would include ensuring compliance with environmental conditions, construction procedures, techniques and plans, landowner agreements, and permit conditions and requirements. The EIs would also verify construction workspaces prior to use, confirm that all sensitive resources are properly marked, and ensure proper installation and maintenance of all erosion control devices (ECDs). The EIs would have peer status with all other inspectors and would have the authority to enforce permit and FERC environmental conditions, issue stop-activity orders, and impose corrective actions to maintain environmental compliance. In addition to monitoring compliance, the EIs would assist with environmental training for Project personnel regarding environmental conditions and Project-specific plans. The EIs duties further include maintaining status reports and training records for the Project and its personnel.

CP2 LNG and CP Express would require that contractors follow procedures and conduct training for their construction workers on spill prevention and cleanup, waste management, and incident

[41] The Project-specific Plan and Procedures are provided in accession nos. 20220304-5046 and 20211202-5104, respectively.

management and reporting to support environmental compliance during construction. Contractors would be contractually obligated to comply with environmental conditions in the Project's FERC Order, if issued, and applicable permits and authorizations. If any noncompliance during construction is discovered, CP2 LNG and CP Express would direct the contractor to immediately comply. Additional corrective actions may be taken as necessary, including issuance of stop-work orders.

In addition to the EIs, FERC staff would conduct periodic compliance inspections during all phases of construction. Following the inspections, we would enter inspection reports into the Commission's public record. Other agencies may conduct inspections as well. Representatives of these agencies could require the implementation of additional and/or corrective environmental measures. These representatives could also issue work stoppages, impose fines, and recommend additional actions in response to environmental compliance failures.

After construction, we would continue to conduct inspections until the Project is successfully restored and/or stabilized. Additionally, the FERC staff would conduct annual engineering safety inspections of the Terminal operations throughout the life of the Project.

2.5 CONSTRUCTION PROCEDURES

CP2 LNG and CP Express provided a series of Project-specific plans and construction alignment drawings describing how it would construct and operate the Project; reduce potential environmental impacts; and restore, monitor, and maintain the construction and operational footprint. These plans are identified in table 2.5-1 below and are discussed in more detail throughout the EIS.

Table 2.5-1

Construction, Restoration, and Operation Plans for the Project

Plan Name	Location of Plan in CP2 LNG and CP Express' Application
Pipeline Alignment Sheets	Attachment RR1-5 of CP2 LNG and CP Express' March 4, 2022 Response to Environmental Information Request. FERC Accession No. 20220304-5046: https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20220304-5046
	Attachment 3 of CP2 LNG and CP Express' March 24, 2023 Supplemental Project Information. FERC Accession No. 20230324-5101: https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20230324-5101
	Attachment 2 of CP2 LNG and CP Express' May 31, 2023 Supplemental Project Information. FERC Accession No. 20230531-5388: https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20230531-5388
	Attachment EIR13 General-3 of CP2 LNG and CP Express' July 7, 2023 Response to Environmental Information Request. FERC Accession No. 20230707-5222: https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20230707-5222
Project-specific Upland Erosion Control, Revegetation, and Maintenance Plan (includes Operational Maintenance)	Attachment RR1-28 of CP2 LNG and CP Express' March 4, 2022 Response to Environmental Information Request. FERC Accession No. 20220304-5046: https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20220304-5046
Project-specific Wetland and Waterbody Construction and Mitigation Procedures (includes Operational Maintenance)	Appendix 1C of CP2 LNG and CP Express' December 2, 2021 Application. FERC Accession No. 20211202-5104: https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20211202-5104

Table 2.5-1 Construction, Restoration, and Operation Plans for the Project	
Plan Name	**Location of Plan in CP2 LNG and CP Express' Application**
Traffic, Noxious Weed, and Fugitive Dust Control Plan (Pipeline System)	Attachment RR1-26 of CP2 LNG and CP Express' March 31, 2022 Response to Environmental Information Request. FERC Accession No. 20220331-5608: https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20220331-5608
Fugitive Dust Control Plan (for Construction of the Terminal Site)	Attachment RR1-25 of CP2 LNG and CP Express' March 4, 2022 Response to Environmental Information Request. FERC Accession No. 20220304-5046: https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20220304-5046
Spill Prevention, Control, and Countermeasure Plan (SPCC) (for Construction of the Terminal Facilities)	Attachment RR1-27 of CP2 LNG and CP Express' March 31, 2022 Response to Environmental Information Request. FERC Accession No. 20220331-5608: https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20220331-5608. Per Plan, final plans to be provided in the Implementation Plan.
SPCC (for Construction of the Pipeline System)	Attachment RR1-27 of CP2 LNG and CP Express' March 31, 2022 Response to Environmental Information Request. FERC Accession No. 20220331-5608: https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20220331-5608. Per Plan, final plans to be provided in the Implementation Plan.
Stormwater Pollution Prevention Plan (SWPPP) (for Construction of the Terminal Facilities)	Protective best management practices are detailed throughout section 4 below. Per Plan, final plans to be provided in the Implementation Plan
SWPPP (for Construction of the Pipeline System)	Protective best management practices are detailed throughout section 4 below. Per Plan, final plans to be provided in the Implementation Plan
Floodplain Mitigation Plan	Attachment 4 of CP2 LNG and CP Express' March 24, 2023 Supplemental Project Information. FERC Accession No. 20230324-5101: https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20230324-5101
Horizontal Directional Drill Monitoring and Contingency Plan	Attachment 4 of CP2 LNG and CP Express' March 24, 2023 Supplemental Project Information. FERC Accession No. 20230324-5101: https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20230324-5101
Pipeline Hydrostatic Testing Specification Plan	Appendix 2C of CP2 LNG and CP Express' December 2, 2021 Application. FERC Accession No. 20211202-5104: https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20211202-5104
Site-Specific Crossing Plans for Major Waterbodies	Appendix 2C of CP2 LNG and CP Express' December 2, 2021 Application. FERC Accession No. 20211202-5104: https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20211202-5104
Plan for Unanticipated Discovery of Cultural Resources or Human Remains During Construction in Louisiana	Attachment RR4-1D of CP2 LNG and CP Express' March 4, 2022 Response to Environmental Information Request. FERC Accession No. 20220304-5046: https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20220304-5046
Plan for Unanticipated Discovery of Cultural Resources or Human Remains During Construction in Texas	Attachment RR4-1D of CP2 LNG and CP Express' March 4, 2022 Response to Environmental Information Request. FERC Accession No. 20220304-5046: https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20220304-5046

Table 2.5-1 Construction, Restoration, and Operation Plans for the Project	
Plan Name	**Location of Plan in CP2 LNG and CP Express' Application**
Traffic Management Plan (Terminal Facilities)	Appendix B of CP2 LNG and CP Express' April 7, 2023 Supplemental Project Information. FERC Accession No. 20230407-5100: https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20230407-5100
Revegetation Plan	Appendix 7C of CP2 LNG and CP Express' December 2, 2021 Application. FERC Accession No. 20211202-5104: https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20211202-5104
Terminal Facilities Lighting Plan (includes Operation)	Appendix 8B of CP2 LNG and CP Express' December 2, 2021 Application. FERC Accession No. 20211202-5104: https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20211202-5104
Emergency Response Plan (Terminal Facilities)	Appendix 11B of CP2 LNG and CP Express' December 2, 2021 Application. FERC Accession No. 20211202-5104: https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20211202-5104
Horizontal Directional Drill Noise Mitigation Plan	Attachment General 1-r of CP2 LNG and CP Express' July 29, 2022 Response to Environmental Information Request. FERC Accession No. 20220729-5342: https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20220729-5342
Draft Compensatory Mitigation Plan and Beneficial Use of Dredged Material Plan	Attachment EIR9-2d of CP2 LNG and CP Express' April 28, 2023 Response to Environmental Information Request. FERC Accession No. 20230428-5528: https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20230428-5528
Migratory Bird Nesting Mitigation Plan	Attachment General 1-n of CP2 LNG and CP Express' July 29, 2022 Response to Environmental Information Request. FERC Accession No. 20220729-5342: https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20220729-5342
Marine Traffic Management Plan	Attachment RR1-27f of CP2 LNG and CP Express' March 31, 2022 Response to Environmental Information Request. FERC Accession No. 20220331-5608: https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20220331-5608

2.5.1 Terminal Facilities

2.5.1.1 Site Preparation and Temporary Construction Facilities

The Terminal Site would require clearing, grubbing, grading, soil stabilization, and filling to increase ground elevation, some of which must be performed ahead of foundation development and plant construction. The full scope of these activities would be partially dependent on the results of CP2 LNG's geotechnical studies, which would be completed and used to evaluate geotechnical soil properties (e.g., bearing capacity, deformability, liquefaction potential, moisture content, compaction, and slope stability) (see section 4.13 for further information), not only for the existing soil at the site, but also for any imported soil required for general and structural backfilling.

Terminal Site ground elevations would be raised approximately 1.1 foot North American Vertical Datum of 1988 (NAVD 88) by grading and potential import of fill materials. CP2 LNG is considering the use of commercially available aggregate materials, including gravel and crushed stone. Imported fill material would be free from environmental contaminants. Perimeter steel floodwalls would be set at 31.5

feet above mean sea level (MSL) and constructed to protect the site against storm surge and potential wave action, as shown in figure 2.1-1. More information regarding steel floodwall design is provided in section 4.13.

The Terminal Site would require improvement and stabilization to provide a load-bearing surface during construction. Commonly used stabilizers include portland cement and hydrated lime. Soil consolidation may also be achieved through the use of other methods, such as the installation of wick drains and stone columns. CP2 LNG would identify soil improvement requirements after analysis of the geotechnical report and the seismic investigations are completed. Aggregate materials (e.g., gravel and crushed stone) and geotextile layers would be used to level and finish temporary workspace and operational areas, as necessary. Aggregate materials would be delivered to the Terminal Site by truck or barge. Barge operations would utilize the existing docks at the fully developed DeHyco/Baker Hughes 1, Martin, and Liberty Yards on the eastern shore of Calcasieu Pass (see figure 2.1-1). No barge deliveries would occur at the Baker Hughes 2/EcoServ Yard. Truck deliveries would be via Davis Road to the entrance to the Terminal Site directly east of Martin Yard. Upon completion of construction, CP2 LNG would remove any stabilizers or aggregate materials used in previously undeveloped temporary workspaces, replace the topsoil, and restore the areas to approximate preconstruction conditions.

At the outset of construction, CP2 LNG would install temporary facility areas within various portions of the Terminal Facilities permanent workspace to support construction. These temporary facility areas would be used for developing "preliminary works," which include initial site preparation and construction of new site access roads. The temporary facility areas may house offices, sanitary facilities, concrete batch plants, a parking area, and a laydown area.

Preparation of construction workspace across the Terminal Site would involve cutting and filling to rough grade and soil stabilization and improvement, followed by erection of temporary fencing to isolate construction activities from peripheral areas. Electrical, communications, and water systems needed for temporary use during construction would be installed at this time.

During construction, CP2 LNG anticipates that a significant portion of materials, equipment, and modular plant components (including the liquefaction units) would be brought to the site by barge, which would require use of dock facilities along the Calcasieu Pass to allow barge visits during construction. The preliminary estimate for barge visits to the Terminal Site is 2,275 visits over the multi-year construction period. Additional information regarding marine traffic is provided in section 4.10.8.

During Terminal Site preparation, CP2 LNG would design topographic grading plans to ensure efficient and environmentally protective stormwater drainage. The site would be sloped to direct discharges towards perimeter outfalls through a system of ditches and, if necessary, holding basins and filtration devices during construction, allowing sufficient retention time to preclude high sediment loads from reaching receiving waters. Stormwater controls (including placement of gravel or other suitable material to provide a stable, well-drained surface) would be installed. Subsequent installation of the perimeter floodwall would also provide stormwater control. Throughout construction, CP2 LNG would follow the erosion and sedimentation control procedures described in its Project-specific Plan and Project-specific Procedures.

2.5.1.2 Liquefaction Plant Facilities

CP2 LNG is continuing to develop site-specific construction procedures for each Terminal Site facility and structure. However, the general construction procedures described below for the liquefaction plant are applicable to the other major site facilities requiring pile foundations (e.g., LNG storage tanks) and involving the transportation of large equipment units by truck and/or barge. For ancillary site facilities (e.g., utility storage areas, administrative buildings, warehouses), construction would also commence with foundation preparation, which would require the installation of piles.

The liquefaction plant would consist of 18 liquefaction blocks occupying a rectangular footprint in the north central sector of the Terminal Site. Following site grading, soil stabilization, and plant road installation, foundation construction would commence with installation of piles to provide a firm base for the structures supporting the liquefaction blocks. After the piles have been positioned using pre-drilled holes and/or pile-driving, caps would be installed and the concrete pad poured. Pile driving for the stormwater protection wall and the facility foundations would take about 16 months to complete. CP2 LNG would only conduct pile driving operations during daylight hours.

The liquefaction blocks would be interconnected with the gas gate station and LNG storage tanks by buried and aboveground piping interconnects, the latter on steel-framed support racks. Pipe spool fabrication would be undertaken mainly off site. Spools fabricated off site would be delivered by truck and barge. Where possible, pipe racks would be modularized to minimize site work. Pipe sections would be painted, coated, or insulated, as necessary, after welds have been tested according to applicable codes.

Certain larger equipment units, such as pretreatment systems, liquefaction cold-boxes, and refrigerant compressors, would be assembled as modules in several offsite prefabrication yards, most of which would likely be in Texas and Louisiana. This offsite modular approach allows equipment assembly in a more controlled environment than that encountered under the onsite "stick-built" approach. Equipment units necessary for the Terminal Facilities would be constructed at existing commercial facilities within existing previously permitted or disturbed areas. Following the assembly, these large modular units would be barged to the new utility dock, off-loaded, and transported to their respective foundations. Other equipment would be shipped to the Terminal Site by truck. Equipment would undergo quality assurance/quality control inspection and testing at its place of origin and upon installation at the Terminal Site.

Once foundations have been set, work on the liquefaction blocks, piping interconnects, and associated utility systems can occur within the same general timeframe, but would be coordinated such that various inter-dependent systems (e.g., electrical and instrumentation) can be installed and tested according to an appropriately sequenced schedule. After the equipment and piping has been set in place, cable systems would be installed. Ultimately, road paving, final site grading, seeding (if applicable), and cleanup would be completed. Temporary construction facilities would be disassembled and removed on a progressive basis when they are no longer needed. CP2 LNG would restore any previously undeveloped temporary workspace associated with temporary construction facilities in accordance with Project permits if the lag between construction of Phases 1 and 2 allows for one full growing season.

Pipe sections would be either hydrostatically or pneumatically tested (additional details are provided in section 4.3) depending on the type and intended function of the pipe. Water for hydrostatic testing of plant piping would be obtained from the onsite wells or local municipal supply.

2.5.1.3 LNG Transfer Lines and Associated Facilities Construction

CP2 LNG would install the LNG transfer lines, BOG pipeline, and utilities between the Terminal Site and Marine Facilities via a combination of conventional and trenchless (i.e., HDD) construction techniques. A description of the HDD method is provided in section 2.5.3.

2.5.1.4 Marine Facilities Dredging Requirements

CP2 LNG would dredge along the southwest shore of Monkey Island for construction of the Marine Facilities. The LNG loading docks and turning basins would be recessed into the existing southwest shoreline of Monkey Island. Initial estimates indicate that approximately 6.3 million cubic yards of material would be excavated and dredged landward of Monkey Island's existing southwest shoreline and seaward of the existing shoreline to the eastern limit of the Federal Navigation Channel to reach the required water depth of -44.3 feet NAVD88 (42 feet below Mean Low Gulf datum) for the LNG loading docks, berthing area, and turning basins. Dredge disposal activities would occur 6 days per week for 12 to 18 months.

CP2 LNG would conduct the dredging using the hydraulic cutter-suction pipeline dredging method. CP2 LNG is currently evaluating various reuse and placement alternatives for the dredged material, including inland options for beneficial reuse (see sections 4.3 and 4.7). It is anticipated that the dredge material would be transported for disposal via temporary slurry pipelines. CP2 LNG proposed to transport a portion of the dredged material to the Cameron Prairie NWR, and the remaining material would be placed outside of the Cameron Prairie NWR, semi-contained by dikes along the north and south. CP2 LNG would perform characterization analyses of the sediments to be dredged and the nearshore soils to be excavated in the Marine Facilities area to confirm the viability of specific reuse options (e.g., placement at marsh restoration sites, beach nourishment, thin-layer open water placement, offshore disposal in a dredged material disposal site, upland disposal in one or more dredged material placement areas).

Additionally, sediment analyses would be undertaken as necessary to comply with applicable regulations or landowner requirements for dredged material disposal. The rate of sedimentation within the berth basin would decrease after the completion of all construction activities and equilibration of sedimentation sources, and as a result of active use of the basin due to ship maneuvering activities. The need for maintenance dredging would be assessed annually. However, CP2 LNG anticipates that periodic maintenance dredging would occur on a two-year cycle and approximately 158,000 cubic yards of material would be excavated and dredged. CP2 LNG does not believe maintenance dredging would negatively impact ongoing maintenance dredging conducted by the COE. Dredging during long-term maintenance at the Terminal Facilities location would be primarily performed using a hydraulic cutter-suction dredge. Maintenance dredge material, depending on volume and frequency, may be removed by and transported by other methods. CP2 has not yet provided a disposal site for maintenance dredging and is currently evaluating onshore sites, such as COE-operated inland disposal sites, and offshore sites, such as the Calcasieu Dredged Material Site 2, located 0.5 nautical miles offshore and adjacent to the Calcasieu Ship Channel's west jetty.

2.5.1.5 Drainage of the Finished Site

The Terminal Site would be graded such that stormwater flow from process areas would enter a peripheral system of shallowly sloped swales that would collect and carry the runoff to perimeter outfall locations. Before arriving at the outfalls, the stormwater would pass through surficial containment sump devices, which are designed to remove oil and sediments from the stormwater. Areas that do not have a potential for contamination would be carried directly to outfalls. The design and operation of all stormwater discharge and treatment facilities would be in accordance with applicable regulations and permits, including LPDES regulations under the CWA.

2.5.2 Pipeline System

CP Express would construct the Pipeline in accordance with the Project-specific Plan and Project-specific Procedures and in compliance with the requirements of 49 CFR 192 (*Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards*) and other applicable federal and state regulations. Construction specifications would also require adherence to the Stormwater Pollution Prevention Plan (SWPPP) for stormwater discharges; the Spill Prevention, Control, and Countermeasure (SPCC) Plan for fuels, hydraulic fluids, and lubricants; and procedures for specialized construction techniques (e.g., HDD).

2.5.2.1 General Construction Procedures

Right-of-Way Surveying

Prior to clearing the right-of-way, a civil survey crew would stake the centerline of the Pipeline route and the boundaries of the workspace limits. CP Express would identify third-party line crossings and would flag environmentally sensitive areas (e.g., wetland boundaries).

Clearing and Grading

CP Express would clear and grade the construction right-of-way and ATWS where necessary to provide a relatively level surface for trench-excavating equipment and movement of other construction equipment. CP Express would clear trees, rocks, brush, and roots. Clearing and grading operations would incorporate procedures to minimize vegetation removal from slopes, wetlands, and waterbody banks, and to prevent undue soil profile disturbance. After clearing, upland sections of the construction right-of-way would be graded as necessary with a bulldozer or similar equipment to create a safe and level work surface. Trees would only be removed when necessary to facilitate safe and practicable construction. CP Express would preserve natural drainage patterns to the extent practical and would install temporary erosion controls immediately after initial disturbance of the soils where necessary to minimize erosion. The temporary erosion control measures would be maintained throughout construction.

Timber and other vegetation debris may be chipped for use as erosion-control mulch, burned, or otherwise disposed of in accordance with the Project-specific Plan, applicable federal and local regulations, and landowner requirements. If requested by the landowner, timber, brush, or woodchips may be stockpiled in an accessible location adjacent to the right-of-way for the landowner to retrieve for beneficial reuse. CP Express would coordinate with landowners regarding disposal or removal of shrub and tree waste that could pose a threat to livestock, where present. Burning would be conducted in accordance with local permits or ordinances and in such a manner as to minimize fire hazard and prevent heat damage to surrounding vegetation.

Where fences cross the right-of-way, CP Express would cut, brace, and temporarily fit them with gates or gaps to maintain access to the right-of-way. Segregated topsoil would be placed along the right-of-way in such a manner that allows for access, material transport, and pipe assembly. In areas where CP Express stores topsoil and spoil on the same side of the right-of-way, sufficient space or a barrier would be left between the piles to allow for returning the subsoil without disturbing the topsoil pile.

The contractor would initiate and implement fire control activities during construction until relieved by professional fire suppression crews. Precautions CP Express would implement during construction to reduce the likelihood of an uncontrolled fire include:

- all construction personnel would receive instruction on the Project's fire prevention and suppression procedures;
- all crews assigned to the job would be provided with fire control equipment;
- equipment parking areas and small stationary engine sites would be cleared of all extraneous flammable materials;

- gasoline, diesel, and oil storage areas would be cleared of extraneous flammable material and "No Smoking" signs would be posted throughout the area at all times; and
- all used and discarded oil, oil filters, oily rags, or other waste would be disposed of in appropriate and marked containers.

Conventional Lay Trenching

The trench would be excavated to a depth that would allow a minimum of 3 feet of soil cover over the pipeline in accordance with 49 CFR 192.327, with the exception of agricultural lands and specified waterbody crossings where the depth of cover would be 4 feet. The bottom width of the trench would be cut to accommodate the specific diameter of pipe to be installed. Where possible (i.e., if soils are not saturated), CP Express would segregate at least top 1 foot of topsoil in deep soils or the entire topsoil layer in soils with less than 1 foot of topsoil in active cropland, residential areas, or at landowner's discretion, and the excavated material would be stored on the right-of-way next to the trench and remain segregated during construction to avoid loss through mixing. No blasting is anticipated for pipeline installation. Where soils are saturated, CP Express would segregate the trench spoils on the opposite side of the working area and allow the trench to fill with water.

Crossing existing third-party pipelines would generally require the new pipeline to be buried at a greater depth than the existing pipelines; therefore, these areas would be identified and flagged during the preconstruction phase. Trenching near an existing pipeline would proceed only after appropriate field potholing or approved locating methods are completed to confirm the exact location of the pipeline or other foreign utility.

In accordance with the Project-specific Plan and Project-specific Procedures, CP Express would minimize erosion and sedimentation during trenching. These measures include minimizing the free flow of surface water into the trench and through the trench from upland areas into waterbodies. Erosion control measures would also be implemented as necessary for bank stabilization at waterbody crossing locations.

If trench dewatering is necessary, discharge to the ground is generally permitted where adequate vegetation along the right-of-way functions effectively as a filter medium. In areas adjacent to waterways or areas of minimal vegetation, straw bale filters, filtration bags, or other appropriate measures would be used to limit sediment dispersion. Trench dewatering would be performed in accordance with applicable permit specifications.

Stringing, Welding, and Installation

Stringing involves moving pipe segments (or joints) into position along the prepared construction right-of-way. The individual pipe joints would typically be 40 to 80 feet in length. Construction of the pipelines would require the use of large side booms to lift and move the pipe. In upland areas, trucks and loaders would move the joints from the pipe yards and place them along the construction right-of-way, parallel to the trench line, for subsequent bending, if required, line-up, and welding. The stringing trucks would lay or string the individual pipe sections on temporary supports (skids) along the working side of the trench to prepare for subsequent bending, line-up, welding, joint coating, lowering-in, backfilling, and associated inspection activities. Certain pipe joints may be bent to conform to changes in the direction of the pipeline alignment and natural ground contours. Individual pipe joints would be bent to the desired angle in the field and/or pre-fabricated fittings may be used. At waterbody crossings, the amount of pipe required for the waterbody crossing would typically be stockpiled in temporary work areas on one or both banks of the waterbody.

Welding would be performed in accordance with 49 CFR 192, Subpart E, Welding of Steel in Pipelines, and API Standard 1104. Completed welds would be visually and radiographically or ultrasonically inspected to determine integrity. Those welds that do not meet the requirements established by DOT regulations, API Standard 1104, and Project specifications would be repaired or replaced and re-inspected. Following integrity inspections, the pipe would be lowered into the trench using sideboom tractors or similar equipment and bedded with padding material if required (screened native material) prior to backfilling.

CP Express plans to use an automatic/mechanized welding process for the majority of the pipeline welds on the Project. Automatic welding operations would be conducted in portable shelters, commonly referred to as “shacks.” Additional workspace is required for worker safety on either side of the equipment and sheds moving along the construction right-of-way.

Coating Application, Inspection and Repair

To prevent corrosion, the pipeline would be coated in compliance with DOT regulations. The pipe joints would be coated (sprayed-on epoxy) at the mill prior to being delivered to the Project. The ends of each piece would be left bare to allow for welding. Once each weld has been inspected and accepted, the weld area would be field-coated by the coating crew. Because pipeline coatings also provide electrical insulation, the coating would be inspected using equipment that emits an electric charge to ensure there are no locations on the pipeline where there is a defect in the coating.

Backfilling and Grade Restoration

After the pipe is lowered into the trench and bedded with padding material, CP Express would backfill the trench with previously excavated material, using barge-mounted track hoes, amphibious equipment, bulldozers, loaders, and/or compactors depending on the site conditions. Any excess excavated material, or components unsuitable for backfill, would be disposed of in accordance with applicable regulations.

In areas where topsoil has been segregated, the backfilling operation would involve returning excavated subsoil to the trench bottom and then placing the stored topsoil over the returned subsoil in the trench. In upland areas, a soil mound, or “crown,” would be left over the trench to allow for soil settlement unless the landowner requires otherwise. During backfilling, particular care would be taken to minimize erosion, restore the natural ground contours, and restore surface drainage patterns as close to preconstruction conditions as practicable. Upon completion of trench backfilling, topsoil would be redistributed as necessary, and the preconstruction soil profile restored across the construction workspace.

Hydrostatic Testing and Tie-ins

CP Express would hydrostatically test the Pipeline in accordance with DOT safety standards (49 CFR 192) to verify its integrity and ensure its ability to withstand the MAOP. Hydrostatic testing consists of installing a hydrostatic test cap and manifold, filling the Pipeline with water, pressurizing the Pipeline, and maintaining that test pressure. Topography, class locations, construction spread break points, and the availability of test water would determine the length of each test segment. Pipeline test segments would be capped and filled with water. The test section would then be pressurized and hydrostatically tested in accordance with applicable regulations. Any loss of pressure that cannot be attributed to specific factors, such as temperature changes, would be investigated. Any leaks detected would be repaired and the test section retested.

Upon completion of hydrostatic testing, the water would be pumped to the next segment for testing or discharged at the test site. Test water would be discharged through energy dissipating devices (e.g., hay bale filter structure) in accordance with the requirements of a NPDES hydrostatic discharge permit using methods described in the Project-specific Procedures. Test water would contact only new internally coated pipe and the addition of chemical additives is not anticipated. Once a pipe segment has been successfully hydrostatically tested and dewatered, the test cap and manifold would be removed, and the pipe would be tied into the remainder of the pipeline for drying operations. The tie-in weld would be visually and radiographically inspected in compliance with applicable codes and standards.

Cleanup and Restoration

After the completion of backfilling and topsoil replacement across the construction workspace, all disturbed areas would be final graded and any remaining trash, debris, or unsuitable backfill would be disposed of in accordance with applicable regulations. Subsequently, the workspace would be protected by the implementation of appropriate erosion control measures, including site-specific contouring and reseeding with an approved seed mix.

2.5.3 Waterbody and Wetland Crossing Procedures

Waterbody crossings would be completed in accordance with the measures described in the Project-specific Procedures, and in accordance with federal, state, and local permits. CP Express would install the pipeline using one of the waterbody crossing methods described below.

2.5.3.1 Horizontal Directional Drill

The HDD method is a process that allows for trenchless construction by drilling a hole beneath a surface feature, such as a waterbody or other unique resource, and installing a prefabricated segment of pipeline through the hole. For each HDD crossing, electric grid guide wires would be laid by hand along the ground's surface of the pipeline centerline to create an electromagnetic sensor grid. The grid would be used by the HDD operator to steer the drill head during drilling. No significant ground disturbance would be required for installation of the guide wires, except for vegetation clearing by hand between HDD entry and exit workspaces, as discussed below.

To complete each HDD, a drill rig would be placed on the entry side of the crossing and a small-diameter pilot hole would be drilled along a pre-determined path beneath the surface feature, using a powered drill bit. As drilling progresses, additional segments of drill pipe would be inserted into the pilot hole to extend the length of the drill. The drill bit would be steered and monitored throughout the process to maintain the designated path of the pilot hole. Once the pilot hole is complete, the electric sensor grid would be removed and the hole would be enlarged to accept the pipeline.

To enlarge the pilot hole, a larger reaming tool would be attached to the end of the drill on the exit side of the hole. The reamer would be drawn back through the pilot hole to the drill rig on the entry side of the hole. Drill pipe sections would be added to the rear of the reamer as it progresses towards the rig, allowing a string of drill pipe to remain in the hole at all times. Several passes with progressively larger reaming tools would be required to enlarge the hole to a sufficient diameter to accommodate the pipeline. The final hole would be about 12 inches larger than the pipeline to be installed. HDD operations from initial pilot hole drilling, through reaming, are typically performed on a 12-hour per day basis except for the pullback phase, which may extend over a 24-hour duration if required.

Throughout the drilling process, a fluid mixture consisting of water and bentonite clay (a naturally occurring mineral) would be pressurized and pumped through the drill stem to lubricate the drill bit, maintain the hole, and remove drill cuttings. Water for the mixture would be pumped to the drill site through a hose or temporary network of irrigation-type piping or trucked in from another source. Small pits would be dug at or near the entry and exit points for the HDD to temporarily store the drilling fluid and cuttings. The fluid and cuttings would be pumped from the pits to an onsite recycling unit where the fluid would be processed for reuse. Alternatively, frac tanks may be used to temporarily store the drilling fluid and cuttings.

The pipeline segment to be installed beneath the surface feature would be fabricated in the ATWS on the exit side of the crossing while the drill hole is reamed to size. The pipeline segment would be inspected and hydrostatically tested prior to installation. After the hole is completed, the pipeline segment would be attached to the drill string on the exit side of the hole and pulled back through the hole toward the drill rig. A steel pullhead would be welded onto the front end of the pull section to aid in pulling the pipe through the drill hole.

As the pipeline is being installed, excess drilling fluid (water and bentonite clay mixture) would be collected and used beneficially (i.e., by landfarming, as a soil admixture in an upland area with landowner approval) or disposed of at an appropriate licensed facility. Prior to beneficial reuse of drilling fluids, landowner approval would be obtained and testing for environmental contaminants would be performed in accordance with applicable regulations and/or landowner requests. If water is left over from the drilling process, it would be discharged in accordance with the Project-specific Plan and Project-specific Procedures and applicable permit conditions.

Mechanical vegetation clearing between HDD entry and exit workspaces is not planned. However, minimal vegetation clearing by hand between HDD entry and exit workspaces would occur to accommodate the installation of the guidance wires. Travel between the HDD entry and exit workspaces would be primarily via foot traffic. However, in certain instances, light vehicle access (via rubber-tired vehicles only) may be necessary to set up pumps to support the HDD operations, for inspection purposes, and to manage any potential drilling mud releases as described below. Ground disturbance due to light vehicle access is anticipated to be minimal. CP Express would conduct any vegetation clearing required to accommodate the light vehicle access by hand.

If a natural fracture or weak area in the ground is encountered during drilling, an inadvertent return of drilling fluid to the environment could occur. Substrate consisting of unconsolidated gravel, coarse sand, or fractured bedrock could present circumstances that increase the likelihood of an inadvertent return. Depending on the orientation of the natural fracture or substrate, the drilling fluid may move laterally or vertically from the drill hole. If the drilling fluid moves laterally, the release may not be evident on the ground. For an inadvertent return to be evident on the ground surface, there must be a preferential pathway extending vertically from the drill hole to the surface. The volume of fluid released in an inadvertent return would be dependent on a number of factors, including the size of the pathway, the permeability of the geologic material, the viscosity of the fluid, and the pressure of the hydraulic drilling system. CP Express has filed a HDD Monitoring and Contingency Plan[42] that describes drilling fluid composition and management, HDD monitoring procedures and frequency, and response procedures should an inadvertent return of drilling fluid occur. This plan also provides contingency crossing options in the event of drill failure. We have reviewed CP Express' HDD Monitoring and Contingency Plan and find it acceptable. HDD feasibility and potential for impacts on resources are further discussed in section 4.2.4 and the applicable resource sections, respectively. Table 2.5.3-1 identifies the proposed HDD crossings for the Pipeline System.

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[42] This document can be viewed in attachment 4 in accession no. 20230324-5101.

Table 2.5.3-1 Planned Horizontal Directional Drill Locations Along the Pipeline System					
Pipeline Facility/ County or Parish	**Begin Milepost**	**End Milepost**	**Approx. Length (miles)**	**Approx. Length (feet)**	**Feature Crossed**
CP Express Pipeline					
Newton County, TX	15.0	15.3	0.3	1,726	Waterline/SH 12
Newton County, TX and Calcasieu Parish, LA	19.9	21.1	1.2	6,143	Sabine River/Cutoff Bayou/Old River
Calcasieu Parish, LA	26.7	27.1	0.4	2,000	Canal Crossing #1 [a]
	32.1	32.4	0.3	1,807	Highway 90/Railroad
	33.6	33.9	0.4	2,075	Interstate 10
	41.7	42.1	0.4	2,000	Energy Corridor
	45.4	45.7	0.4	2,000	Canal Crossing #2 [a]
	48.1	49.0	0.9	4,900	Wetland
	49.5	50.0	0.5	2,692	Intracoastal Waterway [a]
	50.4	51.3	0.9	4,792	Mud Lake/Calcasieu Ship Channel
Cameron Parish, LA	84.4	84.7	0.4	1,983	Marshall Street
	84.9	85.2	0.4	2,000	Terminal Site
Enable Gulf Run Lateral					
Calcasieu Parish, LA	3.5	4.4	0.9	4,600	Houston River

[a] Access to these water sources, via foot traffic and/or light vehicle access, would be required to set up pumps to support the HDD operations.

2.5.3.2 Bore Method

Conventional boring consists of creating a tunnel-like shaft for a pipeline to be installed below roads, waterbodies, wetlands, or other sensitive resources without affecting the surface of the resource. To complete a bore, two pits would be excavated, one on each side of the feature to be bored. A boring machine would be lowered into one pit, and a hole would be bored to a diameter approximately 2 inches larger than the diameter of the pipe (or casing, if required) at the depth of the pipeline installation. The pipeline section and/or casing would be pushed through the bore to the opposite pit. If additional pipeline sections are required to span the length of the bore, they would be welded to the first section of the pipeline in the bore pit before being pushed through the bore.

Because the bore method involves pits on each side of the feature, this method is primarily used for crossings of roads or railroads. However, adjacent waterbodies or wetlands are typically included within the length of the bore. Some elevated or channelized waterbodies, such as irrigation ditches, may also be successfully bored, depending upon the groundwater level in the area.

2.5.3.3 Open-Cut Construction Method

The open-cut construction method involves trench excavation, pipeline installation, and backfilling in a waterbody without controlling stream flow (wet-ditch open-cut method) or while diverting streamflow (dry-ditch open-cut method). With the wet-ditch open-cut method, the trench is excavated across the stream using track hoes or draglines working within the waterbody, on equipment bridges, and/or from the streambanks. Once the trench excavation across the entire waterbody is complete, a pre-fabricated section of pipe is lowered into the trench. The trench is then backfilled with the previously excavated material. Following pipe installation and backfilling, the streambanks are reestablished to approximate preconstruction contours and stabilized. Erosion and sediment control measures are then installed across the right-of-way to reduce streambank and upland erosion and sediment transport into the waterbody.

2.5.3.4 Flume and Dam-and-Pump

Dry-ditch crossing methods involve conventional trenching of channels that are either dry (contain no discernible flow) or not flowing at the time of crossing. A dry-ditch crossing of a flowing waterbody requires the installation of a flume or dam-and-pump to isolate the majority of the stream flow from the trench construction. The flume method involves diverting the flow of water across the construction work area through one or more flume pipes placed in the waterbody. After the flume pipes are placed in the waterbody, sand bags or equivalent dam diversion structures are installed in the waterbody upstream and downstream of the trench area. These devices dam the stream and direct the water flow through the flume pipes thereby isolating the water flow from the construction area between the dams. A backhoe reaches under the flume pipe to dig the trench. The flume pipes and dams typically remain in place during pipeline installation and until final cleanup of the streambed and banks is completed.

The dam-and-pump method is similar to the flume crossing method except that pumps and hoses are used instead of flumes to move water across or around the dammed construction work area. The technique involves damming the stream channel, installing a pump upstream of the crossing, and running a discharge hose from the pump across the construction area to a discharge point downstream of the trench line area. Water flow is maintained throughout the dam-and-pump operation until the pipeline is installed and the streambed and banks are restored and stabilized.

2.5.3.5 Marsh Push Method

The push method is typically used in saturated wetlands and wet soil areas. Equipment on the construction right-of-way would be minimized and, when used, would be of the type having the least environmental impact in any given conditions. This equipment includes mats, marsh buggies, airboats, amphibious equipment, tracked equipment, and barges. The contractor would use discretion in choosing the equipment that would create the least ground pressure for the specific application.

During construction preparation, suitable “push sites” would be identified that are near existing roads, if possible, have all-weather access, and are preferably on higher ground. In addition, mats may be used to provide a firmer foundation for equipment storage and for pipe staging and pipe pushing. Some of the push work in open water sections may be performed from barges as required by access and site conditions.

Once the push sites are established, the right-of-way work can begin. When the right-of-way conditions are determined, the appropriate clearing equipment (amphibious or tracked) would be selected to prepare the right-of-way for the pipe. Where there is standing water, only enough clearing and trenching would be done to accommodate the pipe, trench spoil storage, and passage of equipment and barges, if required. At the push site, various pipeline operations would take place, including welding, non-destructive testing, joint coating, coating repairs, and flotation apparatus installation.

When used, the pipe sections, which are typically concrete-coated, 40-foot lengths, would be transported as needed by truck or barge from the pipe staging area to the push sites. At the push sites, after the pipe joints are welded together, the weld joints coated, and the floats attached, the pipe string would be floated into the cleared right-of-way trench as part of the pipeline push operation. If necessary, a cable would be attached to the front of the pipe string and pulled from the other end of the right-of-way section to assist the push operation. During this operation, traffic on the right-of-way would be restricted, except to remove the floats once the pipe is in place. Trench backfilling would begin once the pipe is in place. The push method may be used in saturated wetlands and open water areas.

2.5.4 Road and Railroad Crossing Procedures

Pipeline construction across major paved highways, railroads, and unpaved roads where traffic cannot be interrupted would be accomplished by using a conventional bore technique (jack and bore method) or HDD method, as described above. Smaller unpaved roads and drives would be crossed by open trenching. If an open-cut road requires extensive construction time, CP Express would provide detours or other measures to permit traffic flow during construction. Railroad and major roadway crossings accomplished using conventional jack-and-bore methodology or HDD would be constructed independently by separate construction crews and later tied into the rest of the pipeline. With these methods, the pipeline would pass under the railroad or roadway with limited disturbance to traffic.

CP Express would use the open-cut crossing method for privately owned roads or public roads within a marsh push section. CP Express would work with landowners to ensure continued road access during construction and would repair road damage caused by pipeline construction. The pipeline would be buried to the depth required by applicable road crossing requirements and would be designed to withstand anticipated external loadings.

2.5.5 Aboveground Appurtenant Facilities

At the sites of aboveground facilities, construction would involve: clearing and grading; placing concrete pad foundations; fabrication welding; installing equipment and equipment housing, compressor units, electrical and instrumentation systems, and permanent perimeter fencing; and conducting surface cleanup during which open areas within the fence line would be covered with gravel, oyster shell, limestone aggregate, or similar material. Where a pig launcher or receiver is installed, a concrete containment area would be constructed below the launcher or receiver’s barrel.

2.5.6 Site Access and Traffic

CP2 LNG developed a Traffic Management Plan for the Terminal Facilities, which addresses worker and materials/equipment transportation for the Terminal Site construction areas. The plan would comply with state and local regulatory requirements and would contain specific routing information and delivery timelines. The Terminal Site can be accessed by road from Interstate 10 in Lake Charles, turning south to SH 27, and continuing south and then west to SH 27/82 (Marshall Street), east of the Calcasieu Ship Channel. Additionally, it can be accessed from the west side of the Calcasieu Ship Channel via the local ferry. From the center of the Town of Cameron, which is approximately 0.4 mile north of the Terminal Site, current access is via Davis Road, a parish road that runs south along the west side of the Terminal Site.

CP Express prepared a Traffic Management Plan for the Pipeline System, which is included in the Traffic, Noxious Weed, and Fugitive Dust Control Plan. Provisionally, access to the Pipeline System construction areas would be via the existing local road network and proposed access roads described in section 4.10.8.

2.6 OPERATIONS AND MAINTENANCE

2.6.1 Operation

CP2 LNG and CP Express would operate and maintain all facilities in accordance with applicable government safety standards and regulations intended to ensure adequate protection of the public and to prevent facility accidents and failures. With respect to the Terminal Facilities, these standards and regulations include, as applicable, the DOT *Federal Safety Standards for Liquefied Natural Gas Facilities* (49 CFR 192 and 193), NFPA Standard 59A, and applicable sections of the Coast Guard's regulations for *Waterfront Facilities Handling Liquefied Natural Gas and Hazardous Gas* (33 CFR 127 and Executive Order 10173). For the Pipeline System, the standards and regulations include, but are not limited to, the PHMSA standards and regulations in 49 CFR 192.

CP2 LNG would prepare detailed operating procedures for the Terminal Facilities after final design is completed. The procedures would address safe startup, shutdown, cool down, purging, as well as routine operation and monitoring. Comprehensive training would be provided to ensure that facility personnel are familiar with, and adhere to, properly documented and recognized safety procedures. The potential hazards of cryogenic LNG operations and proper equipment operation would be two areas of focus. Operators would meet the applicable training requirements of the DOT, Coast Guard, and other regulatory entities.

CP2 LNG and CP Express would prepare an Emergency Response Plan that would address safety procedures during weather events, including storm surges and hurricanes for the Terminal Facilities and includes safety procedures for the Pipeline System. Particular efforts would be made to coordinate with and involve appropriate local officials to ensure effective integration with local communication and emergency response systems.

2.6.2 Maintenance

CP2 LNG and CP Express would maintain the Terminal Facilities and Pipeline System in accordance with the applicable provisions of 49 CFR 192 and 193, other applicable laws and regulations, and through procedures and programs developed by CP2 LNG and CP Express. Full-time staff would conduct routine maintenance and minor repairs, whereas major overhauls and non-routine maintenance would be handled by specialty contractors. Both scheduled and unscheduled maintenance would be entered into a computerized maintenance management system and disseminated to the appropriate personnel for follow-up. Operations and maintenance personnel, including those based at the Moss Lake Compressor Station and Terminal Facilities, would be trained in the use of the computerized maintenance management system. Scheduled preventive and predictive routine maintenance would include equipment rotation and inspection of safety equipment, environmental equipment, and instrumentation. Maintenance activities would be performed by trained maintenance technicians reporting to a maintenance supervisor.

Maintenance activities for the Pipeline System would be limited to right-of-way upkeep and pipeline inspection and repair. CP Express personnel would perform periodic aerial and/or ground inspections for exposed pipe, unauthorized encroachment on the right-of-way, activities near the right-of-way, and other conditions that could present a safety hazard or require preventive maintenance or repairs. The pipeline cathodic protection system would also be monitored and inspected periodically to ensure proper and adequate corrosion protection. Appropriate corrective action for conditions observed during inspection would be taken as necessary.

CP Express would mark the centerlines of the CP Express Pipeline and Enable Gulf Run Lateral at line-of-sight intervals and at crossings of third-party pipelines, marine channels, roads, and other key points. The markers would clearly indicate the presence of each pipeline and provide a telephone number and address where a company representative can be reached in the event of an emergency or prior to any third-party excavation in the pipeline vicinity. Additional information regarding Reliability and Safety for the Terminal Facilities and Pipeline System is provided in section 4.13.

2.7 FUTURE EXPANSION AND ABANDONMENT PLANS

We received a comment from For a Better Bayou, et. al. requesting an analysis of future expansion of the Project facilities. CP2 LNG and CP Express have not identified any future expansions of the Terminal Facilities or Pipeline System. Further, future expansions would be subject to NEPA review if within the jurisdiction of federal agencies (e.g., FERC, COE, EPA, Coast Guard, and DOE). The Terminal is projected to have a minimum design life of 30 years. The Pipeline System is projected to have a minimum design life of 50 years.

3.0 ALTERNATIVES

3.1 INTRODUCTION

As required by NEPA and FERC policy, we identified and evaluated reasonable alternatives to the Project and its various components to determine whether the implementation of an alternative would be environmentally preferable to the proposed action. A reasonable alternative would meet the Project's purpose and would be technically and economically feasible and practical. The range of alternatives analyzed include the No-Action Alternative, system alternatives, Terminal Site alternatives, Terminal Site layout alternatives, pipeline route alternatives, and aboveground facility site alternatives. An alternative would be environmentally preferable if it offers a significant environmental advantage over the proposed action.

We generally consider an alternative to be preferable to a proposed action using three evaluation criteria, as discussed in greater detail below. These criteria include:

1. the ability of the alternative to meet the stated purpose of the Project;

2. the technical and economic feasibility and practicality of each alternative; and

3. whether each alternative would provide a significant environmental advantage relative to the proposed action.

The alternatives were reviewed against the evaluation criteria in the sequence presented above. For the first criterion, an alternative that cannot achieve the purpose for the project cannot be considered as an acceptable replacement for the Project and would not be considered further. Alternatives that would not meet the Project's purpose were not brought forward to the next level of review (i.e., the second evaluation criterion).

With respect to the second criterion, not all conceivable alternatives are technically feasible and practical. Technically practical alternatives, with exceptions, would generally require the use of common construction methods. An alternative that would require the use of a new, unique, or experimental construction method may not be technically practical because the required technology is not available or is unproven. Generally, we do not consider the cost of an alternative as a critical factor unless the added cost to design, permit, and construct the alternative would render a project economically impractical. Alternatives that would not meet the Project's purpose or were not technically/economically feasible or practical were not brought forward to the next level of review (i.e., the third evaluation criterion).

For the third criterion, in conducting an alternatives analysis, the environmental advantages and disadvantages of the proposed action must be recognized in order to focus the analysis on reasonable alternatives that may reduce impacts and offer a significant environmental advantage. Determining if an alternative provides a significant environmental advantage requires a comparison of the impacts on each resource as well as an analysis of impacts on resources that are not common to the alternatives being considered. The determination must then balance the overall impacts and all other relevant considerations. In comparing the impact between resources, we also considered the degree of impact anticipated on each resource. Ultimately, an alternative that results in equal or minor advantages in terms of environmental impact would not compel us to shift the impacts from the current set of landowners to a new set of landowners.

Through environmental comparison and application of our professional judgment, each alternative is considered to a point where it becomes clear if the alternative could or could not meet the three evaluation criteria. Our environmental evaluation considers quantitative data (e.g., acreage or mileage) and uses common comparative factors such as total length, amount of collocation, and land requirements. To ensure a consistent environmental comparison and to normalize the comparison factors, we generally use desktop sources of information (e.g., publicly available data, geographic information system data, aerial imagery). Where comparable data exists for the alternative, we also use site-specific information (e.g., field surveys or detailed designs). In recognition of the competing interests and the different nature of impacts that sometimes exist (i.e., impacts on the natural environment versus impacts on the human environment), we also consider other factors that are relevant to a particular alternative and discount or eliminate factors that are not relevant or may have less weight or significance.

CP2 LNG and CP Express participated in our pre-filing process during the preliminary design stage of the Project (see section 1.0). This process emphasized identification of stakeholder issues, as well as identification and evaluation of alternatives that could reduce environmental impacts. CP Express revised their pipeline route based on conversations with landowners during the pre-filing process to minimize impacts on the landowners to the extent practicable. Our analysis of alternatives is based on Project-specific information provided by the applicant, affected stakeholders, those comments received during Project scoping, publicly available information, our consultations with federal and state agencies, and our own research regarding the siting, construction, and operation of the proposed Pipeline System and Terminal Facilities and their impacts on the environment (i.e., our alternatives analyses are comment and resource driven). As a result of utilizing desktop sources to ensure a consistent comparison (as described above), some of the information presented in this section relative to the Project may differ from information presented in section 4.0, which is based on Project-specific data derived from field surveys and engineered drawings.

3.2 NO-ACTION ALTERNATIVE

NEPA requires the Commission to consider and evaluate the no-action alternative. According to CEQ guidance, in instances involving federal decisions on proposals for projects, no-action would mean the proposed activity would not take place and the resulting environmental effects from taking no-action would be compared with the effects of permitting the proposed activity. Further, the no action alternative provides a benchmark for decisionmakers to compare the magnitude of environmental effects of the proposed activity and alternatives.

Thus, under the No-Action Alternative, the Project would not be developed and CP2 LNG and CP Express' objective of liquefying and exporting natural gas to foreign markets would not be realized. In addition, the potential environmental impacts discussed in section 4.0 of this EIS would not occur.

The No-Action Alternative might result in end users of LNG making different arrangements to meet their needs. Although it is speculative to predict what actions might be taken by policymakers or end users if the No-Action Alternative is selected, it is possible that renewable energy sources (e.g., solar power), traditional energy sources (e.g., coal or fuel oil), or traditional long-term energy sources (e.g., nuclear power) could be used in lieu of the Project. But the location of the facility and use of the fuel (electricity, heating, industrial feed stock, etc.) would also be speculative. In addition, alternative energy sources would not meet the Project objective of liquefying natural gas for export and are beyond the scope of this EIS.

We received multiple comments from individuals and NGOs on the draft EIS requesting further analysis of the No-Action Alternative. As an independent regulatory commission, the FERC reviews applicant proposals to construct and operate natural gas facilities. As described by the CEQ, if it were not for proposed projects and agency authority to consider the proposals, there would be no permit application and no need for NEPA review. Accordingly, where an agency action is in response to an application for permit or other authorization, the agency should consider the applicant's goals based on the agency's statutory authorization to act in defining the proposed action's purpose and need. We have prepared this EIS to inform the Commission and stakeholders about the expected impacts that would occur if the Project were constructed and operated. The FERC does not plan, design, build, or operate natural gas transmission infrastructure. The Commission will determine the Project need and could choose the No-Action Alternative.

3.3 SYSTEM ALTERNATIVES

We received comments on the draft EIS from For a Better Bayou, et. al. and Niskanen Center et. al. regarding further analysis of system alternatives for the Terminal Site and the Pipeline System. We reviewed system alternatives to evaluate the ability of other existing, modified, planned, or proposed facilities to meet the stated objectives of the CP2 LNG and CP Express Project and to determine if a system alternative exists that would have less significant adverse environmental impacts than those associated with the proposed Project. Our analysis of system alternatives for the LNG Terminal and Pipeline System, and responses to the comments summarized below, are presented in sections 3.3.1 and 3.3.2, respectively. By definition, implementation of a system alternative would make construction of all or some of the proposed facilities unnecessary. Conversely, infrastructure additions or other modifications to the system alternative may be required to increase capacity or provide receipt and delivery capability consistent with that of the proposed facilities. Such modifications may result in environmental impacts that are less than, comparable to, or greater than those associated with construction and operation of the proposed facilities.

3.3.1 LNG System Alternatives

We received comments from the public during scoping periods and in response to the draft EIS expressing concern that the demonstrated need of the Project has not been adequately addressed and therefore the alternatives analysis provided by the applicant is insufficient. The need for the Project will be assessed by the Commission in its Order for the Project, consistent with the Commission's obligations under Section 3(a) and Section 7(c) of the NGA. The purpose of this Project, as identified by the Project proponent, is to liquefy and export 20 MTPA of LNG. We reviewed system alternatives in the Gulf Coast region to evaluate the ability of other existing, modified, approved, planned, or proposed facilities to meet the Project purpose and to determine if a system alternative exists that would be technically and economically feasible, as well as offer a significant environmental advantage over the proposed Project. In the case of the CP2 LNG and CP Express Project, it must also be compatible with the Project's purpose and objectives to construct a terminal to serve export markets for LNG, consistent with CP2 LNG and CP Express' DOE authorizations and applications for LNG export to FTA and non-FTA countries. The Project is designed with a nameplate liquefaction capacity of 20.0 MTPA for export of domestically produced natural gas in the form of LNG; therefore, for a system alternative to be considered feasible it must have available capacity of at least 20 MTPA.

The system alternatives identified include both existing LNG terminals with planned, proposed, or authorized expansions, as well as new LNG terminals planned, proposed, or authorized on greenfield sites. The status identified for each system alternative (e.g., planned, proposed, or approved[43]) is current as of the

[43] Proposed projects are projects for which the proponent has submitted a formal application to the FERC; planned projects are projects that are either in pre-filing or have been announced but have not been proposed. Approved projects are projects that have received FERC authorization.

time this EIS being written, and is subject to change over time. These potential system alternatives and their total MTPA capacities are identified in table 3.3.1-1 below.

Our analysis was predicated on the assumption that each project has an equal chance of being constructed and would therefore be available as a potential alternative. However, market forces would factor heavily into which and how many of these facilities are built.

As identified in table 3.3.1-1, six existing or approved projects and two planned projects have a design capacity equaling or exceeding the Project's initial nameplate capacity of 20.0 MTPA. While some of these projects have been approved, there are several projects that have not commenced construction and, as a result, their anticipated in-service dates are uncertain. The cost of an LNG export project is significant, and most, if not all, of a given project's available capacity, or initial phased capacity, is typically subscribed to customers before construction begins. The additional capacity required could also be achieved through increasing the authorized capacity of liquefaction and the vessel berthing areas at existing or approved projects, either in part or whole, by 20.0 MTPA. However, increasing the capacity at existing or approved LNG terminals would result in impacts that are likely comparable to those of the proposed Project. Further, project sponsors would need to propose such a plan to increase capacity, none of which currently have.

Table 3.3.1-1

Planned, Proposed, or Approved LNG Export Terminals and Expansions Projects Along the Gulf Coast Summary Profile of System Alternatives

Project	Capacity (MTPA)	FERC or MARAD/USGS Status	In-Service Target Date
OPERATING TERMINALS			
Operating LNG Export Projects			
Cameron LNG	14.95	Approved	In Service
Corpus Christi LNG	9.0	Approved	In Service
Freeport LNG	15.3	Approved	In Service
Sabine Pass LNG	22.5	Approved	In Service
Venture Global Calcasieu Pass	10.0	Approved	In Service
Expansion Projects at Operating LNG Terminals			
Cameron LNG Expansion	21.7	Approved 5/5/2016 – not under construction	2027
Sabine Pass LNG Expansion	4.8	Approved 10/21/21 – under construction	2023
Freeport LNG Expansion	5.1	Approved 5/16/2019 –extension granted until 8/1/2028 on 10/13/2022	IU [a]
Golden Pass	18.1	Approved 1/19/2021 – under construction	2024
Corpus Christi LNG Stage 3	11.45	Approved 11/29/2019 – under construction	2027
Trunkline LNG - Lake Charles Expansion	16.45	Approved – extension granted until 12/16/2028 on 2/3/2022	2028
NEW LNG TERMINALS			
Approved LNG Export Projects			
Driftwood LNG	27.6	Approved 4/18/2019 –under construction 4/2022	2026
Port Arthur LNG Phase I	13.5	Approved 4/18/2019 – requested extension until 6/18/2028 on 7/28/2022	IU [a]

Table 3.3.1-1			
Planned, Proposed, or Approved LNG Export Terminals and Expansions Projects Along the Gulf Coast Summary Profile of System Alternatives			
Project	**Capacity (MTPA)**	**FERC or MARAD/USGS Status**	**In-Service Target Date**
Delfin LNG Deepwater Port	12.0	Approved 9/28/2017 (MARAD/Coast Guard)	2024
Venture Global Plaquemines LNG	20.0	Approved 9/30/2019, under construction 8/2021	2024
Rio Grande LNG	27.0	Approved 11/22/2019, 2-year extension granted 10/14/2022	2028
Texas LNG	4.0	Approved 11/22/2019, not under construction	2027
Magnolia LNG	8.8	Approved 6/18/2020 – not under construction	2026
Commonwealth LNG	9.5	Approved 11/17/2022 – not under construction.	2026
Proposed Projects			
Port Arthur LNG Phase II	13.5	Application filed 2/19/2020	2026
Corpus Christi Liquefaction Midscale Trains 8 & 9	3.28	Application filed March 30, 2023	2028
Planned Projects			
Venture Global Delta LNG	20.0	Pre-filing approved 4/30/2019	2024
West Delta LNG	6.1	MARAD/USGS pending, FERC filing date 8/28/2019	IU [a]
Port Fourchon LNG	5.0	Pre-file initiated 8/21/17	IU [a]
Sabine Pass Stage 5 Expansion	20.25	Request to initiate Pre-file on 2/22/2023	2032

IU – information unavailable

[a] Estimated in-service target date not publicly available.

Each proposed and approved project (but not planned projects) is authorized from or has applied to DOE to export to FTA countries. The NGA, as amended, has deemed FTA exports to be in the public interest; therefore, we would not speculate or conclude that excess capacity is available from the listed proposed projects to accommodate the purpose and need of the Project. Consequently, we must conclude CP2 LNG's proposed export capacity at any other existing or proposed LNG facility would require an expansion or new facilities. Some of the facilities, such as Driftwood LNG, are unlikely to have the available acreage to expand its facilities to accommodate the purpose and need of the Project. For those remaining LNG facilities, there may be available acreage to expand the existing or proposed facilities. However, expansion would require similar structures as the facilities proposed for the Terminal, resulting in environmental impacts similar to the proposed Project. These systems alternatives, therefore, offer no significant environmental advantage over the proposed Project and are not considered to be preferable.

3.3.2 Pipeline System Alternatives

System alternatives would use existing, modified, or proposed pipeline systems to meet the purpose and need of the Project. Although modifications or additions to existing or proposed pipeline systems may be required, implementation of a system alternative would deem it unnecessary to construct all or part of the Project; for example, if adding pipeline on one part of the system could negate the need for new compression, or if in-trench replacement could be used instead of looping. Such modifications or additions could result in environmental impacts that are less than, similar to, or greater than those associated with construction and operation of the Project.

We received comments from Sierra Club and For a Better Bayou, et. al. requesting discussion and consideration of decreased capacity and/or decreased size of the CP Express Pipeline. However, a viable system alternative to the Project would have to provide sufficient pipeline capacity to transport all or part of the 4.4 Bcf/d of natural gas required for liquefaction at the Terminal Site. Additionally, the system alternative must be technically and economically practical and offer a significant environmental advantage over the proposed Project. Our analysis of system alternatives includes an examination of existing and proposed natural gas transportation systems that currently serve or eventually would serve the markets targeted by the Project. The pipeline must also be in proximity to the Terminal Site. We identified two pipeline system alternatives that meet these criteria: the TransCameron Pipeline and Creole Trail Pipeline.

3.3.2.1 TransCameron Pipeline

The TransCameron Pipeline is a 23.4-mile-long, 42-inch-diameter pipeline that was recently constructed to transport natural gas to the Calcasieu Pass LNG Terminal and is the only large-diameter natural gas pipeline in proximity to the Terminal Site. The TransCameron Pipeline is fully operational and is fully subscribed to meet Venture Global Calcasieu Pass, LLC's need to liquefy natural gas and export 10 MTPA of LNG. Because TransCameron Pipeline is fully subscribed to existing customers, it would not have any capacity to transport and supply natural gas to CP2 LNG. As an alternative to the CP Express Pipeline, a new 48-inch-diameter natural gas pipeline could be constructed along the entire length of the TransCameron Pipeline. The TransCameron Pipeline interconnects with pipelines operated by ANR, TETCO, and Bridgeline. These pipeline systems are operating at or near capacity and would require significant expansion to transport the volume of natural gas required by CP2 LNG (4.4 Bcf/d). Environmental impacts associated with constructing a new 48-inch-diameter pipeline along the length of the TransCameron Pipeline and expanding the existing interconnecting pipelines would likely be equal to or greater than those of the CP Express Pipeline. The TransCameron Pipeline would not provide a significant environmental advantage relative to the proposed pipeline system; therefore, we did not evaluate this system further.

3.3.2.2 Creole Trail Pipeline

The Creole Trail Pipeline is a 94-mile-long, 42-inch-diameter pipeline that transports natural gas to the existing Sabine Pass LNG facility. At its closest point, the Creole Trail Pipeline is about 3.5 miles north of the Project and has the capacity to transport 1.5 Bcf/d. Similar to the TransCameron Pipeline, the Creole Trail Pipeline is operating at or near capacity and would require significant expansion to transport the 4.4 Bcf/d required by the Project. The environmental impacts associated with expanding the Creole Trail Pipeline would be similar to or greater than those of the CP Express Pipeline. Therefore, the Creole Trail Pipeline would not provide a significant environmental advantage relative to the proposed pipeline system; therefore, we did not evaluate this system alternative further.

3.4 SITE ALTERNATIVES

3.4.1 Terminal Site Alternatives

To minimize the potential environmental impacts from the proposed action, we evaluated potential alternative sites for the Project within the Gulf Coast region that meet the following criteria related to site size and zoning, marine operations, and infrastructure.

Site size and availability:

- Site has sufficient acreage (approximately 400 acres[44]) to construct and operate the Terminal Facilities

Marine operations:

- Site has direct access to a deep-draft shipping channel (defined as water depths of at least 40 feet below mean sea level) requiring minimal maintenance dredging;
- Site has water frontage of at least 3,000 linear feet; and
- Site is on a navigation channel capable of supporting LNG carriers.

Infrastructure:

- Site has access to natural gas supply that can provide sufficient volumes of natural gas to the Project to meet the Project's purpose (i.e., a volume large enough to liquefy, store, and export a nameplate liquefaction capacity of 20 MTPA).

Additionally, we considered public lands, environmentally sensitive or protected areas, congested residential or commercial areas, and the presence of environmental justice factors in identifying alternative locations for the Terminal Facilities. This evaluation involved a review of U.S. Geological Survey (USGS) topographic maps, National Wetlands Inventory (NWI) maps, aerial photography, and other publicly available information.

During internal conversations following issuance of the draft EIS with the COE, a cooperating agency for this Project, the COE suggested the EIS include additional alternatives for the Terminal Site, including potential locations on other suitable waterways within the Gulf Coast region. Additionally, the COE recommended the consideration of relinquished COE dredge disposal sites, such as those available along the western edge of the Calcasieu Ship Channel, just south of Calcasieu Lake. We have updated our analysis below to include consideration of these additional sites; information and figures have been incorporated in the sections and tables below.

As shown in tables 3.4.1-1 and 3.4.1-2, and figures 3.4.1-1 through 3.4.1-5, we identified seven sites that meet the selection criteria:

- the CP2 LNG proposed Terminal Facilities on the east side of Calcasieu Ship Channel (Proposed Site);

[44] FERC acknowledges that the Proposed Site is larger than the alternative sites considered. Detailed engineering and design of the LNG terminal necessitated additional land requirements following the alternative site comparison, and additional acreage would likely be necessary at the alternative sites to accommodate minimum federal safety standards.

- two sites on or adjacent to the Calcasieu Ship Channel (Calcasieu Ship Channel Alternative Sites 1 and 2), which are approximately 22 miles further north in Calcasieu Parish, Louisiana;
- one site on the Sabine Pass Channel in Jefferson County, Texas (Sabine Pass Channel Alternative Site 3);
- two sites on the west side of the Calcasieu Ship Channel (Calcasieu Ship Channel Alternative Site 4 and 5), which are approximately 3 miles further northwest in Cameron Parish, Louisiana; and
- one site on Pelican Island in Galveston Bay, approximately 95 miles further west in Galveston County, Texas

FERC acknowledges that the Proposed Site is larger than the alternative sites considered. CP2 LNG states that the alternative sites were selected for conceptual comparison purposes as a theoretical minimum early on in project design process. Detailed engineering and design of the LNG terminal necessitated additional land requirement following the alternative site comparison and additional acreage would likely be necessary at the alternative sites beyond the minimum identified in table 3.4.1-1 below to accommodate minimum federal safety standards. The sites that were recently added based on COE comments were developed using similar criteria as the sites developed early on in the project design process in order to provide a like-for-like comparison between the alternatives.

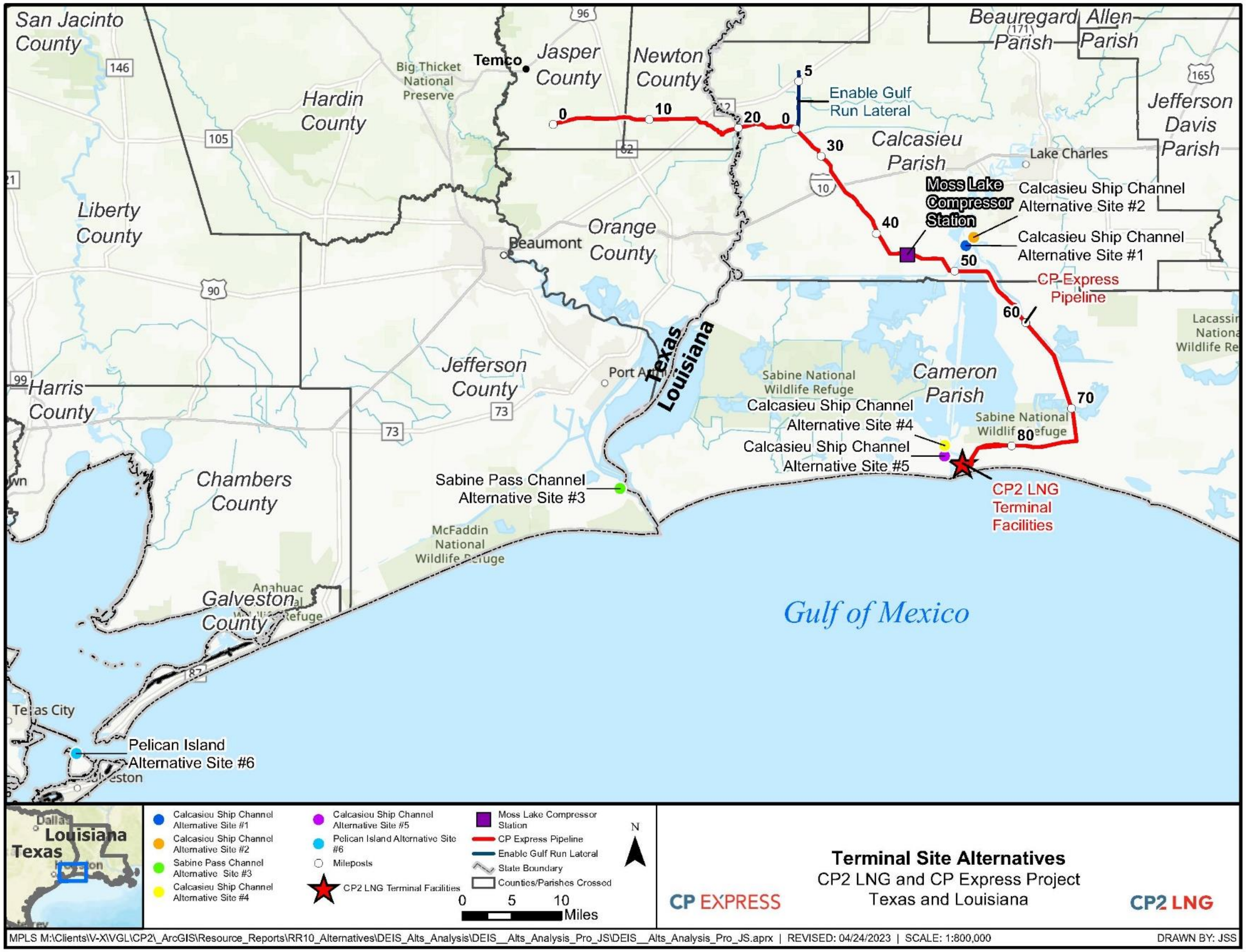

Figure 3.4.1-1 Terminal Site Alternatives

Table 3.4.1-1

Selection Criteria Summary for CP2 LNG Terminal Facilities Site Alternatives

Selection Criteria	Sites						
	Proposed Site	**Calcasieu Ship Channel Alternative Site 1**	**Calcasieu Ship Channel Alternative Site 2**	**Sabine Pass Channel Alternative Site 3**	**Calcasieu Ship Channel Alternative Site 4**	**Calcasieu Ship Channel Alternative Site 5**	**Pelican Island Alternative Site 6**
Major navigable waterway	Calcasieu Ship Channel	Calcasieu Ship Channel	Calcasieu Ship Channel	Sabine Pass Channel	Calcasieu Ship Channel	Calcasieu Ship Channel	Galveston Bay
Available waterfront frontage (feet)	3,000	10,000	4,000	3,000	5,000	5,000	6,000

Table 3.4.1-2

Comparison Summary for CP2 LNG Terminal Facilities Site Alternatives

Feature/Resource	Sites						
	Proposed Site	**Calcasieu Ship Channel Alternative Site 1**	**Calcasieu Ship Channel Alternative Site 2**	**Sabine Pass Channel Alternative Site 3**	**Calcasieu Ship Channel Alternative Site 4**	**Calcasieu Ship Channel Alternative Site 5**	**Pelican Island Alternative Site 6**
Total Site Size/ Available Acreage(acres)	813.3 [a]	440	573.6	463	400.7	400.9	400.5
Distance from Gulf of Mexico (miles)	1.2	23.0	23.6	6.0	5.2	3.0	4.5
Distance to low income and/or minority populations (miles)	Within Low Income Community	>2.0	<2.0	>2.0	0.9	0.2	Within Low Income Community
No. of Environmental Justice Communities crossed by LNG carriers	1	3	3	0	2	2	1
Nearest resident / noise sensitive area (feet)	2,450 [c]	7,500	7,200	3,700	12,000	8,500	9,600

Table 3.4.1-2

Comparison Summary for CP2 LNG Terminal Facilities Site Alternatives

Feature/Resource	**Proposed Site**	**Calcasieu Ship Channel Alternative Site 1**	**Calcasieu Ship Channel Alternative Site 2**	**Sabine Pass Channel Alternative Site 3**	**Calcasieu Ship Channel Alternative Site 4**	**Calcasieu Ship Channel Alternative Site 5**	**Pelican Island Alternative Site 6**
	Sites						
Distance from nearest public road (miles) [b]	0.2	1.0	<0.1	<0.1	2.1	0.1	1.4
Distance from natural gas pipeline interconnect (miles) [d]	85.4	50.8	51.8	55	88.4	86.5	95.7
Transit inbound/outbound for carriers in state waters (hours)	3	8-9	8-9	4-5	4-5	4-5	4-5
Land Use (acres)							
Terminal Site [e]							
Barren Land	0.0	0.0	0.0	0.0	0.2	0.0	272.4
Developed, High Intensity	6.0	0.0	0.0	0.0	0.0	0.0	0.0
Developed, Low Intensity	8.2	0.0	4.3	0.4	0.0	6.2	0.0
Developed, Medium Intensity	8.8	0.0	0.0	0.1	0.0	0.0	0.0
Developed, Open Space [f]	2.0	0.0	4.2	0.4	0.0	0.2	0.0
Emergent Herbaceous Wetlands	130.6	358.9	81.8	459.4	375.5	277.2	115.7
Hay/Pasture	396.2	16.9	31.8	0.0	0.0	26.6	0.0
Herbaceous	0.0	18.1	42.4	1.1	5.0	89.9	0.0
Cultivated Crops	0.0	0.0	12.7	0.0	13.9	0.0	0.0
Shrub/Scrub	76.8	19.6	46.9	0.0	0.0	0.7	0.0

Table 3.4.1-2							
Comparison Summary for CP2 LNG Terminal Facilities Site Alternatives							
	Sites						
Feature/Resource	**Proposed Site**	**Calcasieu Ship Channel Alternative Site 1**	**Calcasieu Ship Channel Alternative Site 2**	**Sabine Pass Channel Alternative Site 3**	**Calcasieu Ship Channel Alternative Site 4**	**Calcasieu Ship Channel Alternative Site 5**	**Pelican Island Alternative Site 6**
Woody Wetlands	3.1	9.1	174.0	0.0	0.0	0.0	0.6
Mixed Forest	0.0	0.7	4.5	0.0	0.0	0.0	0.0
Evergreen Forest	0.0	0.9	144.1	0.0	1.2	0.0	0.0
Open Water	0.0	15.8	26.9	1.6	4.9	0.1	11.8
Total	631.7	440.0	573.6	463.0	400.7	400.9	400.5
Marine Facilities [e]							
Developed, Low Intensity	6.7	0.0	0.0	0.0	0.0	0.0	0.0
Developed, Medium Intensity	5.0	0.0	0.0	0.0	0.0	0.0	0.0
Emergent Herbaceous Wetlands	51.3	0.0	0.0	0.0	0.0	0.0	0.0
Herbaceous	41.5	0.0	0.0	0.0	0.0	0.0	0.0
Scrub/Shrub	2.6	0.0	0.0	0.0	0.0	0.0	0.0
Open Water	15.1	0.0	0.0	0.0	0.0	0.0	0.0
Total	122.2	0.0	0.0	0.0	0.0	0.0	0.0
LNG Transfer Lines and Utilities [e]							
Developed, Low Intensity	2.2	0.0	0.0	0.0	0.0	0.0	0.0
Developed, Medium Intensity	1.2	0.0	0.0	0.0	0.0	0.0	0.0

Table 3.4.1-2							
Comparison Summary for CP2 LNG Terminal Facilities Site Alternatives							
		Sites					
Feature/Resource	**Proposed Site**	**Calcasieu Ship Channel Alternative Site 1**	**Calcasieu Ship Channel Alternative Site 2**	**Sabine Pass Channel Alternative Site 3**	**Calcasieu Ship Channel Alternative Site 4**	**Calcasieu Ship Channel Alternative Site 5**	**Pelican Island Alternative Site 6**
Emergent Herbaceous Wetlands	23.7	0.0	0.0	0.0	0.0	0.0	0.0
Hay/Pasture	0.4	0.0	0.0	0.0	0.0	0.0	0.0
Open Water	4.1	0.0	0.0	0.0	0.0	0.0	0.0
Total	31.6	0.0	0.0	0.0	0.0	0.0	0.0
Waterbodies Crossed	3 [e]	0	0	0	0	0	1
NWI Mapped Wetlands (acres) [g, h]							
Terminal Site [e]							
Palustrine emergent	41.2	271.1	0.0	0.0	0.0	0.0	0.0
Palustrine scrub-shrub	21.0	43.0	0.0	0.0	0.0	0.0	0.0
Estuarine intertidal emergent	6.5	60.9	56.5	438.3	354.1	273.6	71.4
Estuarine subtidal unconsolidated bottom	2.4	1.9	23.5	6.9	6.5	1.0	0.0
Estuarine intertidal unconsolidated shore	0.0	0.0	0.0	0.3	3.0	0.0	53.6
Palustrine unconsolidated bottom	0.6	7.6	7.2	N/A	0.1	0.0	0.0
Palustrine forested	0.0	0.0	193.7	0.0	0.0	0.0	0.0

Table 3.4.1-2 Comparison Summary for CP2 LNG Terminal Facilities Site Alternatives							
	Sites						
Feature/Resource	**Proposed Site**	**Calcasieu Ship Channel Alternative Site 1**	**Calcasieu Ship Channel Alternative Site 2**	**Sabine Pass Channel Alternative Site 3**	**Calcasieu Ship Channel Alternative Site 4**	**Calcasieu Ship Channel Alternative Site 5**	**Pelican Island Alternative Site 6**
Lacustrine littoral unconsolidated shore	0.0	0.0	0.0	0.0	0.0	0.0	236.5
Total	71.7	384.4	280.9	445.5	363.7	274.6	361.5
Marine Facilities							
Estuarine intertidal emergent	15.1	0.0	0.0	0.0	0.0	0.0	0.0
Estuarine subtidal unconsolidated bottom	6.5	0.0	0.0	0.0	0.0	0.0	0.0
Total	21.6	0.0	0.0	0.0	0.0	0.0	0.0
LNG Transfer Lines and Utilities							
Estuarine intertidal emergent	11.5	0.0	0.0	0.0	0.0	0.0	0.0
Estuarine subtidal unconsolidated bottom	4.1	0.0	0.0	0.0	0.0	0.0	0.0
Total	15.6	0.0	0.0	0.0	0.0	0.0	0.0
Federal land crossed (acres)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
State land crossed (acres)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Estimated Dredge Placement Volume (cubic yards) [i]	6,398,600	7,600,000	7,300,000	7,100,000	6,500,000	6,500,000	8,300,000

Table 3.4.1-2							
Comparison Summary for CP2 LNG Terminal Facilities Site Alternatives							
	Sites						
Feature/Resource	**Proposed Site**	**Calcasieu Ship Channel Alternative Site 1**	**Calcasieu Ship Channel Alternative Site 2**	**Sabine Pass Channel Alternative Site 3**	**Calcasieu Ship Channel Alternative Site 4**	**Calcasieu Ship Channel Alternative Site 5**	**Pelican Island Alternative Site 6**

[a] Represents the total acreage that would be leased by CP2 LNG for the Terminal Site.
[b] Road centerline miles, using existing roads.
[c] Based on surveyed data, the closest noise sensitive area is 2,450 feet from the center of the proposed Terminal Site and 330 feet from the proposed Terminal Site floodwall.
[d] Distance is presented as straight-line mileage; actual pipeline mileage would be longer due to routing considerations.
[e] Alternative terminal sites include acreage for marine facilities, LNG transfer lines, and utilities.
[f] Developed, Open Space areas include a mixture of some constructed areas; however, mostly vegetation in the form of manicured grasses.
[g] Calcasieu Pass would be crossed via trenchless (HDD) construction techniques.
[h] Wetland acreages presented in the Land Use section of this table were obtained utilizing the USGS National Land Cover Database and wetland acreages presented in the NWI Mapped Wetlands section were obtained utilizing FWS NWI database; therefore, the acreages may not be comparable.
[i] Includes the estimated volume of material that would be generated from dredging a deep-draft channel to connect the terminal to the nearest deep-draft navigational channel.

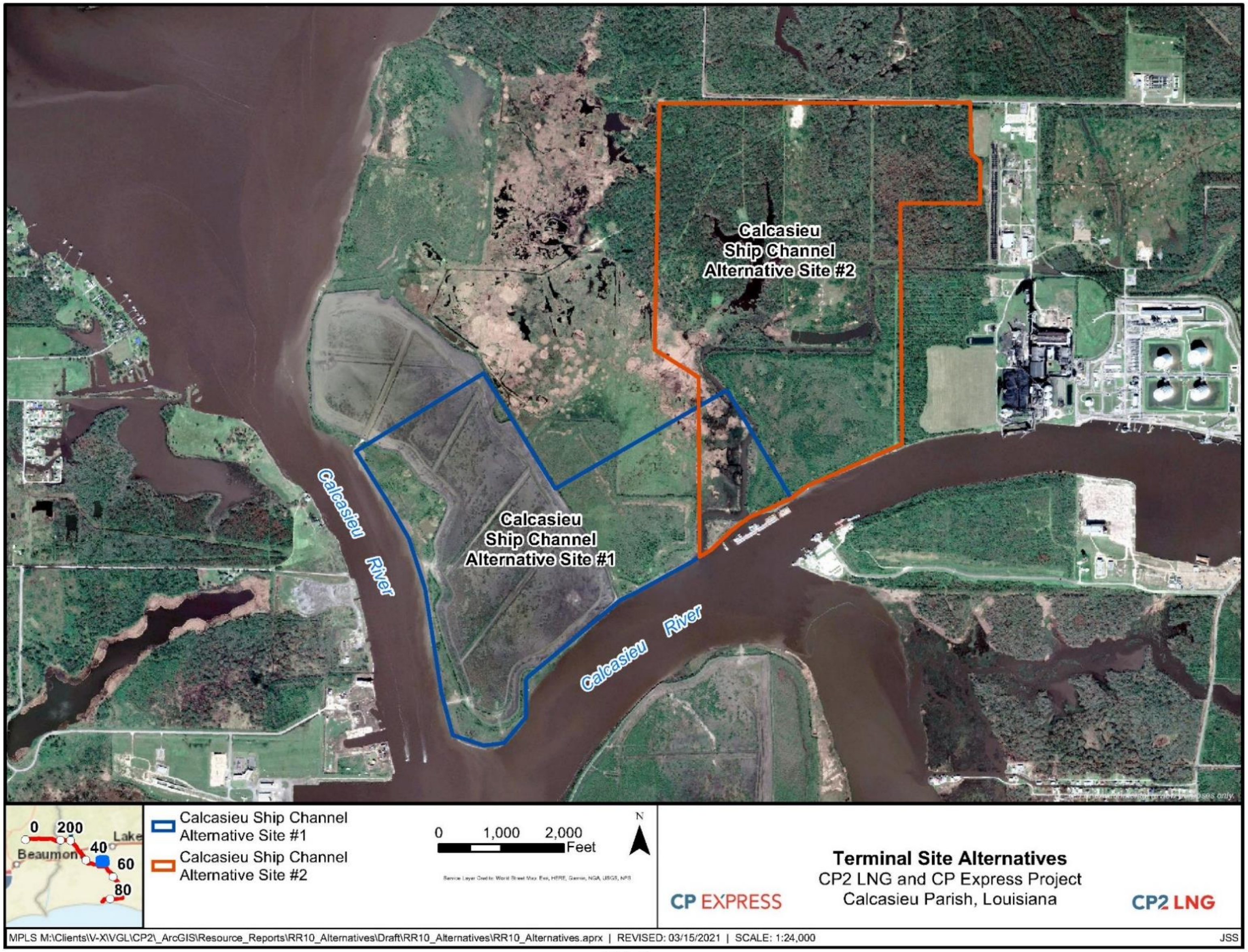

Figure 3.4.1-2 Calcasieu Ship Channel Alternative Sites 1 and 2

Figure 3.4.1-3 Sabine Pass Channel Alternative Site 3

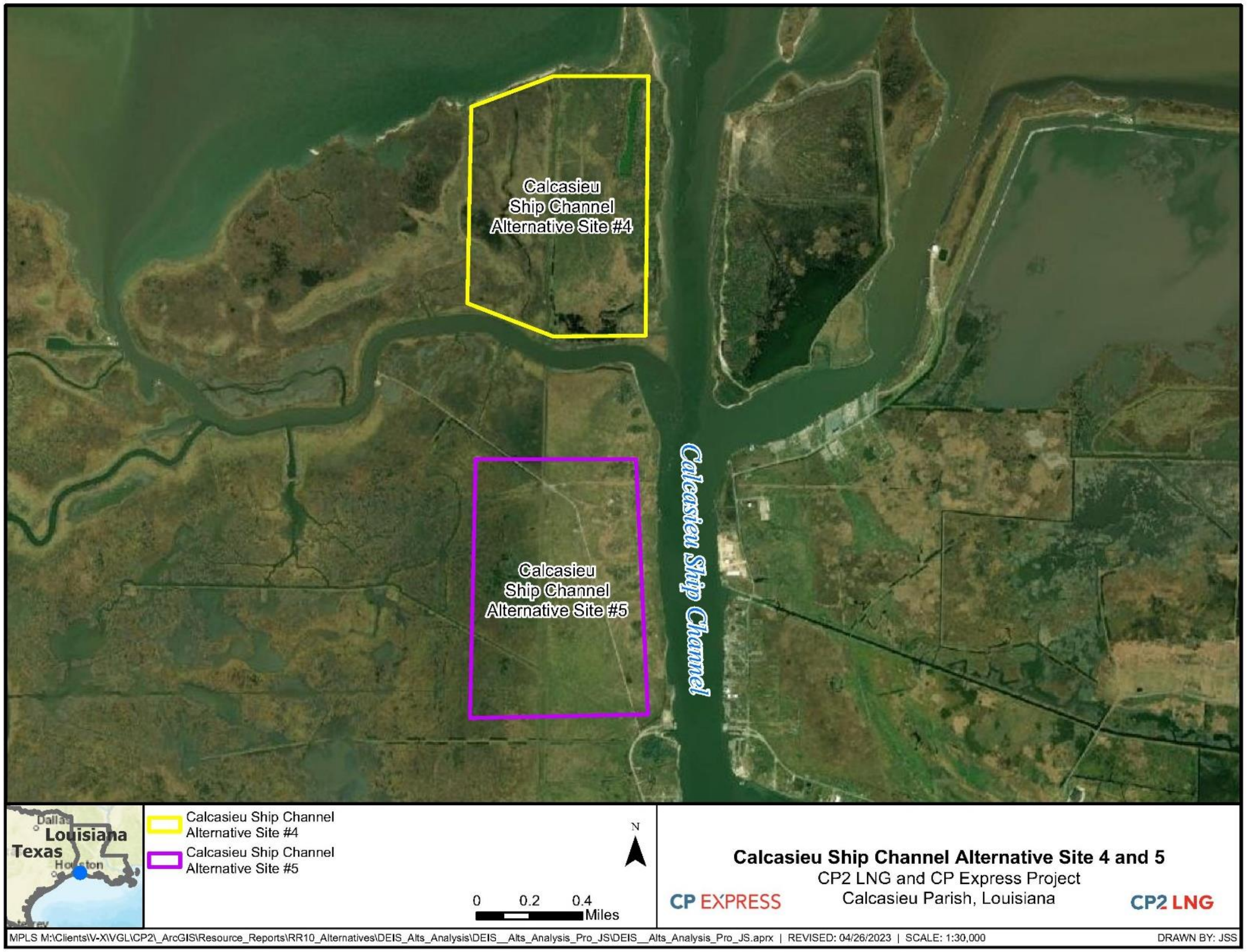

Figure 3.4.1-4 Calcasieu Ship Channel Alternative Sites 4 and 5

Figure 3.4.1-5 Pelican Island Alternative Site 6

3.4.1.1 Proposed Site

The Proposed Site is on 813.3 acres of property approximately 0.4 mile southeast of the center of the Town of Cameron in Cameron Parish, Louisiana. The southern border of the site is approximately 1,170 feet north of the Gulf of Mexico and the site has about 3,000 feet of frontage on the Calcasieu Ship Channel. It is in a remote, industrial region and is 2,450 feet from the nearest residential neighborhood. The Proposed Site is within an environmental justice community (low-income) and would impact approximately 71.7 acres of NWI mapped wetlands. Additionally, the transit hours inbound/outbound for carriers in state waters is approximately 3 hours.

3.4.1.2 Calcasieu Ship Channel Alternative Site 1

Alternative Site 1 is approximately 440 acres of land on the northeast corner of the intersection of the Industrial Canal and the Calcasieu Ship Channel, as shown on figure 3.4.1-2. As previously discussed, additional acreage would likely be necessary to accommodate the facilities proposed for the Project; therefore, the approximately 440 acres available for Alternative Site 1 is likely not large enough. The approximately 10,000 feet of water frontage at Alternative Site 1 is sufficient for the two LNG loading docks proposed for the Terminal Facilities. LNG carrier transit times to Alternative Site 1 would be 8 to 9 hours within state waters. Development of this site would affect 384.4 acres of mapped NWI wetlands. Development of Alternative Site 1 would also affect 1.6 acres of forested land. Alternative Site 1 would not be within an environmental justice community; however, LNG carriers calling to Alternative Site 1 would potentially transit through three environmental justice communities (one low income, one minority, and one that is both low income and minority).

About 298 acres (68 percent) of Alternative Site 1 is an active federal dredged material placement area managed by the COE; given this federal control, and the recognized regional constraints on spoil storage capacity generally, CP2 LNG's acquisition of Alternative Site 1 would not likely be feasible. Additionally, recent dredged material placement within the dredged material placement area would likely necessitate significant area-wide improvements, including soil stabilization and soil augmentation to achieve bearing capacity for the construction of the Terminal Facilities. CP2 LNG estimates that the site preparation of Alternative Site 1 would take an additional 3 to 6 months, as compared to the proposed Terminal Site. Based on estimates using the same marine berth dredge prism dimensions as proposed, plus the volume of dredge material that would be required to connect each alternative site marine berth to the nearest deep-draft navigational channel, CP2 LNG's estimated dredge material volume for Alternative Site 1 would be approximately 7,600,000 cubic yards, not including maintenance dredging.

The natural gas pipeline that would provide feed gas to Alternative Site 1 would be about 50.8 miles in length and would be collocated with the Kinder Morgan Louisiana Pipeline, LLC.

3.4.1.3 Calcasieu Ship Channel Alternative Site 2

Alternative Site 2 is comprised of approximately 573.6 acres on a section of the Calcasieu waterway system referred to as the Industrial Canal. Additional acreage would likely be necessary to accommodate the facilities proposed for the Project. Alternative Site 2 is approximately 1.5 miles east of the Calcasieu Ship Channel, and would overlap a portion of Alternative Site 1 (as shown on figure 3.4.1-2). Based on estimates using the same marine berth dredge prism dimensions as proposed, plus the volume of dredge material that would be required to connect each alternative site marine berth to the nearest deep-draft navigational channel, CP2 LNG's estimated dredge material volume for Alternative Site 2 would be approximately 7,300,000 cubic yards, not including maintenance dredging.

The approximately 4,000 feet of water frontage at Alternative Site 2 is sufficient for the two LNG loading docks proposed for the Terminal Facilities. LNG carrier transit times to Alternative Site 2 would be 8 to 9 hours within state waters. Approximately one-half of Alternative Site 2 is delineated as NWI mapped wetlands (280.9 acres), including the northwest portion of the site, which appears to contain the pimple mounds characteristic of remnant coastal prairie habitat, a Louisiana Department of Wildlife and Fisheries (LDWF) vegetation community of special concern (FERC, 2019a). Development of Alternative Site 2 would affect 148.6 acres of forested land. Alternative Site 2 would not be within an environmental justice community; however, LNG carriers calling to Alternative Site 2 would potentially transit through three environmental justice communities (two low income and one minority).

Given its proximity to the intersection of the Industrial Canal and the Calcasieu Ship Channel and the heavy vessel traffic associated with operational industrial facilities (Alcoa and Trunkline LNG) one mile east on the Industrial Canal, CP2 LNG states that there could be significant marine safety and maneuverability challenges associated with Alternative Site 2.

The natural gas pipeline that would provide feed gas to Alternative Site 2 is about 51.8 miles in length and would be collocated with the Kinder Morgan Louisiana Pipeline, LLC.

3.4.1.4 Sabine Pass Channel Alternative Site 3

Sabine Pass Channel Alternative Site 3 (Alternative Site 3) is comprised of approximately 463 acres on a section of the Sabine Pass Channel, as shown on figure 3.4.1-3. As previously discussed, additional acreage would likely be necessary to accommodate the facilities proposed for the Project; therefore, the approximately 463 acres available for Alternative Site 3 is likely not large enough. The approximately 3,000 feet of water frontage at Alternative Site 3 is sufficient for the two LNG loading docks proposed for the Terminal Facilities. Based on estimates using the same marine berth dredge prism dimensions as proposed, plus the volume of dredge material that would be required to connect each alternative site marine berth to the nearest deep-draft navigational channel, CP2 LNG’s estimated dredge material volume for Alternative Site 3 would be approximately 7,100,000 cubic yards, not including maintenance dredging. LNG carrier transit times to Alternative Site 2 would be 4 to 5 hours within state waters. Development of Alternative Site 3 would affect approximately 445.5 acres of mapped NWI estuarine wetlands (approximately 96 percent of the site). Alternative Site 3 is not within an environmental justice community and LNG carriers calling to Alternative Site 3 would not transit through environmental justice communities.

An approximately 55-mile-long pipeline to supply natural gas to Alternative Site 3 would need to route through or around congested residential and commercial areas, including areas that may contain low income and/or minority populations, such as Beaumont, Nederland, and Port Arthur. Avoiding populated areas north and west of Beaumont (e.g., Lumberton, Rosedale Acres, Pine Ridge) and smaller communities along the Interstate 10 corridor southwest of Beaumont would also be difficult. In order to avoid these higher density population areas, the pipeline route would likely have to cross federal and state lands, including Big Thicket National Preserve.

3.4.1.5 Calcasieu Ship Channel Alternative Site 4

Calcasieu Ship Channel Alternative Site 4 (Alternative Site 4) is anapproximately 400-acre site on the west side of the Calcasieu Ship Channel, as shown on figure 3.4.1-4. Alternative Site 4 has approximately 5,000 feet of frontage adjacent to the Calcasieu Ship Channel and approximately 257 acres of the site was used as a federal dredged material placement area. According to NWI mapping, Alternative Site 4 would also impact approximately 363.7 acres of wetlands, of which a portion of this acreage overlaps with dredged material placement. Based on estimates using the same marine berth dredge prism dimensions as proposed, plus the volume of dredge material that would be required to connect each alternative site marine berth to the nearest deep-draft navigational channel, CP2 LNG's estimated dredge material volume for Alternative Site 4 would be approximately 6,500,000 cubic yards, not including maintenance dredging. The distance to the nearest noise sensitive area (NSA) from Alternative Site 4 is approximately 12,000 feet, which is greater than the proposed site (2,450 feet). The closest environmental justice community to Alternative Site 4 is 0.9 mile; however, LNG carriers calling to Alternative Site 4 would transit through two environmental justice communities, one of which would be the same community crossed by the proposed site.

CP2 LNG states that the dredged material within the site would likely necessitate improvements such as soil stabilization and soil augmentation to achieve the load-bearing capacity for the Terminal Facilities. CP2 LNG estimates that the site preparation of Alternative Site 4 could take an additional 6 months or more due to the existing conditions as compared to the proposed Terminal Site, which would extend construction-related impacts on the community and environment relative to the proposed action. Additionally, Alternative Site 4 would impact 1.2 acres of evergreen forest and 13.9 acres of cultivated crops, neither of which would be affected by the proposed site.

The natural gas pipeline that would provide feed gas to Alternative Site 4 would follow the same alignment as the CP Express Pipeline route until approximate MP 83.0. From this point, the pipeline would deviate from the CP Express Pipeline route and proceed west where it would cross the Calcasieu Ship Channel before turning north and terminating at Alternative Site 4. The natural gas pipeline would be about three miles longer than the proposed pipeline and would require an HDD of the Calcasieu Ship Channel, which would likely be about a half-mile long.

Alternative Site 4 would also increase LNG carrier transit times in state waters by 1 to 2 hours as compared to the proposed Terminal Facilities. LNG carriers approaching the Terminal Facilities would transit across the Cameron Ferry route, which runs every 15 minutes and provides LA 27 users transit across the Calcasieu Ship Channel from 1:30 A.M to 12 A.M daily. Additional transit times in state waters would likely also result in increased impacts on navigation and recreational and commercial fishermen harvests. The inside/outside shrimp line, which separates Louisiana state waters for shrimp fishery, would be approximately 1.6 miles south of Alternative Site 4. Alternative Site 4 would be within the inside waters, where the harvesting season generally runs from May to July and mid-August to mid-December. During construction and operation of the Project, the "Rules of the Road" would apply and commercial fishing vessels would be expected to give way to stand on vessels (e.g., LNG carriers) in maneuvering into and out of the loading docks.

3.4.1.6 Calcasieu Ship Channel Alternative Site 5

Calcasieu Ship Channel Alternative Site 5 (Alternative Site 5) is an approximately 400-acre site on the west side of the Calcasieu Ship Channel, as shown on figure 3.4.1-4. Alternative Site 5 has approximately 5,000 feet of frontage adjacent to the Calcasieu Ship Channel and approximately 236.6 acres of the site was used as a federal dredged material placement area. According to NWI mapping, Alternative Site 5 would impact approximately 274.6 acres of wetlands, of which a portion of this acreage overlaps with dredged material placement. Based on estimates using the same marine berth dredge prism dimensions as proposed, plus the volume of dredge material that would be required to connect each alternative site marine berth to the nearest deep-draft navigational channel, CP2 LNG's estimated dredge material volume for Alternative Site 5 would be approximately 6,500,000 cubic yards, not including maintenance dredging. The distance to the nearest NSA from Alternative Site 5 is approximately 8,500 feet, which is greater than the proposed site (2,450 feet). The closest environmental justice community to Alternative Site 5 is 0.2 mile; however, LNG carriers calling to Alternative Site 5 would cross two environmental justice communities, one of which would be the same as community crossed as the proposed site.

CP2 LNG states that the dredged material within the site would likely necessitate improvements such as soil stabilization and soil augmentation to achieve bearing capacity for the Terminal Facilities. CP2 LNG estimates that the site preparation of Alternative Site 5 could take an additional 6 months or more due to the existing conditions as compared to the proposed Terminal site, which would extend construction-related impacts on the community and environment relative to the proposed action.

The natural gas pipeline that would provide feed gas to Alternative Site 5 would follow the same alignment as the CP Express Pipeline route until approximately MP 83.0. From this point, the pipeline would deviate from the CP Express Pipeline route and proceed west where it would cross the Calcasieu Ship Channel and terminate at Alternative Site 5. The natural gas pipeline would be approximately 1.1 miles longer than the proposed pipeline and would require an HDD of the Calcasieu Ship Channel.

Alternative Site 5 would also increase LNG carrier transit times in state waters by 1 to 2 hours as compared to the proposed Terminal Facilities. LNG carriers approaching the Terminal Facilities would transit across the Cameron Ferry route, which runs every 15 minutes and provides LA 27 highway users transit across the Calcasieu Ship Channel from 1:30 A.M to 12 A.M daily. Additional transit times in state waters would likely result in additional impacts to recreational and commercial fishermen. The inside/outside shrimp line, which separates Louisiana state waters for shrimp fishery, would be approximately 0.2 mile south of Alternative Site 5. Alternative Site 5 would be within the inside waters, where the harvesting season generally runs from May to July and mid-August to mid-December. During construction and operation of the Project, the “Rules of the Road” would apply and commercial fishing vessels would be expected to give way to stand on vessels (e.g., LNG carriers) in maneuvering into and out of the loading docks.

3.4.1.7 Pelican Island Alternative Site 6

Pelican Island Alternative Site 6 (Alternative Site 6) is an approximately 400-acre site on Pelican Island in Galveston Bay, as shown on figure 3.4.1-5. Similar to the proposed Terminal Site, Pelican Island is situated near heavily trafficked ship channels with various recreational uses and commercial fishing operations. The surrounding areas of the Gulf of Mexico and ship channels provide EFH to various species. Shorelines along Pelican Island are primarily marshes and beaches which provide habitat to several federal and state listed species.

Alternative Site 6 has approximately 6,000 feet of frontage adjacent to the shallow-draft (-13 feet) Port Bolivar to Galveston Causeway segment of the Gulf Intracoastal Waterway and is about 2,600 feet from the deep-draft (-46 feet) Texas City Harbor Channel. Approximately 281.4 acres of the site is a federal dredged material placement area. CP2 LNG states that the dredged material within the site would necessitate improvements such as soil stabilization and soil augmentation to achieve bearing capacity for the Terminal Facilities. CP2 LNG estimates that the site preparation of Alternative Site 6 would take an additional 6 months or more due to the existing conditions as compared to the proposed Terminal Site. Alternative Site 6 is approximately 95 miles west of the proposed Terminal Site.

The natural gas pipeline that would provide feed gas to Alternative Site 6 would require a different pipeline route that would total approximately 95.7 miles in length. It would begin at the same location as the proposed route (MP 0.0) and would proceed generally southeast along existing rights-of-way and greenfield alignments, crossing a mix of forestland and open land to cross Interstate 10. After crossing Interstate 10, the pipeline would proceed generally southwest, primarily along existing rights-of-way. The pipeline would cross the Neches River near Spindletop, Texas and enter Galveston Bay at Smith’s Point, where it would cross approximately 13 miles of Galveston Bay to terminate at Alternative Site 6.

According to NWI mapping, Alternative Site 6 would impact approximately 361.5 acres of wetlands, of which a portion of this acreage overlaps with dredged material placement. Based on USGS Land Cover, Alternative Site 6 would only impact four land use types: barren land (272.4 acres), emergent herbaceous wetlands (115.7 acres), open water (11.8 acres), and woody wetlands (0.6 acres). The distance to the nearest NSA from Alternative Site 6 is approximately 9,600 feet, which is greater than the proposed site (2,450 feet). Additionally, Alternative Site 6 would be within one environmental justice community (low-income) and LNG carriers calling to Alternative Site 6 would cross this same environmental justice community.

The Marine Facilities require water depths of -44.3 feet NAVD 88 (42 feet below Mean Low Gulf datum) for the LNG loading docks, berthing area, and turning basins, as described in section 2.5.1.4. Alternative Site 6 is situated 2,600 feet from the nearest deep-draft navigational channel, the Texas City Harbor Channel, whereas the proposed Terminal Facilities' dredge prism abuts the Calcasieu Ship Channel. To accommodate LNG carriers, Alternative Site 6 would require dredging to widen and deepen more than 2,600 feet of the Gulf Intracoastal Waterway from -13 feet to -42 feet Mean Low Gulf datum, in addition to the dredging required to create the LNG carrier turning basin and berthing area in the shallow waters adjacent to the site, which are shallower than 15 feet below Mean Low Gulf datum (National Oceanic and Atmospheric Administration [NOAA], 2023a). Based on estimates using the same marine berth dredge prism dimensions as proposed, plus the volume of dredge material that would be required to connect each alternative site marine berth to the nearest deep-draft navigational channel, CP2 LNG's estimated dredge material volume for Alternative Site 6 would be approximately 8,300,000 cubic yards, not including maintenance dredging.

Additionally, the location of Alternative Site 6 would increase LNG carrier transit times in state waters by 1 to 2 hours as compared to the proposed Terminal Facilities, which could also result in additional impacts on recreational and commercial fishermen. During construction and operation of the Project, the "Rules of the Road" would apply and commercial fishing vessels would be expected to give way to stand on vessels (e.g., LNG carriers) in maneuvering into and out of the loading docks.

3.4.1.8 Terminal Site Alternatives Conclusion

The Proposed Site has the fewest NWI mapped wetland impacts (108.9 acres), while the six alternative sites would impact a range of 274.6 acres (Alternative Site 5) to 445.5 acres (Alternative Site 3) of NWI mapped wetlands. The Proposed Site has the shortest ship transit times within state waters (3 hours) compared to 4 to 5 hours for Alternative Sites 3, 4, 5, and 6 and 8 to 9 hours for Alternative Sites 1 and 2. In addition, the Proposed Site's location next to the existing Calcasieu Pass LNG Terminal, on an industrialized segment of the Calcasieu Ship Channel, allows for overlapping workspace with already disturbed industrial areas, which minimizes disturbance and conversion of land use in non-industrialized areas or alterations of the visual character of the area. Alternative Sites 1, 4, 5, and 6 are primarily within federal dredged material placement areas, which would require more site preparation and alteration to accommodate Project infrastructure, resulting in a longer construction period by about 6 months. Alternative Site 2 would impact a state vegetation community of concern which would require further consultation and enhanced mitigation requirements, 148.6 acres of forested habitat (evergreen forest and mixed forest), and 193.7 palustrine forested (PFO) wetlands, compared to the Proposed Site, which would not impact any state vegetation communities of concern, forested habitat, or PFO wetlands. Both Alternative Sites 1 and 2 are within a portion of the Calcasieu Ship Channel congested with large vessel transit associated with two nearby industrial facilities. Alternative Sites 4 and 5 would be along the Calcasieu Ship Channel; however, LNG carriers calling to these sites would increase disruptions on users of the Cameron Ferry as well as increase disruptions to recreational and commercial fisherman. The Proposed Site has the least estimated dredge placement volume (6,398,600 cubic yards), while the six alternative sites would require an estimated range of 6,500,000 cubic yards (Alternative Sites 4 and 5) to 8,300,000 cubic yards (Alternative Site 6) of dredged material placement volume. Alternative Site 3 would require routing of the natural gas pipeline either through densely populated areas such as Beaumont, Nederland, and Port Arthur, Texas, through federal lands (Big Thicket National Preserve). Alternative Site 4 would impact evergreen forest and cultivated crops land use types, neither of which would be affected by the proposed Terminal Site. Alternative Sites 4 and 5 would result in a slightly longer pipeline than the proposed Terminal Site and Alternative 6 would result in a longer pipeline by approximately 10 miles.

We note that the proposed Terminal site would result in a longer pipeline by about 30 miles than Alternative Sites 1, 2, and 3and therefore would result in additional acres of impact as compared to the alternatives with shorter pipeline routes required. We also note the size of the Proposed Site is larger than the alternative sites considered. As stated above, CP2 LNG states that the alternative sites were selected for conceptual comparison purposes as a theoretical minimum early on in the Project design process. However, upon review of the environmental and technical factors above, including those of the three additional alternative sites analyzed since issuance of the draft EIS, we conclude that the alternative site options do not provide a significant environmental advantage over the Proposed Site. In addition, we did not identify any significant environmental issues with the proposed Terminal Site.

3.4.2 Terminal Site Layout Alternatives

The design and configuration of liquefied natural gas facilities is subject to the safety and siting requirements of Title 49 of CFR Part 193. These standards require that potential thermal exclusion and vapor dispersion zones remain on site, which limits the potential locations for specific pieces of equipment. In addition, thermal radiation zones for flares require that they be set back a minimum distance from other equipment and property lines.

Prior to selecting the proposed terminal configuration, CP2 LNG evaluated an alternative terminal configuration that positioned the liquefaction blocks, pretreatment system, and LNG storage tanks in an east to west orientation compared to the north to south configuration of the proposed Terminal Site. CP2 LNG evaluated the noise impacts that would result from the alternative configuration and determined that noise could potentially exceed permissible levels at NSAs northeast of the site. In addition to potentially exceeding the noise criterion at nearby NSAs, the thermal exclusion zones associated with the alternative configuration of the LNG storage tanks would extend onto property not under the control of CP2 LNG. As a result, CP2 LNG determined that the proposed Terminal Site layout, which meets our noise criterion and applicable siting regulations, codes, and engineering standards, is the preferred configuration for the Terminal Site.

3.5 CP EXPRESS PIPELINE ROUTE ALTERNATIVES

We considered route alternatives to determine whether their implementation would be preferable to the proposed pipeline routing for the Project. Route alternatives typically deviate from the proposed pipeline alignment to avoid or reduce construction impacts on an identified landowner, land-management agency, and/or environmental resources, but the origination and end points generally remain the same as the proposed pipeline alignment. We received comments on the draft EIS from agencies and NGOs such as the EPA, COE, For a Better Bayou et. al., and Niskanen Center, et. al., requesting further analysis of pipeline route alternatives. Each alternative route discussed below provides the rationale for considering the alternative and compares potential impacts on the resources affected by each route.

3.5.1 Major Pipeline Route Alternatives

In the draft EIS, we evaluated four major pipeline route alternatives (the proposed pipeline route and three alternatives) that would utilize substantially different pathways from the receipt and delivery points. Each route would begin at the interconnection with MidCoast Energy near Temco, Texas (see figure 3.5.1-1). In the identification of pipeline route alternatives, CP Express prioritized siting the pipeline routes adjacent to existing rights-of-way (i.e., collocated) to minimize environmental impacts. We evaluated potential routing constraints (e.g., public lands, environmentally sensitive or protected areas, congested residential or commercial areas) using publicly available information. The evaluation involved review of USGS topographic maps, NWI maps, aerial photography, and other publicly available information. Table 3.5.1-1 presents a comparison of the major pipeline route alternatives. Additionally, we conducted an environmental justice evaluation of the major pipeline route alternatives.

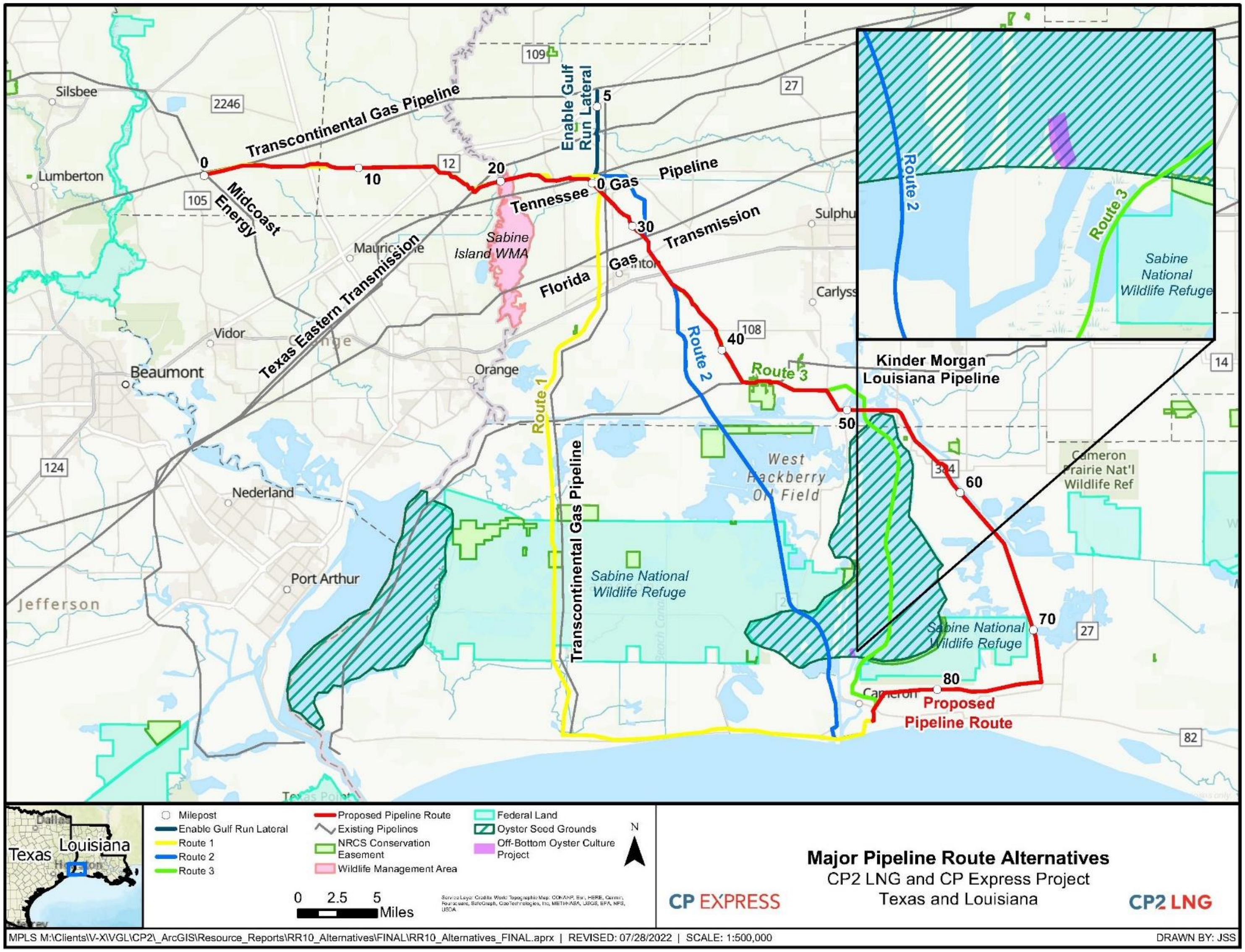

Figure 3.5.1-1 Major Pipeline Route Alternatives

Table 3.5.1-1

CP2 LNG and CP Express Project Comparison of Major Pipeline Route Alternatives

Environmental Factor	Unit	Proposed Pipeline Route	Alternative 1	Alternative 2	Alternative 3
Length	miles	85.4	84.0	70.9	74.3
Length adjacent to existing right-of-way	miles (percent)	37.4 (43.8)	75.7 (90.1)	26.4 (37.2)	31.5 (42.4)
Roads crossed	no.	90	37	38	34
Forestland crossed	miles	12.5	13.0	11.5	11.8
Agricultural land crossed	miles	21.0	8.9	16.9	19.2
Waterbodies crossed	no.	86	65	88	98
NWI-mapped wetlands crossed	miles	34.9	45.8	27.3	31.8
Estuarine	miles	19.3	33.3	19.2	24.0
Palustrine forested	miles	3.6	2.7	2.7	2.8
Palustrine scrub-shrub	miles	1.6	1.6	0.5	0.7
Palustrine emergent	miles	10.4	8.2	4.8	4.3
Cameron Creole Watershed Levee	no.	0	0	0	1
Essential Fish Habitat [a]					
Fresh Marsh	miles (acres) [b]	2.8 (50.9)	1.1 (20.0)	1.5 (27.3)	1.6 (29.0)
Intermediate Marsh	miles (acres)	17.8 (323.6)	30.8 (560.0)	5.7 (103.6)	2.0 (36.4)
Brackish Marsh	miles (acres)	3.1 (56.4)	10.1 (183.6)	10.0 (181.8)	0.0 (0.0)
Saline Marsh	miles (acres)	0.0 (0.0)	0.0 (0.0)	4.2 (76.4)	3.1 (56.4)
Open Water	miles (acres)	1.0 (18.2)	0.2 (3.6)	4.9 (158.2 [c])	18.2 (656.4 [c])
Oyster and Artificial Reef Areas	acres	0.0	0.0	0.6	0.4
Total	miles (acres)	24.7 (449.1)	42.2 (767.2)	26.3 (547.9)	24.9 (778.9)
Federal land crossed	no. (miles)	0 (0)	1 (7.9)	1 (5.8)	0 (0)
NRCS Wetlands Reserve Program easements	no. (miles)	0 (0)	0 (0)	1 (0.6)	1 (0.7)
State Wildlife Management Areas crossed	no. (miles)	1 (0.6)	1 (0.6)	1 (0.6)	1 (0.6)
Environmental Justice communities affected	no.	4	3	3	4

NRCS = Natural Resources Conservation Service

a Nyman et al., 2022
b Acreage based on a 150-foot-wide construction right-of-way
c A 300-foot-wide construction right-of-way would be required to construct across Calcasieu Lake. Alternative 2 and Alternative 3 would cross 3.8 and 17.9 miles of Calcasieu Lake, respectively.

Of the four pipeline alternatives evaluated, Alternative 2 is the shortest in length (70.9 miles), followed by Alternative 3 (74.3 miles), Alternative 1 (84.0 miles), and the proposed pipeline route (85.4 miles). In general, a shorter pipeline route would reduce the amount of land disturbed during construction. Alternative 1 is collocated with existing rights-of-way for a greater percentage of its length (90.1 percent) when compared to the proposed pipeline route (43.8 percent), Alternative 3 (42.4 percent), and

Alternative 2 (37.2 percent). Some of the benefits of collocating the new pipeline with existing rights-of-way are that collocation can reduce forest fragmentation and can often allow construction workspaces to overlap previously disturbed areas, reducing the overall impact.

We received a comment from RESTORE expressing concern regarding the crossing of Alternative 2 over the West Hackberry salt dome. The West Hackberry salt dome was authorized as workspace for the Hackberry Storage Project[45] and RESTORE expressed concerns over instability of the area.

All four alternatives considered cross a similar amount of forestland (between 11.5 and 13.0 miles). The proposed pipeline route would cross the most agricultural land (21.0 miles); however, impacts on agricultural land would typically be temporary to short-term as agricultural activities would be allowed to resume after construction is complete and soils would typically re-establish revegetation potential within a few growing cycles.

Alternative 1 crosses the fewest number of waterbodies (65), while the proposed pipeline route would necessitate 86 crossings. Alternative 1 crosses more NWI-mapped wetlands than Alternatives 2, 3, and the proposed pipeline route.

In addition, Alternatives 1 and 2 would cross the Sabine NWR, which was established as a refuge and breeding ground for migratory birds and other wildlife and covers approximately 125,790 acres of marshland and open water in southwestern Cameron Parish, Louisiana (FWS, 2012). Rights-of-way for new natural gas transmission pipeline construction are generally not permitted within NWRs (FWS, 2012).

We received a comment from NMFS during scoping requesting that CP Express evaluate the different types of EFH crossed by each route alternative. NMFS indicated that crossing open water, mud bottom EFH, such as that within Calcasieu Lake, is preferable to impacts on marsh habitat. Alternative 3 would cross the least EFH marsh habitat (121.8 acres) and the most open water habitat (18.2 miles). Alternative 2 also would cross Calcasieu Lake, though to a lesser extent than Alternative 3 (4.9 miles). However, Alternative 2 also crosses the Sabine NWR. CP Express stated that work within Calcasieu Lake would require a 300-foot-wide construction right-of-way to create a flotation channel for the lay barge and to stockpile excavated sediments. In an email dated April 22, 2022, the LDWF indicated that it does not support pipeline alignments that cross Calcasieu Lake.[46] In particular, LDWF noted concerns with Alternative 3 impacting existing oyster habitat, artificial finfish reefs, and oyster cultch plants within the lake, as well as marsh restoration projects south of the lake. Further, the whole of Calcasieu Lake is designated as a public oyster seed ground. Additionally, Alternative 3 would cross the Cameron Creole Watershed Levee, which would require increased coordination with federal, state, and/or local agencies.

The major advantages of the proposed pipeline route are that the route avoids crossing the Sabine NWR and public oyster seed grounds in Calcasieu Lake and avoids the Cameron Creole Watershed Levee on the south side of Calcasieu Lake. Based on our review and despite the shorter routes, we find that the Alternatives 1, 2, and 3 would not provide a significant environmental advantage over the proposed pipeline route. Compliance with the FERC Procedures, which were developed in consultation with state and federal agencies (e.g., COE), would ensure that impacts on wetlands (especially herbaceous wetlands) within the construction right-of-way are largely short-term until wetland vegetation is re-established. In addition, there are provisions in the Procedures to ensure restoration is completed.

[45] This Order Issuing Certificate can be viewed on the FERC eLibrary under accession no. 20220923-3045.

[46] This email can be viewed on the FERC eLibrary under accession no. 20220520-5241.

All four pipeline alternatives evaluated in the draft EIS included census block groups with environmental justice communities. During the draft EIS comment period, we received comments from the EPA and NGOs, including the Niskanen Center, et. al. and Natural Resources Defense Council, to evaluate an alternative pipeline route with the intent of minimizing environmental justice communities crossed. We evaluated one additional alternative pipeline route, the Sabine River Southern Alternative, which deviates from MPs 0 to 50 of the proposed route (see figure 3.5.1-2). Consistent with the alternative pipeline route analyses above, the evaluation criteria for the Sabine River Southern Alternative included meeting the Project's objective, its economic and technical feasibility, and whether it is significantly environmentally advantageous over the proposed route. To ensure consistency, desktop level data were used to compare the Sabine River Southern Alternative with the proposed route. Information used during the analysis included aerial photographs, USGS topographic maps, NWI maps, and Rextag energy mapping data. An environmental comparison of the Sabine River Southern Alternative to the corresponding segment of the initially proposed pipeline route is presented in table 3.5.1-2.

The Sabine River Southern Alternative begins at the same location as the proposed route (MP 0.0) and proceeds generally southeast along existing rights-of-way and greenfield alignments, crossing a mix of forestland and open land for about 25.1 miles to a point southwest of Bridge City, Texas. The route then turns east and proceeds 33.6 miles along a combination of existing rights-of-way and greenfield alignments, where it crosses the Lower Neches Wildlife Management Area (WMA) and extensive estuarine wetlands until it rejoins the proposed pipeline route at MP 50.0 west of the Calcasieu Ship Channel. During development of the Sabine River Southern Alternative, additional pipeline routes were considered that would cross Sabine Lake, Calcasieu Lake, and the Sabine National Wildlife Refuge to minimize impacts on potential environmental justice communities. However, as noted above, the LDWF does not support pipeline alignments that impact oyster seed grounds (e.g., Calcasieu Lake and Sabine Lake), and rights-of-way for new natural gas pipelines are not permitted within the Sabine National Wildlife Refuge. As a result, we did not further evaluate pipeline routes that would impact these resources.

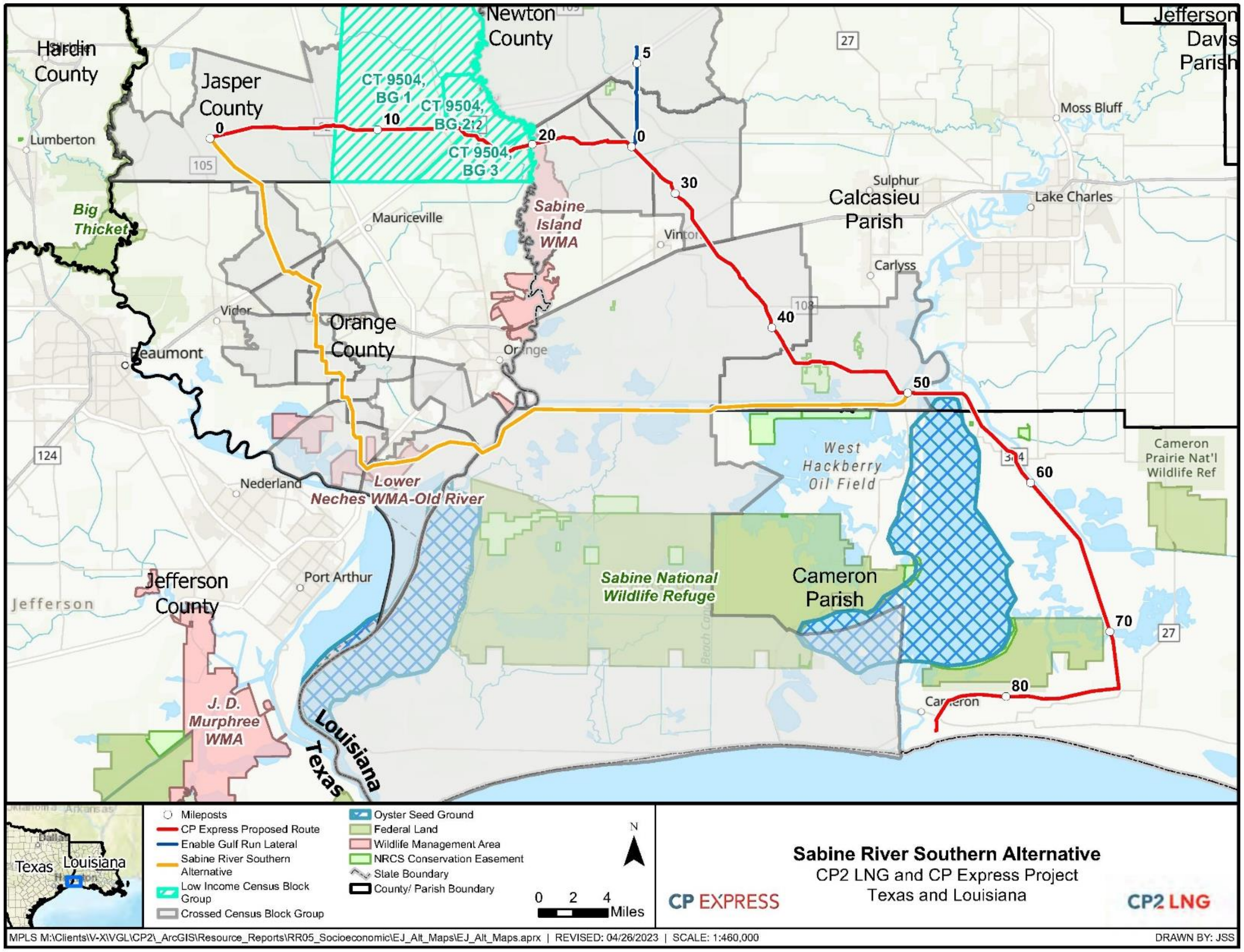

Figure 3.5.1-2 Sabine River Southern Alternative

Table 3.5.1-2

Comparison of the Sabine River Southern Alternative to the Corresponding Segment of the Proposed Pipeline Route

Environmental Factor	Unit	Proposed Pipeline Route [a]	Sabine River Southern Alternative
Length	Miles	50.0	58.7
Length adjacent to existing right-of-way	Miles	25.8	34.5
Forestland crossed	Miles	12.5	6.9
Agricultural land crossed	Miles	18.1	1.1
Waterbodies crossed	Number	81	44
NWI-mapped wetlands crossed	Miles	9.6	25.7
Palustrine forested	Miles	3.4	4.5
Palustrine scrub-shrub	Miles	0.8	0.3
Palustrine emergent	Miles	3.9	3.1
Palustrine estuarine	Miles	1.5	17.8
Essential Fish Habitat [b]	Miles	2.5	23.9
Fresh herbaceous marsh	Miles	1.3	1.1
Brackish herbaceous marsh	Miles	0.0	3.4
Intermediate herbaceous marsh	Miles	1.2	19.4
State Wildlife Management Areas	Number (Miles)	1 (0.6)	1 (3.2)
Environmental Justice Communities Crossed [c]	Number	3	0
Existing residences/buildings within 100 feet of the pipeline centerline	Number	1	5

a The Proposed Pipeline Route includes the Enable Gulf Run Lateral.
b Nyman et al., 2022.
c Data based on EJScreen 2.11 (EPA, 2023a).

EJScreen 2.11 data for demographic and socioeconomic characteristics was used to develop the route alternative with the goal of avoiding EJ communities, reducing new impacts on natural resources by locating the alternative adjacent to existing rights-of-way, and avoiding areas with dense populations, where possible. The Sabine River Southern Alternative would cross 13 census block groups, of which none exceed the thresholds for populations of color or low-income populations when compared to the reference populations of Louisiana and Texas. The corresponding segment of the proposed route would cross nine census block groups, with three exceeding the low-income population threshold when compared to the reference population (i.e., the state of Texas).

The Sabine River Southern Alternative is collocated for a greater percentage of its length (59 percent), but the length of greenfield alignment would be the same for the proposed route and the Sabine River Southern Alternative due to the greater overall length of the Sabine River Southern Alternative. It would also reduce the number of waterbody crossings from 81 to 44; and reduce the acreage of upland forest clearing by about 5.6 miles. However, as shown in table 3.5.1-2, the Sabine River Southern Alternative would increase the length of the pipeline by 8.7 miles, increasing the land disturbance associated with the Project, and would increase the crossing of all wetland types by 16.1 miles, including increased impacts on forested wetlands. Moreover, most of the increase in wetland crossings would involve estuarine wetlands, which are associated with essential fish habitat. Additionally, the Sabine River Southern Alternative would increase the crossing length of state WMAs by 2.6 miles and be within 100 feet of a greater number of existing residences/buildings. As such, the Sabine River Southern Alternative crosses fewer EJ communities and has fewer forested impacts; however, it does not offer a significant environmental advantage over the proposed route.

None of the routes analyzed, including the Sabine River Southern Alternative, would cross a majority of environmental justice communities relative to the total number of census block groupscrossed. Regardless of the pipeline route selected, construction activities would be dispersed along the construction right-of-way and would not be concentrated or disproportionately located in environmental justice populations.

Additionally, during internal conversations with the COE (a cooperating agency), the COE asked that we evaluate in the final EIS at least two pipeline route alternatives for the portion of the pipeline route within Texas to demonstrate impacts to wetlands and Waters of the U.S. are avoided to the maximum extent practicable. The Sabine River Southern Alternative, as discussed above, and the Sabine River Northern Alternative were evaluated in response to the COE's comment.

As discussed above and shown in table 3.5.1-2, the Sabine River Southern Alternative would increase the crossing of all wetland types by 16.1 miles than the proposed route, including increased impacts on forested wetlands and estuarine wetlands, which are associated with essential fish habitat. Therefore, the Sabine River Southern Alternative would not offer a significant environmental advantage regarding impacts to wetlands and Waters of the U.S. over the proposed route.

The Sabine River Northern Alternative follows the same alignment as the proposed route from MP 0.0 to 2.5 (see figure 3.5.1-3). At this point, the Sabine River Northern Alternative deviates from the proposed pipeline route and proceeds northeast for approximately 14.1 miles, adjacent to an existing pipeline, across forestland, State Highway 87, and the Sabine River. After crossing the Sabine River, the Sabine River Northern Alternative continues to follow the existing pipeline east across forestland for approximately 9.1 miles until the northern end of the proposed Enable Gulf Run Lateral. The route then proceeds south along the same alignment as the Enable Gulf Run Lateral before rejoining the proposed route at MP 26.2. An environmental comparison of the Sabine River Northern Alternative to the corresponding segment of the proposed pipeline route is presented in table 3.5.1-3.

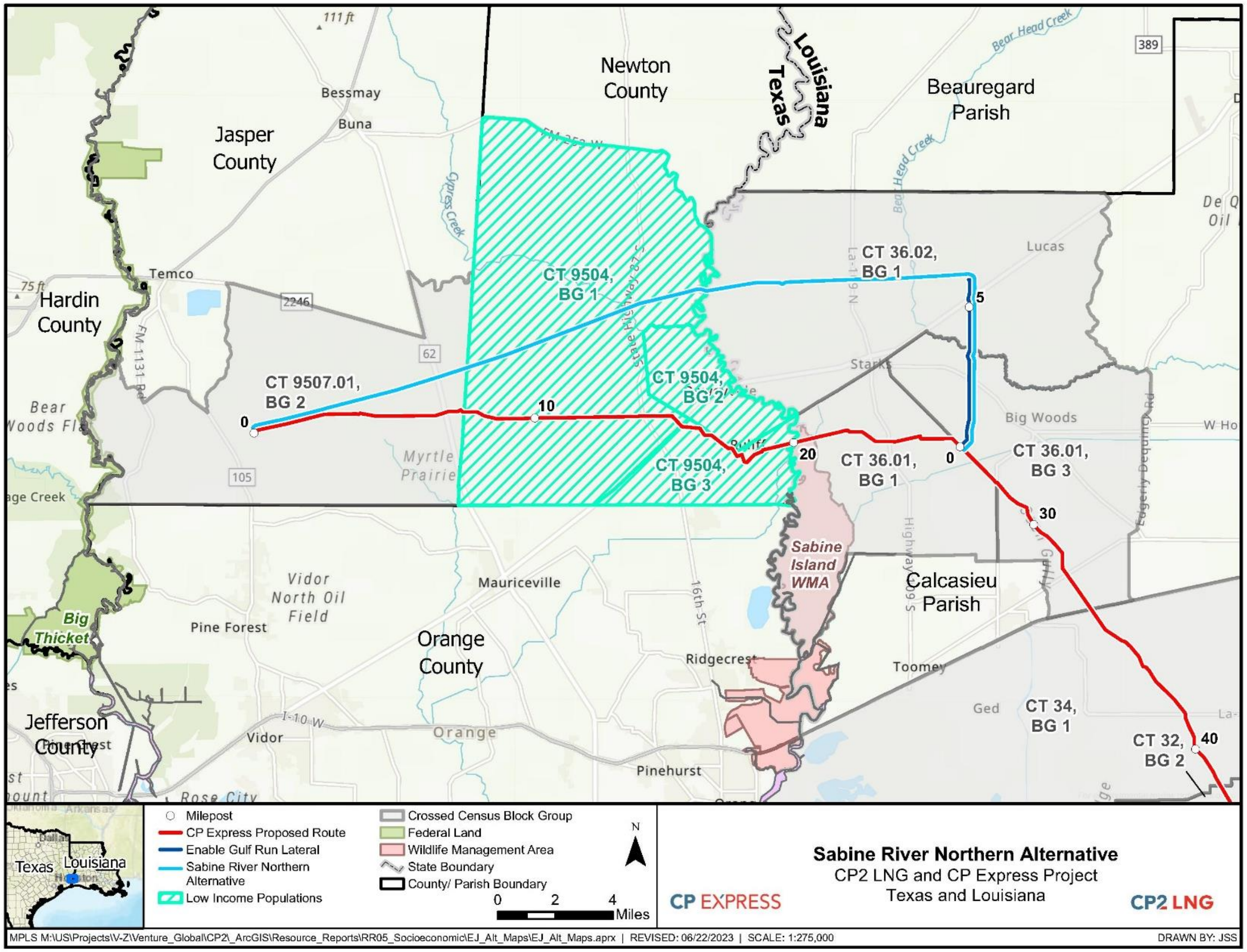

Figure 3.5.1-3 Sabine River Northern Alternative

Table 3.5.1-3

Comparison of the Sabine River Northern Alternative to the Corresponding Segment of the Proposed Pipeline Route

Environmental Factor	Unit	Proposed Pipeline Route [a]	Sabine River Northern Alternative
Length	Miles	32.2	31.7
Length adjacent to existing right-of-way	Miles	23.7	29.6
Forestland crossed	Miles	13.2	11.2
Agricultural land crossed	Miles	1.5	2.0
Waterbodies crossed	Number	45	47
NWI-mapped wetlands crossed	Miles	6.5	6.8
Palustrine forested	Miles	3.4	5.2
Palustrine scrub-shrub	Miles	0.7	0.0
Palustrine emergent	Miles	2.4	1.6
Essential Fish Habitat [a]	Miles	0.0	0.0
State Wildlife Management Areas	Number (Miles)	1 (0.6)	0 (0.0)
Environmental Justice Communities Crossed [c]	Number	3	1
Existing residences/buildings within 100 feet of the pipeline centerline	Number	1	0

[a] The Proposed Pipeline Route includes the Enable Gulf Run Lateral.
[b] NOAA, 2023b
[c] Data based on EJScreen 2.11 (EPA, 2023a).

The Sabine River Northern Alternative and the proposed pipeline route are comparable in length and cross similar amounts of forestland and agricultural land. Neither the proposed pipeline route nor the Sabine River Northern Alternative cross EFH. The main disadvantage of the Sabine River Northern Alternative is that it would cross two more waterbodies and more wetlands, including 1.8 miles more forested wetlands, than the corresponding segment of the proposed route. While the proposed pipeline route would cross the Sabine Island WMA (which is avoided by the Sabine River Northern Alternative), CP Express plans to install the pipeline across the WMA using the HDD construction method, which would avoid trenching and tree clearing impacts within the WMA area. As the proposed route and the alternative have similar impacts, the Sabine River Northern Alternative does not offer a significant environmental advantage over the proposed route.

3.5.2 Minor Route Alternatives

For the purpose of this analysis, a minor route alternative is defined as an alignment that deviates from the base pipeline route to avoid routing constraints and/or environmentally sensitive areas. Following the selection of the initially proposed pipeline route, CP Express completed additional desktop analysis and field reviews to refine the pipeline alignment. The discussion below provides an analysis of the minor route alternatives evaluated and incorporated into CP Express' proposed route.

Robertson Alternative

The Robertson Alternative was identified to avoid a residential development south of Robertson in Jasper County, Texas (see figure 3.5.2-1) due to insufficient available construction workspace between an electric transmission line right-of-way and existing residential structures. The Robertson Alternative deviates from the initially proposed pipeline route at MP 6.4 and proceeds northeast crossing SH 62. After crossing SH 62, the Robertson Alternative proceeds east, crossing primarily forestland and following property lines to the extent practicable, before turning southeast and rejoining the initially proposed pipeline route at MP 8.2. Additionally, at the request of a landowner, the Robertson Alternative was routed to avoid a pond between MPs 7.2 and 7.5. An environmental comparison of the Robertson Alternative to the corresponding segment of the initially proposed pipeline route is presented in table 3.5.2-1.

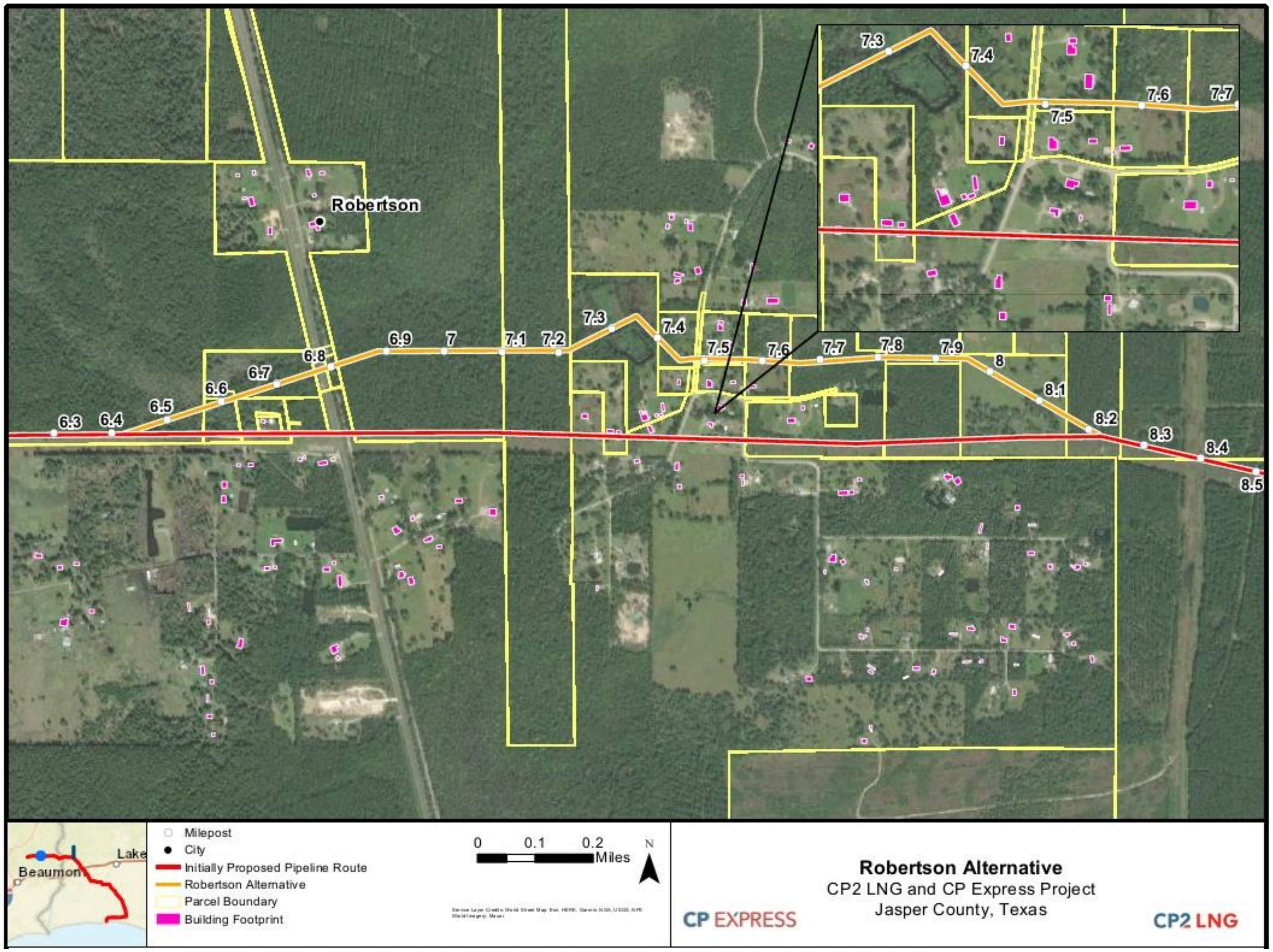

Figure 3.5.2-1 Robertson Alternative

Table 3.5.2-1 Comparison of the Robertson Alternative to the Corresponding Segment of the Proposed Pipeline Route			
Environmental Factor	**Unit**	**Initially Proposed Pipeline Route**	**Robertson Alternative**
Length	Miles	1.7	1.8
Length adjacent to existing right-of-way	Miles	1.7	0
Forestland crossed	Miles	1.3	1.5
Waterbodies crossed	Number	1	1
Wetlands crossed	Miles	0.1	0.4
Existing residences/buildings within 100 feet of the pipeline centerline	Number	8	1

The Robertson Alternative would cross within 100 feet of one residence/building, as compared to eight residences/buildings within 100 feet of the corresponding section of the initially proposed pipeline route. Residential homes and buildings abut the Entergy electric transmission line right-of-way in this area and there is insufficient space between the right-of-way and the residences to allow for collocated pipeline construction. Crossing over to the south side of the Entergy electric transmission line right-of-way would not be feasible because there are similar constraints on the south side. While the Robertson Alternative is slightly longer and affects slightly more wetlands and forested land, it minimizes impacts on residences. Therefore, we find the Robertson Alternative acceptable.

Howard Road Alternative

The Howard Road Alternative was identified to increase the amount of separation between the pipeline and existing residences along Howard and Ozan Roads in Calcasieu Parish, Louisiana (see figure 3.5.2-2). The Howard Road Alternative deviates from the initially proposed pipeline route at approximately MP 22.4 and proceeds southeast across forestland and recently harvested timber tracts before turning east and rejoining the initially proposed pipeline route at MP 23.4 near SH 109.

An environmental comparison of the Howard Road Alternative to the corresponding segment of the initially proposed pipeline route is presented in table 3.5.2-2.

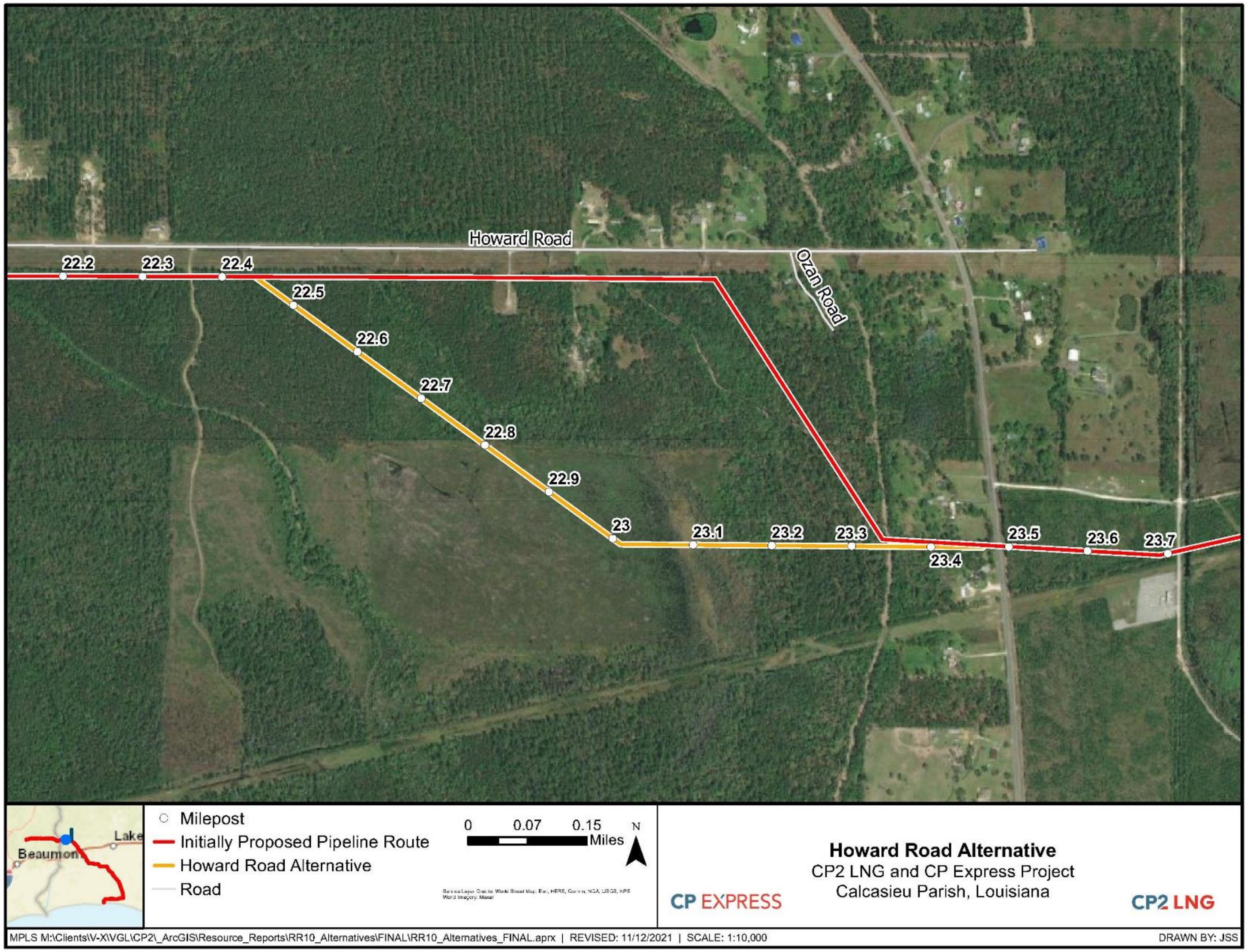

Figure 3.5.2-2 Howard Road Alternative

Table 3.5.2-2			
Comparison of Howard Road Alternative to the Corresponding Segment of the Proposed Pipeline Route			
Environmental Factor	**Unit**	**Initially Proposed Pipeline Route**	**Howard Road Alternative**
Length	miles	1.1	1.0
Length adjacent to existing right-of-way	miles	0.6	0.0
Forestland crossed	miles	1.0	0.7
Waterbodies crossed	no.	1	1
Wetlands crossed	miles	0.0	0.2
Existing residences/buildings within 100 feet of the pipeline centerline	no.	0	0

Although no residences or buildings are within 100 feet of either route, approximately five residences are between 250 and 400 feet from the initially proposed pipeline route. The Howard Road Alternative would increase the distance from construction activities near these residences along Howard Road and Ozan Road. In addition, the Howard Road Alternative would cross 0.3 mile less forestland than the corresponding segment of the initially proposed pipeline route. While the Howard Road Alternative would cross an additional 0.2 mile of wetlands, the wetland impacts would be short-term. Therefore, we find the Howard Road Alternative acceptable.

Big Woods Mitigation Bank Alternative

The Big Woods Mitigation Bank Alternative was identified to avoid the Big Woods Mitigation Bank in Calcasieu Parish, Louisiana, (see figure 3.5.2-3). Peace River Mitigation, LLC (Peace River) has developed the Big Woods Mitigation Bank (approved September 19, 2021), which would encompass 887.5 acres placed in a conservation easement, including 807.4 acres in which wetland enhancement activities are planned (COE, 2019). The Big Woods Mitigation Bank Alternative deviates from the initially proposed pipeline route at MP 24.5 and proceeds south and then east to a point on the east side of No. 7 Road. From this point, the alternative proceeds southeast adjacent to No. 7 Road, crossing primarily timber tracts and the Sabine River Diversion System. After crossing Big Woods Vinton Road, the alignment continues southeast along a greenfield alignment across primarily pasture land before rejoining the initially proposed pipeline route at MP 31.0.

An environmental comparison of the Big Woods Mitigation Bank Alternative to the corresponding segment of the initially proposed pipeline route is presented in table 3.5.2-3.

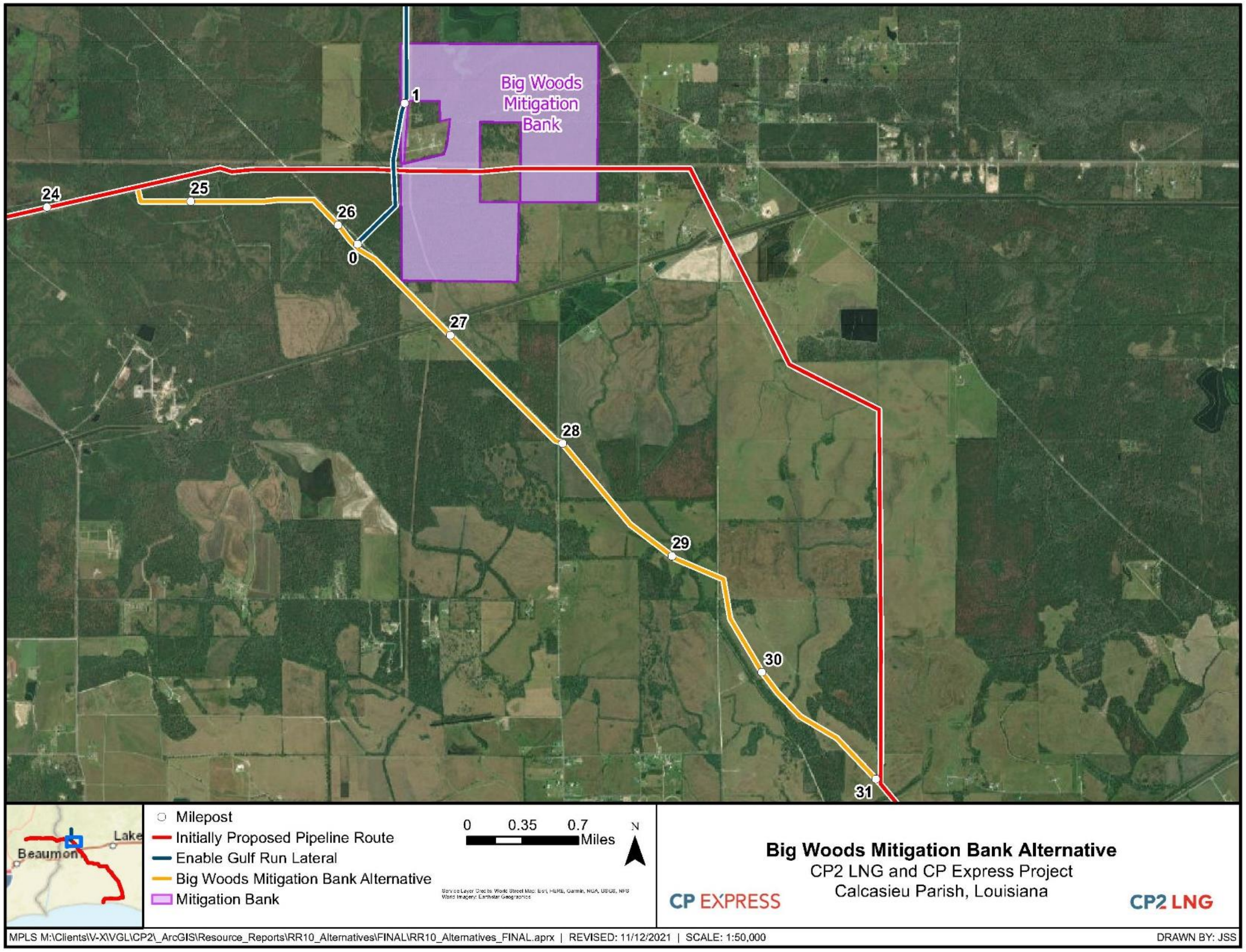

Figure 3.5.2-3 Big Woods Mitigation Bank Alternative

Table 3.5.2-3 Comparison of the Big Woods Mitigation Bank Alternative to the Corresponding Segment of the Proposed Pipeline Route			
Environmental Factor	**Unit**	**Initially Proposed Pipeline Route**	**Big Woods Mitigation Bank Alternative**
Length	miles	7.9	6.4
Length adjacent to existing right-of-way	miles	3.5	2.1
Forestland crossed	miles	3.2	2.9
Waterbodies crossed	no.	21	14
Big woods mitigation bank crossing	miles	1.0	0.0
Wetlands crossed	miles	0.0	0.1
Existing residences/buildings within 100 feet of the pipeline centerline	no.	0	0

Although the Big Woods Mitigation Bank Alternative would require an additional 0.5 mile of the Enable Gulf Run Lateral, this alternative would avoid crossing the Big Woods Mitigation Bank is 1.5 miles shorter than the corresponding segment of the initially proposed pipeline route and crosses less forestland and fewer waterbodies. Based on our review, we find that the Big Woods Mitigation Bank Alternative is acceptable.

Wetland Reserve Program Alternative

The Wetland Reserve Program Alternative was identified to avoid parcels enrolled in the Wetland Reserve Program along the proposed pipeline route in Calcasieu Parish, Louisiana (see figure 3.5.2-4). The Wetland Reserve Program is a voluntary program offering landowners the opportunity to protect, restore, and enhance wetlands on their property. The Wetland Reserve Program Alternative deviates from the initially proposed pipeline route at MP 43.1 and proceeds east and then northeast crossing Ellis Moss Road, as seen in figure 3.5.2-4. After crossing the road, the alternative turns and proceeds east across primarily pasture land before turning south, crossing Ellis Moss Road, and rejoining the initially proposed pipeline route at MP 44.8.

An environmental comparison of the Wetland Reserve Program Alternative to the corresponding segment of the initially proposed pipeline route is included in table 3.5.2-4.

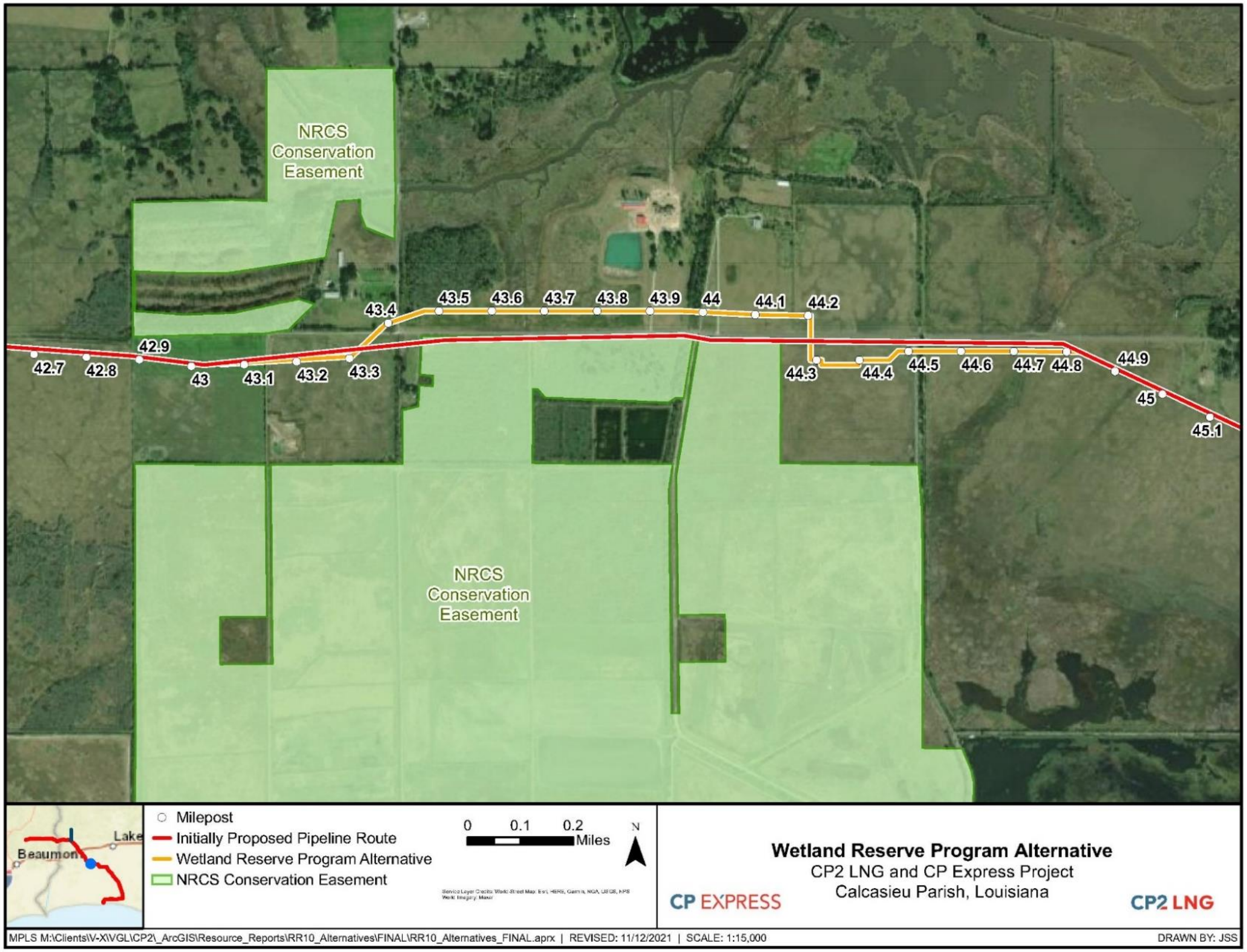

Figure 3.5.2-4 Wetland Reserve Program Alternative

Table 3.5.2-4

Comparison of the Wetland Reserve Program Alternative to the Corresponding Segment of the Proposed Pipeline Route

Environmental Factor	Unit	Initially Proposed Pipeline Route	Wetland Reserve Program Alternative
Length	miles	1.6	1.7
Length adjacent to existing right-of-way	miles	1.6	1.7
Forestland crossed	miles	0.0	0.0
Waterbodies crossed	no.	5	7
Wetland reserve program crossing	miles	0.7	0.0
Wetlands crossed	miles	0.3	<0.1
Existing residences/buildings within 100 feet of the pipeline centerline	no.	0	0

Both the initially proposed pipeline route and the Wetland Reserve Program Alternative are collocated with existing right-of-way and are about the same length. The Wetland Reserve Program Alternative would avoid impacts on tracts enrolled in the Wetland Reserve Program and crosses fewer wetlands. Based on our review, we find that the Wetland Reserve Program Alternative is acceptable. The COE would review unavoidable wetland impacts for compensatory mitigation.

GBG Mitigation Alternative

The GBG Mitigation Alternative in Cameron Parish, Louisiana, was identified to reduce the overall impacts on wetlands (see figures 3.5.2-5 and 3.5.2-6). The GBG Mitigation Alternative deviates from the initially proposed pipeline route at MP 53.1, crosses from the north side to the south side of the existing Cameron LNG, LLC right-of-way, proceeds east across Big Lake Road, then turns and proceeds southeast across primarily estuarine and palustrine wetlands and the GBG Mitigation, LLC tract. After crossing the GBG Mitigation, LLC tract, the GBG Mitigation Alternative continues southeast along an alignment between the Intracoastal Waterway and SH 384 before turning south and crossing SH 384. From this point, the GBG Mitigation Alternative proceeds southeast where it rejoins the initially proposed pipeline route at MP 64.1.

An environmental comparison of the GBG Mitigation Alternative to the corresponding segment of the initially proposed pipeline route is included in table 3.5.2-5.

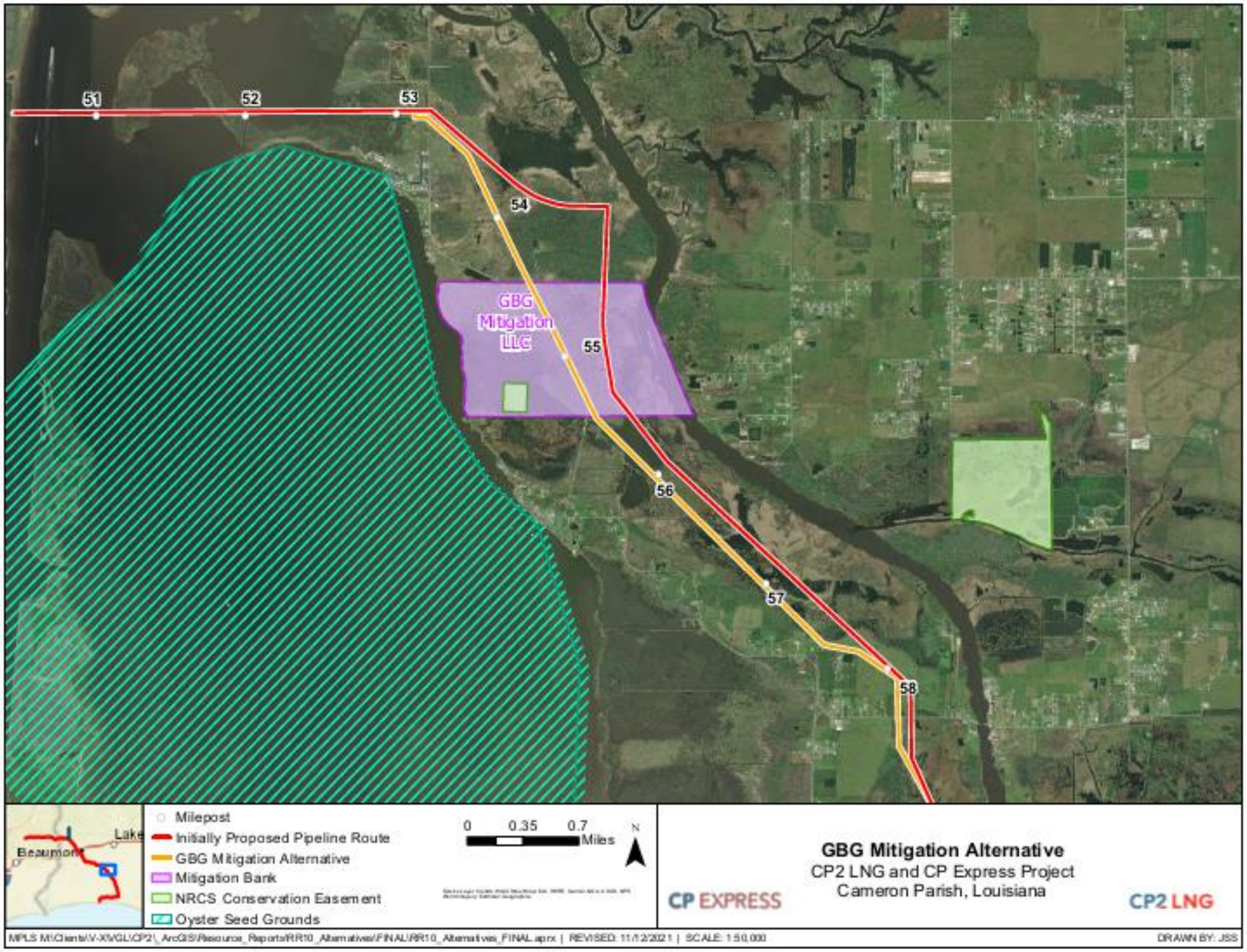

Figure 3.5.2-5 GBG Mitigation Alternative (a)

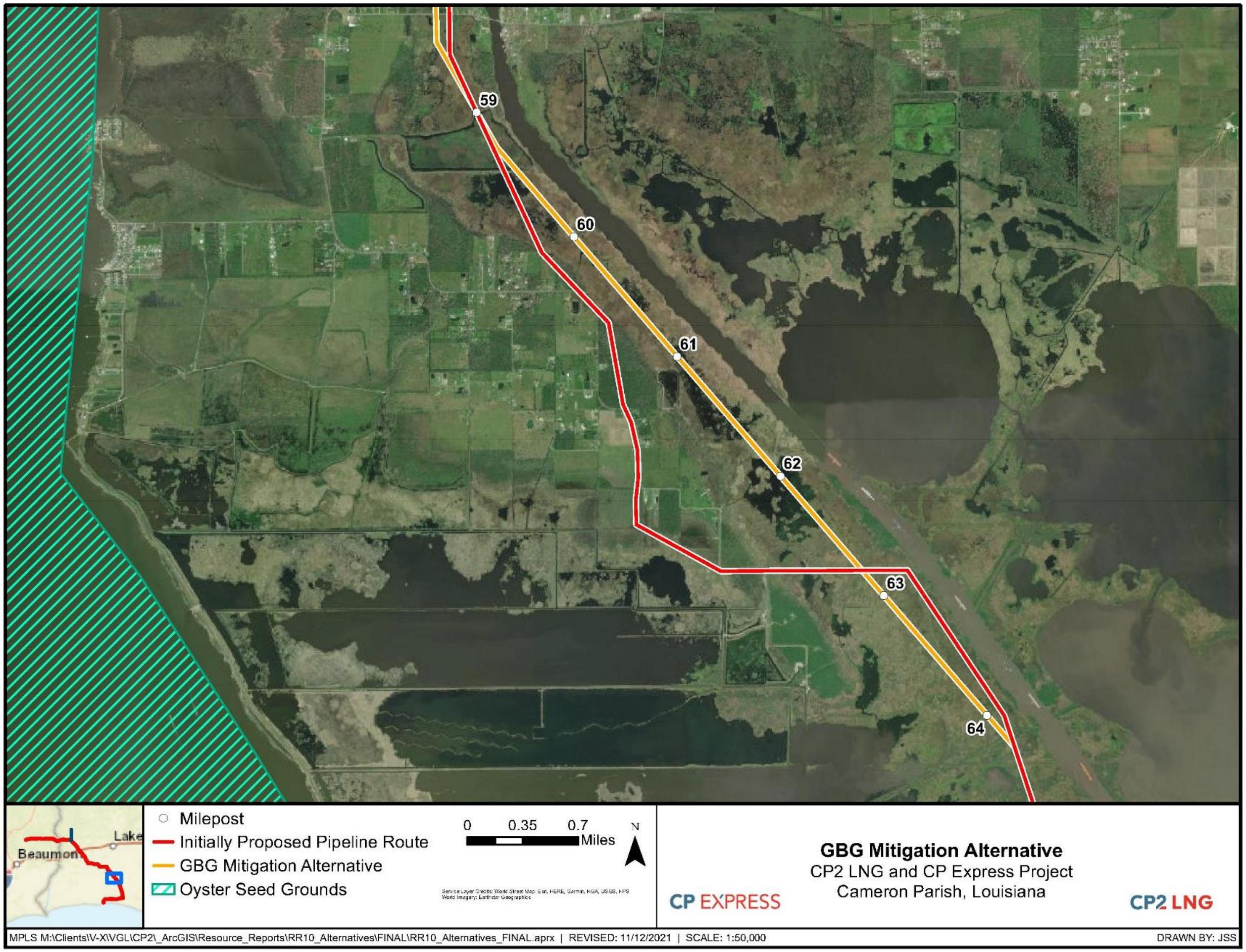

Figure 3.5.2-6 GBG Mitigation Alternative (b)

Table 3.5.2-5 Comparison of the GBG Mitigation Alternative to the Corresponding Segment of the Proposed Pipeline Route			
Environmental Factor	**Unit**	**Initially Proposed Pipeline Route**	**GBG Mitigation Alternative**
Length	miles	12.2	11.2
Length adjacent to existing right-of-way	miles	1.5	0.5
Forestland crossed	miles	0.0	0.0
Agricultural land crossed	miles	1.4	0.8
Waterbodies crossed	no.	0	0
Wetlands crossed	miles	9.9	9.5
Estuarine	miles	4.6	4.3
Palustrine forested	miles	0.7	0.4
Palustrine scrub-shrub	miles	1.1	0.7
Palustrine emergent	miles	3.5	4.1
Existing residences/buildings within 100 feet of the pipeline centerline	no.	0	0

While the initially proposed pipeline route would be collocated with existing rights-of-way for about 1.0 additional mile, the GBG Mitigation Alternative is 1.0 mile shorter. Additionally, the GBG Mitigation Alternative would cross 0.4 mile less wetlands, including 0.3 mile less estuarine wetlands and 0.3 mile less palustrine forested wetlands. Based on our review, we find that the GBG Mitigation Alternative is acceptable. The COE would review unavoidable wetland impacts for compensatory mitigation.

3.5.3 Route Variations

CP2 LNG adopted minor route variations and small adjustments into the Project design throughout FERC's pre-filing process. Many of these small route adjustments were adopted without a detailed alternatives analysis because the basis for the adjustment was intuitive and practical (e.g., a slight shift in the centerline to avoid a wetland; agency preferences; landowner preferences; and survey findings). Table 3.5.3-1 identifies the minor route variations, milepost ranges, and purpose of the route variations.

Table 3.5.3-1 Summary of Route Variations Incorporated into the Proposed Route		
Route Variation	**Milepost Range**	**Purpose of Route Variation**
Route Variation 1	0.0-3.8	Reduces pipeline length and avoids crossing two Transcontinental Gas Pipeline Company pipelines at an angle.
Route Variation 2	17.8-19.2	Avoids the planned expansion of an existing transmission line substation and improves the location for the TETCO/Boardwalk Interconnect Meter Station.
Route Variation 3	48.0-49.2	Reduces pipeline length and avoids a pond and transmission line guy wires adjacent to SH 27.
Route Variation 4	84.7-85.4	Pipeline alignment adjusted to terminate at the meter station within the Terminal Site.

3.6 COMPRESSOR STATION ALTERNATIVES

3.6.1 Site Alternatives

CP Express completed hydraulic modeling to determine the optimum horsepower and location required to transport the proposed natural gas volumes. Based on this evaluation, CP Express determined that a compressor station at the Florida Gas Transmission (FGT) interconnect (MP 30.7), or downstream of this point, is the optimal location from a hydraulics perspective. Compressor station sites north of the FGT interconnect would require additional booster compression on the FGT system to meet the CP Express operating pressure and, as a result, were not evaluated further. Therefore, CP Express identified and evaluated the availability of potential compressor station sites downstream of the FGT interconnect adjacent to the pipeline route. CP Express considered the presence of suitable access roads and the location of existing infrastructure, such as electric distribution lines. Other factors considered included avoiding or minimizing impacts on forestland, wetlands, and waterbodies, and locating the facility as far from NSAs as practicable.

As seen in figure 3.6.1-1, we evaluated four alternative compressor station sites, Vinton Alternative A, Vinton Alternative B, Moss Lake Alternative B, and Moss Lake Alternative A (Proposed Site), all in Calcasieu Parish, Louisiana. An environmental comparison of the compressor station site alternatives is included in table 3.6.1-1. CP Express determined that the compressor station site would need to be nearly 40 acres in size to accommodate the compressor station layout. Moss Lake Alternative B site is not available for long-term lease or purchase; therefore, the Moss Lake Alternative B site was not considered further.

The three compressor station site alternatives have similar land use/vegetation cover and none of the construction footprints would affect NWI-mapped wetlands. While there are NWI-mapped wetlands within the 60-acre Proposed Site property boundary, development of the 37.3-acre compressor station site would avoid affecting NWI-mapped wetlands. The Vinton Alternative A site would affect about 667 feet of a waterbody in the northeast corner of the site. There are mapped waterbodies within the property boundaries of the Proposed Site; however, no waterbodies would be affected by development of the compressor station.

The three compressor station site alternatives are in rural locations and relatively far from residential development. The Proposed Site is 0.3 mile from the nearest residence, followed by Vinton Alternative A (0.4 mile), and Vinton Alternative B (1.1 miles). The Proposed Site is adjacent to an existing electric distribution line. In contrast, the Vinton Alternative A and Vinton Alternative B sites would each require the construction of about 1.6 miles of electric distribution line to provide operational power at the compressor station. The Vinton Alternative A site would require construction of the longest access road (4,200 feet), followed by the Vinton Alternative B (500 feet), and the Proposed Site (327 feet).

The construction and operation of Vinton Alternative A would not have any environmental justice impacts because there are no identified environmental justice communities within the analysis area (crossed by or within 0.25 mile of the CP Express Pipeline and Enable Gulf Run Lateral, and within 1 mile of the proposed Pipeline System aboveground facilities and 2 miles of Terminal Facilities). Vinton Alternative B is within the census block group with the identified low-income population, while the Proposed Site is within the census block group adjacent an identified low-income population.

Upon review of the environmental and technical factors above and in table 3.6.1-1, we conclude that the alternative site options do not provide a significant environmental advantage over the Proposed Site. In addition, we did not identify any significant environmental issues, nor did we receive any comments about alternatives for the proposed Moss Lake Compressor Station site.

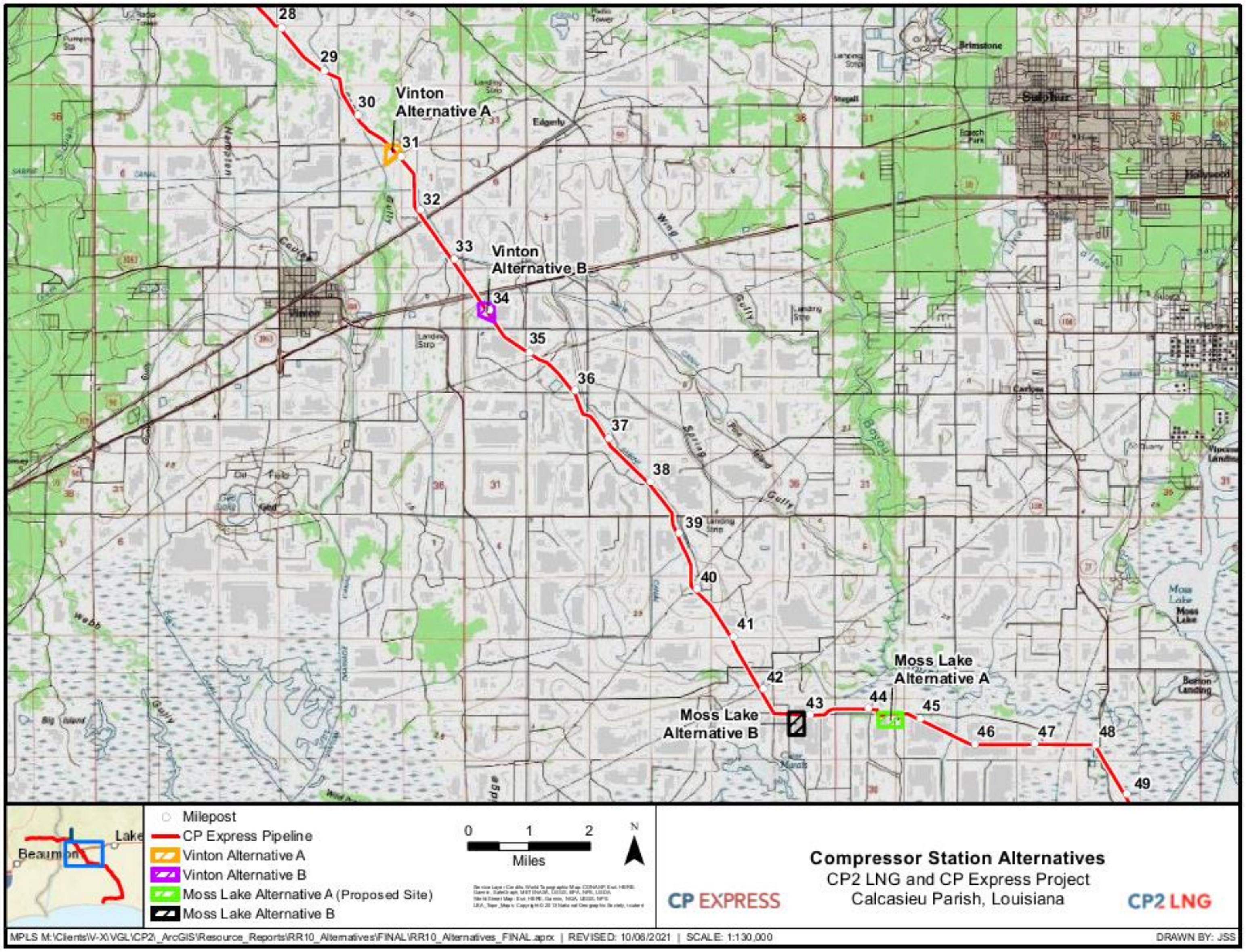

Figure 3.6.1-1 Compressor Station Alternatives

Table 3.6.1-1 Comparison of the Moss Lake Compressor Station A (Proposed Site) to Moss Lake Compressor Station B, Vinton Alternative A, and Vinton Alternative B				
Environmental Factor	**Moss Lake Alternative A (Proposed Site)**	**Moss Lake Alternative B**	**Vinton Alternative A**	**Vinton Alternative B**
Property Size (acres)	60[a]	60	37	41
Land use/vegetative cover	Pasture	Pasture	Pasture	Pasture
NWI mapped wetlands affected (acres)	0.0	0.0	0.0	0.0
Waterbodies permanently affected (feet)	0.0	0.0	667	0.0
Distance and direction to nearest residence	0.3 mile northwest	0.6 mile northeast	0.4 mile east	1.1 miles southwest
Length of electric distribution line (miles)	0.0	0.4	1.6	1.6
Length of access road (feet)	327	2,800	4,200	500
Environmental Justice communities directly affected	None	None	None	1

[a] The compressor station would affect 37.3 acres during operation.

3.7 ALTERNATIVE POWER SOURCES (ELECTRIC)

In response to comments received on the draft EIS from the EPA, NGOs, and individuals, we evaluated energy alternatives for the Project, including the feasibility of utilizing electric-driven turbines at the Terminal Facilities and electric motor-driven compression at the Moss Lake Compressor Station.

3.7.1 Electric-Driven Turbine Alternative

In response to comments received on the draft EIS to reduce direct emissions from the facilities and eliminate the need for the power plant onsite, we evaluated the feasibility of utilizing electric-driven turbines at the Terminal Facilities. As described in section 2.1.1.9, proposed electric power for the Terminal Facilities would be generated by new combined cycle gas turbine electric generation facilities. The Project's proposed natural gas fired turbines would have best-in-class emissions and best available control technologies (BACT). The main power load would be consumed by compressor electric motor drivers in the liquefaction plant (two compressors per liquefaction unit, 36 compressors total). The power plant would supply its own auxiliary electric loads, including fans in the air-cooled steam condenser, and would have multiple generators for black start capability. During construction and until the power plant is operational, power for the Terminal Site would be provided by temporary generators and an existing temporary electrical utility line that was previously installed for the recently constructed Calcasieu Pass LNG facilities (FERC Docket No. CP15-550-000). The temporary electric utility line ties into the Jeff Davis electric distribution line along Marshall Street (SH 27). Once the Terminal Site's power plant is operating, the connection to the local utility would be discontinued.

The Terminal Facilities would require 15 megawatts of electric power for construction. CP2 LNG states the local utility does not anticipate having surplus power to provide to the Project during construction. Moreover, if the temporary transmission line were upgraded such that it could move more power, the local electric utility does not have sufficient power available to transmit to meet the Project's construction or operating needs, and the utility would not have the necessary transmission infrastructure to connect the Project (and lower Cameron Parish) with other potential sources of power to supplement the utility's current power generation resources. The temporary electric transmission line proposed for use during the Terminal Facilities' construction would not be sufficient to meet the needs of the electric-driven turbine alternative during operations. If the utility has surplus power to provide, the temporary electric transmission line would allow for delivery to the site.

While there are environmental benefits to electric-driven power, such as reduced air emissions and noise as compared to gas-driven turbines, other factors are also considered during the selection of the Terminal Facilities' power source, including the reliability of electric power transmission. CP2 LNG states that due to the susceptibility to damage of overhead electric transmission lines as a result of hurricanes and other major storm events, system reliability was a concern. Power outages lasting days or weeks are not uncommon in southern Louisiana after major weather events, which means the LNG terminal would be inoperable until power was restored. Further, severe tropical storm systems are expected to increase in frequency and size and past hurricanes in the Project area have disrupted power supplies for extended periods. In such an instance and to ensure the continued operation of safety critical systems, the Terminal Facilities would need to utilize numerous large diesel-fired generators until electrical power was restored.

CP2 LNG states that using electrical power at the Terminal Site would increase the power load requirements on the electric grid and result in emissions of air pollutants at the source of generation of the electricity, thereby increasing emissions at another geographic location and not necessarily producing a net benefit to regional air quality. Approximately 60 acres of the Terminal Facilities are designated for onsite power generation facilities. If electric-driven turbines utilizing power generated offsite were used, a similar, additional 60 acre area would likely be required. To power the electric-driven turbines, CP2 LNG states the electric utility would need to build a new, high-capacity transmission line estimated to be at least 40 to 50 miles long, to source and deliver power for the Terminal Facilities. CP2 LNG also states it is likely that new power generation capacity would need to be constructed in the region to meet the Project's electricity requirements; further, CP2 LNG states that the local electric utility is currently running diesel generators to provide electricity to customers in lower Cameron Parish. Power generation as proposed onsite could minimize the Project's acreage impacts, avoid significant offsite power transmission and generation requirements and their associated environmental impacts, and provide the necessary electricity to meet the needs of the Terminal Facilities during construction and operation.

For these reasons, the use of grid-based electricity to power the Terminal Facilities does not provide a significant environmental advantage or the reliability as compared to the use of natural gas-fired turbines.

3.7.2 Electric Compressor Alternatives

We received a comment on the draft EIS from RESTORE requesting the evaluation of electrification at the Moss Lake Compressor Station. Some of the advantages of using electric-driven motors compared to natural gas-fired turbines for compressor power include reduced air emissions at the source, reduced noise levels at nearby NSAs, and less routine and long-term maintenance.

An existing 230 kilovolt transmission line operated by Entergy runs along the north side of Ellis Moss Road and, based on CP Express' communications with Entergy, would require upgrading to provide sufficient power to meet the electrical load of the proposed Moss Lake Compressor Station. In addition to potential upgrades to the electric transmission line, ancillary equipment and a new substation, approximately 2 to 3 acres in size, would be required within or adjacent to the Moss Lake Compressor Station.

While there are environmental benefits to using electric motor-driven compressors, there are other factors that need to be considered, such as the reliability of electric power transmission, which can be unpredictable due to the susceptibility to damage of overhead electric transmission lines as a result of hurricanes, periods of severe cold weather, and other major storm events. As stated above, power outages lasting days or weeks are not uncommon in southern Louisiana after major weather events, which means that the electric motor-driven compression facilities would remain shut down until power is restored to the compressor station. Further, severe tropical storm systems are expected to increase in frequency and size and past hurricanes in the Project area have disrupted power supplies for extended periods. While the use of electric motor-driven compressors would reduce the air emissions at the compressor station, it may result in increased emissions of air pollutants at the point of electric generation, which would result in the transfer of air pollutants from one geographic location to another and would not necessarily result in any net benefit for regional air quality. Application of the EPA's AVoided Emissions and Generation Tool (AVERT),[47] based on the approximate total power requirements (140 MW) for the Moss Lake Compressor Station, indicate that use of electric motor-driven compressors would result in a regional increase of some air pollutants (nitrogen oxides [NO_x], sulfur dioxide [SO_2], carbon dioxide-equivalent [CO_2e]) and a decrease in other pollutants (particulate matter [pm] with an aerodynamic diameter less than or equal to 2.5 microns [$PM_{2.5}$], volatile organic compound [VOC]) when using grid-based power.[48] For these reasons, the use of electric motors to supply compression power at the Moss Lake Compressor Station does not provide a significant environmental advantage, or equivalent reliability, as compared to the use of natural gas-fired turbines.

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47 Avoided Emissions and Generation Tool (AVERT v4.1). U.S. Environmental Protection Agency. https://www.epa.gov/avert/download-avert. Accessed on July 20, 2023.

48 The AVERT-calculated emissions results for 140 MW of power generation are as follows: NO_x: 612 tpy; $PM_{2.5}$: 61 tpy; VOC: 20 tpy; SO_2: 775 tpy; CO_2: 1,027,440 tpy.

4.0 ENVIRONMENTAL ANALYSIS

This section describes the affected environment as it currently exists and discusses the environmental consequences of the Project. The discussion is organized by the following major resource topics: geology; soils; water resources; wetlands; vegetation; wildlife; aquatic resources; special-status species; land use, recreation, and visual resources; socioeconomics (including transportation, traffic, and environmental justice); cultural resources; air quality and noise; reliability and safety; and cumulative impacts (including climate change). The analysis contained in this EIS is based upon CP2 LNG and CP Express' application and supplemental filings, and our experience with the construction and operation of natural gas transmission infrastructure.

The environmental consequences of constructing and operating the proposed Project would vary in duration and significance. Four levels of impact were considered: temporary, short-term, long-term, and permanent. Temporary impacts generally occur during construction with the resource returning to preconstruction conditions almost immediately afterward. Short-term impacts could continue for 2 to 5 years following construction. Impacts were considered long-term if the resource would require more than 5 years to recover. A permanent impact could occur as a result of any activity that modified a resource to the extent that it would not return to preconstruction conditions during the life of the Project, such as construction of an aboveground facility. When determining the significance of an impact, the geographic, biological, and/or social context in which the effects would occur, as well as the intensity (e.g., severity), were also considered. In the following sections, we address direct and indirect effects collectively by resource. Section 4.14 analyzes the Project's contribution to cumulative impacts.[50]

As part of its proposal, CP2 LNG and CP Express developed mitigation measures to reduce the environmental impact of the Project. We evaluated CP2 LNG and CP Express' proposed mitigation measures to determine whether additional measures would be necessary to reduce impacts; if we deemed additional measures to be appropriate, we have included them as bulleted, boldfaced paragraphs in the text and included them in section 5.2. We will recommend to the Commission that these measures be included as specific conditions in any order the Commission may issue authorizing this Project. The conclusions in this EIS are based on our analysis of the environmental impacts and the following assumptions:

- CP2 LNG and CP Express would comply with all applicable laws and regulations;
- the proposed facilities would be constructed as described in section 2.0 of this document;
- CP2 LNG and CP Express would implement the mitigation measures included in its application and supplemental filings to FERC; and
- CP2 LNG and CP Express would comply with our recommended mitigation measures, listed in section 5.2.

Our impacts conclusions and determinations of significance are based on the successful restoration of affected lands. The restoration of affected lands is a process, dependent on a number of factors, and may be accomplished relatively quickly (1-2 growing seasons) or may require several years to complete. Restoration of affected lands can be adversely affected by weather conditions such as drought or abnormal rainfall, landowner actions (e.g., physical changes to land use, cattle grazing), and/or third-party actions including non-project use/activities. If initial restoration activities are unsuccessful, affected lands may exhibit uneven grades, ponding, rill erosion, inconsistent revegetation, and/or other adverse conditions that

[50] On April 20, 2022, CEQ issued a final rule, National Environmental Policy Act Implementing Regulations Revisions (Final Rule, 87 FR 23453), which restores the previous regulatory definition of "cumulative effects" that was in effect before being modified in 2020. This recent final rule was effective as of May 20, 2022.

are not consistent with preconstruction conditions. Some of these restoration issues may require additional attention by the applicant or may resolve themselves through normal land use practices and/or natural processes. Ineffective restoration may result in unexpected impacts and the prolonging of impacts described in the following analyses. It is our expectation that if initial restoration activities are unsuccessful, CP2 LNG and CP Express, in consultation with the affected landowner and consistent with our environmental compliance monitoring and reporting requirements, would continue to assess, take action, and implement measures to ensure the eventual restoration of the affected resources.

The EPA has assessed indicators of climate change and summarizes this information in its *Climate Change Indicators in the United States.*[51] Included in the summary is a conclusion that a larger percentage of "heavy participation" events, in recent years, have come in the form of intense single-day events.[52] "Heavy precipitation" which refers to instances during which the amount of rain experienced in a location substantially exceeds what is normal. Intense single-day events can increase the risk and intensity of project-related impacts on the environment. Based on our experience regulating the construction of interstate natural gas transmission pipeline projects, "heavy precipitation" and intense single-day events are not wholly uncommon, especially for projects in which construction spans several months, and it is reasonable to expect that one or more of these events may occur during a project's construction. Predicting these and other extreme weather events (e.g., hurricanes, tropical storms) is difficult; however, should an extreme weather event occur ("heavy precipitation" or an intense single-day event), Project workspaces could become inundated, spoil piles could experience some erosion, and erosion control devices could be overwhelmed. Individually or collectively, these actions may result in off right-of-way impacts and would likely increase rates of erosion, turbidity, and sedimentation. These impacts could in turn affect soil/slope stability, water quality, aquatic wildlife, and other environmental resources. In addition, extreme 1-day precipitation events may lengthen the amount of time required to adequately restore the construction right-of-way. If off-right-of-way impacts occur, CP2 LNG and CP Express would need to request additional approvals from FERC and affected landowners to access these off-right-of-way areas to remediate the erosion and clean-up the sedimentation.

The impacts of an extreme weather event(s) must be assessed and addressed in a timely manner by the company so as to avoid further impacts on the environment. Should a project proponent fail to address these impacts in a timely fashion, the project would be out of compliance with the requirements contained within the FERC Plan (or project-specific Plan). Specifically, the Plan requires that project proponents inspect and ensure the maintenance of temporary erosion control measures within 24 hours of each 0.5 inch of rainfall. The Plan then requires that the repair of all ineffective temporary erosion control measures occur within 24 hours of identification, or as soon as conditions allow. These measures ensure that once an incident occurs, it will be remediated. The occurrence of an incident involving off-right-of-way sediment transport is more likely now than in the past based on the increase in extreme 1-day weather events and should be expected in the Project area.

The analysis contained in this EIS is based upon CP2 LNG and CP Express' application and supplemental filings and our experience with the construction and operation of natural gas infrastructure. However, if a project is approved and proceeds to the construction phase, it is not uncommon for the project proponent to require minor modifications (e.g., minor realignments, changes in workspace configurations). These changes are often identified by the applicant once on-the-ground implementation is initiated. Any

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[51] EPA. 2021. Climate Change Indicators: Heavy Participation. Accessed September 2021. https://www.epa.gov/climate-indicators/climate-changeindicators-heavy-precipitation#tab-2.

[52] The prevalence of extreme single-day precipitation events remained fairly steady between 1910 and the 1980s, but has risen substantially since then. Over the entire period from 1910 to 2020, the portion of the country experiencing extreme single-day precipitation events increased at a rate of about half a percentage point per decade.

Project modifications would be subject to review and approval from the FERC's Director of the Office of Energy Projects (OEP), or their designee, and any other applicable permitting/authorizing agencies.

4.1 ENVIRONMENTAL TRENDS

Climate in the Gulf Coast Region is dominated by the flow of warm, humid, tropical air from the Gulf of Mexico. During winter, the area is alternately influenced by a continental regime, with winds from the north and west, and by a modified maritime regime that prevails during most of the winter. The average minimum temperature in January (typically the coldest month) is approximately 43 °F and the average maximum temperature in August (typically the warmest month) is approximately 91.5 °F (NOAA, 2022e). The average annual precipitation is approximately 60 inches. Severe weather events documented in Cameron and Calcasieu Parishes, and Newton and Jasper Counties include thunderstorms, tornados, hail, drought, flooding, tropical storms, and hurricanes.

Coastal land loss is an ongoing process, which includes discrete (hurricanes) and continuous (subsidence and sea level rise) processes. For example, from 2004 through 2008 alone, Hurricanes Katrina, Rita, Gustav, and Ike eroded more than 300 square miles of the Louisiana coastland (USGS, 2011a). Regional subsidence is widespread through coastal Louisiana due to natural consolidation of sediments, downwarping of basement rocks, and global sea level rise. The proposed Project generally falls within the Calcasieu River Basin. Subsidence rates in the Calcasieu River basin are considered to be low (between zero and 1 foot every 100 years) (COE, 2016).

Before human settlement, southern Louisiana was a blend of biologically diverse ecotones consisting of prairie vegetation, marsh, and forests that were formed as a result of the variable climate cycles and meteorological events described above. Human settlement began over 15,000 years ago with Native American settlement and was followed by European settlement in the 17th century. As population settlements grew, resources such as wetlands and forests were converted to agriculture land and progressively into the human environment we know today. Since European settlement, the landscape has undergone dramatic change with less than 1 percent of intact Louisiana coastal prairie remaining (Baldwin et.al., 2017) and most forests in the Project area now consisting of tertiary or secondary forest. Currently, the Project area is characterized by large expanses of cattle and hay pasture and pine and hardwood forest, much of which is silviculture.

About 40 percent of the U.S.'s continental wetlands in the lower 48 states occur in Louisiana. However, more than 1,000,000 acres of coastal wetlands have been lost since the turn of the century. Louisiana loses wetlands at the rate of about 75 square kilometers (18,533 acres) annually. The construction of levees that channel large coastal rivers, extensive system of dredged canals and flood-control structures, and fill to accommodate development and agriculture (USGS, n.d.) have been major contributors of wetland loss. Natural processes have also added to the degradation and loss of wetlands in Louisiana. Rising sea level and subsidence accelerate coastal erosion and wetland loss, exacerbate flooding, and increase storm impacts. Along with wetland loss, the amount of forest land continues to decline due to a combination of human activities discussed above and natural processes. Data from the Louisiana Department of Agriculture and Forestry indicate that between 2007 and 2016 an average of 14,950 acres of forest was lost to wildfires annually (Louisiana Department of Agriculture and Forestry, 2022).

CP2 Express Pipeline in Texas occurs in a region historically dominated by tallgrass grasslands with a few clusters of oaks, known as oak mottes or maritime woodlands. This region has a long history of alteration, from several hundred years of Native American occupancy and use of fire, to the grazing of large herds of feral cattle and horses from the Spanish by the early 1800's, to domesticated livestock grazing, agriculture, and urban alteration in more recent times. Today, almost all of the coastal prairies have been converted to cropland, rangeland, pasture, or urban and industrial land uses. Extensive networks of drainage canals and stream channelization have occurred in many areas (Griffith et al., 2007). An estimated 4.1 million acres of wetlands existed on the Texas coast in the mid-1950s. By the early 1990s, wetlands had decreased to less than 3.9 million acres including 3.3 million acres of freshwater wetlands and 567,000 acres of saltwater wetlands. About 1.7 million acres (52 percent) of the 3.3 million acres of freshwater wetlands were classified as farmed wetlands. The total net loss of wetlands for the region was approximately 210,600 acres, making the average annual net loss of wetlands about 5,700 acres. The greatest losses were of freshwater emergent and forested wetlands (FWS, 1997).

Specific environmental resources and land uses affected by the Project activities are discussed below.

4.2 GEOLOGIC RESOURCES

This section describes the geologic setting, mineral resources, and geologic hazards associated with the Project; the measures that CP2 LNG and CP Express would implement to minimize impacts on geologic resources during construction and operation of the Project; and any staff recommendations to further avoid or minimize impacts on geologic resources.

4.2.1 Geologic Setting

The Project would be in the West Gulf Coastal Plain section of the Coastal Plain physiographic province. The Coastal Plain physiographic province spans the eastern and southern coast of the United States from Texas to Massachusetts, while the West Gulf Coastal Plain section specifically includes southeast Texas and southwestern Louisiana (Fenneman and Johnson, 1946). The Coastal Plain province is characterized by relatively flat alluvial plains gently sloped seaward that were formed by deposition of Pleistocene and Holocene age fluvial, tidal, and deltaic sediments onto a shallow continental shelf (Louisiana Geological Survey, 1984). The West Gulf Coastal Plain section consists of Late Cretaceous to Holocene age deposits formed in a mostly marine environment and later uplifted and tilted seaward (USGS, 2005; Whiting, 1980).

4.2.1.1 Terminal Facilities

The Terminal Facilities are mapped as being underlain by the Holocene-age, unconsolidated Chenier Plain (saline marsh) deposits comprised of clay and silt (Louisiana Geological Survey, 1984). Elevation is less than about 10 feet NAVD 88 across most of the Terminal Site and Monkey Island, with an average elevation of about 2.8 feet NAVD 88. The Terminal Facilities would cross a landscape dominated by open water and marshland.

4.2.1.2 Pipeline System

The Pipeline System is mapped as being underlain by Holocene and Pleistocene-age geologic units consisting of unconsolidated clays, silts, and sands with minor gravel; organic content is higher in more coastal areas of the Project (Horton et al., 2017). Elevations along the Pipeline System range from about 0 feet NAVD 88 along the southern portion of the Pipeline System to about 47.5 feet NAVD 88 in the north. The northern portion of the Pipeline System is characterized by terraces interspersed with wetlands and the southern portion of the Pipeline System crosses a landscape dominated by open water and marshland.

4.2.2 Mineral Resources

The leading nonfuel mineral resources produced in Texas are cement, crushed stone, and construction sand and gravel (Texas Almanac, 2021). The leading nonfuel mineral resources produced in Louisiana are salt, construction sand and gravel, industrial sand and gravel, crushed stone, and lime (Singh, 2014).

The nearest nonfuel mineral resource deposits to the Project are three salt domes: the Starks salt dome, Big Lake salt dome, and Sweet Lake salt dome, all of which are within 0.25 mile of the CP Express Pipeline in Louisiana (Beckman and Williamson, 1990; Gabelman, 1972; Young et al., 2012). Salt domes are common along the Gulf Coast of Texas and Louisiana. They were created when roughly circular masses of salt from thick, deeply buried layers slowly rose upward through denser formations. The northern boundary of the Starks salt dome is approximately 0.25 mile south of MP 25.0, the Big Lake salt dome is crossed by the pipeline near MP 57.0, and the eastern boundary of the Sweet Lake salt dome is approximately 0.25 mile east of MP 64.0. Based on review of publicly available information and available current and historic aerial imagery, the Starks salt dome is currently being mined for salt and sulfur minerals; however, the area of active mining is approximately 0.8 mile south of the Project workspace (Mindat.org, 2022). The Big Lake and Sweet Lake salt domes are associated with oil fields, but no evidence of historic or active salt mining operations was identified, based on a review of topographic maps and other available information (Beckman and Williamson, 1990; USGS, 2022a). The closest salt dome to the Terminal Facilities is the Calcasieu Lake salt dome, approximately 7 miles northeast of the Terminal Facilities. Depending on easement and safety requirements for subsurface activities, operation of the Pipeline System could restrict future exploitation of the Big Lake salt dome beneath the Project. However, given the abundance of salt dome features in the Project vicinity and because we are not aware of any plans for exploitation of the Big Lake salt dome, we conclude that these impacts would not be significant. Further, based on a search of publicly available federal and state databases, no other active or inactive surface or subsurface mines were identified within 0.25 mile of the Pipeline System or Terminal Facilities (USGS, 2011b; Bureau of Economic Geology, 2021; LDNR, 2022; RRC, 2022).

The Pipeline System and Terminal Facilities would cross multiple oil and natural gas fields. Appendix F identifies the oil and natural gas fields within 0.25 mile of the Project. There are 257 oil and natural gas wells within 0.25 mile of the Project. Of these, a total of 21 wells (10 in Texas and 11 in Louisiana) are active and 9 wells are inactive, but not plugged (i.e., shut-in or orphan) and are shown in table 4.2.2-1. No active or inactive oil and natural gas wells are within the construction workspace associated with the Pipeline System or Terminal Facilities. The remaining wells are listed as plugged and abandoned, dry and plugged, or permitted but have no drill date. No underground natural gas storage facilities are within 0.25 mile of the Pipeline System or Terminal Facilities (U.S. Energy Information Administration, 2022).

CP2 LNG and CP Express would conduct field reconnaissance prior to construction activities to identify or confirm the presence of active or inactive oil and gas wellheads and gathering lines. If a previously unidentified wellhead or gathering line is encountered during construction, CP2 LNG and CP Express would coordinate with the LDNR to develop measures to avoid or minimize impacts on wellheads and gathering lines during construction and operation, such as implementing a construction buffer around the facilities and/or installing highly visible flagging or other markings at the wellhead location and along the portion of the gathering line route within the Project workspace. In addition, blasting is not anticipated to be required for construction of the Project and therefore would not impact oil and gas wells (blasting is discussed further in section 4.2.5). The Project may impact potential future development of oil and gas resources within these oil and gas fields during the lifespan of the Project by restricting exploration and development activities within and near the Project's operational footprint. CP2 LNG and CP Express would consult with landowners prior to construction, to ensure access to existing nearby mineral resource extraction sites is maintained during construction of the Project. We conclude that significant impacts on oil and gas resources are not anticipated due to the abundance of deposits nearby the Project and because common drilling techniques include angled drilling to avoid surface features such as utility rights-of-way.

Table 4.2.2-1

Active and Inactive Oil and Gas Wells within 0.25 Mile of the Project

Nearest Milepost	Distance and Direction from Workspace	Well ID/API Number	Status
PIPELINE SYSTEM			
CP Express Pipeline			
Texas			
9.7	1,005 feet S	281947	Active Oil/Gas Well
9.9	808 feet S	281952	Active Oil/Gas Well
9.9	808 feet S	281949	Active Oil Well
10.1	836 feet S	1081879	Active Gas Well
10.5	1,264 feet N	281946	Active Oil Injection Well
11.5	311 feet N	281766	Active Oil/Gas Well
11.8	41 feet N	1198591	Active Oil Well
12.3	381 feet N	1183901	Active Oil/Gas Well
12.4	493 feet N	281769	Active Oil/Gas Well
12.5	1,237 feet N	1209381	Active Oil Well
Louisiana			
38.7	1,169 feet E	975068	Active Injection Produced Salt Water
38.7	1,162 feet E	234838	Active Producing Gas
40.3	954 feet NE	158064	Reverted to Single Completion No Product Specified (Active)
40.3	954 feet NE	155848	Active Producing Oil
40.4	344 feet NE	70983	Active Injection Produced Salt Water
40.4	391 feet NE	213233	Shut-In Dry Hole – Future Utility No Product Specified
40.4	1,026 feet NE	101367	Active Injection Produced Salt Water
49.9	1,309 feet S	973644	Active Injection Aquifer
49.9	1,297 feet S	973643	Active Injection Aquifer
49.9	1,286 feet S	973642	Active Injection Aquifer
56.5	73 feet SW	167414	Act 404 Orphan Well – Eng Oil
58.4	562 feet E	150921	Act 404 Orphan Well – Injection and Mining No Product Specified
81.0	943 feet S	228467	Shut-In Dry Hole – Future Utility No Product Specified
Johnny Breaux Contractor Yard			
N/A	1,173 feet NW	223992	Shut-In Productive – Future Utility Oil
N/A	509 feet W	33159	Shut-In Productive – Future Utility Gas

Table 4.2.2-1			
Active and Inactive Oil and Gas Wells within 0.25 Mile of the Project			
Nearest Milepost	**Distance and Direction from Workspace**	**Well ID/API Number**	**Status**
Vinton Canal Pipe Unloading Area			
N/A	963 feet NW	223505	Shut-In Productive – Future Utility Oil
N/A	975 feet NW	223506	Active Producing Oil
N/A	1,143 feet SW	226954	Active Producing Oil
West Street Contractor Yard			
N/A	532 feet S	31159	Act 404 Orphan Well – Eng Gas
N/A	607 feet S	29414	Act 404 Orphan Well – Eng No Product Specified
Enable Gulf Run Lateral			
No active oil and gas wells are within 0.25 mile of the Enable Gulf Run Lateral.			
N/A – Not applicable Sources: LDNR, 2022; RRC, 2022			

4.2.3 Geologic Hazards

Geologic hazards are natural, physical conditions that can result in damage to land and structures or injury to people. Such hazards typically are seismic-related, including earthquakes, surface faulting, and soil liquefaction. Additional geologic hazards discussed below include coastal processes, ground subsidence, and flood hazards. The Project facilities were evaluated with respect to those geologic processes that have a potential for occurrence in the Project areas. This section describes natural geologic hazards with respect to the Pipeline System. Natural geologic hazards associated with the Terminal Facilities are discussed in detail in section 4.13.

4.2.3.1 Seismic Hazards

Earthquakes and Surface Faults

The Project would be within the Gulf-margin normal fault system, a belt of poorly defined, mostly seaward-facing normal faults that trend parallel to the Gulf Coast throughout Louisiana (USGS, 2020a). Movement along active growth faults in this system tends to be minimal (less than 0.2 millimeters/year) and non-seismogenic; the Louisiana Geological Survey describes this process as gradual creep instead of sudden break or displacement (Stevenson and McCulloh, 2001). Additionally, the composition of sediments and rocks that underlie the fault system are likely unable to generate the energy required to produce significant seismic events (Wheeler and Heinrich, 1998).

No detected earthquakes have been attributed to the mapped fault systems in southern Louisiana (Stevenson and McCulloh, 2001). One earthquake has been documented within a 50-mile radius of the Project since 1843. The 3.8-magnitude earthquake occurred in 1983 in Calcasieu Parish, Louisiana near Sulfur, approximately 9 miles northeast of the CP Express Pipeline approximate MP 36.1 (USGS, 2021a). A 3.8-magnitude earthquake is in the range for which effects are often felt, but rarely causes damage (National Weather Service, 2021).

Further, Louisiana and Texas are in a low seismic risk region based on the USGS Seismic Hazard Map (USGS, 2019a). The shaking during an earthquake can be expressed in terms of the acceleration as a percent of gravity (g), and seismic risk can be quantified by the motions experienced at the ground surface or by structures during a given earthquake expressed in terms of g. For reference, a peak ground acceleration (PGA) of 10 percent g (0.1g) is generally considered the minimum threshold for damage to older structures or structures not constructed to resist earthquakes. USGS National Seismic Hazard Probability Mapping shows that, for a 50-year period, there is a 2 percent probability of an earthquake with a PGA of 4 to 6 percent g and a 10 percent probability of an earthquake with a PGA of 1 to 2 percent g to occur in the Project area (Rukstales and Petersen, 2019).[53] Soil liquefaction is a physical phenomenon in which saturated, non-cohesive soils temporarily lose their bearing strength when subjected to dynamic forces such as strong and prolonged shaking during an earthquake. Because of the low seismic risk in the Project area, soil liquefaction is also unlikely to occur.

4.2.3.2 Ground Subsidence

Ground subsidence, involving the localized or regional lowering of the ground surface, may be caused by dissolution of carbonate bedrock (i.e., limestone or dolomite), sediment compaction, oil and gas extraction, underground mines, and groundwater over-pumping. As discussed in section 4.2.2, the Project would cross multiple oil and natural gas fields and the closest active well is 41 feet north of approximate MP 11.8 of the CP Express Pipeline workspace. However, based on a review of publicly available information, we did not identify instances of land subsidence attributable to oil and natural gas extraction in the Project vicinity. No active or inactive subsurface mines were identified within 0.25 mile of the Pipeline System or Terminal Facilities and karst terrain or lithology with the potential to develop karst features were not identified in the Project vicinity based on a review of USGS karst mapping (USGS, 2020b). Therefore, subsidence associated with these causes is not anticipated to occur in the Project area or to significantly affect the Pipeline System.

In southwestern Jasper County, simulated land subsidence associated with groundwater withdrawal shows subsidence of up to 3 feet between 1891 and 2000 (USGS, 2004). Simulations for Newton County and the remainder of Jasper County, including the Pipeline System route, show subsidence of less than 1 foot between 1891 and 2000 (USGS, 2004). In southwest coastal Louisiana, subsidence typically results from subsurface water extraction, wetland drainage, flood protection, and development; it also occurs naturally through fault movements and compaction and consolidation of Holocene-age deposits. Artificial drainage of wetlands results in a lower water table, which accelerates compaction and oxidation of organic material (COE, 2015). Recent models of subsidence rates developed for the 2023 Coastal Master Plan (to be issued in 2023) estimate that the total subsidence rate along the Pipeline System north and east of Calcasieu Lake is 1.2 to 2 millimeters per year, and the total subsidence rate in the Chenier Plain is 6.1 to 8 millimeters per year (Fitzpatrick et. al., 2020). Based on the referenced modeling and the minor degree of movement expected in the region, we do not anticipate that significant subsidence would occur in the vicinity of the Pipeline System. Additionally, the pipeline facilities would be designed in accordance with applicable federal and state standards to withstand potential subsidence hazards. Therefore, we conclude significant impacts on the Project resulting from ground subsidence would not occur.

4.2.3.3 Landslides

The topography of Project areas and the immediate vicinity is generally flat to gently sloping. The maximum slope crossed by the Project is about 18 percent. Therefore, the potential for a landslide to be triggered by Project construction and operation, or to damage Project facilities is negligible.

[53] National Earthquake Hazard Reduction Program site class B/C (i.e., soft rock site conditions).

4.2.3.4 Coastal Processes and Flooding

Coastal Erosion and Long-Term Sea Level Rise

We received numerous comments during scoping periods and in response to the draft EIS regarding the potential susceptibility of the Project to coastal erosion due to its proximity to the Gulf of Mexico, the vulnerability of Louisiana's shorelines to rising sea levels, and the resiliency of the Project to climate-related impacts. Coastal land loss is an ongoing process, which includes discrete (hurricanes) and continuous (subsidence and sea level rise) processes. For example, from 2004 through 2008 alone, Hurricanes Katrina, Rita, Gustav, and Ike eroded more than 300 square miles of the Louisiana coastland (USGS, 2011c). In the vicinity of the Project, along the 9-mile stretch of the coastal shoreline from the Calcasieu Ship Channel to approximately 2 miles west of Holly Beach, shoreline erosion is typically between 5 to 30 feet per year (Coastal Protection and Restoration Authority, 2013). The portion of the Pipeline System closest to the shoreline would be where the CP Express Pipeline enters the Terminal Site Gas Gate Station within the Terminal Site. The southern boundary of the proposed Terminal Site Gas Gate Station is over 1,000 feet north of the shoreline at the closest point. Therefore, at the erosion rate of 5 to 30 feet per year, and given additional protective measures that would be incorporated into the Terminal Site design (refer to section 4.13), the Pipeline System would not be affected by erosion of the Gulf of Mexico shoreline within the 30-year design lifespan of the Project.

The Coastal Protection and Restoration Authority's 2017 Coastal Master Plan eustatic sea level rise modeling results indicate that the predicted sea level rise for the Gulf of Mexico region by 2100 ranges from approximately 1 to 6.5 feet (Pahl, 2017). The Pipeline System aboveground facilities buildings would be elevated above base flood elevations with service facilities designed and/or located to prevent water from entering or accumulating within the components. Flood protection measures may also include anchoring systems to prevent floatation, collapse, and lateral movement; flood protection fencing to prevent flood debris damage; concrete or structural steel supports; and elevated platforms or site grading. The proposed pipelines would be buried with a minimum of 3 feet of cover in upland and wetland areas and a minimum of 4 feet of cover in open water areas, which would protect the pipelines from the direct physical forces of storm surges and floodwater. The pipelines would have a concrete coating or other anti-buoyancy measures to prevent the pipelines from floating. In compliance with PHMSA regulations at 49 CFR 192, CP Express would monitor for pipeline exposure and potential third-party intrusions onto its permanent easement to determine if there have been any changes in the pipeline cover over time. CP Express would conduct additional inspections after significant storm events. The determination of the geographic extent of any such inspection would be made on a case-by-case basis and would depend on the geographic extent and severity of the storm event. If the pipeline were to become exposed, CP Express would add soils or lower the pipeline to adjust the depth of cover. Based on the proposed measures to protect the Project facilities from coastal erosion and long-term sea level rise, we conclude the Project would not be significantly affected by these coastal processes.

Flooding

All portions of the Pipeline System in Cameron Parish and much of the Pipeline System in Calcasieu Parish, Newton County, and Jasper County are within Federal Emergency Management Administration (FEMA) Special Flood Hazard Areas (Zones A, AE, V, and VE; FEMA, 2021). Table 4.2.3-1 presents the Pipeline System aboveground facilities in designated floodplains. The 100-year flood zones that would be crossed or underlain by the Pipeline System are shown below in figure 4.2.3-1.

Table 4.2.3-1 Pipeline System Aboveground Facilities Located in Designated Floodplains	
Facility	**FEMA Designation**
MLV 2 site	Flood Zone AE, a Special Flood Hazard Area subject to the 1 percent (100 year) annual chance flood.
TETCO / Boardwalk Interconnect Meter Station	Flood Zone AE, Special Flood Hazard Area subject to the 1 percent (100 year) annual chance flood.
Moss Lake Compressor Station / MLV 4 / Pig Launcher/Receiver, Kinder Morgan Meter Station	Flood Zone VE, Special Flood Hazard Area subject to the 1 percent (100 year) annual chance flood. Zone VE floodplain is defined as a coastal flood zone with velocity hazard (wave action).
MLV 5 site	Flood Zone VE, Special Flood Hazard Area subject to the 1 percent (100 year) annual chance flood.
MLV 6 site	Flood Zone AE, Special Flood Hazard Area subject to the 1 percent (100 year) annual chance flood.
Terminal Site Gas Gate Station (i.e., CPX Meter Station), Pig Receiver, and MLV 7	Flood Zone AE, Special Flood Hazard Area subject to the 1 percent (100 year) annual chance flood.

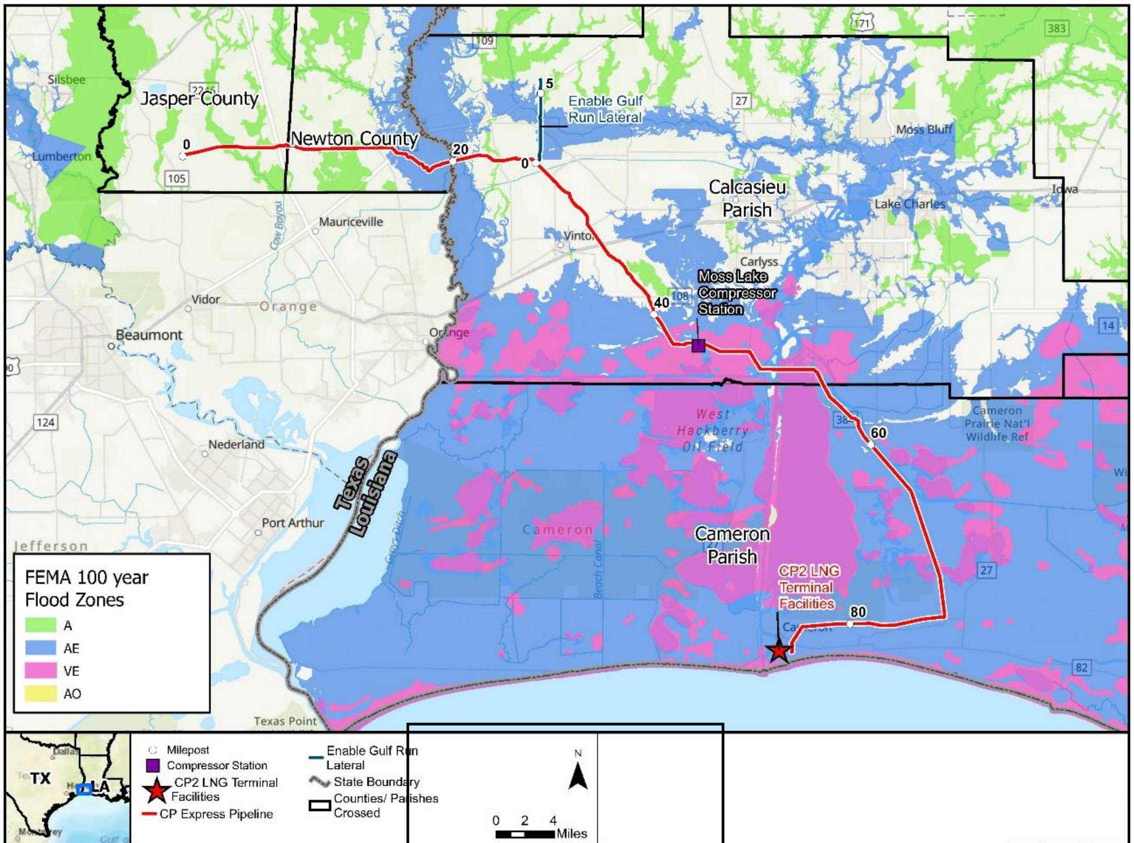

Figure 4.2.3-1 FEMA Flood Zone Map[54]

Flooding in Cameron and Calcasieu Parishes is very common during storm surges related to hurricane events. The level of inundation for the portions of the Project area ranges from 3 feet for a Category 1 hurricane to more than 9 feet for a Category 5 hurricane (NOAA, 2022a). Five hurricanes designated as Category 3 or greater have made landfall in Cameron Parish, Louisiana since 1886 (NOAA, 2022b). CP Express would adhere to its Floodplain Mitigation Plan[55] and local floodplain management requirements to mitigate potential flooding at aboveground facilities. The primary mitigation technique against flooding for facilities proposed within a floodplain is to elevate all buildings or aboveground appurtenances above the base flood elevation (BFE) identified by FEMA. Flood protection measures may also include anchoring systems to prevent floatation, collapse, and lateral movement; flood protection fencing to prevent flood debris damage; concrete or structural steel supports; and elevated platforms or site grading.

In response to our recommendation in the draft EIS, CP Express filed the total estimated volume of floodplain storage capacity that would be lost from Pipeline System construction and operation. CP Express calculated the volume of floodplain storage capacity lost due to construction and operation of aboveground facilities associated with the Pipeline System as 52.5 acre-feet.[56]. Based on an estimated total floodplain storage volume of 136,000 acre-feet, this would represent an approximate 0.04 percent loss of

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54 Flood zones A, AE, AO, and V are designated as high-risk flood areas, having a 1-percent annual chance of flooding, also known as 100-year floodplains.

55 This document can be viewed in attachment 4 of accession no. 20230324-5101.

56 Acre-feet of floodplain storage capacity lost for the Terminal Site Gas Gate Station (i.e., CPX Meter Station), Pig Receiver, and MLV 7 is not included in this calculation. The 3.5-acre facility would be constructed entirely within the CP2 LNG Terminal Site and potential storm and flooding hazards for the Terminal Site are described in section 4.13.

total floodplain storage volume and would therefore represent a minor loss of total available floodplain storage volume. Therefore, because Project facilities would be elevated above BFE ranges identified by FEMA, and given CP Express' implementation of other measures detailed in its Floodplain Mitigation Plan, we conclude that the Pipeline System would not significantly contribute to or be significantly impacted by flood hazards

Four geologic landslide provinces from which submarine landslides are known to originate are defined in the Gulf of Mexico; the Project is in the Northwest Gulf of Mexico province. One historic submarine landslide, the East Breaks landslide, which is among the largest landslides recorded in the Gulf of Mexico, occurred in this province (Atlantic and Gulf of Mexico Tsunami Hazard Assessment Group, 2008). Recent research of seismic sources in the Gulf of Mexico identified 85 submarine landslides that have occurred from 2008 to 2015 (Fan, et. al., 2020). Three historic tsunamis, one in 1922 and two in 2020, are documented in the Gulf of Mexico based on review of the NOAA/World Data Service Global Historical Tsunami Database, but none were attributed to submarine landslides (NOAA, 2022c). Although submarine landslides are considered one of the primary potential sources of tsunamis in the Gulf of Mexico, the probability is low (Fan, et. al., 2020). Tsunamis can also be triggered by seismic activity. However, based on available information, the USGS concluded that wave heights associated with historic tsunamis in the Gulf of Mexico are all most likely less than one meter (USGS, 2022b). Pipelines would be installed at least three feet below the surface and therefore would be unlikely to be affected by tsunami hazards. CP2 LNG and CP Express would mitigate potential storm and flooding hazards for the Terminal Site as described in section 4.13, which would encompass the Terminal Site Gas Gate Station, with the construction of a storm floodwall. Other aboveground facilities would be appropriately designed and constructed according to all applicable rules and regulations, including local floodplain management requirements. Given that tsunami activity is unlikely to occur in the Project area and with other proposed mitigation measures described above, we conclude that the potential for significant impact on Project facilities is negligible.

4.2.4 HDD Feasibility

The HDD method utilizes drilling fluid comprised primarily of water and bentonite clay to lubricate the drill bit, convey cuttings to the surface, and maintain the integrity of the borehole. The drilling fluid is mixed at the surface and pumped through the drill pipe to the drill bit, and then recirculated to the surface in the annular space between the outside of the drill pipe and the borehole wall. The hydraulic pressure of the drilling fluid is greatest at the drill bit and is a function of pumping pressure, density of the drilling fluid, the elevation difference between the drill bit and the drill rig, and friction losses. In general, when the hydraulic pressure exerted by the drilling fluid approximates the hydraulic pressure and strength characteristics of the surrounding formation, minimal drilling fluid is lost to the environment. In instances where the hydraulic pressure of the drilling fluid exceeds the pressure and strength characteristics of the surrounding formation, drilling fluid can extend beyond the immediate area of the borehole and potentially impact uplands, wetlands, waterbodies, and other resources at the land surface.

CP Express would use the HDD method to install its pipeline at 13 locations (see table 2.5.3-1). Additionally, CP2 LNG would install the LNG transfer lines, BOG pipeline, and utilities between the Terminal Site and Marine Facilities via six parallel HDDs across Calcasieu Pass. In response to our recommendation in the draft EIS, CP Express completed geotechnical boring logs for 9 of the 13 proposed HDDs (Intracoastal Waterway, Wetland, Canal Crossing #2, Canal Crossing #1, Terminal Site, Highway 90/Railroad, Mud Lake/Calcasieu Ship Channel, Sabine River/Cutoff Bayou/Old River, and Waterline/SH 12). The geotechnical investigations consisted of one to three soil borings extending to depths of approximately 120 feet below ground surface and exceeding the planned depth of the HDD at each location. An additional geotechnical boring is planned for the Highway 90/Railroad HDD crossing; CP Express states that the boring would be completed once access is granted by the landowner. Access has also not been secured for geotechnical borings at the Interstate 10, Energy Corridor, and Houston River HDD locations. Due to collocation with the operating Venture Global TransCameron Pipeline, CP Express does not intend to complete additional geotechnical borings for its proposed Marshall Street HDD, but would instead incorporate geotechnical information previously collected on the FERC-jurisdictional TransCameron Pipeline into its HDD design.[57] Based on the results of completed investigations, all HDDs would traverse layers of generally fine-grained unconsolidated material consisting primarily of clay, with lesser amounts of silt, and sand. Geotechnical borings did not encounter bedrock.

Corresponding hydrofracture assessments were completed for the 9 investigated HDDs, as well as for the Marshall Street HDD. These assessments considered the physical characteristics of subsurface materials, estimated in-situ hydrostatic pore pressures, assumed drilling fluid properties, and proposed drill profiles. These assessments concluded that hydraulic fracture risk was generally low for the 10 Project HDDs investigated, but would be elevated in proximity to HDD exit points. It is not unusual for inadvertent returns of drilling fluid to occur near the entry and exit points of HDDs due primarily to the shallow depth of the drill at those points. During HDD activities, CP Express would implement its HDD Monitoring and Contingency Plan, which describes drilling fluid composition and management, HDD monitoring procedures and frequency, and response procedures should an inadvertent return of drilling fluid occur. We have reviewed CP Express' HDD Monitoring and Contingency Plan and find it acceptable.

Based on the results of subsurface investigation and regional geology (e.g., clays, silts, sands) and CP Express' implementation of its HDD Monitoring and Contingency Plan we conclude that the HDD method is feasible for installation of the proposed pipelines. CP Express has additionally committed to file the results of geotechnical investigations and corresponding hydrofracture assessments for each of the remaining HDD crossing locations once complete for FERC staff review. However, CP Express has not committed to file alignment plan and profiles that incorporates site-specific geotechnical information for the remaining HDD crossing locations. CP Express has additionally not addressed subsurface conditions that were identified during geotechnical investigations for several HDDs which may increase the risk of complications, including slickensides and poorly graded sand. Therefore, we recommend that:

- **<u>Prior to construction</u>, CP Express should file with the Secretary of the Commission (Secretary), for review and written approval by the Director of OEP, or the Director's designee:**

  a. the Interstate 10, Energy Corridor, and Houston River HDDs alignment plan and profile that incorporates site-specific geotechnical information; and

  b. for each proposed HDD, a description of any subsurface conditions that were identified during geotechnical investigations that may increase the risk of HDD complications (e.g., loss of drilling fluids; drill transition between overburden/bedrock, drill hole collapse, existing groundwater and/or soil contamination) as well as the measures that CP Express would implement to minimize these risks.

CP2 LNG has stated it is in the process of obtaining permits for site-specific geotechnical investigation for the six proposed Calcasieu Pass HDDs (three LNG transfer lines, one BOG line, and two utility lines) and is targeting completion of the geotechnical investigation by Fall 2023. CP2 LNG states that it would utilize the geotechnical data obtained in the site-specific geotechnical exploration to further evaluate its proposed HDD design and options to minimize risks associated with hydraulic fracture,

[57] Public versions of the nine geotechnical investigations completed by CP Express for the Project and the Marshall Street HDD geotechnical investigation previously completed for the TransCameron Pipeline are available at accession number 20230524-5246.

inadvertent returns, and general HDD construction risks. CP2 LNG has additionally committed to file the results of geotechnical investigations and corresponding hydrofracture assessments for FERC staff review. Based on the regional geology (e.g., clays, silts, sands) we anticipate that subsurface conditions would be generally conducive to HDD installation; however, in our experience, a comprehensive feasibility assessment is necessary in order to further refine drill design and minimize the risk of inadvertent returns and drill failure. Therefore, and because CP2 LNG has not filed a drill monitoring and inadvertent return response plan for HDD construction, we recommend that:

- **Prior to construction, CP2 LNG should file with the Secretary, for review and written approval by the Director of the OEP, or the Director's designee, for the six proposed Calcasieu Pass HDDs:**

  a. an HDD monitoring, inadvertent return response, and contingency plan which describes drilling fluid composition and management, monitoring procedures during drilling operations, and response procedures for an inadvertent return of drilling fluid to the ground surface;

  b. an alignment plan and profile that incorporates site-specific geotechnical information; and

  c. a description of any subsurface conditions that were identified during geotechnical investigations that may increase the risk of HDD complications (e.g., loss of drilling fluids; drill transition between overburden/bedrock, drill hole collapse, existing groundwater and/or soil contamination) as well as the measures that CP2 LNG would implement to minimize these risks.

4.2.5 Blasting

Based on available soils and geologic maps, it is not anticipated that blasting would be required for construction of the Project. Should blasting be required, CP2 LNG and CP Express would submit a blasting plan to FERC for approval before initiating blasting activities and would be required to comply with applicable state and federal regulations.

4.2.6 Conclusion

We conclude that construction and operation of the Pipeline System in accordance with CP Express' proposed contingency measures would not result in a significant impact on mineral or geological resources. In addition, with the implementation of the measures outlined above, we conclude that overall impacts from geologic hazards would be low.

As stated previously, discussion of geologic hazard impacts with respect to the Terminal Facilities is presented in section 4.13.1.

4.3 SOILS

4.3.1 Existing Soil Resources

Soil characteristics for the Project area were assessed using the Natural Resources Conservation Service (NRCS) Soil Survey geographic database (NRCS, 2020). Soils were evaluated according to the characteristics that could affect construction or increase the potential impacts on soils during construction, restoration, and/or operation. These characteristics include farmland designation, erodibility, revegetation potential, depth to bedrock, and compaction potential. Shrink-swell soils and soil contamination is also discussed in this section. No soils with shallow depth to bedrock or rocky soils occur in the Project area; therefore, we conclude that no limitations due to restrictive layers such as bedrock are anticipated for the Project and are not discussed. Table 4.3.1-1 summarizes the amount of prime farmland and the soil limitations within the proposed Project footprint.

Table 4.3.1-1

Summary of Major Soil Limitations Crossed by the CP2 LNG and CP Express Project (acres)

Facility	Acres [a]	Prime Farmland/ Farmland of Statewide Importance [b]	Compaction Potential [c]	Water Erosion Potential [d]	Wind Erosion Potential [e]	Revegetation Concerns [f]
TERMINAL FACILITIES						
Terminal Site and Yards	670.0	6.4	327.6	44.1	6.4	0.0
Marine Facilities	122.2	12.5	21.6	58.1	12.5	0.0
LNG Transfer Lines and Utilities	31.6	0.4	14.5	0.1	0.4	0.0
Terminal Facilities Total	**823.8**	**19.3**	**363.7**	**102.3**	**19.3**	**0.0**
PIPELINE SYSTEM						
Pipeline Rights-of-Way [i]						
CP Express Pipeline	1,536.3	558.6	971.5	6.5	43.3	9.3
Enable Gulf Run Lateral	65.7	44.4	49.6	0.0	8.9	1.1
Subtotal	*1,602.0*	*603.0*	*1,021.1*	*6.5*	*52.2*	*10.4*
Access Roads						
	71.6	32.1	51.4	0.6	5.8	0.0
Aboveground Facilities [j]						
Transco & CJ Express Meter Station	3.1	0.0	3.1	0.0	0.0	0.0
MLV 2	0.2	0.0	0.1	0.0	0.0	0.0
TETCO/Boardwalk Interconnect Meter Station	4.1	0.0	2.8	0.0	0.0	0.0

Table 4.3.1-1

Summary of Major Soil Limitations Crossed by the CP2 LNG and CP Express Project (acres)

Facility	Acres [a]	Prime Farmland/ Farmland of Statewide Importance [b]	Compaction Potential [c]	Water Erosion Potential [d]	Wind Erosion Potential [e]	Revegetation Concerns [f]
Florida Gas Transmission Interconnect Meter Station	2.2	2.2	1.8	0.0	0.0	0.0
Moss Lake Compressor Station	33.7	33.7	33.7	0.0	0.0	0.0
Kinder Morgan Meter Station	3.8	3.8	3.8	0.0	0.0	0.0
MLV 5	0.2	0.0	0.0	0.0	0.0	0.0
MLV 6	0.2	0.0	0.1	0.0	0.0	0.0
Enable Receiver and MLV Site and Pig Launcher	1.0	1.0	0.7	0.0	0.0	0.0
Enable Interconnect Meter Station, Trap/MLV E2, and Pig Receiver	2.6	2.6	1.6	0.0	1.0	0.0
Subtotal	*51.1*	*43.3*	*47.7*	*0.0*	*1.0*	*0.0*
Contractor Yards						
SP1 – Johnny Breaux Yard	19.2	19.2	19.2	0.0	0.0	0.0
SP1 – Vinton Canal Boat Launch Road Pipe Unloading Area	2.2	2.2	2.2	0.0	0.0	0.0
SP 1 – West Road Contractor Yard	25.9	25.9	25.9	0.0	0.0	0.0
SP 2 – East Prien Lake Road Contractor and Pipe Yard	44.8	44.8	44.8	0.0	0.0	0.0

Table 4.3.1-1

Summary of Major Soil Limitations Crossed by the CP2 LNG and CP Express Project (acres)

Facility	Acres [a]	Prime Farmland/ Farmland of Statewide Importance [b]	Compaction Potential [c]	Water Erosion Potential [d]	Wind Erosion Potential [e]	Revegetation Concerns [f]
Subtotal	*92.1*	*92.1*	*92.1*	*0.0*	*0.0*	*0.0*
Pipeline System Total	**1,816.8**	**770.5**	**1,212.3**	**7.1**	**59.0**	**10.4**
Project Totals	***2,640.6***	***789.8***	***1,576.0***	***109.4***	***78.3***	***10.4***

Source: NRCS, 2020.

[a] Acreages are inclusive of temporary and permanent impacts.

[b] As designated by the Natural Resources Conservation Service. Prime farmland includes farmland that would be considered prime farmland with limiting factors mitigated for farmland of state-wide importance and unique farmland.

[c] Includes soils in somewhat poor to very poor drainage classes with surface textures of sandy clay loam and finer.

[d] Includes soils in land capability subclasses 4E through 8E and soils with an average slope greater than 8 percent.

[e] Includes soils with a Wind Erodibility Group classification of 1 or 2.

[f] Includes soils with a surface texture of sandy loam or coarser that are moderately well to excessively drained, and soils with an average slope greater than 8 percent.

[g] Includes soils with one or more horizons that have a cobbley, stony, bouldery, channery, flaggy, very gravelly, or extremely gravelly modifier to the textural class and/or contain greater than 5 percent by weight rocks larger than 3 inches.

[h] Includes soils that have bedrock within 60 inches of the soil surface.

[I] Area affected includes permanent pipeline right-of-way, temporary workspace, and additional temporary workspace.

[j] The 3.5-acre Terminal Site Gas Gate Station (i.e., CPX Meter Station) and pig receiver in Cameron Parish near milepost 85.4 will be constructed entirely within the CP2 LNG Terminal Site; therefore, the soil impacts are accounted for in the Terminal Facilities soil impacts.

Note: The numbers in this table have been rounded for presentation purposes. The values in each row do not add up to the total acreage for each county/parish because soils may occur in more than one characteristic class or may not occur in any class listed in the table.

Prime Farmland

Prime farmland is land that is best suited for producing food, feed, forage, fiber, and oilseed crops (Soil Survey Division Staff, 2017). Prime farmland typically contains few or no rocks, is permeable to water and air, is not excessively erodible or saturated with water for long periods and is not subject to frequent prolonged flooding during the growing season. Unique farmland is land other than prime farmland that is used for production of specific high-value food and fiber crops. In some areas, land that does not meet the criteria for prime farmland is considered farmland of statewide importance for the production of food, feed, fiber, forage, and oilseed crops. About 19.3 acres of soils designated as prime farmland would be affected by the Terminal Facilities, all of which would be permanently converted to industrial use. In addition, about 770.5 acres of the soils that would be affected by the Pipeline System are designated as prime farmland, of which approximately 43.3 acres would be permanently converted to industrial use at aboveground facilities.

Compaction Potential

Soil compaction modifies the structure of soil, and consequently, alters its strength and drainage properties. As a result, soil productivity (and plant growth) rates may be reduced, and natural drainage patterns may be altered. The susceptibility of soils to compaction varies based on moisture content, composition, grain size, and density. About 363.7 acres and 1,212.3 acres of soils affected by the Terminal Facilities and Pipeline System, respectively, are considered prone to compaction due to fine texture and poor drainage class.

Shrink-Swell Soils

Shrink-swell soils expand when hydrated and contract when drying. This can cause damage to overlying infrastructure as soil volume is unevenly distributed beneath facility foundations and stress is applied to pipeline connections at aboveground facilities. The TETCO & Boardwalk Interconnect Meter Station is the only proposed aboveground facility that would impact shrink-swell soils.

Erosion

Erosion is a continuing natural process that can be accelerated by human disturbance. Factors such as soil texture, structure, slope, vegetation cover, rainfall intensity, and wind intensity can influence the degree of erosion. Water-induced erosion often occurs on bare soils or soils with sparse vegetation cover, non-cohesive soil particles with low infiltration rates, and moderate to steep slopes. Wind-induced erosion often occurs on dry and non-cohesive soil where vegetation cover is sparse and strong winds are prevalent.

Soils were classified as highly erodible by water if categorized in NRCS-designated land capability subclasses 4E through 9E and having an average slope greater than 8 percent. Soils with high erosion potential due to wind within the Project area were identified based on NRCS-designated Wind Erodibility Group 1 or 2. About 102.3 acres and 7.1 acres of soils affected by the Terminal Facilities and Pipeline System, respectively, are considered to be highly erodible by water. Further, about 19.3 and 59.0 acres of soils affected by the Terminal Facilities and with the Pipeline System, respectively, are considered to be highly erodible by wind.

Revegetation Potential

Successful restoration and revegetation are important for maintaining soil productivity and protecting the underlying soil from potential damage, such as erosion. The revegetation potential of soils in the Project area was evaluated based on the soil surface texture, slope, salinity, and drainage class. Drier soils have less water to aid in the germination and eventual establishment of new vegetation. Coarser textured soils have a lower water holding capacity following precipitation, which could result in moisture deficiencies in the root zone and unfavorable growing conditions for many plants. Soils with a surface texture of sandy loam or coarser that are moderately well to excessively drained with an average slope of greater than 8 percent were categorized as having revegetation concerns. About 10.4 acres of soils affected by the Pipeline System are anticipated to have poor revegetation potential. No soils impacted during construction and operation of the Terminal Facilities are anticipated to have poor revegetation potential.

4.3.2 Soil Contamination

Based on a review of federal and state sources, no active hazardous waste sites, Superfund sites, Brownfield sites, leaking underground storage tanks, or other known areas of existing soil contamination were identified within 1 mile of the Project (LDEQ, 2022, 2018a; Texas Commission on Environmental Quality [TCEQ], 2022a, 2022b, 2022c; EPA, 2021a, 2021b, 2021c, 2021d; NOAA, 2015).

4.3.3 Soil Impacts and Mitigation

Construction activities, such as clearing, grading, excavation, backfilling, and the movement of construction equipment within Project workspaces would affect soil resources. Clearing removes protective cover and exposes the soil to the effects of wind and rain, which increases the potential for soil erosion and sedimentation into sensitive areas. Grading, spoil storage, and equipment traffic can compact soil, reducing porosity and increasing runoff potential. We received comments from Healthy Gulf stating concerns for the impacts of erosion and sedimentation.

The majority of impacts on soils along the Pipeline System would be temporary to short-term (lasting until revegetation is successful); however, permanent impacts would result from construction and operation of the Pipeline System aboveground facilities, permanent access roads, and Terminal Facilities. CP2 LNG and CP Express would implement their Project-specific Plan and Procedures during construction to minimize impacts on soil resources. Mitigation measures include minimizing the quantity and time of soil exposure, protecting critical areas during construction by redirecting and reducing the velocity of storm water runoff, installing and maintaining erosion and sedimentation controls, reestablishing vegetation as soon as possible after final grading, and inspecting disturbed areas and maintenance of erosion and sedimentation controls until final stabilization is achieved. CP2 LNG and CP Express would minimize rutting and compaction by constructing in dry conditions to the extent practicable. Timber mats or low ground-pressure equipment would be used if standing water or saturated soils are present, or if standard construction equipment would otherwise cause ruts or mixing of the topsoil and subsoil in wetlands. To ensure proper functioning, the Project's EIs would inspect temporary ECDs on a regular basis and after each rainfall event of 0.5 inch or greater.

To prevent mixing of the soil horizons in agricultural and residential areas, topsoil would be segregated from subsoil and replaced in the proper order during backfilling and final grading, in accordance with the Project-specific Plan and Procedures. To mitigate wind erosion, CP2 LNG and CP Express would apply mulch or tackifier over dry topsoil piles; wet construction workspaces, as necessary; and implement other methods of topsoil and subsoil conservation in accordance with their Traffic, Noxious Weed, and Fugitive Dust Control Plans, areas applicable.

Project facilities were designed and would be constructed per industry standards based on soil conditions and geotechnical survey results to mitigate structural challenges caused by soil properties, including shrink-swell soils.

In open water and marshland where soils are saturated along the Pipeline System rights-of-way, CP Express would use a 150-foot-wide construction right-of-way to contain excavated trench spoil to reduce sediment runoff potential. To minimize the duration of soil disturbance during pipeline construction, CP Express would attempt to complete final cleanup and installation of permanent erosion control measures in any given area within 20 days after backfilling the trench in the area. Upon completion of construction, temporarily disturbed areas would be returned to preconstruction contours to the extent practicable. Disturbed areas designated for revegetation would be allowed to return to a vegetated state naturally or seeded with an NRCS-approved seed mix included in the Revegetation Plan, which identifies the proposed seed mixes and other measures to promote successful revegetation. CP Express would ensure establishment of vegetation in accordance with the Project-specific Plan and Procedures and specific measures to be developed in coordination with landowners, land-management authorities, and permitting agencies. Once stabilization is achieved, temporary ECDs would be removed and permanent ECDs would be left in place. The effectiveness of revegetation and permanent ECDs would be monitored during the long-term operation and maintenance of the Project Facilities.

After construction is complete, prime farmland soils within temporary workspaces and permanent pipeline rights-of-way would be available for agricultural use. The acreage of prime farmland that would be permanently impacted by the Project (71.5 acres) is negligible when compared to the total acreage of prime and important farmland in Jasper and Newton Counties, Texas (totaling 110,258 acres) and Cameron (106,009 acres) and Calcasieu Parishes, Louisiana (479,408 acres) (NRCS, 2020). Therefore, we conclude impacts on the availability of prime farmland would not be significant. Construction and operation impacts on active agricultural land are further discussed in section 4.9.1.

Terminal Site ground elevations would be raised to a finish grade elevation of -0.9 ft NAVD 88 by grading and potential import of fill materials, such as commercially available aggregate materials, including gravel and crushed stone. CP2 LNG would require assurance from the imported fill suppliers to ensure it is free from environmental contaminants and meets applicable environmental standards. Project-related soil contamination resulting from spills or leaks of fuels, lubricants, and coolant from construction equipment would be minimized by CP2 LNG and CP Express' adherence to its SPCC Plan, which includes measures to minimize accidental spills of materials that may contaminate soils, and ensure that inadvertent spills are contained, cleaned up, and disposed of as quickly as possible and in an appropriate manner. As described in section 4.3.2, no active hazardous waste sites, Superfund sites, Brownfield sites, or leaking underground storage tanks were identified within 1 mile of the Project (LDEQ, 2022, 2018a; TCEQ, 2022a, 2022b, 2022c; EPA, 2021a, 2021b, 2021c, 2021d; NOAA, 2015). If contaminated media is encountered during construction, CP2 LNG and CP Express would halt construction activities in the vicinity of the identified contamination, and implement measures in accordance with applicable permit requirements and their Project-specific Plan and Procedures and SPCC Plan.

As of this writing, CP2 LNG and CP Express has not submitted a final version of the SPCC Plan or a draft of the SWPPP for construction of the Project. We note that final versions of both of these plans would need to be filed with FERC prior to construction.

We conclude that CP2 LNG's and CP Express' adherence to the measures identified in the Project-specific Plan and Procedures, Revegetation Plan, and SPCC Plan during construction and restoration would adequately minimize impacts on soils. The Project would result in minor permanent impacts on the availability of prime farmland (19.3 and 52.2 acres of prime farmland and farmland of statewide importance would be encumbered by the Terminal Site and the Pipeline System's aboveground facilities and permanent access roads, respectively); however, given CP2 LNG's and CP Express' proposed mitigation measures and that remaining disturbed areas would be revegetated or otherwise stabilized with surface cover, we conclude that significant impacts on soil resources would not occur.

4.3.3.1 Dredged Material Disposal Placement

Excavation and dredging along the southwest shore of Monkey Island would be required for the LNG loading docks, berthing area, and vessel turning basins. As described in section 1.4, CP2 LNG estimated approximately 6.4 million cubic yards of material would be excavated and dredged landward of Monkey Island's existing southwest shoreline and seaward of the existing shoreline to the eastern limit of the Federal Navigation Channel to reach the required water depth of -44.3 feet NAVD 88 for the LNG carrier berthing area and turning basins. The dredging activities would be reviewed under the COE/LDNR Joint Permit Application process. CP2 LNG anticipates that the dredge material would be transported for disposal via temporary slurry pipelines. CP2 LNG would perform characterization analyses of the sediments to be dredged and the nearshore soils to be excavated in the Marine Facilities area to confirm the viability of specific reuse and sediment analyses would be undertaken as necessary to comply with applicable regulations or landowner requirements for dredged material disposal.[58]

We received a comment from LDWF on the draft EIS recommending that dredged material be used beneficially to create/restore emergent marsh in the vicinity of the project. According to CP2 LNG's April 2023 draft of their Compensatory Mitigation Plan (CMP) and BUDM Plan[59], during construction of the Terminal Facilities, some of the dredged material (about 893,600 cubic yards) would be transported to the Cameron Prairie NWR and placed in a contained area to create and restore approximately 178 acres of brackish marsh. The remaining 5,505,000 cubic yards would be placed adjacent to the contained area in a semi-contained area, across approximately 1,121 acres of primarily open water at an elevation conducive to growth of vegetation. This acreage is based on a provisional desktop bathymetric and geotechnical assessment; it may differ when field survey data become available. The slurry pipeline would total approximately 6.9 miles, and four booster pumps would be located along the route. The land-based portion of the new slurry pipeline would be the same route used for the TransCameron Pipeline associated with Venture Global's Calcasieu Pass Project, and any impacts on wetlands would be temporary. Marsh creation/restoration at the Cameron Prairie NWR is further discussed in section 4.7.3.

Dredged material placement areas are still being evaluated by the COE and LDNR OCM. The final dredged material disposal plan, including total volumes and placement areas, would be included in COE and LDNR OCM permit applications for dredge and fill activities in waters of the United States and development in the coastal zone, respectively. The final dredged material disposal plan would also be provided to FERC and NMFS.

4.3.4 Conclusion

Temporary and localized soil impacts would result during construction of the pipelines. Soil impacts would be minimized through the use of the construction and restoration plans summarized above and discussed throughout this EIS. Permanent soil impacts would occur where gravel pads, foundations, buildings, and access roads are constructed and operated at the Pipeline System aboveground facilities and at the Terminal Facilities. Based on the overall soil conditions in the Project area, CP2 LNG and CP Express' adoption of the FERC's Plan and Procedures regarding soil management, and the additional soil management practices that would be implemented, we conclude that the Project would not significantly alter the soils of the region.

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58 Preliminary geotechnical investigation information can be viewed at accession nos. 20220610-5127 and 20220311-5288.

59 This document can be viewed on the FERC eLibrary as attachment EIR9-2d under accession number 20230428-5528.

4.4 WATER RESOURCES

4.4.1 Groundwater Resources

The Project area is within the Coastal Lowlands Aquifer System. The Coastal Lowlands Aquifer System is a regional aquifer spanning from coastal Texas to Florida. The Coastal Lowlands Aquifer System is wedge-shaped, thickens and deepens toward the Gulf of Mexico, and generally yields large amounts of water for public, agricultural, and industrial needs (Renken, 1998). It is comprised of permeable zones typically consisting of sand and clay. The Project overlies the locally named Chicot aquifer (LDEQ, 2018b; Renken, 1998), and geologically older aquifers, including the Evangeline aquifer and Jasper aquifer (Tollett et al., 2003).

4.4.1.1 Groundwater Quality and Use

The Chicot aquifer, which makes up the upper part of the Coastal Lowlands Aquifer System, underlies approximately 9,000 square miles of southwestern Louisiana, including the Project area, and is the principal source of fresh groundwater for the region. The Chicot aquifer is largely composed of one, major, undifferentiated sand where it crops out and receives recharge to the north and northeast of Calcasieu Parish. This undifferentiated sand thickens and deepens to the south and, near the northern border of Calcasieu Parish, becomes subdivided by clay confining layers into a complex series of sand layers. The sand units that comprise the Chicot aquifer in the Lake Charles area are divided into three major aquifers, referred to as the "200-foot" sand, the "500-foot" sand, and the "700-foot" sand, based on the average depths of wells completed in these aquifers and the presence of extensive clay layers separating them. The Chicot aquifer is underlain by geologically older aquifers, including the Evangeline aquifer and Jasper aquifer. The Evangeline and Jasper aquifers do not contain freshwater in the Project area in Louisiana. The base of fresh groundwater in the Chicot aquifer for Cameron Parish ranges from 300 feet below the National Geodetic Vertical Datum of 1929 (NGVD 29) to 800 feet below NGVD 29, and no fresh groundwater is present in the southwestern or southeastern portions of Cameron Parish (i.e., in the vicinity of the Terminal Facilities and southern portion of the pipeline) (Prakken, 2014; Smoot, 1988). In the area of the Project within Calcasieu Parish, the depth of base freshwater ranges from about 500 to 800 feet below NGVD 29 (Smoot, 1988).

Groundwater withdrawals in Calcasieu and Cameron Parishes include use for public supply, industrial, rural domestic, livestock, rice irrigation, general irrigation, aquaculture, and power generation. Water well yields in the Chicot aquifer generally range between 3 to 5,310 gallons per minute (gpm) in Cameron Parish and up to 5,471 gpm in Calcasieu Parish (USGS, 2018, 2017, 2014). Water from the Chicot aquifer is tested by the LDEQ have shown full compliance with federal primary drinking water standards. With respect to federal secondary drinking water standards, the data show that the groundwater produced from this aquifer is hard, but of good quality when considering short-term or long-term health risk guidelines (LDEQ, 2018b).

The Coastal Lowlands aquifer system has an average fresh groundwater depth of 1,000 feet and a maximum total sand thickness ranging from 700 to 1,300 feet in the Project area in Texas (Bruun, 2016). In Texas, groundwater use is primarily for municipal, industrial, and irrigation purposes (Texas Water Development Board [TWDB], 2021a). In the southern and central portions of Jasper and Newton Counties, wells are primarily completed within the Chicot aquifer, with wells in the northern portion of the counties completed in the Evangeline and Jasper aquifers. Based on TWDB submitted drillers reports, a majority of these wells yield less than 1,000 gpm (Young et. al., 2016). Groundwater quality in the Coastal Lowlands aquifer system is generally good in the Project area in Texas, but declines closer to the Gulf Coast due to increased chloride concentrations and saltwater intrusion.

4.4.1.2 Sole Source Aquifers

The EPA defines a sole source aquifer as one that supplies as least 50 percent of the drinking water in the area overlying the aquifer, and for which there are no other reasonably available alternative sources should the aquifer become contaminated (EPA, 2021d). The Project is underlain by the Chicot aquifer, which is listed as a sole source aquifer in Louisiana (EPA, 2022a). The Project would not cross any sole source aquifers in Texas. The portion of the Chicot aquifer in Texas is not designated as a sole source aquifer (EPA, 2022a).

4.4.1.3 Water Wells, Springs, and Wellhead Protection Areas

Based on civil surveys completed by CP2 LNG and CP Express, and review of publicly available data from the LDNR and TWDB, one active groundwater monitoring well and one active irrigation well were identified within 150 feet of the Project workspace; however, no active public or private domestic water supply wells were identified (LDNR, 2022; TWDB, 2021b). All water wells identified within 150 feet of the Project construction workspaces are identified in table 4.4.1-1.

Table 4.4.1-1

Water Wells Within 150 feet of the CP2 LNG and CP Express Project

Milepost	County/ Parish	Distance from Construction Workspace (feet)	Direction	Aquifer	Well Depth (feet)	Well Status/Use [a]	Well Owner
TERMINAL FACILITIES							
N/A	Cameron Parish	0	N/A	Chicot Aquifer, shallow sand	270	Plugged and Abandoned; Public Supply	Cameron Water Wells
N/A	Cameron Parish	0	N/A	Chicot Aquifer, shallow sand	220	Plugged and Abandoned; Rig Supply	Smith Production
N/A	Cameron Parish	0	N/A	Chicot Aquifer, surficial confining unit	14	Plugged and Abandoned; Monitor	Canal Refining
N/A	Cameron Parish	0	N/A	Chicot Aquifer, shallow sand	270	Confirmed no water supply well present [b]	Cameron Parish Water & Wastewater District 1
N/A	Cameron Parish	0	N/A	Chicot Aquifer, shallow sand	224	Plugged and Abandoned; Industrial	Phillips Oil
N/A	Cameron Parish	0	N/A	Chicot Aquifer, shallow sand	260	Plugged and Abandoned; Rig Supply	Sandalwood Exploration

Table 4.4.1-1 Water Wells Within 150 feet of the CP2 LNG and CP Express Project							
Milepost	**County/ Parish**	**Distance from Construction Workspace (feet)**	**Direction**	**Aquifer**	**Well Depth (feet)**	**Well Status/Use [a]**	**Well Owner**
N/A	Cameron Parish	0	N/A	Chicot Aquifer, shallow sand	217	Plugged and Abandoned; Rig Supply	Henry Production
PIPELINE SYSTEM							
CP Express Pipeline							
17.6	Newton County	136	S	Chicot Aquifer System Surficial Confining Unit	20	Active; Monitor	Entergy Texas, Inc.
24.6	Calcasieu Parish	95	W	Chicot Aquifer System Surficial Confining Unit	88	Plugged and Abandoned; Rig Supply	Comet DLG Co.
34.9	Calcasieu Parish	25	N	Chicot Aquifer, 200-foot sand	240	Plugged and Abandoned; Rig Supply	Magna Operating, LLC
37.9	Calcasieu Parish	143	SW	200-foot Sand of Lake Charles Area	262	Plugged and Abandoned; Rig Supply	Woolf & Magee
56.4	Cameron Parish	34	SW	Not Identified	16	Plugged and Abandoned; Monitor	BP America
56.4	Cameron Parish	0	N/A	Not Identified	16	Plugged and Abandoned; Monitor	BP America
56.4	Cameron Parish	39	NE	Unknown	16	Plugged and Abandoned; Monitor	BP America
70.5	Cameron Parish	27	W	Chicot Aquifer, Upper Sand Unit	350	Plugged and Abandoned; Rig Supply	Cotton Petro Co.
72.4	Cameron Parish	73	W	Chicot Aquifer, Upper Sand Unit	346	Plugged and Abandoned; Rig Supply	Stone Oil Co.
82.4	Cameron Parish	0	N/A	Chicot Aquifer, Shallow Sand	250	Plugged and Abandoned	Weeks Marine, Inc.

Table 4.4.1-1 Water Wells Within 150 feet of the CP2 LNG and CP Express Project							
Milepost	**County/ Parish**	**Distance from Construction Workspace (feet)**	**Direction**	**Aquifer**	**Well Depth (feet)**	**Well Status/Use [a]**	**Well Owner**
83.3	Cameron Parish	0	N/A	Chicot Aquifer, Shallow Sand	250	Plugged and Abandoned; Rig Supply	Rosewood Resource
Enable Gulf Run Lateral							
1.8	Calcasieu Parish	103	W	700-foot Sand of Lake Charles area	597	Active; Irrigation	Dripps & Rauser
5.9	Calcasieu Parish	127	W	Chicot Aquifer, 200-foot sand	310	Plugged and Abandoned; Rig Supply	Seneca Resource

Source: TWDB, 2021b; LDNR, 2022

N/A – Not applicable

[a] Industrial – well draws groundwater for industrial use; Monitor – well is used to monitor groundwater quality via regular sampling; Public Supply – well draws groundwater for public use; Rig Supply – well draws water used for rig use

[b] LDNR data indicate an active rural water supply well was present at this location. However, a Phase 1 Environmental Site Assessment identified discrepancies with the well data; subsequent field visits determined that no well is present at this location (Venture Global LNG, Inc., 2019).

TCEQ and the LDEQ implement a Wellhead Protection Program to protect drinking water and source waters in accordance with the Safe Drinking Water Act Amendments of 1996. The Project would cross one wellhead protection area in Texas and three wellhead protection areas in Louisiana. Specifically, the CP Express Pipeline would cross the South Newtown Water Supply Corporation, Cameron Parish Waterworks District 11, Cameron Parish Waterworks District 7 (crossed twice), and Cameron Parish Waterworks District 1 wellhead protection areas. The Terminal Facilities also would cross the Cameron Parish Waterworks District 1 wellhead protection area. CP2 LNG and CP Express would notify the South Newton Water Supply Corporation and the Cameron Parish Waterworks Districts prior to construction and follow the communication protocol outlined in the Project's SPCC Plans.

Based on field surveys completed to date and review of the USGS Geographic Names Information System database, there are no springs within 200 feet of the Project facilities (USGS, 2019b).

4.4.1.4 Groundwater Impacts and Mitigation

We received a comment from the EPA requesting a detailed discussion of the Project's potential groundwater impacts, including the Chicot aquifer and surrounding communities relying on groundwater as a potable source. Additionally, in response to the draft EIS, we received comments from multiple NGOs and landowners concerned with the Project's impacts on groundwater. The following sections detail potential impacts on groundwater resources and proposed mitigation for the Terminal Facilities and Pipeline System, respectively.

Terminal Facilities

The majority of Terminal Facilities construction would involve shallow, temporary, and localized excavation. Shallow surficial aquifers could sustain minor impacts from changes in overland water flow and recharge areas caused by clearing and grading of work areas. In addition, near-surface soil compaction caused by heavy construction vehicles could reduce the soil's ability to absorb water. Excavation and backfill could affect local water table elevations during construction. In areas where groundwater is near the surface, excavation may intersect the water table, in which case dewatering could also temporarily impact local water tables. However, we conclude these minor impacts would be highly localized, temporary, and would not significantly affect groundwater resources or change aquifer flow patterns. During operation of the Terminal Facilities, CP2 LNG would convert permanently occupied areas of the site to impervious or semi-pervious surfaces associated with aboveground facilities and roads, which would result in minor and localized impacts on overland flow and groundwater recharge/infiltration.

CP2 LNG anticipates that deep pile driving could extend to depths of 150 feet below ground surface (NAVD 88). The top of the Chicot aquifer is about 190 feet below the ground surface at the Terminal Site; therefore, piles would likely enter the surficial aquifer, but would not intersect the Chicot aquifer. Subsurface stratification of stiff clays that occur between the ground surface and the top of the aquifer provides restrictive layers slowing or preventing the downward migration of surface and near-surface waters or contaminants, further minimizing the potential for impacts on groundwater quality to result from pile driving.

CP2 LNG would use sump and well point systems for groundwater dewatering during construction activities. Groundwater discharges would be managed in accordance with the Project-specific Procedures and Plan, and applicable construction water discharge permits, including general permits issued by the LDEQ. Dewatering would be limited to groundwater at or near the ground surface. Existing water supply wells within the Project area are completed at depths greater than the anticipated depths of dewatering activities. Therefore, we anticipate dewatering activities during construction of the Terminal Facilities would not adversely affect nearby groundwater users.

Contamination from spills or leaks of fuels, lubricants, and coolant from construction equipment during construction could adversely affect groundwater. Hazardous material storage at the Terminal Facilities would be designed to comply with applicable engineering, safety, and environmental standards. CP2 LNG would implement its SPCC Plan during construction and operation of the Terminal Facilities to minimize the potential impact of spills of hazardous materials, including regular monitoring for leaks. The capacity of spill control structures would be proportionate with the quantity of materials stored and would be maintained in compliance with all applicable state and federal regulations and permits. We have reviewed CP2 LNG and CP Express' draft SPCC Plan and determined that the protocols adequately address the storage and transfer of hazardous materials and the response to be implemented in the event of a spill.

Shallow groundwater could also sustain minor, indirect impacts from changes in overland water flow and recharge caused by clearing and grading of the work areas. Near-surface soil compaction caused by heavy construction vehicles and the addition of impervious surfaces could reduce the soil's ability to absorb water. However, impacts would occur only during the construction period and would be localized to the Terminal Site. Based on CP2 LNG's proposed measures to install stormwater controls to mitigate potential runoff and erosion, we conclude that impacts would be mostly temporary and not significant.

Onsite Water Use

Groundwater at the Terminal Site exceeds the salinity threshold for freshwater and would be treated by a reverse osmosis system for use as water supply for administration buildings, control rooms, and maintenance buildings, make-up water, and production of demineralized water. The Terminal Site's process and potable water requirements would be sourced from five new onsite groundwater wells, four for process water (two per phase) and one for potable water, to be developed during Project construction. CP2 LNG states that withdrawal of process water at the Terminal Site would be continuous and that potable water demand would be intermittent and would constitute a minor percentage of the overall water demand during operation. The screened interval for each new water well is anticipated to be approximately 285 feet (screen top depth) to 325 feet (screen bottom depth) (e.g., "200-foot" sand or "upper" sand of the Chicot aquifer) and would be designed to produce 600 gpm (up to 316 million gallons per year). CP2 LNG modeled anticipated drawdown to analyze potential impacts of operational groundwater withdrawal on the nearest well to the Terminal Site (approximately 4,000 feet to the northeast). Using a 5-year pumping duration, a reasonably sufficient time for the cone of depression to equilibrate with aquifer recharge, the estimated drawdown at this well is between 5 and 7 feet. Given the high recharge rate of the aquifer, as well as the available head of this well (at least 40 feet, based on screened interval), we conclude that this drawdown would not be significant.

Venture Global Calcasieu Pass, LLC completed aquifer testing adjacent to the CP2 LNG Terminal Site as part of the development of the Calcasieu Pass LNG Terminal to assess the potential impacts of groundwater withdrawals at the Calcasieu Pass LNG Terminal on salinity conditions at existing public water supply wells in Cameron, Louisiana. Based on the results of the aquifer testing, pumping from the new Calcasieu Pass LNG Terminal well could increase salinity in groundwater in the immediate vicinity of the well, but the pumping would decrease the velocity of solutes to the Cameron municipal wells, therefore forestalling salinity increases in the municipal supply wells. Based on this hydrogeologic assessment, installation of additional water wells at the CP2 LNG Terminal Site would be expected to further decrease the gradient and limit the northerly flow of groundwater, providing additional protection from saltwater intrusion from the south. The study also found that because salinity increases with depth and with proximity to the Gulf, and because the groundwater flow direction is from the Gulf northward towards Lake Charles, the salt/fresh water interface would continue to move inland, even in the absence of any pumping from the Calcasieu Pass LNG Terminal or from the Cameron municipal wells.

Based on Venture Global Calcasieu Pass' studies for the Calcasieu Pass LNG Terminal and subsequent model drawdown for the CP2 LNG Terminal Site, the Chicot aquifer has sufficient volume to support water supply at the CP2 LNG Terminal Site with minimal impact on nearby groundwater users. Therefore, for the reasons discussed above, we conclude the Terminal Site's water use during construction and operation would not adversely impact nearby public water supply wells.

During operation of the LNG Terminal, CP2 LNG would use the firewater system in the event of a fire emergency to control and/or extinguish a fire at the site. Fire system water would be initially sourced from the onsite groundwater wells to fill the 1,500,000-gallon firewater tank and, in the event of an emergency, this water may be supplemented with water from Calcasieu Pass. Because of the assumed infrequent use of the firewater system, we conclude that the firewater system would have negligible impacts on water levels. Groundwater would be used for hydrostatic testing of plant piping and LNG transfer lines (750,000 gallons) and would be obtained from a municipal source or from the onsite groundwater wells. CP2 LNG would comply with all permit conditions and requirements for water withdrawals and hydrostatic testing. Hydrostatic test water discharge impacts and mitigation are discussed in section 4.4.3.

Pipeline System

As discussed in section 4.4.1.3, no springs have been identified within 200 feet of the Pipeline System. One irrigation well and one monitoring well are located within 150 feet of the workspace as presented in table 4.4.1-1, however, no public or private drinking water supply wells are within this radius. One wellhead protection area in Texas and four wellhead protection areas in Louisiana would be crossed by the CP Express Pipeline. Based on recommendations from TCEQ and LDEQ, CP2 LNG and CP Express would notify well owners and the relevant state agency in the event of an accidental spill. CP2 LNG and CP Express would also coordinate with the South Newton Water Supply Corporation and Cameron Parish Waterworks District prior to construction in the wellhead protection areas. In correspondence dated October 14, 2021, the LDEQ recommended documents developed by the EPA and U.S Department of Agriculture (USDA) that outline best management practices (BMPs) for source water protection areas. CP Express would implement measures further discussed below and the LDEQ recommended BMPs for construction in wellhead protection areas. If springs are identified within 200 feet of the Project workspace during field surveys, CP Express would install temporary safety fence along the edge of the workspace, extending 100 feet past the spring in both directions. If springs are identified within the workspace, CP Express would install exclusion barriers or use equipment mats to protect the springs. In addition, CP Express would conduct water quality and yield testing of springs prior to and after construction and would avoid dewatering or refueling activities within 200 feet of springs

Groundwater would likely enter the pipeline trench during excavation, making dewatering of the trench necessary. Generally, dewatering can cause groundwater from the surrounding area to migrate toward the trench site, potentially causing localized drawdown of the water table. CP Express anticipates the bottom of the pipeline trench would be above the depth of the underlying aquifer; although shallow groundwater would likely be encountered in lowland areas, including the marsh wetlands that characterize much of the route in Cameron Parish. Trench dewatering would be performed for short periods and discharges would be managed in accordance with the Project-specific Procedures, Plan, and applicable construction discharge permits, including general permits issued by the LDEQ, TCEQ, and the RRC. CP Express would use sump and well point systems for groundwater dewatering during construction activities and potential dewatering areas may include pipeline tie-in locations, foreign pipeline crossings, pipeline bore pits at road and railroad crossings, locations with pipeline side bends greater than 10 degrees, and pipeline aboveground facility sites. CP Express estimates a pumping rate of 500 gpm and an 8-hour duration at each tie-in location for dewatering of the Pipeline System. CP Express estimates the number of tie-ins would be 15 per mile from MP 0 to MP 50.15 (spread 1) and 2 per mile from MP 50.15 to 85.41 (spread 2). The estimated total volume of groundwater removed during pipeline construction is 130,000,000 gallons. CP Express would remove dewatering structures after completing dewatering activities in accordance with the FERC's Plan. Given that the proposed pipeline right-of-way is within wetland soils where saturated subsurface conditions are likely prevalent and the absence of water wells within the Project construction workspace, perceptible impacts of localized drawdown of the water table is unlikely.

The use of heavy construction equipment could compact soils and reduce recharge/infiltration rates and modify surface water flows, potentially affecting underlying groundwater. CP Express would follow the procedures outlined in the Project-specific Plan and Procedures to reestablish vegetation as quickly as possible after construction in order to promote stormwater infiltration and groundwater recharge.

Inadvertent spills or leaks of hazardous materials, HDD drilling fluid loss and/or inadvertent return, or hydrostatic testing of the Pipeline System could affect groundwater. CP Express would implement spill prevention, containment, and cleanup measures outlined in its SPCC Plan and would implement spill reporting requirements as applicable to federal, state, and local regulations. CP Express would minimize the potential impacts from an inadvertent release of drilling fluid during HDD activities by following the measures outlined in the HDD Monitoring and Contingency Plan. The Pipeline Hydrostatic Testing Specification Plan for the Pipeline System includes procedures that would minimize potential contamination of groundwater resources. Test water would be discharged through an energy dissipation device to prevent erosion and all discharges would comply with applicable permits issued by the LDEQ, TCEQ, and RRC.

While construction of the Project could result in temporary impacts on groundwater quality and recharge, implementation of CP2 LNG and CP Express' Project-specific Plan and Procedures and SPCC Plans would reduce the potential for groundwater impacts, including contamination. During operations, the relatively small amount of new impervious surface associated with the Project is not expected to affect overall recharge rates. In addition, water required for operations is not anticipated to impact the quantity or quality of available groundwater.

4.4.2 Surface Water

Surface water resources at the Terminal Facilities and along the Pipeline System were identified through a combination of field surveys and, in instances where survey permission was not available along the Pipeline System, using data from the NWI (FWS, 2022a). Table 4.4.2-1 identifies the milepost ranges that have not been surveyed for wetlands or waterbodies for the Pipeline System due to a lack of landowner permission. CP Express would complete surveys of the remaining parcels when permission to access those parcels has been obtained and would file reports to FERC prior to construction.

Table 4.4.2-1

Areas Not Surveyed for Wetlands or Waterbodies for the CP2 LNG and CP Express Project

Pipeline Facility/ County or Parish, Site	Milepost Start	Milepost End	Distance (miles)
CP Express Pipeline			
Jasper County, TX	2.23	2.62	0.39
	5.08	5.27	0.19
Newton County, TX	7.65	7.94	0.29
	13.62	13.76	0.14
Calcasieu Parish, LA	20.79	21.56	0.77
	21.57	21.82	0.25
	27.23	27.97	0.74
	27.98	29.31	1.33
	29.49	31.44	1.95
	32.10	32.16	0.06
	32.86	33.67	0.81
	33.75	34.37	0.62
	34.40	36.47	2.07
	37.99	38.69	0.70
	41.56	42.63	1.07
	46.64	47.63	0.99
Enable Gulf Run Lateral			
Calcasieu Parish, LA	5.98	5.99	0.01
		Project Total	**12.38**

4.4.2.1 Existing Surface Water Resources

Watersheds are delineated based on surface water flow along natural hydrologic breaks. The CP2 LNG and CP Express Project would be situated in three watersheds, the Neches Basin, the Sabine Basin, and the Calcasieu-Mermentau Basin, identified by their 6-digit hydrologic unit code (HUC).

The Neches Basin covers approximately 10,011 square miles and extends from the Pine Woods of East Texas to the industrialized areas in Orange and Jefferson Counties. Portions of the Neches River have been dredged to accommodate navigation of sea vessels. The Neches Basin includes two major reservoirs, Lake Palestine and B.A. Steinhagen Reservoir. The basin ultimately drains into Sabine Lake (TCEQ, 2002a). The Sabine Basin covers approximately 9,756 square miles. The Sabine River flows into the Gulf of Mexico through Sabine Lake and defines much of the border between Texas and Louisiana. Major tributaries to the Sabine River include Cow Creek, Big Sandy Creek, and Fork Creek (TCEQ, 2002b). The Calcasieu-Mermentau Basin covers approximately 8,017 square miles. The southern portion of the basin is within the Gulf of Mexico coastal zone. Major tributaries within the basin include the Calcasieu River, Ten Mile Creek, Six Mile Creek, Bundicks Creek, the Mermentau River, the Gulf Intracoastal Waterway, Calcasieu Lake, Grand Lake, and White Lake (Louisiana Department of Transportation and Development [LDOTD], 2009).

The Project would cross waterbodies classified as perennial, intermittent, ephemeral, and open water. Perennial waterbodies flow or contain standing water year-round and are typically capable of supporting populations of fish and macroinvertebrates. Intermittent waterbodies flow or contain standing water seasonally, and are typically dry for part of the year. Ephemeral waterbodies generally contain water only in response to precipitation. We classify waterbodies greater than 100 feet wide as major, waterbodies 10 to 100 feet wide as intermediate, and waterbodies less than 10 feet wide as minor.

Terminal Facilities

The Terminal Facilities would be situated within the Lower Calcasieu subbasin. Table 4.4.2-2 below lists the waterbodies within the Terminal Facilities workspace.

Table 4.4.2-2

Waterbodies Within the Terminal Facilities Workspace

Unique ID	Feature Type	Waterbody Names (if applicable)	Flow Regime	FERC Classification	RHA Section 10 Waters	CWA 303(d) Waters	State Water Quality Designated Use [a]	Crossing Method	Crossing Length (feet)
Terminal Site and Yards									
WAT-01	Waterbody	Unnamed	Perennial	Intermediate	No	Yes	PCR, SCR, FWP, OYS	N/A [b]	22
WAT-02	Waterbody	Unnamed	Perennial	Minor	No	Yes	PCR, SCR, FWP, OYS	N/A [c]	0
								Subtotal	**22**
Marine Facilities									
WAT-M02	Waterbody	Unnamed	Intermittent	Minor	No	Yes	PCR, SCR, FWP, OYS	N/A [e]	0
WAT-M01	Waterbody	Calcasieu Ship Channel	Perennial	Major	Yes	Yes	PCR, SCR, FWP, OYS	N/A [f]	0
								Subtotal	**0**
LNG Transfer Lines and Utilities									

Table 4.4.2-2									
Waterbodies Within the Terminal Facilities Workspace									
Unique ID	**Feature Type**	**Waterbody Names (if applicable)**	**Flow Regime**	**FERC Classification**	**RHA Section 10 Waters**	**CWA 303(d) Waters**	**State Water Quality Designated Use [a]**	**Crossing Method**	**Crossing Length (feet)**
N/A	Waterbody	Calcasieu Pass	Perennial	Major	Yes	Yes	PCR, SCR, FWP, OYS	HDD [g]	930
WAT-02	Waterbody	Unnamed	Perennial	Minor	No	Yes	PCR, SCR, FWP, OYS	HDD [g]	5
WAT-03	Waterbody	Unnamed	Open Water	Major	No	Yes	PCR, SCR, FWP, OYS	Open cut	232
								Subtotal	**1,167**
								TOTAL	***1,189***

N/A – Not Applicable

a PCR – Primary Contact Recreation
SCR – Secondary Contact Recreation
FWP – Fish and Wildlife Propagation
OYS – Oyster Propagation

b An approximately 2,873-foot-long portion of the waterbody would be permanently rerouted around the northern periphery of the Terminal Site to maintain its pre-construction draining function.

c Approximately 1,780 feet of the waterbody would be rerouted along the south side of Davis Road.

d A culvert would be installed in the waterbody where the Terminal Site's North Access Road intersects Marshall Street.

e Approximately 1,725 feet of WAT-M02 would be dredged for construction of the Marine Facilities. This section would be relocated slightly to the south along the widened road to maintain drainage capacity and function.

f Represents the portion of the Calcasieu Ship Channel along the shoreline of the Marine Facilities.

g The waterbody is along a segment of the Project that would be crossed by the HDD method.

Pipeline System

The Pipeline System would cross 96 perennial waterbodies, 95 intermittent waterbodies, 79 ephemeral waterbodies, and 113 open water waterbodies. The waterbodies crossed by the Pipeline System are identified in appendix G.

4.4.2.2 Surface Water Quality Standards and Designated Uses

Section 303(d) of the CWA requires each state to establish, review, and revise water quality standards for surface waters. The TCEQ and LDEQ are responsible for protecting the chemical, physical, biological, and aesthetic integrity of the water resources and aquatic environment of Texas and Louisiana, respectively. Water quality classifications are based on designated uses, and a waterbody that does not achieve water quality criteria for one or more of its designated uses is considered impaired. The TCEQ defines four designated use categories and the LDEQ defines eight uses for surface waters (TCEQ, 2020; LDEQ, 2020). The water use designations for Texas and Louisiana are defined below in table 4.4.2-3.

Table 4.4.2-3	
Designated Surface Water Uses for Texas and Louisiana	
Water Use Designation	**Definition**
Texas	
Recreation	The recreation use consists of five subcategories: 1) Primary Contact Recreation 1, which involves prolonged full body contact with the surface water; 2) Primary Contact Recreation 2, which involves prolonged full body contact with the surface water that is designated unsafe due to water quality issues; 3) Secondary Contact Recreation 1, which involves only incidental contact with the surface water; 4) Secondary Contact Recreation 2, which involves only incidental contact with surface waters that are designated unsafe due to water quality issues; and 5) Non-contact Recreation, which involves surface waters that are deemed unsafe for recreation use for reasons other than water quality.
Domestic Water Supply	The domestic water supply use has three subcategories: 1) public water supply; 2) sole-source aquifer; and 3) aquifer protection area.
Aquatic Life	The aquatic life use contains specific criteria for dissolved oxygen and oyster waters.
Additional Uses	Uses under this category include navigation, agricultural water supply, industrial water supply, seagrass propagation, and wetland water quality functions.
Louisiana	
Agriculture (AGR)	The use of water for crop spraying, irrigation, livestock watering, poultry operations, and other farm purposes not related to human consumption.
Drinking Water Supply (DWS)	The use of water for human consumption and general household use.
Fish and Wildlife Propagation (FWP)	The use of water for aquatic habitat, food, resting, reproduction, cover, and/or travel corridors for any indigenous wildlife and aquatic life species associated with the aquatic environment.
Limited Aquatic and Wildlife Use (LAL)	A subcategory of fish and wildlife propagation that recognizes not all waterbodies are capable of supporting the same level of species diversity and richness; examples of waterbodies to which this subcategory may be applied include intermittent streams and manmade waterbodies that lack suitable riparian structure and habitat.
Outstanding Natural Resource Waters (ONR)	Waterbodies designated for preservation, protection, reclamation, or enhancement of wilderness, aesthetic qualities, and ecological regimes, such as those designated under the Louisiana Natural and Scenic Rivers System or those designated by the LDEQ Office of Water Resources as waters of ecological significance.
Oyster Propagation (OYS)	The use of water to maintain biological systems that support economically important species of oysters, clams, mussels, or other mollusks so that their productivity is preserved and the health of human consumers of these species is protected.
Primary Contact Recreation (PCR)	Any recreational or other water contact activity involving prolonged or regular full-body contact with the water and in which the probability of ingesting appreciable amounts of water is considerable (i.e., swimming, skiing, and diving).
Secondary Contact Recreation (SCR)	Any recreational or other water contact activity in which prolonged or regular full-body contact with the water is either incidental or accidental, and the probability of ingesting appreciable amounts of water is minimal (i.e., fishing, wading, and boating).
Source: TCEQ, 2020; LDEQ, 2020	

In Louisiana, designated uses assigned to a stream segment generally apply to all tributaries and distributaries of that segment unless unique chemical, physical, and/or biological conditions preclude such uses. However, the designated uses of Drinking Water Supply, Outstanding Natural Resource Waters, and/or Oyster Propagation apply only to the named stream segment listed, not to any associated tributaries or distributaries (Louisiana Administrative Code [LAC] 33:1X.1111) (LDEQ, 2016).

Sensitive Waterbodies

For the purposes of this analysis, sensitive surface waterbodies are those that do not meet the water quality standards for their designated uses, outstanding or exceptional quality waterbodies, those containing habitat for threatened and endangered species, waterbodies that support fisheries of special concern, and waterbodies crossed within 3 miles upstream of potable water intake structures. The Project does not cross any federally or state-designated Natural and Scenic Rivers in Texas or Louisiana (National Park Service, 2022; LDWF, 2021a). However, TPWD classifies the Sabine River as an ecologically significant stream (TPWD, 2005). The Project does not cross within 3 miles of any potable surface water intakes in Texas or Louisiana (TCEQ, 2022d; Louisiana Department of Health and Hospitals, 2001). The nearest potable surface water intake is about 15.5 miles southwest of the Sabine River crossing at MP 20.0 and the CP Express Pipeline crosses its area of primary influence. The area of primary influence is identified as the area within 1,000 feet of a reservoir boundary, within 1,000 feet of a stream channel 3 miles upstream from the intake, or specific areas delineated based on the time of travel of a contaminant source to a well (Texas Natural Resource Conservation Commission, 1999). CP Express would cross the Sabine River using the HDD technique and would implement the BMPs included in its Project-specific Procedures and SPCC Plan.

Terminal Facilities

The Terminal Site would be constructed on the mainland east of Calcasieu Pass and the Marine Facilities would be constructed on Monkey Island, which is between the Calcasieu Ship Channel and Calcasieu Pass. The lower Calcasieu River flows south from Lake Charles through Calcasieu Lake and into the Gulf of Mexico. The Calcasieu Ship Channel constitutes the federally maintained portion of the river that is periodically dredged to allow the passage of large vessels between the Port of Lake Charles and the Gulf of Mexico, and access to various industrialized dock sites along the way. The channel is maintained by the COE at a depth of 40 feet and a width of 400 feet (COE, 2010a).

The designated uses of the Calcasieu Ship Channel and Calcasieu Pass include primary contact recreation, secondary contact recreation, fish and wildlife propagation, and oyster propagation. Of these designated uses, only secondary contact recreation is fully supported; the remaining designated uses are not supported due to CWA Section 303(d) impairments, including the presence of *Enterococcus* bacteria, fecal coliform, and furan compounds in the water column and PCBs and dioxin in fish (LDEQ, 2020). The existing turbidity in the Calcasieu Ship Channel is high due to vessel traffic and the influence of natural phenomena such as storms, floods, tidal influences, and a regional sedimentary landscape subject to strong erosional forces that produce high sediment loads.

In addition to the Calcasieu Ship Channel and Calcasieu Pass, the Terminal Facilities would cross or otherwise impact six waterbodies, as identified above in table 4.4.2-2. None of the waterbodies that would be affected by the Terminal Facilities are listed as Wild and Scenic Rivers. There are also no state-designated Natural and Scenic Rivers affected by the Terminal Facilities.

Pipeline System

Appendix G identifies the list of the waterbodies crossed by the Pipeline System, including feature type, flow regime, FERC size classification, crossing width, designated use, RHA Section 10 status, CWA Section 303(d) status, length of the waterbody crossed by the pipeline, and proposed crossing method.

The Pipeline System would cross waterbodies designated as perennial, intermittent, ephemeral, and open water. Of these, about 49 percent of the waterbodies crossed or otherwise impacted by the Pipeline System are designated as CWA Section 303(d) waterbodies, all of which are in Louisiana. The impairments include low dissolved oxygen levels, and presence of *Enterococcus* bacteria, dioxin, furan compounds, or fecal coliform. No waterbodies proposed to be crossed by the Pipeline System in Texas are listed as CWA Section 303(d) waterbodies. Additionally, as mentioned above, the Project would cross an area of primary influence at the Sabine River Crossing on the Texas/Louisiana border, but does not cross within 3 miles upstream of any surface water intakes in Louisiana.

4.4.2.3 Coastal Considerations

Coastal Barrier Resource System

Coastal barriers are landscape features that help protect the mainland against damage from the full force of wind, waves, and tides during coastal storms and provide important wildlife habitat and recreational opportunities. Based on a review of FWS Coastal Barrier Resources Act mapping, the southeast corner of the Terminal Site (approximately 1 acre) would be within Coastal Barrier Resource segment LA-09 (FWS, 2019a).

4.4.3 Surface Water Impacts and Mitigation

We received numerous comments, including from the Natural Resources Defense Council and Healthy Gulf, regarding the Project's impacts on water resources. Construction and operational activities that have the potential to impact surface waters include: clearing and grading activities; construction of the LNG loading docks and temporary berthing structures for construction equipment; vessel ballast water discharges; construction-related discharges (e.g., stormwater and hydrostatic test water); the use of HDD, open-cut, and push method for pipeline installation; dredging and dredge material placement; vessel traffic; fire water system; and potential spills or leaks of hazardous liquids from the refueling of construction vehicles or storage of fuel, oil, and other fluids.

Waterbody crossings during construction would be completed in accordance with the Project-specific Procedures and applicable permit requirements. CP2 LNG and CP Express would adhere to any permit conditions and BMPs related to surface water protection and the Project-specific Procedures to reduce the risk and severity of potential surface water impacts. The BMPs that would be used to prevent the deterioration of surface water resources during Project construction include:

- All employees and contractors would receive training regarding the handling of fuel, oil, lubricants, and hazardous materials commensurate with their position.
- All equipment used in construction and operation would be inspected at regular intervals.
- All vehicles, including fuel trucks transporting fuel to onsite equipment would travel only on approved access roads.
- All equipment at the construction sites would be fueled at least 100 feet from any waterbody, except for cases where there is no reasonable alternative as described in the Project-specific Procedures.
- No hazardous materials, including chemicals, fuels, and oils, would be stored within 100 feet of any waterbody, except as needed as described in the Project-specific Procedures.
- Spill response materials would be kept on site.

Construction activities involving dredge and fill within waters of the United States are regulated by the COE under Section 404 of the CWA, and construction activities in or over navigable waters of the United States (e.g., berthing docks and temporary marine facilities) are regulated by the COE under Section 10 of the RHA. The Project would require permit authorization from the COE under the CWA and the RHA, Coastal Use Permits and Coastal Zone Consistency Determinations from the LDNR OCM for the Terminal Facilities and Pipeline System separately, a Section 401 Water Quality Certification from the LDEQ and RRC, and LPDES, RRC, and TCEQ permits for various water discharges during construction and operation. CP2 LNG and CP Express would coordinate with the COE and LDNR OCM to determine appropriate mitigation for unavoidable permanent and long-term impacts on waters of the United States.

4.4.3.1 Terminal Facilities

Terminal Site

<u>Site Modification and Stormwater Discharge</u>

Ground disturbance for construction of the Terminal Site could result in sedimentation of adjacent waterbodies via stormwater runoff. In addition to stormwater runoff, excess water from dust control, vehicle washdown, and other construction activities onsite would generate wastewater runoff. Refueling of vehicles or storage of fuel near waterbodies could potentially result in accidental spills that could contaminate surface waters. CP2 LNG would adhere to the measures outlined in its SPCC Plan to minimize impacts on surface water resources. During operation, the amount of impervious surface that would be constructed for the Terminal Site would result in an increased volume of stormwater runoff.

CP2 LNG would install temporary erosion and sediment control devices to reduce turbidity and sedimentation from construction activities and would comply with the LPDES program (Construction General Permit for stormwater discharges), as required under the CWA and Louisiana law, to minimize impacts. Measures to control erosion and sedimentation during construction are discussed in detail in section 4.3.3.

Terminal Site construction activities would be designed to direct stormwater discharges to holding basins and filtration devices to allow for sufficient retention time to preclude high sediment loads from reaching receiving waters. CP2 LNG would place gravel or other suitable material for stormwater control, in addition to using other controls to be incorporated in its SWPPP. During operation, in process areas and other areas of the Terminal Site where liquid hydrocarbons are present, the stormwater system design would provide for the capture of potentially oily stormwater. Any oily stormwater captured would be treated prior to discharge. Stormwater would be directed via piping to several energy-dissipating aggregate beds just outside the floodwalls, from where the water would flow through a channelized conveyance system to Calcasieu Pass.

One waterbody, WAT-01, within the floodwalls at the Terminal Site, that is part of a ditch system providing local surface drainage to Calcasieu Pass, would be filled and as such, impacts would be permanent. An approximately 0.73-mile-long section of WAT-01 crosses the northern section of the proposed Terminal Site. This section would be rerouted around the northern periphery of the Terminal Site to fulfill its pre-construction drainage function. Additionally, the Hydrologic Modification Impact Analysis CP2 LNG submitted to the LDNR OCM concluded Terminal Site development would not result in an increase in rate or volume of stormwater runoff flowing overland from the Project area. The Terminal Site's stormwater system would direct runoff to existing receiving waters and discharges would meet applicable water quality standards.

The widening of Davis Road between the DeHyCo/Baker Hughes 1 marine offloading facility and the Martin marine offloading facility would permanently impact a 0.78-mile-long section of a ditch (WAT-M02) abutting the east side of the road at this location. CP2 LNG would relocate the ditch slightly to the south along the widened road to maintain drainage capacity and function. In accordance with Section V.A.B of the Project-specific Procedures, CP2 LNG must comply with the COE, or its delegated agency, permit terms and conditions and maintain adequate waterbody flow rates to protect aquatic life, and prevent interrupting downstream uses. CP2 LNG and CP Express continue to communicate with Cameron Parish government representatives regarding the drainage system design for the Project.

We received comments from nearby landowners and individuals on the draft EIS expressing concern of potential induced flooding from the Project. Interior drainage ditches and detention ponds would be installed within the floodwall of the Terminal Site to manage stormwater. Stormwater discharges from the Terminal Site would be conveyed to the west, avoiding the nearby residences situated to the northeast and east of the Terminal Site. Floodplain storage, drainage flow, water quality, and flood management would be regulated by the LDNR OCM. CP2 LNG submitted a Hydrologic Modification Impact Analysis on December 3, 2021 for review and approval by the LDNR OCM is pending. CP2 LNG states that the Hydrologic Modification Impact Analysis for the Terminal Facilities concluded that Terminal Site development would not result in an increase in the rate or volume of stormwater runoff flowing overland from the Project area.

Surface Water Usage

Water for construction of the Terminal Site would be obtained from Cameron Parish and brought to the site via tanker trucks. Surface water is proposed for hydrostatic testing of the LNG storage tanks and would be sourced from Calcasieu Pass. Water used for HDD installation and hydrostatic testing of the LNG transfer lines, and water for piping and non-LNG hydrostatic testing, would be sourced from a municipal source or the new onsite groundwater wells. During surface withdrawals from Calcasieu Pass, CP2 LNG would implement the following measures:

- place water intakes above the channel bed to avoid or minimize sediment disturbance;
- screen intake structures with 0.5-inch mesh wire fabric screen or equivalent to minimize the entrainment of aquatic organisms and debris;
- limit intake pumping rate to minimize the impingement of aquatic organisms and debris on screens; and
- transfer water from one LNG storage tank to the other, if practicable, to reduce the amount of water withdrawn for testing.

Water discharges are subject to LPDES permit requirements, through which flow limits and practices would be implemented that are protective of biological resources and human health. CP2 LNG would conduct withdrawal, testing, and discharge of hydrostatic test water in accordance with LPDES permit requirements, and the Project-specific Plan and Procedures to minimize impacts on surface water resources.

Water used for Terminal Site operations (e.g., industrial process, potable, and firewater system water) would be sourced from the onsite groundwater wells as discussed in section 4.4.1.4. The groundwater supply for administration buildings, control rooms, and maintenance buildings, make-up water, and production of demineralized water would be treated by a reverse osmosis system and the reject water would be discharged via a permitted outfall to the Calcasieu Pass Ship Channel in accordance with a LPDES permit issued by the LDEQ. The volume and composition of the effluent streams would be defined during development of the LPDES permit application during the Project's construction phase but, provisionally, the discharges would include non-process area stormwater run-off, equipment washwater, reverse osmosis reject water, and ultrafiltration backwash from demineralized water treatment and non-process wastewater. CP2 LNG stated additional details regarding the volume and composition of the process waste water would be developed during detailed design.

Construction Site Dewatering

Dewatering may be necessary during Terminal Site construction requiring the temporary drawdown of groundwater or removal of surface water originating from storm events. CP2 LNG would conduct dewatering consistent with the Project-specific Procedures. The water would be pumped and discharged in a manner that minimizes erosion and prevents silt-laden water from flowing into any surface waters or wetlands. CP2 LNG would remove associated structures and equipment as soon as practicable after dewatering is completed.

Marine Facilities

Dredging and Dredged Material Placement

As discussed in section 4.3.3.1, excavation and dredging along the southwest shore of Monkey Island would be required for the LNG loading docks, berthing area, and vessel turning basins. CP2 LNG estimates dredging would occur over a12- to 18-month period and approximately 6.4 million cubic yards of material would be excavated. In addition, CP2 LNG anticipates it would need a two-year cycle of maintenance dredging to maintain unobstructed access to the berthing area; however, additional dredging may be needed to address storm-induced accretions on an event-specific basis. Dredging during construction and long-term maintenance at the Terminal location would be primarily performed using a hydraulic cutter-suction dredge.

Use of a cutterhead suction dredge would minimize turbidity caused by resuspension of sediments in the water column as compared to a clamshell-type dredge, which would more readily disperse sediment during dredging. Nonetheless, installation of the Marine Facilities and dredging activities would cause increased turbidity in the Calcasieu Ship Channel. Guidance from NMFS regarding how to assess the effects of turbidity on endangered species notes that cutterhead dredging generally creates total suspended solids concentrations above background levels throughout the bottom six feet of the water column out to a radius of about 985 to 1,640 feet of the cutterhead (NMFS, 2020a). NMFS (2020a) further states that total suspended solids concentrations throughout sediment plumes associated with cutterhead dredging typically range from 11.5 to 282.0 milligrams per liter (mg/L) but may be as high as 550.0 mg/L adjacent to the cutterhead. Total suspended solids concentrations decrease with greater distance from the dredge. The COE (2014) reports that the effects of temporarily increased levels of suspended sediments due to dredging are comparable to the common passage of a storm front with high winds and heavy wave action. Increased turbidity due to dredging is typically confined to the time during dredging and about 2 to 3 hours after dredging ceases, after which suspended solids settle to background levels over time (COE, 2014).

The proposed Commonwealth LNG Project,[60] sited across the Calcasieu Ship Channel approximately 0.5 mile southwest of the CP2 LNG Terminal Site, would also conduct dredging activities using a cutterhead suction dredge. Modeling conducted by Commonwealth LNG using the COE's DREDGE model found a range of maximum turbidity concentrations dependent on tidal flow velocity. Modeling results ranged "…from approximately 122 to 128 mg/L adjacent to the cutter head; 3 to 51 mg/L

[60] The Final Environmental Impact Statement for the Commonwealth LNG Project can be viewed at accession no. 20220909-3017.

at 1 meter above the cutter head; and 0.1 to 10 mg/L at 2 meters above the cutter head." Estimated background turbidity concentrations for the Calcasieu River were noted to range from 10 to 45 mg/L. Further discussion of cumulative impacts on turbidity of the Calcasieu Ship Channel is provided in section 4.14.2.3.

Increased turbidity from the dredging activities associated with the Project are expected to be temporary and limited to the immediate vicinity of construction. Additionally, the existing turbidity in the Calcasieu Ship Channel is high due to vessel traffic and the influence of natural phenomena such as storms, floods, tidal influences, and a regional sedimentary landscape subject to strong erosional forces that produce high sediment loads.

Based on the literature estimates published by NMFS and given the proximity of the Commonwealth LNG Project to CP2 LNG (i.e., less than one mile), the similarity in proposed dredge technique (i.e., cutterhead), and operation of dredging activities within the same waterbody (i.e., the Calcasieu Ship Channel), CP2 LNG's construction and maintenance dredging activities are anticipated to result in turbidity profiles and impacts similar to those we evaluated for Commonwealth LNG. Therefore, we conclude the proposed dredging southwest shore of Monkey Island would increase suspended sediment and turbidity levels in the immediate vicinity of the dredging activity; however, sediment and turbidity levels would be indistinguishable from ambient water conditions outside of a small radius (2 meters or less) surrounding the dredge cutterhead. As such, dredging impacts on water quality resulting from the Project would be temporary and not significant. Furthermore, all CP2 LNG dredging would be regulated by the COE and LDNR OCM. Permit issuance by the COE would be dependent on receipt of CWA Section 401 water quality certification from the LDEQ. This certification would only be issued if the LDEQ determines that the turbidity associated with dredging is permissible with respect to state water quality standards. CP2 LNG would adhere to all permit conditions, as well as the BMPs included in its Project-specific Procedures, to minimize the impacts associated with dredging activities and promote the stability of the excavated shoreline during and after construction of the LNG berthing area.

We received a comment from RESTORE on the draft EIS expressing concern regarding dredging and the potential for increased saltwater intrusion from the Gulf of Mexico. Per the COE's 2010 Calcasieu River and Pass, Louisiana, Dredged Material Management Plan and Supplemental Environmental Impact Statement, the Calcasieu Ship Channel contains saltwater (greater than 30 parts per thousand [ppt] salinity) from the Gulf of Mexico to the southern extent of Calcasieu Lake (inclusive of Project dredging for the proposed Marine Facilities). The Calcasieu Ship Channel remains brackish (salinity concentrations ranging from 0.05 to 30 ppt) as far north as the Calcasieu River Saltwater Barrier, approximately 34 miles upriver from the proposed Marine Facilities. This structure was completed by the COE in 1968 to minimize the flow of the saltwater wedge into the upper reaches of the Calcasieu River to protect agricultural water supplies. Dredging for the Project would not impact the main ship channel and would be minor in comparison to the volume of the Calcasieu Ship Channel as a whole. Further, given the existing salinity of the Calcasieu Ship Channel and the presence of the upstream Calcasieu River Saltwater Barrier, Project impacts on salinity in the Calcasieu Ship Channel would be negligible.

Vessel Traffic

During construction, CP2 LNG anticipates that a significant portion of materials, equipment, and modular plant components (including the liquefaction units) would be brought to the site by barge, which would require use of dock facilities along Calcasieu Pass. CP2 LNG estimates 2,275 barge visits over the multi-year construction period to the Terminal Site.

During operation, LNG carriers would access the Terminal Facilities from the Gulf of Mexico through the existing 400-foot-wide navigation channel in the Calcasieu Ship Channel. CP2 LNG estimates a maximum of 200 LNG carriers would call on the Terminal Facilities per year following completion of Phase 1 and a maximum of 400 LNG carriers would call per year following completion of Phase 2 (about three to four LNG carriers per week following Phase 1 facilities placed in service and 7 to 8 LNG carrier calls per week following Phase 2 facilities placed in service). The marine berths on Monkey Island would accommodate LNG carriers ranging in size from 120,000 to 210,000 m^3, with the smallest carriers docking at the Marine Facilities for an average of 24 hours and the largest for an average of 36 hours.

Vessel traffic during construction and operation could increase shoreline erosion and suspended sediment concentrations due to increased wave action. Turbidity resulting from suspension of sediments could reduce light penetration and photosynthetic oxygen production. Disturbance could also introduce chemical and nutrient pollutants from sediments, if present. CP2 LNG would incorporate bankside protection, such as riprap, to protect the Marine Facilities from the effects of shoreline erosion.

Although FERC does not have jurisdiction over LNG vessels, the Calcasieu Ship Channel is federally managed and is designed to accommodate deep-draft vessels (Port of Lake Charles, 2021). As such, the use of waterways by LNG carriers, barges, and support vessels during construction and operation of the Terminal Site would be consistent with the planned purpose and use of active shipping channels. Impacts on shipping channels would be minor. Impacts on vessel traffic as a result of the Project are discussed in section 4.10.8.1.

Ballast Water

LNG carriers are required to undertake nearly continuous ballasting operations during LNG cargo loading operations due to the need to maintain a reasonably constant relative freeboard between the carrier and the LNG cargo loading arms. LNG carriers serving the Marine Facilities would likely arrive with empty cargo tanks, because the carriers would be loaded at the Marine Facilities with LNG destined for export. To provide additional draft and improve ship stability and navigation performance, the carrier's ballast tanks would arrive at the Terminal Facilities with a volume of water similar in weight to the anticipated LNG cargo. The amount of ballast water discharged during LNG cargo loading would vary depending on the size of the LNG carrier, ranging in volume from 9,000,000 to 12,000,000 gallons.

Potential impacts on water quality due to ballast water discharge would be a temporary increase in salinity level, a temporary decrease in dissolved oxygen levels, a potential change in water temperature, and potential change in pH level in the immediate vicinity of the LNG berthing area. Because the proposed Marine Facilities and turning basin are within the lower Calcasieu River Ship Channel (about 1.2 miles from the Gulf of Mexico), these differences are expected to be minor and may not be measurable under normal tidal cycles. In addition, ballast water is stored in the ship's hull below the waterline; as a result, discharged water temperatures are not expected to deviate significantly from ambient water temperatures. Carriers calling at the Terminal Facilities would be required to comply with Coast Guard ballast water management regulations for discharges in waters of the United States. The Coast Guard has also established engineering equipment requirements and an approval process for ballast water treatment systems installed on ships. All ships calling at U.S. ports and intending to discharge ballast water must use a ballast water treatment system in addition to fouling and sediment management. CP2 LNG would include these requirements in agreements for LNG carriers calling at the Marine Facilities. Because vessels would be required to comply with U.S. laws and regulations governing ballast water discharges, we conclude that impacts on surface water quality resulting from ballast water discharge would be minor.

Cooling Water

During operation, LNG carriers use water to cool the main engine, other machinery, and for hotel services. Ship cooling water would be withdrawn and discharged below the water line on the sides of the ship through screened water ports, known as “sea chests.” Cooling water would be withdrawn from, and returned to, Calcasieu Pass.

Impacts on surface waters as a result of cooling water intake and discharge would be primarily limited to an increase in water temperature in the vicinity of the LNG carrier. Cooling water return temperatures vary widely depending on the type of LNG carrier and mode of operation. Based on the mean annual water temperature of 72.5 °F, recorded at a buoy station approximately 1 mile south of the proposed Marine Facilities in Calcasieu Pass, the LNG carrier cooling water discharge could range between 5.4 and 7.2 °F warmer than ambient temperatures (NOAA, 2022d; FERC, 2019a). Discharges of cooling and hoteling water are regulated under the Vessel Incidental Discharge Act (VIDA), which establishes a framework for the regulation of discharges incidental to the normal operation of a vessel under the CWA. Both the Coast Guard and the EPA provide regulatory and enforcement oversight with respect to such discharges and their impacts. CP2 LNG would comply with the applicable VIDA regulations and Vessel General Permit standards for cooling and hoteling water. Impacts of cooling water intake and discharge on aquatic resources are addressed in section 4.7.2. Based on CP2 LNG’s commitment to the Coast Guard, the limited temperature differences, and the relatively small volume of discharged water compared to the total volume of Calcasieu Pass, we conclude that cooling water discharges would only have temporary (while the vessel is docked at the Terminal) and minor impacts on water quality.

4.4.3.2 Pipeline System

Potential impacts on surface waters could occur during construction and operation of the Pipeline System. Project vegetation and clearing activities, trenching, backfilling, hydrostatic testing, and spills or leaks of hazardous materials could affect nearby surface water resources.

Pipeline Construction

Appendix G identifies the waterbodies that would be crossed by the Pipeline System. Runoff from the construction right-of-way could increase sedimentation and turbidity in nearby surface waters through vegetation clearing, trenching, and backfilling. These activities could also reduce dissolved oxygen in the water column and release chemical or nutrient pollutants from sediments.

CP Express proposes the HDD method, bore method, and open-cut construction method to cross waterbodies during construction.

Bore crossings would be used to avoid waterbodies adjacent to roads that are not open cut or crossed by the HDD method. Impacts on waterbodies that would be crossed by trenchless construction methods (conventional bore and HDD) would generally be avoided because the waterbody and its banks would not be disturbed by clearing or trenching; rather, the pipeline would be installed below the feature. CP Express would adhere to measures outlined in its HDD Monitoring and Contingency Plan to minimize the potential for an inadvertent release of drilling fluid and minimize impacts on surface water resources should an inadvertent return occur. The Project would cross an area of primary influence at the Sabine River Crossing on the Texas/Louisiana border. CP Express would avoid direct impacts on the Sabine River by installing the pipeline using the HDD construction method.

For waterbodies proposed to be crossed by open-cut construction, including 303(d) listed waterbodies, CP Express would implement its Project-specific Plan and Procedures during construction and would perform post-construction monitoring to ensure that impacts on surface water resources are avoided and/or minimized and mitigated. Dry-ditch open-cut construction methods would temporarily affect crossed waterbodies, but CP Express would isolate flow or construct when there is low or no flow to minimize turbidity and sedimentation from streambed disturbance. We received a comment from LDWF regarding the placement of sediment barriers where the pipeline crosses waterbodies by open cut to eliminate erosion and stormwater runoff. As discussed in the Project-specific Procedures, sediment barriers would be used to prevent the flow of spoil or silt-laden water into any waterbody. However, for pipeline construction in open water sections, the installation of sediment barriers may not be feasible. Silt fences may not contain spoil in these areas due to the poor cohesiveness of the native soil, as well as its low angle of repose after side casting. In addition, sediment curtains may not be feasible in shallow open water due to the need to maintain access points to allow equipment and access for local watercraft to pass. Sediment barriers would be properly maintained throughout construction and reinstalled as necessary (such as after backfilling of the trench) until replaced by permanent erosion controls or restoration of adjacent upland areas is complete. Additionally, per the Project-specific Procedures, all minor and intermediate waterbody pipeline crossings by open cut would be completed within 24 and 48 hours, respectively.

Refueling of vehicles or storage of fuel near waterbodies could potentially result in accidental spills that could contaminate surface waters. CP Express' SPCC Plan includes measures to prevent spills from occurring near waterbodies. If a spill were to occur, implementation of the measures in the SPCC Plan would minimize response time and impacts on surface water resources.

CP Express would restore waterbodies to preconstruction conditions or a stable angle of repose and revegetate riparian areas after completion of construction. Where pipelines parallel a waterbody, CP Express would retain at least 15 feet of undisturbed vegetation during construction between the waterbody (and any adjacent wetland) and the construction right-of-way, except where the construction right-of-way crosses marsh wetland areas. In these areas, a cleared operations corridor would not be maintained.

We received a comment on the draft EIS from TPWD recommending measures and BMPs to avoid or minimize potential impacts to aquatic species during construction within waterbodies, such as protective mats, entering streams only when essential to construction, minimizing impacts to bottomland/riparian woodlands. CP2 Express would minimize impacts on streams in accordance with the Project-specific Procedures, including limited the use of construction equipment to only that needed to construct the crossing, maintain flow rates to protect aquatic life, and use of timber mats reduce the amount of soil and root disturbance. In addition to the measures discussed throughout this section and within section 4.7.2.2, CP Express would utilize temporary equipment bridges, such as culverts, equipment mats, railroad car bridges, or clean fill, along the construction right-of-way. Equipment bridges would be constructed and maintained to allow unrestricted flow and to prevent soil from entering the waterbody and would be designed to withstand and pass the highest flow anticipated to occur while the bridge is in place.

Runoff from the right-of-way could affect nearby surface waters and vegetation clearing and grading, trenching, and backfilling could increase sedimentation rates and turbidity levels. These activities could also reduce dissolved oxygen in the water column and release chemical or nutrient pollutants from sediments. CP Express would adhere to the BMPs in the Project-specific Procedures to reduce turbidity and sedimentation in adjacent surface water resources. CP Express would implement the Project-specific Plan, Procedures, and SPCC Plan, and would follow all permit requirements to minimize impacts on water resources during construction and operation of the Pipeline System. Impacts on water quality would largely be temporary (lasting minimally beyond direct in-stream construction), and longer-lasting impacts would be minimized with CP Express revegetation of the riparian areas. Therefore, we conclude that construction and operation of the Pipeline would not result in a significant impact on water resources.

Surface Water Usage and Discharges

During construction of the Pipeline System, CP Express estimates a total of 25,302,000 gallons of water for hydrostatic testing of the pipelines, 575,00 gallons for hydrostatic testing of aboveground facilities, 2,977,000 gallons for HDD hydrostatic testing, 11,396,000 gallons for HDD installation, and 1,548,000 gallons for dust suppression would be needed. Water would be sourced from municipal sources or surface waterbodies. CP Express would minimize environmental impacts from the discharge of hydrostatic test water by implementing all of the measures contained in the Project-specific Procedures. CP Express would locate hydrostatic test manifolds outside of wetlands and riparian areas, where feasible, and would comply with all appropriate requirements of the LPDES, TCEQ, and RRC permit requirements for hydrostatic test wastewater discharges. Therefore, we do not anticipate impacts from surface water usage and discharges.

Additional Temporary Workspace

Surface water impacts associated with ATWS are similar to those discussed for pipeline construction. CP Express generally would not establish ATWS within 50 feet of waterbodies, in accordance with its Project-specific Procedures. In locations where site-specific constraints require ATWS within 50 feet of, or within, waterbodies, CP Express has provided site-specific justification and measures to minimize impacts on the waterbody (see appendix H). We have reviewed the sites where CP Express has requested ATWS within 50 feet of wetlands and waterbodies and have found them to be justified and acceptable.

Contractor Yards and Staging Areas

Four contractor and/or pipe yardswould be used during construction of the Pipeline System. Based on a desktop review, no waterbodies or ditches are within the sites, but several are adjacent to waterbodies or ditches. When land access is obtained, CP Express would conduct additional field surveys to confirm the presence or absence of waterbodies within the proposed contractor yards. CP Express would install erosion and sediment controls to prevent migration of sediment outside of disturbed areas within the contractor yards; therefore, no direct or indirect impacts on waterbodies from the use of contractor yards would occur and we conclude impacts to surface water from use of contractor yards would be temporary and not be significant.

Access Roads

Temporary access roads would include existing private roads and/or two-tracks that may require minor modification or improvements, and new roads constructed for the Project. Permanent access roads used by the Project would include existing private roads, which may require minor modification or improvements, and new roads. Access road crossings of waterbodies are identified in appendix G. CP2 LNG and CP Express would maintain surface water flow at permanent access roads by installing the permanent access roads in accordance with applicable permit conditions and approvals, including those conditions relating to the proper sizing of culverts. Therefore, we conclude that impacts on surface waters from temporary and permanent access roads would be minimized and not significant.

Aboveground Facilities

Operation of the Project aboveground facilities would require placement of permanent fill within waterbodies, including at the Moss Lake Compressor Station, MLV 5, and the Enable Receiver and MLV 3. CP Express would coordinate with the COE and LDNR OCM to determine appropriate mitigation for unavoidable permanent and long-term impacts on waters of the United States. Additionally, CP Express would adhere to all permit conditions and implement the mitigation measures discussed previously in this section to minimize impacts on waterbodies. Temporary impacts on waterbodies caused by construction activities such as clearing, grading, and potential spills or leaks of hazardous materials would be similar to those discussed for the pipeline and would be minimized through implementation of the Project-specific Plan and Procedures, and SPCC Plan.

4.4.4 Conclusion

Temporary and minor surface water impacts could result from the construction and operation of the Project. Construction and operation of the Terminal Site would permanently fill 1.51 miles of waterbodies at the Terminal. Construction and operation of the Terminal Facilities would also impact water quality within the vicinity of the Project resulting from dredging, maintenance dredging, marine traffic, and stormwater runoff. However, through implementation of CP2 LNG's Project-specific Procedures, BMPs, and adherence to applicable permit regulations, potential construction and operation impacts resulting from stormwater runoff, or the discharge of hydrostatic test water, would be adequately minimized and would not be significant.

Construction of the Pipeline System could result in impacts to surface water resources from waterbody crossings including open-cut, HDD, and bore crossing methods; hydrostatic testing; and spills or leaks of hazardous materials. Waterbodies crossed by the pipelines via the open-cut methods would experience temporary decreases in water quality resulting from increased turbidity, sedimentation, and overall bed and bank disturbance. Further, crossing the waterbodies would risk spills of hazardous liquids and inadvertent returns of HDD drilling mud within the waterbodies. With implementation of the mitigation measures identified above and CP Express' Project-specific Procedures and HDD Monitoring and Contingency Plan, we have determined that the Project would not significantly impact surface waters.

4.5 WETLANDS

We received numerous comments from agencies, individuals, and NGOs regarding the Project's impacts on wetlands. Wetlands are areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions, commonly known as hydrophytic vegetation (COE, 1987). Wetlands can be a source of substantial biodiversity and serve a variety of functions that include providing wildlife habitat, recreational opportunities, flood control, and naturally improving water quality. In the Project area, wetlands are protected under Section 404 of the CWA. Under Section 404, the COE is authorized to issue permits for activities that would result in the discharge of dredged or fill material, or the dredging of, waters of the United States, such as wetlands. Under Section 401 of the CWA, states are required to certify that proposed dredging or filling of waters of the United States meets state water quality standards. In Louisiana, the LDEQ is responsible for water quality certification. In Texas, the TCEQ and RRC share responsibilities for water quality certification. The RRC has jurisdiction over Section 401 as it pertains to installation and operations of the Project facilities; the TCEQ has jurisdiction as it pertains to return water for dredged material placement areas. Additionally, the Terminal Facilities and portions of the Pipeline System are within the Louisiana Coastal Zone and are under the jurisdiction of LDNR OCM (LDNR, 2021a; 2021b). Therefore, the Terminal Facilities and Pipeline System must receive Coastal Use Permits/Coastal Zone Consistency Determinations, which is further discussed in section 4.9.6.

4.5.1 Existing Wetland Resources

Estuarine and palustrine wetlands occur within the Project area. Estuarine systems include tidal habitats with variable salinity; palustrine features include non-tidal wetlands dominated by trees, shrubs, and emergent vegetation with less than 0.5 percent salinity (Cowardin et al.1979). Wetlands at the Terminal Facilities and along the Pipeline System were identified through a combination of field surveys and, in instances where survey permission was not available along the Pipeline System, using data from the NWI (FWS, 2022a). Wetland delineations were conducted in accordance with COE-approved methods. As discussed in section 4.4.2, CP Express would complete surveys of the remaining parcels when permission to access those parcels has been obtained and file reports to FERC prior to construction. Table 4.5.1-1 describes the wetland types within the Project area and table 4.5.1-2 summarizes the acreage of each wetland type within the Project area.

Table 4.5.1-1

Wetland Types Affected by the CP2 LNG and CP Express Project

Cowardin Classification	Wetland Characteristics
Palustrine Wetlands	
Palustrine emergent (PEM)	PEM wetlands include tidal and non-tidal wetlands dominated by persistent emergent vascular plants, emergent mosses, or lichens, and wetlands that occur in tidal areas in which salinity due to ocean-derived salts is below 0.5 parts per thousand. Plants generally remain standing until the next growing season. PEM wetlands are usually dominated by perennial plants.
Palustrine scrub-shrub (PSS)	PSS wetlands include tidal and non-tidal wetlands dominated by woody plants less than 6 meters (20 feet) tall in, which salinity due to ocean-derived salts is below 0.5 parts per thousand.
Palustrine forested (PFO)	PFO wetlands include tidal and non-tidal wetlands dominated by woody vegetation greater than 3 inches diameter at breast height regardless of height, and all such wetlands that occur in tidal areas in which salinity due to ocean-derived salts is below 0.5 parts per thousand.
Estuarine Wetlands	
Estuarine intertidal emergent (E2EM)	E2EM wetlands include tidal wetlands dominated by erect, rooted herbaceous hydrophytes (excluding mosses and lichens) and wetlands that occur in tidal areas in which salinity due to ocean-derived salts is equal to or greater than 0.5 parts per thousand and that are present for most of the growing season in most years. Perennial plants usually dominate these wetlands.
Estuarine scrub-shrub (E2SS)	E2SS wetlands are dominated by woody plants less than 20 feet tall in which salinity due to ocean-derived salts is equal to or greater than 0.5 parts per thousand.

Table 4.5.1-2

Summary of Wetlands Affected by the CP2 LNG and CP Express Project (acres)

	Palustrine Emergent Wetland		Estuarine Intertidal Emergent Wetland		Palustrine Scrub-shrub Wetland		Estuarine Scrub-shrub Wetland		Palustrine Forested Wetland		Palustrine Aquatic Bed	
Facility	Con[a]	Op[b]	Con[a]	Op[b]	Con[a]	Op[b]	Con[a]	Op[b]	Con[a]	Op[b]	Con[a]	Op[b]
Terminal Facilities												
Terminal Site	286.8	274.8	7.8	5.3	32.7	32.0	0.0	0.0	1.7	1.7	0.0	0.0
Marine Facilities	13.8	13.8	14.2	14.2	12.6	12.6	0.0	0.0	0.6	0.6	0.0	0.0
LNG Transfer Lines/ Utilities	11.3	0.0	0.0	0.0	12.9	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Terminal Facilities Subtotal	**311.9**	**288.6**	**22.0**	**19.5**	**58.2**	**44.6**	**0.0**	**0.0**	**2.3**	**2.3**	**0.0**	**0.0**
Pipeline System												
CP Express Pipeline	375.3	0.0	318.2	0.0	46.5	3.1	0.4	<0.1	204.8	48.9	1.5	0.0
Enable Gulf Run Lateral	15.1	0.0	0.0	0.0	2.4	0.3	0.0	0.0	15.7	6.1	0.0	0.0
Access Roads	3.5	0.5	0.5	0.1	0.2	0.0	0.0	0.0	0.8	0.0	0.0	0.0
Aboveground Facilities	0.5	0.5	0.3	0.3	32.2	32.2	0.0	0.0	5.7	5.7	0.0	0.0
Contractor Yards	2.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pipeline System Subtotal	**397.1**	**1.0**	**319.0**	**0.4**	**81.3**	**35.6**	**0.4**	**<0.1**	**227.0**	**60.7**	**1.5**	**0.0**
Project Total	**709.0**	**289.6**	**341.0**	**19.9**	**139.5**	**80.2**	**0.4**	**<0.1**	**229.3**	**63.0**	**1.5**	**0.0**

[a] Con = Construction Impacts. Includes both temporary construction impacts and permanent operational impacts.
[b] Op = Operational Impacts. Includes both permanent wetland conversion impacts (PSS to PEM, PFO to PEM) and permanent fill impacts.
Note: The totals shown in this table may not equal the sum of addends due to rounding.

4.5.1.1 Terminal Facilities

CP2 LNG identified wetland resources at the Terminal Facilities during field surveys completed in July 2021. Wetlands at the Terminal Facilities are depicted in figure 4.5.1-1.

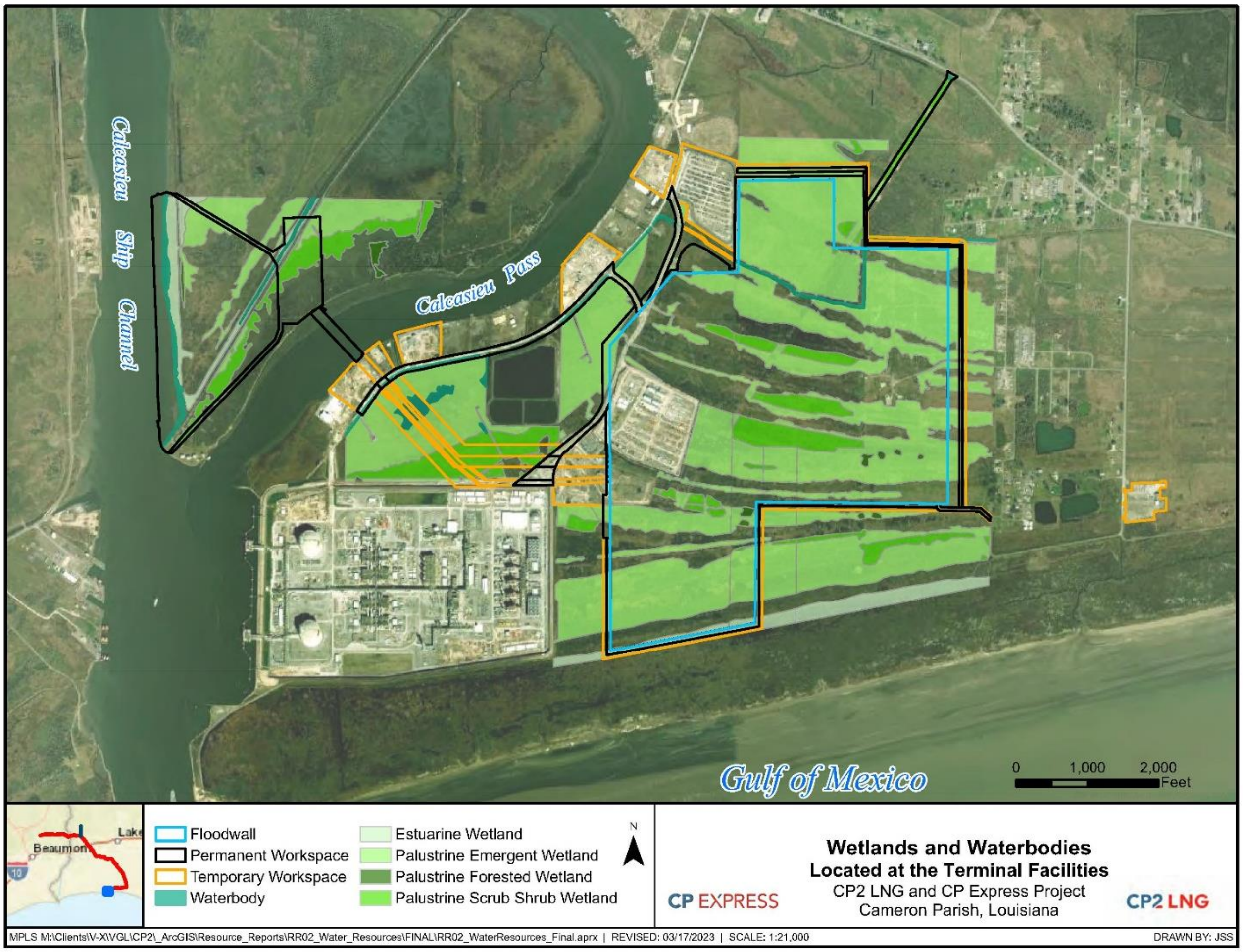

Figure 4.5.1-1 Wetlands and Waterbodies Located at the Terminal Facilities

4.5.1.2 Pipeline System

CP Express identified wetlands along the Pipeline System during field surveys conducted from April to August 2021 and in 2023, where survey access was available. Field surveys were conducted in a 300-foot-wide corridor centered on the permanent right-of-way, with the exception of when landowners requested a 200-foot-wide corridor. Surveys were additionally conducted on the footprint of aboveground facility sites and in a 50-foot-wide corridor on access roads.

Appendix I identifies the wetlands that would be potentially affected by the Pipeline System, including the wetland identification, location, type, crossing width (where applicable), and impact acreage. The pipeline facilities would cross freshwater and estuarine wetlands as summarized in table 4.5.1-2.

4.5.2 Wetland Impacts and Mitigation

4.5.2.1 Terminal Facilities

We received multiple comments from the public and state and federal agencies expressing concern regarding the potential impacts of the Project on biologically valuable resources and protective coastal habitats, such as wetlands. Wetlands affected by the Terminal Facilities are summarized in table 4.5.1-2. Construction of the Terminal Site would result in impacts on 286.8 acres of palustrine emergent (PEM) wetlands, 32.7 acres of palustrine scrub-shrub (PSS) wetlands, 1.7 acres of PFO wetlands, and 7.8 acres of estuarine intertidal emergent (E2EM) wetlands. Of these wetlands, 274.8 acres of PEM wetlands, 32.0 acres of PSS wetlands, 1.7 acres of PFO wetlands, and 5.3 acres of E2EM wetlands would be permanently impacted. The construction of the LNG transfer lines would result in temporary impacts on 11.3 acres of PEM wetlands, 12.9 acres of PSS wetlands, and permanent conversion of 0.1 acre of PSS to PEM. The remaining wetlands, which are associated with temporary workspace outside the Terminal Site perimeter floodwalls, would be temporarily affected during construction. Construction of the Marine Facilities would result in the permanent loss of 41.2 acres of PEM, PSS, PFO, and E2EM wetlands, the majority of which would be converted to open water in the dredge prism for the berthing area. Impacts related to dredging and modification of open water within the Terminal Facilities are addressed in section 4.4.3.1. All direct impacts on wetlands at the Terminal Site would occur during initial construction, because site clearing and preparation would be conducted at that time.

CP2 LNG would be required to obtain the applicable COE permits for permanent loss of wetland habitat and implement any mitigation measures required by the COE for that loss. CP2 LNG and CP Express submitted a Section 404/10 application to the COE for the Terminal Facilities and Pipeline System on November 12, 2021 and submitted updates to the applications on December 16, 2022 and January 17, 2023 to the New Orleans and Galveston Districts, respectively.

As summarized in table 4.5.1-2, construction of the Terminal Facilities would impact 394.4 acres of wetlands, of which 355.0 acres would be permanent. The loss of wetlands associated with the Terminal Facilities would result in loss of aquatic habitat and could temporarily increase the rates of turbidity and sedimentation in adjacent wetlands during construction. Additionally, wetlands adjacent to the Terminal Site could be contaminated due to spills and leaks of hazardous materials during construction and operation. CP2 LNG has proposed to address wetland mitigation through purchase of wetland mitigation bank credits. As proposed in their April 2023 draft CMP/BUDM Plan[61], for the Terminal Facilities CP2 LNG's proposed bank credit purchase quantities are based on a compensation ration of 1.23:1 for PEM and PSS wetlands and a replacement ration of 1.71:1 for E2EM wetlands. CP2 LNG's proposed wetland mitigation calculations are still under review by the COE and LDNR OCM at the time of writing of this EIS. However, the COE and LDNR OCM would require wetland mitigation to sufficiently offset permanent impacts on wetlands. Further, CP2 LNG would minimize construction related impacts on the adjacent wetlands by implementing its Project-specific Procedures, which include wetland crossing procedures, temporary sediment control procedures, and trench dewatering procedures. CP2 LNG would also implement measures contained in its SPCC Plan during construction, which includes discharge prevention measures, containment measures, and cleanup methods to reduce potential impacts and response times should a spill occur. Therefore, through implementation of the measures in CP2 LNG's Project-specific Procedures and SPCC Plan, and compliance with the COE's and LDNR OCM's wetland mitigation, we conclude that impacts on wetlands due to construction of the Terminal Facilities would not be significant.

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[61] This document can be viewed on the FERC eLibrary as attachment EIR9-2d under accession number 20230428-5528.

4.5.2.2 Pipeline System

Pipeline and Additional Temporary Workspace

Construction of the Pipeline System would affect approximately 1,026.3 acres of wetlands. Construction of the aboveground facilities and permanent access roads would result in the permanent fill/loss of approximately 39.3 acres of E2EM, PEM, PFO, and PSS wetlands. An additional 58.4 acres would be converted from PSS and PFO wetlands to PEM wetlands within the CP Express Pipeline and Enable Gulf Run Lateral permanent pipeline easements. Approximately 23.2 acres would be avoided via the HDD method. The remaining 905.4 acres would be temporarily affected by construction of the Pipeline System. Following construction of the CP Express Pipeline and Enable Gulf Run Lateral, wetlands temporarily affected by the Pipeline System would be restored to approximate pre-construction conditions and would be allowed to revegetate naturally or re-seeded in accordance with the Project-specific Procedures.

General Impacts of the CP Express Pipeline and Enable Gulf Lateral

Construction would be conducted in accordance with the Project-specific Procedures and as described in section 2.5. Along the CP Express Pipeline, CP Express has proposed a 150-foot-wide and 125-foot-wide construction right-of-way for the crossing of unsaturated and saturated wetlands, respectively. CP Express indicates that right-of-way width is necessary to facilitate safe work areas due to the large diameter (48 inches) and weight (Class 900) of the pipeline. CP Express also state that 88 percent of the CP Express right-of-way would be considered by the Occupational and Safety Administration as Type C soils. Type C soils are much less cohesive than typical unsaturated soils and requires more shallow trench slopes to prevent safety concerns due to sloughing of the trench walls. The passing lane was eliminated from the typical non-saturated wetland construction configuration to further reduce right-of-way width. The 10-foot buffer between the matted work area and edge of the right-of-way may also be used for the storage of excess saturated trench spoil or topsoil. With the elimination of the passing lane, the installation of ECDs along the edges of the right-of-way, and containment of the trench topsoil or saturated subsoil in the buffer zone, workspace has been limited to the minimum allowable for safe working conditions. Appendix D depicts the typical 125- and 150-foot-wide right-of-way configuration in wetlands related to the CP Express Pipeline.

CP Express has proposed a 75-foot-wide construction right-of-way for the majority of wetland crossings related to the Enable Gulf Run Lateral. The typical 75-foot-wide right-of-way configuration in wetlands related to the Enable Gulf Run Lateral is included in Appendix D.

In areas where the marsh push method is used, CP Express would use a 150-foot-wide construction right-of-way to accommodate the additional equipment, wider trench, and extensive spoils associated with this construction method.

Construction impacts on wetlands could include temporary changes in hydrology and water quality. Ground-disturbing activities, including clearing and grading of temporary work areas and excavation activities could temporarily affect the rate and direction of water movement within wetlands. If contours and elevations are not properly restored, these effects could adversely impact wetland hydrology and revegetation by creating soil conditions that may not support wetland communities and hydrophytic vegetation at pre-construction levels. Temporary removal of wetland vegetation during construction could alter the capacity of wetlands to function as habitat, or as flood and erosion control buffers. Mixing of topsoil with subsoil could alter nutrient availability and soil chemistry, thereby inhibiting recruitment of native wetland vegetation. Heavy equipment operating during construction could result in soil compaction or rutting that would alter natural hydrologic and soil conditions, potentially inhibiting germination of native seeds and the ability of plants to establish healthy root systems. Heavy equipment could also introduce noxious and invasive species to the disturbed soil (see section 4.6.3).

We received a comment from the LDWF in response to the draft EIS recommending the installation of one 24-inch-diameter culvert approximately every 250 feet when constructing access roads through wetlands. CP2 LNG and CP Express have committed to installing culverts across access roads within wetlands to maintain surface water flow, as needed and as authorized by USACE and LDNR/OCM permits. In response to the draft EIS, LDWF stated that to prevent the erosion of interior marsh, CP Express should place bankline stabilization material at the interface of marsh and open water for all pipelines installed via the open trench method. As required by sections V.B.7 (waterbodies) and VI.B.3 (wetlands) of the Project-specific Procedures, the applicants must install and maintain temporary erosion controls immediately after initial disturbance of the adjacent upland. Further, CP Express would implement the measures below to prevent erosion.

The majority of the impacts on wetlands from the proposed pipelines would be short-term (lasting until revegetation is successful). CP Express would restore all wetlands to approximate pre-Project contours and hydrology. Herbaceous wetland vegetation would regenerate quickly, typically within 1 to 3 years. Impacts on PSS wetlands would be longer term, but would typically reestablish to near pre-construction levels within 5 years. PFO wetlands within the construction workspaces (but outside of the permanent right-of-way) would be long-term, because woody vegetation would take several years to regenerate. In accordance with its Project-specific Procedures, CP Express would monitor the success of wetland revegetation annually until wetland revegetation is successful. Wetland revegetation would be considered successful when: a) the affected wetland satisfies the current federal definition for a wetland (i.e., soils, hydrology, and vegetation); b) vegetation is at least 80 percent of either the cover documented for the wetland prior to construction, or at least 80 percent of the cover in adjacent wetland areas that were not disturbed by construction; c) if natural rather than active revegetation was used, the plant species composition is consistent with early successional wetland plant communities in the affected ecoregion; and d) invasive species and noxious weeds are absent, unless they are abundant in adjacent areas that were not disturbed by construction. If the need for supplemental bankline stabilization is determined during restoration inspections, additional stabilization material may be placed to form a barrier to promote restoration (i.e., to trap organic material and sediments at the interface of marsh and open water) in accordance with applicable permit requirements. If preconstruction conditions in wetlands are not achieved after one full growing season following construction, CP Express would work with the COE and LDNR/OCM to determine the appropriate follow up measures. In accordance with the Project-specific Procedures, if revegetation is not successful 3 years from the conclusion of construction, CP Express would develop and implement (in consultation with a professional wetland ecologist) a remedial revegetation plan to actively revegetate wetlands. Further, CP2 LNG and CP Express are evaluating the anticipated permanent conversion and loss impacts associated with the Project and would coordinate with the LDNR/OCM and COE to develop a CMP in accordance with the Mitigation Rule and CWA Section 404(b)(1) Guidelines to replace the loss of aquatic resource functions. CP2 LNG and CP Express are evaluating the availability of wetland mitigation bank credits and the conceptual CMP would likely focus on mitigation banking to the extent possible.

Stormwater discharges and discharges from dewatering structures or hydrostatic testing could transport sediments and pollutants into wetlands, affecting water quality. During dewatering activities, the water would be discharged into wetlands only where upland alternative locations are not available. Dewatering would be conducted in accordance with permit conditions and the Project-specific Procedures. Dewatering structures would be removed as soon as practicable after the completion of dewatering activities. Trench dewatering could result in localized and temporary impacts on water quality (e.g., turbidity); however, these impacts would be minor.

The wetland characteristic most affected by pipeline construction would be the vegetation profile. Native seed banks retained in segregated topsoil in combination with advantageous growing conditions (e.g., climate and length of growing season) would facilitate regrowth. In emergent wetlands, vegetation within the construction workspace would be impacted during construction, but would not be purposely cleared, other than through trench excavation. Scrub-shrub wetland vegetation would be disturbed during construction, but would revegetate following construction except where routinely maintained in an herbaceous state for operations. Forested vegetation disturbed within the construction right-of-way, but outside of the operational vegetative maintenance corridor (i.e., 10-foot-wide corridor centered on the pipeline and those trees within 15 feet where the roots could compromise the integrity of the pipeline coating) would be allowed to regenerate. However, forested vegetation withing the operational vegetative maintenance corridor would be restored as another wetland type (PSS and/or PEM wetlands). Vegetation impacts and mitigation measures are further discussed in section 4.6.4.

Sixteen of the 26 proposed HDD entry and exit sites would be in wetlands based on the limited availability of upland habitat in the Project area, but the footprint of these locations would be limited and impacts would be temporary. HDD entry and exit points within wetlands are summarized in table 4.5.2-1.

Table 4.5.2-1

HDD Entry and Exit Points Within Wetlands

HDD Section and #	Beginning		Ending	
	Milepost	Wetland Type	Milepost	Wetland Type
Spread 1				
Sabine Pass HDD	19.90	PFO	21.07	N/A
Canal HDD #1	26.70	PEM	27.08	PEM
Hwy 90 / Railroad HDD	32.08	N/A	32.42	PEM
Canal HDD #2	45.36	PEM	45.74	PEM
Wetland HDD	48.05	E2EM	48.98	E2EM
Intracoastal HDD	49.47	PEM	49.98	E2EM
Spread 2				
Mud Lake HDD	50.42	PFO	51.32	E2EM
Marshall Street HDD	84.35	E2EM	84.73	PSS
Terminal HDD	84.83	PSS	85.21	PEM

N/A – not applicable

Where surface water is proposed for use to support HDD construction, mobile equipment would be used to withdraw water from the waterbody; however, any clearing required for equipment passage would be limited to the hand-clearing of small diameter vegetation (see section 2.5.3.1). If an inadvertent release of HDD drilling fluid occurred within a wetland, the resulting sedimentation could affect water quality. CP Express would implement its HDD Monitoring and Contingency Plan, which includes methods for detecting and responding to inadvertent returns.

During operation and in compliance with its Project-specific Procedures, CP Express would limit routine vegetation maintenance to the mowing of a 10-foot-wide corridor centered on the pipeline in wetlands. Additionally, CP Express would selectively clear trees within 15 feet of the centerline in PFO and PSS wetlands that could damage the pipeline during operation. As the remainder of the permanent right-of-way would not be maintained, wetlands would be allowed to return to pre-Project vegetation conditions outside of the 10-foot-wide corridors as applicable. CP Express would minimize wetland impacts by implementing its Project-specific Procedures, which includes the following measures:

- minimizing vegetation clearing and soil disturbance;
- avoiding the use of unnecessary vehicular traffic and equipment use;
- installing and maintaining erosion and sedimentation control devices such as straw bales and silt fences;
- restricting the duration of construction to the extent practicable;
- using timber construction mats to create a temporary work surface in wet conditions except for the marsh push sections outside the push pad areas;
- using low-pressure ground equipment in wet conditions to minimize vegetation damage, soil compaction, and rutting; and
- segregating trench topsoil within 12 inches of the surface.

Given that 94 percent of wetland impacts associated with construction of the Project pipelines would be restored to approximate pre-construction conditions (the remaining 6 percent of wetland impacts would consist of permanent conversion of PFO and PSS wetlands) through implementation of the measures in CP2 LNG and CP Express' Project-specific Procedures, and HDD Monitoring and Contingency Plan, we conclude that impacts on wetlands from pipeline construction and operation would be largely short-term (until revegetation is established) and not significant.

Aboveground Facilities

Wetlands affected by aboveground facilities and associated appurtenances are summarized in table 4.5.1-2. These aboveground facilities would include the Moss Lake Compressor Station, MLV 4, and Pig Launcher/Receiver (MP 44.4); TETCO & Boardwalk Interconnect Meter Station (MP 18.1); Transco & CJ Express Interconnect Meter Station, Trap/MLV 1, and Pig Launcher (MP 0.0); Kinder Morgan Meter Station (MP 18.1); MLV 5 (MP 53.2); MLV 6 (MP 72.7); Enable Receiver, MLV 3, and Pig Launcher (Enable Gulf Run MP 0.0); Enable Interconnect Meter Station, Trap/MLV E2, and Pig Receiver (Enable Gulf Run MP 6.0). The Terminal Site Gas Gate Station (i.e., CPX Meter Station), Trap/MLV 7, and Pig Receiver is within the Terminal Site; therefore, wetland impacts associated with this aboveground facility is included in the discussion above. Construction of the Pipeline System aboveground facilities would permanently affect 0.5 acre of PEM wetlands, 32.2 acres of PSS wetlands, 5.7 acres of PFO wetlands, and 0.3 acre of E2EM wetlands, which would be converted to industrial/commercial land. No wetlands would be temporarily affected. While long-term and permanent effects on wetlands would occur, implementation of its Project-specific Procedures would reduce or mitigate short- and long-term wetland impacts. In addition, to further minimize the impacts of wetland loss, CP Express is evaluating the anticipated permanent conversion and loss impacts associated with the Project and would coordinate with the LDNR/OCM and COE to develop a CMP in accordance with the Mitigation Rule and CWA Section 404(b)(1) Guidelines to replace the loss of aquatic resource functions.

Contractor Yards

A total of 2.7 acres of wetlands would be temporarily affected by contractor yards used during construction of the Pipeline System. CP Express would use BMPs such as matting and all impacts would be temporary to short-term (revegetation would likely take between 1 to 3 years). Additionally, CP Express would install erosion and sediment controls in accordance with its Project-specific Procedures to prevent migration of sediment outside of the contractor yards and its SPCC Plan to minimize potential impacts and response time should a spill occur. Therefore, we conclude no permanent impacts on wetlands from the use of contractor yards would occur and these impacts would not be significant.

Access Roads

For construction of the Pipeline System, CP Express has proposed to use 34 access roads within wetlands, of which 6 are permanent access roads and 28 are temporary. Wetlands affected by access roads are summarized in table 4.5.1-2. Construction of the access roads would temporarily impact 5.0 acres of wetlands (PEM, PSS, PFO, and E2EM), of which 0.6 acre of wetlands would be permanently impacted (PEM and E2EM). CP Express would minimize disturbance where practicable, design roads to provide and allow for sufficient cross-drainage during use, and mat saturated wetlands crossed by access roads using equipment mats (with or without culverts) or clean rock fill and culverts in temporarily impacted wetlands. In addition, CP Express would minimize potential impacts on wetlands by installing and maintaining erosion and sediment controls such as silt fence, staked hay or straw bales, and sandbags as necessary, per its Project-specific Plan and Procedures. Because most of these impacts would be short-term, the limited wetland acreage disturbed by access roads, and implementation of the measures in CP Express Project-specific Procedures and SPCC Plan, we conclude there would not be significant impacts from the proposed access roads.

4.5.2.3 Alternative Measures to the FERC Procedures

Terminal Facilities

Sections VI.A.6 and VI.B.1.d of the FERC Procedures specify that aboveground facilities and access roads, respectively, should generally be outside of wetlands. Although CP2 LNG proposes to locate the Terminal Facilities (including LNG transfer lines and the Marine Facilities) and access roads in wetlands, we have determined that the proposed location is environmentally acceptable for the Terminal Site, and the most practical alternative that meets the Project's stated purpose for the Marine Facilities and LNG Transfer Lines (see section 3.3).

Pipeline System

The FERC Procedures specify that the construction right-of-way width in wetlands should be limited to 75 feet. CP Express has requested a 125-foot-wide construction right-of-way in unsaturated wetlands. Generally, the justifications provided by CP Express indicate that a wider work area is necessary to allow for safer work area due to the large diameter (48 inches) and weight (Class 900) of the pipeline. Additionally, CP Express has requested a construction right-of-way width of 150 feet in saturated wetlands, as shown in appendix D. In saturated wetlands, a wider construction area is needed due to the saturated, poorly cohesive, and easily sloughed substrate common in marsh wetlands. Most marsh wetland crossings would require the marsh push crossing method.

The FERC Procedures specify that extra workspace should not be within 50 feet of wetlands except where an alternative measure has been requested by CP Express and approved by the FERC (Section VI.B.1). Areas where CP Express has requested ATWS within wetlands (such as for spoil storage, extra depth in a push method construction, and at conventional bore and HDD construction locations) are identified in appendix H, table H-2. In response to our recommendation in the draft EIS, CP Express filed additional justification and site-specific compliance measures for ATWS within 50 feet of wetlands. We have reviewed CP Express' additional justifications for these locations and conclude that the proposed ATWS are justified and that use of these workspaces is acceptable.

The FERC Procedures state that the only access roads that can be used in wetlands are those existing roads that require no modifications or improvements and that would not impact the wetland (Section VI.B.1.d). CP Express has requested the use of 28 temporary access roads within wetlands. Of the 28 temporary access roads within wetlands, only 4 are existing roads with no proposed improvements. CP

Express has stated it would mat saturated wetlands crossed by access roads using equipment mats (with or without culverts) or install clean rock fill and culverts in the remaining access roads where improvements are proposed and implement measures outlined in its Project specific Plan and Procedures to minimize impacts. In addition, as summarized in table 4.5.1-2, PEM and E2EM wetlands would be permanently affected by permanent access road construction. Given the hydrology of the region, we conclude this modification is adequately justified, associated impacts have been minimized to the extent practicable, and these impacts would not be significant. In addition, CP Express may mitigate all permanent impacts on wetlands through purchase of mitigation bank credits through coordination with the COE and LDNR OCM, as further discussed below in section 4.5.2.4.

4.5.2.4 Compensatory Mitigation

The COE requires that unavoidable wetland impacts be offset by the creation, restoration, enhancement, or preservation of an appropriate amount of wetlands, which is referred to as compensatory mitigation. Where wetlands take years to develop, such as PFO wetlands, the COE may consider temporal loss in determining the amount of wetland credits required in the compensatory mitigation plan. In order to offset the wetland impacts that would occur as a result of the Project, CP2 LNG and CP Express have provided a draft CMP Plan and BUDM Plan to the COE and LDNR/OCM, which involves placement of dredged material in the East Cove Unit of the Cameron Prairie NWR to aid in creation/restoration of approximately 178 acres of brackish marsh. As currently proposed, CP2 LNG propose to purchase 269.0 fresh marsh credit acres, 149.4 coastal prairie credit acres, and 2.3 credit acres of LDNR-approved bottomland hardwoods to offset the loss and permanent conversion of wetlands for construction and operation of the Terminal Facilities. Additionally, CP Express anticipates purchasing 39.6 coastal prairie credit acres to compensate for permanent PSS wetland impacts, 0.4 credit acre of coastal prairie to compensate for PEM wetland impacts, and 0.1 acre of bottomland hardwood credits to compensate for PSS wetland impacts for construction and operation of the Pipeline System. The COE and LDNR OCM would approve the final plans during permit application review and processing, the completion of which is pending (see section 1.5).

With adherence to measures contained in the Project-specific Procedures, COE and LDNR OCM permits, and our recommendations, impacts on wetlands would be reduced, but permanent, with the majority of adverse impacts occurring at the Terminal Site. We anticipate that, if the COE issues a Section 404/Section 10 permit for the Project, it would be conditioned upon Project-related adverse impacts on waters of the United States being effectively offset by wetland mitigation. As such, we conclude that the impacts on wetlands would be adequately minimized and sufficiently mitigated for, in accordance with the requirements of the federal and state agencies, including the COE.

4.5.3 Conclusion

Construction and operation of the Project would result in short-term, temporary, and permanent impacts on wetlands and would require CP2 LNG and CP Express to implement alternative measures to the FERC's Procedures. However, the total impacted wetland area for the Project represents about 1.3 percent of the approximately 108,500 acres of wetlands contained within the HUC 12 watersheds crossed by the Project. Through implementation of the measures in CP2 LNG and CP Express' Project-specific Procedures and compliance with the CWA (e.g., proposed mitigation bank credits, under jurisdiction of the COE), we conclude that the impacts on wetlands would be adequately minimized and sufficiently mitigated for, in accordance with the requirements of the federal and state agencies.

4.6 VEGETATION

4.6.1 Existing Vegetation Resources

The Project is within two Level III Ecoregions: the South Central Plains, which spans eastern Texas and western Louisiana, and the Western Gulf Coastal Plain in Louisiana. Within each of these Level III Ecoregions, the Project crosses two Level IV Ecoregions: (1) Flatwoods and (2) Floodplains and Low Terraces in the South Central Plains Ecoregion; and (1) Northern Humid Gulf Coastal Prairies and (2) Texas-Louisiana Coastal Marshes in the Western Gulf Coastal Plain Ecoregion. Table 4.6.1-1 identifies the Level III and IV Ecoregions that would be crossed by the Project, including the associated natural vegetation, land cover, and land use. Each of the vegetation communities can generally be classified as one of five broad cover types, including hay/pasture, cultivated crops; herbaceous; wetland; scrub/shrub; and forest. The Project would also cross industrial/developed and barren land; however, as these land use types are generally unvegetated, they are discussed in section 4.9. In addition, the Project would also cross open water, which is discussed in sections 4.4 and 4.9, as applicable.

Table 4.6.1-1

Characteristics of Ecoregions Crossed by the Project

Level III and IV Ecoregion ***County/Parish***	**Milepost Range**	**Natural Vegetation**	**Land Cover and Land Use**
South Central Plains			
Flatwoods *Jasper and Newton Counties; Calcasieu Parish*	0.0-18.5 20.9-28.0	Primarily longleaf pine savannas with bluestem grasses and other herbaceous species in understory and occasional flatwood ponds with three-awn grass, spikerushes, and beakrushes. Some mixed pine-hardwood forests. Acidic drainages with sweetbay magnolia, blackgum, and laurel oak.	Forestland, pine plantations, forested wetlands, some pasture and hayland
Floodplains and Low Terraces *Newton County; Calcasieu Parish*	18.5–20.9	Bottomland hardwoods including elms, oaks (water, willow, swamp chestnut), sweetgum, blackgum, and red maple. Wetter areas contain bald cypress and water tupelo.	Forested wetlands and deciduous forest, with small areas of pasture and hayland.
Western Gulf Coastal Plain			
Northern Humid Gulf Coastal Prairies *Cameron and Calcasieu Parishes*	28.0-48.3 57.3-58.5	Prairie grassland with little bluestem, big bluestem, Indiangrass, brownseed paspalum, switchgrass, and other herbaceous species. Riparian forests or gallery forests of bottomland hardwoods.	Cropland with mostly rice, soybeans, and hay; some crawfish aquaculture, pasture, and urban land. Oil and natural gas production.
Texas-Louisiana Coastal Marshes *Cameron and Calcasieu Parishes*	48.3–57.3 58.5–85.4 Terminal and Marine Facilities	Saltmarsh with smooth cordgrass and wiregrass; intertidal salt and mud flats; fresh marsh of maidencane and sawgrass; cheniers with live oak and hackberry.	Marshland, wildlife and waterfowl habitat, oil and natural gas production.

Source: EPA, 2006

4.6.1.1 Terminal Facilities

The Terminal Facilities are situated on a 823.8-acre tract of non-contiguous land, though only 681.6 acres would be permanently impacted by the facilities. The site is generally low-lying (elevations of less than 10 feet) and is relatively flat. The Terminal Site is dominated by open water and marshland east of Calcasieu Pass, Davis Road, and Venture Global Calcasieu Pass, LLC's LNG Terminal, which is under construction. Vegetated land within the construction and operational footprint of the proposed Terminal Facilities includes four different vegetative land cover types: hay/pasture, cultivated crops (28 percent), herbaceous upland (15 percent), wetland (54 percent), and shrub/scrub (3 percent). Acreages for vegetation communities affected by the Terminal Facilities were estimated using field survey data, NWI data, and land use and land cover data (FWS, 2022a; USGS, 2021c). Table 4.6.2-1 identifies the vegetated land cover types at the proposed Terminal Facilities. Dominant vegetation land cover of the Terminal Facilities is wetlands, specifically PEM, PSS, PFO, and E2EM. Palustrine (freshwater) and estuarine wetlands provide important ecological functions including water purification, shoreline stabilization, and flood protection. Typical species of these wetland communities are described in section 4.5.1.

4.6.1.2 Pipeline System

The Pipeline System would also cross through a variety of vegetation communities, as listed in table 4.6.2-1. However, the majority of the natural communities along the CP Express and Enable Gulf Run Lateral route are wetland and previously disturbed areas such as agricultural and industrial land. Table 4.6.2-1 identifies the vegetated land cover types along the proposed CP Express and Enable Gulf Run Lateral route.

As discussed in section 2.2.2.1, portions of the CP Express and Enable Gulf Run Lateral right-of-way would be collocated with existing pipelines, powerlines, roadways, and canals to minimize fragmentation of vegetation communities. Vegetation impacted during construction and operation of the Pipeline System would include five different vegetative land cover types: hay/pasture, cultivated crops (19 percent), herbaceous (1 percent), wetland (66 percent), shrub/scrub (2 percent), and forest (12 percent). Acreages for vegetation communities affected by the Pipeline System were estimated using CP Express' field survey data from 2021. Where field-collected data are not available, due to lack of survey permission, the acreages for these land use categories are based on USGS Land Use Land Cover and FWS NWI data.

4.6.2 Vegetation Impacts and Mitigation

As summarized in table 4.6.2-1, a total of 2,308.1 acres of vegetation would be within the construction footprint of the Terminal Facilities and Pipeline System. Following construction, approximately 1,113.2 acres would be restored to pre-construction conditions. A total of 1,194.9 acres would be within the operational footprint of the Project, of which 701.5 acres would be permanently converted to developed land and 493.4 acres would generally be maintained as herbaceous or scrub-shrub vegetation.

Construction impacts on vegetation resources are classified based on the duration and significance of impacts. Short-term impacts are those which require up to three years to return to pre-construction conditions once construction has been completed. Long-term impacts require more than three years to revegetate, but conditions would return to pre-construction state during the life of the Project. Permanent impacts are those that modify vegetation resources to the extent that they would not return to pre-construction conditions during the life of the Project.

Table 4.6.2-1 Vegetation Land Cover Affected by the CP2 LNG and CP Express Project												
	Hay/Pasture/ Cultivated Crops		**Herbaceous**		**Wetlands**		**Shrub/Scrub**		**Forest**		**Total**	
Facilities	**Con[a]**	**Op[b]**	**Con[a]**	**Op[b]**	**Con[a]**	**Op[b]**	**Con[a]**	**Op[b]**	**Con[a]**	**Op[b]**	**Con[a]**	**Op[b]**
TERMINAL FACILITIES												
Terminal Site and Yards	205.1	177.6	52.9	40.6	329.0	304.1	21.4	15.6	0.0	0.0	608.4	537.9
Marine Facilities	0.0	0.0	54.8	54.8	41.0	41.0	2.5	2.5	0.0	0.0	98.3	98.3
LNG transfer lines and utilities	0.0	0.0	1.3	1.3	24.2	10.0	0.0	0.0	0.0	0.0	25.5	11.3
Terminal Facilities Total	***205.1***	***177.6***	***109.0***	***96.7***	***394.2***	***355.1***	***23.9***	***18.1***	***0.0***	***0.0***	***732.3***	***647.5***
PIPELINE SYSTEM **CP Express Pipeline [c]**												
Pipeline Rights-of-Way	204.8	69.7	17.4	3.3	861.6	326.2	24.7	10.9	143.6	49.3	1,252.1	459.4
Additional Temporary Workspace	23.9	0.0	1.2	0.0	95.0	0.0	2.9	0.0	13.3	0.0	136.3	0.0
Contractor Yards	41.9	0.0	0.0	0.0	2.7	0.0	0.0	0.0	0.0	0.0	44.6	0.0
Aboveground Facility Subtotal	*6.0*	*6.0*	*0.1*	*0.1*	*38.6*	*38.6*	*0.4*	*0.4*	*0.5*	*0.5*	45.5	45.5
Access Roads	12.8	2.7	1.9	<0.1	4.5	0.4	1.4	<0.1	6.3	0.7	26.9	3.8
CP Express Pipeline Total	***289.4***	***78.4***	***20.6***	***3.4***	***1,002.4***	***365.2***	***29.4***	***11.3***	***163.7***	***50.5***	***1,505.4***	***508.8***
Enable Gulf Run Lateral												
Pipeline Rights-of-Way	1.1	0.7	0.4	0.2	34.7	25.4	3.7	1.7	12.0	6.0	51.9	34.0
Additional Temporary Workspace	0.3	0.0	<0.1	0.0	5.8	0.0	0.3	0.0	3.3	0.0	9.7	0.0
Aboveground Facility Subtotal	0.0	0.0	0.1	0.1	2.2	2.2	0.0	0.0	1.2	1.2	3.5	3.5
Access Roads	1.9	0.0	0.4	0.4	0.4	0.2	<0.1	0.0	2.6	0.4	5.3	1.0
Enable Gulf Run Lateral Total	***3.3***	***0.7***	***0.9***	***0.7***	***43.1***	***27.8***	***4.0***	***1.7***	***19.1***	***7.7***	***70.4***	***38.6***
Pipeline System Total	***292.7***	***79.1***	***21.5***	***4.1***	***1,045.5***	***393.0***	***33.3***	***12.9***	***182.8***	***58.2***	***1,575.8***	***547.4***
PROJECT TOTAL	**497.8**	**256.7**	**130.5**	**100.8**	**1,439.7**	**748.1**	**57.2**	**31.0**	**182.8**	**58.2**	**2,308.1**	**1,194.9**

Source: USGS, 2023c

[a] Con = Construction Impacts. Includes both temporary construction impacts and permanent operational impacts.

[b] Op = Operational Impacts. Includes permanent operational impacts.

[c] The CP Express Pipeline crosses a portion of the Terminal Site permanent workspace from MP 85.0 to MP 85.4. Therefore, any associated land requirements are accounted for in the Terminal Site operational footprint at this location.

Note: Totals may not match the sum of addends due to rounding.

4.6.2.1 Terminal Facilities

As summarized in table 4.6.2-1, a total of 732.2 acres of land would be cleared during construction at the Terminal Facilities, including 647.5 acres of vegetated land that would be permanently converted to industrial use associated with the operation of the Terminal Facilities.

Construction of the Marine Facilities would require dredging and excavation of areas on Monkey Island and its shoreline. Upland, wetland, or aquatic vegetation would be impacted by dredging at the Terminal Site and LNG transfer lines and utilities. Impacts from dredging are further discussed in sections 4.4 and 4.7.

Vegetation adjacent to the Terminal Facilities could be impacted by sedimentation from construction activities or could become contaminated due to spills and leaks of hazardous materials during construction and operation. CP2 LNG would minimize construction-related impacts on the adjacent vegetated land by implementing its Project-specific Plan and Procedures. CP2 LNG would implement its SPCC Plan during construction, which would include discharge prevention measures, containment measures, and cleanup methods to reduce potential impacts and response times should a spill occur. The SPCC Plan would also address storage and transportation of hazardous materials.

Impacts on hay/pasture/cultivated crops, herbaceous, and scrub shrub vegetation within the footprint of the Terminal Facilities would be permanent, resulting in a loss of vegetation cover at that location. However, given the extent of habitat adjacent to the proposed location, including protected land to the east and west of the Terminal Facilities, as referenced in section 4.9.4, we have determined that impacts on upland vegetation, though permanent, would be minor. As disccussed in section 4.5, the conversion of 355.0 acres of wetlands (approximately 46.9 acres of scrub-shrub/forested wetlands and 308.1 acres of emergent wetlands), within the footprint of the Terminal Facilities would be considered a moderate impact; however, if the COE issues a Section 404 permit for the Project (which would be required to construct the Terminal Facilities), it would be conditional upon effective wetland mitigation, such that impacts on wetlands would be reduced to less than significant levels.

4.6.2.2 Pipeline System

Pipeline System and Additional Temporary Workspace

CP Express would construct the CP Express Pipeline within a 125- to 150-foot-wide construction right-of-way and Enable Gulf Run Lateral within a 75- to 90-foot-wide construction right-of-way. Impacts on vegetation due to the construction of the Pipeline System, including ATWS, are summarized in table 4.6.2-1. Following construction, CP Express would restore vegetated land within the permanent easement to pre-construction conditions, but would be subject to routine maintenance. Forested land within maintained portions of the permanent right-of-way would be permanently converted to herbaceous or early successional-stage scrub-shrub land. Specific mitigation for impacts on wetlands is discussed in section 4.5.2.4.

General Impacts of the Pipeline System

The primary impacts on vegetation from construction of the pipelines would be the cutting, clearing, and/or removal of existing vegetation within the construction workspace to facilitate pipeline installation and to allow for safe operation of equipment. The duration and magnitude of impacts would depend on the type and amount of vegetation affected, the rate at which vegetation regenerates after construction, and the frequency of vegetation maintenance conducted on the permanent easement during pipeline operation. In addition, revegetation would depend on factors such as the local climate, soil types, and land use, as described in section 4.3.1.

Impacts on agricultural land would be short-term, as these areas are disturbed annually to produce crops and would typically return to their previous condition shortly following construction, cleanup, and restoration. CP Express would conduct topsoil segregation throughout agricultural land in order to minimize topsoil loss and mitigate impacts on subsequent crop production. Upland herbaceous land and emergent wetlands would typically revegetate within one to three years, depending on a number of factors.

Cleared scrub-shrub lands (upland or wetland) would likely require three to five years to regain their woody composition. Where trees are present in forested lands, but not in the permanently maintained right-of-way, impacts would be long term, as reestablishment of trees may require 10 to 30 years or more, depending on the species. Trees in upland areas would not be allowed to reestablish within the 25-foot-wide permanent right-of-way, which would result in a permanent conversion of habitat in forested areas to herbaceous or shrub habitat.

Impacts associated with disturbances to vegetation could include increased soil compaction and erosion, increased potential for the introduction and establishment of noxious and invasive species (see section 4.6.3), and a local reduction in available wildlife habitat (see section 4.7.1). To minimize impacts on vegetation, CP Express has collocated 45 percent of the Pipeline System with existing disturbance. In addition, CP Express would implement its Project-specific Plan and Procedures, which require the use of temporary and permanent erosion control measures, topsoil segregation in select areas, and testing and mitigation for soil compaction. Following the construction of the pipelines, temporarily disturbed areas along the Pipeline System route would be returned to their preconstruction contours to the extent practicable. Disturbed areas would be seeded with a temporary mix in accordance with CP Express' Revegetation Plan, and specific measures developed in coordination with landowners, land-management authorities, and permitting agencies. We received a comment from the FWS recommending revegetation of disturbed areas with native plant species, including pollinators endemic to the area. CP Express consulted with the local offices of the NRCS to determine the most appropriate seed mixes for use and has currently proposed the use of predominantly native grasses and some pollinator-friendly species such as purple prairie clover (*Trifolium purpurea*), coreopsis (*Coreopsis* spp.), and black-eyed susan (*Rudbeckia hirta*).

Disturbed areas would be routinely monitored until restoration and revegetation are determined to be successful in accordance with the Project-specific Plan and Procedures. During operation, CP Express would retain a 50-foot-wide permanent easement for pipeline operations. A 25-foot-wide corridor would be maintained in an herbaceous state in uplands. Within wetlands, CP Express would permanently maintain only a 10-foot-wide corridor. Additionally, CP Express would selectively remove trees within 15 feet of the pipeline. These maintenance activities would permanently convert scrub-shrub/forested areas (including wetlands) to an emergent or scrub-shrub state.

Forest fragmentation occurs when contiguous forested areas are disturbed. Removal of trees in a contiguous forest creates gaps and leads to smaller isolated forest patches, reduction of interior forest, and an increase in edge habitat. Approximately 41.6 miles of the CP Express Pipeline and Enable Gulf Run Lateral are adjacent to existing utility rights-of-way where fragmentation has already occurred. Incremental fragmentation of upland forest habitat could occur due to the expansion of the existing rights-of-way, i.e., the existing forest patches would be further reduced in size. Where the pipelines are not adjacent to existing utilities in forested areas, the Project would create new disturbance and fragmentation within forested areas unless the area would be crossed using HDD. Forest fragmentation is further discussed in section 4.7.1.2. After construction, forested vegetation disturbed within the construction right-of-way and ATWS, but outside of the operational vegetative maintenance corridor (i.e., 10-foot-wide corridor centered on the pipeline and those trees within 15 feet where the roots could compromise the integrity of the pipeline coating) would be allowed to regenerate; however, the impact in these areas would be long term. Cleared scrub-shrub vegetation communities would likely require 3 to 5 years to regain their woody composition.

With the implementation of the mitigation measures described above, we conclude that construction and operation of the Pipeline System would not have a significant impact on vegetation communities.

Aboveground Facilities

The Pipeline System aboveground facilities would require the Moss Lake Compressor Station, seven metering sites (six at interconnects with existing pipelines and one at the terminus of the CP Express Pipeline within the Terminal Site), and associated appurtenances. Impacts from the Terminal Site Gas Gate Station (i.e., CPX Meter Station), Trap/MLV 7, and Pig Receiver at the Terminus of the CP Express Pipeline are discussed above in section 4.6.2.1, as it would be within the boundaries of the Terminal Site. Impacts on vegetation from the Pipeline System aboveground facilities are summarized in table 4.6.2-1. Following construction, CP Express would revegetate the land within construction workspaces, but outside of the aboveground facility footprints, in accordance with the Project-specific Plan and Procedures, NRCS seeding recommendations, other agency requirements and permit conditions, and landowner requests. Specific mitigation for impacts on wetlands is discussed in section 4.5. Each aboveground facility would be fenced to ensure safety and security of the site. As discussed in section 4.9, the fenced area of the compressor and interconnect meter station sites would be maintained as gravel, paved areas, or in an herbaceous state, while the area outside of the fence lines would not. With the implementation of the mitigation measures described above and relative amount of adjacent vegetation, we conclude that construction and operation of the Pipeline System aboveground facilities would not have a significant impact on vegetation communities.

Contractor Yards and Staging Areas

CP Express has proposed to use a total of four contractor yards during construction of the Pipeline System, resulting in vegetative impacts on 41.9 acres of agricultural areas and 2.7 acres of wetland vegetation. The contractor yards would be used for construction of the entire Pipeline System and would be restored after construction is completed, unless otherwise requested by the landowner. Therefore, impacts on vegetation at these areas would mostly be short-term and minor.

Access Roads

CP Express has proposed the use of 55 access roads, most of which are existing roads that would not require improvements; however, 12 existing roads would be expanded, and 12 access roads would be newly constructed. Impacts on vegetation from the access roads are summarized in table 4.6.2-1. Construction impacts on vegetation would be comparable to those described for the proposed pipelines, including the potential for soil compaction and erosion, and establishment of invasive species. Of the 56 access roads proposed for use during construction, 11 would be retained permanently for use during operation. With the implementation of the mitigation measures described above and the relatively small amount of permanent impacts, we conclude that Project access roads would have temporary and permanent, but minor, impacts on vegetation communities.

4.6.3 Noxious Weeds and Other Invasive Plants

Exotic plant communities, invasive species, and noxious weeds can out-compete and displace native plant species, thereby negatively altering the appearance, composition, and habitat value of affected areas. In accordance with the Plant Protection Act of 2000 (7 USC 7701), the Texas Department of

Agriculture (2021) established a list of noxious weeds for Texas, and TPWD established a list of prohibited exotic plant species (Title 4 Texas Administrative Code [TAC] Sec 19.300; TPWD Code 66.0072). The Louisiana Department of Agriculture and Forestry has jurisdiction over plant diseases and pests, and uses information from Tulane University's Xavier Center for Bioenvironmental Research to identify Noxious Weeds of Louisiana (Center for Bioenvironmental Research, 2021).

CP2 LNG and CP Express conducted surveys of the Terminal Facilities and accessible portions of the Pipeline System between April and August 2021, with the intent of identifying individuals or infestations of species listed by 4 TAC Part 19.300(a) and Center for Bioenvironmental Research Noxious Weeds. Noxious and/or invasive plant species found at various locations along the Pipeline System include, but are not limited to, Chinese tallow (*Triadica sebifera*), Japanese honeysuckle, (*Lonicera japonica*), Bahiagrass (*Paspalum notatum*), Bermuda grass (*Cynodon dactylon*), and smut grass (*Sporobolus indicus*). The Chinese tallow tree, which is a state designated noxious weed of Louisiana was documented at various locations within the footprints of the Terminal Site and Marine Facilities. However, as areas within the Terminal Facilities fence lines would be permanently converted to industrial use with minimal vegetated areas, noxious or invasive plants would be unlikely to re-establish within the Terminal Facilities. CP2 LNG and CP Express would implement the Project-specific Plan and Procedures during construction and post-construction, which would include monitoring to ensure that ground-disturbance and restoration activities minimize the spread of invasive species.

CP Express' removal of existing vegetation and disturbance of soils during construction of the pipeline facilities could create conditions conducive to the establishment of invasive weeds, particularly where new corridors are established. To minimize the potential spread of invasive species, CP Express has developed a Project-specific Traffic, Noxious Weed, and Fugitive Dust Control Plan to minimize the potential for noxious and invasive weeds to become established within construction workspaces, which includes the following measures:

- promptly seed and revegetate disturbed areas with certified weed-free seed upon completion of construction;
- ensure all equipment and vehicles arrive at the worksite clean and free of dirt and seed propogules;
- minimize soil disturbance, where possible, and;
- use certified weed-free mulch/straw for erosion control.

Additionally, construction vehicles and equipment would be cleaned before arriving on site to prevent the introduction of weeds and invasive plants to the Project area. Cleaning would consist of scraping visible soils and vegetative debris from the vehicle or equipment. Vehicles or equipment not in compliance with the cleaning requirement would not be allowed in the Project area until cleaned. Pre-treatment of invasive plant infestations would be conducted prior to clearing and grading to aid in minimizing the spread of weeds and invasive plants during construction. The measures implemented could include herbicide treatment or mechanical measures (e.g., removal by hand or equipment, mowing to prevent seed maturity) to control weed or invasive plant species. Weeds and invasive plants would be monitored as part of the Project's restoration monitoring activities for the first and second growing seasons following construction, at a minimum, and in accordance with permit requirements. Pre-treatment of invasive plant infestations may be conducted prior to clearing and grading if it would aid in minimizing the spread of weeds and invasive plants during construction. The measures implemented could include herbicide treatment or mechanical measures (e.g., removal by hand or equipment, mowing to prevent seed maturity) to control weed or invasive plant species. Based on the measures discussed above, we conclude CP Express' mitigation for noxious and invasive species is sufficient.

4.6.4 Vegetation Communities of Special Concern

Vegetation communities of special concern may include ecologically important natural communities or other rare or imperiled plants sensitive to disturbance or in need of special protection. Federal or state listed plants with the potential to occur in the vicinity of the Project are discussed in section 4.8. Three vegetation communities of special concern, all within Louisiana, have been identified within about 1 mile of the Project. These communities are the brackish marsh, Coastal Prairie, and Coastal Live Oak-Hackberry Forest.

The brackish marsh community type is an imperiled community that is vulnerable in Louisiana (LDWF, 2021h) due mainly to shoreline erosion and subsidence; commercial and industrial development; hydrological alterations; fire suppression; and invasive exotic species (LDFW 2021h). The Pipeline System would cross areas identified by LDWF natural heritage data as brackish marsh communities between MP 51.2 and MP 51.4, MP 51.8 and MP 52.0, and MP 52.6 and MP 53.1. The 2021 Project wetland surveys verified discontinuous brackish marsh between MP 51.7 and MP 53.6, totaling about 0.9 mile of brackish marsh. Project disturbance in this segment would include pipeline construction, potentially with the marsh push method or other open cut procedure. Impacts would be short-term, and the brackish marsh would be expected to quickly reestablish following construction (within 1 to 3 years for the vegetation to reestablish). However, the Brackish marsh community may be impacted by turbidity and sedimentation from stormwater runoff and spills or leaks. Additionally, the Brackish marsh community could be contaminated due to spills and leaks of hazardous materials during construction and operation. CP2 LNG and CP Express would minimize construction related impacts on the adjacent wetlands by implementing its Project-specific Procedures, which include wetland crossing procedures, temporary sediment control procedures, and trench dewatering procedures. CP2 LNG and CP Express would also implement measures contained in its SPCC Plan during construction, which includes discharge prevention measures, containment measures, and cleanup methods to reduce potential impacts should a spill occur. If not properly reseeded, ground disturbance as a result of open cut or marsh push method may result in establishment of exotic species or noxious weeds. However, CP Express would adhere to the revegetation measures discussed in section 4.6.3, including the use of its Traffic, Noxious Weed, and Fugitive Dust Control Plan and Project-specific Plan and Procedures. Therefore, we conclude that Project impacts on brackish marsh would be adequately mitigated to not be significant.

The Coastal Prairie is an extension of the tall-grass prairie of the eastern Great Plains and is characterized by a diverse flora of tall grasses and forbs (LDWF, 2021i). This community type is considered critically imperiled in Louisiana, and less than 1 percent of its historical acreage remains (LDWF, 2021i). Threats to this community type include fire suppression; invasive exotic species; agricultural, industrial, and residential development; construction of roads, pipelines, or utilities; saltwater intrusion and subsidence; and over grazing (LDWF, 2021i). Based on the information provided by the LDWF Wildlife Diversity Program (WDP), the Pipeline would not cross the documented Coastal Prairie community, with the closest occurrence about 1.1 mile east of MP 53.7. The presence of Coastal Prairie was not identified during field surveys for the Terminal Facilities; therefore, the Coastal Prairie would not be affected by the proposed Project.

The Coastal Live Oak-Hackberry Forest natural community type is considered critically imperiled in Louisiana (LDWF, 2021j). Coastal Live Oak-Hackberry Forest, also known as chenier forest or maritime forest, forms an important storm barrier, limiting salt water intrusion into marshes, and provides habitat for other species (Lester et al., 2005). Live oak (*Quercus virginiana*) and hackberry (*Celtis laevigata*) are the dominant canopy species. Other characteristic species are honeylocust (*Gleditsia triacanthos*), swamp red maple (*Acer rubrum* var. *drummondii*), toothache tree (*Zanthoxylum clava-herculis*), water oak (*Quercus nigra*), green ash (*Fraxinus pennsylvanica*), and American elm (*Ulmus americana*).

We received a comment from the LDWF, both during scoping and in response to the draft EIS, regarding potential impacts on the Coastal Live Oak-Hackberry Forest. The Coastal Live Oak-Hackberry Forest is in the southernmost lobe of the proposed Terminal Site. Based on a review of aerial imagery and field data collected for the Calcasieu Pass LNG Project (which abuts the CP2 LNG Terminal Site), most of the polygon identified by the LDWF no longer exists. Field surveys conducted on February 28, 2015 for the Calcasieu Pass LNG Project indicated that the forest was heavily cleared to support cattle grazing, and that the habitat type east of the Calcasieu Pass LNG terminal site was converted to pasture for cattle. CP2 LNG conducted field surveys in 2021 to determine the current status of the Coastal Live Oak-Hackberry Forest natural community potentially within the proposed Terminal Site. The presence of Coastal Live Oak-Hackberry Forest was not identified within the Terminal Facilities workspace during the field surveys, and site conditions were consistent with those observed during the 2015 survey described above. Therefore, the Coastal Live Oak-Hackberry Forest community type would not be affected by the proposed Project.

4.6.5 Conclusion

A total of approximately 2,308.1 acres of vegetation would be impacted by construction of the Project, of which 1,194.9 acres would be permanent. CP2 LNG would implement its Project-specific Plan and Procedures and SPCC Plan during construction to minimize impacts on adjacent vetetation communities. Additionally, CP2 LNG would be required to impelement effective mitigation for impacts on wetlands and associated vegetation. In general, CP Express would minimize disturbance impacts on vegetation resources by collocating 45 percent of the Pipeline System with existing disturbance. CP Express would further minimize the duration of impacts on upland vegetation by implementing the measures outlined in its Project-specific Plan, including topsoil segregation and replacement, mitigation of compacted soils, and use of erosion controls. After construction, temporarily disturbed areas along the Pipeline System route would be returned to their preconstruction contours to the extent practicable and the temporary right-of-way would be revegetated according to CP Express' Revegetation Plan. We conclude that collocation of the pipelines with existing maintained rights-of-way and implementation of the measures outlined in CP Express' Project-specific Plan and Procedures and Noxious Weed and Invasive Species Management Plan would adequately minimize impacts on upland vegetation resources and impacts would not be significant.

4.7 WILDLIFE AND AQUATIC RESOURCES

4.7.1 Wildlife Resources

Wildlife species occurring in the vicinity of the Project site are characteristic of the habitats provided by the plant communities that occur in the area. Section 4.6.1 provides detailed information on the vegetation communities present in the vicinity of the Project. Habitat types were identified based on aerial photography, NWI maps, and field surveys. Aquatic resources and federally or state listed wildlife species are discussed in sections 4.7.2 and 4.8, respectively. We received numerous comments during scoping periods and in response to the draft EIS from stakeholders and agencies, including the Natural Resources Defense Council, Healthy Gulf, Louisiana Bucket Brigade, Port Arthur Community Action Network, Sierra Club, Texas Campaign for the Environment, The Vessel Project of Louisiana, Turtle Island Restoration Network, RESTORE, For a Better Bayou, et. al., NOAA, TPWD, LDWF, FWS, as well as numerous individuals, concerned with impacts on wildlife, including endangered and protected species.

4.7.1.1 Existing Wildlife Habitats

Wildlife habitat is more generally defined than the detailed vegetation communities presented in section 4.6.1 by cover type and is based on desktop analysis and field surveys conducted by CP2 LNG and

CP Express. The wildlife habitat types present in the vicinity of the Project include wetlands, agricultural land (i.e., cultivated crops and pasture/hay), barren lands, herbaceous areas, open water, forests, developed lands, and scrub shrub. With the exception of barren lands and developed lands, each of these cover types provide nesting, cover, and foraging habitat for a variety of wildlife species. Impacts on aquatic resources are described in section 4.7.2.

Wetland

Wetland habitat in the Project area includes emergent and scrub-shrub estuarine wetlands and emergent, scrub-shrub, and forested palustrine (freshwater) wetlands, as well as sparsely vegetated mudflats (see section 4.5.1). Wetlands typically support a diverse ecosystem that provide nutrients, cover, shelter, and water for a variety of terrestrial and aquatic wildlife species including waterfowl, wading birds, raptors, mammals, reptiles, and amphibians. Typical wildlife associated with wetlands include mottled duck (*Anas fulvigula*), blue heron (*Ardea herodias*), river otter *(Lontra canadensis*), muskrat (*Ondatra zibethicus*), nutria (*Myocastor coypus*), beaver (*Castoridae* spp.), and the American alligator (*Alligator mississippiensis*).

PFO wetlands are dominated by woody vegetation and provide a diverse assemblage of vegetation and an abundance of food and water sources for wildlife. Mammals such as mink (*Neogale vison*), nutria, river otter, muskrat, raccoon (*Procyonidae* spp.), and white-tailed deer (*Odocoileus virginianus*) use these areas as foraging habitat. Many waterfowl and wading birds use forested wetlands adjacent to scrub-shrub and emergent wetlands for nesting and foraging. PEM wetlands provide important habitat for waterfowl, muskrats, herons, and frogs. PSS wetlands provide cover for invertebrates, reptiles, and amphibians. Scrub-shrub cover provides habitat for small mammal species such as mice and rabbits, which also makes it prime hunting grounds for predator species. E2EM tidal wetlands are dominated by erect, rooted herbaceous hydrophytes (excluding mosses and lichens) and wetlands that occur in tidal areas, in which salinity due to ocean-derived salts is equal to or greater than 0.5 percent and that are present for most of the growing season in most years. Perennial plants usually dominate these wetlands. Estuarine scrub-shrub (E2SS) wetlands are dominated by woody plants less than 20 feet tall in which salinity due to marine salts is equal to or greater than 0.5 percent. Wading birds such as herons, egrets, ibises are found within the estuarine emergent marshes along with fish, shrimp, crabs, American alligator, snakes, turtles, muskrats, nutria, raccoons, and river otters.

Open Upland

This cover type category covers all non-forested upland vegetation, including pasture/hay/cultivated crops, barren lands, and herbaceous areas. Cultivated crops are defined as wildlife habitat consisting of planted or intensively managed crops for the production of food, feed, or fiber and herbaceous vegetation. Pasture/hay are areas of grasses, legumes, or grass-legume mixtures planted for livestock grazing or the production of crops and are considered part of a category characterized as planted/cultivated. Barren lands are characterized by bare rock, gravel, sand, silt, clay, or other earthen material with little to no green vegetation. Although row crops generally provide poor to moderate cover habitat, they often provide forage for several species. Pastures also provide grazing habitat for species such as white-tailed deer. Hayfields, small grains, fallow and old fields, pastures, and idled croplands provide nesting habitats for grassland-nesting birds (USDA, 1999). On landscapes where intensive row crop agriculture is the dominant land use, these strip habitats are important for grassland birds and other wildlife. Irrigation ditches, ponds, and shallow open water areas may provide habitat for shorebirds, wading birds, and waterfowl. Dense grass, shrubs, and small trees provide nesting habitat and seed production for a variety of songbirds such as warblers and sparrows. Predatory birds such as red-tailed hawk, broad-winged hawk, and owls utilize upland meadows for hunting songbirds and small mammals (e.g., cottontail rabbits, voles, shrews). Open fields and shrub cover provide habitat for small mammal species such as mice, rabbits, and voles, which make them prime hunting grounds for predator species, such as owls.

Forests

Forests include areas dominated by deciduous, evergreen, or mixed tree species. The upland forests in the area of the Project provide moderate to high-quality habitat for a variety of mammals, birds, amphibians, reptiles, and invertebrates. As a forest matures, cavity trees become more abundant; overstory trees produce more nuts, acorns, and fruit; and dead wood and leaf litter collect on the ground. Woodpeckers (*Picidae* spp.), squirrels, and other small animals nest in cavity trees, and gray squirrels (*Sciurus carolinensis*) and wild turkey (*Meleagris gallopavo*) eat the acorns and hickory nuts produced by mature trees. Species as large as black bear (*Ursus americanus*) and as small as the shrew (*Soricidae* spp.) forage for insects in dead wood on the ground, and amphibians such as frogs and salamanders thrive in the moist environment created by the closed canopy overhead and the deep leaf litter underfoot.

Open Water

The open water cover type includes the creeks, streams, and rivers crossed by the Project. In addition to the aquatic resources discussed in section 4.4.2, the open water cover type provides important foraging and breeding habitat for various terrestrial species including waterfowl, reptiles, amphibians, and some mammals, such as the river otter and bottlenose dolphin (*Tursiops* spp.).

Scrub Shrub

Scrub shrub is characterized by natural or semi-natural woody vegetation and include areas dominated by shrubs, generally less than 6 meters tall, where cover is generally greater than 25 percent but the tree cover is less than 25 percent. Shrublands provide sources of food and nesting sites for various birds, as well as cover for invertebrates, reptiles, and amphibians. Wildlife species typical of scrub shrub habitat include sparrows (*Passeridae* spp.), nine-banded armadillo (*Dasypus novemcinctus*), Virginia opossum (*Didelphis virginiana*), badger (*Taxidae* spp.), beaver, and the garter snake (*Thamnophis* spp.).

Developed Land

Developed areas are characterized by having 30 percent or greater of constructed materials, which include asphalt, concrete, and buildings. These types of lands tend to provide minimal habitat for wildlife species. Wildlife diversity is often limited to species that are adapted to human presence and the associated anthropogenic changes to the landscape, such as paved and landscaped areas.

4.7.1.2 Impacts and Mitigation

We received comments from the public and state agencies during scoping periods and in response to the draft EIS expressing concern regarding potential Project impacts, including secondary or indirect effects, increased noise, artificial lighting, and general impacts on wildlife and their habitat in the Project area. Construction and operation of the Project would result in various short- and long-term impacts on wildlife. Impacts would vary based on specific habitat requirements of a species and the level and duration of Project impacts on each habitat type. A total of about 2,640.6 acres of wildlife habitat would be impacted by the footprint of the Terminal Facilities and Pipeline System (including the 18.2-acre area of open water within the Calcasieu Ship Channel that would be dredged for the Marine Facilities). Following construction, approximately 1,350.9 acres would be restored to pre-construction conditions. A total of 1,289.7 acres would be within the operational footprint of the Project, of which 743.2 acres would be permanently converted to developed land. A total of 546.5 acres would be maintained as herbaceous or scrub-shrub land within the pipeline rights-of-way (table 4.7.1-1).

Table 4.7.1-1

Habitat Types Affected by Construction and Operation of the CP2 LNG and CP Express Project (in acres)

Facilities	Hay/Pasture, Cultivated Crops		Herbaceous		Barren		Developed		Open Water		Wetland		Shrub/Scrub		Forest		Total	
	Con[a]	Op[b]	Con[a]	Op[b]	Con[a]	Op[b]	Con[a]	Op[b]	Con[a]	Op[b]	Con[a]	Op[b]	Con[a]	Op[b]	Con[a]	Op[b]	Con[a]	Op[b]
TERMINAL FACILITIES																		
Terminal Site and Yards	205.1	177.6	52.9	40.6	0.0	0.0	58.3	3.9	3.3	2.0	329.0	304.1	21.4	15.6	0.0	0.0	**670.0**	**543.8**
Marine Facilities	0.0	0.0	54.8	54.8	0.0	0.0	5.7	5.7	18.2	18.2	41.0	41.0	2.5	2.5	0.0	0.0	**122.2**	**122.2**
LNG Transfer Lines and Utilities	0.0	0.0	1.3	1.3	0.0	0.0	1.6	1.4	4.5	2.9	24.2	10.0	0.0	0.0	0.0	0.0	**31.6**	**15.6**
Terminal Facilities Total	***205.1***	***177.6***	***109.0***	***96.7***	***0.0***	***0.0***	***65.6***	***11.0***	***26.0***	***23.1***	***394.2***	***355.1***	***23.9***	***18.1***	***0.0***	***0.0***	***823.8***	***681.6***
PIPELINE SYSTEM																		
CP Express Pipeline [c]																		
Pipeline Facilities																		
Pipeline Rights-of-Way	204.8	69.7	17.4	3.3	8.5	2.9	19.8	7.4	104.2	40.7	861.6	326.2	24.7	10.9	143.6	49.3	**1,384.6**	**510.3**
Additional Temporary Workspace	23.9	0.0	1.2	0.0	0.3	0.0	5.1	0.0	10.0	0.0	95.0	0.0	2.9	0.0	13.3	0.0	**151.7**	**0.0**
Contractor Yards	41.9	0.0	0.0	0.0	0.0	0.0	46.9	0.0	0.6	0.0	2.7	0.0	0.0	0.0	0.0	0.0	**92.1**	**0.0**
Pipeline Facilities Subtotal	**270.6**	**69.7**	**18.6**	**3.3**	**8.8**	**2.9**	**71.8**	**7.4**	**114.8**	**40.7**	**959.3**	**326.2**	**27.6**	**10.9**	**156.9**	**49.3**	**1,628.4**	**510.3**
Aboveground Facilities																		
Moss Lake Compressor Station	0.3	0.3	0.0	0.0	0.0	0.0	1.0	1.0	0.2	0.2	32.2	32.2	0.0	0.0	0.0	0.0	**33.7**	**33.7**
Kinder Morgan Meter Station	3.5	3.5	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	**3.8**	**3.8**
FGT Interconnect Meter Station	2.2	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**2.2**	**2.2**

Table 4.7.1-1

Habitat Types Affected by Construction and Operation of the CP2 LNG and CP Express Project (in acres)

Facilities	Hay/Pasture, Cultivated Crops		Herbaceous		Barren		Developed		Open Water		Wetland		Shrub/Scrub		Forest		Total	
	Con[a]	Op[b]	Con[a]	Op[b]	Con[a]	Op[b]	Con[a]	Op[b]	Con[a]	Op[b]	Con[a]	Op[b]	Con[a]	Op[b]	Con[a]	Op[b]	Con[a]	Op[b]
TETCO & Boardwalk Interconnect Meter Station	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.0	0.0	3.3	3.3	0.0	0.0	0.3	0.3	**4.1**	**4.1**
TRANSCO & CJ Express Interconnect Meter Station/Launcher Site	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.6	2.6	0.4	0.4	0.1	0.1	**3.1**	**3.1**
MLV 2	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	<0.1	<0.1	**0.2**	**0.2**
MLV 5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	<0.1	<0.1	0.1	0.1	0.0	0.0	0.0	0.0	**0.2**	**0.2**
MLV 6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.0	0.0	0.0	**0.2**	**0.2**
Aboveground Facilities Subtotal	***6.0***	***6.0***	***0.1***	***0.1***	***0.0***	***0.0***	***1.7***	***1.7***	***0.2***	***0.2***	***38.6***	***38.6***	***0.4***	***0.4***	***0.5***	***0.5***	***47.5***	***47.5***
Access Roads	12.8	2.7	1.9	<0.1	0.0	0.0	34.5	4.9	0.6	0.2	4.5	0.4	1.4	<0.1	6.3	0.7	**62.1**	**8.9**
CP Express Pipeline Subtotal	***289.4***	***78.7***	***20.6***	***3.4***	***8.8***	***2.9***	***108.0***	***14.0***	***115.6***	***41.1***	***1,002.4***	***365.2***	***29.4***	***11.3***	***163.7***	***50.5***	***1,738.0***	***566.7***
Enable Gulf Run Lateral																		
Pipeline Facilities																		
Pipeline Rights-of-Way	1.1	0.7	0.4	0.2	0.0	0.0	2.5	1.6	1.0	0.7	34.7	25.4	3.7	1.7	12.0	6.0	**55.4**	**36.2**
Additional Temporary Workspace	0.3	0.0	<0.1	0.0	0.0	0.0	0.6	0.0	0.0	0.0	5.8	0.0	0.3	0.0	3.3	0.0	**10.3**	**0.0**
Pipeline Facilities Subtotal	**1.4**	**0.7**	**0.4**	**0.2**	**0.0**	**0.0**	**3.1**	**1.6**	**1.0**	**0.7**	**40.5**	**25.4**	**4.0**	**1.7**	**15.3**	**6.0**	**65.7**	**36.2**

Table 4.7.1-1

Habitat Types Affected by Construction and Operation of the CP2 LNG and CP Express Project (in acres)

Facilities	Hay/Pasture, Cultivated Crops		Herbaceous		Barren		Developed		Open Water		Wetland		Shrub/Scrub		Forest		Total	
	Con[a]	Op[b]	Con[a]	Op[b]	Con[a]	Op[b]	Con[a]	Op[b]	Con[a]	Op[b]	Con[a]	Op[b]	Con[a]	Op[b]	Con[a]	Op[b]	Con[a]	Op[b]
Aboveground Facilities																		
Enable Receiver, MLV Site, and Pig Launcher	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.1	0.0	0.0	1.9	1.9	0.0	0.0	0.6	0.6	**2.6**	**2.6**
Enable Interconnect Meter Station, Trap/MLV E2, and Pig Receiver	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.3	0.3	0.0	0.0	0.7	0.7	**1.0**	**1.0**
Aboveground Facilities Subtotal	**0.0**	**0.0**	**0.1**	**0.1**	**0.0**	**0.0**	**0.2**	**0.2**	**0.0**	**0.0**	**2.2**	**2.2**	**0.0**	**0.0**	**1.2**	**1.2**	**3.6**	**3.6**
Access Roads	1.9	0.0	0.4	0.4	0.0	0.0	4.1	0.6	<0.1	0.0	0.4	0.2	<0.1	0.0	2.6	0.4	**9.5**	**1.6**
Enable Gulf Run Lateral Subtotal	***3.3***	***0.7***	***0.9***	***0.7***	***0.0***	***0.0***	***7.3***	***2.3***	***1.1***	***0.7***	***43.1***	***27.8***	***4.0***	***1.7***	***19.1***	***7.7***	***78.8***	***41.5***
Pipeline Facilities Total	***292.7***	***79.4***	***21.5***	***4.1***	***8.8***	***2.9***	***115.3***	***16.3***	***116.7***	***41.8***	***1,045.5***	***393.0***	***33.4***	***13.0***	***182.8***	***58.1***	***1,816.8***	***608.1***
CP2 LNG and CP Express Project Total	**497.8**	**257.0**	**130.5**	**100.8**	**8.8**	**2.9**	**180.9**	**27.3**	**142.7**	**64.9**	**1,439.7**	**748.1**	**57.3**	**31.1**	**182.8**	**58.1**	**2,640.6**	**1,289.7**

[a] Con = Construction Impacts. Includes both temporary construction impacts and permanent operational impacts.
[b] Op = Operational Impacts. Includes permanent wetland conversion impacts.
[c] The CP Express Pipeline would cross a portion of the Terminal Site permanent workspace from MP 85.0 to MP 85.4. Therefore, the land requirements associated with the pipeline's 50-foot-wide permanent easement are accounted for in the Terminal Site footprint at this location.
Note: Totals may not match the sum of addends due to rounding.

Terminal Facilities

Permanent impacts on wildlife habitat from construction of the Terminal Site would include 304.1 acres of wetlands, 177.6 acres of hay/pasture or cultivated crops, 40.6 acres of herbaceous land, 15.6 acres of scrub/shrub land, and 2.0 acres of open water. The impacts would consist of replacing the vegetated and filling open water habitat with surfacing materials such as concrete or gravel. The remaining Terminal Site land that would be permanently impacted by construction (3.9 acres) consists of developed land, which does not currently provide significant wildlife habitat value. Construction of a new Terminal Site could result in the mortality of less mobile animals, such as small rodents, reptiles, amphibians, and invertebrates, unable to escape the immediate construction area. In addition, some wildlife would likely be permanently displaced as a result of habitat conversion to non-vegetated and/or impervious cover (i.e., slab, gravel, aboveground structures) or maintained vegetation (i.e., ornamentals and maintained lawn), and the erection of security fences around the site. Vegetation removal for construction of the Terminal Site could cause mortality of nesting birds or cause adult birds to abandon their nests, depending on the extent and proximity of construction disturbance. Impacts on migratory birds are discussed in section 4.7.1.3.

The Marine Facilities are not anticipated to permanently displace aquatic wildlife in open water, but would modify aquatic habitat as the loading docks would be set on in-water piles and the nearshore areas would be dredged to a deeper depth. Additionally, an estimated 122.2 acres of terrestrial/wetland habitat on the southwest tip of Monkey Island would be excavated during the construction of the Marine Facilities, resulting in permanent displacement of terrestrial species at this location. In temporarily disturbed areas, wildlife is expected to return after construction and restoration are completed, but may transition to species more adapted to early successional vegetation.

We received comments from TPWD and Michael Tritico on the draft EIS regarding the Project's potential impacts on wildlife from facility lighting. Artificial lighting can interfere with the behavior of nocturnal animals, seemingly having the greatest impact on nocturnal migrating birds, causing disorientation and collisions with over-lit structures. Artificial lighting could also affect aquatic species in the Calcasieu Ship Channel adjacent to the Terminal Site. To minimize impacts on migratory birds and wildlife in the vicinity of the Project area, CP2 LNG developed a Facility Lighting Plan that considers mitigation of light pollution in the lighting system design, including the use of diffusers, lenses, and shields to reduce glare and light pollution, and to focus light distribution on the LNG loading dock platforms, perimeter fence, and working areas inside the Terminal Site's perimeter floodwalls. Additionally, the floodlights mounted on high masts would be a full cutoff type with no direct upward shining light, thereby helping to eliminate glare by directing all lighting downward to the intended area of illumination. Light fixtures near waterways would be directed away from the body of water, thereby minimizing artificial illumination of aquatic habitat. Nighttime lighting is prominent in and around the Terminal Facilities given the nearby industrial facilities. The Terminal Facilities would add to lighting impacts due to the need to comply with lighting requirements for operational safety and security; however, as with aquatic species, the impact of the Terminal Facilities lighting on migratory birds is anticipated to be minimized as these species are accustomed to lighting from the existing nearby operating industrial facilities. Project-related impacts from facility lighting are further discussed below, for the Pipeline System, and in sections 4.7.1.3 and 4.7.2.2.

Construction-related noise could affect animal behavior, foraging, or breeding patterns, and cause wildlife species to move away from the noise or relocate in order to avoid the disturbance. Although the timing of construction would depend on receipt of all required permits, CP2 LNG anticipates that construction activities at the Terminal Facilities would be staggered, occurring over the course of 4 years, predominantly during daylight hours. Sound would attenuate with increased distance from construction activity. Although construction noise levels could deter wildlife in the area, the Terminal Site is proposed in an industrial area, which experiences regular vehicle or marine vessel traffic. Therefore, the increase in noise during construction is not anticipated to result in significant changes in wildlife behaviors. Noise from construction of the Terminal Site is discussed in detail in section 4.12.2; and noise-related impacts on sensitive wildlife habitat is addressed in section 4.8.1. Potential noise impacts from pile driving activities in the Calcasieu Ship Channel could affect aquatic wildlife, including marine mammals and sea turtles. Underwater noise and potential impacts on marine animals are discussed in sections 4.8.2 and 4.8.3.

Operation of the Terminal Facilities would permanently displace wildlife over the majority of the disturbed area. Based on existing site conditions, common wildlife species that are habituated to anthropogenic activities would likely return to the Terminal Facilities area, including terrestrial fauna such as birds, mammals, amphibians, and reptiles, as well as fish and other aquatic biota that may live in waterbodies. Operational noise would result in an increase in the ambient sound levels in the immediate vicinity of the Project. Moderate impacts on general wildlife species may occur in areas immediately adjacent to the Terminal Site resulting in potential increases in avoidance of the area. However, operational noise would quickly attenuate such that impacts outside of the immediate vicinity would not be anticipated to result in significant effects on local wildlife behaviors. Permanent impacts on wildlife would occur in areas where Project infrastructure would permanently replace habitat, including the majority of the Terminal Site. CP2 LNG would implement its Project-specific Plan and Procedures to minimize impacts on adjacent habitat and open water during construction. The direct loss of habitat and the indirect effects associated with displacement indicate that the construction and operation of the proposed Terminal Site would result in a moderate, but not significant, permanent impact on local wildlife. With the implementation of pre-construction surveys and the implementation of auditory, visual, and/or direct human intervention techniques to deter the presence of wildlife during construction and operation, direct loss of wildlife at the Terminal Site would be further minimized.

CP2 LNG would adhere to the Project-Specific Plan and Procedures, which are specifically designed to avoid or minimize impacts on wildlife species and/or their habitats. Additionally, CP2 LNG would implement a training and awareness program for construction personnel. The program would inform personnel about resident wildlife and endangerment factors and would emphasize the responsibilities of personnel in preventing vehicular or vessel impacts (e.g., by adhering to speed limits and ensuring proper lighting). Therefore, while there would be permanent impacts associated with the removal of habitat and the area immediately surrounding the Terminal Facilities would be impacted by operational noise, lighting, and movement of operational personnel and vehicles, we conclude construction and operation of the proposed Terminal Facilities would not have significant impacts on wildlife species due to the existence of similar habitats adjacent to the Project area and CP2 LNG's proposed restoration and mitigation for Project impacts on wetland habitat.

Pipeline System

As presented above in table 4.7.1-1, construction of the CP Express Pipeline, inclusive of the right-of-way, ATWS, and contractor yards would impact approximately 1,738.0 acres of wildlife habitat, including 1,002.4 acres of wetland, 289.4 acres of hay/pasture or cultivated crops, 115.6 acres of open water, 163.7 acres of forest, 108.0 acres of developed land, 29.4 acres of scrub/shrub, 8.8 acres of barren land, and 20.6 acres of herbaceous. Approximately 510.3 acres of the CP Express Pipeline right-of-way would be permanently maintained.

Construction of the Moss Lake Compressor Station would require approximately 33.7 acres of land, including 0.3 acre of hay/pasture or cultivated crops, 1.0 acres of developed land, 0.2 acre of open water, and 32.2 acres of wetland. The entirety of the 33.7 acres would be permanently maintained. The other aboveground facilities (i.e., meter stations, MLVs) associated with the CP Express Pipeline would permanently impact 13.8 acres of wildlife habitat, including 5.7 acres of hay/pasture or cultivated crops, 6.3 acres of wetland, 0.7 acres developed land, 0.5 acre of forest 0.4 acre of scrub/shrub, 0.1 acre of herbaceous land, and less than 0.1 acre of open water. Construction of the access roads associated with the CP Express Pipeline would impact a total of 62.1 acres of land, including 12.8 acres of hay/pasture or cultivated crops, 1.9 acres of herbaceous land, 34.5 acres of developed land, 0.6 acre of open water, 4.5 acres of wetland, 1.4 acres of scrub/shrub, and 6.3 acres of forest, of which approximately 8.9 acres would be permanently impacted.

Construction of the Enable Gulf Run Lateral, including the right-of-way and ATWS would require approximately 65.7 acres of wildlife. The Enable Gulf Run Lateral right-of-way and ATWS would temporarily impact 55.4 acres of wildlife habitat, including 1.4 acres of hay/pasture or cultivated crops, 0.4 acres of herbaceous, 3.1 acre of developed land, 1.0 acre of open water, 40.5 acres of wetland, 4.0 acres of scrub/shrub, and 15.3 acres of forest. Construction of the aboveground facilities (i.e., meter station, MLV site, and pig launcher) associated with the Enable Gulf Run Lateral would impact 3.6 acres of wildlife habitat, including 0.2 acre of developed land, 2.2 acres of wetland, and 1.2 acres of forest, all of which would be permanently impacted. Construction of the access roads associated with the Enable Gulf Run would impact a total of 9.5 acres of land, including 1.9 acres of hay/pasture or cultivated crops, 0.4 acre of herbaceous land, 4.1 acres of developed land, less than 0.1 acre of open water, 0.4 acre of wetland, less than 0.1 acre of scrub/shrub, and 2.6 acre of forest, of which approximately 1.6 acres would be permanently impacted. All permanent habitat impacts would result from the conversion of existing vegetation to industrial land through placement of fill materials (e.g., concrete).

Construction of the Pipeline System may affect the wildlife resources and habitat in similar ways to the Terminal Site as described above, but over a shorter duration. Clearing, excavation, and backfilling along the pipeline rights-of-way, ATWS, contractor yards, and temporary access roads would temporarily affect uplands, wetlands, and waterbodies. During construction, more mobile species would be temporarily displaced from the construction right-of-way to similar habitats nearby due to human presence and increases in noise. Noise impacts would generally be temporary and intermittent as pipeline construction typically occurs in a manner similar to a moving assembly line, except at HDD locations where construction activity would generate elevated noise levels and could occur up to 24 hours a day.

Less mobile species, such as small mammals, reptiles, amphibians, and nesting birds may experience direct mortality or permanent displacement. Displacement of species could lead to increased competition for some resources. Some wildlife displaced from the right-of-way would return to the newly disturbed area and adjacent, undisturbed habitats after completion of construction. Soil-dwelling invertebrates would be impacted directly through movement of soil from one place to another, resulting in some mortality and displacement. This could reduce the forage potential for insectivores and other small predators that inhabit the area. The overall impact of these effects, however, would not be significant due to the temporary to short-term nature of the effects and limited area affected by construction. In addition, clearing of vegetation and subsequent increases in visibility could result in increased predation during construction and operation of the Pipeline System. While individual mortality rates could increase, the Project would not likely result in any population-level impacts. The clearing of vegetation on the construction right-of-way and within ATWS would reduce cover, foraging, breeding, and nesting habitat for some wildlife. The degree of impact would depend upon the type of habitat affected, the timing of clearing and construction activities, and the rate at which the area recovers after disturbance from construction. The effects on species that rely on upland herbaceous habitats would be short-term as CP Express would comply with BMPs to restore soils and revegetate disturbed areas, which would likely recover 1 to 3 years following construction. In temporarily disturbed areas, such as the pipeline corridor, wildlife is expected to return after construction and restoration are completed. Aquatic resources and migratory birds are discussed below in sections 4.7.2 and 4.7.1.3.

We received a comment from the TPWD regarding the placement of sediment control fencing (i.e., silt fence) as a measure to exclude wildlife from the construction right-of-way. CP Express has not committed to the installation of silt fence for the purpose of excluding wildlife from the construction area; however, silt fence would be used to minimize impacts associated with erosion, which would also minimize the potential for wildlife to enter the trench. In addition, CP Express have committed to inspect open trenches daily prior to the start of construction activities for trapped reptiles and other wildlife in Texas and would minimize the duration that the trench is open during construction. Further, in accordance with section III.F.3 of the Project-specific Upland Erosion Control, Revegetation, and Maintenance Plan, CP Express would develop specific procedures in coordination with the appropriate agencies and landowners, as necessary, to allow for livestock and wildlife movement and protection during construction.

Cleared scrub-shrub/forest vegetation would likely require several years to return to its woody composition. The effect of workspace clearing on scrub-shrub/forest-dwelling wildlife species would be greater than open habitat wildlife as forest land could take decades to return to pre-construction conditions, particularly if stands of trees are present. In addition, trees would be prevented from re-establishing along the permanent right-of-way in uplands and a 10-foot-wide area centered on the pipeline in wetlands. CP Express would minimize the potential for these effects by collocating 45 percent of the rights-of-way. Wildlife could be impeded by, or fall into, areas of open trench, resulting in injury, mortality, or delay of local migration. To minimize the potential for this impact, CP Express would limit the amount and duration of open trench during construction.

Construction of the Pipeline System would take about 3 years. An increased number of people in the area, with a peak of 750 workers, could lead to increased direct and indirect effects on wildlife, such as food or trash attracting predators and vehicular/wildlife interactions. CP Express would collect, contain, and dispose of excess construction material and debris, including garbage, throughout the construction process in accordance with its Project-specific Plan, which would minimize the potential to attract predators. Workers commuting along the pipeline route would increase the potential for vehicular/wildlife interactions; however, as the 750 workers would be spread across 85.4 miles of pipeline, these impacts would be minor. Operational staff would be limited to approximately 10 people for the entire Pipeline System; therefore, impacts on wildlife resulting from operational staff would be negligible.

Effects due to artificial nighttime lighting along the Pipeline System would be similar to those that would occur during Terminal Facility construction. However, any artificial lighting during pipeline and aboveground facility construction is anticipated to be negligible as it would be temporary and occur at limited locations during HDD operations, hydrostatic testing, limited pipeline tie-in work, and testing and commissioning of aboveground facilities.

A spill of hazardous materials during construction, such as fuel or oil, or the excavation and exposure of contaminated soil and/or groundwater could impact wildlife. CP Express would implement procedures outlined in its Project-specific Plan and Procedures and SPCC Plan to minimize impacts associated with construction-related spills in the event that contaminated groundwater and/or soils are encountered during construction.

Operation of the Pipeline System would primarily result in temporary wetland habitat impacts, with permanent impacts resulting from the permanent loss or conversion of wetland habitat for pipeline rights-of-way, aboveground facilities, and permanent access roads. Following construction, CP Express would seed all of the previously vegetated areas disturbed by construction in accordance with recommendations from the local soil conservation agency and/or the landowner. Disturbed areas would be routinely monitored until restoration and revegetation were successful in accordance with the Project-specific Plan and Procedures. Within wetlands, CP Express would permanently maintain only a 10-foot-wide corridor and selectively remove trees within 15 feet of the pipeline. These maintenance activities would permanently convert scrub-shrub and forested wetlands to an emergent state. Wetlands would be restored to preexisting conditions to the extent practicable in accordance with the Project-specific Procedures and the conditions of the COE and LDNR permits. During operation in forested upland areas, CP Express would maintain a 25-foot-wide right-of-way, which would result in a permanent conversion of habitat in forested areas to herbaceous or shrub habitat. Other impacts on vegetation would be temporary. Construction of the aboveground facilities and permanent access roads would result in permanent conversion of habitat to industrial areas; these impacts would be similar to those described in the Terminal Facility discussion above.

In forested areas, construction and operation of the pipelines could increase forest fragmentation resulting in less interior forest and increased edge habitats, which are used by various wildlife species, such as songbirds and small mammals. Many species can adapt to this habitat shift and could take advantage of edge habitats. Predatory species such as red-tailed hawk and coyote commonly use utility rights-of-way for hunting other species, such as the eastern cottontail, mourning dove, field sparrow, white-tailed deer, and fox, could benefit from the transition to early successional habitat for foraging. However, forest fragmentation generally can have negative effects on birds through dispersal barriers, absence of suitable microhabitats, small population size, and edge effects (DeGraaf and Healy, 1990). Effects on wildlife from fragmentation have been studied mostly via migratory birds. Edge effects can result in interactions between birds that nest in the interior of forests and species that inhabit surrounding landscape, typically lowering the reproductive success of the interior species. Other evidence suggests that certain mammals, amphibians, reptiles, and plants are also adversely affected by forest fragmentation. Species that require large tracts of unbroken forested land may be forced to seek suitable habitat elsewhere. The loss of forest habitat, expansion of existing corridors, and the creation of open early successional and induced edge habitats could decrease the quality of habitat for forest interior wildlife species in a corridor much wider than the actual cleared right-of-way. The distance an edge effect extends into a woodland is variable. However, a literature review that compared the distances within adjacent forest of various effect (Harper et al., 2005) found that for eastern North America, the means are less than 25 meters (about 82 feet). Edge impacts within this distance could include an increase in light and temperature levels on the forest floor and the subsequent reduction in soil moisture, resulting in habitat that would no longer be suitable for species that require these specific habitat conditions, such as salamanders and amphibians. Habitat alterations could affect the fitness of some species and increase competition both within and between species, possibly resulting in an overall change in the structure of the forest community. The landscape in the Project area is generally fragmented by existing roads, utility rights-of-way, residential and commercial development, and agriculture. As previously discussed, the Pipeline System has been collocated with other linear features (existing pipelines and electrical transmission lines) to the extent practicable, which would minimize new impacts on wildlife habitat. During operation, previously forested habitat (including forested wetlands) would not reestablish within the permanent right-of-way for the pipelines. The principal impact in areas consisting of existing rights-of-way would be reduction of interior forest and expansion of habitat preferred by species favoring open areas. In areas where existing rights-of-way are not already established, there would be a shift in species use from those favoring interior forest habitat to those using either edge habitat or areas that are more open. Overall, the impact of the permanent conversion of forested habitat to non-forested habitat would be minimized by installing the proposed pipelines adjacent to existing rights-of-way to the extent practicable, which is maintained in an herbaceous state.

Contractor yards associated with the Project would temporarily impact developed, wetland, and hay/pasture, cultivated crop land. Following completion of construction, the yards would be converted back to their current use.

With the implementation of the Project-specific Plan and Procedures, SPCC Plan, and Fugitive Dust Control Plan, as well as additional minimization and mitigation measures discussed above, we find that construction of the proposed pipeline facilities would have a minor and short-term impact on most local wildlife (until vegetation is re-established). Similarly, ongoing operation of the pipeline facilities would have a permanent, but minor impact on local wildlife, that would generally be limited to ongoing vegetation maintenance along the Pipeline System and the loss of land associated with the aboveground facilities and permanent access roads. Therefore, we conclude that construction and operation of the Pipeline System would not have a significant impact on wildlife resources in the Project area.

4.7.1.3 Migratory Birds

Migratory bird species nest in the United States and Canada during the summer months and then migrate south to the tropical regions of Mexico, Central and South America, and the Caribbean for the non-breeding season. Some species migrate from breeding areas in the north to the Gulf Coast for the non-breeding season. Migratory birds are protected under the Migratory Bird Treaty Act of 1918 (MBTA), which prohibits the intentional take or killing of individual migratory birds, their eggs and chicks, and active nests. The MBTA provides that it is unlawful to pursue, hunt, take, capture, kill, possess, sell, purchase, barter, import, export, or transport any migratory bird, or any part, nest, or egg of any such bird. Executive Order 13186 (January 2001) directs federal agencies to consider the effects of agency actions on migratory birds and determine where unintentional take is likely to have a measurable negative effect on migratory bird populations, and to avoid or minimize adverse impacts on migratory birds through enhanced collaboration with the FWS. Executive Order 13186 states that emphasis should be placed on species of concern, priority habitats, and key risk factors, and that particular focus should be given to addressing population- level impacts.

On March 30, 2011, the FWS and the Commission entered into a MOU that focuses on avoiding or minimizing adverse impacts on migratory birds and strengthening migratory bird conservation through enhanced collaboration between the two agencies. This voluntary MOU does not waive legal requirements under the MBTA, Bald and Golden Eagle Protection Act (BGEPA), ESA, Federal Power Act, NGA, or any other statute and does not authorize the take of migratory birds.

The Louisiana coast provides a place for neotropical migratory songbirds to rest and feed before or after crossing the Gulf of Mexico, and it is a winter home to 70 percent of the waterfowl that migrate along the two flyways within the Project vicinity as discussed below (COE, 2012). Additionally, colonial nesting waterbirds (e.g., brown pelicans, coastal wading birds, gulls, terns, skimmers) and their colonies are protected under the MBTA (FWS, 2021a). According to LDWF WDP data, two known colonial waterbird nesting areas are within 1 mile of the Project. Nesting water bird colonies, if observed, would be documented during preconstruction field habitat assessments of the Project footprint.

The FWS has established four administrative flyways in North America in order to facilitate the management of migratory birds and their habitats (FWS, 2021b). Each of the four flyways constitutes a major bird migration corridor used for fall and spring migrations. The Project is crossed by two flyways: the Central flyway and the Mississippi flyway. The portion of the Project in Texas (CP Express Pipeline MP 0.0 to MP 20.0) is within the Central flyway. The portion of the Project in Louisiana (CP Express Pipeline MP 20.0 MP to 85.4, the Enable Gulf Run Lateral, and the Terminal Facilities) is within the Mississippi flyway.

Birds of Conservation Concern (BCC) are a subset of protected birds under the MBTA and include all species, subspecies, and populations of migratory nongame birds that are likely to become candidates for listing under the ESA without additional conservation actions. To accurately identify these sensitive bird species and stimulate action by federal/state agencies and private parties, the FWS Migratory Bird Office issued a report describing the BCC (FWS, 2008). The report identifies priority bird species at the national, regional, and Bird Conservation Region (BCR) levels. The Project would cross the West Gulf Coastal Plain/Ouachitas Region 25 (BCR 25) from CP Express Pipeline MP 0.0 to MP 20.0, and the Gulf

Coast Prairie BCR 37 from CP Express Pipeline MP 20.0 to the Terminal Facilities (FWS, 2008). BCR 37 provides habitat for one of the greatest concentrations of colonial waterbirds in the world and provides important stopover habitat for migrating shorebirds and neotropical migrant forest birds. About 318 species of birds occur regularly in BCR 37 as permanent residents, summer residents, or winter residents (National Audubon Society, 2021a).

Table 4.7.1-2 provides a list of BCCs that occur in the Project area in Louisiana and Texas based on CP2 LNG and EP Express' review of FWS' Information for Planning and Consultation (IPaC) tool, including preferred habitat, and likelihood of occurrence within the Terminal Site or along the pipeline routes. Based on this review, a total of 31 BCCs were identified as having the potential to occur in the Project area due to suitable habitat present, of which 5 are known to breed, in the Project area.

Table 4.7.1-2

Birds of Conservation Concern with Potential to Occur in the Project Vicinity

Species	Season Present	Preferred Habitat	Assessment of Potential Impacts
American golden-plover *Pluvialis dominica*	Migration	Occurs in prairies, mudflats, shores, and tundra (summer). During migration, usually found on short-grass prairies, flooded pastures, plowed fields; less often on mudflats, and beaches. Breeds on Arctic tundra. Nests on the ground at higher elevations, on more barren tundra slopes.	Suitable migration habitat exists in the Project area; however, individuals potentially present during construction would likely avoid the area or displace to similar adjacent habitats.
American kestrel *Falco sparverius paulus*	Nonbreeding	Prefers areas with short vegetation, sparse trees, and raised perches such as grasslands, parks, fields, and meadows. Nests in cavities in large dead tree snags.	Non-breeding individuals potentially present during construction would likely avoid the area or displace to similar adjacent habitats.
American Oystercatcher *Haematopus palliatus*	Year-Round	Occurs in tidal flats and coastal habitats, including saltmarsh, marsh islands, sand or shell beaches, dunes, mudflats, and dredge spoil islands made of sand or gravel. Nests among dunes, on dredge spoil islands, or on islands in salt marsh. Migrates and winters in mud or sandflats exposed by tide or on shellfish beds.	Suitable habitat exists in the Project area; however, individuals potentially present during construction would likely avoid the area or displace to similar adjacent habitats.
Bachman's sparrow *Aimophila aestivalis*	Year-round	Found in open pine woodlands with wiregrass and saw palmetto in the understory as well as grassy areas, clearcuts, and oak-palmetto scrub with limited shrub development.	Suitable habitat exists in the Project area; however, individuals potentially present during construction would likely avoid the area or displace to similar adjacent habitats.
Bald eagle *Haliaeetus leucocephalus*	Year-round	Occurs in rivers, large lakes, and coasts. Nests in forested areas near large waterbodies. During migration, stops near water in mountains and open country. Typically roosts in trees.	Suitable habitat exists in the Project area; however, individuals potentially present during construction would likely avoid the area or displace to similar adjacent habitats.

Table 4.7.1-2

Birds of Conservation Concern with Potential to Occur in the Project Vicinity

Species	Season Present	Preferred Habitat	Assessment of Potential Impacts
Black Skimmer *Rynchops niger*	Year-Round	Occurs in inlets, sheltered bays, tidewater, lagoons, estuaries, gravel or shell bars with sparse vegetation, and open, sandy ocean beaches. Nests on shell banks, sandy islands, and beaches	Suitable breeding habitat exists in the Project area. Non-breeding individuals potentially present during construction would likely avoid the area or displace to similar adjacent habitats.
Brown-headed Nuthatch *Sitta pusilla*	Year-Round	Occurs in open, mature stands of loblolly, shortleaf, and splash pine. Nests in dead and decaying trees or existing nuthatch or woodpecker holes, nest boxes, fence posts, and telephone poles.	Suitable habitat exists in the Project area; however, individuals potentially present during construction would likely avoid the area or displace to similar adjacent habitats.
Chimney Swift *Chaetura pelagica*	Breeding	Occurs in urban and suburban habitat in areas with concentrations of chimneys for nest sites and roosts. They may also nest in hollow trees, tree cavities, and caves. Winter in the upper Amazon basin of Peru, Ecuador, Chile, and Brazil.	Suitable habitat exists in the Project area; however, individuals potentially present during construction would likely avoid the area or displace to similar adjacent habitats.
Dickcissel *Spiza americana*	Migration	Occurs in grassland habitats. In the summer, commonly found in native prairies, restored grasslands, hayfields, or fallow agricultural fields. Winter in grasslands and croplands.	Suitable habitat exists in the Project area; however, individuals potentially present during construction would likely avoid the area or displace to similar adjacent habitats.
Eastern whip-poor-will *Antrostomus vociferus*	Migration	Found in eastern forests with open understories. They can be found in both purely deciduous and mixed deciduous-pine forests, often in areas with sandy soil.	Suitable habitat not available in the project area.
Golden Eagle *Aquila chrysaetos*	Nonbreeding	Occurs in open and semiopen country featuring native vegetation across most of the Northern Hemisphere, including tundra, grasslands, forested habitat and woodland-brushlands. Nests on cliffs or in the largest trees of forested stands that often afford an unobstructed view of the surrounding habitat	Suitable habitat exists in the Project area; however, individuals potentially present during construction would likely avoid the area or displace to similar adjacent habitats.

Table 4.7.1-2

Birds of Conservation Concern with Potential to Occur in the Project Vicinity

Species	Season Present	Preferred Habitat	Assessment of Potential Impacts
Gull-billed tern *Gelochelidon nilotica*	Year-Round	Found in fields, coastal bays, saltmarshes, farmland, pastures, and open country near coast. Breeding and nesting occur on islands and beaches. Winters in plowed fields, estuaries, lagoons, and salt marshes and occasionally around lakes, along rivers, and in freshwater marshes.	Non-breeding individuals potentially present during construction would likely avoid the area or displace to similar adjacent habitats.
Kentucky warbler *Oporornis formosus*	Breeding	Occurs in dense woods and thickets near creeks and rivers, on the edges of swamps, and near ravines in deciduous woods. Nests on the ground or within a few inches of it in shrubs, small trees, and grass tussocks.	Suitable habitat exists in the Project area; however, individuals potentially present during construction would likely avoid the area or displace to similar adjacent habitats.
King Rail *Rallus elegans*	Year-Round	Occurs in freshwater and brackish marshes and rice fields. Sometime occurs in saltmarshes in the winter. Nests in a clump of grass or sedges, usually about a foot above water or land.	Suitable breeding habitat exists in the Project area. Non-breeding individuals potentially present during construction would likely avoid the area or displace to similar adjacent habitats.
Lesser Yellowlegs *Tringa flavipes*	Nonbreeding	Occurs in mudflats, ponds, shores, and marshes. During migration, stops in salt and fresh marshes, coastal estuaries, ponds, and lake edges. Winters in various salt and freshwater habitats. Breeds in large clearings near ponds and open boreal forest with scattered shallow wetlands. Nests on ground in open, typically in dry site and sometimes far from water.	Suitable habitat exists in the Project area; however, individuals potentially present during construction would likely avoid the area or displace to similar adjacent habitats.
Long-billed Curlew *Numenius americanus*	Nonbreeding	Occurs on rangeland, cultivated lad, tideflats, and salt marshes in the winter.	Suitable habitat exists in the Project area; however, individuals potentially present during construction would likely avoid the area or displace to similar adjacent habitats.
Marbled Godwit *Limosa fedoa*	Nonbreeding	Found on tidal flats, shores, prairies, and pools. Breeds in prairie, marshes, and flooded plains. Migrates and winters in marshes, tidal mudflats, ponds, and beaches.	Suitable habitat exists in the Project area; however, individuals potentially present during construction would likely avoid the area or displace to similar adjacent habitats.

Table 4.7.1-2

Birds of Conservation Concern with Potential to Occur in the Project Vicinity

Species	Season Present	Preferred Habitat	Assessment of Potential Impacts
Painted Bunting *Passerina ciris*	Breeding	Occurs in semi-open habitats with scattered shrubs of trees. In the south-central U.S., this species utilizes abandoned farms, strips of woodland between overgrown fields, brushy roadsides, and patches of grasses, weeds, and wildflowers. On the coast, this species occurs in scrub communities, wooded back dunes, palmetto thickets, edges of maritime hammocks, hedges, yards, fallow fields, and old citrus groves.	Suitable habitat exists in the Project area; however, individuals potentially present during construction would likely avoid the area or displace to similar adjacent habitats.
Prairie warbler *Dendroica discolor*	Migration	Occurs in low pines, scrubby pastures, and forests. Nests on forest edges and clearing, in hickory, dogwood, hazel, or laurel.	Suitable habitat exists in the Project area; however, individuals potentially present during construction would likely avoid the area or displace to similar adjacent habitats.
Prothonotary Warbler *Protonotaria citrea*	Nonbreeding	Occurs in flooded bottomland forests, wooded swamps, and forests near lakes and swamps. Avoids forests less than approximately 250 acres. During migration stops in coastal areas, marshes, citrus groves, and scrub. During winter is most common in mangrove swamps, but also use tropical dry forest and wooded areas near streams. Nests in natural holes in standing dead trees.	Suitable habitat exists in the Project area; however, individuals potentially present during construction would likely avoid the area or displace to similar adjacent habitats.
Red-headed Woodpecker *Melanerpes erythrocephalus*	Wintering	Occurs in open habitats, such as forest edges, pine woods, orchards, and groves. Breed in nest cavities in dead or dying trees on forest edges and disturbed areas.	Suitable habitat exists in the Project area; however, individuals potentially present during construction would likely avoid the area or displace to similar adjacent habitats.
Reddish Egret *Egretta rufescens*	Year-Round	Occurs on coastal tidal flats, salt marshes, and lagoons. The species breeds in colonies and generally breeds in Texas. Nesting habitat is mostly in red mangrove swamps in Florida or arid coastal islands covered with thorny brush in Texas.	Suitable breeding habitat does exist in the Project area. Non-breeding individuals potentially present during construction would likely avoid the area or displace to similar adjacent habitats.
Ruddy Turnstone *Arenaria interpres morinella*	Migration	Occurs on rocky and sandy beaches and shorelines, mudflats and deltas in winter. During migration, also occur on the shorelines of freshwater lakes. Breeds on wet tundra and rocky ridges in the Arctic.	Suitable wintering habitat exists in the Project area; however, individuals potentially present during construction would likely avoid the area or displace to similar adjacent habitats.

Table 4.7.1-2

Birds of Conservation Concern with Potential to Occur in the Project Vicinity

Species	Season Present	Preferred Habitat	Assessment of Potential Impacts
Sandwich Tern *Thalasseus sandvicensis*	Nonbreeding	Nests on sandy barrier beaches and barrier islands close to the ocean, including low-lying dredge-spoil islands.	Suitable habitat exists in the Project area; however, individuals potentially present during construction would likely avoid the area or displace to similar adjacent habitats.
Short-billed Dowitcher *Limnodromus griseus*	Nonbreeding	Occurs in mudflats, tidal marshes, and pond edges. Migrants and wintering birds favor coastal habitats, including tidal flats on protected estuaries and bays, salt marshes, lagoons, and sandy beaches. Breeds in the far north, mostly in muskegs and edges of lakes within coniferous forest zone. Nests on sedges in wet meadows at or near tree lines, usually away from the edge of a water body.	Suitable wintering habitat exists in the Project area; however, individuals potentially present during construction would likely avoid the area or displace to similar adjacent habitats.
Sprague's Pipit *Anthus spragueii*	Nonbreeding	Occurs in native and non-native grasslands with limited shrub cover, including some shortgrass environments and occasionally athletic fields and heavily grazed pastures. Nests on the ground in areas of relatively tall vegetation.	Suitable habitat exists in the Project area; however, individuals potentially present during construction would likely avoid the area or displace to similar adjacent habitats.
Swallow-tailed Kite *Elanoides forficatus*	Breeding	Breeds in wooded river swamps, cypress swamps, and open pine woods near marsh or prairie. Nests in tall trees near open country with abundant prey, including slash pine wetlands, edges of pine forest, freshwater or brackish marshes, wet prairies, cypress swamps, mangrove forests, and hardwood hammocks.	Suitable breeding habitat does not exist in the Project area.
Willet *Tringa semipalmata*	Nonbreeding	Occurs on open beaches, bayshores, marshes, mudflats, tidal estuaries, and rocky coastal zones. Nests in cordgrass, saltgrass, and beachgrass near salt marshes or on sand dunes along the coast.	Suitable breeding habitat exists in the Project area. Non-breeding individuals potentially present during construction would likely avoid the area or displace to similar adjacent habitats.
Wilson's Plover *Charadrius wilsonia*	Breeding	Inhabits very open areas in coastal regions, including estuaries, white sand and shell beaches, lagoons, sandy islands, offshore barrier beaches, tidal and salt flats, dredge spoil islands, and open ocean beaches.	Suitable breeding habitat does not exist in the Project area.

Table 4.7.1-2 Birds of Conservation Concern with Potential to Occur in the Project Vicinity			
Species	**Season Present**	**Preferred Habitat**	**Assessment of Potential Impacts**
Wood thrush *Hylocichla mustelina*	Migration	Occurs primarily in mature deciduous woodlands near streams during the breeding season. Nests in deciduous trees approximately 10 to 15 feet above the ground. During migrations, utilizes various kinds of woodlands.	Suitable habitat exists in the Project area; however, individuals potentially present during construction would likely avoid the area or displace to similar adjacent habitats.
Yellow Rail *Coturnicops noveboracensis*	Wintering	Winter in shallow coastal marshes dominated by sedges, rushes, bulrushes and grasses.	Suitable habitat exists in the Project area; however, individuals potentially present during construction would likely avoid the area or displace to similar adjacent habitats.

Sources: FWS, 2022b; National Audubon Society, 2022; Cornell Lab of Ornithology, 2022

Important Bird Areas

Important Bird Areas (IBAs) are sites that provide essential habitat for one or more species of bird. IBAs include sites for breeding, wintering, and/or migrating birds. IBAs may cover a few acres or thousands of acres, but usually they are discrete sites that stand out from the surrounding landscape. These areas are usually large enough to protect a viable population of a species or community during part of its life cycle. IBAs may include public or private lands, or both, and they may be protected or unprotected (National Audubon Society, 2021a). The FERC and FWS MOU requires that agencies and companies identify measures to protect, restore, and manage, as practicable, IBAs and other significant bird sites that occur on lands impacted by a project.

The Project would cross the Coastal Prairie IBA between the CP Express Pipeline MP 28.0 to MP 45.5, which includes the Moss Lake Compressor Station. As noted in section 4.6.4, the Project would not cross coastal prairie habitat identified by the LDWF WDP. This Coastal Prairie IBA is primarily comprised of private land, but it does encompass a portion of the Cameron Prairie NWR. More than half of the IBA is used for agricultural purposes, including rice cultivation (National Audubon Society, 2021a). The IBA is at the convergence of the Central and Mississippi flyways and provides habitat to BCCs. The Coastal Prairie IBA also provides habitat for waterfowl, shorebirds, raptors, and wintering grassland birds. Typical bird species found in the IBA include great egret, little blue heron, wood stork (*Mycteria americana*), white ibis (*Eudocimus albus*), roseate spoonbill (*Platalea ajaja*), white-faced ibis (*Plegadis chihi*), whimbrel (*Numenius phaeopus*), stilt sandpiper (*Calidris himantopus*), long-billed dowitcher (*Limnodromus scolopaceus*), northern harrier (*Circus hudsonius*), short-eared owl (*Asio flammeus*), red-tailed hawk, white-fronted goose (*Anser albifrons*), northern pintail (*Anas acuta*), green-winged teal, Le Conte's sparrow (*Ammospiza leconteii*), and Henslow's sparrow(*Centronyx henslowii*). Conservation issues affecting the IBA include conversion of rice crops to sugarcane (and the associated loss of inundated habitat), agricultural runoff, habitat fragmentation, invasive species, and urban development.

The Chenier Plain IBA is between the CP Express Pipeline MP 45.5 and MP 85.4, and includes the Terminal Facilities. This IBA includes four NWRs (Cameron Prairie, Lacassine, Sabine, and Bayou Teche NWRs); three state wildlife refuges (Rockefeller, State, and Marsh Island Wildlife Refuges); one conservation area; (White Lake Wetlands Conservation Area); and one state park (Cypremort Point State Park) (National Audubon Society, 2021a). The Project would not cross any of these resources. A small, but disproportionately important feature, of this IBA is the Louisiana Chenier Plain, which is a complex mixture of wetlands, uplands, and open water that extends about 200 miles from Galveston Bay, Texas, to Vermilion Bay, Louisiana (FWS, 2021c). We received a comment from the public expressing concern for the Chenier Plain coastal ecosystem. The Chenier Plain provides habitat for a large variety of wintering waterfowl, breeding wading birds, and migratory land birds. Cheniers, which are forested relic beach ridges, attract thousands of trans-Gulf migrant birds during their peak migratory months of April to May and August through October. The cheniers offer the birds an important stop-over on their migration (COE, 2010b). Typical bird species found within this IBA include gull-billed tern (*Gelochelidon nilotica*), long-billed dowitcher, mottle duck, northern harrier, piping plover (*Charadrius melodus*), ring-necked duck (*Aythya collaris*), roseate spoonbill, American white pelican (*Pelecanus erythrorhynchos*), neotropic cormorant, great blue heron, tricolored heron (*Egretta tricolor*), little blue heron (*Egretta caerulea*), great and snowy egret (*Egretta thula*), black-crowned and yellow-crowned night heron (*Nycticorax nycticorax*, *Nyctanassa violacea*) , white and white-faced ibis, yellow rail (*Coturnicops noveboracensis*), least bittern (*Ixobrychus exilis*), American coot (*Fulica americana*), common moorhen (*Gallinula chloropus*), purple gallinule (*Porphyrio martinicus*), and black-necked stilt (*Himantopus mexicanus*). Conservation issues affecting the IBA include coastal erosion and wetland loss; degradation of habitat due to conversion to cattle pasture; and invasive species.

We received a comment from multiple individuals on the draft EIS expressing concern regarding the Project's impacts on cheniers. CP Express conducted field surveys to verify the existence of cheniers and other features identified on agency databases. No cheniers were identified within the Project area during field surveys. The closest occurrence of cheniers was identified approximately 0.6 mile from the Project. Further, the cheniers did not contain suitable habitat for the Coastal Live Oak-Hackberry Forest, which is discussed in section 4.6.4.

There are no designated IBAs along the Enable Gulf Run Lateral.

Bald and Golden Eagles

The bald eagle was officially removed from the federal threatened and endangered species list in 2007, but is still protected under the federal BGEPA as well as the MBTA. The BGEPA protects bald and golden eagles by prohibiting anyone—without a permit issued by the Secretary of the Interior—from "taking" a bald or golden eagle, including their parts, nests, or eggs (16 USC 668−668c). Bald eagles typically nest in large trees near coastlines, rivers, or lakes that support adequate foraging in winter and early spring. Major threats to this species include habitat alteration, human disturbance, and environmental contaminants (particularly organochlorine pesticides and lead). Furthermore, bald eagles are vulnerable to disturbance during courtship, nest building, egg laying, incubation, and brooding. Disturbance during these periods may lead to nest abandonment, cracked and chilled eggs, and exposure of eaglets to the elements.

Golden eagles (*Aquila chrysaetos*) are mostly found in the western United States and are rare in Louisiana and eastern Texas (National Audubon Society, 2021b). According to data received from the LDWF WDP and TPWD Natural Diversity Database (NDD), no bald eagle or golden eagle nests have been documented within 2 miles of the Project; however, suitable nesting habitat for bald eagles occurs in the Project area based on the presence of trees near coastal marsh, rivers, and estuarine open water.

Impacts and Mitigation

We received several comments from the public and federal and state agencies during scoping periods and in response to the draft EIS expressing concern regarding the Project's potential impacts on migratory birds. All vegetated habitat throughout the Project area has the potential to support various migratory bird species; therefore, potential impacts on migratory birds would include the temporary and permanent loss of habitat associated with the removal of existing vegetation. The greatest potential to impact migratory birds would occur if construction activities such as grading, tree clearing, and construction noise take place during the nesting season. This could result in the destruction of nests and mortality of eggs and young birds that have not yet fledged. Additionally, forest fragmentation generally can have negative effects on birds through dispersal barriers, absence of suitable microhabitats, small population size, and edge effects (DeGraaf and Healy, 1990). Construction would also reduce the amount of habitat available for resources such as foraging and predator protection for migratory birds and would temporarily displace birds into adjacent habitats, which could increase the competition for food and other resources. This in turn could increase stress, susceptibility to predation, and negatively impact reproductive success. Migratory birds could also be affected during operations that permanently convert wetlands and scrub-shrub habitat to developed land or converted to a pipeline easement. The reduction in available habitat could result in increased competition, a potential increase in parasitic bird species, and ongoing disturbances associated with periodic mowing and other right-of-way maintenance activities. In addition, potential impacts specific to migratory birds include loss of habitat and injury or disorientation due to artificial illumination. Many migratory birds use natural light from the sun, moon, and stars for navigation. Artificial lighting such as that associated with permanent aboveground facilities or used during 24-hour construction activities can hide natural light sources, having unknown effects on birds at the population level.

We received comments from TPWD on the draft EIS recommending measures to minimize the Project's impacts on migratory birds. Permanent conversion of forested habitat to non-forested habitat would be minimized by installing most of the proposed pipeline adjacent to existing rights-of-way, which is maintained in an herbaceous state. Project-specific vegetation clearing during site preparation is projected to be completed outside the nesting window of March 1 through July 15, as recommended by TPWD. CP2 LNG and CP Express' *Migratory Bird Nesting Impact Mitigation Plan*[62] includes details related to migratory bird mitigation. The migratory bird nesting window of March 1 to July 15 is based on previous consultations and agreements with the FWS regarding the Calcasieu Pass LNG Project and is the same period referenced by the TPWD in their comments on the draft EIS. TPWD also recommended completing nest surveys for the Project area no more than five days prior to clearing activities if clearing must occur during nesting season and recommended a general 100-foot vegetative buffer around any active nests until the eggs have hatched and the young have fledged. Where clearing cannot occur outside of the nesting window, CP2 LNG and CP Express have committed to conducting a walk-through site survey of the Project workspace approximately four weeks prior to March 1 to determine avian species present within the Terminal Facilities footprint and prior to construction along the Pipeline System. The survey would be considered valid for 14 days. If active nests are detected, the implementation of auditory, visual, and/or direct human intervention techniques to deter the presence of wildlife would cease and an appropriate buffer would be established so that the nest remains undisturbed until a monitor confirms that the young have fledged. CP2 LNG and CP Express have committed to setting a nominal 25-foot construction buffer around any active nest unless a different buffer width is specifically identified for a particular bird species. If no active nests are detected during surveys and site preparation has not started by February 15, auditory, visual, and/or direct human intervention techniques would be implemented within areas of high nesting potential, based on the results of the field surveys described above. These measures would be implemented to discourage the nesting of migratory birds. In accordance with the MBTA and consistent with the 2011 MOU between FERC and the FWS, FWS has jurisdiction over migratory birds. CP2 LNG and CP Express stated that support for the Migratory Bird Nesting Impact Mitigation Plan, nest buffers, and pre-construction nest survey schedule would be confirmed during ongoing consultations with the FWS prior to construction.

[62] CP2 LNG and CP Express' *Migratory Bird Nesting Impact Mitigation Plan* can be viewed on FERC's eLibrary as Attachment General 1-n of accession number 20220729-5342.

During operation in forested upland areas, CP Express would maintain a 25-foot-wide right-of-way, which would result in a permanent conversion of habitat in forested areas to herbaceous or shrub habitat.

We received comments from federal and state agencies regarding potential impacts on colonial waterbirds. There is potentially suitable habitat for waterbird nesting rookeries within 1 mile of the Project (Pipeline System), though no nests or rookeries were observed during field surveys of the construction workspace and its vicinity. As such, the Project avoids known rookery locations. CP2 LNG and CP Express would conduct preconstruction nest surveys for the Project approximately four weeks prior to March 1 (which would be considered valid for 14 days). If nesting waterbirds are observed, LDWF guidelines state that all activities occurring within 1,000 feet of nesting wading birds (e.g., herons, egrets, ibis), should take place outside of the wading bird nesting season between September 1 and February 15. For colonies containing nesting gulls (*Laridae* spp.), terns, and/or black skimmers (*Rynchops niger*), construction activities within 650 feet (or 2,000 feet for brown pelicans [*Pelecanus occidentalis*]) should take place between September 16 and April 1, outside of the nesting season for these species. If the recommended time-of-year restrictions cannot be met, CP2 LNG and CP Express would consult with the LDWF no more than 2 weeks prior to the commencement of construction.

We received comments from RESTORE concerning the effect of flaring on birds during migration. The Project would include the installation of a 197-foot-high warm/cold flare structure containing two separate flare headers, a 70-foot-high marine loading flare, and a 70-foot-high low-pressure vent flare. The flares are used during start-up, shut-down, and non-routine venting of excess pressure. Start-up and maintenance events would be planned by CP2 LNG to avoid inclement weather when the risk of bird mortalities due to low visibility would be highest. Non-routine venting of the flares is anticipated to be intermittent and limited to approximately one occasion per year, as further discussed in section 4.13. In addition, planned maintenance events would be primarily scheduled during the summer months, outside of the spring and fall migration periods, further minimizing potential impacts on migrating birds. Additionally, CP2 LNG would utilize the *Conservation Measures for Operation of Flare Stacks* created by the FWS to minimize the potential impacts on migratory birds due to flaring events. These measures include avoiding flaring at night, avoiding flaring during low visibility, avoiding flaring during peak spring and fall migrations, and lighting the facility and flare stacks in accordance with FWS communication tower guidance. We conclude that the temporary flaring during commissioning activities, limited annual flaring, and CP2 LNG's commitment to implementing conservation measures and working with the FWS to avoid and reduce flaring impacts during operation would not represent a significant impact on migratory birds.

CP2 LNG and CP Express would comply with the requirements of the BGEPA. Because of the potential for bald eagles to be nesting in the Project area, CP2 LNG and CP Express would conduct preconstruction surveys to identify active bald eagle nests within 660 feet of the Project area. If active bald eagle nests are found, CP2 LNG and CP Express would follow appropriate mitigation measures according to the National Bald Eagle Management Guidelines to avoid impacts on individual bald eagles. We conclude that the overall impact on raptor would not be significant.

Overall, construction of the proposed Project would result in permanent, minor to moderate impacts on birds due to potential incidental take of birds, eggs, or nests during construction, as well as the loss of habitat in an area heavily used by birds during the migration period. CP2 LNG and CP Express would implement measures as necessary to decrease the risk of impacts on and the loss of habitat for migratory birds, thereby complying with the MBTA and the 2011 MOU between FERC and the FWS. In addition, we believe that CP2 LNG and CP Express would appropriately minimize impacts on sensitive bird species along the Pipeline System and Terminal Facilities through use of the FWS-recommended clearing window. Based on these measures, as well as the installation of most of the proposed pipeline adjacent to existing rights-of-way and the availably of existing habitat in the vicinity of the Project facilities we conclude the

Project would not result in population-level impacts on migratory birds or significant measurable negative impacts on their habitat.

However, we realize that use of the clearing window may not be fully practicable for Project facilities. As such, in these instances we believe that the loss of bird nests would be further limited with the implementation of applicable measures in the *Migratory Bird Nesting Impact Mitigation Plan*. We note that CP2 LNG and CP Express has stated that support for the *Migratory Bird Nesting Impact Mitigation Plan* would be confirmed during ongoing consultations with the FWS.

4.7.1.4 Sensitive or Managed Wildlife Habitats

The Sabine Island WMA in Calcasieu Parish would be crossed by the Project from MP 20.0 to MP 20.6. The East Cove Unit of the Cameron Prairie NWR is approximately 0.1 mile from the CP Express Pipeline at MP 69.1, but would not be crossed. No other sensitive or managed wildlife habitats, or habitats of concern, are within 2 miles of the proposed Project. Sensitive waterbodies are discussed in section 4.4.2.2; EFH is discussed in section 4.7.3; and critical habitat for federally listed species is discussed in section 4.8.

Sabine Island WMA

The Sabine Island WMA landscape varies from low terrain subject to annual flooding, to winding ridges. There are numerous bayous and sloughs throughout the 8,343-acre WMA. The majority of the forest cover is comprised of cypress-tupelo swamp, but there are also pine hardwood areas dominated by white oaks, willow oak, sweetgum, and loblolly pine. Popular game species include squirrels, rabbits, deer, woodcock, and waterfowl. Trapping for furbearers such as raccoon, opossum (*Didelphidae* spp.), mink, bobcat (*Lynx rufus*), and nutria is allowed in the WMA. Recreational and commercial fishing is allowed in the WMA year-round (LDWF, 2021d).

The Pipeline System would cross the Sabine Island WMA between MP 20.0 and MP 20.6. The pipeline crossing would be completed using the HDD construction method, beginning at MP 19.90 and ending at MP 21.07, which would avoid direct ground-disturbing activities within the WMA. Indirect impacts on the Sabine Island WMA may occur during construction of the proposed Project, including disturbance from increased noise from construction.

As with any of the Project's HDDs, there is a possibility for an inadvertent release of drilling fluid. Bentonite clay is non-toxic to aquatic organisms (Hair et al., 2002); however, bentonite clay sediment can interfere with oxygen exchange through gills and can adversely affect filter feeders. The Project-specific HDD Monitoring and Contingency Plan outlines the procedures that CP Express would follow to minimize the potential for an inadvertent release of drilling fluid. The HDD Monitoring and Contingency Plan also identifies measures for undertaking a prompt and effective cleanup if a release occurs. Therefore, in the event of an inadvertent release, the effects on wildlife populations and habitats are expected to be minor, localized, and short term.

The Project would require a Permit and Lease for State Water Bottoms to cross the Sabine Island WMA; therefore, CP Express is coordinating with the Louisiana Office of State Lands to seek approval for the crossing, which CP Express anticipates obtaining in 2023. Additionally, CP Express obtained a Letter of Authorization from the LDWF for the Sabine Island WMA on June 29, 2022 for approval of the crossing.

East Cove Unit of Cameron Prairie NWR

The Cameron Prairie NWR consists of 14,927 acres of intermediate and brackish marshes that is subdivided into the East Cove Unit and the Gibbstown Unit. The East Cove Unit is a portion of a 64,000-acre marsh restoration program called the Cameron Creole Watershed Project. Within the unit, water control structures and a protection levee assist with improving marsh conditions and marsh erosion by controlling saltwater intrusion. Typical fish within the Cameron Prairie NWR include gar (*Lepisosteidae spp.*), catfish (*Siluriformes* spp.), flounder (*Pleuronectoidei* spp.), and redfish (*Sciaenops* spp.). Public access to the East Cove Unit occurs year-round with the exception of the Louisiana Waterfowl hunting season and when the Grand Bayou Boat Bay is closed (FWS, 2022c). Further discussion on impacts to the East Cove Unit of Cameron Prairie NWR is section 4.9.4. Impacts on the crabbing industry is further discussed in section 4.10.4. Construction of the Project would not directly impact the NWR; however, there could be visual impacts during construction in this area, including increased numbers of construction personnel, equipment, and materials, removal of vegetation cover, and disturbance of soil. Noise impacts during construction would be similar to those discussed above in for the Sabine Island WMA. Construction impacts would generally cease following the completion of construction and restoration.

4.7.1.5 Wildlife Conclusion

We conclude that constructing and operating the Project would not significantly affect wildlife populations and wildlife habitat. CP2 LNG and CP Express would minimize impacts on wildlife and habitat by implementing its mitigation plans for impacts on wildlife habitat, by following the measures outlined in the Project-specific Plan and Procedures, and by adhering to avoidance and minimization methods recommended by the FWS and LDWF.

4.7.2 Aquatic Resources

4.7.2.1 Existing Aquatic Resources

The Project area includes freshwater, estuarine, and marine waterbodies that are classified as perennial, intermittent, ephemeral, or open water (see section 4.4.2), as well as freshwater and estuarine wetlands. While perennial waterbodies are typically capable of supporting populations of fish and macroinvertebrates, intermittent and ephemeral waterbodies provide limited habitat value for aquatic resources due to restricted water flow regimes. Estuarine wetlands provide year-round warmwater habitat for aquatic resources, and mudflats provide habitat for a variety of invertebrate species and microfauna. All of the fisheries in the Project area support warmwater species. Table 4.7.2-1 lists representative finfish and crustacean species found in the vicinity of the Terminal Facilities and Pipeline System, and identifies the salinity regime in which they occur.

Table 4.7.2-1

Typical Fish Species in Louisiana and Texas in the Project Area

Species	Scientific Name	State		Salinity Regime
		Louisiana	Texas	
FISH				
Alligator gar	*Atractosteus spatula*	X	X	Freshwater
American eel	*Anguilla rostrata*		X	Freshwater/Estuarine
American paddlefish	*Polyodon spathula*	X	X	Freshwater
Bay Anchovy	*Anchoa mitchilli*		X	Estuarine
Bigmouth buffalo	*Ictiobus cyprinellus*	X	X	Freshwater
Black buffalo	*Ictiobus niger*		X	Freshwater
Black bullhead	*Ameiurus melas*		X	Freshwater
Black crappie	*Pomoxis nigromaculatus*	X	X	Freshwater
Blacktail shiner	*Cyprinella venusta*		X	Freshwater
Blue Catfish	*Ictalurus furcatus*	X	X	Freshwater
Bluegill	*Lepomis macrochirus*	X	X	Freshwater
Bowfin	*Amia calva*	X	X	Freshwater
Chain pickerel	*Esox americanus*		X	Freshwater
Channel catfish	*Ictalurus punctatus*	X	X	Freshwater
Common carp	*Cyprinus carpio*	X	X	Freshwater
Fathead minnow	*Pimephales promelas*		X	Freshwater
Flathead catfish	*Pylodictis olivaris*		X	Freshwater
Freshwater drum	*Aplodinotus grunniens*	X	X	Freshwater
Gizzard shad	*Dorosoma cepedianum*	X	X	Freshwater
Golden shiner	*Notemigonus crysoleucas*		X	Freshwater
Grass carp	*Ctenopharyngodon idella*		X	Freshwater
Gulf Menhaden	*Brevoortia patronus*		X	Saltwater
Largemouth bass	*Micropterus salmoides*	X	X	Freshwater
Longnose gar	*Lepisosteus osseus*		X	Freshwater
Red drum	*Sciaenops ocellatus*	X	X	Estuarine
Red shiner	*Cyprinella lutrensis*		X	Freshwater
Redear sunfish	*Lepomis microlophus*	X	X	Freshwater
Rio Grande cichlid	*Herichthys cyanoguttatus*	X	X	Freshwater
Shortnose gar	*Lepisosteus platostomus*		X	Freshwater
Smallmouth bass	*Micropterus dolomieu*		X	Freshwater
Smallmouth buffalo	*Ictiobus bubalus*		X	Freshwater
Southern flounder	*Paralichthys lethostigma*	X	X	Estuarine
Spotted bass	*Micopterus puntulatus*	X	X	Freshwater
Spotted gar	*Lepisosteus oculatus*		X	Freshwater/Estuarine
Spotted sea trout	*Cynoscion nebulosis*		X	Estuarine
Striped bass	*Morone saxatilis*		X	Freshwater/Estuarine/Saltwater
Texas shiner	*Notropis amabilis*		X	Freshwater
Threadfin shad	*Dorosoma petenense*		X	Freshwater
Walleye	*Sander vitreus*		X	Freshwater
Warmouth	*Lepomis gulosus*	X	X	Freshwater
White bass	*Morone chrysops*		X	Freshwater
White crappie	*Pomoxis annularis*	X	X	Freshwater
Yellow bass	*Morone mississippiensis*		X	Freshwater
Yellow bullhead	*Ameiurus natalis*		X	Freshwater
MOLLUSKS/CRUSTACEANS				
Apple Snail	*Pomacea maculate*	X	X	Freshwater
Asiatic clams	*Corbicula fluminea*	X	X	Freshwater
Blue Crab	*Callinectes sapidus*	X	X	Saltwater

Table 4.7.2-1 Typical Fish Species in Louisiana and Texas in the Project Area				
Species	**Scientific Name**	**State**		**Salinity Regime**
		Louisiana	**Texas**	
Brown Shrimp	*Farfantepenaeus aztecus*	X	X	Saltwater
Eastern Oyster	*Crassostrea virginica*	X	X	Saltwater
Red Swamp Crawfish	*Procambarus clarkia*	X		Freshwater
White Shrimp	*Litopenaeus setiferus*	X	X	Saltwater
Source: LDWF, 2021q; TPWD, 2021a; Herke et al, 1992				

Life histories of many Gulf of Mexico fish species can be characterized as estuarine-dependent because they typically spawn in open water, allowing their larvae to be carried inshore by currents. Juvenile fish generally remain in estuarine nurseries for about a year, taking advantage of the estuary's greater availability of food and protection, before returning to the Gulf of Mexico to either spawn or spend the remainder of their lives. Estuary-dependent species potentially occurring within the Project area include red drum, gray snapper (*Lutjanus griseus*), blue crab (*Callinectes sapidus*), and penaeid shrimp (*Penaeidae* spp.).

A bioassessment of the Neches Basin was conducted by the Inland Fisheries Division of the TPWD, which documented 66 species of freshwater fishes, 22 species of mussels, and 9 species of crayfish in the middle and lower Neches Basin (Robertson et. al, 2018). Approximately 89 species of freshwater fishes, 33 species of mussels, and 13 species of crawfish are found within the Sabine Basin (Lester, et. al., 2005). Approximately 75 species of freshwater fishes, 30 species of mussels, and 16 species of crawfish are found within the Calcasieu-Mermentau Basin (Lester, et. al., 2005).

Rivers, creeks, streams, and other waterbodies within the watersheds crossed by the Pipeline System are used for warmwater commercial and recreational fisheries. Waterbodies and wetlands that would be crossed by the Project are identified in sections 4.4.2 and 4.5.1. These waterways provide recreational fishing opportunities in Texas and Louisiana. In Louisiana, commercial freshwater and saltwater fishing opportunities exist for finfish, crawfish, crab, oyster, and shrimp. See sections 4.10.5.2 and 4.10.4.1 for further information on recreation and commercial fisheries, respectively.

The Terminal Site is on property that borders Davis Road and marine-based industrial facilities along Calcasieu Pass to the northwest, Cameron Wastewater Treatment Facilities, and Venture Global Calcasieu Pass, LLC's LNG Terminal to the west; state land along the Gulf of Mexico shoreline to the south; and private open land historically used for cattle grazing to the south and east. The Marine Facilities are on the southwest shoreline of Monkey Island, between the Calcasieu Ship Channel and Calcasieu Pass.

Saltwater in the Gulf of Mexico is denser than the fresh water flowing downstream in the Calcasieu River. During periods of low river flow, the saltwater moves upstream along the river bottom in the form of a wedge underneath less dense fresh water. As flows increase, the "saltwater wedge" is pushed back downstream to the Gulf of Mexico. To prevent the migration of saltwater from the Gulf further inland, the COE constructed a dam upstream of Lake Charles (about 14.8 miles northeast of CP Express Pipeline MP 50). The dam is designed to block saltwater from moving further upstream, while still allowing commercial navigation on the river (COE, 2021a).

The hydrology of the ship channel is affected by freshwater inflow from the Calcasieu River, Gulf of Mexico tides, precipitation, and wind effects on water level and directional flow (Louisiana Coastal Wetlands Planning Protection and Restoration Act Program, 2002). The LDWF manages the fish and wildlife resources within the approximately 202-mile-long Calcasieu River. According to the LDWF, the portion of the Calcasieu River below the Gulf Intracoastal Waterway (Intracoastal Waterway), including the Calcasieu Ship Channel, is designated the saltwater zone (LDWF, 2014).

The CP Express Pipeline from MP 49.6 to MP 85.4 and the Terminal Facilities are below the saltwater–freshwater line in Louisiana; these waters are considered saltwater according to commercial and recreational fishing regulations (LDWF, 2021c). While the saltwater–freshwater line in the Project area is primarily demarcated by the Gulf Intracoastal Waterway at MP 49.6, depending on the time of the year and the location of the saltwater wedge in the Calcasieu River, the Project region offers habitat for saltwater, freshwater, and estuarine species (i.e., despite the regulatory designation as saltwater, salinity levels in this area vary between freshwater and saltwater).

Coastal marsh (salt, brackish, intermediate, and fresh) habitat extends discontinuously from MP 49.6 to MP 85.4 (LDWF, 2021g). Salt marsh acts as nursery areas for larval forms of many marine organisms (e.g., shrimp, crabs, redfish, seatrout, and menhaden) and, along with brackish and intermediate marsh habitat (which is also important for larval forms of marine organisms such as shrimp, crabs, and menhaden), greatly enhances their production in adjacent waterbodies. Freshwater marsh acts as important nursery areas for many marine fish species, such as croaker, seatrout, black drum, and flounder (Lester et al., 2005). Brackish and intermediate marshes, along with estuarine wetlands and waterbodies, provide EFH for a number of species (see section 4.7.3). Section 4.5.1 describes the existing marshland habitats and their associated vegetation.

The two fish species most commonly harvested by commercial fishermen in the Calcasieu River basin are the alligator gar (*Atractosteus spatula),* which is adapted to varying salinities; and the blue catfish (*Ictalurus furcatus),* which is primarily a freshwater species, but tolerant of different conditions (LDWF, 2014). Other common fish species caught include largemouth bass (*Micropterus salmoides),* channel catfish (*Ictalurus punctatus),* and sunfish (*Lepomis* spp.).

The Calcasieu River is popular for freshwater and saltwater recreational fishing, but the lower 26 river miles (which includes the Calcasieu Ship Channel and Calcasieu Pass) is estuarine, with salinities ranging from 0.5 to 20 parts per thousand. Thus, the Calcasieu Ship Channel is not suitable for freshwater fish. Spotted sea trout (*Cynoscion nebulosis),* southern flounder (*Paralichthys lethostigma),* and red drum (redfish) (*Sciaenops ocellatus)* are commonly found in the lower portion of the river, including the ship channel (LDWF, 2014). Other estuarine species with the potential to occur in the Project area include bay anchovy (*Anchoa mitchilli)* and gulf menhaden (*Brevoortia patronus),* as well as shrimp, oysters, and blue crabs (LDWF, 2014). Exotic species observed in the Calcasieu River basin include grass carp (*Ctenopharyngodon idella),* Asiatic clams (*Corbicula fluminea),* and occasional aquarium releases (e.g., pacu and oscar) (LDWF, 2014).

Classification of fisheries habitat includes the consideration of chemical and biological characteristics of the waterbody in question, including water temperature and salinity, and whether the waterbody is part of a marine, estuarine, or freshwater system. Habitat classification also depends on the presence of certain fish species in the aquatic community that can use the habitat for reproduction.

4.7.2.2 Impacts and Mitigation

Terminal Facilities

We received multiple comments from the public and federal and state agencies during scoping periods and in response to the draft EIS expressing concern about potential adverse impacts on the aquatic environment and aquatic species resulting from construction and operation of the Terminal Facilities and, specifically, the impacts of artificial lighting, dredging, and pile driving. Impacts on fishery resources would occur primarily during construction of the Marine Facilities, about 1 mile north of the mouth of the Calcasieu Ship Channel. Both permanent and intermittent impacts would occur during operation of the Marine Facilities due to habitat changes from the placement of facilities and from operational activities. Impacts from construction and operation are not expected to be significant, as discussed in detail in the following subsections. Direct and indirect impacts on fisheries resources near construction may include impacts on water quality, alteration of habitat, aquatic fauna mortality, loss of food resources, disturbance, and pollutants.

Temporary increases in turbidity and downstream sedimentation within and immediately surrounding the construction work area may lead to temporarily reduced water quality. Aquatic habitat may be altered (e.g., benthic habitat may be lost from permanent pile placement). Mortality of aquatic fauna may occur due to contact with construction equipment, or mortality, injury, or altered behavior due to temporary exposure to elevated sound pressure levels and increased sediment loads. Temporary losses of food resources and temporary disturbance of normal activities and increased stress during in-water construction may occur.

Dredging

The predominant impacts on potential fish habitat are associated with construction of the Marine Facilities, which would involve excavating and dredging approximately 6.4 million cubic yards of material. Limited maintenance dredging would also be needed during operations. Dredging would be required to create the turning basins and berthing area. Excavating and dredging for the Marine Facilities would be conducted in accordance with federal and state permits, as well as other applicable laws and regulations. Dredging is not expected to impact submerged aquatic vegetation (SAV) due to the lack of habitat and absence during 2021 surveys, as further discussed below in section 4.7.3.3.

Most of the dredging and excavation of Monkey Island would convert existing terrestrial habitat into marine habitat. Physical injury or mortality may occur as a result of excavation and dredging, particularly in the case of less mobile marine species. Pilings for the LNG loading docks would be installed in the excavated and dredged area.

The LNG transfer lines and utilities constructed between the Terminal Site and the Marine Facilities would be completed using a combination of conventional and trenchless (HDD) construction techniques. However, CP2 LNG plans on installing the LNG transfer lines and utilities under Calcasieu Pass using the HDD technique, which would avoid disturbing the bed and banks of the waterbody.

We received comments during scoping periods and in response to the draft EIS from RESTORE regarding dredging timing restrictions during times of aquatic species migrations. Based on a migratory clock[63] developed by RESTORE, three migratory ‘pulses’ of various fish and crustaceans appear to occur during March and April, June and July, and September. Additionally, we received a comment from the LDWF expressing concern regarding potential impacts on aquatic species reproductions as well as commercial harvest seasons from dredging. CP2 LNG does not anticipate timing restrictions on dredging and, as currently proposed, would dredge 6 days a week for a period of 12 to 18 months. Once dredging of the berthing area is complete, CP2 LNG would install rock riprap to stabilize the dredged slope surrounding the new basin and minimize erosion. Adopting seasonal restrictions on construction dredging would leave the dredged slope and basin exposed to tidal, wind, and wave action over a longer period compared to the proposed schedule, with the potential for exacerbated sedimentation and turbidity. CP2 LNG would adhere to all COE and LDNR permit conditions to minimize impacts associated with dredging activities.

[63] The migratory clock prepared by RESTORE can be viewed at accession number 20220222-5066 on the eLibrary.

Additionally, periodic maintenance dredging by CP2 LNG would be required at the Marine Facilities during operation to maintain the depths required for LNG carriers and this activity would be consistent with periodic maintenance dredging by COE in the Calcasieu Ship Channel and Calcasieu Pass. If CP2 LNG's the proposed maintenance dredging occurs concurrently with COE's maintenance dredging of the Calcasieu Ship Channel and Calcasieu Pass, cumulative adverse impacts on EFH and benthic habitat in the Project area may occur (see section 4.14). Temporary increases in turbidity in the water column may affect the health of fish, shrimp, and other marine fauna through gill blockage caused by increased suspended sediment. Impacts on marine species (e.g., zooplankton, shrimp, fish, benthic organisms) as a result of Project maintenance dredging during operation are not expected to exceed impacts caused by current periodic COE maintenance dredging; therefore, the current impact profile would not change. Additionally, section 4.10.4 includes further information and discussion on concerns and potential Project impacts regarding commercial fisheries and shrimping.

Water quality impacts associated with excavation and dredging of the Marine Facilities may include temporary increases in total suspended solids and turbidity, increased dissolved nutrient levels, mobilization of existing contaminants in sediments, and decreased dissolved oxygen levels. These conditions could affect the movement and foraging behavior of some fish species and fish health. However, baseline conditions already reflect high turbidity and tidal and riverine flows in the Project area due to existing industrial activity, which would quickly dilute any incremental turbidity. Further discussion on dredging is provided in section 4.4.3.1. The area where the terminal would be sited is largely industrial and the channel was created to help promote industrial activity. Given the temporary nature of dredging and dredged materials placement operations, and because CP2 LNG would be required to implement the measures in applicable COE permits and the state water quality requirements for dredging and dredged material management, we conclude that dredging and dredged materials placement for construction and operation of the Terminal Facilities would have short-term and not significant impacts on fisheries resources.

Hazardous Materials

During construction and operation, hazardous materials such as fuel, antifreeze, and other fluids could inadvertently be released into adjacent aquatic habitat. To reduce the risk and severity of potential impacts from releases of hazardous materials to the Calcasieu Ship Channel, Calcasieu Pass, and adjacent surface waters, CP2 LNG would adhere to all permit conditions and the BMPs included in the Project-specific Procedures. The following BMPs would be used to prevent the deterioration of surface water resources during Project construction:

- All employees and contractors would receive training regarding the handling of fuel, oil, lubricants, and hazardous materials commensurate with their position.
- All equipment used in construction and operation would be inspected prior to use at the site and at regular intervals.
- Fuel trucks transporting fuel to onsite equipment would travel only on approved access roads or the approved right-of-way.
- All equipment at the construction sites would be fueled at least 100 feet from any waterbody, except for cases where there is no reasonable alternative as described in the Project-specific Procedures.
- No hazardous materials, including chemicals, fuels, and oils, would be stored within 100 feet of any waterbody, except as needed as described in the Project-specific Procedures.
- Spill response materials would be kept on site.

With implementation of the BMPs, impacts on fisheries from potential releases of hazardous materials would not be significant. Additionally, CP2 LNG and CP Express would implement the SPCC Plan to address spill response procedures for construction of the Terminal Facilities and Pipeline System. The SPCC Plan would also address remedial response actions to ensure that spills and leaks of hazardous materials are controlled and cleaned up before affecting groundwater or surface water quality. The SPCC Plan would include protective measures, such as designated fuel storage and refueling locations; spill containment structures for fuels, oils, and other fluids; spill response procedures; inspection and reporting procedures; and training for personnel. Additionally, LNG carriers are required to develop and implement a Shipboard Oil Pollution Emergency Plan (SOPEP) that includes measures to be taken when an oil pollution incident has occurred or a ship is at risk of one. Given these impact minimization and mitigation measures, we conclude that the probability of a spill of hazardous materials entering the Calcasieu Ship Channel is small and any resulting impacts on aquatic resources would be temporary and minor.

Pile-Driving

Pile driving during construction of the Marine Facilities would temporarily increase underwater noise levels within the Calcasieu Ship Channel. CP2 LNG would install piles ranging from 20 to 144 inches in diameter for the LNG loading docks and associated structures (table 4.7.2-2). The piles would be placed using a combination of vibratory and impact pile driving, during daylight hours. The piling crew is anticipated to work 10 hours per day, 6 days per week. Each pile installation relying solely on impact hammer would require approximately 4 hours of continuous driving. The anticipated duration of pile driving activities for the Marine Facilities would be approximately 6 months.

Table 4.7.2-2

Marine Facilities Pile Driving Summary

Facility/Pile Size and Type	Number of Piles	Strikes/Minutes per Pile	Piles per Day	Installation Method
144-inch-diameter steel [a]	1	12,000 strikes	1	Impact Hammer
120-inch-diameter steel [a]	17	12,000 strikes	1	Impact Hammer
54-inch-diameter steel	96	2,400 strikes	2.5	Impact Hammer
48-inch-diameter steel	130	2,400 strikes	2.5	Impact Hammer
20-inch-diameter steel	4	60 minutes	2	Vibratory Driver
AZ Sheet Pile – steel	194	30 minutes	4	Vibratory Driver

We received a comment from RESTORE expressing concern regarding the Project's noise impacts on aquatic species from pile driving. Noise created by pile driving activities can physically injure animals or change animal behavior in the affected areas. Animals can be physically injured in two ways. First, immediate adverse effects can occur if a single noise event exceeds the threshold for direct physical injury. Second, adverse physical effects can result from prolonged exposure to noise levels that exceed the daily cumulative sound exposure level for the animals. Noise can also interfere with an animal's behavior, such as migrating, feeding, resting, or reproducing, and such disturbances could constitute adverse behavioral effects.

When an impact hammer strikes a pile, a pulse is created that propagates through the pile and radiates sound (or pressure) into the water, the ground substrate, and the air. Pulsed sounds underwater are typically high-volume events that have the potential to cause hearing injury. Vibratory pile driving produces continuous, non-pulsed sounds that can be tonal or broadband. In terms of acoustics, the sound pressure wave is described by the peak sound pressure level (PEAK), which is the greatest value of the sound signal, the root-mean-square pressure level (RMS), which is the average intensity of the sound signal over time), and the sound exposure level (SEL), which is a measure of the energy that takes into account both received level and duration of exposure. Further, the cumulative sound exposure level (SEL_{CUM}) is the measure of energy that takes into account the received sound pressure level over a 24-hour period. For underwater sounds, a reference pressure of 1 micropascal (µPa) is commonly used to describe sounds in terms of decibels. Thus, 0 decibels (dB) on the decibel scale would be a measure of sound pressure of 1 µPA. NMFS has determined that there are no PEAK potential effects to ESA-listed sea turtles, fishes, and marine mammals resulting from continuous, non-pulsed sounds associated with vibratory pile-driving. Further, NMFS has determined that there are no SEL_{CUM} potential effects to ESA-listed fishes resulting from continuous, non-pulsed sounds associated with vibratory pile-driving.

NMFS uses the U.S. Navy Phase III criteria for all noise thresholds (U.S. Department of the Navy, 2017). As of December 2021, potential effects to ESA-listed sea turtles, fish species, and marine mammals may occur when impact and vibratory pile driving produces sounds that exceed the following thresholds in table 4.7.2-3. Below, PEAK and RMS are referenced to dB re: 1 µPA, the relative unit used to specify the intensity of sound underwater. Further, SEL and cumulative SEL are referenced to dB re: 1 μPA_2 per second. The NMFS Multi-species Pile Driving Tool was utilized to calculate the radii of physical injury and behavioral effects on ESA-listed species based on these measurements of underwater sound. Impacts on both ESA and non-ESA-listed species would be expected to be similar.

Table 4.7.2-3

Underwater Noise Thresholds for Fish, Marine Mammals, and Marine Turtles During Pile Driving Activity

Functional Hearing Group	Vibratory Pile Disturbance Threshold	Vibratory Pile Threshold	Impact Pile Disturbance Threshold	Impact Pile Injury Threshold
Fish <2 grams [a]	150 dB_{RMS}	N/A	150 dB_{RMS}	206 dB_{PEAK} 183 dB SEL_{CUM}
Fish >2 grams [a]	150 dB_{RMS}	N/A	150 dB_{RMS}	206 dB_{PEAK} 187 dB SEL_{CUM}
Mid-frequency Cetaceans [a]	120 dB_{RMS}	198 dB SEL_{CUM}	160 dB_{RMS}	230 dB_{PEAK} 185 dB SEL_{CUM}
Marine Turtles [a]	175 dB_{RMS}	220 dB SEL_{CUM}	175 dB_{RMS}	232 dB_{PEAK} 204 dB SEL_{CUM}

[a] Source: NOAA NMFS SERO Multi-Species Pile Driving Calculator, 2022.

N/A: Not Applicable

Units: dB = decibel; Peak = peak sound pressure (re: 1 µPa), unweighted; RMS = root-mean-square sound pressure (re: 1 µPa), unweighted; SEL_{cum} = cumulative sound exposure level (re: 1 μPa_2/Sec), weighted according to functional hearing group.

The noise analysis when consulting with NMFS evaluates the potential for physical injury and behavioral effects to the ESA-listed fish, sea turtles, and marine mammals that NMFS believes may be affected by the proposed action (for further discussion on ESA-listed species see section 4.8.1). The proposed action occurs in an open-water environment to a channel, of which channels act as a confined space for noise propagation. NMFS defines an open-water environment as any area where an animal would be able to move away from the noise source without being forced to pass through the radius of noise effects, while a confined space is any area that is confined by a natural shoreline that would effectively serve as a barrier or otherwise prevent an animal from exiting the area. That is, in order for the animal to move away from the noise source, the animal would be forced to pass through the radius of noise effects. Any potential effects of pile driving noise from other proposed pile types and methods would not exceed those described below. Therefore, the potential pile driving noise effects from the other proposed pile types and methods are expected to occur within a radius of that size or smaller, if any, and would result in, at most, the potential effects described below.

Underwater noise pressure levels generated by pile driving can affect aquatic fauna, including sea turtles, marine mammals, and fish. Organisms that remain within the area in which the piles would be installed may suffer injury or mortality. For purposes of this analysis, examples of injury include permanent hearing loss and mortality. Examples of behavioral disturbance include movement away from feeding grounds, temporary injuries, increased vulnerability to predators, inability to communicate, and inability to sense the physical environment

Table 4.7.2-4 provides typical underwater sound pressure levels produced by proposed pile type and installation methods. Sound pressure is expressed using three different measurement units: peak decibels (dB_{PEAK}), root mean square decibels (dB_{RMS}), and the sound exposure level (dB SEL).

Table 4.7.2-4

Typical Underwater Sound Pressure Levels Produced by Proposed Pile Types and Installation Methods

Type of Pile and Installation Method	Average of Observed Sound Pressure Levels [a]		
	Peak (dB_{peak})	dB_{RMS}	dB SEL
Steel/Impact Hammer			
144-inch-diameter steel [a]	199	183	169
120-inch-diameter steel [a]	220	205	195
54-inch-diameter steel	207	192	182
48-inch-diameter steel	213	192	179
Steel/Vibratory Driver			
20-inch-diameter steel	196	158	158
AZ Sheet Pile – steel	177	163	163

Source: California Department of Transportation, 2020
Abbreviations: dB_{RMS} = root mean square decibels re: 1 micropascal (1 µPa); dB_{PEAK} = peak decibels re: 1 µPa; dB SEL = single strike or vibratory duration sound exposure level re: 1 µPa2/Sec
[a] Sound pressure levels measured at a reference distance of 10 meters from the source.

The distances required to attenuate sound pressure levels below the respective behavioral effect thresholds and permanent and temporary injury-level effect thresholds are summarized by species group in table 4.7.2-5. The distances assume that 10-dB mitigation would be used in the form of double bubble curtains around the larger steel piles (144-inch and 120-inch). If the mitigation were to perform as specified, these threshold distances represent the likely maximum extent of potentially harmful underwater noise impacts for each species group from each type of pile driving based on peak and cumulative sound exposures. Noise propagation would be constrained by the surrounding shoreline and the Calcasieu Ship Channel's stone jetties where it opens into the Gulf of Mexico, meaning that the zone of noise effects would be restricted to the ship channel and a cone-shaped impact area. Much of the sound energy would likely be absorbed by the channel bed, surrounding shorelines, and jetties before reaching the threshold distances in table 4.7.2-5. In addition, the injury-level effect threshold distance calculations shown in table 4.7.2-5 assume that an individual subject would remain within this maximum SEL_{CUM} exposure area over an entire in-water workday, and therefore represent an improbable worst-case scenario for potential injury-level effects. The actual safe distance would vary depending on the sensitivity and the typical movement speed of each individual species and life stage in the affected habitat type and would probably be significantly less than the maximum threshold difference.

Table 4.7.2-5

Threshold Distances for Underwater Noise Disturbance and Injury Level Effects on Fish, Marine Mammals, and Marine Turtles Likely to Occur in the Project Vicinity – With Temporary Noise Attenuation (TNAP) Mitigation In Place (feet)

Pile Type/Installation Method	Mid-Frequency Cetaceans			Fish				Marine Turtles		
	Peak	Cumulative	Behavioral Disturbance	Peak Injury	Physical Injury (>2g)	Physical Injury (<2g)	Behavioral Disturbance	Peak Injury	Physical Injury	Behavioral Disturbance
144-inch-diameter steel/impact hammer	0.3	71	1,120	11	606	606	5,200	0.2	80	112
120-inch-diameter steel/impact hammer	0.3	71	1,120	11	606	606	5,200	0.2	80	112
54-inch-diameter steel/impact hammer	1	330	4,460	38	4,460	4,460	20,701	0.7	370	446
48-inch-diameter steel pile/impact hammer	1	330	4,460	38	4,460	4,460	20,701	0.7	370	446
20-inch-diameter steel/vibratory driver	N/A	1	5,200	N/A	N/A	N/A	52	N/A	0.4	1
AZ Sheet Pile steel/vibratory driver	N/A	4	24,135	N/A	N/A	N/A	241	N/A	2	5

N/A – Not applicable; Threshold is not reached by the activity.
Injury and behavioral disturbance distances based on NOAA SERO Multi-Species Pile Driving Calculator, Version 1.2 Multi-Species: 2022

Potential noise impacts on aquatic fauna may be lessened because the Marine Facilities are on a heavily traveled portion of the Calcasieu Ship Channel, where background noise levels reflect a high level of vessel activity, including multiple large ships and barges visiting the Port of Lake Charles. Also, in-stream noise at the Marine Facilities is expected to quickly attenuate to background levels due to the local sinuosity of the channel banks, which consequently function as barriers to sound traveling through the water. Much of the noise energy would be absorbed by the sediments comprising the channel banks and bed before reaching the threshold distances identified in the tables. For sound waves to travel many thousands of feet, they would have to bounce multiple times off the channel's banks, which are comprised of unconsolidated sediments or revetment. It is likely that sound energy would be absorbed each time the sound waves bounce off the banks, thereby reducing the intensity of each successive wave.

In order to mitigate the potential impacts on marine fauna caused by pile installation, CP2 LNG stated they would implement the use of ramp-up procedures (i.e., a soft start) at the beginning of each pile installation or when a delay of 15 minutes or more has occurred to minimize its impact on marine species. CP2 LNG stated they may implement other noise attenuation measures, such as bubble curtains, modification of pile impact frequency, and placement of cushion blocks consisting of wood, nylon, or micarta between the pile and hammer. In order to substantially reduce underwater sound pressure levels produced by pile driving, and in order to identify impact distances as a result of specific mitigation, we included a recommendation in the draft EIS that CP2 LNG utilize temporary noise attenuation pile mitigation. In response to our recommendation and through consultation with NMFS, CP2 LNG has committed to utilizing double bubble curtains around 144-inch-diameter and 120-inch diameter piles during impact pile driving activities, providing an overall 10 dB reduction (5 dB reduction per sound curtain).

CP2 LNG would also utilize biological monitors, such as a Marine Mammal Observer, to monitor for protected marine species, including the West Indian manatee, sea turtles, and giant manta rays during marine construction. A 150-foot buffer would be established around all dredging or marine pile driving locations, where dedicated observers would maintain watch for sea turtles and other protected species for 20 minutes prior to the onset of and continuously during pile driving activities. If a sea turtle or other protected species is spotted within the buffer zone, in-water work would not start or, if underway, would be halted until the animal moves outside of the buffer zone or has not been observed in the area for 30 minutes.

Based on the proposed mitigation measures, CP2 LNG's ongoing Section 7 consultation with NMFS, and a letter from NMFS filed on the docket on March 28, 2023,[64] the proposed Project is not likely to adversely affect marine species occurring in the Project vicinity during the in-water construction period.

We anticipate that the implementation of soft starts and noise attenuation measures such as double bubble curtains would minimize harassment of fish during pile driving activities and any impacts would be temporary; therefore, with the implementation of noise mitigation measures developed in consultation with NMFS, we conclude that the overall impacts on fish would not be significant. Impacts on federally listed threatened and endangered species (i.e., West Indian manatee, giant manta ray, and marine turtle species) and marine mammals resulting from pile driving activities are further discussed in sections 4.8.1 and 4.8.3, respectively.

<u>Site Construction and Stormwater Runoff</u>

Terminal Site construction activities would be designed to direct stormwater discharges to holding basins and filtration devices, allowing sufficient retention time to preclude high sediment loads from reaching receiving waters. Portions of the Terminal Site where the topography remains unchanged may

[64] This document can be viewed on the FERC eLibrary under accession number 20230328-5189.

retain natural drainage. CP2 LNG would place gravel or other suitable material for stormwater control, in addition to using other controls. During operation, in process areas and other areas of the Terminal Site where liquid hydrocarbons are present, the stormwater system design would provide for the capture of potentially oily stormwater. If required, any oily stormwater captured would be treated prior to discharge. Stormwater would be directed via piping to several energy-dissipating aggregate beds just outside the floodwalls, from which the water would flow through a channelized conveyance system to Calcasieu Pass.

During and after construction of the Terminal Facilities, the conversion of land to impervious surface areas would increase the volume of stormwater runoff in the area. Water quality impacts would be minimized, as much as practicable, through the implementation of applicable BMPs. Stormwater treatment and discharge facilities would be designed and operated in accordance with applicable regulations and permits, including the LPDES regulations. Based on these measures and regulations and permits, indirect impacts on aquatic species due to stormwater discharges are not expected to be significant. We conclude operational water quality impacts are minimal.

<u>Vessel Traffic</u>

Vessel traffic in the Calcasieu Ship Channel during construction and operation of the Marine Facilities would increase underwater noise levels. Construction activities would be temporary and would occur in areas that experience underwater noise from commercial shipping and recreational boaters. During Terminal Facilities operations, engine noise produced by LNG carriers would result in temporary increases in underwater noise levels near transiting ships. Impacts on aquatic resources due to increased noise levels would vary by species. Large and relatively slow vessels have less of an impact on marine mammals than quieter, faster vessels, as noise associated with these vessels can startle wildlife in the area. In addition, these larger slower vessels typically emit lower sound frequencies than smaller vessels, such as those used for leisure. Lower frequency sounds tend to have less impact on smaller cetaceans (e.g., dolphins) (Whale and Dolphin Conservation Society, 2004). The aquatic resources present within the LNG carrier routes are likely accustomed to regular fluctuations in noise levels from ongoing industrial and commercial shipping activities. Impacts on marine mammals are further discussed in sections 4.8.1 and 4.8.3. The mobility of marine species and their ability to leave any area of noise disturbance would minimize impacts from vessel traffic and the construction of the Marine Facilities. Due to the temporary and intermittent nature of these noise sources, we conclude that construction operational noise impacts from vessel traffic on fisheries would not be significant.

LNG carriers could collide with marine species such as manatees, whales, sea turtles, and rays, which might cause injury or mortality, although such collisions are unlikely where established, well-traveled, deep-water shipping lanes are used. The mobility of free-swimming marine species and their ability to leave any area of disturbance would minimize impacts from LNG carrier traffic.

To minimize potential collisions between vessel traffic and marine species, the Southeast Region of NOAA Fisheries has developed *Vessel Strike Avoidance Measures* (NMFS, 2021e). These are standard measures to be implemented to reduce the risk associated with vessel strikes or disturbance of marine species. The measures include, but are not limited to, maintaining watch for protected species; maintaining a buffer zone if species are sighted; reducing engine speed; and reporting collisions or any sightings of injured or dead species protected under federal law. Although LNG carriers are outside of our jurisdiction, CP2 LNG would provide the *Vessel Strike Avoidance Measures* to LNG carrier captains, who would be responsible for implementing the measures. In addition, to address the potential marine pollution impacts associated with offshore spills of fuel, lubricants, or other hazardous materials, the Coast Guard requires LNG carriers to develop and implement a SOPEP, which includes measures to be taken if an oil pollution incident occurs or a ship is at risk of one.

CP2 LNG estimates that between 200 and 400 LNG carriers would visit the Terminal Facilities annually, which would represent a minor increase in the level of existing ship traffic in the Calcasieu Ship Channel; as such, we conclude operation impacts on fisheries resources (including those associated with noise as discussed above) would be negligible.

Ballast Water

LNG carriers could affect fisheries and habitat within the Calcasieu Ship Channel during operation through the discharge of ballast water below the waterline from one or more sea chests towards the bottom of the ship's hull within the LNG berthing area. CP2 LNG anticipates a ballast water discharge of 11 billion gallons per call for vessels with 120,000 $m^3$of cargo capacity and 17 billion gallons per call for vessels with 210,000 $m^3$of cargo capacity just below the surface. Such discharges could theoretically impact ambient water quality through physio-chemical profile (e.g., pH, temperature, salinity, dissolved oxygen) changes, or resuspension of sediment. Additionally, LNG carriers can harbor a diverse assemblage of marine organisms in ballast water that may be foreign and exotic to the carrier's port of destination. Invasive species may compete with native species for food and space, affect the overall health of an ecosystem, cause algal blooms and hypoxic conditions, and affect all trophic levels, resulting in a decline in biodiversity.

Ballast water discharged in the LNG berthing area by the LNG carriers would likely be composed of ocean water, which characteristically would have a different physico-chemical profile to the ambient water in the berthing area. The pH of ballast water is generally maintained between 8.1 and 8.5; the pH within the Calcasieu Ship Channel and ship channel ranges from 7.7 to 8.3 (COE, 2010a). Based on the small volume of discharged ballast water relative to the volume of ambient water, differences in temperature, salinity, pH, and dissolved oxygen levels are expected to be slight, minimizing adverse impacts associated with ballast water discharges.

As required by 33 CFR 151, Subpart D, vessels equipped with ballast water tanks and operating in United States waters are required to manage and control the discharge of nonindigenous (e.g., invasive) species. In addition, under 33 CFR 160, Subpart B, the Coast Guard Captain of the Port would ensure a vessel is compliant with the International Maritime Organization signatory conventions on ballast water treatment and can deny entry of any vessel into the navigable waters of the United States if a ballast water treatment and/or management system has failed to operate in accordance with type-approved certificates. These strategies include retaining ballast water on board, minimizing uptake or discharge at certain times or locations, and exchanging ballast water from coastal sources with mid-ocean seawater. With the implementation of these strategies, impacts are not expected to be significant.

Vessels calling on the Terminal Facilities would be required to adhere to the EPA and Coast Guard regulations that prevent the introduction of exotic species such as:

- limiting the concentration of living organisms in ballast water;
- washing anchors and anchor chains to remove organisms at their point of origin;
- removing fouling organisms;
- cleaning ballast tanks regularly; and
- disposing of any waste in accordance with regulations.

Based on the relatively localized, temporary and minor impacts and proposed adherence to regulations and BMPs, we have determined that impacts on aquatic resources due to ballast water would be negligible.

Cooling Water Discharge

During operation, LNG carriers berthed at the Marine Facilities would use water to cool the main engine, other machinery, and for hoteling services, which increase the temperature of the discharged water. The cooling water would be withdrawn from and then returned to the Calcasieu Ship Channel. Intake of water can result in the entrainment of aquatic resources.

Cooling water return temperatures vary widely depending on the type of LNG carrier and mode of operation. Fish and invertebrates within the immediate vicinity of the LNG carrier could be temporarily affected by this increase in temperature; however, many of the species present are mobile and would be expected to relocate to more suitable conditions during discharges. Discharges of cooling and hoteling water are regulated under the VIDA, which establishes a framework for the regulation of discharges incidental to the normal operation of a vessel under the CWA. Both the Coast Guard and EPA provide regulatory and enforcement oversight with respect to such discharges and their impacts. CP2 LNG would comply with the applicable VIDA regulations and Vessel General Permit standards for cooling and hoteling water.

During each visit, the smallest carriers would be docked at the Marine Facilities an average of 24 hours and the largest carriers would be docked an average of 36 hours. Using an average cooling water flow rate of 396,255 gallons per hour (FERC, 2019a), the volume of cooling water discharged from a berthed LNG carrier would be 9,510,120 gallons per day. This discharge volume is relatively small, representing less than 0.5 percent of the total volume of the proposed berthing area combined with the approximate volume of the adjacent Calcasieu Ship Channel. If continuous river flow is considered, the dilution factor would lower the percentage of cooling water relative to ambient water at any given time to an almost immeasurable level. Cooling water intakes would have an average flow rate of approximately 6,604 gpm. Cooling and hoteling water would be discharged in the mid to lower part of the water column.

The mean annual water temperature recorded at buoy station CAPL1-8768094, approximately 1 mile south of the Marine Facilities in Calcasieu Pass, is 72.5°F, with a range between the January mean of 54.9°F and the August mean of 87.9°F (NOAA, 2022f). Based on a review of available information for a similar project in the Gulf of Mexico, we anticipate that LNG carrier cooling water discharges could be 5.4°F to 7.2°F warmer than ambient water temperatures (FERC, 2019a). The discharged water could cause a temporary increase in water temperature in the immediate vicinity of the discharge ports, but the discharged water would mix with the surrounding water, aided by strong currents in the Calcasieu Ship Channel, quickly becoming indistinguishable from ambient conditions.

Any effect from an increase in temperature would be minor (only affecting the waters in the immediate vicinity of the vessel) and intermittent (associated with about eight vessel visits per week). Therefore, we do not anticipate this increase in temperature would have a significant impact on sea turtles, fish, and other mobile organisms given the mobility of these species, the small volume of cooling/hoteling water discharged relative to the total volume of water moving through the Calcasieu Ship Channel, and the limited temperature differential. Any sea turtle that may swim close enough to the cooling water discharge ports to detect the temperature difference is expected to swim out of the warmer plume and continue its normal activities in the unaffected expanse of water surrounding the berthing area if the temperature difference does, in fact, constitute a negative behavioral stimulus.

Withdrawing water for cooling/hoteling could result in entrainment or impingement of small aquatic organisms and life stages such as fish eggs, juvenile fish, and plankton, which could occupy the LNG berthing area, just as they may occupy the existing adjacent Calcasieu Ship Channel. Cooling water intake pumps would have a section caisson extending down roughly five feet below the pump entrance. The intake would be screened with 0.5-inch steel screen to allow small turtles, fish, and other mobile organisms to avoid entrainment and impingement.

Water withdrawals and discharges for cooling/hoteling would be of relatively short duration, low velocity, and, compared to the source waterbody, low volume. All discharges would be conducted in accordance with the EPA's Vessel General Permit for Discharges Incidental to The Normal Operation of Vessels, administered under the NPDES.

Given the volume of cooling water discharged relative to the total volume of water withing the Calcasieu Ship Channel, the intake pump screens, the mobility of resident species, and CP2 LNG's compliance with the EPA regulations, we conclude that impacts on aquatic resources from cooling water discharge would not be significant.

Artificial Lighting and Shading

The Terminal Facilities lighting during construction and operation would be consistent with similar industrial lighting at facilities along the Calcasieu Ship Channel and Calcasieu Pass. Because LNG terminals involve safety-critical operations, an artificial lighting system is essential for the performance of various tasks and operational safety. However, artificial light sources can create undesirable effects on aquatic resources, such as altering foraging behavior and spatiotemporal patterns of species density. Artificial light emanating from coastal infrastructure has the potential to alter the feeding behavior of predatory fish and affect prey fish behavior, particularly schooling (Becker et al., 2012).

To minimize impacts on aquatic resources, CP2 LNG has developed a Facility Lighting Plan that considers mitigation of light pollution in the lighting system design, including the use of diffusers, lenses, and shields to reduce glare and to focus light distribution on the LNG loading dock platforms, perimeter fence, and working areas inside the Terminal Site's perimeter floodwall. Nighttime lighting is prominent in and around the Terminal Facilities given the nearby industrial facilities. The Terminal Facilities would add to lighting impacts due to the need to comply with lighting requirements for operational safety and security; however, we conclude that the impact of the Terminal Facilities lighting on aquatic species is anticipated to be mitigated to the extent practicable and not significant as these species are accustomed to lighting from the existing nearby operating industrial facilities.

In addition to facility lighting, shading from over-water structures, such as the LNG loading docks and marine offloading facilities can also affect aquatic resources. Benthic invertebrates, algae, and aquatic plants may be affected by shading. Algae and plants may not receive adequate sunlight to complete photosynthesis. Benthic invertebrates and other species that eat those plants and/or algae may also be affected. However, as discussed further in section 4.7.3.3, the shallow water in the affected area immediately off Monkey Island is not likely to support SAV EFH, and no evidence of SAV was found in this area during the 2021 field surveys. In addition, CP2 LNG would construct LNG loading docks and marine offloading facilities to a minimum of 33.7 feet MSL, thus minimizing potential secondary impacts resulting from shading. Therefore, we conclude that impacts resulting from shading would be permanent, but not significant.

Water Withdrawal and Discharge

The Project would require fresh water during Terminal Facilities construction and operation. Construction water use would primarily be for personal consumption and sanitary use, hydrostatic testing of storage tanks and facility piping, concrete production, dust suppression, and miscellaneous construction uses, as described in section 4.4. Pipe sections would be either hydrostatically or pneumatically tested depending on the type and intended function of the pipe. Water would be sourced from Calcasieu Pass for hydrostatic testing of the LNG storage tanks. Potential impacts on fisheries during the water withdrawal process could include altered localized flow in the Calcasieu Ship Channel or Calcasieu Pass, disturbance of bottom sediments and increased turbidity, and the entrainment or impingement of fish eggs, juvenile fish, and food resources near the intake hose. Given the volume and flow profiles of the Calcasieu Ship Channel and Calcasieu Pass, water withdrawals needed for construction of the Terminal Facilities would not be expected to impact fish habitat through any change in water level. CP2 LNG would implement a number of mitigation measures to reduce impacts on aquatic resources, including placement of water intakes above the channel bed, using 0.5-inch mesh wire fabric or equivalent screens on water intakes, and limiting water withdrawal rates. In addition, CP2 LNG would comply with its Project-specific Procedures and would comply with applicable regulatory requirements for water withdrawal to minimize the potential for entrainment and impingement of aquatic organisms during surface water withdrawal.

No chemical additives would be added to the water during hydrostatic testing. The discharge of the hydrostatic test water would require authorization under the LPDES General Permit LAG670000 – Hydrostatic Test and Vessel Testing Wastewater. Following completion of the hydrostatic testing and prior to discharge, the test water would be analyzed for total suspended solids, oil and grease, and pH. Large discharges of hydrostatic test water would be treated as necessary and then discharged back into Calcasieu Pass, into adjacent drainage ditches, or on site. Water discharges following hydrostatic testing have the potential to cause localized erosion or scour of the bed and banks of Calcasieu Pass and adjacent upland habitat, which could increase sedimentation into Calcasieu Pass. Pumps and energy dissipation devices would be used to control the discharge rate and limit scouring and erosion. By implementing these measures, we conclude impacts on aquatic resources from hydrostatic test water discharges would be temporary, localized, and minor.

In order to prevent aquatic nuisance species from being transported between waterbodies, water would be discharged to upland areas, which would preclude the transfer of invasive species. If not discharged into upland areas, water would be appropriated from and discharged to the same waterbody where possible. Should uptake and discharge within the same waterbody not be feasible, CP2 LNG and would select uptake and discharge waterbodies that are within the same watershed.

CP2 LNG would minimize environmental impacts from the discharge of hydrostatic test water by implementing the measures contained in the Project-specific Procedures. CP2 LNG would locate hydrostatic test manifolds outside of wetlands and riparian areas, where feasible, and would comply with the permit requirements of the LDEQ, TCEQ, and RRC for hydrostatic test wastewater discharges, as applicable.

Process and potable water used for Terminal Facilities operations would be obtained from groundwater wells. Similarly, the supply for the firewater system would be sourced initially from groundwater wells but, in the event of an emergency, may be supplemented by water drawn from Calcasieu Pass. CP2 LNG anticipates that the water required for Terminal Facilities operations would be used primarily for industrial processes (e.g., power plant feed water) and domestic supply, as discussed in section 4.4.1.4. CP2 LNG would place screened fire water intakes above the channel bed to avoid or minimize sediment disturbance. We have determined that impacts on aquatic resources due to the discharge of hydrostatic test water would be temporary and negligible.

Pipeline System

General Impacts of the Pipeline System

Impacts on fishery resources from the Pipeline System would primarily occur during Project construction. No impacts on fisheries are expected as a result of construction and operation of the Pipeline System aboveground facilities. Impacts on fisheries resulting from pipeline construction activities at waterbody crossings could include sedimentation and turbidity, alteration or removal of in-stream and stream bank cover, and introduction of water pollutants. Suspension of deposited organic material and inorganic sediments could cause an increase in biological and chemical use of oxygen, potentially resulting in a decrease of dissolved oxygen concentrations in the affected area. Lower dissolved oxygen concentrations could cause temporary displacement of mobile organisms, such as fish, and may kill non-mobile organisms within the affected area. Because the pipeline would be buried, operation impacts would generally be limited to infrequent maintenance activities that could entail vehicle disturbance or excavation of small segments of pipe. These temporary maintenance activities would be similar to, but more limited than, impacts from construction, as described below.

The waterbodies that would be crossed or affected by the pipeline facilities, as well as the proposed crossing method and water quality classification for each feature, are included in appendix G. As discussed above, waterbodies and wetlands that would be crossed by the Pipeline System have the potential to support fish. Wetlands can provide refuge and foraging habitats for larval and juvenile fish populations. Because intermittent and ephemeral waterbodies provide limited habitat value for aquatic resources, impacts on aquatic resources as a result of crossing these waterbodies would be negligible. CP Express would use open-cut and trenchless waterbody crossing methods. Pipeline construction impacts on fishery resources from excavation/dredging for the pipelines would be temporary and may include direct mortality of individuals due to contact with construction equipment; temporary loss of food resources in the form of relatively immobile prey in the benthic environment; temporary increase in noise disturbance during in-water construction; temporary increase in water turbidity within and immediately surrounding the construction work area; or temporary and permanent alteration, addition, or removal of aquatic habitat cover.

Large waterbodies, (e.g., Sabine River, the Intracoastal Waterway, Mud Lake/Calcasieu Ship Channel) would be crossed using the HDD method. Impacts on aquatic organisms within waterbodies that would be crossed by trenchless construction methods (conventional bore and HDD) would generally be avoided because the waterbody and its banks would not be directly disturbed by clearing or trenching. However, if an inadvertent release of HDD drilling fluid occurs within a waterbody, the resulting turbidity could have a short-term effect on aquatic organisms. CP Express would implement its HDD Monitoring and Contingency Plan, which addresses methods for detecting and responding to inadvertent returns. For water withdrawals required for HDD operation, the intakes would be screened with 0.5-inch mesh to minimize entrainment of aquatic organisms. Further, in accordance with the Project-specific Procedures, pumps operating within 100 feet of a waterbody would be within appropriate secondary containment to prevent spills.

Most fish species are highly mobile and would be expected to leave the area during excavation activities. Excavation would, however, result in direct mortality of benthic organisms, which are important food sources for many species of fish. Slower, less mobile benthic organisms would be directly affected, while larger, more mobile species (e.g., blue crab) would likely disperse and be temporarily displaced. Following construction activities, more mobile species would be expected to quickly return to the area; however, the abundance and diversity of less mobile species may take additional time to return to preconstruction conditions.

Excavation activities would also temporarily increase noise and turbidity, the latter of which could reduce light penetration and the corresponding primary production of aquatic plants, algae, and phytoplankton. Increased turbidity could also adversely affect fish eggs and juvenile fish survival, benthic community diversity and health, foraging success, and the suitability of spawning habitat. Sediments suspended in the water column could be deposited on nearby substrates, which could bury aquatic macroinvertebrates. Impacts on aquatic resources due to increased turbidity would vary by species.

Construction impacts on fishery resources are expected to be temporary and localized to the immediate vicinity of construction activities. Although pipeline construction would take place over an extended duration, the duration of conventional open-cut waterbody crossings (24 hours for minor waterbodies and 48 hours for intermediate waterbodies, as set forth in the Project-specific Procedures) would reduce the level and duration of impacts. Disturbed areas would be allowed to return to preconstruction conditions following pipeline installation. Stormwater runoff from upslope construction workspace into aquatic habitat would be minimized through implementation of the Project-specific Plan and Procedures, which require the implementation of erosion control and revegetation measures. The pipeline trench would be backfilled following construction.

Further, as recommended by TPWD, CP Express has committed to coordinating with the TPWD Kills and Spills Team to develop and submit an Aquatic Resources Relocation Plan to control and limit the impacts of construction, operation, and/or maintenance from the Project on aquatic resources, as applicable. Based on the assessment above and the mitigation measures proposed by CP Express, we conclude impacts on fisheries from open-cut excavation would be temporary and minor.

CP Express has developed an HDD Monitoring and Contingency Plan that outlines the procedures that it would follow to minimize the potential for an inadvertent release of drilling fluid. Drilling fluid is a non-toxic mixture of water and bentonite clay. The HDD Monitoring and Contingency Plan identifies measures for undertaking effective cleanup should a release occur. Therefore, in the event of an inadvertent release, the effects on fish populations and habitats are expected to be minor, localized, and short in duration.

It is anticipated that water for the drilling fluid used during the HDD process would be sourced from existing canals, ditches, ponds, or other open water within the construction limits. If this method is not feasible, CP Express would obtain water from local municipal sources. After completion of the HDD, containment and disposal of the drilling fluid would be performed in accordance with applicable permit requirements. The recovered drilling fluid may be recycled, spread on farmlands, or disposed of at an approved upland location or an approved disposal facility. Water discharged over land would be directed through containment structures such as straw bales and/or filter bags.

During and following construction, CP Express would ensure that the surface water and wetland impacts associated with construction of the pipeline facilities are appropriately addressed through adherence to COE and LDNR OCM permit conditions, CWA Section 401 water quality certification requirements, and implementation of the protective measures in the Project-specific Plan and Procedures. CP Express would also minimize impacts by developing site-specific crossing plans for major waterbodies and by adhering to the procedures set forth in its SPCC Plan and HDD Monitoring and Contingency Plan. Therefore, we conclude that impacts from HDD crossings would be temporary, localized, and minor.

Hydrostatic Testing

CP Express would comply with all permit conditions and requirements for water withdrawals and hydrostatic testing. Impacts due to hydrostatic testing would be similar to those incurred during the Terminal Facilities construction. In order to minimize impacts, CP Express would implement the same mitigation measures to reduce impacts on aquatic resources, including placement of water intakes above the streambed, using appropriately sized screens on water intakes, and limiting water withdrawal rates. CP Express would also minimize impacts from the discharge of hydrostatic test water on aquatic resources by implementing the measures contained in the Project-specific Procedures.

In order to prevent aquatic nuisance species from being transported between waterbodies, water would be discharged to upland areas in most cases, precluding the transfer of any invasive species from one aquatic location to another for the Pipeline System. In other cases, water would be appropriated from and discharged to the same waterbody, where possible. In those cases where a discharge to neither upland nor the same waterbody is feasible, CP Express would select uptake and discharge waterbodies within the same watershed, which would prevent the spread of invasive species between watersheds.

With implementation of these measures, we conclude that impacts on aquatic resources from hydrostatic testing of the pipeline facilities would be temporary, localized, and minor.

4.7.2.3 Aquatic Resources Conclusion

The highest potential for Project impacts on aquatic resources would stem from activities associated with construction of the Terminal Facilities. Dredging and pile driving during construction of the Terminal Facilities could cause increased sedimentation, turbidity, and noise levels in the Calcasieu Ship Channel. However, with our recommendation for CP2 LNG to adhere to NMFS-recommended measures to mitigate noise impacts on aquatic species in the vicinity of pile driving activities, we conclude impacts on aquatic resources from construction of the Terminal Facilities would not be significant. Aquatic species would be expected to populate the area shortly after construction. Species that prefer only shallow-water habitat would be displaced, but given the abundance of similar shallow water habitat immediately upriver of the Project, we do not expect this to cause population-wide impacts on these species. Otherwise, Project impacts on aquatic resources would be temporary to short-term in duration.

4.7.3 Essential Fish Habitat

4.7.3.1 Regulatory Background

In 1996, the U.S. Congress made amendments to the MSFCMA that mandated the identification of EFH as "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity" (16 USC 1802(10)). In addition to their ecological significance, EFH areas are of high economic importance due to the dependence of recreational and commercial fisheries associated with them. The MSFCMA granted NMFS legislative authority for fisheries regulation in the U.S. within a jurisdictional area between 3 and 200 miles offshore, depending on the geographical location. NMFS in turn established eight regional fishery management councils, each responsible for the proper management and harvest of finfish and shellfish resources within their respective geographic regions. These fishery management councils have developed region-specific fishery management plans, which outline measures to ensure the proper management and harvest of finfish and shellfish species within federal waters. The Project area lies within the management jurisdiction of the Gulf of Mexico Fishery Management Council (GMFMC), which has prepared fishery management plans for seven marine groups within the Gulf of Mexico: reef fish, migratory pelagic fish, red drum, shrimp, spiny lobster, and corals. Each fishery management plan has undergone several amendments, including an amendment in 1998 that defined EFH for each fisheries group.

Federal agencies that authorize, fund, or undertake activities that may adversely impact EFH must consult with NMFS. Although absolute criteria have not been established for conducting EFH consultations, NMFS recommends consolidated EFH consultations with interagency coordination procedures required by other statutes, such as NEPA and the ESA, to reduce duplication and improve efficiency. Generally, the EFH consultation process includes the following steps:

1. **Notification** – The action agency (i.e., FERC in this instance) should clearly state the process being used for EFH consultations (e.g., incorporating EFH consultation into the EIS).

2. **EFH Assessment** – The action agency should prepare an EFH Assessment that includes both identification of affected EFH and an assessment of impacts. Specifically, the EFH Assessment should include: 1) a description of the proposed action; 2) an analysis of the effects (including cumulative effects)

of the proposed action on EFH, the managed fish species, and major prey species; 3) the federal agency's views regarding the effects of the action on EFH; and 4) proposed mitigation, if applicable.

3. **EFH Conservation Recommendations** – After reviewing the EFH Assessment, NMFS would provide recommendations to the action agency regarding measures that can be taken by that agency to conserve EFH.

4. **Agency Response** – Within 30 days of receiving the recommendations, the action agency must respond to NMFS. The action agency may notify NMFS that a full response to the conservation recommendations would be provided by a specified completion date agreeable to all parties. The response must include a description of measures proposed by the agency to avoid, mitigate, or offset the impact of the activity on EFH. For any conservation recommendation that is not adopted, the action agency must explain its reason to NMFS for not following the recommendation.

The FERC proposes to incorporate EFH consultation for the Project with the interagency coordination procedures required under NEPA. As such, on March 7, 2023 we requested that NMFS consider the draft EIS, and CP2 LNG and CP Express' draft EFH assessment, as our initiation of EFH consultation.[65] In response to our recommendation in the draft EIS, CP2 LNG developed mitigation measures to minimize noise impacts in consultation with the NMFS Protected Resources Division, Southeast Regional Office, which we conclude would further lessen the impacts from those described within this EFH Assessment.

4.7.3.2 Characterization of Essential Fish Habitat

The GMFMC characterizes EFH as occurring within three zones: estuarine (inside barrier islands and estuaries), nearshore (60 feet or less in depth), and offshore (greater than 60 feet in depth). The GMFMC defines 12 standard habitat types in the Gulf of Mexico: SAV (e.g., seagrasses, benthic algae); mangroves; drifting algae; estuarine emergent marshes (E2EM wetlands; e.g., tidal wetlands, salt marshes, tidal creeks, rivers/streams); soft bottoms (e.g., mud, clay bottoms, silt); sand/shell bottoms; hard bottoms (e.g., live hard bottoms, low-relief irregular bottoms, high-relief irregular bottoms); oyster reefs; banks/shoals; reefs (e.g., reef halos, patch reefs, deep reefs); shelf edge/slope; and pelagic (e.g., estuarine and nearshore water column; GMFMC, 2004).

Impacts associated with the Project would occur in the estuarine and nearshore marine zones. The habitat types that would be affected are listed below.

- SAV – seagrasses, benthic algae;
- mangroves;
- drifting algae – *Sargassum*;
- emergent marshes – tidal wetlands, salt marshes, tidal creeks, rivers/streams;
- sand/shell bottom;
- soft bottom – mud, clay, silt;
- hard bottom – including live hard bottoms, low-relief irregular bottoms, high-relief irregular bottoms;

[65] See accession number 20230307-3046 on the FERC eLibrary.

- oyster reefs;
- banks/shoals;
- reefs – reefs, reef halos, patch reefs, deep reefs;
- shelf edge/slope; and
- water column associated – pelagic, planktonic, coastal pelagic.

4.7.3.3 Essential Fish Habitat in the Project Area

Within the Project area, open water EFH is within Calcasieu Lake, Calcasieu Pass, the Calcasieu Ship Channel, and the Gulf of Mexico. In addition, CP2 LNG and CP Express identified palustrine and estuarine wetlands and waterbodies that may function as EFH because of some level of tidal connectivity. Wetlands were identified during 2021 wetland and waterbody surveys for the Project. Where the type of marsh (e.g., brackish, intermediate, freshwater) was not specified in the field, coastal vegetation data were referenced to determine the classification. All palustrine and estuarine wetlands and waterbodies with tidal connectivity that are east of the crossing location of SH 27 (approximately MP 48.0 of the CP Express Pipeline) on the west side of Calcasieu Lake were considered EFH habitat. Along the proposed pipeline route, potential EFH may include palustrine emergent or scrub-shrub wetlands; palustrine open water features; estuarine emergent or scrub-shrub wetlands; and estuarine open water features that are capable of supporting certain life stages of managed species. Estuarine systems, which include estuarine wetlands, consist of "deepwater tidal habitats and adjacent tidal wetlands that are usually semi-enclosed by land but have open, partly obstructed, or sporadic access to the open ocean, and in which ocean water is at least occasionally diluted by freshwater runoff from the land" (Cowardin et. al, 1979). Palustrine systems, which include palustrine wetlands, consist of "non-tidal wetlands dominated by trees, shrubs, persistent emergent, emergent mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean-derived salts is below 0.5%" (Cowardin et. al, 1979). In the Project area, tidal connectivity is influenced by the proximity to Calcasieu Pass, the Calcasieu Ship Channel, and the Gulf Intracoastal Waterway. It should be noted that, in Cameron Parish, the geographic separation of palustrine and estuarine wetlands is often subtle and may vary over time, reflecting natural or anthropogenic changes in tidal connectivity. The local levee system in the area was installed primarily to protect historically freshwater areas from tidal influences and saltwater intrusion. Due to the inherent difficulty in assessing the degree to which the levee system affects spatiotemporal tidal flow patterns, some estuarine and palustrine wetlands and waterbodies identified here as EFH may not be capable of providing habitat for managed fisheries on a consistent basis.

Both palustrine and estuarine wetlands exist at the Terminal Site and Marine Facilities. Estuarine wetlands along the southern edge of the Terminal Site and estuarine wetlands along the western side of Monkey Island appear to be tidally influenced; as such, they may provide EFH. Portions of the CP Express Pipeline cross palustrine and estuarine wetlands south, east, and north of Calcasieu Lake in Louisiana. EFH capable of supporting early life stages of managed species is possible in these areas, provided there is adequate tidal influence. Figures 4.7.3-1, 4.7.3-2, and 4.7.3-3 show EFH in the Project area. EFH affected by the Terminal Facilities and Pipeline System is listed in table 4.7.3-1.

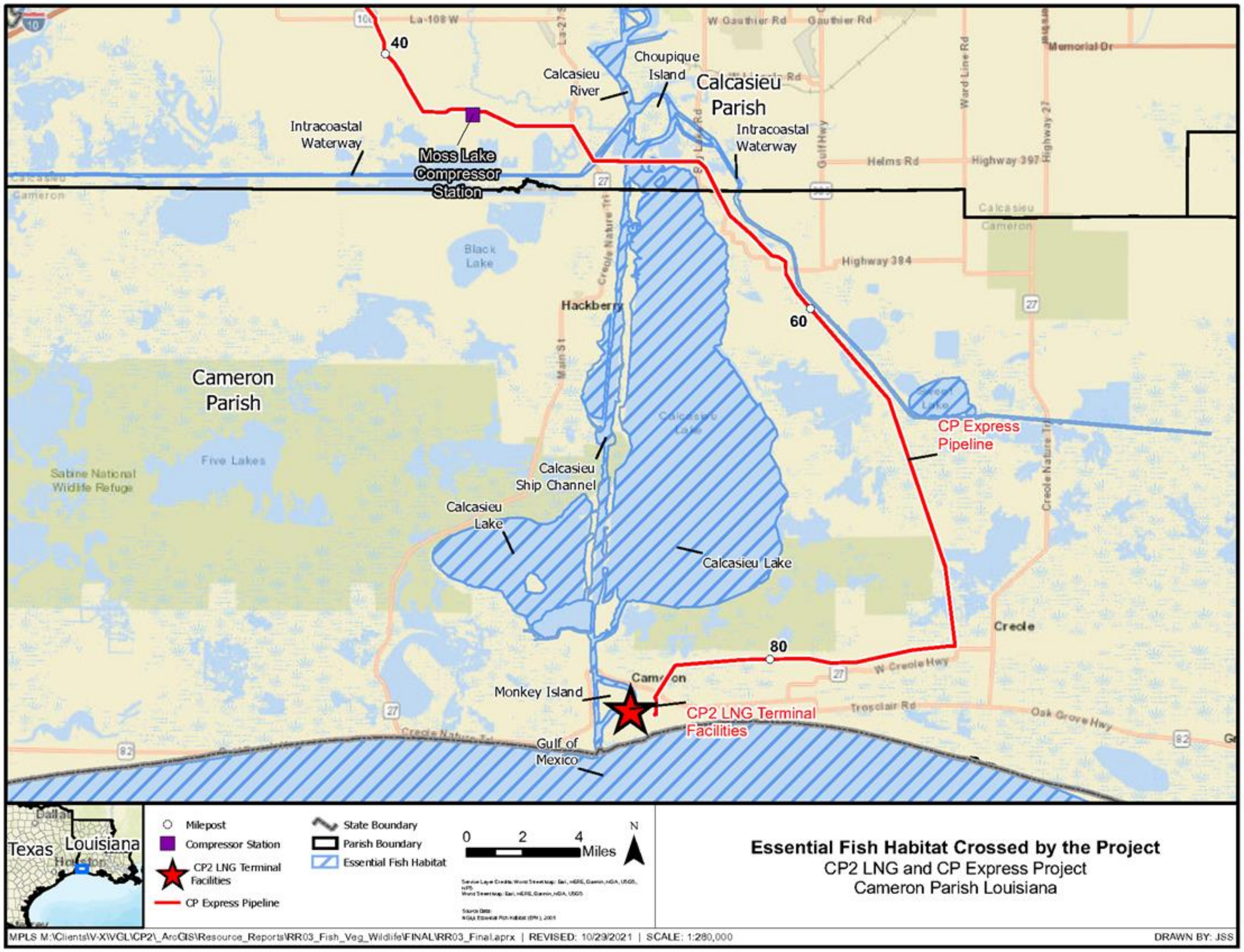

Figure 4.7.3-1 Open Water Essential Fish Habitat Crossed by the Project

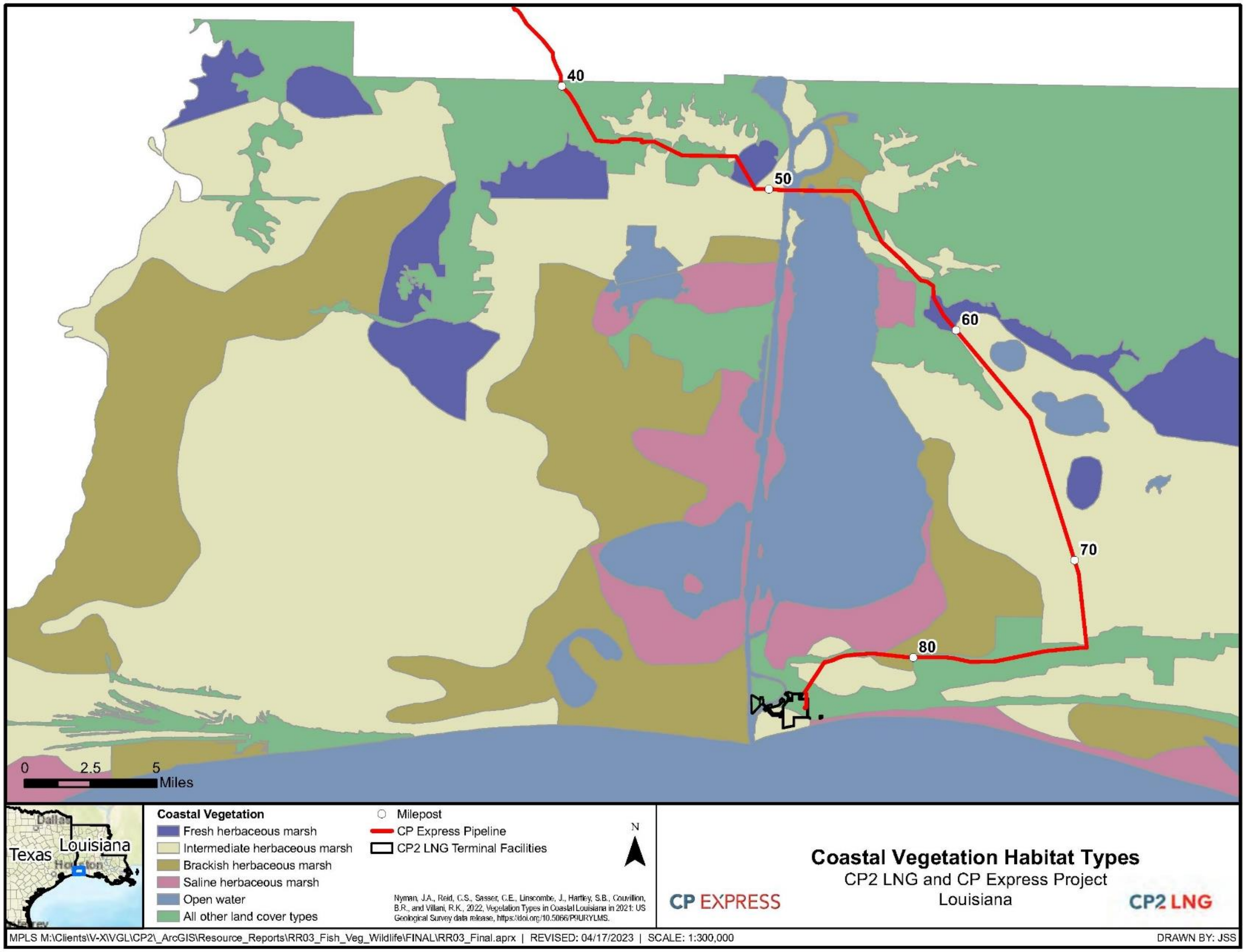

Figure 4.7.3-2 Coastal Vegetation Habitat Types Crossed by the Project

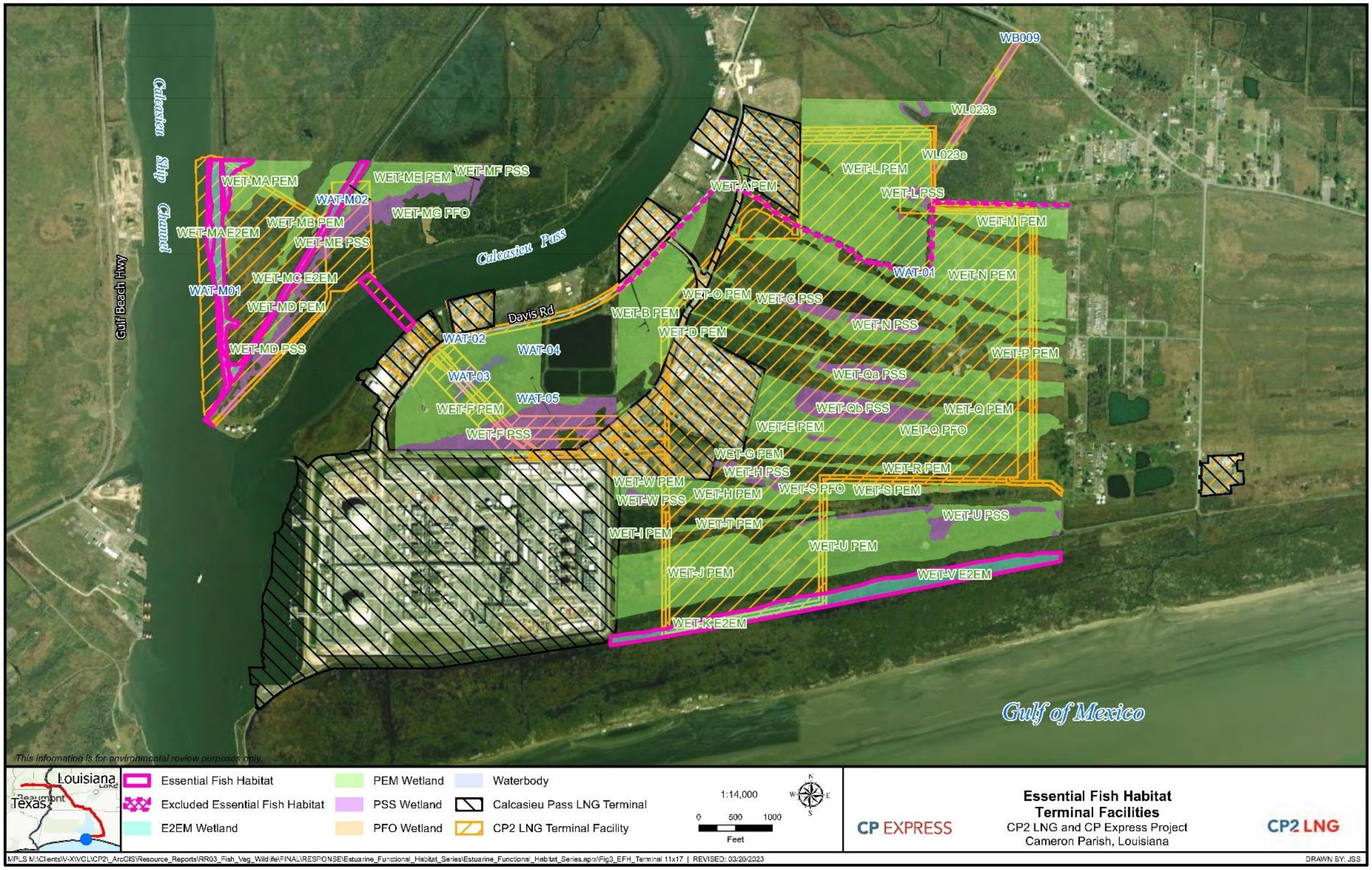

Figure 4.7.3-3 Essential Fish Habitat Located within the Terminal Facilities Footprint

4.7.3.4 Federally Managed Species with Essential Fish Habitat in the Project Area

Managed species with the potential to occur in the Project area include shrimp, reef fish, red drum, coastal migratory pelagic species, and Gulf highly migratory species, as further described below. EFH is categorized according to the preferred habitat type(s) for each life stage of species managed. The GMFMC classifies life stages for fishes and shrimp as eggs, larvae, post larvae, early juveniles, late juveniles, adults, and spawning adults (GMFMC, 2016). NOAA Fisheries classifies the life stages of sharks as neonate/young-of-year (YOY), juvenile, and adult. Neonates include newborns and small YOY (NOAA, 2017).

Shrimp Fishery of the Gulf of Mexico

Shrimp species managed within the Shrimp FMP include brown shrimp (*Farfantepenaeus aztecus*), pink shrimp (*Penaeus duorarum*), white shrimp (*Litopenaeus setiferus*), and royal red shrimp (*Pleoticus robustus*). Shrimp with designated EFH in the Project area include brown shrimp and white shrimp. Brown shrimp occupy habitat from estuaries to offshore waters as deep as 110 meters (about 361 feet). Spawning occurs year-round at water depths greater than about 64 meters (about 210 feet) and occurs during fall and spring in water depths of 18 meters (about 59 feet). Post-larvae and juvenile brown shrimp occupy estuaries with shallow vegetated habitats or non-vegetated areas with silty sand or mud bottoms. Marsh edge and submerged vegetation with decaying or organic matter support the densest populations of post-larvae and juvenile brown shrimp. Other important habitats include tidal creeks, inner marsh, shallow open water, and oyster reefs, particularly areas with muddy substrates. Sub-adults leave estuaries at night on an ebb tide under full or new moons. Adults inhabit Gulf waters with silt, muddy sand, and sandy substrates, from the mean low tide line to the edge of the continental shelf (GMFMC, 2016).

White shrimp have a short lifespan, grow quickly, and inhabit estuaries and Gulf of Mexico waters out to depths of 40 meters (about 131 feet). Spawning occurs from spring to fall and is most common in water depths less than 26 meters (about 88 feet) (GMFMC, 2016). Newly hatched shrimp are transported to estuarine nursery habitats where they remain through winter. Survivors grow quickly in late winter and early spring before returning to marine waters (NOAA, 2022g). During the post-larvae and juvenile life stages, white shrimp prefer mud and peat bottoms with large amounts of decaying matter or with good vegetative cover. Some researchers suggest that juveniles prefer to inhabit areas with lower salinity. Subadults leave estuaries in late August and September based on changes in environmental conditions, particularly sharp temperature drops. Adults inhabit nearshore waters with soft mud and silt bottoms (GMFMC, 2016). Shrimp species that may be affected by the Project are described in table 4.7.3-1.

Designated EFH for shrimp includes:

- Gulf of Mexico waters and substrates from the U.S./Mexico border to Fort Walton Beach, Florida, extending from estuarine waters out to depths of 600 feet;
- Gulf of Mexico waters and substrates from Grand Isle, Louisiana, to Pensacola Bay, Florida, between depths of 600 and 1,950 feet; and
- Gulf of Mexico waters and substrates from Pensacola Bay, Florida to the boundary between the areas covered by the GMFMC and the South Atlantic Fishery Management Council (SAFMC), extending from estuarine waters out to depths of 210 feet, with the exception of waters extending from Crystal River, Florida, to Naples, Florida, between depths of 60 to 150 feet, and in Florida Bay between depths of 30 to 60 feet (GMFMC 2005, 2016).

Reef Fishery of the Gulf of Mexico

Reef fish (e.g., snapper, grouper, tilefish, jack, triggerfish, and hogfish) occupy different habitats based on the species and life history stage. These include estuarine, pelagic, and benthic (e.g., soft bottom) habitats, as well as topographic features on the continental shelf with high relief (GMFMC, 2004). Designated EFH for reef fish consists of Gulf of Mexico waters and substrates from the U.S./Mexico border to the boundary between the areas covered by the GMFMC and the SAFMC and extends from estuarine waters out to depths of 600 feet (GMFMC, 2005, 2016; NOAA, 2019). Most reef fish inhabit offshore waters or areas far from the Louisiana coast, but three reef fish (red snapper [*Lutjanus campechanus*], gray snapper [*Lutjanus griseus*], and lane snapper [*Lutjanus synagris*]) are expected to occupy habitats affected by the Project. Red snapper, gray snapper, and lane snapper are further described in table 4.7.3-1.

Red Drum Fishery of the Gulf of Mexico

Red drum (*Sciaenops ocellatus*) is distributed throughout the Gulf of Mexico in estuarine, nearshore, and offshore waters. This species occupies various habitats including SAV, soft bottom, hard bottom, emergent marsh, and sand/shell, and is water column associated at various life stages (GMFMC, 2016). Spawning occurs in nearshore waters, including all nearshore waters of central Texas, from mid-August through October. Eggs typically hatch in the Gulf of Mexico and larvae are passively transported to estuaries where they mature. Juveniles inhabit shallow, protected waters with grassy or muddy bottoms before moving offshore as adults. Adults form schools offshore at depths to 70 meters (about 230 feet) (GMFMC, 2016). Prior to reaching sexual maturity after 3 or 4 years, red drum live in bays or the surf zone near passes. During winter, red drum can be found in rivers and tidal creeks where their movement between shallow and deeper waters is influenced by tides and water temperatures. Red drum are further described in table 4.7.3-1.

Designated EFH for red drum includes:

- All estuaries in the Gulf of Mexico;
- Substrates and water out to depths of 150 feet that extend from Vermilion Bay, Louisiana to the eastern edge of Mobile Bay, Alabama;
- Substrates and waters that are 30 to 60 feet deep from Crystal River, Florida to Naples, Florida; and
- Substrates and waters that are 30 to 60 feet deep from Cape Sable, Florida to the boundary between the areas covered by the GMFMC and the SAFMC (GMFMC, 2004; GMFMC, 2005).

Coastal Migratory Pelagic Species of the Gulf of Mexico

The Coastal Migratory Pelagic FMP manages king mackerel (*Scomberomorus cavalla*), Spanish mackerel (*Scomberomorus maculatus*), and cobia (*Rachycentron canadum*). These species typically migrate throughout the Gulf and South Atlantic, and their occurrence is dependent on temperature and salinity. Adults are seldom found in water temperatures less than 68°F and they generally prefer higher salinities (GMFMC, 2004). Eggs and larvae are found in the pelagic habitat and concentrated in surface waters. Juveniles utilize coastal and estuarine waters. Designated EFH for coastal migratory pelagics includes all Gulf of Mexico waters and substrates from the U.S./Mexico border to the boundary between the areas covered by the GMFMC and SAFMC, and extends from estuarine waters out to depths of 600 feet (GMFMC, 2005, 2016). Coastal migratory species that may be affected by the Project are described in Table 4.7.3-1.

Gulf Highly Migratory Species of the Gulf of Mexico

Highly Migratory Species include tunas, swordfish, billfish, and shark species. These species migrate across long distances and cross domestic and international borders. Designated EFH for highly migratory species in the Gulf of Mexico spans from the U.S./Mexico border around the tip of Florida and to the exclusive economic zone. Based on the descriptions provided in Final Amendment 10 to the 2006 Consolidated Atlantic Highly Migratory Species Fishery Management Plan: Essential Fish Habitat (NOAA, 2017), five shark species were identified as having the potential to occur in the Project area: bull shark (*Carcharhinusleucas)*, blacktip shark (*Carcharhinus limbatus)*, spinner shark (*Carcharhinus brevipinna)*, Atlantic sharpnose shark (*Rhizoprionodon terraenovae)*, and bonnethead shark (*Sphyrna tiburo*). Shark habitat can be described in four broad categories: coastal, pelagic, coastal-pelagic, and deep-dwelling. Coastal species inhabit estuaries, nearshore areas, the continental shelf, and the continental slope. Adult sharks are broadly distributed as adults, but often utilize estuaries as pupping and nursery areas during pupping season and through their neonate and young-of-year life stages (NMFS, 2009, 1999). Highly migratory species that may be affected by the Project are described in Table 4.7.3-2.

Table 4.7.3-1

Life Stage Occurrence for Species with Essential Fish Habitat in the Project Area

Managed Species	Habitat type in the Project Area	Life Stages Occurrence
SHRIMP		
Brown shrimp *Farfantepenaeus aztecus*	Estuarine emergent marsh, estuarine pelagic, estuarine submerged aquatic vegetation, estuarine sand and shell bottom, estuarine soft bottom, and nearshore mud/soft bottom	Larvae, post larvae, early juveniles, late juveniles, and adults
White shrimp *Litopenaeus setiferus*	Estuarine emergent marsh, estuarine soft bottoms, nearshore soft bottom, and nearshore pelagic	Eggs, larvae, post larvae, early juveniles, late juveniles, adults, and spawning adults
REEF FISH		
Red snapper *Lutjanus campechanus*	Nearshore pelagic and nearshore soft bottom	Larvae, early juveniles, late juveniles
Gray snapper *Lutjanus griseus*	Estuarine emergent marsh, estuarine mud/soft bottom, and nearshore soft bottom	Adults
Lane snapper *Lutjanus synagris*	Estuarine soft bottom, estuarine submerged aquatic vegetation, nearshore submerged aquatic vegetation, and nearshore soft bottom.	Post larvae, early juveniles, and late juveniles
RED DRUM		
Red drum *Sciaenops ocellatus*	Estuarine submerged aquatic vegetation, estuarine soft bottom, estuarine emergent marsh, estuarine pelagic, nearshore submerged aquatic vegetation, nearshore soft bottom, nearshore emergent marsh, nearshore pelagic	Eggs, post larvae, early juveniles, late juveniles, and adults
COASTAL MIGRATORY PELAGIC		
Spanish mackerel *Scomberomorus maculatus*	Nearshore pelagic and estuarine pelagic	Eggs, larvae, early juvenile, late juvenile, adult, spawning adult
King mackerel *Scomberomorus cavalla*	Nearshore pelagic	Early juveniles, late juveniles, adults
Cobia *Rachycentron canadum*	Nearshore pelagic	Eggs, post larvae, early juvenile, late juvenile, adult, spawning adult

Table 4.7.3-1

Life Stage Occurrence for Species with Essential Fish Habitat in the Project Area

Managed Species	Habitat type in the Project Area	Life Stages Occurrence
GULF HIGHLY MIGRATORY SPECIES		
Bull shark [a] *Carcharhinusleucas*	N/A	Neonate, juvenile, and adult
Blacktip shark [a, b] *Carcharhinus limbatus*	N/A	Neonate, juvenile, and adult
Spinner shark[a] *Carcharhinus brevipinna*	N/A	Neonate and juvenile
Atlantic sharpnose shark [a, b] *Rhizoprionodon terraenovae*	N/A	All
Bonnethead shark [a, b] *Sphyrna tiburo*	N/A	Neonate and juvenile

Source: NMFS, 2009

[a] Highly migratory species, which includes apex predators whose removal may induce cascading changes in the ecosystem, are not characterized by particular habitats due to their migratory behavior.

[b] Species would not be impacted by pipeline construction or operation. All other species would be impacted by construction and operation of the terminal facility as well as construction of the pipeline.

Table 4.7.3-2 Life History and Essential Fish Habitat in the Gulf of Mexico for Select Highly Migratory Species				
Species	**Life History**	**Neonate/Young-of-year**	**Juvenile**	**Adults**
Bull shark (*Carcharhinus leucas)*	Bull sharks occur in warm seas and estuaries and can often be found venturing into freshwater. This is the only shark species known to be physiologically capable of spending extended time in freshwater in the U.S. Important nursery areas in the Louisiana region occur in coastal and inland estuarine waters, with the seasonal distribution of bull sharks in Louisiana concentrated during the spring and summer. In Louisiana's coastal and inland estuaries, bull sharks have been documented in salinities ranging from 0.0 to 32.1 ppt, water temperatures ranging from 15 to 37 degrees Celsius (°C), turbidity ranging from 10 to 200 centimeters (cm) (120 to 6 NTUs) ain mud, and mud/shell habitats.	EFH includes coastal areas of Texas to the mouth of the Mississippi River, particularly the inland bay and bayou systems of Louisiana (i.e., interior of Lake Pontchartrain, the Pearl River system, Little Lake Barataria Bay and its inland waters, the Terrebonne/ Timbalier Bay system, and the Atchafalaya/ Vermilion Bay system). EFH for neonates/YOY includes areas of shallow depth (less than 9 meters" [30 feet]).	EFH includes portions of coastal Florida, Mississippi, and Alabama, and "interior of Lake Pontchartrain, the Pearl River system, around the Chandeleur Sound on the east side of the Mississippi River Delta, Little Lake/Barataria Bay and its inland waters, the Terrebonne/Timbalier Bay system, and the Atchafalaya/Vermilion Bay system in the coastal waters off Louisiana, the west side of Mississippi River Delta, and coastal areas along the Texas coast, especially Matagorda Bay and San Antonio Bays."	EFH includes portions of coastal Florida, Mississippi, and Alabama, and `"interior of Lake Pontchartrain, the Pearl River system, around the Chandeleur Sound on the east side of the Mississippi River Delta, Little Lake/Barataria Bay and its inland waters, the Terrebonne/Timbalier Bay system, and the Atchafalaya/Vermilion Bay system in the coastal waters off Louisiana, the west side of Mississippi River Delta, and coastal areas along the Texas coast, especially Matagorda Bay and San Antonio Bays."
Spinner shark (*Carcharhinus brevipinna)*	Spinner sharks occur in warm-temperate and tropical waters of the continental shelf in various water depths. Juveniles more frequently occur inshore of the 20-meter (about 66-foot) bathymetric line, while adults occupy both inshore and offshore habitats. Adults do not generally occur in inland bays or bayous. Nursery areas have been identified in Florida, and along the beaches and in the bays of Texas. Juveniles have been documented in the coastal waters of Mississippi and Louisiana, as well as along the beach of Tampa Bay.	EFH includes coastal areas of the Florida Keys and from the Big Bend Region to southern Texas. EFH consists of sand bottom areas where sea surface temperatures range from 24.5 to 30.5 °C and salinity averages 36 ppt.	EFH includes coastal areas from Apalachicola, Florida to southern Texas. Juvenile EFH extends from the shore to water depth of 20 meters (about 66 feet).	EFH includes coastal areas from Apalachicola, Florida to southern Texas. Juvenile EFH extends from shore to water depth of 90 meters (about 295 feet).

Table 4.7.3-2

Life History and Essential Fish Habitat in the Gulf of Mexico for Select Highly Migratory Species

Species	Life History	Neonate/Young-of-year	Juvenile	Adults
Blacktip shark (*Carcharhinus limbatus)*	Blacktip sharks are fast moving sharks that are often seen at the surface and may be observed leaping and spinning out of the water. Adults typically occur within the 200- meter (about 656-foot) depth contour, while juveniles and YOY are found closer to shore in silt, sand, mud, and seagrass habitats. Nursery areas for blacktip sharks in the Gulf of Mexico are not restricted to a particular habitat type. Important nursery and pupping areas in the central Louisiana region appear to include mainly nearshore coastal waters. Higher numbers of blacktip sharks are found in areas of warmer and more saline waters in Louisiana.	Coastal areas from the Florida Keys to southern Texas, including estuaries, from the shore to water depth of 30 meters (about 98 feet). Important EFH includes central Louisiana's nearshore coastal waters, which are important pupping and nursery areas. Neonate EFH is associated with silt, sand, mud, and seagrass habitats that have water temperatures ranging from 20.8 to 32.2°C, salinities from 22.4 to 36.4 ppt, water depths from 0.9 to 7.6 meters (about 3 to 25 feet), and dissolved oxygen (DO) levels from 4.32 to 7.7 milligrams per liter (mg/L).	Coastal areas from the Florida Keys to southern Texas, including coastal areas of Mississippi and Louisiana, from the shore to water depth of 100 meters (about 328 feet). EFH is associated with water temperatures ranging from 19.8 to 32.2°C, salinities from 7.0 to 36.8 ppt, water depths from 0.7 to 9.4 meters (about 2 to 31 feet), and DO from 4.28 to 8.3 mg/L. EFH substrates include silt, sand, mud, and seagrass.	Coastal areas from the shore to water depth of 100 meters (about 328 feet) from the Florida Keys to southern Texas, including coastal areas of Mississippi and Louisiana. EFH is associated with water temperatures from 19.8 to 32.2°C, salinities ranging from 7.0 to 36.8 ppt, water depths from 0.7 to 9.4 meters (about 2 to 31 feet), and DO from 4.28 to 8.3 mg/L. EFH substrates include silt, sand, mud, and seagrass.
Atlantic sharpnose shark (*Rhizoprionodon terraenovae)*	The Atlantic sharpnose shark is the most abundant small coastal shark in the U.S. Atlantic and Gulf of Mexico. In the Gulf of Mexico, these sharks are known to occupy a broad range of substrate types including coastal habitats with silt, sand, mud, or seagrass bottoms. Atlantic sharpnose sharks exhibit sex-specific distribution and behavioral differences. Females pup in deeper offshore waters while males occur closer to shore.	EFH includes areas between Mobile Bay, Alabama and southern Texas. Important summer nursery habitats for neonates includes, among others, Terrebonne/Timbalier bay systems of Louisiana, all major bay systems of Texas from Galveston Bay to lower Laguna Madre, and coastal Texas waters (water temperatures ranging from 16.7 to 32°C and salinities from 10 to 38 ppt).	Includes coastal areas from the Florida Keys to Texas, from the shore to water depth of 200 meters (about 656 feet). In identified important nursery areas, EFH is recognized in concert with specific habitat associations, including, among others, Terrebonne/ Timbalier bay systems of Louisiana (water temperatures ranging from 22.6 to 32.4°C, salinities from 23 to 37.3 ppt, and water depths from 1.5 to 4.9 meters [about 5 to 16 feet]), all major bay systems along the Gulf Coast of Texas from Galveston Bay to lower Laguna Madre, and coastal Texas waters (water temperatures ranging from 16.7 to 32°C, salinities from 10 to 38 ppt).	Includes coastal areas from the Florida Keys to Texas, out to water depths of 200 meters (about 656 feet).

Table 4.7.3-2

Life History and Essential Fish Habitat in the Gulf of Mexico for Select Highly Migratory Species

Species	Life History	Neonate/Young-of-year	Juvenile	Adults
Bonnethead shark (*Sphyma tiburo)*	Bonnetheads are small hammerhead sharks that occur in shallow coastal waters, often with sandy or muddy bottoms. Mixing between populations is unlikely as these sharks do not appear to exhibit long distance migrations. Important summer nursery areas in the Gulf of Mexico varies by region, and includes the Terrebone and Timbalier Bay system in Louisiana and all major bay systems along the Texas Gulf Coast from Sabine Lake to Lower Laguna Madre.	EFH includes coastal areas from the Florida Keys through eastern Mississippi and from western Louisiana to Texas. Important summer nursery areas include, among others, the Terrebonne/Timbalier Bay system of Louisiana, and all major bay systems of Texas from Sabine Lake to Lower Laguna Madre (water temperatures from 18 to 33.5°C).	EFH includes coastal areas from the Florida Keys to Chandeleur Sound in Louisiana, and coastal areas of Texas. Known habitat associations include the Terrebonne/ Timbalier Bay system of Louisiana (water temperatures ranging from 28.4 to 31.4°C, salinities from 25.3 to 34.3 ppt, and water depths from 1.8 to 2.4 meters [about 6 to 8 feet]) and all major bay systems of Texas from Sabine Lake to lower Laguna Madre.	EFH includes coastal areas from the Florida Keys to Chandeleur Sound in Louisiana, and coastal areas of Texas. Known habitat associations include the Terrebonne/Timbalier Bay system of Louisiana (water temperatures ranging from 28.4 to 31.4°C, salinities from 25.3 to 34.3 ppt, and water depths from 1.8 to 2.4 meters [about 6 to 8 feet]) and all major bay systems of Texas from Sabine Lake to lower Laguna Madre.

Source: NOAA Fisheries, 2017

[a] Turbidity is a measure of how much light is scattered by particles suspended in a liquid. The distance from the bottom of the sampling tube can be measured as centimeters (cm), which can be converted to Nephelometric Turbidity Units (NTUs) (Utah State University, 2016).

4.7.3.5 Impacts and Mitigation

Terminal Facilities

Calcasieu Pass, the Calcasieu Ship Channel, and the Gulf of Mexico are designated as EFH for highly migratory species, red drum, reef fish, coastal migratory pelagics, and shrimp. Within the Project area, EFH in the Calcasieu Pass and the Calcasieu Ship Channel is comprised of estuarine habitat, while EFH in the Gulf of Mexico is comprised of nearshore and offshore habitat.

Habitat Modification

Categories of EFH near the Terminal Facilities that could be affected include benthic substrates (soft bottom habitats) and water column (pelagic) habitats that occur in nearshore and offshore marine open water in the Gulf of Mexico, in estuarine unconsolidated bottom (EUB) in the Calcasieu Ship Channel and Calcasieu Pass, and in estuarine wetlands. SAV EFH can occur along the Louisiana coast, but is largely limited to the littoral zone in water depths no greater than 4 feet. The shallow water in the affected area immediately off Monkey Island is not likely to support SAV due to the persistent high turbidity, periodic maintenance dredging, and relatively steep shoreline profile that characterizes the Calcasieu Ship Channel (regularly dredged to 40 feet across a 200-foot span in the center of the channel) (COE, 2009). Further, no evidence of SAV was found in this area during the 2021 field surveys.

In estuarine and marine open water, benthic substrates can provide feeding and growth habitat for post-larval and juvenile shrimp; all life stages of reef fish; juvenile bull, bonnethead, Atlantic sharpnose, and blacktip sharks; adult bull sharks; coastal migratory pelagics; and larval, post-larval, juvenile, and adult red drum (GMFMC, 1983; GMFMC, 1981a; GMFMC, 1981b). Pelagic habitats can provide EFH for eggs of red drum and coastal migratory pelagics; some adult reef fish; larval and adult shrimp; juvenile and adult coastal migratory pelagics; and adult sharks. Estuarine wetlands on Monkey Island may provide nursery areas and foraging and growth opportunities for post-larval and juvenile life stages of shrimp and adult red drum.

Project activities, including passage of construction barges, could intermittently occur across about 1.0 mile of EUB EFH in the Calcasieu Ship Channel and Calcasieu Pass. Construction of the Marine Facilities would modify existing EFH and create new EFH. During operation, LNG carriers would cross nearshore and offshore marine open water EFH in the Gulf of Mexico on their approach to the Marine Facilities.

Construction of the Terminal Site would affect 7.6 acres of estuarine EFH associated with estuarine wetlands along the southern boundary of the Terminal Site as presented in table 4.7.3-3. Of these 7.6 acres, 5.3 acres would be permanently impacted and 2.3 acres would be temporarily impacted. Construction of the Marine Facilities would permanently impact 14.2 acres of estuarine EFH and 0.5 acre of waterbody EFH associated with habitat loss and conversion due to dredging, excavation, fill, and pile installation.

Approximately 6.4 million cubic yards of soil and sediment would be excavated and dredged using a hydraulic cutter-suction dredge from Monkey Island for the LNG carrier turning basins and berth. As a result, within the 97.5-acre dredge prism, approximately 19.1 acres of existing EUB EFH at the Marine Facilities would be deepened from a water depth of about -1 foot (based on LIDAR data) and maintained at a water depth of −44.3 feet NAVD 88 (or 42 feet below Mean Low Gulf datum) to accommodate LNG vessels, with the remaining 78.4 acres converted to open water from estuarine emergent wetland, waterbodies, non-EFH wetlands, and upland habitat. Of the 78.4 acres, approximately 59.1 acres (including 12.5 acres of estuarine EFH and 0.2 acre of waterbody EFH) would be permanently converted to EUB EFH and 19.0 acres of submerged riprap would be installed to form the new sloping shoreline. Approximately

1.5 acres of estuarine EFH would be replaced by submerged riprap. Land-based facilities would occupy approximately 24.7 acres adjacent to the 97.5-acre dredge prism. Construction of the land-based facilities would permanently impact 1.6 acre of estuarine EFH and 0.3 acre of waterbody EFH. Compensatory mitigation for permanently affected wetlands would be developed in accordance with COE and LDNR permitting requirements.

Table 4.7.3-3

Summary of Essential Fish Habitat Impacts

Facility	Wetland/ Waterbody	Vegetation Type	Marsh Classification	Impact Acreage Permanent	Temporary	Total
Pipeline	Wetland	Estuarine Emergent (E2EM)	Brackish	0.0	14.7	14.7
			Intermediate	0.2	250.2	250.4
		Estuarine Scrub- Shrub (E2SS)	Intermediate	0.0	0.2	0.2
			SS or FO (over 50% exotic)	0.0	0.2	0.2
		Estuarine Unconsolidated Bottom (E1UB)	Brackish	0.0	10.9	10.9
			Intermediate	0.0	19.9	19.9
		Estuarine Unconsolidated Shore (E2US)	Brackish	0.1	0.2	0.3
			Intermediate	0.0	40.1	40.1
			Fresh Marsh	0.0	1.2	1.2
		Palustrine Emergent (PEM)	Fresh Marsh	0.0	3.7	3.7
			Wet Pasture	0.0	58.7	58.7
		Palustrine Scrub-Shrub (PSS)	SS or FO (over 50% exotic)	0.0	0.3	0.3
		Palustrine Unconsolidated Bottom (PUB)	N/A	0.0	1.9	1.9
	Waterbody	Estuarine Unconsolidated Bottom (E1UB)	Intermediate SAV[a] - Beaked Tasselweed	0.0	7.0	7.0
			Brackish SAV - Eurasian Milfoil	0.0	1.9	1.9
			Open Water	0.0	8.3	8.3
		Riverine	N/A	0.0	2.4	2.4
			Total	0.3	421.8	422.1
Terminal Site	Wetland	E2EM	Intermediate	5.3	2.3	7.6
			Total	5.3	2.3	7.6
Marine Facilities (Onshore Structures)	Wetland	E2EM	N/A	14.2	0.0	14.2
	Waterbody	Open Water	N/A	15.4	0.0	15.4
		E1UB	N/A	3.7	0.0	3.7
		E2US	N/A	0.5	0.0	0.5
			Total	33.8	0.0	33.8
			EFH Total:	**39.4**	**424.1**	**463.5**

Facility	Wetland/ Waterbody	Vegetation Type	Marsh Classification	Impact Acreage		
				Permanent	Temporary	Total
[a] SAV in waterbodies at MP 52.7, 53.0, 56.6, and 57.1.						

Table 4.7.3-3

Summary of Essential Fish Habitat Impacts

Displacement and Mortality

Temporary impacts on EFH would occur in the Calcasieu Ship Channel and Calcasieu Pass during construction of the Marine Facilities. Short term impacts on EUB EFH during dredging of the marine berth would include disturbance of benthic habitat and would likely result in the direct mortality of benthic organisms, including less mobile life stages of managed species such as shrimp and benthic invertebrates, which are an important food source for many species of fish. These losses would be short term and the benthic community is expected to rebound within a few seasons. In addition, dredging would temporarily reduce water quality through increased turbidity and nutrient levels in the water column, along with decreased dissolved oxygen. Increased concentrations of suspended sediments would produce temporary turbidity plumes in the water column. These plumes would be most dense in the immediate area of dredging but may also extend downstream in the Calcasieu Ship Channel toward the Gulf of Mexico. Resuspension of sediments within the ship channel could potentially mobilize any contaminants. However, as discussed in sections 4.3.2 and 4.9.5, based on federal and state databases, there are no contaminated sites within 0.5 mile of the Project. Once construction is complete, water quality would quickly return to baseline conditions as the current dilutes and disperses the turbidity plume and sediments fall back out of suspension, causing a minor temporary increase in sedimentation in downstream benthic habitat. Given the existing high ambient turbidity in the Calcasieu Ship Channel, any additional temporary turbidity increase would not represent a notable change in conditions. Dredging for the Marine Facilities would be conducted in accordance with federal and state permits, as well as other applicable laws and regulations.

Underwater Noise and Vibration

Other temporary in-water activities would include pile driving for the LNG loading docks in the newly formed open water berthing area off Monkey Island. Installation of a construction utility dock on the east shoreline of Monkey Island in Calcasieu Pass would also involve pile driving. Pile driving below water may cause noise and vibration levels above established thresholds for disturbance and injury to fish. CP2 LNG plans to implement mitigation measures to minimize underwater noise and vibration associated with pile driving for the LNG loading docks and utility dock (see section 4.7.2.2). Development of the Terminal Facilities would involve the passage of supply barges and construction vessels in the Calcasieu Ship Channel and Calcasieu Pass. These vessels would travel to/from the Project area via established navigation routes through Calcasieu Lake and the Gulf Intracoastal Waterway to the north. Given the existing high volume of commercial shipping in the area, they are not expected to cause any incremental, measurable effect on EFH.

Dredge Material

The disposal of dredged material could have permanent impacts on EFH at disposal sites, depending on the location. The April 2023 draft version of the CMP and BUDM Plan[66] proposes that during construction of the Marine Facilities, dredged/excavated material would be transported to the Cameron Prairie NWR, some of which would be placed in a contained area for beneficial use (marsh

[66] Available on eLibrary under accession no. 20230428-5528.

creation/restoration) to offset associated permanent impacts on estuarine wetlands. The remainder would be placed adjacent to the marsh creation area in a semi-contained area at an elevation that is conducive to vegetation growth. CP2 LNG is continuing to consult with agencies to finalize its BUDM Plan.

CP2 LNG's CMP facilitates EFH impact mitigation through the creation/restoration of brackish marsh at the Cameron Prairie NWR would provide ecological compensation for the modifications described herein. EFH impacts on the Marine Facilities would be offset by the creation of new EFH associated with the creation of brackish marsh at the Cameron Prairie NWR. The brackish marsh would replace open water that reflects degradation of the historically expansive vegetated marsh at this location and, in doing so, would enhance the EFH that currently exists by virtue of the Cameron Prairie NWR's tidal connection. This same creation/restoration of marsh habitat, in the amount proposed (approximately 178.0 acres), is intended to address some permanent loss of EFH due to E2EM wetland impacts associated with construction of the Project.

As mentioned above, CP2 LNG is continuing to consult with agencies to finalize their BUDM Plan. As mentioned in section 1.4, the BUDM site and associated disposal pipeline are non-jurisdictional to the Commission, but are addressed in the resource sections of this final EIS given they are closely related to the Project. The final dredged material disposal plan would be included in the COE and LDNR/OCM permit applications for dredge and fill activities in waters of the United States and development in the coastal zone, respectively. The final dredged material disposal plan would also be provided to FERC. As with dredging, dredge spoil disposal could result in direct mortality of benthic organisms, including managed species and invertebrates. Additionally, turbidity plumes may result in adverse impacts on pelagic eggs and larval life stages. These losses would be short term and the benthic community would rebound within a few seasons as these species are highly prolific and mobile.

<u>Entrainment/Impingement</u>

Hydrostatic testing for the LNG storage tanks at the Terminal Site would require the use of water from Calcasieu Pass. Potential impacts on EFH during the water withdrawal process include reduced water flow, disturbance of bottom sediments and increased turbidity, and entrainment or impingement of fish eggs, small or juvenile fish, or food resources. CP2 LNG would implement certain mitigation measures to reduce impacts, including placement of water intakes above the channel bed, using appropriately sized screens on water intakes (0.5-inch mesh wire fabric or equivalent), and limiting water withdrawal rates. CP2 LNG has not provided the withdrawal rate of the water intake structures/facilities that would be used for hydrostatic testing. The EPA considers an intake velocity of less than 0.5 feet per second (fps) to be protective of aquatic species (EPA, 2014). Therefore, **we recommend that**:

- **<u>Prior to construction</u>, CP2 LNG should provide a plan for review and written approval by the Director of the OEP, or the Director's designee, to maintain an intake velocity of less than 0.5 feet per second at the hydrostatic test water intake structure screen**.

Likewise, entrainment of fish eggs, larvae, and juveniles during dredging would be minor. Documented entrainment rates of mobile fish species are low (Wenger et al, 2017). Impacts would likely be highest on eggs and larvae present in the dredge footprint. However, given the area encompassed by dredging operations, the frequency in which maintenance dredging would occur, and the noted generally high natural mortality rates of eggs and larvae in the water column, we conclude entrainment impacts from dredging would not be significant.

With these measures, and our recommendation above, impacts on EFH would be temporary, localized, and minor.

Introduction of Pollutants

Water quality in EFH could be temporarily reduced due to accidental spills or leaks of hazardous liquids from construction vehicles and equipment. These impacts would be avoided or minimized by closely managing storage facility locations and refueling methods, and cleanup in the event of a spill or leak. Impacts on surface waters during construction of the Terminal Facilities would be mitigated by adherence to the Project-specific Procedures and SPCC Plan.

Use of the HDD method to install the LNG transfer lines and utilities under Calcasieu Pass would avoid direct impacts on EFH. However, an inadvertent release of drilling fluid (generally consisting of bentonite clay and water) into the overlying waterbody and associated EFH could occur. To minimize the risk of an inadvertent release of drilling fluid, minimize the duration of a release should one occur, and to undertake immediate effective cleanup should a release occur, CP2 LNG would implement the Project's HDD Monitoring and Contingency Plan during construction. Based on the mitigation measures that would be implemented during construction, and because approximately 59.1 acres due to the dredging of the marine berthing area would be created relative to the much smaller loss of estuarine EFH, impacts on EFH from Terminal Facilities construction would not be significant.

Operation Impacts

Impacts on EFH from post-construction operations associated with vessels (e.g., ballast water discharge and vessel traffic) are not anticipated to be significant. All LNG carriers and other vessels visiting the Terminal Facilities would be expected to be in full compliance with ballast water management requirements. LNG carriers would use water for engine cooling while berthed at the facility. Cooling water intakes would have an average flow rate of about 6,604 gpm. The intake pump would have a suction caisson extending down roughly 5 feet below the pump entrance. The intake would be screened with 0.5-inch steel screen to minimize the entrainment or impingement of marine organisms. Therefore, any associated impacts on EFH would be short-term (during vessel loading) and minor through the life of the Project.

Periodic maintenance dredging may be required at the Marine Facilities biannually or after storm events, generating an estimated 158,000 cubic yards of material with predicted disposal to an onshore location or to an offshore dredged material disposal site. The need for maintenance dredging would be assessed annually during operation. If maintenance dredging is required, it would temporarily affect benthic habitat by removing or dispersing sediment.

During operation of the Terminal Facilities, the conversion of land to impervious surface areas would increase the volume of stormwater runoff. Water quality impacts would be minimized through the implementation of a SWPPP, which would be required to be developed prior to construction; impacts would be minimized with the use of applicable best management practices for operational activities. The Terminal Site would have stormwater catch basins and water diversion structures to minimize runoff. Stormwater treatment and discharge facilities have been designed and would operate in accordance with applicable regulations and permits under the LPDES program. Based on these mitigation measures, and compliance with applicable regulations and permits, the impacts of stormwater discharges on EFH are not expected to be significant. No long-term water quality impacts are anticipated.

Pipeline System

Habitat Loss

Certain wetlands and waterbodies along the pipeline right-of-way may provide EFH, including estuarine SAV habitat. Estuarine SAV serves an important function as a component of some types of EFH.

Numerous federally managed fish and other species inhabit areas with SAV for all or part of their life cycle, including larval red drum and shrimp (NOAA, 2018; 1986; GMFMC, 1981b). SAV was documented during field surveys of the estuarine wetlands and waterbodies considered for this review. The SAV occurred as dispersed, isolated communities at four locations along the pipeline right-of-way in areas identified as estuarine waterbodies. Two of the locations were dominated by an invasive species, Eurasian milfoil (*Myriophyllum spicatum*). The other two locations were dominated by beaked tasselweed (*Ruppia maritima*). The SAV occupied a total of 2.7 acres, or about 30 percent of the overall acreage of the surveyed waterbodies, primarily adjacent to the waterbody banks.

Managed fisheries that could rely on estuarine EFH in the pipeline right-of-way include post-larval and juvenile life stages of white shrimp, brown shrimp, and adult red drum. The wetlands could also provide habitat for a variety of economically important marine fishery species, such as striped mullet, Atlantic croaker, gulf menhaden, spotted and sand seatrout, southern flounder, and blue crab. Estuarine channels may provide travel corridors for managed species between habitats. Species that are present in estuarine EFH may constitute prey for managed species in EFH both inside and outside the Project area, such as mackerels, snappers, and groupers (managed by the GMFMC), and Atlantic Highly Migratory Species, such as sharks (managed by NOAA Fisheries). Therefore, managed species could also be indirectly affected by the Project through potential impacts on their food sources.

Based on 2021 and 2023 field survey data, construction of the Pipeline System would result in the permanent fill of about 0.3 acre of estuarine EFH for the construction of MLV 5 near MP 53.2, along with its associated access road. The Pipeline System would temporarily affect about 402.2 acres of estuarine and palustrine EFH and 19.6 acres of waterbody EFH (421.8 acres total).

We received comments from NMFS in response to the draft EIS recommending CP Express develop and implement a pre- and post-construction monitoring plan to identify portions of the pipeline right-of-way not restored to pre-construction conditions. Further, NMFS recommended CP Express provide mitigation for all permanent impacts on wetlands from the pipeline construction right-of-way, if warranted by the results of the monitoring effort after more than 5 years. CP2 LNG and CP Express would adhere to COE and LDNR permit conditions, which would establish specific timeframe(s) for post-construction mitigation. In response to these permit conditions, CP2 LNG and CP Express would develop a monitoring plan that provides the level of detail and information necessary to ensure post-construction conditions meet agency requirements. Additionally, CP Express would comply with section VI.D of its Project-specific Procedures, which outlines post-construction maintenance and reporting measures. CP Express would be required to conduct post-construction monitoring for at least three years and file a report with the Secretary documenting successful wetland revegetation as defined in section VI.D.5. If wetland revegetation is not considered successful after the three-year period, CP Express would have to develop and implement a remedial revegetation plan in coordination with a professional wetland ecologist and file documentation annually until revegetation is successful.

Displacement and Mortality

Impacts on estuarine EFH have been minimized through use of the HDD crossing method to install the pipeline under Calcasieu Lake, the Intracoastal Waterway, and about 2 miles of estuarine EFH. An inadvertent return of drilling mud could occur during the HDD process, during which drilling mud could reach the overlying EFH and affect benthic habitat and organisms, as discussed previously for the Terminal Facilities with respect to dredging. To minimize the risk of an inadvertent release of drilling mud and to undertake effective cleanup should one occur, CP Express would implement the Project's HDD Monitoring and Contingency Plan during construction.

Limited impacts on estuarine EFH could occur where pipeline construction through waterbodies requires open-cut trenching associated with either conventional or push installation. Impacts would include physical disturbance through vehicle and equipment movement; displaced sediment; disrupted stream flow; and increased turbidity. Short-term impacts would also occur from the placement of temporary access roads and ATWS in estuarine EFH. The associated impacts on estuarine EFH would be short-term and localized to the construction area, although less mobile managed and prey species could experience direct mortality.

Pipeline trenches in wetlands would be backfilled with the excavated material and returned to pre-existing conditions in accordance with the Project-specific Procedures. Following construction, the benthic community in EFH is expected to be quickly recolonized by invertebrates and fully recover within a few seasons. Wetlands would be returned to preconstruction contours. We note that, in accordance with the Project-specific Procedures, CP Express and CP2 LNG would be required to monitor wetland revegetation efforts and would file a status report within 3 years of construction documenting, with location detail and photographs, the status of revegetation. Where revegetation is not successful after 3 years, CP Express and CP2 LNG would develop and implement, in consultation with a professional wetland ecologist, a remedial revegetation plan to actively revegetate wetlands. Revegetation efforts would be monitored and annual reports would be filed on the project docket until wetland revegetation is successful. Therefore, any adverse impacts on EFH from pipeline construction would be minor because of their short-term nature. We note that any additional wetland mitigation would be determined by the COE.

Temporary Water Quality Impacts

Indirect effects on EFH could occur through increased turbidity and sedimentation due to stormwater runoff from disturbed soils in temporary workspaces and the construction right-of-way. These impacts would be minimized through adherence to CP Express' Plan and Procedures. In addition, additional temporary workspaces would be set back at least 50 feet from the edges of waterbodies and wetlands, unless topographic or other factors impose constraints and except where the adjacent upland consists of actively cultivated or rotated cropland or other disturbed land.

Introduction of Pollutants

Vehicle and equipment use during construction could result in indirect effects on EFH through the incidental release of hazardous materials such as fuel and antifreeze. Temporary adverse impacts during construction would be avoided or minimized through adherence to the construction SPCC Plan.

Entrainment/Impingement

As discussed for the Terminal Facilities, hydrostatic testing could temporarily affect EFH. Potential impacts on EFH during the water withdrawal process could include reduced water flow, disturbance of bottom sediments and increased turbidity, and entrainment or impingement of fish eggs, small or juvenile fish, or food resources. CP Express would implement certain mitigation measures to reduce impacts, including placement of water intakes above the channel bed, using appropriately sized screens on water intakes (½-inch mesh wire fabric or equivalent), and limiting water withdrawal rates. Hydrostatic test water discharges have the potential to cause localized erosion or scour, which could increase sedimentation. To minimize these impacts, CP Express would regulate the discharge rate and use energy dissipation devices, as necessary, to prevent erosion, streambed scour, and suspension of sediment. With these measures, impacts on EFH would be temporary, localized, and minor.

Operational Impacts

The majority of EFH impacts would be short-term and would occur during pipeline construction. However, development of MLV 5 and its associated access road would result in the permanent loss of 0.3 acre of estuarine EFH. Should the pipeline need to be accessed for maintenance or repair, temporary impacts on EFH could occur through sediment disturbance and increased turbidity during pipe excavation. However, impacts would be minor because they would be short-term and restricted to the maintenance or repair site.

Essential Fish Habitat Conclusion

The Project would have permanent and short term impacts on benthic and pelagic conditions in EFH (table 4.7.3-3). Permanent impacts will include the modification of existing EUB EFH, the creation of new EUB EFH, and the loss of estuarine EFH. Compensatory mitigation for permanently affected wetlands would be provided in accordance with COE and LDNR permitting requirements.

At the Marine Facilities, approximately 1.7 acre of estuarine EFH and 0.3 acre of waterbody EFH would be permanently impacted due to fill. Approximately 19.1 acres of EUB EFH off Monkey Island would change from an approximate 1-foot depth to a 44.3-foot depth. Dredging of the marine berthing area would result in the creation of approximately 59.1 acres of new EUB EFH. This includes 12.5 acres converted from estuarine EFH and 0.2 acre converted from waterbody EFH; the remainder would be converted to new EUB EFH from uplands and non-EFH wetlands. As mentioned in section 1.4, the BUDM site and associated disposal pipeline are non-jurisdictional to the Commission, but are addressed in the resource sections of this final EIS given they are closely related to the Project. The location of any dredged non-jurisdictional material disposal sites located in EFH would be determined based on agency consultation. Therefore, we conclude that the Project would adversely affect EFH, but these adverse effects would be appropriately offset through purchase of wetland mitigation, compliance with the MSFCMA and CWA permit, and/or would be temporary to short-term in duration and not significant.

4.8 THREATENED, ENDANGERED, AND OTHER SPECIAL STATUS SPECIES

Special status species are those species for which federal or state agencies afford an additional level of protection by law, regulation, or policy. Included in this category are federally listed and federally proposed species that are protected under the ESA, as amended, or are considered as candidates for such listing by the FWS or the NMFS, and those species that are state listed as threatened, endangered, or other special status.

We received multiple comments from the public and federal and state agencies expressing concern regarding potential Project impacts on threatened and endangered species. Federal agencies are required under section 7 of the ESA, as amended, to ensure that any actions authorized, funded, or carried out by the agency would not jeopardize the continued existence of a federally listed endangered or threatened species, or result in the destruction or adverse modification of the designated critical habitat of a federally listed species. As the lead federal agency authorizing the Project, FERC is required to consult with the FWS and/or NMFS to determine whether federally listed endangered or threatened species or designated critical habitats are found in the vicinity of the Project, and to evaluate the proposed action's potential effects on those species and/or critical habitats.

For actions involving major construction activities with the potential to affect listed species or designated critical habitat, the lead federal agency must report its findings to the FWS and/or NMFS in a Biological Assessment for those species that may be affected. If it is determined that the action is likely to adversely affect a listed species, the federal agency must submit a request for formal consultation to comply with section 7 of the ESA. In response, the FWS and/or NMFS would issue a Biological Opinion detailing whether the federal action would jeopardize the continued existence of a listed species or result in the destruction or adverse modification of designated critical habitat.

Although proposed and under review species and proposed critical habitat do not receive federal protection through the ESA, we considered the potential effects on these species and habitats so that section 7 consultation could be facilitated in the event one or more of these species become listed before or during Project construction. Should a federally listed, proposed, petitioned, or candidate species be identified during construction that has not been previously identified during field surveys or assessed through consultation, and Project activities could adversely affect the species, CP2 LNG and CP Express would be required to suspend the construction activity and notify the Commission and FWS or NMFS of the potential affect. The construction activity could not resume until the Commission completes its consultation with the FWS or NMFS.

CP2 LNG and CP Express, acting as the FERC's non-federal representative for the purpose of complying with section 7 of the ESA (18 CFR § 380.13), initiated informal consultation with the FWS Southwest Region, Texas Coastal Ecological Services Field Office and FWS Southeast Region, Louisiana Ecological Services Field Office on April 19, 2021 to request technical assistance from the FWS, verify the list of species, and obtain feedback on field survey protocols for those species that may require survey. CP2 LNG and CP Express initiated an updated expedited informal consultation with the NMFS on February 25, 2022; consultation is currently ongoing.

We have determined that the Project *may affect* federally listed species. On March 7, 2023, as required by section 7 of the ESA, the FERC requested to initiate formal consultation with FWS and NMFS regarding the potential impacts of the Project on threatened and endangered species in the Project area. To assist with finalizing informal section 7 consultation, we requested that the FWS and NMFS consider the draft EIS as our official Biological Assessment for the Project; consultation is ongoing.

Because ESA consultation with the FWS and NMFS is ongoing and to ensure that CP2 LNG and CP Express does not begin construction until section 7 consultation is complete, **we recommend that:**

- **CP2 LNG and CP Express should <u>not begin</u> construction of the Project <u>until</u>:**

  a. all outstanding biological surveys are completed and filed with the Secretary;

  b. the FERC staff completes any necessary ESA section 7 consultation with the FWS and NMFS; and

  c. CP2 LNG and CP Express have received written notification from the Director of OEP, or the Director's designee, that construction and/or use of mitigation (including implementation of conservation measures) may begin.

Based upon our review of publicly available information, agency correspondence, and field survey data, we have identified a total of 18 federally listed threatened or endangered species, one candidate species, one species proposed for listing, and one species under review as being potentially present in the Project vicinity, as presented in table 4.8-1. Of these species, nine are under the jurisdiction of the FWS, six are under the jurisdiction of NMFS, and six live in habitats that fall within an area where both services manage the species. No species under NMFS jurisdiction would be impacted in Texas. We have determined that four of these species would not be impacted by the Project because the species should only be considered for wind related projects along its migratory route (piping plover [*Charadrius melodus*] and red knot [*Calidris canutus rufa*]), the is the Project is not within the known range of the species (Gulf sturgeon [*Acipenser oxyrinchus (oxyrhynchus) desoto*]), or there is no suitable habitat in the Project area Navasota ladies-tresses (*Spiranthes parksii)*. A discussion of the remaining 17 species with potential to occur in the Project area are included below. In addition, due to the proximity of designated critical habitat for the piping plover to the Project area, this species is also discussed further below. Other special status species, such as those that are state listed as threatened or endangered, or those protected by the MMPA, are discussed in sections 4.8.2 and 4.8.3.

Table 4.8-1

Federally Threatened and Endangered Species, Candidate Species, and Species Under Review Potentially Occurring within the Project Area

Common Name *Scientific Name*	Federal Status	State Status		Federal Jurisdiction	Parish/County within Species Range	Project Component		Designated Critical Habitat in the Project Vicinity	Determination of Effect
		Louisiana	Texas			Pipeline System	Terminal Facilities		
Birds									
Eastern Black Rail *Laterallus jamaicensis ssp. jamaicensis*	T	-	-	FWS	Cameron Parish, LA	X	X	No	*May Affect, Likely to Adversely Affect*
Piping Plover [a] *Charadrius melodus*	T CH	T	T	FWS	Cameron Parish, LA and Jasper County, TX	X	X	Yes	*No Effect*
Red Knot [a] *Calidris canutus rufa*	T	T	-	FWS	Cameron Parish, LA and Jasper and Newton Counties, TX	X	X	No	*No Effect*
Red-cockaded woodpecker *Picoides borealis*	E	E	E	FWS	Calcasieu Parish, LA and Jasper and Newton Counties, TX	X		No	*May Affect, Not Likely to Adversely Affect*
Fish									
Giant manta ray *Manta birostris*	T	-	-	NMFS	Nearshore		X	No	*May Affect, Not Likely to Adversely Affect*
Gulf sturgeon *Acipenser oxyrinchus desotoi*	T	-	-	FWS, NMFS	Nearshore		X	No	*No Effect*
Oceanic whitetip shark *Carcharhinus longimanus*	T	-	-	NMFS	Nearshore		X	No	*May Affect, Not Likely to Adversely Affect*
Saltmarsh topminnow [b] *Fundulus jenkinsi*	Under Review	-	-	FWS	Cameron Parish, LA	X	X	No	*Would Not Contribute to a Trend Toward Federal Listing*
Insects									
Monarch Butterfly *Danaus plexippus*	Candidate	-	-	FWS	Cameron and Calcasieu parishes, LA	X	X	No	*Would Not Contribute to a Trend Toward Federal Listing*
Marine Mammals									
Fin Whale *Balaenoptera physalus*	E	-	-	NMFS	Nearshore		X	No	*May Affect, Not Likely to Adversely Affect*

Table 4.8-1

Federally Threatened and Endangered Species, Candidate Species, and Species Under Review Potentially Occurring within the Project Area

Common Name *Scientific Name*	Federal Status	State Status: Louisiana	State Status: Texas	Federal Jurisdiction	Parish/County within Species Range	Project Component: Pipeline System	Project Component: Terminal Facilities	Designated Critical Habitat in the Project Vicinity	Determination of Effect
Rice's Whale (previously designated as Gulf of Mexico's Bryde's whale) *Balaenoptera ricei (previously Balaenoptera edeni)*	E	-	-	NMFS	Nearshore		X	No	*May Affect, Not Likely to Adversely Affect*
Sei Whale *Balaenoptera borealis*	E	-	-	NMFS	Nearshore		X	No	*May Affect, Not Likely to Adversely Affect*
Sperm Whale *Physeter macrocephalus*	E	-	-	NMFS	Nearshore		X	No	*May Affect, Not Likely to Adversely Affect*
West Indian Manatee *Trichechus manatus*	T	T	T	FWS	Cameron and Calcasieu Parishes, LA	X	X	No	*May Affect, Not Likely to Adversely Affect*
Reptiles									
Alligator snapping turtle *Macrochelys temminckii*	Proposed Threatened	-	T	FWS	Jasper and Newton Counties, TX [c]	X		No	*Not Likely to Jeopardize Continued Existence*
Green sea turtle *Chelonia mydas*	T	-	-	FWS	Nearshore		X	No	*No Effect*
				NMFS					*May Affect, Not Likely to Adversely Affect*
Hawksbill sea turtle *Eretmochelys imbricata*	E	-	-	FWS	Nearshore		X	No	*No Effect*
				NMFS					*May Affect, Not Likely to Adversely Affect*
Kemp's ridley sea turtle *Lepidochelys kempii*	E	-	-	FWS	Nearshore		X	No	*No Effect*
				NMFS					*May Affect, Not Likely to Adversely Affect*
Leatherback sea turtle *Dermochelys coriacea*	E	-	-	FWS	Nearshore		X	No	*No Effect*
				NMFS					*May Affect, Not Likely to Adversely Affect*
Loggerhead sea turtle *Caretta caretta*	T	-	-	FWS	Nearshore		X	Yes	*No Effect*
				NMFS					*May Affect, Not Likely to Adversely Affect*
	CH	-	-	NMFS					*No Effect*

Table 4.8-1 Federally Threatened and Endangered Species, Candidate Species, and Species Under Review Potentially Occurring within the Project Area									
Common Name ***Scientific Name***	**Federal Status**	**State Status**		**Federal Jurisdiction**	**Parish/County within Species Range**	**Project Component**		**Designated Critical Habitat in the Project Vicinity**	**Determination of Effect**
		Louisiana	**Texas**			**Pipeline System**	**Terminal Facilities**		
Plants									
Navasota ladies-tresses *Spiranthes parksii*	E	-	T	FWS	Jasper County, TX	X		No	*No Effect*

Source: FWS, 2021d, LDWF, 2021s; TPWD, 2022b
TBD – to be determined
CH – Critical Habitat; E - Endangered; T - Threatened
[a] Suitable habitat exists in the Project area; however, as per the iPaC Official Species List, these species should be considered for consultation only for wind related projects along its migratory route. The Project is on its migratory route, but is not a wind related project.
[b] Species is not listed on the iPaC Official Species List.
[c] Counties within the potential range of the alligator snapping turtle are based on state listings (TPWD, 2021c).

CP2 LNG and CP Express completed field habitat assessment surveys on all accessible parcels in summer 2021. Table 4.4.2-1 identifies by milepost the areas that were not accessible for surveys due to a lack of landowner permission. CP Express would complete surveys of the remaining parcels when permission to access those parcels has been obtained.

4.8.1 Federally Listed Threatened and Endangered Species

4.8.1.1 Birds

Eastern Black Rail

During scoping and in response to the draft EIS, we received multiple comments from the public and from state and federal agencies regarding potential Project impacts on the Eastern black rail (EBR) (*Laterallus jamaicensis)*. The EBR is listed as threatened under the ESA with a 4(d) Rule. Section 4(d) of the ESA allows the FWS to establish prohibitions or exceptions to prohibitions for threatened species, which do not automatically have the same protections as endangered species (FWS, 2018a). As stated in the EBR 4(d) Rule, prohibited take of EBR includes incidental take from a variety of activities including the long-term or permanent damage, fragmentation, or conversion of EBR habitat to other types that do not support the species.

The EBR is a subspecies of black rail that occupies high marsh habitats, with soils moist or flooded to a shallow depth. The subspecies requires dense vegetative cover (i.e., greater than 6 stems at 10-20 cm) that allows movement underneath the canopy, and because birds are found in a variety of salt, brackish, and freshwater wetland habitats that can be tidally or non-tidally influenced, plant structure is considered more important than plant species composition in predicting habitat suitability (Flores and Eddleman 1995). Impounded intermediate marshes of the Gulf Coast Chenier Plain of Louisiana and Texas are typified by dominance of salt meadow cordgrass (*Spartina patens*) (Gabrey et al. 2001, p. 220), while unimpounded intermediate marshes include both salt meadow cordgrass and gulf cordgrass (*Spartina spartinae*). In addition, shallow pools that are 1-3 cm deep may be the most optimal for foraging and for chick-rearing. Some elevational variability in the substrate is needed, and EBRs require elevated refugia with dense cover to survive high water events due to the propensity of juvenile and adult EBRs to walk and run rather than fly and chicks' inability to fly. This small bird is about 4 to 6 inches long, is pale to blackish-grey, with a small black bill and red eyes. Its diet is generally unknown; however, it is believed to feed on small aquatic and terrestrial invertebrates and small seeds (FWS, 2021e). The EBR breeding season occurs from March through September. Major threats to the EBR include alteration of plant communities on which this subspecies depends caused by fire suppression, invasive species, sea-level rise, and human modifications. There is no designated critical habitat for the species.

The current range of the EBR within the Project area only includes Cameron Parish, Louisiana and EBR could be impacted by construction of the Terminal Facilities through permanent loss of potentially suitable habitat. Surveys in Cameron Parish west of the proposed Terminal Facilities have detected the EBR during the breeding and overwintering seasons and call-back surveys conducted in July 2022 identified individuals at the Terminal Facilities. Cameron Parish is also known to support plant species, gulf cordgrass and salt meadow cordgrass, that compose suitable EBR habitat within Louisiana. Within the Terminal Facilities footprint, potential EBR habitat was identified during a preliminary field determination based on the presence of emergent wetlands with gulf cordgrass. The majority of these wetlands were within the Terminal Site workspace; however, these areas were historically used for cattle grazing and routinely mowed. Permanent impacts on potentially suitable habitat within the Terminal Facilities workspace could result in displacement, injury, or mortality for the EBR. Further, the construction of the floodwall around the Terminal Facilities would isolate any remaining EBR habitat. Operation noise and lighting could also degrade suitable habitat surrounding the Terminal Facilities during operation. Alteration of hydrology through the addition of impervious surfaces, dredging, and installation of the floodwall could also indirectly impact EBR habitat outside of the Terminal Facilities. However, placement of dredge material for beneficial reuse in the Cameron Prairie NWR may create or improve EBR habitat.

The proposed CP Express Pipeline route through southern Cameron Parish may also result in loss of potentially suitable habitat or disturbance of upland areas utilized by the EBR. Wetland-upland transition zones are an important aspect of suitable habitat for the species. Upland areas adjacent to wetlands allow for escape or refuge during stochastic events, such as hurricanes or floods, for the EBR. Within the Pipeline System workspace, areas of higher elevation within marsh wetlands were observed which, under undisturbed conditions, could provide suitable EBR habitat. Temporary impacts on potentially suitable habitat within the Pipeline System workspace could result in displacement for the EBR.

Because EBRs are difficult to detect, the FWS has recently recommended using habitat as a surrogate for estimating populations under the 4(d) Rule (FWS, 2021e). Initial surveys were completed in the summer of 2021 and callback surveys were completed July 2022 within the Terminal Facilities property and along a portion of the CP Express pipeline corridor. Preferred habitat was determined to be approximately 42 acres within the southernmost tip of the Terminal Site. This habitat was dominated by gulf cordgrass and contained chenier ridge topography. Further, EBRs were identified within this habitat during the callback surveys conducted in July 2022.

CP2 LNG and CP Express consulted with the FWS in March 2023 regarding recommended mitigation measures to minimize direct impacts (e.g., habitat loss), and indirect impacts (e.g., lighting, noise, and stormwater) that the Project may have on the EBR[67]. Potential direct impacts and avoidance measures CP2 LNG and CP Express would implement are discussed below:

- Construction at the Terminal Site would permanently remove approximately 40.6 acres of preferred EBR habitat and would temporarily disturb approximately 1.8 acres of preferred EBR habitat. If practicable, vegetation clearing (mowing) in these habitat areas would take

[67] CP Express' correspondence with the FWS regarding recommended mitigation measures to minimize impacts on the EBR can be viewed on FERC's eLibrary in attachment 5 of accession number 20230324-5101.

place between October and January, which is outside of the EBR's vulnerable periods (i.e., breeding season [May through August] and molt periods for juveniles and adults [February through April; July through September]).

- A walkover of the area to be cleared would be conducted by a qualified biologist no more than 10 days prior to construction. If an EBR active nest is detected, FWS would be notified, an appropriate buffer established, and the nest avoided until the young have successfully fledged. In addition, a biological monitor would be utilized within designated EBR habitat during the clearing and grading phases of the Project. The biological monitor would have stop work authority should EBR chicks, eggs, or flightless molted birds be observed within the Project area.

- Clearing of preferred EBR habitat would be conducted in a way that allows for the escape of birds towards refugia adjacent to the Project area. The Project would avoid a pattern of clearing that creates isolated pockets of preferred EBR habitat. This would be achieved by linear clearing in the direction of refugia and avoiding clearing via decreasing concentric circles. Clearing would be done at a slow speed within preferred EBR habitat, such that individual birds would have enough time to avoid equipment.

- In the rare instance that equipment is temporarily inactivated within preferred EBR habitat (e.g., through mechanical failure or temporary stoppage), a complete inspection of the surroundings would take place prior to reactivation, to ensure that no birds have settled around the equipment in the interim.

CP2 LNG and CP Express' implementation of the measures above could avoid direct impacts (e.g., take) on the EBR during removal of preferred habitat within the Project area. Additional suitable habitat contiguous to the Project area is available for displaced EBRs. Further, because of the amount of adjacent available habitat, it is unlikely any EBRs currently within adjacent habitat would be impacted by an influx of additional EBRs.

Potential indirect impacts and avoidance measures CP2 LNG and CP Express would implement are discussed below:

- Lighting would be directed towards the Project area for nighttime work and would only be utilized during active construction. The potential effects of permanent lighting on designated EBR habitat outside the Project footprint would be factored into perimeter lighting design and stray light, including glare or reflected light, would be minimized. Outdoor fixtures would have diffusers, lenses, and shields to reduce glare and light pollution. A 31.5-foot-high floodwall would be erected around the Terminal Site at the beginning of construction. Impacts from lighting on areas outside the Terminal Site would be further minimized through the shielding offered by the surrounding floodwall. Additionally, the floodwall, erected around the Terminal Site at the beginning of construction, would minimize noise in adjacent preferred habitat.

- The Project would mitigate construction noise by restricting the loudest activity (pile-driving) to daytime hours, which would be outside peak breeding call times (i.e., one hour before dawn and after dusk). Additional noise mitigation measures during nighttime construction may include broadband backup alarms, local equipment barriers, and reduced activities, as needed.

- The Project would obtain a LPDES Construction Stormwater Discharge Permit for the discharge of construction stormwater (administered and regulated by the LDEQ). Additionally, the Project would develop and adhere to the SPCC Plan and a SWPPP, in accordance with applicable regulations and permit requirements. These measures and regulations would minimize potential impacts from discharge and contamination on surrounding habitat.

- Stormwater would not be directed towards preferred EBR habitat during construction and operation of the Terminal Site.

Consultation with FWS is ongoing. With the implementation of the above measures in addition to the *Migratory Bird Nesting Impact Mitigation Plan*, we conclude that the Project would minimize impacts on the species to the extent practicable; however, the Project *may affect, and would likely adversely affect* the EBR.

Red Cockaded Woodpecker

We received a comment from the FWS regarding potential Project impacts on the red-cockaded woodpecker (RCW) (*Leuconotopicus borealis*). The RCW is listed as endangered under the ESA. The RCW is about 7 inches long, has black and white horizontal stripes on its back, and a black cap and nape that encircle large white cheek patches (FWS, 2016). Males have a red streak on either side of the black cap. Within the Project area, the species' known range includes Calcasieu Parish, Louisiana, and Jasper and Newton Counties, Texas. There is no designated critical habitat for the species (FWS, 2021e).

The RCW is a non-migratory, social bird that nests in small family groups within live, mature pine trees, typically 80 to 120 years old. Longleaf pines (*Pinus palustris*) are preferred, but other pine species are acceptable. The woodpecker excavates a nest cavity in the heartwood of the pine, a process that can take 1 to 6 years. Its diet consists of ants, beetles, caterpillars, spiders, and wood-boring and other insects. Primary threats to this species are destruction and degradation of pine forest habitat as a result of timber harvest and agriculture (FWS, 2016).

While the Pipeline System occurs within the bird's known or suspected range in Jasper and Newton Counties, Texas, and Calcasieu Parish, Louisiana, based on data received from the LDWF WDP and TPWD NDD, and a review of the eBird website, there are no known occurrences of the RCW within 2 miles of the Project. About 91 percent of the Pipeline System workspace within the bird's range was surveyed, and no suitable cavity nest trees were identified within the survey corridor nor was the species observed during the field survey. The portion of the corridor for which survey access was not granted was reviewed utilizing Google Earth imagery and habitat conditions were evaluated from public roadways.

No potential RCW roosting or nesting habitat was observed during field surveys or identified within 0.5 mile of the survey corridor during CP Express' aerial review; however, suitable foraging habitat was observed along the Pipeline System route, generally between MP 0.1 through MP 27.9 of the CP Express Pipeline, and MP 0.0 through MP 6.0 of the Enable Gulf Run Lateral. In upland areas, where the RCW is characteristically found, trees would be removed within the right-of-way and permanently removed within a 25-foot-wide corridor centered on the permanent right-of-way.

In upland areas, trees removed from temporary construction workspace would be allowed to regrow. Thus, trees that could provide suitable foraging habitat for the RCW may be removed within the construction workspace and operational rights-of-way, resulting in a temporary and/or permanent conversion of wooded foraging habitat to herbaceous or scrub-shrub habitat; however, additional foraging habitat that may be utilized by the RCW would remain in the surrounding area. In addition, as discussed in section 4.7.1.3, where clearing cannot occur outside of the migratory bird nesting window of March 1 through July 15, CP Express would conduct a walk-through site survey of the Project workspace prior to construction along the Pipeline System and implement measures outlined in its *Migratory Bird Nesting Impact Mitigation Plan*. Therefore, we conclude that the Project *may affect, but is not likely to adversely affect* the RCW. FWS also reviewed these minimization measures proposed by CP2 LNG and concurred with a *may affect, but is not likely to adversely affect* determination for the RCW in a letter dated May 3, 2022. Therefore, consultation for the RCW is considered complete.

Piping Plover

The piping plover (*Charadrius melodus)* is federally listed as threatened, with designated critical habitat along the Louisiana coast. The species is a small shorebird about 7 inches long, with sand-colored plumage on its back and crown, and white underparts. Breeding birds have a single black breastband, a black bar across the forehead, bright orange legs and bill, and a black tip on the bill. During winter, the birds lose the black bands, the legs fade to pale yellow, and the bill becomes mostly black. Within the Project area, the species' known range includes Cameron Parish (FWS, 2021e).

Texas and Louisiana provide overwintering habitat for the piping plover (The Cornell Lab, 2019). There are no breeding populations in the two states. The species arrives in its wintering grounds between about late July through April. Individuals overwinter in areas that provide suitable foraging and roosting habitat, which includes intertidal beaches and flats, and associated dune systems above annual high tide along the coast. Foraging habitat includes intertidal beaches, mudflats, algal flats, sand flats, and wash-over passes with sparse emergent vegetation. Roosting habitat must provide unvegetated or sparsely vegetated areas with debris, detritus, or micro-topographic relief offering refuge from high winds and cold weather.

Habitat surveys found that the Project footprint contains only a small amount of narrow, low-quality shoreline habitat on Monkey Island adjacent to the Marine Facilities and along the banks of the Sabine River (CP Express MP 19.9), which would be crossed by the HDD construction method. Piping plovers are more likely to use the wide, high-quality beach habitat delineated as designated critical habitat for the species along the Gulf of Mexico shoreline about 1 mile south of Monkey Island and 1,000 feet south of the Terminal Facilities (FWS, 2021e). The species was not observed during Project field surveys. No adverse modification of piping plover designated critical habitat is anticipated as a result of the Project since this habitat occurs outside the Project footprint. Therefore, we conclude the Project would have *no effect* on the piping plover. Further, there would be *no effect* on piping plover designated critical habitat because it occurs outside the Project footprint.

4.8.1.2 Fishes

Giant Manta Ray

The federally threatened giant manta ray (*Mobula birostris*) is commonly found offshore; however, it has been observed in estuarine waters near oceanic inlets, with the use of these waters as potential nursery grounds (NMFS, 2021d, 2021f). There is no designated critical habitat for this species (NMFS, 2021b, 2021c). Threats to the giant manta ray include overutilization for commercial purposes and being caught as bycatch in fisheries throughout their range.

Potential Project-related impacts on the giant manta ray could be associated with dredging/excavation of the LNG berthing area, pile driving for dock construction, barge traffic associated with Terminal Facilities construction, and operation of LNG carriers in Gulf of Mexico and Calcasieu River shipping channels. During dock construction, vibratory pile driving could result in temporary injury and impact pile driving could result in permanent injury of giant manta rays depending on the size of the piles. CP2 LNG has assessed the extent of potential impacts of pile driving noise on sea turtles and fish (including the giant manta ray), as described in section 4.7.2.2. In order to mitigate the potential impacts on marine fauna caused by pile installation, CP2 LNG would implement the use of ramp-up procedures at the beginning of each pile installation or when a delay of 15 minutes or more has occurred to minimize impacts on marine species. On-site personnel would also be advised by an EI or Marine Mammal Observer to cease work if the giant manta ray is observed. Additionally, based on our recommendation in the draft EIS, CP2 LNG has committed to utilizing double bubble curtains around 144-inch-diameter and 120-inch diameter piles during impact pile driving activities, providing an overall 10 dB reduction (5 dB reduction per sound curtain).

The giant manta ray is a surface-oriented species and is therefore somewhat susceptible to LNG vessel strikes; however, per NMFS, the potential for LNG carriers associated with the Project to strike giant manta rays is highly unlikely. The LNG carriers and barges/other vessels carrying construction equipment would also use established and well-traveled shipping lanes. Although LNG carriers are outside of our jurisdiction, CP2 LNG would provide the *Vessel Strike Avoidance Measures* document to LNG carrier captains to minimize the risk of potential collisions between vessel traffic and giant manta rays. In response to our recommendation in the draft EIS to further minimize the risk of potential collisions and impacts on aquatic species, CP2 LNG has committed to conducting mandatory training for construction vessel operators which would include review of the recommended BMPs outlined in the *Vessel Strike Avoidance Measures*. The training would also include a visual component to assist with identification of protected marine species that may be encountered in the Project area.

Further, to address the potential marine pollution impacts associated with offshore spills of fuel, lubricants, or other hazardous materials, the Coast Guard requires LNG carriers to develop and implement a SOPEP, which includes measures to be taken if an oil pollution incident occurs or a ship is at risk of one.

CP2 LNG remains in consultation with NMFS and would adhere to any requirements or requests for additional monitoring after consultation is complete. Due to implementation of the above mitigation measures and information received through consultation with NMFS, we conclude the Project *may affect, and would not likely adversely affect* the giant manta ray.

Oceanic Whitetip Shark

The federally threatened oceanic whitetip shark (*Carcharhinus longimanus*) is found in tropical and sub-tropical waters, generally in water depths greater than 600 feet (NMFS, 2021d, 2021g). There is no designated critical habitat for this species (NMFS, 2021b, 2021c). The primary threat to the whitetip shark is incidental bycatch associated with commercial fisheries. LNG carriers would travel through the Gulf of Mexico to the Terminal Facilities during Project operation, raising the potential for collisions between LNG carriers and sharks. Barges carrying construction equipment/modules also have the potential for strikes during Project construction.

Suitable habitat for this species is only present along vessel transit routes for the LNG carriers. Given that it is a surface-dwelling shark, oceanic whitetip sharks could be vulnerable to vessel strikes during operation of the Terminal. Vulnerability to collision with LNG carriers would be greatest while these animals feed, swim, and rest near the surface of the water. In areas of intense ship traffic, they could experience propeller or collision injuries. The potential for collisions is low because the LNG carriers and barges/other vessels carrying construction equipment would use established, well-traveled shipping lanes. As per the NMFS, the potential for LNG carriers associated with the Calcasieu Pass LNG Project to strike sharks is highly unlikely (NMFS, 2019a). Although LNG carriers are outside of our jurisdiction, CP2 LNG would provide the *Vessel Strike Avoidance Measures* document to LNG carrier captains to further minimize the risk of potential collisions between vessel traffic and sharks, as discussed in section 4.7.2.2. Further, to address the potential marine pollution impacts associated with offshore spills of fuel, lubricants, or other hazardous materials, the Coast Guard requires LNG carriers to develop and implement a SOPEP, which includes measures to be taken if an oil pollution incident occurs or a ship is at risk of one. With implementation of the aforementioned measures, we conclude that the Project *may affect, but is not likely to adversely affect* the oceanic whitetip shark.

Saltmarsh Topminnow

The saltmarsh topminnow (*Fundulus jenkinsi*) listing status is currently under review. The species occurs in marsh habitat along the northern Gulf of Mexico coast in Alabama, Florida, Louisiana, Mississippi, and Texas (FWS, 2021e). Within the Project area, the species' known range includes Cameron Parish (FWS, 2021e). This fish is typically smaller than 1.7 inches, with gray-green cross-hatching on its back and sides, and dark, round spots (FWS, 2011).

Suitable habitat for the minnow includes brackish saltmarsh with small, shallow tidal meanders and low salinity (e.g., 1 to 4 parts per thousand) (FWS, 2011). Based on the occurrence of estuarine wetlands in the Project area for the Terminal Facilities and Pipeline System, potential saltmarsh topminnow habitat is present in the Project area. Water quality impacts associated with Project construction may include temporary turbidity increases and reduced dissolved oxygen levels; however, baseline conditions would quickly return following construction. Further, per the data received from the LDWF WDP, there are no documented occurrences of the saltmarsh topminnow within 2 miles of the Project. Therefore, we conclude that the Project is *would not contribute to a trend toward federal listing* of the saltmarsh topminnow.

4.8.1.3 Insects

Monarch Butterfly

The monarch butterfly (*Danaus plexippus*) is a candidate species under the ESA and is not listed nor proposed for listing. There is no designated critical habitat for the species. Monarch butterflies are larger insects, with distinct orange wings bearing black borders and veins. They can be found in a variety of habitats such as forests, agricultural fields, and meadows; however, nectar-bearing wildflowers for feeding adults and native milkweeds as host plants must be available. In most regions, the monarch butterfly breeds year-round. Adults migrate each year to overwintering sites, flying across the entire United States and beyond. Monarch butterflies breed and migrate throughout Texas and Louisiana, with peak migration along the upper Texas coast occurring in October. During the breeding season, monarchs lay their eggs on obligate milkweed host plants (primarily *Asclepias* spp.), and emerging larvae feed on milkweed, sequestering toxic chemicals as a defense against predators. The Texas coast is an important fall migration pathway for the eastern U.S. monarch population in route to the monarch's primary overwintering site in Mexico.

The Project has the potential to impact habitat containing nectar-bearing wildflowers, on which adult monarch butterflies might feed in Texas and Louisiana; however, vegetation surveys of wetland and upland areas during field delineations provided no records of milkweed (*Asclepias* spp.), the sole source of food for monarch caterpillars. The Project's permanent impacts on vegetation would be associated with aboveground facilities, permanent access roads, and the maintained pipeline right-of-way. Temporary workspace at the Terminal Site and the majority of the workspace for the Pipeline System would be returned to preconstruction conditions and allowed to revegetate in accordance with CP2 LNG and CP Express' Revegetation Plan and Project-specific Plan and Procedures, resulting in only temporary habitat impacts. Where losses of potential habitat are permanent, it is expected that similar adjacent available habitat could be utilized, should the species be present. FWS – Texas Coastal Ecological Services Field Office recommended utilizing BMPs including the conservation of native grasslands and other pollinator habitats by seeding and replanting existing rights-of-way or disturbed sites with native grasses, milkweeds, and nectar plants that are native to the area; organic gardening that avoids pesticides and herbicides that can destroy the monarchs or the milkweeds they need to survive; for right-of-way maintenance, use a mowing deck height of 12 inches to protect native vegetation communities and combat the establishment of invasive plant species. CP2 LNG and CP Express coordinated with the NRCS to incorporate native seed mixes and would only mow the right-of-way once every three years (per the Project-specific Plan), which should result in a greater likelihood of providing monarch butterfly habitat. Therefore, with the implementation of the above measures, we conclude that the Project *would not contribute to a trend toward federal listing* of the monarch butterfly.

4.8.1.4 Marine Mammals

West Indian Manatee

During scoping and in response to the draft EIS, we received multiple comments from state and federal agencies regarding potential Project impacts on the West Indiana manatee. The West Indian manatee (*Trichechus manatus*) is protected under the ESA as a threatened species and under the MMPA. Manatees are found at depths of about 5 to 20 feet in marine, estuarine, and freshwater coastal environments of the Gulf of Mexico and the Atlantic Ocean (FWS, 2021e). Manatees are sub-tropical mammals that are not cold-tolerant and reside in the warm waters of peninsular Florida during the winter; however, they may disperse great distances during warmer months (FWS 2021e). Manatees have large, seal-shaped bodies with paired flippers and a round, paddle-shaped tail with adults averaging about 9 feet in length. The primary cause for the species' decline is human activity, including boat and barge collisions, entrapment in flood control structures, poaching, habitat loss, and pollution.

In Louisiana, the West Indian manatee is regularly found in Lake Pontchartrain and Lake Maurepas and their associated coastal waters and streams (FERC, 2019b). It can also occur in other Louisiana coastal areas, most likely when the average water temperature is warm. Based on data maintained by the Louisiana WDP, over 80 percent of reported manatee sightings in Louisiana between 1999 and 2011 occurred between June and December (FERC, 2019b). Manatees are known to travel long distances up coastal waterways from the Gulf of Mexico. The LDWF WDP has records of the West Indian manatee occurring in the Calcasieu River, Calcasieu Ship Channel, and Calcasieu Pass; however, the species is considered extremely rare in these waters (FERC, 2018), and none of the parishes or counties crossed by the Project are listed by the FWS as part of the manatee's known range (FWS, 2021e). The nearest designated critical habitat for the manatee is in Florida (FWS, 2021e).

Potential Project-related impacts on the manatee could be associated with dredging/excavation of the LNG berthing area, pile installation during dock construction, barge traffic associated with Terminal Facilities construction, and operation of LNG carriers in Gulf of Mexico and Calcasieu River shipping channels. Impacts due to pile driving are discussed in section 4.7.2.2. To further reduce impacts as a result of Project construction, CP2 LNG would implement the FWS *Standard Manatee Conditions for In-Water Activities* in addition to noise attenuation measures during pile driving (see our recommendation in section 4.7.2.2). Additionally, as discussed in section 4.8.1.2, CP2 LNG has committed to conducting mandatory training for construction vessel operators which would include review of the recommended BMPs outlined in the *Vessel Strike Avoidance Measures*. On-site personnel would also be advised to cease work if the manatee is observed.

During Project operations, LNG carriers could collide with manatees, which might cause injury or mortality, although such collisions would be unlikely in the Calcasieu Ship Channel or in other designated navigable channels used by the Project, where established, well-traveled, shipping lanes are present. Although LNG carriers are outside of our jurisdiction, to minimize potential collisions between vessel traffic and marine species, CP2 LNG would provide the *Vessel Strike Avoidance Measures* to LNG carrier captains and would advocate compliance with the measures identified in the document.

Considering the low likelihood of occurrence of the manatee in the proposed Project area, in addition to implementation of the *Standard Manatee Conditions for In-Water Activities* and adherence to the *Vessel Strike Avoidance Measures*, impacts on the manatee would be minimal. We conclude that the Project *may affect, but is not likely to adversely affect* the West Indian manatee. FWS also reviewed these minimization measures proposed by CP2 LNG and concurred with a *may affect, but is not likely to adversely affect* determination for the West Indian manatee in a letter dated May 3, 2022. Therefore, consultation for the West Indian manatee is considered complete.

Whales

We received multiple comments from the public regarding potential impacts on the newly named Rice's whale (*Balaenoptera ricei*) (formerly Bryde's whale)[68] from construction of the Project and the resulting increase in LNG traffic and consequent marine pollution during operation of the Project. The federally endangered Rice's whale (*Balaenoptera ricei*), fin whale, sei whale, and sperm whale have been documented off the coast of Louisiana in the Gulf of Mexico. Their habitat is limited to the offshore ocean environment, typically at depths greater than 640 feet (200 meters). There is no designated critical habitat for these whale species. LNG carriers would travel through the Gulf of Mexico to the Terminal Facilities during Project operation, raising the potential for collisions between LNG carriers and whales. Barges/other vessels carrying construction equipment also have the potential for strikes during Project construction.

The potential for collisions is low because the LNG carriers and barges would use established, well-traveled shipping lanes. Per NMFS, the potential for LNG carriers associated with the Calcasieu Pass LNG Project (which is similar and next to the Terminal Facilities) to strike a sperm whale, which is the most abundant whale species in the Gulf of Mexico, is highly unlikely.

To further minimize the risk of potential collisions between vessel traffic and whales, as well as other marine species, although LNG carriers are outside of our jurisdiction, CP2 LNG would provide the *Vessel Strike Avoidance Measures* to LNG carrier captains and would advocate compliance with the measures identified in the document. Further, to address the potential marine pollution impacts associated with offshore spills of fuel, lubricants, or other hazardous materials, the Coast Guard requires LNG carriers to develop and implement a SOPEP, which includes measures to be taken if an oil pollution incident occurs or a ship is at risk of one. Implementation of these measures would minimize the risk of collisions with the four whale species protected under the ESA and all marine mammals protected under the MMPA. We conclude that the Project *may affect, but is not likely to adversely affect* federally listed whales.

4.8.1.5 Reptiles

Alligator Snapping Turtle

The alligator snapping turtle (AST) (*Macrochelys temminckii*) is proposed for federal listing as threatened under the ESA, and may become listed prior to or during Project construction. The species is the largest freshwater turtle in the western hemisphere (Texas Turtles, 2021). Individuals can range from 15 to 29 inches in length and have been documented to weigh up to 175 pounds (Texas Turtles, 2021). The species has a wide-ranging habitat that extends from the Midwest south into the Gulf states (Texas Turtles,

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[68] Rice's whales were previously identified as Gulf of Mexico Bryde's whales. On August 23, 2021, the NMFS announced the revised taxonomy and common name for the Gulf of Mexico Bryde's whale, revising the species name to Rice's whale (*Balaenoptera ricei*). See 86 FR 160.

2021), including at least the northern portion of the Sabine River in Texas (FWS, 2021e). The turtle can be found in fresh and brackish waterbodies, including streams, rivers, ponds, and lakes. They are almost exclusively aquatic turtles, only coming on land to lay eggs from about March through May. Habitat alteration is a concern for the alligator snapping turtle, as the species is endemic to river systems that drain into the Gulf of Mexico, including tributary waterbodies and associated wetland habitats (e.g., swamps, lakes, reservoirs, etc.). They prefer aquatic habitat with structure (e.g., tree root masses, stumps, submerged trees, etc.) and a high percentage of canopy cover rather than open water (FWS, 2021e). Additional threats to the species include illegal harvest, habitat loss, and pollution (Texas Turtles, 2021).

If the AST is listed under the ESA, the FWS has proposed a 4(d) rule that would promote conservation of the turtle by prohibiting take (as set forth at 50 CFR 17.2I)(1)) and encouraging implementation of BMPs for activities in freshwater wetlands and riparian areas to minimize habitat alteration to the maximum extent practicable (FWS, 2021h). However, take incidental to construction, operation, and maintenance activities using appropriate BMPs would be excepted.

There are no known occurrences of the AST in the Project vicinity based on natural heritage data received in 2021 from the TPWD and LDWF, and the species was not included in the FWS IPaC list for the Project. However, the current range of the species is uncertain. Several known locations of AST were identified within watersheds in Jasper and Newton Counties, as well as Orange County, just south of the proposed Project area (Rudolph et al. 2002; Gordon et al. 2023). AST are known to move extensively within suitable freshwater habitats of which can include deeper water of large rivers and their major tributaries; however, they may be found in a wide variety of habitats, including small streams, bayous, canals, swamps, lakes, reservoirs, ponds, and oxbows. Neither the FWS (2021e) nor the LDWF (2009) show the current range for the species extending into Calcasieu and Cameron Parishes in Louisiana. In Jasper and Newton Counties, Texas, the CP Express Pipeline would cross seven perennial waterbodies, including WAA204 (Dognash Gully); WAA205 (unnamed tributary to Cow Bayou); WAAB096, WAB094, WAB095, and WAB097 (unnamed tributaries to Sabine River); and WAB075A (Sabine River), which could provide potential habitat for the AST. As mentioned previously, the Sabine River (WAB075A) would be crossed via HDD, thereby avoiding impacts. While open-cut crossings are proposed for the remaining six perennial waterbodies listed above, instream impacts would be temporary and localized to the immediate vicinity of construction activities. Disturbed areas would be allowed to return to preconstruction conditions following pipeline installation and measures would be implemented in accordance with the Project-specific Plan and Procedures.

In response to our recommendation in the draft EIS, CP Express consulted with the FWS regarding BMPs to minimize impacts on the AST.[69] In addition to utilize HDDs where practical, CP Express has committed, where feasible and in accordance with landowner easements and approvals, to stockpile wood debris from Project waterways identified as having the potential to provide AST habitat and to replace the debris once construction is completed. Additionally, the Project EI(s) and/or Biological Monitors would be trained to identify, trap, and move ASTs if observed. Trapping and relocation would only be attempted if determined to be more protective of an AST than allowing it to leave the construction area through its own volition or persuading it to leave. If an AST is captured, the turtle would be kept in water and shaded using tree branches or another suitable method. If relocation is necessary, ASTs would only be transported in water to the extent practicable. Further, CP Express would contact the FWS in the event an AST is captured.

[69] CP Express' correspondence with the FWS regarding recommended BMPs to minimize impacts on the AST can be viewed on FERC's eLibrary in attachment 23-1 of accession number 20230313-5230.

With the implementation of the above measures, we conclude that the Project is not likely to jeopardize the continued existence of the AST.

Sea Turtles

The NMFS shares ESA authority with the FWS for sea turtles. Pursuant to a joint MOU (NMFS and FWS, 1977), the FWS has jurisdiction over sea turtles on land (nesting habitat) and the NMFS has jurisdiction over sea turtles in marine habitats. Listed sea turtle nesting habitat does not occur within the Project vicinity according to the FWS IPaC database accessed on April 19, 2021; therefore, only potential impacts on listed sea turtles in marine habitat are assessed in this document. Primary threats to sea turtles include nesting and feeding habitat destruction and alteration, fisheries bycatch, entanglement in marine debris, and vessel strikes (NMFS, 2021h).

The endangered leatherback (*Dermochelys coriacea*), Kemp's ridley (*Lepidochelys kempii*), loggerhead (*Caretta caretta*), green sea (*Chelonia mydas*), and hawksbill sea turtles (*Eretmochelys imbricata*) can be found in estuarine and marine environments along the southeastern coast of Louisiana. Critical habitat has been designated for the green, hawksbill, leatherback, and loggerhead sea turtle (NMFS, 2021c); however, designated critical habitat for the loggerhead sea turtle is the only habitat in the Project vicinity. This designated critical habitat includes dispersed sargassum habitat in a large portion of the Gulf of Mexico, starting about 7 miles south of the Terminal Facilities (where depths are 20 meters [66 feet] and greater between Texas and the Mississippi River) and south to the Economic Exclusion Zone (NOAA, 2014) and is under NMFSjurisdiction and provides an important concentrated, protected foraging area for the oceanic juvenile life stage of loggerhead sea turtles. Designated critical habitat for the other turtle species is associated with the Atlantic Ocean (NMFS, 2021c).

Loggerhead sea turtles may enter estuaries, coastal streams, salt marshes, and river mouths. The distribution of loggerheads in Louisiana coastal waters is similar to that of Kemp's ridley sea turtles; however, their abundance is greater west of Freeport, Texas, outside of the Project area (NMFS, 2021h).

Leatherback sea turtles are commonly regarded as pelagic (open ocean) animals, but they also forage in coastal waters during breeding. The leatherback is the most migratory and wide ranging of sea turtle species. It prefers open ocean habitat outside of breeding season and the only known breeding sites within and near the United States occur in southeast Florida and the Caribbean (Puerto Rico, U.S. Virgin Islands). NMFS identifies this species as rare along the Gulf Coast; however, juveniles or adults can be present year-round (January through December) (NMFS, 2021h).

The Kemp's ridley sea turtle is the smallest marine turtle in the world and has been documented off the coast of Louisiana more than other sea turtles. This species is not known to nest on the Louisiana coast; however, it could use the estuarine and offshore waters for foraging and travel during the non-nesting season (NMFS, 2021h).

Green sea turtles usually frequent shallow water areas where marine grasses and algae are present. Green sea turtles occur throughout the Gulf of Mexico but have been documented primarily in bays of southwest Texas. This species is not commonly known to occur in either inshore or offshore waters of Louisiana. Adult green sea turtles could potentially use the open waters of the Gulf of Mexico for travel and juveniles could potentially use nearshore areas for foraging (NMFS, 2021h).

Hawksbill sea turtles are widely distributed throughout the Caribbean Sea and western Atlantic Ocean. They occur in shallow coastal areas, oceanic islands, rocky areas, and coral reefs. This species is not commonly known to occur in either inshore or offshore waters of Louisiana. Suitable nesting habitat is not present in the Project area; however, adult hawksbill sea turtles could potentially use the open waters of the Gulf of Mexico for travel and juveniles could potentially use nearshore and estuarine habitats for foraging (NMFS, 2021h).

Potential Project-related impacts on sea turtles could be associated with dredging/excavation of the LNG berthing area, pile driving for dock construction, barge traffic associated with Terminal Facilities construction, and operation of LNG carriers in Gulf of Mexico and Calcasieu River shipping channels.

In November 2003, NMFS revised its 1995 regional biological opinion to cover all hopper dredging activities in the Gulf of Mexico that involve maintenance dredging or sand mining by or under the auspices of the COE (Consultation No. F/SER/2000/01287). The regional biological opinion concludes that non-hopper type dredges are not known to take sea turtles and are the preferred method for dredging activities during summer months. Although dredging is expected to occur at any time of the year, the Project does not propose to use hopper dredges. Therefore, direct injury or mortality from dredging/excavation activities is not anticipated. Dredging/excavation could have indirect temporary impacts on foraging habitat by disturbing vegetation and increasing turbidity. However, as discussed in section 4.7.3.3, the Project area is not likely to support SAV and no evidence of SAV was found in this area during the 2021 field surveys. Impacts on sea turtles and their habitat would be insignificant given the anticipated very low likelihood of encounters, abundant foraging habitat in adjacent areas, the turtles' ability to disperse to adjacent habitats, and the temporary nature of the impacts.

Potential Project-related impacts on the sea turtle could be associated with pile installation during dock construction. Marine turtles exhibit behavioral effects from vibratory and impact pile driving at a threshold sound level of 175 dB_{RMS}. Injury-level effects on marine turtles can result from exposure to high-intensity sound from single pile strikes, expressed in dB_{PEAK}, as well as cumulative exposure to extended vibratory pile driving or multiple impact pile strikes at lower intensity (SEL_{CUM}). Examples of behavioral disturbance include movement away from feeding grounds, increased vulnerability to predators, inability to communicate, and inability to sense the physical environment. Disturbance and injury thresholds are summarized in table 4.7.2-2.

The distances required to attenuate sound pressure levels below the respective behavioral effect thresholds and permanent and temporary injury-level effect thresholds are summarized by species group in table 4.7.2-2. Impacts due to pile driving on sea turtles are similar to those discussed in section 4.7.2-2 for existing aquatic resources. As shown, without mitigation, the proposed Project may result in short-term impacts on marine turtles occurring in the Project vicinity during the in-water construction period. Potential noise impacts on sea turtles may be lessened because noise is expected to quickly attenuate to background levels due to the local sinuosity of the channel banks, which consequently function as barriers to sound traveling through the water. Much of the noise energy would be absorbed by the sediments comprising the channel banks and bed before reaching the threshold distances identified in the tables. As discussed above for the giant manta ray and oceanic whitetip shark, in order to mitigate the potential impacts on marine fauna caused by pile installation, CP2 LNG would implement the use of ramp-up procedures at the beginning of each pile installation or when a delay of 15 minutes or more has occurred to minimize its impact on marine species. CP2 LNG may implement other noise attenuation measures to substantially reduce underwater sound pressure levels produced by pile driving. Examples of additional mitigation measures that could be included are utilization of bubble curtains, modification of pile impact frequency, and placement of cushion blocks consisting of wood, nylon, or micarta between the pile and hammer. CP2 LNG would also utilize biological monitors to monitor for the marine turtle species during marine construction (see section 4.7.2.2).

Based on consultation with NMFS, the proposed Project is not likely to adversely affect marine species, including federally listed sea turtles occurring in the Project vicinity during the in-water construction period. CP2 LNG is completing additional calculations to determine the level of noise attenuation that would be achieved with the implementation of these measures. CP2 LNG continues to coordinate with NMFS on potential impacts and mitigation for marine species, and would adhere to any requirements or requests for additional monitoring after consultation is complete. Additionally, based on our recommendation in the draft EIS, CP2 LNG has committed to utilizing double bubble curtains around 144-inch-diameter and 120-inch diameter piles during impact pile driving activities, providing an overall 10 dB reduction (5 dB reduction per sound curtain). Due to implementation of the above mitigation measures and information received through consultation with NMFS, we conclude the Project *may affect, and would not likely adversely affect* the federally listed sea turtles.

In addition to impacts from construction activities, sea turtles could collide with or be hit by barges, other construction vessels, or LNG carriers, resulting in sea turtle injury or mortality. However, the relatively slow speed of construction vessels would make hitting a sea turtle unlikely; in addition, the risk of collision with LNG carriers is reduced because the ships would use established, well-traveled shipping lanes and the bow waves of large vessels push water and smaller objects (such as sea turtles) away from the front of the vessel. To further minimize the risk of potential collisions between vessel traffic and sea turtles, CP2 LNG would provide the *Vessel Strike Avoidance Measures* document to LNG carrier captains, as discussed above, and to operators of construction vessels. Further, in response in our recommendation in the draft EIS, CP2 LNG would conduct mandatory training for construction vessel operators, which would include review of the recommended BMPs outlined in the *Vessel Strike Avoidance Measures* and a visual component to assist with identification of protected marine species that may be encountered in the Project area. LNG carriers associated with operation of the Project would utilize established shipping routes in the Gulf of Mexico. These routes cross designated critical habitat for the loggerhead sea turtle, specifically sargassum habitat LOGG-S-02. However, because there would be no disturbance of the water bottom in areas of critical habitat, utilization of the shipping routes by LNG carriers would have *no effect* on the designated critical habitat.

4.8.1.6 Plants

Navasota Ladies-Tresses

The Navasota ladies-tresses (*Spiranthes parksii*) is federally listed as endangered. Within the Project area, the species known range includes Jasper County, Texas (FWS, 2007; 2018b). In Jasper County, this small, white orchid grows in grasslands as well as post oak-black hickory woodlands, and in association with sandstone glades. As per the FWS' draft *Navasota Ladies-Tresses Recovery Plan Amendment* (FWS, 2007), the species has been documented to occur in the northwest corner of Jasper County, which is about 50 miles north of the Pipeline System at MP 0.0. While the Pipeline System occurs within the species' range in Jasper County, based on data received from the TPWD NDD, there are no known occurrences of the Navasota ladies-tresses within 2 miles of the Project. This species can be identified reliably during its flowering period, most often between October and November. In conjunction with field investigations, CP Express reviewed publicly available desktop information to identify potentially suitable habitat for this species, including the USDA Web Soil Surveys for Jasper County to determine suitable soil conditions. Based on the desktop review and field investigation, no suitable habitat, including grassland/post oak-black hickory habitat, or sandstone glades, was identified within the Project area. Therefore, we find that construction and operation of the proposed Project would have *no effect* on the Navasota ladies-tresses.

4.8.1.7 Conclusion

CP2 LNG and CP Express would minimize impacts on wildlife and habitat, including listed species, by implementing its mitigation plans for impacts on wildlife habitat, by following the measures outlined in the Project-specific Plan and Procedures, and by adhering to avoidance and minimization methods recommended by the FWS and LDWF. In addition, ESA consultation with the FWS and NMFS is ongoing. To ensure that CP2 LNG and CP Express do not begin construction until section 7 consultation is complete, we recommend that CP2 LNG and CP Express should not begin construction until all outstanding biological surveys are completed and filed, the FERC staff completes any necessary ESA section 7 consultation with the FWS and NMFS, and CP2 LNG and CP Express have received written notification from the Director of OEP, or the Director's designee, that construction and/or use of mitigation (including implementation of conservation measures) may begin (see section 4.8.1).

4.8.2 State Listed Species

In Texas, TAC 65.175, 65.176, and 69.8 designates threatened non-game species; endangered non-game species; and endangered, threatened, and protected native plant species, respectively. TAC 65.171 and Texas Parks and Wildlife Code 67 and 68 prohibit the take, possession, transport, or killing of any state-designated threatened or endangered fish or wildlife species. TAC 69.1 prohibits the take of any state-designated threatened, endangered, or protected plant species from public lands for any reason, and from private lands for commercial purposes, where "take" means to collect, pick, cut, dig up, or remove, as defined in Texas Parks and Wildlife Code 88.001. Because the activities proposed by CP Express do not involve the commercial collection of plants, TAC 69.1 does not apply to the Project.

In Louisiana, statutes governing the management of fish and wildlife species are contained in Louisiana Revised Statutes Title 56 (Wildlife and Fisheries), and relevant rules and regulations adopted by the Louisiana Wildlife and Fisheries Commission and the Secretary of the LDWF, are found in LAC Title 76. LAC Title 76, section I-317 establishes a list of state-designated threatened and endangered species that are generally made up of federally listed species. Louisiana Rev. Stat. Title 56, section 1904 Parts E–G gives the Louisiana Wildlife and Fisheries Commission the authority to prohibit the take, possession, or transport of a state-designated threatened or endangered wildlife species (including fish species) without a permit. Louisiana Rev. Stat. Title 56, section 1904 Parts E and H prohibit the willful destruction or harvest of state-designated threatened or endangered plant species on someone else's private land or on public land without written permission from the landowner or a permit from the LDWF.

Table 4.8.2-1 identifies a total of 15 species listed as state threatened or endangered in Texas and/or Louisiana that have the potential to occur in the counties or parishes crossed by the Project (i.e., Newton and Jasper Counties, Texas and Cameron and Calcasieu Parishes, Louisiana). Some federally listed species are also state-listed as threatened or endangered, as identified in table 4.8-1, and are not discussed further in this section. Per the natural heritage data received from the TPWD and the LDWF in 2021, the only state-listed species documented in the Project vicinity is the West Indian manatee, discussed in section 4.8.1.4.

We have determined that five state-listed species would not be impacted by the Project because the Project is not within the known range of the species, the species has been extirpated in the Project area, there is no suitable habitat in the Project area, or the species would only occur in the Project area as an occasional transient. In addition, we have determined an additional five species (two fish and three mollusk species) would not be impacted, as suitable habitat would be avoided via HDD. The remaining five state-listed species and the five species that have suitable habitat that would be avoided via HDD are discussed in the following sections. In response to a comment we received on the draft EIS from TWPD, CP2 LNG and CP Express have committed to report any sightings of protected or rare species observed in the Project area to TPWD and would evaluate measures to avoid impacts, where practicable.

Table 4.8.2-1

State Listed Species Potentially Occurring within the Project Area

Common Name *Scientific Name*	**State Status**		**Parish/County within Species Range**	**Project Component**		**Habitat Requirements**	**Determination of Effect**
	Louisiana	**Texas**		**Pipeline System**	**Terminal Facilities**		
Birds							
Bachman's Sparrow *Peucaea aestivalis*	-	T	Jasper and Newton Counties, TX	X	-	Mature pine woods with scattered bushes and grassy understory in Pineywoods region, brushy or overgrown grassy hillsides, overgrown fields with thickets and brambles, grassy orchards; remnant grasslands in post oak savannah region; nests on ground against grass tufts or under low shrubs.	*No Impact*
Swallow-tailed Kite *Elanoides forficatus*	-	T	Jasper and Newton Counties, TX	X	-	Lowland forested regions, especially swampy areas, ranging into open woodland; marshes, along rivers, lakes, and ponds; nests high in tall tree in clearing or on forest woodland edge, usually in pine, cypress, or various deciduous trees.	*Not Likely to Adversely Impact*
White-faced Ibis *Plagadis chihi*	-	T	Jasper and Newton Counties, TX	X	-	Prefers freshwater marshes, sloughs, and irrigated rice fields, but will visit brackish and saltwater habitats; currently confined to near-coastal rookeries in so-called hog-wallow prairies. Nests in marshes, in low trees, on the ground in bulrushes or reeds, or on floating mats.	*No Impact*
Wood Stork *Mycteria americana*	-	T	Jasper and Newton Counties, TX	X	-	Prefers to nest in large tracts of bald cypress or red mangrove; forages in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water, including salt-water; usually roosts communally in tall snags, sometimes in association with other wading birds.	*No Impact*
Fish							
Blue Sucker *Cycleptus elongatus*	-	T	Jasper County, TX	X	-	Rapids, riffles, runs and pools with moderate to fast current, with bottoms of exposed bedrock sometimes in combination with hard clay, sand, gravel, and boulders; generally intolerant of highly turbid conditions. Adults winter in deep pools and move upstream in spring to spawn on riffles. Has been located in the Sabine River; however, the Sabine River will be crossed via HDD.	*No Impact*

Table 4.8.2-1 State Listed Species Potentially Occurring within the Project Area							
Common Name *Scientific Name*	**State Status**		**Parish/County within Species Range**	**Project Component**		**Habitat Requirements**	**Determination of Effect**
	Louisiana	**Texas**		**Pipeline System**	**Terminal Facilities**		
Paddlefish *Polyodon spathula*	-	T	Jasper and Newton Counties, TX	X	-	Prefers large, free-flowing rivers but will frequent impoundments with access to spawning sites.	*No Impact*
Western Creek Chubsucker *Erimyzon claviformes*	-	T	Jasper and Newton Counties, TX	X	-	Habitat includes silt-, sand-, and gravel-bottomed pools of clear headwaters, creeks, and small rivers; often near vegetation; occasionally in lakes. Spawning occurs in river mouths or pools, riffles, lake outlets, or upstream creeks.	*Not Likely to Adversely Impact*
Mammals							
Louisiana Black Bear [c] *Ursus americanus luteolus*	-	T [b]	Jasper and Newton Counties, TX	X	-	Generalist. Historically found throughout Texas. For ssp. luteolus, bottomland hardwoods, floodplain forests, upland hardwoods with mixed pine; marsh. Bottomland hardwoods and large tracts of inaccessible forested areas.	*No Impact*
Rafinesque's big-eared bat *Corynorhinus rafinesquii*	-	T	Jasper and Newton Counties, TX	X	-	Historically, lowland pine and hardwood forests with large hollow trees. Roosts in cavity trees of bottomland hardwoods, concrete culverts, and abandoned man-made structures.	*Not Likely to Adversely Impact*
Mollusks							
Louisiana pigtoe *Pleurobema riddellii*	-	T	Jasper and Newton Counties, TX	X	-	Occurs in small streams to large rivers in slow to moderate currents in substrates of clay, mud, sand, and gravel.	*Not Likely to Adversely Impact*
Sandbank Pocketbook *Lampsilis satura*	-	T	Jasper and Newton Counties, TX	X	-	Occurs in small streams to large rivers in slow to moderate current in sandy mud to sand and gravel substrate. Can occur in a variety of habitats but most common in littoral habitats such as banks or backwaters or in protected areas along point bars. There are four documented occurrences within 5 miles of the Project area based on TPWD NDD data (2021). Suitable habitat crossed by the CP Express Pipeline is limited to the Sabine River, which will be crossed via HDD.	*No Impact*

Table 4.8.2-1 State Listed Species Potentially Occurring within the Project Area							
Common Name ***Scientific Name***	**State Status**		**Parish/County within Species Range**	**Project Component**		**Habitat Requirements**	**Determination of Effect**
	Louisiana	**Texas**		**Pipeline System**	**Terminal Facilities**		
Southern Hickorynut *Obovaria arkansasensis*	-	T	Jasper and Newton Counties, TX	X	-	Clay, sand, and medium sized gravel substrates with low to moderate current; Neches, Sabine, and Cypress river basins. The only potential habitat in the Project area for the southern hickorynut is the Sabine River; however, it is rare in Texas and may only persist in Village Creek (Harvey, 2009). Suitable habitat crossed by the CP Express Pipeline in the Sabine River would be crossed via HDD.	*No Impact*
Texas Heelsplitter *Potamilus amphichaenus*	-	T	Jasper and Newton Counties, TX	X	-	Occurs in small streams to large rivers in standing to slow-flowing water; most common in banks, backwaters and quiet pools; adapts to some reservoirs. Often found in soft substrates such as mud, silt, or sand.	*Not Likely to Adversely Impact*
Texas Pigtoe *Fusconaia askewi*	-	T	Jasper and Newton Counties, TX	X	-	Occurs in small streams to large rivers, usually in water with at least some current; not known from reservoirs. Found in a variety of habitats but most common in riffles. Inhabits various substrates though most often sand, gravel, and cobble. Based on TPWD NDD data (2021), there is one documented occurrence in the Sabine River within 5 miles of the Project area; however, the Project will cross the Sabine River via HDD.	*No Impact*
Reptiles							
Louisiana pinesnake *Pituophis ruthveni*	-	T [c]	Jasper and Newton Counties, TX	X	-	Longleaf pine savannas - open, herbaceous-dominated vegetation understory with long- and short-leaf pines. Spends most of its time underground in pocket gopher burrow systems.	*No Impact*

E: Endangered; T: Threatened

[a] Species are also federally listed under the ESA.
[b] The black bear (*Ursus americanus*) is included in the species lists for Jasper and Newton Counties; however, the black bear is currently only found in Louisiana with rare occurrences in northeastern Texas (TPWD, 2021d; FWS, 2019b).
[c] The Louisiana pinesnake is also federally listed, but it is not listed as occurring in the Project area per the IPaC.

Note: In Louisiana, species considered here include those documented in the Louisiana Wildlife Diversity Program data (accessed April 2021) within a 2-mile search radius of the Project area. In Texas, species considered here include those documented within the Project counties in Texas, as requested by the TPWD (TPWD, 2021c).

4.8.2.1 Birds

Swallow-Tailed Kite

The Texas state-threatened swallow-tailed kite (*Elanoides forficatus*) can be found in lowland forested regions, especially swampy areas, and typically nests high in tall cypress or pine trees. Swallow-tailed kites forage on flying insects or pluck insects and lizards from the tops of trees. Preferred swallow-tailed kite habitat along the pipeline right-of-way in Texas occurs in the bottomland hardwoods adjacent to the Sabine River (Shackelford and Simons, 1999). The nesting season for the species is believed to extend from mid-March through the end of July (Shackelford and Simmons, 1999). There were no swallow-tailed kites observed during CP Express' or CP2 LNG's field surveys.

About 1.2 miles of the pipeline would be installed using HDD where it crosses the Sabine River, reducing the amount of swallow-tailed kite habitat that would be affected because no trees would be removed between the HDD entry and exit pads. Trees would be cleared within a 150-foot-wide construction right-of-way in adjacent hardwood forest; however, trees would be allowed to reestablish outside the central 25-foot-wide right-of-way in this area following construction. The right-of-way on either side of the Sabine River overlaps with an existing powerline right-of-way, which reduces the total amount of woodland habitat that would be cleared. CP Express would clear trees outside the nesting window of March 1 to July 15 where feasible, which would reduce potential impacts on the species. In addition, as discussed in section 4.7.1.3, where clearing cannot occur outside of the nesting window, CP Express would conduct a walk-through site survey of the Project workspace prior to construction along the Pipeline System and implement measures outlined in its *Migratory Bird Nesting Impact Mitigation Plan*. Therefore, we find that construction and operation of the proposed Project would *not likely adversely impact* the swallow-tailed kite.

4.8.2.2 Fish

All three fish species listed in table 4.8.2-1 could be affected by the Project based on the presence of suitable habitat in the Project area.

Suitable habitat for the blue sucker (*Cycleptus elongatus*) and paddlefish (*Polyodon spathula*) is limited to the Sabine River, which would be crossed by the CP Express Pipeline using the HDD crossing method; therefore, there would be *no impact* on the blue sucker and paddlefish. However, an inadvertent return of drilling mud could occur during the HDD process, during which drilling mud could be released to the waterbodies. To minimize the risk of an inadvertent release of drilling mud and to undertake effective cleanup should one occur, CP Express would implement the Project's HDD Monitoring and Contingency Plan during construction.

As discussed with mollusks, apart from the Sabine River, the CP Express Pipeline would cross six perennial waterbodies in Jasper and Newton Counties, Texas, including Dognash Gully and five unnamed waterbodies. The open-cut construction method would be used for these crossings. Potential fish habitat for the western creek chubsucker (E*rimyzon claviformis*) could be found in these waterbodies and also in the Sabine River, which would be crossed using the HDD crossing method. If species are present in the affected area, construction equipment used during pipeline installation could directly cause injury or mortality or increased turbidity in the water column could indirectly cause injury or mortality. Fish would generally be expected to move away from the disturbance area, reducing the likelihood for direct effects. Increased turbidity would be temporary, with aquatic habitat quickly returning to baseline conditions following construction. Stormwater runoff from upslope construction workspace into aquatic habitat would be minimized through implementation of the Project-specific Plan and Procedures, which would require the implementation of erosion control and revegetation measures. In addition, the Project-specific Procedures require that construction be completed within 24 hours in minor waterbodies and 48 hours in intermediate waterbodies. CP Express would adhere to the construction minimization measures recommended by TPWD, as described above for the mollusk species. These measures would reduce the level and duration of impacts; therefore, pipeline construction could have a temporary impact on local fish populations and habitat in the six perennial waterbodies crossed by the CP Express Pipeline using the open cut construction method. Therefore, we find that construction and operation of the proposed Project would *not likely adversely impact* the western creek chubsucker.

4.8.2.3 Mammals

Per the natural heritage data received from the TPWD and the LDWF, the West Indian manatee is the only state-listed species documented in the Project vicinity. This species is also a federally listed species and is discussed in detail in section 4.8.1.4. The remaining two mammal species listed in table 4.8.2-1, Rafinesque's big-eared bat and Louisiana pigtoe, could be affected by the Project based on suitable habitat identified in the Project area, as described below.

Rafinesque's big-eared bat

The Texas state-threatened Rafinesque's big-eared bat (*Corynorhinus rafinesquii*) is a medium-sized bat with long rabbit-like ears. The species primarily consumes moths, but would also feed on small insects, beetles, and flies. It roosts in tree cavities of bottomland hardwoods, in abandoned man-made structures, and under bridges. Maternity roosts include snags and human structures (Titus, 2017). The breeding season is in the fall. The young are born in late May or early June and are able to fly 3 weeks after birth (TPWD, 2021e). The primary threat to the species is the loss of large trees that provide roosting habitat (TPWD, 2021e). Suitable bottomland hardwood forest occurs adjacent to the Sabine River. The habitat impacts described for the swallow-tailed kite would also apply to Rafinesque's big-eared bat. As noted in section 4.7.1.3, where feasible, CP Express would clear trees outside the migratory bird nesting window of March 1 to July 15, which would also avoid the pup season for Rafinesque's big-eared bat and reduce potential impacts on the species. Therefore, we find that construction and operation of the proposed Project *would not likely adversely impact* the Rafinesque's big-eared bat.

4.8.2.4 Mollusks

All five mollusk species listed in table 4.8.2-1 could be affected by the Project based on the presence of suitable habitat in the Project area.

Suitable habitat for the sandbank pocketbook (*Lampsilis satura*), southern hickorynut (*Obovaria arkansasensis)*, and Texas pigtoe (*Fusconaia askewi)* within the Project area is limited to the Sabine River, which would be crossed by the CP Express Pipeline via HDD. As with any of the Project's HDDs, there is a possibility for an inadvertent release of drilling fluid; however, CP Express would adhere to its Project-specific HDD Monitoring and Contingency Plan to minimize the potential for an inadvertent release of drilling fluid and any resulting impacts; therefore, we conclude there would be *no impact* on the sandbank pocketbook, southern hickorynut, and Texas pigtoe during construction or operation of the Project. The CP Express Pipeline would cross six perennial waterbodies in Jasper and Newton Counties, Texas, including WAA204 (Dognash Gully); WAA205 (unnamed tributary to Cow Bayou); WAAB096, WAB094, WAB095, and WAB097 (unnamed tributaries to Sabine River) using an open-cut construction method, and potential habitat for the Louisiana pigtoe (*Pleurobema riddellii*) or Texas heelsplitter (*Potamilus amphichaenus*) could be found in these waterbodies (FWS, 2021f; 2017). Potential habitat can also be found in the Sabine River, which would be crossed by HDD, thus not be affected. Pipeline installation and use of construction equipment could cause injury or mortality of the mollusk species directly, or indirectly as a result of increased turbidity. However, increased turbidity would be temporary, with aquatic habitat quickly returning to baseline conditions following construction. Stormwater runoff from upslope construction workspace into aquatic habitat would be minimized through implementation of the Project-specific Plan and Procedures, which require the implementation of erosion control and revegetation measures. In addition, the Project-specific Procedures require that construction be completed within 24 hours in minor waterbodies and 48 hours in intermediate waterbodies. These measures would reduce the level and duration of impacts. CP Express would adhere to the construction minimization measures recommended by TPWD, where practicable, such as limiting personnel and equipment to enter the waterbody, avoiding construction during spawning and brooding periods (i.e., January through May for the Louisiana pigtoe and Texas pigtoe), and use of double silt fences and doubling soil stabilization measures along the banks to avoid increasing the turbidity of the water. Therefore, we conclude the Project would *not likely adversely impact* the Louisiana pigtoe and Texas heelsplitter.

4.8.3 Marine Mammals

All marine mammals are protected under the MMPA and some receive additional protection under the ESA if they are federally listed species. Although two federally listed whale species (Rice's whale and sperm whale) occur in the coastal waters of Louisiana, risks to whales from transiting LNG vessels in the Gulf of Mexico would be minimized with the implementation of the *Vessel Strike Avoidance Measures* (see section 4.8.1.4).

As noted in section 4.8.1.4, the West Indian manatee, although considered extremely rare in the area, has been documented in the Calcasieu River; and the common bottlenose dolphin has been documented in the bays, sounds, and estuaries of the Gulf of Mexico, as well as the Calcasieu River and Calcasieu Ship Channel. NMFS has identified a stock population of dolphins specific to the western coast of the Gulf of Mexico in Louisiana and Texas (NOAA, 2016). Bottlenose dolphins are frequently observed riding the bow waves of passing vessels in the Calcasieu Ship Channel. Given these occurrences, CP2 LNG utilized the July 2018 NMFS *Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing* (NMFS, 2018) to evaluate potential noise impacts from Marine Facilities on marine mammals. Potential Project-related impacts on the manatee and bottlenose dolphin could occur from pile installation during dock construction.

Under the July 2018 NMFS Guidance, and for the purposes of hydroacoustic analysis, marine mammals are categorized as low-frequency cetaceans, mid-frequency cetaceans, high-frequency cetaceans, Phocid pinnipeds, or Otariid pinnipeds. The bottlenose dolphin is considered a mid-frequency cetacean, while the manatee is most similar to the mid-frequency cetaceans. Therefore, for purposes of hydroacoustic analysis, the bottlenose dolphin and the manatee are both included in the mid-frequency cetacean category. Cetaceans and pinnipeds exhibit disturbance behaviors at 130 dB_{RMS} for vibratory pile driving and 160 dB_{RMS} for impact pile driving. Injury-level effects on marine mammals can result from exposure to high-intensity sound from single pile strikes, expressed in dB_{PEAK}, as well as cumulative exposure to extended vibratory pile driving or multiple impact pile strikes at lower intensity, expressed as the SEL_{CUM}. SEL_{CUM} is a function of the single pile strike or set-duration vibratory dB SEL and the total number of pile strikes or the total duration of vibratory pile driving over the period of exposure.

NMFS has defined a set of categorical injury thresholds for marine mammals by species group and the type of injury. In the case of marine mammals, two categories of injury are defined: temporary and permanent threshold shifts. These refer to temporary loss of hearing ability and permanent loss of or reduction in hearing ability, respectively. Examples of behavioral disturbance include movement away from feeding grounds, increased vulnerability to predators, inability to communicate, and inability to sense the physical environment. Disturbance and injury thresholds are summarized in table 4.7.2-2.

The distances required to attenuate sound pressure levels below the respective behavioral effect thresholds and permanent and temporary injury-level effect thresholds are summarized by species group in table 4.7.2-2. These threshold distances represent the likely maximum extent of potentially harmful underwater noise impacts for each species group from each type of pile driving based on peak and cumulative sound exposures. Based on the proposed mitigation measures in response to our condition in the draft EIS, CP2 LNG's ongoing Section 7 consultation with NMFS, and a letter from NMFS filed on the docket on March 28, 2023,[70] the Project is not likely to adversely affect marine species occurring in the Project vicinity during the in-water construction period. Further, impacts due to pile driving are similar to those discussed in section 4.7.2.2 for other aquatic resources.

In-stream noise at the Marine Facilities is expected to quickly attenuate to background levels due to the local sinuosity of the channel banks, which consequently function as barriers to sound traveling through the water. Much of the noise energy would be absorbed by the sediments comprising the channel banks and bed before reaching the threshold distances identified in the tables. In order to mitigate the potential impacts on marine mammals caused by pile installation, CP2 LNG would implement the use of ramp-up procedures at the beginning of each pile installation or when a delay of 15 minutes or more has occurred to minimize its impact on marine species. CP2 LNG would utilize double bubble curtains around 144-inch-diameter and 120-inch diameter piles during impact pile driving activities, providing an overall 10 dB reduction (5 dB reduction per sound curtain). CP2 LNG would also utilize biological monitors to monitor for the West Indian manatee during marine construction as discussed in section 4.7.2.2. CP2 LNG remains in consultation with NMFS and would adhere to any requirements or requests for additional monitoring after consultation is complete. In combination with appropriate monitoring and construction controls, CP2 LNG anticipates that the implementation of the proposed noise attenuation measures would avoid harassment of marine mammals during pile driving activities.

Terminal Facilities operations would include LNG carriers moving between the Calcasieu Ship Channel and the Gulf of Mexico. LNG carrier traffic is projected to involve up to seven to eight LNG carrier calls per week when the Terminal Facilities are operating at full capacity (after the Phase 2 facilities are placed into service). CP2 LNG conducted a preliminary Waterway Suitability Assessment, which was submitted to the Coast Guard on January 8, 2021. As part of this assessment, CP2 LNG estimated the maximum number of vessels to call on the Terminal Facilities to be no more than 400 per year. As discussed with respect to whales and sea turtles, CP2 LNG would provide LNG carrier captains with the NMFS *Vessel Strike Avoidance Measures* (NMFS, 2021e) and would advocate compliance with the measures identified in the document.

CP2 LNG and CP Express would employ mitigation measures during construction that avoid harassment to marine mammals, including implementing buffer zones. Prior to construction, CP2 LNG and CP Express would train an EI in the techniques and guidelines associated with marine mammal monitoring. The trained EI would scan the channel waters for marine mammals for 20 minutes prior to onset of and continuously during pile driving activities. If a marine mammal is spotted in the buffer zone, work would not begin or would be halted until the marine mammal has left the area.

With implementation of buffer zone observation procedures, exercise of stop work authority to avoid marine mammal harassment, adoption of select noise reduction measures as necessary, and adherence to the *Vessel Strike Avoidance Measures*, the Project would have not have a significant impact on marine mammals. However, since consultation with NMFS is ongoing, **we recommend that:**

- **<u>Prior to construction</u>, CP2 LNG should consult with the NMFS Marine Mammal Branch to confirm that an Incidental Take Authorization is not**

[70] This document can be viewed on the FERC eLibrary under accession number 20230328-5189.

required for the Project. CP2 LNG should file the documentation of the consultation with the Secretary.

4.9 LAND USE, RECREATION, AND VISUAL RESOURCES

4.9.1 Land Use

The Project comprises two major components, the CP2 LNG Terminal Facilities and the CP Express Pipeline System. CP2 LNG would construct the Terminal Facilities in Cameron Parish, Louisiana. CP Express' Pipeline System consists of 85.4 miles of new 48-inch-diameter pipeline, 6.0 miles of new 24-inch-diamater lateral pipeline, the Moss Lake Compressor Station, and other associated aboveground facilities across four counties in Texas and Louisiana. Land use in the vicinity of the Project is generally classified into the following categories:

- Cultivated crops are planted or intensively managed for the production of food, feed, or fiber and herbaceous vegetation. Examples of annual crops include corn, soybeans, vegetables, tobacco, and cotton and examples of perennial crops include orchards and vineyards;
- Pasture/hay are areas of grasses, legumes, or grass-legume mixtures planted for livestock grazing or the production of seed or hay crops, typically on a perennial cycle;
- Herbaceous areas include an upland characterized by natural or semi-natural herbaceous vegetation;
- Barren lands are characterized by bare rock, gravel, sand, silt, clay or other earthen material with little to no green vegetation;
- Developed areas are characterized by having 30 percent or greater of constructed materials, which include asphalt, concrete, and buildings;
- Open water includes all areas of open water or permanent snow/ice cover;
- Wetlands includes both woody wetlands and emergent wetlands and is defined as areas where soil or substrate is either covered or periodically saturated with water;
- Shrub/scrub is characterized by natural or semi-natural woody vegetation and include areas dominated by shrubs, generally less than 6 meters tall where cover is generally greater than 25 percent when the tree cover is less than 25 percent; and
- Forests include areas dominated by trees where 75 percent or more of the tree species are either deciduous, evergreen, or mixed.

Table 4.9.1-1 summarizes the acreages of each land use type that the Project would affect during construction and operation.

Table 4.9.1-1

Land Use Types Affected by Construction and Operation of the CP2 LNG and CP Express Project (in acres)

Facilities	Hay/Pasture, Cultivated Crops		Herbaceous		Barren		Developed		Open Water		Wetland		Shrub/Scrub		Forest		Total	
	Con [a]	Op [b]	Con [a]	Op [b]	Con [a]	Op [b]	Con [a]	Op [b]	Con [a]	Op [b]	Con [a]	Op [b]	Con [a]	Op [b]	Con [a]	Op [b]	Con [a]	Op [b]
TERMINAL FACILITIES																		
Terminal Site and Yards	205.1	177.6	52.9	40.6	0.0	0.0	58.3	3.9	3.3	2.0	329.0	304.1	21.4	15.6	0.0	0.0	**670.0**	**543.8**
Marine Facilities	0.0	0.0	54.8	54.8	0.0	0.0	5.7	5.7	18.2	18.2	41.0	41.0	2.5	2.5	0.0	0.0	**122.2**	**122.2**
LNG Transfer Lines and Utilities	0.0	0.0	1.3	1.3	0.0	0.0	1.6	1.4	4.5	2.9	24.2	10.0	0.0	0.0	0.0	0.0	**31.6**	**15.6**
Terminal Facilities Total	***205.1***	***177.6***	***109.0***	***96.7***	***0.0***	***0.0***	***65.6***	***11.0***	***26.0***	***23.1***	***394.2***	***355.1***	***23.9***	***18.1***	***0.0***	***0.0***	***823.8***	***681.6***
PIPELINE SYSTEM																		
CP Express Pipeline [c]																		
Pipeline Facilities																		
Pipeline Rights-of-Way	204.8	69.7	17.4	3.3	8.5	2.9	19.8	7.4	104.2	40.7	861.6	326.2	24.7	10.9	143.6	49.3	**1,384.6**	**510.3**
Additional Temporary Workspace	23.9	0.0	1.2	0.0	0.3	0.0	5.1	0.0	10.0	0.0	95.0	0.0	2.9	0.0	13.3	0.0	**151.7**	**0.0**
Contractor Yards	41.9	0.0	0.0	0.0	0.0	0.0	46.9	0.0	0.6	0.0	2.7	0.0	0.0	0.0	0.0	0.0	**92.1**	**0.0**
Pipeline Facilities Subtotal	**270.6**	**69.7**	**18.6**	**3.3**	**8.8**	**2.9**	**71.8**	**7.4**	**114.8**	**40.7**	**959.3**	**326.2**	**27.6**	**10.9**	**156.9**	**49.3**	**1,628.4**	**510.3**
Aboveground Facilities																		
Moss Lake Compressor Station	0.3	0.3	0.0	0.0	0.0	0.0	1.0	1.0	0.2	0.2	32.2	32.2	0.0	0.0	0.0	0.0	**33.7**	**33.7**
Kinder Morgan Meter Station	3.5	3.5	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	**3.8**	**3.8**
FGT Interconnect Meter Station	2.2	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**2.2**	**2.2**
TETCO & Boardwalk	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.0	0.0	3.3	3.3	0.0	0.0	0.3	0.3	**4.1**	**4.1**

Table 4.9.1-1

Land Use Types Affected by Construction and Operation of the CP2 LNG and CP Express Project (in acres)

Facilities	Hay/Pasture, Cultivated Crops		Herbaceous		Barren		Developed		Open Water		Wetland		Shrub/Scrub		Forest		Total	
	Con [a]	Op [b]	Con [a]	Op [b]	Con [a]	Op [b]	Con [a]	Op [b]	Con [a]	Op [b]	Con [a]	Op [b]	Con [a]	Op [b]	Con [a]	Op [b]	Con [a]	Op [b]
Interconnect Meter Station																		
TRANSCO & CJ Express Interconnect Meter Station/Launcher Site	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.6	2.6	0.4	0.4	0.1	0.1	**3.1**	**3.1**
MLV 2	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	<0.1	<0.1	**0.2**	**0.2**
MLV 5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	<0.1	<0.1	0.1	0.1	0.0	0.0	0.0	0.0	**0.2**	**0.2**
MLV 6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.0	0.0	0.0	**0.2**	**0.2**
Aboveground Facilities Subtotal	***6.0***	***6.0***	***0.1***	***0.1***	***0.0***	***0.0***	***1.7***	***1.7***	***0.2***	***0.2***	***38.6***	***38.6***	***0.3***	***0.3***	***0.5***	***0.5***	***47.5***	***47.5***
Access Roads	12.8	2.7	1.9	<0.1	0.0	0.0	34.5	4.9	0.6	0.2	4.5	0.4	1.4	<0.1	6.3	0.7	**62.1**	**8.9**
CP Express Pipeline Subtotal	***289.4***	***78.7***	***20.6***	***3.4***	***8.8***	***2.9***	***108.0***	***14.0***	***115.6***	***41.1***	***1,002.4***	***365.2***	***29.4***	***11.3***	***163.7***	***50.5***	***1,738.0***	***566.7***
Enable Gulf Run Lateral																		
Pipeline Facilities																		
Pipeline Rights-of-Way	1.1	0.7	0.4	0.2	0.0	0.0	2.5	1.6	1.0	0.7	34.7	25.4	3.7	1.7	12.0	6.0	**55.4**	**36.2**
Additional Temporary Workspace	0.3	0.0	<0.1	0.0	0.0	0.0	0.6	0.0	0.0	0.0	5.8	0.0	0.3	0.0	3.3	0.0	**10.3**	**0.0**
Pipeline Facilities Subtotal	**1.4**	**0.7**	**0.4**	**0.2**	**0.0**	**0.0**	**3.1**	**1.6**	**1.0**	**0.7**	**40.5**	**25.4**	**4.0**	**1.7**	**15.3**	**6.0**	**65.7**	**36.2**
Aboveground Facilities																		
Enable Receiver, MLV Site, and Pig Launcher	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	1.9	1.9	0.0	0.0	0.6	0.6	**2.6**	**2.6**

Table 4.9.1-1

Land Use Types Affected by Construction and Operation of the CP2 LNG and CP Express Project (in acres)

Facilities	**Hay/Pasture, Cultivated Crops**		**Herbaceous**		**Barren**		**Developed**		**Open Water**		**Wetland**		**Shrub/Scrub**		**Forest**		**Total**	
	Con [a]	**Op [b]**	**Con [a]**	**Op [b]**	**Con [a]**	**Op [b]**	**Con [a]**	**Op [b]**	**Con [a]**	**Op [b]**	**Con [a]**	**Op [b]**	**Con [a]**	**Op [b]**	**Con [a]**	**Op [b]**	**Con [a]**	**Op [b]**
Enable Interconnect Meter Station, Trap/MLV E2, and Pig Receiver	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.3	0.3	0.0	0.0	0.7	0.7	**1.0**	**1.0**
Aboveground Facilities Subtotal	**0.0**	**0.0**	**0.1**	**0.1**	**0.0**	**0.0**	**0.2**	**0.2**	**0.0**	**0.0**	**2.2**	**2.2**	**0.0**	**0.0**	**1.2**	**1.2**	**3.6**	**3.6**
Access Roads	1.9	0.0	0.4	0.4	0.0	0.0	4.1	0.6	<0.1	0.0	0.4	0.2	<0.1	0.0	2.6	0.4	**9.5**	**1.6**
Enable Gulf Run Lateral Subtotal	***3.3***	***0.7***	***0.9***	***0.7***	***0.0***	***0.0***	***7.3***	***2.3***	***1.1***	***0.7***	***43.1***	***27.8***	***4.0***	***1.7***	***19.1***	***7.7***	***78.8***	***41.5***
Pipeline Facilities Total	***292.7***	***79.4***	***21.5***	***4.1***	***8.8***	***2.9***	***115.3***	***16.3***	***116.7***	***41.8***	***1,045.5***	***393.0***	***33.4***	***13.0***	***182.8***	***58.1***	***1,816.8***	***608.1***
CP2 LNG and CP Express Project Total	**497.8**	**257.0**	**130.5**	**100.8**	**8.8**	**2.9**	**180.9**	**27.3**	**142.7**	**64.9**	**1,439.7**	**748.1**	**57.3**	**31.1**	**182.8**	**58.1**	**2,640.6**	**1,289.7**

[a] Con = Construction Impacts. Includes both temporary construction impacts and permanent operational impacts.

[b] Op = Operational Impacts. Includes permanent wetland conversion impacts.

[c] The CP Express Pipeline crosses a portion of the Terminal Site permanent workspace from MP 85.0 to MP 85.4. Therefore, the land requirements associated with the pipeline's 50-foot-wide permanent easement are accounted for in the Terminal Site footprint at this location.

Note: Totals may not match the sum of addends due to rounding.

Construction of the Project would affect a total of 2,640.6 acres of land over a 4-year construction period. Of this, 1,289.7 acres would be permanently affected by operation of the Project or within the permanent right-of-way, and 1,350.9 acres would be allowed to revert to the existing land use type after the completion of construction activities.[71] CP2 LNG and CP Express would conduct reseeding of temporarily disturbed areas and routine monitoring in accordance with the Project-specific Plan and Procedures and Revegetation Plan, as discussed in section 4.3.3. Impacts on land use types are discussed below. Impacts and mitigation on wetlands and vegetation cover types are discussed in detail in sections 4.5 and 4.6, respectively.

4.9.1.1 Terminal Facilities

CP2 LNG has contractually secured, through agreements with landowners, all land required for construction and operation of the Terminal Facilities. The proposed Terminal Site would be bordered by Davis Road and marine-based industrial facilities fringing Calcasieu Pass to the northwest; Cameron Wastewater Treatment Facilities and Venture Global Calcasieu Pass, LLC's LNG Terminal to the west; state land along the Gulf of Mexico shoreline to the south; and private open land historically used for cattle grazing to the south and east.

Terminal Site construction would affect 670.0 acres of land, 543.8 acres of which would be permanently converted to industrial use. Land use types at the Terminal Site consist of hay/ pasture and cultivated crops, herbaceous land, developed land, open water, wetlands, and scrub/shrub. The land within the permanent facility footprint would not be returned to its original contours or vegetation; however, the remaining 126.3 acres not retained for facility operation would be returned to preconstruction conditions as practicable.

The Marine Facilities would be recessed along the southwest shoreline of Monkey Island on the east side of the Calcasieu Ship Channel. Construction of the Marine Facilities would affect 122.2 acres, which would be retained for facility operation. Land use types at the Marine Facilities consist of herbaceous land, developed land, open water, wetlands, and shrub/scrub. As discussed in section 2.5.1, approximately 6.4 million cubic yards of soil and sediment along the southwest shoreline of Monkey Island would be excavated/dredged and converted to open water to construct the LNG loading docks, turning basins, and berthing area. According to CP2 LNG's April 2023 draft of their CMP and BUDM Plan, during construction of the Terminal Facilities, some of the dredged material (about 893,600 cubic yards) would be transported to the Cameron Prairie NWR and placed in a contained area to create and restore approximately 178 acres of brackish marsh. The remaining 5,505,000 cubic yards would be placed adjacent to the contained area, across approximately 1,121 acres of primarily open water. This acreage is based on a provisional desktop bathymetric and geotechnical assessment; it may differ when field survey data become available. The slurry pipeline would total approximately 6.9 miles, and four booster pumps would be located along the route. The land-based portion of the new slurry pipeline would be the same route used for the TransCameron Pipeline associated with Venture Global's Calcasieu Pass Project. Impacts from dredging is further discussed in section 4.4.3.

CP2 LNG would install LNG transfer lines and utilities between the Terminal Site and Marine Facilities via a combination of conventional and trenchless (i.e., HDD) construction techniques, which would require an additional 31.6-acre construction corridor between the Terminal Site and the Marine Facilities. Land use types along the LNG transfer lines consist of hay/pasture and cultivated crops, herbaceous land, developed land, open water, and wetlands. During operations, a nominal 150-foot-wide easement would be retained over the LNG transfer lines and utilities, which would affect 15.6 acres between

[71] Areas within the permanent right-of-way of the CP Express Pipeline and the Enable Gulf Run Lateral would be allowed to revert to existing land uses (e.g., hay/pasture, cultivated crops and herbaceous land).

the Terminal Site and Marine Facilities site boundaries. When construction is complete, 16.0 acres would return to preconstruction conditions, as practicable.

Construction and operation of the Terminal Facilities would not conflict with current land use plans, future land use plans, and/or zoning ordinances of Cameron Parish. Zoning laws in Cameron Parish relate solely to flood zones and protection from flooding; therefore, re-zoning of the site would not be required. The Project would be designed to comply with LNG facility safety and siting requirements including the DOT, 49 CFR 193 (Liquefied Natural Gas Facilities - Federal Safety Standards); NFPA 59A (version and applicable sections referenced in 49 CFR Part 193) (Standard for the Production, Storage, and Handling of LNG); and Coast Guard, 33 CFR Part 127 (Waterfront Facilities Handling Liquefied Natural Gas and Liquefied Hazardous Gas regulations).

4.9.1.2 Pipeline System

The Pipeline System would be in Jasper and Newton Counties, Texas, and Calcasieu and Cameron Parishes, Louisiana, crossing undeveloped or rural residential portions of eastern Texas and Louisiana. These facilities would be sited primarily on wetlands and agricultural land. The Pipeline System would result in land use impacts from installation of the pipeline facilities, construction and operation of aboveground facilities, and development of new or modified access roads.

Pipeline System and Additional Temporary Workspace

Construction of the CP Express Pipeline and Enable Gulf Run Lateral, including ATWS, would affect 1,602.1 acres of land. Land use types affected by construction of the Pipeline System consist of hay/pasture and cultivated crops, herbaceous land, barren land, developed land, open water, wetlands, shrub/scrub, and forests. Construction of the 48-inch-diameter CP Express Pipeline would require a 150-foot-wide construction right-of-way in upland areas and saturated wetlands and a 125-foot-wide construction right-of-way in non-saturated wetland areas to provide sufficient space to store excavated spoil, particularly in areas of unconsolidated soils, while allowing adequate space for automatic welding operations and safe passage of construction equipment and vehicles. Construction of the 24-inch-diameter Enable Gulf Run Lateral would require a 90-foot-wide construction right-of-way in upland areas and a 75-foot-wide construction right-of-way in wetland areas. This land would be temporarily disturbed by grading, trenching, backfilling, and restoration, except at the location of aboveground facilities, where impacts would be permanent (impacts associated with aboveground facilities along the Pipeline System are discussed in the following section). All construction would be performed in accordance with the Project-specific Plan and Procedures.

Following construction, a 50-foot-wide easement would be retained for pipeline operations; the remainder of the construction right-of-way would be restored to preconstruction conditions. Routine vegetation mowing or clearing over the full width of the permanent right-of-way would not occur more frequently than every three years and a corridor not exceeding 10 feet in width centered on the pipeline would be cleared at a frequency necessary to maintain the 10-foot corridor in an herbaceous state. A corridor not exceeding 10 feet in width centered over the pipeline would be maintained in an herbaceous state in wetlands. CP Express would adhere to its Project-specific Plan and Procedures to minimize impacts on sensitive resources within upland and wetland areas. Specific mitigation for impacts on wetlands is discussed in section 4.5.2.4.

ATWS outside of the temporary construction rights-of-way would be required for road and waterbody crossings, existing utility line crossings, points of inflection along the route, staging areas, spread breaks, pipeline and high-voltage power line crossings, reverse lay sections, hydrostatic test section breaks, MLVs and other facilities, areas where special construction methods would be implemented (e.g., the HDD or guided bore drilling method), and areas where additional space is needed for storage of stripped topsoil. Unless topographic or other factors impose constraints, ATWS would be set back at least 50 feet from the edges of waterbodies and wetlands where feasible (except where the adjacent upland consists of actively cultivated or rotated cropland or other disturbed land). Site-specific deviations to the FERC Procedures are discussed in sections 4.4.3.2 and 4.5.2.3. When construction is complete, all ATWS would be restored to preconstruction condition. At HDD construction segments, there would be no impacts along the pipeline right-of-way between the drill entry and exit locations, except for minimal vegetation clearing by hand, limited travel for inspection purposes, access to water supplies at some locations, and management of potential drilling mud releases as described in section 2.5.3. The HDD entry and exit locations and HDD pullback areas would be identified as ATWS, and would be temporarily affected. Appendix H lists the locations of these ATWSs, their dimensions, area affected, justification, and other information.

During pipeline construction, topsoil would be segregated from subsoil within agricultural areas, residential areas, and at the landowner's request, to preserve native seed banks. As mentioned previously, surface disturbance in some wetlands and waterbodies would be avoided using the HDD method; elsewhere, impacts associated with marsh push and open-cut crossing methods would be temporary. All lands affected by pipeline construction, except for lands identified for aboveground facilities or permanent access roads, would be restored to preconstruction contours. Most developed land uses would be able to continue following construction. However, some activities, such as the building of new commercial or residential structures, would be prohibited on the permanent right-of-way.

Cultivated Crops and Pasture/Hay

Agricultural land in the Project area includes hayfields, pasture, and cultivated crop lands. Project construction would temporarily impact approximately 497.8 acres of agricultural land, of which 205.1 acres would be associated with Terminal Facilities and 292.7 acres would be associated with Pipeline System, which is inclusive of 6.0 acres with aboveground facilities and 14.7 acres with access roads. Approximately 177.6 acres of agricultural lands would be permanently impacted by the Terminal Facilities. Approximately 79.4 acres would be permanently impacted by the Pipeline System during operation, including 70.4 acres for maintained rights-of-way, 6.0 acres for aboveground facility footprints, and 2.7 acres for permanent access roads.

The effects of construction on agricultural land would generally be minor and short term, except where new aboveground facilities and associated permanent access roads are installed. Short-term impacts on agricultural areas would include the temporary loss of crops and grazing areas within the construction work area and the disruption of farming operations for the growing season during the year of construction. Impacts on agricultural land use are generally temporary, typically occurring over only one growing season. CP Express would follow its Project-specific Plan to avoid and minimize construction impacts on agricultural lands by installing erosion and sediment control and restoration measures, including soil stabilization, topsoil segregation, and decompaction. To preserve soil fertility on agricultural lands, CP Express would strip topsoil up to 12 inches in depth from either the full construction right-of-way or from the trench and subsoil storage area, keep it segregated from subsoil, and replace soils to approximate their original horizons.

Following restoration of affected agricultural lands, short-term impacts could occur as a result of the Project. These impacts include unsuitable drainage and the spread or introduction of non-native plant species, as well as soils impacts such as compaction, uneven grade, ponding, and mixing of soils. Occasionally observed long-term impacts on soils (changes to soil composition and chemistry) could also affect agricultural land use and crop production. Following construction, CP Express would visually inspect agricultural land to assess the success of restoration and compliance with landowner agreements. The Commission's environmental staff would also monitor restoration efforts during construction, monitor the Commission's docket for this project for landowner identified issues, and require action, if necessary, in accordance with the Commission's Plan. Revegetation of agricultural areas would be considered successful when crop growth and vigor are similar to adjacent undisturbed portions of the same field, unless the easement agreement specifies otherwise. An important element of right-of-way restoration in active agricultural areas is timely replanting of crops or other cover vegetation. Resumption of agricultural operations following Project construction and/or planting of a cover crop would aid in the restoration of soil structure and productivity that could take several years to achieve success, depending on site-specific conditions and land use practices. CP Express would compensate landowners for any temporary or permanent loss of crop production resulting from construction and operation of the Project and, following restoration, agricultural activities would be allowed to continue over the permanent pipeline right-of-way. Compensation for damages may be determined through easement agreements, other private negotiations between the applicant and the landowner, and/or as determined by the appropriate court. We note the Commission does not have the authority to direct payment of compensation for damages to landowners or to assess the cost of those damages.

Aboveground Facilities

Aboveground facilities and associated appurtenances associated with the Pipeline System would include the Moss Lake Compressor Station, six meter stations (five at interconnects with existing pipelines and one at the terminus of the CP Express Pipeline within the Terminal Site), taps/MLVs, and pig launchers/receivers. Table 4.9.1-1 summarizes the temporary workspace and operational area associated with the aboveground facilities.

Land use types affected by construction of aboveground facilities consist of hay/pasture and cultivated crops, herbaceous land, developed land, open water, wetland, shrub/scrub, and forests. Permanent impacts would occur at MLVs, meter station sites, permanent access roads, interconnection receiver site for the Enable Gulf Run Lateral, and the Moss Lake Compressor Station. All construction would be performed in accordance with the Project-specific Plan and Procedures.

Aboveground facilities constructed for the Pipeline System are considered part of the operational footprint and are expected to be encumbered by an easement or would be leased by CP Express (see section 4.10.9.2).

Following construction, land within construction workspaces, but outside of the aboveground facility footprints, would be allowed to revert to pre-construction conditions in accordance with the Project-specific Plan and Procedures. Each aboveground facility would be fenced to ensure safety and security of the site.

Contractor Yards

Temporary contractor yards would be required during construction of the Project for various purposes, such as pipe fabrication, concrete coating operations, construction staging operations, construction materials storage, equipment parking, and temporary construction offices. Land use types affected by the contractor yards include hay/pasture, cultivated crops, and developed land. Following construction, the land affected by the temporary contractor yards would be returned to preconstruction conditions or as otherwise specified in the landowner agreement.

Access Roads

Access roads are categorized for temporary or permanent use; however, many of the roads are identified as temporary and would be restored to preconstruction conditions following construction. CP

Express proposes to use 55 access roads (including 11 permanent and 44 temporary) to access the right-of-way during construction. Appendix E lists the access roads along with their lengths, required improvements, and locations by milepost. Access roads would be used to transport construction workers, equipment, and materials to the construction work area from public interstate, state, county/parish, and local highways/roads. This includes some private roads and/or two-track roads that may require minor modification or improvement and construction of some new access roads to safely support the expected loads associated with the movement of construction equipment and materials to and from the public roadways to the construction right-of-way. Land use types affected by access roads consist of wetlands, hay/pasture and cultivated crops, forest, open water, scrub/shrub, developed land, and herbaceous land. The access roads would be improved by widening where needed to 25 feet, grading, and adding aggregate. Other improvements would be determined upon field review of each road, and a variance would be requested if necessary, as detailed in section 4.0. Following Project construction, temporary access roads would be returned to preconstruction conditions unless otherwise specified in the landowner agreement.

4.9.2 Existing and Planned Residences and Commercial Developments

CP2 LNG and CP Express have contacted affected county and parish representatives and reviewed publicly available information regarding planned developments. No planned residential developments have been identified within 0.25 mile of the Project (SWLA Economic-Chamber Alliance, 2021). There are several proposed commercial developments within 2 miles of the Terminal Facilities, including LNG terminals and natural gas infrastructure; these are addressed in section 4.14 (Cumulative Impacts).

4.9.2.1 Terminal Facilities

The closest residence is approximately 330 feet north of the Terminal Facilities; there are no existing residences or buildings within 50 feet of the Terminal Site.[72] Due to recent hurricanes in the Project area, many residences became uninhabitable and the majority of occupied residences near the Terminal Site are approximately 0.8 mile northwest in the Town of Cameron.

4.9.2.2 Pipeline System

A total of nine structures are within 50 feet of work areas proposed for use during construction of the Pipeline System (see table 4.9.2-1). Four of these structures, which include two residences and two barns, are within 50 feet of the proposed CP Express Pipeline construction right-of-way. However, no residences are within 25 feet of the construction right-of-way. No residences or commercial buildings are within 50 feet of the construction workspace for the Enable Gulf Run Lateral Pipeline. Five structures, including three barns/storage buildings and two residences, were identified within 50 feet of access roads (see table 4.9.2-1).

Table 4.9.2-1

Existing Residences and Buildings Within 50 Feet of the Pipeline System Construction Workspace

Facility/ Existing Use	Nearest Milepost	Approximate Distance (feet) from Construction Workspace	Direction from Construction Workspace
CP Express Pipeline			
Barn	7.5	32	S
Barn	7.5	15	N

72 One existing residence is within the Terminal Facility footprint; however, it is on property controlled by CP2 LNG and was destroyed by recent hurricanes.

Table 4.9.2-1

Existing Residences and Buildings Within 50 Feet of the Pipeline System Construction Workspace

Facility/ Existing Use	Nearest Milepost	Approximate Distance (feet) from Construction Workspace	Direction from Construction Workspace
Residence - Mobile Home	18.1	33	SW
Residence - Home	78.1	36	SW
Access Roads			
TAR-NE-013: Barn/Storage Building	8.5	36	W
TAR-NE-020: Storage Building	11.8	16	N
TAR-CL-030-E: Barn and Silos	2.1	40	W
TAR-CM-115: Residences – Homes [a]	78.0	14	S
TAR-CM-134: Residence - Home	78.9	22	W

[a] TAR-CM-115 is an existing gravel access road. Some minor grading, top rock dressing, and timber mat placement would be required for use during construction; however, no new road construction would occur.

Note: No existing residence or buildings are within 50 feet of the Enable Gulf Run Lateral, with the exception of a barn with silos adjacent to Enable Gulf Run Lateral TAR-CL-030-E, which is included in this table.

Temporary construction impacts on residential and commercial developments would include increased noise and dust generated by construction equipment, personnel, and trenching through roads or driveways; removal of trees or other vegetation screening between residences and the right-of-way; potential damage to wells; and removal of aboveground structures, such as sheds or trailers, from the right-of-way. Visual impacts are discussed in section 4.9.6, and transportation impacts are discussed in section 4.10.8. Dust and noise impacts on nearby residences are discussed in sections 4.12.1 and 4.12.2, respectively.

In general, as the distance to the construction work area increases, the impacts on residences decrease.

There are two residences within 50 feet but greater than 25 feet from the Project workspace, including one parked mobile home and one residence near CP Express Pipeline MP 18.1 and MP 78.1, respectively. Two existing, gravel access roads (TAR-CM-115 and TAR-CM-134) are within 25 feet of residences. TAR-CM-115 is within 25 feet of one residence and one parked motor home near CP Express Pipeline MP 78.0, and would require minor grading, top rock dressing, and timber mat placement for use during construction; however, no new road construction would occur. TAR-CM-134 is within 25 feet of one residence near CP Express Pipeline MP 78.9, and would require minor grading and top rock dressing with no new road construction. To mitigate impacts on residences, CP Express would work with landowners to ensure that additional road traffic is appropriately mitigated, which may include installing signage and construction fencing for a distance of 25 feet on either side of residential driveways and maintaining the signage and fencing throughout pipeline installation. CP Express would maintain driveway and access for the residence and motor home within 25 feet of TAR-CM-115 and TAR-CM-134 during construction. During extremely dry conditions, the roadway would be sprayed with water to reduce potential fugitive dust, as needed. If any damages occur to the driveway during construction, CP Express would repair the damaged property or provide appropriate compensation to the landowner.

CP2 LNG and CP Express would coordinate with landowners and property lessees to mitigate potential impacts on local, private roads. At Project completion, CP Express would restore all roads back to their original level of service (LOS), or better, unless directed otherwise in writing by the landowner or regulatory agency. At the end of each workday, CP Express would make passable any open-cut driveways for ingress and egress, unless an agreement is reached with the landowner. After the completion of backfilling and topsoil replacement across the construction workspace, all disturbed areas would be final graded and any remaining trash, debris, or unsuitable backfill would be disposed of in accordance with applicable regulations. CP Express would implement appropriate erosion control measures, including site-specific contouring and reseeding with an approved seed mix.

CP Express would need to acquire new easements or acquire the necessary land to construct and operate the new pipelines. These easements would convey both temporary (for construction) and permanent rights-of-way to the applicant. CP Express is seeking to obtain a 50-foot-wide permanent easement for the entire pipeline right-of-way. We received comments regarding the use of eminent domain in situations where CP Express and landowners are not able to reach an agreement during easement negotiations. If an easement cannot be negotiated with a landowner and the Project has been certificated by the FERC, the company may use the right of eminent domain granted to it under section 7(h) of the NGA and the procedure set forth under the Federal Rules of Civil Procedure (Rule 71A) to obtain the right-of-way and extra workspace areas. The easement acquisition process is designed to provide fair compensation to landowners for the right of CP Express to use the property during construction and operation of the pipelines and for any damages incurred during construction. However, a court would determine the level of compensation if a Certificate is issued. In either case, the landowner would be compensated for the use of the land. Easement agreements would also specify the allowable uses and restrictions on the permanent right-of-way after construction. These restrictions could include prohibition of construction of aboveground structures, such as house additions, garages, patios, pools, or any other objects not easily removable; roads or driveways over the pipeline; or the planting and cultivating of trees or orchards within the permanent easement. Alternatively, most agricultural uses would be allowed to continue within the permanent easement and would not be permanently impacted. The areas used as temporary construction right-of-way and ATWS would be allowed to revert to preconstruction uses with no restrictions. Landowners would be notified prior to the start of pre-construction surveys and staking.

In accordance with 18 CFR 157.6, CP Express has provided landowners with written information on how to contact them in the event that there are complaints or incidences that need to be addressed during construction. CP Express has also provided landowners (directly affected and owners of abutting land) with the number for the FERC Landowner Helpline if landowners do not get an adequate response from CP Express.

4.9.3 Recreation and Special Interest Areas

Construction and operation of the Project would not cross or directly affect any national or state-designated Wild and Scenic Rivers, national or state historic landmarks, national forests, national parks, national recreation trails, Indian lands, land managed under the Wetland Reserve Program or Conservation Reserve Program, state parks, preservation areas, other state-recognized public areas (refuges, wetland conservation areas), private conservation lands or land trusts, or wilderness areas (Bureau of Indian Affairs, 2016; National Park Service, 2022, 2020; National Recreational Trails, 2021; National Wild and Scenic Rivers System, 2021; FWS, 2021; U.S. Forest Service, 2021, Louisiana Department of Culture, Recreation and Tourism, 2021; LDWF, 2021d; Land Trust for Louisiana, 2021;). One NWR, the Cameron Prairie NWR East Cove Unit, is within 0.25 mile of the Pipeline System. In addition, Sabine Island WMA and the Creole Nature Trail (SH 27/82) are within 0.25 mile of the Pipeline System, and the Jetty Pier Facility and Lighthouse Bend Park are within 0.25 mile of the Terminal Facilities. One Wetland Reserve Program easement is adjacent to the Moss Lake Compressor Station and would not be crossed or otherwise impacted by the Project. There are no federal, state, or local public or conservation lands within 0.25 mile of the CP Express Pipeline in Texas.

As presented in table 4.9.3-1 below, there are several recreational vehicle (RV) camping sites in Cameron and Calcasieu Parishes less than 0.25 mile from the Project. There are no RV camping sites within 0.25 mile of the pipeline facilities in Texas or along the Enable Gulf Run Lateral.

Table 4.9.3-1

RV Parks within 0.25 mile of the CP2 LNG and CP Express Project

RV Park	Nearest Facility	Nearest Milepost	Distance from the Project (miles)
King's Place	Terminal Facilities	85.3	0.1
3G RV Park	Terminal Facilities	85.3	0.2
Beachridge RV Park	Terminal Facilities	85.3	0.1
Gulf Breeze RV Park	Terminal Facilities	85.3	0.2
Charles RV Park	Terminal Facilities	85.3	0.2
Miss Kay's RV Park	Terminal Facilities	85.3	0.1
BW RV Park	Terminal Facilities	85.3	0.2
K and K RV Park	Terminal Facilities	85.0	<0.1
Peshoff's RV Park	CP Express Pipeline	84.9	0.2
Coastal Oaks RV Park	CP Express Pipeline	84.8	0.2
Cameron Rental & Supply RV Park	CP Express Pipeline	84.5	<0.1
K&D RV Park	CP Express Pipeline	84.5	0.1
Ms. Dale's RV Park	CP Express Pipeline	84.5	0.1

While none of the RV parks would be directly impacted during construction of the Project, they would experience indirect impacts such as increased noise levels and increased traffic, and likely increased use from construction workers. In addition, there would be permanent visual impacts associated with the Terminal Facilities (see section 4.9.5).

Pipeline construction impacts would be temporary and confined to the period of active construction. Following construction, CP Express would restore the rights-of-way to preconstruction conditions; therefore, there would be no permanent visual impact associated with the pipeline.

National Wildlife Refuges

The Cameron Prairie NWR East Cove Unit consists of 14,927 acres of brackish to intermediate marsh, is only accessible by boat, and is utilized as a nursey for brown and white shrimp, blue crab, and various fish species (FWS, 2022c). The CP Express Pipeline would maintain a minimum distance of 0.25 mile from the refuge boundary, except for the portion of the pipeline near MP 69.1 that would cross within 700 feet of the Cameron Prairie NWR East Cove Unit. In general, the NWR and associated land in proximity to the Project are expected to experience some temporary impacts during construction. Designated hunting land within the NWR would not be crossed. Construction could generate dust, noise, and traffic, which could be a nuisance to recreational users, and could generally interfere with or diminish the quality of the recreational experience by affecting wildlife movements or disturbing hunters and boaters. To minimize disturbances to recreational users of the NWR, CP Express would implement the Project-specific Plan and Procedures, SPCC Plan, and Traffic, Noxious Weed, and Fugitive Dust Control Plan. Therefore, we conclude that construction of the Pipeline would have temporary and short-term impacts on the Cameron Prairie NWR.

Wildlife Management Areas

The Sabine Island WMA is along the Texas/Louisiana border, bounded by the Sabine River to the west and the Old River and Big Bayou to the east and north (LDWF, 2021r). The Sabine Island WMA is a popular location for boating, hunting, and other recreational activities. Approximately 0.6 mile of the CP Express Pipeline would cross the northern end of the Sabine Island WMA. The Sabine Island WMA would be crossed via HDD with the entrance and exit locations approximately 2,170 feet east and 760 feet west of the WMA, respectively ; therefore, no noise, traffic, or disturbance-related wildlife impacts that would interfere with hunting, boating, or other recreational activities would occur from construction of the Project. CP Express consulted with LDWF regarding the Sabine Island WMA regarding BMPs for the proposed crossing. The LDWF does not have standard requirements for minimizing impacts on recreational activities. The LDWF issued a Letter of Authorization on June 29, 2022. The Letter of Authorization includes any requirements deemed appropriate by LDWF to minimize impacts on recreational activities at the Sabine Island WMA. Because the Pipeline would cross the WMA using the HDD method, avoiding direct impacts, and CP Express is consulting with the LDWF, we conclude the Pipeline would not impact the WMA.

Creole Nature Trail Scenic Byway

The Creole Nature Trail National Scenic Byway is a 180-mile-long “All-American Road,” which is the highest designation of national scenic byways (Visit Lake Charles, 2021). The Creole Nature Trail crosses Cameron and Calcasieu Parishes, and includes portions of SH 14, SH 82, SH 27, SH 384, and SH 385, providing multiple recreational opportunities for birding, photography, hiking, and picnicking. A portion of this scenic route parallels the Gulf Coast in Cameron Parish. The Creole Nature Trail would be crossed twice by the CP Express Pipeline at MP 48.0 and MP 84.5. The designated roadway would be crossed via conventional bore at MP 48.0 and via HDD at MP 84.5; therefore, there would be no direct impacts on road pavement or traffic. Disturbance adjacent to the byway would be short-term (until revegetation is established) and the landscape would be returned to preconstruction conditions. Vehicles would be able to access all portions of the Creole Nature Trail during construction and operation of the Project. CP Express consulted with the Louisiana Scenic Byways Program and Creole Nature Trail Scenic Byway District Board of Commissioners regarding impacts the Creole Nature Trail. The Creole Nature Trail Scenic Byway District Board of Commissioners indicated that impacts associated with open-cut or HDD crossings of the Creole Nature Trail are not of concern due to their temporary nature, and proposed no specific mitigation measures for the Project. Visual impacts on the Creole Nature Trail are discussed in section 4.9.6.

Jetty Pier Facility and Lighthouse Bend Park

The Jetty Pier Facility is situated at the confluence of the Calcasieu Ship Channel and the Gulf of Mexico and abuts the southwest boundary of the Terminal Site. The recreational site was rebuilt after Hurricanes Rita and Ike, which occurred in 2005 and 2008, respectively. In 2020, Hurricane Laura destroyed the marina at the park. In addition, due to the construction and operation of the Calcasieu Pass LNG Terminal north of the facility, the southern end of David Road (approximately 1.4 miles) and the Jetty Pier Facility were closed to the public in 2019.[73] The Jetty Pier Facility remains closed to the public until further notice.

The new Lighthouse Bend Park is on Calcasieu Pass and would include a marina, a market, RV parking, a family restaurant, an event pavilion, and open-air flex space for the community. The new marina would include a boat launch and 24 boat slips to offer Cameron fishermen access to the Gulf of Mexico,

[73] Additional information is available at https://cameronpj.org/cameron-jetty-pier-facility/

attracting tourism and creating local jobs. Lighthouse Bend Park construction is ongoing and the new opening date is scheduled for summer of 2023.

One of the primary concerns when recreation and special interest areas are in close proximity to a project is the impact of construction on the purpose for which the area was established (e.g., the recreational activities, public access, and resources the area aims to protect). Construction could alter visual aesthetics by removing existing vegetation and disturbing soils; these potential impacts are discussed in sections 4.9.6.1 and 4.9.6.2. Construction could also generate dust and noise, which could be a nuisance to recreational users, and could generally interfere with or diminish the quality of the recreational experience by affecting wildlife movements or disturbing hunters and boaters. To minimize disturbances to recreational users and public access areas, CP2 LNG and CP Express would implement the Project-specific Plan and Procedures, SPCC Plan, and Traffic, Noxious Weed, and Fugitive Dust Control Plan. Collectively, these plans describe various measures and procedures to address issues that could affect recreational users, such as site access and restoration, revegetation, and travel safety.

Construction associated with the Terminal Facilities may temporarily affect local recreational fishing, bird watching, trapping, hunting, and boating activities. Access to local boat launches could be delayed due to dredging and increased roadway and ship channel traffic from equipment and material deliveries and construction workers commuting to and from the Project site, including to the Marine Facilities on Monkey Island. During construction, barges delivering materials and equipment to the Terminal Site and Marine Facilities may impede or delay recreational boat traffic, although the impact is expected to be short term and minimal. The potential impact of additional roadway traffic during construction and operation of the Project is discussed in detail in section 4.10.8. Additionally, pile-driving, which would be required for the installation of the piles ranging from 20 to 144 inches in diameter for the LNG loading docks and associated structures would be louder than typical construction noise and would be most prominent for receptors in or along the Calcasieu Ship Channel near the Terminal Facilities. The piles would be placed using a combination of vibratory and impact pile driving. Piles would primarily be installed via an impact hammer, during daylight hours. The piling crew would be anticipated to work 10 hours per day, 6 days per week. Impact pile driving would last 16 to 18 months at the Marine Facilities and 12 to 16 months at the Terminal Site. Each pile installation relying solely on impact hammer would require approximately 4 hours of continuous driving.

During operations, between three and four LNG carriers per week would call at the Marine Facilities after the Phase 1 facilities are placed in service, and approximately seven to eight LNG carrier calls per week after the Phase 2 facilities are placed into service. Based on comments received on the draft EIS from the Coast Guard, a cooperating agency for the Project, a fixed security zone around the Marine Facilities would not be established. The Coast Guard stated the establishment of moving security zones would be based on a risk-based decision-making model. As discussed further in section 4.10.4, during operations, LNG carriers in transit would have short-term and minimal impacts on recreational activities within the Calcasieu Ship Channel and up to eight times per week after Phase 2 facilities are placed into service.

In general, construction of the Pipeline System would result in impacts on recreational and special interest areas that would be temporary and limited to the period of active construction, which typically would last only several days to several weeks in any one area. For areas in proximity to the Pipeline System, CP Express would implement the requirements and mitigation included in its Project-specific Plan and Procedures. As described throughout this EIS, implementation of these requirements would generally minimize, and to some extent mitigate, potential impacts on resources and activities in recreation and special use areas.

4.9.4 Contaminated Sites

CP2 LNG and CP Express reviewed publicly available federal and state databases for potentially hazardous or contaminated sites within the Project area. According to the EPA and LDEQ, there are no superfund sites or leaking petroleum storage tanks within 0.5 mile of the Project area in either Calcasieu or Cameron Parish (EPA, 2021b; LDEQ, 2022, 2018a). According to the EPA and TCEQ, there are no leaking petroleum storage tanks or superfund sites within 0.5 mile of the Project in either Jasper or Newton County (TCEQ, 2022a, 2022b).

In numerous comments during scoping and on the draft EIS, RESTORE expressed concern about the "Carlyss Pit #2" hazardous waste site, indicating that the site was crossed by the CP Express Pipeline at approximately MP 50. We searched publicly available LDEQ and EPA records and were unable to locate records of current or historic contamination at the referenced location or by the name "Carlyss Pit #2." In a July 10, 2023 filing, RESTORE clarified that the referenced site was the "Ellender Ferry Facility" (LDEQ AI Number 4373).

Based on a review of documentation publicly available through LDEQ's Electronic Document Management System, the Ellender Ferry Facility comprises approximately 4 acres of undeveloped land that was formerly utilized for the burning and burial of hazardous and non-hazardous wastes from the Lake Charles/Sulphur industrial areas. This site has been undergoing remediation activities since the early-1980s, including removal and off-site disposal of contaminated soils and water. A compacted clay "cap" has been installed across the site to minimize surface water leachate, and bio-remediation is on-going for remaining dissolved volatile organic compounds in shallow groundwater. Routine groundwater monitoring is also conducted under LDEQ oversight.

At its closest, the area of investigation for the Ellender Ferry Facility is approximately 350 feet from existing paved/graveled access road TAR CL-275. Project activities would include surficial disturbance (grading) and gravel placement that would not encounter groundwater. At its closest, the pipeline right-of-way (at approximate MP 50) would be approximately 650 north from the nearest groundwater monitoring wells associated with the Ellender Ferry Facility. Based on LDEQ records, these wells (MW 1A and MW-7-B3) were most recently sampled in November 2021 and April 2021, respectively, at which time chemicals of concern were below laboratory detection limits. Therefore, we do not anticipate that the Project would impact ongoing remediation efforts or encounter existing contamination associated with the Ellender Ferry Facility.

If unanticipated contaminated media is encountered, CP2 LNG and CP Express would halt construction activities in the vicinity of the identified contamination, and implement measures in accordance with applicable permit requirements and their Project-specific Plan and Procedures and SPCC Plan.

4.9.5 Visual Resources

"Visual Resources" refers to the composite of basic terrain features, geologic features, hydrologic features, vegetation patterns, and anthropogenic features that influence the visual appeal of an area for residents or visitors. In general, impacts on visual resources may occur during construction when large equipment, excavation activities, spoil piles, and construction material are visible to residents and visitors and during operation to the extent that facilities or portions of facilities and their lighting are visible to residents and visitors. The degree of visual impact resulting from the proposed facilities would be highly variable among individuals and would typically be determined by the general character of the existing landscape and the visually prominent features of the proposed facilities.

4.9.5.1 Terminal Facilities

The immediate viewshed of the Terminal Facilities includes the Calcasieu Ship Channel, industrial businesses along Davis Road and the Calcasieu Ship Channel shorefront, visitors of nearby beaches, and the Port Pilot's housing complex on Monkey Island.

Construction of the Terminal Facilities would result in changes to the visual character of the Project site including increased equipment, vehicles, soil disturbance, import of fill to raise portions of the site elevation, and erection of structures. Construction activities would be visible from users of the Calcasieu Ship Channel; visitors to the Jetty Pier Facility (if it reopens to the public), Lighthouse Bend Park, and nearby beaches; employees and operators of industrial facilities along Davis Road; motorists along the Creole Nature Trail (SH 27); and other areas surrounding the Project site. As discussed in section 4.9.2.1, the closest residence is approximately 330 feet north of the Terminal Facilities. The flat topography of the Project area would allow some construction activities to be visible from local residences, depending on the location and perspective of the viewing point. Residents would see continued construction traffic along SH 27 and Davis Road as Calcasieu Pass' construction would have been recently completed.

While the vessel transits associated with construction and operation of the LNG Terminal would result in a moderate increase in traffic in the Calcasieu Ship Channel, this increase would have a minimal impact on the viewshed because the vessels would be consistent with current use and visual character of the waterway.

Once the Project is complete, many aboveground structures would result in permanent impacts on the viewshed near the Terminal Facilities (see appendix J). The most prominent visual features would be the four 176-foot-tall and 300-foot-wide LNG storage tanks, and the 197-foot-high flare stack. CP2 LNG would construct a perimeter berm and 31.5-foot-high floodwall around the Terminal Site. The Terminal Facilities would be visible from the residential properties/RV parks nearest to the site (330 feet north and 360 feet east), depending on the location and perspective of the viewing point. While the perimeter berm and floodwall are proposed for purposes of handling projected maximum flood cresting, they would also help partially obscure the industrial facilities on the Terminal Site from offsite views, including partial obstruction of the proposed tanks and flare stack. CP2 LNG would also vegetate the storm surge wall berm, where possible. There is a pilot station on the southern tip of Monkey Island, which is a transfer point for pilots to wait to board tugs to be transferred to ships to work. The Terminal Facilities on Monkey Island are approximately 210 feet from the pilot house and would be visible.

Other structures at the site would include exterior lighting, air navigation lighting, the electric power generation facility, and liquefaction heat exchangers. The new facilities would require lighting for operations, safety, and to comply with FAA requirements. CP2 LNG developed a Facility Lighting Plan[74] for the Terminal Facilities which includes measures to minimize visual impacts from lighting, including the use of LED lamps and fixtures with diffusers, lenses, and shields to reduce glare and light pollution. The plan also includes measures to provide an energy-efficient light source; uniform light distribution; proper mounting devices; and maintenance safety.

As discussed above, the Creole Nature Trail (SH 27/82) is a 180-mile-long scenic byway, a portion of which runs adjacent to the Terminal Facilities. Based on the surrounding terrain, we estimate that at least some portion of the Terminal Facilities would be visible to motorists along the byway between the Lake Charles Pilots Boat Dock and approximately 5 miles east of Cameron. This is approximately 9 miles of the total 180-mile road. As motorists travel along the road, visual impacts due to the presence of the

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[74] CP2 LNG and CP Express' Facility Lighting Plan can be viewed on FERC's eLibrary as Appendix 8B of accession no. 20211202-5104.

Terminal Facilities would increase as they approach the facilities and would decrease as they travel further away. For users directly adjacent to the east of the Terminal Facilities, the change from open marshland to a large industrial site would be a significant change, however, the nearby Calcasieu Pass LNG Terminal would limit visual impacts.

The Jetty Pier Facility is situated at the confluence of the Calcasieu Ship Channel and the Gulf of Mexico and abuts the southwest boundary of the Terminal Site. Due to the construction and operation of the Calcasieu Pass LNG Terminal north of the facility, the southern end of David Road (approximately 1.4 miles) and the Jetty Pier Facility were closed to the public in 2019.[75] The Jetty Pier Facility was scheduled to reopen by the end of 2022, but is still currently closed. Lighthouse Bend Park is adjacent to the north of the Terminal Site on Calcasieu Pass and includes a marina, a market, RV parking, a family restaurant, an event pavilion, and open-air flex space for the community. For users visiting these facilities, the Terminal Facilities would be visible and add to permanent visual impacts, as the current land use is mainly wetlands and flat land. This would result in a permanent change in the viewshed for visitors of Lighthouse Bend Park and the Jetty Pier Facility (if and when this facility reopens to the public). However, the surrounding area to the west of the Terminal Site has been developed with the adjacent Calcasieu Pass LNG Terminal, permanently altering the surrounding land use as industrial.

Due to the distance to the nearest residences (360 feet and 330 feet) and the pilot house on Monkey Island, the height and extent of the Terminal Facilities, and the inability to obscure these structures from the nearby residents, we conclude the visual effect of the new facility would significantly alter the viewshed experienced by residents and passersby and would result in significant impacts on visual resources. In order to minimize impacts on the nearby residents and passersby, we included a recommendation in the draft EIS for CP2 LNG to file a visual screening plan to minimize visual impacts on the residences northeast and east of the Terminal, including vegetative plantings to provide a year-round visual buffer of the new Terminal floodwall. In response to our recommendation, CP2 LNG has committed to install vegetative screening by planting native live oak trees and native groundsel bushes on the northeastern and eastern sides of the Terminal Site. CP2 LNG would plant live oak trees of 15 to 25-gallon size on 30-foot centers between 20 and 40 feet outside the stormwater aggregate beds and approximately 70 to 90 feet outside of the floodwall border in those areas without stormwater aggregate beds. Groundsel bushes of 3-gallon size would be planted on 18-foot centers between the live oak trees, where space allows.

CP2 LNG's proposed vegetative screening would provide a visual buffer of the new LNG Terminal floodwall; however, some of the Terminal Facilities, including the LNG storage tanks and the flare stack, would still be visible from the nearby residences. Even with CP2 LNG's proposed screening, which would minimize impacts to the extent practicable, the visual impacts on these residences would still be significant. Visual impacts on environmental justice communities are further discussed in section 4.10.10 and visual renderings of the LNG Terminal are available in appendix J.

4.9.5.2 Pipeline System

In Jasper and Newton Counties in Texas, and the northern portion of Calcasieu Parish in Louisiana, the CP Express Pipeline and Enable Gulf Run Lateral would cross areas that are characterized by upland forest, woody wetlands, and rural areas. Near MP 30 of the CP Express Pipeline in Calcasieu Parish, the landscape transitions to predominantly pastures and herbaceous wetlands. In Cameron Parish, the CP Express Pipeline would be in areas that are primarily characterized by marshland and rural residential areas. Given the low, even topography and sparse tree cover of the area, viewsheds are extensive. The Pipeline System would not affect nationally or state designated visual resources like scenic rivers (National Wild and Scenic Rivers System, 2021). The CP Express Pipeline would cross a scenic byway, Creole Nature

75 Additional information is available at https://cameronpj.org/cameron-jetty-pier-facility/.

Trail, at MP 48.0 and MP 84.5 (Louisiana Travel, 2022). The crossing at MP 48.0 would be completed using a conventional bore and the crossing at MP 84.5 would be completed using an HDD. The HDD entry and exit points would be approximately 1,072 and 88 feet, respectively, from the Creole Nature Trail.

Visual impacts associated with construction of CP Express Pipeline and the Enable Gulf Run Lateral would include the removal of existing vegetation and exposure of bare soils, as well as earthwork and grading scars associated with heavy equipment tracks, trenching, and machinery and tool storage. Other visual effects may result from the removal or alteration of vegetation that provides a visual barrier, or landform changes that introduce contrasts in visual scale, spatial characteristics, form, line, color, and texture.

Impacts on open land uses during construction within the pipeline right-of-way would be short term because herbaceous and shrub communities would likely revert to preconstruction conditions between one to three growing seasons following construction. Thus, the former workspace area would be difficult to distinguish from the surrounding areas. Developed areas would also experience short term impacts as a result of construction. In addition, because developed areas have been previously disturbed, the impacts are expected to not be significant. As both pipelines would be buried, there would be no permanent disturbance to the viewshed during operation of the pipelines.

Visual impacts would be greatest where the pipeline routes parallel or cross trails, recreational waterbodies, or prominent off-site observation points, and where the pipeline rights-of-way may be seen by passing motorists or recreationists. The Creole Nature Trail would be crossed by the CP Express Pipeline at MP 48.0 and MP 84.5. The highway would be crossed by the conventional bore crossing method at MP 48.0 and by the HDD construction method at MP 84.5. The road pavement would not be disturbed at either location. Vehicles would be able to access the Creole Nature Trail during construction and operation of the Project. In addition,, the Cameron Prairie NWR East Cove Unit and the Sabine Island WMA are within 0.25 mile of the Pipeline System. Peripheral disturbance associated with the construction equipment for the Pipeline System would be temporary only and the landscape returned to perconstruction conditions (with vegetation reestabilishing between one to three years following construction). Permanent impacts on these areas would be further reduced given the CP Express Pipeline would be buried near these resources. Therefore, the construction and operation of the CP Express Pipeline would not result in long-term visual impacts to these areas.

Each of the meter stations would be installed at a location with topography similar to that described for the pipeline. The meter stations would be installed on primarily open land along the permanent pipeline right-of-way and, although they may be visible to passers-by on nearby roads, they would not create a unique visual impact on the area. There are two residences 0.4 and 0.6 mile northwest of the Kinder Morgan Meter Station. Given the potential for visual impacts in this location, we have recommended below that CP Express provide a visual screening plan for the Kinder Morgan Meter Station. For the remaining meter stations, there are no residences that do not already have an existing visual buffer (e.g., trees) between the facility and residence.

MLV sites would be within the permanent pipeline rights-of-way and enclosed within a chain-link security fence. The valves and valve sites would be relatively small and are not expected to present a significant change in the visual quality of areas surrounding the pipeline rights-of-way; therefore, visual screening is not planned. There are residences 0.2 mile southwest of MLV 5, and 0.2 mile and 0.3 mile east and west, respectvely, of MLV 6. Given distance between MLV 5 and MLV 6 and the nearest residences, as well as the relative size of MLVs, we believe the permanent visual impact at these facilities would be negligible. In the draft EIS, we included a recommendation for CP Express to file a visual screening plan for MLV 2 as it was originally proposed 0.04 mile south of the nearest residence. Since the issuance of the draft EIS, CP Express relocated MLV 2; the closest residence is now approximately 0.25

mile southeast and an existing vegetative buffer between the facility and the residence exists. Therefore, we conclude a visual screening plan for MLV 2 is no longer necessary.

Following construction, all disturbed areas would be restored, and areas outside of the permanent rights-of-way would be returned to pre-construction conditions in compliance with federal, state, and local permits; the Project-specific Plan and Procedures; landowner agreements, and CP Express lease requirements, with the exception of aboveround facility sites. As described throughout this EIS, implementation of these requirements would minimize, and to some extent mitigate, potential impacts on resources and, as such, would mitigate impacts on visual receptors.

Moss Lake Compressor Station

The Moss Lake Compressor Station is sited in a rural area, adjacent to Ellis Moss Road. There are two residences (0.2 mile and 0.3 mile northwest, respectively) of the Moss Lake Compressor Station. CP Express has stated they would maintain an existing vegetative buffer to minimize visual impacts; however, no further details were provided. We received a comment from a nearby landowner concerned with the impacts of ambient lighting of the compressor station.

In response to our recommendation in the draft EIS, CP Express filed a visual screening plan to minimize visual impacts on the residences northwest of the Moss Lake Compressor Station and Kinder Morgan Meter Station. In accordance with its visual screening plan, CP Express would plant native Carolina cherry laurel trees of 15-gallon size on 15-foot centers and native groundsel bushes of 3-gallon size on 18-foot centers for vegetative screening along the northern and northwestern sides of the compressor station. Additionally, in compliance with its location within a floodplain, CP Express would construct a 12-foot-high floodwall surrounding the facility. CP Express' proposed vegetative screening should provide a visual buffer of the Moss Lake Compressor Station and Kinder Morgan Meter Station, including the floodwall, from the residences 0.2 and 0.3 mile northwest.As stated above, the draft EIS also recommended for CP Express to file a visual screening plan for MLV 2 as it was originally proposed 0.04 mile south of the nearest residence. In response to this recommendation, CP Express relocated MLV 2; the closest residence is now approximately 0.25 mile southeast and there is an existing vegetative buffer between the proposed facility and the residence that would minimize visual impacts of the facility. Therefore, we conclude a visual screening plan for MLV 2 is no longer necessary.

With the implementation of the above measures and CP Express' proposed visual screening plan, we conclude that impacts on visual resources from the construction and operation of the Pipeline System aboveground facilities would be minimized and not significant.

4.9.6 Coastal Zone Management

The CZMA calls for the "effective management, beneficial use, protection, and development" of the nation's coastal zone and promotes active state involvement in achieving those goals. As a means to reach those goals, the CZMA requires participating states to develop management programs that demonstrate how those states would meet their obligations and responsibilities in managing their coastal areas. The Louisiana Coastal Resources Program, approved by the NOAA in 1980, is administered by the LDNR's OCM. The authority for the coastal management program is the Louisiana State and Local Coastal Resources Management Act of 1978. The Louisiana Coastal Zone, which extends 16 to 32 miles inland from the Gulf Coast, covers 10 million acres and includes 40 percent of the nation's coastal wetlands (USGS, 2021b).

The National Coastal Zone Management Program requires a federal consistency review for actions taken or authorized by federal or state agencies that may affect an approved state coastal zone. The

Terminal Facilities and approximately 45.5 miles of the Pipeline System are within the Louisiana Coastal Management Zone Boundary as shown on figure 4.9.6-1 (LDNR, 2021a, 2021b). A Coastal Use Permit from the LDNR/OCM is required for various development activities taking place in the coastal zone, including the type of activities proposed by the Project. The Project would be designed and built in compliance with conditions set forth in various agency authorizations, including the FERC authorization, the COE section 404/10 permits and section 408 approval, and the LDNR/OCM's Coastal Use Permit. No portion of the Project is within the Texas Coastal Zone.

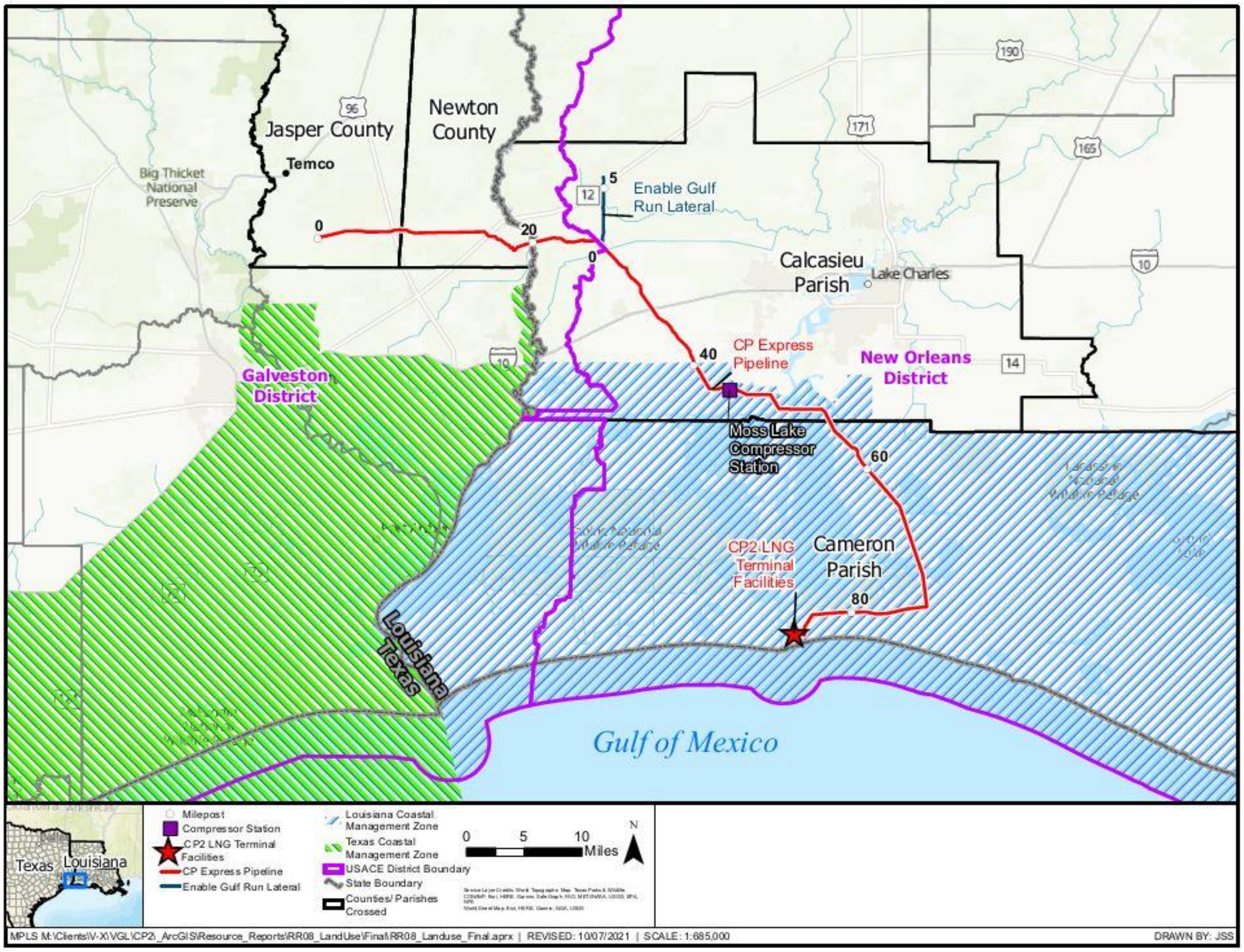

Figure 4.9.6-1 Project Facilities and Coastal Zone Boundaries

CP2 LNG and CP Express have requested a CZMA determination for the Project as part of the Coastal Use Permit permitting process, and submitted an application for a Coastal Use Permit to LDNR/OCM for the Project in December 2021. The application is still under review, and a Coastal Use Permit has not been issued; therefore, **we recommend that:**

- **CP2 LNG and CP Express should not begin construction of the Project until they file with the Secretary a copy of the determination of consistency with the Coastal Zone Management Plan issued by the LDNR/OCM.**

Therefore, based on our recommendation above, the Project would not result in significant impacts on the coastal zone.

4.10 SOCIOECONOMICS

Construction and operation of the Project could impact socioeconomic conditions, either adversely or positively, in the general Project vicinity. These potential impacts include alteration of population levels or local demographics, increased employment opportunities, increased demand for housing and public services, increased traffic on area roadways and waterways, and an increase in state and local government revenues associated with sales and payroll taxes.

The Project study area includes the two Texas counties and two Louisiana parishes crossed by the Pipeline System and Terminal Facilities, and two additional counties in Texas. The counties and parishes included in the study area are:

- Jasper County, Texas (crossed by the Pipeline System);
- Newton County, Texas (crossed by the Pipeline System);
- Jefferson County, Texas (west of the Project area, but not crossed);
- Orange County, Texas (west of the Project area, but not crossed);
- Calcasieu Parish, Louisiana (crossed by the Pipeline System); and
- Cameron Parish, Louisiana (crossed by the Pipeline System and Terminal Facilities).

Although Jefferson and Orange Counties, Texas, are not crossed by the Project, they have been included in the study area because construction personnel may be drawn from small towns in these counties, and the counties may benefit from the procurement of goods and services during construction.

4.10.1 Population

Table 4.10.1-1 provides a summary of selected population and demographic information for the affected areas.

Table 4.10.1-1

Land Area and Population Characteristics Within the Project Study Area

State/Parish or County/City or Town	Population (2010) [a]	Population (2020 estimate) [b]	Population Percent Change (2010 to 2020) (percent)	Population Density (2020) (persons per square mile) [c]	Land Area (square miles) [b]
Texas	25,145,561	28,635,442	13.9	106.0	268,597
Jasper County	35,710	35,562	-0.4	36.7	970
Newton County	14,445	13,788	-4.5	14.7	940
Jefferson County	252,277	253,136	0.3	288.9	876.3
Port Arthur [d]	54,376	54,705	0.6	711.4	76.9
Orange County	81,837	83,776	2.4	251.1	333.7
Louisiana	4,533,372	4,664,616	2.9	89.1	52,378
Calcasieu Parish	192,768	202,858	5.2	185.4	1,094
Lake Charles (City) [d]	71,224	77,832	9.3	1,733.5	44.9
Sulphur (City) [d]	20,390	20,122	-1.3	1,796.6	11.2
Vinton (Town) [d]	3,207	3,296	2.8	646.3	5.1
Cameron Parish	6,839	6,963	1.8	3.6	1,937
Cameron (Town) [d]	537	219	-59.2	19.2	11.4

Table 4.10.1-1					
Land Area and Population Characteristics Within the Project Study Area					
State/Parish or County/City or Town	**Population (2010) [a]**	**Population (2020 estimate) [b]**	**Population Percent Change (2010 to 2020) (percent)**	**Population Density (2020) (persons per square mile) [c]**	**Land Area (square miles) [b]**
Study Area Total [e]	**583,876**	**596,083**	**2.1**	**120.6**	**6,151**

Sources:

[a] U.S. Census Bureau, 2020a (File # B03002)

[b] U.S. Census Bureau, 2010

[c] Population density for the study area was calculated by dividing the study area totals for the 2020 population by total land area.

[d] City or town is within the county or parish identified above, respectively.

[e] Includes the total population of the counties and parishes in the study area (i.e., Jasper, Newton, Jefferson, and Orange Counties, Texas and Calcasieu and Cameron Parishes, Louisiana).

4.10.1.1 Terminal Facilities

Construction of the Terminal Facilities would take place over a 4-year period; CP2 LNG anticipates starting construction in the fourth quarter of 2023, with a Phase 1 in-service target during the fourth quarter of 2026; however, the actual start of construction would be dependent on the issuance of all relevant permits and authorizations. Table 4.10.1-2 provides a summary of the construction and operational workforce for the Project.

Table 4.10.1-2					
Construction and Operational Workforce for the CP2 LNG and CP Express Project					
Phase/Facility	**Workforce (Number)**			**Duration (months)**	
	Phase 1	**Phase 2**	**Phase 1 & 2 Combined**	**Phase 1**	**Phase 2**
Terminal Facilities Construction					
Initial	300	300	N/A [a]	3 months	3 months
Average	1,600	1,600	3,200 [b]	35 months	35 months
Peak	3,000	3,000	6,000 [c]	6 months	6 months
Pipeline System Construction					
Initial	500	50	550	1 month	1 month
Average	750	80	830	18 months	12 months
Peak	1,425	125	1,550	3 months	5 months
Operation					
Terminal Facilities		250		30 years (minimum)	
Pipeline System		10 [d]		50 years (minimum)	

[a] No overlap between initial workforce in Phases 1 and 2; Phase 2 begins 12 months after commencement of Phase 1.

[b] Average workforce would generally increase during construction and decrease as the facilities near completion and pre-commissioning, commissioning, and plant startup take place.

[c] Maximum peak of employees during overlap between Phases 1 and 2 may last up to 6 months.

[d] Includes aboveground facilities staff.

CP2 LNG estimates that approximately 30 percent of the construction workforce for the Terminal Facilities would be hired from the existing population within the study area. Because the Terminal Facilities would be built over a multi-year period, CP2 LNG assumes 70 percent of non-local workers would be accompanied by family members. Based on an average family size of 2.8 persons in Louisiana (U.S. Census Bureau, 2019) and a total average non-local workforce of 2,240 (70 percent of 3,200 workers for Phase 1 and 2 combined), up to 6,272 non-local persons and family members could relocate to the affected area during construction of the Terminal Facilities. This addition would represent a 3.0 percent increase in the total population within Calcasieu and Cameron Parishes over the 2020 census data.

After construction, CP2 LNG anticipates that 125 workers (50 percent of 250 operations workforce) that would be employed at the Terminal Facilities during operation would be non-local hires who would relocate to the Project area. The influx of these workers and their families would represent a minor but permanent increase in the population in the vicinity of the Terminal Facilities.

4.10.1.2 Pipeline System

CP Express anticipates starting construction in the fourth quarter of 2023, with commissioning beginning in the fourth quarter of 2025. There would be two construction spreads for the CP Express Pipeline. Spread 1 would be from about MP 0.0 to MP 50.15 and spread 2 from about MP 50.15 to MP 85.4. Both spreads would be mechanically completed within 16 months of construction commencing, with commissioning and demobilization expected to last an additional 2 months.

For the Pipeline System, CP Express estimates that about 50 percent of the construction workforce would be hired from the existing population within the study area. CP Express estimates that the 375 non-local construction workers (50 percent of the average workforce of 750) for Phase 1 and 40 non-local construction workers for Phase 2 (50 percent of the average workforce of 80) would not bring their family members to the area because of the shorter construction periods. CP Express estimates that 50 percent of the operations workforce (5 workers) would be non-local hires who would relocate to the Project.

4.10.1.3 Impacts on Population

The parishes and counties crossed by the Project are largely rural, with the Lake Charles Metropolitan Statistical Area (MSA) as the main metropolitan area. The Lake Charles MSA has an estimated population of just over 200,000 people. Non-local workers would not distribute evenly throughout the study area; with a higher concentration of workers at the Terminal Facilities. It is anticipated that many non-local workers would seek residences in communities with housing options within 1 hour or less from the Project.

Based on the comparison of workers and relocated family members with the existing population, Project construction would likely have a moderate, short-term effect on population numbers in the study area communities around the Terminal Facilities, and a minimal effect along the Pipeline System. In the short-term, the population increase associated with construction could incrementally increase demands for housing and public services (see sections 4.10.3 and 4.10.7, respectively) but may also create minimal economic benefits in the study area, which is rural.

4.10.2 Economy and Employment

Texas is the largest producer of crude oil and natural gas in the United States, and in 2019, Louisiana ranked as the third highest producer of natural gas. In 2018 and 2019, the Louisiana economy was in the midst of an industrial boom. Low natural gas prices, together with the long-term prospect that they would remain low, encouraged a large number of firms (particularly in the chemical sector) to announce expansion of existing industrial plants or construction of new plants in Louisiana (Scott and Collins, 2018). The growth of natural gas-oriented industries, combined with the recovering oil and natural gas extraction sector, meant that urban and rural parishes benefited from an improving economy. The global COVID-19 pandemic paused this growth, and it is estimated that Louisiana lost 105,400 jobs (-5.3 percent) in 2020 (Scott and Upton, 2020). The global pandemic also had a detrimental effect on the oil and natural gas sector in Texas. According to a Texas Petro Index analysis, the upstream oil and natural gas economy suffered a 30 percent contraction in 2020, as well as the loss of nearly 60,000 direct jobs (Texas Petro Index, 2021).

Calcasieu and Cameron Parishes make up the Lake Charles MSA, which is one of nine MSAs in Louisiana. The Lake Charles MSA is dominated by three industries: petrochemicals (including natural gas liquefaction and export), gambling, and aircraft repair. In 2019, Calcasieu Parish was home to 16 chemical plants, 3 industrial natural gas processing plants, 2 oil refineries, and 1 LNG export facility (with another under construction). Total employment in these facilities was in excess of 7,500 direct employees and about 3,800 indirect employees (contractors) (Scott et al., 2019).

Gambling in the Lake Charles MSA grew in the five years prior to the COVID-19 pandemic. In 2019, Lake Charles' three casinos and one racetrack employed 5,391 persons with a gross revenue of $684 million (Scott et al., 2019). Additionally, the aircraft repair sector is centered on Lake Charles' Chennault Industrial Airpark, which houses three significant aircraft repair employers.

There is a heavy reliance on the petrochemicals industry in Calcasieu and Cameron Parishes, which has resulted in cyclical economic fortunes, with both parishes hit hard by the 2007 to 2009 recession. The area recovered between 2013 and 2018, experiencing an industrial boom linked to the construction of several large LNG projects. In 2020, the COVID-19 pandemic had devastating consequences for both parishes, with both the casino market and industrial construction resulting in the loss of approximately 7,000 jobs in the Lake Charles MSA. Recovery in the Lake Charles MSA is expected as there are $13 billion in LNG projects underway and another $58 billion potential projects forecast for the area (Scott and Upton, 2020).

Table 4.10.2-1 provides a summary of employment and income data for the study area.

Table 4.10.2-1

Existing Socioeconomic Conditions Within the CP2 LNG and CP Express Project

State/Parish or County/City	Median Per Capita Income (2020 dollars) [a]	Population Age 16 Years and Over (2020) [a]	Civilian Labor Force Participation Rate, 2020 [a]	Unemployment Rates (percent) [b, c]			Top Occupational Categories [a] (2020)
				2018	2019	2020	
Louisiana	$29,522	3,688,107	58.7	4.8	4.7	8.3	• Management, business, and science, and arts 34.1% • Services 19.2% • Sales and office 22.0%
Cameron Parish	$28,341	5,727	54.8	3.5	3.6	5.7	• Management, business, science, and arts 31.0% • Services 20.2% • Sales and office 21.4%

Table 4.10.2-1 Existing Socioeconomic Conditions Within the CP2 LNG and CP Express Project							
State/Parish or County/City	**Median Per Capita Income (2020 dollars) [a]**	**Population Age 16 Years and Over (2020) [a]**	**Civilian Labor Force Participation Rate, 2020 [a]**	**Unemployment Rates (percent) [b, c]**			**Top Occupational Categories [a] (2020)**
				2018	**2019**	**2020**	
Calcasieu Parish	$29,866	157,087	61.0	3.8	3.9	9.0	• Management, business, science, and arts 29.1% • Sales and office 24.0% • Production, transportation, and material moving 17.5%
Lake Charles (City)	$30,683	61,802	61.0	3.7	3.8	8.9	• Management, business, science, and arts 31.9% • Services 24.6% • Sales and office 23.4%
Texas	$32,177	22,078,090	64.4	3.9	3.5	7.6	• Management, business, science, and arts 36.7% • Services 17.3% • Sales and office 22.2%
Newton County	$21,836	11,411	51.6	6.7	6.3	11.0	• Management, business, science, and arts 26.7% • Services 21.3% • Production, transportation, and material moving 19.3%
Jasper County	$25,690	28,242	51.9	6.6	6.1	11.2	• Management, business, science, and arts 25.0% • Services 18.6% • Sales and office 18.8% • Production, transportation, and material moving 20.1%
Jefferson County	$20,409	198,405	55.5	3.9	3.1	13.3	• Management, business, science, and arts 29.8% • Sales and office 22.2% • Production, transportation, and material moving 16.8%

Table 4.10.2-1 Existing Socioeconomic Conditions Within the CP2 LNG and CP Express Project							
State/Parish or County/City	**Median Per Capita Income (2020 dollars) [a]**	**Population Age 16 Years and Over (2020) [a]**	**Civilian Labor Force Participation Rate, 2020 [a]**	**Unemployment Rates (percent) [b, c]**			**Top Occupational Categories [a] (2020)**
				2018	**2019**	**2020**	
Orange County	$31,260	65,435	60.4	3.8	2.5	11.3	• Management, business, science, and arts 27.4% • Service occupations 19.8% • Sales and office occupations 18.2%
Study Area Total	**N/A**	**466,307**	**N/A**	**N/A**	**N/A**	**N/A**	
Study Area Average [d]	**$27,400**	**NA**	**55.9**	**4.72**	**4.25**	**8.75**	

a U.S. Census Bureau, 2020a (File # S1903; File # B01001; File # S2301).
b 2018, 2019, and 2020 unemployment rate data based on annual averages (U.S. Bureau of Labor Statistics, 2021).
c Unemployment rate data are not seasonally adjusted.
d Includes the average of the counties and parishes in the study area (i.e. Jasper, Newton, Jefferson, and Orange Counties, Texas and Calcasieu and Cameron Parishes, Louisiana).
NA = not applicable

4.10.2.1 Construction Impacts on Economy and Employment

The Project's total estimated construction cost would exceed $10 billion for both phases, including construction workforce payroll (approximately $540 million) and materials and equipment costs. The study area would experience an increased demand for labor and materials during Project construction. The Project would purchase and lease construction equipment and machinery locally, including cranes, lifts, pump trucks, flatbed trucks, dump trucks, excavators, and front-end loaders. Additionally, locally procured services would include limited design and engineering services, waste disposal, sanitary services, food services, and security. Local distributors (from within the two parishes and two counties that comprise the study area) would supply fuel to operate the Project's dredging equipment, pumps, earth-moving equipment, trucks, and diesel generators. An estimated 10 percent of Project costs would be spent at locally or regionally based suppliers.

The Project would temporarily boost employment in the study area by providing additional job opportunities particularly in the Lake Charles MSA, in which the most populous localities are found. The percentage of the workforce that is locally sourced would be dependent upon several factors, including the availability of local workers, the timing of need for different skilled trades, and the timing of other proposed or ongoing projects in the study area. CP2 LNG and CP Express anticipates employing approximately 30 percent of the workforce locally (i.e., from within the study area) for construction of the Terminal Facilities, and 50 percent of the workforce locally for construction of the Pipeline System, as well as operation of both the Terminal Facilities and Pipeline System.

Construction and related activities would create temporary business opportunities for local suppliers and service providers, likely providing a limited boost in supply chain revenues and supporting job growth in related industries. The Project may increase competition for local supplies, which would heighten costs for some market participants and generate more revenue for others. Overall, Project construction would generate minor, temporary economic benefits in the parishes and counties in the study area. Greater benefits would be experienced in Cameron and Calcasieu Parishes, as there would be a greater demand for labor, goods, and services around the Terminal Facilities.

Employment-related benefits would accrue during the four years of construction of the Project, as well as for one to two years afterwards while Project-related dollars move through the local economy. In Cameron and Calcasieu Parishes, the economic benefit could be moderate depending on the number of workers who live in the parishes and the amount of spending that occurs there. Given the low population of Cameron Parish, it is assumed that the Project would source labor from both Cameron and Calcasieu Parishes during construction. The average construction workforce of 1,600 to 3,200 for the Terminal Facilities would represent a 49.0 to 85.8 percent increase in the number of workers employed in Cameron Parish, which was estimated at 3,264 for 2017 (Louisiana Department of Labor, 2018). The average construction workforce during Phase 1 and Phase 2 of the Pipeline System would represent less than a 1.5 percent increase in the number of workers employed in Cameron and Calcasieu Parishes combined.

4.10.2.2 Operation Impacts on Economy and Employment

We received comments from the public expressing concern regarding the temporary nature and quality of jobs potentially created by the Project. While it is true that most of the positions would be temporary, only lasting the length of construction, there would still be about 260 permanent positions during operation of the facilities. Given the maturity of the oil and natural gas industry in the study area, nearly half of the Terminal Facilities and Pipeline System workers would be hired locally as the local workforce would have the relevant experience required to fill these positions. The operations workforce would represent a less than 1.0 percent increase in the number of employed workers in the study area overall, but, assuming that all of the Terminal workforce would be located in Cameron Parish, the workforce would increase by 7.7 percent. For the duration of the Project (at least 50 years), CP2 LNG and CP Express expect to spend about $750,000 annually on local materials, land leases, and sewer and waste disposal utilities. As such, the operation of the Project would have minor, permanent beneficial impacts on local employment and the economy in the study area. Depending on the number of workers who move to Cameron Parish and the vendor contracts established there, the employment and economic benefit to the parish could be greater. It is reasonable to assume that the 260 new permanent jobs associated with the Terminal Facilities and Pipeline System would lead to additional indirect employment opportunities and growth in both Cameron and Calcasieu Parishes.

4.10.3 Housing

The number of housing units (permanent and temporary) varies across the affected areas, largely based on county or parish population and the presence or absence of a major city. Table 4.10.3-1 provides data on the rental and other temporary living options in the affected areas, including the occupied and vacant housing inventory in the study area based on the U.S. Census Bureau's 2019 estimates. Since then, the area has been impacted by extensive damage from Hurricanes Laura and Delta during the 2020 hurricane season. While the U.S. Census Bureau has not yet released revised numbers, reports from other authorities indicate that the storms adversely affected the number of available housing units. Over 50,000 housing units were damaged overall and half of Calcasieu Parish's total housing stock was damaged in the storms (Calcasieu Parish Police Jury, 2021).

Table 4.10.3-1
Vacant Housing Statistics for the Project Study Area

State, Parish/County/Cities and Town	Total Vacant Housing Units (number)	Vacant Properties for Rent (number)	Rental Vacancy Rate (percent)	Seasonal, Recreational or Occasional Use (number)	Rented/Sold but not Occupied (number)	Other Vacant (number)
Texas						
Jasper County	3,650	179	4.9	1,390	96	1,708
Newton County	2,278	27	1.2	866	105	1,237

Table 4.10.3-1 Vacant Housing Statistics for the Project Study Area						
State, Parish/County/Cities and Town	**Total Vacant Housing Units (number)**	**Vacant Properties for Rent (number)**	**Rental Vacancy Rate (percent)**	**Seasonal, Recreational or Occasional Use (number)**	**Rented/Sold but not Occupied (number)**	**Other Vacant (number)**
Jefferson County	14,935	1,442	9.7	516	505	11,798
Orange County	6,313	988	15.7	375	254	4,122
Mauriceville	101	0	0	0	0	101
Port Arthur	4,869	352	7.2	144	156	4,125
Study Area Total	**27,176**	**2,636**	**9.7**	**3,147**	**960**	**18,865**
Louisiana						
Calcasieu Parish	12,388	2,529	8.8	2,466	1,157	5,014
Cameron Parish	1,391	0	0	1,198	0	145
Lake Charles	6,675	1,983	1,281	858	2,553	11.5
Vinton	326	21	23	57	199	2.0
Sulphur	1,262	36	404	58	671	9.2
Carlyss	513	26	246	0	112	5.7
Cameron	49	0	49	0	0	0
Study Area Total	**22,604**	**4,595**	**2,011.8**	**4,637**	**4,692**	**5,187.4**
Source: U.S. Census Bureau, 2020a (File #B25004)						

The highest concentration of housing in the Project area is in Jefferson County. Even with the reduced availability of housing after the storm season, the second highest concentration of housing in the study area is in Calcasieu Parish. Cameron Parish and Jasper, Newton, and Orange Counties have few housing units available, with Cameron Parish having almost no housing rental units available other than short-term recreational rentals. It is unclear how big of an impact the 2020/21 storm season has had on short-term rentals in Cameron Parish. However, Calcasieu Parish, has greater housing availability in comparison and is approximately 42 miles from the Terminal Facilities in terms of commuting distance.

The average one-way commute for workers in both Cameron and Calcasieu Parishes is 27 minutes (U.S. Census Bureau, 2019). Workers in construction and mining, from both urban and rural areas, have the longest average commute (33 minutes) of any industry (Kopf, 2016). Average one-way commutes for workers in Jasper and Newton Counties are 32 and 39 minutes, respectively (U.S. Census Bureau, 2019). CP2 LNG and CP Express assume Project construction workers would be willing to travel up to 60 minutes each way to work.

Calcasieu Parish had the highest percentage of available rental and owner-occupied housing, but the rental vacancy rate for the whole study area was low. Non-local construction workers are more likely to live in rental units and short-term housing than to purchase homes, due to the temporary nature of their work.

In addition to rental units, several short-term accommodation options, including hotels/motels, RV parks, and camping grounds, are available within the study area. For the Pipeline System, temporary accommodations are largely limited to Calcasieu Parish and Jasper County. The Moss Lake Compressor Station would be within Calcasieu Parish and is southwest of Lake Charles and Sulphur with easy access to the highest concentration of temporary accommodation options. While some accommodation options have been affected by severe storm seasons in 2020 and 2021, RV parks have been observed to adapt and reopen shortly after storm events, through the use of generators and trucked water.

4.10.3.1 Terminal Facilities

During Terminal Facilities construction, an average of 980 non-local workers would require housing for 3 years for each of the two construction stages (1 and 2). Thirty percent of construction workers would be hired from the local area, which would reduce the demand for non-local worker housing. It is anticipated that many non-local workers would seek residences in communities with rental housing within a 1-hour or less commute to the Terminal Facilities; Lake Charles, the largest community in Calcasieu Parish, offers a commute of about 1 hour. Housing in Cameron Parish is extremely limited, while Calcasieu Parish has more accommodation options. Several communities in Calcasieu Parish, including Lake Charles, Sulphur, and Carlyss, are within a reasonable commute of the Terminal Facilities and would provide feasible accommodation options for the 980 non-local workers that would need housing. Based on this availability within a reasonable commuting distance, we anticipate there would be sufficient housing units to accommodate the non-resident workers and their families.

We anticipate that during Project operations, the estimated 125 non-local permanent workers hired to operate the Terminal Facilities would have a negligible but permanent effect on housing rates in the area, although their purchase or rental of local housing would benefit individuals.

4.10.3.2 Pipeline System

During Pipeline System construction, an average of 750 workers would be required for Phase 1 and 80 for Phase 2. Local residents would make up about 50 percent of the workers hired for construction, reducing the demand for housing. The total work duration would be 18 months for Phase 1 and 12 months for Phase 2. However, some peak construction work durations would be as short as one month. Along most of the pipeline route, rental and extended recreational stay options are available, but the low rental vacancy rates, about 5 percent for the study area, indicate that the rental market is highly competitive.

Housing effects would be most noticeable for the Pipeline System, with housing being particularly limited in Jasper and Newton Counties. During Phase 1 construction, the estimated 375 non-local workers are anticipated to spread out within the study area and increase demand for housing and accommodations. The estimated 375 additional housing units required during Pipeline System Phase 1 construction would comprise approximately 8 percent of the non-seasonal vacant housing in the study area. Given the short-term nature of pipeline construction, actual construction-phase housing demand would likely be met through a combination of housing units (i.e., single-family or multi-family houses and apartments), hotels, motels, RV spaces, and campground sites. While proprietors and rental unit owners would benefit, the demand would increase competition among tenants in the study area, and potentially increase the relatively low rental prices. Overall, we anticipate Project construction would have a minor and temporary impact on the housing and accommodations market within the study area.

During Project operations, the 5 non-local permanent workers hired to operate the Pipeline System would have a negligible but permanent effect on housing rates in the area, although their purchase or rental of local housing would benefit individuals.

4.10.4 Commercial Industries

4.10.4.1 Commercial Fisheries

The shrimp fishery was the most valuable commercial fishery in Louisiana and Texas in 2019, while menhaden, oyster, red snapper, and blue crab also contributed a large share of the commercial fishery revenue (LDWF, 2021n). White and brown shrimp are the most valuable and second largest commercial fishery commodity in Louisiana (LDWF, 2021b). Approximately, 81.5 million pounds of shrimp were landed with a value of approximately $153 million in Louisiana (NMFS, 2021a). Annually, Louisiana's seafood industry contributes approximately $2.4 billion to the Louisiana economy and, in 2019, Louisiana contributed 81 million pounds of shrimp at $1.44 per pound to the world seafood market (The Advocate, 2020). In an average year (based on 2014 to 2019 numbers), shrimp harvesting contributes approximately $265 million to the Texas economy (Dudensing et al., 2021).

The LDWF has identified three coastal zones across Louisiana for shrimp fishing, each with its own regulations regarding season length. The Terminal Facilities are in Zone 3, which covers the area east from the Texas border to Vermillion Bay and the Southwest Pass at Marsh Island. The inshore shrimping seasons for Zone 3 are the spring season (May to July) and the fall season (August to December). Accounting for offshore fishing and seasonal inshore shrimping and oyster harvesting, commercial fishing is a year-round activity (LDWF, 2021b). Generally, shrimp fleets use the Calcasieu Ship Channel year-round. Shrimp harvest seasons adjacent to the Project area are further discussed below.

Blue crab is the other main fishery in the area, with Louisiana's blue crab fishery being the largest in the Gulf of Mexico and the U.S., supplying about a quarter of the blue crab harvested in the U.S. (LDWF, 2021o, 2021p). Fish landing reports suggest that Louisiana's commercial fishing industry has recovered from the Deepwater Horizon oil spill in 2010 (Louisiana State University, 2017). In 2018, the marine fisheries harvest in Cameron Parish totaled approximately $4.5 million, with the contributors being crabs, shrimp, and commercial finfish; in the same year, the crab and shrimp harvest for Calcasieu Parish totaled nearly $2 million. The freshwater fisheries harvest for 2018 (finfish) amounted to $8,844 in Cameron Parish and $18,419 in Calcasieu Parish (Louisiana State University, 2018).

Cameron and Calcasieu Parishes support a modest commercial fishing industry compared to some of the other coastal parishes in Louisiana, with top commercial fishing ports being Empire-Venice, Intracoastal City, Dulac-Chauvin, and Grand Isle (NMFS, 2021a). There are approximately 55 commercial fishing vessels that operate out of the town of Cameron. During the draft EIS comment period, we received several comments from individuals expressing concern regarding the impact of the Project on commercial fisheries, including the shrimping industry. Potential impacts on fisheries include disturbance in vessel traffic corridors where fishing and shrimping vessels may need to traverse. Large vessels may also make access to fishing locations more difficult and impact the number of fish, shrimp, or crab a commercial vessel may be able to catch. Additional LNG carriers for CP2 LNG would represent an increase of approximately 17 percent[76] of projected ship traffic in the Calcasieu Ship Channel.

The shrimp fishery is the only LDWF-managed commercial fishery in the Calcasieu Ship Channel. For management purposes, the LDWF divided state waters into inside waters and outside waters, with the inside/outside shrimp line (referred to as the "Firing Line") separating these two designations (Louisiana Revised Statues §56:495 (A)). Due to safety concerns, the Firing Line was moved by the LDWF in 2018 from its previous location near the entry to the Calcasieu Ship Channel northward to a position north of Monkey Island and south of the Ferry Landing (FERC, 2018; LDWF, 2023). The Firing Line generally follows the coastline and is shown in figure 4.10.4-1 below. The Calcasieu Ship Channel adjacent to the Marine Facilities is open for shrimp harvesting year-round (outside waters). In inside waters, the shrimp harvesting season varies from year to year, but generally coincides with shrimp migrations from May to July for brown shrimp and mid-August to mid-December for white shrimp. Based on consultations between FERC and LDWF,[77] impacts on shrimping vessels would be greatest near the Terminal south of the Firing

[76] Based on 8 LNG carriers to the Terminal Facilities per year and the projected vessel traffic for 2026 in the Calcasieu Ship Channel (2,514 vessels). Additional discussion on marine transportation is provided in section 4.10.8.1.

[77] See accession number 20230609-3003.

Line where shrimping occurs year-round and vessel traffic and dredging associated with the Terminal Facilities would occur.

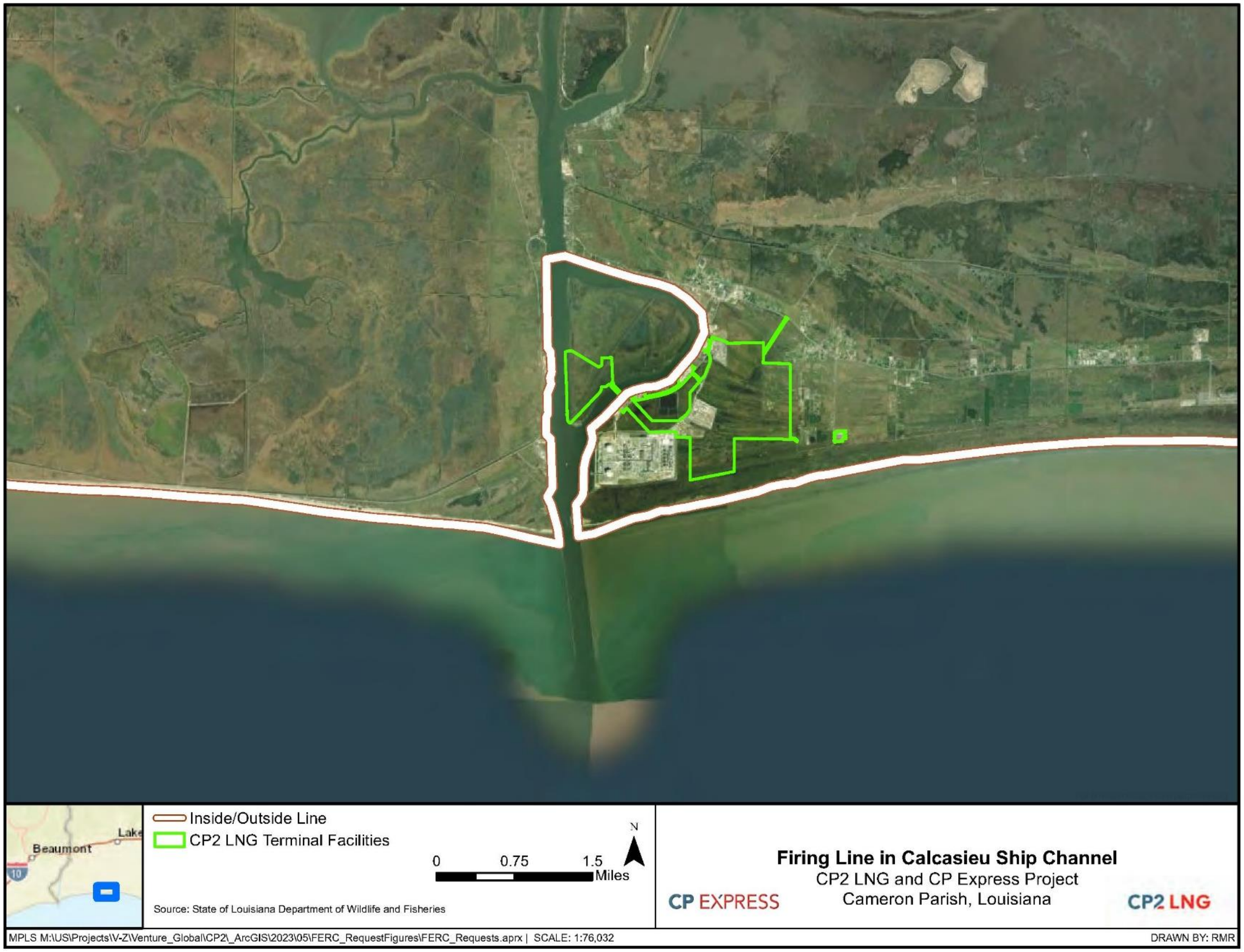

Figure 4.10.4-1 Firing Line in Calcasieu Ship Channel

Potential impacts on commercial fisheries would likely occur during the construction phase due to disturbances from vessel traffic and activities such as excavating and dredging, as well as during operation with the transit of LNG carriers. The Coast Guard requires that any waterway activities which temporarily disrupt navigation and/or channel traffic (e.g., dredge vessel movement, dredge pipeline crossing, etc.) require coordination and permission with the Coast Guard Marine Safety Unit Lake Charles and the Lake Charles Pilots, with a notice to mariners and temporary lighted markers during the event. Project activities would be routed for approval via Coast Guard District 8, in which the notice to mariners and light list would be broadcasted both on navigation charts (electronic and print) and voice communication over very high frequency radio during the activity. Regarding operation of the Project, the Letter of Recommendation issued by the Coast Guard on December 17, 2021, does not identify a specific exclusion zone for CP2 LNG carriers and the CP2 LNG marine terminal. In accordance with the "Rules of the Road," it is the legal obligation of commercial fishing and shrimping vessels to not conduct any activity that would impede the navigation of a "stand on vessel" (e.g., the vessel that must maintain its course and speed) in a restricted maneuvering situation (Coast Guard, 2020). Due to the limited width and depths of the Calcasieu Ship Channel, a deep draft vessel (e.g., an LNG carrier) is legally determined to be the stand on vessel to which the smaller commercial vessel must give way to allow for a safe passage. By international and domestic laws, commercial (e.g., fishing and shrimping) boats must monitor the bridge-to-bridge very high frequency radio and therefore would receive notices (Coast Guard, 2020). Given all these requirements, it is likely that commercial fishing vessels would experience increased burdens and impediments to transiting the Ship Channel with the increased frequency of construction vessel traffic .

We received a comment from the LDWF during the draft EIS comment period inquiring about any proposed dredging timing restrictions to avoid spawning and commercial harvest seasons. CP2 LNG proposes dredging to occur 6 days per week for 12 to 18 consecutive months. CP2 LNG would adhere to all COE and LDNR permit conditions to minimize impacts associated with dredging activities. The dredge prism for the Marine Facilities would be situated along the existing Calcasieu Ship Channel. As discussed in section 4.4.3.1, dredging would be conducted using a cutterhead suction dredge and the sediment plume is anticipated to extend approximately 2 meters from the dredge activity before reaching ambient conditions. As stated above, the Calcasieu Ship Channel adjacent to the Marine Facilities is open for shrimp harvesting year-round (outside waters). The area immediately surrounding the dredge activities would likely not be suitable for shrimp harvesting. However, this impact would be limited to the extent of the sediment plume and temporary during dredge activities. As such, the Project is expected to have a temporary but not significant impact on commercial harvest activities.

During operations, the "Rules of the Road" would apply and commercial fishing vessels would be expected to give way to stand on vessels (e.g., LNG carriers) while the LNG carrier passes (approximately 20 to 25 minutes) and during maneuvering in the turning basin (approximately 1 hour). After the LNG transit is complete, fishing vessels could resume fishing activities throughout the Ship Channel. Typically, shrimp are most active at night when few vessels are using the Calcasieu Ship Channel. Given the Terminal Facilities' proximity to the mouth of the Calcasieu River (about 1 mile) and the year-round use of the area by commercial fishing vessels, we conclude the increase in delays associated with LNG carrier transit would have a moderate, but not significant impact on commercial fishing. Impacts on vessel traffic in the Calcasieu Ship Channel are discussed further in section 4.10.8.1.

As stated above, we also received several comments expressing concern regarding the impacts of the CP2 LNG Project on the commercial fisheries and the shrimping industries based on experience with the Venture Global's Calcasieu Pass Project. In 2019, Venture Global convened and has maintained a Community Advisory Group in Cameron Parish as part of its community engagement plan for the construction and operation of Calcasieu Pass LNG. CP2 LNG states that the goal of Venture Global's Calcasieu Pass Community Advisory Group is to ensure that residents from all parts of Cameron Parish are represented and can communicate promptly and directly with Venture Global to express any concerns they have or to communicate adverse impacts that they or their neighbors have seen related to Calcasieu Pass. The Community Advisory Group is comprised of Cameron Parish residents and other local stakeholders, including members of the Cameron Parish School Board, small business owners, the Louisiana State University AgCenter, the Cameron Parish Police Jury, 4-H, and the Cameron Council on Aging. CP2 LNG states that Venture Global may expand the membership of the Community Advisory Group over the next year to ensure Calcasieu Pass and CP2 LNG continue to hear concerns or issues so actions can be taken to promptly resolve or mitigate problems. As part of the Community Advisory Group and as part of their general community relations, Calcasieu Pass and CP2 LNG state they would continue to seek stakeholder feedback and work with stakeholders, including shrimpers and fishermen, on ways to avoid or mitigate any negative impacts.

Further, CP2 LNG and CP Express prepared an Engagement Plan for Local Commercial Shrimp Fishery (Engagement Plan) with the objective of facilitating communication, addressing concerns, providing updates, and encouraging collaboration with local shrimp fisherman.[78] CP2 LNG state they would rely on feedback it receives from direct outreach to local shrimp fishermen and from the Community Advisory Group to meet this objective. CP2 LNG states topics of discussion for future Community Advisory Group meetings would include navigation and vessel traffic management, timing of construction activities relative to shrimp harvest activities, and marsh restoration activities related to BUDM. CP2 LNG state they provided the Engagement Plan to the Community Advisory Group and requested its members review the document for discussion during the next quarterly meeting in August 2023. Further, CP2 LNG have committed to continuing the development of the Engagement Plan and would provide updates on its engagement effort and on Community Advisory Group meetings within the monthly construction reports.

CP2 LNG states if there are issues and/or concerns in Cameron Parish related to Project impacts on the shrimping community, the Community Advisory Group would allow Venture Global LNG to continue to hear and address them accordingly. Additionally, Calcasieu Pass and CP2 LNG would comply with project permits, including those issued by the applicable Louisiana resource agencies, which were developed with the feedback provided by all stakeholders, including any provided by the fishing and shrimping industry.

As shrimp and crabs are mobile, some of the populations would be expected to disperse during construction or maintenance activities (refer to section 4.7.2 for additional information on impact on aquatic resources). It is likely that some could also be harmed or killed by equipment. Construction and operation impacts on fish, shrimp, and blue crabs would be localized and are not expected to have a significant impact on commercial fisheries.

In addition to commercial fisheries, certain coastal Louisiana communities are dependent on subsistence fishing. Small and close-knit communities, like the ones found in these areas, are more likely to depend on subsistence economies (Hunter et al., 2009). Based on desktop research completed by CP2 LNG and CP Express and community/stakeholder outreach, there is no written or anecdotal evidence of subsistence fishing communities near the study area. If subsistence fishing communities are found that could be affected by the Project, CP2 LNG and CP Express states that it would engage with the communities to understand and manage potential impacts on the communities.

4.10.4.2 Agriculture and Aquaculture

In Louisiana, the agricultural sector (including aquaculture) plays an important role in the economy, ranking among the key income generating industries in the state, together with the petrochemical industry and tourism. Nearly 30,000 farms operate on 8,000,000 acres of agricultural land; in addition, the state has

[78] See attachment EIR 10 Socioeconomics-2 at accession number 20230522-5195.

about 14 million acres of forestland (USDA, 2018). Commercial agricultural activity in the southern portion of Cameron Parish is limited as much of the land area is marshland or swamps and not suitable for agriculture. Rice, cattle and calves, and aquaculture (crawfish, fish bait, alligators, and oysters) are the predominant agricultural activities in Cameron Parish (LDWF, 2021k, 2021l). Calcasieu Parish has land more suited to agriculture, but also has a larger urban land percentage. Forestry, cattle and calves, and horses are the predominant agricultural activities in Calcasieu Parish. Gross farm values in Cameron and Calcasieu Parishes total $16.6 million and $36.0 million, respectively (USDA, 2018).

Texas ranks first in the nation for total number of farms with over 248,000 farms, which account for 127 million acres of agricultural land or nearly 74 percent of the state's total acreage (Hundl, 2019). Primary agricultural activities in Jasper and Newton Counties are hay crops and cattle. In 2017, the total market value of agriculture in Jasper and Newton Counties was $9.1 million and $1.6 million, respectively (Texas Almanac, 2017a; 2017b). Gross farm values in Jasper and Newton Counties total $8.1 million and $1.8 million, respectively (USDA, 2018).

The Terminal Facilities would impact 205.1 acres of hay/pasture or cultivated crops during construction and permanently impact 177.6 acres during operation. The Pipeline System would impact 298.2 acres during construction and permanently impact 80.5 acres during operation, of which 8.7 acres would be permanently removed from hay/pasture or cultivated crop use due to construction and operation of aboveground facilities and access roads. The agricultural land that would be lost as a result of the Project represents a small percentage of the total acreage of agricultural land in the counties/parishes traversed by the Project. Therefore, we anticipate the Project would not have a significant adverse impact on the local or regional economy.

4.10.5 Tourism and Recreational Fishing

4.10.5.1 Tourism

Prior to the COVID-19 pandemic, the Louisiana Department of Culture, Recreation, and Tourism (2018) reported that the travel and tourism industry employed 237,200 people across Louisiana, making it the fourth highest employer in the state. In 2018, over 15.6 million passengers arrived at and departed from Louisiana airports, which was a 9 percent increase over 2017. Additionally, 51.3 million domestic and international visitors to the state were recorded, spending $18.8 billion, a 7.6 percent increase over 2017 (Louisiana Department of Culture, Recreation, and Tourism, 2019). The areas with the highest visitor spending are consistently the New Orleans-Metairie MSA and the Baton Rouge MSA.

A review of tourism spending by parish shows that the largest spending generated by visitors in the study area is in Calcasieu Parish, with spending of $698.1 million in 2018 (University of New Orleans, 2019). Tourism indicators for the area show casino admissions and hotel demand that outpace neighboring areas. Tourism spending elsewhere in the study area is considerably lower, with Jasper County recording the next highest amount in 2018 at $39.4 million; Cameron Parish recorded the lowest amount at $2.2 million. Tourism spending decreased in Cameron and Calcasieu Parishes between 2016 and 2018, but increased in Jasper and Newton Counties over the same period.

According to a 2019 Louisiana Visitor Profile, Louisiana received a record number of domestic visitors in that year, spending record amounts of money. Domestic person-stay volume was up 3.4 percent year-over-year and domestic spending increased 6.3 percent in 2019 over 2018 (Allen, 2020).

Louisiana receives visitors throughout the year; however, winter and spring are the most popular tourist seasons. The majority of Louisiana's visitors (59 percent) come for non-vacation leisure purposes such as to visit with friends/relatives (22 percent) or to attend a special event (13 percent). Vacation purposes, such as a getaway weekend (11 percent) or general vacation (9 percent), account for a significant portion of visitors. Travelers coming to Louisiana for business account for 15 percent of the visitors (Allen, 2020).

Nearly a quarter (24 percent) of Louisiana travelers stay in mid-level hotels and 16 percent stay in high-end hotels; 27 percent stay in non-paid accommodations, typically at homes of friends/relatives (Allen, 2020).

There are tourist attractions clustered near Lake Charles, over 50 miles (commute) north of the Terminal Facilities, and include Prien Lake Park, Imperial Calcasieu Museum, the Creole Nature Trail Adventure Point, and the Lake Charles casino resorts. Recreational opportunities within the Project area and impacts on recreational activities as a result of the Project are further discussed in section 4.9.4.

Tourism in Texas constitutes an $80.9 billion industry. Of that, more than half of all visitor spending in Texas was generated by residents traveling from other states and countries. The Piney Woods region of Texas, which includes Jasper and Newton Counties, generates the smallest comparative tourist spending of all regions (Dean Runyan Associates, 2020). Much of the Pipeline System crosses private land in sparsely populated, rural areas; as such, there are few tourism attractions/activities along the route.

4.10.5.2 Recreational Hunting and Fishing

The Calcasieu River is popular for freshwater and saltwater recreational fishing, but the lower 26 river miles (which includes the Calcasieu Ship Channel and Calcasieu Pass) is estuarine and, thus, not suitable for freshwater fish. However, spotted sea trout, southern flounder, and red drum (redfish) are commonly found in the lower portion of the river. Recreational fishers also catch shrimp, oysters, and blue crabs in the Calcasieu River (LDWF, 2021m). Recreation and sport fishing are popular in Cameron Parish, with a number of commercial fishing charters operating in the parish.

We received a comment on the draft EIS from the Niskanen Center, et. al. regarding the Project's impacts on one landowner's hunting and fishing business and another landowner's livestock grazing and recreational fishing pond. Both properties would be crossed by the CP Express Pipeline. CP Express would construct the Pipeline in accordance with the Project-specific Plan and Project-specific Procedures and in compliance with the requirements of 49 CFR 192 (*Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards*) and other applicable federal and state regulations. A majority of impacts from construction of the CP Express Pipeline would be temporary to short-term (lasting throughout construction [approximately 36 months total for both spreads] and restoration of vegetation) and potential impacts are discussed throughout section 4.0 of this EIS. During operation, CP Express would retain a 50-foot-wide permanent easement for pipeline operations. A 25-foot-wide corridor would be maintained in an herbaceous state in uplands and a 10-foot-wide corridor would be maintained within wetlands. CP Express would negotiate a mutually acceptable easement agreement and compensation for the easement with each landowner. If such an agreement cannot be determined, a court would determine an appropriate agreement. During operation, recreational hunting and fishing, as well as livestock grazing would be allowed to resume.

4.10.5.3 Impacts on Tourism and Recreational Hunting and Fishing

Section 4.10.1 summarizes the number of local and non-local workers that would be required for construction and operation of the Project. Many temporary construction workers would seek accommodation in hotels or RV campgrounds, depending on their length of hire. Temporary and extended stay options in Cameron and Calcasieu Parishes are discussed in table 4.10.3-1.

Parishes and counties with urban centers or close to larger towns offer more accommodation options, such as Lake Charles, Sulphur, and Vinton in Calcasieu Parish. The compressor station would be constructed in Calcasieu Parish, which has adequate temporary accommodation options available. Tourism spending in the Texas counties along the Pipeline System is considerably lower than spending in Calcasieu Parish, although tourism spending in Jasper and Newton Counties has steadily increased from 2016 to 2018, growing by 4.6 percent and 1.3 percent, respectively. Based on the low tourism spending in these counties, it can be assumed that the demand for temporary accommodations in these counties is low.

Given the supply of temporary accommodations compared with the Project workforce maximum, the influx of Project personnel may result in minor, impacts during construction for those visitors seeking accommodations in the study area. However, we anticipate there would still be sufficient inventory of hotel/motel rooms and seasonal, recreational, or occasional use housing options available for tourists within the study area.

During operation, non-local workers hired permanently would seek permanent accommodations near the Terminal Facilities or Pipeline System. Given the available accommodations in the study area, we anticipate there would be minimal impact on tourism-based accommodations during operation of the Project.

Construction and operation impacts on fish, shrimp, and blue crabs are likely to be localized, minor, and temporary, and thus, we anticipate would not have a significant impact on recreational fisheries.

During construction and operation of the Marine Facilities, recreational fishing vessels would avoid project-related marine vessels and areas of activity. As discussed above for commercial fishing, during operations, LNG carriers in transit could impact recreational fishing vessels within the Calcasieu Ship Channel because they would be required to give way to stand on vessels when theLNG carrier passes. After the LNG carrier passes, fishing vessels could return and continue their prior activities. LNG and other shipping traffic is closely managed and directed by the Port of Lake Charles and the Lake Charles Pilots, thereby minimizing the risk of safety incidents involving fishing vessels. Project work areas and vessels would also comply with the safety requirements (warning signs, lights, etc.) of the Coast Guard.

Given the Terminal Facilities' proximity to the mouth of the Calcasieu River (about 1 mile), we conclude the increase in construction vessel traffic and the delays associated with LNG carrier transit are not expected to significantly impact recreational fishing. Further, we anticipate Project construction and operation would not negatively impact any recreational fishing, given the fact that these activities are not restricted to the relatively small sections of the Project footprint that could provide potential fishing opportunities. However, if fisheries concerns are subsequently communicated by stakeholders, CP2 LNG and CP Express stated they would engage directly with the concerned parties to identify an appropriate path forward, which may include the development of appropriate mitigation measures (see section 4.10.4.1).

4.10.6 Local Taxes and Government Revenue

Major revenue sources for Louisiana and Texas include general sales tax, corporate taxes, and excise taxes, as well as federal contributions. Sales taxes are applied to all retail sales, non-essential taxable services, and the leases and rentals of most goods. Louisiana also relies on personal income tax for revenue, whereas personal income tax is not collected in Texas. We received a comment from the Southeast Laborers District Council expressing concern that the Project's local economic benefits were not appropriately stated by CP2 LNG and CP Express, as they have applied for tax exemptions and incentives. Discussions of the local taxes and government revenue anticipated from the Project are provided below in sections 4.10.6.1 and 4.10.6.2. Section 4.10.6.2 includes a discussion of the possible tax abatement for the Project.

Cameron Parish's primary revenue streams are from ad valorem taxes, oil and gas royalties, and parish royalty funds from the state. In terms of taxable revenue streams, Cameron and Calcasieu Parishes have some of the highest tax liability per return, with ranks of 3 and 10 respectively among all the Louisiana parishes for 2019. In 2019, Cameron Parish ranked 6th in taxable oil barrels and 8th in natural gas production. Calcasieu Parish also depends strongly on the severance tax from oil and natural gas, ranking 11th in taxable oil barrels and 18th in production of natural gas (Louisiana Department of Revenue, 2019).

Table 4.10.6-1 summarizes the total revenues, expenses, and net assets of the counties/parishes in the counties and parishes that would see the most tax benefits from the Project.

Table 4.10.6-1

Revenues, Expenditures, and Assets Within the CP2 LNG and CP Express Project

State, Parish/County	Revenues (dollars)	Expenditures (dollars)	Excess of Revenues over Expenditures (dollars)	Net Assets (dollars)
Louisiana				
Cameron Parish	20,686,503	21,622,030	(889,195)	124,909,647
Calcasieu Parish	199,902,000	166,010,000	33,892,000	1,229,009,000
Texas				
Jasper County	19,900,908	22,682,22	(2,781,312)	21,850,157
Newton County	18,218,328	18,742,101	(523,773)	31,383,110

Sources:
Cameron Parish Policy Jury, 2020; Calcasieu Parish Policy Jury, 2020; Jasper County, 2020; Newton County, 2020

4.10.6.1 Construction Impacts on Local Taxes and Government Revenue

During construction and operation, the Project would result in increased tax revenues for the study area parishes and counties and the states of Louisiana and Texas. At the local level, the Project would generate sales tax, as well as ad valorem tax. At the state and parish level, the Project would generate sales and income taxes.

The two phases of the Project are estimated to cost over $10 billion. This amount includes labor costs, materials, and equipment costs. The average workforce for construction during each phase of the Terminal Facilities would be 1,600 workers, with an average of 3,200 workers during construction overlap of Phase 1 and 2. The average annual salaries would be in line with those in the oil and gas sector, which would be higher than the Cameron Parish average annual wage of $28,358. The duration of Terminal Facilities construction during Phase 1 is an estimated 35 months. Therefore, construction labor expense would amount to hundreds of millions of dollars and would further generate income taxes at the state level. Additionally, a portion of the construction payroll would be spent locally by both local and non-local workers for the purchase of housing, food, gasoline, and entertainment, which would generate sales tax. An estimated 40 to 60 percent of each construction employee's income would be spent locally.

The local sales tax rate in the study area ranges from 4.45 to 6.25 percent. The state sales tax rate is 4.45 percent in Louisiana (including 3.97 percent Louisiana state sales tax and 0.03 percent Louisiana Tourism Promotion District sales tax). Sales tax revenues resulting from the Project would be approximately $75 million during construction applicable at the state level only because there are no sales taxes at the Cameron Parish level. While it is difficult to predict the level of worker or Project spending that would be subject to sales tax, the amount would likely be noticeable to the local economy. Added to these estimates would be sales tax generated from locally purchased construction materials and, during the construction period, the Project would generate payroll tax and income tax at the state level.

Locally purchased concrete, miscellaneous consumable materials, and fuel supplies would generate sales taxes at both the local and state levels. CP2 LNG and CP Express anticipate spending approximately $1 billion on materials and procured services during construction of the Project. The Project would purchase and lease a portion of the total materials and service expenditures locally or regionally. This outlay would cover construction equipment and machinery, as well as procured services such as engineering, waste management, sanitary, food, and security. Due to the proximity of the Port of Houston to the Project area, it is reasonable to conclude that more materials and services may come from this location than the Port of New Orleans. At this stage in Project development, it is too early to determine the exact value of direct local expenditures on construction materials, but CP2 LNG and CP Express estimate that approximately 10 percent of construction materials would be purchased locally.

4.10.6.2 Operational Impacts on Local Taxes and Government Revenue

During operations, the Project would continue to generate income and sales taxes. Approximately 250 full-time workers would be hired for the Terminal Facilities and approximately 10 full-time workers would be hired for the Pipeline Facilities. Total payroll for these workers would be approximately $24 million annually, which would generate state income tax in Louisiana. The full-time staff are expected to live and spend a portion of their income in the study area, particularly within Cameron and Calcasieu Parishes where the Terminal Facilities and the Moss Lake Compressor Station would be located.

The Project would generate ad valorem taxes during operations. The Project may apply for the State of Louisiana's Industrial Tax Exemption Program which, according to current rules, would provide an 80 percent tax abatement on ad valorem tax for a 5-year term with a possible extension for another 5-year term. If accepted into the program, the Project would pay approximately $50 million per year in property taxes during a 10-year abatement period, and then approximately $160 million per year following the abatement period.

Aside from tax revenues directly generated from workers and Project spending, the Project would have a minimal positive impact on local economies and stimulate indirect expenditures within the study area as inventories are restocked and additional business earnings are reinvested. The permanent jobs would generate additional socioeconomic benefits as workers purchase goods and services and pay for housing.

4.10.7 Public Services

Table 4.10.7-1 provides the number of public schools, fire departments, police departments, hospitals, and hospital beds available in the study area. There are no schools, daycares, hospitals, or nursing homes within 2 miles of the Terminal facilities or 1 mile of the Moss Lake Compressor Station and proposed meter stations.

Table 4.10.7-1

Public Service Infrastructure within the Project Study Area

State, Parish/County	Public Schools (number) [a]	Fire Departments (number) [b]	Police Department (number) [c]	Hospitals (number) [d]	Hospital Beds (number) [d]
Texas					
Jasper County	16	10	4	1	59
Newton County	25	7	1	0	0
Jefferson County	70	5	7	3	947
Orange County	14	3	8	1	40

Table 4.10.7-1 Public Service Infrastructure within the Project Study Area					
State, Parish/County	**Public Schools (number) [a]**	**Fire Departments (number) [b]**	**Police Department (number) [c]**	**Hospitals (number) [d]**	**Hospital Beds (number) [d]**
Louisiana					
Calcasieu Parish	57	18	8	8	753
Cameron Parish	4	6	1	1	49
Total	**186**	**49**	**29**	**14**	**1,848**

[a] Cameron Parish School District, 2021; Calcasieu Parish School Board, 2021; K12 academics, 2021; Newton County Schools, 2021; Orange County Economic Development Corporation, 2021

[b] Louisiana Office of State Fire Marshal Public Safety Services, 2021; Texas Fire Connect, 2021; USA Fire & Rescue, 2021

[c] USA Cops, 2021

[d] Louisiana Hospital Association, 2021; Texas Hospital Association, 2021; American Hospital Directory, 2021

Note: Sheriff's offices are included in the police department numbers. Long-term extended care, psychiatric care, rehabilitation, or labor delivery and women's services hospitals are not included in hospital numbers.

4.10.7.1 Education

Public school systems in the four parishes and counties that the Project would affect serve 36,433 students enrolled in the 2020–2021 school year. The largest school district in the study area is the Calcasieu Parish School District, the fifth largest district in the state of Louisiana. In the four parishes and counties the Project affects, 102 schools serve students from pre-kindergarten through 12th grade, with an enrollment of 1,193 students in Cameron Parish, 27,584 students in Calcasieu Parish, 5,884 students in Jasper County, and 1,772 students in Newton County (Louisiana Department of Education, 2021; Texas Education Agency, 2021). Additionally, the public school systems in Jefferson and Orange Counties serve an additional 40,702 and 14,771 students, respectively (Texas Education Agency, 2021). The nearest school district to the Terminal Facilities is the Cameron Parish School District. Enrollment has dropped in the last 10 years, with about 7 percent fewer students in 2021 than in 2011. This system includes four K -12 schools (Grand Lake, Hackberry, Johnson Bayou, and South Cameron). The largest school system in proximity to the Terminal Facilities and Pipeline System (including the Moss Lake Compressor Station) is Calcasieu Parish. Like Cameron Parish School District, enrollment has declined over the last decade. However, as a larger district, it has access to more resources and is in a better position to absorb an influx of new students. Along the pipeline route, student enrollments have declined, with Jasper County enrollments decreasing by 11 percent between 2011 and 2021 and Newton County enrollments decreasing by 14 percent over the same period. Given that enrollment numbers have declined in these counties, it can be assumed that there is capacity to take new students.

To understand potential impacts on schools, assumptions have been made based on the anticipated workforce. CP2 LNG estimates that the maximum number of non-local hires and their family members that would relocate to the Project area during peak construction of each phase of the Terminal Facilities is expected to be 6,272. Based on information from the Census Bureau (U.S. Census Bureau, 2020b), about 23 percent of people in a household are under the age of 18. Therefore, assuming about 23 percent of the population influx would be under the age of 18, about 632 school-aged children would need to be enrolled in local schools. As stated above, an estimated 1,193 students are enrolled in schools in Cameron Parish and 27,584 students are enrolled in schools in Calcasieu Parish. This would result in an enrollment increase of 2.2 percent within Calcasieu and Cameron Parishes. The last year has seen a general decline in enrollments of about 2 percent throughout the state. Should a large portion of non-local worker families reside in Cameron Parish, the additional students could have a moderate to major impact on the public school system, as even an additional 100 students (a little over 20 percent of the expected school-aged children) would represent an 8 percent increase in enrollment. However, given the vast majority of available housing in Calcasieu Parish, it is assumed the majority of additional students would enroll in Calcasieu Parish, which, as mentioned above, is in a better position to absorb an influx of new students. Additionally, due to the 7 percent decline in enrollment over the past 10 years in Cameron Parish, the impact associated with the conservative 8 percent increase in enrollment would be offset. Therefore, we believe that this would result in minor, temporary impacts on the schools.

During operation, there would be an estimated 250 workers employed at the Terminal Facilities and 10 employed along the Pipeline System. Using the above-described assumptions, an estimated 350 non-local workers and family members could relocate to the study area around the Terminal Facilities, and 14 non-local workers and family members along the CP Express Pipeline and Enable Gulf Run Lateral routes. Therefore, approximately 70 total school-aged children may relocate with non-local hires to the areas around the Terminal Facilities and Pipeline System. Given the number of school age children expected to relocate to the Project area, the capacity of the public school systems, and the declining enrollment in these areas, we conclude the Project's impact on the public school system would be minor and not significant.

4.10.7.2 Public Safety

Table 4.10.7-1 above summarizes the number of law enforcement agencies and fire departments in the Project area.

The Cameron Parish Sheriff's Office is the primary law enforcement entity where the Terminal Facilities would be situated. At any given time, the patrol division has 9 to 10 vehicular units on the road, in addition to two motorcycle patrols. We received a comment in response to the draft EIS from a resident near the proposed Terminal Facilities expressing safety concerns over the influx of workers for the CP2 LNG Project based on their experience during the construction of Calcasieu Pass LNG. While outside the scope of this Project, we note that Venture Global states it worked with the Cameron Parish Sheriff's Office throughout the development, construction, and commissioning phases of its Calcasieu Pass LNG Project, and would continue to do so once operational and for the life of the project. During the development phase of the Calcasieu Pass Project, Venture Global staff worked with the Sheriff's department by providing extra funding to support bringing more officers into the area or paying for officers' overtime during peak traffic times and ensure their presence was appropriate to the number of additional people in the area. Venture Global states they are in contact with the Sheriff's department and District Attorney's office to make similar arrangements for the Terminal Facilities. In addition, CP2 LNG and CP Express would conduct background checks on all personnel prior to being hired. The background check would confirm identity, work history, education, social media activity, and criminal record. CP2 LNG's contractor would also conduct background checks on its staff, craft personnel, and subcontractors. Once hired for the Project, all staff and contractors would participate in an orientation process, including how personnel must act responsibly and respectfully towards the local communities. CP2 LNG and CP Express state that failure to uphold CP2 LNG and CP Express' standards would lead to disciplinary action, up to and including termination. A significant percentage of CP2 LNG construction personnel would park at the Helms Road P&R site and be bussed to the Terminal site. Busing from the P&Rs allows personnel to be taken to the site under supervision and does not easily allow for individuals to leave the worksite until the buses return at the end of the workday and individuals are bussed back to their personal vehicles. Additionally, prior to transport to and from the P&Rs, CP2 LNG would conduct security checks to confirm identity and affiliation with the Project, as well as checks for drugs, alcohol, weapons, and other prohibited items. Randomized checks are also conducted on personal vehicles when personnel arrive and depart the site to further minimize criminal or unauthorized behavior that may negatively impact surrounding communities or the Project. CP2 LNG and CP Express would contract a private security company that supports management of all site access at the Terminal and any remote locations used by the Project and would work closely with the Sheriff's Office to support and share information on current or developing issues, as required. In addition to the cost-sharing agreement and efforts to reduce crime, CP2 LNG it is working with first responders to develop an ERP for the CP2 LNG Terminal to ensure public safety.

The Cameron Parish Sheriff's Office also has a marine unit with two full-time Marine Deputies and one part-time Marine Deputy (Cameron Parish Sheriff's Office, 2021). Calcasieu Parish has seven police departments and a sheriff's office. Moss Lake Compressor Station is under the Calcasieu Parish Sheriff's Department jurisdiction, with the nearest department office in Carlyss about 6 miles from the Moss Lake Compressor Station.

The nearest fire station to the Terminal Facilities is the Cameron Volunteer Fire Department District 1, about 1.5 miles northwest of the Terminal Facilities. The Holly Beach Volunteer Fire Department is the next closest to the Terminal Facilities, but is over 10 miles to the west on the opposite side of the Calcasieu Ship Channel. During Project construction and operation, CP2 LNG would work closely with the local fire departments to ensure that adequate firefighting support is available. At the Terminal Facilities, CP2 LNG would have firewater pumps, fire extinguishers, and emergency warning systems; in addition, emergency practices would be established and implemented as necessary to ensure safe construction and operation. The closest fire stations to the Moss Lake Compressor Station are the Carlyss Volunteer Fire Department Stations 1 (about 6 miles northeast), and the Carlyss Fire Department Station 4 (about 7 miles northeast). The Vinton Volunteer Fire Department Southside Station is about 11 miles northwest of the compressor station.

The study area has around 14 hospitals and medical centers. The closest hospital to the Terminal Facilities is the South Cameron Memorial Hospital, about 10 miles east of the terminal with 49 licensed beds. This facility provides most medical services, including walk-in and emergency services. The next closest medical facilities are in Lake Charles, over 35 miles from the Terminal Facilities. Calcasieu Parish has the greatest concentration of medical facilities, largely in Lake Charles and Sulphur. All of these medical facilities are around 20 miles from the Moss Lake Compressor Station and collectively offer 753 licensed beds (Louisiana Hospital Association, 2021).

Within Cameron Parish, emergency medical response is provided by the parish's ambulance department. The ambulance department provides emergency medical service across the parish 24 hours per day, seven days per week. The closest ambulance department post to the Terminal Facilities is about 1.5 miles northwest in Cameron. The emergency medical service is collocated with the Cameron Volunteer Fire Department. Calcasieu Parish also provides parish-wide emergency medical ambulance service.

CP2 LNG and CP Express met with the Cameron Parish Fire Chief in June 2021 to provide a project update and relevant contact information. The Project would continue to engage with relevant fire and emergency services throughout Project planning, construction, and operation.

As described in section 4.10.3, population increases due to a temporary influx of non-local workers and family members during Project construction would be minor; therefore, additional demand for fire, safety, and medical services would also be short-term and minor. These services are adequate for existing populations in the study area, and relocated households associated with construction are not expected to place an undue burden on such services. Moreover, local revenues and economic stimuli generated by Project construction could indirectly increase funds available to public safety departments and hospitals in the future. During Phase 1 and Phase 2 facility operation, the 350 non-local permanent workers and family members for the Terminal Facilities and 14 non-local workers and family members for the Pipeline System would not represent a significant population increase in the study area and their needs would not affect the current LOS offered by local law enforcement, fire, and medical providers.

CP2 LNG would provide onsite medical services for minor incidents that may occur during construction and operation at the Terminal Facilities. The Pipeline System would have medical services near the job site and workers and supervisors would be trained in the locations.

During construction and operation of the Terminal Facilities, CP2 LNG would supply security, fire safety, and medical services on site. According to CP2 LNG, the Cameron Parish Fire District would provide backup fire protection during the construction period, as described in the Project's ERP. For the Calcasieu Pass Project, Venture Global Calcasieu Pass, LLC has entered into an agreement with Cameron Parish and anticipates a similar agreement would be entered into for the CP2 LNG Terminal Facilities. CP2 LNG anticipates its permanent personnel would visit local medical facilities.

The development of a Terminal Facilities ERP would be coordinated with the Coast Guard and the Cameron Parish Office of Emergency Preparedness. The ERP would be compliant with the Louisiana State Emergency Alert System Plan. The ERP draws on state and local emergency organizations and law enforcement. An Emergency Action Plan has been prepared for the Pipeline System, which contains procedures to be implemented at the compressor station in the event of an emergency and is intended to minimize hazards to human health that might result from emergencies. In the event of a fire or medical emergency, the first response would be to call 911. During routine operations, the Project would not place additional demands on public services such as law enforcement and emergency responders because security, fire safety, and medical services would be provided by onsite Project staff trained to deal with minor incidents. In the event of an emergency or major incident; however, the Project would place additional demands on these services in the location of the emergency (at the Terminal Facilities or on the Pipeline System). CP2 LNG's ERP for the Terminal Facilities and CP Express' Emergency Action Plan provide the procedures that would be followed in the event of an emergency[79].

Overall, construction of the Project would have a minor temporary impact on available public services. Additionally, based on CP2 LNG and CP Express' commitment to supplement local fire department gaps by expanding internal training and aiding local fire departments, impacts on public services due to operation would not be significant. Additional discussion regarding public services and safety is presented in section 4.13.

4.10.7.3 Public Utilities

The Terminal Facilities would require electrical power, water, and sewer utilities. During construction at the Terminal Site and until the power plant is operational, electrical power would be provided by temporary generators and an existing temporary electrical utility line that was previously installed for Venture Global Calcasieu Pass, LLC's LNG Terminal. This line, which is adjacent to the floodwall on the western side of the CP2 LNG Terminal Site, would remain in place for use during construction. The temporary electric utility line ties into the Jeff Davis Electric Co-Op, Inc. electric distribution line along Marshall Street (SH 27). Once the Terminal's electrical generation facility is placed in service, all electric power required for the Terminal Facilities would be generated on site. Power for the Moss Lake Compressor Station would be provided by the local utility (Entergy Louisiana) via a new distribution line. The route for these non-jurisdictional electric transmission lines would be determined by the utility provider, who would be responsible for the construction thereof. Non-jurisdictional facilities associated with the Project are discussed further in section 1.5 and section 4.13.

BP Disposal, in Lake Charles, is a Construction and Demolition Debris/ Woodwaste landfill specializing in construction waste. Cameron Parish does not have any landfill sites, but does maintain dump sites in every community including one in Cameron, Creole, and Holly Beach. Along the pipeline

79 CP2 LNG's ERP can be viewed on FERC's eLibrary as Appendix 11B of accession no. 20211202-5104.

route, there are two landfill sites within 15 miles of the Moss Lake Compressor Station. Waste generated during construction of the Pipeline System would be contained and disposed at a local approved dump site. Where the HDD method is used, drilling fluid and cuttings would be pumped to an onsite recycling unit where the fluid would be processed for reuse. Excess drilling fluid (water and bentonite clay mixture) would be collected and used as a soil admixture for land farming in an upland area or disposed of at an appropriate licensed facility.

Cameron Parish operates the water and sewer district for the Terminal Facilities (Cameron Parish Water & Wastewater District 1). The Terminal Site's process and potable water requirements would be sourced from new groundwater wells and/or water withdrawals from the Calcasieu Pass and, therefore, would not place an increased demand on the Cameron Parish Water Works District's supply. Water required for HDDs on the Pipeline System would be pumped to the drill site through a hose or temporary network of irrigation-type piping or trucked in from another source.

During construction, CP2 LNG would install a temporary facility area including mobile offices with sanitary facilities at the Terminal Site. As site preparation proceeds, this temporary facility area would be expanded and an additional temporary facility would be added, which would also include sanitary facilities. Onsite holding tanks would be pumped out as necessary and the waste disposed of at licensed facilities.

The sanitary waste disposal system used for Terminal Facilities operations would likely involve a tie-in to the local wastewater treatment system. Contractor yards would be established along the Pipeline System, which would include temporary sanitation facilities. Onsite holding tanks would be pumped out as necessary and the waste disposed of at licensed facilities.

Although the Project would require public utilities as described above, CP2 LNG and CP Express would work with the relevant providers and authorities to ensure that Project requirements can be met. During operation, the Terminal Facilities' electrical power would be generated on site, but waste would continue to be disposed of at local licensed facilities. We conclude the Project requirements for public utilities would not have a significant adverse impact on the availability of public services in the study area.

4.10.8 Transportation

Several potential impacts on vehicular and marine traffic may result from the construction and operation of the Project. Potential impacts on vehicular traffic would generally be related to the influx of construction workers commuting to and from the Terminal Facilities and Pipeline System, as well as the transport of construction materials. Marine traffic impacts would result from the increase in large vessel movements in the Calcasieu Ship Channel during construction and operation of the Terminal Facilities.

Table 4.10.8-1 identifies the roadways that would provide primary access to the Project.

Table 4.10.8-1

Primary Roadway Access to the Project

Pipeline Facility/Aboveground Facility/Terminal Facility	State, Parish/County	Approximate Milepost	Primary Roadway for Site Access	Average Annual Daily Traffic (AADT) [a]	Daily Roadway Capacity [b]
Pipeline System					
CP Express Pipeline					
Transco & CJ Express Meter Station	Jasper County, TX	0.0	FM 105 Road	3,668 [c]	12,400

Table 4.10.8-1

Primary Roadway Access to the Project

Pipeline Facility/Aboveground Facility/Terminal Facility	State, Parish/County	Approximate Milepost	Primary Roadway for Site Access	Average Annual Daily Traffic (AADT) [a]	Daily Roadway Capacity [b]
MLV 2	Newton County, TX	14.9	SH 12	4,850 [c]	12,400
TETCO/Boardwalk Interconnect Meter Station	Newton County, TX	18.1	County Road 4213	272 [c]	10,600
Florida Gas Transmission (FGT) Interconnect Meter Station	Calcasieu Parish, LA	31.0	Highway 90	5,512	12,400
Moss Lake Compressor Station	Calcasieu Parish, LA	44.4	SH 27	4,331	16,500
			Ellis Moss Road	77	10,600
Kinder Morgan Meter Station	Calcasieu Parish, LA	44.6	Ellis Moss Road	77	10,600
MLV 5	Calcasieu Parish, LA	53.2	Big Lake Road	4,164	16,500
MLV 6	Cameron Parish, LA	72.7	Raymond Richard Road	30	10,600
Terminal Site Gas Gate Station (i.e., CPX Meter Station)	Cameron Parish, LA	85.4	Marshall Street	138	16,500
Spread 1 and West Road Contractor Yard	Calcasieu Parish, LA	N/A	I-10	64,239	64,500
			West Street / SR 3063	1,024	14,800
Spread 1, Johnny Breaux Yard and Vinton Canal Pipe Unloading Area	Calcasieu Parish, LA	N/A	Gum Cove Road / SR 108	1,259	12,400
Spread 2 and East Prien Lake Road Contractor and Pipe Yard	Calcasieu Parish, LA	N/A	SR 397	5,498	16,500
			East Prien Lake Road	2,299	12,400
Aboveground Facilities					
Enable Gulf Run Lateral					
Enable Receiver and MLV Site	Calcasieu Parish, LA	0.0 (MP 26.2 of CP Express Pipeline)	No. Seven Road	N/A [d]	N/A [d]
Enable Interconnect Meter Station	Calcasieu Parish, LA	6.0	SH 12	2,705	10,600
Terminal Facilities					
Terminal Facilities	Calcasieu and Cameron Parishes, LA	N/A	SH 27 (Near Davis Road)	2,651	16,500
			SH 27 (Near SH 1142)	6,341 [f]	16,500
			SH 1142	390	10,600
			Gayle Street	220	1,000 [e]
Park and Rides					
Helms Road P&R	Calcasieu Parish, LA	N/A	SH 27	807	16,500

Table 4.10.8-1 Primary Roadway Access to the Project					
Pipeline Facility/Aboveground Facility/Terminal Facility	**State, Parish/County**	**Approximate Milepost**	**Primary Roadway for Site Access**	**Average Annual Daily Traffic (AADT) [a]**	**Daily Roadway Capacity [b]**
Liberty P&R	Cameron Parish, LA	N/A	SH 27	2,651	16,500
PHI Yard P&R	Cameron Parish, LA	N/A	SH 27	6,341 [f]	16,500
			SH 1142	390	10,600
			Gayle Street	220	1,000 [e]

MLV = mainline valve

[a] Annual Average Daily Traffic (AADT) is the average number of vehicles on a roadway calculated by the LDOTD with the formula AADT = 24-hour Volume count x applicable month/day combination seasonal factor x applicable axle-correction factor
Source: LDOTD, 2022a

[b] Daily roadway capacity estimates are from the Highway Capacity Manual 6th Edition Generalized Daily Service Volume tables in Chapters 12 and 15 for basic freeway and multilane highway segments and two-lane highways respectively. Values for generalized calculations are derived from available LDOTD AADT information for the directional distribution and proportion of AADT traffic occurring within any given hour.

[c] Source: Texas Department of Transportation, 2023

[d] Not applicable – No reliable estimates for this roadway

[e] Two Lane Local Street Capacity.

[f] Traffic Study prepared for Venture Global CP2 LNG, LLC and Venture Global CP Express, LLC for the CP2 LNG Terminal Facilities & Moss Lake Compressor Station Cameron, Louisiana. Project No. 154786 3/10/2023 Burns & McDonnell Engineering Company, Inc.

4.10.8.1 Terminal Facilities

Roadway Transportation

The Terminal Site would be accessed by road from Lake Charles via SH 27 from either the east or the west, connecting to Davis Road. Access from the west requires a toll ferry crossing (Cameron Ferry) of the Calcasieu Ship Channel less than 2 miles from the Terminal Facilities. The Cameron Ferry's capacity is 50 cars and operates 24 hours per day, seven days per week and departs every 15 minutes (LDOTD, 2022b). Davis Road is a parish-maintained road that connects with SH 27 in Cameron and provides access to businesses along the Calcasieu Pass shoreline.

Project construction may result in temporary impacts on the ground transportation network in the study area through the movement of workers to and from construction areas and the delivery of construction material. The LDOTD characterizes SH 27 as rural road (LDOTD, 2022a). LDOTD annual average daily traffic (AADT) counts near the Terminal Site in 2022 was 2,651 on SH 27 at a location near Cameron (location ID 240121), approximately 0.3 mile north of the Terminal Site. The AADT count at this location for 2022 was 9 percent lower than the AADT count in 2021 (2,914 vehicles). Further, the AADT count in 2021 grew approximately 8 percent compared to 2020 (2,696), most likely because construction activities and work patterns were affected by COVID-19. LDOTD standards for arterials recommend considering widening four-lane rural arterials to six lanes when AADT counts regularly exceed 25,000 vehicles during peak hours. The current traffic counts are well below the threshold for road widening.

The construction workforce would generate new traffic around the Terminal Facilities. CP2 LNG has developed a Terminal Facilities Traffic Management Plan [80], which identifies anticipated construction traffic volumes (vehicular traffic) and describes plans for safely and effectively managing the construction volumes throughout the construction of the Terminal Facilities.

In addition to worker-related traffic, there would be an increase in heavy truck traffic as equipment and construction materials are brought to the Terminal Site via SH 27/82 and Davis Road. About 800 trucks per day are expected during the peak construction period (estimated mid-2024 to mid-2026). Outside of this major haul period, the anticipated truck deliveries would generally be about 100 trucks per day. Truck deliveries would be staged prior to being allowed to travel down Davis Road to the Northeast Access Road or the heavy haul road. Staging the trucks would limit the amount of construction-related traffic on Davis Road at a given time. CP2 LNG's Traffic Coordinator would schedule, coordinate, and manage the overall truck deliveries to the Terminal Site. Truck arrivals to the Terminal Site would be directed to a staging area, either at a P&R or a designated location on the Terminal Site.

During Terminal Facilities construction, CP2 LNG would designate three P&R locations to be used to reduce traffic volume and parking needs. The P&R locations would be at Helms Road, Davis Road, and SH 1142/Beach Road (Helms Road P&R, Liberty P&R, and PHI Yard P&R, respectively). The Liberty P&R abuts the Terminal site and would be used during all stages of construction. The Helms Road P&R is offsite in Calcasieu Parish about 22 miles northeast of the Terminal Site and would be utilized during Stages 3 and 4 of CP2 LNG Terminal construction. The PHI Yard P&R is offsite approximately 0.5 mile east of the Terminal Site and would only be used during peak workforce activities (Stage 4). Figures 4.10.8-1, 4.10.8-2, and 4.10.8-3 below show the locations of the Liberty, Helms Road, and PHI Yard P&Rs, respectively. Table 4.10.8-2 below summarizes the number of construction personnel per stage, parking and transportation information, and traffic mitigation measures.

Table 4.10.8-2
Traffic Management Plan- Summary by Construction Stage

	Stage 1	Stage 2	Stage 3	Stage 4
Number of Construction Personnel	1 to 600 (dayshift)	601 to 1,400 (dayshift)	1,401 to 2,400 (dayshift) 1 to 600 (nightshift)	2,401 to 4,800 (dayshift) 601 to 1,200 (nightshift)
Parking	Liberty P&R – 600 stalls	Liberty P&R – 700 stalls Helms Road P&R – 700 stalls	Liberty P&R – 700 stalls Helms Road P&R – 1,700 stalls	Terminal Site – 1,640 stalls Liberty P&R – 700 stalls Helms Road P&R – 2,000 stalls PHI Yard P&R – 360 stalls
Transportation	Shared ride as needed	Buses operating: Liberty P&R – 10 Helms Road P&R - 10	Buses operating: Liberty P&R – 10 Helms Road P&R – 25	Buses operating: Liberty P&R – 10 Helms Road P&R – 25 PHI Yard P&R - 5
Traffic Control	Monitor routes and intersections as needed	Monitor routes and intersections as needed	Flagger police vehicle(s) at various locations and times	Flagger police vehicle(s) or traffic signals at various locations and times

80 CP2 LNG's Traffic Management Plan can be viewed on FERC's eLibrary as Appendix B of accession no. 20230407-5100.

Table 4.10.8-2 Traffic Management Plan- Summary by Construction Stage				
	Stage 1	**Stage 2**	**Stage 3**	**Stage 4**
	None	5 a.m. – 8 a.m. 3 p.m. – 6 p.m.	5 a.m. – 8 a.m. 3 p.m. – 6 p.m.	5 a.m. – 9 a.m. 3 p.m. – 7 p.m.

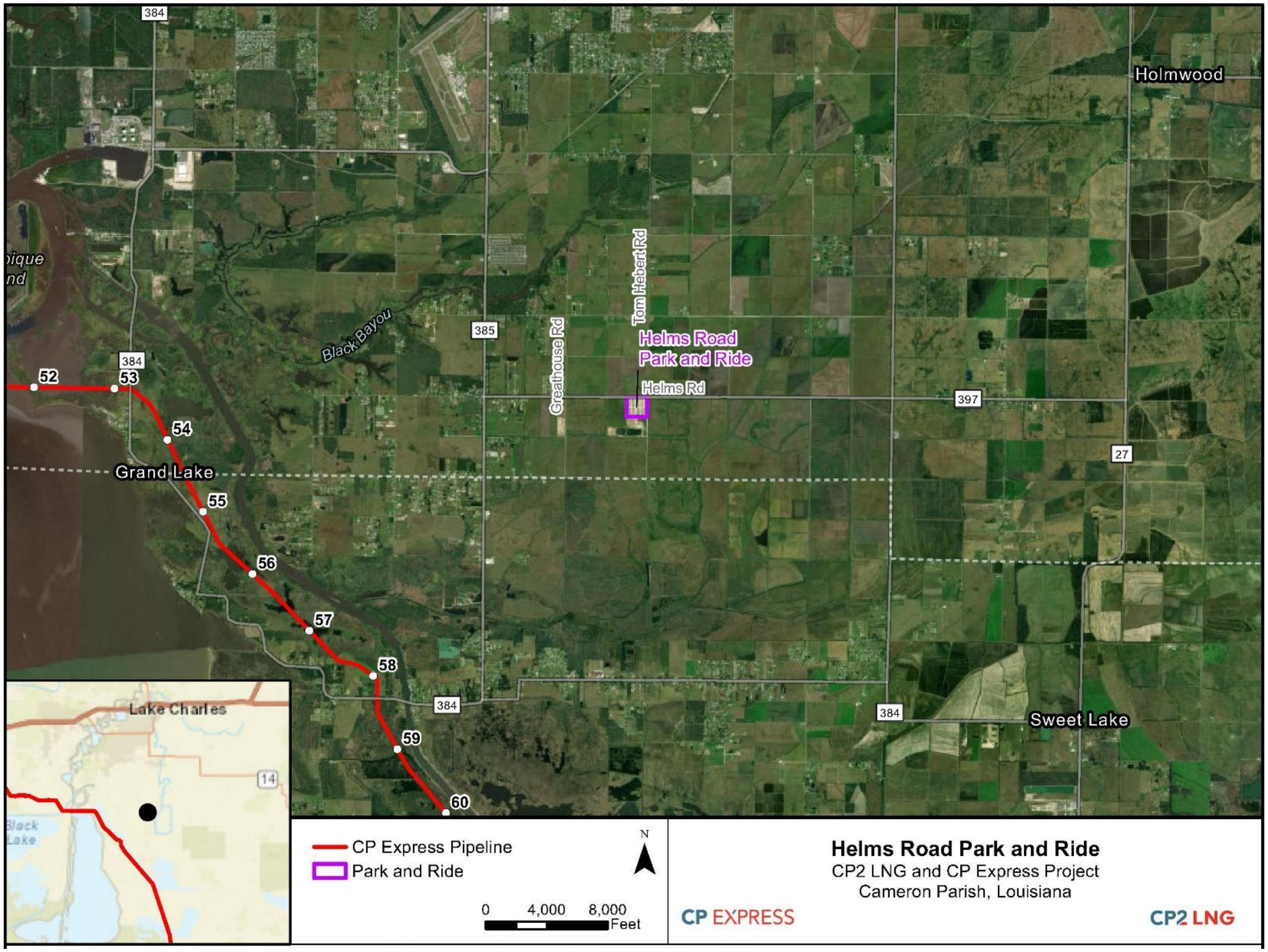

Figure 4.10.8-1 Helms Road P&R Location

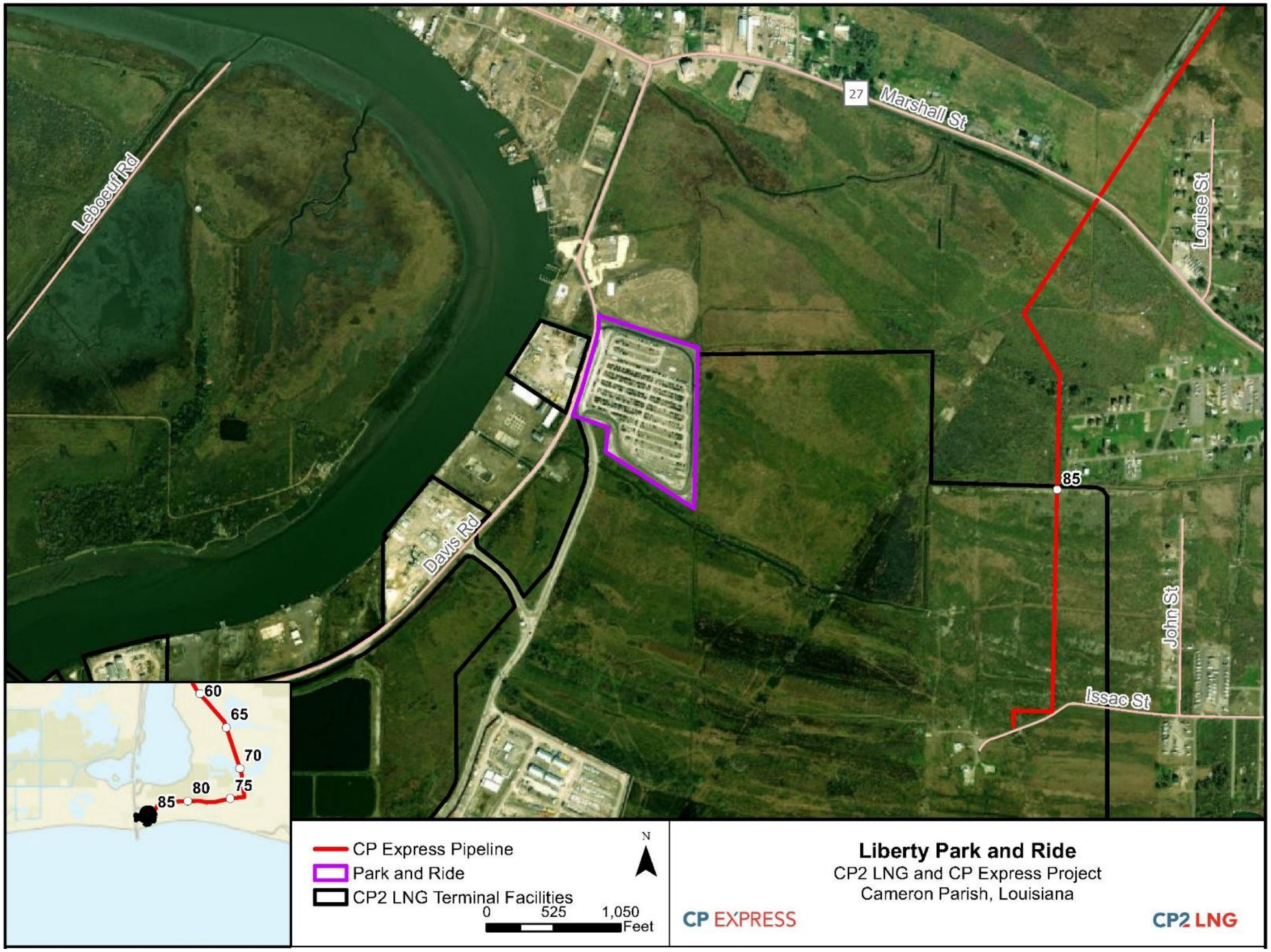

Figure 4.10.8-2 Liberty P&R Location

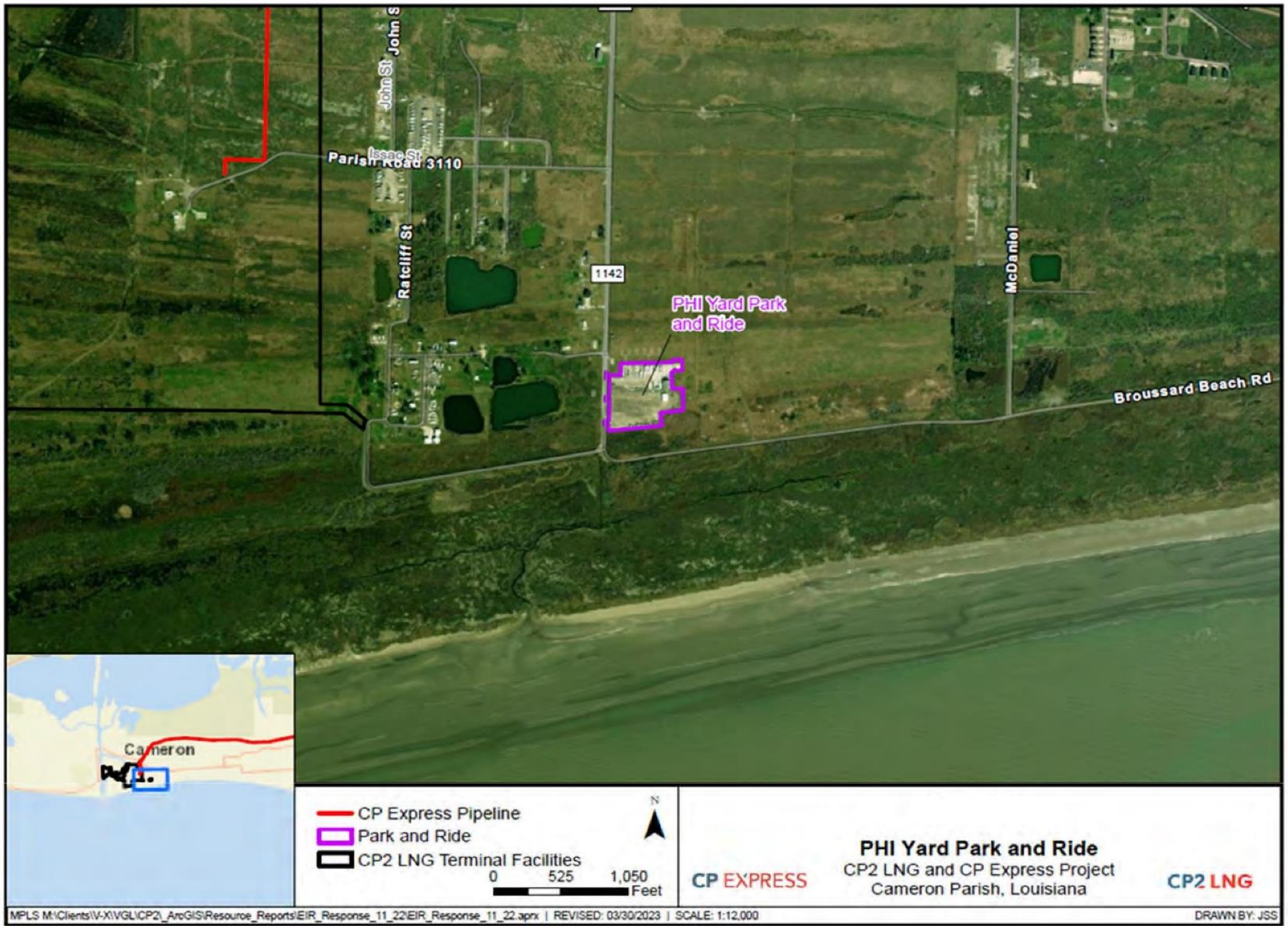

Figure 4.10.8-3 PHI Yard P&R Location

Use of each P&R location would be staged, depending on the number of workers on site, as detailed in table 4.10.8-2. Dayshift workers would be shuttled from the P&Rs to the Terminal Site using buses and vans. The total number of buses operating during each construction phase is detailed in table 4.10.8-2. Buses for workers would begin to operate at the P&R locations an hour before each shift and would end an hour after each shift, using staggered shift start times to avoid large peak traffic surges. Nightshift workers are planned to arrive and depart in a single hour and staggered start/departure times are not proposed. Nightshift workers would arrive and depart during offpeak traffic hours. Shift change between dayshift and nightshift workers is anticipated to be staggered such that dayshift and nightshift trips would not overlap.

SH-27 and Davis Road would provide access to the Liberty P&R and Terminal Site. The 2022 AADT count on SH-27 near Davis Road and nearest the Liberty P&R is 2,651 vehicles per day (LDOTD, 2022a). During Stage 1 of CP2 LNG Terminal construction, 600 parking stalls would be available at the Liberty P&R and 700 parking stalls would be available during Stage 2 through 4. During peak construction (Stage 4), 210 worker trips would be anticipated to and from the Liberty P&R. Additionally, CP2 LNG are proposing to construct the Northern Access Road during Stage 4 of construction, which would provide primary access between LA-27 and the CP2 LNG Terminal Site. The Northern Access Road would directly service the CP2 LNG Terminal Facilities. A total of 1,640 stalls would be available for on-site parking (approximately 344 worker trips during peak traffic hours).[81] Further, during the peak construction period (Stage 4), approximately 3,960 worker round trips and 1,600 heavy vehicle round trips per day would access the Terminal Site using SH 27 (Davis Road).[82] This would result in a daily volume/capacity ratio of 0.50 along SH-27 (Davis Road). Residents of Cameron may experience a short-term reduction in average speed and an increase in the time spent behind slower vehicles. These impacts would be more noticeable during peak construction activities and would diminish during operations when the traffic volume decreases. Additionally, a maximum of 700 nightshift workers would commute from the Liberty P&R to the Terminal Site during Stage 4 construction.

Helms Road (LA 27) would provide access to the Helms Road P&R. The most recent AADT count nearest the Helms Road P&R is 807 vehicles per day (LOTD, 2022a). During Stage 4 construction, a total of 600 worker trips to and from the Helms P&R are anticipated during peak traffic hours. Further, it is estimated that approximately 7,880 worker round trips and 1,600 heavy vehicle/truck round trips per day would utilize SH-27 (South of Helms Road). This would result in a daily volume/capacity ratio of 0.74 along LA 27 (South of Helms Road). Additionally, 500 nightshift workers would commute from the Helms Road P&R. CP2 LNG would install temporary signals with illumination, restriping, rumble strips, and a secondary entrance to the Helms P&R in effort to minimize traffic impacts during construction.

SH 27 and SH 1142/Beach Road would provide access the PHI Yard P&R. The 2022 AADT counts on SH-27 (near the intersection with SH 1142) nearest the PHI P&R is 6,341 vehicles per day[83]. During Stage 4 of CP2 LNG Terminal construction, 360 parking stalls would be available at the PHI Yard P&R and 108 worker trips to and from the PHI Yard P&R are anticipated during peak traffic hours. CP2 LNG proposes to construct the Southeastern Access Drive, which would extend from the PHI Yard P&R via Beach Road and Gayle Street. The Southeastern Access Drive would directly service buses from the

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81 The estimated number of worker trips for the Northern Access Road is derived from information provided in CP2 LNG's Traffic Study (accession no. 20230522-5195). The study states 70% of workers accessing the on-site parking areas through the proposed Northern Access Road. Further, the Traffic Study states 492 worker trips during peak hours of Stage 4 construction would be associated with future on-site parking.

82 This traffic count is inclusive of all Project facilities and P&Rs that would utilize SH 27 (Davis Road) to access the Project construction areas.

83 Based on information included in CP2 LNG's Terminal Facilities and Moss Lake Compressor Station Traffic Study. This document can be viewed on FERC's eLibrary as appendix A of accession no. 20230407-5100.

PHI Yard P&R (approximately 108 worker trips during peak hours) while also providing additional access to the Terminal Facilities on-site parking (approximately 148 trips during peak hours).[84]

The term LOS categorizes the estimated traffic flow along roads and highways from best (LOS A) to worst (LOS F). In response to our recommendation in the draft EIS, CP2 LNG completed a Traffic Study to assess impacts from construction vehicles, including deliveries and workers, on traffic within the Project area. Table 4.10.8-3 identifies the intersections analyzed in the Traffic Study in the vicinity of the Project, the existing LOS, predicted LOS per construction stage, and the predicted LOS with incorporation of recommended mitigation measures.

Table 4.10.8-3
Construction Traffic Impact Summary of Intersections in the Vicinity of the Project

Intersection (Closest Facility and/or P&R)	Existing Level of Service (LOS) A.M (P.M) [a]	Workforce Stage	Predicted LOS A.M (P.M) [b]	Predicted LOS with Mitigation A.M (P.M)
Two-Way Stop Controlled				
LA 27 & Ellis Moss Road (Moss Lake Compressor Station)	B (B)	1	B (B)	NA [d]
		2	B (B)	NA [d]
		3	B (B)	NA [d]
		4	B (B)	NA [d]
Helms Road & LA 385 (Gulf Highway) (Helms Road P&R)	B (C)	1	B (C)	NA [d]
		2	D (C)	NA [d]
		3	F (F)	A (B) [e]
		4	F (F)	A (B) [e]
Helms Road & Tom Hebert Road (Helms Road P&R)	A (A)	1	A (A)	NA [d]
		2	B (B)	NA [d]
		3	F (F)	B (A) [e]
		4	E (F) [f]	A (A) [e]
LA 27 & Helms Road (Helms Road P&R)	A (B)	1	B (B)	NA [d]
		2	B (C)	NA [d]
		3	B (C)	NA [d]
		4	E (F)	B (B) [e]
LA 27 & Marshall Street (PHI Yard P&R and Terminal Site)	A (A)	1	B (A)	NA [d]
		2	B (A)	NA [d]
		3	B (A)	NA [d]
		4	E (C)	A (A) [e]
LA 27 & LA 1142 (PHI Yard P&R and Terminal Site)	A (A)	1	A (B)	NA [d]
		2	B (B)	NA [d]
		3	B (B)	NA [d]
		4	D (D)	NA [d]
	A (A)	1	C (B) [g]	NA [d]

84 The estimated number of worker trips for the Southeastern Access Drive is derived from information provided in CP2 LNG's Traffic Study (accession no. 20230522-5195). The study states 30% arriving through the Southeastern Access Drive, accessible by Beach Road. Further, the Traffic Study states 492 worker trips during peak hours of Stage 4 construction would be associated with future on-site parking.

Table 4.10.8-3 Construction Traffic Impact Summary of Intersections in the Vicinity of the Project				
Intersection (Closest Facility and/or P&R)	**Existing Level of Service (LOS) A.M (P.M)** [a]	**Workforce Stage**	**Predicted LOS A.M (P.M)** [b]	**Predicted LOS with Mitigation A.M (P.M)**
LA 27 & Davis Road (Liberty P&R and Terminal Site)		2	B (B)	NA [d]
		3	B (B)	NA [d]
		4	B (B)	NA [d]
LA 27 & Northern Access Road (Terminal Site)	NA	4 [c]	A (C)	NA [d]
All-Way Stop Controlled (Flashing Red Signal Heads)				
LA 27, LA 82, & LA 1143 / LA 27 & E Creole Highway (PHI Yard P&R and Terminal Site)	A (A)	1	A (B)	NA [d]
		2	A (B)	NA [d]
		3	A (C)	NA [d]
		4	F (F)	A (B)
All-Way Stop Controlled				
Gayle Street/Southeastern Access Drive and LA 1142 (PHI Yard P&R and Terminal Site)	A (A)	4 [c]	A (A)	NA [d]

Source: CP2 LNG Terminal Facilities & Moss Lake Compressor Station – Traffic Study, accession number 20230522-5195
NA – not applicable
Note: LOS Criteria for Two-Way Stop Controlled and All-Way Stop Controlled intersections: A = average control delay of 0-10 seconds/per vehicle, B = average control delay of greater than 10-15 seconds/per vehicle, C = average control delay of greater than 15-25 seconds/per vehicle, D = average control delay of greater than 25-35 seconds/per vehicle, E = average control delay of greater than 35-50 seconds/per vehicle, and F = average control delay of greater than 50 seconds/per vehicle or volume to capacity ration greater than 1.0.

[a] Per Highway Capacity Manual Guidelines, no overall LOS is computed for intersections with free flow approaches. For presentation purposes, LOS values for Two-Way Stop Controlled intersections are presented as the worst-case scenario of the intersection approach legs as presented in table 5-1 of the Traffic Study.
[b] For presentation purposes, LOS values for Two-Way Stop Controlled intersections are presented as the worst-case scenario of the intersection approach legs as presented in tables 5-5, 5-6, 5-7, and 5-8 of the Traffic Study.
[c] The Northern Access Road and Southeastern Access Road would only be utilized during Stage 4 of construction.
[d] Per the Traffic Study conducted by CP2 LNG, mitigation measures and resulting predicted LOS were only evaluated for intersections with an unmitigated, predicted LOS D or worse (i.e., LOS E or F).
[e] The predicted LOS shown is the overall LOS presented in tables 6-3 and 6-4 of the Traffic Study, not the worst-case scenario of the intersection approach legs, as mitigation measures include signalized intersection control.
[f] The worst-case predicted LOS for Stage 4 of the Helms Road & Tom Hebert Road intersection is better than the worst-case predicted LOS for Stage 3 due to less worker trips from the Helms Road P&R expected during peak hours, despite a greater number of overall workers during Stage 4.
[g] Stage 1 construction predicts a worse LOS than subsequent Stages of construction, presumably based upon the assumption that workers would not carpool to and from the site during Stage 1.

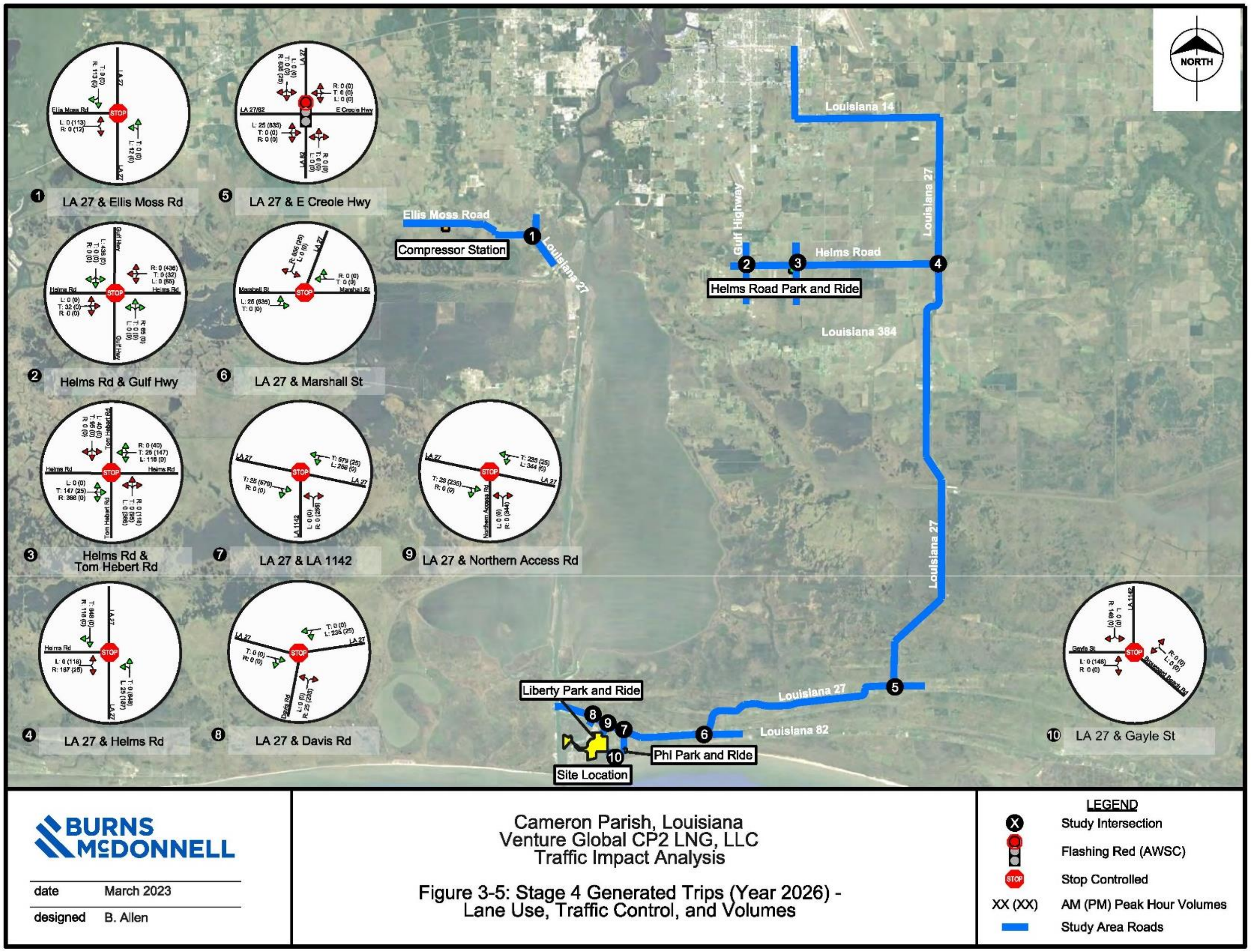

Figure 4.10.8-4 Intersections Analyzed in CP2 LNG and CP Express' Traffic Study

The existing peak capacity analyses conducted for the primary roads to be utilized for the Project show all are currently an LOS A or B during the peak morning hours and LOS A, B, or C during peak evening hours. CP2 LNG estimated in its Traffic Study that construction activities during Stages 1 and 2 would generally result in a change in LOS at the studied intersections, with the worst LOS designated as D at Helms Road & LA 385 (Gulf Highway). However, during Stages 3 and 4 construction activities, the LOS of roads in the Project area would further be impacted, with LOS ranging from A to F. During Stage 3, an LOS F would be experienced during peak morning and evening hours at the intersection of Helms Road and LA 385 and at the intersection of Helms Road and Tom Hebert Road. During Stage 4, an LOS of E or F would be experienced during peak morning and/or evening hours at the intersections of Helms Road and LA 385, Helms Road and Tom Hebert Road, LA 27 and Helms Road, LA 27 and Marshall Street, and LA 27 and East Creole Highway. These roads would also be nearing full capacity, with a volume/capacity ratio of 0.96 and 0.74 at LA 27 and LA 1142 and at LA 27 south of Helms Road, respectively.

Based on the findings in the Traffic Study, CP2 LNG would utilize additional traffic mitigation measures during Stages 3 and 4, including flagger police vehicles or traffic signals during times of heavy traffic, as presented in table 4.10.8-4 below. Mitigation measures are proposed for intersections or road segments that are both adjacent and not immediately adjacent to the Project areas. Additional considerations accounted for in the Traffic Study include implementing further flagger locations along LA 27 as deemed appropriate through coordination with CP2 LNG and the area school districts, as identified from acknowledgement of the surrounding schools' bus schedules and probable routes, which are likely to be active within the morning peak hour of construction employees' arrivals.

Table 4.10.8-4
Traffic Mitigation Measures Implemented During Terminal Facilities Construction

Workforce Stage	Location	Mitigation Measure
3	Helms Road and Tom Hebert Road Intersection	During 6 to 8 AM and 4 to 6 PM each day, implement flagger police vehicle(s).
3	Along school bus routes that utilize LA 27 and serve Bell City High School, Grand Lake High School, and South Cameron High School	Flagger police vehicle(s) as needed along LA 27 during peak morning and peak evening hours. Specific timing and location would be determined in coordination with the school districts.
3	Gulf Highway (LA 385) and Helms Road intersection	During 6 to 8 AM and 4 to 6 PM each day, implement flagger police vehicle(s).
4	LA 27 and Helms Road intersection	During 6 to 8 AM and 4 to 6 PM each day, implement flagger police vehicle(s). Alternate measure: implement traffic signal.
4	LA 27, LA 82, and LA 1143 intersection	
4	LA 27 and Marshall Street intersection	

Measures to reduce affects to local roadways from construction of the Terminal Facilities include flagging stations, warning signs, lights, and/or barriers, as appropriate. Additionally, CP2 LNG would coordinate with state and local agencies to develop a Logistics Plan, featuring detour routes, speed/load limits, and other use limitations, conditions, or restrictions on the roads proposed for use during construction. If roadways are damaged during construction of the Project, CP2 LNG, and/or its contractor, would repair or reconstruct the damaged roadway(s) to preconstruction condition. CP2 LNG would also implement staggered shift start and stop times during expected times of peak site personnel, which would reduce the number of vehicles operating simultaneously between the P&R and the Terminal Facilities. More information about the phased/staged traffic management approach is included in the Terminal

Facilities Traffic Management Plan.[85] In addition, material deliveries to the Terminal Site may cause speeds Facilities Traffic Management Plan, a Traffic Coordinator would schedule, coordinate, and manage the overall truck deliveries to the Terminal Site, including staging of deliveries for time slots throughout the day. These efforts would allow for minimization of impacts to the surrounding roadways resulting from Project deliveries.

As shown in table 4.10.8-3, CP2 LNG predicts the LOS of the roadways within the Project area would remain at an LOS D or better throughout construction, which would not result in a significant increase in traffic delays. With the implementation of the proposed measures to minimize impacts of traffic and the current traffic conditions along LA 27 we have determined that impacts from construction of the Terminal Facilities would have short-term and less than significant impacts on roadway transportation.

During operation, impacts on road traffic would be primarily limited to the 250 permanent Terminal Facilities employees, and periodic deliveries to the Terminal Site. The predicted peak capacity of roadways in the Project area during operations are modeled to have an LOS of C or better and a volume/capacity ration of 0.41 or better. Therefore, we have determined that operation of the Terminal Facilities would have permanent but minor impacts on roadway transportation.

Marine Transportation

We received comments from the public expressing concern over the additional LNG traffic that would be created during construction and operation of the Terminal Facilities. The Marine Facilities would include two LNG loading docks and a shared berthing area on Monkey Island, capable of receiving LNG carriers with volumetric capacities between 120,000 and 210,000 m^3. The Marine Facilities would be accessed via the Calcasieu Ship Channel, which connects the Gulf of Mexico to the Port of Lake Charles. The Calcasieu Ship Channel handles over 56 million tons of cargo annually (Port of Lake Charles, 2021). Traffic in the channel is expected to grow significantly over the next 10 years due to the expanded operations of existing terminals and the construction of various proposed facilities. Based on forecasted traffic levels in the Calcasieu Ship Channel for 2033, vessel traffic in the Calcasieu Ship Channel could reach 2,607 vessels which is more than double the predicted 2018 traffic levels (Port of Lake Charles, 2019).

During construction of the Terminal Facilities, materials (including piles), equipment, and modular plant components (including the liquefaction units) would be brought to the Terminal Facilities by barge. A typical delivery barge would be 250 feet long and 52 feet wide, carrying approximately 1,650 short tons per load. Bulk material carriers would be used for delivery of rock, structural fill, and cement. Some major material supplies and equipment would be delivered by barge via the docks at the yards along the eastern shoreline of Calcasieu Pass and via a new utility dock to be constructed on the eastern side of the Marine Facilities north of and immediately adjacent to the LNG transfer line easement. Barge deliveries would occur throughout the Project's 35-month construction period, with a higher number of deliveries expected to occur at the beginning of construction.

Marine deliveries during Project construction would utilize barges to deliver equipment and bulk material for site preparation. At the Phase 1 construction peak, 32 barges a week are anticipated. Based on the Calcasieu Shipping Channel's existing traffic patterns and capacity, the Project's additional deliveries are not expected to result in waterway congestion or significantly impact other waterway users such as fishermen and recreational users.

During Terminal Facilities operation and after completion of Phase 2, seven to eight LNG carrier visits are anticipated per week at the Marine Facilities. During normal operations, no other vessels are

85 CP2 LNG's Traffic Management Plan can be viewed on FERC's eLibrary as Appendix B of accession no. 20230407-5100.

expected to consistently call on the Terminal Facilities. In accordance with statutory requirements, pilots are required to be on board to control the navigation of all foreign flagged deep-draft vessels, including LNG carriers. As discussed above for commercial and recreational fishing (sections 4.10.4.1 and 4.10.5.2, respectively), during operations, LNG carriers in transit could impact vessels of other users within the Calcasieu Ship Channel because they would be required to give way while the LNG carrier passes. After the LNG carriers passes, other vessels could return and continue their prior activities.

As recorded in the Port of Lake Charles Calcasieu Ship Channel Traffic Study (2019), between 2006 and 2018, an average of 913.4 vessels per year called at terminals along the Calcasieu Shipping Channel. The same study modeled an increase in traffic due to increased operations by present users combined with new traffic from proposed terminals. The modeled increase in traffic is forecasted to reach a peak in 2026, with around 2,514 vessels coming through the channel annually. Even with the modeled increase in traffic, the capacity of the channel is still noted to be higher than the expected peak levels (Port of Lake Charles, 2019). Given the Terminal Facilities' proximity to the mouth of the Calcasieu River (about 1 mile), we conclude the increase in construction vessel traffic and the delays associated with LNG carrier transit are not expected to significantly impact marine transportation.

Additionally, CP2 LNG developed a Waterway Suitability Assessment for the Terminal Facilities, which constitutes the Project's Marine Traffic Management Plan. The Waterway Suitability Assessment was developed with support from the Coast Guard and Lake Charles Pilots' Association. The Preliminary Water Suitability Assessment was submitted to the Coast Guard on January 8, 2021. On December 17, 2021, the Coast Guard issued an LOR to the FERC recommending that the Calcasieu River Ship Channel be considered suitable in its current state for accommodating the type and frequency of LNG marine traffic associated with the Terminal Facilities. This recommendation was based on the Coast Guard's review of CP2 LNG's LOI and the Preliminary WSA, in addition to completion of an evaluation of the Ship Channel in consultation with state and local port stakeholders. Evaluation included a two-day, follow-up Waterway Suitability Assessment workshop to analyze the feasibility of the Project. Workshop participants included representatives from CP2 LNG, the Coast Guard, the Lake Charles Pilots Association, the Port of Lake Charles, and other relevant stakeholders.

4.10.8.2 Pipeline System

Access to the Pipeline System construction areas would be via the existing local road network, which consists of largely rural roads. During Pipeline System construction, approximately 140 vehicle trips per day per pipeline spread would be required, in addition to an expected 10 trips per day at MLV sites, 50 trips per day at each meter station, and 100 trips per day at the Moss Lake Compressor Station.

For the Pipeline System, construction employees would utilize public roads/highways and approved private access roads to maneuver crews and equipment to and from the right-of-way and contractor yards. An increase in traffic to local and state roads would be expected throughout the construction day. The temporary traffic would include light and heavy-duty trucks to transport construction workers and tractor-trailers hauling machinery and materials. Impacts are expected to be minor and temporary because construction spreads and personnel would be geographically dispersed and personnel would commute to and from work areas in early morning and late evening during nonpeak traffic hours. It is expected the largest impact on traffic would be vehicle trips to the Moss Lake Compressor Station. The Moss Lake Compressor Station would be accessed via Ellis Moss Road, which is an east-west rural connector roadway between Choupique Road and LA 27. The AADT for SH 27 near the Moss Lake Compressor Station is 4,331 vehicles, but the 2022 AADT of Ellis Moss Road is 77 vehicles. Moss Lake Compressor Station construction personnel would park onsite at the compressor station. Due to the number of vehicles accessing the site (i.e., approximately 100 vehicles per day during construction and 10 vehicles per day during operations), the additional traffic associated with construction and operation of the Moss

Lake Compressor Station would not significantly impact Ellis Moss Road traffic. Material deliveries may cause speeds to slightly decrease in the area of the compressor station as these delivery vehicles would need to slow and turn into the site. CP Express would obtain a Heavy Industrial Development Permit through the Calcasieu Parish Police Jury and access to the Moss Lake Compressor Station via Ellis Moss Road in addition to the design of the Moss Lake Compressor Station would be reviewed prior to issuance. CP Express would work with the Parish during permit review if the Parish determines further traffic mitigation measures are required. Additional measures to reduce affects to local roadways from construction of the Pipeline System include flagging stations, warning signs, lights, and/or barriers, as appropriate. Additionally, CP Express would coordinate with state and local agencies to develop a Logistics Plan, featuring detour routes, speed/load limits, and other use limitations, conditions, or restrictions on the roads proposed for use during construction. Further, if roadways are damaged during construction of the Project, CP Express would repair or reconstruct the damaged roadway(s) to preconstruction condition. CP Express prepared a Traffic Management Plan[86] for the Pipeline System, which is inclusive of measures such as staggered work shifts, utilization of P&Rs and buses for travel to construction workspaces, and the implementation of flaggers and/or traffic signals to avoid congestion. With the implementation of the proposed measures, we have determined that impacts from construction of the Pipeline System would result in temporary and moderate impacts on traffic and roadways.

During operation, impacts on road traffic would be primarily limited to the 10 permanent Pipeline System employees based at the Moss Lake Compressor Station, and periodic deliveries to aboveground facilities. Given the low number of operational personnel for the pipeline facilities, impacts on traffic or roadways resulting from operation of the Pipeline System would be negligible.

4.10.9 Property Values

We received several comments from individuals and the Niskanen Center, et. al. during the draft EIS comment period expressing concern regarding the Project's impacts on property values, as further discussed in the sections below. Potential impacts on the value of a tract of land depends on many factors, including size, the value of adjacent properties, the presence of other industrial facilities or pipelines, the current value of the land, and the extent of development and other aspects of current land use. A potential purchaser would make an offer to purchase based on his or her own values, which may or may not take the presence of the Terminal Facilities or Pipeline System into account.

There are several studies that assess the effects of natural gas pipeline compressor stations; however, most of these studies were produced or funded by the natural gas industry. As these studies were peer-reviewed, we will include their results here for informational purposes. The first study was prepared for the National Fuel Gas Supply Corporation and assesses the impacts on property values in 56 neighborhoods surrounding compressor stations in seven locations in New York (Griebner, 2015). Sales data over the previous 15 years was evaluated and assessors from six of the seven areas were interviewed. The study found no quantifiable evidence of a discernable effect on property values or appreciation rates of properties within 0.5 mile of compressor stations. The study, which notes the general lack of sales data for analysis, identified the following commonalities among the seven areas: the compressor stations were sited on large land parcels and set back from the road, and compressor station sites were generally in rural areas removed from higher density development. These characteristics are generally consistent with the location of the Moss Lake Compressor Station and Terminal Facilities (with the notable exception of the residences northwest of the Moss Lake Compressor Station and east of the Terminal Facilities).

The second study, "A Study of Natural Gas Compressor Stations and Residential Property Values", prepared for Tennessee Pipeline Company LLC, was based on four case studies in New Hampshire and

86 This document can be viewed in appendix 5B on the FERC eLibrary under accession no. 20211202-5104.

Massachusetts and compared the value of properties close to compressor stations to properties farther away. The study relied on available market data and interviews with town assessors, building department representatives, and other government representatives. The study concluded that the presence of a compressor station did not generally affect property values in the area. The study indicated a higher confidence in this conclusion for properties more than 0.5 mile from compressor stations. The reason for this is that the areas surrounding the compressor stations in each of the case studies were more rural in nature, and therefore there was a comparative lack of sales data in the immediate vicinity of the compressor stations as compared to the area 0.5 mile away. Overall, the study concluded that "well designed and operated compressor stations on larger sites with adequate buffers should have minimal impact on surrounding land uses and residential property values" (Foster, 2016).

A 2011 study analyzed sales data from approximately 1,000 residential properties in Arizona to test whether proximity to a natural gas pipeline affected real estate sales prices. The study compared sales prices for properties encumbered by or adjacent to a natural gas transmission pipeline with comparable properties not along a pipeline right-of-way. The study was unable to identify a systematic relationship between proximity to a pipeline and sales price or property values (Diskin et al., 2011).

4.10.9.1 Terminal Facilities

The proposed Terminal Site would be bordered by Davis Road and marine-based industrial facilities fringing Calcasieu Pass to the northwest; Cameron Wastewater Treatment Facilities and Venture Global Calcasieu Pass, LLC's LNG Terminal to the west; state land along the Gulf of Mexico shoreline to the south; and private open land historically used for cattle grazing to the south and east. A small rural residential area lies beyond the open land to the east.

Land values are determined by appraisals that take into account objective characteristics of the property such as size, location of homes in relation to jobs, schools, retail locations, transportation, recreational areas and any improvements. The value of a tract of land is related to many tract-specific variables, including the current value of the land, the utilities and services available or accessible, the current land use, and the values of the adjacent properties. The valuations generally do not consider subjective aspects such as the potential effect of a pipeline or an LNG terminal; however, there is limited data for the effect of LNG terminals on property value. To provide an analysis of the impacts of LNG terminals on property values, CP2 LNG provided additional analysis of nearby property values for three LNG terminals: Freeport LNG in Freeport, Texas; Golden Pass LNG in Port Arthur, Texas; and Sabine Pass LNG in Port Arthur, Texas. These projects were examined by comparing residential real estate sales before initial startup of export operations to recent residential real estate sales (i.e., 2021 to 2023).

Commercial operations at the Freeport LNG export terminal in Freeport, Texas occurred in early 2019 and in the preceding three month period during the fourth quarter of 2018, the median price of residential property (single family homes and manufactured/mobile homes) in Freeport, Texas was $33,076. By comparison, the median price for similar residential property in Freeport in the first quarter of 2023 was $131,000. Commercial operations at the Golden Pass LNG import terminal occurred in October 2010 and in the first quarter of 2010, the median residential property price (single family homes and manufactured/mobile homes) in Port Arthur, Texas was $38,250. In the first quarter of 2011, the median price of residential real estate was $71,179 (ATTOM, 2023). In the first quarter of 2022, 11 years after the Golden Pass LNG terminal went online and following the impacts of Hurricane Harvey in 2017, the median residential property price (single family homes and manufactured/mobile home) in Port Arthur, Texas was $48,527 (ATTOM, 2023). Commercial operations at the Sabine Pass LNG import terminal occurred in February 2016. In the last quarter of 2015, the median residential property price (single family homes and manufactured/mobile homes) in Port Arthur, Texas was $55,000. In the last quarter of 2016, the median price of residential real estate was $19,641, demonstrating a property value decrease since startup of the import operations at the LNG terminal (ATTOM, 2023). In the last quarter of 2022, following the terminal going online and the impacts of Hurricane Harvey in 2017, the median residential property price (single family homes and manufactured/mobile homes) in Port Arthur, Texas was $49,393 (ATTOM, 2023).

We recognize that the property value comparisons above are not holistic of potential impacts on property values and all the LNG terminal comparisons cited do not have a direct applicability to the entire Project, given the location of the terminals compared to the Project. Further, the peer-reviewed studies cited above in section 4.10.9 do not have a direct applicability to the entire Project, given the location of the studies compared to the Project and that none of the studies were for LNG facilities. The studies considered compressor stations that are generally in rural areas with a mix of residential and industrial/commercial property. However, we are not aware of any studies that would provide a more direct comparison to the Project. The proposed Terminal Site is substantially larger than a compressor station, with most residential structures more than 2 miles from the site. However, there are residences within 0.5 mile of the Terminal Facilities, with the closest residence 330 feet north of the Terminal Facilities from the floodwall.

According to CP2 LNG's review of publicly available information and consultation with local planning offices, there are no planned residential developments or subdivisions within a one-mile radius of the Project, including the Terminal Facilities.

The Terminal Facilities would be set within the partly industrialized landscape surrounding the site, including the adjacent LNG Terminal that is under construction and the marine facilities along the Calcasieu Ship Channel and Calcasieu Pass. The closest existing residence is approximately 330 feet east of the Terminal Site. We acknowledge that it is reasonable to expect that property values may be impacted differently based on the setting and inherent characteristics of each property. However, we find no conclusive evidence indicating that the Project would have a significant negative impact on property values.

4.10.9.2 Pipeline System

The Pipeline System includes the CP Express Pipeline, Enable Gulf Run Lateral, Moss Lake Compressor Station, five meter stations, and a gas regulating station. Impacts from the gas regulating station are discussed above, as it would be within the boundaries of the Terminal Site. The remaining aboveground facilities would be constructed on open land, agricultural land, and barren land.

The Pipeline System crosses primarily undeveloped or rural residential portions of eastern Texas and Louisiana. Nine structures would be within 50 feet of the construction work area; however, only four of those structures are residential, of which two would be within 25 feet of the Project workspace. These two residences within 25 feet are within 25 feet of existing access roads only that are proposed for use without modification. The Pipeline System is not expected to have more than negligible effects on property values in the region. The MLV sites would create a minor visual disturbance due to their relatively small size. The Moss Lake Compressor Station and Kinder Morgan Meter Station are in a sparsely populated area. Given the proximity of nearby residences and open landscape surrounding the Moss Lake Compressor Station and the Kinder Morgan Meter Station, CP Express filed a visual screening plan based on our recommendation in the draft EIS and have committed to planting native Carolina cherry laurel trees and native groundsel bushes along the northern and northwestern sides of the facility (section 4.9.5.2). CP Express would compensate the landowners for new easements at the aboveground facilities, as well as the temporary loss of land use associated with construction workspaces and any damages. The easement acquisition process is designed to provide fair compensation to the landowner for the right to use the property for facility construction and operation. Although not anticipated due to the rural and sparsely-populated land in the vicinity of the Pipeline System, affected landowners who believe that their property values have been negatively affected could appeal to the local tax agency for reappraisal and potential reduction of taxes. Construction and operation of the Pipeline System would not change the general use of the land, but would preclude the construction of aboveground structures within the permanent easements.

CP Express states that it has secured agreements for 94 percent of the aboveground facilities as of June 2022. In response to our recommendation in the draft EIS, CP Express stated negotiations with landowners are ongoing for the Transco & CJ Express Meter Station/MLV 1, MLV 2, Florida Gas Transmission Meter Station, Kinder Morgan Meter Station, and the Enable Meter Station/MLV E2. Although landowner agreements are not yet secured for these facilities, customary negotiation, due diligence, and documentation processes are underway. CP Express states it anticipates that purchase/lease agreements will be secured for all aboveground facility tracts through voluntary agreement without the need to utilize eminent domain authority. Further, no comments have been received from landowners of the proposed sites recommending any alternatives.

As discussed above for the Terminal Facilities, we acknowledge that it is reasonable to expect that property values may be impacted differently based on the setting and inherent characteristics of each property. However, we find no conclusive evidence indicating that the Project would have a significant negative impact on property values.

4.10.10 Environmental Justice

According to the EPA, "Environmental Justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies." Fair treatment means that no group of people should bear a disproportionate share of the negative environmental consequences resulting from industrial, governmental, and commercial operations or policies (EPA, 2021e). Meaningful involvement means:

1. people have an opportunity to participate in decisions about activities that may affect their environment and/or health;

2. the public's contributions can influence the regulatory agency's decision;

3. community concerns will be considered in the decision-making process; and

4. decision makers will seek out and facilitate the involvement of those potentially affected (EPA, 2021e).

In conducting NEPA reviews of proposed natural gas projects, the Commission follows the instruction of Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations*, which directs federal agencies to identify and address "disproportionately high and adverse human health or environmental effects" of their actions on minority and low-income populations (i.e., environmental justice communities).[87] Executive Order 14008, *Tackling the Climate Crisis at Home and Abroad*, also directs agencies to develop "programs, policies, and activities to address the disproportionately high and adverse human health, environmental, climate-related and other cumulative impacts on disadvantaged communities, as well as the accompanying economic challenges of such impacts."[88] The term "environmental justice community" includes disadvantaged communities that

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87 Exec. Order No. 12,898, 59 Federal Register 7629, at 7629, 7632 (Feb. 11, 1994).

88 Exec. Order No. 14,008, 86 Federal Register 7619, at 7629 (Jan. 27, 2021).

have been historically marginalized and overburdened by pollution.[89] Environmental justice communities include, but may not be limited to minority populations, low-income populations, or indigenous peoples.[90]

Commission staff used EPA's Federal Interagency Working Group on Environmental Justice and NEPA Committee's publication, *Promising Practices for Environmental Justice Methodologies in NEPA Reviews* (*Promising Practices*) (EPA, 2016), which provides methodologies for conducting environmental justice analyses throughout the NEPA process, for this Project. Commission staff's use of these methodologies is described throughout this section.

Commission staff also used EJScreen 2.1 as an initial step to gather information regarding minority and/or low-income populations; potential environmental quality issues; environmental and demographic indicators; and other important factors. EPA recommends that screening tools, such as EJScreen 2.1, be used for a "screening-level" look and a useful first step in understanding or highlighting locations that may require further review.

4.10.10.1 Meaningful Engagement and Public Involvement

The CEQ Environmental Justice Guidance Under the National Environmental Policy Act *(CEQ Environmental Justice Guidance)* (CEQ, 1997) and *Promising Practices* recommend that federal agencies provide opportunities for effective community participation in the NEPA process, including identifying potential effects and mitigation measures in consultation with affected communities and improving the accessibility of public meetings, crucial documents, and notices.[91] They also recommend using adaptive approaches to overcome linguistic, institutional, cultural, economic, historical, or other potential barriers to effective participation in the decision-making processes of federal agencies. In addition, Section 8 of Executive Order 13985, *Advancing Racial Equity and Support for Underserved Communities Through the Federal Government*, strongly encourages independent agencies to "consult with members of communities that have been historically underrepresented in the Federal Government and underserved by, or subject to discrimination in, federal policies and programs."

As discussed in section 1.3 of this EIS, there have been many opportunities for public involvement during the Commission's environmental review process. On January 21, 2021, CP2 LNG and CP Express filed a request to use our pre-filing review process for the CP2 LNG and CP Express Project. We approved CP2 LNG and CP Express' request on February 17, 2021 and established pre-filing docket number PF21-1-000 for the Project. Information and documents filed by CP2 LNG and CP Express for the Project, as well as related documents, were placed into the public record.[92] During the pre-filing process, we worked with CP2 LNG and CP Express and stakeholders to identify and resolve issues, where possible, prior to CP2 LNG and CP Express' filings of a formal application with FERC.

We participated in three virtual open houses sponsored by CP2 LNG and CP Express in April 2021 to explain our environmental review process to interested stakeholders. On April 27, 2021, we issued a *Notice of Scoping Period for the Planned CP2 LNG and CP Express Project, Request for Comments on*

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[89] *Id*.

[90] See EPA, *EJ 2020 Glossary* (Aug. 18, 2022), https://www.epa.gov/environmentaljustice/ej-2020-glossary.

[91] CEQ, *Environmental Justice: Guidance Under the National Environmental Policy Act*, 4 (Dec. 1997) (CEQ's *Environmental Justice Guidance*), https://www.energy.gov/sites/default/files/nepapub/nepa_documents/RedDont/G-CEQ-EJGuidance.pdf.

[92] The pre-filing review process provides opportunities for interested stakeholders to become involved early in project planning, facilitates interagency cooperation, and assists in the identification and early resolution of issues, prior to a formal application being filed with the FERC.

Environmental Issues, and Notice of Public Virtual Scoping Sessions.[93] In addition, we conducted three virtual public scoping sessions to provide an opportunity for agencies and the general public to learn more about the Project and to participate in the environmental analysis by identifying issues to be addressed in the EIS. The virtual sessions were held via phone between May 11 to 13, 2021.

On December 16, 2021, the FERC issued a Notice of Application announcing that CP2 LNG and CP Express filed their application with the FERC. On February 9, 2022, the FERC issued a *Notice of Intent to Prepare an Environmental Impact Statement for the Proposed CP2 LNG and CP Express Project, Request for Comments on Environmental Issues, and Schedule for Environmental Review*).[94]

All documents that form the administrative record for these proceedings are available to the public electronically through the internet on the FERC website (www.ferc.gov). Anyone may comment to FERC about the Project, either in writing or electronically. All substantive environmental comments received prior to issuance of this EIS have been addressed within this document.

In 2021, the Commission established the Office of Public Participation to support meaningful public engagement and participation in Commission proceedings. The Office of Public Participation provides members of the public, including environmental justice communities, with assistance in FERC proceedings—including navigating Commission processes and activities relating to the Project. For assistance with interventions, comments, requests for rehearing, or other filings, and for information about any applicable deadlines for such filings, members of the public are encouraged to contact the Office of Public Participation directly at 202-502-6592 or OPP@ferc.gov for further information.

We recognize that not everyone has internet access or is capable of filing electronic comments. For this reason, each notice was physically mailed to all parties (i.e., landowners and abutters, federal, state, and local government representatives and agencies; local libraries; newspapers; elected officials; Native American Tribes; and other interested parties) on the environmental mailing list. In addition, CP2 LNG and CP Express sent copies of its application in hard copy and/or digital format to local libraries in the Project area. Further, Commission staff has consistently emphasized in public notices and scoping sessions that all comments, whether spoken or delivered in person at meetings, mailed in, or submitted electronically, receive equal weight by FERC staff for consideration in the EIS.

In addition to the notices that FERC mailed to landowners and other stakeholders throughout the environmental review process, CP2 LNG and CP Express' outreach efforts have included: Project mailings; hosting multiple open houses throughout the Project area; meetings with community leaders, elected officials, landowners and other stakeholders; sponsoring scholarships and other educational initiatives for the local community; funding a wide variety of cultural and community events; and engaging in a door-to-door home visit campaign within areas identified as environmental justice communities, as further described below.

CP2 LNG and CP Express initiated a public and stakeholder outreach program in January 2021 to enhance the involvement of potential stakeholders in the Project area. The Project-wide outreach program included: open house announcement and schedule, which was mailed to affected parties, including all

93 The NOS was mailed and/or emailed to approximately 2,700 entities, including affected landowners (as defined in the Commission's regulations); federal, state, and local officials; Native American Tribes; agency representatives; environmental and public interest groups; and local libraries and newspapers.

94 The *Notice of Intent to Prepare an Environmental Impact Statement for the Proposed CP2 LNG and CP Express Project, Request for Comments on Environmental Issues, and Schedule for Environmental Review* was published in the FR and sent to 2,700 parties, including federal, state, and local agencies; elected officials; environmental and public interest groups; Native American Tribes; potentially affected landowners; local libraries and newspapers; and other stakeholders who had indicated an interest in the Project.

affected landowners and other municipality and county leaders; designation of a point of contact for stakeholder contacts; a Project toll-free telephone number for public inquiries; and a Project website with periodic updates of relevant information.[95]

CP2 LNG and CP Express initiated targeted outreach in 12 identified environmental justice census block groups (block groups) through mailing of a supplemental Project update letter during the week of June 6, 2022. All landowners within the block groups were mailed a copy of the letter, which included an overview map of the Project and contact information (cell phone numbers and emails) for individuals on the Project team who could answer questions and provide additional information. To ensure accommodation of any potential non-English speaking residents and landowners, CP2 LNG and CP Express included both an English and Spanish version of the letter in all mailings.

Approximately two weeks after mailing the Project letters, CP2 LNG and CP Express commenced a door knocking effort to meet with residents in-person within 12 identified environmental justice block groups[96]. The door knocking outreach started in Cameron Parish in June 2022. In July 2022, CP2 LNG and CP Express continued the outreach efforts in in Calcasieu Parish. On August 10, 2022, CP2 LNG and CP Express began door knocking in Newton County and completed the effort during the week of October 10, 2022. During the same week in October, additional block groups in Calcasieu Parish were visited by the Project team. The door knocking effort was completed in the final attempted block group in Calcasieu Parish on October 20, 2022. Members of the Project team went door-to-door in the environmental justice block groups to introduce themselves and provide more information on the Project. During conversations with residents, CP2 LNG and CP Express state the Project team also asked individuals for feedback or concerns and provided a twelve-page informational Project brochure[97]. Across the 12 identified environmental block groups, CP2 LNG and CP Express identified 546 permanent residences in effort to receive feedback on the Project and to address any questions or concerns.

Of the 546 permanent residences identified within environmental justice block groups identified, CP2 LNG and CP Express' door knocking efforts resulted in approximately 200 interactions with residents. The twelve-page Project brochures were left at homes where the Project team was unable to speak with residents (i.e., at homes where no one answered the door).

CP2 LNG and CP Express state they started a second round of door knocking efforts in environmental justice communities. During two weeks in June 2023, five previously visited block groups[98] were revisited by the Project team, resulting in approximately 100 in-person conversations with residents and over 300 Project brochures were left at homes where the Project team was unable to speak with residents.

As a part of Project planning, CP2 LNG and CP Express state they are communicating frequently with a Project-specific Community Action Group in the town of Cameron. CP2 LNG and CP Express state the group members participate on a voluntary basis and include local business owners, residents, landowners, and public officials who offer broad community representation and provide valuable feedback. The group meetings provide a forum through which CP2 LNG and CP Express state they can tailor their

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95 Public inquires can be made directly to CP2 LNG and CP Express by calling the Project toll-free phone number – (800) 514-0833. The Project website can be viewed at http://ventureglobalIng.com.

96 The environmental justice block groups visited from June through October 2022 are available in the CP2 LNG and CP Express EJ Outreach Summary table provided in Attachment 2 of accession number 20221101-5147.

97 CP2 LNG and CP Express' Informational Project Brochure can be viewed as Attachment 2 of accession number 20221101-5147.

98 Census Tract (CT) 9504.00, Block Group (BG) 1 in Newton County; CT 34.00, BG 1 in Calcasieu Parish; and CT 9701.01, BG 2; CT 9702.02, BG 2; and CT 9701.02, BG 1 in Cameron Parish.

project development to accommodate local needs and foster a mutually beneficial relationship between the existing Cameron community and CP2 LNG and CP Express.

Following a similar approach to that described above for the town of Cameron, and focusing primarily on local communities that would be crossed by the Pipeline System, CP2 LNG and CP Express have conducted and have stated they would continue to conduct routine outreach visits every 6 to 8 weeks with elected officials, appointed officials, community leaders, landowners, and other stakeholders in Jasper County, Newton County, Calcasieu Parish, and Cameron Parish. Since the Project's pre-filing acceptance in January 2021, CP2 LNG and CP Express have conducted more than 100 meetings with stakeholders throughout these locations. Venture Global LNG also maintains a 24-hour hotline (1-800-514-0833) for residents and stakeholders to call and provide feedback, thoughts, and concerns.

Between January and October 2022, CP2 LNG and CP Express staff held 63 meetings with Project stakeholders and elected officials in the Project area, including discussions with organizations and/or representatives within environmental justice communities, port authorities, parish police juries, and county commissioners. The meetings presented Project updates, introduced staff, and facilitated discussions on the Project and community needs. CP2 LNG and CP Express state that future Project mailings would include a statement in Spanish that stakeholders may reach out to the Project team if they require information be provided in Spanish.[99] CP2 LNG and CP Express also state that the statement would include specific email(s) and/or phone number(s) of individuals that stakeholders can contact to make a request for more information. If individuals are identified during outreach efforts who need Project-related communications provided in a language other than English, CP2 LNG and CP Express state they would accommodate the request(s) to the extent possible.

We received environmental justice-related comments from the EPA during scoping. The EPA recommended that Commission staff facilitate a means for the public at large to review FERC's federal Projects that have potential adverse impacts on its populations (this is addressed above in this section and section 1.3). The EPA also recommended the Commission Staff incorporate a map in the EIS depicting the locations and alignments of all proposed projects directly, indirectly, and cumulatively impacting the minority and low income populations in Cameron and Calcasieu Parishes, Louisiana (see section 4.14). The EPA also commented that the EIS should include an explanation on how the proposed Project would not adversely impact minority and low-income communities and/or populations residing outside and adjacent to the Project area (see discussion in section 4.10.10.2). The EPA also recommended that with regards to induced flooding and eminent domain, the Commission Staff, CP2 LNG, CP Express, and local governments implement equitable treatment of minority and low-income populations adversely impacted by the Project, within and adjacent/outside the Project area (see discussion in section 4.10.10.3). With regard to eminent domain, any eminent domain power conferred to CP Express under the NGA "requires the company to go through the usual condemnation process, which calls for an order of condemnation and a trial determining just compensation prior to the taking of private property." Further, "if and when the company acquires a right of way through any [landowner's] land, the landowner will be entitled to just compensation, as established in a hearing that itself affords due process." Compensation would be determined by a local court in Louisiana, consistent with state law. Eminent domain is not applicable to the NGA section 3 NGA facilities proposed herein. The EPA further recommends FERC incorporate a discussion in the EIS regarding how the proposed Project construction would alter the contour of the land and the long-term effect on the surrounding area as it relates to seasonal storms, hurricanes, livelihoods, community resiliency, etc. (this is discussed in sections 4.2.3, 4.10, and 4.13).

In response to the draft EIS, we received additional comments from the EPA, and multiple NGOs and individuals, concerned with the impacts of the Project on environmental justice communities. Project

99 Populations of limited English speakers in the block groups within the study area range from 0 to 7.3 percent.

impacts and mitigation on environmental justice communities are discussed throughout this section. Additionally, copies of all unique comments received are included in our comment responses contained in appendix N.

4.10.10.2 Identification of Environmental Justice Communities

According to the CEQ's *Environmental Justice Guidance Under the National Environmental Policy Act* and *Promising Practices*, minority populations are those groups that include: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic. Following the recommendations set forth in *Promising Practices*, FERC uses the **50 percent** and the **meaningfully greater analysis** methods to identify minority populations. Using this methodology, minority populations are defined in this EIS where either: (a) the aggregate minority population of the block groups in the affected area exceeds 50 percent; or (b) the aggregate minority population in the block group affected is 10 percent higher than the aggregate minority population percentage in the county/parish. The guidance also directs low-income populations to be identified based on the annual statistical poverty thresholds from the U.S. Census Bureau. Using *Promising Practices*' **low-income threshold criteria** method, low-income populations are identified as block groups where the percent of low-income population in the identified block group is equal to or greater than that of the county/parish. Here, Commission staff selected Jasper and Newton Counties, Texas and Calcasieu and Cameron Parishes, Louisiana as the comparable reference community to ensure that affected environmental justice communities are properly identified. A reference community may vary according to the characteristics of the particular project and the surrounding communities.

According to the current U.S. Census Bureau information, minority and low-income populations exist within the Project area, as discussed further below. Table 4.10.10-1 identifies the minority populations by race and ethnicity and low-income populations within the states, counties and parishes, and block groups[100] crossed by the CP Express Pipeline and Enable Gulf Run Lateral, and within 1 mile of the proposed Pipeline System aboveground facilities and 15 miles of Terminal Facilities. We have determined that a 1-mile radius around the proposed Pipeline System aboveground facilities (inclusive of contractor yards and P&R locations) and a 15-mile radius around the proposed Terminal Facilities are the appropriate units of geographic analysis for assessing impacts for this Project on environmental justice communities. As stated, 15 miles for the Terminal Facilities represents the furthest extent of impacts on environmental justice communities (operational air quality) and the 1-mile radius around the Pipeline System aboveground facilities is sufficiently broad considering the likely concentration of construction activities, air quality, noise, visual, and traffic impacts associated with these locations.[101] To ensure we are using the most recent available data, we use 2020 U.S. Census American Community Survey File# B03002 for the race and ethnicity data and Survey File# B17017 for poverty data at the census block group level. Figures 4.10.10-1 through 4.10.10-4 provide a geographic representation of identified environmental justice communities relative to the location of the Project.

As presented in table 4.10.10-1, 17 block groups out of 31 block groups within the geographic scope of the Project are environmental justice communities. Of the 17 block groups, five block groups[102]

[100] Census block groups are statistical divisions of census tracts that generally contain between 600 and 3,000 people (U.S. Census Bureau, 2022).

[101] Operation of the Project would contribute to the cumulative nitrogen dioxide (NO_2) 1-hour relevant significant impact level exceedance at various locations out to about 15 miles from the Terminal Facilities. Fifteen miles and represents the further extent of impacts on environmental justice communities for the Terminal Facilities. Operation of the Moss Lake Compressor Station would not contribute to cumulative relevant significant impact level exceedances. Therefore, 1 mile would be a sufficient extent of impacts on environmental justice communities for the Pipeline System.

[102] Census Tract (CT) 35, Block Group (BG) 1; CT 9701.01, BG 1; CT 9701.02, BG 1; CT 16, BG 3; and CT 17, BG 4

within the Project's area of review are identified as environmental justice communities based on the minority population that either exceeds 50 percent or is meaningfully greater than their respective counties/parishes. Eight block groups[103] within the Project's area of review are identified as environmental justice communities based on a low-income population that is equal to or greater than their respective counties/parishes. Four block groups[104]within the Project's area of review have both minority and low-income populations that are equal to or greater than their respective counties/parishes.

For the Terminal Facilities, six block groups (two based on the minority threshold alone [Census Tract {CT} 9701.02, Block Group {BG} 1 and CT 9701.01, BG 1] three based on the low-income threshold alone [CT 9702.02, BG 2; CT 9701.01, BG 2; CT 9702.03, BG 2] and one based on both the minority and low-income thresholds [CT 9702.03, BG 1]) out of eight are considered environmental justice block groups. For the CP Express Pipeline and Enable Gulf Run Lateral, six block groups (one based on the minority threshold alone [CT 9701.02, BG 1] and five based on the low-income threshold alone [CT 9701.01, BG 2; CT 9702.02, BG 2; CT 34, BG 1; CT 9504, BG 1; CT 36.02, BG 1]) out of 15 are considered environmental justice block groups. For the contractor yards, six of the block groups (three based on the low-income threshold alone [CT 34, BG 1; CT 35, BG 2; and CT 35, BG 4], two based on the minority threshold alone [CT 16, BG 3 and CT 17, BG 4], and one based on both the minority and low-income thresholds [CT 16, BG 1]) out of 11 are considered environmental justice block groups.[105]. The Moss Lake Compressor Station is within one mile of only one block group (CT 32, BG 2), which is not considered an environmental justice community. For the meter stations, three block groups (one based on the minority threshold alone [CT 35, BG 1] and two based on the low-income threshold alone [CT 9702.02, BG 2 and CT 36.02, BG 1) out of eight are considered environmental justice block groups.[106] For the three P&R locations, all four of the block groups (one based on the low-income threshold alone [CT 9702.02, BG 2], one based on the minority threshold alone [CT 9701.01, BG 1], and two based on both the minority and low-income thresholds [CT 17, BG 5 and CT 17, BG 6]) are considered environmental justice block groups.[107] Potential impacts on these communities from the Project are further discussed below.

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[103] CT 34, BG 1; CT 36.02, BG 1; CT 9504, BG 1; CT 9701.01, BG 2; CT 9702.02, BG 2; CT 9702.03, BG 2; CT 35, BG 2; and CT 35, BG 4

[104] CT 9702.03, BG 1; CT 17, BG 5; CT 17, BG 6; and CT 16, BG 1

[105] SP 1 – Vinton Canal Boat Launch Road Pipe Unloading Area and Johnny Breaux Contractor Yard are within CT 34, BG 1; SP 1 – West Road Contractor Yard is within or within 1-mile of CT 34, BG 1; CT 35, BG 2, CT 35, BG 4; CT 36.01, BG 2; SP 2 – East Prien Lake Road Contractor and Pipe Yard is within or within 1-mile of CT 16, BG 1; CT 16, BG 3; CT 17; BG 4.

[106] The CPX Meter Station is within CT 9702.02, BG 2; the Florida Gas Transmission Interconnect Meter Station is within 1-mile of CT 35, BG 1; and the Enable Interconnect Meter Station is within CT 36.02, BG 1.

[107] The Helms Road P&R is within or within 1-mile of CT 17, BG 6; CT 17, BG 5; CT 9701.01, BG 1; and the Liberty and PHI Yard P&Rs are within CT 9702.02, BG 2.

Table 4.10.10-1 Demographic Composition within the Project Area										
	Race and Ethnicity Columns									Low-Income Column
State and Parish/County	White Alone, not Hispanic or Latino (percent)	Black or African-American (percent)	American Indian and Alaska Native (percent)	Asian (percent)	Native Hawaiian and Other Pacific Islander (percent)	Some Other Race (percent)	Two or more Races (percent)	Hispanic or Latino (any race) (percent)	Total Minority Population (percent)	Households Below Poverty Level (percent)
LOUISIANA	58.3	31.9	0.5	1.7	<0.1	0.3	2.0	5.2	41.7	18.1
TEXAS	41.4	11.8	0.2	4.9	0.1	0.2	2.0	39.4	58.6	13.4
TERMINAL FACILITIES										
Cameron Parish, LA	90.2	1.5	0.6	0.4	0.0	0.0	2.7	4.6	9.8	6.9
CT 9702.02, BG 2 [a]	98.6	0.9	0.0	0.0	0.0	0.0	0.0	0.5	1.4	**24.4**
CT 9701.02, BG 1	48.5	51.5	0.0	0.0	0.0	0.0	0.0	0.0	**51.5**	0.0
CT 9702.02, BG 1	97.9	0.0	0.0	1.7	0.0	0.0	0.4	0.0	2.1	0.0
CT 9701.02, BG 2	93.9	0.0	0.0	0.0	0.0	0.0	6.1	0.0	6.1	0.0
CT 9701.01, BG 1	81.4	0.0	1.6	1.0	0.0	0.0	6.4	9.5	**18.5**	3.0
CT 9701.01, BG 2	99.9	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	**11.7**
CT 9702.03, BG 1	87.6	0.0	0.0	0.0	0.0	0.0	0.0	12.4	**12.4**	**8.2**
CT 9702.03, BG 2	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**16.0**
PIPELINE SYSTEM **CP Express Pipeline**										
Cameron Parish, LA	90.2	1.5	0.6	0.4	0	0	2.7	4.6	9.8	6.9
CT 9701.01, BG 2	99.9	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	**11.7**

Table 4.10.10-1
Demographic Composition within the Project Area

State and Parish/County	White Alone, not Hispanic or Latino (percent)	Black or African-American (percent)	American Indian and Alaska Native (percent)	Asian (percent)	Native Hawaiian and Other Pacific Islander (percent)	Some Other Race (percent)	Two or more Races (percent)	Hispanic or Latino (any race) (percent)	Total Minority Population (percent)	Households Below Poverty Level (percent)
	Race and Ethnicity Columns									Low-Income Column
CT 9701.02, BG 1	48.5	51.5	0.0	0.0	0.0	0.0	0.0	0.0	**51.5**	0.0
CT 9702.02, BG 2	98.6	0.9	0.0	0.0	0.0	0.0	0.0	0.5	1.4	**24.4**
Calcasieu Parish, LA	66.9	25.1	0.2	1.5	0	0.1	2.3	3.8	33.1	15.8
CT 18.03, BG 3	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.2
CT 32, BG 2	95.6	0.0	0.3	0.0	0.0	0.0	2.1	2.1	4.4	14.3
CT 34, BG 1	92.4	1.7	0.0	0.0	0.0	0.0	5.8	0.0	7.6	**28.3**
CT 36.01, BG 1	97.8	1.2	0.0	0.0	0.0	0.0	0.9	0.0	2.2	5.6
CT 36.01, BG 3	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.4
Newton County, TX	73.2	21.1	0.3	0.6	0.0	0.3	0.7	3.8	26.8	26.0
CT 9504, BG 1	92.3	0.0	0.0	0.0	0.0	0.0	0.0	7.7	7.7	**27.4**
CT 9504, BG 2	96.1	0.0	3.9	0.0	0.0	0.0	0.0	0.0	3.9	23.7
CT 9504, BG 3	97.5	0.0	0.0	0.0	0.0	0.0	0.0	2.5	2.5	24.0
Jasper County, TX	74.4	16.4	0.0	0.4	0.1	0.1	1.5	6.9	25.6	18.7
CT 9507.01, BG 2	96.4	0.0	0.0	0.0	0.0	0.0	3.6	0.0	3.6	4.8

Table 4.10.10-1 Demographic Composition within the Project Area										
	Race and Ethnicity Columns									Low-Income Column
State and Parish/County	**White Alone, not Hispanic or Latino (percent)**	**Black or African-American (percent)**	**American Indian and Alaska Native (percent)**	**Asian (percent)**	**Native Hawaiian and Other Pacific Islander (percent)**	**Some Other Race (percent)**	**Two or more Races (percent)**	**Hispanic or Latino (any race) (percent)**	**Total Minority Population (percent)**	**Households Below Poverty Level (percent)**
Enable Gulf Run Lateral										
Calcasieu Parish, LA	66.9	25.1	0.2	1.5	0	0.1	2.3	3.8	33.1	15.8
CT 36.01, BG 1	97.8	1.2	0.0	0.0	0.0	0.0	0.9	0.0	2.2	5.6
CT 36.01, BG 3	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.4
CT 36.02, BG 1	90.5	8.5	0.0	0.0	0.0	0.0	0.0	1.0	9.5	**23.2**
Moss Lake Compressor Station										
Calcasieu Parish, LA	66.9	25.1	0.2	1.5	0	0.1	2.3	3.8	33.1	15.8
CT 32, BG 2	95.6	0.0	0.0	0.3	0.0	0.0	2.1	2.1	4.4	14.3
Meter Stations										
CPX Meter Station										
Cameron Parish, LA	90.2	1.5	0.6	0.4	0.0	0.0	2.7	4.6	9.8	6.9
CT 9702.02, BG 2 [b]	98.6	0.9	0.0	0.0	0.0	0.0	0.0	0.5	1.4	**24.4**
Kinder Morgan Meter Station										
Calcasieu Parish, LA	66.9	25.1	0.2	1.5	0	0.1	2.3	3.8	33.1	15.8
CT 32, BG 2 [c]	95.6	0.0	0.3	0.0	0.0	0.0	2.1	2.1	4.4	14.3

Table 4.10.10-1 Demographic Composition within the Project Area										
	Race and Ethnicity Columns									Low-Income Column
State and Parish/County	**White Alone, not Hispanic or Latino (percent)**	**Black or African-American (percent)**	**American Indian and Alaska Native (percent)**	**Asian (percent)**	**Native Hawaiian and Other Pacific Islander (percent)**	**Some Other Race (percent)**	**Two or more Races (percent)**	**Hispanic or Latino (any race) (percent)**	**Total Minority Population (percent)**	**Households Below Poverty Level (percent)**
Florida Gas Transmission Interconnect Meter Station										
Calcasieu Parish, LA	66.9	25.1	0.2	1.5	0	0.1	2.3	3.8	33.1	15.8
CT 36.01, BG 3 [d]	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.4
CT 35, BG 1	39.6	8.9	1.9	9.1	0.0	0.0	4.5	35.9	**60.4**	9.8
Enable Interconnect Meter Station										
Calcasieu Parish, LA	66.9	25.1	0.2	1.5	0	0.1	2.3	3.8	33.1	15.8
CT 36.02, BG 1 [e]	90.5	8.5	0.0	0.0	0.0	0.0	0.0	1.0	9.5	**23.2**
TETCO/Boardwalk Interconnect Meter Station										
Newton County, TX	73.2	21.1	0.3	0.6	0.0	0.3	0.7	3.8	26.8	26.0
CT 9504, BG 3 [f]	97.5	0.0	0.0	0.0	0.0	0.0	0.0	2.5	2.5	24.0
CT 9504, BG 2	96.1	0.0	3.9	0.0	0.0	0.0	0.0	0.0	3.9	23.7
Transco & CJ Express Meter Station										
Jasper County, TX	74.4	16.4	0.0	0.4	0.1	0.1	1.5	6.9	25.6	18.7
CT 9507.01, BG 2 [g]	96.4	0.0	0.0	0.0	0.0	0.0	3.6	0.0	3.6	4.8

Table 4.10.10-1

Demographic Composition within the Project Area

State and Parish/County	Race and Ethnicity Columns: White Alone, not Hispanic or Latino (percent)	Black or African-American (percent)	American Indian and Alaska Native (percent)	Asian (percent)	Native Hawaiian and Other Pacific Islander (percent)	Some Other Race (percent)	Two or more Races (percent)	Hispanic or Latino (any race) (percent)	Total Minority Population (percent)	Low-Income Column: Households Below Poverty Level (percent)
Contractor and Pipe Yards										
SP 1 – Vinton Canal Boat Launch Road Pipe Unloading Area and Johnny Breaux Yard										
Calcasieu Parish, LA	66.9	25.1	0.2	1.5	0.0	0.1	2.3	3.8	33.1	15.8
CT 34, BG 1	92.4	1.7	0.0	0.0	0.0	0.0	5.8	0.0	7.6	**28.3**
SP 1 – West Road Contractor Yard										
Calcasieu Parish, LA	66.9	25.1	0.2	1.5	0.0	0.1	2.3	3.8	33.1	15.8
CT 34, BG 1 [h]	92.4	1.7	0.0	0.0	0.0	0.0	5.8	0.0	7.6	**28.3**
CT 35, BG 2	87.7	10.1	0.0	0.0	0.0	0.0	2.2	0.0	12.3	**39.4**
CT 35, BG 3	78.6	14.0	0.0	0.0	0.0	0.0	3.3	4.1	21.4	8.8
CT 35, BG 4	91.7	7.6	0.0	0.0	0.0	0.0	0.0	0.7	8.3	**19.5**
CT 36.01, BG 2	98.1	0.1	0.3	0.0	0.0	0.0	0.0	1.5	1.9	2.0
SP 2 – East Prien Lake Road Contractor and Pipe Yard										
Calcasieu Parish, LA	66.9	25.1	0.2	1.5	0	0.1	2.3	3.8	33.1	15.8
CT 9800, BG 1 [i]	0	0	0	0	0	0	0	0	0	0

Table 4.10.10-1

Demographic Composition within the Project Area

State and Parish/County	White Alone, not Hispanic or Latino (percent)	Black or African-American (percent)	American Indian and Alaska Native (percent)	Asian (percent)	Native Hawaiian and Other Pacific Islander (percent)	Some Other Race (percent)	Two or more Races (percent)	Hispanic or Latino (any race) (percent)	Total Minority Population (percent)	Households Below Poverty Level (percent)
	Race and Ethnicity Columns									Low-Income Column
Park and Ride Locations										
Helms Road P&R										
Calcasieu Parish, LA	66.9	25.1	0.2	1.5	0.0	0.1	2.3	3.8	33.1	15.8
CT 17, BG 6 [j]	60.4	25.5	0.0	0.0	0.0	0.0	0.0	14.1	**39.6**	**21.5**
CT 17, BG 5	61.5	0.6	0.0	0.0	0.0	0.0	13.8	24.1	**38.5**	**28.0**
CT 9701.01, BG 1	81.4	0.0	1.6	1.0	0.0	0.0	6.4	9.5	**18.5**	3.0
Liberty and PHI Yard P&Rs										
Cameron Parish, LA	90.2	1.5	0.6	0.4	0.0	0.0	2.7	4.6	9.8	6.9
CT 9702.02, BG 2	98.6	0.9	0.0	0.0	0.0	0.0	0.0	0.5	1.4	**24.4**

Source: U.S. Census Bureau, 2020a, File # B17017 and File # B03002.

[a] The Terminal Facilities are within this block group.
[b] The CPX Meter Station is within this block group
[c] The Kinder Morgan Meter Station is within this block group.
[d] The Florida Gas Transmission Interconnect Meter Station is within this block group.
[e] The Enable Interconnect Meter Station is within this block group.
[f] The TETCO/Boardwalk Interconnect Meter Station is within this block group.
[g] The Transco & CJ Express Meter Station is within this block group.
[h] The SP 1 – West Road Contractor Yard is within this block group.
[i] The SP 2 – East Prien Lake Road Contractor and Pipe Yard is within this block group. Additionally, this block group has a reported population of 0.
[j] The Helms P&R is within this block group.

Notes:
"Minority" refers to people who reported their ethnicity and race as something other than non-Hispanic White.
Low-income or minority populations exceeding the established thresholds are indicated in red, bold, type and blue shading.

Table 4.10.10-1 Demographic Composition within the Project Area										
	Race and Ethnicity Columns									Low-Income Column
State and Parish/County	**White Alone, not Hispanic or Latino (percent)**	**Black or African-American (percent)**	**American Indian and Alaska Native (percent)**	**Asian (percent)**	**Native Hawaiian and Other Pacific Islander (percent)**	**Some Other Race (percent)**	**Two or more Races (percent)**	**Hispanic or Latino (any race) (percent)**	**Total Minority Population (percent)**	**Households Below Poverty Level (percent)**
Due to rounding differences in the dataset, the totals may not reflect the sum of the addends.										

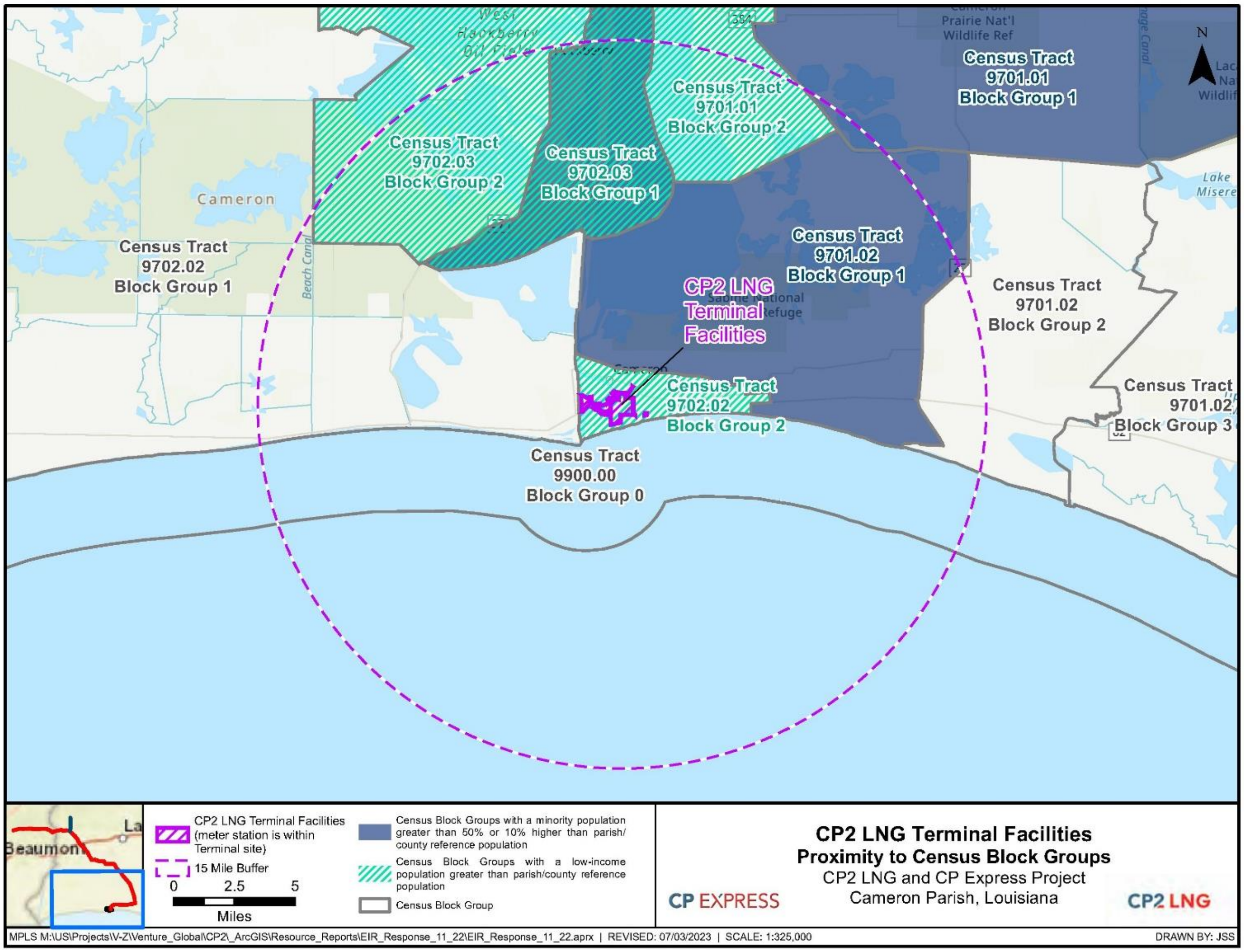

Figure 4.10.10-1 Identified Low-Income and Minority Populations by Census Block Groups within 15 miles of the Terminal Facilities

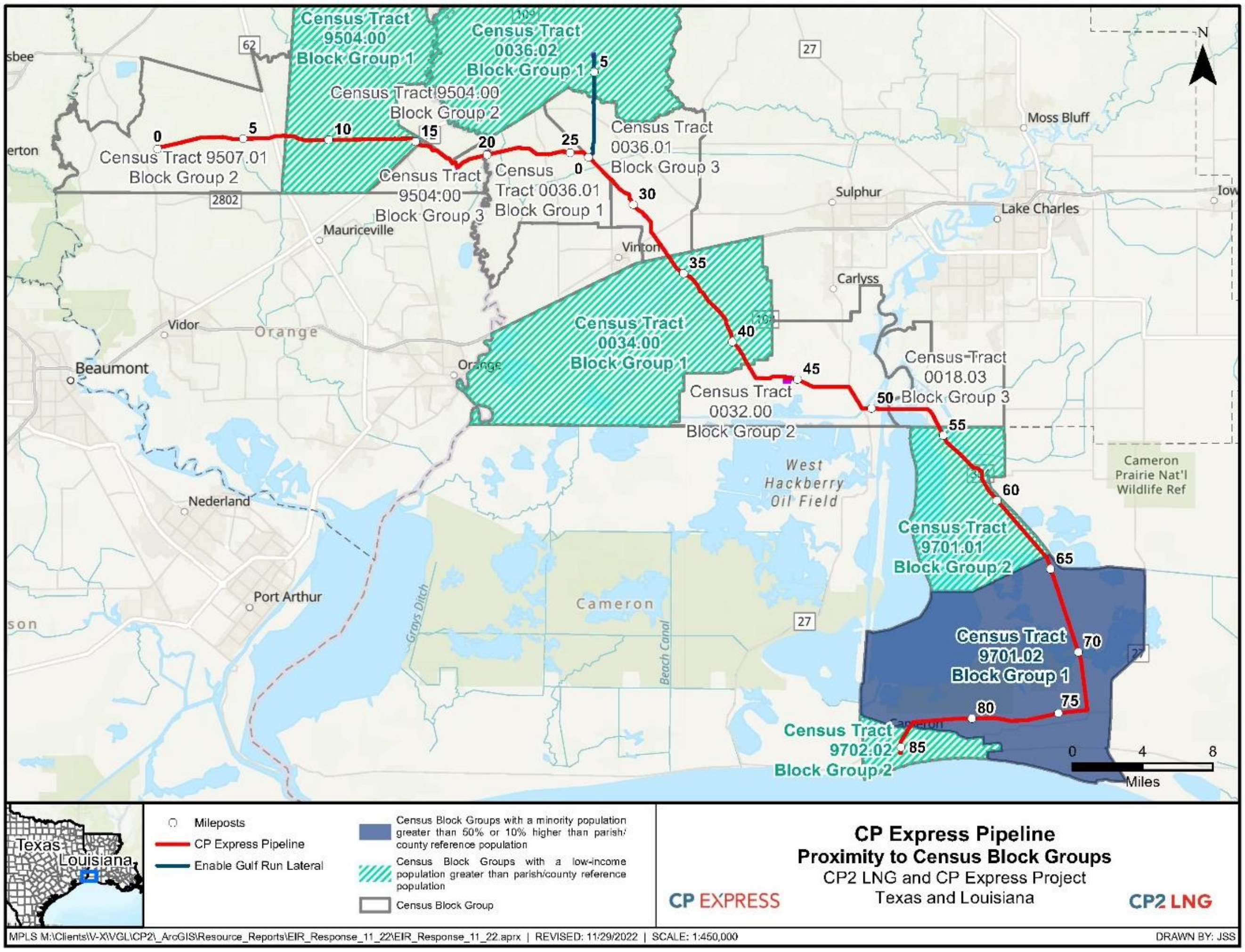

Figure 4.10.10-2 Identified Low-Income and Minority Populations by Census Block Groups Crossed by the CP Express Pipeline and Enable Gulf Run Lateral

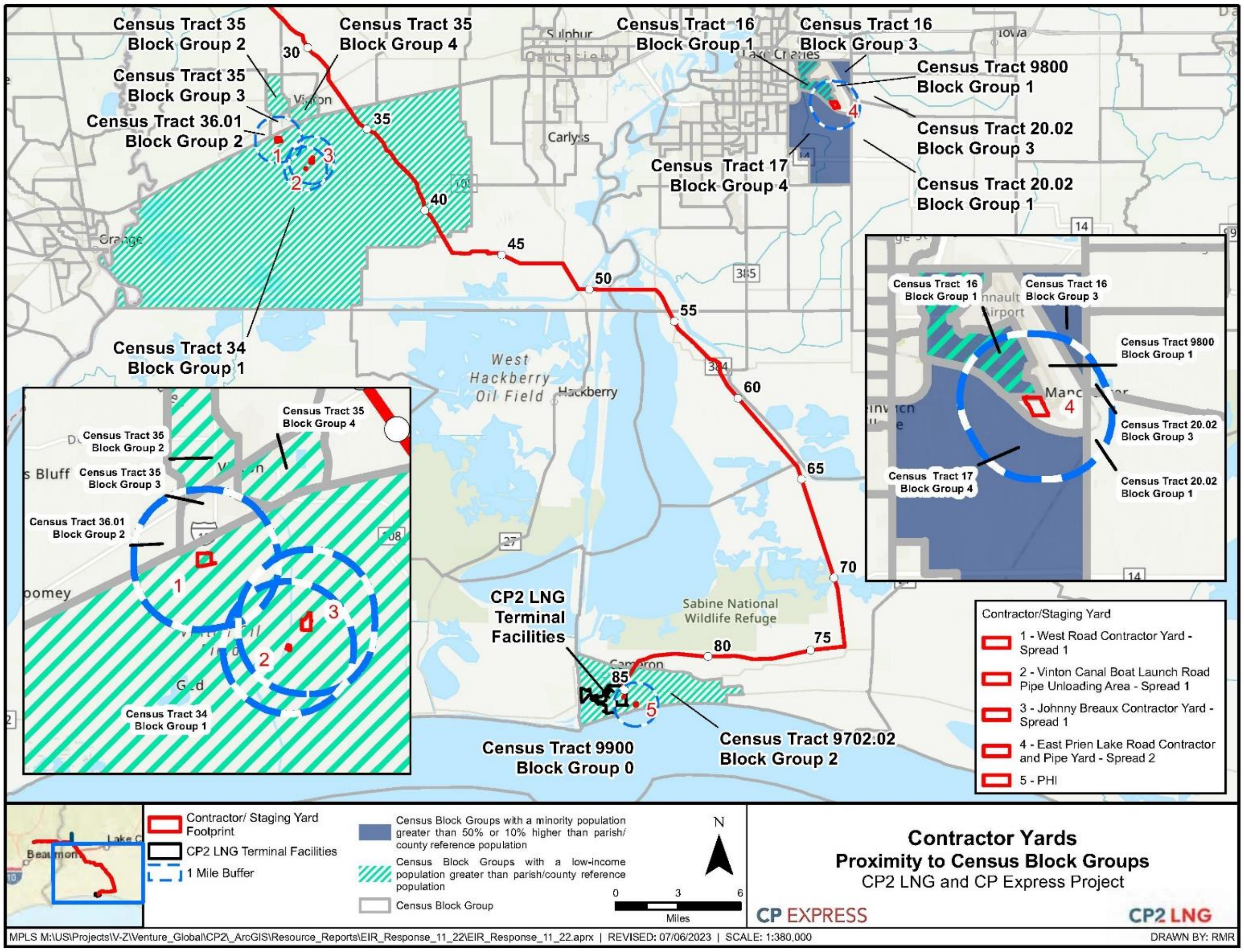

Figure 4.10.10-34 Identified Low-Income and Minority Populations by Census Block Groups Within 1 Mile of Contractor Yards

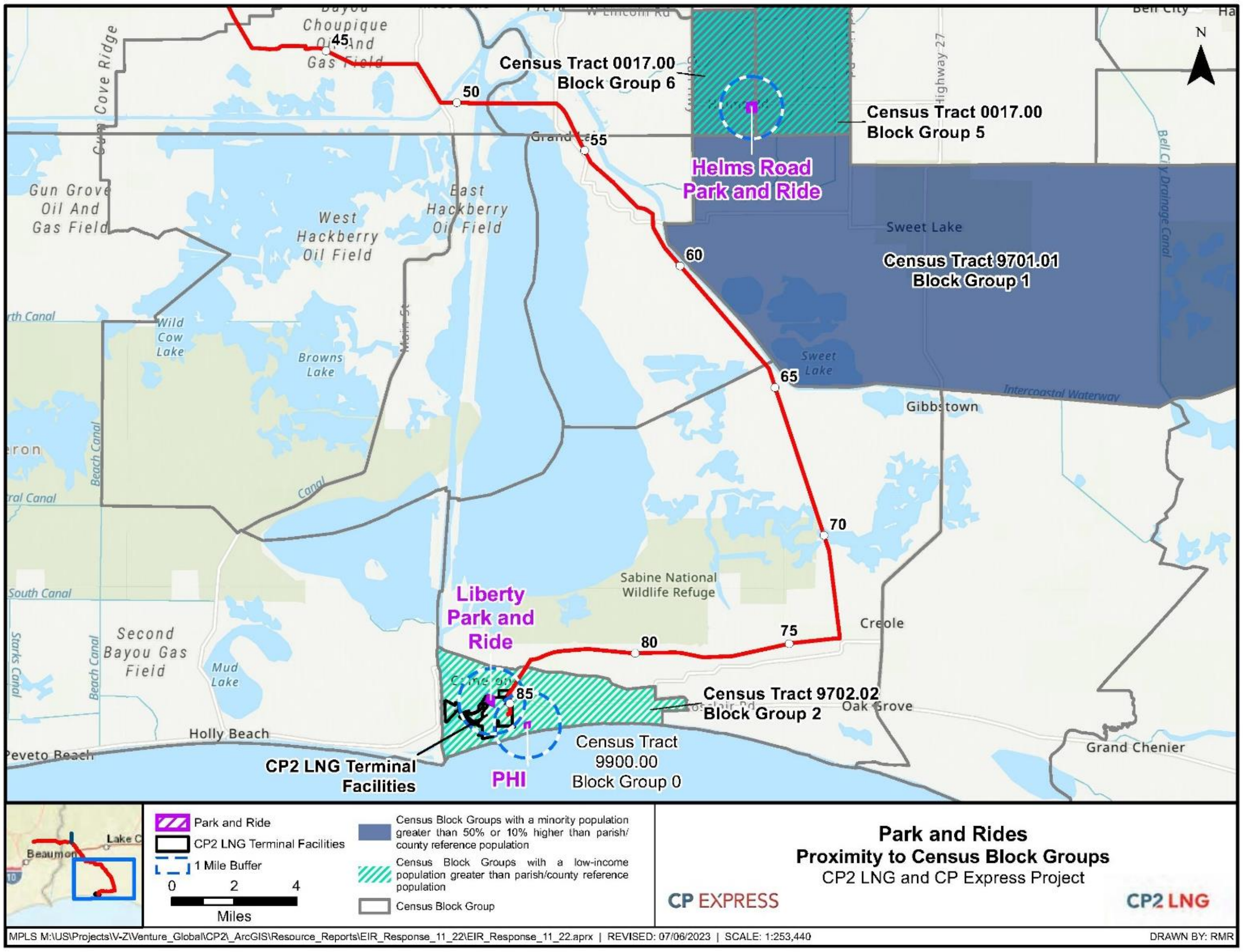

Figure 4.10.10-45 Identified Low-Income and Minority Populations by Census Block Groups Within 1 Mile of Park and Rides

4.10.10.3 Impacts on Environmental Justice Communities

As previously described, *Promising Practices* provides methodologies for conducting environmental justice analyses. Issues considered in the evaluation of environmental justice include human health or environmental hazards; the natural physical environment; and associated social, economic, and cultural factors. Consistent with *Promising Practices* and Executive Order 12898, we reviewed the Project to determine if its resulting impacts would be disproportionately high and adverse on minority and low-income populations and also whether impacts would be significant.[108] *Promising Practices* provides that agencies can consider any of a number of conditions for determining whether an action will cause a disproportionately high and adverse impact.[109] The presence of any of these factors could indicate a potential disproportionately high and adverse impact. For this Project, a disproportionately high and adverse effect on an environmental justice community means the adverse effect is predominantly borne by such population. Relevant considerations include the location of Project facilities and the Project's human health and environmental impacts on identified environmental justice communities, including direct, indirect, and cumulative impacts. The analysis of impacts is included in this section.

Project work within the review area for assessing impacts on environmental justice communities includes the construction and operation of the Terminal Facilities,[110] portions of the CP Express Pipeline[111] and Enable Gulf Run Lateral,[112] the CPX Meter Station[113] and Enable Interconnect Meter Station[114], the spread 1 contractor and pipe yards (i.e., Vinton Canal Boat Launch Road Pipe Unloading Area, West Road Contractor Yard, Johnny Breaux Yard)[115] and the spread 2 – East Prien Lake Road Contractor and Pipe Yard[116]. In addition, the Florida Gas Transmission Interconnect Meter Station is within 1 mile of an identified environmental justice block group (CT 35, BG 1). The Helms P&R is located in and within 1 mile of three environmental justice block groups, and the Liberty P&R is in and within 1 mile of one environmental justice block group. The Moss Lake Compressor Station is not in or within 1 mile of an environmental justice block group and three of the six meter stations are not in or within 1 mile of an environmental justice block group, therefore, are not considered further in this analysis.

Impacts on the natural and human environment from construction and operation of Project facilities are identified and discussed throughout this document. Factors that could affect environmental justice communities include flooding, surface water resources (section 4.4.2), wetlands, (section 4.5.2), visual impacts (see section 4.9.6), socioeconomic impacts (see section 4.10), recreational and commercial fishing

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108 *See Promising Practices* at 33 (stating that "an agency may determine that impacts are disproportionately high and adverse, but not significant within the meaning of NEPA" and in other circumstances "an agency may determine that an impact is both disproportionately high and adverse and significant within the meaning of NEPA").

109 *See Promising Practices* at 45-46 (explaining that there are various approaches to determining whether an impact will cause a disproportionately high and adverse impact). We recognize that CEQ and EPA are in the process of updating their guidance regarding environmental justice and we will review and incorporate that anticipated guidance in our future analysis, as appropriate.

110 Environmental justice block groups within the 15-mile review radius for the Terminal Facilities include CT 9702.02, BG 2; CT 9701.02, BG 1; CT 9701.01, BG 1; CT 9701.01, BG 2; CT 9702.03, BG 1; CT 9702.03, BG 2.

111 Environmental justice block groups impacted by the CP Express Pipeline include CT 9701.01, BG 2; CT 9701.02, BG 1; CT 9702.02, BG 2; CT 34, BG 1; CT 9504, BG 1.

112 The only environmental justice block group impacted by the Enable Gulf Run Lateral includes CT 36.02, BG 1.

113 The CPX Meter Station is within CT 9702.02, BG 2, which is the only environmental justice block group within the 1-mile review radius.

114 The Enable Interconnect Meter Station CT 36.02, BG 1, which is the only environmental justice block group within the 1-mile review radius.

115 All three spread 1 contractor and pipe yards are located within CT 34, BG 1, which was identified as an environmental justice block group. Additionally, environmental justice block groups within the 1-mile review radius of the West Road Contractor Yard include:

116 The East Prien Lake Road Contractor and Pipe Yard is not within an environmental justice block group; however, environmental justice blocks groups within the 1-mile review radius include: CT 16, BG 1; CT 16, BG 3; and CT 17, BG 4.

impacts (see sections 4.10.4.1 and 4.10.5.2, respectively), traffic impacts (see section 4.10.8), and air and noise impacts from construction and operation (see section 4.12 and 4.13). Potentially adverse environmental effects on surrounding communities associated with the Project, including environmental justice communities, would be minimized and/or mitigated. In general, the magnitude and intensity of the aforementioned impacts would be greater for individuals and residences closest to the Project's facilities and would diminish with distance. These impacts are addressed in greater detail in the associated sections of this EIS. Environmental justice concerns are not present for other resource areas, such as geology, soils, wildlife, land use, or cultural resources, due to the minimal overall impact the Project would have on these resources and/or the absence of any suggested connection between such resources and environmental justice communities; therefore, these resources will not be discussed further.

Flooding

We received a comment from EPA during scoping recommending that the FERC, CP2 LNG, CP Express, and local governments implement equitable treatment of minority and low-income populations adversely impacted by induced flooding caused by the Project. Induced flooding is not anticipated as all aboveground facilities and roads would be constructed in accordance with federal, state, and local regulations, including parish floodplain requirements. Additionally, the Project is not anticipated to significantly displace flood storage capacity and the only aboveground facilities within environmental justice block groups that are also within the floodplain are the Terminal Site and CPX Meter Station, both of which would be within the proposed floodwall. Therefore, we conclude that flooding impacts on environmental justice communities would be less than significant.

Water Resources

Construction and operation of the Terminal Facilities would permanently impact two unnamed waterbodies (two drainage ditches) within the Project area and would both temporarily (during construction) and permanently (during operation) impact portions of the adjacent Calcasieu Ship Channel. These impacts would result from dredging activities, site construction, marine traffic, stormwater runoff, water use, hydrostatic testing, and could occur from accidental spills or other releases of hazardous substances. Environmental justice communities in proximity to the Terminal Facilities, particularly the environmental justice community the Terminal Facilities are within (CT 9702.02, BG 2), would be the most likely to experience the effect caused by dredging and resuspension of sediments. Resuspension of sediments within the ship channel could potentially mobilize any contaminants. However, as discussed in section 4.3.2, there are no known areas of existing contamination within 1 mile of the Project. CP2 LNG would adhere to all permit conditions, as well as the BMPs included in its Project-specific Procedures, to minimize the impacts associated with dredging activities and promote the stability of the excavated shoreline during and after construction of the LNG berthing area. Further, CP2 LNG would minimize impacts on water quality by using a hydraulic suction dredge, where turbidity would be focused close to the river bottom and would equate to a storm event within a short distance of the cutterhead. Overall, we do not anticipate significant impacts on environmental justice communities related to surface water.

Construction and operation of the Pipeline System, Terminal Facilities, as well as marine traffic to and from the terminal, have the potential to adversely impact water quality in the event of an accidental release of a hazardous substance such as fuel, lubricants, coolants, or other material. In order to minimize the risk of a release, CP2 LNG and CP Express would implement the measures outlined in the Project-specific Plan and Procedures, and SPCC Plan to minimize the likelihood of a spill and would implement its SPCC Plan in the event of a spill. These plans would minimize the risk of a spill by requiring CP2 LNG and CP Express to conduct personnel training, equipment inspection, install secondary and spill containment structures for fuels, vehicles, or equipment, and identifying refueling procedures. Additionally, LNG carriers are required to develop and implement a SOPEP, which includes measures to be taken when an oil pollution incident has occurred, or a ship is at risk of one.[117] If an accidental release was to occur, environmental justice communities along the ship channel, particularly the environmental justice community the Terminal Facilities are within (CT 9702.02, BG 2), as well as individuals from these communities that use the channel, would be affected. However, with the mitigation measures CP2 LNG and LNG carriers would implement, we conclude that environmental justice communities would not be significantly impacted by an accidental release.

Wetlands

Construction and operation of the Project would result in short-term (until revegetation is re-established), temporary (during construction), and permanent (during operation) impacts on wetlands (section 4.5). Wetlands provide various benefits to local populations, including a source of substantial biodiversity and serve a variety of functions that include providing wildlife habitat, recreational opportunities, flood control, and naturally improving water quality. Wetland impacts would occur within several identified environmental justice communities; therefore, the loss of wetland habitat and the subsequent decrease in wetland benefits, could affect those environmental justice communities within and near the Project. However, CP2 LNG would be required to obtain the applicable COE and LDNR/OCM permits for permanent loss of wetland habitat and implement any mitigation measures required by the COE and LDNR/OCM for that loss. The majority of wetland impacts associated with construction of the Pipeline System would be restored to pre-construction conditions resulting in only short-term impacts. CP2 LNG and CP Express would implement Project-specific plans, as applicable, including its Project-specific Procedures, and HDD Monitoring and Contingency Plan, and SPCC Plan to minimize and/or avoid impacts on wetlands during Project construction. Through implementation of the CP2 LNG and CP Express' applicable Project-specific plans and proposed mitigation bank credits (see section 4.5.2), we conclude that the impacts on wetlands would not have a significant impact on environmental justice communities. Wetland impacts are more fully addressed in section 4.5.

Visual Resources

Construction of the Terminal Facilities, in environmental justice community CT 9702.02, BG 2, would create permanent visual impacts associated with operation of the facilities. The tops of the LNG storage tanks and flare stack would create a vertical visual contrast across a relatively flat existing landscape for the nearby residences 330 feet north and 360 feet east of the Project fence line (see appendix J). These same structures and the proposed floodwall surrounding the Terminal facilities would be visible from users of the Calcasieu Ship Channel, visitors to nearby beaches, employees and operators of industrial facilities along Davis Road, motorists along the Creole Nature Trail (SH 27), and other areas surrounding the Project site. While the perimeter berm and floodwall would help partially obscure the industrial facilities on the Terminal Site from offsite views, including partial obstruction of the proposed tanks and flare stack, the nearby residences (and associated environmental justice population) have a direct view of the Terminal Facilities. In response to our recommendation in the draft EIS, CP2 LNG would install vegetative screening by planting native live oak trees and native groundsel bushes on the northeastern and eastern sides of the Terminal Site (see section 4.9.5.1). However, the permanent changes in the viewshed would have a significant adverse effect on residents and passersby of those environmental justice communities near the Project.

Temporary visual impacts would occur during construction of the pipeline and appurtenant aboveground facilities, including vehicle and equipment movement, vegetation clearing and grading, trench and foundation excavation, pipe storage, and spoil piles. Permanent visual impacts may occur along the pipeline from removal of forested vegetation and periodic vegetation clearing within the permanent right-of-way to allow for visual pipeline inspection. After construction, disturbed areas associated with the CP Express Pipeline and Enable Gulf Run Lateral pipeline right-of-way construction would be restored to preconstruction

[117] LNG vessels are outside of the Commission's jurisdiction.

conditions, with the exception of the permanent right-of-way that would be kept in a low, maintained herbaceous state through regular mowing and woody vegetation removal.

The Florida Gas Transmission Meter Station is 0.6 mile northeast of an identified environmental justice block group (CT 35, BG 1). The nearest sensitive receptor within CT 35, BG 1 is a residence approximately 1 mile southwest of this meter station. The Florida Gas Transmission Meter Station would not be visible from the residence due to the presence of a wooded parcel of land west of the meter station. The Enable Interconnect Meter Station is within an identified environmental justice block group (CT 36.02, BG 1). The nearest residence is approximately 0.6 mile east of this meter station. The Enable Interconnect Meter Station would be constructed west of existing industrial facilities and a wooded lot; therefore, the meter station would not be visible to the nearest residence. The CPX Meter Station is also within an identified environmental justice block group (CT 9702.02, BG 2), however, it would be within the proposed floodwall associated with the Terminal Facilities and, therefore, would not be visible. Given the height of the meter stations (about 14 feet) and the presence of wooded areas between the residences and the Florida Gas Transmission Meter Station and Enable Interconnect Meter Station (in addition to the presence of other existing industrial facilities near the Enable Interconnect Meter Station), no visual impacts are anticipated. The remaining meter stations and the Moss Lake Compressor Station are not in or within one mile of an environmental justice community.

Long-term visual impacts from the Pipeline System are expected to be minor and primarily limited to the areas where forested land and wetlands would be permanently maintained in an herbaceous state. Overall, visual impacts from the Pipeline System are anticipated to have a permanent and minor effect on environmental justice communities. Visual impacts are more fully addressed in section 4.9.5.

Socioeconomics

Project impacts on environmental justice populations may include impacts on socioeconomic factors. The two phases of the Project are estimated to cost over $10 billion, which includes labor, materials, and equipment. The average workforce for the duration of construction of the Terminal Facilities would be 1,600 personnel and the peak construction workforce at the Terminal Facilities is estimated to be 3,00 workers for each phase. The average workforce for the duration of construction of the Pipeline System would be 830 personnel and the peak construction workforce for the Pipeline System would be 1,425 workers and 125 workers for Phase 1 and Phase 2, respectively. The temporary flux of workers into environmental justice communities could affect economic conditions and increase the demand for community services, such as traffic, housing, police enforcement, and medical care. Impacts on traffic are included in section 4.10.8. Impacts on property values, property taxes, and costs of material goods from the Project alone are not anticipated; however, cumulative impacts may occur. A discussion of cumulative impacts on property values, property taxes, and costs of material goods is in section 4.14.2.8.

Approximately 250 full-time workers would be hired for the Terminal Facilities and approximately 10 full-time workers would be hired for the Pipeline System. CP2 LNG anticipates that 125 workers (50 percent) that would be employed at the Terminal Facilities during operation would be non-local hires who would relocate to the Project area. The influx of these workers and their families would represent a minor but permanent increase in the population in the vicinity of the Terminal Facilities. CP Express estimates that 50 percent of the Pipeline System operations workforce (5 workers) would be non-local hires who would relocate to the Project area. This increase in permanent workers would have a negligible impact on economic conditions and community infrastructure. We conclude that socioeconomic impacts on the environmental justice communities would be less than significant. Socioeconomic impacts are more fully addressed throughout section 4.10.

Recreational and Commercial Fishing

Recreational and commercial fishing could be impacted by construction activities associated with the Project, primarily with the Terminal Facilities. Project activities are anticipated to occur during peak fishing and recreational seasons, therefore, temporary impacts on recreational and commercial users in the Calcasieu Ship Channel, which would likely include individuals from environmental justice communities, may occur in areas where construction is occurring. However, fishing activities are not restricted to the relatively small sections of the Project footprint that could provide potential fishing opportunities and due to the overall size of the waterway and the bay, access to and maneuverability within the Calcasieu Ship Channel would not be significantly affected by the use of barges. During the draft EIS comment period, we received several comments from individuals expressing concern regarding the impact of the Project on commercial fisheries and shrimping. The construction impacts on recreational and commercial fisheries would be temporary, lasting the duration of construction activities. Permanent impacts on recreational and commercial fisheries in the ship channel, which likely include individuals from environmental justice communities, may occur due the loss of available fishing areas from operation of the Marine Facilities and LNG carrier traffic. Based on consultations between FERC and LDWF, impacts on shrimping vessels would be greatest near the Terminal south of the Firing Line where shrimping occurs year-round and vessel traffic and dredging associated with the Terminal Facilities would occur. Although we expect fish, crab, and shrimp species common to the bay could be present, the location does not have any unique features or habitat characteristics that would draw recreational or commercial users to this particular location. The Project area does not support special habitat that is different from the miles of surrounding habitat. Given these characteristics, and due to the overall size of the waterway, we conclude that these impacts on environmental justice communities would not be significant. Additionally, Venture Global created the Calcasieu Pass Community Advisory Group to ensure that residents from all parts of Cameron Parish are represented and can communicate promptly and directly with Venture Global to express any concerns they have or to communicate adverse impacts that they or their neighbors have seen related to Calcasieu Pass. As part of the Community Advisory Group and as part of their general community relations, CP2 LNG states it would continue to seek stakeholder feedback and work with stakeholders, including shrimpers and fishermen, on ways that negative impacts may be avoided or mitigated. CP2 LNG have committed to continuing the development of the Engagement Plan and would provide updates on its engagement effort and on Community Advisory Group meetings within the monthly construction reports. Additionally, Venture Global Calcasieu Pass, LLC and CP2 LNG would comply with project permits, including those issued by the applicable Louisiana resource agencies, which CP2 LNG states were developed with the feedback provided by all stakeholders, including any provided by the fishing and shrimping industry.

Recreational and commercial fishing impacts are more fully addressed in sections 4.10.4.1 and 4.10.5.2, respectively.

Traffic

Roadway Traffic

Potential impacts on the environmental justice communities during construction of the Project may also include traffic delays. There would be a temporary increase in use of area roads by heavy construction equipment and associated trucks and vehicles. Area residents may be affected by traffic delays during construction of the Project. CP2 LNG anticipates about 100 to 800 truck deliveries per day during construction of the Terminal Facilities. The Liberty P&R would be used during all stages of construction and abuts the Terminal Site. The Helms Road P&R would be utilized during Stages 3 and 4 of CP2 LNG Terminal construction. The PHI Yard P&R would be utilized during Stage 4 of CP2 LNG Terminal construction. During the time when parking at all three P&Rs would be utilized, it is anticipated approximately 1,410 dayshift worker trips would occur during peak traffic hours, including 492 worker trips associated with future onsite parking, 210 worker trips to and from the Liberty P&R, 600 worker trips to and from the Helms P&R, and 108 worker trips to and from the PHI P&R for dayshift workers. During peak construction (Stage 4), an

LOS of E or F[118] would be experienced during peak morning and/or evening hours at the intersections of Helms Road and LA 385, Helms Road and Tom Hebert Road, LA 27 and Helms Road, LA 27 and Marshall Street, and LA 27 and East Creole Highway. Based on these findings, CP2 LNG would utilize additional traffic mitigation measures (see table 4.10.8-4) during Stages 3 and 4, including flagger police vehicles or traffic signals during times of heavy traffic. With mitigation measures, an LOS of B or A would be achieved at these intersections. As shown in table 4.10.8-3, CP2 LNG predicts the LOS of the roadways within the Project area would remain at an LOS D or better throughout construction, which would not result in a significant increase in traffic delays.

CP2 LNG would implement its Terminal Facilities Traffic Management Plan, which identifies anticipated vehicular construction traffic volumes and describes plans for safe and effective management throughout construction of the Terminal Facilities. Specific measures to reduce vehicle traffic included in the Terminal Facilities Traffic Management Plan are the use of three P&R locations, staggered shift start and stop times during expected times of peak site personnel, and utilization of flagger police vehicles or traffic signals. As discussed further in section 4.10.8.1, construction-related traffic between the P&R locations and the Terminal Site would be mitigated via the use of busing to transport construction personnel, reducing the number of vehicles operating between the P&R locations and the Terminal. In addition, in accordance with its Terminal Facilities Traffic Management Plan, a Traffic Coordinator would schedule, coordinate, and manage the overall truck deliveries to the Terminal Site, including staging of deliveries for time slots throughout the day.

During operation of the Terminal Facilities, impacts on road traffic would be primarily limited to the 250 permanent Terminal Facilities employees, and periodic deliveries to the Terminal Site; therefore, impacts are not expected to be significant based on the AADT and capacity of roads in the area. The LOS of intersections in the vicinity of the Terminal Site are expected to result in an LOS of C or better during peak morning and evening hours, however impacts would be less than significant and temporary (see section 4.10.8.1).

During Pipeline System construction, approximately 140 vehicle trips per day per pipeline spread would be required, including 10 trips per day at MLV sites and 50 trips per day at each meter station. Increased use of these roads would result in a higher volume of traffic, increased commute times, and greater risk of vehicle accidents. These impacts would adversely affect local residents residing in environmental justice communities. However, these impacts would be limited to periods of active construction over the course of the construction period. During construction, public roads utilized in the immediate vicinity of the Project would be monitored by CP2 LNG and CP Express and maintained as necessary. CP Express would implement its Traffic, Noxious Weed, and Fugitive Dust Control Plan to minimize Project effects on local traffic and transportation systems during construction.

During operation of the Pipeline System, impacts on road traffic would be primarily limited to the ten Pipeline System employees based at the Moss Lake Compressor Station (which is not within an environmental justice block group), and periodic deliveries to aboveground facilities; therefore, impacts are expected to be minor.

[118] LOS calculations were derived by CP2 LNG from the 6th Edition of the Highway Capacity Manual, which follows deterministic assessments of traffic conditions at the intersection level. LOS Criteria for Two-Way Stop Controlled and All-Way Stop Controlled intersections: A = average control delay of 0-10 seconds/per vehicle, B = average control delay of greater than 10-15 seconds/per vehicle, C = average control delay of greater than 15-25 seconds/per vehicle, D = average control delay of greater than 25-35 seconds/per vehicle, E = average control delay of greater than 35-50 seconds/per vehicle, and F = average control delay of greater than 50 seconds/per vehicle or volume to capacity ration greater than 1.0.

Marine Traffic

Marine deliveries during Project construction would utilize barges to deliver equipment and bulk material for site preparation. At the Phase 1 construction peak, 32 barges a week are anticipated. Based on the Calcasieu Shipping Channel's existing traffic patterns and capacity, the Project's additional deliveries are not expected to result in waterway congestion or significantly impact other waterway users such as fishermen and recreational users. Recreational boaters and fishers, which likely include individuals from environmental justice communities, would not experience any significant changes in marine traffic. To evaluate and minimize potential impacts on marine transportation associated with Terminal Facilities construction and operation, CP2 LNG prepared a Waterway Suitability Assessment, for which a Letter of Recommendation was issued by the Coast Guard on December 17, 2021. Any other LNG projects on the Calcasieu Ship Channel would also be required to develop a similar assessment to study potential impacts of facility construction and operation on marine transportation, further reducing the potential for cumulative impacts.

Although marine traffic on the Calcasieu Ship Channel is expected to grow significantly over the next 10 years due to the expanded operations of existing terminals and the construction of various proposed facilities, there should be no associated short-term or long-term effects on transportation safety or viability. This reflects the channel's purpose-built design and latent capacity for handling a high volume of commercial vessels. The operational and cumulative traffic impacts on environmental justice communities are not anticipated to be significant.

Based on the AADT data, current LOS along LA 27, the assumption that a majority of the workforce would use buses to reach the Terminal Facilities, and implementation of measures included in the Project-specific plans, the Project is not expected to result in a change in serviceability (as defined by LDOTD as the "ability of pavement to provide a safe and comfortable ride to its users") for any of the area roadways in environmental justice communities during construction or operation. In addition, traffic impacts on environmental justice communities associated with operation of the Pipeline System and the addition of 10 permanent workers (of which 5 would be non-local) would not have a measurable impact on area traffic. Therefore, traffic impacts on environmental justice communities would be less than significant. Project transportation needs and impacts are more fully addressed in section 4.10.8.

Air Quality

As discussed in section 4.12.1, construction and operation of the Terminal Site would result in impacts on air quality. Emissions during construction of the Project would generally be associated with onshore construction activities conducted using on-road and off-road mobile equipment and offshore construction activities conducted using marine vessels such as tugboats or barges and a dredging vessel. Fugitive dust emissions from earth-moving/material handling and equipment/vehicle traffic during construction, and gaseous emissions from fuel combustion in construction equipment would result in short-term, localized impacts in the immediate vicinity of construction work areas. Fugitive dust generation would be minimized, in part, by applying water in active construction areas (e.g., unpaved roads, material storage piles) and imposing speed limits for on-site vehicles in accordance with CP2 LNG and CP Express' Traffic, Noxious Weed, and Fugitive Dust Control Plan (see table 2.5-1). Construction equipment exhaust emissions would be minimized by using construction equipment and vehicles that are maintained in accordance with manufacturers' maintenance schedules; comply with EPA vehicle and non-road engine emissions regulations; and use commercial fuels (e.g., diesel) that meet specifications of applicable federal and state air pollution control regulations. In addition, CP2 LNG committed to develop a Project Ambient Air Quality Mitigation and Monitoring Plan, in coordination with the LDEQ, involving the installation of air quality monitors to measure ambient concentrations of inhalable particulate matter ($PM_{2.5}$ and PM with an aerodynamic diameter less than or equal to 10 microns [PM_{10}]), and nitrogen dioxide (NO_2) during construction and commissioning of the CP2 LNG Terminal. Implementation of this plan would result in the identification and reporting of periods of elevated concentrations. These measurements, in combination with other information about conditions (e.g., weather) and specific activities at the site, would help to pinpoint the reasons for the elevated concentrations, allowing for the implementation of effective mitigation measures to minimize the potential for future NAAQS exceedances (see section 4.12.1.3 for additional detail). With implementation of these measures, we conclude the construction-related impact on local air quality during the temporary construction period for the Project would not be significant.

CP2 LNG and CP Express conducted detailed air quality impact assessments for emissions of criteria pollutants (subject to Prevention of Significant Deterioration [PSD] review) from the Terminal Facilities and Moss Lake Compressor Station to show compliance with the relevant NAAQS. As part of these assessments, CP2 LNG and CP Express provided model-predicted results that showed the furthest distance that the impacts of Project-related operation emissions would contribute to the cumulative impacts for the NAAQS compliance assessment. Based on the air quality impact analysis results for CP2 LNG, operation of the Project would result in 1-hour NO_2 impacts at various locations out to about 15 miles from the Terminal Facilities that exceed the relevant significant impact level (SIL). However, a further assessment of the cumulative analysis results showed that none of these predicted impacts would cause or contribute to a modeled exceedance of the 1-hour NO_2 NAAQS. A summary of the predicted exceedances of the 1-hr NO_2 NAAQS around the Terminal Facilities, including the Project's contribution to these exceedances, is presented in appendix K.

The Significance Analysis for the Moss Lake Compressor Station sources showed that 1-hour and annual NO_2 and 24-hour PM (i.e., $PM_{2.5}$) impacts exceeded the associated SILs. A further assessment of the cumulative analysis results showed compliance with the NAAQS except for the 1-hour NO_2 NAAQS and 24-hour $PM_{2.5}$ NAAQS. However, the cumulative analysis results showed that none of these predicted impacts would cause or contribute to a modeled exceedance of the 1-hour NO_2 or 24-hour $PM_{2.5}$ NAAQS.

Although Project emissions of criteria pollutants are expected to be minimal, and the NAAQS are designated to protect sensitive populations such as children, the elderly, and persons with asthma, we acknowledge that NAAQS attainment alone may not assure there is no localized harm to such populations due to project emissions of VOCs, hazardous air pollutants (HAP), and issues such as the presence of non-Project-related pollution sources, local health risk factors, disease prevalence, and access (or lack thereof) to adequate care. Based on review of EJScreen, the environmental justice community in which the Terminal Facilities are located (CT 9702.02, BG 2) are within the 64th percentile for cancer.[119] FERC conducted a Human Health Risk Assessment (HHRA) for HAP emissions from the CP2 LNG Terminal Facilities (stationary and mobile marine sources) based on model-predicted 1-hour and annual average ground-level concentrations of a total of 16 HAPs (see section 4.12.1.4).[120]

The HHRA estimated chronic (long-term) cancer risk and non-cancer hazard, as well as acute (short-term) non-cancer hazard via inhalation of HAP compounds potentially emitted from stationary and mobile marine sources at the Terminal Facilities. The HHRA evaluated inhalation exposure of hypothetical adult and child residents for which Reasonable Maximum Exposure was assumed.[121] Residential inhalation exposures were assumed to occur at the area (i.e., receptor) of greatest contaminant concentration (i.e., maximum model-predicted 1-hour and annual average concentrations) to maximize estimated exposure.

Chronic cancer risks and chronic non-cancer hazards as well as acute hazards associated with inhalation exposure are estimated using the calculated average inhalation exposure per unit of time (Exposure

[119] EJScreen data descriptions state data is for cancer (excluding skin cancer) prevalence among adults aged 18 or older. EJScreen data descriptions state this data is available at the Census tract level; the same tract value is then assigned to all sub block groups. The source is listed as CDC Places Data, available at https://www.cdc.gov/places/index.html.

[120] Venture Global CP2 LNG, LLC and CP Express, LLC. Accession No. 20230526-5223, Attachment 11-2 – Hazardous Air Pollutants Air Quality Modeling Analysis Report for the CP2 LNG Terminal. May 26, 2023.

[121] Reasonable Maximum Exposure means that the hypothetical resident is conservatively assumed to be exposed 24 hours a day, 350 days a year (two weeks assumed for travel) for 30 years for the adult resident (represents ~ 95th percentile residency time for the U.S. population) and six years for the child resident.

Concentration) with the appropriate chronic and acute toxicity factors for the inhalation pathway. For chronic and acute non-cancer inhalation exposure to emissions from each HAP, the potential for adverse effects were estimated by comparing the Exposure Concentration for each HAP to the HAP-specific toxicity factor. This HAP-specific comparison is known as the Hazard Quotient (HQ).

The results of the HHRA showed that the estimated adult and child resident cancer risk for each HAP is at least an order of magnitude (i.e., 10-fold) below EPA's risk management objective of 1-in-1 million for individual HAPs. Moreover, the total cancer risks summed across all HAPs are well below (by almost 100-fold) EPA's target of 1-in-100,000 for a single facility. This 1-in-100,000 individual facility risk management objective is ten times more stringent than the highest cancer risk that EPA deems acceptable to account for potential exposure to background levels of air contaminants. Therefore, this facility risk management objective addresses the potential for cumulative risk (i.e., risk associated with multiple HAPs and other sources in the area).

The results of the HHRA also indicated that no chronic HQ for any HAP is greater than the non-cancer risk management objective of 1 for individual HAPs. In addition, all segregated chronic Hazard Index values (derived by summing HQ values for all HAPs with similar chronic effects) are well below 1 (by almost 100-fold). Similarly, all acute HQ and segregated acute HI values are well below the acute risk management objective of 1 (by almost 100-fold).

We emphasize that the cancer risks for the adult and child resident in this HHRA were estimated at the off-property location of maximum model-predicted impacts for each HAP. In addition, summing cancer risk across all carcinogenic HAPs is an extremely conservative approach (i.e., health protective) that is likely to substantially overestimate cumulative cancer risk from a particular source. Likewise, summing chronic HQ or acute HQ values across HAPs, even those that have similar effects, is highly conservative and likely overestimates chronic and acute hazards. Therefore, based on the results of this HHRA, the estimated cancer and non-cancer risks for the environmental justice communities near the CP2 LNG Terminal Facilities would be below EPA's risk management objectives described above. Section 4.12.1.4 provides additional discussion on the air quality impacts from the Project, including further discussion of the results of the human health impact assessment due to operation of the LNG Terminal and mobile sources.

Overall, we conclude the construction and operational emissions from the Project would not have significant adverse air quality impacts on the minority and low-income populations in the Project area. The air quality impacts analyses are discussed in more detail in section 4.12.1.

Noise

Noise levels above ambient conditions, attributable to construction activities would vary over time and would depend upon the nature of the construction activity, the number and type of equipment operating, and the distance between sources and receptors. The Terminal Facilities and the closest NSA are within an identified environmental justice block group (CT 9702.02, BG 2). The closest NSA (NSA 2) is about 330 feet northeast of the Terminal Site (from the floodwall, where pile driving would occur during construction) and consists of an RV park and residence.[122] Construction activities would vary depending on the type of construction activity, the type of equipment used, and the distance of sensitive receptors, such as residences, from the construction activity. The most prevalent construction noise sources include pile driving, HDDs used to install pipeline sections at several locations, and internal combustion engines associated with construction equipment.

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[122] NSA distance is presented differently here than in section 4.12.2.2. NSA 2 is 330 feet from the floodwall of the Terminal Site, where pile driving would occur to install the floodwall, and is 2,450 feet from the approximate center of the Terminal Site.

With the exception of pile driving activities, construction at the Terminal Facilities would occur 24 hours per day for the duration of construction of both Phase 1 and Phase 2. There are phases of construction that may result in noticeable increased noise levels (e.g., during the civil phase alone and peak construction days) at the nearest NSAs. The human ear's threshold of perception for noise change is considered to be 3 dB on the A-weighted scale (dBA). Construction noise related to the civil phase alone and peak construction days would increase noise levels over ambient by 9 dB and 10 dB (respectively) at this NSA. During peak construction days, CP2 LNG expects civil works, facilities equipment assembly, pile driving, and dredging to occur simultaneously. Pile driving activities would occur at different locations throughout the Terminal Facilities site. At the nearest NSA, pile driving activities could increase estimated 24-hour equivalent noise levels up to 7 dB. Although the Project intends to construct 24 hours per day, pile driving would be limited to daytime hours (i.e., 7 a.m. to 7 p.m.). Construction of the floodwall near the affected NSAs would occur as early as possible during Project construction. The floodwall is expected to reduce the noise levels at the NSAs by 5 to 10 dBA, depending on the location of construction activities. Additional noise mitigation measures during nighttime construction may include broadband backup alarms, local equipment barriers, and reduced activities, as needed. Construction noise would be short-term and would last the 4 years of construction, with the most noise intensive activities (pile driving and civil works) occurring over the first 18 months of construction. To minimize noise attributable to nighttime construction and pile driving, we recommend in section 4.12.2.3 that CP2 LNG file nighttime noise and pile driving noise mitigation plans with the Secretary for review and approval.

As discussed in section 4.12.2, noise associated with unmitigated HDD activities for the Pipeline System would increase noise levels above the ambient at sensitive receptor sites in proximity to two HDD entry/exit locations (Marshall Street HDD Entry/Exit and Terminal Site Entry/Exit) in an identified environmental justice block group (CT 9702.02, BG2). The closest NSAs to the Marshall Street HDD are residences 990 feet southeast and 380 feet southeast of its entry/exit locations, respectively. The closest NSAs to the Terminal Site HDD are residences 890 feet northeast and 430 feet southeast of its entry/exit location, respectively. CP Express plans to restrict HDD activities to daytime hours (i.e., 7 a.m. to 7 p.m.) with the exception of pipe pullback and hydrostatic testing, which would occur continuously during daytime and nighttime hours until the activity is complete; however, depending on site conditions, pullback and testing activities are generally completed within a day or two. In locations where temporary noise barriers are not feasible and the HDD activities occur during the nighttime hours, CP Express would offer temporary relocation to affected residents at NSAs where sound levels are greater than the applicable FERC noise criterion (55 dBA day-night sound level [L_{dn}]; see section 4.12.2.1), as necessary.

Noise associated with construction of the pipelines would be short-term and temporary at any given location, including those locations within environmental justice block groups, due to the assembly-line method of pipeline installation. During installation, construction activities are concentrated in one area while the pipeline is installed and continue in a linear fashion along the pipeline route. While the noise levels attributable to construction equipment could noticeably increase ambient noise levels at the sensitive receptors nearest the workspace, this noise would be temporary and localized. Except for HDD locations, construction activities would generally be limited to daytime hours; therefore, most construction noise would have no nighttime impacts on residents or other sensitive receptors near the pipelines. Due to the temporary nature of these activities, no associated long-term impacts are anticipated for environmental justice populations.

Operational noise at the Terminal Facilities would increase noise levels over ambient by about 5.7 decibels at the closest NSA. With the implementation of appropriate mitigation measures and our recommendation, the Project would not result in significant noise impacts on local residents and the surrounding communities, including environmental justice populations, at the Terminal Facilities. Operational noise associated with the Terminal Facilities would be persistent; however, CP2 LNG would be required to meet sound level requirements.

Operation of the Pipeline System would include an increase in noise levels at the Florida Gas Transmission Meter Station, Enable Interconnect Meter Station, CPX Meter Station; however, there are no NSAs within identified environmental justice block groups within 0.5 mile of meter stations.

Overall, based on our recommendations, the Project would not result in significant noise impacts on local residents and the surrounding communities, which include environmental justice communities, along the Pipeline System. Noise impacts are more fully addressed in section 4.12.2.

4.10.10.4 Environmental Justice Impact Mitigation

As described in Promising Practices, when an agency identifies potential adverse impacts it may wish to evaluate practicable mitigating measures. CP2 LNG and CP Express have committed to several minimization and mitigation measures to reduce impacts related to traffic delays, construction-period dust and noise, and visual impacts, as well as long-term noise and air quality (see table 2.5-1 in section 2.5). Though not specifically targeted at mitigating impacts on environmental justice communities, mitigation measures would be implemented across the Project area, including within the identified environmental justice communities. CP2 LNG and CP Express have committed to:

- working with local school districts to identify bus routes and commute times to minimize construction traffic impacts along these routes during peak use periods;
- implementing flagger police vehicle(s) and/or traffic signals along certain school bus routes and intersections during Stages 3 and 4 of construction;
- utilizing P&Rs, shared rides, and/or buses during construction to allow for efficient transportation to work areas;
- staggering shift start and end times during construction to minimize construction traffic impacts;
- complying with all fugitive dust requirements, including implementation of its Traffic, Noxious Weeds, and Fugitive Dust Control Plan, and generally limiting most construction activities to 7:00 a.m. to 7:00 p.m. (see sections 2.3 and 4.12.2), as well as the areas of ground disturbance, to minimize fugitive dust and noise during construction;
- offering relocation to residents affected by nighttime construction;
- complying with applicable air quality regulations;
- reducing vehicle and equipment speed in construction work areas and on access roads to account for environmental conditions and establish a policy to limit equipment idling; and
- implementation of a Facility Lighting Plan[123] for the Terminal Facilities, which includes measures to minimize visual impacts from lighting, including the use of LED lamps and fixtures with diffusers, lenses, and shields to reduce glare and light pollution.

Following construction, temporary workspaces associated with installation of the CP Express Pipeline and Enable Gulf Run Lateral, would be restored in accordance with CP Express' Project-Specific Plan and Procedures, and in addition to other federal, state, and local permit requirements. Areas disturbed by construction would be graded to match original contours and surrounding drainage patterns, except at those locations where permanent changes in drainage would be required to prevent scour, erosion, or potential exposure of the pipeline. In addition, FERC staff would maintain compliance oversight of the Project throughout construction and restoration.CP2 LNG and CP Express' community benefit efforts have included: sponsoring scholarships and other educational initiatives for the local community and funding a wide variety

[123] CP2 LNG and CP Express' Facility Lighting Plan can be viewed on FERC's eLibrary as Appendix 8B of accession no. 20211202-5104.

of cultural and community events.CP2 LNG and CP Express have committed to seeking additional opportunities to contribute to the region, with a special emphasis to be placed on supporting/developing technical and workforce training programs (e.g., programs that provide training opportunities for residents for high-demand skilled labor, workforce training programs at high schools in the Project area, etc.). Venture Global LNG created and funds Will to Skill, a community investment program piloted in 2020 that provides training opportunities for high-demand skilled labor and includes tuition, books, instructors, and fees associated with receiving the certifications. Venture Global developed and is implementing Will to Skill pilot programs for residents in Jasper and Newton counties, Texas and Calcasieu and Cameron parishes, Louisiana, which commenced in March 2023. Through the Will to Skill program, CP2 LNG and CP Express state residents from Jasper and Newton counties graduated from a welding class in May 2023 and Calcasieu Parish residents graduated from a Commercial Driver's License class in June 2023. CP2 LNG and CP Express state the Will to Skill program would host a Commercial Driver's License class for Cameron Parish residents in August 2023 and further workforce training opportunities, including a fiber optics class for Calcasieu Parish residents and two additional welding classes and a maritime class for Jasper and Newton County residents, would be offered in the remainder of 2023. Additionally, Venture Global is also working with elected officials and other stakeholders to implement workforce training and apprenticeship programs in the Project area.

4.10.10.5 Determination of Disproportionately High and Adverse Impacts on Environmental Justice Communities

In conclusion, as highlighted in table 4.10.10-1, 17 block groups out of 31 block groups within the geographic scope of the Project are considered environmental justice communities. As previously stated, Project work within the review area for assessing impacts on environmental justice communities includes the construction and operation of the Terminal Facilities, portions of the CP Express Pipeline and Enable Gulf Run Lateral, the CPX Meter Station and Enable Interconnect Meter Station, the spread 1 contractor and pipe yards (i.e., Vinton Canal Boat Launch Road Pipe Unloading Area, West Road Contractor Yard, Johnny Breaux Yard), and the spread 2 – East Prien Lake Road Contractor and Pipe Yard. In addition, the Florida Gas Transmission Interconnect Meter Station is within 1 mile of an identified environmental justice block group (CT 35, BG 1). The Helms P&R is in and within 1 mile of three environmental justice block groups (CT 17, BG 6; CT 17, BG 5; and CT 9701.01, BG 1) and the Liberty P&R and PHI Yard P&R are in and within 1 mile of one environmental justice block group (CT 9702.02, BG 2).

Temporary adverse impacts on environmental justice communities from construction of the Pipeline System include impacts associated with water resources, wetlands, socioeconomic, recreational and commercial fishing, traffic, air quality, and construction noise. Operation of the Pipeline System would include an increase in noise levels at the Florida Gas Transmission Meter Station, Enable Interconnect Meter Station, CPX Meter Station; however, there are no NSAs within identified environmental justice block groups within 0.5 mile of meter stations. Permanent adverse impacts on visual resources in environmental justice communities would occur as a result of operation of the Pipeline System, including removal of forested vegetation and periodic vegetation clearing within the permanent right-of-way. Permanent adverse impacts on visual resources would occur as a result of the CPX Meter Station, Enable Interconnect Meter Station, and Florida Gas Transmission Interconnect Meter Station; however, these changes would not be visible from nearby residences. The construction and operation of the Pipeline System (including meter stations, contractor yards, and P&R locations) would have a disproportionately high and adverse impact on environmental justice communities because the impacts are predominately borne by those communities, but the impacts would be less than significant.

In addition, as described throughout this section, temporary and permanent adverse impacts on environmental justice communities from construction and operation of the Terminal Facilities include impacts associated with water resources, wetlands, socioeconomic, recreational and commercial fishing, traffic, air quality, noise, and visual resources. The construction and operation of the Terminal Facilities would have a disproportionately high and adverse impact on environmental justice communities because the impacts are predominately borne by those communities. Visual impacts on environmental justice communities near the Terminal would be significant. In addition, as discussed in section 4.14.2.8 and shown in visual renderings provided in appendix J, the Project would contribute to significant cumulative visual impacts on environmental justice communities. The remainder of the temporary and permanent adverse impacts on environmental justice communities from construction and operation of the Terminal Facilities associated with water resources, wetlands, socioeconomic, recreational and commercial fishing, traffic, air quality, and noise would be less than significant.

4.11 CULTURAL RESOURCES

Section 106 of the NHPA, as amended, requires the FERC to take into account the effects of its undertakings on properties listed, or eligible for listing, on the National Register of Historic Places (NRHP), and to afford the Advisory Council on Historic Preservation (ACHP) an opportunity to comment. CP2 LNG and CP Express, as non-federal parties, are assisting the FERC in meeting our obligations under Section 106 by preparing the necessary information, analyses, and recommendations, as authorized by 36 CFR 800.2(a)(3) and FERC's regulations at 18 CFR 380.12(f).

4.11.1 Area of Potential Effects

The Project area of potential effects (APE) is the "geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist" (36 CFR 800.16(d)). The Project APE includes the construction footprint, or direct APE, as well as the indirect APE that could be affected by the installation of visual or atmospheric, and, in some cases, physical elements that would alter a property's setting and feeling.

The Project's APE for direct effects is limited to the area where ground or offshore disturbance will or could take place. For the Terminal Facilities, the APE includes the Terminal Site, Marine Facilities, and LNG transfer lines as well as offshore areas within Calcasieu Pass. For the Pipeline System, the APE is the proposed pipeline corridor and associated workspace and footprints of aboveground facilities, access roads, and other work areas.

The Project's APE also includes an area in which historic structures within a direct line of sight within a 0.5-mile-wide buffer from the Terminal Facilities boundary. For the Pipeline System, the indirect APE includes a 0.5-mile buffer from the pipeline corridor, and aboveground facilities.

4.11.2 Survey Results

Terminal Facilities

CP2 LNG completed marine, terrestrial, and historic architecture investigations for the Terminal Facilities APE in Louisiana. Marine surveys included magnetometer, side-scan sonar, and sub-bottom data collection methods, as well as diving investigations specific to an identified magnetic anomaly and corresponding side-scan sonar acoustic contact. The dive investigations of the anomaly determined that the source is modern debris and is not a historic property. No additional cultural resources were identified as a result of these marine investigations. Based on these findings, CP2 LNG recommended that no historic properties would be affected by the Project specific to the marine APE. In a July 14, 2021 letter, the Louisiana State Historic Preservation Officer (SHPO) concurred with CP2 LNG's recommendations. We also concur.

CP2 LNG completed terrestrial Phase I cultural resources surveys for the Terminal Site and Marine Facilities APE in Louisiana. The Phase I survey resulted in the documentation of one archeological site (16CM172) within the Terminal Site, and two archeological sites (16CM146 and 16CM176) within the Marine Facilities. CP2 LNG recommended that sites 16CM172 and 16CM176 are not eligible for listing in the NRHP.

No evidence of site 16CM146 was documented within the Marine Facilities APE. As such, the portion of site 16CM146 within the Marine Facilities APE is recommended as not eligible for listing in the NRHP. CP2 LNG completed a historic architectural survey viewshed assessment within the indirect APE, which included a 0.5-mile study area around the Terminal Facilities. Research identified no known historic architectural resources within either the direct or indirect APE. Based on these findings, CP2 LNG recommended that no historic properties would be directly or indirectly affected by the Project. In a December 17, 2021 letter, the Louisiana SHPO concurred with CP2 LNG's recommendations. We also concur.

We received a comment from RESTORE on the draft EIS that a historic site known as the Gulf Biological Station at Cameron is on the proposed Terminal Site. This historic site lies outside of the APE for the proposed Project. However, the site was documented as 16CM171 during an archaeological survey conducted by Venture Global in 2015 for the Calcasieu Pass Project (CP15-550-000). At that time, the site was recommended as not eligible for listing in the NRHP, as it was reported to be 90 percent destroyed. The Louisiana SHPO concurred with the recommendation. With the construction of the Calcasieu Pass Terminal, the site no longer exists.

Pipeline System

CP Express conducted terrestrial Phase I cultural resources surveys within a 300-foot-wide corridor for the Pipeline System, a 50-foot-wide corridor for access roads, as well as the total footprint for ATWS areas and other off-line facilities, such as meter and compressor stations in Texas and Louisiana. The Phase I survey specific to the Pipeline Facilities APE in Louisiana resulted in the documentation of one new archeological site (16CU231). This site has an undetermined NRHP status and has been avoided by Project workspace. CP Express also completed a historic architectural survey viewshed assessment for the Pipeline System in Louisiana. These investigations resulted in the documentation of seven historic resources, of which one resource (New Orleans, Opelousas and Great Western railway [10-02198]) is recommended eligible for listing in the NRHP. CP Express has modified its Project design to bypass this resource via HDD resulting in no impacts on historic properties. The remaining six documented historic resources were recommended not eligible for listing in the NRHP, and no further work is warranted for these resources in association with the Project.

The Phase I survey specific to the Pipeline System APE in Texas resulted in the documentation of one new archeological site (41NW131) and one isolated find (IF-RAM-03). CP Express recommended that the site and the isolated find are not eligible for listing in the NRHP. CP Express also completed a historic architectural survey viewshed assessment for the Pipeline System in Texas. These investigations resulted in the documentation of seven historic resources, of which one resource (Sabine River and Northern Railroad [Resource 51]) is recommended eligible for listing in the NRHP. CP Express modified its Project design to bypass this resource via HDD resulting in no impacts on historic properties. The remaining six documented historic resources were recommended not eligible for listing in the NRHP, and no further work is warranted for these resources in association with the Project.

Based on these factors, CP Express recommended that no historic properties would be affected by those portions of the Pipeline System surveyed for cultural resources to date. In a December 17, 2021 letter, the Louisiana SHPO concurred with CP Express' recommendations. We also concur. In correspondence dated March 9, 2022, the Texas SHPO requested additional information before they can provide a determination. Specifically, this included the receipt and approval of a scope of work for deep testing investigations at select locations, as well as various other data requests needed to facilitate their review. A deep testing scope of work was submitted to the Texas SHPO on May 6, 2022, and additional information was requested specific to the deep testing scope of work from the Texas SHPO in correspondence dated June 2, 2022. The revised scope of work for deep testing investigations was submitted to the Texas SHPO on June 3, 2022. In correspondence dated July 12, 2022, the Texas SHPO indicated that they would delay their review of the revised Phase I report until the deep testing has been conducted, and results have been included in a revised Phase I report. To date, these consultations are ongoing.

To date, Phase I surveys as well as deep testing at select locations have not been completed for portions of the Pipeline System in Louisiana and Texas due to land access restrictions. CP Express state they have signed survey permission for 63 percent of the Pipeline System right-of-way and are in active negotiations with the remaining 37 percent..

4.11.3 Unanticipated Discoveries Plan

CP2 LNG and CP Express provided a plan addressing the unanticipated discovery of cultural resources or human remains during construction to the FERC and SHPOs. We and the SHPOs requested revisions to the plan. CP2 LNG and CP Express submitted a revised plan which we find acceptable. The Louisiana SHPO concurred with the plan on July 26, 2021. The Texas SHPO has yet to provide their concurrence of the plan.

4.11.4 Tribal Consultation

CP2 LNG and CP Express sent letters to 14 federally recognized tribes on January 20, 2021 and July 2, 2021 (via hard copy), which included a Project description and maps. CP2 LNG and CP Express requested any information or concerns regarding places of traditional or cultural significance. CP2 LNG and CP Express contacted the following tribes: the Alabama-Coushatta Tribe of Texas, Alabama-Quassarte Tribal Town, Apache Tribe of Oklahoma, Caddo Nation of Oklahoma, Chitimacha Tribe of Louisiana, Comanche Nation of Oklahoma, Coushatta Tribe of Louisiana, Jena Band of the Choctaw Indians, Mississippi Band of Choctaw Indians, Muscogee (Creek) Nation, Tonkawa Tribe of Indians of Oklahoma, Tunica-Biloxi Tribe of Louisiana, and Wichita and Affiliated Tribes. On July 2, 2021, a letter providing a Project description was also sent to the Choctaw Nation of Oklahoma.

CP2 LNG and CP Express sent the Project map and a CD with copies of survey reports, respectively, to the Caddo Nation of Oklahoma via email on November 18, 2021 and November 21, 2021.

In email correspondence dated November 2, 2021, CP2 LNG and CP Express provided Project shapefiles and cultural reports completed to date to the Choctaw Nation of Oklahoma. In addition, CP2 LNG and CP Express provided a CD with copies of survey reports to the Choctaw Nation of Oklahoma on November 21, 2021.

In email correspondence dated January 3, 2022 and January 4, 2022, copies of completed cultural reports were submitted to the Choctaw Nation of Oklahoma. No additional responses have been received to date.

On September 15, 2021, we sent letters to the following tribes: Alabama-Coushatta Tribe of Texas, Alabama-Quassarte Tribal Town, Apache Tribe of Oklahoma, Caddo Nation of Oklahoma, Chitimacha Tribe of Louisiana, Comanche Nation of Oklahoma, Coushatta Tribe of Louisiana, Jena Band of the Choctaw Indians, Muscogee (Creek) Nation, Tonkawa Tribe of Indians of Oklahoma, Tunica-Biloxi Tribe of Louisiana, and Wichita and Affiliated Tribes.

In a letter to FERC dated October 14, 2021, the Choctaw Nation of Oklahoma requested to consult with FERC on the portion of the Project in Calcasieu and Cameron Parishes, Louisiana. The Choctaw Nation also requested copies of the Project's cultural resource surveys and FERC's EIS when available. As mentioned above, CP2 LNG and CP Express provided the survey reports on November 21, 2021. The Choctaw Nation of Oklahoma was on our environmental mailing list to receive the Notice of Availability of the draft EIS. The draft EIS is available on the FERC website.[125] No further comments have been received from the Choctaw Nation of Oklahoma.

In email correspondence dated December 6, 2021, the Muscogee (Creek) Nation stated "The project area is currently outside of the Muscogee (Creek) Nation historic area of interest" and deferred to the other federally-recognized Tribes. No further comments have been received from the Muscogee (Creek) Nation.

On February 19, 2022, we sent the NOI for the Project to the same federally-recognized tribes. To date, no tribe has responded to our letter or the NOI.

CP2 LNG and CP Express also sent a Project status update on March 17, 2023 to the following tribes: the Alabama-Coushatta Tribe of Texas, Alabama-Quassarte Tribal Town, Apache Tribe of Oklahoma, Caddo Nation of Oklahoma, Chitimacha Tribe of Louisiana, Comanche Nation of Oklahoma, Coushatta Tribe of Louisiana, Jena Band of the Choctaw Indians, Mississippi Band of Choctaw Indians, Muscogee (Creek) Nation, Tonkawa Tribe of Indians of Oklahoma, Tunica-Biloxi Tribe of Louisiana, Wichita and Affiliated Tribes, and Choctaw Nation of Oklahoma. No further comments have been received.

4.11.5 Status of Compliance with the National Historic Preservation Act

No Native American traditional cultural properties, sacred sites, aboriginal burials, or objects of cultural patrimony were identified to date within the APE by the Texas Historical Commission, Louisiana Division of the Arts, or an interested Indian tribe.

Because surveys and consultation are not complete for the Pipeline Facilities, and to ensure our responsibilities under Section 101(d)(6) NHPA and its implementing regulations are met, **we recommend that**:

- **CP Express should <u>not begin</u> construction of the facilities and/or use of staging, storage, or temporary workspace areas and new or to-be improved access roads <u>until</u>:**

  a. CP Express files with the Secretary:
  - **i. any remaining cultural resources survey report(s);**
  - **ii. site evaluation report(s) and avoidance/treatment plan(s), as required; and**
  - **iii. comments on the cultural resources reports and plans from the Texas and Louisiana SHPOs and/or any interested Indian tribes.**

  b. the ACHP is afforded the opportunity to comment if historic properties would be adversely affected; and

  c. the FERC staff reviews and the Director of OEP, or the Director's designee, approves the cultural resources reports and plans, and notifies CP Express in writing that treatment plans/mitigation measures (including archaeological data recovery) may be implemented and/or construction may proceed.

  All material filed with the Commission containing <u>location, character, and ownership information</u> about cultural resources much as the cover and any

[125] FERC-issued Environmental documents including Draft Environmental Impact Statements, Final Environmental Impact Statements and Environmental Assessments can be viewed at https://www.ferc.gov/industries-data/natural-gas/environmental-overview/environmental-documents-2022.

relevant pages therein clearly labeled in bold lettering: "CUI/PRIV – DO NOT RELEASE."

4.12 AIR QUALITY AND NOISE

4.12.1 Air Quality

The term air quality refers to the relative concentrations of pollutants in the ambient air. Air quality would be affected by construction and operation of the Project. Although air emissions would be generated by operation of equipment during construction of the Project facilities, most air emissions associated with the Project would result from the operation of the Project facilities. This section of the EIS addresses the construction and operational air emissions from the Project, as well as applicable regulatory requirements and projected impacts on air quality. We received comments from Healthy Gulf expressing concern with the impacts of construction and operation on air quality at the Terminal Site.

Regional Climate

The proposed Project facilities are on the flat Coastal Plain in the southwestern corner of Louisiana and eastern Texas. The general climate of the region is classified as humid subtropical with a strong maritime character. The climate is influenced to a large degree by the proximity of the Gulf of Mexico.

Although not significant, small differences exist between the climate experienced in the regions around the Terminal Facilities and the Moss Lake Compressor Station. Available data from meteorological monitoring stations representative of the region surrounding the two primary facilities of the Project are summarized and presented below.

Terminal Facilities Region (Cameron Parish, Louisiana)

Climate information from the National Weather Service station at Jack Brooks Regional Airport (KBPT) in Beaumont/Port Arthur, Texas was used to describe the climate (temperature and precipitation) of the Terminal Facilities region. This meteorological station is about 43 miles west-northwest of the proposed facility.

Cameron Parish has very short, mild winters and long, hot and humid summers, although sea breezes from the Gulf of Mexico prevent the occurrence of extremely high temperatures. Climate data for the period 1981 through 2010 show daily average high temperatures that range from 62 °F during January to 92 °F during August. Daily average low temperatures range from 43 °F in January to 74 °F during July and August. The record minimum and maximum temperatures are 12 °F and 108 °F, respectively. High humidity is the result of evenly distributed rainfall and proximity to the Gulf of Mexico, resulting in an annual average relative humidity of 79 percent (NOAA, 2021a).

Precipitation is evenly distributed throughout the year, with the lowest amounts falling during early-spring and the highest amounts falling during the summer. The annual average precipitation amounts to 60.5 inches, with a monthly maximum of 7.1 inches in June and a monthly minimum of 3.2 inches in April. Much of the precipitation during the summer occurs in short duration thunderstorms. Tropical storms or hurricanes, although infrequent, can also enhance the summer and autumn rainfall in this region (NOAA, 2021a).

Historical wind summaries have been derived from analysis of wind data for 1982 through 2000 from the Cameron Heliport in Cameron, Louisiana. This meteorological station is approximately 1.5 miles east of the Terminal Facilities. The predominant wind direction for most of the year is generally southeasterly, with a shift to north-northeasterly during periods of the fall and winter. The prevailing southeasterly wind is further enhanced during spring and summer by thermal winds which develop when the air over the heated land further inland from the coast is warmer than the air over the relatively cooler waters of the Gulf of Mexico. The average wind speed, excluding periods of calm, was 8.7 miles per hour (mph). Calm periods (e.g., no wind) occurred 7.3 percent of the time (Iowa State University, 2021).

Moss Lake Compressor Station and Pipeline Region (Calcasieu Parish, Louisiana, and Jasper and Newton Counties, Texas)

Climate information from the National Weather Service station at Lake Charles Municipal Airport (KLCH) in Lake Charles, Louisiana was used to describe the climate (temperature and precipitation) of the Moss Lake Compressor Station and pipeline region north of Cameron Parish. This meteorological station is about 11.1 miles east–northeast of the proposed compressor station site.

Climate data obtained for the period 1981 through 2010 show daily average high temperatures range from 61 °F during January to 92 °F during August. Daily average low temperatures range from 42 °F in January to 75 °F during July. The record minimum and maximum temperatures are 11 °F and 107 °F, respectively. High humidity is the result of evenly distributed rainfall and proximity to the Gulf of Mexico, resulting in an annual average relative humidity of 79 percent (NOAA, 2021b).

Precipitation is evenly distributed throughout the year, with the lowest amounts falling during late-winter/early-spring and the highest amounts falling during the summer. The annual average precipitation amounts to 57.5 inches, with a monthly maximum of 6.9 inches in June and a monthly minimum of 3.3 inches in April. Much of the precipitation during the summer occurs in short duration thunderstorms. Tropical storms or hurricanes, although infrequent, can also enhance the summer and autumn rainfall in this region (NOAA, 2021b).

Historical wind summaries have been derived from analysis of wind data for 2006 through 2021 from the Southland Field Airport (KUXL) in Sulphur, Louisiana. This meteorological station is approximately 4.8 miles northeast of the compressor station site. The predominant wind direction for most of the year is generally southeasterly. The average wind speed, excluding periods of calm, was 6.8 mph. Calm periods (e.g., no wind) occurred 20.1 percent of the time (Iowa State University, 2021).

4.12.1.1 Existing Air Quality

The EPA comments state that the EIS should provide a detailed discussion of ambient air conditions, the NAAQS and non-NAAQS pollutants, nonattainment areas, and the potential air quality impacts of construction and operation of the Project, including any proposed mitigation measures. These topics are all discussed in the respective sections below.

The subsections below describe well-established air quality concepts that are applied to characterize air quality and to determine the significance of increases in air pollution. This includes metrics for specific air pollutants known as criteria pollutants, in terms of ambient air quality standards, regional designations to manage air quality known as Air Quality Control Regions (AQCR), and the on-going monitoring of ambient air pollutant concentrations under state and federal programs.

Combustion of fossil fuels, such as natural gas, produces air pollutants such as NO_x, carbon monoxide (CO), SO_2, and inhalable particulate matter ($PM_{2.5}$ and PM_{10}). $PM_{2.5}$ includes particles with an aerodynamic diameter less than or equal to 2.5 micrometers, and PM_{10} includes particles with an aerodynamic diameter less than or equal to 10 micrometers. Combustion of fossil fuels also produces VOCs, a large group of organic chemicals that have a high vapor pressure at room temperature. VOCs react with NO_x, typically on warm summer days, to form ozone. Other byproducts of combustion are greenhouse gases (GHG) and HAPs. HAPs are chemicals known to cause cancer and other serious health impacts.

The EPA has defined air pollution to also include the mix of six directly emitted and long-lived GHGs: CO_2, methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. GHGs occur in the atmosphere both naturally and because of human activities, such as the burning of fossil fuels. The primary GHGs produced by fossil fuel combustion are CO_2, CH_4, and N_2O. There are no NAAQS for GHGs and their status as pollutants is not related to toxicity; GHGs are non-toxic and non-hazardous at normal ambient concentrations. The EPA found that the current and projected concentrations of the six GHGs in the atmosphere threaten the public health and welfare of current and future generations through climate change. This topic is discussed further in section 4.12.2.13.

Emissions of GHGs are typically expressed in terms of CO2e. The GHG CO2e unit of measure takes into account the global warming potential (GWP) of each GHG. The GWP is a ratio relative to CO2 that is based on the particular GHG's ability to absorb solar radiation as well its residence time within the atmosphere. Based on this definition, CO2 has a GWP of 1, CH_4 has a GWP of 25, and N2O has a GWP of 298. To obtain the CO2e quantity, the mass of the particular GHG compound is multiplied by the corresponding GWP, the product of which is the CO2e for that compound. The CO2e value for each of the GHG compounds is summed to obtain the total CO2e GHG emissions. We received a comment on the draft EIS that FERC relied on superseded estimates of GWP. We have selected these GWPs over other published GWPs for other timeframes because these are the GWPs the EPA has established for reporting of GHG emissions and air permitting requirements. This allows for a consistent comparison with these regulatory requirements.[126]

Other pollutants, not produced by combustion, are fugitive dust and fugitive emissions. Fugitive dust is a mix of $PM_{2.5}$, PM_{10}, and larger particles thrown up into the atmosphere by moving vehicles, construction equipment, earth movement, and/or wind erosion. Fugitive emissions, in the context of this EIS, includes fugitive emissions of CH_4 and VOCs from operational pipelines and aboveground facilities.

Ambient Air Quality Standards

The EPA has established NAAQS for the following criteria pollutants: SO_2, CO, O_3, NO_2, PM (PM_{10} and $PM_{2.5}$), and lead. There are two classifications of NAAQS: primary and secondary standards. Primary standards set limits the EPA believes are necessary to protect human health including sensitive populations such as children, the elderly, and asthmatics. Secondary standards are set to protect public welfare from detriments such as reduced visibility and damage to crops, vegetation, animals, and buildings.

Individual state air quality standards cannot be less stringent than the NAAQS. The state standards established by the LDEQ as outlined in the Louisiana Administrative Code, Title 33, Part III, Section 711.A and Section 711.B (LAC 33:III.711.A and 711.B), are the same as the federal NAAQS for criteria pollutants. Because the Project air emission sources requiring permitting – the Terminal Facilities and Moss Lake Compressor Station – are located in Louisiana, Texas air quality standards are not included in this assessment. The NAAQS are summarized in table 4.12.1-1. The footnotes in table 4.12.1-1 explain how compliance with each NAAQS is determined.

Table 4.12.1-1

National Ambient Air Quality Standards

Criteria Pollutant	Primary/ Secondary	Averaging Time	Level	Form of Air Quality Standard
CO	Primary	8 hours	10,000 µg/m³	Not to be exceeded more than once per year
	Primary	1 hour	40,000 µg/m³	Not to be exceeded more than once per year
Lead (Pb)	Primary and Secondary	Rolling 3-month average	0.15 µg/m³ [a]	Not to be exceeded

[126] Title 40 , part 98, subpart A, Table A-1 to Subpart A of Part 98 - Global Warming Potentials

Table 4.12.1-1 National Ambient Air Quality Standards				
Criteria Pollutant	**Primary/ Secondary**	**Averaging Time**	**Level**	**Form of Air Quality Standard**
NO_2	Primary	1 hour	188 µg/m^3	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years
	Primary and Secondary	1 year	100 µg/m^3 [b]	Annual mean
Ozone (O_3)	Primary and Secondary	8 hours	0.070 ppm [c]	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years
$PM_{2.5}$	Primary	1 year	12 µg/m^3	Annual mean, averaged over 3 years
	Secondary	1 year	15 µg/m^3	Annual mean, averaged over 3 years
	Primary and Secondary	24 hours	35 µg/m^3	98th percentile, averaged over 3 years
PM_{10}	Primary and Secondary	24 hours	150 µg/m^3	Not to be exceeded more than once per year on average over 3 years
SO_2	Primary	1 hour	75 ppb d	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
	Secondary	3 hours	500 ppb	Not to be exceeded more than once per year

Source: EPA, 2021f

µg/m^3 = micrograms per cubic meter; ppb = parts per billion; ppm = parts per million

[a] In areas designated nonattainment for the Pb standards prior to the promulgation of the current (2008) standards, and for which implementation plans to attain or maintain the current (2008) standards have not been submitted and approved, the previous standards (1.5 µg/m^3 as a calendar quarter average) also remain in effect.

[b] The level of the annual NO_2 standard is 0.053 ppm. This standard is shown here in terms of parts per billion for the purposes of clearer comparison to the 1-hour standard level.

[c] Final rule published October 1, 2015, and effective December 28, 2015. The previous (2008) O_3 standards additionally remain in effect in some areas. Revocation of the previous (2008) O_3 standards and transitioning to the current (2015) standards will be addressed in the implementation rule for the current standards.

[d] The previous SO_2 standards (0.14 ppm 24-hour and 0.03 ppm annually) will additionally remain in effect in certain areas:
1) any area for which it is not yet 1 year since the effective date of designation under the current (2010) standards, and
2) any area for which an implementation plan providing for attainment of the current (2010) standard has not been submitted and approved and that is designated nonattainment under the previous SO_2 standards or is not meeting the requirements of a State Implementation Plan call under the previous SO_2 standards (40 CFR 50.4(3)). A State Implementation Plan call is an EPA action requiring a state to resubmit all or part of its State Implementation Plan to demonstrate attainment of the required NAAQS.

Air Quality Control Regions and Attainment Status

AQCRs are areas established for air quality planning purposes in which state implementation plans (SIPs) describe how ambient air quality standards would be achieved and maintained. AQCRs were established by the EPA and local agencies, in accordance with Section 107 of the CAA and its amendments, as a means to implement the CAA and comply with the NAAQS through SIPs. The AQCRs are intrastate and interstate regions such as large metropolitan areas where the improvement of the air quality in one portion of the AQCR requires emission reductions throughout the AQCR. Cameron and Calcasieu Parishes of Louisiana and Jasper and Newton Counties of Texas are part of the Southern Louisiana-Southeast Texas Interstate AQCR (No. 106).

An AQCR, or portion thereof, is designated based on compliance with the NAAQS. AQCR designations fall under three general categories as follows: attainment (areas in compliance with the NAAQS); nonattainment (areas not in compliance with the NAAQS); or unclassifiable (air quality data is not available). AQCRs that were previously designated nonattainment but have since met the requirements to be classified as attainment are classified as maintenance areas. The Southern Louisiana-Southeast Texas Interstate AQCR is designated as unclassifiable and/or attainment for all criteria pollutants per 40 CFR Part 81. Areas designated as unclassifiable are treated as attainment areas.

Air Quality Monitoring and Background Concentrations

Air quality monitors maintained by the LDEQ are throughout the state to determine existing levels of various air pollutants. In addition, air quality monitors maintained by the TCEQ in the eastern region of Texas can be used to supplement the network of LDEQ monitors for those pollutants with a paucity of available data in the Project region.

Air quality monitoring data for the period 2019-2021 were reviewed by CP2 LNG and CP Express to characterize ambient air quality for regulated criteria pollutants in the vicinity of the Project, including the regions surrounding the Terminal Facilities and Moss Lake Compressor Station. Measured concentrations (micrograms per cubic meter [$\mu g/m^3$]) from representative air quality monitors are summarized by year in table 4.12.1-2. The assessment included the following pollutants: O_3, CO, NO_2, $PM_{2.5}$, PM_{10}, SO_2, and lead. For each pollutant, table 4.12.1-2 gives the available concentrations in terms of annual mean concentration values for each year and/or short-term concentrations. The short-term concentrations shown in this table are maximum or near maximum values (as defined by EPA – see table 4.12.1-2 footnotes) for the identified monitors, which are limited in number and location. As such, the concentrations are not necessarily representative of current actual air quality in the immediate vicinity of the Project sites.

As shown in table 4.12.1-2, each of the measured pollutant concentrations is below the associated NAAQS for each applicable averaging period, thus indicating continued, on-going attainment of the standards.

Table 4.12.1-2

Ambient Air Quality Concentrations for Areas near the Terminal Facilities and Moss Lake Compressor Station

Pollutant	Averaging Period	Rank a	Location	2019	2020	2021	Units	Monitor Station
CO	1-hour	2nd	Texas	1,718	1,718	1,718	$\mu g/m^3$	Deer Park, TX (48-201-1039)
	8-hour	2nd		1,146	1,146	1,000		
NO2	Annual	Mean	Louisiana	14	13	9.5	$\mu g/m^3$	Westlake, LA (22-019-0008)
	1-hour	98^{th} percentile		73	60	55		
Ozone	8-hour	4th	Louisiana	0.065	0.058	0.062	ppm	Carlyss, LA (22-019-0002)
$PM_{2.5}$	24-hour	98^{th} percentile	Louisiana	14	22	16	$\mu g/m^3$	Vinton, LA (22-019-0009)
	Annual	Mean		8.2	8.7	7.8		West Orange, TX (48-361-1001)
PM_{10}	24-hour	2nd	Louisiana	52	90	56	$\mu g/m^3$	Lafayette, LA (22-055-0007)
SO_2	1-hour	99th percentile	Louisiana	14	14	11	ppb	Westlake, LA (22-019-0008)
	3-hour[b]	2nd		17	17	13		

Table 4.12.1-2 Ambient Air Quality Concentrations for Areas near the Terminal Facilities and Moss Lake Compressor Station								
Pollutant	**Averaging Period**	**Rank a**	**Location**	**2019**	**2020**	**2021**	**Units**	**Monitor Station**
Lead	Rolling 3- month average	1st	Louisiana	0.012	0.019	0.014	μg/m^3	Baton Rouge, LA[c]

μg/m^3 = micrograms per cubic meter; ppb = parts per billion; ppm = parts per million
[a] Averaging periods and values displayed for these monitors are as close to matching the relevant NAAQS averaging periods as possible. These monitors are certified by the EPA as suitable for NAAQS-compliance data gathering. The averaging periods used by these monitors may be used to calculate data expressed in accordance with the NAAQS averaging periods.
[b] 2nd high 1-hr value is listed.
[c] The nearest monitor (Site ID 22-033-0014) is located in the East Baton Rouge Parish. No city location is specified but maps indicate the monitor site is located just north of Baton Rouge.

4.12.1.2 Permitting/Regulatory Requirements

The Project would be potentially subject to a variety of federal and state regulations pertaining to the construction and operation of air emission sources. The LDEQ has the primary jurisdiction over air emissions produced by stationary sources associated with the Project. The LDEQ is delegated by the EPA to implement federal air quality programs. The LDEQ's air quality regulations are codified in LAC Title 33, Part III, Chapters 1 through 59. New facilities, such as those associated with the Project, are required to obtain an air quality permit from the LDEQ before initiating construction and operation. Air permit applications were submitted by CP2 LNG for the Terminal Facilities and CP Express for the Moss Lake Compressor Station to the LDEQ on July 29, 2022 and filed in the FERC docket on August 1, 2022.[127] No part of the Project would require air quality permitting in Texas.

The following sections summarize the applicability of various state and federal regulations. The CO_2e emissions summarized in the sections below do not account for the projected CO_2 emissions reductions CP2 LNG would achieve with carbon capture as the CCS system is in development. CP2 LNG's CCS facilities would capture and sequester about 500,000 tons of CO_2 emissions per year.

Federal Air Quality Requirements

The CAA, Title 42 of the U.S. Code, Section 7401 et seq., as amended in 1977 and 1990, and 40 CFR Parts 50 through 99 are the basic federal statutes and regulations governing air pollution in the U.S. The following federal requirements have been reviewed for applicability to the Project.

- New Source Review (NSR)/Prevention of Significant Deterioration (PSD);
- Part 70 Operating Permit;
- New Source Performance Standards (NSPS);
- National Emission Standards for Hazardous Air Pollutants (NESHAP);
- Greenhouse Gas Reporting;
- Chemical Accident Prevention Provisions;
- Stratospheric Ozone Protection; and

[127] Additional information is available in accession No. 20220801-5238.

- General Conformity.

We received a comment from the EPA stating that the EIS should include a discussion of air quality and visibility impacts to Class 1 Federal Areas. No air quality or visibility impacts to any Class I Federal Areas identified in 40 CFR Part 81, Subpart D are expected. The closest Class I Federal Area (Brenton NWR) is 361 miles east of the Terminal Facilities and 270 miles east of the Moss Lake Compressor Station. Based on these distances and the magnitude of Project emissions, an impacts analysis to this area is not required.

New Source Review (NSR)/Prevention of Significant Deterioration (PSD)

Separate preconstruction review procedures for major new sources of air pollution (and major modifications to major sources) have been established for projects that are proposed to be built in attainment areas versus nonattainment areas. The preconstruction permit program for new or modified major sources proposed in attainment areas is known as the PSD program. This review process is intended to keep new air emission sources from causing existing air quality to deteriorate beyond acceptable levels codified in the federal regulations. Because all of the stationary emission sources at the Project facilities are proposed within an attainment area for all criteria pollutants, nonattainment NSR does not apply. Rather, each facility must be reviewed separately to determine applicability with the PSD program.

The PSD rule defines a major stationary source as any source with a potential to emit (PTE) 100 tons per year (tpy) or more of any NSR-regulated pollutant for source categories listed in 40 CFR 52.21(b)(1)(i) or 250 tpy or more of any NSR-regulated pollutant for source categories that are not listed. If a new source is determined to be a major source for any regulated pollutant, then other remaining regulated pollutants, including GHG (CO_2e), would be subject to PSD review if those pollutants are emitted at rates that exceed their respective significant emission rates. A stationary source with annual emissions that exceed the major source threshold for one or more regulated pollutants is subject to a PSD review.

The proposed Terminal Facilities would be adjacent to the Venture Global Calcasieu Pass LNG Terminal, which is an existing major stationary source. Because the Terminal Facilities and Venture Global Calcasieu Pass LNG Terminal are on contiguous properties and under common control by the same parent company, the two terminals are considered part of one major stationary source, per PSD regulations. Therefore, the proposed Terminal Facilities is considered a modification to the existing Calcasieu Pass LNG Terminal.

As shown in table 4.12.1-3, the annual emission rates for NSR-regulated pollutants emitted from the Terminal Facilities – the proposed modification to the existing Calcasieu Pass LNG Terminal – exceed their respective significant emission rates; thus, the Terminal Facilities is subject to PSD review. The PSD regulations, particularly those that apply to major modifications, are outlined in the state regulations in LAC 33:III.509.

Table 4.12.1-3

New Source Review-Prevention of Significant Deterioration (PSD) Applicability Analysis for the Terminal Facilities [a]

Pollutant	Proposed Project Emissions (tpy)[b]	Significant Emission Rate for Major Modification (tpy)	PSD Review Triggered?
PM_{10}	368.9	15	Yes
$PM_{2.5}$	368.9	10	Yes
NO_x	1,152.9	40	Yes
CO	1,844.5	100	Yes

Table 4.12.1-3 New Source Review-Prevention of Significant Deterioration (PSD) Applicability Analysis for the Terminal Facilities [a]			
Pollutant	**Proposed Project Emissions (tpy)[b]**	**Significant Emission Rate for Major Modification (tpy)**	**PSD Review Triggered?**
VOC	175.5	40	Yes
SO_2	254.5	40	Yes
CO_2e[c]	8,528,260	75,000	Yes [d]

a The proposed Terminal Facilities is considered a modification to an existing major stationary source: Venture Global Calcasieu Pass, LLC LNG Facility.
b In determining PSD applicability, NO_x and CO emissions are based on an alternate operating scenario; see Title V/PSD permit applications for the Terminal Facilities submitted to the LDEQ.
c CO_2e emissions do not account for applicant-projected CO_2 emission reductions achieved with carbon capture.
d CO_2e threshold is only applicable if there is a significant increase in emissions of another regulated NSR pollutant.

Venture Global states the Terminal Facilities and Calcasieu Pass LNG terminal would operate independently under separate corporate management. The Terminal Facilities and Calcasieu Pass LNG terminal would not share equipment associated with the power island or liquefaction or marine facilities, and each facility would receive natural gas from separate pipelines. Based on these reasons, Venture Global petitioned the LDEQ to receive a separate PSD permit for the Terminal Facilities, which is pending with the LDEQ.

The annual emissions from the Moss Lake Compressor Station, which is not adjacent to an existing Venture Global facility, must be evaluated to determine if the major source threshold is exceeded. The Moss Lake Compressor Station is not a source-type listed in 40 CFR 52.21(b)(1)(i); therefore, the major source threshold is 250 tpy.

As shown in table 4.12.1-4, the annual CO emission rate exceeds the major source threshold. Additionally, the annual emission rates for the other NSR-regulated pollutants except SO_2 exceed their respective significant emission rates; thus, the Moss Lake Compressor Station is subject to PSD review.

Note that CO_2e emission rates for both the Terminal Facilities and the Moss Lake Compressor Station exceed the significant emission rate threshold of 75,000 tpy, thereby necessitating the inclusion of GHG emissions as part of PSD review for the Project.

Table 4.12.1-4 New Source Review-Prevention of Significant Deterioration (PSD) Applicability Analysis for the Moss Lake Compressor Station				
Pollutant	**Proposed Project Emissions (tpy)**	**Major Stationary Source Threshold Level (tpy)**	**Significant Emission Rate (tpy)**	**PSD Review Triggered?**
PM_{10}	101.7	250	15	Yes
$PM_{2.5}$	101.7	250	10	Yes
NO_x	345.7	250	40	Yes
CO	526.5	250	100	Yes
VOC	150.7	250	40	Yes

Table 4.12.1-4 New Source Review-Prevention of Significant Deterioration (PSD) Applicability Analysis for the Moss Lake Compressor Station				
Pollutant	Proposed Project Emissions (tpy)	Major Stationary Source Threshold Level (tpy)	Significant Emission Rate (tpy)	PSD Review Triggered?
SO_2	4.2	250	40	No
CO_2e	809.007	75,000	75,000	Yes[a]

[a] CO_2e threshold is only applicable if the major source threshold for another regulated NSR pollutant is exceeded.

Part 70 Operating Permit

Title V of the CAA requires states to establish an air quality operating permit program. The requirements of Title V are outlined in the federal regulations in 40 CFR Part 70 and in the state regulations in LAC 33:III.507. The operating permits required by these regulations are often referred to as Title V or Part 70 operating permits.

A major source is required to obtain a Part 70 operating permit. Under 40 CFR 70, a major source is defined as a source that could emit at or above at least one of the following levels: 100 tpy for any regulated air pollutant; 10 tpy for an individual HAP; or 25 tpy for any combination of HAPs.

Both the Terminal Facility and the Moss Lake Compressor Station would be subject to the Part 70 operating permit program because regulated pollutant emissions exceed the Part 70 major source threshold for at least one pollutant. Therefore, CP2 LNG and CP Express would need to apply for separate Part 70 operating permits, and receive LDEQ approval before beginning Project construction, per LAC 33:III.507 C.2.

New Source Performance Standards (NSPS)

NSPS regulations (40 CFR Part 60) establish pollutant emission limits and monitoring, reporting, and recordkeeping requirements for various emission sources based on source type and size. These regulations apply to new, modified, or reconstructed sources, and are incorporated by reference under the state regulations per LAC 33:III.3003. The following NSPS requirements were identified as potentially applicable to the specified Project sources.

Subpart A of 40 CFR 60, *General Provisions*, includes broader definitions of applicability and various methods for maintaining compliance with requirements listed in subsequent subparts of 40 CFR 60. This subpart also provides visible emissions requirements for flares, per 40 CFR 60.18. This subpart also specifies the state agencies to which the EPA has delegated authority to implement and enforce standards of performance. The EPA has given delegated authority to the LDEQ for all relevant 40 CFR 60 standards. Equipment at the Project facilities that is subject to any of the NSPS subparts listed below would be subject to Subpart A.

Subpart Db of 40 CFR 60, *Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units*, applies to the gas-fired hot oil heaters for the Terminal Facilities, each of which has a heat input rating of greater than 100 million British Thermal Units per hour (MMBtu/hr). NSPS Subpart Db applies to each steam generating unit that commences construction, modification, or reconstruction after June 19, 1984, that has a maximum heat input capacity of greater than 100 MMBtu/hr. Given that fuel gas is to be fired in the hot oil heaters, these units are subject to a NO_x emission limit, but not PM and SO_2 emission limits. These units also would be subject to the applicable recordkeeping and reporting requirements of NSPS Subpart Db as outlined in 40 CFR 60.49b.

Subpart OOOOa of 40 CFR 60, *Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015*, applies to emissions of GHG (CH_4) and VOC from affected facilities listed in section 60.5365a(a) through (i). Examples of rule-identified equipment typically associated with natural gas facilities include centrifugal and reciprocating compressors, pneumatic controllers and pumps, and storage vessels. The Moss Lake Compressor Station would operate centrifugal compressors, pneumatic controllers and pumps, and a storage vessel. The centrifugal compressors are anticipated to be the dry seal-type; therefore, these units would not be subject to the Subpart OOOOa requirements (which apply only to wet seal-type centrifugal compressors). The storage vessel (condensate storage tank) is projected to have VOC emissions less than the Subpart OOOOa applicability threshold of 6 tpy; therefore, this vessel is not subject to the Subpart OOOOa requirements. Monitoring for, and if necessary, repair of equipment leaks (resulting in fugitive emissions) would be required per Subpart OOOOa requirements for the Moss Lake Compressor Station.

Subpart IIII of 40 CFR 60, *Standards of Performance for Stationary Compression Ignition Internal Combustion Engines*, applies to diesel-fueled stationary compression ignition internal combustion engines of any size that are constructed, modified, or reconstructed after July 11, 2005. The rule requires manufacturers of these engines to meet emission standards based on engine size, model year, and end use and to configure, operate, and maintain the engines according to specifications and instructions provided by the engine manufacturer. These requirements of Subpart IIII would apply to the diesel-fired standby emergency generators and fire water pump engines proposed for the Terminal Facilities and the emergency generator proposed for the Moss Lake Compressor Station. The recordkeeping and reporting requirements would also apply.

Subpart KKKK of 40 CFR 60, *Standards of Performance for Stationary Combustion Turbines*, applies to each combustion turbine with a heat input greater than 10 MMBtu/hr that commences construction, modification, or reconstruction after February 18, 2005. The Terminal Facilities and Moss Lake Compressor Station gas-fired combustion turbines would be subject to the emission limits for NO_x for high and low load operation and emission limits for SO_2.

<u>National Emissions Standards for Hazardous Air Pollutants (NESHAP)</u>

The NESHAP, codified in 40 CFR Parts 61 and 63, regulate HAP emissions. Part 61 was promulgated prior to the 1990 CAA Amendments and regulates specific HAPs, such as asbestos, benzene, beryllium, inorganic arsenic, mercury, radionuclides, and vinyl chloride. Federal NESHAP requirements presented in 40 CFR 61 are incorporated by reference under the state regulations per LAC 33:III.5116.

The 1990 CAA Amendments established a list of 189 HAPs, while directing EPA to publish categories of major sources and area sources of these HAPs, for which emission standards were to be promulgated according to a schedule outlined in the CAA Amendments. These standards, also known as the Maximum Achievable Control Technology standards, were promulgated under Part 63. The 1990 CAA Amendments defines a major source of HAPs as any source that has a PTE of 10 tpy for any single HAP or 25 tpy for all HAPs in aggregate. Area sources are stationary sources that do not exceed the thresholds for major source designation. Federal NESHAP requirements presented in 40 CFR 63 are incorporated by reference under the state regulations per LAC 33:III.5122.

The annual PTE HAP emissions from the Terminal Facilities would be approximately 40 tpy in aggregate (see section 4.12.1.4), which is above the major source threshold of 25 tpy; therefore, the Terminal Facilities would be classified as a major source of HAP emissions. The NESHAP described in the following paragraphs have been identified as being potentially applicable to specific emission units of the Terminal Facilities.

The annual HAP PTE for the Moss Lake Compressor Station would be approximately 7.2 tpy in aggregate (see section 4.12.1.4), which is below the major source threshold of 25 tpy. In addition, the annual PTE for each individual HAP is below the major source threshold of 10 tpy. Therefore, the Moss Lake Compressor Station would be classified as an area source of HAP emissions and subject only to Subpart ZZZZ of 40 CFR Part 63 for the emergency generator.

Subpart A of 40 CFR Part 63, *General Provisions*, includes broader definitions of applicability and various methods for maintaining compliance with requirements listed in subsequent subparts of 40 CFR 63. This subpart also specifies the state agencies to which the EPA has delegated authority to implement and enforce NESHAP. The LDEQ has been delegated authority for all relevant 40 CFR 63 standards promulgated by the EPA.

Subpart YYYY of 40 CFR Part 63, *NESHAP for Stationary Combustion Turbines*, applies to each combustion turbine at a major source of HAP emissions. On March 9, 2022, the EPA removed the stay of effectiveness of the standards for new lean premix and diffusion flame gas-fired turbine (87 Fed. Reg. 13183). These standards include a formaldehyde limit of 91 parts per billion by volume in the exhaust gas, with compliance demonstrated through initial and annual performance testing and continuous monitoring of operating parameters. Venture Global stated that the gas-fired turbines at the Terminal Facilities would comply with this NESHAP.

Subpart ZZZZ of 40 CFR 63, *NESHAP for Stationary Reciprocating Internal Combustion Engines*, applies to reciprocating internal combustion engines of all sizes located at major and area sources of HAPs. The emergency generators and fire water pump engines at the Terminal Facility and the Moss Lake Compressor Station are considered new emergency reciprocating internal combustion engines and would be required to comply with the requirements of 40 CFR Part 60 Subpart IIII. However, the engine at the Moss Lake Compressor Station, categorized as an area source of HAP emissions, satisfies the requirements of Subpart ZZZZ by meeting the requirements of 40 CFR 60, Subpart IIII, per 40 CFR 63.6590(c)(1).

Subpart DDDDD of 40 CFR Part 63, *NESHAP for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters*, applies to each existing, new or reconstructed boiler or process heater at a major source of HAP emissions, and includes the requirement for an annual tune-up.

Greenhouse Gas Reporting Rule

Subpart W under 40 CFR 98, the Mandatory GHG Reporting Rule, requires petroleum and natural gas systems that emit 25,000 metric tons or more of CO_2e per year to report annual emissions of GHG and other relevant information (e.g., emissions monitoring and calculation methods, data quality assurance information) to the EPA. GHG emissions from operation of the Terminal Facilities and Moss Lake Compressor Station are projected to exceed the 25,000-metric ton threshold; therefore, each facility would be subject to the reporting requirements of 40 CFR Part 98.

A review of the Terminal Facilities emission sources and associated potential GHG emissions indicates that Subparts W (petroleum and natural gas systems) and C (stationary fuel combustion sources) of Part 98 would be applicable. "LNG storage" and "LNG import and export equipment" are industry segments included in the source category definition for Subpart W that apply to the Terminal Facilities; process emissions for this equipment would be reported under this subpart. The combined cycle and simple cycle combustion turbines are the primary emission sources triggering applicability under Subpart C; fuel combustion emissions would be reported under this subpart.

A review of the Moss Lake Compressor Station and associated pipeline emission sources and associated GHG emissions indicates that Subparts W and C of Part 98 would be applicable. "On-shore natural gas transmission compression" and "onshore natural gas transmission pipeline" are industry segments included in the source category definition for Subpart W that applies to the Moss Lake Compressor Station and pipeline; process emissions for this equipment would be reported under this subpart. The simple cycle combustion turbines are the primary emission sources triggering applicability under Subpart C; fuel combustion emissions would be reported under this subpart.

In April 2022, the EPA proposed revisions to Subparts C and W that could alter how emissions are calculated and reported, beginning with reporting year 2023. CP Express should analyze these subparts, when finalized, to identify all revised requirements that apply to the Project

Chemical Accident Prevention Provisions

The chemical accident prevention provisions, codified in 40 CFR 68, are federal regulations designed to prevent the release of hazardous materials in the event of an accident and minimize potential impacts if a release does occur. The regulations contain a list of substances (including methane, propane, and ethylene) and threshold quantities for determining applicability to stationary sources. If a stationary source stores, handles, or processes one or more substances on this list in a quantity equal to or greater than that specified in the regulation, the facility must prepare and submit a risk management plan (RMP). An RMP is not required to be submitted to the EPA until the chemicals are stored onsite at the facility.

If a facility does not have a listed substance on-site, or the quantity of a listed substance is below the applicability threshold, the facility does not have to prepare an RMP. However, if there is any regulated substance or other extremely hazardous substance onsite, the facility still must comply with the requirements of the General Duty Clause in Section 112(r)(1) of the 1990 CAA Amendments. The General Duty Clause is as follows:

> "The owners and operators of stationary sources producing, processing, handling and storing such substances have a general duty to identify hazards which may result from such releases using appropriate hazard assessment techniques, to design and maintain a safe facility, taking such steps as are necessary to prevent releases, and to minimize the consequences of accidental releases which do occur."

Stationary sources are defined in 40 CFR 68 as any buildings, structures, equipment, installations, or substance-emitting stationary activities which belong to the same industrial group, that are on one or more contiguous properties, are under control of the same person (or persons under common control), and are from which an accidental release may occur. The Project facilities would store significant quantities of methane (as LNG) at least and possibly propane and butane as well, which are regulated substances under 40 CFR 68. However, the definition also states that the term stationary source does not apply to transportation, including storage incidental to transportation, of any regulated substance or any other extremely hazardous substance. The term transportation includes transportation subject to oversight or regulation under 49 CFR Parts 192, 193, or 195. Based on these definitions, the Project facilities are subject to 49 CFR Part 193 and would not be required to prepare an RMP.

Stratospheric Ozone Protection

The implementing regulations for the stratospheric ozone protection provisions of the CAA are codified under 40 CFR 82. An LDEQ condition would be included in the Part 70 operating permit for the Terminal Facilities and Moss Lake Compressor Station that requires CP2 LNG and CP Express to comply with the standards for recycling and emissions reduction pursuant to Subpart F as well as the standards for motor vehicle air conditioners pursuant to Subpart B of 40 CFR 82, as applicable.

General Conformity

A general conformity analysis must be conducted by the lead federal agency if a federal action would result in the generation of emissions that would exceed the general conformity applicability threshold levels of the pollutants(s) for which an AQCR is in nonattainment. According to Section 176(c)(1) of the CAA (40 CFR 51.853), a federal agency cannot approve or support any activity that does not conform to an approved SIP. Conforming activities or actions should not, through additional air pollutant emissions:

- cause or contribute to new violations of the NAAQS in any area;
- increase the frequency or severity of an existing violation of any NAAQS; or
- delay timely attainment of any NAAQS or interim emission reductions.

General Conformity assessments must be completed when the total direct and indirect emissions of a planned project would equal or exceed the specified pollutant applicability emission thresholds per year in each nonattainment area.

As previously discussed, operating emission sources for the Project would be entirely within designated unclassifiable/attainment areas for all criteria air pollutants and would be subject to evaluation under the NSR PSD permitting program; therefore, these emissions are not subject to General Conformity regulations.

During the construction phase of the Project, barges carrying equipment and materials would be traveling to and from dock(s) along Calcasieu Pass at the Terminal Facilities. CP2 LNG stated that they do not anticipate causing or contributing to new construction-related tug/barge traffic in any existing nonattainment or maintenance areas, including ozone nonattainment areas in east Texas.

Applicable State Air Quality Requirements

In addition to the federal regulations identified above, the LDEQ requires compliance with its air quality regulations, codified in LAC Title 33, Part III, Chapters 1 through 59. The state requirements applicable to the Project are as follows:

- *LAC 33:III Chapter 5 – Permit Procedures*. This chapter outlines the construction and operating permit procedures for major and subject non-major sources of air pollution in Louisiana. More information on the construction (NSR) and operating (Part 70) permitting for the Terminal Facility and Moss Lake Compressor Station is found in earlier sections of this document.
- *LAC 33:III Chapter 9 – General Regulations on Control of Emissions and Emission Standards*. The stationary emission sources at the Terminal Facility and Moss Lake Compressor Station are subject to the general regulations outlined in this chapter. As such, Venture Global would be required to include the emissions from these sources in an annual emission summary report and to submit written reports of any "unauthorized discharges" of an air pollutant from these sources.
- *LAC 33:III Chapter 11 – Control of Emissions of Smoke*. This chapter outlines opacity limits for fuel combustion units and flares, limitations on outdoor burning, and the prohibition on visibility impairment on public roads. Fuel combustion emission units (except the combustion turbines) and flares at the Terminal Facility and Moss Lake Compressor Station would be required to comply with the opacity limits of this chapter, unless exempted for combustion of fuel(s) with the characteristics outlined in LAC 33:III.1107.B.

- *LAC 33:III Chapter 13 – Emission Standards for Particulate Matter*. This chapter applies to any operation, process, or activity from which PM is emitted, and requires that all reasonable measures be taken to prevent generation of fugitive PM emissions (e.g., from construction activities). PM emitted from any process or process equipment associated with the Project would be required to comply with the opacity limits of this chapter.
- *LAC 33:III Chapter 15 – Emission Standards for Sulfur Dioxide*. This chapter applies to existing or new sulfuric acid production units, existing or new sulfur recovery plants, and all other single point sources that emit or have the potential to emit 5 tpy or more of SO_2. Each of the combined cycle combustion turbines, hot oil heaters, and thermal oxidizers at the Terminal Facilities has the potential to emit more than 5 tpy; therefore, requirements of this chapter would be applicable to these sources.
- LAC 33:III Chapter 21 – Control of Emissions of Organic Compounds. This chapter regulates organic compound emissions from various sources; however, the only Project sources subject to this chapter are components in VOC service. LAC 33:III.2111 requires that pumps and compressors handling VOC with a true vapor pressure greater than 1.5 pounds per square inch absolute at handling conditions be equipped with mechanical seals or other equivalent equipment approved by the LDEQ. LAC 33:III.2121 requires that open-ended valves (except valves or lines in emergency systems) be equipped with a second valve, blind flange, plug, or cap. The affected fugitive components at the Project facilities would be subject to these requirements.
- LAC 33:III Chapter 29 – Odor Regulations. This chapter prohibits the discharge of odorous substances that cause a nuisance at or beyond the property line. CP2 LNG and CP Express would be required to operate the Terminal Facility and Moss Lake Compressor Station in a manner that would not cause an odorous nuisance beyond the property line for each facility.
- LAC 33:III Chapter 51 – Comprehensive Toxic Air Pollutant Emission Control Program. This chapter applies to a major source of any toxic air pollutant(s) (TAPs) listed in LAC 33:III.5112, table 51.2 or table 51.3. A major source is defined as a source that has the potential to emit, in the aggregate, 10 tpy or more of any individual LDEQ-listed TAP, or 25 tpy or more of any combination of LDEQ-listed TAPs. Emissions from the combustion of natural gas and on-site generated fuel gas are exempt from the requirements of this chapter, per LAC 33:III.5105.B.3. However, due to ammonia emissions from operation of NOx emission controls systems, this rule would apply to the combined cycle and aeroderivative simple cycle combustion turbines at the Terminal Facilities. Also, emissions of TAPs from the thermal oxidizers (due to acid gas combustion) would subject these emission units to this rule. The Moss Lake Compressor Station is not a major source of LDEQ-listed TAPs and, therefore, not subject to the requirements of this chapter.
- *LAC 33:III Chapter 56 – Prevention of Air Pollution Emergency Episodes*. This chapter requires the preparation of standby plans for the reduction of emissions contributing to high pollution levels and to activate such plans when the LDEQ declares an Air Pollution Alert, Air Pollution Warning, or Air Pollution Emergency. CP2 LNG and CP Express would be required to prepare standby plans for the Terminal Facility and Moss Lake Compressor Station.

4.12.1.3 Construction Emissions and Impacts and Mitigation

Construction Emissions and Impacts

During scoping, the EPA states that the EIS should estimate emissions from construction activities, including mobile sources (on- and off-road), stationary sources, fugitive sources, area sources, and ground disturbance and summarize any proposed mitigation measures to minimize these emissions. The emissions are all quantified and analyzed in the sections below, including any applicable mitigation measures. In response to the draft EIS, the EPA states that an appendix should be included in the EIS to summarize all supporting calculations used to calculate emissions estimates for the Project. The supporting calculations for the emissions are provided in numerous filings available in the Project record.[128]

Construction of the Project facilities would result in short-term increases in emissions of some air pollutants due to the use of equipment powered by diesel fuel or gasoline and the generation of fugitive dust due to the disturbance of soil and other dust-generating activities. More specifically, the construction activities that would generate air emissions include:

- site preparation (vegetation clearing, trenching, land contouring, foundation preparation, etc.);
- construction of Project facilities;
- operation of the concrete batch plant during construction;
- operation of off-road construction equipment and trucks during construction;
- operation of marine vessels (e.g., equipment barges/tugs) during construction;
- offshore dredging; and
- workers' vehicles used for commuting to and from the construction site and delivery trucks (i.e., on-road vehicles).

CP2 LNG and CP Express estimate the total period of construction for the Project facilities under Phases 1 and 2 to be about 48 months, including commissioning activities. These two phases of construction could overlap; in general, this overlap would tend to result in periods of higher emissions at the Project site compared to that associated with non-overlapping schedules.

Fugitive dust would be produced primarily during the site preparation activities, when the site would be cleared of debris, leveled, and graded. During grading, fill, consisting of commercially available aggregate materials (e.g., gravel and crushed stone), would need to be imported to the site to raise ground elevations. These same aggregate materials would be used for lay-down areas and access roads within the Project site boundaries. Any such imported fill material would be free of environmental contaminants. Also, Portland cement and hydrated lime would be used for soil stabilization/consolidation. In addition to these emissions-generating activities, prescribed burning of vegetation is planned during pipeline system construction.

Within the Project construction site throughout the construction period, movement of off-road equipment would generate fugitive dust. On-road truck traffic (e.g., supply trucks) and worker commuter vehicles at the Project site also would generate fugitive dust from travel on paved and unpaved surfaces. These sources of fugitive dust would be reduced by mitigating measures, such as watering unpaved roads, outlined in the Fugitive Dust Control Plan. An existing paved road – David Road – would be used to access the Project construction sites.

Site preparation equipment would include bulldozers, excavators, backhoes, graders, loaders, dump trucks, and other mobile construction equipment. In addition to the equipment involved in site preparation,

[128] The details on emission factors, activity levels, equipment number and type, engine sizes, etc., used to develop the emission rates can be found in accession no. 20211202-5104 (Appendices 9A and 9B of Resource Report 9) for construction activities and Accession No. 20220801-5238 (Response 1-f.v, Attachments General 1-f.v-1 and General 1-f.v-2) for operation of Project sources as well as subsequent responses to FERC Environmental Information Requests that resulted in modifications to the original assumptions and calculations. Revisions to the set of emission sources for the Moss Lake Compressor Station were provided in Attachment 31-2 of Accession No. 20230313-5230. Also, per CP2 LNG and CP Express' response to EPA Comment No. 1, Attachment 1-1, of Accession No. 20230407-5147, updates to construction workforce projections were provided that resulted in further revisions to construction-related emissions. Additionally, in their response to EPA Comment No. 2 presented in Accession No. 20230407-5147 (Attachments 2-1, 2-2, and 2-3), CP2 LNG and CP Express provided emission rates for individual HAPs for each year of construction.

equipment such as cranes, aerial lifts, pile drivers, and forklifts would be used in the Project construction. This site preparation/construction equipment, including trucks and barges delivering equipment and materials, would be powered primarily by diesel-fueled internal combustion engines that would generate PM_{10}, $PM_{2.5}$, SO_2, NO_x, VOC, and CO emissions. Most of the on-road passenger cars and trucks would likely burn gasoline, although supply trucks and some worker pickup trucks would burn ultra-low-sulfur diesel fuel.

Construction equipment and materials, including modular facility components/structures, would be delivered to the Terminal Facilities site primarily by barge. CP2 LNG estimates that approximately 2,275 marine deliveries would be needed for the two phases of the Project, with the peak being approximately 32 deliveries per week (earlier on in the construction period). Barge/tug operations would result in fuel combustion emissions from the diesel-fired engines.

Construction of the Terminal Facilities would require large quantities of concrete. To meet those needs, CP2 LNG is planning to operate a temporary concrete batch plant at the Terminal Facilities site. Operation of the concrete batch plant would result in fuel combustion emissions from diesel-fired engines and fugitive dust emissions from material handling operations.

The construction phase for the Terminal Facilities also would include offshore dredging for the Marine Facilities, including LNG carrier loading docks, berthing area, and turning basins. The emissions generated by these activities, including dredge disposal, would be predominantly fuel combustion emissions from diesel-fired marine and non-road engines associated with a hydraulic cutterhead suction dredge, excavator, tugboats, survey/workboats, and trucks.

CP2 LNG and CP Express developed an inventory of off-road equipment and vehicles, on-road vehicles, and expected activity levels (either hours of operation or vehicle miles travelled) based on the expected duration of construction at the site for the purposes of calculating emissions. The engine rating and load level and activity level for each piece of construction equipment was combined with the relevant EPA emission factors (e.g., MOVES3) to quantify annual emission estimates. Fuel combustion emissions from barges/tugs were calculated using engine sizes, activity levels, and current EPA emission factors/emissions development guidance (EPA, 2020). Fugitive dust emission estimates associated with site preparation activities for the Project were based on an estimate of total disturbed acreage and the use of AP-42 emission factors with a control factor for application of dust suppressant (i.e., watering).

The total criteria air pollutant, GHG (as CO_2e), and HAPs emissions associated with construction-related activities (under both phases) for all facets of the Project are summarized by construction year in table 4.12.1-5. The criteria air pollutant, CO_2e, and HAPs emissions associated with construction of the Terminal Facilities, Moss Lake Compressor Station, and the pipeline system are presented in tables 4.12.1-6, 4.12.1-7, and 4.12.1-8, respectively. The emission rates for the Terminal Facilities account for the projected increases in construction workforce and associated emissions from the additional on-road vehicles (from commuting workers and material deliveries) from the increase in workforce proposed following draft EIS issuance. These emission rates were provided by Venture Global in response to an EPA comment made on the construction emissions presented in the draft EIS. The emission rates include fuel combustion emissions as well as fugitive dust (i.e., particulate) emissions. The total PM_{10} and $PM_{2.5}$ emissions shown in these tables are mainly the result of fugitive dust-generating activities, with most of the fugitive dust emissions associated with land clearing/grading activities. Note that the estimated annual construction emissions are based on the latest available information on Project schedule; the timing and magnitude of annual emissions could vary based on when construction activities actually occur, which is dependent on business-related and other (e.g., regulatory) factors.

Table 4.12.1-5 Annual Total Construction Emissions (tpy) for the Project								
Year	**Pollutant**							
	PM_{10}	**$PM_{2.5}$**	**NO_x**	**CO**	**VOC**	**SO_2**	**Total HAPs**	**CO_2e[a]**
2023[b]	301.5	95.5	1,217.6	568.5	81.1	1.4	20.4	176,655
2024[b]	743.4	179.4	2,294.9	877.2	131.0	2.6	38.0	342,402
2025[b]	932.8	264.8	4,228.4	1,341.1	245.0	3.7	89.6	802,708
2026[c]	287.9	86.3	1,025.0	557.0	50.8	0.9	18.8	225,895
Total Emissions [d] (tons per Project construction duration)	**2,265.5**	**626.0**	**8,765.8**	**3,343.9**	**507.9**	**8.5**	**166.8**	**1,547,660**

a CO2e emissions based on GWPs of 1 for CO_2, 25 for CH_4, and 298 for N_2O.
b Emissions from construction activities for Terminal Facilities, Moss Lake Compressor Station, and pipeline system.
c Emissions from construction activities for Terminal Facilities only.
d The total emissions may not match the sum of the addends due to rounding.

Table 4.12.1-6 Annual Construction Emissions (tpy) for the Terminal Facilities								
Year	**Pollutant**							
	PM_{10}	**$PM_{2.5}$**	**NO_x**	**CO**	**VOC**	**SO_2**	**Total HAPs**	**CO_2e[a]**
2023 Emissions								
Diesel non-road equipment	20.5	19.9	472.2	121.2	31.2	0.3	14.3	89,748
Diesel and gas on-road equipment	0.3	0.3	15.5	90.3	1.6	0.1	0.7	13,978
Construction activity fugitive dust	92.0	15.3	NA	NA	NA	NA	NA	NA
Marine vessels	0.4	0.4	14.4	2.3	0.6	<0.1	0.3	1,003
Marine unloading conveyor	<0.1	<0.1	NA	NA	NA	NA	NA	NA
Marine unloading storage piles	<0.1	<0.1	NA	NA	NA	NA	NA	NA
Concrete batch plants	4.3	2.8	0.6	5.2	0.3	0.3	0.2	1,021
Wind Erosion	0.7	0.6	NA	NA	NA	NA	NA	NA
Dredging	16.0	15.6	637.6	100.0	18.3	0.4	2.7	42,758
2023 Total[b]	***134.2***	***54.9***	***1,140.3***	***319.0***	***52.0***	***1.1***	***18.2***	***148,508***
2024 Emissions								
Diesel non-road equipment	41.3	40.1	1,031.6	242.3	64.3	0.6	29.3	196,645
Diesel and gas on-road equipment	0.7	0.5	31.3	169.3	2.7	0.1	1.0	29,048
Construction activity fugitive dust b	259.8	38.8	NA	NA	NA	NA	NA	NA
Marine vessels	0.8	0.8	28.7	4.7	1.2	<0.1	0.3	2,007
Marine unloading conveyor	<0.1	<0.1	NA	NA	NA	NA	NA	NA

Table 4.12.1-6

Annual Construction Emissions (tpy) for the Terminal Facilities

Year	Pollutant							
	PM_{10}	**$PM_{2.5}$**	**NO_x**	**CO**	**VOC**	**SO_2**	**Total HAPs**	**CO_2e[a]**
Marine unloading storage piles	<0.1	<0.1	NA	NA	NA	NA	NA	NA
Concrete batch plants	7.6	6.1	1.4	12.4	0.7	0.8	0.2	2,450
Wind Erosion	0.7	0.6	NA	NA	NA	NA	NA	NA
Dredging	27.7	26.8	1,099.0	172.4	31.6	0.7	4.6	73,700
2024 Total[b]	***338.6***	***113.7***	***2,192.0***	***601.1***	***100.5***	***2.2***	***35.4***	***303,850***
2025 Emissions								
Diesel non-road equipment	112.5	109.1	2,947.8	652.5	177.3	1.9	80.6	636,585
Diesel and gas on-road equipment	0.9	0.8	48.8	209.8	3.5	0.2	1.1	43,217
Construction activity fugitive dust b	302.9	49.4	NA	NA	NA	NA	NA	NA
Marine vessels	0.7	0.7	26.2	4.2	1.0	<0.1	0.3	1,815
Marine unloading conveyor	<0.1	<0.1	NA	NA	NA	NA	NA	NA
Marine unloading storage piles	<0.1	<0.1	NA	NA	NA	NA	NA	NA
Concrete batch plants	5.3	3.8	0.8	7.3	0.4	0.5	0.2	1,429
Wind Erosion	0.7	0.6	NA	NA	NA	NA	NA	NA
Dredging	27.6	26.7	1,094.8	171.7	31.5	0.7	4.5	73,419
2025 Total[b]	***450.6***	***191.1***	***4,118.4***	***1,045.5***	***213.7***	***3.3***	***86.7***	***756,465***
2026 Emissions								
Diesel non-road equipment	22.3	21.7	604.7	130.1	35.5	0.4	16.2	139,771
Diesel and gas on-road equipment	1.0	0.9	52.0	369.1	4.6	0.3	0.8	61,413
Construction activity fugitive dust b	254.9	54.3	NA	NA	NA	NA	NA	NA
Marine vessels	0.2	0.2	7.6	1.2	0.3	<0.1	0.2	519
Marine unloading conveyor	<0.1	<0.1	NA	NA	NA	NA	NA	NA
Marine unloading storage piles	<0.1	<0.1	NA	NA	NA	NA	NA	NA
Concrete batch plants	NA	NA	NA	NA	NA	NA	NA	NA
Wind Erosion	0.4	0.4	NA	NA	NA	NA	NA	NA
Dredging	9.1	8.8	360.7	56.6	10.4	0.2	1.6	24,192
2026 Total[b]	***287.9***	***86.3***	***1,025.0***	***557.0***	***50.8***	***0.9***	***18.8***	***225,895***
Total Emissions[b] (tons per construction duration)	**1,211.2**	**445.9**	**8,475.7**	**2,522.6**	**417.0**	**7.5**	**159.1**	**1,434,718**

[a] CO_2e emissions based on GWPs of 1 for CO_2, 25 for CH_4, and 298 for N_2O
[b] The total emissions may not match the sum of the addends due to rounding

Table 4.12.1-7

Annual Construction Emissions (tpy) for the Moss Lake Compressor Station

Year	Pollutant							
	PM_{10}	**$PM_{2.5}$**	**NO_x**	**CO**	**VOC**	**SO_2**	**Total HAPs**	**CO_2e[a]**
2023 Emissions								
Diesel non-road equipment	0.4	0.4	7.3	22.1	1.2	<0.1	0.5	4,540
Diesel and gas on-road equipment	<0.1	<0.1	0.1	3.8	<0.1	<0.1	0.2	747
Construction activity fugitive dust	4.9	0.6	NA	NA	NA	NA	NA	NA
2023 Total[b]	***5.3***	***1.0***	***7.4***	***25.9***	***1.2***	***<0.1***	***0.7***	***5,287***
2024 Emissions								
Diesel non-road equipment	0.5	0.4	9.3	30.2	1.6	<0.1	0.6	6,728
Diesel and gas on-road equipment	<0.1	<0.1	0.7	7.6	<0.1	<0.1	0.2	943
Construction activity fugitive dust	12.0	1.3	NA	NA	NA	NA	NA	NA
2024 Total[b]	***12.5***	***1.7***	***10.0***	***37.8***	***1.6***	***<0.1***	***0.8***	***7,671***
2025 Emissions								
Diesel non-road equipment	0.7	0.6	13.9	47.6	2.4	<0.1	1.0	11,990
Diesel and gas on-road equipment	<0.1	<0.1	1.2	5.6	<0.1	<0.1	0.2	1,137
Construction activity fugitive dust	14.1	1.5	NA	NA	NA	NA	NA	NA
2025 Total[b]	***14.8***	***2.1***	***15.1***	***53.2***	***2.4***	***<0.1***	***1.2***	***13,127***
Total Emissions[b] (tons per construction duration)	**32.6**	**4.8**	**32.5**	**116.9**	**5.2**	**<0.1**	**2.7**	**26,085**

[a] CO2e emissions based on GWPs of 1 for CO2, 25 for CH4, and 298 for N2O
[b] The total emissions may not match the sum of the addends due to rounding

Table 4.12.1-8

Annual Construction Emissions (tpy) for the Pipeline System

Year	Pollutant							
	PM_{10}	**$PM_{2.5}$**	**NO_x**	**CO**	**VOC**	**SO_2**	**Total HAPs**	**CO_2e[a]**
2023 Emissions								
Diesel non-road equipment	1.6	1.5	29.0	9.5	2.0	<0.1	1.0	12,998
Diesel and gas on-road equipment	<0.1	<0.1	2.2	28.5	0.4	<0.1	0.2	3,218
Construction activity fugitive dust	137.7	15.4	NA	NA	NA	NA	NA	NA
Barge and Tug Transport	0	0	0	0	0	0	0	0
Open Burning	21.9	21.9	5.2	180.4	24.5	0.3	NA	4,398

Table 4.12.1-8 Annual Construction Emissions (tpy) for the Pipeline System								
Year	Pollutant							
Marine Vessels	0.8	0.8	33.5	5.2	1	<0.1	0.3	2,246
2023 Total[b]	***162.0***	***39.6***	***69.9***	***223.6***	***27.9***	***0.3***	***1.5***	***22,860***
2024 Emissions								
Diesel non-road equipment	2.0	1.9	36.9	11.7	2.5	0.1	1.2	18,727
Diesel and gas on-road equipment	<0.1	<0.1	2.6	38.6	0.5	<0.1	0.2	4,520
Construction activity fugitive dust	367.3	39.1	NA	NA	NA	NA	NA	NA
Barge and Tug Transport	0	0	0	0	0	0	0	0
Open Burning	21.9	21.9	5.2	180.4	24.5	0.3	NA	4,398
Marine Vessels	1.2	1.2	48.2	7.6	1.4	<0.1	0.4	3,236
2024 Total[b]	***392.3***	***64.1***	***92.9***	***238.3***	***28.9***	***0.4***	***1.8***	***30,881***
2025 Emissions								
Diesel non-road equipment	1.7	1.7	34.7	10.5	2.4	0.1	1.1	20,350
Diesel and gas on-road equipment	<0.1	<0.1	2.6	43.3	0.5	<0.1	0.2	4,851
Construction activity fugitive dust	442.5	46.7	NA	NA	NA	NA	NA	NA
Barge and Tug Transport	0	0	0	0	0	0	0	0
Open Burning	21.9	21.9	5.2	180.4	24.5	0.3	NA	4,398
Marine Vessels	1.3	1.3	52.4	8.2	1.5	<0.1	0.4	3,517
2025 Total[b]	***467.4***	***71.6***	***94.9***	***242.4***	***28.9***	***0.4***	***1.7***	***33,116***
Total Emissions[b] (tons per construction duration)	**1,021.7**	**175.3**	**257.6**	**704.4**	**85.7**	**1.0**	**5.0**	**86,857**

[a] CO_2e emissions based on GWPs of 1 for CO_2, 25 for CH_4, and 298 for N_2O
[b] The total emissions may not match the sum of the addends due to rounding

Table 4.12.1-9
Annual Construction Emissions (tpy) of CO2, CH4, N2O, and CO_2e for the Terminal Facilities, Pipeline System, and Moss Lake Compressor Station

Year	Greenhouse Gas			
	CO_2	CH_4	N_2O	CO_2e
2023 Emissions				
Terminal Facilities	146,605	1.7	6.23	148,508
Pipeline System	22,605	7.6	0.73	22,860
Moss Lake Compressor Station	4,883	14.2	0.16	5,287

Table 4.12.1-9
Annual Construction Emissions (tpy) of CO2, CH4, N2O, and CO_2e for the Terminal Facilities, Pipeline System, and Moss Lake Compressor Station

Year	Greenhouse Gas			
	CO_2	**CH_4**	**N_2O**	**CO_2e**
2023 Total	***174,093***	***23.5***	***7.12***	***176,655***
2024 Emissions				
Terminal Facilities	299,991	3.3	12.68	303,850
Pipeline System	30,631	7.6	1.05	30,881
Moss Lake Compressor Station	6,902	25.9	0.41	7,671
2024 Total	***337,524***	***36.8***	***14.14***	***342,402***
2025 Emissions				
Terminal Facilities	746,561	7.0	32.64	756,465
Pipeline System	32,866	7.6	1.13	33,116
Moss Lake Compressor Station	11,097	62.8	1.55	13,127
2025 Total	***790,524***	***77.4***	***35.32***	***802,708***
2026 Emissions				
Terminal Facilities	223,534	2.4	7.72	225,895
Pipeline System	-	-	-	-
Moss Lake Compressor Station	-	-	-	-
2026 Total	***223,534***	***2.4***	***7.72***	***225,895***
2023-2026 Total	**1,525,675**	**140.1**	**64.31**	**1,547,660**

In general, construction activities would increase air pollutant emissions and ambient concentrations in the vicinity of the Project site at various points during the approximate 48-month construction period. The magnitude of the effect on air quality would vary with time due to the construction schedule (i.e., intensity of construction activities), mobility of the sources, the variety/type of construction equipment, and the overlap of emissions from Phase 1 commissioning and operation and Phase 2 construction activities. There may be localized minor to moderate elevated levels of fugitive dust and tailpipe emissions in the vicinity of construction areas during periods of peak construction activity. Considering these factors, we determine that construction of the Project would impact local air quality on an intermittent basis. However, construction emissions would not have any long-term, significant impacts on air quality.

Residences and recreational vehicle parks are within a quarter mile of the eastern edge of the proposed Project construction site, with the closest residence being 330 feet north of the Terminal workspace. Emission increases associated with the Project construction activities could have localized impacts on air quality at residences during construction.

Mitigation Measures

The EPA states that the EIS should include a draft Construction Emissions Mitigation Plan. The EPA states the plan should commit to consulting with all applicable local and state agencies to coordinate land-clearing and burning activities to avoid adverse air quality impacts that would be exacerbated by poor weather conditions (such as inversions). The EPA also states that CP2 LNG and CP Express should utilize EPA Tier 4 compliant non-road engines to reduce impacts associated with PM and pollutant emissions during construction. CP2 LNG and CP Express have committed to various construction emissions minimization measures, as detailed below.

As discussed previously, fugitive dust accounts for most of the PM emissions during the construction period for the Project. Therefore, fugitive dust controls would play an important role in reducing impacts on air quality in the Project area. Project construction activities would be subject to LAC 33:III.1305, which requires the use of water or suitable chemicals for control of dust during construction activities or land-clearing operations.

CP2 LNG and CP Express developed fugitive dust control plans for the Terminal Facilities and pipeline and compressor station construction, which encompassed regulatory requirements as well as additional measures to reduce fugitive dust emissions. The dust reduction procedures and techniques outlined in the plans include:

- application of dust suppressant (e.g., water), on an as-needed basis, to the following areas of the construction site:
    - active work areas during earthmoving operations;
    - unpaved roads and parking areas;
    - construction staging areas; and
    - on bulk material being transported off-site;
- covering of material stockpiles or application of dust suppressant;
- covering of beds of open-bodied trucks hauling dusty materials to or from the Project site;
- limiting vehicle speeds within construction site to 20 mph or less, with the posting of speed limit signs along construction site roads;
- installation and maintenance of one of the following track-out control techniques/devices at the construction site entrance and exit locations of all unpaved access roads:

gravel pads; or wheel shakers (if gravel pads deemed ineffective); or
    - wheel washers (if gravel pads and wheel shakers deemed ineffective); and

- appointing an EI to conduct inspections, monitor, and enforce the measures outlined in this plan, and stop activities that are not in compliance with plan measures and order corrective mitigation.

We received a comment from the EPA in response to the draft EIS that recommended CP2 LNG implement additional measures to minimize construction emissions. CP2 LNG committed to develop a Project Ambient Air Quality Mitigation and Monitoring Plan, in coordination with the LDEQ, prior to commencement of initial site preparation, to monitor $PM_{2.5}$ (24 hour), PM_{10} (24 hour), and NO_2 (1-hour) concentrations during construction and commissioning of the CP2 LNG Terminal. The plan would provide the site selection process for the proposed locations for air quality monitors, data management protocols, and reporting protocols to manage potential NAAQS exceedances during construction or commissioning. CP2 LNG would file updates in their construction status reports when the plan is in use and would document the duration of any exceedances, reasons for elevated levels of $PM_{2.5}$, PM_{10}, and NO_2, measured values, and to the extent there are exceedances, what minimization or mitigation measures CP2 LNG implemented to reduce levels and documentation of the reduction to below the NAAQS.

In addition, CP2 LNG and CP Express would implement the following measures, above and beyond those described in the fugitive dust control plan, to reduce fugitive dust emissions:

- All field construction personnel will receive training on the environmental compliance requirements of the job, including compliance with the fugitive dust control plan.
- Prior to construction, CP2 LNG and CP Express will publish in the local newspaper and on the Project website a phone number to use to report construction complaints, including those related to fugitive dust. The concerns will be relayed to the EI for follow-up.
- The EI or his/her designee will keep a daily log documenting weather conditions, including noting:
    - the occurrence of precipitation or windy conditions;
    - condition of rock/gravel construction track-out pads;
    - if water was applied for dust control during the day;
    - any incidences where special dust abatement measures were needed, the measures employed, and the reason for those measures; and
    - any stop-work order issued for excessive dust generation incidences.
- CP Express and CP2 LNG would make available the daily logbook to the Commission staff, or its designated representative, for review upon request.
- If a dust-related complaint is received by the LDEQ and communicated to CP2 LNG or CP Express, CP2 LNG and CP Express will provide a record of the complaint and its resolution to the Commission in its monthly report.[131]

CP2 LNG and CP Express would minimize vehicular exhaust and crankcase emissions from gasoline- and diesel-fired engines by complying with applicable EPA mobile source emission performance standards and by using equipment manufactured to meet these standards. Additionally, CP2 LNG and CP Express would implement the following work practices:

[131] These measures were outlined by Venture Global in Response Air-2 of Accession No. 20230522-5195.

- Maintain construction equipment in accordance with manufacturers' recommendations. Maintenance and tuning of all construction-related equipment would be conducted in accordance with the original equipment manufacturers' recommendations.
- Minimize engine idling to the extent practicable. CP2 LNG and CP Express would instruct Project construction personnel to minimize the idle time of equipment to 5 minutes or less when not in active use. CP2 LNG and CP Express' expectations concerning minimizing on-site idling would be communicated to construction personnel during safety/environmental training sessions and enforced by construction supervisors and inspectors. Also, consistent with industry practice, unmanned equipment would be turned off and would not be left idling.
- Take measures to prevent and/or detect tampering with construction equipment.
- Conduct unscheduled inspections to ensure that the outlined mitigation measures are followed.
- Reduce roadway traffic congestion (and the resulting increase in emissions) during construction of the Terminal Facilities through implementation of the measures described in CP2 LNG and CP Express' Terminal Facilities Traffic Management Plan.[132] This plan leverages the experience gained in improving traffic flow while constructing the adjacent Calcasieu Pass LNG Terminal.

Given the mitigation measures proposed by CP2 LNG and CP Express described above, in addition to the commitment to develop a Project Ambient Air Quality Mitigation and Monitoring Plan, we do not think a separate Construction Mitigation Plan is necessary and find the minimization measures proposed by the applicants acceptable.

4.12.1.4 Operation Emissions and Impacts and Mitigation

The Project encompasses the CP2 LNG Terminal Facilities and CP Express Moss Lake Compressor Station and pipeline. Operation of these Project components would result in criteria pollutant, GHG, and HAP emissions from onshore sources (e.g., combustion turbines, heaters, flares, oxidizers, fugitive sources) and marine vessels (e.g., LNG carriers and tugs). Operational-phase emissions from these sources would be permanent (lasting the life of the Project). The various emission sources and associated emission rates are discussed in more detail in the following sections. Also discussed are the mitigation measures to be implemented for the operating emission sources. We received a comment from For a Better Bayou, et. al, on the draft EIS stating that although the draft EIS clearly states that operational emissions from the LNG Terminal presented below are based on 28 MPTA, it is unclear if the operational emissions associated with the marine facilities and LNG carrier transits, and the Moss Lake Compressor Station are based on peak operational capacity. As stated below, the emissions summarized in tables 4.12.1-14 and 4.12.15 below regarding the LNG carriers and mobile sources are inclusive of 412 carrier calls per year.[133] The emissions in table 4.12.1-17 below regarding the Moss Lake Compressor Station are based on the maximum emissions rates for the turbines operated at 8,760 hours per year.

Terminal Facilities

<u>Onshore Emission Sources</u>

The largest source of emissions for the Project would be the Terminal Facilities. With the completion of both phases of the Project, the Terminal Facilities would operate up to 18 natural gas liquefaction blocks. The two power islands (one for each phase of the Project) for the liquefaction operations would provide a

[132] CP2 LNG's Traffic Management Plan can be viewed on FERC's eLibrary as Appendix B of accession no. 20230407-5100.

[133] The number of carrier calls per year is a conservative estimate of LNG carrier/mobile source emissions from LNG carriers that would have a range of LNG capacity between 120,000 to 210,000 cubic meters.

combined 1,470-MW power generation capability. The complete suite of stationary and mobile sources of air emissions associated with the Terminal Facilities, once permanent commercial operation is initiated, includes:

- 10 natural gas-fired combustion turbines in a combined cycle configuration (as two power plants, each consisting of five turbines, five heat recovery steam generators, and two steam turbine generators);
- 3 natural gas-fired aeroderivative simple cycle combustion turbines (for peaking duty);
- 26 diesel-fired generators for emergency use (22 standby emergency generators and 4 fire water pump engines);
- 8 natural gas-fired hot oil heaters;
- 4 flare systems (1 warm flare, 1 cold flare, 1 low-pressure flare, and 1 marine vapor control system flare);
- 4 thermal oxidizers (for control of acid gas emissions);
- 2 diesel fuel storage tanks;
- organic liquid storage tanks;
- condensate truck loading;
- fugitive VOC and GHG emissions sources (e.g., leaks from equipment such as valves, flanges, and connectors);
- maneuvering and hoteling from LNG carriers and tugs; and
- vehicle/truck traffic.

At the completion of construction of Phase 1 of the Project, 9 liquefaction blocks powered by five combined cycle combustion turbines would be in operation. At the completion of construction of Phase 2, an additional 9 liquefaction blocks (total of 18 for the Project) powered by an additional five combined cycle combustion turbines (total of 10 for the Project) would be in operation. Two of the three aeroderivative simple cycle combustion turbines would operate under Phase 1, with the third such turbine added under Phase 2.

The combustion turbines, hot oil heaters, flares, and thermal oxidizers would fire a fuel gas comprised of pipeline quality natural gas, boil-off gas, and/or liquefier end flash gas. Additionally, the hot oil heaters would fire vaporized hydrocarbon condensate associated with the heavy hydrocarbons removal system.

Once constructed, each phase of Terminal Facilities would undergo a commissioning process before it could be fully operational. The initial start-up process for each phase is projected by CP2 LNG to occur over a 24-month period, with Phase 1 commissioning starting in May 2025. Table 4.12.1-10 summarizes the estimated criteria pollutants, GHGs, and HAP emissions for the commissioning process for the Terminal Facilities.

Table 4.12.1-10

Annual Emissions (tpy) Associated with Commissioning Activities for the Terminal Facilities [a]

Year	Pollutant							
	PM_{10}	**$PM_{2.5}$**	**NO_x**	**CO**	**VOC**	**SO_2**	**Total HAPs [b]**	**CO_2e[c]**
2025	13.4	13.4	122.5	558.5	93.1	20.0	39.5	246,527
2026	18.5	18.5	168.5	767.9	128.0	27.5	39.5	338,974
2027	5.0	5.0	45.9	209.4	34.9	7.5	9.9	92,448
Total Emissions (tons per commissioning duration)	**36.9**	**36.9**	**336.9**	**1,535.8**	**256.0**	**55.0**	**88.8**	**677,949**

[a] Total emissions in each year for Phase 1 and Phase 2 are presented
[b] The individual HAP with the highest total emissions among all HAPs is n-hexane at 16 tpy
[c] CO_2e emissions based on GWPs of 1 for CO_2, 25 for CH_4, and 298 for N_2O

Table 4.12.1-11

Annual Commissioning Emissions (tpy) of CO2, CH4, N2O, and CO_2e for the Terminal Facilities

Year	Greenhouse Gas			
	CO_2	**CH_4**	**N_2O**	**CO_2e**
2025	210,743	1,426.6	0.40	246,527
2026	289,772	1,961.6	0.54	338,974
2027	79,029	535.0	0.15	92,448
2025-2027 Total	**579,543**	**3,923.2**	**1.09**	**677,949**

After completing the commissioning process, the Terminal Facilities would start commercial operations.

Table 4.12.1-12 summarizes the estimated annual criteria air pollutant, GHG, and HAP emission rates for sources associated with routine commercial operation of the Terminal Facilities (post-Phase 2 commissioning). This operating scenario includes the full-time operation of six pretreatment facilities and 18 liquefaction blocks powered by 10 combined cycle combustion turbines and three aeroderivative simple cycle combustion turbines. The estimated emission rates represent operation of the Terminal Facilities at the peak liquefaction capacity of 28 million tons (or tonnes) per annum. As shown in the table, Terminal Facilities emissions would be generated primarily by the fuel combustion sources, and the set of combined cycle combustion turbines is responsible for most of those emissions.

Table 4.12.1-12

Annual Emissions (tpy) Associated with Operation of the Terminal Facilities [a]

Emissions Unit	Pollutant							
	PM_{10}	**$PM_{2.5}$**	**NO_x [b]**	**CO [b]**	**VOC**	**SO_2**	**Total HAPs [c]**	**CO_2e[d]**
Combined Cycle Combustion Turbines	263.0	263.0	452.5	558.7	80.8	55.2	25.3	5,655,788
Aeroderivative Turbines	59.2	59.2	35.3	283.8	6.8	2.8	4.6	513,519
Emergency Generators	1.2	1.2	35.1	19.2	35.1	0.2	0.2	4,022

Table 4.12.1-12 Annual Emissions (tpy) Associated with Operation of the Terminal Facilities [a]								
Emissions Unit	**Pollutant**							
	PM_{10}	**$PM_{2.5}$**	**NO_x [b]**	**CO [b]**	**VOC**	**SO_2**	**Total HAPs [c]**	**CO_2e[d]**
Hot Oil Heaters	32.6	32.6	166.5	360.6	23.4	180.8	7.4	659,056
Acid Gas Thermal Oxidizers	10.8	10.8	199.0	118.8	10.1	15.2	1.7	1,651,052
Warm, Cold, and LP Flares	1.1	1.1	10.5	47.7	16.5	<0.1	0.2	20,861
Marine Loading Flare	1.0	1.0	8.7	39.7	<0.1	<0.1	<0.1	17,326
Fire Water Pumps	<0.1	<0.1	0.6	0.2	<0.1	<0.1	NA	112
Equipment Leaks	NA	NA	NA	NA	2.3	NA	0.1	6,524
Organic Liquid Storage Tanks	NA	NA	NA	NA	<0.1	NA	NA	NA
Diesel Fuel Storage Tank	NA	NA	NA	NA	0.1	NA	<0.1	NA
Condensate Truck Loading	NA	NA	NA	NA	<0.1	NA	NA	NA
Total Emissions [b]	**368.9**	**368.9**	**908.2**	**1,428.7**	**175.5**	**254.5**	**39.7**	**8,528,260**

[a] This table does not include marine vessel emissions; see table 4.12.1-8 for the estimated annual emissions for the marine vessels maneuvering from the turning basin to, and holding and hoteling at, the pier.
[b] NO_x and CO emissions do not reflect the emissions associated with the alternate operating scenario referenced in footnote b of table 4.12.1-3.
[c] The individual HAP with the highest total emissions among all HAPs is hexane at 15 tpy
[d] CO_2e emissions based on GWPs of 1 for CO_2, 25 for CH_4, and 298 for N_2O
[e] CO_2e emission rate is based on: CO_2 emission rate of 8,347,005 tpy; CH_4 emission rate of 7,096 tpy; and N_2O emission rate of 12.89 tpy

The flares are used only for start-up, shutdown, routine maintenance, and non-routine venting of emissions due to excess pressure. Cold and dry hydrocarbons would go the cold flare; warm and wet hydrocarbons would go to the warm flare; excess vapor from the LNG storage tanks and generated during LNG carrier loading would go to the low-pressure flare; and vent gases generated during gas-up and cool down procedures for warm LNG carriers would go to the marine vapor control system flare. Venture Global plans to continuously operate the liquefaction facility, thus limiting start-up/shutdown events to those associated with periodic routine maintenance or the need to shut down due to unanticipated equipment malfunction.

We received comments from several individuals on the draft EIS expressing concern over the duration of flaring at the Venture Global Calcasieu Pass LNG terminal and concerns as to whether the flaring activities for CP2 LNG would differ from the summary provided above. Prior to the commencement of normal operations, CP2 LNG would perform required activities as part of the commissioning and startup of the Terminal facilities. The commissioning activities are necessary to ensure facility-wide equipment is in proper working order to safely produce LNG. Such activities include, but are not limited to, inerting all systems by filling equipment with nitrogen, purging that nitrogen from the systems and filling with natural gas, starting up and blowing down equipment associated with pretreatment and liquefaction systems, cooling down the LNG tanks, and commissioning the facility turbines. All of the activities associated with the Terminal facilities commissioning are one-time activities and are necessary for safe installation and to test the equipment to verify proper functionality. Per the current schedule, commissioning activities would occur over approximately 24 months per phase of the two-phase Project. For commissioning and startup, CP2 LNG estimated flaring duration based on performing blowdowns on each pre-treatment train, blowdowns of each liquefaction train, cooldowns of each liquefaction train, defrosting each liquefaction train every 3 months, blowdowns associated with power outages during turbine commissioning and startup, and purging vessels. The flaring emissions calculations for commissioning were conservatively based on the volumetric capacity of the piping and vessels. Per phase, the total flaring duration is estimated to be approximately 37 days for the Warm Flare, 122 days for the Cold Flare, and approximately 80 days for LP Flare. Given the nature of commissioning, the frequency of flaring is unpredictable. According to Venture Global, Calcasieu Pass is experiencing unanticipated issues that require daily corrective, testing, and rectification work, thereby prolonging the duration of commissioning. CP2 LNG states that although these circumstances do not raise any safety concerns and while the flaring conducted at Calcasieu Pass LNG in 2022 was within the limits imposed by the facility's Title V permit (0560-00987-V4), such issues have resulted in flaring that is both longer in duration and more frequent than anticipated As illustrated above in table 4.12.1-12, during operation of the CP2 LNG Terminal facilities, the flaring for start-up, shutdown, and periodic routine maintenance is expected to be greatly reduced below the flaring rates anticipated during commissioning. The Marine Flare would be used intermittently for LNG carrier gas up and cooldown for approximately 1,224 hours per year. Except for equipment malfunction or upsets, the Warm Flare, Cold Flare, and LP Flare would be used intermittently for scheduled maintenance, startup, and shutdown activities for approximately 500 hours per year per flare. CP2 LNG would comply with the facility's Title V and PSD permit limits for short-term and annual flaring. To comply with these federally-enforceable limits, CP2 LNG stated that it would monitor the volumetric or mass flow rates of flared gas on an hourly basis and keep records on-site (electronic or hard copy)[134].

A portion of the total number of LNG carriers calling on the port each year would have their tanks filled with inert gas (mixture of mainly nitrogen and CO_2), which is vented out of the tanks directly to the marine flare, via a gassing up and cooldown process, before loading of LNG can begin. This process would result in additional CO_2 emissions to the atmosphere.

Table 4.12.1-13 provides a summary of the estimated short-term (pounds per hour [lb/hr]) controlled criteria air pollutant emission rates for routine operation of Terminal Facilities (excluding marine vessels). The short-term emission rates are needed as input for the pollutant dispersion modeling analysis to estimate ground-level concentrations or impacts from the Project. Emission rates are presented for only those criteria pollutants subject to PSD review (i.e., the only criteria pollutants for which an air quality impact assessment is required).

Table 4.12.1-13

Short-term Emissions (lb/hr) Associated with Equipment Operating Full-Time at the Terminal Facilities (On-Shore) [a, b]

Emissions Unit	Pollutant				
	PM_{10}	$PM_{2.5}$	NO_x	CO	SO_2
Combined Cycle Combustion Turbines (10)	84.92	84.92	136.03	670.01	22.05
Aeroderivative Turbines (3)	13.52	13.52	8.05	66.0	1.16
Hot Oil Heaters (8)	8.16	8.16	41.84	90.54	129.65
Acid Gas Thermal Oxidizers (2)	10.87	10.87	49.97	29.84	3.81
Warm, Cold, and LP Flares (3)[c]	0.017	0.017	0.155	0.710	0.003

[134] See Accession Nos. 20230428-5528 and 20230522-5195.

Table 4.12.1-13 Short-term Emissions (lb/hr) Associated with Equipment Operating Full-Time at the Terminal Facilities (On-Shore) [a, b]					
Emissions Unit	Pollutant				
	PM_{10}	$PM_{2.5}$	NO_x	CO	SO_2
Marine Loading Flare [c]	0.003	0.003	0.030	0.137	0.001

a The marine vessel emissions are not included in this summary table because the lb/hr emissions cannot be summed across all activities as they do not occur simultaneously.
b The short-term emissions for emergency equipment (emergency generators and fire water pumps), flare MSS operation, and LNG carrier "gas up" (marine flare) are not included in this table due to their limited, intermittent operations.
c Emissions associated with flare pilots only.

Marine Vessel Emission Sources

During operation of the Terminal, LNG carriers and supporting marine vessels, namely tugboats, would routinely generate air emissions. CP2 LNG developed the emission rates associated with LNG carrier and supporting marine vessel operating scenarios based on engine duty and fuel types. All scenarios assumed a representative LNG carrier main engine size rating of 22,800 kilowatt and 412 carrier calls per year.

Air pollutant emissions from LNG carriers would occur along the entire route from the open seas to the ships' berth. Air emissions generated during ship transit in offshore areas would be temporary, transient, and occur at distances allowing for considerable dispersion before reaching any sensitive receptors. Therefore, air emissions from ship transit outside the point where the pilot boards the vessel (which is within state territorial waters) would not be expected to result in a significant impact on air quality.

Marine vessel emissions are quantified for transiting inside the state water line (9 nautical miles offshore), for maneuvering up the Calcasieu Ship Channel and maneuvering to and holding at the pier, and for hoteling at the pier. For LNG carrier arrival, CP2 LNG estimated emissions assuming maneuvering in the turning basin and to the pier would occur over a 20-minute period with the assistance of four tugboats. For LNG carrier departure, maneuvering away from the pier and in the turning basin would occur over a 15-min period, also with the assistance for four tugboats. These four tugboats would also assist the LNG carrier during holding, both at arrival (lines made fast) and departure (lines released). While the LNG carrier is docked at the pier, emissions would be generated by carrier hoteling (i.e., standby and cargo loading operations on the carrier) and one tugboat idling for an approximate representative time of 24 hours.

For LNG carrier transiting and maneuvering within the Calcasieu Ship Channel, CP2 LNG assumed that the vessel's power requirements would be met through a 50-50 split between natural gas- and marine gas oil-firing. For LNG carrier maneuvering from the turning basin to, and holding and hoteling at, the Terminal Facilities pier, Venture Global assumed the vessel's power requirements would be met through a 90-10 split between natural gas- and marine gas oil-firing.

CP2 LNG's emissions calculations for the LNG carriers firing marine gas oil in the main engine while transiting, maneuvering, holding, and hoteling are based on use of ultra-low sulfur diesel and EPA's recent port emissions inventory guidance for EPA Tier 1 engine standards (EPA, 2020), except for NO_x. The NO_x emission factor used by Venture Global is consistent with the International Maritime Organization MARPOL Annex VI Tier III NO_x limit for the North America Emission Control Area. Additionally, the SO_2 emission factor used is consistent with the use of ultra-low sulfur diesel , which meets the International Maritime Organization MARPOL Annex VI fuel sulfur content limit for the Emission Control Area. Emissions calculations for the LNG carriers firing natural gas in the main engine are based on AP-42 boiler emission factors.

CP2 LNG accounted for emissions from the use of a gas combustion unit (GCU) and auxiliary boilers on the LNG carriers while maneuvering to and hoteling at the pier. The GCU is used to control vapor pressure in the LNG carrier tank if that pressure rises above the normal range; the GCU is natural gas fired. The auxiliary boilers are marine gas oil fired.

CP2 LNG's emission calculations for the tugboats are based on EPA Tier 4 exhaust emission standards for marine engines (for NO_x, VOC, and PM_{10}/$PM_{2.5}$) and EPA's recent port emission inventory guidance for CO, SO_2, and CO_2. CP2 LNG committed to the use of dedicated tugboats outfitted with engines certified to EPA Tier 4 standards.

Table 4.12.1-14 presents a summary of the estimated highest annual emissions associated with 1) LNG carriers and tugboats (four for each ship call) maneuvering from the turning basin to the Terminal Facilities pier; and 2) LNG carriers hoteling at the pier and tugboats (one for each ship call) idling nearby. Table 4.12.1-15 presents a summary of the estimated highest annual emissions associated with the following other operations of marine vessels: 1) LNG carriers and assist tugboats (2 per carrier call) transiting the Calcasieu Ship Channel and operating in state waters; and 2) pilot boats (1 per carrier call) operating in state waters. These emissions are based on 412 carrier calls per year.

Table 4.12.1-14

Annual Emissions (tpy) Associated with Operation of Marine Vessels Maneuvering from the Turning Basin to, and Holding and Hoteling at, the Terminal Facilities Pier

Vessel Operation	Pollutant						
	PM_{10}	$PM_{2.5}$	NO_x	CO	VOC	SO_2	CO_2e[d]
LNG Carrier Maneuvering, Holding, and Hoteling[a]	0.63	0.62	10.03	3.39	0.65	0.02	4,067.0
Gas Combustion Units & Auxiliary Boilers[b]	1.52	1.52	7.00	0.65	0.16	0.01	3,195
Tugboats Support[c]	0.21	0.21	9.35	4.77	0.99	0.03	3,580.0
Total Emissions	**2.4**	**2.4**	**26.4**	**8.8**	**1.8**	**0.1**	**10,841.9**

a LNG carrier hoteling emissions include emissions associated with cargo loading and standby operations

b Gas combustion units are found on LNG carriers with Dual Fuel Diesel-Electric or Slow-Speed gas-burning diesel engines; auxiliary boilers are used for low-duty compressors, which supply boil-off gas to the gas-burning engines and/or boilers on the LNG carriers.

c Emission rates assume four tugboats used for LNG carrier maneuvering and holding operations, and one tugboat used for LNG carrier hoteling operations

d CO_2e emissions based on GWPs of 1 for CO_2, 25 for CH_4, and 298 for N_2O

Table 4.12.1-15

Annual Emissions (tpy) Associated with Operation of Marine Vessels in State Waters (Beyond the Terminal Facilities Turning Basin)

Vessel Operation	Pollutant						
	PM_{10}	**$PM_{2.5}$**	**NO_x**	**CO**	**VOC**	**SO_2**	**CO_2e[c]**
LNG Carrier	2.61	2.54	35.35	15.91	2.94	0.07	8,416
Tugboats Support[a]	0.23	0.23	10.17	5.19	1.07	0.04	3,897
Pilot Boat[b]	0.23	0.22	9.10	1.43	0.26	0.01	610
Total Emissions	**3.1**	**3.0**	**54.6**	**22.5**	**4.3**	**0.1**	**12,923**

[a] Emission rates assume two tugboats used for LNG carrier maneuvering and transiting within State waters, excluding the turning basin for the Terminal Facilities; annual emissions for tugboats (4) operating within the turning basin are included in Table 4.12.1-12

[b] Emission rates for each LNG carrier call are based on pilot boat delivery of pilot to LNG carrier and pilot boat return to base, and pilot boat pick-up of pilot from LNG carrier and pilot boat return to base

[c] CO_2e emissions based on GWPs of 1 for CO_2, 25 for CH_4, and 298 for N_2O

The short-term emission rates for the marine vessels maneuvering from the turning basin to, and holding and hoteling at, the Terminal Facilities pier are needed, in addition to short-term emission rates for the Terminal Facilities stationary sources (shown above), as input for the pollutant dispersion modeling analysis to estimate ground-level concentrations or impacts from the Project. Emission rates are presented for only those criteria pollutants subject to PSD review (and for which an air quality impact analysis was required). Table 4.12.1-16 presents a summary of the estimated short-term (lb/hr) criteria air pollutant emissions associated with 1) one LNG carrier maneuvering from the turning basin to the pier and holding alongside with the assistance of four tugboats; and 2) one LNG carrier hoteling at the pier with one tugboat nearby operating in standby mode. These emission rates were used as input in the air dispersion modeling analysis discussed below.

Table 4.12.1-16 Short-Term Emissions (lb/hr) Associated with Operation of Marine Vessels Maneuvering from the Turning Basin to, and Holding and Hoteling at, the Terminal Facilities Pier [a]					
Vessel Operation	**Pollutant**				
	PM_{10}	**$PM_{2.5}$**	**NO_x**	**CO**	**SO_2**
Maneuvering LNG Carrier [b]	0.36	0.36	3.52	0.80	0.007
Hoteling LNG Carrier [c]	0.46	0.46	3.61	0.83	0.007
Tugboats Assisting Maneuvering LNG Carrier [d]	0.024	0.024	9.52	4.88	0.032
Tugboats Assisting Hoteling LNG Carrier [e]	0.019	0.019	0.83	0.43	0.003

[a] These emission rates were used in the air quality impact analysis for the Terminal Facilities
[b] Includes emissions associated with alongside-holding operation
[c] Emission rates are based on combined emissions for cargo loading and standby operations
[d] Emission rates assume four tugboats used for LNG carrier maneuvering and alongside-holding operations
[e] Emission rates assume one tugboat used for LNG carrier hoteling operations

Moss Lake Compressor Station and Pipeline

For the Moss Lake Compressor Station, the primary source of emissions, except for VOC, would be the set of five gas-fired aeroderivative combustion turbines. The station would have a total capacity of 187,000 horsepower upon completion of Phase 2. Fugitive VOC emissions from equipment leaks would be responsible for most of the VOC emissions from the operating compressor station.

In response to our recommendation in the draft EIS, Venture Global provided updates to the set of emission sources being permitted for the Moss Lake Compressor Station. Specifically, Venture Global reduced the number of emergency generators from five to one and added a gas-driven booster compressor turbine. The design total capacity for the facility (187,000 HP) is unchanged.

The only sources of emissions associated with the pipeline system are fugitive emissions at various points along the length of the pipeline and at the meter stations.

- Once constructed, the Moss Lake Compressor Station and pipeline would undergo a commissioning process before becoming fully operational. The total GHG (CO_2e) emissions from commissioning of the pipeline system is 275 tpy (based on 235 tpy of CO_2 and 1.6 tpy of CH_4), with VOC and HAP emissions being less than 0.1 tpy. Venture Global did not provide emission estimates associated with commissioning activities for the Moss Lake Compressor Station, but stated in its response to our recommendation in the draft EIS that the annual emissions associated with these commissioning activities would be less than or equal to the annual emissions associated with operation of the facility, which are presented in table 4.12.1-17.

We received a comment during scoping from Healthy Gulf stating concern with formaldehyde emissions from the compressor station. Table 4.12.1-15 summarizes the estimated annual criteria pollutant, GHG, and HAP emission rates for the sources at the Moss Lake Compressor Station. Additionally, the VOC, GHG, and HAP emissions associated with operation of the pipeline system, including the meter stations, are included in table 4.12.1-17. CP Express projected an annual formaldehyde emission rate of 4.7 tpy for the station.

Table 4.12.1-17								
Annual Emissions (tpy) Associated with Operation of the Moss Lake Compressor Station and Pipeline System								
Emissions Unit	**Pollutant**							
	PM_{10}	**$PM_{2.5}$**	**NO_x**	**CO**	**VOC**	**SO_2**	**Total HAPs**	**CO_2e[a]**
Moss Lake Compressor Station								
Emergency Generator #1	<0.1	<0.1	0.7	0.4	0.7	<0.1	N/A	81
Aeroderivative Turbine #1	20.1	20.1	64.0	96.0	23.2	0.8	1.3	144,568
Aeroderivative Turbine #2	20.1	20.1	64.0	96.0	23.2	0.8	1.3	144,568
Aeroderivative Turbine #3	20.1	20.1	64.0	96.0	23.2	0.8	1.3	144,568
Aeroderivative Turbine #4	20.1	20.1	64.0	96.0	23.2	0.8	1.3	144,568
Aeroderivative Turbine #5	20.1	20.1	64.0	96.0	23.2	0.8	1.3	144,568
Condensate tank	N/A	N/A	N/A	N/A	0.5	N/A	N/A	N/A
Equipment leaks	N/A	N/A	N/A	N/A	24.7	N/A	1.1	3,573
Gas-Driven Booster Compressor Turbine	1.4	1.4	25.1	46.0	8.7	0.4	0.7	82,513
Total Emissions	**101.7**	**101.7**	**345.7**	**526.5**	**150.7**	**4.2**	**7.2**	**809,007**
Pipeline System	**N/A**	**N/A**	**N/A**	**N/A**	**24.4**	**N/A**	**3.2**	**17,541**

N/A – not applicable

a CO_2e emissions based on GWPs of 1 for CO_2, 25 for CH_4, and 298 for N_2O

b CO_2e emission rate for Moss Lake Compressor Station is based on: CO_2 emission rate of 786,484 tpy; CH_4 emission rate of 884 tpy; and N_2O emission rate of 1.45 tpy

c CO_2e emission rate for Pipeline System is based on: CO_2 emission rate of 40.8 tpy and CH_4 emission rate of 700 tpy

Table 4.12.1-18 provides a summary of the estimated short-term (lb/hr) controlled criteria air pollutant emission rates for routine operation of the Moss Lake Compressor Station, respectively. Emission rates are presented for only those pollutants subject to PSD review for the Moss Lake Compressor Station (and for which an air quality impact analysis was required).

Table 4.12.1-18				
Short-term Emissions (lb/hr) Associated with Operation of Moss Lake Compressor Station [a]				
Emissions Unit	**Pollutant**			
	PM_{10}	**$PM_{2.5}$**	**NO_x**	**CO**
Aeroderivative Turbines (5)	25.18	25.18	80.99	120.52
Gas-Driven Booster Compressor Turbine	0.36	0.36	6.31	69.16

a The short-term emissions for emergency generators are not included in this table due to their limited, intermittent operations; emissions for the condensate tank and equipment leaks are not required to be modeled.

Emission Source Mitigation

Given that the Project – both the Terminal Facilities and Moss Lake Compressor Station – is subject to PSD review, the LDEQ air quality regulations (LAC 33:III.509.J) stipulate that all construction permit applicants must evaluate and apply BACT for the stationary air emission sources.[135] Methods for reducing criteria pollutant emissions for affected sources were evaluated based on technical feasibility.

135 CP2 LNG and CP Express' BACT analysis for the Project is included in the PSD permit applications for Terminal Facilities and Moss Lake Compressor Station (Accession No. 20220801-5238).

The natural gas-fired combustion turbines would be designed with Dry Low-NO_x Combustors. Additionally, for the combined cycle units, duct burners would be Low-NO_x Burner design and the heat recovery steam generator exhaust would be ducted to a selective catalytic reduction system. Also, for the aeroderivative simple cycle units, the exhaust would be ducted to a selective catalytic reduction system. The combination of these measures would minimize NO_x emissions from the combustion turbines. The heat recovery steam generator exhaust from the combined cycle units would also pass through an oxidation catalyst, which would minimize CO and VOC emissions. The use of low-sulfur gaseous fuel would minimize SO_2 and PM emissions. The use of good combustion practices would serve to minimize emissions of other regulated pollutants. These measures are considered BACT for emissions from the combustion turbines.

The hot oil heaters would be equipped with Ultra- Low-NO_x Burner, which is considered BACT for NO_x emissions from these units. The use of low-sulfur gaseous fuel would minimize SO_2 and PM emissions. The use of good combustion practices would serve to minimize emissions of other regulated pollutants. These measures are considered BACT for emissions from the hot oil heaters.

The acid gas thermal oxidizers would be equipped with Low-NO_x Burner, which is considered BACT for NO_x emissions from these units. The use of low-sulfur gaseous fuel would minimize SO_2 and PM emissions. The use of good combustion practices would serve to minimize emissions of other regulated pollutants; these practices would include the continuous monitoring of key operating parameters. These measures are considered BACT for emissions from the thermal oxidizers.

The limited-use emergency generators/engines would be built to meet the applicable emission standards outlined in 40 CFR 60, Subpart IIII. Additionally, these generators would utilize good combustion practices and ultra-low sulfur diesel fuel to minimize emissions of other regulated pollutants.

Emissions from the flares would be reduced through proper flare/burner design, proper operation, and good combustion practices, including continuous monitoring of key operating parameters. Additionally, for the marine flare, emissions would be reduced through recovery of cargo loading return gas (methane content greater than or equal to 80 percent). Fugitive VOC emissions (equipment leaks) would need to comply with source specific BACT requirements as well, including proper design and construction and good work practices.

We received a comment from the EPA on the draft EIS that FERC should require all practicable GHG mitigation measures. CP2 LNG and CP Express state that they would implement work practice standards and use equipment types/designs that minimize leaks and venting, including: 1) use of strap-on ultrasonic meters to monitor flow balancing; 2) installation of leak protection at the Moss Lake Compressor Station; 3) use of tertiary design for all compressor seals; 4) assembling of flange installations greater than 24 inches using bolt tensioning; and 5) installation of low-bleed pneumatic devices. All pipeline valves that are part of the mainline would be weld-end connections and there will be no flanges on the mainline. Ultrasonic flow meters would be installed in the metering station at the Terminal Facilities. Any hot tapping used to avoid the need to blow down gas would be implemented with consideration for safety.[136] These measures would help to reduce VOC as well as GHG emissions from leaks.

Regarding GHG, for the combustion turbines, emergency engines, hot oil heaters, and acid gas thermal oxidizers, emissions would be minimized through use of low-carbon gaseous fuel only, proper combustion/operations and maintenance practices, and proper insulation for surfaces above 120 ^{o}F to prevent heat loss and improve combustion efficiency. For the fugitive GHG emissions (equipment leaks) would be minimized through proper design and construction and good work practices.

[136] See Accession No. 20230522-5195.

We received a comment from the EPA on the draft EIS that asked if CP2 LNG would use gas-insulated switchgears that contained sulfur hexafluoride, which is a potent GHG. In their response, CP2 LNG stated that it would use sulfur hexafluoride in gas-insulated substation switchgears, however, they would comply with the International Electrotechnical Commission Standard (IEC62271-203 Sec. 7.104) and as a result, would expect minimal fugitive emissions from leaks at these switchgears.[137]

In summary, the proposed BACT and resulting BACT-based emission rates for the Project emissions sources would be consistent with NSPS, NESHAP, and/or LDEQ-stipulated emission standards (via recent PSD permits for other similar sources), as applicable.

Summary of Total Project Emissions

A summary of the total annual emissions from operation of all facets of the Project – Terminal Facilities, Moss Lake Compressor Station, and Pipeline System – post-Phase 2 commissioning is presented in table 4.12.1-19.

[137] See Accession No. 20230522-5195.

Table 4.12.1-19

Total Annual Emissions (tpy) from Operation of the Project

Emissions Source	**Pollutant**							
	PM_{10}	**$PM_{2.5}$**	**NO_x**	**CO**	**VOC**	**SO_2**	**Total HAPs**	**CO_2e[a,b,c]**
Terminal Facilities – Onshore Sources	368.9	368.9	908.2	1,428.7	175.5	254.5	39.7	8,528,260
Terminal Facilities – Marine Vessel Operations [d]	5.4	5.3	81.0	31.3	6.1	0.2	0.8	23,765
On-Road Vehicle Operation at Terminal Facilities	0.02	0.01	0.75	18.82	0.17	0.01	0.05	2,201
Moss Lake Compressor Station	101.7	101.7	345.7	526.5	150.7	4.2	7.2	809,007
Pipeline System [e]	N/A	N/A	N/A	N/A	24.4	N/A	3.2	17,541
Total Emissions	**476.1**	**476.0**	**1,335.7**	**2,005.4**	**356.9**	**258.9**	**50.9**	**9,380,774**

N/A – not applicable

a CO_2e emissions based on GWPs of 1 for CO_2, 25 for CH_4, and 298 for N_2O

b CO_2e emission rate for marine vessels is based on: CO_2 emission rate of 23,517 tpy; CH_4 emission rate of 0.33 tpy; and N_2O emission rate of 0.80 tpy

c CO_2e emission rate for on-road vehicles is based on: CO_2 emission rate of 2,198 tpy; CH_4 emission rate of 0.009 tpy; and N_2O emission rate of 0.05 tpy

d Emission rates account for marine vessels operating in the vicinity of the Terminal Facilities pier and in state waters

e All emissions from the pipeline system are fugitive emissions

These emissions are based on the maximum operating capacity of the Project. Actual annual emissions could be somewhat lower than these values and would vary year to year over the operational life of the Project.

Operations Impacts Assessment

To provide a more thorough evaluation of the potential impacts on air quality in the vicinity of the Project, CP2 LNG and CP Express conducted a quantitative assessment of criteria air pollutant emissions associated with operation of the Project facilities. Separate air quality impacts analyses were conducted for the Terminal Facilities and Moss Lake Compressor Station.[138] The analysis for the Terminal Facilities included emissions from marine vessels – LNG carrier and tugboats – maneuvering from the turning basin to, and holding and hoteling at, the Terminal Facilities pier. The focus of the impact analysis was assessing compliance with the applicable NAAQS. Note that because lead emissions would not exceed the significant emission rate threshold for either the Terminal Facilities or the Moss Lake Compressor Station, an air quality impact analysis for lead is not required for either facet of the Project.

CP2 LNG and CP Express conducted this analysis using EPA-recommended pollutant dispersion modeling methods to predict off-site (i.e., ambient) concentrations in the vicinity of the Project site for

138 Available in accession No. 20220801-5238

comparison against the NAAQS. Specifically, CP2 LNG and CP Express used the American Meteorological Society/Environmental Protection Agency Regulatory Model dispersion model with the regulatory default option invoked. Representative surface meteorological data for the 5-year period 2016 through 2019 and 2021 from Lake Charles Regional Airport were input to the model (meteorological data for 2020 did not meet EPA's data completeness requirements). CP2 LNG consulted with the LDEQ regarding the use of this specific meteorological dataset for the Project analysis. The model receptor grid extended from the property boundary for each facility out to 50 kilometers (km). Representative background concentrations were developed for each pollutant and associated averaging period and added to the controlling model-predicted concentrations, with the total concentrations compared against the NAAQS.

CP2 LNG and CP Express conducted PSD Significance Analyses (i.e., separate analyses for the Terminal Facilities and Moss Lake Compressor Station) to determine if Project emissions for air pollutants subject to PSD review would cause a significant impact. Generally, the Significance Analysis considers emissions only associated with the Project sources and compare the model-predicted highest concentrations to corresponding SILs to determine if any such concentrations would be "significant."[139] If the predicted Significance Analysis impacts for a particular pollutant and averaging period are below the applicable SIL, then no further analyses are required for that pollutant/averaging period. If the Significance Analysis shows that model-predicted concentrations for a particular pollutant and averaging period(s) are greater than the applicable SIL, a full or cumulative impact analysis (i.e., NAAQS analysis) is performed for this pollutant and averaging period(s). Full or cumulative impact analyses must consider emissions from existing regional sources in addition to the Project sources. In cases where a potential NAAQS exceedance is identified, the modeled contribution from the Project is not considered to have caused or contributed to the exceedance if its own impact, as shown in the Significance Analysis, is not significant (i.e., is less than the SIL) at the receptor and time period of the predicted exceedance. For those cases where there is no simultaneous exceedance of the NAAQS and the SIL by the proposed Project source, the modeling analysis is deemed to demonstrate that the proposed source would not cause or contribute to the potential NAAQS exceedance.[140]

<u>Significance Analysis Results</u>

Tables 4.12.1-20 and 4.12.1-21 present the separate set of Significance Analysis results for the Terminal Facilities and Moss Lake Compressor Station, respectively. The $PM_{2.5}$ impacts include the contribution from secondary $PM_{2.5}$ formation as required by EPA. CP2 LNG also performed an air quality impact analysis for O_3 for each facility. Both the analysis of secondary $PM_{2.5}$ formation and O_3 were based on use of EPA's latest Modeled Emission Rates for Precursors guidance in conjunction with EPA's Tier 1 demonstration tool (40 CFR Part 51, Appendix W – Guideline on Air Quality Models).

Table 4.12.1-20

Significant Impact Analysis Results for Terminal Facilities

Air Pollutant	Averaging Period	Highest Model-Predicted Concentration (μg/m³)	Significant Impact Level (SIL) (μg/m³)	Model-Predicted Concentration > SIL? (Yes/No)	Area of Impact [a] (km)
NO_2	1-hour	26.7	7.5	Yes	23.7
	Annual	2.4	1	Yes	1.8

[139] In accordance with 40 CFR 51, Appendices S and W.

[140] Per 40 CFR part 51, Appendix W – Guideline on Air Quality Models, Section 8.1.2 a.: "For a NAAQS or PSD increments assessment, the modeling domain or project's impact area shall include all locations where the emissions of a pollutant from the new or modifying source(s) may cause a significant ambient impact." Further, per Section 9.2.3 c.: "The receptors that indicate the location of significant ambient impacts should be used to define the modeling domain for use in the cumulative impact analysis."

Table 4.12.1-20 Significant Impact Analysis Results for Terminal Facilities					
Air Pollutant	**Averaging Period**	**Highest Model-Predicted Concentration (μg/m³)**	**Significant Impact Level (SIL) (μg/m³)**	**Model-Predicted Concentration > SIL? (Yes/No)**	**Area of Impact [a] (km)**
$PM_{2.5}$ [b]	24-hour	4.1	1.2	Yes	7.9
	Annual	0.4	0.2	Yes	2
PM_{10}	24-hour	4.8	5	No	NA
SO_2	1-hour	32.9	7.8	Yes	22.1
	3-hour	32	25	Yes	1.5
	24-hour	11.7	5	Yes	4.3
	Annual	0.4	1	No	NA
CO	1-hour	5,325.3	2,000	Yes	1.5
	8-hour	274.6	500	No	NA

[a] Relative to the assumed facility center point (UTM coords.): 468610.0 meters (Easting), 3294293.7 meters (Northing)
[b] For 24-hour and annual $PM_{2.5}$ analysis modeling:
Notes: Total concentration = Primary $PM_{2.5}$ (model-predicted concentration) + Secondary $PM_{2.5}$ (from MERP analysis)
- 24-hour total $PM_{2.5}$ concentration = 3.74 + 0.3480 = 4.1 μg/m³
- Annual total $PM_{2.5}$ concentration = 0.34 + 0.0109 = 0.4 μg/m³
NA = Not applicable
MERP = Modeled Emission Rates for Precursors

Table 4.12.1-21 Significant Impact Analysis Results for Moss Lake Compressor Station					
Air Pollutant	**Averaging Period**	**Highest Model-Predicted Concentration (μg/m³)**	**Significant Impact Level (SIL) (μg/m³)**	**Model-Predicted Concentration> SIL? (Yes/No)**	**Area of Impact[a] (km)**
NO_2	1-hour	38.9	7.5	Yes	1.4
	Annual	0.4	1	No	NA
$PM_{2.5}$ [b]	24-hour	1.3	1.2	Yes	0.8
	Annual	0.1	0.2	No	NA
PM_{10}	24-hour	1.4	5	No	NA
CO	1-hour	670.0	2,000	No	NA
	8-hour	440.5	500	No	NA

[a] Relative to the assumed facility center point (UTM coords.): 459527.4 meters (Easting); 3328917.5 meters (Northing)
[b] For 24-hour and annual $PM_{2.5}$ NAAQS analysis modeling:
Notes: Total concentration = Primary $PM_{2.5}$ (model-predicted concentration) + Secondary $PM_{2.5}$ (from MERP analysis)
24-hour total $PM_{2.5}$ concentration = 1.25 + 0.053 = 1.3 μg/m³
Annual total $PM_{2.5}$ concentration = 0.11 + 0.0018 = 0.1 μg/m³
NA = Not applicable
MERP = Modeled Emission Rates for Precursors

The Significance Analysis for the Terminal Facilities sources showed that 1-hour and annual NO_2; 24-hour and annual $PM_{2.5}$; 1-hour, 3-hour, and 24-hour SO_2; and 1-hour CO impacts exceeded the associated SILs; therefore, CP2 LNG conducted a full or cumulative impact analysis to assess compliance with the

NAAQS for these pollutants and averaging periods, the results of which are discussed in the subsection below. For all other pollutants and averaging periods evaluated, the maximum model-predicted impacts were below the associated SILs; therefore, NAAQS compliance was demonstrated for those pollutants and averaging periods and no further analyses are required for the Terminal Facilities.

CP2 LNG performed a screening analysis using EPA's Tier 1 methodology and O_3 precursor – NO_x and VOC – emissions for the Terminal Facilities to assess the potential impact on ground-level O_3 concentrations. The Tier 1 methodology showed that these precursor emissions would result in air quality impacts that exceed the O_3 SIL; therefore, CP2 LNG conducted a cumulative impact analysis to assess compliance with the O_3 NAAQS, the results of which are discussed in the subsection below.

The Significance Analysis for the Moss Lake Compressor Station sources showed that 1-hour NO_2 and 24-hour $PM_{2.5}$ impacts exceeded the associated SILs; therefore, CP Express conducted a full or cumulative impact analysis to assess compliance with the NAAQS for these pollutants and averaging periods, the results of which are discussed in the subsection below. For all other pollutants and averaging periods evaluated, the maximum model-predicted impacts were below the associated SILs; therefore, NAAQS compliance was demonstrated for those pollutants and averaging periods and no further analyses are required for the Moss Lake Compressor Station.

CP Express performed a screening analysis using EPA's Tier 1 methodology and O_3 precursor – NO_x and VOC – emissions for the Moss Lake Compressor Station to assess the potential impact on ground-level O_3 concentrations. The Tier 1 methodology showed that these precursor emissions would result in air quality impacts that exceed the O_3 SIL; therefore, CP Express conducted a cumulative impact analysis to assess compliance with the O_3 NAAQS, the results of which are discussed in the subsection below.

NAAQS Analysis Results

CP2 LNG conducted a cumulative impact analysis for the Terminal Facilities for each pollutant that exceeded the SIL (see table 4.12.1-20). The Terminal Facilities sources, including marine vessels – LNG carriers and tugboats, were modeled along with additional offsite sources obtained from the LDEQ Emissions Reporting and Inventory Center.[141] The Area of Impact (AOI) for each pollutant and averaging period was established as the distance from the Terminal Facilities to the farthest receptor that showed a model-predicted impact greater than the SIL in the Significance Analysis. The offsite source inventory for the cumulative analysis included all sources within the AOI plus 15 km and all major sources within the AOI plus 20 km. Table 4.12.1-22 shows the results of the modeling for the emission sources (Terminal Facilities and offsite sources) plus background concentration values in comparison to the NAAQS for each pollutant and averaging period.

Table 4.12.1-22

Summary of Air Pollutant Dispersion Modeling and Air Quality Impact Analysis Results for the Terminal Facilities

Air Pollutant	**Averaging Period**	**Model-Predicted Concentration (μg/m³)**	**Background Concentration [a] (μg/m³)**	**Total Concentration (μg/m³)**	**NAAQS (μg/m³)**
NO_2	1-hour	138.3	62.7	**201.0**[b]	188
	Annual	4.0	12.2	16.2	100

141 For the Terminal Facilities modeling analysis, CP2 LNG assumed the LNG carrier to have vessel dimensions of 16 m high (above water line) by 49 m long by 53.75 m wide, with a stack height of 46 m (above water line). LNG carrier dimensions could vary amongst the suite of vessels calling at the Terminal Facilities.

Table 4.12.1-22 Summary of Air Pollutant Dispersion Modeling and Air Quality Impact Analysis Results for the Terminal Facilities					
Air Pollutant	**Averaging Period**	**Model-Predicted Concentration ($\mu g/m^3$)**	**Background Concentration [a] ($\mu g/m^3$)**	**Total Concentration ($\mu g/m^3$)**	**NAAQS ($\mu g/m^3$)**
$PM_{2.5}$	24-hr	3.2	17.3	20.9	35
	Annual	0.7	8.7	9.4	12
SO_2	1-hour	87.5	34.0	121.5	196
	3-hour	29.9	44.2	74.1	1,300
	24-hour	38.2	12.0	50.2	365
CO	1-hour	4,893.5	1,718.4	6,611.9	40,000

N/A = not applicable
SIL = Significant Impact Level
[a] Background concentrations are based on available representative monitoring data for the 2019-2021 period.
[b] Further analysis demonstrated that the Project emissions do not cause or contribute to this exceedance.

The results from the cumulative impact analysis for the Terminal Facilities (including marine vessel emissions) showed compliance with the NAAQS except for the 1-hour NO_2 NAAQS. Also, application of EPA's Tier 1 methodology showed that the Terminal Facility's estimated O_3 impact (4.2 parts per billion [ppb]) combined with the nearby O_3 background concentration (61 ppb) - 65.2 ppb total - was below the 8-hr O_3 NAAQS (70 ppb).

CP2 LNG conducted a culpability analysis to determine if and to what extent the Project emission sources contributed to the exceedance of the 1-hour NO_2 NAAQS. This culpability analysis showed that the contribution by the Terminal Facilities sources to each exceedance concentration at the same point in space and time is not significant (i.e., the contribution is less than the EPA-designated SIL of 7.5 $\mu g/m^3$). Therefore, the Terminal Facilities are not considered, by the EPA, to cause or contribute to this exceedance. The results of the culpability analysis indicate that emissions from existing marine vessels operating in the nearby Calcasieu Ship Channel are primarily the drivers behind the maximum predicted 1-hour NO_2 potential exceedances. Appendix K provides a listing of all model-predicted impacts resulting in an exceedance of the 1-hour NO_2 NAAQS along with the location of those impacts and the Project's non-significant contribution to those impacts. Appendix K also provides a figure that illustrates the locations (i.e., specific receptors) of the 1-hour NO_2 NAAQS exceedances relative to nearby industrial facilities included in the cumulative analysis, including Commonwealth LNG, Calcasieu Pass LNG and CP2 LNG facilities.[142]

CP Express conducted a cumulative impact analysis for the Moss Lake Compressor Station for each pollutant that exceeded the SIL (see table 4.12.1-21). The Moss Lake Compressor Station sources were modeled along with additional offsite sources obtained from the LDEQ Emissions Reporting and Inventory Center. The AOI for each pollutant and averaging period was established as the distance from the station to the farthest receptor that showed a model-predicted impact greater than the SIL in the Significance Analysis, which included all sources within the AOI plus 15 km and all major sources within the AOI plus 20 km. Table 4.12.1-23 shows the results of the modeling for the emission sources (Moss Lake Compressor Station and offsite sources) plus background concentration values in comparison to the NAAQS for each pollutant and averaging period.

[142] Note that although the red dots in the figure shows the specific model receptor locations of these exceedances, the potential exists for other 1-hour NO_2 NAAQS exceedances to occur in the geographic area between those receptors

Air Pollutant	Averaging Period	Model-Predicted Concentration ($\mu g/m^3$)	Background Concentration [a] ($\mu g/m^3$)	Total Concentration ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)
NO_2	1-hour	200.8	62.7	**263.5**[b]	188
$PM_{2.5}$	24-hr	27.2	17.3	**44.5** [b]	35

Table 4.12.1-23

Summary of Air Pollutant Dispersion Modeling and Air Quality Impact Analysis Results for the Moss Lake Compressor Station

NA = Not applicable
SIL = Significant Impact Level
[a] Background concentrations are based on available representative monitoring data for the 2019-2021 period.
[b] Further analysis demonstrated that the Project emissions do not cause or contribute to this exceedance.

The results from the cumulative impact analysis for the Moss Lake Compressor Station showed compliance with the NAAQS except for the 1-hour NO_2 NAAQS and 24-hour $PM_{2.5}$ NAAQS. Also, application of EPA's Tier 1 methodology showed that the Moss Lake Compressor Station's estimated O_3 impact combined with the nearby O_3 background concentration (total of 62.8 ppb) was below the 8-hr O_3 NAAQS (70 ppb).

CP Express conducted a culpability analysis to determine if and to what extent the Project emission sources contributed to the exceedances of the 1-hour NO_2 and 24-hour $PM_{2.5}$ NAAQS. This culpability analysis showed that the contribution by the Moss Lake Compressor Station sources to each exceedance concentration at the same point in space and time is not significant (i.e., the contribution is less than the EPA-designated SILs of 7.5 $\mu g/m^3$ for the 1-hour NO_2 and for 1.2 $\mu g/m^3$ 24-hr $PM_{2.5}$ average concentrations). Therefore, the Moss Lake Compressor Station is not considered, by the EPA, to cause or contribute to these exceedances. Appendix K provides a listing of all model-predicted impacts resulting in an exceedance of the 1-hour NO_2 and 24-hour $PM_{2.5}$ NAAQS along with the location of those impacts and the Project's non-significant contribution to those impacts.

PSD Increment Analysis Results

A PSD increment is the maximum allowable increase in the ambient concentration of a specific pollutant in an area that is in attainment of the NAAQS. Significant deterioration of air quality is deemed to occur when the amount of additional new pollution exceeds the applicable PSD increment. PSD Class II Increments have been established for four pollutants: NO_2 (annual averaging period); SO_2 (annual, 24-hour, and 3-hour averaging periods); PM_{10} (annual and 24-hour averaging periods); and $PM_{2.5}$ (annual and 24-hour averaging periods). PSD Class II Increments apply to the Terminal Facilities and the Moss Lake Compressor Station.

CP2 LNG conducted modeling analyses to assess whether the Terminal Facilities could demonstrate compliance with the PSD Class II Increments for the corresponding pollutants/averaging periods with concentrations that exceeded the SIL: NO_2 – annual, SO_2 – 3-hour and 24-hour, and $PM_{2.5}$ – 24-hour and annual. CP2 LNG used an inventory of appropriate offsite emission sources obtained from the LDEQ for the PSD increment modeling analysis. The model-predicted maximum increment concentrations for the subject pollutants and averaging periods were below the PSD Class II increments. Therefore, the Terminal Facilities would not cause or contribute to an exceedance of the PSD Class II increments.

CP Express conducted modeling analyses to assess whether the Moss Lake Compressor Station could demonstrate compliance with the PSD Class II Increments for the corresponding pollutants/averaging periods with concentrations that exceeded the SIL: $PM_{2.5}$ – 24-hour. CP2 LNG used an inventory of appropriate offsite emission sources obtained from the LDEQ for the PSD increment modeling analysis. The model-predicted maximum 24-hr $PM_{2.5}$ increment concentration exceeded the PSD Class II increment. As a result, CP Express conducted a culpability analysis to determine if and to what extent the Project emission sources contributed to the exceedance of the 24-hr $PM_{2.5}$ increment. This culpability analysis showed that the contribution by the Project emission sources to each exceedance concentration at the same point in space and time is not significant (i.e., the Project contribution is less than the EPA-designated PSD Class II SIL of 1.2 $\mu g/m^3$ for the 24-hr $PM_{2.5}$ concentrations). Therefore, the Moss Lake Compressor Station would not cause or contribute to an exceedance of the 24-hour $PM_{2.5}$ PSD Class II Increment.

The Terminal Facilities and Moss Lake Compressor Station are greater than 400 km from the nearest Federal Class I area – Breton NWR. As demonstrated by CP2 LNG and CP Express, based on the significant separation distance and magnitude of maximum annual NO_x, $PM_{2.5}$, SO_2 emissions from each facility, the Project is not required to notify the Federal Land Manager or conduct an assessment of the potential impact on the Class I area, per Federal Land Manager guidance (FWS, 2010). We agree.

Human Health Risk Assessment

Although we have determined that the Project would not result in significant impacts on air quality, to confirm our analysis and further disclose health-related impacts of the LNG Terminal due to emissions of HAPs, which are not criteria pollutants (i.e., are not evaluated under the NAAQS using air pollutant dispersion modeling), and because the Terminal Facilities are considered a major source of HAPs, we included a recommendation in our draft EIS that CP2 LNG provide maximum off-site HAPs ground-level concentrations from the LNG Terminal stationary and mobile marine sources. Further, we received a comment from the EPA on the draft EIS recommending the evaluation of potential HAPs impacts based on relevant inhalation health-based risk for the pollutants identified as available from EPA's Integrated Risk Information System. FERC staff conducted an HHRA of HAP emissions based on the maximum model-predicted 1-hour and annual off-property concentrations of HAPs emitted from the Terminal Facilities stationary sources and mobile marine sources (LNG carriers and tugs). The complete HHRA report is available in Appendix O and is summarized below.

The modeling results used in the HHRA were based on the maximum hourly (lb/hr) and annual emission rates (lb/yr) for 16 HAPs emitted by the Terminal Facilities stationary sources, including HAP emissions from the combustion turbines, hot oil heaters, thermal oxidizers, flares, equipment leaks, emergency generators, and storage tanks.[143] The mobile marine sources included emissions from tugboat engines and LNG carrier engines, as well as the auxiliary boilers and gas combustion units on the LNG carriers[144,145]

The dispersion modeling analysis for HAP emissions was performed in accordance with the EPA's Guideline on Air Quality Models (40 CFR Part 51, Appendix W) and LDEQ air quality modeling guidance, as described in the CP2 LNG's Hazardous Air Pollutants Air Quality Modeling Analysis report for the CP2 LNG Terminal (CP2 LNG Modeling Report).[146] The model-predicted 1-hour and annual average ground-

143 Venture Global CP2 LNG, LLC and CP Express, LLC. Accession No. 20220801-5238, Attachment General 1-f.v-1 – CP2 LNG Terminal Title V Permit and PSD Permit Application. August 1, 2022.

144 Venture Global CP2 LNG, LLC and CP Express, LLC. Accession No. 20211202-5105, Resource Report 9 – Air and Noise Quality, Appendix 9D. December 2, 2021.

145 Venture Global CP2 LNG, LLC and CP Express, LLC. Accession No. 20230526-5223, Attachment 11-2 – Hazardous Air Pollutants Air Quality Modeling Analysis Report for the CP2 LNG Terminal. May 26, 2023.

146 Venture Global CP2 LNG, LLC and CP Express, LLC. Accession No. 20230526-5223, Attachment 11-2 – Hazardous Air Pollutants Air Quality Modeling Analysis Report for the CP2 LNG Terminal. May 26, 2023.

level concentrations of 16 HAPs, that serve as the basis of the HHRA, were obtained from Table 3-2 of the CP2 LNG Modeling Report. [147]

The HHRA was conducted in accordance with methods outlined in EPA's 2005 "Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities".[148] The Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities provides a standardized methodology for conducting combustion risk assessments and was, therefore, chosen as appropriate guidance for this HHRA.

The HHRA estimated chronic (long-term) cancer risk and non-cancer hazard, as well as acute (short-term) non-cancer hazard via inhalation of compounds emitted from stationary and mobile marine emission sources at the Terminal Facilities. The HHRA evaluated inhalation exposure of hypothetical adult and child residents for which Reasonable Maximum Exposure (RME) was assumed. RME means that the hypothetical resident is conservatively assumed to be exposed 24 hours a day, 350 days a year (two weeks assumed for travel) for 30 years for the adult resident (represents ~ 95th percentile residency time for the U.S. population)[149] and six years for the child resident.[150] In addition, residential inhalation exposures were assumed to occur at the area (i.e., receptor) of greatest contaminant concentration (i.e., maximum model-predicted 1-hour and annual average concentrations) to maximize estimated exposure.

Chronic cancer risks and chronic non-cancer hazards as well as acute non-cancer hazards associated with inhalation exposure are estimated using the calculated average inhalation exposure per unit of time (Exposure Concentration [EC]) for each HAP and the appropriate HAP-specific chronic and acute toxicity factors for the inhalation pathway. Specifically, for chronic cancer risk, the EC for each HAP is multiplied by the available chronic (cancer) toxicity factor for that HAP to determine the risk for each HAP individually. Also, the risk results for the HAPs (EC multiplied by toxicity factor) are summed to estimate the total cancer risk across all HAPs analyzed. For chronic and acute non-cancer inhalation exposure to emissions from each HAP, the potential for adverse effects were estimated by comparing the EC for each HAP to the HAP-specific (non-cancer) toxicity factor This HAP-specific comparison (EC divided by the toxicity factor) for non-cancer hazards is known as the HQ (see appendix O for additional detail on methodology).

The toxicity factors used to estimate chronic cancer risk are Inhalation Unit Risk Factors, and those used to estimate chronic non-cancer hazards include Reference Concentrations or Minimal Risk Levels. Toxicity factors for estimating acute inhalation hazards are comprised of California EPA Acute Reference Exposure Levels and EPA 1-Hour Acute Exposure Guideline Levels.

Regarding potential hazards posed by acute or long-term exposure to non-carcinogenic HAPs, a HQ of less than or equal to 1 is generally considered protective of human health.[151] Because they represent exposures that are likely to be without an appreciable risk of deleterious effects, if the chronic or acute

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147 Although some of these HAPs qualified for exemption from demonstrating compliance with LDEQ Ambient Air Standards under LAC 33:III, Chapter 51 (Comprehensive Toxic Air Pollutant Emission Control Program), as a conservative measure, all HAPs were included in CP2 LNG's HAPs dispersion modeling analysis.

148 EPA. 2005. U.S. Environmental Protection Agency. Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities. EPA530-R-05-006. https://archive.epa.gov/epawaste/hazard/tsd/td/web/html/risk.html.

149 EPA. 2011. United States Environmental Protection Agency. "Exposure Factors Handbook: 2011 Edition". EPA/600/R-090/052F. Tables 16-108. September.

150 EPA. 2005. U.S. Environmental Protection Agency. Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities. EPA530-R-05-006. p. 6 – 20.

151 EPA. 2005. U.S. Environmental Protection Agency. Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities. EPA530-R-05-006. p. 7-6. https://archive.epa.gov/epawaste/hazard/tsd/td/web/html/risk.html; ATSDR website. Calculating Hazard Quotients and Cancer Risk Estimates. https://www.atsdr.cdc.gov/pha-guidance/conducting_scientific_evaluations/epcs_and_exposure_calculations/hazardquotients_cancerrisk.html#:~:text=HQs%20less%20than%201%20indicate,in%2Ddepth%20toxicological%20effects%20analysis. Visited on June 20, 2023.

exposure concentration is less than the relevant toxicity factor, no adverse chronic or acute health effects are expected.

The results of the HHRA showed that the estimated adult and child resident cancer risk for each HAP is at least an order of magnitude (i.e., 10-fold) below EPA's risk management objective of 1-in-1 million for individual HAPs. Moreover, the total cancer risks summed across all HAPs are well below (by almost 100-fold) EPA's target of 1-in-100,000 for a single facility.[152] This 1-in-100,000 individual facility risk management objective is ten times more stringent than the highest cancer risk that EPA deems acceptable (1-in-10,000) in order to account for potential exposure to background levels of air contaminants (i.e., existing air quality). Therefore, use of this facility risk management objective addresses the potential for cumulative risk (i.e., risk associated with multiple HAPs and other sources in the area).

The results of the HHRA also indicated that no chronic HQ for any HAP is greater than the non-cancer risk management objective of 1 for individual HAPs. In addition, all segregated chronic Hazard Index values (derived by summing HQ values for all HAPs with similar chronic effects) are well below 1 (by almost 100--fold). Similarly, all acute HQ and segregated acute Hazard Index values are well below the acute risk management objective of 1 (by almost 100-fold).

It is important to recognize that the cancer risks for the adult and child resident in this HHRA were estimated at the off-property location of maximum model-predicted impacts for each HAP, not necessarily at occupied residences. In addition, summing cancer risk across all carcinogenic HAPs is an extremely conservative approach (i.e., health protective) that is likely to substantially overestimate cumulative cancer risk from a particular source.[153] Likewise, summing chronic HQ or acute HQ values across HAPs, even those that have similar effects, is highly conservative and likely overestimates chronic and acute hazards.

<u>Conclusion</u>

Based on the analysis presented above, including the results of the Significance Impact Analysis and the cumulative NAAQS Impact Analysis, we find that the Project would not cause or contribute to an exceedance of the NAAQS, which are established to be protective of human health, including sensitive populations such as children, the elderly, and those with compromised respiratory function, i.e. asthmatics. Also, the results of the HHRA demonstrated that all chronic cancer, chronic non-cancer, and acute non-cancer hazards are below EPA risk management objectives. While the Project would have minor impacts on local air quality during operation, the Project would not result in significant impacts on air quality.

4.12.2 Noise

Sound is a sequence of waves of pressure that propagates through compressible media such as air or water. When sound becomes excessive, annoying, or unwanted, it is often referred to as noise. The Project has the potential to affect existing ambient noise conditions in surrounding areas during construction and operation. We received multiple comments regarding the Project's impacts on noise levels at the Moss Lake Compressor Station and the LNG Terminal. The ambient sound level is defined by the total noise generated within the specific environment and usually comprises natural and anthropogenic sounds. At any location, both the magnitude and frequency (audible pitch) of environmental noise may vary considerably over the

[152] EPA. 1998. Region 6 Risk Management Addendum – Draft Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities. EPA-R6-98-002. p. ADD-3. https://archive.epa.gov/region6/6pd/rcra_c/pd-o/web/pdf/r6add.pdf.

[153] Salmon, A. G., & Roth, L. A. 2010. Cancer risk based on an individual tumor type or summing of tumors. Cancer Risk Assessment: Chemical Carcinogenesis, Hazard Evaluation, and Risk Quantification, 716-735.

course of a day and throughout the week and year. This variation may be caused in part by changing weather conditions and the effect of seasonal changes in vegetative cover.

Two metrics used by some federal agencies to relate the time-varying quality of environmental noise to its known effects on people are the equivalent sound level (L_{eq}) and the L_{dn}. The L_{eq} is the level of steady sound that would have the same total (equivalent) energy as the time-varying sound, averaged over a specific period of interest. For example, the 24-hour equivalent sound level [L_{eq}(24hr)] represents the time-varying sound averaged over a 24-hour period. Sound levels, measured in dB, are perceived differently depending on the length of exposure and time of day. The L_{dn} considers the duration and time the noise is encountered. In the calculation of the L_{dn}, nighttime (10:00 p.m. to 7:00 a.m.) noise exposures are increased by 10 dB to account for people's greater sensitivity to sound during nighttime hours.

The L_{eq} and L_{dn} are reported as dBA sound levels. The A-weighted scale is used because human hearing is less sensitive to low and very high frequencies than mid-range frequencies. A person's threshold of perception for a perceivable change in loudness on the A-weighted sound level is on average 3 dBA, whereas a 5 dBA change is clearly noticeable, and a 10 dBA change is perceived as twice or half as loud. Table 4.12.2-1 demonstrates the relative A-weighted sound levels of common sounds measured in the environment and industry and their loudness as perceived relative to a baseline level (i.e., conversation at a 3-foot distance).

Table 4.12.2-1

Sound Levels and Relative Loudness

Description of Sound	Sound Level (dBA)	Loudness Perception Relative to Baseline
Threshold of pain	140	256
Jet taking off (200-foot distance)	130	128
Operating heavy equipment	120	64
Night club with music	110	32
Construction site	100	16
Boiler room	90	8
Freight train (100-foot distance)	80	4
Classroom chatter	70	2
Conversation (3-foot distance)	60	1 (Baseline)
Urban residence	50	1/2
Soft whisper (5-foot distance)	40	1/4
North rim of Grand Canyon	30	1/8
Silent study room	20	1/16
Threshold of hearing (1,000 hertz)	0	1/64

Note: Adapted from U.S. Department of Labor (2016) Occupational Health and Safety Administration Technical Manual https://www.osha.gov/dts/osta/otm/new_noise/index.html

4.12.2.1 Regulatory Requirements

In 1974, the EPA published a document called, "*Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety*" (EPA, 1974). This document provides information for state and local governments to use in developing their own ambient noise standards. The EPA has determined that, to protect the public from activity interference and annoyance outdoors in residential areas, noise levels should not exceed an L_{dn} of 55 dBA. FERC has adopted the following criterion described in 18 CFR 380.12(k) for new compression and associated facilities and for all new LNG facilities. Therefore, it was used to assess the potential noise impact from the construction and operation of the Project:

> *The noise attributable to any new compressor station, compression added to an existing station, or any modification, upgrade or update of an existing station, must not exceed an L_{dn} of 55 dBA at any pre-existing NSAs such as schools, hospitals, or residences.*

For a continuously operating noise source, the maximum permissible L_{eq} at a nearby NSA would be 48.6 dBA throughout the daytime and nighttime periods. The 6.4-dBA difference between L_{eq} 48.6 dBA and L_{dn} 55 dBA is due to the 10-dBA penalty for night-time hours used in the logarithmic calculation.

The State of Louisiana has not adopted noise regulations applicable to Project construction and operation. Both Calcasieu and Cameron Parishes prohibit "unnecessary or excessive noise which unreasonably interferes with the comfort and repose of others within the jurisdiction of the parish" in Article VIII, Section 18-96 of the Calcasieu Parish code and in Article III, Section 15-28 of the Cameron Parish code. No numeric noise criterion is established in Calcasieu or Cameron Parish code; therefore, the noise generated by the Project is compared to FERC's noise criterion.

The State of Texas penal code states that a noise is presumed to be unreasonable if it exceeds a decibel level of 85. Such a limit is considerably less restrictive than the FERC criterion. Counties in Texas do not have any legal authority to enact noise ordinances that are more restrictive than the 85-dB state limit (CP Express pipeline and associated meter stations would traverse through Newton and Jasper Counties).

4.12.2.2 Noise Sensitive Areas

Terminal Facilities

The Terminal Facilities would be constructed in a mixed industrial and rural area. Hurricane Ida in 2021 and Hurricane Laura in 2020 destroyed a large number of residential structures in proximity to the Terminal Facilities, many of which were abandoned. CP2 LNG field verified structures being used as residences and structures in active reconstruction. For the purposes of this analysis, CP2 LNG identified three NSAs[154] most proximal to the Terminal Facilities as potential NSAs. The locations of the NSAs are presented in table 4.12.2-2 and figure 4.12.2-1. NSA 1 is an RV park. NSA 2 consists of an RV park and a residence (house). NSA-3 is a residence. NSA-4 is the Monkey Island pilot house, which was added as an NSA per our recommendation in the draft EIS.

Preconstruction ambient noise levels were conducted for the Calcasieu Pass LNG facility (Docket Nos. CP15-550-000 and CP15-551-000).[155] CP2 LNG conducted more recent ambient sound measurements in February 2023[156], with the Calcasieu Pass LNG facility operational (we note that while operational, the Calcasieu Pass LNG Terminal was still in the commissioning phase during the sound survey). The NSAs in proximity to the Terminal Facilities and the surveyed ambient sound levels are provided in table 4.12.2-2.[157] Measured sound levels at NSA 4 were dominated by boats, tugboats, and waves.

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154 CP2 LNG and CP Express' Resource Report 9 (accession no. 20211202-5104) uses the term "Noise Evaluation Locations", not "Noise Sensitive Area"

155 Further details regarding the ambient noise survey are included in Supplemental Resource Report 9 prepared for Calcasieu Pass LNG dated July 2016 and available at FERC accession no. 20160725-5230.

156 See attachment 33-1 of accession no. 20230313-5230.

157 The NSAs identified within the Terminal Facilities in figure 4.12.2-2 were acquired by CP2 LNG and are no longer considered NSAs.

Table 4.12.2-2

CP2 LNG and CP Express Project Terminal Facilities Ambient Noise Survey Results

NSA Name	Distance and Direction to NSA from the Project Area [a]	Surveyed Daytime Ambient Noise Level (L_{eq}) dBA	Surveyed Nighttime Ambient Noise Level (L_{eq}) dBA	Calculated Ambient Noise Level (L_{dn}) dBA
NSA 1 (RV Park)	2,700 ft. / East	43.3	40.5	47.5
NSA 2 (RV Park/Residence)	2,450 ft. / Northeast	41.1	45.2	51.2
NSA 3 (Residence)	3,900 ft. / North	60.3	57.0	64.0
NSA 4 Monkey Island (ship pilot station)	8,600 ft. / West	54.3	54.2	60.6

[a] Distances are measured from the approximate center of the Terminal Site to the NSA. Distances from the NSA to the LNG floodwall are closer than identified in table here.

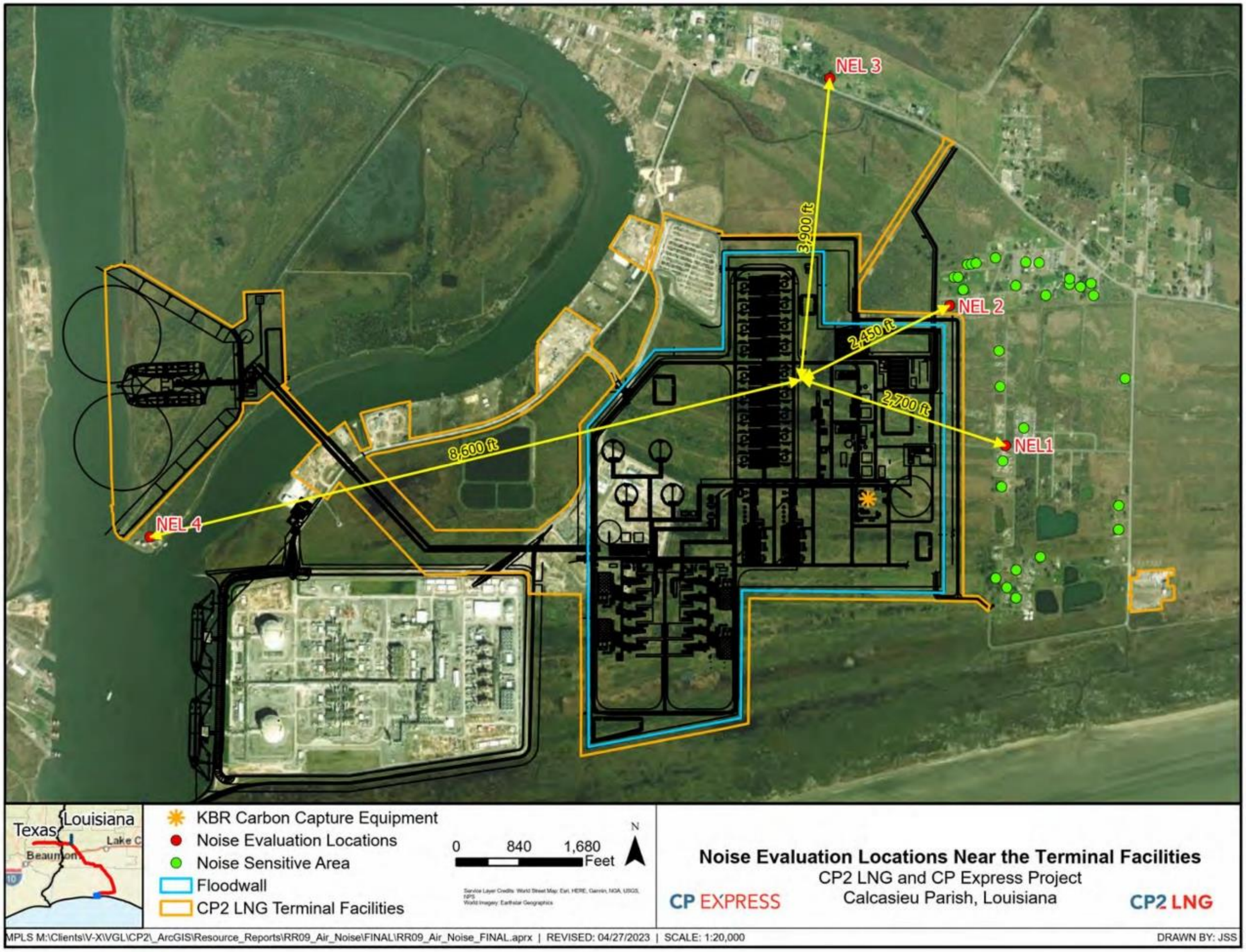

Figure 4.12.2-1 Noise Evaluation Locations Near the Terminal Facilities

During the Calcasieu Pass LNG permitting, additional NSAs or potential NSAs were identified, which CP2 LNG does not consider as being NSAs, including a temporary lodge on the south-western side of Calcasieu Channel (Potential Receptor #1), which was abandoned and subsequently destroyed during a recent hurricane, a pilot's station on the southern tip of Monkey Island (NSA #3); and a park, the Jetty Pier Facility (NSA #5), which no longer provides overnight use and is no longer open to the public (see section 4.9.3). The pilot station is a transfer point for pilots to wait to board tugs to be transferred to ships to work. CP2 LNG has stated that it does not consider the pilot station an NSA. This is because, although pilots have the ability to sleep at the station, it is not a typical occurrence and is not the intent of the facility, which serves as a meeting location, a training space, and a waiting area. However, FERC has typically characterized facilities such as schools, churches, or parks as NSAs when there is a reasonable expectation for rest or quiet, and where noise would unduly impede the function of the space. In response to our recommendation in the draft EIS, CP2 provided noise modeling results for the Monkey Island location, shown in table 4.12.2-8.

In addition to these former or potential NSAs, Cameron Parish, in partnership with Venture Global, is developing a new recreational park, referred to as Lighthouse Bend Park, which is scheduled to open the summer of 2023, and would include a marina, a market, RV parking, family restaurant, an event pavilion, and open-air flex space for the community. In November 2021, the Cameron Parish Police Jury submitted comments to FERC stating that the park is being developed in an existing industrial area and was not intended to be a location where quiet or solitude is expected. Therefore, this location is not considered an NSA for the purpose of this analysis.

Moss Lake Compressor Station

The Moss Lake Compressor Station would be in a rural area with agricultural and residential property surrounding the compressor station site. Eight NSAs are within one mile of the compressor station site. Table 4.12.2-3 lists the three closest NSAs and their distance from the Moss Lake Compressor Station. As shown in table 4.12.2-3 and on figure 4.12.2-2, the closest NSA to the compressor station is a residence about 0.25 mile to the north-northwest. We received a comment from this landowner during scoping, expressing concern for the noise levels produced by compressor station operation, noting the current quiet levels in the area.

Table 4.12.2-3

Noise-Sensitive Areas near the Moss Lake Compressor Station

NSA Name (type)	Direction of Nearest NSA [a]	Distance to Nearest NSA (feet)
NSA 1 (residence)	North-northwest	1,400
NSA 2 (residence)	Northwest	1,750
NSA 3 (residence)	West	3,700

[a] Distances measured from nearest compressor station property boundary.

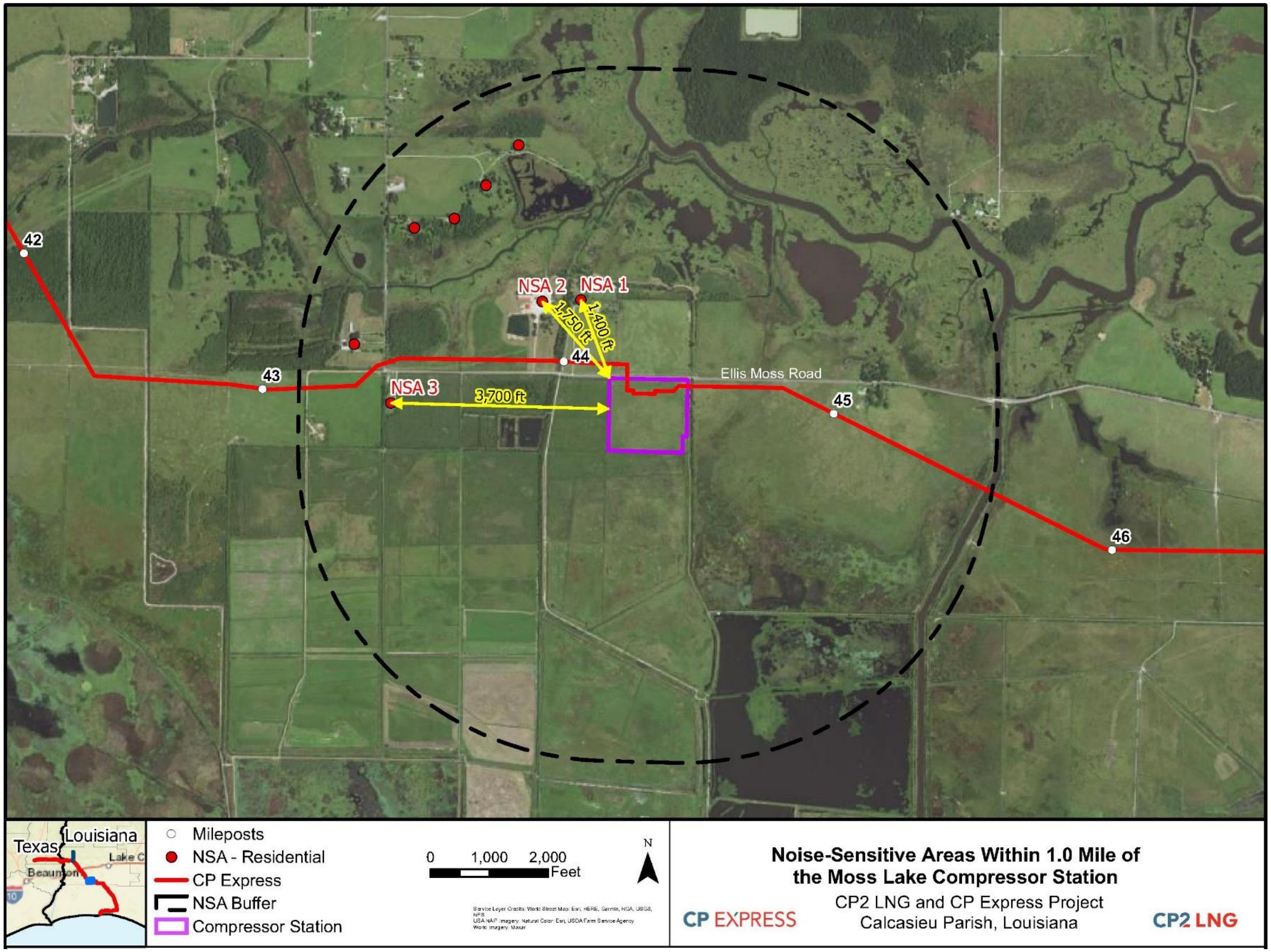

Figure 4.12.2-2 Noise Sensitive Areas Within 1.0 Mile of the Moss Lake Compressor Station

CP Express provided a pre-construction noise survey for the Moss Lake Compressor Station. Sound levels were measured at the closest NSA (NSA 1) over a 24-hour period in March 2023. Given the rural character of the area, the single measurement location can be used to characterize other nearby NSAs. The results of the survey are shown in table 4.12.2-4. The findings of CP2 Express' Noise Impact Analysis for the Moss Lake Compressor Station[159] are provided in section 4.12.2.3.

Table 4.12.2-4

CP Express Project Facilities: Moss Lake Compressor Station Ambient Noise Survey Results

NSA Name	Distance and Direction to NSA from the Project Area [a]	Surveyed Daytime Ambient Noise Level (L_{eq}) dBA	Surveyed Nighttime Ambient Noise Level (L_{eq}) dBA	Calculated Ambient Noise Level (L_{dn}) dBA
NSA 1	1,400 ft. / NNW	44.0	41.8	48.6

Details on the computer noise modeling are included in section 4.12.2.3.

HDD Locations

CP Express is proposing thirteen HDDs along the Pipeline System route. CP Express estimated ambient noise levels at fifteen NSAs within 0.5 mile of HDD entry and exit pad locations. The estimates were based on a desktop analysis using land use type for these locations. The locations are identified in table 4.12.2-6. For the five HDD entry/exit locations where there were no NSAs identified within 0.5 mile of the drill sites, potential noise impacts were not analyzed. HDD entry noise was assumed to emit 83 dBA at 50 feet. At distances of 0.5 mile (2,632 feet) and beyond, HDD sound levels would be no higher than 48.6 dBA L_{eq} (i.e., 55 dBA 24-hour L_{dn}), staying below the FERC limit.

Meter Stations

Six meter stations are associated with the Pipeline System. The Kinder Morgan Meter Station would be adjacent to the Moss Lake Compressor Station, and the CPX Meter Station would be at the terminus of the CP Express Pipeline within the Terminal Site. NSAs in proximity to these two stations are incorporated into the noise assessments for the Moss Lake Compressor Station and Terminal Site.

The remaining four (4) meter stations are proposed in rural areas. Two of these stations, the Transco & CJ Express Meter Station at MP 0.0 of the CP Express Pipeline, and the Enable Interconnect Meter Station at MP 6.0 of the Enable Gulf Run Lateral, do not have NSAs within 0.5 mile and are not analyzed further for noise impacts as noise impacts due to meter station operation beyond 0.5 mile are not anticipated.

The TETCO & Boardwalk Interconnect Meter Station and the Florida Gas Transmission Interconnect Meter Station have NSAs within 0.5 mile of the meter station sites. The closest NSAs relative to each meter station are shown in figures 4.12.2-3 and 4.12.2-4. Table 4.12.2-9 lists the closest NSAs relative to each meter station and the intervening distances. CP Express estimated ambient noise levels at NSAs within 0.5 mile of the meter station based on a desktop analysis, using land use type. Estimated ambient levels are included in table 4.12.2-9 within the noise impacts section.

[159] Available under accession no. 20230323-5251.

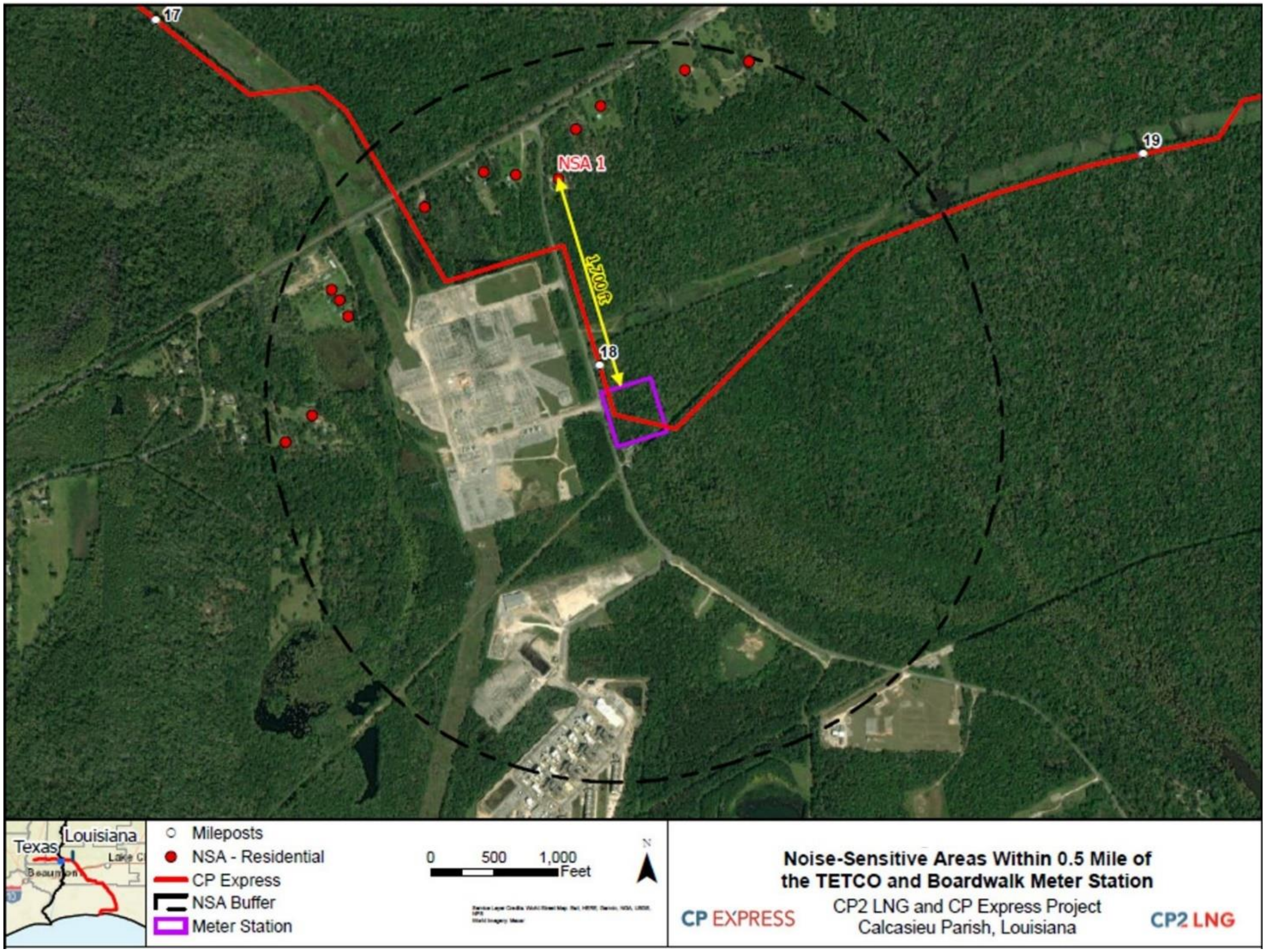

Figure 4.12.2-3 Noise Sensitive Areas Within 0.5 Mile of the TETCO and Boardwalk Meter Station

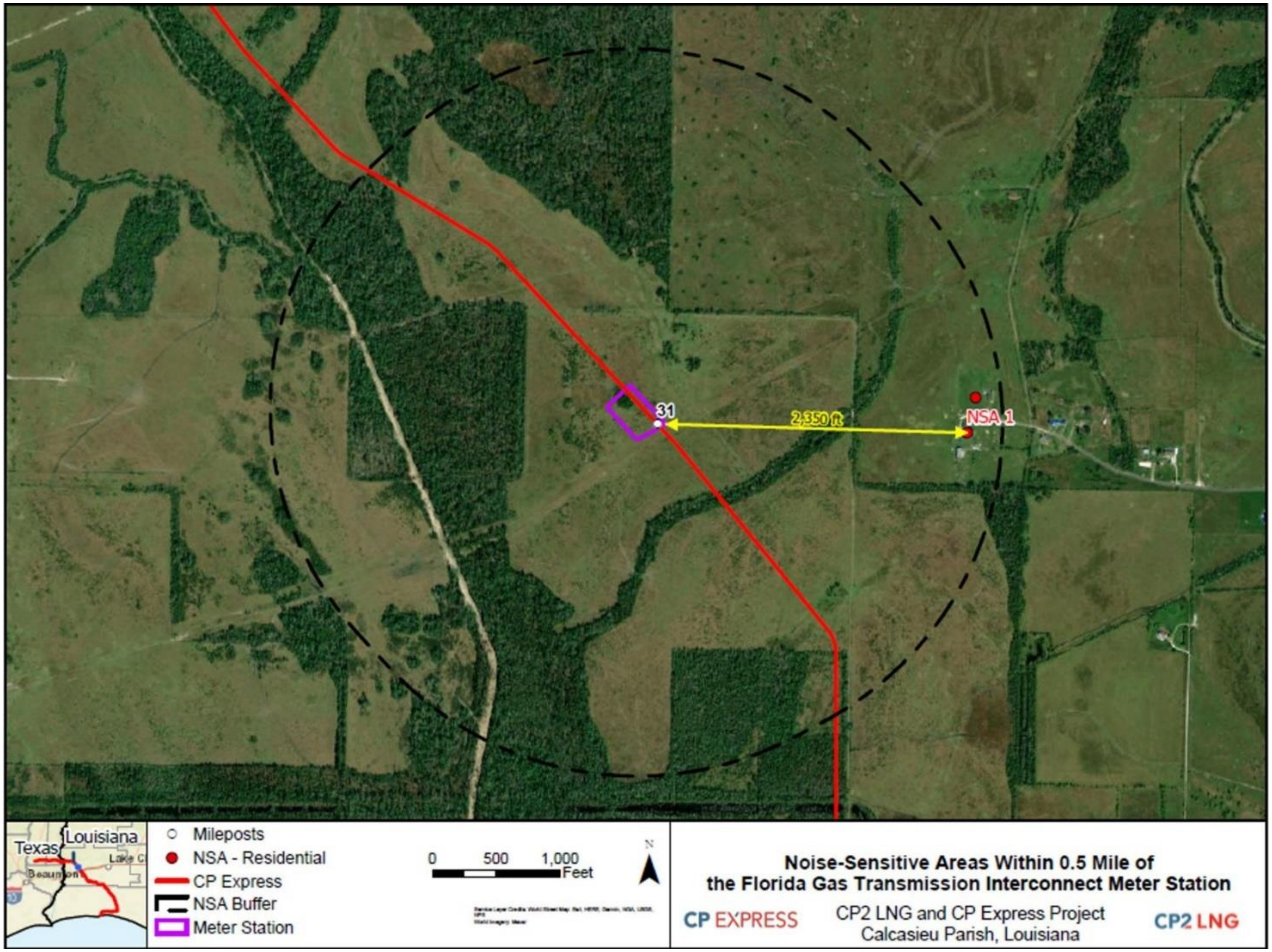

Figure 4.12.2-4 Noise Sensitive Areas Within 0.5 Mile of the Florida Gas Transmission Interconnect Meter Station

4.12.2.3 Noise Impacts and Mitigation

Construction Noise

Terminal Facilities

The most prevalent noise-generating activity and equipment during Terminal Facilities construction is anticipated to be pile driving and the internal combustion engines associated with construction equipment. Pile driving could produce peak sound levels that could be perceptible above the background sound levels during construction. The most prevalent noise-generating activity and equipment during the remaining aboveground facility construction is anticipated to be internal combustion engines associated with construction equipment. The noise levels would vary over time and depend on the type of equipment used, the mode of operation of the equipment, the length of time the equipment is in use, the amount of equipment used simultaneously, the distance between the sound generation source and the receptor, and existing noise in the area.

Construction activities at the Terminal Facilities would occur 24 hours per day for the duration of construction of both Phase 1 and Phase 2, which is estimated to last up to 4 years in total. However, CP2 LNG commits to not conduct pile driving during evening or nighttime hours between 7:00 p.m. and 7:00 a.m. Peak construction noise would likely occur during the first 18 months of construction, when civil works and pile driving activities are anticipated to occur, with site works and soil improvement (i.e., civil works) occurring during the first 15 months of construction, while pile driving would begin a few months after civil works and would take about 15 months to complete.

Construction equipment type, use, and quantity would vary depending on the construction stage in progress at the particular time. An analysis of Terminal Facilities construction noise was prepared based on the following construction phases: civil works, dredging, and assembly. Estimated typical noise levels during each of these construction phases is presented in table 4.12.2-4. Levels are also shown for peak construction. Additional intermittent noise would be generated by pile driving activities. Pile driving would occur at different locations throughout the Terminal Facilities site, including the footprint of the sheetpile floodwalls that would surround the liquefaction and power plant plants. Pile driving activities would be restricted to daytime hours (i.e., 7 a.m. to 7 p.m.). An assessment of noise associated with typical pile driving activity is also presented in table 4.12.2-5.

Table 4.12.2-5
Construction Noise Analysis for the Terminal Facilities

	NSA 1 (2,700 feet / East)			NSA 2 (2,450 feet / Northeast)			NSA 3 (3,900 feet / North)			NSA 4 (8,600 feet / West)		
Construction Phase	**Daytime (L_d)**	**Nighttime (L_n)**	**24-hour (L_{dn})**	**Daytime (L_d)**	**Nighttime (L_n)**	**24-hour (L_{dn})**	**Daytime (L_d)**	**Nighttime (L_n)**	**24-hour (L_{dn})**	**Daytime (L_d)**	**Nighttime (L_n)**	**24-hour (L_{dn})**
Civil	58.8	55.1	62.3	60.4	56.8	63.9	51.2	47.6	54.7	45.4	41.8	48.9
Dredging	25.6	25.6	32.0	26.8	26.8	33.2	27.6	27.6	34.0	49.2	49.2	55.6
Assembly	49.6	45.9	53.1	51.5	47.9	55.0	47.9	44.2	51.4	42.1	38.4	45.6
Pile Driving [a]	53.3	0.0	51.2	54.7	0.0	52.6	48.1	0.0	57.0	56.2	0.0	54.2
Pile Driving Lmax [b]	64.3	N/A	N/A	65.7	N/A	N/A	59.1	N/A	N/A	67.9	N/A	N/A
Peak Construction Day [c]	60.3	55.6	63.1	61.9	57.3	64.7	54.1	49.3	59.7	57.4	50.2	58.7

[a] Estimated hourly L_{eq} during pile driving operations.
[b] Estimated maximum instantaneous noise level during typical pile driving operations.
[c] Estimated peak construction day including 24-hour civil works, 24-hour dredging, 24-hour assembly, and daytime pile driving.

There are phases of construction that may result in nighttime levels exceeding 48.6 dBA at the NSA locations, particularly at NSA 1 and NSA 2 during the civil phase. Construction of the floodwall near the affected NSAs would occur as early as possible during Project construction. The floodwall is expected to reduce the noise levels at the NSAs by 5 to 10 dBA, depending on the location of construction activities. Additional noise mitigation measures during nighttime construction may include broadband backup alarms, local equipment barriers, and reduced activities, as needed.

Table 4.12.2-6 provides the estimated noise levels due to a single pile driver operating along the floodwall nearest to each NSA location. These would be close to the highest (worst-case) maximum levels at NSA 1 and NSA 2. The distance from the NSA to the floodwall is also provided. Noise levels provided are A-weighted maximum instantaneous, daytime average, nighttime, and 24-hour L_{dn}. Although the Project intends to construct 24 hours per day, pile driving would be limited to daytime hours.

Table 4.12.2-6

Pile Driving Maximum Levels

	Distance (feet)	Maximum (L_{max})	Daytime (L_d)	Nighttime (L_n)	24-hour (L_{dn})
NSA 1	852	64.3	53.3	0.0	51.2
NSA 2	373	65.7	54.7	0.0	52.6
NSA 3	2,309	59.1	48.1	0.0	57.0
NSA 4	8,600	67.9	56.2	0.0	54.2

CP2 LNG has stated that it would develop a nighttime construction plan to address potential noise impacts during nighttime construction. However, this plan has not yet been filed.

Based on the predicted modeling, **we recommend** that pile driving noise and nighttime construction noise be addressed as follows:

- **<u>Prior to construction</u>, CP2 LNG should file a nighttime noise mitigation plan with the Secretary, for review and written approval by the Director of OEP, or the Director's designee, that includes the measures it would implement to reduce the projected nighttime (7 pm to 7 am) construction noise levels to at or below 48.6 dBA L_{eq} at NSAs/NELs.**

- **<u>Prior to construction</u>, CP2 LNG should file a pile driving noise mitigation plan with the Secretary, for review and written approval by the Director of OEP, or the Director's designee, that includes the measures it would implement to reduce the projected L_{max} pile driving noise levels to at or below 70 dBA L_{max} at NSAs/NELs, and how it would monitor the noise levels during pile driving activities. The mitigation plan should identify the number of piles and expected duration for pile driving for those piles that are predicted to cause sound levels in excess of 70 dBA L_{max} at NSAs/NELs. The mitigation plan should include mitigation measures, such as temporary barriers or shrouds.**

- **<u>During construction activities at the Terminal Facilities between 7:00 p.m. and 7:00 a.m.</u>, CP2 LNG should monitor noise levels, document the noise levels in the construction status reports, and restrict the noise attributable to construction activities to no more than 55 dBA L_{dn} (48.6 dBA L_{eq}) at any**

nearby NSAs.

Noise generated during Terminal Facilities construction also has the potential to affect terrestrial and aquatic wildlife species. Specifically, pile driving and dredging during construction would result in increased underwater noise levels within the Calcasieu Shipping Channel and nearshore environment. Detailed information regarding noise impacts on terrestrial and aquatic species is provided in section 4.7.2.2. Based on the short-term nature of construction, and our recommendations limiting construction noise above, we conclude that noise impacts during Terminal construction would not be significant.

Pipeline System HDD

Noise associated with construction of pipelines would be temporary at any given location because of the assembly-line method of pipeline installation, during which construction activities are concentrated in one area while the pipeline is installed and continue in a linear fashion along the pipeline route. While the noise levels attributable to construction equipment could noticeably increase ambient noise levels at the NSAs nearest the workspace, this noise would be temporary and localized. Additionally, due to the temporary nature of these activities, no associated long-term impacts would occur.

Noise level data for HDD activities have been measured and reported in literature (Burge and Kitech, 2009). These data indicate that HDD entry generates a sound level, with equipment at full load, of approximately 83 dBA at 50 feet. Noise levels on the exit side of the HDD, where fewer equipment units typically are in use, are approximately 71 dBA at 50 feet. HDD activities would be restricted to daytime hours (i.e., 7 a.m. to 7 p.m.), with the exception of pipe pullback, which would occur continuously during daytime and nighttime hours until pullback is complete. CP Express anticipates that each HDD would take about 2 months at each site, with pullback lasting up to 2 days at the end of drilling.

Estimated HDD noise levels (as L_{dn} levels) at each NSA within 0.5 mile of an HDD entry and exit location are presented in table 4.12.2-7.

Table 4.12.2-7

HDD Noise Levels Within 0.5 Mile of HDD Entry and Exit Locations

Pipeline Facility/ HDD Location	Entry/ Exit Milepost	Nearest NSA (Distance / Direction)	Estimated Ambient Noise Level at the NSA (L_{dn}) (dBA)	Estimated L_{dn} of HDD Activities (dBA)	Estimated L_{dn} of HDD Activities + Ambient L_{dn} (dBA)	Potential Noise Increase (dBA)
CP Express Pipeline						
Waterline/SH 12 Exit	15.0	1,290 feet / Southeast	52 [c]	46.2	53.0	1.0
Waterline/SH 12 Entry	15.3	430 feet / West	52 [c]	69.8	69.9	17.9
Sabine River/ Cutoff Bayou/Old River Entry	21.1	610 feet / South	42 [a]	66.3	66.3	24.3
Highway 90/Railroad Entry	32.1	630 feet / West	47 [b]	65.9	66.0	19.0
Highway 90/Railroad Exit	32.4	630 feet / West	47 [b]	53.9	54.7	7.7

Table 4.12.2-7						
HDD Noise Levels Within 0.5 Mile of HDD Entry and Exit Locations						
Pipeline Facility/ HDD Location	**Entry/ Exit Milepost**	**Nearest NSA (Distance / Direction)**	**Estimated Ambient Noise Level at the NSA (L_{dn}) (dBA)**	**Estimated L_{dn} of HDD Activities (dBA)**	**Estimated L_{dn} of HDD Activities + Ambient L_{dn} (dBA)**	**Potential Noise Increase (dBA)**
Energy Corridor Entry [d]	41.7	2,000 feet / East-northeast [a]	42 [a]	52.9	53.3	11.3
Energy Corridor Exit [d]	42.1	2,540 feet / North- northeast [a]	42 [a]	37.8	43.4	1.4
Energy Corridor Entry/Exit Cumulative Noise [d]	--	--	42 [a]	53.0	53.3	11.3
Wetland Entry	48.1	740 feet / South	42 [a]	64.3	64.3	22.3
Wetland Exit	49.0	1,630 feet / East-northeast	47 [b]	43.4	48.6	1.6
Intracoastal Waterway Entry [d]	49.5	750 feet / Southeast [a, b]	52 [c]	64.1	64.4	12.4
Intracoastal Waterway Exit [d]	50.2	2,200 feet / East [a, b]	52 [c]	39.7	52.2	0.2
Intracoastal Waterway Entry/Exit Cumulative Noise [d]	--	--	52 [c]	64.1	64.4	12.4
Marshall Street Entry	84.7	990 feet / Southeast	52 [c]	61.2	61.7	9.7
Marshall Street Exit	84.4	380 feet / Southeast	52 [c]	59.0	59.8	7.8
Terminal Site Entry	85.2	890 feet / East-northeast	52 [c]	62.3	62.7	10.7
Terminal Site Exit	84.9	430 feet / South-southeast	52 [c]	57.8	58.8	6.8

a ANSI Residential Land Use Category 6 - Very quiet suburban and rural residential (ANSI, 2013)

b ANSI Residential Land Use Category 5 - Quiet suburban residential (ANSI, 2013).

c ANSI Residential Land Use Category 4 – Quiet urban and normal suburban residential (ANSI, 2013).

d Same NSA located within ½ mile of both the HDD entry and exit locations. Cumulative HDD noise at the NSA calculated based on estimated entry and exit HDD noise.

As presented in table 4.12.2-7, noise associated with unmitigated HDD activities would likely exceed 55 dBA L_{dn} at NSAs in proximity to eight HDD entry/exit locations. CP Express has developed and provided an HDD noise mitigation plan to minimize noise levels at these NSAs.[160] Noise mitigation measures that are identified in the plan include:

160 CP Express did not provide estimates of mitigated noise levels at NSAs due to HDD.

- use of temporary acoustical barriers;
- reconfiguring equipment locations to take advantage of natural and artificial noise barriers;
- use of residential grade silencers or mufflers on engines;
- use of gear box noise blanket and other mechanical noise dampening blankets;
- acoustical tents; and
- temporary relocation of adjacent residents during the HDD operations.

CP Express plans to restrict HDD activities to daytime hours (i.e., 7 a.m. to 10 p.m.) with the exception of pipe pullback and hydrostatic testing, which would occur continuously during daytime and nighttime hours until the activity is complete. In locations where temporary noise barriers are not feasible and the HDD activities occur during the nighttime hours, CP Express would offer temporary relocation to affected residents at NSAs where sound levels are greater than 55 dBA L_{dn}, as necessary.

Based on the temporary nature of construction, and CP Express' commitment to restrict HDD activities to daylight hours (with the exception of pipeline pullback) and to provide noise mitigation measures as outlined in their HDD noise mitigation plan, we do not believe these impacts would be significant.

Compressor Station and Meter Stations

The most prevalent noise-generating activity and equipment during the remaining aboveground facility construction is anticipated to be internal combustion engines associated with construction equipment. The noise levels would vary over time and depend on the type of equipment used, the mode of operation of the equipment, the length of time the equipment is in use, the amount of equipment used simultaneously, the distance between the sound generation source and the receptor, and existing noise in the area. CP Express would conduct construction activities during the daytime hours (7 a.m. to 7 p.m.), with the exception of hydrostatic testing, pipeline tie-in work, and testing and commissioning of aboveground facilities. Construction at the compressor station would last about 18 months for Phase 1, with Phase 2 lasting about 12 months. At the closest NSA (NSA-1, 1,400 feet to the northwest), CP Express calculated sound levels of 43 dBA to 55 dBA (L_{eq}) during most construction phases (site clearing, excavation, foundations, and building erection/finishing). Measured daytime ambient sound levels were 44 dBA (L_{eq}); therefore, construction sound is expected cause a temporary 3 to 11 dBA increase in the ambient daytime sound level. Daytime-only pile driving at the Moss Lake site would occur during construction of a floodwall. Expected worst-case sound levels during pile driving are 67 dBA (L_{eq}) at NSA-1. The worst-case sound levels are expected to occur during the initial pile driving phase.

CP Express did not provide an estimate for the duration of meter station construction, but the meter stations would be constructed during Phase 1. To mitigate construction noise, CP Express would conduct vehicle maintenance (including maintenance of vehicle mufflers) and would limit construction to daytime hours.

Based on the temporary nature of pile driving (5 to 6 weeks) and construction activities, the fact that pile driving and the majority of construction activities would be limited to daytime hours only, compressor station and meter station construction would not result in significant noise impacts on nearby residents or NSAs.

Operational Noise

Terminal Facilities

Operation of the Terminal Facilities would produce noise on a continuous basis. The primary noise- generating sources would be:

- fan-driven, air-cooled heat exchangers;
- mixed refrigerant compressor electric motor drive units;
- mixed refrigerant and boil-off gas compressor units;
- power plant electric generation units;
- inlet and discharge piping; and
- LNG carriers.

CP2 LNG would design the liquefaction block and boil-off gas compressors with acoustically treated enclosures to ensure that the noise associated with the Terminal Facilities meets FERC's noise criterion. These mitigation measures were incorporated into the noise impact calculations summarized below. However, the final noise mitigation measures would be based on final facility engineering design. An analysis of noise impacts associated with operation of the Terminal Facilities is included in table 4.12.2-8.[161]

We received a comment during scoping from Healthy Gulf noting concern with vibration and low-frequency noise, which can result in health impacts. The analysis below indicates that the low frequency sound levels from the normal full load production of all liquefaction trains would not create perceptible vibration in residential structures at the nearby NSA locations. Additionally, equipment would be installed and maintained according to manufacturer's specifications; therefore, no offsite vibration is anticipated.

Table 4.12.2-8

Noise Analysis for the Terminal Facilities

NSA	Direction & Distance from CP2 liquefaction area noise center	Ambient [b]	CP2 LNG Facility	CP2 plus 2023 Ambient	CP2 LNG Increase Above Ambient
		L_{dn}	L_{dn}	L_{dn}	L_{dn}
1	2,700 ft. east	47.5	51.8	53.2	5.7
2	2,450 ft. northeast	51.2	53.2	55.3	4.1
3	3,900 ft. north	64.0	50.1	64.2	0.2
4	8,600 ft west	60.6	46.6	60.8	0.2

[a] Measured ambient level in March 2023 with Calcasieu Pass LNG operational
[b] CP2 LNG Long Term Ambient Sound Level Measurements for Proposed CP2 LNG Terminal (March 11, 2023)
[c] Includes Calcasieu Pass LNG and CP2 LNG

As presented in table 4.12.2-8, calculated sound levels attributable to the CP2 LNG facility are below FERC's requirement to be less than 55 dBA L_{dn} at the existing NSAs with all the liquefaction trains in full load operation. Additionally, the combined noise impacts of both CP2 LNG and Calcasieu Pass LNG are also below 55 dBA L_{dn} at the existing NSAs with all the liquefaction trains in full load

[161] Additional information can be found in a revised noise assessment report, filed on July 13, 2022 (Accession No. 20220713-5191).

operation. The calculated noise increases associated with the operation of CP2 LNG are 0.1 dBA to 5.7 dBA above ambient at the NSAs.

CP2 LNG committed to install noise mitigation measures that would include, but not necessarily be limited to, the mitigation measures described in the noise impact analysis reports in order to achieve compliance with the FERC noise standards. However, to ensure that the nearest NSAs are not significantly affected by noise during operation of the Terminal, **we recommend that**:

- **CP2 LNG should file with the Secretary a full power load noise survey for the Terminal no later than 60 days after each phase of liquefaction blocks are placed into service. If the noise attributable to operation of the equipment at the Terminal exceeds an L_{dn} of 55 dBA at any nearby NSA, within 60 days CP2 LNG should modify operation of the liquefaction facilities or install additional noise controls until a noise level below an L_{dn} of 55 dBA at the NSA is achieved. CP2 LNG should confirm compliance with the above requirement by filing a second noise survey with the Secretary no later than 60 days after it installs the additional noise controls.**

- **CP2 LNG should file a noise survey with the Secretary, no later than 60 days after placing the entire Terminal into service. If a full load condition noise survey is not possible, CP2 LNG should provide an interim survey at the maximum possible horsepower load within 60 days of placing the Terminal into service and provide the full load survey within 6 months. If the noise attributable to operation of the equipment at the Terminal exceeds an L_{dn} of 55 dBA at any nearby NSA under interim or full horsepower load conditions, CP2 LNG should file a report on what changes are needed and should install the additional noise controls to meet the level within 1 year of the in-service date. CP2 LNG should confirm compliance with the above requirement by filing an additional noise survey with the Secretary no later than 60 days after it installs the additional noise controls.**

In compliance with the recommendation above, CP2 LNG would need to complete several noise surveys to ensure that the total noise levels of the phased-in liquefaction blocks are below 55 dBA L_{dn} at the nearest NSAs. If the noise levels reported in any of the noise surveys from the Project facilities are over 55 dBA L_{dn}, CP2 LNG would need to implement the recommended mitigation to reduce the noise impacts on nearby NSAs within the time specified in the recommendation. Therefore, based on our analysis and our recommendations above, we conclude that noise impacts due to LNG Terminal operation would not be significant.

CP2 LNG states that at the Terminal, maintenance-related blowdowns would be controlled to limit noise via adjustment of valves during gas pressure release, as needed, and gas would be directed to the LNG Terminal flares. Additional intermittent noise would be generated by the three flare units (warm/cold flare, low-pressure vent flare, and marine loading flare).[162]

Based on commissioning activities at the Calcasieu Pass LNG facility, CP2 LNG does not anticipate routinely flaring at full/maximum flare capacity during the commissioning of the Terminal Facilities (see section 4.12.1.4 for additional information on flaring). Flaring would occur as necessary to protect the safety of personnel, the public, and the facility during commissioning. Although the flaring schedule cannot be reliably estimated, CP2 LNG would stay within the facility's LDEQ air

[162] Details regarding the three flares, including their height above ground surface, are included CP2 LNG and CP Express' Resource Report 9 (accession number 20211202-5104).

permit limits for short-term and annual flaring. The flaring scenarios shown in table 4.12.2-9 are the most common anticipated flare events for each of the flares (i.e., warm, cold, low pressure, and marine flares). Noise source data are based on elevated flare data from similar projects. These flare activities, plus those occurring concurrently with operation of Calcasieu Pass LNG and CP2 LNG facilities, are not expected to exceed a day-night average sound level (L_{dn}) of 55 dBA at any NSA location. Therefore, a noise mitigation/action plan to minimize flaring impacts is not required.

Table 4.12.2-9

Combined Noise of Flare Scenarios, plus Normal Operation of Calcasieu Pass LNG and CP2 LNG (24-hour L_{dn}, dBA)

Location	Operation of Calcasieu Pass LNG and CP2 LNG	Warm flare (pretreatment startup)	Cold flare (LNG train startup)	LP flare (LNG tank cooldown)	Marine flare (LNG tanker cooldown)
NSA 1	52.8	54.3	54.5	53.1	52.8
NSA 2	53.8	54.3	54.4	53.9	53.8
NSA 3	50.8	51.4	51.5	51.0	50.9

Pipeline

Noise generated during the operation of the pipeline is anticipated to be minimal; however, blowdown events of varying duration may occur at MLVs and the compressor station during emergencies or scheduled maintenance activities. The sound levels associated with high pressure gas venting are a function of initial blowdown pressure, the diameter and type of blowdown valve, and the diameter and arrangement of the downstream vent piping. Blowdown sound levels are loudest at the beginning of the blowdown event and they decrease as the blowdown pressure decreases.

An emergency shutdown (ESD) is an action initiated in an emergency scenario. ESD blowdowns are unplanned. CP Express states that the average number of ESD blowdown events cannot be determined. Maintenance-related blowdowns are not anticipated at the Project's meter stations or MLVs. Facility-wide maintenance blowdowns are also not anticipated at the Moss Lake Compressor Station. For the Moss Lake compressor units, gas would be recirculated during maintenance activities to preclude the need for release.

CP Express states that it would notify neighbors by letter or public announcement if any scheduled blowdown is necessary. Compressor unit blowdowns would occur occasionally as part of normal compressor station maintenance. Noise generated during these maintenance blowdown events would be temporary, short in duration, and are anticipated to occur once per year per compressor unit. Additionally, CP Express filed a noise impact analysis that estimated the L_{max} at the closest NSAs due to blowdown events at each aboveground facility. CP Express states they would install silencers on each blowdown vent, such that maximum sound levels at the closest NSAs would be 45 dBA L_{max} and therefore below the FERC noise limit. Moss Lake Compressor Station

Once completed (Phases 1 and 2), the Moss Lake Compressor Station would have five (5) Baker Hughes Model PGT25+ combustion turbines and one (1) Baker Hughes Model NovaLT12 booster turbine (approximate 187,000 horsepower in total). Each turbine would drive a compressor. Operation of the Moss Lake Compressor Station would produce noise on a continuous basis. Equipment would be installed and maintained according to manufacturer's specifications; therefore, no perceptible offsite vibration is anticipated. CP Express provided a noise impact analysis that estimated the impact of operations.[163] CP Express developed a sound propagation model of the station, which identified the equipment noise mitigation needed to comply with the FERC noise criterion at nearby NSAs. The modeling assumed that

[163] Available under accession no. 20230323-5251.

gas turbine air intakes and combustion exhaust would be equipped with silencers. The building ventilation system was also assumed to have silencing. Table 4.12.2-10 shows the results of the modeling, as calculated at the closest NSAs based on full-load operation of all equipment. CP Express committed to install noise mitigation measures that would include, but not necessarily be limited to, the mitigation measures described in the noise impact analysis reports in order to achieve compliance with the FERC noise standards.

Table 4.12.2-10

Noise Analysis for the Moss Lake Compressor Station (Phase 2)

NSA	Direction & Distance from CP2 liquefaction area noise center	Ambient [a]	Moss Lake Facility	Future Ambient: Moss Lake plus 2023 Ambient	Increase Above Ambient
		L_{dn}	L_{dn}	L_{dn}	L_{dn}
1	1,400 ft. northwest	48.6	52.5	54.0	5.4
2	1,750 ft. northwest	48.6	51.2	53.1	4.5
3	3,700 ft. west	48.6	45.6	50.4	1.8

[a] Measured ambient level in March 2023 at NSA-1
[b] CP2 LNG Environmental Noise Assessment Report (dated July 13, 2022).
[c] Includes Calcasieu Pass LNG and CP2 LNG

Calculated contributions from future station equipment are below the 55-dBA L_{dn} FERC limit at all NSAs. Calculated sound levels from future full-load operation result in a 1.8 to 5.4 dBA increase in the day-night sound level at nearby NSAs.

To minimize the impact of noise attributable to the Moss Lake Compressor Station on the NSAs identified in table 4.12.2-3, **we recommend that**:

- **CP Express should file a noise survey for the Moss Lake Compressor Station with the Secretary <u>no later than 60 days</u> after placing the station into service. If a full power load conditions are not possible, CP Express should file an interim survey at the maximum possible horsepower load <u>within 60 days</u> of placing the station into service and file the full load survey <u>within 6 months</u>. If the noise attributable to operation of the equipment at the Moss Lake Compressor Station exceeds an L_{dn} of 55 dBA at any nearby NSA under interim or full horsepower load conditions, CP Express should file a report on what changes are needed and should install the additional noise controls to meet the level <u>within 1 year</u> of the in-service date. CP Express should confirm compliance with the above requirement by filing an additional noise survey with the Secretary, <u>no later than 60 days</u> after it installs the additional noise controls.**

Based on our recommendation above that the Moss Lake Compressor Station would be required to demonstrate that full load operational noise impacts from the station (Phase 1 and Phase 2 combined) would be less than 55 L_{dn} dBA at all nearby NSAs, we conclude the Project would not result in significant impacts on nearby residents or NSAs.

Meter Stations

Noise generated during the operation of the meter stations would be minimal and would be primarily associated with aboveground piping and valves at the meter station sites. No additional noise generating equipment is proposed for the meter station sites. CP Express used data from an existing meter station on another pipeline system to estimate the noise impacts of meter station operation on nearby NSAs. The results of this assessment are presented in table 4.12.2-11.[164]

Table 4.12.2-11

Noise Analysis for the Meter Stations

Meter Station (MP) / NSAs	Distance and Direction of NSA to Facilities Center	Estimated Ambient Noise Level at the NSA (L_{dn}) (dBA)	Estimated L_{dn} of the Station (dBA)	L_{dn} of Station + Ambient L_{dn} (dBA)	Potential Noise Increase (dBA)
TETCO & Boardwalk Interconnect Meter Station (MP 18.1) – NSA 1	1,700 ft. / North-northwest	52 [a]	51.2 [c]	54.6	2.6
Florida Gas Transmission Interconnect Meter Station (MP 31.0) – NSA 1	2,350 ft. / East	47.9 [b]	48.4 [c]	51.2	3.3

a ANSI Residential Land Use Category 4 (Quiet Urban/Normal Suburban Residential) due to proximity to county road and existing aboveground natural gas infrastructure (ANSI, 2013).
b Calculated L_{dn} based on nighttime ambient sound measurements completed in March 28-29, 2022.
c Based on meter station noise estimates for the VNG Suffolk No. 3 Meter Station. FERC document accession number 20190322-5033.

As presented in table 4.12.2-11, the noise attributable to the operation of the two meter stations with NSAs within 0.5 mile would be less than 55 dBA L_{dn} at the nearest NSA and, therefore, in compliance with FERC requirements. Increases in the ambient sound level are expected to be approximately 3 dBA at the NSAs. To minimize the potential impact of noise attributable to the meter stations on the NSAs identified in table 4.12.2-11, **we recommend that**:

- **CP Express should file a noise survey for the TETCO & Boardwalk Interconnect and Florida Gas Meter Stations with the Secretary, <u>no later than 60 days</u> after placing the stations into service. If full power load conditions are not possible, CP Express should file an interim survey at the maximum possible horsepower load <u>within 60 days</u> of placing the station into service and file the full load survey <u>within 6 months</u>. If the noise attributable to operation of the equipment at the meter stations exceeds an L_{dn} of 55 dBA at any nearby NSAs under interim or full horsepower load conditions, CP Express should file a report on what changes are needed and should install the additional noise controls to meet the level <u>within 1 year</u> of the in-service date. CP Express should confirm compliance with the above requirement by filing an additional noise survey with the Secretary, <u>no later than 60 days</u> after it installs the additional noise controls.**

164 Calculation details can be found in Appendix 9E of accession no. 20211202-5104.

Based on our analysis and recommendation above, we conclude operation of the meter stations would not result in significant impacts on nearby NSAs.

4.13 RELIABILITY AND SAFETY

4.13.1 Terminal Facilities

4.13.1.1 LNG Facility Reliability, Safety, and Security Regulatory Oversight

LNG facilities handle flammable and sometimes toxic materials that can pose a risk to the public if not properly managed. These risks are managed by the companies owning the facilities, through selecting the site location and plant layout, as well as through suitable design, engineering, construction, and operation of the LNG facilities. Multiple federal agencies share regulatory authority over the LNG facilities and the operator's approach to risk management. The safety, security, and reliability of the CP2 LNG Project would be regulated by PHMSA, the Coast Guard, and the FERC.

In February 2004, PHMSA, the Coast Guard, and the FERC entered into an Interagency Agreement to ensure greater coordination among these three agencies in addressing the full range of safety and security issues at LNG terminals and LNG marine vessel operations and maximizing the exchange of information related to the safety and security aspects of LNG facilities and related marine operations. Under the Interagency Agreement, the FERC is the lead federal agency responsible for the preparation of the analysis required under NEPA for impacts associated with terminal construction and operation. PHMSA and the Coast Guard participate as cooperating agencies but remain responsible for enforcing their regulations covering LNG facility siting, design, construction, operation, and maintenance. All three agencies have some oversight and responsibility for the inspection and compliance during the LNG facility's operation.

PHMSA establishes and has the authority to enforce the minimum federal safety standards for the location, design, installation, construction, inspection, testing, operation, and maintenance of onshore LNG facilities under the Natural Gas Pipeline Safety Act (49 USC 1671 et seq.). PHMSA's LNG safety regulations are codified in 49 CFR 193, which prescribes safety standards for LNG facilities used in the transportation of gas by pipeline that is subject to federal pipeline safety laws (49 USC 60101 et seq.), and 49 CFR 192. On August 31, 2018, PHMSA and FERC signed a MOU regarding methods to improve coordination throughout the LNG permit application process for FERC jurisdictional LNG facilities. In the MOU, PHMSA agreed to issue an LOD stating whether a proposed LNG facility would be capable of complying with the siting requirements in Subpart B of Part 193. The Commission committed to relying upon the PHMSA's determination in conducting its review of whether the facilities would be consistent with the public interest. The issuance of the LOD does not abrogate PHMSA's continuing authority and responsibility over a proposed project's compliance with Part 193 during construction and future operation of the facility. PHMSA's conclusion on the siting and hazard analysis required by Part 193 is based on preliminary design information which may be revised as the engineering design progresses to final design. PHMSA regulations also contain requirements for the design, construction, installation, inspection, testing, operation, maintenance, qualifications and training of personnel, fire protection, and security for LNG facilities as defined in 49 CFR 193, which would be completed during later stages of the Project. If the Project is authorized, constructed, and operated, LNG facilities, as defined in 49 CFR 193, would be subject to PHMSA's inspection and enforcement programs to ensure compliance with the requirements of 49 CFR 193. Regarding the CCS system, DOT PHMSA staff have clarified that the CO_2 piping system to the last flange connection upstream of the CO_2 compressors would be subject to the regulations in 49 CFR 193. The offsite pipelines transporting CO_2 from the carbon capture system would be non-jurisdictional to FERC, but would be subject to the PHMSA regulations in 49 CFR 195, starting from the first flange connection downstream of the onsite CO_2 pipeline pumps. In addition, CP2 LNG indicates that the LDNR has authority under Louisiana Revised Statute 30:1104 to regulate carbon capture projects, including facilities ancillary to the CO_2 pipeline that are outside of PHMSA jurisdiction, such as compressors and pumps. In addition, CP2 LNG indicated its intention to ensure that the design and operation of the CCS system complies with the latest edition of NFPA 59A.

The Coast Guard has authority over the safety of an LNG terminal's marine transfer area and LNG marine vessel traffic, as well as over security plans for the waterfront facilities handling LNG and LNG marine vessel traffic. The Coast Guard regulations for waterfront facilities handling LNG are codified in 33 CFR 105 and 33 CFR 127. As a cooperating agency, the Coast Guard assists the FERC staff in evaluating whether an applicant's proposed waterway would be suitable for LNG marine vessel traffic and whether the waterfront facilities handling LNG would be operated in accordance with 33 CFR 105 and 33 CFR 127. If the facilities are constructed and become operational, the facilities would be subject to the Coast Guard inspection program to ensure compliance with the requirements of 33 CFR 105 and 33 CFR 127.

The FERC authorizes the siting and construction of LNG terminals under the NGA and delegated authority from the DOE. The FERC requires standard information to be submitted to perform safety and reliability engineering reviews. FERC's filing regulations are codified in 18 CFR § 380.12 (m) and (o) and requires each applicant to provide information on the reliability and safety of its facilities and engineering design, including how its proposed design would comply with the DOT PHMSA requirements in 49 CFR 193. The level of detail necessary for the reliability, safety, and engineering information requires the applicant to perform substantial front-end engineering of the complete project. The design information is required to be site-specific and developed to the extent that further detailed design would not result in significant changes to the siting considerations, basis of design, operating conditions, major equipment selections, equipment design conditions, or safety system designs. As part of the review required for a FERC order, we use this information from the applicant to assess whether the proposed facilities would have a public safety impact and to suggest additional mitigation measures for the Commission to consider for incorporation as conditions in the order. If the facilities are approved and the suggested mitigation measures are incorporated into the order as conditions, FERC staff would review material filed to satisfy the conditions of the order and conduct periodic inspections throughout construction and operation.

In addition, the EPAct of 2005 requires FERC to coordinate and consult with the DOD on the siting, construction, expansion, and operation of LNG terminals that would affect the military. On November 21, 2007, the FERC and the DOD entered into a MOU formalizing this process.[165] On April 5, 2022, the FERC received a response letter from the DOD Military Aviation and Installation Assurance Siting Clearinghouse indicating that the CP2 LNG Project would have a minimal impact on military operations conducted in the area.

4.13.1.2 PHMSA Siting Requirements and 49 CFR Part 193 Subpart B Determination

Siting LNG facilities, as defined in 49 CFR 193, to ensure that the proposed site selection and location would not pose an unacceptable level or risk to the safety of plant personnel and the public is required by the PHMSA's regulations in 49 CFR 193 Subpart B. The Commission's regulations under 18 CFR § 380.12 (o) (14) require CP2 LNG to identify how the proposed design complies with the siting requirements in PHMSA's regulations, including those under 49 CFR 193 Subpart B. The scope of

[165] Memorandum of Understanding between the FERC and US DOD to ensure consultation and coordination on effect of LNG Terminals on Active Military Installations, https://www.ferc.gov/media/2007-mou-dod, access March 2022.

PHMSA's siting authority under 49 CFR 193 applies to LNG facilities used in the transportation of gas by pipeline subject to the federal pipeline safety laws and 49 CFR 192.[166]

The regulations in 49 CFR 193 Subpart B require the establishment of an exclusion zone surrounding an LNG facility in which an operator or government agency must exercise legal control over the activities where specified levels of thermal radiation and flammable vapors may occur in the event of a release for as long the facility is in operation. Approved mathematical models must be used to calculate the dimensions of these exclusion zones. The siting requirements specified in NFPA 59A (2001), an industry consensus standard for LNG facilities, are incorporated into 49 CFR 193 Subpart B by reference, with regulatory preemption in the event of conflict. The following sections of 49 CFR 193 Subpart B specifically address siting requirements:

- Section 193.2051, Scope, states that each LNG facility designed, replaced, relocated or significantly altered after March 31, 2000, must be provided with siting requirements in accordance with Subpart B and NFPA 59A (2001). In the event of a conflict with NFPA 59A (2001), the regulatory requirements in Part 193 prevail.

- Section 193.2057, Thermal radiation protection, requires that each LNG container and LNG transfer system have thermal exclusion zones in accordance with section 2.2.3.2 of NFPA 59A (2001).

- Section 193.2059, Flammable vapor-gas dispersion protection, requires that each LNG container and LNG transfer system have a dispersion exclusion zone in accordance with sections 2.2.3.3 and 2.2.3.4 of NFPA 59A (2001).

- Section 193.2067, Wind forces, requires that shop fabricated containers of LNG or other hazardous fluids less than 70,000 gallons must be designed to withstand wind forces based on the applicable wind load data in American Society of Civil Engineers (ASCE) 7 (2005). All other LNG facilities must be designed for a sustained wind velocity of not less than 150 mph unless the PHMSA Administrator finds a lower wind speed is justified or the most critical combination of wind velocity and duration for a 10,000-year mean return interval.

As stated in 49 CFR § 193.2051, under Subpart B, LNG facilities must meet the siting requirements of NFPA 59A (2001), Chapter 2, which includes but are not limited to:

- NFPA 59A (2001) section 2.1.1 (c) requires consideration of protection against forces of nature.

- NFPA 59A (2001) section 2.1.1 (d) requires that other factors applicable to the specific site that have a bearing on the safety of plant personnel and surrounding public be considered, including an evaluation of potential incidents and safety measures incorporated in the design or operation of the facility.

- NFPA 59A (2001) section 2.2.3.2 requires provisions to minimize the damaging effects of fire from reaching beyond a property line and requires provisions to prevent a radiant heat flux level of 1,600 British thermal units per square foot per hour (Btu/ft^2-hr) for ignition of a design spill and fire over an impounding area from reaching beyond a property line that can be built upon. The distance to this flux level is to be calculated with LNGFIRE3 or with models that have been validated by

[166] 49 CFR § 193.2001 (b) (3), Scope of part, excludes any matter other than siting provisions pertaining to marine cargo transfer systems between the LNG marine vessel and the last manifold (or in the absence of a manifold, the last valve) located immediately before a storage tank.

experimental test data appropriate for the hazard to be evaluated and that have been approved by PHMSA.

- NFPA 59A (2001) section 2.2.3.4 requires provisions to minimize the possibility of any flammable mixture of vapors from a design spill from reaching a property line that can be built upon and that would result in a distinct hazard. Determination of the distance that the flammable vapors extend is to be determined with DEGADIS or approved alternative models that take into account physical factors influencing LNG vapor dispersion.[167]

NFPA 59A (2001) also specifies three radiant heat flux levels which must be considered for the damaging effects of fire from the LNG storage tank impounding areas for as long as the facility is in operation:

- 1,600 Btu/ft^2-hr - This level can extend beyond the plant property line that can be built upon but cannot include areas that are used for outdoor assembly by groups of 50 or more persons;[168]

- 3,000 Btu/ft^2-hr - This level can extend beyond the plant property line that can be built upon but cannot include areas that contain assembly, educational, health care, detention or residential buildings or structures;[169] and

- 10,000 Btu/ft^2-hr - This level cannot extend beyond the plant property line that can be built upon.[170]

NFPA 59A (2001) requires the design spill be determined in accordance with Table 2.2.3.5. For containers, design spills are based upon the largest flow from any single line or penetration below the liquid level resulting in the largest flow from an initially full container. For impounding areas serving only vaporization, process, or LNG transfer areas, the design spill is based on any single accidental leakage source. However, NFPA 59A (2001) does not define a single accidental leakage source. In order to clarify single accidental leakage source, PHMSA provides guidance on the determination of single accidental leakage sources on their website of frequently asked questions, which indicate use of 2-inch diameter holes in piping 6 inches in diameter or larger and full guillotine ruptures of piping less than 6 inches in diameter and full guillotine ruptures of transfer hoses and single ply expansion bellows.[171]

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167 PHMSA has approved two additional models for the determination of vapor dispersion exclusion zones in accordance with 49 CFR § 193.2059: FLACS 9.1 Release 2 (Oct. 7, 2011) and PHAST-UDM Version 6.6 and 6.7 (Oct. 7, 2011). On April 13, 2023, PHMSA also approved PHAST Version 8.4.

168 The 1,600 Btu/ft^2-hr flux level is associated with producing pain in less than 15 seconds, first degree burns in 20 seconds, second degree burns in approximately 30 to 40 seconds, 1 percent mortality in approximately 120 seconds, and 100 percent mortality in approximately 400 seconds, assuming no shielding from the heat, and is typically the maximum allowable intensity for emergency operations with appropriate clothing based on average 10-minute exposure.

169 The 3,000 Btu/ft^2-hr flux level is associated with producing pain in less than 5 seconds, first degree burns in 5 seconds, second degree burns in approximately 10 to 15 seconds, 1 percent mortality in approximately 50 seconds, and 100 percent mortality in approximately 180 seconds, assuming no shielding from the heat, and is typically the critical heat flux for piloted ignition of common building materials (e.g., wood, PVC, fiberglass, etc.) with prolonged exposures.

170 The 10,000 Btu/ft^2-hr flux level is associated with producing pain in less than 1 seconds, first degree burns in 1 seconds, second degree burns in approximately 3 seconds, 1 percent mortality in approximately 10 seconds, and 100 percent mortality in approximately 35 seconds, assuming no shielding from the heat, and is typically the critical heat flux for unpiloted ignition of common building materials (e.g., wood, PVC, fiberglass) and degradation of unprotected process equipment after approximate 10 minute exposure and to reinforced concrete after prolonged exposure.

171 PHMSA, LNG Plant Requirements: Frequently Asked Questions | PHMSA (dot.gov), https://www.phmsa.dot.gov/pipeline/liquified-natural-gas/lng-plant-requirements-frequently-asked-questions#ds1nt Requirements:, accessed March 2022.

In addition, section 2.1.1 of NFPA 59A (2001) requires that factors applicable to the specific site with a bearing on the safety of plant personnel and the surrounding public must be considered, including an evaluation of potential incidents and safety measures incorporated into the design or operation of the facility. PHMSA has indicated that potential incidents, such as vapor cloud explosions and toxic releases should be considered to comply with Part 193 Subpart B.[172]

In accordance with the August 31, 2018 MOU, PHMSA issued an LOD on June 28, 2023[173] to the Commission on the 49 CFR 193 Subpart B siting requirements. The LOD provided PHMSA's analysis and conclusions regarding the proposed Project's compliance with 49 CFR 193 Subpart B for the Commission to consider in its decision to authorize, with or without modification or conditions, or deny an application.

4.13.1.3 Coast Guard Safety Regulatory Requirements and Letter of Recommendation

LNG Marine Vessel Historical Record

Since 1959, marine vessels have transported LNG without a major release of cargo or a major accident involving an LNG marine vessel. There are approximately 730 LNG marine vessels in operation routinely transporting LNG to approximately 220 import/export terminals currently in operation worldwide.[174,175] Since U.S. LNG terminals first began operating under FERC jurisdiction in the 1970s, there have been thousands of individual LNG marine vessel arrivals at terminals in the U.S. For more than 40 years, LNG shipping operations have been safely conducted in U.S. ports and waterways.

A review of the history of LNG maritime transportation indicates that there has not been a serious accident at sea or in a port which resulted in a spill due to rupturing of the cargo tanks. However, insurance records, industry sources, and public websites identify a number of incidents involving LNG marine vessels, including minor collisions with other marine vessels of all sizes, groundings, minor LNG releases during cargo unloading operations, and mechanical/equipment failures typical of large vessels. Some of the more significant occurrences, representing the range of incidents experienced by the worldwide LNG marine vessel fleet, are described below:

- **El Paso Paul Kayser** grounded on a rock in June 1979 in the Straits of Gibraltar during a loaded voyage from Algeria to the United States. Extensive bottom damage to the ballast tanks resulted; however, no cargo was released because no damage was done to the cargo tanks. The entire cargo of LNG was subsequently transferred to another LNG marine vessel and delivered to its U.S. destination.

- **Tellier** was blown by severe winds from its docking berth at Skikda, Algeria in February 1989 causing damage to the loading arms and the LNG marine vessel and shore piping. The cargo loading had been secured just before the wind struck, but the loading arms had not been drained. Consequently, the LNG remaining in the loading arms spilled onto the deck, causing fracture of some plating.

172 PHMSA's "LNG Plant Requirements: Frequently Asked Questions" item H1, https://www.phmsa.dot.gov/pipeline/liquified-natural-gas/lng-plant-requirements-frequently-asked-questions, Accessed February 2022.

173 USDOT PHMSA Letter of Determination, dated June 28, 2023, filed on eLibrary under Accession Number 20230706-3015

174 Vessel Finder, Vessel Database, LNG Tankers, https://www.vesselfinder.com/vessels?type=604, Accessed July 2023.

175 International Group of Liquefied Natural Gas Importers (GIIGNL), Annual Report, 2023 Edition, World LNG Maps, https://giignl.org/wp-content/uploads/2023/07/GIIGNL_2023_Annual_Report_July14.pdf, Accessed July 2023.

- **Mostefa Ben Boulaid** had an electrical fire in the engine control room during unloading at Everett, Massachusetts on February 5, 1996. The LNG marine vessel crew extinguished the fire and the ship completed unloading.

- **Khannur** had a cargo tank overfill into the LNG marine vessel's vapor handling system on September 10, 2001, during unloading at Everett, Massachusetts. Approximately 100 gallons of LNG were vented and sprayed onto the protective decking over the cargo tank dome, resulting in several cracks. After inspection by the Coast Guard, the Khannur was allowed to discharge its LNG cargo.

- **Mostefa Ben Boulaid** had LNG spill onto its deck during loading operations in Algeria in 2002. The spill, which is believed to have been caused by overflow rather than a mechanical failure, caused significant brittle fracturing of the steelwork. The LNG marine vessel was required to discharge its cargo, after which it proceeded to dock for repair.

- **Norman Lady** was struck by the USS Oklahoma City nuclear submarine while the submarine was rising to periscope depth near the Strait of Gibraltar in November 2002. The 87,000 m^3 LNG marine vessel, which had just unloaded its cargo at Barcelona, Spain, sustained only minor damage to the outer layer of its double hull but no damage to its cargo tanks.

- **Tenaga Lima** grounded on rocks while proceeding to open sea east of Mopko, South Korea due to strong current in November 2004. The shell plating was torn open and fractured over an approximate area of 20 by 80 feet, and internal breaches allowed water to enter the insulation space between the primary and secondary membranes. The LNG marine vessel was refloated, repaired, and returned to service.

- **Golar Freeze** moved away from its docking berth during unloading on March 14, 2006, in Savannah, Georgia. The powered emergency release couplings on the unloading arms activated as designed, and transfer operations were shut down.

- **Catalunya Spirit** lost propulsion and became adrift 35 miles east of Chatham, Massachusetts on February 11, 2008. Four tugs towed the LNG marine vessel to a safe anchorage for repairs. The Catalunya Spirit was repaired and taken to port to discharge its cargo.

- **Al Gharrafa** collided with a container ship, Hanjin Italy, in the Malacca Strait off Singapore on December 19, 2013. The bow of the Al Gharrafa and the middle of the starboard side of the Hanjin were damaged. Both ships were safely anchored after the incident. No loss of LNG was reported.

- **Al Oraiq** collided with a freight carrier, Flinterstar, near Zeebrugge, Belgium on October 6, 2015. The freight carrier sank, but the Al Oraiq was reported to have sustained only minor damage to its bow and no damage to the LNG cargo tanks. According to reports, the Al Oraiq took on a little water but was towed to the Zeebrugge LNG terminal where its cargo was unloaded using normal procedures. No loss of LNG was reported.

- **Al Khattiya** suffered damage after a collision with an oil tanker off the Port of Fujairah on February 23, 2017. Al Khattiya had discharged its cargo and was anchored at the time of the incident. A small amount of LNG was retained within the LNG marine vessel to keep the cargo tanks cool. The collision damaged the hull and two ballast tanks on the Al Khattiya, but did not cause any injury or water pollution. No loss of LNG was reported.

- **Assem** collided with a very large crude carrier Shinyo Ocean off the Port of Fujairah on March 26, 2019. The Shinyo Ocean suffered severe portside hull height breach and the Assem had damage to its bow. Both marine vessels were unloaded at the time of the collision and subsequently no LNG or oil was released. Aseem was moved to port for anchorage and Shinyo Ocean was relocated to another point of anchorage.

- **Adam LNG** was struck while anchored by a bulk carrier off Gibraltar on August 29, 2022. The bulk carrier sustained a hull breach and was intentionally grounded to avoid sinking. The Adam had unloaded its cargo prior to the allision. The allision resulted in a superficial dent on the Adam's bow and did not result in water ingress.

LNG Marine Vessel Safety Regulatory Oversight

The Coast Guard exercises regulatory authority over LNG marine vessels under 46 CFR 154, which contains the U.S. safety standards for self-propelled LNG marine vessels transporting bulk liquefied gases. The LNG marine vessels visiting the proposed facility would also be constructed and operated in accordance with the International Marine Organization (IMO), *International Convention for the Safety of Life at Sea*. Since 1986, the *International Convention for the Safety of Life at Sea* Chapter VII requires LNG marine vessels to meet IMO, *International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk.* LNG marine vessels built from October 31, 1976 to July 1, 1986 would have to comply with IMO, *Code for Construction and Equipment of Ships Carrying Liquefied Gases in Bulk* and LNG marine vessels in built and in operation before then would have to meet IMO, *Code for Existing Ships Carrying Liquefied Gas in Bulk.* Under 46 CFR 154, no ship entering U.S. waters may carry a cargo of bulk liquid hazardous material without possessing a valid IMO Certificate of Fitness and either a Coast Guard Certificate of Inspection (for U.S. flag vessels) or a Coast Guard Certificate of Compliance (for foreign flag vessels). These documents certify that the LNG marine vessel is designed and operating in accordance with both international standards and the U.S. regulations for bulk LNG marine vessels under 46 CFR 154.

Pilotage is compulsory for foreign marine vessels and U.S. marine vessels under registry in foreign trade when in U.S. waters. All deep draft marine vessels currently entering the shared waterway would employ a U.S. pilot. The National Vessel Movement Center in the U.S. would require a 96-hour advance notice of arrival for deep draft marine vessels calling on U.S. ports. During transit, LNG marine vessels would be required to maintain voice contact with controllers and check in on designated frequencies at established way points.

The LNG marine vessels that would deliver or receive LNG to or from a facility would also need to comply with various U.S. and international security requirements. The IMO adopted the *International Ship and Port Facility Security Code* in 2002. This code requires both ships and ports to conduct vulnerability assessments and to develop security plans. The purpose of the code is to prevent and suppress terrorism against ships; improve security aboard ships and ashore; and reduce the risk to passengers, crew, and port personnel on board ships and in port areas. All LNG marine vessels, as well as other cargo vessels (e.g., 500 gross tons and larger), and ports servicing those regulated vessels, must adhere to the IMO standards. Some of the IMO requirements for ships are as follows:

- marine vessels must develop security plans and have a Vessel Security Officer;

- marine vessels must have a ship security alert system to transmit ship-to-shore security alerts identifying the ship, its location, and indication that the security of the ship is under threat or has been compromised;

- marine vessels must have a comprehensive security plan for international port facilities, focusing on areas having direct contact with ships; and

- marine vessels may have equipment onboard to help maintain or enhance the physical security of the ship.

In 2002, the Maritime Transportation Security Act (MTSA) was enacted by the U.S. Congress and aligned domestic regulations with the maritime security standards of the IMO, *International Ship and Port Facility Security Code;* IMO, *Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk;* and IMO, *International Convention for the Safety of Life at Sea*. The Coast Guard's regulations in 33 CFR 104 require marine vessels to conduct a vessel security assessment and develop a vessel security plan that addresses each vulnerability identified in the vessel security assessments. All LNG marine vessels servicing the facility would have to comply with the MTSA requirements and associated regulations while in U.S. waters.

The Coast Guard also exercises regulatory authority over LNG facilities that affect the safety and security of port areas and navigable waterways under Executive Order 10173; the Magnuson Act (50 USC section 191); the Ports and Waterways Safety Act of 1972, as amended (33 USC section 1221, et seq.); and the MTSA of 2002 (46 USC section 701). The Coast Guard is responsible for matters related to navigation safety, LNG marine vessel engineering and safety standards, and all matters pertaining to the safety of facilities or equipment located in or adjacent to navigable waters up to the last valve immediately before the receiving tanks. The Coast Guard also has authority for LNG facility security plan review, approval, and compliance verification as provided in 33 CFR 105.

The Coast Guard regulations in 33 CFR 127 apply to the marine transfer area of waterfront facilities between the LNG marine vessel and the last manifold or valve immediately before the receiving tanks. Title 33 CFR 127 applies to the marine transfer area for LNG of each new waterfront facility handling LNG and to new construction in the marine transfer areas for LNG of each existing waterfront facility handling LNG. The scope of the regulations includes the design, construction, equipment, operations, inspections, maintenance, testing, personnel training, and firefighting of the marine transfer area of LNG waterfront facilities. The safety systems, including communications, emergency shutdown, gas detection, and fire protection, must comply with the regulations in 33 CFR 127. Under 33 CFR § 127.019, CP2 LNG would be required to submit copies of its Operations and Emergency Manuals to the Coast Guard Captain of the Port (COTP) for examination.

CP2 LNG Project's Waterway Suitability Assessment

An LNG marine vessel's transit to the terminal would begin when it reaches the entrance at the pilot boarding station located at the channel's entrance sea buoy in the Gulf of Mexico outside the Calcasieu River. The LNG marine vessel then would travel northward approximately 32 nautical miles toward the Cameron Jetties, which marks the mouth of the Calcasieu River. After passing the Cameron Jetties, the LNG carriers would continue up the channel approximately 2 miles before reaching the proposed turning basin at the CP2 LNG Marine Facilities. The LNG marine vessel would then back into the marine slip. The route would be reversed for outbound LNG marine vessel transits.

Both the Coast Guard regulations under 33 CFR 127 and FERC regulations under 18 CFR § 157.21, require an applicant who intends to build an LNG terminal to submit a LOI to the Coast Guard no later than the date that the owner/operator initiates pre-filing with FERC, but, in all cases, at least 1 year prior to the start of construction. In addition, the applicant must submit a Preliminary WSA to the COTP with the LOI.

The Preliminary WSA provides an initial explanation of the port community and the proposed facility and transit routes. It provides an overview of the expected impacts LNG operations may have on the port and the waterway. Generally, the Preliminary WSA does not contain detailed studies or conclusions. This document is used by the COTP to begin his or her evaluation of the suitability of the waterway for LNG marine traffic. The Preliminary WSA must provide an initial explanation of the following:

- port characterization;
- characterization of the LNG facility and the LNG marine vessel route;
- risk assessment for maritime safety and security;
- risk management strategies; and
- resource needs for maritime safety, security, and response.

A Follow-On WSA must be provided no later than the date the owner/operator files an application with FERC, but in all cases at least 180 days prior to transferring LNG. The Follow-on WSA must provide a detailed and accurate characterization of the waterfront facilities handling LNG, the LNG marine vessel route, and the port area. The Follow-on WSA provides a complete analysis of the topics outlined in the Preliminary WSA. It should identify credible security threats and navigational safety hazards for the LNG marine vessel traffic, along with appropriate risk management measures and the resources (i.e., federal, state, local, and private sector) needed to carry out those measures. Until a facility begins operation, applicants must also annually review their WSAs and submit a report to the COTP as to whether changes are required. This document is reviewed and validated by the Coast Guard and forms the basis for the agency's LOR to the FERC.

In order to provide the Coast Guard COTPs/Federal Maritime Security Coordinators, members of the LNG industry, and port stakeholders with guidance on assessing the suitability of a waterway for LNG marine traffic, the Coast Guard has published a Navigation and Vessel Inspection Circular – *Guidance on Assessing the Suitability of a Waterway for Liquefied Natural Gas Marine Traffic* (NVIC 01-11).

NVIC 01-11 directs the use of the three concentric Zones of Concern, based on LNG marine vessels with a cargo carrying capacity up to 265,000 m^3, used to assess the maritime safety and security risks of LNG marine traffic. The Zones of Concern are:

- Zone 1 – impacts on structures and organisms are expected to be significant within 500 meters (1,640 feet). The outer perimeter of Zone 1 is approximately the distance to thermal hazards of 37.5 kilowatts per square meter (kW/m^2) (approximately 12,000 Btu/ft^2-hr) from a pool fire.[176]
- Zone 2 – impacts would be significant but reduced, and damage from radiant heat levels are expected to transition from severe to minimal between 500 and 1,600 meters (1,640 and 5,250 feet).

[176] The 37.5kW/m^2 (approximately 12,000 Btu/ft^2-hr) flux level is associated with producing pain in less than 1 seconds, first degree burns in 1 seconds, second degree burns in approximately 3 seconds, 1 percent mortality in less than 10 seconds, and 100 percent mortality in approximately 30 seconds, assuming no shielding from the heat, and is typically the critical heat flux for unpiloted ignition of common building materials (e.g., wood, PVC, fiberglass) and degradation of unprotected process equipment after approximate 10 minute exposure and to reinforced concrete after prolonged exposure.

The outer perimeter of Zone 2 is approximately the distance to thermal hazards of 5 kW/m^2 (1,600 Btu/ft^2-hr) from a pool fire.[177]

- Zone 3 – impacts on people and property from a pool fire or an unignited LNG spill are expected to be minimal between 1,600 meters (5,250 feet) and a conservative maximum distance of 3,500 meters (11,500 feet or 2.2 miles). The outer perimeter of Zone 3 should be considered the vapor cloud dispersion distance to the lower flammability limit from a credible worst-case unignited release. Impacts to people and property could be significant if the vapor cloud reaches an ignition source and burns back to the source.

Like the Coast Guard, FERC staff also uses characteristics of the structures and population within the Zones of Concern for accidental and intentional events to identify challenges to evacuating or sheltering in place to inform its review of emergency response plans and corresponding cost sharing plans, which are described in more detail in the Onsite and Offsite Emergency Response Plans Section.

On January 8, 2021, CP2 LNG submitted an LOI and a Preliminary WSA to the COTP, Sector Port Arthur, to notify the Coast Guard that it proposed to construct an LNG export terminal. In addition, CP2 LNG completed a follow-on WSA on September 8, 2021, which was included in the Coast Guard analysis of the waterway suitability.

U.S. Coast Guard Letter of Recommendation and Analysis

Once the applicant submits a complete Follow-On WSA, the Coast Guard reviews the document to determine if it presents a realistic and credible analysis of the public safety and security implications from LNG marine traffic both in the waterway and when in port. As required by its regulations (33 CFR § 127.009), the Coast Guard is responsible for issuing a LOR to the FERC regarding the suitability of the waterway for LNG marine traffic with respect to the following items:

- physical location and description of the facility;
- the LNG marine vessel's characteristics and the frequency of LNG shipments to or from the facility;
- waterway channels and commercial, industrial, environmentally sensitive, and residential areas in and adjacent to the waterway used by LNG marine vessels en route to the facility, within 25 kilometers (15.5 miles) of the facility;
- density and character of marine traffic in the waterway;
- locks, bridges, or other manmade obstructions in the waterway;
- depth of water;
- tidal range;
- protection from high seas;

177 The 5kW/m^2 flux level is associated with producing pain in less than 15 seconds, first degree burns in 20 seconds, second degree burns in approximately 30 to 40 seconds, 1 percent mortality in approximately 120 seconds, and 100 percent mortality in approximately 400 seconds, assuming no shielding from the heat, and is typically the maximum allowable intensity for emergency operations with appropriate clothing based on an average 10 minute exposure.

- natural hazards, including reefs, rocks, and sandbars;
- underwater pipes and cables; and
- distance of berthed LNG marine vessels from the channel and the width of the channel.

The Coast Guard may also prepare an LOR Analysis, which serves as a record of review of the LOR and contains detailed information along with the rationale used in assessing the suitability of the waterway for LNG marine traffic.

In a letter dated December 17, 2021, the Coast Guard issued an LOR and LOR Analysis to FERC stating that the Calcasieu River Ship Channel would be considered suitable for accommodating the type and frequency of LNG marine traffic associated with this Project. As part of its assessment of the safety and security aspects of this Project, the COTP Sector Port Arthur consulted a variety of stakeholders including the Area Maritime Security Committee, Harbor Safety Committee, state and local government representatives, and local emergency response groups. The LOR was based on a comprehensive review of the applicant's WSA, including an assessment of the risks posed by these transits and validation of the risk management measures proposed by the applicant in the WSA.

Although CP2 LNG has suggested mitigation measures for responsibly managing the maritime safety and security risks associated with LNG marine traffic, the necessary vessel traffic and/or facility control measures may change depending on changes in conditions along the waterway. The Coast Guard regulations in 33 CFR 127 require that applicants annually review WSAs until a facility begins operation and submit a report to the Coast Guard identifying any changes in conditions, such as changes to the port environment, the LNG facility, or the LNG marine vessel route, that would affect the suitability of the waterway for LNG marine traffic.

The Coast Guard's LOR is a recommendation, regarding the current status of the waterway, to the FERC, the lead agency responsible for siting the on-shore LNG facility. Neither the Coast Guard nor the FERC has authority to require waterway resources of anyone other than the applicant under any statutory authority or under the ERP or the Cost Sharing Plan. As stated in the LOR, the Coast Guard would assess each transit on a case-by-case basis to identify what, if any, safety and security measures would be necessary to safeguard the public health and welfare, critical marine infrastructure and key resources, the port, the marine environment, and vessels. Under the Ports and Waterways Safety Act, the Magnuson Act, the MTSA, and the Security and Accountability For Every Port Act, the COTP has the authority to prohibit LNG transfer or LNG marine vessel movements within his or her area of responsibility if he or she determines that such action is necessary to protect the waterway, port, or marine environment. If this Project is approved and if appropriate resources are not in place prior to LNG marine vessel movement along the waterway, then the COTP would consider at that time what, if any, vessel traffic and/or facility control measures would be appropriate to adequately address navigational safety and maritime security considerations.

4.13.1.4 LNG Facility Security Regulatory Requirements

The security requirements for the proposed project are governed by 33 CFR 105 and 49 CFR 193 Subpart J - Security. Title 33 CFR 105, as authorized by the MTSA, requires all terminal owners and operators to submit a Facility Security Assessment (FSA) and a Facility Security Plan (FSP) to the Coast Guard for review and approval before commencement of operations of the proposed Project facilities. CP2 LNG would also be required to control and restrict access, patrol and monitor the plant, detect unauthorized access, and respond to security threats or breaches under 33 CFR 105. Some of the responsibilities of the applicant include, but are not limited to:

- designating a Facility Security Officer with a general knowledge of current security threats and patterns, security assessment methodology, vessel and facility operations, conditions, security measures, emergency preparedness, response, and contingency plans, who would be responsible for implementing the FSA and FSP and performing an annual audit for the life of the Project;

- conducting an FSA to identify site vulnerabilities, possible security threats and consequences of an attack, and facility protective measures; developing a FSP based on the FSA, with procedures for: responding to transportation security incidents; notification and coordination with federal, state, and local authorities; prevention of unauthorized access; measures to prevent or deter entrance with dangerous substances or devices; training; and evacuation;

- defining the security organizational structure with facility personnel with knowledge or training in current security threats and patterns; recognition and detection of dangerous substances and devices, recognition of characteristics and behavioral patterns of persons who are likely to threaten security; techniques to circumvent security measures; emergency procedures and contingency plans; operation, testing, calibration, and maintenance of security equipment; and inspection, control, monitoring, and screening techniques;

- implementing scalable security measures to provide increasing levels of security at increasing maritime security levels for facility access control, restricted areas, cargo handling, LNG marine vessel stores and bunkers, and monitoring; ensuring that the Transportation Worker Identification Credential (TWIC) program is properly implemented;

- ensuring coordination of shore leave for LNG marine vessel personnel or crew change out as well as access through the facility for visitors to the LNG marine vessel;

- conducting drills and exercises to test the proficiency of security and facility personnel on a quarterly and annual basis; and

- reporting all breaches of security and transportation security incidents to the National Response Center.

Title 33 CFR 127 has requirements for lighting and emergency power. In addition, an LNG facility regulated under 33 CFR 105 would be subject to the TWIC Reader Requirements Rule issued by the Coast Guard on August 23, 2016. This rule requires owners and operators of certain vessels and facilities regulated by the Coast Guard to conduct electronic inspections of TWICs (e.g., readers with biometric fingerprint authentication) as an access control measure. The final rule would also include recordkeeping requirements and security plan amendments that would incorporate these TWIC requirements. The Coast Guard’s June 22, 2018 notice initially delayed the effective date to implement this rule to August 23, 2021. Subsequently, Coast Guard’s March 9, 2020 final rule delayed the effective date to implement requirements for electronic inspections of TWICs for facilities that handle certain dangerous cargoes in bulk and transfer such cargoes from or to a vessel to May 8, 2023. In April 17, 2023, Coast Guard’s final rule further delayed the effective date to implement these TWIC requirements to May 8, 2026. Although the implementation of this rule has been postponed, the company should consider the rule when developing access control and security plan provisions for the facility.

Title 49 CFR 193 Subpart J also specifies security requirements for the onshore components of LNG facilities, as defined in 49 CFR 193, including requirements for conducting security inspections and patrols, liaison with local law enforcement officials, design and construction of protective enclosures, lighting, monitoring, alternative power sources, and warning signs. If the Project is authorized, constructed, and operated, it would be subject to the security requirements of 33 CFR 105 and 49 CFR 193 Subpart J and the respective Coast Guard and PHMSA inspection and enforcement programs.

As part of its application to FERC, CP2 LNG provided preliminary information on physical security features and indicated additional details would be completed in the final design. A preliminary Security Risk Assessment was conducted to develop baseline procedural, physical, and technical design elements for the facility that resulted in twenty-three recommendations. The Security Risk Assessment recommendations would be reevaluated and included in the final FSP. The details of the security features and the Security Risk Assessment are not described in this EIS as they are considered Critical Energy Infrastructure Information. We recommend in section 4.13.5 that CP2 LNG provide a plan to address the security risk analysis countermeasure recommendations and provide justification for any that would not be implemented as recommended. We also recommend in section 4.13.5 that CP2 LNG provide final design details on the following security features for review and approval, including:

- vehicle barrier and controlled access point drawings that demonstrate crash-rated barriers are provided to prevent uncontrolled access, inadvertent entry, and impacts to components containing hazardous fluids from vehicles;

- fencing drawings that demonstrate a fence would deter or mitigate entry along the perimeter of the entire facility and is set back from exterior structures and vegetation, and from interior hazardous piping and equipment by at least 10 feet;

- camera coverage drawings that illustrate camera characteristics and coverage areas of each camera such that the entire perimeter of the plant is covered with redundancy and the interior of plant is covered, including a camera be provided at the top of each LNG storage tank, within pretreatment areas, within liquefaction areas, within truck transfer areas, within marine transfer areas, and buildings; and

- photometric analyses or equivalent and associated lighting coverage drawings that illustrate the lux levels at the interior of the terminal along the perimeter fence line and along paths/roads of access and egress are in accordance with API 540, and applicable federal regulations.

As part of its application to FERC, CP2 LNG provided some engineering information relevant to cybersecurity and indicated cybersecurity plans would be completed in the final design. Owners and operators have the responsibility for establishing policy, procedures, and controls to guard against cybersecurity threats to energy system architectures. Government agencies establish regulatory requirements and coordinate and share threat information, promote best protection practices, and help improve energy sector response for mitigation of adverse impacts. Nearly all of the government agencies authorized for security are under the Department of Homeland Security (DHS). The DHS Cybersecurity and Infrastructure Security Agency leads the effort in defending against cybersecurity threats to U.S. infrastructure and partners with private sector facility owners/operators to detect and mitigate cyber threats and vulnerabilities.[3] In addition, under the MTSA of 2002, 46 U.S.C. 2101, the Coast Guard within DHS has authority to establish security requirements for any structure or facility of any kind located in, on, under, or adjacent to any waters subject to the jurisdiction of the United States. The Coast Guard has codified these requirements under 33 CFR parts 104 and 105 and has issued NVIC 01-20, Guidelines for Addressing Cyber Risks at MTSA Regulated Facilities, which establishes requirements to assess and address computer system or network vulnerabilities in the Facility Security Assessment under 33 CFR 105. The DHS Transportation Security Administration (TSA) is also assessing its programs related to cybersecurity oversight for pipelines and other transportation infrastructure. On November 30, 2022, TSA published an advance notice of proposed rulemaking titled, Enhancing Surface Cyber Risk Management, under TSA Docket No TSA-2022-0001. The notice requested input on how the pipeline sector, including natural gas facilities, implements cyber risk management in its operations so that TSA has a better understanding for developing a comprehensive and forward-looking approach to cybersecurity requirements for its jurisdictional facilities. The extended comment period for the Advanced Notice of Proposed Rulemaking ended on February 1, 2023, and the Notice of Proposed Rulemaking is expected in September 2023. The Federal Bureau of Investigation within DHS is the lead federal agency for investigating cyber attacks and intrusions.

Furthermore, in accordance with the February 2004 Interagency Agreement among FERC, PHMSA, and Coast Guard, FERC staff would collaborate with the Coast Guard and PHMSA on the Project's security features.

4.13.1.5 FERC Engineering and Technical Review of the Preliminary Engineering Designs

LNG Facility Historical Record

The operating history of the U.S. LNG industry has been free of safety-related incidents resulting in adverse effects on the public or the environment with the exception of the October 20, 1944, failure at an LNG plant in Cleveland, Ohio. The 1944 incident in Cleveland led to a fire that killed 128 people and injured 200 to 400 more people.[178] The failure of the LNG storage tank was due to the use of materials not suited for cryogenic temperatures. LNG migrated through streets and into underground sewers due to inadequate spill impoundments at the site. Current regulatory requirements ensure that proper materials suited for cryogenic temperatures are used in the design and that spill impoundments are designed and constructed properly to contain a spill at the site. To ensure that this potential hazard would be addressed for proposed LNG facilities, we evaluate the preliminary and final specifications for suitable materials of construction and for the design of spill containment systems that would properly contain a spill at the site.

Another operational accident occurred in 1979 at the Cove Point LNG plant in Lusby, Maryland. A pump electrical seal located on a submerged electrical motor LNG pump leaked causing flammable gas vapors to enter an electrical conduit and settle in a confined space. When a worker switched off a circuit breaker, the flammable gas ignited, causing severe damage to the building and a worker fatality. With the participation of the FERC, lessons learned from the 1979 Cove Point accident led to changes in the national fire codes to better ensure that the situation would not occur again. To ensure that this potential hazard would be addressed for proposed facilities that have electrical seal interfaces, we evaluated the preliminary designs and recommend in section 4.13.5 that CP2 LNG provide, for review and approval, the final design details of the electrical seal design at the interface between flammable fluids and the electrical conduit or wiring system, details of the electrical seal leak detection system, and the details of a downstream physical break (i.e., air gap or approved equivalent) in the electrical conduit to prevent the migration of flammable vapors.

On January 19, 2004, a blast occurred at Sonatrach's Skikda, Algeria, LNG liquefaction plant that killed 27 and injured 56 workers. No members of the public were injured. Findings of the accident investigation suggested that a cold hydrocarbon leak occurred at Liquefaction Train 40 and was introduced into a high-pressure steam boiler by the combustion air fan. An explosion developed inside the boiler firebox, which subsequently triggered a larger explosion of the hydrocarbon vapors in the immediate vicinity. The resulting fire damaged the adjacent liquefaction process and liquid petroleum gas separation equipment of Train 40 and spread to Trains 20 and 30. Although Trains 10, 20, and 30 had been modernized in 1998 and 1999, Train 40 had been operating with its original equipment since start-up in 1981. To ensure

[178] For a description of the incident and the findings of the investigation, see "U.S. Bureau of Mines, Report on the Investigation of the Fire at the Liquefaction, Storage, and Regasification Plant of the East Ohio Gas Co., Cleveland, Ohio, October 20, 1944," dated February 1946.

that this potential hazard would be addressed for proposed facilities, in the Spacing and Layout section below, we evaluated the preliminary design philosophy for mitigation of flammable vapor dispersion and ignition in buildings and combustion equipment to ensure these facilities would be adequately covered by hazard detection equipment that could isolate and deactivate any ventilation or combustion equipment whose continued operation could add to or sustain an emergency. We also recommend in section 4.13.5 that CP2 LNG provide, for review and approval, the final design details of hazard detection equipment, including their locations and elevations, instrument tag numbers, types, alarm indication locations, and shutdown functions.

On March 31, 2014, a detonation occurred within a gas heater at Northwest Pipeline Corporation's LNG peak-shaving plant in Plymouth, Washington.[179] This internal detonation subsequently caused the failure of pressurized equipment, resulting in high velocity projectiles. The plant was immediately shut down, and emergency procedures were activated, which included notifying local authorities and evacuating all plant personnel. No members of the public were injured, but one worker was sent to the hospital for injuries. As a result of the incident, the liquefaction trains and a compressor station located onsite were rendered inoperable. Projectiles from the incident also damaged the control building that was located near pre-treatment facilities and penetrated the outer shell of one of the LNG storage tanks. All damaged facilities were ultimately taken out of service for repair. The accident investigation showed that an inadequate purge after maintenance activities resulted in a fuel-air mixture remaining in the system. The fuel-air mixture auto-ignited during startup after it passed through the gas heater at full operating pressure and temperature. To ensure that this potential hazard would be addressed for proposed facilities, we recommend in section 4.13.5 that CP2 LNG provide a plan for purging, for review and approval, which addresses the requirements of the American Gas Association Purging Principles and Practice and to provide justification if not using an inert or non-flammable gas for purging. In evaluating such plans, we would assess whether the purging could be done safely based on review of other plans and lessons learned from this and other past incidents. If a plan proposes the use of flammable mediums for cleaning, dry-out or other activities, we would evaluate the plans against other recommended and generally accepted good engineering practices, such as NFPA 56, *Standard for Fire and Explosion Prevention during Cleaning and Purging of Flammable Gas Piping Systems*. We also recommend in section 4.13.5 that CP2 LNG provide, for review and approval, operating and maintenance plans, including safety procedures, prior to commissioning. In evaluating such plans, we would assess whether the plans cover all standard operations, including purging activities associated with startup and shutdown. Also, in order to prevent other sources of projectiles from affecting occupied buildings and storage tanks, we recommend in section 4.13.5 that CP2 LNG incorporate mitigation into their final design with supportive information, for review and approval, that demonstrates it would mitigate the risk of a pressure vessel burst or boiling liquid expanding vapor explosion (BLEVE) from occurring.

On June 8, 2022, a pipe rupture and subsequent fireball and fire occurred at Freeport LNG Development, L.P.'s (Freeport LNG) terminal near Quintana, Texas. The energy release from the pipe rupture damaged adjacent process piping and compromised nearby electrical wiring that likely ignited the released gases to form a fireball and subsequent onsite fires. The resulting fires were extinguished in approximately 40 minutes after the initial pipe rupture. The incident did not injure onsite personnel, visitors, or members of the public. The incident investigation found that an LNG filled piping segment was blocked off. The pressure relief valve that is utilized for overpressure protection was inadvertently closed. As ambient heat leak warmed and expanded the LNG, the piping segment underwent a BLEVE and ruptured.[180] To address this potential hazard for the proposed facilities, we recommend in section 4.13.5

[179] For a description of the incident and the findings of the investigation, see Root Cause Failure Analysis, Plymouth LNG Plant Incident Investigation under CP14-515.

[180] Freeport LNG, "Freeport LNG Provides Summary of Root Cause Failure Analysis Report on June 8 Incident", November 2022, http://freeportlng.newsrouter.com/news_release.asp?intRelease_ID=9752&intAcc_ID=77, Accessed January 2023.

that prior to construction of final design, CP2 LNG file a request for review and written approval of their car seal and lock philosophy and car seal and lock program, including a list of all car-sealed and locked valves consistent with the piping and instrumentation diagrams (P&IDs). The car seal and lock program should include monitoring and periodically reviewing correct car seal and lock placement and valve position. In addition, we recommend in section 4.13.5 that prior to commencement of service, CP2 LNG should develop procedures for offsite contractors' responsibilities, restrictions, monitoring, training, and limitations and for supervision of these contractors and their tasks by CP2 LNG staff. Specifically, the procedures should address: a) selecting a contractor, including obtaining and evaluating information regarding the contract employer's safety performance and programs; b) informing contractors of the known potential hazards, including flammable; and toxic release, explosion, and fire, related to the contractor's work and systems they are working on; c) developing and implementing provisions to control and monitor the entrance, presence, and exit of contract employers and contract employees from process areas, buildings, and the plant; d) developing and implementing safe work practices for control of personnel safety hazards, including lockout/tagout, confined space entry, work permits, hot work, and opening process equipment or piping; e) developing and implementing safe work practices for control of process safety hazards, including identification of layers of protection in systems being worked on, recognizing abnormal conditions on systems they are working on, and re-instatement of layers of protection, including ensuring bypass, isolation valve, and car-seal programs and procedures are being followed; f) developing and implementing provisions to ensure contractors are trained on the emergency action plans and that they are accounted for in the event of an emergency; g) monitoring and periodically evaluating the performance of contract employers in fulfilling their obligations above, including successful and safe completion of work and re-instatement of all layers of protection. Other lessons learned from contributing factors would also be applied to the review of recommendations related to other layers of protection to ensure their effectiveness and reliability, such as ensuring maintenance procedures refer back to car seal requirements and procedures, ensuring management of change procedures include changes to procedures, ensuring operating and safety procedures as well as personnel training to include identification of abnormal operations and conditions (e.g., pipe movement), ensuring emergency response plans account for all personnel, including contractors, and address contingency plans when firewater systems may need to be isolated for continued effective operation, loss of firewater supply, etc.

FERC Preliminary Engineering Review

FERC requires an applicant to provide safety, reliability, and engineering design information as part of its application, including hazard identification studies and front-end-engineering-design (FEED) information for its proposed Project. FERC staff evaluates this information with a focus on potential hazards from within and nearby the site, including external events, which may have the potential to cause damage or failure to the Project facilities, and the engineering design and safety and reliability concepts of the various protection layers to mitigate the risks of potential hazards.

The primary concerns are those events that could lead to a hazardous release of sufficient magnitude to create an offsite hazard or interruption of service. Furthermore, the potential hazards are dictated by the site location and the engineering details. In general, FERC staff considers an acceptable design to include various layers of protection or safeguards to reduce the risk of a potentially hazardous scenario from developing into an event that could impact the offsite public. These layers of protection are generally independent of one another so that any one layer would perform its function regardless of the initiating event or failure of any other protection layer. Such design features and safeguards typically include:

- a facility design that prevents hazardous events, including the use of inherently safer designs; suitable materials of construction; adequate design margins from operating limits for process piping, process vessels, and storage tanks; adequate design for wind, flood, seismic, and other outside hazards;

- control systems, including monitoring systems and process alarms, remotely operated control and isolation valves, and operating procedures to ensure that the facility stays within the established operating and design limits;

- safety instrumented prevention systems, such as safety control valves and emergency shutdown systems, to prevent a release if operating and design limits are exceeded;

- physical protection systems, such as appropriate electrical area classification, proper equipment and building spacing, pressure relief valves, spill containment, and cryogenic, overpressure, and fire structural protection, to prevent escalation to a more severe event;

- site security measures for controlling access to the plant, including security inspections and patrols, response procedures to any breach of security, and liaison with local law enforcement officials; and

- onsite and offsite emergency response, including hazard detection and control equipment, firewater systems, and coordination with local, state, and federal emergency management officials and first responders, to mitigate the consequences of a release and prevent it from escalating to an event that could impact the public.

The inclusion of such protection systems or safeguards in a plant design can minimize the potential for an initiating event to develop into an incident that could impact the safety of the offsite public. The review of the engineering design for these layers of protection are initiated in the application process and carried through to the next phase of the proposed project in final design if authorization is granted by the Commission.

The reliability of these layers of protection is informed by occurrence and likelihood of root causes and the potential severity of consequences based on past incidents and validated hazard modeling. As a result of the continuous engineering review, we recommend mitigation measures and continuous oversight to the Commission for consideration to include as conditions in the order. If a facility is authorized and recommendations are adopted as conditions to the order, FERC staff would continue its engineering review through final design, construction, commissioning, and operation.

Process Design

CP2 LNG provided information on the process design in its application and subsequent filings, consistent with FERC's regulations in 18 CFR 380.12(o) and the guidance provided by FERC in the Guidance Manual for Environmental Report Preparation for Applications Filed Under the Natural Gas Act, Volume II, Liquefied Natural Gas Project Resource Reports 11 & 13 Supplemental Guidance, 2017. The information includes narrative descriptions of each major system and the related process design information, including, but not limited to: basis of design and design philosophies, process flow diagrams (PFDs), heat and material balances (HMBs), P&IDs, and equipment lists and data sheets. This engineering design information is consistent with the scope of engineering design information defined in NFPA 59A (2019) section 3.3.9, including the items in section A.3.3.9, that would be expected to be developed at this stage of the project design (FEED).

Title 49 CFR 193 and 33 CFR 127 contain limited requirements for the process design. Title 33 CFR 127 scope only applies to design criteria for the marine area facilities and a majority of the ship transfer lines. For the design of LNG facility components, 49 CFR § 193.2703, under Subpart H, does require the use of persons who have demonstrated competence by training or experience in the design of comparable components. In addition, a more general requirement for designers to be competent in performing their assigned functions is found in NFPA 59A (2001) section 2.4, incorporated by 49 CFR § 193.2101(a), under

Subpart C, which also incorporates the other design provisions in NFPA 59A (2001). These other design provisions include general requirements for material compatibility, isolation valves, shutdown valves, emergency shutdown, and pressure relief valves, which we will describe in applicable descriptions of each major process system. However, 49 CFR 193 does not provide specific requirements on the overall process engineering design necessary to reliably and safely operate the LNG facilities. For example, in order to liquefy natural gas, most liquefaction technologies require that the feed gas stream be pre-treated to remove components that could freeze out and clog the liquefaction equipment or would otherwise be incompatible with the liquefaction process or equipment, including mercury, H_2S, CO_2, water, and heavy hydrocarbons. If water and carbon dioxide are not removed to certain concentrations, the downstream plate heat exchangers could clog and over-pressurize leading to a catastrophic failure of equipment, or if mercury is not limited to certain concentrations, it can induce embrittlement and corrosion of downstream brazed aluminum heat exchangers, resulting in a catastrophic failure of equipment. However, there are no regulatory requirements that water, carbon dioxide, or mercury be removed, and proposed facility designs have not always included these features. Therefore, FERC engineering staff confirmed appropriate systems necessary for LNG facilities to operate reliably and safely are included in the FEED process design information.

As part of the process design review, FERC staff evaluated the P&IDs to verify equipment operating and design conditions are consistent with the PFDs and HMBs and that adequate process monitoring, controls, and shutdowns would be in place, consistent with the operating and design conditions, and that their reliability or redundancy would be commensurate with potential consequences of failure. However, the FEED P&IDs would be subject to changes in final design after additional detailed engineering is conducted. Therefore, we recommend in section 4.13.5 that CP2 LNG provide updated P&IDs reflective of the final design. In addition, the margins between operating and design conditions would not be finalized until final design and many of the instrumentation and control set points would not be determined until final design. Therefore, we recommend in section 4.13.5 that CP2 LNG file the safe operating limits (upper and lower), alarm and shutdown set points for all instrumentation (e.g., temperature, pressures, flows, and compositions). Below we discuss each major system in the proposed LNG export terminal and the specific requirements and recommendations applicable to those major systems based upon our process design review. DOT PHMSA and Coast Guard would be responsible for enforcing any of the minimum federal requirements in their respective regulations that would be applicable.

The inlet feed gas would first pass through an area called the gas gate; comprised of pig receivers, gas meters, and inlet filter coalescers. The inlet filter coalescers would be designed to remove solids and water droplets in the inlet feed gas. The gas gate would be connected to the terminal's utility systems (e.g., flare, instrument air, power) through tie-in points. The inlet gas from the gas gate would flow into the terminal's high integrity pressure protection system (HIPPS). A HIPPS is often specified at the inlet to an LNG terminal, near the feed gas pressure control system, to automatically close if the pipeline pressure exceeds the design pressure of the pipe and equipment downstream of the HIPPS. The pressure would be monitored by a set of pressure indicators that would trigger isolation valves to close and stop gas flow from the pipeline if at least two monitors read a pressure that exceeds the design pressure of the downstream equipment. FERC staff has confirmed the set pressure of the HIPPS is lower than the design pressure of the downstream equipment. Some inlet gas would be taken off as supplemental fuel gas for use in start-up operations, fuel gas, and gas turbines. The inlet gas then passes to the mercury removal system to reduce the mercury concentration in the feed gas. As noted above, mercury removal is often specified to prevent mercury embrittlement and corrosion of downstream brazed aluminum heat exchangers.

After mercury removal, the feed gas would contact an amine-based solvent solution in the acid gas absorber column to remove the H_2S and CO_2 (i.e., acid gas) present in the feed gas, down to a concentration to prevent freezing in the liquefaction process that can lead to lesser performance, more frequent deriming (thawing and disposal of frozen components of the feed gas), or clogging of the downstream heat exchangers that, if not derimed, can lead to failure from over-pressurization. To prevent backflow, we recommend in section 4.13.5 that CP2 LNG provide a check valve upstream of the acid gas removal column or provide a dynamic simulation that shows that upon plant shutdown, the proposed vertical piping segment would be sufficient for this purpose. Once the acid gas components accumulate in the amine solution, the acid gas rich amine solution would be routed to an amine regenerator distillation column. The amine regenerator would essentially boil the acid gases out of the amine solution, leading to a lean, regenerated amine stream leaving the bottom of the column and an overhead vapor stream containing the acid gas components (H_2S and CO_2). The lean amine solution would be cycled back to the acid gas absorber column, and the acid gas stream would be sent through a sulfur removal unit to remove H_2S. The acid gas stream would then be routed to a carbon capture and sequestration system where the CO_2 would be compressed, condensed into a liquid, and then pumped to a higher pressure and sent through a pipeline for injection into offsite saline aquifers. In the event the carbon capture and sequestration system becomes unavailable, the acid gas stream would be routed to thermal oxidizers, where trace amounts of H_2S not removed in the sulfur removal unit and trace amounts of hydrocarbons would be incinerated and discharged to atmosphere, along with the CO_2 in the acid gas. Thermal oxidizers are commonly specified downstream of a sulfur removal unit to further reduce emissions and decrease the hazard footprint over just venting the acid gas stream. In the event the thermal oxidizers become out-of-service during operations, the acid gas would be routed to the warm flare.

The feed gas exiting the acid gas absorber column would be cooled and then sent to a separator where amine and water would be recovered and recycled back to the acid gas absorber column. After the separator, any remaining water in the feed gas and any heavy hydrocarbons would be removed using regenerative molecular sieve beds. Once a molecular sieve bed reaches its capacity of adsorbing water and hydrocarbons from the feed gas, the facility would utilize heated regeneration gas to remove water and hydrocarbons from the molecular sieve bed. The molecular sieve beds would operate in staggered adsorption and regeneration cycles, so the overall process would be continuous. Water collected during the molecular sieve regeneration process would be routed to a slop water discharge system for treating. Similarly, heavier hydrocarbon components removed during the regeneration process would be routed to the HC Condensate Surge Drum for further stabilizing and be used as fuel for the Hot Oil Furnaces.

In order to achieve the cryogenic temperatures needed to liquefy the natural gas stream, the gas would be cooled by a thermal exchange process driven by a closed loop refrigeration system using a MR. The MR would be comprised of a mixture of nitrogen, methane, ethylene, propane, and isopentane. Methane would be provided from the treated dry feed gas stream entering the refrigeration process. Nitrogen makeup would be supplied from the on-site high purity nitrogen generators. The ethylene, propane, and isopentane fluids would be delivered by truck and stored onsite for initial filling of the refrigerant system and used, as needed, to restore refrigerant levels. Truck unloading facilities would be provided to unload refrigerants into their storage tanks. Individual mercury removal beds would be provided for the ethylene, propane, and isopentane. Individual dehydration vessels would also be provided for the propane and isopentane.

The MR would flow in a closed loop through each heat exchanger pass. High pressure MR would flow parallel with the feed gas initially, then would exit and reenter the exchanger and flow counter currently to the feed gas. The MR pressure is reduced progressively to cool the natural gas to its final desired temperature. As a result, all MR would exit the exchanger as vapor, where it would then be compressed, cooled, and sent back to the liquefaction unit heat exchanger. FERC staff evaluated the PFDs and HMBs to determine the liquefaction capacities relative to the requested capacity in the application. The application requests exports with peak rates of up to 28 MTPA for ideal conditions. FERC staff confirmed the HMBs support the application export capacity in terms of net maximum production during low ambient conditions. However, HMBs may be updated in final design in a way that could increase liquefaction production without increasing export capacity, therefore we recommend in section 4.13.5 that CP2 LNG provide updated PFDs and HMBs and any other engineering documentation that demonstrates the final design would be capable of liquefying natural gas and producing LNG for up to a 28 MTPA export capacity.

During liquefaction operation, LNG from the 18 blocks of liquefaction trains (36 total trains) would be sent to the four LNG storage tanks. Each LNG storage tank is designed to receive LNG rundown from all 18 blocks. 49 CFR § 193.2513, under Subpart F, requires that procedures for making bulk transfer of LNG into a partially filled (excluding cooldown heel) container must include provisions for personnel to determine any differences in temperature or specific gravity between the LNG being transferred and the LNG already in the container and, if necessary, provide a means to prevent "rollover" due to stratification inside the tank and excessive vapor evolution. Title 49 CFR § 193.2101(a) incorporates the design provisions in NFPA 59A (2001), which specifies in section 4.1.2.4 that all LNG containers be designed to accommodate both top and bottom filling unless other positive means are provided to prevent stratification. The CP2 LNG tank design includes both a top fill and a bottom fill pipe to allow the facility to cycle the LNG if the system detects stratification in the tank. The LNG storage tanks represent the largest potential hazard if a failure would be realized. Therefore, we ensure there would be redundancies for monitoring and controlling the liquid level, pressure, and temperatures. NFPA 59A (2001) section 7.1.1.1 provides that LNG storage containers be equipped with two independent liquid level gauging devices, and section 7.1.1.2 specifies that the LNG storage containers also be equipped with two independent high liquid level alarms, which may be part of the liquid level gauging devices, and that the alarms are audible to the operators and would be set so that the operator has sufficient time to stop the flow without exceeding the maximum permitted filling height. NFPA 59A (2001) section 7.1.1.3 also specifies that LNG containers be equipped with a high liquid level flow cutoff device, which shall be separate from all gauges. In this regard, we recommend in section 4.13.5 that CP2 LNG provide each LNG storage tank with a fill flow measurement with a high flow alarm as a more precise means of monitoring and controlling liquid flow into the tank.

During export operations, LNG stored within the LNG storage tanks would be sent out through multiple in-tank pumps. The pump discharge piping would penetrate through the roof of the LNG storage tank, which is an inherently safer design than penetrating the side of the tank. The LNG would be routed through a marine transfer line and multiple liquid marine transfer arms connected to an LNG marine vessel. CP2 LNG would install two approximately 1.1-mile-long 42-inch outside diameter, 34-inch inside diameter pipe-in-pipe LNG transfer lines as well as a spare third LNG transfer line, a vapor return transfer line, and associated utilities between the Terminal Site and Marine Facilities, using horizontal directional drilling to install the portions under the waterway. The pipe-in-pipe LNG marine transfer system is jurisdictional to the Coast Guard under 33 CFR 127, which incorporates NFPA 59A (2019) to provide requirements for pipe-in-pipe system design, including secondary containment provisions. CP2 LNG indicates that the LNG transfer lines would meet the requirements in NFPA 59A (2019) Chapter 10. We recommend in section 4.13.5 that CP2 LNG provide detailed design information for the pipe-in-pipe LNG transfer lines. CP2 LNG is investigating the use of a fiber optic system to be included in the pipe-in-pipe LNG transfer line for leak monitoring. We recommend in section 4.13.5 that CP2 LNG provide a plan to detect and monitor the LNG transfer line for leak monitoring. Additionally, we recommend in section 4.13.5 that CP2 LNG provide details of the pipe-in-pipe system design including considerations of stress analysis (thermal, mechanical, surge loading, seismic, etc.), and construction loading (external forces and resulting stresses during horizontal directional drilling and fabrication processes). The marine transfer lines have emergency shutoff valves, and pressure relief capability would be provided to the pipe-in-pipe annulus at the Terminal Site and the Marine Facilities. A sudden closure of the shutoff valves could cause surge pressures that exceed allowable pressures. We recommend in section 4.13.5 that CP2 LNG file an evaluation demonstrating the pressure surge events do not exceed the design pressures. Additionally, the sizing and configuration of any pressure relief for the annular space of the pipe-in-pipe was indicated to be determined during detailed design; therefore, we recommend in section 4.13.5 that CP2 LNG provide drawings and calculations for the sizing and configuration of any pressure relief for the annular space of the pipe-in-pipe and for the inner pipe in case of isolation while containing LNG.

To keep the marine transfer line cold between LNG export cargoes and avoid a cooldown prior to every marine vessel loading operation, an LNG recirculation line would maintain the marine transfer line temperature between ship loading operations. The LNG transferred to the LNG marine vessel would displace vapors from the marine vessel. Displaced vapors would be routed through a vapor marine transfer arm, a vapor return line, and into the BOG header. Once loaded, the LNG marine vessel would disconnect and depart for export.

Low pressure BOG generated from stored LNG and vapors returned during LNG marine vessel filling operations would be compressed and routed to the fuel gas system. NFPA 59A (2001) section 3.4.5 requires a BOG and flash gas handling system separate from container pressure relief valves, designed so the BOG and flash gas discharge either safely into the atmosphere or into a closed system, and that the BOG venting system cannot normally inspirate air during operation. The closed vapor handling system proposed for the CP2 LNG project would prevent the release of BOG and flash gas to the atmosphere and would be in accordance with NFPA 59A (2001). This would be an inherently safer design when compared to allowing the BOG to vent to the atmosphere. To monitor LNG storage tank pressure, NFPA 59A (2001) section 7.2 requires each container be equipped with a pressure gauge connected to the container at a point above the maximum intended liquid level. However, NFPA 59A (2019) section 11.4.1 specifies each LNG container to be equipped with a minimum of two independent pressure gauging devices for continuous monitoring with high and low pressure alarms. The proposed CP2 LNG tank design meets all of these criteria. To protect the LNG tank from vacuum conditions, vacuum breaker gas for each LNG storage tank would be pulled from the feed gas to the terminal through a separate piping system. NFPA 59A (2001) section 4.7.3 also lists several scenarios which must be considered in sizing the pressure and vacuum safety relief valves for the LNG storage tanks. CP2 LNG has provided preliminary sizing calculations for the pressure and vacuum relief valves for the LNG storage tanks. The calculations address the cases outlined in the NFPA 59A. In addition, we recommend in section 4.13.5 that CP2 LNG provide the final sizing calculations for the pressure and vacuum safety relief valves associated with the LNG storage tanks. CP2 LNG would include a discretionary vent valve to send excess BOG to the flare as an additional form of overpressure protection for the storage tanks. In addition, we recommend in section 4.13.5 that CP2 LNG specify that the manual block valves around the discretionary vent valve be car sealed open to allow maintenance of the valve and prevent inadvertent isolation. In the event an LNG storage tank would be isolated from the common BOG header and system, the only path to prevent overpressure in the LNG storage tank vapor space would be through the pressure relief valves. Therefore, we also recommend in section 4.13.5 that prior to construction of final design, CP2 LNG should specify a discretionary vent valve on each LNG storage tank to safely vent pressure when the tank is isolated from the common BOG system.

The Project would include many utilities and associated auxiliary equipment. The major auxiliary systems required for the operation of the liquefaction facility include BOG, fuel gas, flares, instrument and plant air, firewater, demineralized water, steam, hot oil, glycol water, nitrogen, diesel, and backup power.

Three flare systems at the Terminal Site would be designed to handle and control the vent gases from the process areas. The warm, cold, and LP flares would be routed to separate elevated flare tips, located in common areas. There is a common spare flare tip that serves the warm and cold flares. A Marine Vapor Control System Package (elevated low-pressure flare) would be utilized for the venting requirements in the marine area during a warm LNG ship cool down operation. Preliminary relief valve sizes and governing cases were reviewed and found to be consistent with operating and design pressures and sizing scenarios that are consistent with NFPA 59A, API 520 and API 521. The safety relief valves would be designed to handle process upsets and thermal expansion. NFPA 59A (2001) sections 6.1.1 and 6.8.2 require thermal expansion relief valves be installed as required to prevent overpressure in any section of piping handling flammable liquids or gases with service temperatures below -20 degrees F that can be isolated by valves. FERC staff notes that CP2 LNG has incorporated the use of thermal relief safety valves on piping segments with process fluids susceptible to thermal expansion. In addition, CP2 LNG indicates that a spare pressure relief valve would be installed on most systems that are continuously used by all process trains (e.g., refrigerant storage, hot oil storage, and LNG storage tanks) to maintain those systems in operation during PSV maintenance. The preliminary sizing of vent and flare systems was also evaluated and found to be consistent with the limits in API 521. The flare heights and their design radiant heat levels could not be evaluated as the designs are preliminary and would be finalized during the final design phase. Therefore, based on the above, we recommend in section 4.13.5 that CP2 LNG provide final design information on pressure and vacuum relief devices, the vent stack, and flares, for review and approval, to ensure that the final sizing, design, and installation of these components would be adequate and in accordance with the standards referenced and other recommended and generally accepted good engineering practices. Additionally, we recommend in section 4.13.5 that CP2 LNG provide updated P&IDs for review and approval.

An onsite combined-cycle power plant with gas turbine generator drivers and steam turbine generators would provide electricity for the facility. Additionally, there will be two gas turbine generators to provide extra power during peak electrical demand. Back-up power would be provided by diesel engine generators to equipment essential for safe shutdown. A power management system would be utilized to eliminate nonessential loads following a turbine upset. Two diesel storage tanks would provide the bulk diesel storage in the plant. The diesel generators and the diesel firewater pumps have individual diesel day tanks. The diesel generators would include black-start capability. Additionally, a battery back-up system, also called an Uninterruptable Power Supply system, would provide emergency power for essential services.

Hot oil would provide heat to the HC Condensate Stabilization Reboiler, the Regeneration Gas Heater, the HP Fuel Gas Heater, and the Amine Regenerator Reboiler. The hot oil would be heated by the hot oil heaters.

Air compressors would provide both instrument air and plant air. To provide instrument air in the event of a safe plant shutdown, three instrument air receivers, one in each of the three main areas of the facility, would be provided. Each area would have a pair of air compressors, one operating, one spare, powered by main power from the power island area. In the event of a black start event, the air compressors in the power island area would be connected to the essential load bus which can receive power from the emergency generators. Once the power island starts to generate main power, the instrument air compressors in the other areas would start to generate instrument air.

High purity nitrogen would be generated onsite in three packages located around the Terminal Site and the Marine Facilities, to supply the various needs of the terminal, including refrigerant makeup. Import of liquid nitrogen by trucks would be a backup option if needed. Ambient air vaporizers would be used to convert the liquid nitrogen to gaseous nitrogen. A Defrost Gas Heater would be used in the Terminal Site to supply higher temperature nitrogen where needed to defrost equipment.

The failure of process equipment could pose potential harm if not properly safeguarded through the use of appropriate engineering controls and operation. CP2 LNG would install process control valves and instrumentation to safely operate and monitor the facilities. Alarms would have visual and audible notification in the control room to warn operators that process conditions may be approaching design limits. CP2 LNG would design their control systems and human machine interfaces to the International Society for Automation (ISA) Standards 5.3, 5.5, 60.1, 60.3, 60.4, and 60.6, and other standards and recommended practices. CP2 LNG indicates that an alarm management program and procedures would be determined during detailed design to ensure the effectiveness of the alarms. We recommend in section 4.13.5 that CP2

LNG develop and implement the alarm management program consistent with ISA 18.2 or approved equivalent prior to introduction of hazardous fluids.

Operators would have the capability to act from the control room to mitigate an upset. CP2 LNG would develop facility operation procedures after completion of the final design; this timing is fully consistent with accepted industry practice. Title 49 CFR § 193.2503, under Subpart F, requires written operating procedures for normal and abnormal operation, including, but not limited to purging and inerting components, cooldown, startup and shutdown, liquefaction, transfer, and vaporization, as applicable, as well as recognizing abnormal operating conditions. Title 49 CFR § 193.2707, under Subpart H, requires the operator perform assigned functions only after they have demonstrated capability after they are trained in accordance with 49 CFR § 193.2713 and § 193.2717, experience related to the assigned function, and have acceptable performance on a proficiency test relevant to the assigned function. Otherwise, the operator or maintenance personnel must be accompanied and directed by an individual that has met those requirements. Title 49 CFR 193 Subpart G also contains requirements for maintenance, including written maintenance of components. In addition, 49 CFR § 193.2017, under Subpart A, requires that operating and maintenance plans and procedures are reviewed and updated when a component is changed significantly or a new component is installed and at intervals not exceeding 27 months, but at least once every 2 calendar years. Title 33 CFR 127 also has similar requirements for written operations, training, and experience for persons in charge of shoreside transfer operations. Title 33 CFR § 127.401 also requires equipment is maintained in a safe condition. We recommend in section 4.13.5 that CP2 LNG provide more information, for review and approval, on the operating and maintenance procedures, including safety procedures, hot work procedures and permits, abnormal operating conditions procedures, and personnel training prior to commissioning. We would evaluate these procedures in coordination with DOT PHMSA and Coast Guard to ensure that an operator can operate and maintain all systems safely, based on benchmarking against other operating and maintenance plans and comparing against recommended and generally accepted good engineering practices, such as American Institute of Chemical Engineers (AIChE) Center for Chemical Process Safety (CCPS), *Guidelines for Writing Effective Operating and Maintenance Procedures*, AIChE CCPS, *Guidelines for Management of Change for Process Safety*, AIChE CCPS, *Guidelines for Effective Pre-Startup Safety Reviews, AGA, Purging Principles and Practices*, and NFPA 51B, *Standards for Fire Prevention During Welding, Cutting, and Other Hot Work*. In addition, we recommend in section 4.13.5 that CP2 LNG tag and label instrumentation and valves, piping, and equipment and provide car-seals/locks to address human factor considerations and improve facility safety and prevent incidents.

In the event of a process deviation, ESD valves and instrumentation would monitor, alarm, shutdown, and isolate equipment and piping during process upsets or emergency conditions. NFPA 59A (2001) section 9.2.1 requires each LNG facility to incorporate ESD system(s) that, when operated, isolate or shut off a source of LNG, flammable liquid, flammable refrigerant, or flammable gas, and shutdown equipment whose continued operation could add to or sustain an emergency. The Project would also have a plant-wide emergency shutdown system to initiate closure of valves and shutdown of the process during emergency situations as well as the ability to shutdown specific areas to address local emergency conditions. Safety-instrumented systems would comply with ISA Standard 84.00.01 and other recommended and generally accepted good engineering practices. We also recommend in section 4.13.5 that CP2 LNG file information, for review and approval, on the final design, installation, and commissioning of instrumentation and emergency shutdown equipment to ensure appropriate cause-and-effect alarm or shutdown logic and enhanced representation of the emergency shutdown system in the plant control room and throughout the plant.

ESD valves and other safety valves which isolate and depressurize a process in emergencies have a failsafe position. If the valve loses instrument air or control signal, the valve will resort to its position which shuts off the source of hazardous fluids or reduces the pressure of the hazardous fluids within the process. For instance, in the event of loss of instrument air or control signal, an ESD valve might failsafe to the closed position to shutoff the source of hazardous fluids to or from a vessel, while a blowdown valve would failsafe to the open position to reduce the vessel pressure. All process valves with a failsafe position rely on an electrical signal to an instrument air solenoid valve to keep the process valve in its non-failsafe position during normal operation. In the event of an emergency, that signal would change, and the valve would move to the failsafe position.

Failsafe valves are used in industries other than LNG, such as the nuclear power plant industry. Since the Browns Ferry Fire incident in 1975, the Nuclear Regulatory Commission has supported testing to examine how electrical cabling commonly used for control and safety purposes would behave during fire exposure. This testing expanded in 2007 to 2012, including a series of testing and reports followed for alternating current and direct current circuits. The alternating current testing methods and results are described in the Nuclear Regulatory Commission report NUREG-6931, “Cable Response to Live Fire (CAROLFIRE)”, 2007. The direct current testing methods and results are described in the Nuclear Regulatory Commission report NUREG-7100 “Direct Current Electrical Shorting in Response to Exposure Fire (DESIRRE-Fire): Test Results”, 2012. Probabilistic risks are described in NUREG-7150, Joint Assessment of Cable Damage and Quantification of Effects from FIRE (JACQUE-FIRE)”, 2012. The test results showed that fire exposed electrical cables could experience electrical shorts and faults which resulted in spurious action, meaning a valve position could change from its failsafe position to its normal position. The test results also showed many different types of cables experienced spurious action within 20 minutes from the onset of the fire exposure, and some experienced the duration of the spurious action for over 20 minutes.

ESD valve closures, and other safety valves moving to and remaining in their failsafe position is a layer of protection LNG facilities utilize to mitigate hazardous fluid releases following accidents. In the event of a release and or fire which damages cabling used to control failsafe valves, spurious opening and closing of the valves could unexpectedly create situations which hamper the facility personal response to control the emergency. Therefore, we recommend in section 4.13.5 that CP2 LNG demonstrate electrical and control equipment which activate emergency systems be designed to withstand a minimum 20-minute Underwriters Laboratories (UL) 1709 fire exposure.

In developing the FEED, CP2 LNG conducted a Hazard Identification (HAZID) review of the project’s preliminary design based on the proposed process flow diagrams and the plot plans. This is consistent with NFPA 59A (2019) which requires consideration of a process hazard analysis for the plant and site evaluation. We recommend in section 4.13.5 that CP2 LNG file information to demonstrate that all FEED HAZID recommendations have been addressed. A more detailed Hazard and Operability Review (HAZOP) analysis would be performed by CP2 LNG during the final design to identify the major process hazards that may occur during the operation of the facilities. The HAZOP study would be intended to address hazards of the process, engineering, and administrative controls and would provide a qualitative evaluation of a range of possible safety, health, and environmental consequences that may result from the process hazard, and identify whether there are adequate safeguards (e.g., engineering and administrative controls) to prevent or mitigate the risk from such events. Where insufficient engineering or administrative controls were identified, recommendations to prevent or minimize these hazards would be generated from the results of the HAZOP review. We recommend in section 4.13.5 that CP2 LNG file the HAZOP study on the completed final design for review and approval. We would evaluate the HAZOP to ensure all systems and process deviations are addressed appropriately based on likelihood, severity, and risk values with commensurate layers of protection in accordance with recommended and generally accepted good engineering practices, such as AIChEs, *Guidelines for Hazard Evaluation Procedures*. We also recommend in section 4.13.5 that CP2 LNG file the resolutions of the recommendations generated by the HAZOP review be provided for review and approval by FERC staff. Once the design has been subjected to a HAZOP review, the design development team would track, manage, and keep records of changes in the facility design, construction, operations, documentation, and personnel. CP2 LNG would evaluate these changes to ensure that the safety, health, and environmental risks arising from these changes are addressed and controlled based on its management of change procedures. If our recommendations are adopted into the order, resolutions of the recommendations generated by the HAZOP review would be monitored by FERC staff. We also recommend in section 4.13.5 that CP2 LNG file all changes to their FEED for review and approval by FERC staff. However, major modifications could require an amendment or new proceeding.

If the Project is authorized and constructed, CP2 LNG would install equipment in accordance with its design. We recommend in section 4.13.5 that Project facilities be subject to construction inspections and that CP2 LNG provide, for review and approval, commissioning plans, procedures and commissioning demonstration tests that would verify the performance of equipment. In addition, we recommend in section 4.13.5 that CP2 LNG provide semi-annual reports that include abnormal operating conditions and planned facility modifications. Furthermore, we recommend in section 4.13.5 that the Project facilities be subject to regular inspections throughout the life of the facilities to verify that equipment is being properly maintained and to verify basis of design conditions, such as feed gas and sendout conditions, do not exceed the original basis of design.

Mechanical Design

CP2 LNG provided codes and standards for the design, fabrication, construction, and installation of piping and equipment and specifications for the facility. The mechanical design and specifications of piping and equipment will depend on the fluid service (e.g., corrosion rates) and process conditions (e.g., temperature, pressure, etc.). Codes and standards are then used to determine the materials of construction based on the minimum design metal temperature and maximum design metal temperatures and potential corrosion. Title 49 CFR § 193.2304 requires a person qualified under 49 CFR § 193.2707(c) review the applicable design drawings and materials specification from a corrosion control viewpoint and determines that the materials involved will not impair the safety or reliability of the components or any associated components. Title 49 CFR § 193.2631 also requires each component that is subject to internal corrosive attack to be protected from internal corrosion by material that has been designed and selected to resist the corrosive fluid involved or suitable coating, inhibitor, or other means. These systems are specified with special materials of construction and/or corrosion allowances and maintenance procedures typically require periodic testing to confirm corrosion allowance would not be exceeded, which are recommended to be filed for a request to review and approval prior to commissioning. Codes and standards, such as American Society of Mechanical Engineers (ASME) B31.3 and ASME Boiler and Pressure Vessel Code (BPVC), are then also used to determine the minimum thickness of the piping and equipment based on the properties of the materials of construction to limit the piping and equipment from exceeding specified allowable stresses. Additional codes and standards, such as ASME B36.10 and ASME B36.19, are then often used to select standard schedule of piping and class of valves that have minimum pressure ratings and corresponding minimum thicknesses for different materials of construction. These codes and standards also specify they fabrication, construction, and installation, such as welding and non-destructive examination requirements for those welds as well as pressure/leak testing.

Piping must be designed, fabricated, assembled, erected, inspected, examined, and tested in accordance with the ASME BPVC, ASME Standard B31.3, as applicable, and all valves must meet ASME B31.3, B31.5, B31.8, or API 6D, as applicable. In addition, CP2 LNG's application indicated they would also meet ASME Standards B31.1, B36.10, and B36.19, as applicable. Valves and fittings would also be designed to standards and recommended practices such as API Standards 594, 598, 600, 602, 603, 607, 608, 609, and 623; ASME Standards B16.5, B16.9, B16.10, B16.20, B16.21, B16.25, B16.34, B16.36 and B16.47; and ISA Standards 75.01.01, 75.05.01, 75.08.01, and 75.08.05. Portions of the facility regulated under 33 CFR 127 for the marine transfer system, including piping, hoses, and loading arms should also be tested in accordance with 33 CFR § 127.407. Although FERC staff generally agreed the design specifies appropriate materials of construction and ratings suited to the pressure and temperature conditions of the process design, we recommend in section 4.13.5 that CP2 LNG provide for review and approval the final piping and valve specifications for the project.

Pressure vessels must be designed, fabricated, inspected, examined, and tested in accordance with ASME BPVC Section VIII per 49 CFR 193 Subparts C, D, and E and NFPA 59A (2001). Although FERC staff generally agreed the design specifies appropriate materials of construction and ratings suited to the pressure and temperature conditions of the process design, we also recommend in section 4.13.5 that CP2 LNG provide for review and approval an up-to-date equipment list, process and mechanical data sheets, and specifications for the project, which would include ASME BPVC pressure vessels manufacturer forms that define the design of the pressure vessels.

LNG storage tanks must be designed, fabricated, tested, and inspected in accordance with 49 CFR 193 Subpart D, NFPA 59A (2001 and 2006), and API Standard 620. In addition, CP2 LNG would design, fabricate, test, and inspect the LNG storage tanks in accordance with API Standard 625 and American Concrete Institute (ACI) 376. Other low-pressure storage tanks such as the amine storage tank would be designed, inspected, and maintained in accordance with API Standards 650 and 653. Although FERC staff generally agreed the design specifies appropriate materials of construction and ratings suited to the pressure and temperature conditions of the process design, we also recommend in section 4.13.5 that CP2 LNG provide for review and approval an up-to-date equipment list, process and mechanical data sheets, and specifications for the project. We also recommend in section 4.13.5 that CP2 LNG provide for review and approval the complete specifications and drawings for the proposed LNG tank design and installation.

The Heat exchangers would be designed to ASME BPVC Section VIII standards; API Standards 660, 661, and 662 - Part II; the Tubular Exchanger Manufacturers Association standards; the Heat Exchanger Institute standards; the American Society for Testing and Materials (ASTM) standards; and Aluminum Plate-Fin Heat Exchanger Manufacturer's Association guidelines. Although FERC staff generally agreed the design specifies appropriate materials of construction and ratings suited to the pressure and temperature conditions of the process design, we also recommend in section 4.13.5 that CP2 LNG provide for review and approval an up-to-date equipment list, process and mechanical data sheets, and specifications for the project, which would include any ASME BPVC pressure vessels manufacturer forms that define the design of the pressure vessels of the heat exchangers.

Rotating equipment would be designed to standards and recommended practices, such as API Standards 610, 613, 614, 617, 618, 619, 670, 671, 672, 674, 675, 676, and 682; and ASME Standards B73.1, and B73.2. Although FERC staff generally agreed the design specifies appropriate materials of construction and ratings suited to the pressure and temperature conditions of the process design, we also recommend in section 4.13.5 that CP2 LNG provide for review and approval an up-to-date equipment list, process and mechanical data sheets, and specifications for the project.

Pressure and vacuum safety relief valves, a vent stack, and flares would be installed to protect the storage containers, pressure vessels, process equipment, and piping from an unexpected or uncontrolled pressure excursion. The safety relief valves would be designed in accordance with API Standards 520, 521, 526, 527, 537, and 2000; ASME Standard B31.3; and other recommended and generally accepted good engineering practices. In addition, the operator should verify the set pressure of the pressure relief valves meet the requirements in 33 CFR § 127.407. Although FERC staff generally agreed the design specifies appropriate materials of construction and ratings suited to the pressure and temperature conditions of the process design, we also recommend in section 4.13.5 that CP2 LNG provide for review and approval an up-to-date equipment list, process and mechanical data sheets, and specifications for the project, which would include any API 520 and API 526 specification sheets and API 537 data sheets.

CP2 LNG intends to have the pretreatment and liquefaction equipment and piping prefabricated at an offsite location as modules and transport the modules to the site for installation. CP2 LNG intends to perform the pipe and pressure vessel pressure testing in accordance with the applicable codes and standards for these items. We recommend in section 4.13.5 that CP2 LNG provide an overall Quality Control/Quality Assurance plan which includes initial equipment laydown receipt and preservation procedures to ensure mechanical integrity of the equipment and piping is maintained.

Although CP2 LNG indicated that this project would meet many of the relevant industry codes and standards, CP2 LNG did not initially reference all codes and standards required by regulations or that are recommended and generally accepted good engineering practices. CP2 LNG committed to meeting codes and standards within regulations and others identified by FERC staff in response to data requests. Therefore, we recommend in section 4.13.5 that CP2 LNG provide the final specifications for all equipment and a summarized list of all referenced codes and standards for review and approval. If the Project is authorized and constructed, CP2 LNG would install equipment in accordance with its specifications and design, and FERC staff would verify equipment nameplates to ensure equipment is being installed based on approved design. In addition, FERC staff would conduct construction inspections including reviewing quality assurance and quality control plans to ensure construction work (e.g., welds, non-destructive examination, etc.) is being performed according to proposed Project specifications, procedures, codes, and standards. We recommend in section 4.13.5 that CP2 LNG provide semi-annual reports that include equipment malfunctions and abnormal maintenance activities. In addition, we recommend in section 4.13.5 that the Project facilities be subject to inspections to verify that the equipment is being properly maintained during the life of the facility.

Hazard Mitigation Design

If operational control of the facilities were lost and operational controls and emergency shutdown systems failed to maintain the Project within the design limits of the piping, containers, and safety relief valves, a release could potentially occur. FERC regulations under 18 CFR § 380.12 (o) (1) through (4) require applicants to provide information on spill containment, spacing and plant layout, hazard detection, hazard control, and firewater systems. In addition, 18 CFR § 380.12 (o) (7) requires applicants to provide engineering studies on the design approach and 18 CFR § 380.12 (o) (14) requires applicants to demonstrate how they comply with 49 CFR 193 and NFPA 59A. As required by 49 CFR 193 Subpart I and by incorporation section 9.1.2 of NFPA 59A (2001), fire protection must be provided for all PHMSA-regulated LNG facilities based on an evaluation of sound fire protection engineering principles, analysis of local conditions, hazards within the facility, and exposure to or from other property. NFPA 59A (2001) also requires the evaluation on the type, quantity, and location of hazard detection and hazard control, passive fire protection, emergency shutdown and depressurizing systems, and emergency response equipment, training, and qualifications.

If authorized, constructed, and operated, LNG facilities as defined in 49 CFR 193, must comply with the requirements of 49 CFR 193 Subpart I and would be subject to PHMSA's inspection and enforcement programs. However, NFPA 59A (2001) also indicates the wide range in size, design, and location of LNG facilities precludes the inclusion of detailed fire protection provisions that apply to all facilities comprehensively and includes subjective performance-based language on where ESD systems and hazard control are required and does not provide any additional guidance on placement or selection of hazard detection equipment and provides limited requirements on firewater. Also, the project marine facilities would be subject to 33 CFR 127, which incorporates sections of NFPA 59A (2019), which have similar performance-based guidance. Therefore, FERC staff evaluated the proposed spill containment and spacing, hazard detection, emergency shutdown and depressurization systems, hazard control, firewater coverage, structural protection, and onsite and offsite emergency response to ensure they would provide adequate protection of the LNG facilities as described below.

CP2 LNG performed a preliminary fire protection evaluation to ensure that adequate mitigation would be in place, including spill containment and spacing, hazard detection, emergency shutdown and depressurization systems, hazard control, firewater coverage, structural protection, and onsite and offsite emergency response. We recommend in section 4.13.5 that CP2 LNG provide a final fire protection evaluation that evaluates the type, quantity, and location of hazard detection and hazard control, passive fire protection, emergency shutdown and depressurizing systems, and emergency response equipment, training, and qualifications in accordance with NFPA 59A (2001), and to provide more information on the final design, installation, and commissioning of spill containment, hazard detection, hazard control, firewater systems, structural fire protection, and onsite and offsite emergency response procedures for review and approval.

Spill Containment

In the event of a release, sloped areas at the base of storage and process facilities would direct a spill away from equipment and into the impoundment system. This arrangement would minimize the dispersion of flammable vapors into confined, occupied, or public areas and minimize the potential for heat from a fire to impact adjacent equipment, occupied buildings, or public areas if ignition were to occur.

Title 49 CFR § 193.2181, under Subpart C specifies that each impounding system serving an LNG storage tank must have a minimum volumetric liquid capacity of 110 percent of the LNG tank's maximum design liquid capacity for an impoundment serving a single tank. If authorized, constructed, and operated, LNG facilities as defined in 49 CFR 193, must comply with the requirements of 49 CFR 193 Subpart C and would be subject to PHMSA's inspection and enforcement programs. For full containment LNG tanks, we also consider it prudent to provide a barrier to prevent liquid from flowing to an unintended area (i.e., outside the plant property). The purpose of the barrier is to prevent liquid from flowing off the plant property and is not defined as containment or an impounding area for thermal radiation or flammable vapor exclusion zone calculations or other code requirements already met by sumps and impoundments throughout the site. CP2 LNG proposes four full-containment LNG storage tanks for which the outer tank wall would serve as the impoundment system. FERC staff verified that the LNG storage tank's outer concrete wall would have a liquid capacity of at least 110 percent of the inner LNG tank's maximum liquid capacity. Per NFPA 59A (2001), section 2.2.2.4, an outer shell of a double wall tank is allowed to be considered as the impounding area for siting purposes, provided the outer wall material is designed to withstand rapid cooling to the temperature of the liquid being confined. In addition, CP2 LNG would install a storm surge wall (i.e., floodwall or storm surge floodwall) around the Terminal Site, which would be designed to withstand cryogenic temperatures up to a level that would prevent the liquid volume from an LNG storage tank from flowing offsite in the event of an outer tank impoundment failure. In addition, the design of the storm surge wall would consider prevention of this spill from flowing offsite through the passageways in the wall. Therefore, we recommend in section 4.13.5 that details of this tertiary containment for the LNG storage tanks be provided for review and approval prior to construction.

CP2 LNG proposes to install curbing, paving, and troughs to direct potential hazardous liquid spills, involving LNG, refrigerant, heavy hydrocarbon and other hazardous material releases to impoundment basins. CP2 LNG indicates that all containment areas would be paved, and the spill conveyance system would be constructed of concrete and/or stainless steel, although this would not be finalized until the detailed design phase. We recommend that any elevated stainless steel that would convey spills of cold liquefied gases should be demonstrated suitable to handle the thermal shock combined with any applicable jetting forces of a pressurized release. Liquid releases from the liquefaction trains or the LNG liquefaction rundown piping would be directed by paving to either the Process Area LNG Spill Impoundment Basin or the LNG Loading Line LNG Spill Impoundment Basin. Liquid releases from LNG tank top piping would be conveyed down from the tank top via a downcomer pipe. CP2 LNG provided preliminary discussion on sizing for the tank downcomer; however, we recommend in section 4.13.5 that CP2 LNG provide final design calculations for the downcomer sizing. LNG releases from the ship loading line at the Terminal Site would be directed to the LNG Loading Line Spill Impoundment Basin. LNG releases from the ship loading piping at the Marine Facilities would be directed to the Berth Area LNG Spill Impoundment Basin. Between the Terminal Site and Marine Facilities, the ship loading line would be buried and within an outer pipe. The ship loading line would transition between below and above ground within areas of the spill collection system that lead to impoundments. Releases from refrigerant delivery trucks would be directed to a Refrigerant Truck Unloading – Storage Area Spill Impoundment Basin. Releases of hazardous liquids in the pre-treatment area, including heated hot oil and heavy hydrocarbon condensate, would be contained in a local Pretreatment Area Impoundment Basin. Releases from diesel, hot oil, and solvent truck areas would be contained in a Diesel/Hot Oil/Solvent Truck Unloading Recessed Containment Area. A concrete impoundment would also be provided to capture potential spills during the unloading of aqueous ammonia. CP2 LNG would also include diked containment areas for the solvent, hot oil, aqueous ammonia, and diesel storage tanks. The impoundment basins were sized considering potential firewater volumes that may not vaporize during the release.

Under NFPA 59A (2001), section 2.2.2.2, the capacity of impounding areas for vaporization, process, or LNG transfer areas must equal the greatest volume that can be discharged from any single accidental leakage source during a 10-minute period or during a shorter period based upon demonstrable surveillance and shutdown provisions acceptable to the PHMSA. If authorized, constructed, and operated, LNG facilities, as defined in 49 CFR 193, must comply with the requirements of 49 CFR 193 Subpart C and would be subject to PHMSA's inspection and enforcement programs. The impoundment system design for the marine facilities would be subject to the Coast Guard's 33 CFR 127, which does not specify a spill or duration for impoundment sizing. However, we evaluate whether all hazardous liquids are provided with spill containment based on the largest flow capacity from a single pipe for 10 minutes accounting for de-inventory or the liquid capacity of the largest vessel (or total of impounded vessels) served, whichever is greater and whether providing spill containment reduces consequences from a release. Additionally, CP2 LNG provided sizing basis for the trenches leading to the impoundment basins. We recommend in section 4.13.5 that CP2 LNG provide additional information on the final design of the impoundment systems for review and approval.

CP2 LNG indicated that all piping, hoses, and equipment that could produce a hazardous liquid spill would be provided with spill collection and/or spill conveyance systems. Furthermore, CP2 LNG indicates that each impoundment basin would include a recessed sump to house the water removal pumps. Pump operation would be automatically actuated to remove rainwater that collects in an LNG impoundment. Low temperature and flammable gas interlocks would be provided to automatically shut off or prevent startup of the water removal pumps upon detection of a spill in the LNG impoundments. Stormwater removal pumps are also proposed for the impoundment basins and diked secondary containment systems. The curbed containment systems for hazardous fluids would also drain to an impoundment basin.

If the project is authorized and constructed, CP2 LNG would install spill impoundments in accordance with its design and FERC staff would verify during construction inspections that the spill containment system including dimensions, and slopes of curbing and trenches, and volumetric capacity matches final design information. In addition, we recommend in section 4.13.5 that Project facilities be subject to regular inspections throughout the life of the facility to verify that impoundments are being properly maintained.

Spacing and Plant Layout

The spacing of vessels and equipment between each other, from ignition sources, and to the property line must meet the requirements of 49 CFR 193 Subparts C, D, and E, which incorporate NFPA

59A (2001). NFPA 59A (2001) includes spacing and plant layout requirements and further references NFPA 30, NFPA 58, and NFPA 59 for additional spacing and plant layout requirements. If authorized, constructed, and operated, LNG facilities, as defined in 49 CFR 193, must comply with the requirements of 49 CFR 193 and would be subject to PHMSA's inspection and enforcement programs.

In addition, FERC staff evaluated the spacing to determine if there could be cascading damage and to inform what fire protection measures may be necessary to reduce the risk of cascading damage. If spacing to mitigate the potential for cascading damage was not practical, we evaluated whether other mitigation measures were in place and evaluated those systems in further detail as discussed in subsequent sections. CP2 LNG provided a preliminary building siting analysis, for our evaluation, conducted in accordance with API 752, which provides guidance on identifying and evaluating explosion and fire impacts to occupied buildings and occupants resulting from events external to the buildings. Evaluation of design spill releases used for the plant siting analysis for PHMSA indicates that overpressures above 1 psi from vapor cloud explosions in congested areas at the Terminal Site would not be expected to reach occupied buildings and that the 1,600 Btu/ft^2-hr heat flux levels from jet fires would only be expected to reach the jetty control building. The heat flux onto the jetty control building would be expected to be high, and CP2 LNG indicates that mitigation would be evaluated for this during detailed design and may include fire water application, thermal barriers, shrouding of the lines responsible for the hazard, or others. Therefore, we recommend in section 4.13.5 that CP2 LNG demonstrate how personnel in occupied buildings within the 1,600 Btu/ft^2-hr zone of fires would be protected from exposure as well as provide information on the mitigation for heat from jet fires onto the jetty control building, for review and approval. CP2 LNG indicates that it may also conduct a risk-based evaluation of this scenario. CP2 LNG indicated there would be no elevated buildings at the facility, however we note that other filed information indicates the jetty control building may be elevated. If so, and depending on the configuration, there may be potential for overpressures to develop due to an LNG vapor cloud ignition in the space underneath. CP2 LNG stated that the jetty control room would be of blast-resistant design to maintain operating integrity after a blast event and that blast resistant designs would be developed during the final design phase. Therefore, we recommend in section 4.13.5 that CP2 LNG provide additional information, for review and approval, on the final design for any blast walls, hardened structures, and blast resistant design, including a supporting hazard analysis and building risk assessment studies, in order to prevent cascading damage.

In addition, FERC staff evaluated other hazards associated with releases and whether any damage would likely occur at buildings or would result in cascading damage. To minimize the risk of cryogenic spills causing structural supports and equipment from cooling below their minimum design metal temperature, CP2 LNG would generally locate cryogenic equipment away from other types of process areas and have spill containment systems for cryogenic spills that would direct them to a remote impoundment. In addition, CP2 LNG would protect equipment and structural steel against cold shocks through selection of suitable materials of construction or by the application of cold spill protection. We recommend in section 4.13.5 that CP2 LNG file drawings and specifications for structural passive protection systems to protect equipment and supports that could be exposed to low temperature releases below the minimum design metal temperatures.

To minimize risk for flammable or toxic vapor ingress into buildings and from reaching areas that could result in cascading damage from explosions, CP2 LNG would generally locate buildings, fired equipment, ignition sources, and LNG storage tanks away from process areas. CP2 LNG would include flammable gas detection near all combustion and building ventilation air intakes within the facility such that upon activation, the gas detectors would alert operators and the associated air intake would shut down. In addition, toxic detection would be provided for all occupied buildings. Shutdown would be based on gas detection from two out of the total gas detectors for that air intake. However, the specific installed locations of the detectors would need to be verified as appropriate during final design. Therefore, we recommend in section 4.13.5 that CP2 LNG conduct a technical review of the final design of the facility, for review and approval, identifying all combustion/ventilation air intake equipment and the detailed placement of detectors at those air intakes to detect flammable gas or toxic releases; and verify that these areas would be adequately covered by hazard detection devices that would isolate or shut down any combustion or ventilation equipment whose continued operation could add to or sustain an emergency. We also recommend in section 4.13.5 that Project facilities be subject to periodic inspections during construction to verify flammable/toxic gas detection equipment is installed in heating, ventilation, and air condition intakes of buildings at appropriate locations. In addition, we recommend in section 4.13.5 that Project facilities be subject to regular inspections throughout the life of the facilities to continue to verify that flammable/toxic gas detection equipment installed in building air intakes function as designed and are being maintained and calibrated.

To minimize overpressures from vapor cloud explosions, we evaluated how flammable vapors would be prevented from accumulating within confined areas. CP2 LNG would design for overpressures in accordance with API RP 752, ASCE 41088, and other recommended and generally accepted good engineering practices. In addition, vapor cloud explosions in process areas were evaluated by a CP2 LNG consultant using the Q9 method to determine the equivalent stoichiometric volume for the flammable mass in the congested areas and the Baker-Strelow-Tang method to evaluate the extent of overpressures. No areas of high congestion with potential for deflagration to detonation transitions were identified that might preclude the use of the Q9 method. The results demonstrate that process area explosions would be expected to produce less than 1 pound per square inch (psi) side-on overpressure at the LNG storage tanks, as well as at the firewater tank and pumps. However, CP2 LNG notes that the 1 psi overpressure does reach the emergency diesel generators and that consideration may need to be given to mitigation during final design. Because the final design is not available for this evaluation, we recommend in section 4.13.5 that CP2 LNG confirm the density and extent of congestion levels used in the vapor cloud overpressure modeling. We also recommend that CP2 LNG file final design details for mitigation of overpressures onto the emergency diesel generators and any other significant components, unless demonstrated not necessary, for review and approval.

To minimize the risk of pool fires from causing cascading damage, CP2 LNG located the spill impoundments such that the radiant heats would have a minimal impact on most areas of the plant. Fires within the process impoundments would be spaced such that there would not likely be high radiant heats on equipment. CP2 LNG indicates that, based on LNGFIRE3 modeling, a fire in the Solvent Storage Impoundment and Pretreatment Area Impoundment would produce greater than 4,000 Btu/ft^2-hr heat flux over the flare knockout drums, hot oil furnaces, and mercury removal drums. However, this would be the heat level for an LNG fire in those impoundments, and the use of a model that could account for the actual composition of the fluids would show significantly less radiant heat for fires involving solvent or flammable pretreatment fluids (e.g., heated hot oil, heavy hydrocarbons). In addition, based on LNGFIRE3 modeling, the boiloff gas compressor substations and essential power diesel generators would be located within the 4,000 Btu/ft^2-hr zone from a full LNG tank top fire. Furthermore, LNGFIRE3 modeling shows that a fire from the LNG storage tank roof would result in radiant heats over 10,000 Btu/ft^2-hr at an adjacent LNG storage tank. Modeling performed for CP2 LNG using FDS indicates significantly less radiant heat for the same tank roof fire scenario. However, FDS validation data shows the potential for significant underprediction that warrants high uncertainty factors, which may not even extrapolate to a larger tank top size fire. LNGFIRE3 does not show underprediction for the largest LNG pool fire experiment conducted to date. Therefore, we recommend in section 4.13.5 for CP2 LNG to file an analysis, for review and approval, of modeling of radiant heats for LNG tank top fires, using LNGFIRE3 or a similarly validated model with application of uncertainty factors commensurate with its validation results including consideration of extrapolation. In addition, we recommend for CP2 LNG to file an analysis that demonstrates the LNG tank walls could withstand the heat flux or that an analysis that demonstrates the fire water coverage or equivalent mitigation could absorb the radiant heat predicted at the tank walls. NFPA

59A (2001) section 2.2.3.6 also requires LNG storage tank impounding areas to be located such that heat fluxes shall not cause major structural damage to any LNG marine carrier that could prevent its movement. A radiant heat level of 4,900 Btu/ft^2-hr would be needed to have potential to cause impacts to the LNG marine carriers. For the CP2 LNG project, this level would not reach the LNG marine carriers due to a fire from any LNG storage tank impoundment, which is its outer concrete wall.

To minimize vaporization rates and the radiant heat fluxes from an impoundment fire, spill impoundments for LNG, refrigerant, and other flammable hydrocarbons would contain cellular foam blocks designed to float on top of the spilled liquid. Cryogenic spill impoundments would also be constructed with a cellular foam insulation system to reduce the rate of vaporization and provide thermal shock protection to the concrete and steel impoundment materials. High expansion foam trailers at the site would be used on an as-needed basis to supplement the cellular foam systems. To further mitigate cascading impacts from impoundment fires, CP2 LNG would install firewater hydrants and monitors at the Marine Facilities and throughout the Terminal Site. We recommend in section 4.13.5 that CP2 LNG file supporting firewater demand calculations that demonstrate there would be adequate firewater supply and delivery devices to mitigate the consequences of radiant heats from impoundment fires. We also recommend in section 4.13.5 that CP2 LNG file drawings and specifications of the passive structural fire protection for review and approval for structural supports and equipment.

To minimize the risk of jet fires from causing cascading damage that could exacerbate the initial hazard, CP2 LNG would generally locate flammable and combustible containing piping and equipment away from buildings and process areas that do not handle flammable and combustible materials. However, in addition to the jetty control building scenario discussed above, jet fire scenarios associated with LNG marine transfer piping could result in radiant heats above 10,000 Btu/ft^2-hr on the dock and LNG marine vessel. Heat impacts from jet fires in process areas could also reach pressure vessels, structural members, and other significant components. To mitigate these exposures, CP2 LNG would install emergency shutdown systems that would limit the duration of a jet fire event, depressurization systems that would reduce the pressure in equipment, and would install firewater systems to cool equipment and structures as described in section 4.13.1.5. We recommend in section 4.13.5 that CP2 LNG file drawings of the passive structural fire protection for review and approval for structural supports and equipment. In addition, we recommend in section 4.13.5 that CP2 LNG file a detailed quantitative analysis demonstrating that adequate mitigation would be provided for each significant component within the 4,900 Btu/ft^2-hr zone from jet fires that could cause failure of the component.

In addition, FERC staff evaluated the spacing to determine if there could be cascading damage from fires to inform what fire protection measures may be necessary to reduce the risk of cascading damage. To mitigate against fires within the plant, CP2 LNG proposes thermal radiation mitigation measures to prevent cascading events in the design, including fire-retardant insulation materials, emergency depressurization, flame, combustible gas and low temperature detectors, fire proofing of structural steel columns supporting critical equipment, fixed automatic firewater spray system, insulating foam blocks in LNG and refrigerant impoundments, foam trailers, wheeled extinguishers, and firewater monitors and hydrants. However, details of these systems would be developed in final design. Therefore, we recommend in section 4.13.5 that CP2 LNG provide the final design of these thermal mitigation measures, for review and approval, to demonstrate cascading events would be mitigated. Also, computer modeling simulations of a rupture of the largest CO_2 line within the Terminal Site indicate that mildly harmful levels of CO_2 may reach near the base of the storm surge wall but would not be expected reach offsite. To protect plant operators, multiple detection systems would monitor the Carbon Capture System area for leaks.

If the project is authorized, CP2 LNG would finalize the plot plan, and we recommend in section 4.13.5 that CP2 LNG provide any changes for review and approval to ensure capacities and setbacks are maintained. If the facilities are constructed, CP2 LNG would install equipment in accordance with the spacing indicated on the plot plans. In addition, we recommend in section 4.13.5 that Project facilities be subject to periodic inspections during construction to verify equipment is installed in appropriate locations and the spacing is met in the field. We also recommend in section 4.13.5 that Project facilities be subject to regular inspections throughout the life of the facilities to continue to verify that equipment setbacks from other equipment and ignition sources are being maintained during operations.

Ignition Controls

CP2 LNG plant areas would be designated with a hazardous electrical classification and process seals commensurate with the risk of the hazardous fluids being handled in accordance with NFPA 59A (2001), NFPA 70 Article 500, NFPA 497, and API RP 500. If authorized, constructed, and operated, LNG facilities, as defined in 49 CFR 193, must comply with the requirements of 49 CFR 193 and would be subject to PHMSA's inspection and enforcement programs, which require compliance, by incorporation by reference, with NFPA 59A (2001). NFPA 59A (2001) subsequently references NFPA 70 (1999) for installation of electrical equipment and wiring.

The marine transfer area must comply with Coast Guard regulations in 33 CFR 127 and incorporation of NFPA 70 (2020). However, 33 CFR 127 excludes NFPA 59A (2019) hazardous area classifications and NFPA 70 (2020) no longer contains hazardous area classification extents. Nonetheless, CP2 LNG indicates its hazardous electrical classifications would meet NFPA 59A (2001) and API RP 500 which stipulates the hazardous areas for marine transfer areas.

Depending on the risk level, areas where electrical equipment would be located and wiring routed would either be unclassified or classified as Class 1 Division 1 or Class 1 Division 2. Electrical equipment and wiring located in these areas would be designed such that in the event a flammable vapor is present, the equipment would have a minimal risk of igniting the vapor. We evaluated CP2 LNG's electrical area classification drawings to determine whether CP2 LNG would meet the electrical area classification requirements and good engineering practices in NFPA 59A, NFPA 70 Article 500, NFPA 497, and API RP 500. CP2 LNG provided a set of figures for the area classification philosophies that also includes a note incorporating the codes mentioned above. However, the application of the transfer piping leakage and trough area classification philosophies is not clear. CP2 LNG appears to be applying an area classification figure meant for equipment and piping to the ground level trough in the marine area but not to potential leakage points on the LNG marine transfer piping. Applying this philosophy to the transfer lines would have appeared to be consistent with similar area classifications on plot plans for the Terminal Site. However, more recent statements provided by CP2 LNG while discussing the area classification philosophy for refrigerant and pretreatment transfer piping at the Terminal Site appear to describe a similar philosophy as applied on updated drawings for the Marine Facilities, although this is not what appears to be depicted on the more recent drawings for the refrigerant transfer piping, or on existing drawings for LNG transfer piping, if implied. Therefore, the area classification at potential leakage points on large flammable fluid piping, including large flanges and large valves, is not clear. Also, the area around the refrigerant truck transfer connections would be expected to be classified as Division 2 to the extent consistent with API 500 figure 20 or 21 and classified as Division 1 to the extent specified in NFPA 59A (2001) Table 7.6.2. The ship loading connections would also be expected to have a similar Division 1 classifications. It is also not clear why the area above the mounded refrigerant tanks would not be classified unless it has a significantly higher elevation. In addition, electrical classification plot plans for some other areas, including the LNG tank tops, gas turbine generators, certain pretreatment systems, and some portions of the impoundment system, have not yet been provided, and CP2 LNG indicates that additional drawings and details would be available during the final design phase. Therefore, we recommend in section 4.13.5 that CP2 LNG provide the final electrical area classification drawings for review and approval. If the Project is authorized, CP2 LNG would finalize the electrical area classification drawings and would describe changes made from the FEED design.

If facilities are constructed, CP2 LNG would install appropriately classed electrical equipment, and we recommend in section 4.13.5 that Project facilities be subject to periodic inspections during construction for FERC staff to spot check electrical equipment and verify equipment is installed per classification and are properly bonded or grounded in accordance with NFPA 70. In addition, we recommend in section 4.13.5 that Project facilities be subject to regular inspections throughout the life of the facility to ensure electrical equipment is maintained (e.g., bolts on explosion proof equipment properly installed and maintained, panels provided with purge, etc.), and electrical equipment are appropriately deenergized and locked out and tagged out when being serviced.

In addition, submerged pumps and instrumentation must be equipped with electrical process seals, and instrumentation in accordance with NFPA 59A (2001) and NFPA 70 (1999 and 2020). We recommend in section 4.13.5 that CP2 LNG provide, for review and approval, final design drawings showing process seals installed at the interface between a flammable fluid system and an electrical conduit or wiring system that meet the requirements of NFPA 59A (2001) and NFPA 70 (1999 or 2020, as applicable). In addition, we recommend in section 4.13.5 that CP2 LNG file, for review and approval, details of an air gap or vent equipped with a leak detection device that should continuously monitor for the presence of a flammable fluid, alarm the hazardous condition, and shut down the appropriate systems or alternatively, CP2 LNG should file details on a system providing equivalent protection, in accordance with NFPA 59A (2023 edition) or approved equivalent, from the migration of flammable fluid through the electrical conduit or wiring. In addition, we recommend in section 4.13.5 that Project facilities be subject to regular inspections throughout the life of the facility to ensure electrical process seals for submerged pumps continue to conform to NFPA 59A and NFPA 70 and that air gaps are being properly maintained.

Hazard Detection, Emergency Shutdown, and Depressurization Systems

CP2 LNG would also install hazard detection systems to detect cryogenic spills, flammable and toxic vapors, low oxygen environments, and fires. The hazard detection systems would alarm and notify personnel in the area and in the control room to initiate an emergency shutdown, depressurization, or appropriate procedures, and would meet NFPA 72, ISA Standard 12.13, ISA Standard 84.00.07 and other recommended and generally accepted good engineering practices. Additionally, CP2 LNG would install an ESD system in accordance with NFPA 59A. The ESD shutdown would include failsafe, or fireproof, valves within 50 feet of the equipment they protect. ESD manual push buttons would be installed at least 50 feet from the equipment they serve. CP2 LNG indicated the ESD layout plans would be developed during detailed engineering. Therefore, we recommend in section 4.13.5 that CP2 LNG provide drawings showing the locations of all emergency shutdown buttons, including at the refrigerant storage and LNG storage areas, as well as for area/unit emergency isolation and equipment shutdown. In addition, we recommend in section 4.13.5 that CP2 LNG provide specifications, for review and approval, for the final design of fire safety specifications, including hazard detection, hazard control, and firewater systems.

FERC staff also evaluated the adequacy of the general hazard detection type, location, and layout to ensure adequate coverage to detect cryogenic spills, flammable and toxic vapors, and fires near potential release sources (i.e., pumps, compressors, sumps, trenches, flanges, and instrument and valve connections). The proposed hazard detection design utilizes an array of point gas, open path, flame, and low temperature detectors to provide coverage of process equipment containing flammable fluids. Furthermore, the alarm setpoints for these detectors are appropriate for the hazard they would detect. However, FERC staff noted the set points for low temperature detectors were not provided. CP2 LNG stated the final design would provide all incomplete setpoint information. FERC staff evaluated the hazard detection layout and noted a lack of hazard detection in several areas of the proposed plant, including the liquefaction areas and hydrocarbon spill sump, refrigerant unloading pump area, power plant essential diesel generator area, ventilation and fired equipment air intakes, LNG tank roof, pre-treatment modules, liquefaction modules, jetty LNG spill basin, and jetty diesel storage area, among others. CP2 LNG provided updated drawings showing hazard detectors installed in most areas FERC staff noted as missing; however, there are several areas that are still lacking hazard detection such as the low- and high-pressure fuel gas knock-out drum areas, ventilation and fired equipment air intakes, and jetty diesel storage area. CP2 LNG stated hazard detection in the uncovered areas noted would be evaluated during detailed engineering design and updated drawings and specifications would be provided with the final design. CP2 LNG also stated the final design would provide a gas mapping study to evaluate hazard detection system performance based on ISA 84.00.07. FERC staff also noted a lack of heat detectors throughout the plant. CP2 LNG stated heat detectors would be used to detect indoor fires in enclosed structures and the layout details and specifications would be incorporated into the hazard detection drawings during detailed design. FERC staff also noted flame detector specifications and cone-of-vision drawings were not provided. CP2 LNG stated flame detector specifications and cone-of-vision drawings would be provided during detailed design. Lastly, FERC staff noted the NFPA 59A Preliminary Fire Protection Evaluation did not contain any recommendations. CP2 LNG stated an additional NFPA 59A evaluation would be conducted during detailed design contemporaneous with the development of hazard detection measures. CP2 LNG also stated the final design would comply with NFPA 72, Annex B requirements for spacing smoke detectors at 30 feet or less. We recommend in section 4.13.5 that CP2 LNG file a hazard detection study to evaluate the effectiveness of their flammable and combustible gas detection and flame and heat detection systems in accordance with ISA 84.00.07 or approved equivalent methodologies. However, ISA 84.00.07 does not account for the potential higher consequences of liquefied gaseous releases and treats those consequences as the same as gaseous releases. We do not agree with this consequence scoring given the much higher potential consequences of liquefied gasses and highly volatile liquids. In addition, ISA 84.00.07 does not specify the release of concern. Given the goal to reduce offsite impacts and potential consequences to the public, we stipulate that the releases that need to be detected be based on releases that could result in offsite impacts. Therefore, the ISA 84.00.07 evaluation would need to demonstrate that 90 percent or more of releases (unignited and ignited) that could result in an off-site or cascading impact would be detected by two or more detectors and result in isolation and de-inventory within 10 minutes. The analysis should also consider the set points, voting logic, wind speeds, and wind directions.

CP2 LNG specified low oxygen detection would be considered in the laboratory where facility samples would be processed. In addition, CP2 LNG specified low oxygen detectors at the liquid nitrogen storage and vaporization package in the plant utilities area and the nitrogen unit at the jetty. The proposed alarm setpoints for these detectors would be appropriate for low oxygen detection. Also, as discussed in the Spacing and Plant Layout section above, multiple detection systems would monitor the CCS system area for leaks, including point combustible gas detectors, flame detectors and combined carbon dioxide/oxygen monitors.

CP2 LNG indicated that the batteries for the uninterruptible power supply would consist of valve-regulated lead-acid batteries. In addition, CP2 LNG indicated hydrogen detectors would be present in the vicinity of battery installations. We recommend in section 4.13.5 that CP2 LNG file an analysis of the off gassing of hydrogen in battery rooms and ventilation calculations that limit concentrations below the lower flammable limits (LFLs) (e.g., 25-percent LFL) as well as provide hydrogen detectors that alarm and initiate mitigative actions or alarms in the event the ventilation equipment is not operating or functioning as designed.

FERC staff also reviewed the fire and gas cause and effect matrices to evaluate if the detectors would initiate an alarm, shutdown, depressurization, or other action based on the FEED. The cause-and-effect matrices included most detector types but did not include low oxygen detectors. The hazard detection devices that were included did specify the hazard detector device type, device tag number, voting logic, and set points that would initiate any type of action. However, these are not finalized. Therefore, we recommend in section 4.13.5 that CP2 LNG provide, for review and approval, the final cause-and-effect matrices for fire and gas detection system. In addition, we recommend in section 4.13.5 that CP2 LNG provide additional information, for review and approval, on the final design of all hazard detection systems (e.g., manufacturer and model, elevations, etc.) and hazard detection layout drawings.

If the project is authorized, constructed, and operated, CP2 LNG would install hazard detectors according to its final specifications and drawings, and we recommend in section 4.13.5 that Project facilities be subject to periodic inspections during construction to verify hazard detectors and ESD pushbuttons are appropriately installed per approved design and functional based on cause-and-effect matrixes prior to introduction of hazardous fluids. In addition, we recommend in section 4.13.5 that Project facilities be subject to regular inspections throughout the life of the facility to verify hazard detector coverage and functionality is being maintained and not being bypassed without appropriate precautions.

Hazard Control

If ignition of flammable vapors occurred, hazard control devices would be installed to extinguish or control incipient fires and releases, and would meet NFPA 59A; NFPA 10, 17, and 2001; API Standard 2510A; and other recommended and generally accepted good engineering practices. Fixed dry chemical systems would be used at the jetties to supplement the fixed water systems as described in 33 CFR § 127.609. As mandated by 33 CFR § 127.609, marine transfer areas would have dry systems large enough to provide two full discharges protecting the areas around the loading arms. These systems would discharge via pre-aimed monitors and would be automatically activated on flame detection. However, selection and sizing of this system would be completed during the detailed engineering phase. The nitrogen snuffing system for the LNG storage tank relief valves would also be sized during the detailed engineering phase to control small fires caused by leaks. In addition, fixed dry chemical fire suppression systems would be provided for these relief valves. FERC staff also evaluate whether the spacing of the fire extinguishers would meet NFPA 10 and agent type and capacities meet NFPA 59A (2009 and later editions). The agent type (potassium bicarbonate) and agent storage capacities for wheeled and for handheld extinguishers appear to meet NFPA 59A requirements. However, the FEED drawings did not cover certain areas, such as liquefaction, pretreatment, mercury removal, and buildings, and the flow rates of extinguishers were not specified at this time to verify whether they meet NFPA 59A (2009 and later edition) requirements. In addition, the available FEED hazard control plans appeared to meet NFPA 10 travel distances to most components containing flammable or combustible fluids (Class B) for handheld fire extinguishers (30 to 50 feet) and wheeled extinguishers (100 feet) and NFPA 10 travel distance to most other components that could pose an ordinary combustible hazard (Class A) or associated electrical (Class C) hazard for handheld extinguishers (75 feet). Some components, such as LNG transfer piping in the storage tank area, certain pretreatment equipment, and others, were not shown with extinguishers meeting the above distances. CP2 indicates that portable fire extinguishers would be located throughout the facility and within all buildings, per NFPA 10, and that extinguishers would be located within 50 feet of the area to be protected. Travel distances, installation heights, visibility, flow rate capacities, and other requirements should be confirmed in final design and in the field where design details, such as manufacturer, obstructions, and elevations, would be better known. Therefore, we recommend in section 4.13.5 that CP2 LNG file the final design of these systems, for review and approval, where details are yet to be determined (e.g., manufacturer and model, elevations, flowrate, capacities, etc.) and where the final design could change as a result of these details or other changes in the final design of the Project.

In addition, we evaluated whether clean agent systems would be installed in all instrumentation buildings in accordance with NFPA 2001. CP2 LNG would install clean agent fire suppression systems in accordance with NFPA 2001 in enclosed spaces containing electronic circuits that do not tolerate the use of water as an extinguishing agent, including the central control room, jetty control rooms, electrical substations, e-houses, and MCC buildings. We recommend in section 4.13.5 that prior to introduction of hazardous fluids, CP2 LNG should file clean agent acceptance tests demonstrating the clean agent systems would function as designed. In addition, CP2 LNG would provide water mist and aerosol extinguishing systems for the gas turbines.

If the Project is authorized, constructed, and operated, CP2 LNG would install hazard control equipment, and we recommend in section 4.13.5 that Project facilities be subject to periodic inspections during construction to verify hazard control equipment is installed in the field and functional prior to introduction of hazardous fluids. In addition, we recommend in section 4.13.5 that Project facilities be subject to regular inspections throughout the life of the facility to verify in the field that hazard control coverage and is being properly maintained and inspected.

Passive Cryogenic Temperature and Fire Protection

If cryogenic releases or fires could not be mitigated from impacting facility components to insignificant levels, passive protection (e.g., fireproofing structural steel, cryogenic protection, etc.) should be provided to prevent failure of structural supports of equipment and pipe racks. The structural fire protection would comply with NFPA 59A (2001) and other recommended and generally accepted good engineering practices. NFPA 59A (2001) section 6.4.1 requires pipe supports, including any insulation systems used to support pipe whose stability is essential to plant safety, to be resistant to or protected against fire exposure, escaping cold liquid, or both, if they are subject to such exposure. However, NFPA 59A (2001) does not provide the criteria for determining if they are subject to such exposure or the level of protection needed to protect the pipe supports against such exposures. In addition, NFPA 59A does not address cryogenic or structural protection of pressure vessels or other equipment.

Therefore, FERC staff evaluated whether passive cryogenic and fire protection would be applied to pressure vessels and structural supports to facilities that could be exposed to cryogenic liquids or radiant heats of 4,900 Btu/ft^2-hr or greater from fires with durations that could result in failures[181] and that they are specified in accordance with recommended and generally accepted good engineering practices with a fire protection rating commensurate to the exposure. The structural fire protection design would comply with NFPA 59A (2001); API RP 2218; International Organization for Standardization 22899; UL 1709; and other recommended and generally accepted good engineering practices.

To minimize the risk of cryogenic spills causing structural supports and equipment from cooling below their minimum design metal temperature, CP2 LNG would protect equipment and structural steel against cold shocks through selection of suitable materials of construction or by the application of cold proofing. In addition, CP2 LNG would have spill containment systems surrounding cryogenic equipment and would generally locate cryogenic equipment away from other types of process areas that do not handle cryogenic materials. Cryogenic protection would comply with NFPA 59A (2001), International Organization for Standardization 20088, and other recommended and generally accepted good engineering practices. However, the drawings provided by CP2 LNG to depict the areas where cryogenic protection would be provided did not appear to include certain areas, such as those on the LNG tank tops, for which deluge systems were not proposed, and areas within the liquefaction blocks having fluids lower than the minimum design temperature of the structural supports. Therefore, we recommend in section 4.13.5 that CP2 LNG file drawings and specifications of the final design, for review and approval, for the structural passive protection systems to protect equipment and supports from low temperature releases below minimum design metal temperatures.

[181] Pool fires from impoundments are generally mitigated through use of emergency shutdowns, depressurization systems, structural fire protection, and firewater, while jet fires are primarily mitigated through the use of emergency shutdowns, depressurization systems, and firewater with or without structural fire protection.

To minimize the risk of a pool or jet fire from causing cascading damage, CP2 LNG would generally locate flammable and combustible containing piping, equipment, and impoundments away from buildings and other process areas that do not handle flammable and combustible materials. CP2 LNG provided drawings that show fire exposed areas, including equipment and components, and demonstrated that the radiant heats from pool fires from the LNG storage tank outer containment walls and impoundments would have a minimal impact on most areas of the plant with the exceptions described in the Spacing and Plant Layout section above. CP2 LNG specified that fire-proofing would be applied to structures and vessel supports within the fire scenario envelope of high fire potential equipment in consideration of the guidance presented in API 2218. Fireproofing would be provided to protect structures supporting high fire potential equipment from reaching 1000°F for a period of one and a half hours, as defined by UL 1709 when tested on a 10W49 column. Electrical, instrument and control systems used to activate emergency systems needed to control a fire or mitigate its consequences (such as emergency shut-down systems, emergency isolation systems or emergency depressurization systems) would be protected from fire damage, unless they are specifically designed to fail safe during a fire exposure. CP2 LNG indicates that the control wiring used to activate emergency systems during a fire could be exposed to the fire, the wiring would be fire resistant to 15- to 30-minute fire exposure equivalent to UL 1709 (or functional equivalent). In section 4.13.5, we recommend a minimum of 20 minutes. However, the drawings CP2 LNG provided to depict the fire exposed areas where fireproofing would be applied do not include all areas where jet fires and impoundment fires could impact structural supports, including LNG tank top areas for which deluge systems have not been proposed.

Therefore, we recommend in section 4.13.5 that CP2 LNG demonstrate that passive protection is provided in areas where pool or jet fires from design spills may exacerbate the initial hazard, such as resulting in: a) cascading failures of structural supports, b) pressure vessel bursts or BLEVEs, c) tank failures, or d) failure of safety systems (e.g., ESD systems, firewater systems, etc.). CP2 LNG would need to file drawings of the passive structural fire protection for review and approval for structural supports and equipment that could result in a failure when exposed to a pool or jet fire. In addition, we recommend in section 4.13.5 that CP2 LNG provide additional information on final design of these systems, for review and approval, where details are yet to be determined (e.g., calculation of structural fire protection materials, thicknesses, etc.) and where the final design could change as a result of these details or other changes in the final design of the Project.

FERC staff also evaluated whether the design would include blast or fire walls for transformers per NFPA 850. CP2 LNG does not propose to install fire walls in transformer areas. However, CP2 LNG indicated their transformers would utilize a high fire point liquid which can justify reduced separation distances per NFPA 850 and NFPA 70. Therefore, we recommend in section 4.13.5 that CP2 LNG provide final datasheets for the transformers and transformer fluid and an analysis in accordance with NFPA 850 to justify the acceptability of the transfer spacing and lack of firewalls.

CP2 LNG indicated that the jetty control room would be of blast-resistant design to maintain operating integrity after a blast event and that requirements for any blast walls, hardened structures, and blast resistant design needs around the facility would be developed during final design. Therefore, we recommend in section 4.13.5 that CP2 LNG provide additional information on final design for any blast walls, hardened structures, and blast resistant design, including a supporting hazard analysis and building risk assessment studies, in order to prevent cascading damage.

If the Project is authorized, constructed, and operated, CP2 LNG would install structural cryogenic and fire protection according to its design, and we recommend in section 4.13.5 that Project facilities be subject to periodic inspections during construction to verify structural cryogenic and fire protection is properly installed in the field as designed prior to introduction of hazardous fluids. In addition, we recommend in section 4.13.5 that Project facilities be subject to regular inspections throughout the life of the facility to continue to verify that passive protection is being properly maintained.

Firewater Systems

CP2 LNG would also provide firewater systems, including fixed and manually operated firewater monitors, sprinkler systems, fixed water spray systems, and firewater hydrants and hoses for use during an emergency to cool the surface of storage vessels, piping, and equipment exposed to heat from a fire. These firewater systems would be designed to meet NFPA 59A (2001), 13, 14, 15, 20, 22, 24, and 25 requirements. However, it is not clear whether the operational maintenance and testing procedures for these and all other fire protection components would adhere to the practices in the relevant NFPA standards. Therefore, we recommend in section 4.13.5 that the operational maintenance and testing procedures for fire protection components should be in accordance with current versions of the applicable standards listed in NPFA 59A (2019) or approved equivalents. The firewater facilities would be installed as two dedicated and independent firewater systems, one at the Terminal Site and one at the Marine Facilities, to supply firewater to a user from multiple flow paths. Post indicator and sectional valves would be installed to isolate portions of the firewater loops out of service for maintenance. NFPA 24 (2013, 2016, 2019, 2022) section 6.6 requires sectional valves be provided on looped systems at locations within piping sections such that the number of fire protection connections between sectional valves does not exceed six. CP2 LNG indicated that no more than 5 sectional valves would be lost when one section of fire water piping is removed from service. FERC staff evaluated the adequacy of the firewater loops and found sufficient placement of post indicator and sectional valves on the firewater systems. We recommend in section 4.13.5 that CP2 LNG provide final design plan drawings of both firewater loop systems which show the location of post indicator valves and sectional valves are in accordance with NFPA 24 (2013 or thereafter). CP2 LNG indicated that the water density considerations for demand cases and justification for firewater zones would be provided in detailed engineering. FERC staff evaluated the water spray and deluge systems and found that firewater calculations did not define design cases and basis of sizing. CP2 LNG indicated that the firewater demand table would be updated during final design to reflect final equipment data. Therefore, we recommend in section 4.13.5 that CP2 LNG file additional drawings and calculations showing details of the firewater system that demonstrate they are capable of absorbing all heat transfer from pool and jet fires.

CP2 LNG indicated that it would also provide high expansion foam trailers for each LNG and refrigerant spill impoundment basin to assist cellular foam systems that would be installed in those impoundments for further reducing vaporization rates from LNG and refrigerant pools, as needed. FERC staff evaluated the adequacy of the general firewater system coverage and verified the appropriateness of the associated preliminary firewater demands of those systems and worst-case fire scenarios to size the firewater systems. CP2 LNG provided firewater coverage drawings for the firewater monitors, fire hydrants, and deluge systems. However, where firewater monitor coverage circles intersect pipe racks, large vessels or process equipment, the firewater coverage could be blocked, and the coverage circles should be modified to account for obstructions during the final design. CP2 LNG also indicated that the automatic sprinkler system design for buildings housing diesel engines would be developed during detailed engineering. Therefore, we recommend in section 4.13.5 that CP2 LNG file drawings of the sprinkler system design which show coverage per NFPA 850 and in select closed roofed buildings around the site per NFPA 13. Additionally, we recommend in section 4.13.5 that CP2 LNG file additional information on the final design of these systems, for review and approval, where details are yet to be determined (e.g., manufacturer and model, nozzle types, etc.) and where the final design could change as a result of these details or other changes in the final design of the Project. Many hydrants and monitors would be installed along the internal facility roads. CP2 LNG stated they would install bollards and guards for hydrants and monitors installed in close proximity to the roadways. We recommend in section 4.13.5 that CP2 LNG file additional information detailing the internal road vehicle protections not only for hydrants and monitors, but for firewater post indicator valves per NFPA 24 section 6.3 and other plant equipment as well.

FERC staff also assessed whether the reliability of the firewater pumps, firewater source, and onsite storage volume would be appropriate. CP2 LNG would provide a primary and backup firewater pump with different drivers per NFPA 20 for the firewater system areas that would draw firewater from the firewater tank for the Terminal Site. For the Marine Facilities, CP2 LNG would provide a primary pump and backup firewater pump that would draw firewater from the Calcasieu River, each driven by its own dedicated diesel engine. The firewater tank volumes would be sufficient to supply the maximum fire water demand case. The makeup supply for the firewater tank would come from the fresh water tank, using water that originated from wells. CP2 LNG also states that the firewater tank would meet NFPA 22 and API Standard 650. We recommend in section 4.13.5 that CP2 LNG demonstrate that design of the firewater tank is in accordance with NFPA 22 or approved equivalent. In addition, the jockey pumps at the Marine Facilities would use water from the fresh water tank to maintain pressure in the system.

FERC staff reviewed that the firewater flow test meters would be equipped with a transmitter and that a pressure transmitter is installed upstream of the flow transmitter, which would both be connected to the DCS and recorded to keep a history of flow test data. In addition, we recommend in section 4.13.5 that the largest firewater pump or component be able to be removed for maintenance from the firewater pump shelter.

If the Project is authorized, constructed, and operated, CP2 LNG would install the firewater and foam systems as designed, and we recommend in section 4.13.5 that Project facilities be subject to periodic inspections during construction and that companies provide results of commissioning tests to verify the firewater and foam systems are installed and functional as designed prior to introduction of hazardous fluids. In addition, we recommend in section 4.13.5 that Project facilities be subject to regular inspections throughout the life of the facility to ensure firewater and foam systems are being properly maintained and tested.

Geotechnical and Structural Design

CP2 LNG provided geotechnical and structural design information for its facilities to demonstrate the site preparation and foundation designs would be appropriate for the underlying soil characteristics and to ensure the structural design of the Project facilities would be in accordance with federal regulations, standards, and recommended and generally accepted good engineering practices. The application focuses on the resilience of the Project facilities against natural hazards, including extreme geological, meteorological, and hydrological events, such as earthquakes, tsunamis, seiches, hurricanes, tornadoes, floods, rain, ice, snow, regional subsidence, sea level rise, landslides, wildfires, volcanic activities, and geomagnetism.

Geotechnical Evaluation

FERC regulations under 18 CFR § 380.12 (h) (3) require geotechnical investigations to be provided. In addition, FERC regulations under 18 CFR § 380.12 (o) (14) require an Applicant to demonstrate compliance with regulations under 49 CFR 193 and NFPA 59A (2001). All facilities, once constructed, must comply with the requirements of 49 CFR 193 and would be subject to PHMSA's inspection and enforcement programs. PHMSA regulations incorporate by reference NFPA 59A (2001). NFPA 59A (2001) section 2.1.4 requires soil and general investigations of the site to determine the design basis for the facility. However, no additional requirements are set forth in 49 CFR 193 or NFPA 59A on minimum requirements for evaluating existing soil site conditions or evaluating the adequacy of the foundations. Therefore, FERC staff evaluated the existing site conditions, geotechnical report, and proposed foundations to ensure they are adequate for the LNG facilities as described below.

The Project would be located northeast to the existing Calcasieu Pass LNG 1 (CPLNG 1) Terminal in south Cameron Parish, Louisiana on the Calcasieu Ship Channel at the mouth of the Gulf of Mexico. CP2 LNG contracted Fugro to conduct the geotechnical investigation and report to evaluate the existing soil site conditions and proposed foundation design for the proposed Project site.

Fugro reviewed geotechnical information for the existing CPLNG 1 terminal and complete field exploration activities at the proposed project site. The field exploration activities included drilling 28 geotechnical soil borings, performing approximately 45 cone penetration tests (CPTs) soundings and 9 seismic cone penetration tests (SCPTs). The site was divided into four areas: LNG storage tanks area, train and process area, power generation area, and dock area. At the LNG storage tanks area, the field exploration included: 1 soil boring at the center of each tank; 2 CPTs, 1 soil boring, and 1 SCPT at each quarter point of each tank's perimeter (for a total of 8 borings, 8 CPTs, and 4 SCPTs for each LNG storage tank); and 2 borings and 3 CPTs in the remaining LNG storage tank area. At train and process area, the field exploration included: 9 soil borings, 20 CPTs, and 4 SCPTs. At power generation unit area, the field exploration included: 5 borings and 10 CPTs. At dock area, the field exploration included: 4 borings, 3 CPTs, and 1 SCPT. The borings are typically drilled to a depth ranging from 100 feet to 250 feet below existing grade. Soil samples were taken at 2-foot intervals to a depth of approximately 16 feet below existing grade and at about 5-foot intervals to a depth of 100 feet and at 10-foot intervals thereafter to the completion depth of the borings. Fugro stated that the CPT and SCPT soundings for this project were conducted using their CPT track rig. They obtained CPT/SCPT data by pushing a series of cylindrical rods, with an instrumented probe at the base, into the soil at a constant rate. The probe consists of a piezocone tip element and a side-friction sleeve element. Fugro indicated that the initial plans were to perform 49 CPTs, however, 4 CPTs were deleted from the scope of work. Those deleted 4 CPTs were on the route from LNG storage tank area to dock area.

The regional and site geology information is based on review of the geotechnical information for the existing CPLNG 1 terminal, the geologic map, and the available geotechnical information that includes boring logs, CPT sounding logs, SCPT sounding logs, in situ test results, geophysical test results, and laboratory test data. The proposed project site is in the West Gulf Coastal Plain Physiographic section of the Coastal Plain Physiographic province. The Gulf of Mexico is characterized by relatively flat terrain that slopes gently towards the Gulf of Mexico and is dissected by highly sinuous streams. It's formed from Pleistocene and Holocene fluvial, tidal, and deltaic sediments. The sediments in the project area are Holocene Coastal Marshes deposits that consist chiefly of mud and organic matter. These deposits are thousands of feet thick and are underlain by Tertiary bedrock. The project site was created by deposition as the Mississippi River delta meandered across the landscape, depositing deltaic sediments (Owen, 2008) [182].

CP2 LNG also contracted Fugro to conduct a fault study to assess whether there is evidence of Quaternary tectonic or growth faults within 5 miles of the site and whether there has been historical seismicity that can be reasonably associated with the identified faults. Fugro performed a desktop level geologic fault study "*Phase I Geologic Fault Study*" to assess the possibility of geologic faulting that could impact the project site and to develop recommendations for further study as appropriate. Fugro stated the Phase I geologic fault study was performed in accordance with the guidelines originally published in the Houston Geological Society Bulleting in March 1985, Ratcliff, et al. (1985)[183] and more recently confirmed

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[182] Owen, D.E., 2008, Geology of the Chenier Plain of Cameron Parish, southwestern Louisiana, in Moore, G., ed.: Geological Society of America Field Guide 14, 2008 Joint Annual Meeting, Houston, Texas, 5–9 October 2008, p. 27–38.

[183] Ratcliff, L. J., Elsbury, B. R., Norman, C. E., Valentine, R.M., and Van Siclen, D.C. (1985), "Recommended Standards of Practice for Investigating Geologic Faults in the Texas Gulf Coast Region," Houston Geological Society Bulletin, V. 27, No. 7, March, p10.

and updated by Elsbury (2002)[184], and by Elsbury and Ringholz (2004)[185]. The study included following tasks: reviewing the results of the fault studies conducted for the initial Calcasieu Pass LNG Terminal 1 project, reviewing publicly available geologic literature, reviewing topographic maps for geomorphic features that may be associated with surface fault activity, interpreting aerial photographs of the area from multiple flight years to look for photo lineaments and tonal anomalies that might be associated with surface faults, reviewing Light Detection and Ranging imagery for lineaments associated with surface faults, reviewing maps of subsurface geologic structure prepared by Geomap Company (Geomap) for the presence of faults at depth that could project to the surface at the site, conducting visual observations to look for physical evidence of distress in pavements and structures caused by surface faults, and evaluating the data to assess the risk of a geologic surface fault impacting the site.

Fugro stated the fill height is generally limited to about 1 to 1.5 feet across the site. A fill height of about 3 feet may be required in the northeastern portion of the process area. The LNG storage tank area is relatively level, and the existing elevation ranges from elevation (El.) 0 feet to El. +8.0 feet. The southern portion of this area is currently used as a construction laydown yard. The northern portion of this area has vegetation in the form of shrubs. The train and process area has an existing elevation that ranges from El. 0 feet to El. +6 feet with thick vegetation consisting of small trees and shrubs. The proposed final grade would be El.+3 feet for LNG storage tank area and the train and process area. The existing elevation ranges from El. +2 feet to El. +8 feet at the power generation area that would be located south of an existing levee. The ground is very soft and standing water was encountered with mangrove type vegetation. The proposed final grade for the power generation area would be El. +5 feet. At the dock area, the existing elevation ranges from El. 0 feet to El. +11 feet. This area is west of Calcasieu ship channel and is relatively flat towards the center of the island with steep drop in elevations near the shoreline. For the dock area, the final dredged depth would be EL. -44.3 feet with 2 feet of over-dredge and no final grade was provided for the land area. Fugro stated the project site would be surrounded by perimeter barrier walls. The two storm surge floodwalls along the north and south would be designed as vertical sheetpile walls with battered steel pipe piles providing lateral support. The north storm surge floodwall would enclose the tank area, and the train and process area of the facility and the south storm surge floodwall would enclose the power generation area to protect the facilities from storm surge hazard as discussed in more detail in the flood storm surge barrier section.

Fugro indicated that the groundwater was initially observed in borings during drilling activities at approximate depths of 0 feet to 8 feet below the existing grade. After a period of about 15 minutes, the water level was observed at the depths of about 1.5 to 7.3 feet below existing grade. Fugro stated that the short-term depth-to-water observations recorded in the open boring should not be considered to represent a long-term condition. The time associate with short-term observations may not be sufficient for conditions in the open borings to reach equilibrium. More accurate determinations of groundwater levels are usually made using long-term standpipe piezometer readings. Groundwater levels will fluctuate with seasonal variations in rainfall and surface runoff, especially during extended periods of wet or dry weather. Per the geotechnical soil boring logs on the LNG storage tank area, groundwater would be present at the existing ground surface. The site grade in this area would be raised and positive drainage would be established to prevent issues originating from the existing surface water.

Fugro stated the CP2 LNG site is categorized as Seismic Site Class E per ASCE/Structural Engineering Institute (SEI) 7 (2005) based on the results of soil strata and shear wave velocities

184 Elsbury, B. R. (2002), "Recommended Standards of Practice for Fault Studies in the Houston Area, Texas," Proceedings, CIGMAT - 2002, Construction and Rehabilitation Activities Related to Houston & Other Major Cities, C. Vipulanandan and J. Liu, ed., pp. I-29 to I-31.

185 Elsbury, B. R. and Ringholz, R. P. (2004), "Standards for Fault Detection Studies," lecture at GSA/AEG Growth Fault Symposium, College Station, TX, March 18.

measurements from SCPTs by measuring the travel time of a shear wave generated by a source (metal block) located at the ground surface. The velocities were measured by geophones built into the seismic cone. The subsurface condition in the upper 200 feet at the site primarily consists of near-surface loose to medium dense silty and clayey sands and sand underlain by soft to very stiff clays interlayered with stiff to very stiff silts and sandy silts with V_{S30} values on the order of 500 fps. Susceptibility of steel foundation elements exposed to soil and groundwater is increased by a lower soil/water pH, by lower soil electrical resistivity, and by higher chloride levels. Sulfate content of soil and water is primarily an indicator of corrosion potential concerns for reinforced concrete foundation elements. Elevated sulfate levels increase the risk and potential severity of sulfate attack on buried concrete. Concrete buried at the site would generally be exposed to mild to moderate sulfate attack risk and severity. Erosion is a particularly concerning issue at the marine facility, where wave dynamics and prop washing would create more erosive energy than the rest of the site would experience. In areas susceptible to prop wash, erodibility of clay slopes should be evaluated.

Fugro laboratory corrosion tests point out that there is a very high potential for corrosion of buried steel based on electrical resistivity results (i.e., the electrical resistivity of the site soil is low, the chloride content in the site soil and groundwater is high, and pH is mild), and a mild to moderate deterioration of concrete based on sulfate ion concentrations. Steel and concrete elements in contact with soil, whether part of a foundation or part of the supported structure, are subject to degradation due to corrosion or chemical attack. Fugro concluded that the buried steel and concrete elements should be designed to resist corrosion and degradation based on accepted practices. In the proposed basis of foundation design, CP2 LNG states the groundwater level shall be assumed at the final finished grade, and the corrosion protection measures, such cathodic protection or protective coating, shall be considered for all metal objects directly buried in the site soil. Therefore, to address the potential corrosion/erosion, we recommend in section 4.13.5 that prior to initial site preparation, CP2 LNG should file with the Secretary the following information, stamped and sealed by the professional engineer-of-record, registered in the State of Louisiana: a) the corrosion control and prevention plan for any underground piping, structure, foundations, equipment, and components; b) the erosion control and prevention plan for the dock area; c) the finalized foundation design criteria for the project; and the associated quality assurance and quality control procedures for the project.

Fugro performed settlement and slope stability analyses for the project site. Depending on the variation in the existing site grade, the site grade would be balanced with cut or fill depending upon the final grade in each area. Fugro indicated that an adequate drainage plan should be provided to reduce the potential to saturate the subgrade soils as most subgrade problems are attributable to poor site drainage. Fugro recommended structural clay fill, lime-stabilized clay, structural sand and crushed stone fill for the project site. Fugro also recommended that detailed performance specifications be developed for the selected ground improvement technique during final design. Settlements will occur over a long period of time and will vary across the areas with elevated grade. Fugro analyzed settlements for tanks area, trains and process area, and power generation area, including short-term and long-term settlements. Fugro indicted the soil design parameters for the settlement analyses were determined based on the results of laboratory consolidation tests, soil index parameters, and previous studies near the site. Fugro stated both shallow and deep foundation should not be used for structures that would be connected, have connecting piping, have any other types of connections, or for the same structure. The differential settlement may be greater if there are variances in subsurface conditions, loading conditions, and construction procedures.

Subsidence is the sudden sinking or gradual downward settling of land with little or no horizontal motion, caused by movements on surface faults or by subsurface mining or pumping of oil, natural gas, or ground water. Because subsidence is a recognized concern in the project area, CP2 LNG would install the full containment LNG storage tanks and all major facilities on deep piled foundations to mitigate potential subsidence.

FERC staff evaluated the geotechnical investigation to ensure the adequacy in the number, coverage, and types of the geotechnical borings, CPTs, seismic CPTs, and other tests for major facilities, including the marine facilities, liquefaction area, pretreatment area, flare system, buildings, power generation, LNG storage tanks, and storm surge protection barrier wall at the site. We do not agree with the deletion of the CPTs on the route from LNG storage tank area to dock area as indicated in the above field exploration section. An adequate geotechnical investigation should be conducted to determine and confirm the subsurface condition of this area and prevent design changes necessitated by unfamiliar site conditions. We also recognize that ACI 376 (2011) specifies the minimum number of boreholes or CPTs should be performed for LNG storge tank foundations that are not supported directly on rock. Fugro's supplemental Geotechnical Study report did not meet the minimum number of boreholes or CPTs for the current LNG storage tank foundation area as specified in ACI 376 (2011).

Furthermore, CP2 LNG filed an updated plan that indicated the LNG storage tanks have been relocated. CP2 LNG has requested permits to conduct an updated geotechnical investigation for the revised LNG storage tank arrangement.

Therefore, we recommend in section 4.13.5 that prior to initial site preparation, CP2 LNG should file with the Secretary, for review and approval, the finalized geotechnical investigation report that includes the performance of boreholes and CPT soundings on the route from LNG storage tank area to dock area; the performance of the boreholes and CPT soundings for each LNG storage tank foundation area in accordance with the provisions of ACI 376 (2011 edition) or approved equivalent; and details on the number, location, and depth of boreholes and CPT soundings.

The results of CP2 LNG's geotechnical investigation at the Project site indicate that subsurface conditions are generally suitable for the proposed facilities, if proposed site preparation, foundation design, and construction methods are implemented appropriately in addition to the satisfaction of proposed recommendations. As recommended above, a final geotechnical investigation would confirm that the subsurface conditions for the soil modification and foundation designs in the LNG storage tank area, and the route from LNG storage tank area to dock area. If authorized and constructed, FERC staff would continue its review of the results of the geotechnical investigation to ensure facility foundation designs are appropriate prior to construction of final design and throughout the life of the facilities.

Structural and Natural Hazard Evaluation

FERC regulations under 18 CFR § 380.12 (m) requires applicants address the potential hazard to the public from failure of facility components resulting from accidents or natural catastrophes, evaluate how these events would affect reliability, and describe what design features and procedures that would be used to reduce potential hazards. In addition, 18 CFR § 380.12 (o) (14) require an applicant to demonstrate how they would comply with 49 CFR 193 and NFPA 59A.[186] PHMSA's minimum federal requirements in 49 CFR 193 have specific requirements on designs to withstand certain loads from natural hazards and incorporate by reference ASCE/SEI 7 (2005) for applicable wind load data for shop fabricated containers of LNG or other hazardous fluids with a capacity of not more than 70,000 gallons, incorporates by reference ASCE/SEI 7 (2002) via NFPA 59A (2006) for seismic design of field fabricated LNG storage tanks, ASCE/SEI 7 (unspecified edition) via API 620 (2008/11[th] and addendums) for seismic design of all other LNG storage tanks, and ASCE 7 (1993) via NFPA 59A (2001) for siting, design, construction, design, fabrication, and installation of all other LNG facilities and equipment. State and local codes incorporate

[186] FERC regulations do not specify what edition of NFPA 59A an applicant should demonstrate compliance with. In most applications, applicants have interpreted this as the edition(s) incorporated into DOT PHMSA regulations, which for this case would be the 2001 and 2006 editions at the time of application. Others have interpreted this as the NFPA 59A edition published at the time of application or another edition they intend on incorporating in addition to those incorporated into DOT PHMSA regulations.

ASCE/SEI 7 via the International Building Code (IBC) (2021 and earlier editions).[187] Louisiana incorporates ASCE/SEI 7 (2010) via its statewide adoption of IBC (2015).[188] Louisiana also incorporates ASCE/SEI 24 (2014) via IBC (2015) for design and construction of buildings and structures located in flood hazard areas. NFPA 59A (2001) section 2.1.1 (c) also requires CP2 LNG to consider the plant site location in the design of the Project, with respect to the proposed facilities being protected, within the limits of practicality, against natural hazards, such as from the effects of flooding, storm surge, and seismic activities. PHMSA's LOD on 49 CFR 193 Subpart B discusses CP2 LNG's proposed wind speed design and studies of site-specific natural hazards. We also recognize that NFPA 59A (2023 and earlier editions) contain equivalency clauses that may allow for different editions or standards to be allowed as equivalents. If authorized, constructed, and operated, LNG facilities as defined in 49 CFR 193 must comply with the requirements of 49 CFR 193 and would be subject to PHMSA's inspection and enforcement programs.

The Marine Facilities would be subject to 33 CFR 127, which requires that the piers and wharves are designed to resist earthquake forces, if the waterfront facility handling LNG is in a region subject to earthquakes. In addition, Coast Guard regulations under 33 CFR 127 incorporate by reference certain portions of NFPA 59A (2019), including Chapter 10 and Chapter 12 that contain provisions for design against natural hazards. NFPA 59A (2019) Chapter 10 requires piping be designed to withstand certain seismic events under limited parameters and Chapter 12 requires design seismic activity, including tsunami and wind, ice, flooding, including hurricane storm surge, and snow in accordance with ASCE/SEI 7 (2016) Risk Category III.

Furthermore, we evaluated the basis of design for project facilities for all natural hazards under FERC jurisdiction, including those under DOT PHMSA and Coast Guard jurisdiction. CP2 LNG states that the facilities would be constructed to satisfy the FERC and NFPA 59A requirements in accordance with IBC (2009), ASCE/SEI 7 (2005), and ASCE/SEI 7 (2010). In addition, CP2 LNG has committed to meeting NFPA 59A (2019) as incorporated by 33 CFR 127 if needed. These regulations and standards require various structural loads to be applied to the design of the facilities, including live (i.e., dynamic) loads, dead (i.e., static) loads, and environmental loads. FERC staff also evaluated whether the engineering design would withstand impacts from natural hazards, such as earthquakes, tsunamis, seiches, hurricanes, tornadoes, floods, rain, ice, snow, regional subsidence, sea level rise, landslides, wildfires, volcanic activity, and geomagnetism. We recommend in section 4.13.5 that prior to construction of final design, CP2 LNG should file with the Secretary the final design package (e.g., finalized civil design basis, criteria, specifications, structures and foundations drawings, and calculations, etc.) and associated quality assurance and quality control procedures with the documents reviewed, approved, stamped and sealed by the professional engineer-of-record, registered in the State of Louisiana.

CP2 LNG states that the deep pile foundation system would be used for full containment LNG storage tanks and all equipment, structures and piperack foundations except for lightly loaded minor foundations not sensitive to settlement. Lightly loaded structures or equipment insensitive to settlement may be supported on grade supported slab foundations. The soil under the grade supported slab foundation would be improved and would be proof rolled by proper construction equipment. CP2 LNG states the driven piles selected for this proposed project would be prestressed concrete piles and open ended steel piles. The Cast-in-place concrete piles for this project could be either displacement cast-in-pace piles or auger cast-in-place piles. CP2 LNG also states that the pile capacities would be subject to verification by future pile load tests. The pile load testing would be performed in accordance with ASTM D1143 for axial compression, ASTM D3689 for axial tension, and ASTM D3966 for lateral loading, or approved

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187 ICC, ICC Code Adoptions by state, I-Code, or Country, https://www.iccsafe.org/adoptions/code-adoption-map/IBC, Accessed July 2023.

188 ICC, International Codes-Adoption by State (January 2023), iccsafe.org/wp-content/uploads/Master-I-Code-Adoption-Chart-Jan-2023.pdf, Accessed July 2023.

equivalents. FERC staff would review the final foundation design for the Project. Therefore, **we recommend in section 4.13.5 that prior to initial site preparation, CP2 LNG should file with the Secretary for review and approval of the finalized pile load test program (e.g., pile load test procedure, locations, configuration, quality assurance, and quality control, etc.), which should comply with ASTM D1143, ASTM 3689, ASTM 3966, or approved equivalent. The filing should be stamped and sealed by the professional engineer-of-record, registered in the State of Louisiana.**

If a Project is authorized, and constructed, and operated, the company would install equipment in accordance with its final design. **We recommend in section 4.13.5 that prior to commissioning, CP2 LNG should file with the Secretary, for review and approval, settlement results during hydrostatic tests of the LNG storage containers and periodically thereafter to verify settlement is as expected and does not exceed the applicable criteria set forth in API 620 (12th edition), API 625 (1st edition), API 650 (13th edition), API 653 (5th edition), and ACI 376 (2011 edition) or approved equivalents. The program should also specify what actions would be taken after various levels of seismic events.**

Earthquakes, Tsunamis, and Seiche

FERC regulations under 18 CFR § 380.12 (h) (5) requires evaluation of earthquake hazards based on whether there is potential seismicity, surface faulting, or liquefaction. Earthquakes and tsunamis have the potential to cause damage from shaking ground motion and fault ruptures. Earthquakes and tsunamis often result from sudden slips along fractures in the earth's crust (i.e., faults) and the resultant ground motions caused by those movements but can also be a result of volcanic activity or other causes of vibration in the earth's crust. The damage that could occur as a result of ground motions is affected by the type/direction and severity of the fault activity and the distance and type of soils the seismic waves must travel from the hypocenter (or point below the epicenter where seismic activity occurs). To assess the potential impact from earthquakes and tsunamis, CP2 LNG evaluated historic earthquakes along fault locations and their resultant ground motions.

The USGS maintains a database containing information on surface and subsurface faults and folds in the U.S. that are believed to be sources of earthquakes of greater than 6.0 magnitude occurring during the past 1.6 million years (Quaternary Period).[189] The CP2 LNG Project is located on the northern margin of the Gulf of Mexico in the central Gulf of the Coastal Plain Physiographic Province (Peel et al. 1995)[190]. This province is characterized by extension in the Oligocene that was absorbed within a preexisting giant salt canopy overlying the basement rock. The faults in the basement rock are steeply dipping normal faults that formed during continental margin rifting during the Triassic. The top of basement is approximately 3 to 9 miles (5 to 14 km) below the ground/sea floor surface (Angell and Hitchcock, 2007)[191]. Within this province faults on the shelf margin in the overlying Mesozoic and Cenozoic sedimentary rocks are syndepositional growth faults which sole into a detachment at or within the underlying salt or shale. The Terminal Site is located near the boundary between the Oligocene–Miocene detachment and salt dome tectono-stratigraphic provinces that cover most of the modern slope offshore and parts of coastal onshore Texas and Louisiana (Diegel et al., 1995)[192]. The Oligocene–Miocene detachment province is characterized by large-displacement, dominantly down-to-the-basin listric growth faults that sole on a regional

[189] USGS. Earthquake Hazards Program. Quaternary Fault and Fold Database of the United States. Available at: https://www.usgs.gov/natural-hazards/earthquake-hazards/faults.

[190] Peel, F. J., C. J. Travis, and J. R. Hossack, 1995, Genetic structural provinces and salt tectonics of the Cenozoic offshore U.S. Gulf of Mexico.

[191] M. Angell and C. Hitchcock, William Lettis & Assocs, 2007, A Geohazard Perspective of Recent Seismic Activity in the Northern Gulf of Mexico.

[192] Diegel, F. A., J. F. Karlo, D. C. Schuster, R. C. Shoup, and P. R. Tauvers, 1995, Cenozoic structural evolution and tectono stratigraphic framework of the northern Gulf Coast continental margin, in M. P. A. Jackson, D. G. Roberts, and S. Snelson, eds., Salt tectonics: A global perspective: American Association of Petroleum Geologists Memoir 65, p. 109-151

detachment above the Paleogene sedimentary rocks. Downslope (basinward) gravitational spreading and gliding of cover sediments on the weak salt and shale detachments produces significant faulting above the detachments. The up-dip limit of the detachments is irregular (Diegel et al., 1995). Several growth faults that underlie southern Louisiana have been reactivated and displace the late Pleistocene and or Holocene deposits at the ground surface (Heinrich, 2005; McCulloh and Heinrich, 2012; Gagliano et al., 2003; Gagliano, 2005)[193,194,195].

To address the potential ground motions at the site, PHMSA regulations in 49 CFR § 193.2101 under Subpart C require that field-fabricated LNG tanks comply with section 7.2.2 of NFPA 59A (2006) for seismic design. NFPA 59A (2006) requires LNG storage tanks be designed to continue safely operating with earthquake ground motions at the ground surface at the site that have a 10 percent probability of being exceeded in 50 years (475-year mean return interval), termed the operating basis earthquake (OBE). In addition, section 7.2.2 of NFPA 59A (2006) requires that LNG tanks and its impounding system be designed to have the ability to safely shutdown when subjected to earthquake ground motions which have a 2 percent probability of being exceeded in 50 years (2,475-year mean return interval), termed the safe shutdown earthquake (SSE). PHMSA regulations in 49 CFR § 193.2101 under Subpart C also incorporate by reference NFPA 59A (2001) Chapter 6, which requires piping systems conveying flammable liquids and flammable gases with service temperatures below −20°F, be designed as required for seismic ground motions. If authorized, constructed, and operated, LNG facilities, as defined in 49 CFR 193, would be subject to the PHMSA's inspection and enforcement programs.

In addition, FERC staff recognizes CP2 LNG would also need to address hazardous fluid piping with service temperatures at −20°F and higher and equipment other than piping, and LNG storage containers. We also recognize the current FERC regulations under 18 CFR § 380.12 (h) (5) continue to incorporate National Bureau of Standards Information Report 84-2833. National Bureau of Standards Information Report 84-2833 provides guidance on classifying stationary storage containers and related safety equipment as Category I and classifying the remainder of the LNG project structures, systems, and components as either Category II or Category III, but does not provide specific guidance for the seismic design requirements for them. Absent any other regulatory requirements, we recommend that other LNG project structures classified as Seismic Category II or Category III be seismically designed to satisfy the design earthquake and seismic requirements of the ASCE/SEI 7 (2005) or approved equivalent in order to demonstrate there is not a significant impact on the safety of the public. ASCE/SEI 7 (2005) or approved equivalent is recommended as it is a complete American National Standards Institute consensus design standard, its seismic requirements are based directly on the National Earthquake Hazards Reduction Program Recommended Provisions, and it is referenced directly by the IBC. Having a link directly to the IBC and ASCE/SEI 7 is important to accommodate seals by the engineer of record because the IBC is directly linked to state professional licensing laws while the National Earthquake Hazards Reduction Program Recommended Provisions are not.

Fugro's investigations indicated that the site is classified as Site Class E[196] in accordance with ASCE/SEI 7 (2005), which is in accordance with IBC (2009) based on a site time-averaged shear wave

193 Gagliano, S.; Kemp, E.; Wicker, K., and Wiltenmuth, K., 2003, Active Geological Faults and Land Change in Southeastern Louisiana, Gulf Coast Association of Geological Societies Transactions, no. 53, 178 p.

194 Gagliano, S., 2005, Testimony: Effects of Geological Faults on Levee Failures in South Louisiana. Prepared for Presentation and Discussion U.S. Senate Committee on Environment and Public Works, Presented by Coastal Environments, Inc., November 17, 2005, 26 p.

195 McCulloh, R.P., and Heinrich, P.V., 2012, Surface faults of the south Louisiana growth-fault province, Geological Society of America Special Papers, no. 493, p. 37-49.

196 There are six different site classes in ASCE/SEI 7 (2005), A through F, that are representative of different soil conditions that impact the ground motions and potential hazard ranging from Hard Rock (Site Class A), Rock (Site Class B), Very dense soil

velocity (Vs) in approximately the upper 100 feet that ranged between 200 and 875 fps in the upper 100 feet of strata at LNG storage tank area, between 200 fps and 790 fps in the upper 100 feet of strata at train and process area, and between 240 fps and 825 fps in the upper 100 feet of strata at dock area. The subsurface conditions in the upper 200 feet at the site primarily consist of near-surface loose to medium dense silty and clayey sands and sand underlain by soft to very stiff clays interlayered with stiff to very stiff silts and sandy silts with Vs_{30} values on the order of 500 fps. Sites with soil conditions of this type could experience significant amplifications of surface earthquake ground motions. However, due to the absence of a major fault in proximity to the site and lower ground motions, the seismic risk to the site is considered low.

Fugro also performed a *FEED Level Seismic Hazard Study* for the project site. In a Seismic Hazard Assessment report, Fugro stated that the seismic design parameters were developed using the site-specific Probabilistic Seismic Hazard Analysis and site response analysis procedures outlined in Chapter 21 of ASCE/SEI 7 (2005). The project site would have a horizontal OBE spectral PGA of 0.0297 g, a horizontal SSE PGA of 0.0862 g; a short-period (0.2-second) spectral response acceleration parameter adjusted for Site Class effect S_{MS}=0.206 g at 5 percent damped, a 1.0-second spectral acceleration parameter adjusted for Site Class effect S_{M1}=0.207 g at 5 percent damped; and the long-period transition period, T_L is 12 second. Fugro indicated that for seismic Category II & III structures, design earthquake spectral response acceleration parameters at short-period (0.2-second), S_{DS} is equal to 0.137 g, and at 1.0-second period, S_{D1} equals 0.138 g. For the Site Class E and seismic design parameters, the Site Coefficient at short period should be F_a=2.5 and Site Coefficient at long period should be F_v=3.5 according to ASCE/SEI 7 (2005) Tables 11.4-1 and 11.4-2. CP2 LNG also stated that the aftershock level earthquake is defined as 50 percent the SSE per NEPA 59A (2013 edition), and the vertical response spectra to horizontal response spectra would be at a minimum of two-third ratio to comply with NFPA 59A (2006) requirement. FERC staff independently evaluated the OBE, SSE, short-period (0.2-second) spectral acceleration parameter, 1.0-second spectral acceleration parameter, and the long-period transition period for the site using the ASCE 7 Hazard Tool[197], USGS Earthquake Hazards Program Seismic Design Maps[198] and Applied Technology Council Hazard[199] tools for all occupancy categories (I through IV). FERC staff believe the SSE PGA, OBE PGA, and 5 percent-damped response spectral acceleration parameters proposed by CP2 LNG are acceptable. These ground motions are relatively low compared to other locations in the U.S. However, we would continue our review of CP2 LNG's final seismic design basis and criteria for the project site.

Based on the severity of the potential impacts, the facility seismic design is assigned Seismic Category I for LNG containers, systems required for isolation of LNG containers, and systems required for safe shutdown or fire protection. Seismic Category II structures include facilities and systems not included in Category I required for safe plant operation, which include LNG liquefaction trains, inlet facilities, pre-treatment area(s), power generation area(s), fuel gas system, interconnecting piping systems, metering systems, LNG pumps, and other items. Seismic Category III includes all other facilities that are not included in Categories I and II, including administration buildings, dock service equipment, waste treatment plant, and incoming electrical power supply.

ASCE/SEI 7 (2005) also requires determination of the Seismic Design Category based on the Occupancy Category (or Risk Category in ASCE/SEI 7 (2010 and 2016) and severity of the earthquake design motion. The Occupancy Category (or Risk Category) is based on the importance of the facility and

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and soft rock (Site Class C), Stiff Soil (Site Class D), Soft Clay Soil (Site Class E), to soils vulnerable to potential failure or collapse, such as liquefiable soils, quick and highly sensitive clays, and collapsible weakly cemented soils (Site Class F).

197 ASCE 7 Hazard Tool: https://asce7hazardtool.online/. Accessed March 2022.

198 USGS. Unified Hazards Tool: https://earthquake.usgs.gov/hazards/interactive/. Accessed March 2022.

199 Applied Technology Council: https://hazards.atcouncil.org/. Accessed March 2022.

the risk it poses to the public.[200] FERC staff has identified the Seismic Design Category D based on ASCE/SEI 7 (2005). ASCE/SEI 7 (2005) Table 11.6-1 and 11.6-2 indicate the Seismic Design Category D for Occupancy Category IV structures with S_{D1}=0.138 g, which is the one governing in this case. This seismic design categorization would be consistent with the IBC (2009) and ASCE/SEI 7 (2005 and 2010).

Seismic events can also result in soil liquefaction in which saturated, non-cohesive soils temporarily lose their strength/cohesion and liquefy (i.e., behave like viscous liquid) as a result of increased pore pressure and reduced effective stress when subjected to dynamic forces such as intense and prolonged ground shaking. Areas susceptible to liquefaction may include saturated soils that are generally sandy or silty. Typically, these soils are located along rivers, streams, lakes, and shorelines or in areas with shallow groundwater. However, due to the low seismicity of the region, the potential for soil liquefaction to occur is low. Fugro performed additional evaluation to assess the potential for liquefaction triggering and liquefaction induced ground settlement at the site during strong earthquake shaking. Liquefaction is a phenomenon by which cohesionless soils experience rapid loss of internal strength during strong ground shaking. Conditions favorable to liquefaction occur in loose to medium dense, clean to moderately silty sand (granular soil) and low plasticity silts located below the groundwater table. Dense sands are less susceptible to liquefaction. Ground settlement, lateral spreading and sand boils may result from liquefaction. Structures supported directly on liquefied soils could suffer foundation settlement or lateral movement that could be severely damaging to the structures. Evaluation of liquefaction potential is dependent on numerous site parameters, including soil grain size, soil density, site geometry, static stresses, and the magnitude and Seismic Ground Motion Level PGA. Liquefaction at the site was evaluated using simplified semi-empirical, CPT-based procedure developed by Boulanger and Idriss (2014) methods[201]. Based on the analysis, Fugro concluded that the site has a low potential for liquefaction for the Maximum Considered Earthquake (MCE), the liquefaction-induced settlements for the MCE) are estimated to range from negligible to approximately four inches, with larger settlements estimated within the northern section of tanks and trains areas where thicker deposits of shallow sandy soils were encountered. Fugro recommends that the range of 4 to 5 inches settlement should be considered for the design level event given the reasonable parameter variations increase settlements in the northern tanks and trains areas. Fugro also performed global slope stability analyses for the dock areas. Fugro states that the dock areas include the installation of a sheet pile bulkhead wall. CP2 LNG has confirmed that these findings would be reevaluated based on the tolerances of the structure and when pile loads and sizes are defined during the detailed design phase. The ultimate design of the bulkhead wall should satisfy requirements for global stability and be able to resist the anticipated lateral forces. The bulkhead wall at dock area would be anchored with a tie-back system. In addition, CP2 LNG would address possible issues relating to the potential for soil liquefaction and loss of soil strength by using deep foundation system design. We would continue our evaluation of CP2 LNG's final design of dock areas' finalized bulkhead wall design and slope stability analyses. Therefore, we recommend in section 4.13.5 that prior to construction of the final design, CP2 LNG should file with the Secretary the finalized site settlement analysis for the project. This analysis should include

[200] ASCE/SEI 7 (2005) defines Occupancy Categories I, II, III, and IV. Occupancy Category I represents facilities with a low hazard to human life in even of failure, such as agricultural facilities; Occupancy Category III represents facilities with a substantial hazard to human life in the event of failure or with a substantial economic impact or disruption of day to day civilian life in the event of failure, such as buildings where more than 300 people aggregate, daycare facilities with facilities greater than 150, schools with capacities greater than 250 for elementary and secondary and greater than 500 for colleges, health care facilities with 50 or more patients, jails and detention facilities, power generating stations, water treatment facilities, telecommunication centers, hazardous facilities that could impact public; Occupancy Category IV represents essential facilities, such as hospitals, fire, rescue, and police stations, emergency shelters, power generating stations and utilities needed in an emergency, aviation control towers, water storage and pump structures for fire suppression, national defense facilities, and hazardous facilities that could substantially impact public; and Occupancy Category II represents all other facilities. ASCE/SEI 7 (2010) changed the term to Risk Categories I, II, III, and IV with some modification.

[201] Ross W. Boulanger, and I. M. Idriss, 2014, CPT-Based Liquefaction Triggering Procedure.

differential settlement, total settlement, subsidence, sea level rise, potential soil liquefaction, etc. The filing should be stamped and sealed by the professional engineer-of-record, registered in the State of Louisiana.

CP2 LNG indicated they would implement a seismic monitoring program at the Project site to monitor seismic activities impacts on the critical structures and facilities. Required seismic monitoring during construction would be elaborated on during the final design stage of the Project. Therefore, we recommend in section 4.13.5 that prior to construction of the final design, CP2 should file with the Secretary the finalized seismic monitoring program for the Project site. The seismic monitoring program should comply with NFPA 59A (2019 edition) sections 8.4.14.10, 8.4.14.12, 8.4.14.12.1, 8.4.14.12.2, and 8.4.14.13; ACI 376 (2011 edition) sections 10.7.5 and 10.8.4; U.S Nuclear Regulatory Commission Regulatory Guide RG 1.12 (Revision 3) sections 1 and 3 through 9 and all subsections, or approved equivalents subject to review and approval. A free-field seismic monitoring device should be included in the seismic monitoring program for the Project site. The proposed seismic monitoring system must include installation location plot plan; description of the triaxial strong motion recorders or other seismic instrumentation; the proposed alarm set points and operating procedures (including emergency operating procedures) for control room operators in response to such alarms/data obtained from seismic instrumentation; and testing and maintenance procedures.

Seismic events in waterbodies can also cause tsunamis or seiches by sudden displacement of the sea floors in the ocean or standing water. Tsunamis and seiche may also be generated from volcanic eruptions or landslides. Tsunami wave action can cause extensive damage to coastal regions and facilities. The Terminal site's low-lying position would make it potentially vulnerable were a tsunami to occur. There is little evidence that the northern Gulf of Mexico is prone to tsunami events, but the occurrence of a tsunami is possible. Two did occur in the Gulf of Mexico in the early 20th century and had wave heights of 3 feet or less (USGS, 2009)[202], which is not significantly higher than the average breaking wave height of 1.5 feet (Owen, 2008). Hydrodynamic modeling conducted off the coast of south Texas in 2004 indicated that the maximum tsunami run-up could be as high as 12 feet above mean sea level. No earthquake generating faults have been identified that are likely to produce tsunamis, despite recorded seismic activity in the area.

The potential for tsunamis associated with submarine landslides is more likely a source in the Gulf of Mexico and remains a focus of government research (USGS, 2009). CP2 LNG contracted Fugro to conduct tsunami hazard analysis for the proposed project site. Fugro stated that they performed a thorough review and analysis of previous tsunami hazard assessment for the United States Gulf Coast of the Gulf of Mexico. Fugro stated that given the low expected magnitudes of tsunami and seiche wave heights in the site area relative to storm surge heights, and the lack of sufficient quantitative data on tsunami in the Gulf Coast region to complete a robust probabilistic assessment, they conducted a qualitative tsunami hazard analysis for the proposed project site. There are four main submarine landslide hazard zones in the Gulf of Mexico including the Northwest Gulf of Mexico, Mississippi Canyon and Fan, the Florida Escarpment, and the Campeche Escarpment (USGS, 2009). Fugro concluded that based on approximate tsunami hazard analyses using the existing historic record and landslide simulation results reviewed, the tsunami hazard in the region containing the site could be low or insignificant. Large submarine landslide within the Gulf of Mexico would pose the greatest tsunami risk to the site. These events are believed to have very long return periods (approximately 10,000 years) with modeled wave heights less than 4 meters (13.12 feet) in the vicinity of the proposed Project site. These tsunami run-up elevations are significantly less than the hurricane design storm surge elevations discussed below, so any tsunami hazard has been considered in the storm surge design.

[202] USGS, 2009, Regional Assessment of Tsunami Potential in the Gulf of Mexico - Report to the National Tsunami Hazard Mitigation Program.

Hurricanes, Tornadoes, and other Meteorological Events

Hurricanes, tornadoes, and other meteorological events have the potential to cause damage or failure of facilities due to high winds and floods, including failures from flying or floating debris. To assess the potential impact from hurricanes, tornadoes, and other meteorological events, CP2 LNG evaluated such events historically. The severity of these events is often determined on the probability that they occur and are sometimes referred to as the average number years that the event is expected to re-occur, or in terms of its mean return/recurrence interval.

Because of its location, the Project site would likely be subject to hurricane force winds during the life of the Project. CP2 LNG states that all LNG facilities would be designed to withstand a sustained wind velocity of not less than 150 mph per 49 CFR § 193.2067. Other structures and equipment wind speed design would comply with ASCE/SEI 7 (2010) requirements. A sustained wind speed of 150 mph is equivalent to a 183 mph 3-second gust wind speed at 33 feet (10 meters) above ground for Exposure C category, using the Durst Curve in ASCE/SEI 7 (2010) or using a 1.23 gust factor recommended for offshore winds at a coastline in World Meteorological Organization, *Guidelines for Converting between Various Wind Averaging Periods in Tropical Cyclone Conditions*. These wind speeds are equivalent to approximately 50,200-year mean return interval or 0.1 percent probability of exceedance in a 50-year period for the site, based on ASCE/SEI 7 (2022) wind speed return period conversions (ASCE 7 Hazard Tool). Per ASCE/SEI 7 (2010), the 183 mph 3-second gust wind speed equates to a strong Category 4 Hurricane using the Saffir-Simpson Hurricane Wind Scale (130-156 mph sustained wind speed). CP2 LNG must meet 49 CFR § 193.2067 under Subpart B for wind load requirements. In accordance with the MOU, the PHMSA evaluated in its LOD whether an applicant's proposed project meets the PHMSA siting requirements under Subpart B. If the project is constructed and becomes operational, the facilities would be subject to the DOT's inspection and enforcement programs. Final determination of whether the facilities are in compliance with the requirements of 49 CFR 193 would be made by the PHMSA staff.

However, as noted in the limitation of ASCE/SEI 7 (2005 and 2010), tornadoes were not considered in developing basic wind speed distributions. This leaves a potential gap in potential impacts from tornados. However, tornado speed and load design have been implemented in ASCE/SEI 7 (2022). The Project site is in the tornado-prone region as indicated in ASCE/SEI 7 (2022). Per ASCE/SEI 7 (2022), the design tornado loads for buildings and other structures, including the Main Wind Force Resisting System and Components and Cladding elements thereof, should be determined using one of the procedures as specified in section 32.1.2 and subject to the applicable limitations of Chapters 26 through 32, excluding Chapter 28 of ASCE/SEI 7 (2022). FERC staff independently evaluated the potential of tornados hazard for the Project site, using ASCE Hazard Tool along with ASCE/SEI 7 (2022). With the maximum effective plan area of 4,000,000 ft^2 and a mean recurrence interval of 10,000 years, the tornado speed corresponds to a 3-second gust speed at 33 feet (10 meters) above the ground would be V_T = 142 mph at the Project location. The proposed project site is more than 48,000,000 ft^2. CP2 LNG proposed a 183 mph 3-second gust wind speed at 33 feet (10 meters) above the ground for all the LNG facilities design, which is above the tornado speed V_T=142 mph at 4,000,000 ft^2 effective plan area per ASCE/SEI 7 (2022) tornado hazard map. Per ASCE/SEI 7 (2022) Chapter 32, linear interpolation of tornado speed between maps using the logarithm of the effective plan area size is permitted. Therefore, FERC staff estimated that the tornado wind speed for effective plan area of 48,000,000 ft^2 corresponds to a 3-second gust wind speed at 33 feet (10 meters) above the ground is approximately equal to V_T=163.5 mph at the proposed project site. CP2 LNG proposed a 183 mph 3-second gust wind speed at 33 feet (10 meters) above the ground for all the LNG facilities design, which is above the estimated tornado speed V_T=163.5 mph at 48,000,000 ft^2 effective plan area. However, the tornado loads design procedure is unlike the wind loads design procedure per ASCE/SEI 7 (2022); the tornado loads of V_T=163.5 mph could turn out greater than the wind load using wind speed of 183 mph. The more stringent load should be used for combinations of loads cases per ASCE/SEI 7 (2022) Chapter 2. Hence, the CP2 LNG's proposed wind speed of 183 mph 3-second gust wind speed at 33 feet (10 meters) above the ground may not be sufficient for the proposed project site per ASCE/SEI 7 (2022). Therefore, we recommend in section 4.13.5 that prior to initial site preparation, CP2 LNG should file with the Secretary the finalized wind design basis for the project facility, which should include the tornado loads determination and consideration for the design loads combinations cases per ASCE/SEI 7 (2022) or approved equivalent. As a result, FERC staff believe the use of a 150 mph sustained wind speed, which is equivalent to a 183 mph 3-second gust wind speed at 33 feet (10 meters) above ground for all the LNG facilities design, is adequate for the LNG storage tanks and other LNG facilities, if both the wind and tornado loads design procedures are followed appropriately as recommended during final design and construction.

The PHMSA regulations in 49 CFR § 193.2067 under Subpart B would require the impounding system for the LNG storage tanks to withstand impact forces from potential penetrations by windborne missiles. ASCE/SEI 7 also recognizes the facility would be in a windborne debris region. Windborne debris has the potential to perforate equipment and the LNG storage tanks if not properly designed to withstand such impacts. The potential impact is dependent on the equivalent projectile/missile wind speed, characteristics of projectile/missile, and methodology or model used to determine whether penetration or perforation would occur. Unfortunately, no criteria are provided in 49 CFR 193 or ASCE/SEI 7 for these specific parameters. NFPA 59A (2016) recommends Comite Euro-International du Beton 187[203] be used to determine projectile/missile perforation depths. In order to address the potential impact, we recommend in section 4.13.5 that prior to construction of the final design, CP2 LNG should file with the Secretary for review and approval of the finalized projectile/missile impact analysis to demonstrate that the outer concrete container wall of the full containment LNG storage tank could withstand projectile/missile impact. The analysis should detail the projectile/missile speeds and characteristics and methods used to determine penetration resistance and perforation depths. The finalized projectile/missile impact analysis should be stamped and sealed by the professional engineer-of-record, registered in the State of Louisiana. We would continue our evaluation of the final projectile/missile impacts analysis and specified projectile/missile and speeds using established methods, such as Comite Euro-International du Beton 187, DOD[204], DOE[205], and Nuclear Regulatory Commission[206] guidance.

In addition, FERC staff evaluated historical tropical storm, hurricane, and tornado tracks in the vicinity of the project facilities using data from the Department of Homeland Security's Homeland Infrastructure Foundation Level Data and NOAA Historical Hurricane Tracker.[207,208] Between 1856 and October 2020, there were 92 hurricanes and tropical storms made landfall within 60 nautical miles of the Project site, including numerical Unnamed Hurricanes at Hurricane Categories 1, 2, and 3. Three unnamed Hurricanes in 1856/1986/1918, Hurricane Audrey in 1957, Hurricane Carmen in 1974, Hurricane Andrew in 1992, and Hurricane Laura in 2020, which all made Hurricane Category 3 landfall within 60 nautical miles of Cameron Parish, Louisiana. Category 5 Hurricane Rita in 2005 was the most intense tropical cyclone on record in the Gulf of Mexico and the fourth-most intense Atlantic hurricane ever recorded. However, it weakened to a Category 3 Hurricane with winds of 115 mph before making landfall in Johnson's Bayou, Louisiana, which is about 20 nautical miles from proposed Project site area. However, it produced significant storm surges, with maximum heights greater than 18 feet struck southwestern

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203 Comite Euro-International du Beton Bulletin. Concrete Structures under Impact and Impulsive Loading-Synthesis Report 187 (1988).

204 DOD. Unified Facilities Criteria (UFC) Structures to Resist the Effects of Accidental Explosions (UFC 3-340-02), December 5, 2008.

205 DOE. Natural Phenomena Hazards Design and Evaluation Criteria for Department of Energy Facilities (2002). DOE Standard DOE-STD-1020-2002.

206 NCR. Regulatory Guide 1.76, Design Basis Tornado and Tornado Missiles for Nuclear Power Plants, Revision 1 (2007a). Regulatory Guide 1.221, Design Basis Hurricane and Hurricane Missiles for Nuclear Power Plants (2011).

207 Department of Homeland Security. Homeland Infrastructure Foundation Level Data: https://hifld-geoplatform.opendata.arcgis.com/. Accessed February 2022.

208 NOAA. Historical Hurricane Tracker: https://coast.noaa.gov/hurricanes/. Accessed February 2022.

Louisiana, and coastal parishes experienced extensive damage. Category 5 Hurricane Katrina in 2005 was large and destructive. However, it was weakening to Category 3 strength when it made its second landfall over southeast Louisiana. There is no known historic Category 5 Hurricane, which has made direct landfall within 60 nautical miles of Project site. CP2 LNG climate data report indicated the Lake Charles Region received 24.9 inches of rain in 24 hours for 1,000-year mean recurrence interval and the dominant flood mechanism at the project site is driven by coastal storm surge rather than high precipitation events. CP2 LNG states the project site would be designed with a 183 mph 3-second gust wind speed at 33 feet (10 meters) above ground for Exposure C category, and adequate floodwall elevations to withstand Category 4 Hurricanes and 500 years flood events.

Potential flood levels may also be informed from the FEMA Flood Insurance Rate Maps, which identify Special Flood Hazard Areas (base flood) that have a 1 percent probability of exceedance in 1 year to flood (or a 100-year mean return interval) and moderate flood hazard areas that have a 0.2 percent probability of exceedance in 1 year to flood (or a 500-year mean return interval). The 100-year base flood is also used in structural codes and standards, such as ASCE/SEI 7 (2022 and previous editions) that is incorporated into federal, state, and local requirements directly or indirectly as previously discussed. The 500-year flood event is used as the basis of design in ASCE/SEI 24, *Flood Resistant Design and Construction*, for Class 4 buildings and structures equivalent to Risk Category IV in ASCE/SEI 7. According to the FEMA National Flood Hazard Layer Viewer[209], the Project site would be located in special flood hazard areas Zone AE and VE with base flood elevation BFE at approximately +15 to +17 feet. Zone AE is defined as Areas subject to inundation by the 1-percent-annual-chance flood event as determined by detailed hydraulic analyses and Zone VE is defined as Areas along coasts subject to inundation by the 1-percent-annual-chance flood event with additional hazards due to storm-induced velocity wave action.[210] CP2 LNG states the facility would be designed to withstand at a minimum a 500-year return storm, rain, and associated storm surge event, with overtopping limited to ensure that internal flooding is of no consequence.

The Project site would be enclosed for flood protection by construction of storm surge protection walls (floodwalls). The current CP2 LNG plan layout shows that the entire site footprint would be within the storm surge walls. A 500-year return for resiliency is the design case. The floodwall minimum height will reflect this elevation. CP2 LNG states that the top of El. +31.5 feet NAVD 88 is a post-settlement elevation for the flood wall. The overall top elevation has been designed to account for relative sea level rise, settlement, etc. In addition, the overall structural configuration of the storm surge wall is such that the battered pipe piles, in combination with the sheet piles, provides for resistance to any settlement. The floodwall design would be completed prior to final design. This would incorporate the FEMA National Flood Hazard Layer elevations, and the storm surge exclusion wall design prior to construction.

We generally evaluate the design against a 500-year Stillwater Flood Elevation (SWEL) with a 500-year wave crest and sea level rise and subsidence. A 500 -year flood elevation, including wave height, provides greater resiliency than the 100-year base flood and design flood elevation, including wave height, used in structural codes, such as ASCE/SEI 7, which forms the basis of the International Building Code referenced in most state building codes, and referenced in DOT PHMSA minimum federal regulations for LNG facilities and is consistent with NFPA 59A, 2019 edition, referenced in Coast Guard federal regulations, and most current NFPA 59A, 2023 edition, and most current ASCE/SEI 24 (2014), *Flood Resistant Design and Construction*. A 500-year event would equate to an approximate 138 mph 3-second

[209] FEMA National Flood Hazard Layer Viewer: https://hazards-fema.maps.arcgis.com/apps/webappviewer. Accessed February 2022.

[210] FEMA, National Flood Insurance Program, Flood Insurance Manual, Risk Rating 2.0: Equity in Action Edition, October 2022, https://www.fema.gov/sites/default/files/documents/fema_nfip-flood-insurance-full-manual_102022.pdf, Accessed July 2023.

gust wind speed, equivalent to a strong Category 2 Hurricane. Using the maximum envelope of water (MEOW) storm surge inundation maps generated from the Sea, Lake, and Overland Surge from Hurricanes model developed by NOAA National Hurricane Center, which does not explicitly model the impacts of waves on top of the surge nor does it account for normal river flow or rain flooding, a Category 2 Hurricane would result in greater than 9 feet MEOW at high tide.[211] However, while NOAA seems to provide higher resolution of topographic features, it limits its Sea, Lake and Overland Surges from Hurricanes (SLOSH) maps to storm surge levels at high tide above 9 feet. As a result, FERC staff evaluated the storm surge against other sources using SLOSH maps that indicate a similar upper range of 10-12 feet MEOW for Category 2 Hurricanes, and also indicated 13-16 feet MEOW for Category 3 Hurricanes, 16-20 feet MEOW for Category 4 Hurricanes, and 20-25 feet MEOW for Category 5 Hurricanes. This data suggests that the site design can withstand Category 5 Hurricane storm surge SWEL, without waves, equivalent to more than 10,000 year mean return intervals. In addition, wave heights would likely impact the channel side, but would not reach the landward side and would add approximately 5.4-6.5 feet mean wave heights (15.4-18.5 feet total) for Category 2 Hurricanes, 7-8.6 ft mean wave heights (20-34.5 feet total) for Category 3 Hurricanes, 8.6-10.8 feet mean wave heights (24.4-30.8 feet total) for Category 4 Hurricanes, and 10.8-13.5 feet mean wave heights (30.8-38.5 feet total) for Category 5 Hurricanes. We also would expect the relative sea level rise to increase 1 foot 3 inches (1.26 feet) based on the difference between NOAA 2017 intermediate projection of approximately 0.84 foot for relative sea level rise in 2025 and approximately 2.1 feet for sea level rise in 2055.[212]

CP2 LNG committed that the Project facility would be designed to handle a 500-year mean recurrence interval flood event to comply with Coast Guard regulations under 33 CFR 127 requirements. CP2 LNG indicated the floodwalls height of 31.5 feet above mean sea level would be designed to be above a 500-year SWEL, 500-year wave, and sea level rise height of 1.5 feet, and 8 to -12 inches (0.67 to -1.0 feet) of expected settlement, 6.3 inches (0.525 feet) of local subsidence yielding over the course of the project life of 30 years. The 31.5 feet above mean sea level would be well above the 17.9-22.3 feet total height from the 10-12 feet projected 500 year SWEL determined by FERC staff based on NOAA SLOSH MEOWs, the 5.4-6.5 feet projected 500 year mean wave heights calculated by FERC staff based on ASCE 7, 1.26 ft sea level rise determined by FERC staff based on NOAA projections, the 0.67-1.0 feet expected settlement determined by CP2 LNG and agreed with by FERC staff, and 0.525 ft of local subsidence yielding over 30 years determined by CP2 LNG. The proposed 31.5 feet height would seem to be higher than a strong Category 4 hurricane with an approximate 18.7 ft MEOW, 10.0 feet mean wave height, 1.26 foot sea level rise, the 0.67-1.0 foot expected settlement, and 0.525 foot of local subsidence yielding over 30 years. FERC staff calculations indicate this would equate to approximately a Category 4 hurricane equivalent or exceeding an approximate 183 mph 3-second gust wind speed and equivalent or exceeding an approximate 10,000-year mean return interval.

Given the uncertainty in the 500-year SWEL data, 500-year wave data, SLOSH maps, sea level rise and subsidence projections, and settlement projections and uncertainties, we agree that the proposed post settlement storm surge floodwalls at the elevations of +31.5-feet above mean sea level would provide adequate protection for the CP2 LNG project site. In addition, given the uncertainty in storm surge floodwalls settlement, we recommend in section 4.13.5 that CP2 LNG periodically monitor and maintain the storm surge floodwalls to be no less than a minimum elevation of 500-year mean recurrence interval flood event. We also recommend in the section 4.13.5 that prior to initial site preparation, CP2 LNG should file the final design of floodwalls (storm surge protection barriers) to comply with applicable code/standards requirements including but not limited to NFPA 59A (2019 edition) as incorporated by 33 CFR 127, and

211 NOAA, National Hurricane Center Storm Surge Risk Maps: https://experience.arcgis.com/experience/203f772571cb48b1b8b50fdcc3272e2c/page/Category-2/. Accessed July 2023.

212 U.S. Army Corps of Engineers, Sea Level Change Curve Calculator, https://cwbi-app.sec.usace.army.mil/rccslc/slcc_calc.html, Accessed July 2023.

NFPA 59A (2001) in 49 CFR 193. In addition, the floodwalls should be designed and maintained in accordance with ASCE/SEI 7 (2022) or approved equivalent and ASCE/SEI 24 (2014) to withstand a minimum of a 500-year mean occurrence interval in consideration of relative sea level rise, local subsidence, site settlement, shoreline recession, erosion and scour effect, and wind-driven wave effects, etc. The sea level rise and vertical land movement should be in accordance with a minimum intermediate curve corresponding to design life of facility in Global and Regional Sea Level Rise Scenarios for the United States from the U.S. Department of Commerce, NOAA, National Ocean Service Center for Operational Oceanographic Products and Services, February 2022 or equivalent.

The Texas and Louisiana Gulf Coast area is experiencing the highest rates of coastal erosion and wetland loss in the United States (Ruple, 1993)[213]. The average coastal erosion rate is 1.2 meters per year between 2000 and 2012 along the Texas coastal shoreline, with the area between Sabine Pass and Rollover Pass experiencing a shoreline loss rate of -4.7 meters per year between 2000 and 2012 (McKenna, 2014)[214]. Shoreline erosion could occur at the Project site and along the opposite shoreline as a result of waves, currents, and vessel wakes. CP2 LNG contracted Moffatt & Nichol (M&N) to perform a storm surge wall coastal study. A wave overtopping analysis was conducted to validate a top of wall elevation of 31.5 ft NAVD88 for the storm surge walls for both the 100-year and 500-year events. M&N indicated the analysis conservatively considered an influencing foreshore and impulsive conditions. M&N indicated that the hydrostatic loads should be computed separately and included in the structural design calculation. M&N also performed shoreline protection study for the marine slip, with the specific objective to design rock riprap to protect the dredged slope of the marine slip, based on wind-generated wave loads associated with 100-year and 500-year return period, operational passing-vessel loads, and vessel propulsion loads. M&N stated the shoreline protection design for the dredged slope within the marine slip has resulted in the recommendation of LDOT 440-lb class graded rock riprap primary armor layer placed on top of LDOT 2-lb class graded rock riprap bedding stone with a geotextile fabric below the bedding stone. This would result in two layers of riprap with a minimum thickness of 3.0 feet: one bedding layer with 2-pound riprap class 1-foot thick and geotextile fabric below the bedding layer. M&N also recommended that a program of inspection of hydrographic survey of the submerged slope conducted with enough frequency (e.g., once every six months) to detect any erosion in the areas vulnerable to bow thrusters and propellers. As required by ASCE/SEI 7 (2005 and 2010), the erosion and scour should be included in the calculation of flood loads on buildings and other structures in flood hazard areas as recommended above. Therefore, we recommend in the section 4.13.5 that CP2 LNG shall file with the Secretary the final design basis of the structure, system, and components in consideration of flood loads, erosion and scour and hydrostatic loads, etc.; and final maintenance program of inspection of hydrographic survey of the submerged slope conducted with enough frequency to detect any erosion in the areas vulnerable to bow thrusters and propellers. The filing should be reviewed, approved, stamped and sealed by the professional engineer-of-record, registered in the State of Louisiana. FERC staff would continue our evaluation of final flood loads design within erosion and scour effect for the proposed Project. Even though shoreline erosion is a concern at the site, the recommended and proposed mitigation measures would minimize erosion and scour impacts.

Climate Change Impacts to Meteorological Events

As indicated in previous sections, the EPA has commented on climate change and its impacts on LNG facilities, including resilience of the LNG facilities to extreme weather due to climate change. EPA summarizes these impacts in its Climate Change Indicators in the United States.[215] FERC staff evaluated the extreme weather change effects and impacts at the proposed project site. Numerous reports

213 David L. Ruple, 1993, Shoreline Erosion Losses.

214 McKenna, K. K., 2014, Texas Coastwide Erosion Response Plan.

215 EPA (United States Environmental Protection Agency) 2021. Climate Change Indicators: Weather and Climate. https://www.epa.gov/climate-indicators/weather-climate, Accessed September 2021.

[216,217,218,219,220,221] have been published addressing potential impacts that indicate there has been an annual precipitation increase of approximately 4-5 percent since 1901. This increase indicates extreme precipitation, defined as the amount of precipitation falling in daily events that exceed the 99th percentile of all non-zero precipitation days, and based on the reports would continue to increase approximately 27 percent over the next 30 years. In addition, hurricane rainfall is projected to increase on the order of 10-15 percent and hurricane intensities (i.e., wind) are projected to increase on average by 1 to 10 percent, however most modeling studies project a decrease (or little change) in the global frequency of hurricanes. The global mean sea level is very likely to rise relative to the year 2000 by 0.3 to 0.6 feet by 2030, 0.5 to 1.2 feet by 2050, and 1.0 to 4.3 feet by 2100. For almost all future global mean sea level rise scenarios, relative sea level rise is likely to be greater than the global average in the western Gulf of Mexico. For other extreme events, like tornadoes, the influence of human-caused climate change remains very uncertain, and further observations and research are needed.

CP2 LNG would meet or exceed the minimum federal requirements for LNG facilities in the U.S. that then meet or exceed design requirements in codes and standards for other essential infrastructure in the U.S. These more resilient design requirements make these facilities more resilient against projected increases due to climate change. For example, while CP2 LNG indicated they have designed the stormwater detention pond using an average daily rainfall rate of 15.5 inches over 24 hours, or 0.65 inches per hour, based on a 100-year return period (i.e., 99th percentile), which is stipulated in ASCE/SEI 7, the spill containment system rainwater removal pumps would be designed using 49 CFR 193 that requires the pumps be designed to handle 25 percent of the maximum rainfall in a 10-year return period for 1 hour, or approximately 0.83 inches per hour. Therefore, while a 27 percent projected increase from climate change in the average 24-hour daily rainfall rate with a 100 year return period would result in 19.7 inches over a 24-hour period or 0.82 inches per hour and may exceed the design basis for the stormwater detention pond, the exceedance of the storm water detention pond would not be expected to cause any safety impacts to the proposed LNG facilities. Further, the projected increase would be less than the impoundment sump pump design and therefore should not impact the spill containment safety systems. In addition, while ASCE/SEI 7 would require most essential facilities in U.S. to be designed to approximately a 157 mph 3 second gust wind speed for highest risk category (IV) based on a 3,000 year return period, DOT PHMSA minimum requirements for LNG facilities require a more stringent 183 mph 3-second gust wind speed or a wind speed with a 10,000 year return period. For CP2 LNG, a 10,000 year return period would equate to 171 mph 3-second gust wind speed, which would be approximately 9 percent higher than the wind speed that would be required in ASCE/SEI 7 for the most essential facilities in the U.S. and would be higher than the projected 1 to 10 percent (5 percent average) increase in hurricane intensity projected by studies evaluating impacts of climate change on future hurricane intensities. In addition, while ASCE/SEI 7 and DOT PHMSA federal regulations require only a 100-year flood event, FERC staff recommends designing the storm surge barrier to withstand a more stringent 500 year event consistent with more current codes and standards, such as NFPA 59A (2019 and later editions) and ASCE/SEI 24 (2014) edition adopted in IBC (2015 and later editions). In addition, FERC staff also evaluated and recommended CP2 LNG account

[216] U.S. Global Change Research Program: Climate Science Special Report - Fourth National Climate Assessment. Volume I. First Published 2017.

[217] ASCE, Impacts of Future Weather and Climate Extremes on United States Infrastructure: Assessing and Prioritizing Adaptation Actions, https://ascelibrary.org/doi/pdf/10.1061/9780784415863.fm, Accessed July 2023.

[218] NOAA, Climate Program Office, About the Climate Program Office, https://cpo.noaa.gov/About-CPO, Accessed July 2023.

[219] U.S. Global Change Research Panel, About USGCRP, https://www.globalchange.gov/about, Accessed July 2023.

[220] NOAA, State of the Science FACT SHEET: How Changing Climate Affects Extreme Events, https://sciencecouncil.noaa.gov/wp-content/uploads/2022/07/FINAL-SoS-Fact-Sheet-How-Changing-Climate-Affects-Extreme-Events-04.14.2021-1.pdf, March 2021, Accessed July 2023.

[221] NOAA, Global Warming and Hurricanes, An Overview of Current Research Results, https://www.gfdl.noaa.gov/global-warming-and-hurricanes/, May 26, 2023, Accessed July 2023.

explicitly for local sea level rise using the most recent projections by NOAA and have included a recommendation to maintain facilities to withstand the 500 year storm surge, including wave height, and sea level rise. As aforementioned and predicted by NOAA , we would expect the local mean sea level rise to be closer to the 1.26 feet higher than sea level rise projected in 2025, which equates to a localized 2.1 feet intermediate projection midpoint higher sea level between 2050 and 2060 (relative to year 2000) at the proposed project site area. This projected sea level rise is more stringent than the projected global mean sea level of 0.5 to 1.2 feet by 2050 and consistent with the potentially unspecified higher relative sea level rise projected in the western Gulf of Mexico. Moreover, CP2 LNG is proposing to build their storm surge wall to 31.5 feet, which would be a height equivalent to or exceed the storm surge, including mean wave heights, of a 10,000 year mean return interval, in addition to local projected sea level rise, local projected subsidence, and project specific projected settlement. These proposed design parameters would be well above the 100 year storm surge required by regulations, would be higher than the 500 year storm surge recommended by FERC staff, and would further increase the resilience of the LNG facilities from future climate change impacts that are already accounted. For other extreme events, such as tornadoes, there isn't sufficient data to justify increases and usually aren't bounding case for projects in the Gulf of Mexico, like the CP2 LNG Project. Therefore, based on the more stringent minimum DOT PHMSA regulatory requirements, the more stringent FERC recommendations, and CP2 LNG's proposed design, FERC staff believe the project would be resilient from potential changes due to climate change and any changes due to climate change would not present a significant impact to the safety of the proposed LNG facilities.

Landslides and other Natural Hazards

Landslides involve the downslope movement of earth materials under force of gravity due to natural or human causes. Landslides in the United States occur in all 50 states. CP2 LNG states that there is little likelihood that landslides or slope movement at the site would be a realistic hazard as the topography across the Project site is relatively flat. We reviewed the CP2 LNG geotechnical investigation report and conclude the landslide would not be a significant risk for the proposed Project site.

Wildfires are prevalent on the West Coast, especially in California, Alaska, and Hawaii. The proposed Project site is surrounded by the Calcasieu Ship Channel on the Eastern side and Gulf of Mexico on the Southern side. There is no significant evidence that vegetation on the northern and western side of the plant would cause potential wildfires. Therefore, we conclude that it is unlikely that a wildfire would occur at the Project site. Volcanic activity is primarily a concern along plate boundaries on the West Coast and in Alaska and Hawaii. Based on FERC staff review of maps from USGS[222] and DHS[223] of the nearly 1,500 volcanoes with eruptions since the Holocene period (in the past 10,000 years) there has been no known active or historic volcanic activity closer than approximately 700 miles across the Gulf of Mexico in Los Atlixcos, Mexico.

Geomagnetic disturbances may occur due to solar flares or other natural events with varying frequencies that can cause geomagnetically induced currents, which can disrupt the operation of transformers and other electrical equipment. USGS provides a map of geomagnetic disturbances intensities with an estimated 100-year mean return interval.[224] The map indicates the CP2 LNG site could experience geomagnetic disturbances intensities of 10-50 nano-Tesla with a 100-year mean return interval. However,

[222] United States Geological Survey, U.S. Volcanoes and Current Activity Alerts, https://volcanoes.usgs.gov/index.html, Accessed February 2022.

[223] Department of Homeland Security, Homeland Infrastructure. Foundation-Level data (HIFLD). Natural Hazards, https://hifld-geoplatform.opendata.arcgis.com/, Accessed February 2022.

[224] United States Geological Survey. Magnetic Anomaly Maps and Data for North America, https://mrdata.usgs.gov/magnetic/map-us.html#home, Accessed February 2022.

CP2 LNG would be designed such that if a loss of power were to occur the valves would move into a fail-safe position. In addition, CP2 LNG is an export facility that does not serve any U.S. customers.

External Impact Review

To assess the potential impact from external events, FERC staff conducted a series of reviews to evaluate transportation routes, land use, and activities within the facility and surrounding the LNG terminal site, and the safeguards in place to mitigate the risk from events, where warranted. FERC staff coordinated the results of the reviews with other federal agencies to assess potential impacts from vehicles and rail; aircraft impacts to and from nearby airports and heliports; pipeline impacts from nearby pipelines; impacts to and from adjacent facilities that handle hazardous materials under the EPA's RMP regulations and power plants, including nuclear facilities under the Nuclear Regulatory Commission's regulations. Specific mitigation of impacts from use of external roadways, rail, helipads, airstrips, or pipelines are also considered as part of the engineering review done in conjunction with the NEPA review.

FERC staff uses a risk-based approach to assess the potential impact of the external events and the adequacy of the mitigation measures. The risk-based approach uses data based on the frequency of events that could lead to an impact and the potential severity of consequences posed to the LNG terminal site and the resulting consequences to the public beyond the initiating events. The frequency data is based on past incidents and the consequences are based on past incidents and/or hazard modeling of potential failures.

Road

FERC staff reviewed whether any truck operations would be associated with the project and whether any existing roads would be located near the site. FERC staff uses this information to evaluate whether the project and any associated truck operations could increase the risk along the roadways and subsequently to the public and whether any pre-existing unassociated vehicular traffic could adversely increase the risk to a project site and subsequently increase the risk to the public. In addition, if authorized, constructed, and operated, LNG facilities as defined in 49 CFR 193, must comply with the requirements of 49 CFR 193 and would be subject to the PHMSA's inspection and enforcement programs. PHMSA regulations under 49 CFR § 193.2155 (a) (5) (ii) under Subpart C require that structural members of an impoundment system must be designed and constructed to prevent impairment of the system's performance reliability and structural integrity as a result of a collision by or explosion of a tank truck that could reasonably be expected to cause the most severe loading if the liquefaction facility adjoins the right-of-way of any highway. Similarly, NFPA 59A (2001), section 8.5.4, requires transfer piping, pumps, and compressors to be located or protected by barriers so that they are safe from damage by rail or vehicle movements. However, the PHMSA regulations and NFPA 59A (2001) requirements do not indicate what collision(s) or explosion(s) could reasonably be expected to cause the most severe loading. FERC staff evaluated consequence and frequency data from these events to evaluate these potential impacts.

FERC staff evaluated the risk of the truck operations based on the consequences from a release, incident data from the DOT Federal Highway Administration (FHWA)[225], DOT National Highway Traffic

[225] FHWA, Office of Highway Policy Information, Highway Statistics 2020, https://www.fhwa.dot.gov/policyinformation/statistics/2020/, accessed March 2022.

Safety Administration[226], PHMSA[227], EPA, NOAA[228], and other reports[229,230,231], and frequency of trucks and proposed mitigation to prevent or reduce the impacts of a vehicular incident.

Incident data from PHMSA and estimated lane mileage from the FHWA and National Highway Traffic Safety Administration, indicate hazardous material incidents are very infrequent (2e-3 incidents per lane mile per year) and nearly 75 percent of hazardous material vehicular incidents occur during unloading and loading operations while the other 25 percent occur while in transit or in transit storage. In addition, approximately 95 percent of hazardous liquid releases are 1,000 gallons or less and catastrophic events that would spill 10,000 gallons or more make up less than 0.1 percent of releases. In addition, less than 1 percent of all reportable hazardous material incidents with spillage result in injuries and less than 0.1 percent of all reportable hazardous material incidents with spillage result in fatalities.

The EPA and NOAA report that 80 percent of fires that lead to container ruptures results in projectiles and that 80 percent of projectiles from liquefied petroleum gas (LPG) incidents, which constitute the largest product involved in BLEVEs, travel less than 660 feet. The EPA also reports that on average container ruptures would result in less than four projectiles for cylindrical containers and 8.3 for spherical vessels. FERC staff evaluated other reports that affirmed the EPA estimates based on data for approximately 150 experimental and accidental pressure vessel bursts (PVBs) and BLEVEs with approximately 683 total projectiles (4.6 average fragments per incident) that showed approximately 80 percent of fragments traveled 490 to 820 feet and within 6.25 times the estimated or observed fireball radius. The data also showed projectiles have traveled up to 3,900 feet for large LPG vessels and 1,200 feet for LPG rail cars. In all the documented cases, the projectiles traveled less than 15 times the fireball diameter, but one of the reports indicated up to 30 times the fireball diameter is possible albeit very rare.

Unmitigated consequences under average ambient conditions from releases of 1,000 gallons through a 1-inch hole would result in distances ranging from 25 to 200 feet for flammable vapor dispersion, and 75 to 175 feet for jet fires. Unmitigated consequences under worst case weather conditions from catastrophic failures of trucks proposed at the site generally can range from 200 to 2,000 feet for flammable vapor dispersion, 275 to 350 feet for radiant heat of 5 kW/m^2 from jet fires, 800 to 1,050 feet to a 1 psi overpressure from a BLEVE, 850 to 1,500 feet for a heat dose equivalent to a radiant heat of 5 kW/m^2 over 40 seconds from 250 to 325 feet radii fireballs burning for 5 to 15 seconds from a BLEVE, and projectiles from BLEVEs possibly extending farther. Based on distribution function of the projectile distances, FERC staff estimate approximately 90 percent of all projectiles for a 10,000-gallon tanker truck would be within 0.5 mile and there is approximately a 1 percent probability they would extend beyond 1 mile and less than 0.1 percent probability they would extend 30 times the fireball diameter. These values are also close to the distances provided by the DOT FHWA for designating hazardous material trucking routes (0.5 mile for flammable gases for potential impact distance) and PHMSA for emergency response (0.5 to 1 mile for initial evacuation and 1 mile for potential BLEVEs for flammable gases).

[226] National Highway Traffic Safety Administration, Traffic Safety Facts Annual Report Tables, https://cdan.nhtsa.gov/tsftables/tsfar.htm, accessed March 2022.

[227] PHMSA, Office of Hazardous Material Safety, Incident Reports Database Search, https://hazmatonline.phmsa.dot.gov/IncidentReportsSearch/Welcome.aspx, accessed March 2022.

[228] U.S. Environmental Protection Agency, National Oceanic and Atmospheric Administration, ALOHA®, User's Manual, The CAMEO® Software System, February 2007.

[229] Birk, A.M., BLEVE Response and Prevention Technical Documentation, 1995.

[230] American Institute of Chemical Engineers, Center for Chemical Process Safety, Guidelines for Vapor Cloud Explosion, Pressure Vessel Burst, BLEVE, and Flash Fire Hazards, Second Edition, 2010.

[231] Lees, F.P, Lees' Loss Prevention in the Process Industries: Hazard Identification, Assessment, and Control, Volume 2, Second Edition, 1996.

During normal operation of the project, CP2 LNG estimates up to 39 refrigerant make-up trucks, 5 amine trucks, 2 nitrogen trucks, and 1 hot oil truck would be needed at the site annually, as well as a small number of diesel trucks. During commissioning and startup, CP2 LNG estimates up to 57 refrigerant trucks, 27 amine trucks, 24 hot oil trucks, 2 nitrogen trucks, and 12 diesel trucks to conduct the first fill of the facility. The most frequent truck deliveries would occur during commissioning and startup activity at the site and would deliver refrigerants to load the liquefaction trains. CP2 LNG does not plan to utilize any trucks to deliver LNG.

Davis Road runs along the northern property line at the Terminal Site and turns into Highway LA-127 just after the Terminal Site and would be used to access the CP2 LNG Project site as well as the adjacent Calcasieu Pass LNG facility. Davis Road is a two-lane bi-directional route with a 35 mph speed limit. CP2 LNG provided a Road Safety and Reliability Impact Study. The Road Safety and Reliability Impact Study addresses potential safety and reliability impacts of proposed tanker trucks loaded or unloaded at the LNG terminal, and from commercial and recreational roadway traffic along the roads near the CP2 LNG Terminal Site.

The separation distance between Davis Road or Highway LA-127 and the Terminal Site facilities that would contain hazardous fluids would be greater than 1000 feet, which would exceed the distances estimated for flammable vapor dispersion and radiant heat from a liquid hydrocarbon truck 1-inch hole release and the radiant heat from catastrophic releases. The Marine Facilities on Monkey Island would have similar separation. While dispersion from catastrophic failures and projectiles from catastrophic failures may extend beyond 1000 ft the risk of the hazards impacting the site are not significant given the likelihood of those incidents and other mitigating factors. Specifically, the Terminal Site would have a perimeter wall, at least 26 feet tall, that would separate Davis Road and Highway LA-127 from the process equipment. FERC staff did not identify any major highways or roads within close proximity to piping or equipment containing hazardous materials at the site that would raise concerns of direct impacts from a vehicle impacting the site. Therefore, we conclude that the Project would not pose a significant risk or significant increase in risk to the public due to vehicle impacts as a result of the potential consequences, incident data, frequency of trucks, proposed mitigation by CP2 LNG, and additional mitigation measures proposed by FERC staff.

<u>Rail</u>

FERC staff reviewed whether any rail operations would be associated with the Project and whether any existing rail lines would be located near the site. FERC staff uses this information to evaluate whether the Project and any associated rail operations could increase the risk along the rail line and subsequently to the public and whether any pre-existing unassociated rail operations could adversely increase the risk to the CP2 LNG site and subsequently increase the risk to the public. In addition, if authorized, constructed, and operated, LNG facilities as defined in 49 CFR 193, must comply with the requirements of 49 CFR 193 and would be subject to PHMSA's inspection and enforcement programs. The PHMSA regulations under 49 CFR § 193.2155 (a) (5) (ii) under Subpart C state that if the LNG facility adjoins the right-of-way of any railroad, the structural members of an impoundment system must be designed and constructed to prevent impairment of the system's performance reliability and structural integrity as a result of a collision by or explosion of a train or tank car that could reasonably be expected to cause the most severe loading.

Section 8.5.4 of NFPA 59A (2001), incorporated by reference in 49 CFR 193, requires transfer piping, pumps, and compressors to be located or protected by barriers so that they are safe from damage by rail or vehicle movements. However, the PHMSA regulations and NFPA 59A (2001) requirements do not indicate what collision(s) or explosion(s) could reasonably be expected to cause the most severe loading. Therefore, FERC staff evaluated consequence and frequency data from these events to evaluate these potential impacts. FERC staff evaluated the risk of the rail operations based on the consequences from a release, incident data from the Federal Rail Administration and PHMSA, and frequency of rail operations nearby CP2 LNG.

FERC staff evaluated the risk of the rail operations based on the consequences from a release, incident data from PHMSA[232], and rail miles from DOT Bureau of Transportation Statistics[233]. Incident data from PHMSA and rail miles from DOT Bureau of Transportation Statistics indicates hazardous material incidents are very infrequent (7e-3 incidents per rail mile per year). In addition, approximately 95 percent of liquid releases are 1,000 gallons or less, and catastrophic events that would spill 30,000 gallons or more make up less than 1 percent of releases. In addition, less than 1 percent of hazardous material incidents result in hospital injuries and less than 0.1 percent of hazardous material incidents result in fatalities.

As previously discussed, the EPA and NOAA report that 80 percent of fires that lead to container ruptures results in projectiles and that 80 percent of projectiles from LPG incidents, which constitute the largest product involved in BLEVEs, travel less than 660 feet. The EPA also reports that on average container ruptures would result in less than four projectiles for cylindrical containers and 8.3 for spherical vessels. FERC staff evaluated other reports that affirmed the EPA estimates based on data for approximately 150 experimental and accidental PVBs and BLEVEs with approximately 683 total projectiles (4.6 average fragments per incident) that showed approximately 80 percent of fragments traveled 490 to 820 feet and within 6.25 times the estimated or observed fireball radius. The data also showed projectiles have traveled up to 3,900 feet for large LPG vessels and 1,200 feet for LPG rail cars. In all the documented cases, the projectiles traveled less than 15 times the fireball diameter, but one of the reports indicated up to 30 times the fireball diameter is possible albeit very rare.

Unmitigated consequences under average ambient conditions from releases of 1,000 gallons through a 1-inch hole would result in distances ranging from 25 to 200 feet for flammable vapor dispersion, and 75 to 175 feet for jet fires. Unmitigated consequences under worst-case weather conditions from catastrophic failures of rail cars containing various flammable products generally can range from 300 to 3,000 feet for flammable vapor dispersion, 450 to 575 feet for radiant heat of 5 kW/m^2 from jet fires, 1,225 to 1,500 feet to a 1 psi overpressure from a BLEVE, 1,250 to 2,100 feet for a heat dose equivalent to a radiant heat of 5 kW/m^2 over 40 seconds from 350 to 450 feet radii fireballs burning for 7 to 20 seconds from a BLEVE, and projectiles from BLEVEs possibly extending farther. Based on distribution function of the projectile distances, FERC staff estimate approximately 80 percent of all projectiles for a 30,000-gallon rail car would be within 0.5 mile and there is approximately a 5 percent probability they would extend beyond 1 mile and less than 0.1 percent probability they would extend 30 times the fireball diameter. These values are also close to the distances provided by PHMSA for emergency response (0.5 to 1 mile for initial evacuation and 1 mile for potential BLEVEs for flammable gases).

The closest rail line would be Union Pacific terminus located approximately 23 miles north of the Project site near the Trunkline LNG terminal. This is outside any of the potential unmitigated consequences under even worst-case weather conditions for the most severe catastrophic failures of rail cars. Therefore, FERC staff conclude there are no potential rail safety or reliability impacts of significance that railroad lines would pose due to vapor dispersion, fireball, jet fire, pool fire, BLEVE, or projectile hazard to the proposed Project.

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[232] PHMSA, Incident Statistics, https://www.phmsa.dot.gov/hazmat-program-management-data-and-statistics/data-operations/incident-statistics, Hazmat Incident Report Search Tool 2010 – 2020, accessed March 2022.

[233] DOT Bureau of Transportation Statistics, System Milage Within the United States, https://www.bts.gov/content/system-mileage-within-united-states, 2010 – 2020, Accessed March 2022.

Air

FERC staff reviewed whether any aircraft operations would be associated with the Project and whether any existing aircraft operations would be located near the site. FERC staff uses this information to evaluate whether the Project and any associated aircraft operations could increase the risk to the public and whether any pre-existing unassociated aircraft operations could adversely increase the risk to the Project site and subsequently increase the risk to the public. In addition, if authorized, constructed, and operated, LNG facilities, as defined in 49 CFR 193, must comply with the requirements of 49 CFR 193 and would be subject to the PHMSA's inspection and enforcement programs. PHMSA regulations under 49 CFR § 193.2155 (b) under Subpart C state that LNG storage tanks must not be located within a horizontal distance of one mile from the ends, or 0.25 miles from the nearest point of a runway, whichever is longer. In addition, the height of LNG structures in the vicinity of an airport must comply with DOT FAA requirements. In addition, FERC staff evaluated the risk of an aircraft impact from nearby airports.

Three aviation airports, Chennault International Airport, Lake Charles Regional Airport, and Southland Field Airport would be located approximately 31, 24, and 24 miles north of the LNG terminal site, respectively. CP2 LNG also indicates that two private airports, having one turf airstrip each, would be located at approximately 18 and 22 miles from the site. Additionally, small heliports are located near the proposed CP2 LNG facility location.

DOT FAA regulations in 14 CFR 77 require CP2 LNG to provide a notice to the FAA of its proposed construction. This notification should identify all equipment that are more than 200 feet above ground level or lesser heights if the facilities are within 20,000 feet of an airport (at 100:1 ratio or 50:1 ratio depending on length of runway) or within 5,000 feet of a helipad (at 100:1 ratio). In addition, mobile objects, including the LNG marine vessel that would be above the height of the highest mobile object that would normally traverse it would require notification to FAA.

The Project provided an Air Safety and Reliability Study conducted by AcuTech, which concluded that the CP2 LNG facility would pose a low risk of public impacts from accidental or intentional aircraft incidents. This study identified that there would be no permanent structures taller than 200 feet. DOT FAA regulations in 14 CFR 77 require CP2 LNG to provide a notice to the FAA of its proposed construction and mobile objects, including the LNG marine vessel that would be above the height of the highest mobile object that would normally traverse the LNG marine transit route. CP2 LNG would need to provide notice to DOT FAA for any temporary (construction) structures that would exceed permanent structure heights. In addition, FERC staff used DOE Standard 3014, Accident Analysis for Aircraft Crash into Hazardous Facilities, which utilizes a 22-mile threshold radius around the hazardous facility for consideration of hazards posed by airport and heliport operations to the Project facilities. However, there are no commercial service airports within a 22-mile radius of the proposed project. Based on the potential separation distance between the process equipment and the nearby heliports and private turf airstrips, we conclude the impact risk due to heliport and private turf airstrip operations would not be significant.

Pipelines

FERC staff reviewed whether any pipeline operations would be associated with the Project and whether any existing pipelines would be located near the site. FERC staff uses this information to evaluate whether the Project and any associated pipeline operations could increase the risk to the pipeline facilities and subsequently to the public and whether any pre-existing unassociated pipeline operations could adversely increase the risk to the Project site and subsequently increase the risk to the public. In addition, pipelines associated with this Project must meet the PHMSA regulations under 49 CFR 192 and 195 as discussed in section 4.13.1.1. FERC staff evaluated the risk of a pipeline incident impacting the Project and the potential of cascading damage increasing the risk to the public based on the consequences from a release, incident data from the PHMSA, and proposed mitigation to prevent or reduce the impacts of a pipeline incident from CP2 LNG.

For existing pipelines, FERC staff identified that the nearest pipeline would be the feed gas line for the Calcasieu Pass LNG terminal, located near the CP2 LNG storage tanks and liquefaction blocks, and the buried feed gas lines for the CP2 LNG project, located near plant buildings and other facilities. FERC staff evaluated the potential risk from an incident from the pipelines and the potential impacts by considering the design and operating conditions and location of the pipelines. CP2 LNG indicates that the Class 3 pipeline designations and the pipeline depth of cover would mitigate the potential for impacts. Class 3 pipelines have equivalent wall thicknesses to the specifications in ASME B31.3. In addition, water deluge systems would cover hazardous fluid vessels in the liquefaction blocks. The outer concrete wall of the LNG storage tank could receive radiant heat for the duration of a fire due to a pipeline rupture. The fire hydrants proposed in that area may not be accessible during a pipeline fire. Therefore, we recommend in section 4.13.5 that CP2 LNG demonstrate effective firewater coverage for the LNG storage tank wall area that could be impacted by a pipeline fire or demonstrate that the wall would be designed to withstand the potential heat and duration of this scenario. CP2 LNG also indicates that a preliminary Wheel Load Evaluation was performed which concluded that the wheel loading stresses imparted to various buried marine transfer lines in the several cases examined were within code limits, given that proposed materials would be determined to conform to API RP 1102. The preliminary API RP 1102 evaluation was based upon tandem axle loads of 40 kips and noted that loads in excess of that should be evaluated on a case-by-case basis. CP2 LNG also indicated that vehicle loads over the buried feed gas lines within the plant would be expected to be minimal. We recommend in section 4.13.5 that CP2 LNG provide the final wheel load evaluations for underground hazardous fluid lines, including feed gas lines within the plant, in accordance with API RP 1102 or approved equivalent, and address any recommendations, for review and approval.

In addition, based on the potential likelihood of pipeline incidents and potential consequences from a pipeline incident, we conclude that the Project would not significantly increase the risk to the public beyond existing risk levels that would be present from a pipeline leak or pipeline rupture worst-case event near the proposed Project site.

Hazardous Material Facilities and Power Plants

FERC staff reviewed whether any EPA RMP regulated facilities handling hazardous materials and power plants were located near the site to evaluate whether the facilities could adversely increase the risk to the Project site and whether the Project site could increase the risk to the EPA RMP facilities and power plants and subsequently increase the risk to the public.

There are two facilities handling hazardous materials near the site. The John W. Stone Oil Distribution site contains a storage tank about 2,000 feet from the proposed Marine Facilities and about 1.4 miles from the Terminal Site. The Venture Global Calcasieu Pass LNG facility would be adjacent to the proposed project, and the proposed Commonwealth LNG project would be located across the Calcasieu Ship Channel from the Marine Facilities on the other side of the Calcasieu River. The closest known EPA RMP regulated facilities handling hazardous materials would be the Barracuda Plant located approximately 16 miles away, and the Cameron Meadows Gas Processing Facility located approximately 17 miles away. The EPA RMP regulations require certain hazard distances to be calculated and a risk management plan to be developed commensurate with those consequences. In addition, the closet power plant identified would be the Calcasieu Natural Gas Plant approximately 25 miles north and the closest nuclear plant would be the River Bend Station located approximately 136 miles to the northeast of the proposed facility.

Given the distances, locations, and risk management plan requirements of the facilities relative to the populated areas near the proposed site, we recommend in section 4.13.5 that CP2 LNG coordinate its ERP with the John W. Stone Oil Distribution site, the Venture Global Calcasieu Pass LNG facility and, if constructed, the Commonwealth LNG facility. Based on this mitigation, we conclude that the Project would not pose a significant increase in risk to the public or that the hazardous material facilities and power plants would not pose a significant risk to the Project and subsequently to the public.

Onsite and Offsite Emergency Response Plans

As part of its application, CP2 LNG indicated that the Project would continue to develop a comprehensive ERP with local, state, and federal agencies and emergency response officials to address the CP2 LNG facilities and the marine vessel transit route. The ERP would include a Cost Sharing Plan that identifies the mechanisms for funding all project-specific security/emergency management costs that would be imposed on state and local agencies. CP2 LNG would continue these collaborative efforts during the development, design, and construction of the Project. FERC staff would review the ERP with Cost Sharing Plan to verify that adequate plans had been developed, and CP2 LNG would need to receive approval prior to proceeding with any construction. FERC staff would also continue to review the ongoing detailed finalization of the ERP and Cost Sharing Plan to confirm that details of the emergency procedures continue to provide for the protection of personnel and the public as well as the prevention of property damage that may occur as a result of incidents at the CP2 LNG Project facilities. The facility would also provide appropriate personal protective equipment to enable operations personnel and first responder access to the area.

As required by 49 CFR § 193.2509 under Subpart F, CP2 LNG would need to prepare emergency procedures manuals that provide for: a) responding to controllable emergencies and recognizing an uncontrollable emergency; b) taking action to minimize harm to the public including the possible need to evacuate the public; and c) coordination and cooperation with appropriate local officials. Specifically, 49 CFR § 193.2509 (b) (3) states that emergency procedures must include provisions for "Coordinating with appropriate local officials in preparation of an emergency evacuation plan which sets forth the steps required to protect the public in the event of an emergency, including catastrophic failure of an LNG storage tank." PHMSA regulations under 49 CFR § 193.2905 (d) under Subpart J also require at least two access points in each protective enclosure that are located to minimize the escape distance in the event of emergency.

Title 33 CFR § 127.307 also requires the development of emergency manual that incorporates additional material, including LNG release response and emergency shutdown procedures, a description of fire equipment, emergency lighting, and power systems, telephone contacts, shelters, and first aid procedures. In addition, 33 CFR § 127.207 establishes requirements for warning alarm systems. Specifically, 33 CFR § 127.207 (a) requires that the LNG marine transfer area to be equipped with a rotating or flashing amber light with a minimum effective flash intensity, in the horizontal plane, of 5000 candelas with at least 50 percent of the required effective flash intensity in all directions from 1.0 degree above to 1.0 degree below the horizontal plane. Furthermore, 33 CFR § 127.207 (b) requires the marine transfer area for LNG to have a siren with a minimum 1⁄3- octave band sound pressure level at l meter of 125 decibels referenced to 0.0002 microbars. The siren must be located so that the sound signal produced is audible over 360 degrees in a horizontal plane. Lastly, 33 CFR § 127.207 (c) requires that each light and siren must be located so that the warning alarm is not obstructed for a distance of 1.6 km (1 mile) in all directions. The warning alarms would be required to be tested in order to meet 33 CFR 127. CP2 LNG would be required to meet the warning alarms requirements specified in 33 CFR § 127.207.

In accordance with the EPAct 2005, FERC must also approve an ERP covering the terminal and ship transit prior to construction. Section 3A (e) of the NGA, added by section 311 of the EPAct 2005, stipulates that in any order authorizing an LNG terminal, the Commission must require the LNG terminal operator to develop an ERP in consultation with the Coast Guard and state and local agencies. The final ERP would need to be evaluated by appropriate emergency response personnel and officials. Section 3A (e) of the NGA (as amended by EPAct 2005) specifies that the ERP must include a Cost-Sharing Plan that contains a description of any direct cost reimbursements the applicant agrees to provide to any state and local agencies with responsibility for security and safety at the LNG terminal and in proximity to LNG marine vessels that serve the facility. The Cost-Sharing Plan must specify what the LNG terminal operator would provide to cover the cost of the state and local resources required to manage the security of the LNG terminal and LNG marine vessel, and the state and local resources required for safety and emergency management, such as:

- direct reimbursement for any per-transit security and/or emergency management costs (for example, overtime for police or fire department personnel);
- capital costs associated with security/emergency management equipment and personnel base (for example, patrol boats, firefighting equipment); and
- annual costs for providing specialized training for local fire departments, mutual aid departments, and emergency response personnel; and for conducting exercises.

The cost-sharing plan must include the LNG terminal operator's letter of commitment with agency acknowledgement for each state and local agency designated to receive resources.

As part of the FEED review, FERC staff considers elements of recommended and generally accepted good engineering practices for emergency response plans and resource requirements for cost-sharing plans, including, but not limited to the following NFPA standards related to emergency response planning: NFPA 1600[234], NFPA 1616[235], NFPA 1620[236], NFPA 470[237], and NFPA 475[238]. Specifically, Chapter 5 of NFPA 1600 (2019 edition) provides provisions for the planning and design process of an emergency management program, and includes the following provisions:

- Section 5.2.2 specifies a risk assessment to be conducted evaluating the likelihood and severity of hazards, including accidental and intentional events that may result in hazardous material releases, explosions, and fires as well as consideration of specific causes and preceding events, such as geological events (e.g., subsidence, earthquakes, tsunamis, volcanic, etc.) and meteorological events (e.g., extreme temperatures, hurricanes, tornadoes, floods, snow and ice storms, and wildland fires, etc.) as discussed in previous sections.
- Section 5.2.2.2 specifies the vulnerability of people, property, operations, environment, and supply chain operations to be evaluated.

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234 Free and publicly accessible to view online in English and Spanish at NFPA, https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1600, Accessed March 2023.

235 Free and publicly accessible to view online in English and Spanish at NFPA, https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1616, Accessed March 2023.

236 Free and publicly accessible to view online in English and Spanish at NFPA, https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1620, Accessed March 2023.

237 Free and publicly accessible to view online in English and Spanish at NFPA, https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=470, Accessed March 2023.

238 Free and publicly accessible to view online in English and Spanish at NFPA, https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=475, Accessed March 2023.

- Section 5.2.3 specifies the analysis of the impacts of the hazards identified in section 5.2.2 on the health and safety of persons in the affected area and personnel responding to the incident as well as impacts to properties, facilities, and critical infrastructure.

- Section 5.2.4 specifies an analysis of the escalation of impacts over time.

- Section 5.2.5 specifies evaluation of incidents that could have cascading impacts.

- Section 5.2.6 specifies the risk assessment to evaluate the adequacy of existing prevention and mitigation measures.

NFPA 1600 Chapter 6 covers the implementation of the plans, including health and safety of personnel, roles and responsibilities of internal and external entities, lines of authority, process for delegation of authority, liaisons with external entities, and logistics support and resource requirements.

- Section 6.3.1 specifies the implementation of a mitigation strategy that includes measures to limit or control the consequences, extent, or severity of an incident that cannot be prevented based on the results of hazard identification and risk assessment and analysis of impacts.

- Section 6.9.2 specifies that emergency response plans should identify actions to be taken to protect people, including people with disabilities and other access and functional needs.[244]

- Sections 6.6 and 6.9.4 stipulate an emergency response plan include warning, notification, and communication should be determined and be reliable, redundant, and interoperable and tested and used to alert stakeholders potentially at risk from an actual or impending incident.

- Section 6.8 specifies the development of an incident management system to direct, control, and coordinate response, continuity and recovery operations.

- Section 6.8.1 stipulates primary and alternate emergency operations centers be established capable of managing response, continuity, and recovery operations and may be physical or virtual.

In addition, NFPA 1600 Chapter 7 provides specifications for execution of the plan, Chapter 8 provides for training and education provisions, Chapter 9 provides for exercises and tests to be conducted periodically, and Chapter 10 provides for its continued maintenance and improvement.

NFPA 1616 (2020 edition) covers organizing, planning, implementing, and evaluating a program for mass evacuation, sheltering, and re-entry. Similar to NFPA 1600, NFPA 1616 states:

- Section 4.5 also stipulates similar hazard identification, risk assessment, and requirements analysis as NFPA 1600.

- Section 5.1 also stipulates plans to address the health and safety of personnel including persons with disabilities and access and functional needs.[245]

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[244] NFPA 1600 defines "access and functional need" as "Persons requiring special accommodations because of health, social, economic, or language challenges."

[245] NFPA 1616 defines people with access and functional needs as "People with Access and Functional Needs" as "Persons with disabilities and other access and functional needs include those from religious, racial, and ethnically diverse backgrounds;

- Section 5.6 also specifies a requirements analysis in sub-section 5.6.1 that is based upon the threat, hazard identification, and risk assessment. Sub-section 5.6.2(1) specifies the requirements analysis include characteristics of the potentially affected population, including persons with disabilities and other access and functional needs. In addition, sub-section 5.6.2(2) stipulates consideration of existing mandatory evacuation laws and expected enforcement of those laws. Sub-section 5.6.2(3) stipulates the requirements analysis to include characteristics of the incident that trigger consideration for evacuation based on weather, season, and ambient conditions, speed of onset, magnitude, location and direction, duration, resulting damages to essential functions, risk for cascading effects and secondary disasters, and capability of transportation routes and systems to transport life-sustaining materials (e.g., water, medical supplies, etc.) into the affected area.

- Section 5.6.3 stipulates the determination if evacuation or sheltering-in-place is appropriate to the situation and resources available based on 1) the anticipated impact and duration of the event, 2) the distance to appropriate sheltering facilities, 3) the availability of and access to transportation to those facilities, and 4) the ability to communicate with the affected population within the required timeframe.

- Section 5.6.4 stipulates the 1) establishment of a single or unified command, 2) development of information system to notify public and provide an assessment of the time needed to reach people with the information, 3) identification of appropriate sheltering facilities by location, size, types of services available, accessibility, and building safety, and 4) identification of the modes and routes for evacuee transportation and the time needed to reach them, sources of evacuee support services, and manpower requirements based on various potential shelters.

- Section 5.8 also has stipulations for dissemination of information on evacuation, shelter in place, and re-entry before, during, and after an incident to personnel and to the public.

- Section 5.9 has stipulations for warning, notification, and communication needs that are reliable and interoperable and redundant where feasible that takes into account persons with disabilities and other access and functional needs.

Similar to NFPA 1600, NFPA 1616 has stipulations in Chapter 6 on Implementation, Chapter 7 on Training and Education, Chapter 8 on Exercises, and Chapter 9 on Program Maintenance and Improvement with additional specifics for mass evacuation, sheltering in place and re-entry.

NFPA 1620 (2020 edition) specifies the characteristics of the facility and personnel onsite that should be within a pre-incident plan, such as emergency contact information, including those with knowledge of any supervisory, control, and data acquisition systems, communication systems, emergency power supply systems, and facility access controls as well as personnel accountability and assistance for people with self-evacuation limits, means of egress, emergency response capabilities, spill containment systems, water supply and fire protection systems, hazardous material information (e.g., safety datasheets), special considerations for responding to hazardous materials (e.g., firewater may exacerbate LNG fires, BLEVE potential, etc.), and access to emergency action plans developed by the facility. Similar to NFPA 1600 and NFPA 1616, NFPA 1620 section 8.5.2 also addresses the implementation of an incident

people with limited English proficiency; people with physical, sensory, behavioral and mental health, intellectual, developmental and cognitive disabilities, including individuals who live in the community and individuals who are institutionalized; older adults with and without disabilities; children with and without disabilities and their parents; individuals who are economically or transportation disadvantaged; women who are pregnant; individuals who have acute and chronic medical conditions; and those with pharmacological dependency."

management system for the duration of the event and Chapter 10 establishes maintenance of a pre-incident plan.

NFPA 1600, NFPA 1616, and NFPA 1620 provisions for threat, hazard identification, and risk assessment provisions and identification of resource requirements and gaps are also consistent with Department of Homeland Security FEMA's Comprehensive Preparedness Guide 101, Developing and Maintaining Emergency Operations Plans, Version 3.0, September 2021, and Comprehensive Preparedness Guide 201, Threat and Hazard Identification and Risk Assessment and Stakeholder Preparedness Review Guide, Third Edition, May 2018, and other FEMA guidance.

NFPA 470 covers the competencies and job performance requirements for emergency response personnel to incidents involving hazardous materials, including awareness level personnel (i.e., personnel onsite that would call for emergency responders and secure the scene), operations level responders (i.e., personnel responding to incident for implementing supporting actions to protection public), hazardous material technicians (i.e., personnel responding to incident for analyzing and implementing planned response), hazardous materials officers, hazardous materials safety officers, emergency medical services personnel, incident commanders, and other specialist employees. The standard covers competencies and Job Performance Requirements, including the ability to identify hazardous material releases and hazardous materials involved and identifying surrounding conditions, such as topography, weather conditions, public exposure potential, possible ignition sources, land use and adjacent land use, overhead and underground wires and pipelines, rail lines, and highways, bodies of water, storm and sewer drains, and building information (e.g., ventilation ducts and air returns), Part of the standard also describes the ability and requirement to estimate potential outcomes in order to properly plan response strategies and tactics, and the selection and use of proper personnel protective equipment. Many of these provisions are similar and synergistic with NFPA 1600, NFPA 1616, and NFPA 1620.

NFPA 475 covers the organization, management, and sustainability of a hazardous material response program, including identifying facilities with hazardous materials, analyzing the risk of hazardous material incidents, including identifying hazardous materials at each location, (e.g., quantity, concentration, hazardous properties, etc.), type and design of containers; surrounding population and infrastructure, including vulnerable populations and critical facilities (e.g., schools, hospitals, businesses, etc.). NFPA 475 similarly calls for analyzing the risk of an incident based on the consequences of a release and predicting its behavior and estimating the probability for an incident to take place and potential for cascading incidents. NFPA 475 Chapter 7 also has provisions for resource management, including the identification, acquisition, and management of personnel, equipment, and supplies to support hazardous material response programs. NFPA 475 Chapter 8 expands upon staffing requirements and use of different staffing models and Chapter 9 expands upon training program with reference and similarities to NFPA 470.

In accordance with these recommended and generally accepted good engineering practices, FERC staff evaluated the potential impacts from incidents caused by a range of natural hazards, accidental events, intentional events, and potential for cascading damage at the LNG terminal, including scenarios that would lead to a potential catastrophic failure of a tank required to be accounted in emergency response plans by PHMSA regulations in 49 CFR §193.2509, and along the LNG carrier route using the Zones of Concern referenced in Coast Guard NVIC 01-11. In addition, FERC staff identified potential emergency response needs based on the potential impacts to and characteristics of the population and infrastructure for potential intentional and accidental incidents along the LNG marine vessel route and at the LNG terminal. Consistent with these practices, FERC staff evaluated the potential hazards from incidents, the potential impacts to areas from incidents and the evaluation of characteristics of population, including those with potential access and functional needs, and infrastructure that require special considerations in pre-incident planning, including but not limited to:

- daycares;
- elementary, middle, and high schools and other educational facilities;
- elderly centers and nursing homes and other boarding and care facilities;
- detention and correctional facilities;
- stadiums, concert halls, religious facilities, and other areas of assembly;
- densely populated commercial and residential areas, including high rise buildings, apartments, and hotels;
- hospitals and other health care facilities;
- police departments, stations, and substations;
- fire departments and stations;
- military or governmental installations and facilities;
- major transportation infrastructure, including evacuation routes, major highways, airports, rail, and other mass transit facilities as identified in external impacts section; and
- industrial facilities that could exacerbate the initial incident, including power plants, water supply infrastructure, and hazardous facilities with quantities that exceed thresholds in EPA RMP and/or OSHA PSM standards as identified in external impacts section.

Many of these facilities are also identified and defined in NFPA 101, Life Safety Code, and require emergency action plans. NFPA 101 is currently used by every U.S. state and adopted statewide in in 43 of the 50 states.[246] Louisiana currently adopts NFPA 101 (2015 edition) with amendments.[247,248] These areas are also similar to "identified sites" defined in 49 CFR 192 that define high consequence areas and those identified within Pipelines and Informed Planning Alliance for special land use planning considerations near pipelines.[249]

Potential Hazards

An incident can result in various potential hazards and are initiated by a potential liquid and/or gaseous release with the formation of vapor at the release location, as well as from any liquid that pooled. The fluid released may present low or high temperature hazards and may result in the formation of toxic or flammable vapors. The type and extent of the hazard will depend on the material released, the storage and process conditions, and the volumes and durations released.

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246 NFPA, NFPA 101 Fact Sheet, https://www.nfpa.org/assets/files/AboutTheCodes/101/NFPA101FactSheet0809.pdf, accessed 2022-02-17.

247 Up Codes, Louisiana Codes, https://up.codes/codes/louisiana, accessed 2022-02-17.

248 Louisiana Office of State Fire Marshal, Department of Public Safety and Corrections, Public Safety Services, Codes, Rules, and Laws Enforced by the Louisiana State Fire Marshal, http://sfm.dps.louisiana.gov/insp_crl.htm, accessed 2022-02-17.

249 Pipelines and Informed Planning Alliance, Partnering to Further Enhance Pipeline Safety in Communities through Risk-Informed Land Use Planning, Final Report of Recommended Practices, https://primis.phmsa.dot.gov/comm/pipa/landuseplanning.htm, November 2010.

Exposure to either cold liquid or vapor could cause freeze burns and depending on the length of exposure, more serious injury or death. However, spills would be contained to on-site areas and the cold state of these releases would be greatly limited due to the continuous mixing with the warmer air. The cold temperatures from the release would not present a hazard to the public, which would not have access to onsite areas. The cold temperatures may also quickly cool any materials contacted by the liquid on release, causing extreme thermal stress in materials not specifically designed for such conditions. These thermal stresses could subsequently subject the material to brittleness, fracture, or other loss of tensile strength and result in cascading failures. However, regulatory requirements and recommendations made herein would ensure that these effects would be accounted for in the design of equipment and structural supports.

A rapid phase transition (RPT) can occur when a cryogenic liquid is spilled onto water and changes from liquid to gas, virtually instantaneously. Unlike an explosion that releases energy and combustion products from a chemical reaction, an RPT is the result of heat transferred to the liquid inducing a change to the vapor state. RPTs have been observed during LNG test spills onto water. In some test cases, the overpressures generated were strong enough to damage test equipment in the immediate vicinity of the LNG release point. The sizes of the overpressure events have been generally small and are not expected to cause significant damage. Six of the 18 Coyote spills produced RPT explosions. Most were early RPTs that occurred immediately with the spill, and some continued for the longer periods. Including RPTs near the end of the spills on three tests. LNG composition, water temperature, spill rate and depth of penetration all seem to play a role in RPT development and strength. The maximum strength RPT yielded equivalent to up to 6.3 kilograms of trinitrotoluene free-air point source at the maximum spill rate of 18m^3/minute (4,750 gpm). This would produce an approximate 1 psi overpressures less than 100 feet from the spill source. These events are typically limited to the area within the spill and are not expected to cause damage outside of the area engulfed by the LNG pool. However, a RPT may affect the rate of pool spreading and the rate of vaporization for a spill on water.

Vapor Dispersion

Depending on the size and product of the release, liquids may form a liquid pool and vaporize. Additional vaporization would result from exposure to ambient heat sources, such as water or soil. The vapor may form a toxic or flammable cloud depending on the material released. The dispersion of the vapor cloud will depend on the physical properties of the cloud, the ambient conditions, and the surrounding terrain and structures. Generally, a denser-than-air vapor cloud would sink to the ground and would travel with the prevailing wind, while a lighter-than-air vapor cloud would rise and travel with the prevailing wind. The density will depend on the material releases and the temperature of the material. For example, an LNG release would initially form a denser than-air vapor cloud and transition to lighter-than-air vapor cloud as the vapor disperses downwind and mixes with the warm surrounding air. However, experimental observations and vapor dispersion modeling indicate an LNG vapor cloud would not typically be warm, or buoyant, enough to lift off from the ground before the LNG vapor cloud disperses below its LFL.

A vapor cloud formed following an accidental release would continue to be hazardous until it dispersed below toxic levels and/or flammable limits. Toxicity is primarily dependent on the airborne concentration of the toxic component and the exposure duration, while flammability of the vapor cloud is primarily dependent just on the concentration of the vapor when mixed with the surrounding air. In general, higher concentrations within the vapor cloud would exist near the spill, and lower concentrations would exist near the edge of the cloud as it disperses downwind.

Toxicity is defined by several different agencies for different purposes. Acute Exposure Guideline Level (AEGL) and Emergency Response Planning Guidelines (ERPG) can be used for emergency planning, prevention, and response activities related to the accidental release of hazardous substances. Other federal agencies, such as the DOE, EPA, and NOAA, use AEGLs and ERPGs as the primary measure of toxicity.

There are three AEGLs and three ERPGs, which are distinguished by varying degrees of severity of toxic effects with AEGL-1 and ERPG-1 (level 1) being the least severe to AEGL-3 and ERPG-3 (level 3) being the most severe.

- AEGL-1 is the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic non sensory effects. However, these effects are not disabling and are transient and reversible upon cessation of the exposure.

- AEGL-2 is the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long lasting adverse health effects or an impaired ability to escape.

- AEGL-3 is the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience life-threatening health effects or death.

The EPA directs the development of AEGLs in a collaborative effort consisting of committee members from public and private sectors across the world. FERC staff uses AEGLs preferentially as they are more inclusive and provide toxicity levels at various exposure times (10 minutes, 30 minutes, 1 hour, 4 hours, and 8 hours). The use of AEGLs is also preferred by the DOE and NOAA. Under the EPA RMP regulations in 40 CFR 68, the EPA currently requires the determination of distances to toxic concentrations based on ERPG-2 levels. ERPG levels have similar definitions but are based on the maximum airborne concentration below which it is believed nearly all individuals could be exposed for up to 1 hour without experiencing similar effects defined in each of the AEGLs. The EPA provides ERPGs (1 hour) for a list of chemicals. These toxic concentration endpoints are comparable to AEGLs endpoints.

In addition, any non-toxic release that does not contain oxygen would be classified as simple asphyxiants and may pose extreme health hazards, including death, if inhaled in significant quantities within a limited time. Very cold methane and heavier hydrocarbons vapors may also cause freeze burns. However, the locations of concentrations where cold temperatures and oxygen-deprivation effects could occur are greatly limited due to the continuous mixing with the warmer air surrounding the spill site. For that reason, exposure injuries from contact with releases of methane, nitrogen, and heavier hydrocarbons normally represent negligible risks to the public.

Flammable vapors can develop when a flammable material is above its flash point and concentrations are between the LFL and the upper flammable limit (UFL). Concentrations between the LFL and UFL can be ignited, and concentrations above the UFL or below the LFL would not ignite.

The extent of the affected area and the severity of the impacts on objects within a vapor cloud would primarily be dependent on the material, quantity, and duration of the initial release, the surrounding terrain, and the weather (e.g., wind speed and direction, temperature, humidity, etc.) present during the dispersion of the cloud.

Flammable Vapor Ignition

If the flammable portion of a vapor cloud encounters an ignition source, a flame would propagate through the flammable portions of the cloud. In most circumstances, the flame would be driven by the heat it generates. This process is known as a deflagration, or a flash fire, because of its relatively short duration. However, exposure to a deflagration, or flash fire, can cause severe burns and death, and can ignite combustible materials within the cloud. If the deflagration in a flammable vapor cloud accelerates to a sufficiently high rate of speed, pressure waves that can cause damage would be generated. As a deflagration accelerates to super-sonic speeds, the large shock waves produced, rather than the heat, would begin to drive the flame, resulting in a detonation. The flame speeds are primarily dependent on the reactivity of the fuel, the ignition strength and location, the degree of congestion and confinement of the area occupied by the vapor cloud, and the flame travel distance. Once a vapor cloud is ignited, the flame front may propagate back to the spill site if the vapor concentration along this path is sufficiently high to support the combustion process. When the flame reaches vapor concentrations above the UFL, the deflagration will transition to a pool or jet fire back at the source. If ignition occurs soon after the release begins, a fireball may occur near the source of the release and would be of a relatively short duration compared to an ensuing jet or pool fire. The extent of the affected area and the severity of the impacts on objects in the vicinity of a fire would primarily be dependent on the material, quantity, and duration of the fire, the surrounding terrain, and the ambient conditions present during the fire.

Overpressures

If the deflagration in a flammable vapor cloud accelerates to a sufficiently high rate of speed, pressure waves that can cause damage would be generated. As a deflagration accelerates to super-sonic speeds, large pressure waves are produced, and a shock wave is created. In this scenario, the shock wave, rather than the heat, would drive the flame, resulting in a detonation. Deflagrations or detonations are generally characterized as "explosions" as the rapid movement of the flame and pressure waves associated with them cause additional damage beyond that from the heat. The amount of damage an explosion causes is dependent on the amount the produced pressure wave is above atmospheric pressure (i.e., an overpressure) and its duration (i.e., pulse). For example, a 1 psi overpressure, often cited as a safety limit in NFPA 59A (2019 edition) and U.S. regulations, is associated with glass shattering and traveling with velocities high enough to lacerate skin.

Flame speeds and overpressures are primarily dependent on the reactivity of the fuel, the ignition strength and location, the degree of congestion and confinement of the area occupied by the vapor cloud, and the flame travel distance.

The potential for unconfined LNG vapor cloud detonations was investigated by the Coast Guard in the late 1970s at the Naval Weapons Center in China Lake, California. Using methane, the primary component of natural gas, several experiments were conducted to determine whether unconfined LNG vapor clouds would detonate. Unconfined methane vapor clouds ignited with low-energy ignition sources (13.5 joules), produced flame speeds ranging from 12 to 20 mph. These flame speeds are much lower than the flame speeds associated with a deflagration with damaging overpressures or a detonation.

To examine the potential for detonation of an unconfined natural gas cloud containing heavier hydrocarbons that are more reactive, such as ethane and propane, the Coast Guard conducted further tests on ambient-temperature fuel mixtures of methane-ethane and methane-propane. The tests indicated that the addition of heavier hydrocarbons influenced the tendency of an unconfined natural gas vapor cloud to detonate. Less processed natural gas with greater amounts of heavier hydrocarbons would be more sensitive to detonation.

Although it has been possible to produce damaging overpressures and detonations of unconfined LNG vapor clouds, the feed gas stream proposed for the project would have lower ethane and propane concentrations than those that resulted in damaging overpressures and detonations. The substantial amount of initiating explosives needed to create the shock initiation during the limited range of vapor-air concentrations also renders the possibility of detonation of these vapors at an LNG plant as unrealistic. Ignition of a confined LNG vapor cloud could result in higher overpressures. To prevent such an occurrence, CP2 LNG would take measures to mitigate the vapor dispersion and ignition into confined areas, such as buildings. CP2 LNG would install hazard detection devices at all combustion and ventilation air intake equipment to enable isolation and deactivation of any combustion equipment whose continued operation could add to, or sustain, an emergency. In general, the primary hazards to the public from an LNG spill that disperses to an unconfined area, either on land or water, would be from dispersion of the flammable vapors or from radiant heat generated by a pool fire.

In comparison with LNG vapor clouds, there is a higher potential for unconfined propane clouds to produce damaging overpressures. This has been shown by multiple experiments conducted by the Explosion Research Cooperative to develop predictive blast wave models for low, medium, and high reactivity fuels and varying degrees of congestion and confinement. The experiments used methane, propane, and ethylene, as the respective low, medium, and high reactivity fuels. In addition, the tests showed that if methane, propane, or ethylene are ignited within a confined space, such as in a building, they all have the potential to produce damaging overpressures.

Fires and overpressures may also cause failures of nearby storage vessels, piping, and equipment if not properly mitigated. These failures are often termed cascading events or domino effects and can exceed the consequences of the initial hazard. The failure of a pressurized vessel could cause fragments of material to fly through the air at high velocities, posing damage to surrounding structures and a hazard for operating staff, emergency personnel, or other individuals in proximity to the event. In addition, failure of a pressurized vessel when the liquid is at a temperature significantly above its normal boiling point could result in a BLEVE. BLEVEs can produce overpressures when the superheated liquid rapidly changes from a liquid to a vapor upon the release from the vessel. BLEVEs of flammable fluids may also ignite upon its release and cause a subsequent fireball.

Potential Infrastructure Impacts from the LNG Terminal

The preceding Reliability and Safety sections assessed potential impacts to the public and whether the CP2 LNG Project would operate safely, reliably, and securely. However, in order to assess potential impacts from catastrophic incidents and in response to FERC staff's data requests, CP2 LNG evaluated potential impacts from incidents identified at the LNG Terminal, including potential impacts to individuals with access and function needs as defined in NFPA 1600, Standard on Continuity, Emergency, and Crisis Management and NFPA 1616, Standard on Mass Evacuation, Sheltering, and Re-Entry Programs. FERC staff also performed an independent analysis of potential safety impacts on environmental justice communities using conservative, worst-case distances in the modeling assumptions. The analysis evaluated a range of releases to evaluate the potential impacts to populations and infrastructure within vicinity of the plant. Impacts would vary based on the initiating event and subsequent release characteristics (e.g., size, location, direction, process conditions, etc.), hazard (i.e., vapor dispersion, overpressures, fires, BLEVE and pressure vessel bursts), weather conditions, and surrounding terrain. Distances to radiant heats of 5 kW/m^2 (or approximately 1,600 BTU/ft^2-hr) from fires produced by accidental and intentional acts could impact onsite personnel or offsite public. For example, Section 2.2.2.2 in NFPA 59A-2001, incorporated by reference in PHMSA regulations in 49 CFR 193, requires spill containments, serving vaporization, process, or LNG transfer area, to contain liquid releases from 2-inch diameter holes and guillotine releases of piping less than 6-inches in diameter. Additionally, PHMSA siting regulations for flammable vapor dispersion and thermal radiation exclusion zones limit the dispersion of flammable vapors and 1,600 BTU/ft^2-hr radiant heats from LNG pool fires in those spill containment systems in certain weather conditions from extending beyond the control of the operator or government agency and prevent it from extending onto areas accessible by the public. FERC staff also recommends spill containment systems to capture all liquid from guillotine ruptures of the single largest line and largest vessel(s) to limit their pool spread and vaporization. This effectively limits the extent of the 1,600 BTU/ft^2-hr radiant heat from pool fires to onsite for even the largest releases from a single source and considerably reduces the dispersion distance of flammable and toxic vapors. However, ignition of releases larger than those used in the siting analyses can result in 1,600 BTU/ft^2-hr and 10,000 BTU/ft^2-hr radiant heats from jet and pool fires that extend offsite onto publicly accessible areas.

The infrastructure and communities that could be impacted by a fire with 10,000 BTU/ft^2-hr radiant heats extending offsite due to a pool fire over an LNG release from both the inner and outer walls of an LNG storage tank and from large piping jet fires if not mitigated by the storm surge wall around the Terminal Site, include potentially some residences and a portion of LA 27. The infrastructure and communities that could be impacted by a fire with 1,600 BTU/ft^2-hr radiant heats extending offsite, include portions of the Calcasieu Pass LNG facility and numerous local government buildings including the Cameron Parish Health Unit, Court House, Police Jury Building, Cameron Parish Sheriff's department, Cameron Fire Department, Cameron Parish School District Offices, the Cameron Parish Branch Library, and the Post Office. It would also include multiple residential homes, multiple RV parks, several places of worship, and the Cameron Parish Jail as well as the previously mentioned infrastructure and communities within the 10,000 BTU/ft^2-hr radiant heats. The unignited vapor dispersion is extremely unlikely but, if it occurred, could extend farther offsite and could impact the following infrastructure: the Monkey Island Pilot's Dormitory, the Calcasieu shipping channel ferry; LA 27 on both sides of the Calcasieu Shipping Channel; the John W. Stone Oil distribution center; if constructed, the Commonwealth LNG terminal; and most of Cameron, LA. FERC staff did not locate any schools, daycare facilities, boarding and care facilities, or hospitals within the hazard footprints.

Potential Infrastructure Impacts Along LNG Marine Vessel Route

As LNG marine vessels would proceed along the intended transit route, the estimated impacts would extend onto populated areas and infrastructure. These distances are provided as Zones of Concern in the publicly available guidance document NVIC 01-11[251] used by the Coast Guard and correspond to 37.5 kW/m^2 (approximately 12,000 BTU/ft^2-hr) radiant heats from fires for Zone 1, 5 kW/m^2 (approximately 1,600 BTU/ft^2-hr) radiant heats from fires for Zone 2, and flammable vapor dispersion distances for Zone 3. The areas impacted by the three different hazard zones are illustrated for accidental and intentional events in figures 4.13.1-1 and 4.13.1-2, respectively.

251 NVIC 01-11, https://www.dco.uscg.mil/Portals/9/DCO%20Documents/5p/5ps/NVIC/2011/NVIC%2001-2011%20Final.pdf, Accessed March 2023.

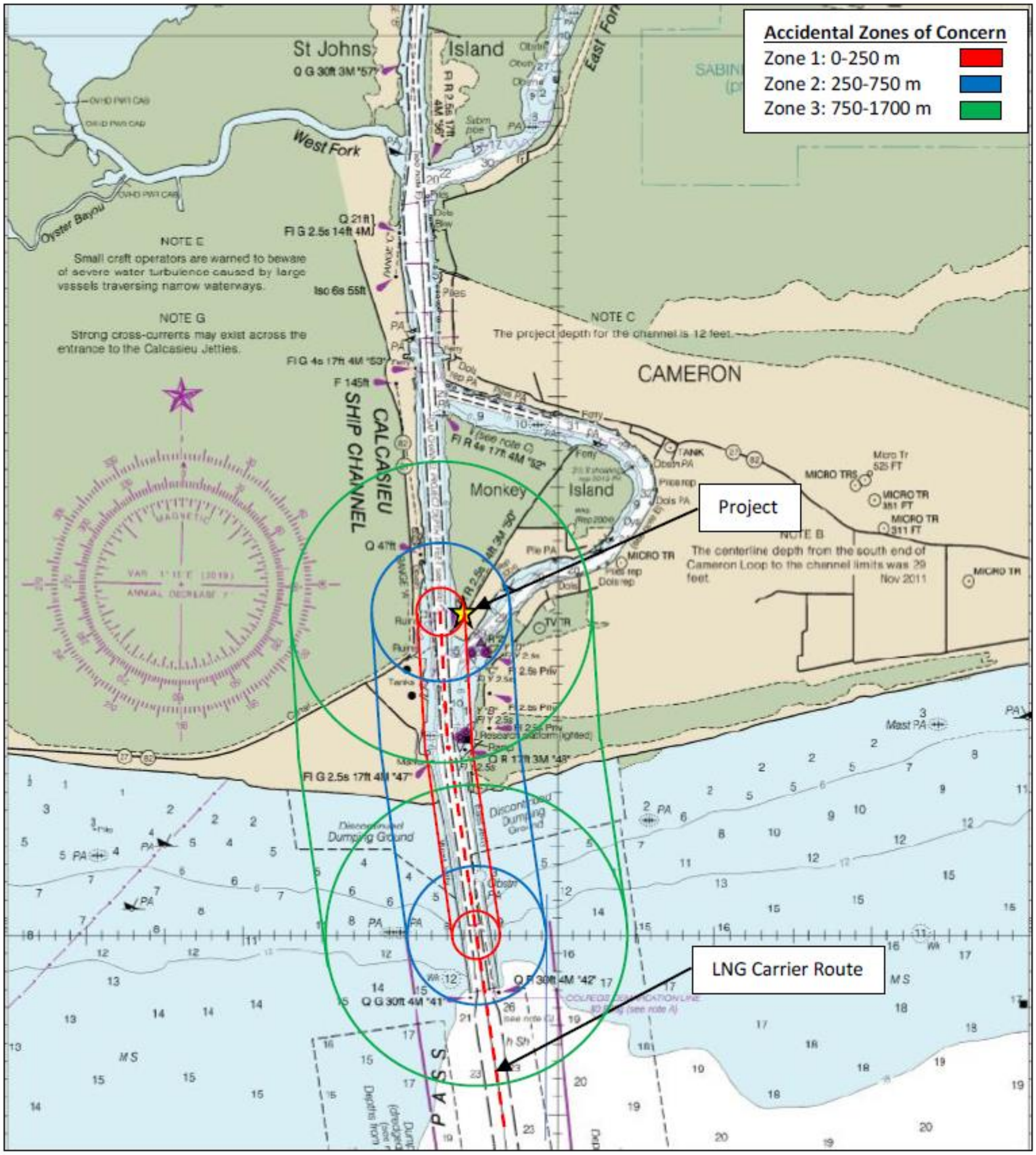

Figure 4.13.1-1 Accidental Hazard Zones along LNG Marine Vessel Route

Distances to radiant heats of 5kW/m^2 (or approximately 1,600 BTU/ft^2-hr) from fires demarked by Zone 1 for accidental acts would remain entirely over the water and would encompass coastal areas in Cameron and any commercial and recreational vessels if they would be allowed within 830 feet (250 meters) of the LNG marine vessel. Zone 2 for accidental acts would encompass the waterway, coastal areas in Cameron, any commercial and recreational vessels if they would be allowed with 1,660 feet (500 meters) of the LNG marine vessel, the John W. Stone Oil Distribution facility, and a portion of the Calcasieu Pass LNG facility. Zone 3 for accidental acts would also encompass a wider swath of coastal areas along Cameron and would include multiple places of business, and the Monkey Island Pilot's Dormitory.

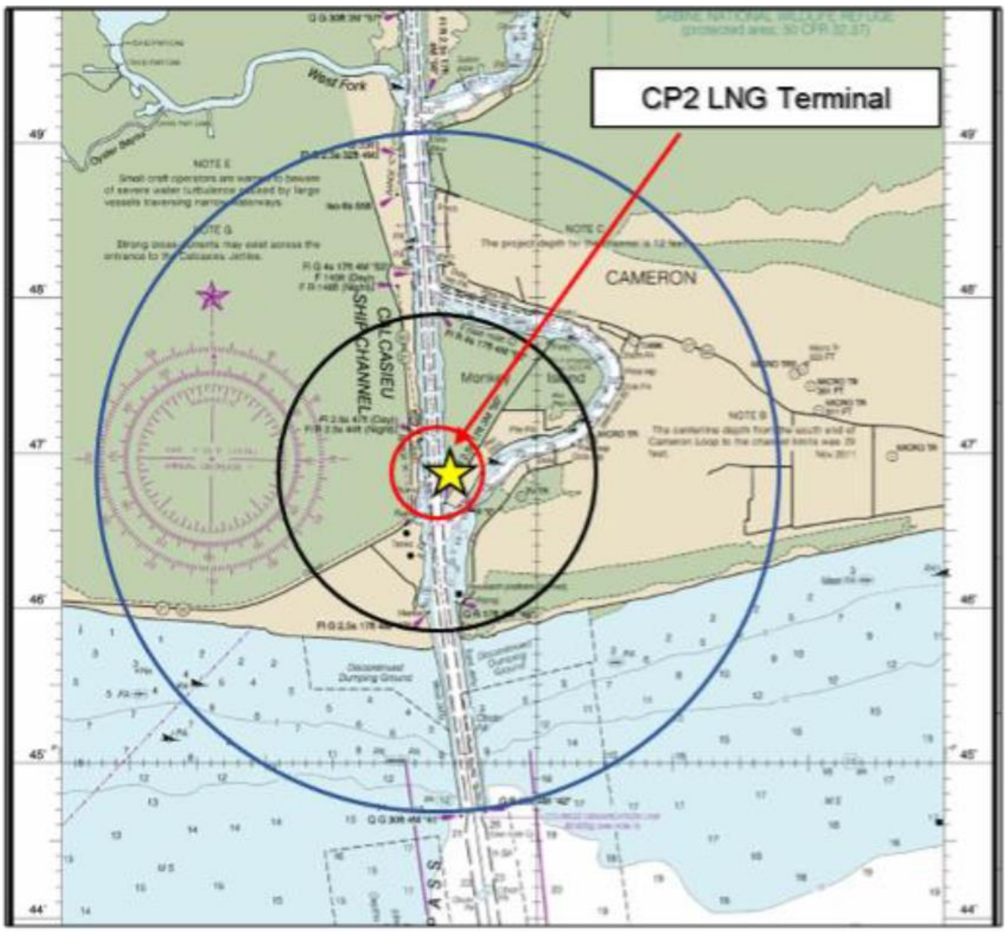

Figure 4.13.1-2 Intentional Hazard Zones along LNG Marine Vessel Route

The Intentional Hazard Zones are shown above for marine vessels at the CP2 LNG project berths, and these zones would apply at any location from the mouth of the river to the berths, similar to the progression shown in figure 4.13.1-1 for the accidental hazard zones. Zone 1 for intentional acts would encompass coastal areas in Cameron and any commercial and recreational vessels if they would be allowed within 1,640 feet (500 meters) of the vessel, as well as portions of Venture Global Calcasieu Pass LNG, John W. Stone Oil Distribution, and the Monkey Island Pilot's Dormitory. Zone 2 for intentional acts would cover a wider swath of coastal areas along Cameron. Zone 3 for intentional acts would span larger portions of Cameron and would include two churches and multiple residences, places of business, municipal facilities (Cameron Fire Department, Cameron Parish Sheriff's Department and Detention Center), and all of Monkey Island.

Potential Impacts on People with Access and Functional Needs and Environmental Justice Communities

FERC staff used EJScreen[252] as an initial screening tool to identify the potential impacts from incidents identified along the LNG marine vessel transit route and at the LNG terminal, including potential impacts to people with access and functional needs as defined in NFPA 1600 and 1616. For the Terminal Site, this includes jet fires from large piping in addition to a pool fire from an LNG tank failure, although the storm surge wall around the site, which is at least 26 feet tall, may mitigate most jet fires, as well as vapor cloud dispersion to the AEGL and LFL from a worst-case unignited release potentially due to a catastrophic rupture of the largest flowing pipe or vessel as well as projectile impacts from PVBs and BLEVEs. Table 4.13.1-1 shows the resultant percentages of people with potential access and functional needs within all potential impact areas[253] combined for that category, which may not be representative of a single event, based on 2016-2020 U.S. Census Bureau, American Community Survey as follows:[254]

Table 4.13.1-1

People with Access and Functional Needs within Potential Incident Impact Areas (not necessarily a single event)

Potential Incident Impact Area	Population Density (per square mile) [1]	Households [1]	Housing Units [1]	Age 0-4 (percent) [1]	Age 65+ (percent) [1]	Linguistically Isolated Households(percent) [1, 2, 3]
Zone 1 (accidental)	0	0	0	NA	NA	NA
Zone 2 (accidental)	0	0	0	NA	NA	NA
Zone 3 (accidental)	1	0	0	0%	44%	0%
Zone 1 (intentional)	0	0	0	NA	NA	NA
Zone 2 (intentional)	1	0	0	0%	44%	0%
Zone 3 (LNG marine	14	22	39	4%	14%	0%

[252] EPA, EJScreen, https://ejscreen.epa.gov/mapper/, Accessed March 2022.

[253] Potential impact areas would be representative of cumulative worst case impacts from all potential worst case hazard releases, including from all release directions and orientations subject to all worst case wind directions and conditions and may also include different applicable incident locations. Therefore, the potential impact area should not be interpreted as the impact distance from any single event, which will be dependent on release orientation and direction, wind direction and conditions, location of release, type of hazard (e.g., pool fire, jet fire, flammable vapor dispersion, etc.), and characteristics, timing, and location of any ignition that may or may not occur. However, the radius of the potential impact area would represent the maximum distance from a single event.

[254] Based on EPA, EJScreen User Guide, Version 2.1, 2022, the impact area would aggregate appropriate portions of the intersecting block groups, weighted by population, to create a representative set of data for the entire ring area, honoring variation and dispersion of the population in the block groups within it. For each indicator, the result is a population-weighted average, which equals the block group indicator values averaged over all residents who are estimated to be inside the impact area. A weight factor for each block group is determined by summing each block point population percentage for that block group. If the impact area touches part of a neighboring block group that contains no block points, nothing will be aggregated; if an impact area intersects a number of block groups, EJScreen indices will be aggregated within each block group based on the affiliated block points. The aggregation is done by using factor-weighted block points.

Table 4.13.1-1 People with Access and Functional Needs within Potential Incident Impact Areas (not necessarily a single event)						
Potential Incident Impact Area	**Population Density (per square mile)** [1]	**Households** [1]	**Housing Units** [1]	**Age 0-4 (percent)** [1]	**Age 65+ (percent)** [1]	**Linguistically Isolated Households(percent)** [1, 2, 3]
vessel intentional)						
10,000 BTU/ft^2-hr (LNG Terminal)	38	15	26	6%	21%	0%
1,600 BTU/ft^2-hr (LNG Terminal)	40	31	54	6%	21%	0%
Flammable Vapor Cloud (LNG Terminal)	6	82	143	6%	21%	0%

[1] American Community Survey, 2016-2020, American Community Survey Estimates

[2] Households in which no one 14 and over speaks English "very well" or speaks English only.

[3] Calculated by dividing the number of linguistically isolated households by the total number of households multiplied by 100.

The worst-case distances from these potential incidents would potentially impact three block groups, two of which are considered environmental justice communities, as defined in the 4.10.10 Environmental Justice section. The block groups located with environmental justice communities that exceed the thresholds for minority and low income identified in the 4.10.10 Environmental Justice section would include CT 9702.01, BG 3 (based on the low-income threshold); and CT 9701, BG 1 (based on the minority threshold). Minority and low-income population percents for these Census Tract Block Groups are provided in detail in the Environmental Justice Section (section 4.10.10).

Should a catastrophic incident or other more likely emergency occur at the CP2 LNG Terminal Facilities or at the LNG marine vessel along its route, people with access and functional needs and environmental justice communities could experience significant public safety impacts and impacts on environmental justice communities would be disproportionately high and adverse as the impacts of such an accident would be predominately borne by environmental justice communities. However, FERC staff has determined that the risk (i.e., likelihood and consequence) of accidental and intentional events would be less than significant with implementation of the proposed safety and security measures recommendations. These measures further enhance the safety and security of the engineering design of the layers of protection for review subject to the approval by FERC staff and in accordance with recommended and generally accepted good engineering practices, which go above the minimum federal requirements that would also be required at the LNG terminal by DOT PHMSA regulations under 49 CFR 193 and Coast Guard regulations under 33 CFR 127 and 33 CFR 105, and those required for the LNG marine vessel by Coast Guard regulations under 33 CFR 104 and 46 CFR 154, such that they would further reduce the risk of incidents impacting the public to less than significant levels, including impacts to those with access and functional needs and environmental justice communities.

Emergency Response Plans and Mitigation

In order to mitigate these potential offsite risks, additional recommendations are made by FERC staff to further enhance the safety and security measures beyond that which would normally be required at the LNG terminal by the minimum standards for LNG safety promulgated in PHMSA regulations under 49 CFR 193 and Coast Guard regulations under 33 CFR 127 and 33 CFR 105.

As stated in Sandia National Laboratories Report, Guidance on Risk Analysis and Safety Implications of a Large LNG Spill Over Water, SAND2004-6258, which was the basis for the Zones of Concern and referenced in NVIC 01-011, Zone 1 represents "risks and consequences of an LNG spill could be significant and have severe negative impacts" and radiant heat demarked by this zone "poses a severe public safety and property hazard, and can damage or significantly disrupt critical infrastructure." Subsequently, the Sandia report concludes that for accidental Zone 1 impacts, "risk management strategies for LNG operations should address both vapor dispersion and fire hazards" and the most rigorous deterrent measures, such as vessel security zones, waterway traffic management, and establishment of positive control over vessels are options to be considered as elements of the risk management process." Zone 1 is based upon a 37.5 kW/m^2 radiant heat from a fire, which would cause significant damage to equipment and structures that are located within 1,640 feet as described more fully in footnote describing impacts of radiant heat corresponding to Zone 1. Sandia recommends that "incident management and emergency response measures should be carefully evaluated to ensure adequate resources (i.e., firefighting, salvage, etc.) are available for consequence and risk mitigation."

Sandia indicates Zone 2 represents where radiant heat "transitions to less severe hazard levels to public safety and property" and the consequence of an accidental LNG spill are reduced and risk reduction and mitigation approaches and strategies can be less extensive." Zone 2 is based upon a 5 kW/m^2 radiant heat, which would cause significant impacts to individuals, but would not be expected to significantly impact most structures as described more fully in footnote describing impacts of radiant heat corresponding to Zone 2. Sandia concludes that for accidental Zone 2 impacts, "risk management strategies for LNG operations should focus on approaches dealing with both vapor dispersion and fire hazards" and "should include incident management and emergency management and emergency response measures, such as ensuring areas of refuge (e.g., enclosed areas, buildings) are available, development of community warning signals, and community education programs to ensure persons know what precautions to take."

Sandia indicates Zone 3 represents "risks and consequences to people and property of an accidental LNG spill over water are minimal" and radiant heat "poses minimal risks to public safety and property". Zone 3 is based upon the dispersion distance to flammable vapors under worst-case wind conditions. In the rare circumstance that the flammable vapors are not ignited until later, there could be flash fires or explosions depending on congestion, confinement, and ignition strength and location. Subsequent pool fires that would be demarked from the Zone 1 and 2 fire hazard distances, Sandia concludes that for accidental Zone 3 impacts, "risk reduction and mitigation strategies can be significantly less complicated or extensive" and "should concentrate on incident management and emergency response measures that are focused on dealing with vapor cloud dispersion...", such as ensuring "areas of refuge are available, and community education programs...to ensure that persons know what to do in the unlikely event of a vapor cloud." Sandia makes similar recommendations for the Zones of Concern for intentional acts. We recommend the Sandia recommendations be incorporated into Emergency Response Plans consistent with the recognized and generally accepted good engineering practices for evacuating and sheltering in place, such as NFPA 1600, NFPA 1616, NFPA 1620, NFPA 470, and NFPA 475.

FERC staff determined that the risk of accidental and intentional events would be less than significant with implementation of the proposed safety and security recommendations that further enhance the safety and security measures that would be required at the LNG terminal by PHMSA regulations under

49 CFR 193 and Coast Guard regulations under 33 CFR 127 and 33 CFR 105, and those required for the LNG marine vessel by Coast Guard regulations under 33 CFR 104 and 46 CFR 154. Furthermore, EPAct 2005 requires that an LNG terminal operator's ERP be developed in consultation with the Coast Guard and State and local agencies and be approved by the commission prior to final approval to begin construction. To satisfy this requirement, FERC staff recommends in section 4.13.5 that prior to initial site preparation, CP2 LNG develop an ERP (including evacuation and any sheltering and re-entry) and coordinate procedures with the Coast Guard; state, county, and local emergency planning groups; fire departments; state and local law enforcement; and other appropriate federal agencies. This plan should be consistent with recommended and good engineering practices, as defined in NFPA 1600, NFPA 1616, NFPA 1620, NFPA 470, NFPA 475, or equivalent, and based on potential impacts and onsets of hazards from accidental and intentional events along the LNG marine vessel route and potential impacts and onset of hazards from accidental and intentional events at the LNG terminal, including but not limited to a catastrophic rupture of the largest LNG tank. The plan should also address any special considerations and pre-incident planning for infrastructure and public with access and functional needs and should include at a minimum:

- materials and plans for periodic dissemination of public education and training materials for potential hazards and impacts, identification of potential hazards, and steps for notification, evacuation and shelter in place of the public within any transient hazard areas along the marine vessel route, and within LNG terminal hazard areas in the event of an incident;

- plans to competently train emergency responders required to effectively and safely respond to hazardous material incidents including, but not limited to LNG fires and dispersion;

- plans to competently train emergency responders to effectively and safely evacuate or shelter public within transient hazard areas along the marine vessel route, and within hazard areas from LNG terminal;

- designated contacts with federal, state and local emergency response agencies responsible for emergency management and response within any transient hazard areas along the marine vessel route, and within hazard areas from LNG terminal;

- scalable procedures for the prompt notification of appropriate local officials and emergency response agencies based on the level and severity of potential incidents;

- scalable procedures for mobilizing response and establishing a unified command, including identification, location, and design of any emergency operations centers and emergency response equipment required to effectively and safely to respond to hazardous material incidents and evacuate or shelter public within transient hazard areas along the marine vessel route, and within LNG terminal hazard areas;

- scalable procedures for notifying public, including identification, location, design, and use of any permanent sirens or other warning devices required to effectively communicate and warn the public prior to onset of debilitating hazards within any transient hazard areas along the LNG marine vessel route and within hazard areas from LNG terminal;

- scalable procedures for evacuating the public, including identification, location, design, and use of evacuation routes/methods and any mustering locations required effectively and safely evacuate public within any transient hazard areas along the LNG marine transit route and within hazard areas from LNG terminal; and

- scalable procedures for sheltering the public, including identification, location, design, and use of any shelters demonstrated to be needed and demonstrated to effectively and safely shelter public prior to onset of debilitating hazards within transient hazard areas that may benefit from sheltering in place (i.e., those within Zones of Concern 1 and 2), along the route of the LNG marine vessel and within hazard areas that may benefit from sheltering in place (i.e., those within areas of 1,600 BTU/ft^2-hr and 10,000 BTU/ft^2-hr radiant heats from fires with farthest impacts, including from a catastrophic failure of largest LNG tank) of the LNG terminal.

FERC staff recommends CP2 LNG notify FERC staff of all planning meetings in advance and should report progress on the development of its ERP at 3-month intervals, as well as file public versions of offsite emergency response procedures for public notification, evacuation, and shelter in place. EPAct 2005 also requires LNG terminal operators develop a cost-sharing plan to reimburse direct costs to state and local agencies. To satisfy this requirement, FERC staff also recommends a Cost Sharing Plan that includes sustained funding of any requirement or resource gap analysis identified above to be needed and to effectively and safely evacuate and shelter public and required to effectively and safely respond to hazardous material incidents Once submitted by CP2 LNG, we would evaluate the revised ERP and Cost Sharing Plan in accordance with recommended and good engineering practices such as, but not limited to, NFPA 1600, NFPA 1616, NFPA 1620, NFPA 470 and NFPA 475, or equivalents.

Based on our preliminary analysis of the hazards from the LNG facilities and recommendations herein as well as hazards along the LNG marine vessel route, we recommend in section 4.13.5 that CP2 LNG provide additional information, for review and approval, on development of emergency response plans prior to initial site preparation. We also recommend in section 4.13.5 that CP2 LNG file three dimensional drawings, for review and approval, that demonstrate there is a sufficient number of access and egress locations. If this Project is authorized, constructed, and operated, CP2 LNG would coordinate with local, state, and federal agencies on the development of an emergency response plan and cost sharing plan. We recommend in section 4.13.5 that CP2 LNG provide periodic updates on the development of these plans for review and approval, and ensure they are in place prior to introduction of hazardous fluids. In addition, we recommend in section 4.13.5 that Project facilities be subject to regular inspections throughout the life of the facility and would continue to require companies to file updates to the ERP.

4.13.2 Pipeline Facilities

The transportation of natural gas by pipeline involves some incremental risk to the public due to the potential for accidental release of natural gas. The greatest hazard is a fire or explosion following a major pipeline rupture. CH_4, the primary component of natural gas, is colorless, odorless, and tasteless. It is not toxic, but is classified as a simple asphyxiate, possessing a slight inhalation hazard. If breathed in high concentration, oxygen deficiency can result in serious injury or death. CH_4 is inactive biologically and essentially nontoxic. It is not listed in the International Agency for Research on Cancer (2017), National Toxicology Program (2021), or by the Occupational Safety and Health Administration (2017) as a carcinogen or potential carcinogen. CH_4 has an auto-ignition temperature of 1,000°F and is flammable at concentrations between 5 and 15 percent in the air (World Health Organization, 2000). Unconfined mixtures of CH_4 in air are not explosive; however, it may ignite if there is an ignition source. A flammable concentration within an enclosed space in the presence of an ignition source can explode. It is buoyant at atmospheric temperatures and disperses rapidly in air.

The DOT is mandated to provide pipeline safety under Title 49, USC Chapter 601. PHMSA's Office of Pipeline Safety administers the national regulatory program to ensure the safe transportation of natural gas and other hazardous materials by pipeline. It develops safety regulations and other approaches to risk management that ensure safety in the design, construction, testing, operation, maintenance, and emergency response of pipeline facilities. Many of the regulations are written as performance standards that set the level of safety to be attained and allow the pipeline operator to use various technologies to achieve the required safety standard. PHMSA's mission is to protect people and the environment from the risks of pipeline incidents. This work is shared with state agency partners and others at the federal, state, and local level.

Title 49, USC Chapter 601 provides for a state agency to assume all aspects of the safety program for intrastate facilities by adopting and enforcing the federal standards. A state may also act as DOT's agent to inspect interstate facilities within its boundaries; however, the DOT is responsible for enforcement actions. The State of Louisiana has delegated authority to inspect interstate pipeline facilities. Texas has adopted the minimum federal pipeline safety regulations as authorized by PHMSA to assume all aspects of the safety program intrastate, but not interstate, facilities. In Title 16 of the TAC, Texas has also instituted multiple more stringent safety requirements beyond the federal standards. The RRC is charged with overseeing the state's safety program for intrastate natural gas facilities.

The DOT pipeline standards are published in 49 CFR Parts 190–199. Part 192 specifically addresses natural gas pipelines. We received a comment from RESTORE on the draft EIS expressing concern regarding the proximity of the CP Express Pipeline to other pipelines, especially during construction. CP Express would construct the CP Express Pipeline and Enable Gulf Run Lateral in accordance with the DOT pipeline standards outlined in 49 CFR 192.325, which requires a minimum of 12 inches of clearance between natural gas transmission lines and other underground structures, including other pipelines.

Under a MOU on Natural Gas Transportation Facilities dated January 15, 1993, between the DOT and FERC, the DOT is recognized as having the exclusive authority to promulgate federal safety standards used in the transportation of natural gas. Section 157.14(a)(9)(vi) of FERC's regulations require that an applicant certify that it would design, install, inspect, test, construct, operate, replace, and maintain the facility for which a Certificate is requested in accordance with federal safety standards and plans for maintenance and inspection; or should certify that it has been granted a waiver of the requirements of the safety standards by the DOT in accordance with section 3(e) of the Natural Gas Pipeline Safety Act. FERC accepts this certification and does not impose additional safety standards other than the DOT standards. If the Commission becomes aware of an existing or potential safety problem, there is a provision in the MOU to promptly alert the DOT. The MOU also provides instructions for referring complaints and inquiries made by state and local governments and the general public involving safety matters related to pipelines under the Commission's jurisdiction.

We also participate as a member of the DOT's Technical Pipeline Safety Standards Committee, which determines if proposed safety regulations are reasonable, feasible, and practicable.

The pipelines and aboveground facilities associated with the Project would be designed, constructed, operated, and maintained in accordance with or to exceed the DOT Minimum Federal Safety Standards in 49 CFR 192. These regulations, which are intended to protect the public and to prevent natural gas facility accidents and failures, include specifications for material selection and qualification; minimum design requirements; and protection of the pipeline from internal, external, and atmospheric corrosion.

The DOT defines area classifications based on population density in the vicinity of the pipelines and specifies more rigorous safety requirements for populated areas. Pipe wall thickness and pipeline design pressures, hydrostatic test pressures, MAOP, inspection and testing of welds, and frequency of pipeline patrols and leak surveys must also conform to higher standards in more populated areas. The class locations unit is an area that extends 220 yards on either side of the centerline of any continuous 1- mile length of pipeline. The four area classifications are defined below:

- Class 1 – Location with 10 or fewer buildings intended for human occupancy;
- Class 2 – Location with more than 10 but less than 46 buildings intended for human occupancy;
- Class 3 – Location with 46 or more buildings intended for human occupancy or where the pipeline lies within 100 yards of any building, or small well-defined outside area occupied by 20 or more people on at least 5 days a week for 10 weeks in any 12-month period; and,
- Class 4 – Location where buildings with four or more stories aboveground are prevalent.

In accordance with federal standards, class locations representing more populated areas require higher safety factors in pipeline design, testing, and operation. Pipelines constructed on land in Class 1 locations must be installed with a minimum depth of cover of 30 inches in normal soil and 18 inches in consolidated rock. Class 2, 3, and 4 locations, as well as drainage ditches of public roads and railroad crossings, require a minimum cover of 36 inches in normal soil and 24 inches in consolidated rock. We note that the proposed pipelines do not cross any areas of consolidated rock within trenching depth. All pipelines installed in navigable rivers, streams, and harbors must have a minimum cover of 48 inches in soil or 24 inches in consolidated rock. Class locations also specify the maximum distance to sectionalized block valves (that is 10.0 miles in Class 1, 7.5 miles in Class 2, 4.0 miles in Class 3, and 2.5 miles in Class 4).

The CP Express Pipeline and Enable Gulf Run Lateral class locations are shown below in table 4.13.2-1. If the Project is approved, the regulations require that the pipelines be designed, at a minimum, to the appropriate class location standards and that the spacing between the MLVs meets the DOT requirements.

Table 4.13.2-1

Class Locations Along the Pipeline Routes of the Project

County/Parish	Milepost Begin	Milepost End	Length (feet)	Class Rating
CP Express Pipeline				
Jasper County	0.0	6.5	34,474	1
Jasper County	6.5	6.8	1,383	2
Jasper County	6.8	7.2	2,073	1
Jasper and Newton Counties	7.2	7.9	3,563	2
Newton County and Calcasieu Parish	7.9	49.2	220,877	1
Calcasieu Parish	49.2	49.4	1,207	3
Calcasieu and Cameron Parishes	49.4	83.9	181,970	1
Cameron Parish	83.9	84.2	1,603	2
Cameron Parish	84.2	84.4	1,109	1
Cameron Parish	84.4	84.7	1,597	2
Cameron Parish	84.7	84.9	1,165	1
Cameron Parish	84.9	85.0	299	2

Table 4.13.2-1 Class Locations Along the Pipeline Routes of the Project				
County/Parish	**Milepost Begin**	**Milepost End**	**Length (feet)**	**Class Rating**
Enable Gulf Run Lateral				
Calcasieu Parish	0.0	6.0	31,897	1

During operation of the pipelines, if a subsequent increase in population density adjacent to the right-of-way indicates a change in class location for the pipelines, CP Express would be required to reduce the MAOP or replace the segment with pipe of sufficient grade and wall thickness, if required, to comply with the DOT regulations for the new class location. The Pipeline Safety Improvement Act of 2002 also requires operators to develop and follow a written integrity management program that contains all the elements described in 49 CFR § 192.911 and addresses the risks on each transmission pipeline segment. Specifically, the law establishes an integrity management program that applies to all high consequence areas (HCAs).

The DOT published rules that define HCAs where a gas pipeline accident could do considerable harm to people and their property and requires an integrity management program to minimize the potential for an accident. This definition satisfies, in part, the Congressional mandate for the DOT to prescribe standards that establish criteria for identifying each gas pipeline facility in a high-density population area.

The HCAs may be defined in one of two ways. In the first method, an HCA includes:

- current Class 3 and 4 locations; or
- any area in Class 1 or 2 locations where the potential impact radius is greater than 660 feet and there are 20 or more buildings intended for human occupancy within the potential impact circle; or,
- any area in Class 1 or 2 locations where the potential impact circle includes an identified site.

In the second method, an HCA includes any area within a potential impact circle that contains:

- 20 or more buildings intended for human occupancy; or
- an identified site.

An identified site is an outside area or open structure that is occupied by 20 or more persons on at least 50 days in any 12-month period; a building that is occupied by 20 or more persons on at least 5 days a week for any 10 weeks in any 12-month period; or a facility that is occupied by persons who are confined, are of impaired mobility, or would be difficult to evacuate.

Once a pipeline operator has determined the HCAs on its pipeline, it must apply the elements of its integrity management plan to those segments of the pipeline within the HCAs. The DOT regulations specify the requirements for the integrity management plan at 49 CFR § 192.911. The pipeline integrity management rule for HCAs requires inspection of the pipeline every 7 years. Currently, there are no HCAs along the Pipeline System.

After construction, and as required by the DOT regulations, the pipelines would be marked at line-of-sight intervals and at crossings of roads, railroads, and other key points. The markers would indicate the presence of the pipelines and provide a telephone number and address where a company representative could be reached in the event of an emergency or before any excavation in the area of the pipeline by a third-party.

Since 1982, operators have been required to participate in "One Call" public utility programs in populated areas to minimize unauthorized excavation activities in the vicinity of pipelines. The "One Call" program is a service used by public utilities and some private sector companies (e.g., oil pipelines and cable television) to provide preconstruction information to contractors or other maintenance workers on the underground location of pipes, cables, and culverts. CP Express would participate in the One Call" program in Texas and Louisiana. CP Express perform periodic aerial and/or ground inspections for exposed pipe, unauthorized encroachment on the right-of-way, activities near the right-of-way, and other conditions that could present a safety hazard or require preventive maintenance or repairs. The pipeline cathodic protection system would also be monitored and inspected periodically to ensure proper and adequate corrosion protection.

The DOT prescribes the minimum standards for operating and maintaining pipeline facilities, including the requirement to establish a written plan governing these activities. Each pipeline operator must establish an emergency plan that includes procedures to minimize the hazards in a natural gas pipeline emergency. Key elements of the plan would include procedures for:

- receiving, identifying, and classifying emergency events such as gas leakage, fires, explosions, and natural disasters;
- establishing and maintaining communications with local fire, police, and public officials, and coordinating emergency response;
- ESD of system and safe restoration of service;
- making personnel, equipment, tools, and materials available at the scene of an emergency; and
- protecting people first and then property, and making them safe from actual or potential hazards.

CP Express would prepare an ERP that would provide procedures to be followed in the event of an emergency that would meet the requirements of 49 CFR 192.615. The plan would include the procedures for communicating with and notifying emergency services departments, prompt responses for each type of emergency, logistics, ESD and pressure reduction, and service restoration.

4.13.3 Pipeline Accident Data

The DOT requires all operators of natural gas transmission pipelines to notify the DOT of any significant incidents and to submit a report within 30 days. Significant incidents are defined as any leaks that:

- cause a death or personal injury requiring hospitalization; or
- involve property damage of more than $50,000 in 1984 dollars.[256]

Data available from PHMSA indicates that during the 20-year period from 2001 through 2020, a total of 1,142 significant incidents were reported on the more than 300,000 total miles of natural gas transmission pipelines nationwide.

Additional insight into the nature of service incidents may be found by examining the primary factors that caused the failures. Table 4.13.3-1 provides a distribution of the causal factors, as well as the number of each incident by cause.

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[256] $50,000 in 1984 dollars is approximately $131,979 as of November, 2021 (U.S Bureau of Labor Statistics, 2022).

Table 4.13.3-1 Natural Gas Transmission Dominant Incident Causes, 2001-2020		
Incident	**Number of Incidents [a]**	**Percentage**
Pipeline material, weld, or equipment failure	429	37.6
Corrosion	193	16.9
Excavation [b]	182	15.9
Natural force damage	99	8.7
Other Outside forces [c]	80	7.0
Incorrect operation	64	5.6
All other causes [d]	95	8.3
Total	**1,142**	**--**

a All data gathered from PHMSA's Significant Incident files, January 20, 2022 (PHMSA, 2022).
b Includes third party damage.
c Fire, explosion, vehicle damage, previous damage, intentional damage.
d Miscellaneous causes or unknown causes.

The dominant incident cause of pipeline incidents were pipeline material, weld, or equipment failure and corrosion, constituting 54.5 percent of all significant incidents. The pipelines included in the data set in table 4.13.3-1 vary widely in terms of age, pipe diameter, and level of corrosion control. Each variable influences the incident frequency that may be expected for a specific segment of pipeline. The frequency of significant incidents is strongly dependent on pipeline age. Older pipelines have a higher frequency of corrosion incidents, since corrosion is a time-dependent process. The use of both an external protective coating and a cathodic protection system,[257] required on all pipelines installed after July 1971, significantly reduces the corrosion rate compared to unprotected or partially protected pipe.

Outside forces, including excavations and natural events were the cause of 31.6 percent of significant pipeline incidents nationwide from 2001 to 2020. Table 4.13.3-2 provides a breakdown of outside force incidents by cause. These mostly result from the encroachment of mechanical equipment such as bulldozers and backhoes; earth movements due to soil settlement, washouts, or geologic hazards; weather effects such as winds, storms, and thermal strains; and willful damage.

Older pipelines have a higher frequency of outside forces incidents partly because their location may be less well known and less well marked than newer lines. In addition, the older pipelines contain a disproportionate number of smaller-diameter pipelines, which have a greater rate of outside forces incidents. Small diameter pipelines are more easily crushed or broken by mechanical equipment or earth movement.

Table 4.13.3-2 Outside Forces Incidents by Cause, 2001 – 2020		
Cause	**Number of Incidents**	**Percent of Outside Force Incidents**
Third party excavation damage	143	39.6%
Vehicle (not engaged with excavation)	44	12.2%

257 Cathodic protection is a technique to reduce corrosion (rust) of the natural gas pipeline using an induced current or a sacrificial anode (like zinc) that corrodes at faster rate to reduce corrosion.

Table 4.13.3-2

Outside Forces Incidents by Cause, 2001 – 2020

Cause	Number of Incidents	Percent of Outside Force Incidents
Lightning/temperature/high winds	30	8.3%
Heavy rains/floods	29	8.0%
Earth movement	27	7.5%
Operator excavation damage	26	7.2%
Unspecified excavation damage/previous damage	13	3.6%
Natural force (unspecified and other)	13	3.6%
Fire/explosion	12	3.3%
Unspecified/other outside force	11	3.0%
Previous mechanical damage	5	1.4%
Electrical arcing from other equipment/facility	4	1.1%
Fishing or maritime activity/maritime equipment or vessel adrift	3	0.8%
Intentional damage	1	0.3%
Total	**361**	**--**

Source: PHMSA, 2022

4.13.4 Impact on Public Safety

The service incident data summarized in table 4.13.3-1 includes pipeline failures of all magnitudes with widely varying consequences. Table 4.13.4-1 presents the annual injuries and fatalities that occurred on natural gas transmission lines between 2017 and 2021. The data has been separated into employees and public (nonemployees) to better identify a fatality rate experienced by the general public.

The majority of fatalities from pipelines involve local distribution pipelines (not included in table 4.13.4-1). These are natural gas pipelines that are not regulated by FERC and that distribute natural gas to homes and businesses after transportation through interstate natural gas transmission pipelines. In general, these distribution lines are smaller diameter pipes, often made of plastic or cast iron rather than welded steel and tend to be older pipelines that are more susceptible to damage. In addition, distribution systems do not have large rights-of-way and pipeline markers common to the FERC-regulated natural gas transmission pipelines.

The nationwide totals of accidental fatalities from various manmade and natural hazards are listed in table 4.13.4-2 in order to provide a relative measure of the industry-wide safety of natural gas transmission pipelines. Direct comparisons between accident categories should be made cautiously, however, because individual exposures to hazards are not uniform among all categories. Furthermore, the fatality rate is more than 25 times lower than the fatalities from natural hazards such as lightning, tornados, floods, etc.

Table 4.13.4-1 Injuries and Fatalities – Natural Gas Transmission Pipelines				
Year	**Injuries**		**Fatalities**	
	Employees	**Public**	**Employees**	**Public**
2017	1	2	1	2
2018	2	3	0	1
2019	0	8	0	1
2020	1	1	1	1
2021	3	1	2	2
Total	**7**	**15**	**4**	**7**

Source: PHMSA, 2022

Table 4.13.4-2 Nationwide Accidental Deaths	
Type of Accident	**Annual Number of Deaths**
Motor vehicles	42,336 [a]
Falls	42,113 [a]
Choking on object or substance	4,963 [a]
Drowning	4,176 [a]
Fires, Flames, or Smoke	2,951 [a]
Total for all weather events	446 [b]
Floods	126 [b, c]
Tornadoes and Thunderstorms (not including lightning strikes)	76 [b, d]
Lightning	17 [b, c]
Natural gas transmission and gathering pipelines (2020)	2 [e]
Natural gas transmission and gathering pipelines (January 2001 – December 2020 annual average)	2 [e]

[a] National Safety Council, 2022.
[b] Reflects 2020 statistics (National Weather Service, 2022).
[c] These fatalities are included in the total for all weather events.
[d] These fatalities due not include fatalities during hurricanes or tropical storms and these fatalities are included in the total for all weather events.
[e] PHMSA, 2022.

The available data show that natural gas transmission pipelines continue to be a safe, reliable means of energy transportation. From 2001 to 2020, there was a national average of 57.1 significant incidents, 7.9 injuries and 1.8 fatalities per year. For Louisiana over the past 20 years there was an average of 8.2 significant incidents and 0.4 injuries per year with only 0.4 fatality over that period, well below the national average. The number of significant incidents over the more than 300,000 miles of natural gas transmission lines indicates the risk is low for an incident at any given location. The operation of the CP Express and Enable Gulf Run Lateral pipelines would represent a slight increase in risk to the nearby public.

4.13.5 Recommendations from FERC Preliminary Engineering and Technical Review

Based on our preliminary engineering and technical review of the reliability and safety of the CP2 LNG Project, we recommend the following mitigation measures as conditions to any order authorizing the Project. These recommendations would be implemented prior to initial site preparation, prior to construction of final design, prior to commissioning, prior to introduction of hazardous fluids, prior to commencement of service, and throughout the life of the facility to enhance the reliability and safety of the facility and to mitigate the risk of impact on the public.

- **<u>Prior to initial site preparation</u>, CP2 LNG should file with the Secretary the following information, stamped, and sealed by the professional engineer-of-record, registered in the State of Louisiana:**

  a. the erosion control and prevention plan for the dock area; and

  b. the finalized foundation design criteria for the project; and the associated quality assurance and quality control procedures.

- **<u>Prior to initial site preparation</u>, CP2 LNG should file with the Secretary the finalized pile load test program (e.g., pile load test procedure, locations, configuration, quality assurance, and quality control, etc.), which should comply with ASTM D1143, ASTM 3689, ASTM 3966, or approved equivalent. The filing should be stamped and sealed by the professional engineer-of-record, registered in the State of Louisiana.**

- **<u>Prior to initial site preparation</u>, CP2 LNG should file with the Secretary the finalized wind design basis for the project facility, which should include the tornado loads determination and consideration for the design loads combination cases as required by ASCE/SEI 7 (2022)**.

- **<u>Prior to construction of final design</u>, CP2 LNG should file with the Secretary the following information, stamped and sealed by the professional engineer-of-record, registered in the State of Louisiana:**

  a. the corrosion control and prevention plan for any underground piping, structure, foundations, equipment, and components;

  b. the finalized site settlement analysis for the project site, which should include total settlement, differential settlement, subsidence, sea level rise, potential soil liquefaction, etc.; and

  c. the total and differential settlement of final designed structures, systems, and components foundations for the Project site; and

  d. the finalized settlement monitoring program and procedures for the Project site;

e. the total and differential settlement monitoring system of LNG storage tank foundation design should comply with applicable LNG industrial code/standards, including but not limited to API 620 (12th edition), API 625 (1st edition), API 650 (13th edition), API 653 (5th edition), and ACI 376 (2011 edition) or approved equivalents.

- **<u>Prior to construction of final design</u>, CP2 LNG should file with the Secretary the following information, stamped and sealed by the professional engineer-of-record, registered in the State of Louisiana:**

  a. site preparation drawings and specifications;

  b. finalized civil and structural design basis, criteria, specifications;

  c. LNG terminal structures, LNG storage tank, and foundation design drawings and calculations (including prefabricated and field constructed structures);

  d. seismic design specifications for procured Seismic Category I equipment;

  e. quality control procedures to be used for civil/structural design and construction; and

  f. a determination of whether soil improvement is necessary to counteract soil liquefaction.

  g. In addition, CP2 LNG should file, in its Implementation Plan, the schedule for producing this information.

- **<u>Prior to construction of the final design</u>, CP2 LNG should file with the Secretary the finalized projectile/missile impact analysis to demonstrate that the outer concrete container wall of the full containment LNG storage tank could withstand projectile/missile impact. The analysis should detail the projectile/missile speeds and characteristics and methods used to determine penetration resistance and perforation depths. The finalized projectile/missile impact analysis should be stamped and sealed by the professional engineer-of-record, registered in the State of Louisiana.**

- **<u>Prior to construction of final design</u>, CP2 LNG shall file with the Secretary a final design basis of the structure, system, and components in consideration of flood loads, erosion and scour and hydrostatic loads, etc.; and final maintenance program of inspection of hydrographic survey of the submerged slope conducted with enough frequency to detect any erosion in the areas vulnerable to bow thrusters and propellers. The filing should be stamped and sealed by the professional engineer-of-record, registered in the State of Louisiana.**

Information pertaining to the following specific recommendations, including any of the equivalents, should be filed with the Secretary for review and written approval by the Director of OEP, or the Director's designee, within the timeframe indicated by each recommendation. Specific

engineering, vulnerability, or detailed design information meeting the criteria specified in Order No. 833 (Docket No. RM16-15-000), including security information, should be submitted as critical energy infrastructure information pursuant to 18 CFR §388.113. See Critical Electric Infrastructure Security and Amending Critical Energy Infrastructure Information, Order No. 833, 81 Fed. Reg. 93,732 (December 21, 2016), FERC Stats. & Regs. 31,389 (2016). Information pertaining to items such as offsite emergency response, procedures for public notification and evacuation, and construction and operating reporting requirements would be subject to public disclosure. All information should be filed <u>a minimum of 30 days</u> before approval to proceed is requested.

- **<u>Prior to initial site preparation</u>, CP2 LNG should file the finalized geotechnical investigation report that includes the performance of boreholes and CPT soundings on the route from LNG storage tank area to dock area; the performance of the boreholes and CPT soundings for each LNG storage tank foundation area in accordance with the provisions of ACI 376 (2011 edition) or approved equivalent; and details on the number, location, and depth of boreholes and CPT soundings. The finalized geotechnical investigation report should be stamped and sealed by the professional engineer-of-record, registered in the State of Louisiana.**

- **<u>Prior to initial site preparation</u>, CP2 LNG should file with the finalized civil plot plan with slopes and elevations contour lines for the Project site. The finalized civil plot plan should demonstrate that the CP2 LNG site would not be flooded during mean higher high water (MHHW) after accounting for sea level rise and subsidence using intermediate values over 30 years. The MHHW should be based upon tidal datum from station 8768094 recorded by NOAA or approved equivalent. The sea level rise and vertical land movement should be in accordance with a minimum intermediate curve corresponding to design life of facility in Global and Regional Sea Level Rise Scenarios for the United States. U.S. Department of Commerce. National Ocean and Atmospheric Administration, National Ocean Service Center for Operational Oceanographic Products and Services, February 2022 or approved equivalent.**

- **<u>Prior to initial site preparation,</u> CP2 LNG should file the final design of floodwalls (storm surge protection barriers) to comply with applicable code/standards requirements including but are not limited to NFPA 59A (2019 edition) as incorporated by 33 CFR 127, and NFPA 59A (2001 edition) in 49 CFR 193. In addition, the floodwalls should be designed and maintained in accordance with ASCE/SEI 7 (2022 edition) or approved equivalent and ASCE/SEI 24 (2014 edition) or approved equivalent to withstand a minimum of a 500-year mean occurrence interval in consideration of relative sea level rise, local subsidence, site settlement, shoreline recession, erosion and scour effect, and wind-driven wave effects, etc. The sea level rise and vertical land movement should be in accordance with a minimum intermediate curve corresponding to design life of facility in Global and Regional Sea Level Rise Scenarios for the United States. U.S. Department of Commerce. National Ocean and Atmospheric Administration, National Ocean Service Center for Operational Oceanographic Products and Services, February 2022 or approved equivalent.**

- **<u>Prior to construction of final design</u>, CP2 LNG should file the settlement monitoring and maintenance plan, which ensures the storm surge floodwalls to be no less than a minimum elevation of 500-year mean recurrence interval flood event; and facilities are protected for the life of the LNG terminal considering settlement, subsidence, and sea level rise.**

- **<u>Prior to initial site preparation</u>, CP2 LNG should file an overall Project schedule, which includes the proposed stages of initial site preparation, construction, commissioning and in-service plan relative to notice to proceed requests and related conditions.**

- **<u>Prior to initial site preparation</u>, CP2 LNG should file procedures for controlling access during construction.**

- **<u>Prior to initial site preparation</u>, CP2 LNG should file quality assurance and quality control procedures for construction activities, including initial equipment laydown receipt and preservation.**

- **<u>Prior to initial site preparation</u>, CP2 LNG should file its design wind speed criteria for all other facilities not covered by PHMSA's LOD to be designed to withstand wind speeds commensurate with the risk and reliability associated with the facilities in accordance with ASCE/SEI 7 (2022) or approved equivalent.**

- **<u>Prior to initial site preparation</u>, CP2 LNG should develop an ERP (including evacuation and any sheltering and re-entry) and coordinate procedures with the Coast Guard; state, county, and local emergency planning groups; fire departments; state and local law enforcement; and other appropriate federal agencies. This plan should be consistent with recommended and good engineering practices, as defined in National Fire Protection Association (NFPA) 1600, NFPA 1616, NPFA 1620, NFPA 470, NFPA 475, or approved equivalents, and based on potential impacts and onsets of hazards from accidental and intentional events along the LNG marine vessel route and potential impacts and onset of hazards from accidental and intentional events at the LNG terminal, including but not limited to a catastrophic failure of the largest LNG tank. This plan should address any special considerations and pre-incident planning for infrastructure and public with access and functional needs and should include at a minimum:**

  a. materials and plans for periodic dissemination of public education and training materials for evacuation and/or shelter in place of the public within any transient hazard areas along the LNG marine vessel route and within LNG terminal hazard areas;

  b. plans to competently train emergency responders required to effectively and safely respond to hazardous material incidents including, but not limited to, LNG fires and dispersion;

  c. plans to competently train emergency responders to effectively and safely evacuate or shelter public within transient hazard areas along

the LNG marine vessel route and within hazard areas from LNG terminal;

d. **designated contacts with federal, state and local emergency response agencies responsible for emergency management and response within any transient hazard areas along the LNG marine vessel route and within hazard areas from LNG terminal;**

e. **scalable procedures for the prompt notification of appropriate local officials and emergency response agencies based on the level and severity of potential incidents;**

f. **scalable procedures for mobilizing response and establishing a unified command, including identification, location, and design of any emergency operations centers and emergency response equipment required to effectively and safely to respond to hazardous material incidents and evacuate or shelter public within transient hazard areas along the LNG marine vessel route and within LNG terminal hazard areas;**

g. **scalable procedures for notifying public, including identification, location, design, and use of any permanent sirens or other warning devices required to effectively communicate and warn the public prior to onset of debilitating hazards within any transient hazard areas along the LNG marine vessel route and within hazard areas from LNG terminal;**

h. **scalable procedures for evacuating the public, including identification, location, design, and use of evacuation routes/methods and any mustering locations required to effectively and safely evacuate the public within any transient hazard areas along the LNG marine transit route and within hazard areas from LNG terminal; and**

i. **scalable procedures for sheltering the public, including identification, location, design, and use of any shelters demonstrated to be needed and demonstrated to effectively and safely shelter the public prior to onset of debilitating hazards within transient hazard areas that may better benefit from sheltering in place (i.e., those within Zones of Concern 1 and 2), along the route of the LNG marine vessel and within hazard areas of the LNG terminal that may benefit from sheltering in place (i.e., those within areas of 1,600 BTU/ft^2-hr and 10,000 BTU/ft^2-hr radiant heats from fires with farthest impacts, including from a catastrophic failure of largest LNG tank).**

CP2 LNG should notify the FERC staff of all planning meetings in advance and should report progress on the development of its ERP <u>at 3-month intervals</u>. CP2 LNG should file public versions of offsite emergency response procedures for public notification, evacuation, and shelter in place.

- **<u>Prior to initial site preparation</u>, CP2 LNG should file a Cost-Sharing Plan identifying the mechanisms for funding all Project-specific security/emergency management costs that would be imposed on state and local agencies. This comprehensive plan should include funding mechanisms for the capital costs associated with any necessary security/emergency management equipment and personnel base. This plan should include sustained funding of any requirement or resource gap analysis identified to effectively and safely evacuate and shelter the public and to effectively and safely respond to hazardous material incidents consistent with recommended and good engineering practices. CP2 LNG should notify FERC staff of all planning meetings in advance and should report progress on the development of its Cost Sharing Plan at <u>3-month intervals</u>.**

- **<u>Prior to initial site preparation</u>, CP2 LNG should file calculations demonstrating the loads on buried pipelines and utilities at temporary road crossings would be adequately distributed. The analysis should be based on American Petroleum Institute (API) RP 1102 or other approved methodology.**

- **<u>Prior to initial site preparation</u>, CP2 LNG should file pipeline and utility damage prevention procedures for personnel and contractors. The procedures should include provisions to mark buried pipelines and utilities prior to any site work and subsurface activities.**

- **<u>Prior to construction of final design</u>, CP2 LNG should file change logs that list and explain any changes made from the FEED provided in CP2 LNG's application and filings. A list of all changes with an explanation for the design alteration should be provided, and all changes should be clearly indicated on all diagrams and drawings.**

- **<u>Prior to construction of final design</u>, CP2 LNG should file information/revisions pertaining to CP2 LNG's response numbers 37, 50, 60, 75b, 175, 176 of its June 10, 2022 filing; numbers 35, 86, 195, 197 of its July 7, 2022 filing; numbers 55, 59, 184, 191, 206 of its July 19, 2022 filing; numbers 15 of its August 2, 2022 filing; 196, 205 of its August 4, 2022 filing; number 87 of its September 14, 2022 filing, numbers 13, 18 and 24 of its October 28, 2022 filing; number 22 of its November 3, 2022 filing; number 6 of its November 28, 2022 filing; number 11 of its May 19, 2023 filing; and numbers 1, 6, 7, 8, 9, 10 of its May 26, 2023 filing, which indicated features to be included or considered in the final design.**

- **<u>Prior to construction of final design</u>, CP2 LNG should file drawings and specifications for crash rated vehicle barriers in accordance with ASTM F2656 (2015) or approved equivalent at each facility entrance for access control. The crash rating vehicle type should be supported by a security vulnerability assessment that takes into account the potential target attractiveness, threats, vulnerabilities, consequences, and mitigation effectiveness consistent with American Institute of Chemical Engineers, *Guidelines for Analyzing and Managing the Security Vulnerabilities of Fixed Chemical Sites*, or equivalent. The crash rating speed should be supported by an analysis of the maximum attainable vehicle velocity based on vehicle type**

acceleration and road characteristics (e.g., straight length, radius of curvature, sloped/banked, coefficient of friction, etc.).

- **<u>Prior to construction of final design</u>, CP2 LNG should file drawings of vehicle protections internal to the plant, such as guard rails, barriers, and bollards to protect transfer piping, pumps, compressors, hydrants, monitors, etc. to ensure that the facilities would be protected from inadvertent damage from vehicles, unless the facilities are located sufficiently away from in-plant roadways and areas accessed by vehicle.**

- **<u>Prior to construction of final design</u>, CP2 LNG should file drawings of the security fence. The fencing drawings should provide details of fencing that demonstrate it is in accordance with NFPA 59A (2019 edition) and would restrict and deter access around the entire facility and have a setback from exterior features (e.g., power lines, trees, etc.) and from interior features (e.g., piping, equipment, buildings, etc.) by at least 10 feet and that would not allow the fence to be overcome.**

- **<u>Prior to construction of final design</u>, CP2 LNG should file security camera and intrusion detection drawings. The security camera drawings should show the locations, mounting elevation, areas covered, and features of each camera (e.g., fixed, tilt/pan/zoom, motion detection alerts, low light, etc.) and should provide camera coverage at access points and along the entire perimeter of the terminal with redundancies and camera coverage of the interior of the terminal to enable rapid monitoring of the terminal, including a camera at the top of each LNG storage tank, and coverage within pretreatment areas, within liquefaction areas, within truck transfer areas, within marine transfer areas, and within buildings. Drawings should also show or note the location and type of the intrusion detection and should cover the entire perimeter of the facility.**

- **<u>Prior to construction of final design</u>, CP2 LNG should file photometric analyses or equivalent and associated lighting drawings. The lighting drawings should show the location, elevation, type of light fixture, and lux levels of the lighting system and should depict illumination coverage along the perimeter of the terminal, process equipment, mooring points, and along paths/roads of access and egress to facilitate security monitoring and emergency response operations in accordance with federal regulations (e.g., 49 CFR 193, 29 CFR 1910, and 29 CFR 1926) and API 540 or approved equivalent.**

- **<u>Prior to construction of final design</u>, CP2 LNG should file a plan to implement the security risk analysis countermeasure recommendations and provide justification for any that would not be implemented as recommended.**

- **<u>Prior to construction of final design</u>, CP2 LNG should file a plot plan of the final design showing all major equipment, structures, buildings, and impoundment systems.**

- **<u>Prior to construction of the final design</u>, CP2 LNG should file an evaluation of the final design that quantitatively confirms the congestion levels used in**

overpressure modeling, considering the volume blockage ratios with all of the equipment, structural components, and piping included. In addition, CP2 LNG should file details for mitigation of overpressures onto the emergency diesel generators and any other significant components, unless final overpressure calculations demonstrate this is not necessary.

- **<u>Prior to construction of final design</u>, CP2 LNG should file three-dimensional plant drawings to confirm plant layout for maintenance, access, egress, and the extent and density of congested areas used in overpressure modeling.**

- **<u>Prior to construction of final design</u>, CP2 LNG should file up-to-date process flow diagrams (PFDs), heat and mass balances (HMBs), and piping and instrument diagrams (P&IDs) including vendor P&IDs. The HMBs should demonstrate a peak export rate of 28 million metric tonnes per annum. The P&IDs should include the following information:**

  a. equipment tag number, name, size, duty, capacity, and design conditions;

  b. equipment insulation type and thickness;

  c. storage tank pipe penetration size and nozzle schedule;

  d. valve high pressure side and internal and external vent locations;

  e. piping with line number, piping class specification, size, and insulation type and thickness;

  f. piping specification breaks and insulation limits;

  g. all control and manual valves numbered;

  h. relief valves with size and set points; and

  i. drawing revision number and date.

- **<u>Prior to construction of final design</u>, CP2 LNG should file P&IDs, specifications, and procedures that clearly show and specify the tie-in details required to safely connect subsequently constructed facilities with the operational facilities.**

- **<u>Prior to construction of final design</u>, CP2 LNG should file a car seal and lock philosophy and car seal and lock program, including a list of all car-sealed and locked valves consistent with the P&IDs. The car seal and lock program should include monitoring and periodically reviewing correct car seal and lock placement and valve position.**

- **<u>Prior to construction of final design</u>, CP2 LNG should file information to verify how the EPC contractor has addressed all FEED HAZID recommendations.**

- **<u>Prior to construction of final design</u>, CP2 LNG should file a hazard and operability review of the final design P&IDs, a list of the resulting recommendations, and action taken on the recommendations. The issued for construction P&IDs should incorporate the hazard and operability review recommendations and justification should be provided for any recommendations that are not implemented.**

- **<u>Prior to construction of final design</u>, CP2 LNG should file information to demonstrate adherence to NFPA 59A (2019) Chapter 10 or approved equivalent, and, or including, the following information for the final design of the LNG transfer pipe-in-pipe systems:**

  a. the detailed design, materials of construction, and a plot plan layout of the pipe-in-pipe system, including identification of all conventional process lines extending from or attached to the pipe-in-pipe, as well as the locations of any reliefs, instrumentation or other connections along the inner or outer pipes;

  b. an assessment of the vapor production and vapor handling capacities within the annular space during a full inner pipe rupture or smaller release into the outer pipe;

  c. stress analysis (thermal, mechanical, seismic, etc.) for the pipe-in-pipe systems, including the differential stresses between the inner pipe and outer pipe for a full inner pipe rupture, or any smaller release, at any location along the system;

  d. an evaluation demonstrating that pressure surge events would not exceed the design pressures;

  e. leak testing details, including pressures, for the outer pipe, consistent with ASME B31.3;

  f. details of the maintenance procedures that will be followed over the life of the facility to determine that the outer pipe will be continuing to adequately serve as spill containment;

  g. procedures for purging or draining LNG from the outer pipe;

  h. details of loading and any external features that will protect against external common cause failures of the inner and outer pipes, including resulting stresses during horizontal directional drilling and fabrication processes;

  i. drawings and calculations for the sizing and configuration of any pressure relief for the annular space of the pipe-in-pipe and for the inner pipe in case of isolation while containing LNG; and

  j. plans to detect and monitor the LNG transfer line for leak monitoring.

- **<u>Prior to construction of final design</u>, CP2 LNG should provide a check valve upstream of the acid gas removal column to prevent backflow or provide a dynamic simulation that shows that upon plant shutdown, the vertical piping segment would be sufficient for this purpose.**

- **<u>Prior to construction of final design</u>, CP2 LNG should include LNG tank fill flow measurement with high flow alarm.**

- **<u>Prior to construction of final design</u>, CP2 LNG should specify the discretionary vent valve be operable through the Distributed Control System (DCS). In addition, car sealed open manual block valves should be provided upstream and downstream of the discretionary vent valve operable through the DCS. CP2 LNG should also specify a discretionary vent valve on each LNG storage tank to safely vent pressure when the tank is isolated from the common BOG system.**

- **<u>Prior to construction of final design</u>, CP2 LNG should file the safe operating limits (upper and lower), alarm and shutdown set points for all instrumentation (e.g., temperature, pressures, flows, and compositions).**

- **<u>Prior to construction of final design</u>, CP2 LNG should file cause-and-effect matrices for the process instrumentation, fire and gas detection system, and emergency shutdown system. The cause-and-effect matrices should include alarms and shutdown functions, details of the voting and shutdown logic, and set points.**

- **<u>Prior to construction of final design</u>, CP2 LNG should specify that all ESD valves are to be equipped with open and closed position switches connected to the Distributed Control System (DCS)/SIS.**

- **<u>Prior to construction of final design</u>, CP2 LNG should file an up-to-date equipment list, process and mechanical data sheets, and specifications. The specifications should include:**

  a. building specifications (e.g., control buildings, electrical buildings, compressor buildings, storage buildings, pressurized buildings, ventilated buildings, blast resistant buildings);

  b. mechanical specifications (e.g., piping, valve, insulation, rotating equipment, heat exchanger, storage tank and vessel, other specialized equipment);

  c. electrical and instrumentation specifications (e.g., power system, control system, safety instrument system [SIS], cable, other electrical and instrumentation); and

  d. security and fire safety specifications (e.g., security, passive protection, hazard detection, hazard control, firewater).

- **<u>Prior to construction of final design</u>, CP2 LNG should file a list of all codes and standards and the final specification document number where they are referenced.**

- **<u>Prior to construction of final design</u>, CP2 LNG should file complete specifications and drawings of the proposed LNG tank design and installation.**

- **<u>Prior to construction of final design</u>, CP2 LNG should file an evaluation of emergency shutdown valve closure times. The evaluation should account for the time to detect an upset or hazardous condition, notify plant personnel, and close the emergency shutdown valve(s).**

- **<u>Prior to construction of final design</u>, CP2 LNG should file an evaluation of dynamic pressure surge effects from valve opening and closure times and pump operations that demonstrate that the surge effects do not exceed the design pressures.**

- **<u>Prior to construction of final design</u>, CP2 LNG should file a pipe stress analysis for critical or potential higher consequence lines that evaluates all loads in ASME B31.3 (2016 edition and after), including but not limited to consideration of hazardous fluid lines that are cryogenic, high temperature, subject to slug flow, and that include 2-phase flow. CP2 LNG should also demonstrate, for hazardous fluids, piping and piping nipples 2 inches or less in diameter are designed to withstand external loads, including vibrational loads in the vicinity of rotating equipment and operator live loads in areas accessible by operators.**

- **<u>Prior to construction of final design</u>, CP2 LNG should clearly specify the responsibilities of the LNG tank contractor and the EPC contractor for the piping associated with the LNG storage tank.**

- **<u>Prior to construction of final design</u>, CP2 LNG should file the sizing basis and capacity for the final design of the flares and/or vent stacks as well as the pressure and vacuum relief valves for major process equipment, vessels, and storage tanks.**

- **<u>Prior to construction of final design,</u> CP2 LNG should specify that the common, non-spared process vessels are installed with spare pressure relief valves to ensure overpressure protection during relief valve testing or maintenance.**

- **<u>Prior to construction of final design</u>, CP2 LNG should file an updated fire protection evaluation of the proposed facilities. A copy of the evaluation, a list of recommendations and supporting justifications, and actions taken on the recommendations should be filed. The evaluation should justify the type, quantity, and location of hazard detection and hazard control, passive fire protection, emergency shutdown and depressurizing systems, firewater, and emergency response equipment, training, and qualifications in accordance with NFPA 59A (2001). The justification for the flammable and combustible gas detection and flame and heat detection systems should be in accordance**

with ISA 84.00.07 or approved equivalent methodologies and would need to demonstrate 90 percent or more of releases (unignited and ignited) that could result in an off-site or cascading impact would be detected by two or more detectors and result in isolation and de inventory within 10 minutes. The analysis should take into account the set points, voting logic, wind speeds, and wind directions. The justification for firewater should provide calculations for all firewater demands based on design densities, surface area, and throw distance as well as specifications for the corresponding hydrant and monitors needed to reach and cool equipment.

- **<u>Prior to construction of final design</u>, CP2 LNG should file spill containment system drawings with dimensions and slopes of curbing, trenches, impoundments, tertiary containment and capacity calculations considering any foundations and equipment within impoundments, as well as the sizing and design of the down-comers. The spill containment drawings should show containment for all hazardous fluids including all liquids handled above their flashpoint, from the largest flow from a single line for 10 minutes, including de-inventory, or the maximum liquid from the largest vessel (or total of impounded vessels) or otherwise demonstrate that providing spill containment would not significantly reduce the flammable vapor dispersion or radiant heat consequences of a spill. Any elevated stainless steel that would convey spills of cold liquefied gases should be demonstrated suitable to handle the thermal shock combined with any applicable jetting forces of a pressurized release.**

- **<u>Prior to construction of final design</u>, CP2 LNG should file an analysis that demonstrates the flammable vapor dispersion from design spills would be prevented from dispersing underneath the elevated jetty control room, or the control room would be able to withstand an overpressure due to ignition of the flammable vapor that disperses underneath the elevated jetty control room.**

- **<u>Prior to construction of final design</u>, CP2 LNG should file electrical area classification drawings, including cross sectional drawings. The drawings should demonstrate compliance with NFPA 59A, NFPA 70, NFPA 497, and API RP 500, or approved equivalents. In addition, the drawings should include revisions to the electrical area classification design or provide technical justification that supports the electrical area classification using most applicable API RP 500 figures (i.e., figures 20 and 21) or hazard modeling of various release rates from equivalent hole sizes and wind speeds (see NFPA 497 release rate of 1 lb-mole/minute).**

- **<u>Prior to construction of final design</u>, CP2 LNG should file analysis of the buildings containing hazardous fluids and the ventilation calculations that limit concentrations below the LFLs (e.g., 25-percent LFL), including an analysis of off gassing of hydrogen in battery rooms, and should also provide hydrogen detectors that alarm (e.g., 20- to 25-percent LFL) and initiate mitigative actions (e.g., 40- to 50-percent LFL) or alarms in the event the ventilation is not functioning as designed, in accordance with NFPA 59A and NFPA 70, or approved equivalents.**

- **<u>Prior to construction of final design</u>, CP2 LNG should file drawings and details of how process seals or isolations installed at the interface between a flammable fluid system and an electrical conduit or wiring system meet the requirements of NFPA 59A (2001) and NFPA 70 (1999 or 2020, as applicable).**

- **<u>Prior to construction of final design</u>, CP2 LNG should file details of an air gap or vent installed downstream of process seals or isolations installed at the interface between a flammable fluid system and an electrical conduit or wiring system. Each air gap should vent to a safe location and be equipped with a leak detection device that should continuously monitor for the presence of a flammable fluid, alarm the hazardous condition, and shut down the appropriate systems. Alternatively, CP2 LNG should file details on a system providing an approved equivalent protection, in accordance with NFPA 59A (2023 edition), from the migration of flammable fluid through the electrical conduit or wiring.**

- **<u>Prior to construction of final design</u>, CP2 LNG should file complete drawings and a list of the hazard detection equipment. The drawings should clearly show the location and elevation of all detection equipment as well as their coverage area. The list should include the instrument tag number, type, manufacturer, model, location, alarm indication locations, and shutdown functions of the hazard detection equipment.**

- **<u>Prior to construction of final design</u>, CP2 LNG should file a technical review of facility design that:**

    a. **identifies all combustion/ventilation air intake equipment; and**

    b. **demonstrates that these areas are adequately covered by flammable gas detection devices, and applicable toxic gas detection devices, and indicates how these devices would isolate or shutdown any combustion or ventilation air intake equipment whose continued operation could add to or sustain an emergency.**

- **<u>Prior to construction of final design</u>, CP2 LNG should file a design that includes hazard detection suitable to detect high temperatures and smoldering combustion products in electrical buildings and control room buildings.**

- **<u>Prior to construction of final design</u>, CP2 LNG should file an evaluation of the voting logic and voting degradation for hazard detectors.**

- **<u>Prior to construction of final design</u>, CP2 LNG should file a list of alarm and shutdown set points for all hazard detectors that account for the calibration gas of the hazard detectors when determining the lower flammable limit set points for methane, ethylene, propane, isopentane, and condensate.**

- **<u>Prior to construction of final design</u>, CP2 LNG should file a list of alarm and shutdown set points for all hazard detectors that account for the calibration gas of hazard detectors when determining the set points for toxic components such as condensate and hydrogen sulfide.**

- **<u>Prior to construction of final design</u>, CP2 LNG should file a drawing showing the location of the emergency shutdown buttons, including, but not limited to the refrigerant storage, LNG storage areas and area/unit emergency isolation and equipment shutdown. Emergency shutdown buttons should be easily accessible, conspicuously labeled, and located in an area which would be accessible during an emergency.**

- **<u>Prior to construction of final design</u>, CP2 LNG should file facility plan drawings and a list of the fixed and wheeled dry-chemical, hand-held fire extinguishers, and other hazard control equipment. Plan drawings should clearly show the location by tag number of all fixed, wheeled, and hand-held extinguishers and should demonstrate the spacing of extinguishers meet prescribed NFPA 10 travel distances. The list should include the equipment tag number, type, manufacturer and model, capacity, equipment covered, discharge rate, and automatic and manual remote signals initiating discharge of the units and should demonstrate they meet NFPA 59A.**

- **<u>Prior to construction of final design</u>, CP2 LNG should file drawings and specifications for the structural passive protection systems to protect equipment and supports from low temperature releases below minimum design metal temperatures.**

- **<u>Prior to construction of final design</u>, CP2 LNG should file calculations or test results for the structural passive protection systems to protect equipment and supports from low temperature releases below minimum design metal temperatures.**

- **<u>Prior to construction of final design</u>, CP2 LNG should file drawings and specifications for the structural passive protection systems to protect equipment and supports from pool fires and from jet fires of design spills that may exacerbate the initial hazard, as well as for electrical and control equipment that activate emergency systems to protect this equipment from a minimum 20-minute UL 1709 fire exposure.**

- **<u>Prior to construction of final design</u>, CP2 LNG should file a detailed quantitative analysis to demonstrate that adequate mitigation would be provided for each pressure vessel that could fail within the 4,000 BTU/ft^2-hr zone from a pool or jet fires; each critical structural component (including the LNG marine vessel) and emergency equipment item that could fail within the 4,900 BTU/ft^2-hr zone from a pool or jet fire; and each occupied building that could expose unprotected personnel within the 1,600 BTU/ft^2-hr zone from a pool or jet fire. Trucks at truck transfer stations should be included in the analysis of potential pressure vessel failures, as well as measures needed to prevent cascading impact due to the 10-minute sizing spill at the marine area. A combination of passive and active protection for pool fires and passive and/or active protection for jet fires should be provided and demonstrate the effectiveness and reliability. Effectiveness of passive mitigation should be supported by calculations or test results for the thickness limiting temperature rise over the fire duration, and active mitigation should be supported by reliability information by calculations or test results, such as demonstrating flow rates and durations of any cooling water would mitigate**

the heat absorbed by the component. The total firewater demand should account for all components that could fail due to a pool or jet fire.

- **<u>Prior to construction of final design</u>, CP2 LNG should file an evaluation and associated specifications, drawings, and datasheets for transformers and transformer fluid demonstrating prevention of cascading damage of transformers (e.g., fire walls or spacing) in accordance with NFPA 850 or approved equivalent.**

- **<u>Prior to construction of final design</u>, CP2 LNG should provide additional information on final design for any blast walls, hardened structures, and blast resistant design, including supporting hazard analysis and building risk assessment studies, in order to prevent cascading damage.**

- **<u>Prior to construction of final design</u>, CP2 LNG should file facility plan drawings showing the proposed location of the firewater systems. Plan drawings should clearly show the location of firewater piping, post indicator and sectional valves, and the location and area covered by, each monitor, hydrant, hose, water curtain, deluge system, water-mist system, and sprinkler. The drawings should demonstrate that each process area, fire zone, or other sections of piping with several users can be isolated with post indicator or sectional valves in accordance with NFPA 24 (2013 or thereafter) or approved equivalent, and that firewater coverage is provided by at least two monitors or hydrants with sufficient firewater flow to cool exposed surfaces subjected to a fire. The drawings should also include piping and instrumentation diagrams of the firewater systems. Drawings of the sprinkler system design should show coverage in applicable buildings per NFPA 850 and in applicable closed roofed buildings around the site, per NFPA 13.**

- **<u>Prior to construction of final design</u>, CP2 LNG should specify that the firewater pump shelter is designed to remove the largest firewater pump or other component for maintenance with an overhead or external crane.**

- **<u>Prior to construction of final design</u>, CP2 LNG should demonstrate that the firewater storage tank is in compliance with NFPA 22 or approved equivalent.**

- **<u>Prior to construction of final design</u>, CP2 LNG should specify that the firewater flow test meter is equipped with a transmitter and that a pressure transmitter is installed upstream of the flow transmitter. The flow transmitter and pressure transmitter should be connected to the DCS and recorded.**

- **<u>Prior to construction of the final design</u>, CP2 should file the finalized seismic monitoring program for the Project site. The seismic monitoring program should comply with NFPA 59A (2019 edition) sections 8.4.14.10, 8.4.14.12, 8.4.14.12.1, 8.4.14.12.2, and 8.4.14.13; ACI 376 (2011 edition) sections 10.7.5 and 10.8.4; U.S. Nuclear Regulatory Commission Regulatory Guide RG 1.12 (Revision 3) sections 1 and 3 through 9 and all subsections, or approved equivalents. A free-field seismic monitoring device should be included in the seismic monitoring program for the Project site. The proposed seismic monitoring system must include installation location plot plan; description of**

the triaxial strong motion recorders or other seismic instrumentation; the proposed alarm set points and operating procedures (including emergency operating procedures) for control room operators in response to such alarms/data obtained from seismic instrumentation; and testing and maintenance procedures.

- **<u>Prior to construction of final design</u>, CP2 LNG should file drawings of the storage tank piping support structure and support of horizontal piping at grade including pump columns, relief valves, pipe penetrations, instrumentation, and appurtenances.**

- **<u>Prior to construction of final design</u>, CP2 LNG should file the structural analysis of the LNG storage tank and outer containment demonstrating they are designed to withstand all loads and combinations.**

- **<u>Prior to construction of final design</u>, CP2 LNG should file an analysis of the structural integrity of the outer containment of the full containment LNG storage tank demonstrating it can withstand the radiant heat from an adjacent external pipeline fire or from an adjacent tank roof fire modeled using LNGFIRE3 or a similarly approved and validated pool fire model with application of uncertainty factors commensurate with its validation results including consideration of extrapolation. If the LNG storage tank walls would not be designed to withstand the predicted radiant heat for the maximum duration, CP2 LNG should demonstrate firewater coverage, or other mitigation that could be remotely or automatically activated or manually activated from a safe accessible distance based on appropriate Personal Protective Equipment ratings, for the LNG storage tank walls in addition to any other firewater coverage needs.**

- **<u>Prior to construction of final design,</u> CP2 LNG should file an analysis of the structural integrity of the outer containment of the full containment LNG storage tank demonstrating it can withstand the thermal shock caused by a failure of the inner tank, including specification of the leakage rate.**

- **<u>Prior to construction of final design</u>, CP2 LNG should file the final wheel load evaluations for underground hazardous fluid lines, including feed gas lines within the plant, in accordance with API RP 1102 or approved equivalent, and address any recommendations.**

- **<u>Prior to commissioning</u>, CP2 LNG should file a detailed schedule for commissioning through equipment startup. The schedule should include milestones for all procedures and tests to be completed: prior to introduction of hazardous fluids and during commissioning and startup. CP2 LNG should file documentation certifying that each of these milestones has been completed before authorization to commence the next phase of commissioning and startup will be issued.**

- **<u>Prior to commissioning</u>, CP2 LNG should file detailed plans and procedures for: testing the integrity of onsite mechanical installation; functional tests; introduction of hazardous fluids; operational tests; and placing the equipment into service.**

- **<u>Prior to commissioning</u>, CP2 LNG should file settlement results during the hydrostatic tests of the LNG storage containers and should file a plan to periodically thereafter to verify settlement is as expected and does not exceed the applicable criteria set forth in API 620 (12th edition), API 625 (1st edition), API 650 (13th edition), API 653 (5th edition), and ACI 376 (2011 edition) or approved equivalents. The program should also specify what actions would be taken after various levels of seismic events.**

- **<u>Prior to commissioning</u>, CP2 LNG should file the operation and maintenance procedures and manuals, as well as safety procedures, hot work procedures and permits, abnormal operating conditions procedures, simultaneous operations procedures, and management of change procedures and forms. The operational maintenance and testing procedures for fire protection components should be in accordance with the current versions of the applicable standards listed in NPFA 59A (2019) or approved equivalent.**

- **<u>Prior to commissioning</u>, CP2 LNG should file a plan for clean-out, dry-out, purging, and tightness testing. This plan should address the requirements of the American Gas Association's Purging Principles and Practice, and should provide justification if not using an inert or non-flammable gas for clean-out, dry-out, purging, and tightness testing.**

- **<u>Prior to commissioning</u>, CP2 LNG should tag all equipment, instrumentation, and valves in the field, including drain valves, vent valves, main valves, and car-sealed or locked valves.**

- **<u>Prior to commissioning</u>, CP2 LNG should file a plan to maintain a detailed training log to demonstrate that operating, maintenance, and emergency response staff have completed the required training. In addition, CP2 LNG should file signed documentation that demonstrates training has been conducted, including ESD and response procedures, prior to the respective operation.**

- **<u>Prior to commissioning</u>, CP2 LNG should file the procedures for pressure/leak tests which address the requirements of ASME BPVC Section VIII and ASME B31.3. In addition, CP2 LNG should file a line list of pneumatic and hydrostatic test pressures.**

- **<u>Prior to introduction of hazardous fluids</u>, CP2 LNG should complete and document a pre-startup safety review to ensure that installed equipment meets the design and operating intent of the facility. The pre-startup safety review should include any changes since the last hazard review, operating procedures, and operator training. A copy of the review with a list of recommendations, and actions taken on each recommendation, should be filed.**

- **<u>Prior to introduction of hazardous fluids</u>, CP2 LNG should complete and document all pertinent tests (Factory Acceptance Tests, Site Acceptance Tests, Site Integration Tests) associated with the DCS and SIS that demonstrates full functionality and operability of the system.**

- **<u>Prior to introduction of hazardous fluids</u>, CP2 LNG should develop and implement an alarm management program consistent with ISA 18.2 (2016 edition) or approved equivalent to reduce alarm complacency and maximize the effectiveness of operator response to alarms.**

- **<u>Prior to introduction of hazardous fluids</u>, CP2 LNG should complete and document clean agent acceptance tests.**

- **<u>Prior to introduction of hazardous fluids</u>, CP2 LNG should complete and document a firewater pump acceptance test and firewater monitor and hydrant coverage test. The actual coverage area from each monitor and hydrant should be shown on facility plot plan(s).**

- **<u>Prior to introduction of hazardous fluids</u>, CP2 LNG should complete and document sprinkler system acceptance tests.**

- **CP2 LNG should file a request for written authorization from the Director of OEP <u>prior to unloading or loading the first LNG commissioning cargo</u>. After production of first LNG, CP2 LNG should file weekly reports on the commissioning of the proposed systems that detail the progress toward demonstrating the facilities can safely and reliably operate at or near the design production rate. The reports should include a summary of activities, problems encountered, and remedial actions taken. The weekly reports should also include the latest commissioning schedule, including projected and actual LNG production by each liquefaction train, LNG storage inventories in each storage tank, and the number of anticipated and actual LNG commissioning cargoes, along with the associated volumes loaded or unloaded. Further, the weekly reports should include a status and list of all planned and completed safety and reliability tests, work authorizations, and punch list items. Problems of significant magnitude should be reported to the FERC within 24 hours.**

- **<u>Prior to commencement of service</u>, CP2 LNG should file a request for written authorization from the Director of OEP. Such authorization would only be granted following a determination by the Coast Guard, under its authorities under the Ports and Waterways Safety Act, the Magnuson Act, the MTSA of 2002, and the Security and Accountability For Every Port Act, that appropriate measures to ensure the safety and security of the facility and the waterway have been put into place by CP2 LNG or other appropriate parties.**

- **<u>Prior to commencement of service</u>, CP2 LNG should notify the FERC staff of any proposed revisions to the security plan and physical security of the plant.**

- **<u>Prior to commencement of service</u>, CP2 LNG should label piping with fluid service and direction of flow in the field, consistent with ASME A13.1 (2020 edition) or approved equivalent, in addition to the pipe labeling requirements of NFPA 59A (2001).**

- **<u>Prior to commencement of service</u>, CP2 LNG should provide plans for any preventative and predictive maintenance program that performs periodic or continuous equipment condition monitoring.**

- **<u>Prior to commencement of service</u>, CP2 LNG should develop procedures for offsite contractors' responsibilities, restrictions, monitoring, training, and limitations and for supervision of these contractors and their tasks by CP2 LNG staff. Specifically, the procedures should address:**

  a. selecting a contractor, including obtaining and evaluating information regarding the contract employer's safety performance and programs.

  b. informing contractors of the known potential hazards, including flammable and toxic release, explosion, and fire, related to the contractor's work and systems they are working on.

  c. developing and implementing provisions to control and monitor the entrance, presence, and exit of contract employers and contract employees from process areas, buildings, and the plant.

  d. developing and implementing safe work practices for control of personnel safety hazards, including lockout/tagout, confined space entry, work permits, hot work, and opening process equipment or piping.

  e. developing and implementing safe work practices for control of process safety hazards, including identification of layers of protection in systems being worked on, recognizing abnormal conditions on systems they are working on, and re-instatement of layers of protection, including ensuring bypass, isolation valve, and car-seal programs and procedures are being followed.

  f. developing and implementing provisions to ensure contractors are trained on the emergency action plans and that they are accounted for in the event of an emergency.

  g. monitoring and periodically evaluating the performance of contract employers in fulfilling their obligations above, including successful and safe completion of work and re-instatement of all layers of protection.

In addition, we recommend that the following measures should apply <u>throughout the life of the CP2 LNG Project</u>.

- **The facility should be subject to regular FERC staff technical reviews and site inspections on at least an <u>annual</u> basis or more frequently as circumstances indicate. Prior to each FERC staff technical review and site inspection, CP2 LNG should respond to a specific data request including information relating to possible design and operating conditions that may have been imposed by other agencies or organizations. Up-to-date detailed P&IDs reflecting facility modifications and provision of other pertinent information not included in the semi-annual reports described below, including facility events that have taken place since the previously submitted semi-annual report, should be submitted.**

- **Semi-annual operational reports should be filed with the Secretary to identify changes in facility design and operating conditions; abnormal operating experiences; activities (e.g., ship arrivals, quantity and composition of imported and exported LNG, liquefied and vaporized quantities, boil off/flash gas); and plant modifications, including future plans and progress thereof. Abnormalities should include, but not be limited to, unloading/loading/shipping problems, potential hazardous conditions from offsite vessels, storage tank stratification or rollover, geysering, storage tank pressure excursions, cold spots on the storage tank, storage tank vibrations and/or vibrations in associated cryogenic piping, storage tank settlement, significant equipment or instrumentation malfunctions or failures, non-scheduled maintenance or repair (and reasons therefore), relative movement of storage tank inner vessels, hazardous fluids releases, fires involving hazardous fluids and/or from other sources, negative pressure (vacuum) within a storage tank, and higher than predicted boil off rates. Adverse weather conditions and the effect on the facility also should be reported. Reports should be submitted within 45 days after each period ending June 30 and December 31. In addition to the above items, a section entitled "Significant Plant Modifications Proposed for the Next 12 Months (dates)" should be included in the semi-annual operational reports. Such information would provide the FERC staff with early notice of anticipated future construction/maintenance at the LNG facilities.**

- **In the event the temperature of any region of the LNG storage container, including any secondary containment and imbedded pipe supports, becomes less than the minimum specified operating temperature for the material, the Commission should be notified within 24 hours and procedures for corrective action should be specified.**

- **Significant non-scheduled events, including safety-related incidents (e.g., LNG, condensate, refrigerant, or natural gas releases; fires; explosions; mechanical failures; unusual over pressurization; and major injuries) and security-related incidents (e.g., attempts to enter site, suspicious activities) should be reported to the FERC staff. In the event that an abnormality is of significant magnitude to threaten public or employee safety, cause significant property damage, or interrupt service, notification should be made immediately, without unduly interfering with any necessary or appropriate emergency repair, alarm, or other emergency procedure. In all instances, notification should be made to the FERC staff within 24 hours. This notification practice should be incorporated into the liquefaction facility's emergency plan. Examples of reportable hazardous fluids-related incidents include:**

  a. fire;

  b. explosion;

  c. estimated property damage of $50,000 or more;

  d. death or personal injury necessitating in-patient hospitalization;

e. release of hazardous fluids for 5 minutes or more;

f. unintended movement or abnormal loading by environmental causes, such as an earthquake, landslide, or flood, that impairs the serviceability, structural integrity, or reliability of an LNG facility that contains, controls, or processes hazardous fluids;

g. any crack or other material defect that impairs the structural integrity or reliability of an LNG facility that contains, controls, or processes hazardous fluids;

h. any malfunction or operating error that causes the pressure of a pipeline or LNG facility that contains or processes hazardous fluids to rise above its maximum allowable operating pressure (or working pressure for LNG facilities) plus the build-up allowed for operation of pressure-limiting or control devices;

i. a leak in an LNG facility that contains or processes hazardous fluids that constitutes an emergency;

j. inner tank leakage, ineffective insulation, or frost heave that impairs the structural integrity of an LNG storage tank;

k. any safety-related condition that could lead to an imminent hazard and cause (either directly or indirectly by remedial action of the operator), for purposes other than abandonment, a 20 percent reduction in operating pressure or shutdown of operation of a pipeline or an LNG facility that contains or processes hazardous fluids;

l. safety-related incidents from hazardous fluids transportation occurring at or en route to and from the LNG facility; or

m. an event that is significant in the judgment of the operator and/or management even though it did not meet the above criteria or the guidelines set forth in an LNG facility's incident management plan.

In the event of an incident, the Director of OEP has delegated authority to take whatever steps are necessary to ensure operational reliability and to protect human life, health, property, or the environment, including authority to direct the LNG facility to cease operations. Following the initial company notification, the FERC staff would determine the need for a separate follow-up report or follow up in the upcoming semi-annual operational report. All company follow-up reports should include investigation results and recommendations to minimize a reoccurrence of the incident.

4.14 CUMULATIVE IMPACTS

We received multiple comments from individuals, non-governmental organizations, and federal agencies, during scoping periods and in response to the draft EIS, expressing the importance of a comprehensive cumulative impacts analysis. In accordance with NEPA, we considered the cumulative impacts of the Project with other projects or actions within the geographic and temporal scope of the Project. As defined by CEQ, a cumulative effect is the impact on the environment that results from the incremental effects of the proposed action when added to other past, present, and reasonably foreseeable actions, regardless of what agency or person undertakes such actions.

This cumulative impacts analysis uses an approach consistent with the methodology set forth in relevant guidance (CEQ, 1997, 2005; EPA, 1999). Under these guidelines, inclusion of actions within the analysis is based on identifying commonalities between the impacts that would result from the Project and the impacts likely to be associated with other potential projects.

The purpose of this analysis is to identify and describe cumulative impacts that would potentially result from construction and operation of the Project. To avoid unnecessary discussions of insignificant impacts and projects and to adequately address and accomplish the purposes of this analysis, an action must first meet the following three criteria to be included in the cumulative analysis:

- impact a resource potentially affected by the proposed Project;
- impact that resource within all, or part of, the geographic scope of the Project (the geographic area considered varies depending on the resource being discussed, which is the general area in which the Project could contribute to cumulative impacts on that particular resource); and
- impact that resource within all, or part of, the time span for the potential impact from the Project.

To understand the contribution of past actions to the cumulative effects of the proposed action, this analysis relies on current environmental conditions as a proxy for the effects of past actions. Existing conditions reflects the aggregate effects of all prior human actions and natural events that have affected the environment and might contribute to cumulative effects. The regional landscape of the Project area has been significantly altered since the latter part of the nineteenth century, initially by agriculture and later by the development of industrial complexes, oil and gas infrastructure, port infrastructure, residential and commercial complexes, and other public infrastructure (schools, roads, etc.) These developments, along with associated flood protection and drainage systems (levees, ditches, etc.), have permanently altered the regional landscape in eastern Texas and southwest Louisiana. Consistent with CEQ guidelines (2005), we have aggregated past actions that helped shape the current environment into our discussion of the affected environment in section 4.0. Thus, we discuss only present and reasonably foreseeable actions in this section.

However, this analysis does consider as applicable, the present effects of past actions. In accordance with the CEQ regulations and guidance[258], we identified actions near the Project and evaluated the potential for a cumulative impact on the environment. This analysis evaluates other actions that affect resources also affected by the Project, within the resource-specific geographic scopes described below.

Several present and reasonably foreseeable actions with impacts during the Project's temporal extent would commence construction or operation during the Project's construction period. Reasonably foreseeable projects that might cause cumulative impacts in combination with the proposed Project include projects that

[258] On April 20, 2022, CEQ issued a final rule, National Environmental Policy Act Implementing Regulations Revisions (Final Rule, 87 Fed. Reg. 23453), which was effective as of May 20, 2022.

are under construction, approved, proposed, or planned. CP2 LNG and CP Express plan to initiate construction of Phase 1 upon receipt of all required permits and authorizations. CP2 LNG and CP Express aim to begin construction in 2023 and propose to place Phase 1 facilities into service in 2025. Phase 2 would begin construction 12 months after the start of Phase 1 construction, with a proposed in-service date of Phase 2 facilities in 2026. CP Express estimates that construction of the Pipeline System would begin in Phase 1, with Phase 2 work on the Pipeline System consisting of installation of three additional compressor units at the Moss Compressor Station. CP2 LNG and CP Express have not identified any plans for future expansion or abandonment. Any plans for expansion or abandonment of the Project would require the appropriate authorization from the FERC (e.g., environmental analyses, abandonment regulations) and other federal, state, and local agencies at that time.

Actions with resource impacts within the same geographic scope as the Project would occur within a prescribed distance from the Project, uniquely defined based on the characteristics of the resource and how far the Project's effects might extend. Geographic scope defines how far out from the Project a cumulative impact could occur. Table 4.14-1 provides the geographic scope for each resource and the reasoning behind its establishment.

Table 4.14-1

Resource-Specific Geographic Scope for the Cumulative Impact Assessment

Environmental Resource	Geographic Scope for Cumulative Impacts	Justification for Geographic Scope
Soils and surficial geology	Construction workspaces and adjacent areas	Impacts on soils and surficial geology would be highly localized and would not be expected to extend beyond the area of direct disturbance associated with the Project.
Water resources (groundwater, surface water, wetlands, aquatic resources)	Hydrologic Unit Code (HUC)-12 subwatershed	Impacts on groundwater and surface water resources could reasonably extend throughout a HUC-12 subwatershed (i.e., a detailed hydrologic unit that can accept surface water directly from upstream drainage areas and indirectly from associated surface areas such as remnant, noncontributing, and diversions to form a drainage area with single or multiple outlet points), as could the related impacts on aquatic resources and fisheries.
Vegetation and wildlife, including threatened and endangered species	HUC-12 subwatershed	Impacts within a HUC-12 subwatershed sufficiently accounts for impacts on vegetation and wildlife that would be directly affected by construction activities and for indirect impacts such as changes in habitat availability and displacement of transient species.
Land use and recreation	1.0 mile	Impacts on general land uses would be restricted to the construction workspaces and the immediate surrounding vicinity; therefore, the geographic scope for land use and recreation is 1.0 mile from the Project.
Visual	For aboveground facilities, the distance that the tallest feature at the aboveground facilities would be visible from neighboring communities. For the pipelines, a distance of 0.25 mile from the pipeline at existing visual access points (e.g., roads).	Assessing the impact based on the viewshed allows for the impact to be considered with any other feature that could have an effect on visual resources.

Table 4.14-1 Resource-Specific Geographic Scope for the Cumulative Impact Assessment		
Environmental Resource	**Geographic Scope for Cumulative Impacts**	**Justification for Geographic Scope**
Socioeconomics	Affected parishes and counties	Affected parishes and counties would experience the greatest impacts associated with employment, housing, public services, transportation, traffic, property values, economy and taxes, and environmental justice.
Environmental Justice	Affected environmental justice block groups	The geographic scope of potential impacts for environmental justice includes all environmental justice block groups affected by the Project.
Marine transportation	Calcasieu Ship Channel	Affected navigable waterways would experience the greatest impact downstream from the Terminal Site.
Cultural resources	Overlapping impacts within the APE	The APE for direct effects (physical) includes areas subject to ground disturbance, while the APE for indirect effects (visual or audible) includes aboveground ancillary facilities or other Project elements visible from historic properties in which the setting contributes to their NRHP eligibility.
Air quality-construction [a]	0.25 mile of the proposed pipeline facilities, 0.5 mile of the Moss Lake Compressor Station, and 1 mile of the Terminal	Air emissions produced during construction would be limited to vehicle and construction equipment emissions and dust and localized to the Project construction area.
Air quality-operation [a]	27.1 miles (43.7 kilometers) for Terminal Facilities and 13.3 miles (21.4 kilometers) for Moss Lake Compressor Station	The distance used by the EPA and the LDEQ for cumulative modeling of major sources (40 CFR 51, appendix W) for the PSD permitting of the Project.
Noise-construction	0.25 mile of any construction and within 0.5 mile of HDD entry/exit and Terminal (including pile locations); underwater noise due to pile driving: up to 0.15 mile, as determined by NMFS (2022)	Areas in the immediate proximity of construction activities (within 0.25 mile) would have the potential to be affected by construction noise. NSAs within 0.5 mile of an HDD, direct pipe installation, or pile driving could be cumulatively affected if other projects had a concurrent impact on the NSA. Aquatic life could be cumulatively affected if other projects conduct pile driving within 0.15 mile of the Project.
Noise-operation	NSAs within 1.0 mile of a noise-emitting permanent aboveground facility	Noise from the proposed Project's permanent aboveground facilities could result in cumulative impacts on NSAs within 1 mile.

[a] We note that GHGs do not have a localized geographic scope. GHG emissions from the Project combined with projects all over the planet lead to increased CO2, methane, and other GHG concentrations in the atmosphere.

As in sections 4.2 through 4.13, we use specific terms to describe the intensity and duration of cumulative impacts. The intensity of a cumulative impact could be temporary, short-term, long-term, or permanent. Temporary cumulative impacts generally occur during construction with the resource returning to preconstruction condition almost immediately afterward. Short-term cumulative impacts could continue for up to three years following construction. Cumulative impacts were considered long-term if the resource would require more than three years to recover. A permanent cumulative impact could occur as a result of any activity that modifies a resource to the extent that it would not return to preconstruction conditions during the life of the Project.

4.14.1 Projects and Activities Considered

This analysis identified several different types of present, proposed, and permitted actions that could cause a cumulative impact when considered along with the Project. The actions were provided by CP2 LNG and CP Express and by a general literature review of publicly available sources including, but not limited to:

- FERC eLibrary;
- COE Regulatory Public Notices;
- Texas Department of Transportation and Louisiana Department of Transportation; and
- Cameron Parish Police Jury.[259]

Table 4.14.1-1 summarizes the actions that have the potential for cumulative impacts because of their location and timing. We received several comments that compared the cumulative projects identified in the Commonwealth LNG cumulative impact table[260] and questioned why the same projects were not included in table 4.14.1-1 below. We compared the projects further and determined that three additional residential subdivision projects that were included in Commonwealth LNG cumulative impact table did overlap with CP2 LNG and CP Express' geographic scope and we have included these projects below. No additional projects as identified in the Commonwealth LNG Project were within the same geographic scope as the CP2 LNG and CP Express Projects. The actions are mapped on figure 4.14.1-1. Of the 22 total actions, not including the Project, there are:

- 10 FERC jurisdictional LNG and pipeline projects;
- four industrial projects;
- two transmission line projects;
- two carbon capture and sequestration projects;
- one transportation and road improvement project; and
- three residential subdivision projects.

259 As of the writing of this draft EIS, CP2 LNG and CP Express have not received responses from the Calcasieu Parish Planning and Development Department, the Jasper County Emergency Management and Homeland Security Department, or the Newton County Office of Floodplain Administration.

260 The Commonwealth LNG cumulative impact table is available as table 4.13-2 in the final EIS (accession number 20220909-3017).

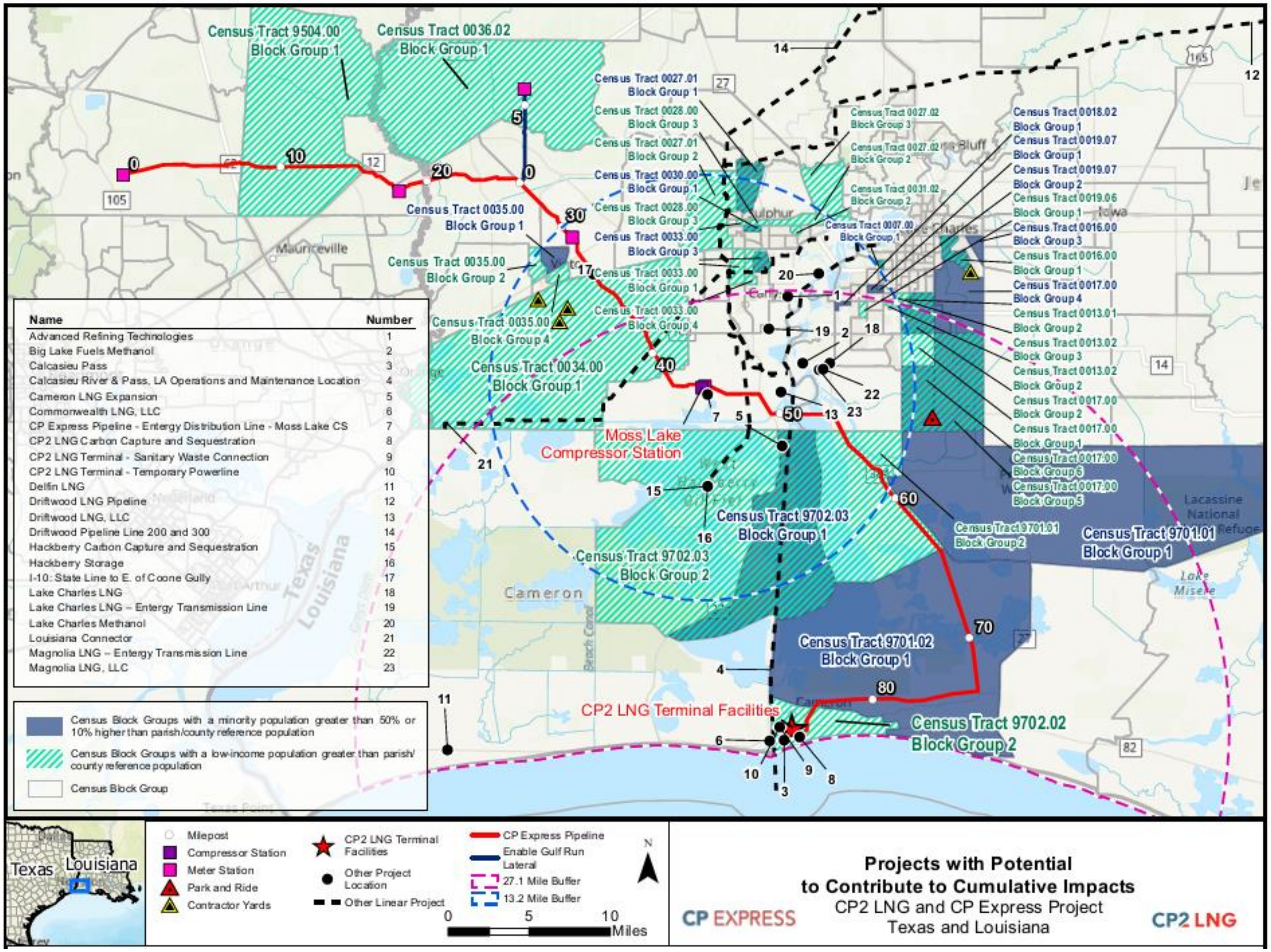

Figure 4.14.1-1 Projects with Potential to Contribute to Cumulative Impacts

Table 4.14.1-1

Projects and Reasonably Foreseeable Future Actions with Potential to Contribute to Cumulative Impacts

Project / Company	Description	Construction/ Operational Status	Parish/ County, State	Approximate Distance and Direction from CP2 LNG and CP Express Project Facility	Resources Cumulatively Affected	Workforce	Approximate Size of Project (acres)	Wetland Impacts (acres)
FERC-jurisdictional Liquified Natural Gas (LNG) Terminals and Pipeline Projects								
Calcasieu Pass Project (CP15-550)/Venture Global Calcasieu Pass, LLC and Trans Cameron Pipeline, LLC	New LNG export facility and pipeline	C: Ongoing O: In-service	Cameron Parish, LA	0.5 mile west of and adjacent to the CP2 LNG Terminal Site, with some overlapping workspace. 1.7 miles west of the CP Express Pipeline MP 85.4 21.5 miles south of the Moss Lake Compressor Station	Geology, soils, water resources, vegetation, wildlife, socioeconomics, marine transportation, land use, visual, cultural, noise –construction and operation, air quality – construction and operation, environmental justice	C: 1,425 O: 135	C: 826.6 O: 314.0	163.81
Driftwood LNG Project / Driftwood LNG, LLC and Driftwood Pipeline, LLC (CP17-117)	New LNG production and export terminal and associated pipeline	C: Ongoing O: expected 2026	Calcasieu Parish, LA	22 miles north of the CP2 LNG Terminal Site 1.5 miles north of the CP Express Pipeline near MP 48.6 4 miles east of the Moss Lake Compressor Station	Water resources, vegetation, wildlife, socioeconomics, marine transportation, air quality – construction and operation	C: 6,500 O: 539	C: 2,774.5 O: 1,287.8	745.0
Lake Charles Liquefaction Project (Trunkline Gas Company, LLC; Lake Charles LNG Company, LLC; and Lake Charles LNG Export Company, LLC) (CP14-120)	Expansion of LNG facility	C: pending O: expected 2025	Calcasieu Parish, LA	22 miles north of the CP2 LNG Terminal Site 3.0 miles north of the CP Express Pipeline near MP 53.1 7.5 miles east of the Moss Lake Compressor Station	Socioeconomics, marine transportation, air quality – construction and operation	C:2,100 O:176	C: 1,516 O: 457	253.0

Table 4.14.1-1

Projects and Reasonably Foreseeable Future Actions with Potential to Contribute to Cumulative Impacts

Project / Company	Description	Construction/ Operational Status	Parish/ County, State	Approximate Distance and Direction from CP2 LNG and CP Express Project Facility	Resources Cumulatively Affected	Workforce	Approximat e Size of Project (acres)	Wetland Impacts (acres)
Cameron LNG Expansion Project / Cameron LNG, LLC (CP15-560 CP22-41-000)	Expansion of LNG facility	C: pending O: expected 2026	Cameron Parish, LA	16 miles north of the CP2 LNG Terminal Site 2 miles south of the CP Express Pipeline MP 50.4 5 miles southeast of the Moss Lake Compressor Station	Water resources, vegetation, wildlife, socioeconomics, marine transportation, air quality operation	C:2,000 O:65	C:141 O: 60	0.0
Commonwealth LNG Project / Commonwealth LNG, LLC (CP19-502)	New LNG export facility pipeline	C: 2023 O: 2026 Pipeline C: 2024	Cameron Parish, LA	0.5 mile southwest of the CP2 LNG Terminal Site 1.75 miles west of the CP Express Pipeline MP 85.4	Water resources, vegetation, wildlife, land use, recreation, visual, socioeconomics, marine transportation, air quality - operation	C: 2,000 O:65	C:164.9 O:112.8	139.5
Delfin LNG Project / Delfin LNG LLC (CP15-490 and CP16-20)	New meter station, compressor station, gas supply header and existing/abandoned pipeline	C: pending O: expected 2024	Cameron Parish, LA	DOF Meter Station and DOF Compressor Station is 19 miles west of the CP2 LNG Terminal Site 20 miles west of the CP Express Pipeline MP 0.0 25.5 miles southwest of the Moss Lake Compressor Station	Socioeconomics and air quality – operation	C: 200 O: 200 – 400	C: 20.6 O: 16.8	3.4
Magnolia LNG / Magnolia LNG, LLC (CP14-347, CP14-511, and CP19-19)	LNG export facility and reconfiguration of existing pipeline system	C: pending O: expected 2026	Calcasieu Parish, LA	21.5 miles north of the CP2 LNG Terminal Site 7 miles east of the Moss Lake Compressor Station	Socioeconomics and air quality – operation	C: 781 O: 67	C: 204.8 O: 144.6	15

Table 4.14.1-1

Projects and Reasonably Foreseeable Future Actions with Potential to Contribute to Cumulative Impacts

Project / Company	Description	Construction/ Operational Status	Parish/ County, State	Approximate Distance and Direction from CP2 LNG and CP Express Project Facility	Resources Cumulatively Affected	Workforce	Approximate Size of Project (acres)	Wetland Impacts (acres)
Louisiana Connector Project (CP18-7) / Port Arthur Pipeline, LLC	New gas pipeline and interconnect facilities	C: pending	Calcasieu Parish, LA	Louisiana Connector Project crosses CP Express near MP 39.8 3.5 miles northwest of the Moss Lake Compressor Station	Geology, soils, water resources, vegetation, wildlife, land use, recreation, socioeconomics, cultural, noise -construction and operation, air quality – construction and operation	C: 600 O: 10	C: 2,821.30 O: 770.98	644.8
Line 200 and Line 300 Project / Driftwood Pipeline, LLC (CP21-465)	Two new, collocated gas pipelines and interconnect facilities	C: Phase I: 2023 C: Phase II: pending	Calcasieu and Beauregard Parishes, LA	21.5 miles north of the CP2 LNG Terminal Site 1.25 miles north of the CP Express Pipeline near MP 48.0	Water resources, vegetation and wildlife, socioeconomics, transportation	C:1,500 O:25	C:841.48 O:364.32	154.2
Hackberry Storage Project / LA Storage, LLC (CP21-44)	New natural gas storage facility and associated pipeline	Gas storage facility C: 2022 Gas storage facility O: 2025 Pipeline C: 2022 Pipeline O: 2023	Calcasieu and Cameron Parishes, LA	Storage facility is 15.5 miles northwest of the CP2 LNG Terminal Site Crosses CP Express at MP 47.2 3 miles east of the Moss Lake Compressor Station	Geology, soils, water resources, vegetation and wildlife, land use, recreation, visual, socioeconomics, transportation, cultural, noise – construction and operation, air quality – construction and operation,	C:313 O:10	C: 441.5 O: 266.7	143.0

Table 4.14.1-1

Projects and Reasonably Foreseeable Future Actions with Potential to Contribute to Cumulative Impacts

Project / Company	Description	Construction/ Operational Status	Parish/ County, State	Approximate Distance and Direction from CP2 LNG and CP Express Project Facility	Resources Cumulatively Affected	Workforce	Approximate Size of Project (acres)	Wetland Impacts (acres)
Non-jurisdictional Facilities Associated with the CP2 LNG and CP Express Project								
CP2 LNG Terminal Facilities (CP22-21) / Venture Global CP2 LNG, LLC	Temporary electric utility line and sanitary waste utility connection system	C: estimated 2023 O: estimated 2026	Cameron Parish, LA	Overlapping with the Terminal Facilities Footprint	Geology, soils, water resources, vegetation, wildlife, socioeconomics, marine transportation, land use, visual, cultural, noise –construction and operation, air quality – construction and operation, environmental justice	N/A	N/A	N/A
CP2 Express Pipeline System aboveground facilities (CP22-22) / Venture Global CP Express, LLC	Permanent electric powerline, substation, permanent fiber optic cabling, permanent water line, and permanent sanitary waste disposal line	C: estimated 2023 O: estimated 2026	Cameron Parish, LA	Overlapping with the Moss Lake Compressor Station and with the Pipeline System aboveground facilities	Geology, soils, water resources, vegetation, wildlife, socioeconomics, marine transportation, land use, visual, cultural, noise –construction and operation, air quality – construction and operation, environmental justice	N/A	N/A	N/A
Industrial Projects								
Calcasieu River and Pass, LA Operations and Maintenance Location / U.S. Army Corps of Engineers	Periodic dredging of the river and channel to facilitate boat traffic	Dredging every other year between river mile marker 17 and 28	Calcasieu and Cameron Parishes, LA	<0.1 mile west of the CP2 LNG Terminal Site Crossed by pipeline near MP 50.8	Water resources, socioeconomics, noise –construction, air quality – construction	N/A	Over 6,000	0.0

Table 4.14.1-1

Projects and Reasonably Foreseeable Future Actions with Potential to Contribute to Cumulative Impacts

Project / Company	Description	Construction/ Operational Status	Parish/ County, State	Approximate Distance and Direction from CP2 LNG and CP Express Project Facility	Resources Cumulatively Affected	Workforce	Approximate Size of Project (acres)	Wetland Impacts (acres)
Advanced Refining Technologies / W.R. Grace & Co. and Chevron Products Company	Aluminum manufacturing facility	C: estimated 2022 O: estimated 2024	Calcasieu Parish, LA	25 miles north of the CP2 LNG Terminal Site 5 miles north of CP Express MP 51.5 6 miles north of the Moss Lake Compressor Station	Socioeconomics and air quality – operation	190	120	N/A
Lake Charles Methanol Project / Lake Charles Methanol, LLC	Petrochemical production facility	C: estimated 2023 O: expected 2025	Calcasieu Parish, LA	27.5 miles north of the CP2 LNG Terminal Site 8.5 miles north of CP Express MP 51.5 10 miles northeast of the Moss Lake Compressor Station	Socioeconomics and air quality – operation	1,000	250	N/A
Big Lake Fuels Methanol Plant (G2X Energy)	Methanol production facility	C: Present/on hold O: Unavailable	Calcasieu Parish, LA	22 miles north of the CP2 LNG Terminal Site 3 miles north of the CP Express Pipeline near MP 51.8 7 miles northeast of the Moss Lake Compressor Station	Socioeconomics and air quality – operation	2,500	200	N/A
Transmission Line Projects								
Lake Charles LNG – Entergy Transmission Line (Entergy Louisiana)	19-mile transmission line	C: Pending O: 2025	Calcasieu Parish, LA	22 miles north of the CP2 LNG Terminal Site 3.0 miles north of the CP Express Pipeline near MP 53.1 7.5 miles east of the Moss Lake Compressor Station	Socioeconomics and air quality – operation	N/A	N/A	N/A
Magnolia LNG – Entergy Transmission Line (Entergy Louisiana)	1.3-mile transmission line	C: estimated 2022 O: 2025	Calcasieu Parish, LA	21.5 miles north of the CP2 LNG Terminal Site 7 miles east of the Moss Lake Compressor Station	Socioeconomics and air quality – operation	N/A	26.1	N/A

Table 4.14.1-1

Projects and Reasonably Foreseeable Future Actions with Potential to Contribute to Cumulative Impacts

Project / Company	Description	Construction/ Operational Status	Parish/ County, State	Approximate Distance and Direction from CP2 LNG and CP Express Project Facility	Resources Cumulatively Affected	Workforce	Approximate Size of Project (acres)	Wetland Impacts (acres)
Transportation and Road Improvement Projects								
I-10: State line to East of Coone Gully / Louisiana Department of Transportation	Bridge replacements and highway widening	C: ongoing, expected to be completed in 2025	Calcasieu Parish, LA	Approaches pipeline ~300 feet west of MP 33.7	Geology, soils, water resources, vegetation, wildlife, land use, recreation, socioeconomics, visual, air quality – construction and operation, noise –construction and operation	N/A	N/A	0.0
Carbon Capture and Sequestration Projects								
CP2 LNG Carbon Capture Sequestration project (Venture Global CP2 LNG, LLC)	CO_2 sequestration	C: expected 2023 O: expected 2026	Cameron Parish, LA and State of Louisiana Waters	Within CP2 LNG Terminal Site 21.5 miles south of the Moss Lake Compressor Station	Geology, soils, water resources, vegetation, wildlife, socioeconomics, marine transportation, land use, visual, cultural, noise –construction and operation, air quality – construction and operation, environmental justice	N/A	N/A	N/A
Hackberry Carbon Sequestration Project	CO_2 sequestration	C: pending O: pending	Calcasieu and Cameron Parishes, LA	15.5 miles northwest of the CP2 LNG Terminal Site 6 miles south of CP Express at MP 45 6 miles south of the Moss Lake Compressor Station	Socioeconomics and air quality – operation	N/A	N/A	0.2
Residential Subdivision Projects [a]								
Belle Savanne	Residential subdivision under construction	C: Ongoing O: Ongoing	Calcasieu Parish, LA	7.8 miles north of the Moss Lake Compressor Station	Socioeconomics	N/A	N/A	N/A
Carlyss Place	Residential subdivision under construction	C: Ongoing O: Ongoing	Calcasieu Parish, LA	7.8 miles north of the Moss Lake Compressor Station	Socioeconomics	N/A	N/A	N/A

Table 4.14.1-1

Projects and Reasonably Foreseeable Future Actions with Potential to Contribute to Cumulative Impacts

Project / Company	Description	Construction/ Operational Status	Parish/ County, State	Approximate Distance and Direction from CP2 LNG and CP Express Project Facility	Resources Cumulatively Affected	Workforce	Approximate Size of Project (acres)	Wetland Impacts (acres)
Graywood	Residential subdivision under construction	C: Ongoing O: Ongoing	Calcasieu Parish, LA	7.5 miles northeast of the Moss Lake Compressor Station	Socioeconomics	N/A	N/A	N/A

C – Construction
O – Operation
N/A – Information not publicly available or information not applicable

[a] The three residential subdivision projects (Belle Savanne, Carlyss Place, and Graywood) are not depicted on figure 4.14.1-1 above. Refer to the approximate distance and direction column in this table for the general location of these projects.

4.14.1.1 FERC-jurisdictional LNG and Pipeline Projects

Calcasieu Pass Project

The Calcasieu Pass LNG export terminal is a 12 MTPA LNG export facility along the Calcasieu Ship Channel. The site is currently operational, with minor activities related to commissioning still ongoing inside the terminal. The Terminal includes liquefaction facilities, LNG storage facilities, a 720-MW electric generating plant, a marine terminal consisting of a turning basin and LNG carrier berths, LNG piping, transfer lines, loading facilities, and other infrastructure. The Terminal can accommodate up to 200 LNG vessel calls annually. The project also includes the TransCameron Pipeline, a 23.4-mile-long natural gas pipeline that supplies the terminal. The feed-gas pipeline extends to the east of the terminal, also within Cameron Parish. The project was approved by FERC in 2019 and is currently undergoing commissioning activities with an anticipated in-service date in the third quarter of 2023. The project affects about 1,069 acres with a portion of the project occurring in the Calcasieu Lake-Calcasieu Pass watershed. Calcasieu Pass LNG had an estimated peak construction workforce of 1,810 employees and expects a permanent workforce of 130 employees. The FERC docket number assigned to the project is CP15-550-000. The Calcasieu Pass Project is 0.5 mile west of and adjacent to the CP2 LNG Terminal Site, with some overlapping workspace, and is 1.7 miles west of the CP Express Pipeline near MP 85.4.

Driftwood LNG Project

The Driftwood LNG Project is a 27.6 MTPA LNG export facility on the west side of the Calcasieu River in Calcasieu Parish, Louisiana that was approved by FERC in 2019. Construction of the LNG facility is currently underway, and construction of the first LNG terminal is anticipated to be completed in 2026. Construction activities are anticipated to coincide with the CP2 LNG and CP Express Project activities. The project includes five liquefaction trains, three LNG storage tanks, a dredged turning basin, and three LNG carrier berths to accommodate an expected average of 365 vessel calls annually. Construction of the project would affect approximately 2,775 acres. The project has an expected peak construction workforce of 6,500 employees, and 539 permanent employees. The FERC docket number assigned to the project is CP17-117-000. The Driftwood LNG Project is 22 miles north of the CP2 LNG Terminal Site and 1.5 miles north of the CP Express Pipeline near MP 48.6.

Lake Charles Liquefaction Project

The Lake Charles Liquefaction Project has been permitted, and includes modification of an existing LNG import terminal, as well as construction and operation of new facilities adjacent to the modified terminal. The new liquefaction facilities will have a design production capacity of 16.45 MTPA and would not increase the number of ships that were previously analyzed to call on the terminal, which is currently 225 annually.[261] Construction of the project would affect approximately 1,516 acres. The Lake Charles Liquefaction Project would have a peak construction workforce of 5,600 employees and a permanent workforce of 176 employees. Lake Charles LNG Export Company, LLC filed for an extension to construct by December 16, 2028. Construction of the Lake Charles Liquefaction Project has been rescheduled to be completed by the fourth quarter of 2028; however, the construction start date is not known. The FERC docket number assigned to the project is CP14-120-000. The Lake Charles Liquefaction Project is 22 miles north of the CP2 LNG Terminal Site and 3.0 miles north of the CP Express Pipeline near MP 53.1.

[261] A recent LOR from the Coast Guard increased the authorized number of ships calling on the terminal from 225 to 300 annually (see accession no. 20230316-3019).

Cameron LNG Expansion Project

FERC approved expansion of the Cameron LNG terminal to include 2 additional liquefaction trains in 2016. Cameron LNG recently filed for an extension to construct by May 2026. On January 18, 2022, Cameron filed an application to amend the project to, in part, only construct one of the liquefaction trains that was approved by FERC in 2023. Construction of the Cameron LNG Expansion Project is anticipated to begin in 2023 with an anticipated in-service date in the third quarter of 2027. Construction activities are anticipated to coincide with the CP2 LNG and CP Express Project activities. If constructed, the facility export capacity would increase to 20.9 MTPA. Construction of the Cameron LNG Expansion Project would affect 141 acres and would occur within the permitted footprint of the Cameron LNG Project. The expansion would have a peak construction workforce of 3,269 employees. The combined permanent workforce of Cameron LNG and the expansion is expected to total 225 employees. The FERC docket number assigned to the project is CP22-41-000. The Cameron LNG Expansion Project is 16 miles north of the CP2 LNG Terminal Site and 2 miles south of the CP Express Pipeline near MP 50.4.

Commonwealth LNG Project

The Commonwealth LNG Project is a new LNG liquefaction and export facility that is being developed by Commonwealth LNG. The facility would be at the confluence of the Calcasieu Ship Channel and the Gulf of Mexico in Cameron Parish, Louisiana. The project would include the installation of a 3-mile-long pipeline to connect the facility to existing pipeline systems, six new liquefaction trains, six gas pre-treatment trains, two flare systems, six LNG storage tanks, one marine facility, utilities, safety systems, appurtenant facilities, two interconnection facilities, and one meter station. Construction activities are anticipated to coincide with the CP2 LNG and CP Express Project. The project would produce 8.4 MTPA of LNG for export on an average of 156 LNG carriers per year. The Commonwealth LNG Project would have a peak construction workforce of 2,000 employees and a permanent workforce of 65 employees. Construction of the project would affect about 165 acres. Terminal construction is anticipated to begin in late 2023 and operations are anticipated to begin in 2026. Pipeline construction is anticipated to begin in 2024 and be completed in 2025. The FERC docket number assigned to the project is CP19-502-000; the project was approved by FERC in November 2022. The Commonwealth LNG Project is 0.5 mile southwest of the CP2LNG Terminal Site and 1.75 miles west of the CP Express Pipeline near MP 85.4.

Delfin LNG Project

The Delfin LNG Project would include the construction of a floating liquefaction and LNG terminal in the Gulf of Mexico, approximately 45 miles south of the Terminal Facilities. The Project would include the reactivation of 1.1 miles of existing onshore 42-inch diameter pipeline as well as the installation of one new meter station, new supply header lines, and one new compressor station. This offshore facility would also include an onshore compressor system, monitoring, and piping which would be approximately 20 miles west of the Terminal Facilities. In 2017, the offshore facility was approved by the DOE (DOE docket number 13-147-LNG), and FERC approved the onshore facilities (docket numbers CP15-490-000, and CP16-20-000). The project has an estimated construction workforce of 200 employees, and 200 to 400 permanent employees. Although the project was slated to begin operations in 2021/2022, construction has not begun, and Delfin received an extension from FERC in November 2022 to begin construction by September 2023. The project is now anticipated to be operational by 2024. Construction activities are anticipated to coincide with the CP2 LNG and CP Express Project activities.

Magnolia LNG Project

The Magnolia LNG Project, sited on an industrial canal on the east side of the Calcasieu Ship Channel approximately 23 miles north of the Terminal Facilities, includes four liquefaction plants, two

LNG storage tanks, and two LNG carrier berths. During operation, approximately 208 LNG vessels (104 LNG carriers and 104 LNG barges) would call on the LNG terminal per year. The project was originally approved by FERC in 2016 at a maximum 8.0 MTPA capacity; however, FERC authorized an amendment to increase the output by 0.8 MTPA on June 18, 2020. The total capacity for Magnolia LNG will be 8.8 MTPA. On September 11, 2020, Magnolia requested an extension until April 15, 2026 to construct the project. The Magnolia Project would have a peak construction workforce of 781 employees and a permanent workforce of 67 employees. Construction has not started on this project as of the issuance of this document. Due to the expected timeframe of construction for the project (i.e., 36 months) it can be estimated that the construction timeframe will coincide with the CP2 LNG and CP Express Project. To supply the LNG terminal, Kinder Morgan Louisiana Pipeline would modify its existing pipeline system to include a new compressor station, new natural gas header pipelines adjacent to the existing easement, and modifications at six existing meter stations. Construction of Magnolia LNG would affect about 129 acres within the Calcasieu River-Prien Lake watershed. The FERC docket numbers assigned to the project are CP14-347-000, CP14-511-000, and CP19-19-000.

Louisiana Connector Project

The Louisiana Connector Project is part of the overall Port Arthur Liquefaction Project; however, it is the only project component within the geographic scope considered for cumulative impacts. The Louisiana Connector Project is a new interstate natural gas pipeline system to transport natural gas to the Port Arthur Liquefaction Project and export facility at a site in Port Arthur, Texas. The Louisiana Connector Project consists of about 131 miles of new 42-inch-diameter natural gas pipeline, one new compressor station, and interconnect facilities in east Texas and western Louisiana. FERC approved the project in 2019 and granted a 50-month extension on July 28, 2022. The Louisiana Connector Project is now anticipated to be completed by June 18, 2028; however, the current construction start date is unknown. The Louisiana Connector Project would have a peak construction workforce of 600 employees and a permanent workforce of 10 employees. Construction of the Louisiana Connector Project would affect about 2,807 acres. The FERC docket numbers assigned to the project are CP17-20-000, CP17-21-000, and CP18-7-000. The Louisiana Connector Project crosses the CP Express Pipeline near MP 39.8.

Driftwood Line 200 and Line 300 Project

Driftwood Line 200 and Line 300 Project involves the construction and operation of Line 200, consisting of 36.9 miles of new 42-inch-diameter natural gas pipeline, and Line 300, consisting of 32.4 miles of new 42-inch-diameter natural gas pipeline collocated with Line 200, originating near Ragley in Beauregard Parish, Louisiana and running south to a proposed receiver facility near Carlyss in Calcasieu Parish, Louisiana. Additional facilities include one 0.9-mile of 30-inch-diameter lateral, one 0.8-mile 30-inch-diameter lateral, 1 new compressor station, 11 meter stations, 6 MLVs, and appurtenant aboveground facilities. Construction of the project would affect approximately 2,775 acres. The project would have a peak workforce of 1,500 workers, and 25 permanent workers. Construction of Phase I (Line 200) could occur in 2023 with an in service date in 2024, and construction of Phase II (Line 300) is anticipated to take 12 months to complete with an in service date in 2026. Construction activities are anticipated to coincide with the CP2 LNG and CP Express Project activities. The FERC docket number assigned to the project is CP21-465-000. The Driftwood Line 200 and Line 300 Project would terminate approximately 1.3 miles north of the CP Express Pipeline near MP 48.0.

Hackberry Storage Project

The Hackberry Storage Project would involve the conversion of three existing salt dome caverns to natural gas storage service, the development of one new salt dome cavern for additional natural gas storage service, construction of a compressor station, six freshwater supply wells, a brine disposal system, and associated pipeline to transport brine from the caverns to four new saltwater disposal wells, construction of 4.9 miles of 42-inch-diameter pipeline, and construction of 11.1 miles of 42-inch-diameter pipeline. Construction of the project would affect approximately 442 acres. The project would have a workforce of approximately 313 workers during construction and 10 permanent workers. Construction of the gas storage facility is scheduled to be in-service in 2025 with pipeline construction scheduled to begin in 2022 and be complete in 2023. Construction activities are anticipated to coincide with the CP2 LNG and CP Express Project activities. The FERC docket number assigned to the project is CP21-44-000. The Hackberry Storage Project pipeline intersects the CP Express Pipeline near MP 47.2.

4.14.1.1 Non-jurisdictional Facilities Associated with the CP2 LNG and CP Express Project

Terminal Facilities

Electric power for the Terminal Site will be provided by an existing temporary electric utility line that was previously installed for Venture Global Calcasieu Pass, LLC's Calcasieu Pass LNG Terminal Facility under Docket No. CP15-550-000. The electric line will be within the CP2 LNG Terminal Facilities footprint and will only be needed during construction. Approximately 500 feet of overhead electrical line would be constructed to deliver power from the existing line to the new CP2 LNG substation. The temporary electric utility line ties into the Jeff Davis electric distribution line along Marshall Street (SH 27). During operation of the Terminal Facilities, CP2 LNG would source electric power from two on-site generating plants providing 1,470 MW. No additional areas outside the CP2 LNG construction footprint would be disturbed to provide electrical power. Jeff Davis would be responsible for obtaining the necessary authorizations to construct and operate the expanded facilities; however, both the extended power line and the substation would be within the footprint of the Terminal Site. As such, they would be constructed on land operated by CP2 LNG and their associated permits. Due to the overlapping footprint of the electric line and Terminal Facilities, the electric utility line was included in our cumulative impact analysis.

Additionally, the Terminal Facilities would require a permanent sanitary waste utility connection. The sanitary waste collection system would be within the Terminal Site and would connect to an existing forced main sewer line that parallels Davis Road in the site's immediate vicinity and discharges to the local wastewater treatment facility, operated by Cameron Parish Water and Wastewater District 1. The connection would be accomplished by a short section of approximately 4-inch-diameter underground polyvinyl chloride pipe, which would be confined to the Terminal Site footprint and the utility right-of-way along Davis Road. The design and construction of this tie-in section would be subject to approval by Cameron Parish and any impacts on wetlands or waterbodies outside the CP2 LNG construction footprint would be subject to CWA Section 404 and coastal use permit authorizations.

Pipeline System aboveground facilities

CP Express' non-jurisdictional facilities would include utilities at the Pipeline System aboveground facilities. CP Express would construct a permanent electric power line, substation, permanent fiber optic cabling, a permanent water line, and a permanent sanitary waste disposal line to provide service connections to the Moss Lake Compressor Station. Permanent electric power lines and permanent fiber optic cabling would also be constructed to provide service connections to the five meter stations and four MLV sites. Electric utility power for the Moss Lake Compressor Station would be provided by Entergy via an interconnect with an existing distribution line that is parallel to the property. The service line interconnect at the proposed Moss Lake Compressor Station substation would not entail ground disturbance outside of the Moss Lake Compressor Station boundary. Both the substation and the associated power line tie-in are included in the Project's Section 106 NHPA consultation, Section 7 ESA consultation, CWA Section 404 permit application, and pipeline Coastal Use Permit application. Entergy or other service provider(s) would be responsible for permitting the off-site power line sections and fiber optic cabling for all aboveground facilities on the Pipeline System.

4.14.1.2 Industrial Projects

Dredging

The Calcasieu River and Pass, Louisiana Operations and Maintenance Project, is a COE Dredge Material Maintenance Plan project that requires dredging on an annual basis to maintain access for large vessel traffic coming to and from the Port of Lake Charles. Dredging occurs from Lake Charles, Louisiana along the Calcasieu River to 32 miles into the Gulf of Mexico, with different areas of the project dredged with different frequencies. The dredging occurs less than 0.1 mile from the Terminal Facilities. The CP Express Pipeline crosses the dredge area via the HDD method at approximately MP 50.4 to MP 51.3.

Petrochemical and Manufacturing

There are three petrochemical and one manufacturing project that have the potential to cumulatively impact socioeconomic resources and air quality. Advanced Refining Technologies' specialty aluminum manufacturing facility expansion project in Calcasieu Parish is ongoing, although construction appears to currently be delayed. No completion date is known. The Lake Charles Methanol project, currently delayed due to financing needs, will produce methanol, hydrogen, carbon dioxide, and other chemicals from the oil and gas industry' waste petroleum coke, and will capture excess CO_2 to be sold to domestic oilfield operators. Construction of G2X Energy's Big Lake Fuels natural-gas-to-methanol facility in Calcasieu Parish is currently underway although progress appears to be delayed. These projects are anticipated to generate approximately 3,690 construction jobs.

Transmission Line Projects

Entergy Louisiana has planned electrical transmission projects to accommodate the increased demands from LNG export terminal projects. These transmission projects may include construction within existing or new rights-of-way. A new 19-mile-long 230-kV electrical transmission line will support the Lake Charles LNG Project and a 1.3-mile-long electrical transmission line will support the Magnolia LNG Project.

4.14.1.3 Transportation and Road Improvement Projects

I-10: State line to East of Coone Gully

The I-10 State Line to East of Coone Gully Project is an infrastructure project planned by the LDODT along I-10 in Calcasieu Parish, Louisiana. This project will widen I-10 from three to six lanes from the Texas state line to east of Vinton. The project will also replace five bridge systems as well as remove and upgrade the eastbound weigh-in-motion system. Construction is being completed in three segments to minimize the impact on the traveling public. Work began on segment one from the state line to LA 109 in September 2020 and the entire project is anticipated to be complete in 2025. The CP Express Pipeline would cross I-10 using the HDD method near MP 33.7 and workspaces of the projects would not intersect.

4.14.1.4 Carbon Capture and Sequestration Projects

CP2 LNG Carbon Capture Sequestration Project

The CP2 LNG Carbon Capture Sequestration project would originate within the proposed CP2 LNG Terminal Site in Cameron Parish, Louisiana and extend approximately 3 miles to an offshore platform in State of Louisiana waters. The pipeline alignment, platform location, and well location are in the siting stage of project development. CP2 LNG plans to capture and sequester an estimated 500,000 tons per year of CO_2 emissions from the proposed Terminal Facilities. CP2 LNG proposes to compress the CO_2 and transport via pipeline to be injected into saline aquifers.

Hackberry Carbon Sequestration Project

The Hackberry Carbon Sequestration project would be constructed near Hackberry, Louisiana. It would be designed to capture, transport, and store CO_2 from primarily Cameron LNG in a saline aquifer. The project would include installation of a CO_2 injection well, a 5.8-mile-long 6-inch-diameter suction pipeline, a 2.8-mile-long 12-inch-diameter injection pipeline, and facility with boathouse and gangplank. The CO_2 would be captured by acid gas removal units, dehydrated, compressed, and transported from the Cameron LNG terminal by suction pipeline to the saline aquifer injection well site.

4.14.1.5 Residential Subdivision Projects

Three residential subdivision projects are under construction in the Lake Charles area in Cameron Parish. Construction is ongoing at these projects and completed residential units are currently being sold.

4.14.2 Potential Cumulative Impacts by Resource

The following sections address the potential cumulative impacts from CP2 LNG and CP Express' Project combined with other projects identified within the geographic scope on specific environmental resources (see table 4.14.1-1).

4.14.2.1 Geology and Soils

The geographic scope for cumulative impacts on geological resources and soils was defined as the area that would be affected by, or directly adjacent to, the Project. Projects that would be constructed in close proximity to one another, and require excavation or considerable grading, would generally have greater impacts on geological resources and soils than projects with limited ground disturbance or those projects that are separated by time and space. Therefore, the potential increase for erosion and impact on geological hazards would be highly localized and limited primarily to the period of construction.

The primary cumulative impacts on current geologic and soils conditions include large projects involving the installation of aboveground facilities and impervious surfaces, and construction activities such as clearing, grading, excavation, blasting, backfilling, and pile driving. The Calcasieu Pass LNG Terminal associated with the Calcasieu Pass Project, the Louisiana Connector Project, and the Hackberry Storage Project have the greatest potential to contribute to cumulative impacts on geologic resources and soils (see table 4.14.1-1).

Geologic Resources

Fuel and non-fuel mineral resources are not anticipated to be impacted by the Project, as no active mining operations or active oil and gas wells are within 0.25 mile of the Terminal Facilities. Therefore, construction and operation of the Project are not anticipated to result in impacts on mineral resources and thus, the Project would not contribute to cumulative impacts on mineral resources.

CP Express does not anticipate that blasting would be required for construction of the Pipeline System and, following construction, CP Express would restore topographic contours along the pipeline rights-of-way to approximate preconstruction conditions. The Louisiana Connector Project and Hackberry Storage Project overlap the Project Pipeline System workspace at MP 39.8, MP 47.2, respectively. The I-10: State line to East of Coone Gully project is also adjacent to the Pipeline System near MP 33.7. Further, workspaces for non-jurisdictional facilities and the carbon capture sequestration facilities associated with the Project would have overlapping workspace.

As described in section 4.2.3, the overall potential for impacts on or by the Project related to geologic hazards is low. Coastal processes, such as flooding, long-term sea level rise, and shoreline erosion are the geologic hazards with the greatest potential to affect the Project. The Louisiana Connector Project and Hackberry Storage Projects are FERC-regulated, and topographic contours would be restored along the pipeline right-of-way to approximate preconstruction conditions. Construction of the Terminal Site would permanently modify current topographic contours. Similarly, Venture Global Calcasieu Pass, LLC's adjacent Calcasieu Pass LNG Terminal would permanently alter topographic contours through cut and fill activities, import of fill, and dredging of a marine berth. Both CP2 LNG and Venture Global Calcasieu Pass, LLC have designed their respective facilities to include mitigation measures to withstand predicted geological hazards. In addition, although pile driving at the Terminal Site would occur in the vicinity of installed piles associated with the Calcasieu Pass LNG Terminal, the piles for both projects would be designed and engineered based on geotechnical analysis to ensure localized minor impacts on the subsurface geology. Therefore, cumulative impacts on geologic hazards and surficial geology are anticipated to be minimal.

Soils

Cumulative impacts on soil resources could occur where other actions occur within or immediately adjacent to the Project footprint. Additive impacts on soils can occur if projects are constructed concurrently or if previously restored areas are subsequently re-disturbed. Prolonged disturbance of soils can increase the potential for erosion, compaction, rutting, and the establishment of invasive species. Soil erosion could lead to increased sedimentation in adjacent wetlands and waterbodies, while soil compaction, rutting, and the establishment of invasive species can prevent the successful revegetation and stabilization of the temporarily disturbed areas located within the geographic scope.

Several areas of the Calcasieu Pass Project would overlap with CP2 LNG's Terminal Site, including temporary workspace, and existing access road, and the existing terminal facility yards. The Louisiana Connector Project; Hackberry Storage Project; and I-10: State Line to East Coone Gully project would cross or be adjacent to the Pipeline System and would contribute to potential cumulative impacts on soil resources. While Project impacts and the impacts of other actions could contribute to cumulative impacts on soil resources within the overlapping construction areas during construction and restoration, these impacts would be individually and collectively temporary and localized given that all projects would implement similar soil conservation and restoration measures to prevent erosion and stabilize disturbed areas and would not result in a significant cumulative impact. All FERC-regulated projects identified above would implement the FERC Plan and Procedures to protect soil resources and minimize incremental impacts on soils. In addition, the remaining projects identified that are not FERC-regulated would also be required to implement similar best management practices in accordance with applicable federal and state regulations to minimize soil erosion. Permanent impacts on soils for all actions would be limited to the conversion of soils classified as farmland at the location of permanent aboveground facilities. However, permanent resulting impacts would be highly localized. Therefore, the potential cumulative impact on soils would be minor.

4.14.2.2 Groundwater

The geographic scope for cumulative impacts on groundwater resources was considered to be the HUC-12 subwatersheds affected by the Project. Other projects within the geographic scope for groundwater resources that are included in the cumulative impacts analysis are identified in table 4.14.1-1.

Cumulative impacts on groundwater may occur through construction activities, including clearing and grading, shallow excavations, dewatering, contamination through fuel and other hazardous material spills, and groundwater withdrawal. Cumulative impacts may also occur during operation, including changes in near-surface hydrology from the addition of impervious surfaces at aboveground facilities and groundwater withdrawals. As discussed in section 4.4.1.4, the majority of potential impacts on groundwater resources associated with the Project would be short-term and localized, primarily associated with clearing, grading, excavating, filling, and placement of piles and foundations. The majority of the other projects considered for cumulative impacts on groundwater would involve similar ground disturbing activities that could temporarily affect groundwater.

The four LNG facilities also in the HUC-12 subwatersheds affected by the Project would use a combination of water and groundwater wells for construction and operation of the facilities. Cones of depression from projects in the geographic scope with groundwater withdrawals could overlap, overlap, and groundwater withdrawals could exacerbate salinity conditions in the Chicot aquifer. The Terminal Site's process and potable water requirements would be sourced from five new onsite groundwater wells, four for process water and one for potable water. The Driftwood LNG Project and Commonwealth LNG Project would utilize municipal water for operational water needs. No additional onsite groundwaters wells are proposed for the Cameron LNG Expansion Project and the project would not increase operational water needs. Approximately 850 million gallons of water are withdrawn from the Chicot aquifer per day (USGS, 2018). Based on studies for the adjacent Calcasieu Pass LNG Terminal (Calcasieu Pass Project) and CP2 LNG's modeling to predict drawdown for the CP2 LNG Terminal Site, over a 5-year pumping duration assuming respective pumping rates, the drawdown estimated at the nearest Cameron well (approximately 4,000 feet from the Project) was between 5 to 7 feet. Therefore, the Chicot aquifer has sufficient volume to support water supply at the Terminal Site with minimal impact to nearby groundwater users. The studies also determined that while the installation and use of the new wells would increase salinity in the immediate area of the new wells, salinity is unlikely to increase at Cameron's public water supply wells to the north of the Terminal Site, as discussed in section 4.4.1.4.

Several projects from table 4.14.1-1 share the same geographic scope areas with the Pipeline System and would have similar impacts to those described in section 4.4.1.4. The most likely cumulative impacts associated with construction and operation of the Pipeline System on groundwater are turbidity caused by the shallow excavations and reduced groundwater recharge caused by the installation of impervious structures. The Pipeline System's impact on groundwater resources would be localized due to the limited horizontal and vertical extent of disturbance; lack of blasting; and implementation of various measures and construction plans to limit erosion and sedimentation, reduce compaction, restore pre-existing grades and vegetation, protect nearby water supply wells and springs, and prevent and minimize fuel and hazardous materials spills. Where aboveground facilities are proposed, the relatively small amount of new impervious surface is not expected to affect overall groundwater recharge rates in the geographic scope.

The projects included in table 4.14.1-1 that are within the HUC 12 subwatersheds affected by the Project either have or would be required to obtain water use and discharge permits, implement erosion and sediment controls, and adhere to various spill plans as mandated by federal and state agencies, as appropriate. All FERC-regulated projects would mitigate for potential contamination of wells and shallow groundwater areas due to accidental spills or leaks of hazardous materials associated with vehicle refueling, vehicle maintenance, and storage of construction materials by adhering to the FERC Plan and Procedures and/or project-specific plans, which include spill prevention and containment measures to minimize potential impacts on groundwater resources. For these reasons, we anticipate that the majority of cumulative impacts on groundwater would be temporary and minor. While the Project and other projects in the geographic scope would result in permanent impacts on depth to groundwater from cones of depression created by groundwater withdrawals, impacts on other users are not expected to be significant.

4.14.2.3 Surface Water and Aquatic Species and Habitat

Surface waters and aquatic species and habitat are combined in this analysis because activities that affect surface waters also affect fish and other aquatic species such as marine mammals and sea turtles, as well as their habitats. The geographic scope for cumulative impacts on surface water resources and aquatic species habitat was considered to be the HUC-12 subwatersheds affected by the Project, inclusive of potential overlapping impacts from sedimentation, turbidity, and water quality for direct in-water work. Projects that fill waterbodies during construction and/or involve dredging, open-cut pipeline crossing techniques, modification of surface water resources, and/or operational vessel traffic could result in cumulative impacts on surface waters, aquatic species, and habitats. These impacts are primarily temporary and could include increased sedimentation, turbidity, decreased dissolved oxygen, impaired flow, releases of chemicals and nutrient pollutants, modification of habitat, and fish injury or mortality. Other projects within the geographic scope for surface water resources that are included in the cumulative impacts analysis are identified in table 4.14.1-1.

Terminal Facilities

Construction and operation of the Terminal Facilities would result in decreased water quality of surface waterbodies within the vicinity of the Terminal Facilities as a result of initial dredging and maintenance dredging, vessel traffic, site grading activities, placement of fill, stormwater runoff, industrial wastewater, hydrostatic testing, and the potential for spills or leaks of hazardous materials. Operational impacts on waterbodies within the Terminal Site boundary would be permanent. Excavation and dredging along the southwest shore of Monkey Island would be required for the LNG loading docks, berthing area, and vessel turning basins. Additionally, periodic maintenance dredging may also be required at the Marine Facilities, which would release sediments into the water column.

Approximately 2.0 acres of portions of two waterbodies (WAT-01 and WAT-M02) would be filled and rerouted/relocated to support construction of the Terminal Facilities, both of which are portions of the stormwater surface drainage system operated by Cameron Parish Gravity Drainage District No. 3. The Calcasieu Pass Project, Driftwood LNG Project, and Commonwealth LNG Project, when combined, would fill approximately 77 acres of open water. Surface waters in this region are protected under Sections 404 and 401 of the CWA and the Louisiana State and Local Coastal Resources Management Act of 1978. All project proponents would be required to obtain authorizations from the COE, LDEQ, and LDNR/OCM prior to engaging in actions that would negatively impact surface waters.

Impacts on water quality from dredging for the Project would be reduced by the use of a hydraulic dredge with a suction cutterhead and compliance with applicable COE permit conditions, as discussed in section 4.4.3.1. Construction of other regional LNG export terminals and Calcasieu River and Pass, Louisiana Operations and Maintenance Project would require dredging millions of cubic yards within the Calcasieu Ship Channel. The neighboring Commonwealth LNG Project could have similar impacts on the Calcasieu River due to dredging but, likewise, a barge-mounted cutterhead suction dredge would be used to minimize suspended sediment and turbidity. Localized impacts could be exacerbated if the marine construction schedules of the two projects were to overlap, which is possible given the proposed construction schedules. Maintenance dredging for the Calcasieu Pass Project and the Commonwealth LNG Project, as well as periodic dredging of the Calcasieu Ship Channel by the COE, could also contribute to a cumulative impact on surface waters. However, each of these projects would be required to obtain dredging permits and utilize best management practices to ensure that water quality standards are maintained and that dredge materials are being beneficially used or placed in an approved location. Shoreline erosion would be controlled by the placement of rip-rap shoreline protection. Increased vessel traffic from the Project and these other projects would also result in increased cooling and ballast water exchanges. Ballast water discharges would be governed by federal oversight and applicable Coast Guard requirements. Cooling water exchanges would result in minor changes in water temperature at the point of discharge, but these impacts are not anticipated to extend beyond the maneuvering basin, with temperatures quickly returning to ambient temperatures.

Dredging for projects can impact aquatic species by affecting benthos directly by removing habitat and indirectly by sedimentation downstream. The impacts on EFH species from increases in turbidity due to dredging for the Terminal Facilities and the other projects identified above would be temporary to short-term as species recolonize the area and localized to the dredged area and areas directly adjacent and a relatively short distance downstream. As a result, EFH species would experience localized effects. If dredging for the Project takes place at the same time as the Commonwealth LNG Project or maintenance dredging of Calcasieu Ship Channel, the duration of impacts on aquatic species would be longer. Impacts on aquatic species would be temporary to short-term and localized and turbidity would return to pre-dredging levels after dredging is completed. Dredging would remove habitat for species that do not tolerate deep water; however, the Calcasieu River has an abundance of shallow water habitat outside of the Calcasieu Ship Channel and the dredged areas.

Four other projects identified in the geographic scope for the Terminal Facilities would require the temporary use of surface waters for hydrostatic testing of LNG storage tanks, pipelines, and/or equipment, of which impacts would generally diminish with increased distance from the Project. The four projects within the geographic scope include the Commonwealth LNG Project (0.5 miles southwest of the Terminal Site), Driftwood LNG Project (22 miles north of the Terminal Site), Driftwood Line 200 and Line 300 Project (21.5 miles north of the Terminal Site), and Hackberry Storage Project (15.5 miles northwest of the Terminal Site). CP2 LNG would require approximately 26,200,000 gallons of water from Calcasieu Pass for hydrostatic testing of tanks and equipment at the Terminal Facilities. CP2 LNG would comply with all permit conditions and requirements for water withdrawals and hydrostatic testing. The Commonwealth LNG Project would require approximately 9,700,000 gallons of water from the Calcasieu Ship Channel for hydrostatic testing of LNG storage tanks. The Driftwood LNG project would require approximately 116,000,000 gallons of water from the Calcasieu River for hydrostatic testing of tanks. The Driftwood Line 200 and Line 300 Project would require water to perform hydrostatic testing from a variety of sources, including up to approximately 12,600,000 gallons from the Calcasieu River. The Hackberry Storage Project would require approximately 7,200,000 gallons of water for hydrostatic testing of the pipelines, which would be obtained from commercial, municipal, and on site-water well sources. The Project, in combination with the other projects within the HUC 12, could result in a cumulative impact due to water withdrawal and discharge. The volumetric flow of the Calcasieu Ship Channel is approximately 115 cubic meters per second, and cumulative effects on flow or drawdown are not expected. Withdrawals from other bodies of water would be as needed on an infrequent basis. Discharges of hydrostatic test water for each project would be required to comply with LPDES permitting for hydrostatic discharge. Compliance with these regulations by CP2 LNG and the other project proponents, and implementation of BMPs in the Project-specific Plan and Procedures, and the FERC Plan and Procedures, would minimize potential cumulative impacts on surface water resources. Further, the FERC Procedures require adequate flow is maintained to prevent the interruption of existing downstream uses.

Surface water could be subject to contamination caused by inadvertent surface spills of hazardous materials (e.g., fuels, lubricants, and coolants) used during construction and operation of the LNG Terminal and other projects within the HUC-12 subwatershed. However, CP2 LNG would implement its Project-specific Plan and Procedures and SPCC Plan to minimize the risk of occurrence and potential impacts. Similarly, all projects considered in the cumulative impacts analysis for surface water resources would likely use equipment and or materials that could be hazardous to the environment in the event of a spill. However, like the proposed Project, these projects would have to prepare and implement spill prevention and response procedures to prevent spills of hazardous materials from reaching surface water resources, as well as the measures to be implemented if such a spill occurs.

Based on the above discussion, we conclude overall cumulative impacts on surface water resources as a result of dredging, fill activities, vessel traffic, stormwater runoff, hydrostatic test water withdrawals and discharges, as well as spills of hazardous materials related to construction and operation of the Terminal Facilities are anticipated to be moderate, but not significant.

Pipeline System

Several projects from table 4.14.1-1 are within the cumulative geographic area for surface waters. Cumulative impacts on surface waters from projects and actions identified in table 4.14.1-1 would dissipate the farther they occur from the Project. The proposed pipeline facilities would contribute little to the long-term cumulative impacts on waterbodies, because the majority of the potential impacts would be temporary and short-term.

Construction of the Pipeline System would require a total of 383 waterbody crossings, including 253 crossed by centerlines and 130 within the construction workspace beyond the centerline. Construction of the Project and other projects in the geographic scope considered for cumulative impacts could have direct and indirect impacts on surface water quality and flow. These impacts could include increased sedimentation, turbidity, decreased dissolved oxygen, impaired flow, releases of chemicals and nutrient pollutants, reduced riparian cover, thermal changes, modification of habitat, and fish injury or mortality. Most impacts, such as increased turbidity, would individually result in temporary and localized impacts, because they would return to baseline levels over a period of days following construction. In-water activities, such as open-cut pipeline crossing techniques, would have the greatest potential for cumulative impacts on surface water resources. Construction and operation of the Moss Lake Compressor Station, MLV 5, and the Enable Receiver and MLV 3 would permanently affect waterbodies through the placement of permanent fill and could temporarily increase the rates of turbidity and sedimentation observed in nearby waterbodies. In addition, the concurrent dredging associated with the Calcasieu River and Pass, Louisiana Operations and Maintenance Project and the HDD installation of the CP Express Pipeline could temporarily increase the rates of turbidity and sedimentation in the event of an inadvertent return during HDD activities. Other projects within the same HUC 12 subwatersheds as the Pipeline System would be required to obtain permits, such as Section 401 Water Quality Certification, to cross waterbodies and would be subject to BMPs during in-water construction activities. Further, projects crossing waters of the United States would need to comply with COE requirements. Therefore, most of the impacts on waterbodies are expected to be of short duration and/or permittable under regulations implemented by the applicable regulatory agency.

The greatest cumulative impact in relation to geographic scope would be from the Louisiana Connector Project and Hackberry Storage Project, which cross the CP Express Pipeline centerline. The construction schedule of the Louisiana Connector Project is unknown and the Hackberry Storage Project pipeline is anticipated to be operation in 2023. Increased sedimentation and turbidity resulting from potential run-off from the adjacent construction workspace and use of access roads would be minimized through implementation of erosion control measures at the edges of the workspace and access roads. As other projects in the area complete construction activities, the impacts from sedimentation and turbidity would cease and restoration activities would ensure bank vegetation resumes, per appropriate permit requirements, lessening the potential for long-term effects on waterbodies. Therefore, after active construction has ended, most of the impacts on waterbodies have already ceased to exist with projects that are in restoration.

Any projects involving dredge and fill or obstructing the navigable capacity within waters of the United States would require Section 10 of the Rivers and Harbors Act and/or Section 404 CWA authorizations from the COE and corresponding Section 401 CWA Water Quality Certifications. These authorizations require implementation of spill prevention plans during construction and operation. Although a spill or leak from any of these projects could be significant, it is unlikely that multiple actions would result in spills or leaks in the same relative timeframe to produce a significant cumulative effect given the regulatory environment regarding spill prevention.

The CP Express Pipeline would be installed across the Calcasieu Ship Channel via the HDD method at the location of the Calcasieu River and Pass Operations and Maintenance Project, avoiding direct impacts on the Calcasieu Ship Channel and reducing the likelihood of potential cumulative impacts.

CP Express proposes to withdraw a total of 26,787,000 gallons of water for hydrostatic testing of the Pipeline System, including aboveground facilities and HDDs, of which up to 2,078,000 could be from a municipal source and the remaining volume would be from surface waterbodies. CP Express would follow federal, state, and local permit requirements with regard to water withdrawal and discharge and ensure that adequate flows are maintained. Several of the FERC-regulated projects identified in table 4.14.1-1 would require hydrostatic testing of storage tanks and/or pipelines. All project proponents would be required to adhere to state and federal regulations regarding hydrostatic discharges. Further, we assume the cumulative surface water use would be minor compared to the overall surface water availability within the region. Compliance with these regulations by CP Express and the other project proponents, and implementation of BMPs in the Project-specific Plan and Procedures or the FERC Plan and Procedures, respectively, would minimize potential cumulative impacts on surface water resources from wastewater discharges.

Once active construction is completed, the temporary and short-term impacts from other projects in the area would dissipate; however, the long-term impacts from potential sedimentation and loss of riparian habitat could contribute to cumulative impacts. Operation of the CP Express Pipeline and Enable Gulf Run Lateral would not impact waterbodies. Given that impacts from the other projects would be mitigated via state and federal permitting requirements, such as the installation of BMPs we conclude that construction and operation of the Project and other projects in the same HUC 12 subwatersheds as the Pipeline System would not result in significant cumulative impacts on surface water resources.

4.14.2.4 Wetlands

The geographic scope established for cumulative impacts on wetlands is considered to be the HUC-12 subwatersheds crossed by the Project. As identified in table 4.14.1-1, several other projects identified within the same HUC-12 subwatersheds as the Project could contribute to cumulative impacts on wetlands. Wetlands that would be affected by the Project include a total of 1,420.7 acres of PEM, PSS, PFO, E2EM, and E2SS wetlands. Of the 1,420.7 acres of wetlands affected by the Project, construction of the Terminal Facilities and Pipeline System aboveground facilities and permanent access roads would result in the permanent loss of 394.3 acres of wetlands. Quantitative information regarding total construction related wetland impacts (inclusive of temporary and permanent impacts) for the Projects identified in table 4.14.1-1 is publicly available for the Calcasieu Pass Project (163.8 acres), Commonwealth LNG Project (139.5 acres), Louisiana Connector Project (644.8 acres), Line 200 and Line 300 Project (154.2 acres), and Hackberry Storage Project (143.0 acres).

Wetlands provide important ecosystem functions due to their ability to retain water, minimizing flooding and improving water quality by filtering contaminants before reaching surface waterbodies. Therefore, conversion of wetlands to uplands or developed land can affect water quality, as well as flooding, within a subwatershed. Wetlands also provide valuable wildlife habitat. COE-regulated activities are by nature likely to impact wetland resources and result in temporary and/or permanent wetland impacts. Most construction-related impacts on wetlands range from temporary to permanent, depending on the proposed action/facility and type of wetland impacted. For example, impacts on PEM wetlands from pipeline construction would be short-term because they would return to original emergent function and value within a couple of years after construction; impacts on PSS wetlands from pipeline construction would be short to long term because they would take 3 to 5 years to return to original scrub-shrub function and value; and impacts on palustrine forested wetlands from pipeline construction would be long term because trees would take from 3 to 50 years or longer to become reestablished, and trees would not be allowed to become reestablished directly over the pipeline. However, these areas would be restored as wetlands. There would also be a permanent loss of some wetland habitat from aboveground facilities or roads. LNG terminal facility projects are expected to permanently impact wetlands. Indirect wetland impacts could result from all of the other projects identified during construction due to storm runoff from disturbed areas during construction or if an accidental release of a hazardous substance such as fuel, lubricants, coolants, or other material were to occur.

CP2 LNG and CP Express would follow the Project-specific Procedures to avoid or minimize impacts on wetlands, as well as implement mitigation measures to reduce the potential for hazardous spills. Other FERC-regulated projects would be required to adhere to the FERC Procedures, with approved deviations, which minimize impacts on wetlands. The remaining non-FERC-regulated projects would likely follow BMPs similar to those proposed by CP2 LNG and CP Express so as to avoid or minimize impacts on wetlands in accordance with Section 404 of the CWA. Therefore, most of the impacts on wetlands would be of short duration. The COE evaluates permits under Section 404 of the CWA for the placement of fill in jurisdictional waters of the United States, including wetlands, and the COE and LDNR/OCM assess the need for compensatory mitigation to offset any unavoidable impacts to jurisdictional wetlands. All project proponents would be required to comply with the CWA by avoiding, minimizing, or mitigating wetland impacts. Because of this federally mandated protection measure, we conclude that cumulative adverse impacts from construction and permanent fill would be adequately mitigated.

Therefore, for the reasons discussed above, we conclude that the Project and other projects identified that would impact wetlands within the same HUC 12 subwatersheds affected by the Project, would not result in a significant cumulative impact on wetlands.

4.14.2.5 Vegetation and Wildlife

The geographic scope for vegetation and wildlife is considered to be the HUC-12 subwatersheds affected by the Project. As identified in table 4.14.1-1, several other projects in this area could contribute to cumulative impacts on vegetation and wildlife. The Project crosses a total of 18 HUC-12 subwatersheds. Construction of the Terminal Facilities and Pipeline System would impact a total of approximately 2,308.1 acres of vegetation, of which approximately 62 percent consists of wetland vegetation. Following construction, approximately 1,113.2 acres of Project temporary workspaces, yards, and temporary access roads would be restored to pre-construction conditions. A total of 493.4 acres would be within the new permanent right-of-way for the pipelines and maintained in an herbaceous state in accordance with the Plan and Procedures. In addition, a total of 701.5 acres would be permanently converted to developed land.

Wildlife habitats affected by construction and operation include PFO, PEM, E2EM, E2SS wetlands; open upland; forested upland; open water; and scrub-shrub habitat. Some wildlife habitat within the Terminal Site footprint would be permanently converted to industrial use associated with the operation of the Terminal Site. The greatest impact on wildlife habitat would result from the permanent loss of the 543.8 acres of wetlands, herbaceous land, hay/pasture, scrub shrub, and open water habitat at the Terminal Site. Subject to final review and approval by the COE, LDNR/OCM, CP2 LNG would provide mitigation for permanent impacts on wetlands. Disturbed areas would be seeded with a temporary mix in accordance with CP Express' Revegetation Plan, and specific measures developed in coordination with landowners, land-management authorities, and permitting agencies.

The major projects that would contribute to cumulative impacts are the four LNG projects within the vegetation and wildlife geographic scope. Combined, these projects along with the CP2 LNG and CP Express Project, would result in permanent loss of upwards of 2,331 acres of vegetation and wildlife habitat. The largest proportion of the vegetation loss would come in the form of the approximately 1,771 acres of wetlands that would be permanently lost. The majority of the remaining habitat would consist of upland scrub, herbaceous, and agricultural or pasture lands. We were unable to find quantitative data for the extent of impacts on vegetation from the I-10 State Line to East of Coone Gully Project. Calcasieu Pass LNG, Driftwood LNG, and Commonwealth LNG have all proposed to partially mitigate the loss of wetland vegetation at the respective project sites through beneficial use of dredged material programs that would restore degraded wetland habitat in the vicinity of the project sites. As detailed in section 4.4.2, CP2 LNG and CP Express are evaluating the availability of wetland mitigation bank credits and the development of a CMP focusing on mitigation banking to the extent possible. Other projects within the geographic scope that involve permanent loss of wetland habitat would also be required to mitigate for these impacts in accordance with the CWA.

Impacts on wildlife could occur as a result of habitat (i.e., vegetation) disturbance and loss and increased noise and light. Wildlife that cannot relocate away from noise emitting sources could be adversely affected by increased stress levels and masking auditory cues necessary to avoid predation, hunt prey, and find mates. In addition to more common wildlife, there are 31 BCCs that could potentially occur in the Project area. Elevated structures at the Terminal Facilities, such as flares, could contribute to cumulative impacts on migratory birds. Project activities such as clearing, grading, and installation of impervious surfaces (e.g., compression station pads, access roads) would remove vegetation, alter wildlife habitat, fragment habitat, displace wildlife, and result in other potential secondary effects, such as increased population stress, predation, and the establishment or spread of invasive species. These effects would be greatest where the other projects are constructed within the same timeframe and areas as the Project, as described in section 4.14.1. However, even construction that does not overlap temporally can have cumulative effects, as it takes time for vegetation/habitat to return to a preconstruction state, especially forested habitats that could take up to 50 years or longer to become reestablished and would not be allowed to become reestablished directly over the pipeline. Cumulative impacts on wildlife could include mortality due to inadvertent vehicular and marine strikes from construction and operational activities. Incremental loss of habitat and vegetation would occur due to the construction and operational footprint of the projects. However, the projects identified in table 4.14.1-1, including the Hackberry Storage Project and the Line 200 and Line 300 Project, are spaced out geographically and temporally, leaving wildlife the opportunity to disperse to nearby, similar habitats and vegetation the opportunity to re-establish.

Combined with the Project, the overall footprint of FERC-regulated actions and other identified projects within the geographic scope considered for cumulative impacts, would result in the permanent disturbance of approximately 2,759 acres of wildlife habitat. The addition of new linear rights-of-way or the widening of existing rights-of-way would increase habitat fragmentation and edge effects, which are permanent effects that result from vegetation maintenance along utility rights-of-way, along with other planned projects, would contribute to these cumulative impacts. This would reduce habitat available to species that prefer deep forests, while increasing habitat for species that prefer open areas and edge habitat.

Other projects in the geographic scope, such as the I-10 State Line to East of Coone Gully Project, could increase vegetation removal and have cumulative direct and secondary impacts on wildlife.

Invasive species often flourish in areas where vegetation has been disturbed. Other projects that are adjacent to or cross the Project could potentially lead to a greater spread of invasive vegetation. CP2 LNG and CP Express have developed Project-specific invasive plant species control plans in coordination with NRCS to minimize the Project's contribution to invasive species infestations. Other FERC-regulated pipeline projects in the cumulative impacts area also have similar plans to manage the spread of invasive species.

Each of the major project proponents in the geographic scope, including CP2 LNG, would be expected to implement BMPs to minimize wildlife impacts associated with noise and lighting. Further, we anticipate other projects with elevated structures, such as the Calcasieu Pass Project, Driftwood LNG Project, Cameron LNG Expansion Project, and Commonwealth LNG Project, would implement similar deterrent measures to minimize impacts on migratory birds, though bird strikes with elevated structures are still likely to occur. Cumulative impacts on wildlife would ultimately be greatest during the concurrent construction of the projects with the proposed Project, and would continue, to a lesser extent during operation. LNG terminal facility projects are expected to permanently impact vegetation, habitat, and associated wildlife. However, CP2 LNG and CP Express would implement its Project-specific Plan and Procedures and implement their Revegetation Plan which identifies NRCS-recommended seed mixes and other measures to promote successful revegetation, which would provide wildlife habitat within a year or two following construction. Proponents of other FERC-regulated projects in the same watersheds would also be required to follow the FERC Plan and Procedures.

Cumulative impacts on vegetation and wildlife resulting from the Project and other projects would be considered minor to moderate. Impacts would be moderate where the pipelines or roads would create a new cleared and maintained right-of-way and development projects clear larger expanses of land adjacent to or outside urban settings where wildlife would be more abundant. Based on CP2 LNG and CP Express' proposed mitigation and other measures that would be implemented to minimize or offset impacts on vegetation and wildlife and compliance with the Project-specific Plan and Procedures, the Project would not have significant or population level impacts on vegetation and wildlife. Combined with other projects in the geographic scope, the Project would not significantly contribute to overall cumulative impacts on vegetation and wildlife.

4.14.2.6 Threatened and Endangered Species

As with water, wetlands, and vegetation, we considered the geographic scope for threatened and endangered species to be the HUC-12 subwatersheds. A total of 18 federally listed threatened or endangered species, one candidate species, one species proposed for listing, and one species under review have the potential to occur in the vicinity of the Project. In addition, 15 state listed only species have the potential to occur in the counties or parishes crossed by the Project. We have concluded the Project would have *no effect* or would be *not likely to adversely affec*t 17 of the federally listed species and the one species proposed for listing, and *would not contribute to a trend toward federal listing* for the candidate species and species under federal review. In addition, the Project would be *likely to adversely affect* the EBR due to the presence of potential suitable habitat. We have concluded that 10 of the state listed species would not be impacted by the Project as they are not within the known range of the species, the species has been extirpated in the Project area, there is no suitable habitat in the Project area, suitable habitat present in the Project area would be avoided via HDD, or the species would only occur in the Project area as an occasional transient. Additionally, we have concluded the Project would have *no impact* or would be *not likely to adversely impact the remaining* five state listed species.

The major projects that would most contribute to cumulative impacts on threatened and endangered species would include the Calcasieu Pass, Driftwood LNG, Lake Charles Liquefaction, Cameron LNG Expansion, and Commonwealth LNG projects. Each of these projects have a very similar list of threatened and endangered species that would potentially be affected by the Project (e.g., EBR, AST, West Indian manatee, sea turtles, and whales). Each of these projects, for which an EIS has been issued, have received concurrences from the FWS and NMFS that the projects would have *no effect* or would be *not likely to adversely affect* the threatened or endangered species potentially present at the project locations. The FERC-jurisdictional and other projects listed in table 4.14.1-1 would be required to comply with the ESA (described in detail in section 4.8.1). As a result of the consultation process, the FWS and NMFS would review each project's potential impacts on federally listed species and either provide concurrence that the project would not adversely affect listed species or issue a Biological Opinion that would address whether the project would likely jeopardize the continued existence of listed species. These projects have gone through this process, or are expected to before their approval, as will CP2 LNG and CP Express. More detailed discussion is provided in the following sections.

Birds

Eastern Black Rail

As discussed in section 4.8.1.1, CP2 LNG and CP Express completed call back surveys for the EBR in July 2022 and consultation with FWS is ongoing. In September 2021, FWS published a BO regarding the potential effects of the Commonwealth LNG Project on EBRs and determined that the project would not jeopardize the continued existence of the species. In addition, it was determined the Line 200 and Line 300 Project is *not likely to adversely affect* the EBR. With the exception of the Commonwealth LNG, Line 200 and Line 300, and Hackberry Storage projects, EBRs were not listed when the EISs were developed for the other LNG and pipeline projects in the HUC-12 subwatersheds, so EBRs were not addressed directly within. However, the Driftwood LNG and Port Arthur Liquefaction projects are re-consulting with FWS in regards to the EBR; consultation is ongoing. Because the EBR is now listed as Threatened, if the other projects in the geographic scope were to proceed with construction, they would need to consult with the FWS, per the ESA, to assess whether the projects would adversely affect EBRs. Within the Terminal Facilities footprint, potential EBR habitat was identified during a preliminary field determination based on the presence of emergent wetlands with gulf cordgrass. The majority of these wetlands were within the Terminal Site workspace; however, these areas were historically used for cattle grazing and routinely mowed. Permanent impacts on suitable habitat within the Terminal Facilities workspace could result in displacement, injury, or mortality for the EBR. However, consultation with FWS is ongoing in order to minimize impacts on the EBR. Given the coordination with FWS and associated guidance, and that the other projects in the geographic scope would be required to follow the ESA Section 7 consultation process (and applicants would be required to follow the terms and conditions of any Biological Opinion), we conclude cumulative impacts on EBRs would not be significant.

Red Cockaded Woodpecker

As discussed in section 4.8.1.1, no potential RCW roosting or nesting habitat was observed during field surveys or identified within 0.5 mile of the survey corridor during aerial review. Although suitable foraging habitat was observed along the Pipeline System route, additional foraging habitat that may be utilized by the RCW remains in the surrounding area. Additionally, the Driftwood LNG, Lake Charles Liquefaction, Port Arthur Liquefaction, and Line 200 and Line 300 projects are *not likely to adversely affect* the RCW. Given the abundance of foraging habitat surrounding the cumulative projects, we conclude cumulative impacts on the RCW would not be significant.

Fishes

Giant Manta Ray and Oceanic Whitetip Shark

We determine in section 4.8.1 that the Project is *not likely to adversely affect* the giant manta ray and oceanic whitetip shark. These aquatic species inhabit offshore, oceanic waters, and therefore, potential cumulative impacts resulting from the LNG projects in the HUC-12 subwatershed would be limited to impacts from vessel collision injuries or hazardous liquid spills associated with LNG carriers transiting through the Gulf of Mexico. The Port Arthur Liquefaction Project, assessed in conjunction with the Texas Connector Project and Louisiana Connector Project, is *not likely to adversely affect* the giant manta ray, and Commonwealth LNG Project's EIS determined that the project is *not likely to adversely affect* the giant manta ray and the oceanic whitetip shark. Impacts on neither the giant manta ray nor the oceanic whitetip shark are discussed further in the remaining projects within the geographic scope for cumulative impacts. LNG carriers use established and well-traveled shipping lanes, and the Coast Guard requires LNG carriers to develop and implement a spill plan, which includes measures to be taken if an oil pollution incident occurs or a ship is at risk of one. The giant manta ray is a surface-oriented species and is therefore somewhat susceptible to LNG vessel strikes; however, per NMFS, the potential for LNG carriers associated with the Project to strike giant manta rays is highly unlikely (NMFS, 2021f). CP2 LNG would utilize biological monitors to monitor for the giant manta ray during marine construction. To further minimize the risk of potential collisions between vessel traffic and giant manta rays, CP2 LNG would provide the *Vessel Strike Avoidance Measures* document to LNG carrier captains and would conduct mandatory training for construction vessel operators, which would include a review of recommended BMPs and protected marine species identification, as discussed in section 4.8.1.2. Accordingly, the Port Arthur Liquefaction Project and Commonwealth LNG Project will likely implement similar mitigation measures (e.g., utilizing biological monitors and/or a *Vessel Strike Avoidance Measures* document). Therefore, we conclude that although the Project would contribute to a cumulative increase in vessel traffic which could incur a risk to protected fish species in the Gulf of Mexico, the magnitude of the increase would not be significant.

Marine Mammals

West Indian Manatee

Other projects considered for cumulative impacts on West Indian manatees include the LNG terminals in the geographic scope that may have construction activities that overlap with construction of the Project and the periodic maintenance dredging of the Calcasieu Ship Channel (e.g., Calcasieu Pass, Driftwood LNG, and Lake Charles Liquefaction projects). Project impacts on West Indian manatees would most likely result from activities such as dredging and pile-driving, and increased vessel traffic in the Calcasieu Ship Channel. In addition to the rarity of manatee presence in western Louisiana, CP2 LNG has committed to implementing all measures in the FWS *Standard Manatee Conditions for In-Water Activities* and utilizing biological monitors to monitor for the West Indian manatee during marine construction. In addition, we included a recommendation in section 4.7.2.2 requiring CP2 LNG to commit to implement additional noise mitigation measures to reduce underwater sound pressure levels produced by pile driving developed in consultation with NMFS; therefore, impacts on West Indian manatees would be minimal.

Potential Impacts on West Indian manatees resulting from the other projects considered would be similar to those discussed for the proposed Project. Dredging and pile driving associated with the cumulative projects and increased vessel traffic associated with construction and operation of the LNG terminals, would present the potential for impacts on West Indian manatees. However, the increases in vessel traffic would be consistent with the industrial nature of the Calcasieu Ship Channel and animals present in this area are likely accustomed to frequent vessel traffic. Furthermore, these projects would be expected to implement mitigation measures identified by the respective applicant, the FWS (during project-specific consultations), and/or state and other federal agencies to minimize potential impacts on manatees. Due to the rarity of the West Indian manatee in the Project area, and measures that would be implemented if a manatee were to occur in the vicinity of construction activities, the cumulative impacts of the Project when considered with other projects would be temporary (during construction) to permanent (due to increases in LNG carrier traffic), but would not be significant.

Whales

Projects considered for cumulative impacts on the whales discussed in section 4.8.1.4, including the blue whale, Rice's whale, fin whale, sei whale, and sperm whale, encompass the LNG terminals in the HUC-12 subwatershed that would be in operation during the same period as the Project. These whales inhabit offshore waters and therefore, would not be affected by construction activities in the nearshore or estuarine waters of the Calcasieu Ship Channel. Potential impacts on whales would be related to increased LNG carrier traffic across the Gulf of Mexico.

Increased LNG carrier traffic during operation of the Project and the other projects considered, could increase the potential for vessel strikes on whales. Although LNG carriers are not under FERC jurisdiction, they would use established and well-traveled shipping lanes. Per NOAA Fisheries, the potential for LNG carriers associated with the Calcasieu Pass LNG Project (which is similar and next to the Terminal Facilities) to strike a sperm whale, which is the most abundant whale species in the Gulf of Mexico, is highly unlikely. CP2 LNG would additionally provide the *Vessel Strike Avoidance Measures* document to LNG carrier captains and would conduct mandatory training for construction vessel operators, which would include a review of recommended BMPs and protected marine species identification, as discussed in section 4.8.1.2, which provides standard measures for vessel captains to implement to reduce the risk associated with vessel strikes or disturbance of marine mammals. To address the potential impacts associated with offshore spills of fuel, lubricants, or other hazardous materials, LNG carriers are required to develop and implement a spill plan, which includes measures to be taken if an oil pollution incident occurs or a ship is at risk of one. The contribution of the Project on cumulative impacts on whales would remain very low. Therefore, we conclude that although the Project would contribute to a minor cumulative increase in vessel traffic which could incur a risk to whales in the Gulf of Mexico, the magnitude of the increase would not be significant. In addition, the cumulative impacts of the Project when considered with other projects would be permanent (due to increases in LNG carrier traffic), but would not be significant.

Reptiles

Sea Turtles

Based on CP2 LNG's response to our recommendation in the draft EIS and continuing consultation with NMFS, we determine in section 4.8.1.5 that the Project is *not likely to adversely affect* the federally listed sea turtles. Other projects that could contribute to cumulative impacts on sea turtles, in the form of dredging, pile-driving, and increased construction vessel traffic, would primarily be limited to the Calcasieu Pass LNG and Commonwealth LNG projects due to their proximity to the Gulf of Mexico. Each of the LNG projects within the geographic scope that have LNG vessels transiting through the Gulf of Mexico could also potentially contribute to cumulative impacts in the form of vessel strikes. Dredging impacts on sea turtles would be minimized by CP2 LNG, and Commonwealth through use of hydraulic suction cutter head dredges as opposed to hopper dredges, the latter of which are associated with increased impacts on sea turtles. Additionally, Calcasieu Pass LNG has completed the initial dredging operation; therefore, dredging impacts would not be concurrent with CP2 LNG. Impacts on sea turtles would otherwise be temporary and local in nature because dredging would be confined to the respective marine facilities of the projects. These projects would also follow NMFS-prescribed BMPs for avoiding dredging and construction vessel impacts on sea turtles, thereby further minimizing the potential for impacts on sea turtles.

Cumulative impacts related to pile driving could occur if the Project and other cumulative projects construct their marine facilities during overlapping time periods. Calcasieu Pass LNG has completed proposed pile driving work; therefore, no cumulative impacts between CP2 LNG and Calcasieu Pass LNG are anticipated. Additionally, CP2 LNG would implement the use of ramp-up procedures, utilize a biological monitor during marine construction, and may implement additional NMFS-prescribed noise mitigation methods for pile driving (e.g., utilization of bubble curtains, modification of pile impact frequency, and placement of cushion blocks consisting of wood, nylon, or micarta between the pile and hammer). We included a recommendation in section 4.7.2.2 requiring CP2 LNG to commit to implement additional noise mitigation measures to reduce underwater sound pressure levels produced by pile driving developed in consultation with NMFS. In addition, noise mitigation measures would be recommended if adverse effects are anticipated or a BO would be drafted. Furthermore, as sea turtles are very mobile species, individual sea turtles would likely avoid the construction noise upon initiation of pile driving by swimming away from the sites. Given this mobility and the projects' respective coordination with NMFS and implementation of these methods, cumulative impacts on sea turtles related to pile driving would be localized and temporary.

Cumulative impacts on sea turtles from increased LNG vessel usage of the Gulf of Mexico would be similar to those of the protected fish species discussed above. LNG carriers use established and well-traveled shipping lanes and the Coast Guard requires LNG carriers to develop and implement a SOPEP, which includes measures to be taken if an oil pollution incident occurs or a ship is at risk of one. Therefore, we conclude that although the Project would contribute to a cumulative increase in vessel traffic which could incur a risk to sea turtles in the Gulf of Mexico, the magnitude of the increase would not be significant.

4.14.2.7 Land Use, Visual Resources, and Recreation

Land Use

The geographic scope for land use was determined to be a 1.0-mile radius from the Project. The Terminal Facilities and Pipeline System would be sited mainly in wetlands, surrounded by wetlands, agriculture, open land, forest, and industrial and commercial developments. Land use within the geographic scope is generally made up of hay/pasture and cultivated crops (agriculture), herbaceous, scrub/shrub, and barren land (open land), forest, and developed land, and open water. The projects listed in table 4.14.1-1 would or have disturbed thousands of acres of land affecting a variety of land uses, including the land uses impacted by the Terminal Facilities and Pipeline System. Large industrial projects identified in table 4.14.1-1 have the most potential to contribute to cumulative impacts on land use. Projects with permanent aboveground components (e.g., buildings) and roads would generally have greater impacts on land use than the operational impacts of a pipeline, which would be buried and thus allow for most uses of the land following construction.

The duration of impacts on land use would depend on the type of land cover affected and the rate at which the land can be restored to its preconstruction use and condition after construction. Pipeline project impacts on developed land and open water would be temporary because they would return to their preconstruction uses and conditions almost immediately after construction. Pipeline project impacts on agricultural land, open land, and emergent wetlands would be largely short term because those areas likely would regain preconstruction use and composition within a few years of completion of construction. Pipeline project impacts on forested land and forested wetlands would be long term or permanent because trees could take up to 50 years or longer to become reestablished and would not be allowed to become reestablished directly over the pipeline.

The Louisiana Connector Project and Hackberry Storage Project overlap with the CP Express Pipeline, and the I-10: State line to East of Coone Gully project is approximately 300 feet from the CP

Express Pipeline. As presented in table 4.14.1-1, the construction schedule for the Louisiana Connector Project is unknown, but could potentially be concurrent with construction of the CP Express Pipeline. The temporal staggering of the construction phases of these projects reduces the cumulative effect on land use where they overlap. The I-10: State line to East of Coone Gully project would result primarily in temporary impacts during construction, similar to the CP Express Pipeline. Construction and operation of the Terminal Site, Calcasieu Pass LNG Terminal (Calcasieu Pass Project), and Commonwealth LNG facility (Commonwealth LNG Project) would result in a conversion of the existing land uses to industrial land and, consequently, result in a cumulative impact on land use.

CP2 LNG and CP Express would adhere to its Project-specific Plan and the Calcasieu Pass Project, Commonwealth LNG Project, Louisiana Connector Project, and Hackberry Storage Project are required to adhere to the FERC Plan to minimize impacts on land use. Any impacts would be further minimized or mitigated to the greatest extent practicable through consultation with federal agencies, state agencies, and landowners. We anticipate that other projects in the geographic scope would be required to implement similar construction and restoration practices to minimize impacts on land use.

The CP2 LNG and CP Express Project would result in temporary, short-term, and permanent impacts on existing land use. Construction and operation of the Project and other projects within the geographic scope identified in table 4.14.1-1 would result in permanent changes in land use. However, the Project, Calcasieu Pass LNG Terminal, and Commonwealth LNG facility are sited in areas that have been historically associated with industrial land use. Therefore, we conclude the Project would contribute to a cumulative impact on land use but impacts would not be significant.

Recreation

The geographic scope for recreation was also determined to be a 1.0-mile radius from the Project. No national or state historic landmarks, national forests, national parks, national recreational trails, national or state-designated Wild and Scenic Rivers, Indian Lands, or wilderness areas would be crossed or directly impacted by the proposed Terminal Facilities or Pipeline System. One NWR, the Cameron Prairie NWR East Cove Unit, is within 0.25 mile of the Pipeline System. In addition, Sabine Island WMA and the Creole Nature Trail are within 0.25 mile of the Pipeline System, and the Jetty Pier Facility and Lighthouse Bend Park are within 0.25 mile of the Terminal Facilities.

Additionally, there are several RV camping sites in Cameron and Calcasieu Parishes less than 0.25 mile from the CP Express Pipeline (see section 4.9.4); however, none would be directly impacted by the Project. Further, the Calcasieu Ship Channel would be crossed by the Project by the HDD construction method, further minimizing impacts on recreation. Cameron Parish is home to vital fishery resources as described in section 4.7.2 and serves as a conduit for access to such resources in the Calcasieu Ship Channel and the Gulf of Mexico.

The projects listed in table 4.14.1-1 that were identified within the geographic scope for recreation would disturb lands and waterways which could be a disruption for recreationalists resulting in diminished or lost use of recreation areas. However, the Cameron Prairie NWR, Sabine Island WMA, Creole Nature Trial Scenic Byway, and RV parks are not where the Project is within 1 mile of the other projects identified. Therefore, construction and operation of the Pipeline System is not likely to contribute to cumulative impact on recreation.

Construction associated with the Terminal Facilities and Commonwealth LNG facility (Commonwealth LNG Project), and other concurrent actions may temporarily impact local recreational fishing, bird watching, trapping, hunting, and boating activities. At the Phase 1 construction peak, 32 barges a week are anticipated. If the other concurrent projects also require barge deliveries during the same time frame, this may result in a minor increase in vessel traffic. However, this increase is not expected to result in a decrease in the availability of recreational fishing.

The construction and use of the Marine Facilities as well as the proposed Commonwealth LNG Facility marine slip would remove those areas from the available recreational fishing area. However, each of these facilities represent only a small portion of the available areas for recreational fishing. The moving security zone around LNG carriers has the potential to close the channel to traffic and recreation. If all LNG export terminals listed in table 4.14.1-1 are constructed, this could occur more frequently. Because large ships, such as LNG carriers and crude oil tankers, typically enter the channel in a convoy, channel closures due to the transit would tend to be combined into a longer channel closure that occurs less frequently. Recreational activity outside the channel itself is not likely to be affected by large ship transit. Therefore, we conclude that the Project would contribute negligibly to overall minor cumulative impacts on recreation.

Visual Resources

The geographic scope of analysis for cumulative impacts on visual resources for aboveground facilities was considered to be the distance at which that the tallest feature at the aboveground facilities would be visible from neighboring communities; for the pipelines, a distance of 0.25 mile from the pipeline at existing visual access points (e.g., roads) (see table 4.14-1). As described above for land use, projects with permanent aboveground components, such as the LNG terminals and roads would generally have greater impacts on visual resources than subsurface projects (e.g., pipelines). The operational impacts of a pipeline, with the exception of aboveground facilities and (in some cases) the permanent ROW, would only have short-term impacts on the viewshed as a vegetation cover is re-established.

Construction of the Terminal Facilities would create temporary visual impacts associated with construction activities. The most prominent visual features would be the four 176-foot-tall and 300-foot-wide LNG storage tanks, and the 197-foot-high flare stack. The tops of the LNG storage tanks and flare stacks would create a vertical visual contrast across a relatively flat existing landscape and the Marine Facilities would permanently modify the existing viewshed. During operation, the Terminal Site would be partially screened by the floodwall which, per our recommendation in the draft EIS, would have vegetative screening alongside it, that would help to limit the visual impact on those traveling on nearby roads. Construction of the other planned area LNG projects. Construction of the Commonwealth LNG Facility, Calcasieu Pass LNG Terminal, and the proposed Terminal Facilities would result in several industrial sites in a concentrated area and would contribute to cumulative visual impacts on users of the Calcasieu Ship Channel; users of the Jetty Pier Facility, Lighthouse Bend Park, and nearby beaches; residents in the town of Cameron; and motorists along the Creole Nature Trail. During operation, the LNG Facilities, especially the flares, lighting, and storage tanks, may be visible for several miles. The extent of these impacts would vary depending on the proximity to the sites. Motorists along the approximate 2-mile stretch of road between the Commonwealth LNG Facility and the Cameron Ferry West Landing and those traveling along the 2.5-mile stretch between the Cameron Ferry East Landing through the town of Cameron would have direct views of all three facilities and associated structures. Due to the addition of these three facilities, cumulative visual impacts in this area would be significant.

Construction and operation of the Pipeline System would add incrementally to the cumulative visual impacts through the clearing of vegetation and installation of aboveground facilities. Residences and businesses adjacent to new aboveground facilities would likely experience moderate visual impacts. Minor to moderate visual impacts would also occur where residences and businesses are adjacent to a new pipeline corridor or where new developments are constructed. However, the overall contribution would be relatively minor given the majority of the Pipeline System facilities as well as the other FERC-regulated pipeline projects in the cumulative impacts area would be buried (i.e., the pipeline). About 45 percent of the Pipeline

System would be adjacent to existing rights-of-way. Collocation with existing utility or transportation corridors would contribute to widening existing corridors but would have fewer visual impacts than creating a new corridor. The corridors would be revegetated, thereby limiting the duration of many of the visual impacts associated with construction. Long-term cumulative impacts associated with foreign pipeline and road crossings would be minor and limited to areas where forested upland and forested wetlands would be permanently maintained in an herbaceous state to facilitate pipeline maintenance and maintain pipeline integrity. In addition, there are no permanent aboveground facilities associated with the other projects identified for cumulative impacts in the vicinity of the Pipeline System aboveground facilities. For these reasons, we conclude the Project's contribution to cumulative visual impacts associated with the Pipeline System would be permanent, but minor.

4.14.2.8 Socioeconomics

All projects listed in table 4.14.1-1 could contribute to socioeconomic cumulative impacts. As proposed, the Project alone would have no significant impacts during construction or operation on population, employment, regional, or local services.

Economy and Employment

Construction of the Project would generate an average of 1,600 to 3,200 construction jobs for the Terminal Facilities for a period of about 4 years and approximately 830 construction jobs for the Pipeline System for a period of about 28 months starting in 2023. The peak construction workforces for the Driftwood LNG Project (6,500 workers), Line 200 and Line 300 Project (1,500 workers), Hackberry Storage Project (313 workers) and the Commonwealth LNG Project (2,000 peak workers) could also occur during portions of that time period. The peak construction workforces of the Terminal Facilities and Pipeline System construction totals approximately 7,550 and could occur with one or more of these projects. The current construction schedules for the Lake Charles Liquefaction Project, Cameron LNG Expansion Project, Louisiana Connector Project, have not been made publicly available; therefore, the timing of peak construction for these projects is unknown. Additionally, the construction workforces for the Calcasieu River and Pass, Louisiana Operations and Maintenance, I-10 State Line to East of Coone Gully, the three residential subdivision projects, and transmission line projects are unknown. The cumulative effect from this increase in construction positions may be a minor reduction in unemployment in the area, although it should be noted that these projects include modular construction methods, so several of the generated construction jobs may occur outside of Cameron and Calcasieu Parishes, and even outside of the U.S. Therefore, although construction of the Project, in addition to the other proposed actions identified in table 4.14.1-1, would generate a large number of jobs over a period of about 4 years, the overall effect on local unemployment would likely not be significant.

Housing

The abundance of jobs resulting from the Project and other concurrent actions would lead to an influx of non-local workers, which would impact transient housing in the geographic scope of potential impact (table 4.14.2-1). A variety of temporary housing units are available in the Project area, including rental units, hotels/motels, RV parks, and camping grounds. Cameron Parish has 1,391 vacant housing units. The short-term workforce will likely seek temporary housing in Calcasieu Parish where there is significantly more housing available (12,388 vacant housing units). Workers living in Calcasieu Parish would need to commute up to an hour to the work site, but this drive time is not considered unusual in this area and in this industry. Considering the number of temporary housing units currently available in the Project area, sufficient units would be available for the peak temporary construction workforce.

Action	Temporary Workforce	Percent Non-Local	Temporary Non-Local Workers Requiring Housing
CP2 LNG and CP Express Project	7,550	40%	3,020
Commonwealth LNG Project	2,000	50%	1,000
Driftwood LNG Project	6,500	70%	4,550
Cameron LNG Expansion	3,269	50%	1,634
Delfin LNG	170	35%	60
Line 200 and Line 300 Project	1,500	50%	750
Hackberry Storage Project	313	80%	250
Magnolia LNG	781	40%	312
Total	**22,083**	**N/A**	**11,576**

Table 4.14.2-1

Temporary Worker Housing Needs [a, b]

[a] These estimates conservatively assume that each project construction workforce peaks with the Project.

[b] Sources: Commonwealth LNG Final EIS, FERC eLibrary Accession Number 20220909-3017; Driftwood LNG Resource Report 5, FERC eLibrary Accession Number 20170331-5058; Cameron LNG Expansion Resource Report 5, FERC eLibrary Accession Number 20220118-5208; Delfin LNG Resource Report 5, FERC eLibrary Accession Number 20150508-5237; Lake Charles Liquefaction Resource Report 5, FERC eLibrary Accession Number 20140325-5137; Line 200 and Line 300 Project Final EIS, FERC eLibrary Accession Number 20220915-3026; Magnolia LNG Resource Report 5, FERC eLibrary Accession Number 20140430-5338.

Permanent impacts on housing would occur at a more gradual pace than temporary construction impacts. However, housing impacts from permanent jobs created would be minimal given the sufficient housing inventory in the area. Short-term cumulative impacts on housing from the increased workforce could include higher occupancy and increased room rates for hotels and motels, less availability at recreational vehicle parks, longer commutes for workers living outside the study area, and higher rental costs associated with the increased demand for accommodation. It is estimated that a combined maximum of 11,576 non-local workers will be present in the area during construction of the Project and the other projects considered. However, construction schedules for the proposed Project and other projects identified range from 2020 to 2028, and it is unlikely that the peak number of workers for each project would be required in the Project area at the same time. There are a sufficient number of vacant temporary housing units in the area (13,779 units in Calcasieu and Cameron parishes) to house the combined maximum of 11,576 non-local workers. The percentage of non-local workers and peak construction dates associated with Advanced Refining Technologies' specialty aluminum manufacturing facility expansion project (190 construction jobs), the Lake Charles Methanol Project (1,000 construction jobs), and G2X Energy's Big Lake Fuels natural-gas-to-methanol facility (2,500 construction jobs) are unknown; however, due to the number of vacant temporary housing units in the area, as well as the three residential subdivision projects identified in table 4.14.1-1, cumulative impacts on housing as a result of these projects and the Project are not anticipated to be significant. Long-term cumulative impacts would be significantly diminished when compared to the short-term effects. Few workers would become permanent residents in the area; therefore, these additional residents would be easily accommodated within the current housing inventory available in the Project. Therefore, we conclude the Project would not contribute to a significant cumulative impact on housing.

Commercial Fisheries

The only managed fishery in the Calcasieu Ship Channel is shrimp. Shrimp fleets use the Calcasieu Ship Channel year-round. During construction of the Project, barge delivery of material supplies and equipment has the potential to affect commercial fishing due to the additional number of barges. However, the Calcasieu Ship Channel was specifically created to provide deep-water access for maritime commerce and, as such, use of the channel by barges and support vessels to deliver materials during construction of the liquefaction facility would be consistent with the planned purpose and use of this active shipping channel. Additionally, if all proposed projects are completed, once in operation, there would be an overall increase in LNG vessels associated within each terminal within the ship channel. Commercial fishing vessels generally coexist with industrial vessels in the Calcasieu Ship Channel without incident and, as described above, vessel increases within the Calcasieu Ship Channel would be managed by the Port of Lake Charles, Lake Charles Pilots Association, and Coast Guard.

Twice a year, for approximately 2 weeks each time, large numbers of shrimp migrate in or out of the Calcasieu River Ship Channel. During these times, which typically occur at night and during the full moon from May to July and from mid-August to mid-December, shrimp trawlers cluster at the inside/outside shrimp line in the ship channel in order to catch as many shrimp as possible. As with marine transportation in general, assuming most of the other projects along the Calcasieu Ship Channel that are listed in table 4.14.1-1 were to be constructed at the same time as the Project, cumulative impacts on vessel traffic in the waterway could occur due to increased congestion of construction vessels associated with the Project and the other projects and seasonal shrimp trawlers. Based on consultations between FERC and LDWF, impacts on shrimping vessels would be greatest near the Terminal south of the Firing Line where shrimping occurs year-round and vessel traffic and dredging associated with the Terminal Facilities would occur. Although we expect fish, crab, and shrimp species common to the bay could be present, the location does not have any unique features or habitat characteristics that would draw recreational or commercial users to this particular location. The Project area and areas of other projects along the Calcasieu Ship Channel that are listed in table 4.14.1-1 do not support special habitat that is different from the miles of surrounding habitat. Therefore, we conclude that the Project would contribute negligibly to overall temporary and minor cumulative impacts on commercial fisheries in the Calcasieu Ship Channel.

Public Services

The Project would not affect the capability of law enforcement or fire departments to provide consistent levels of service in the study area. Cameron and Calcasieu Parishes, Louisiana, and Jasper and Newton Counties, Texas, have sufficient public safety infrastructure in place to provide the necessary public services to their population bases. Short-term construction impacts may result in increased demand for emergency medical services; however, medical services will typically expand to meet the needs of permanent population growth. The nearest school system to the Terminal Facilities is the Cameron Parish School System; however, the Calcasieu Parish School System is most likely to absorb the most students from the Project. Calcasieu Parish is 7 percent under the enrollment counts of 2011 and the enrollment counts in the Cameron Parish School System are also declining. Thus, the school systems have capacity to absorb new students if workers associated with the Project move with their families. Based upon the available capacity and existing student teacher ratios within the two nearest school systems, the study area appears to have sufficient educational resources to accommodate school-age children accompanying non-local workers to the study area for the projects listed in table 4.14.1-1. The short-term population increase from construction would not put additional pressure on the school districts, because it is not anticipated that a majority of construction staff would move to the study area with their families. Additionally, for many of the projects identified above, the workforce would be comprised primarily of local workers.

If several of the projects listed in table 4.14.1-1 were to be constructed at the same time as the Project, the combined construction workforces would increase the need for some public services, such as police, fire, medical services, and schools, resulting in a greater potential for cumulative impact on such services, particularly in Cameron and Calcasieu Parishes. If the medical and emergency services, or other public services, are adversely affected during construction, the project sponsors may mitigate the impact by providing funding for temporarily increasing the staff and equipment of the public services affected. In addition, other LNG projects would be required to file an Emergency Response Plan like the Project's requirement, which includes a cost-sharing plan describing any direct cost reimbursements agreed to for state and local agencies. Long-term impacts from permanent workers would be more gradual, which would allow public services to adjust, if necessary. Therefore, we conclude that the Project would contribute to overall temporary minor cumulative impacts on public services.

Traffic

Road Transportation

The greatest potential for cumulative impacts on vehicular traffic and on the ground transportation network in the study area during construction and operation of the Project is associated with the Terminal Facilities. There would be an increase in heavy truck traffic and workforce traffic to and from the Terminal Facilities during the construction phase. To reduce potential traffic-related impacts, CP2 LNG has developed a Terminal Facilities Traffic Management Plan, which identifies anticipated construction traffic volumes (vehicular traffic) and describes plans for safely and effectively managing the traffic volumes throughout the construction of the Terminal Facilities. Mitigation measures to reduce potential impacts on traffic volumes include a phased approach to traffic management based on the number of construction personnel and the use of three P&R locations to reduce traffic volumes and parking needs at the Terminal Site.

Construction-related traffic associated with the Pipeline System would result in only minor, temporary impacts on traffic, and would be relatively short-term at any given location. For the Pipeline System, construction employees would utilize public roads/highways and approved private access roads to maneuver crews and equipment to and from the right-of-way and contractor yards. An increase in traffic to local and state roads would be expected but impacts are anticipated to be minor and short term because construction spreads and personnel would be geographically dispersed and personnel would commute to and from work areas in early morning and late evening during nonpeak traffic hours. To reduce traffic-related impacts, CP Express would implement its Traffic, Noxious Weed, and Fugitive Dust Control Plan.

Actions that could overlap with construction traffic include traffic associated with the Calcasieu Pass LNG Terminal and the Commonwealth LNG Project. Construction of the Calcasieu Pass LNG Terminal is anticipated to be completed in 2022; therefore, no overlap with CP2 LNG's Terminal Facilities construction workforce is anticipated. However, an estimated 130 permanent employees will be required for operation of the Calcasieu Pass LNG Terminal starting in 2022, which could have a minor cumulative effect on traffic in the immediate vicinity. The Commonwealth LNG Project was approved by FERC in November 2022, therefore, construction could occur concurrently with the CP2 LNG Terminal Facilities construction. Preliminary estimates indicate that construction of the Commonwealth LNG Project would require an estimated 2,000 workers during peak construction (FERC, 2022). However, the size of the workforce in any given month will fluctuate. Additionally, the Commonwealth LNG Project would require substantial amounts of construction materials, equipment, and specialty parts, which are anticipated to be delivered by both trucks and by barges. Commonwealth LNG would also implement a Traffic Management Plan to minimize disruption to local traffic flow and mitigate cumulative impacts on the region's transportation corridors, which would include the use of offsite parking, park-and-ride locations, and other mitigation measures to reduce impacts on local traffic (FERC, 2022).

If construction of the Terminal Facilities and Commonwealth LNG Project occur concurrently, traffic delays on the SH 27 could occur during commute periods for construction workers. However, with implementation of the measures in CP2 LNG's Terminal Facilities Traffic Management Plan and Commonwealth LNG's Traffic Management Plan, potential cumulative impacts associated with construction traffic will be minimized to less than significant levels. Construction of the Pipeline System and projects identified in table 4.14.1-1 could result in temporary impacts on road traffic in some areas and contribute to cumulative traffic impacts if other projects are scheduled to take place at the same time and in the same area. CP Express would use the local road and highway network to access the construction right-of-way, to the extent practicable. It is likely the other projects listed in table 4.14.1-1 would also use existing public roads. Increased use of local roadways from multiple projects could accelerate degradation of roadways and require early replacement of road surfaces. CP Express and the other project sponsors in the geographic scope of influence would be required to adhere to local road permit requirements (which may have provisions for road damage repairs or compensation) and road weight restrictions. Additionally, we included a recommendation in the draft EIS that CP2 LNG completed a Traffic Study to assess impacts from construction vehicles, including deliveries and workers, on traffic within the Project area. Based on the findings in their Traffic Study, CP2 LNG would utilize additional traffic mitigation measures during Stages 3 and 4 of construction when roadway LOS and capacity would be impacted; mitigation measures include flagger police vehicles or traffic signals during times of heavy traffic. As shown in table 4.10.8-3, CP2 LNG predicts the LOS of the roadways within the Project area would remain at an LOS D or better throughout construction, which would not result in a significant increase in traffic delays. Therefore, we conclude the Project would not contribute significantly to overall cumulative impacts on land transportation.

Marine Transportation

If the other projects along the Calcasieu Ship Channel that are listed in table 4.14.1-1 were to be constructed at the same time as the Project, a cumulative impact on vessel traffic in the waterway, primarily by increasing congestion and vessel travel times could occur. However, these impacts would be temporary, and the extent of the impacts would depend on the frequency and number of deliveries being made for various projects at any given time during the respective construction periods. Additionally, the projects identified are anticipated to begin construction and operations at a staggered pace, which would allow for a gradual increase in the associated ship traffic.

Throughout construction of the Project, general cargo carrier vessels, barges, and support vessels would deliver large equipment and materials to the Terminal Facilities.

During operation, LNG carrier vessel calls on the Terminal Facilities would average about one per day, or slightly less. The projected number of LNG carrier calls per week associated with the Terminal Facilities is seven to eight; however, the maximum number of transits would be established by the Coast Guard before operation of the Terminal Facilities commences. As recorded in the Port of Lake Charles Calcasieu Ship Channel Traffic Study (2019b), between 2006 and 2018, an average of 913.4 vessels per year called at terminals along the Calcasieu Shipping Channel. The same study modeled an increase in traffic due to increased operations by present users combined with new traffic from proposed terminals. The modeled increase in traffic is forecasted to reach a peak in 2026, with around 2,514 vessels coming through the channel annually. Even with the modeled increase in traffic, the capacity of the channel is still noted to be higher than the expected peak levels.

To minimize potential impacts on marine transportation associated with Terminal Facilities construction and operation, CP2 LNG developed The Waterway Suitability Assessment for the Terminal Facilities, which constitutes the Project's Marine Traffic Management Plan (as discussed in section 4.2.8.1). The Waterway Suitability Assessment was developed with support from the Coast Guard and Lake Charles

Pilots' Association. Any other LNG projects on the Calcasieu Ship Channel would also be required to develop a similar plan to reduce potential impacts of facility construction and operation on marine transportation, reducing the potential for cumulative impacts. Although traffic in the channel is expected to grow significantly over the next 10 years due to the expanded operations of existing terminals and the construction of various proposed facilities, there should not be significant short-term or long-term effects on marine transportation in the channel deriving from Project construction and operation due to the vast capacity available on the Calcasieu Ship Channel. Therefore, we conclude that the Project would have a non-significant contribution to overall cumulative impacts on marine transportation in the Calcasieu Ship Channel during construction and operation.

Environmental Justice

Based on the scope of the Project and our analysis of the Project's impacts on the environment as described throughout this EIS, we have determined Project-related impacts on wetlands, surface water, visual resources, socioeconomics, recreational and commercial fishing, traffic, noise, and air quality may adversely affect the identified environmental justice communities (see table 4.10.10-1). Therefore, cumulative impacts on environmental justice communities could occur for these resources.

Construction and operation of the Project would result in short-term, temporary, and permanent impacts on wetlands. Wetlands provide various benefits to local populations, including environmental justice communities. These benefits could include shoreline protection, flood control, habitat for a variety of plant and animal species that can be used for recreation and/or sustenance and use by the public for recreation and education. Impacts on wetlands associated with the project would be minimized and sufficiently mitigated (largely through the CWA permitting process) and would not have a significant impact on environmental justice communities. As discussed in section 4.14.2.4, wetlands that would be affected by the Project include a total of 1,420.7 acres, of which operation of the Terminal Facilities and Pipeline System aboveground facilities and permanent access roads would result in the permanent loss of 394.1 acres of wetlands. In addition, total wetland impacts for the other projects identified in within the Project's geographic scope for cumulative wetland impacts (including temporary impacts and permanent loss) include 163.8 acres (Calcasieu Pass Project), 139.5 acres (Commonwealth LNG Project), 644.8 acres (Louisiana Connector Project), 154.2 acres (Line 200 and Line 300 Project), and 143.0 acres (Hackberry Storage Project). However, the COE issues permits under Section 404 of the CWA for construction in jurisdictional waters of the United States, including wetlands, and the COE and LDNR/OCM require mitigation or compensation to ensure there is no net loss of wetlands or wetland functions. All project proponents would be required to comply with the CWA by avoiding, minimizing, or mitigating wetland impacts. The Project would contribute to cumulative impacts on wetlands from the projects within the geographic scope. However, overall, we conclude these wetland impacts would be mitigated and would not have a significant cumulative impact on environmental justice communities. Wetland impacts are more fully addressed in section 4.5 and cumulative wetland impacts are discussed in section 4.14.2.4.

Construction and operation of the Terminal Facilities would both temporarily and permanently impact portions of the adjacent Calcasieu Ship Channel. These impacts would result from dredging activities, site construction, marine traffic, stormwater runoff, water use, hydrostatic testing, and could occur from accidental spills or other releases of hazardous substances. Environmental justice communities in proximity to the Project could be affected by dredging and resuspension sediments. Resuspension of sediments within the ship channel could potentially mobilize any contaminants. However, as discussed in sections 4.3.2 and 4.9.5, based on federal and state databases, there are no contaminated sites within 0.5 mile of the Project. If the projects along the ship channel (see table 4.14.1-1) that require dredging (Calcasieu Pass Project, Commonwealth LNG Project, and periodic dredging of the Calcasieu Ship Channel by the COE) occur simultaneously, there may be increased turbidity within the channel and cumulative impacts on surface water. However, the greatest impacts would be highly localized and the initial dredging of Calcasieu Pass is complete, which is the closest other project to CP2 LNG, thus the potential for cumulative impacts is greatly diminished. Overall, we do not anticipate significant cumulative impacts on environmental justice communities that may use or live near the water related to surface water due to dredging.

Construction and operation of the Project, as well as marine traffic to and from the Terminal Facilities, have the potential to adversely impact water quality in the event of an accidental release of hazardous substance such as fuel, lubricants, coolants, or other material. Construction of multiple projects (see table 4.14.1-1) during the same time period, and the associated vessel traffic, may increase this risk. However, CP2 LNG and CP Express and proponents of the other FERC-regulated projects would implement the measures outlined in the Project-specific Plan and Procedures and the FERC Plan and Procedures, respectively to minimize the likelihood of a spill and would implement its respective SPCC Plans. Additionally, LNG carriers are required to develop and implement an emergency plan, which includes measures to be taken when an oil pollution incident has occurred, or a ship is at risk of one. If an accidental release were to occur, environmental justice communities along the ship channel, as well as individuals from these communities that use the channel, could be affected. However, given the mitigation measures that would be in place, we conclude that environmental justice communities would not be significantly impacted by an accidental release. Water resource impacts are more fully addressed in section 4.4 and cumulative water resources impacts are discussed in section 4.14.2.3.

Recreational and commercial fishing could be impacted by construction activities associated with the Project and the other projects listed in table 4.14.1-1. Project activities are anticipated to occur during peak fishing and recreational seasons; however, due to the overall size of the waterway, access to and maneuverability within the Calcasieu Ship Channel would not be significantly affected by the use of construction barges. Temporary cumulative impacts on recreational and commercial users in the Calcasieu Ship Channel, which would likely include individuals from environmental justice communities, may occur in areas where construction of the various projects is occurring. The construction impacts on recreational and commercial fisheries would be temporary. Permanent cumulative impacts on recreational and commercial fisheries in the ship channel, which likely include individuals from environmental justice communities, may occur due the loss of available fishing areas due to operation of permanent marine facilities. Although we expect fish, crab, and shrimp species common to the area could be present, the Project area does not have any unique features or habitat characteristics that would draw recreational or commercial users to this particular location. The Project area doesn't support special habitat that is different from the miles of surrounding habitat. Given these characteristics, and due to the overall size of the waterway, we conclude that these cumulative impacts on environmental justice communities would not be significant. Aquatic resources impacts related to fishing are more fully addressed in section 4.7.2 and cumulative aquatic resources impacts are discussed in section 4.14.2.3.

An increase in marine traffic could result in delays to other large vessels as well as commercial and recreational fisherman and boaters, including those from environmental justice communities. If the other projects along the Calcasieu Ship Channel that are listed in table 4.14.1-1 were to be constructed at the same time, a cumulative impact on vessel traffic in the waterway, primarily by increasing congestion and vessel travel times could occur. Construction vessel traffic would be temporary, and the extent of the impacts would depend on the frequency and number of deliveries being made for various projects at any given time during the respective construction periods.. Operation of multiple new LNG facilities along the ship channel would result in an increase in LNG vessels using the ship channel. However, CP2 LNG's Marine Facilities would be near the start of the channel, approximately 0.50 mile north of the Commonwealth LNG's facilities, resulting in short inbound and outbound transits for vessels, reducing the projects contribution to the overall increase of traffic in the ship channel. According to the Calcasieu Ship Channel Traffic Study (Ausenco, 2018), traffic in the channel is projected to double to 2,183 vessel calls in 2023. Approximately 800 of these new vessel calls are projected to involve LNG carriers (some of which are listed in table 4.14.1-1, including those associated with the Calcasieu Pass, Cameron LNG Expansion, Driftwood LNG, and Lake Charles Liquefaction projects). The proposed increase in vessels over the estimated 2023 number of approximately 2,183 vessels annually and projected future increase in vessels would not likely affect the capability of the channel to handle the proposed ship movements according to the Calcasieu Ship Channel Traffic Study (Ausenco, 2018). Therefore, we conclude that the Project would not have a significant contribution to overall cumulative impacts on marine transportation associated with commercial and recreational fisherman and boaters, including those from environmental justice communities in the Calcasieu Ship Channel. Marine traffic impacts are more fully addressed in section 4.10.8.1 and cumulative marine traffic impacts are discussed in section 4.14.2.8.

Construction of the Terminal Facilities would create temporary visual impacts associated with construction activities occurring during the period of active construction. During operation, the Terminal Site would be partially screened by the floodwall which, per our recommendation in section 4.9.5, would have vegetative screening alongside it, that would help to limit the visual impact on those traveling on nearby roads; however, the addition of the Terminal Facilities at this location would represent a significant impact on the viewshed of boaters, beachgoers, tourists, and local residents, as it would detract from the overall quality of the scenic views of this portion of the region. The Commonwealth LNG Facility, Calcasieu Pass LNG Terminal, and the proposed Terminal Facilities would result in several industrial sites in a concentrated area and would contribute to cumulative visual impacts on users of the Calcasieu Ship Channel; users of the Jetty Pier Facility, Lighthouse Bend Park, and nearby beaches; residents in the town of Cameron; and motorists along the Creole Nature Trail. The Jetty Pier Facility, a recreational facility, is situated at the confluence of the Calcasieu Ship Channel and the Gulf of Mexico and was closed to the public in 2019 (it was supposed to reopen in 2022, but is still currently closed). Lighthouse Bend Park (scheduled to open in 2022; however, as of this writing, construction is ongoing and the new opening date is summer of 2023). Lighthouse Bend Park is adjacent to the north of the Terminal Site on Calcasieu Pass. For users visiting these facilities, the Terminal Facilities, in addition to the Calcasieu Pass LNG Terminal and potentially the Commonwealth LNG Facility, would be visible and add to permanent visual impacts. During Project operation, the Terminal Facilities, including flares, lighting, and storage tanks, may be visible for several miles. The extent of these impacts would vary depending on the proximity to the sites. Motorists along the approximate 2-mile stretch of road between the Commonwealth LNG Facility and the Cameron Ferry West Landing and those traveling along the 2.5-mile stretch between the Cameron Ferry East Landing through the town of Cameron would have direct views of all three facilities and associated structures. Due to the addition of these three facilities, cumulative visual impacts in this area would be significant. Visual impacts are more fully addressed in section 4.9.5 and cumulative visual resources impacts are discussed in section 4.14.2.7.

Project impacts on environmental justice populations may include impacts on socioeconomic factors. Constructing the Project would require, at its peak, about 3,625 and 2,325 workers/contractors for Phase 1 and Phase 2, respectively. The combined populations of Cameron and Calcasieu Parishes are about 210,000 individuals. The towns closest to the Project that are considered environmental justice communities include Cameron (CT 9702.02 BG 2), Hackberry (CT 9702.03 BG 1), Creole (CT 9701.02, BG 1), and Vinton (CT 35, BG 1; CT 35, BG 2; and CT 35, BG 4). There are several other projects that have been proposed or approved that could have overlapping construction schedules with CP2 LNG. These include Driftwood LNG Project, Line 200 and Line 300 Project, Hackberry Storage Project, Cameron LNG Expansion Project, Lake Charles Liquefaction Project, Magnolia LNG, Delfin LNG, and the Commonwealth LNG Project. Combined, these additional projects could require a peak of more than 20,000 workers, a 10 percent increase in the current population. The temporary flux of workers/contractors into the area would increase the demand for housing and community services, such as police enforcement, and medical care. Available short- and long-term housing would be limited within the two affected parishes and associated environmental justice communities. Should other LNG and pipeline projects listed in table 4.14.1-1 be constructed at the same time as the Project, sufficient housing is available for the additional residents made up of the non-local workforce for these projects in the Project area. This cumulative increased demand for housing could drive costs up, increase property taxes, and adversely impact low-income individuals. An increase in costs of material goods may also occur due to increased demand for these goods. However, given the volume of existing housing available in the Project area, as well as the three residential subdivision projects identified in table 4.14.1-1, we conclude the Project would not contribute to a significant cumulative impact on housing within environmental justice communities.

The population increase, as well as various construction projects, may also increase the need for police, fire, and emergency medical services. Because environmental justice and smaller communities could have fewer public service resources available, any increased need due to these projects could negatively affect the availability of these services to the public. However, because applicants would be required to assess the capabilities of local public services and develop appropriate mitigation measures, such as training of internal staff to respond to emergencies, providing equipment, or funds to local departments, we have determined that cumulative impacts on police, fire, and emergency medical service within environmental justice communities would be less than significant.

Overall, cumulative socioeconomic impacts associated with housing and public services within environmental justice communities would be less than significant; housing units would be available should all the projects be constructed at the same time and impacts on community services would be mitigated as previously described. Socioeconomic impacts are more fully addressed in section 4.10 and cumulative socioeconomic impacts are discussed in this section.

Area residents may be affected by traffic delays during construction of the Project. There would be a temporary increase in use of area roads by heavy construction equipment and associated trucks and vehicles. Increased use of these roads would result in a higher volume of traffic, increased commute times, and greater risk of vehicle accidents. These impacts would most likely affect those environmental justice communities that are in close proximity to several large projects, such as Cameron (CT 9702.02 BG 2), Hackberry (CT 9702.03 BG 1), as well as those communities to the north where workers would find housing. Mitigation measures would be implemented to minimize potential road congestion during construction including a phased approach to traffic management based on the number of construction personnel. Additionally, the use of speed/load limits, and other use limitations, conditions, or restrictions on the roads proposed for use during construction, flagging stations, warning signs, lights, and/or barriers would be implemented, as appropriate, to ensure the safety of local traffic. Other large projects in the area would likely use large available lots for parking for the majority of their workers. Depending on the location of these lots, and timing of construction, there could be some overlap, which would result in minor to significant traffic impacts. These impacts would also be limited to the time of construction. Once construction is complete, the vehicle trips for the permanent workforce and large heavy trucks are not anticipated to significantly increase traffic. Therefore, we do not expect the Project to significantly contribute to cumulative traffic impacts during operation. Traffic impacts are more fully addressed in section 4.10.8 and cumulative traffic impacts are discussed in this section.

Because most of the projects assessed would be along the Calcasieu Ship Chanel or Calcasieu Lake, it is likely that most non-local workers would find housing in larger towns and cities such as Lake Charles or Sulphur, Louisiana or Port Arthur, Texas. These areas could experience increased traffic volumes due to the influx of workers. Because several projects would be accessed along SH 27, traffic volumes along the road would increase if those projects were constructed concurrently. Commonwealth LNG would use bus lots for Project parking in Carlyss, Louisiana, about 40 miles north of the Terminal Facilities and it is likely that other large projects would also use off-site parking for workers to minimize traffic along LA-27 and other local roadways. Additionally, projects would develop and implement project-specific traffic mitigation plans that would further minimize overall traffic impacts from a project. The 2022 annual daily traffic count on LA Hwy 27 near the Terminal Facilities is 2,651 vehicles. CP2 LNG would utilize three

P&R locations, use bussing to transport construction personnel, and stagger shift start times to reduce the number of vehicles operating simultaneously during anticipated times of peak site personnel. Overall, cumulative traffic impacts on environmental justice communities would be less than significant. Project transportation needs and impacts are more fully addressed in section 4.9.11 and cumulative transportation impacts are discussed in this section.

Noise levels resulting from construction of the Project along with the Louisiana Connector Project, which is the only other project in table 4.14.1-1 that crosses the Project pipelines in an identified environmental justice block group (CT 34, BG 1), vary over time and would depend upon the number and type of equipment operating, the level of operation, and the distance between sources and receptors. Noise levels above ambient conditions attributable to construction activities would vary over time and would depend upon the nature of the construction activity, the number and type of equipment operating, and the distance between sources and receptors. The Terminal Facilities and the NSAs identified 1 mile are within an identified environmental justice block group (CT 9702.02, BG 2). Construction at CP2 LNG and the Commonwealth LNG facilities may overlap if both projects are permitted and constructed. Both projects would conduct pile-driving activities during daytime hours. We included a recommendation in section 4.12.2.2 for CP2 LNG to include the pilot station on the southern tip of Monkey Island that is used to house Calcasieu Ship Channel pilots as an NSA and provide revised noise impact analyses tables and corresponding reports for construction and operation. The pilot station is located within an environmental justice community (CT 9702.02 BG 2) and is about 150 feet southeast of the proposed Marine Facilities. This NSA is also within 1 mile of the Calcasieu Pass LNG and the proposed Commonwealth LNG projects.. Operational noise associated with the Terminal Site would be persistent; however, CP2 LNG would be required to meet sound level requirements. Similarly, all additional facilities would be subject to the same sound level requirements. Operational noise would increase noise levels over ambient by less than 3 dB at NSA 2. Operational noise would also increase at the pilot station (our recommendation in section 4.12.2.2). The construction and operation of LNG Projects along the southern portion of the Calcasieu Ship Channel would not result in significant noise impacts on local residents and the surrounding communities, including environmental justice populations. Noise impacts are more fully addressed in section 4.12.2 and cumulative noise impacts are discussed in this section.

Air pollutant emissions during construction of the Terminal Facilities, Moss Lake Compressor Station, and Pipeline would generally be associated with onshore construction activities conducted using on-road and off-road mobile equipment and offshore construction activities conducted using marine vessels such as tugboats or barges and a dredging vessel. Emissions from construction equipment fuel combustion and fugitive dust (i.e., particulate matter) generated by equipment traffic and material handling activities would result in localized impacts on air quality in the immediate vicinity of construction work areas. Efforts to mitigate exhaust emissions during construction would include using construction equipment and vehicles that comply with EPA on-road and non-road emission regulations, and use of commercial gasoline and diesel fuel products that meet specifications of applicable federal and state air pollution control regulations. Fugitive dust would be mitigated, in part, by applying water to the roadways and reducing vehicle speed.

CP2 LNG and CP Express conducted an air dispersion modeling analysis to assess air quality impacts and show compliance of Project operations with applicable NAAQS and Class II PSD Increments for the pollutants subject to PSD review. The results of the CP2 LNG's analysis, which included other industrial facilities in the area of the Terminal Facilities, showed exceedances of the 1-hour NO_2 NAAQS, with some of these exceedances within an environmental justice community (Census Tract 9702.02.2). CP2 LNG's results also showed that in all instances, the Project's contributions to these exceedances, including those within the local environmental justice community, were below EPA's 1-hour NO_2 Significant Impact Level (7.5 $\mu g/m^3$) while being less than 2 percent of the cumulative impact. Based on these findings, we conclude that the Project would not cause or significantly contribute to any exceedance of the NAAQS within environmental justice communities surrounding the Terminal Facilities. Also, the results of the

HHRA demonstrated that all chronic cancer, chronic non-cancer, and acute non-cancer hazards are below EPA risk management objectives. Air Quality impacts for the Terminal Facilities are more fully addressed in section 4.12.1 and cumulative air quality impacts are discussed in section 4.14.2.10.

The results of the CP Express' analysis, which included other industrial facilities in the region around the Moss Lake Compressor Station, showed exceedances of the 1-hour NO_2 and 24-hour $PM_{2.5}$ NAAQS. However, the impacts analysis results showed that in all instances, the Project's contributions to these exceedances were below EPA's 1-hour NO_2 and 24-hour $PM_{2.5}$ Significant Impact Levels (7.5 and 1.2 $\mu g/m^3$, respectively). Impacts associated with operation of the Moss Lake Compressor Station were confined to within a mile of the station; there are no environmental justice communities within a mile of the station. Based on these results, we conclude that the Project would not cause or significantly contribute to an exceedance of the NAAQS within the nearest environmental justice community. Air Quality impacts for the Moss Lake Compressor Station are more fully addressed in section 4.12.1.

Construction and operation of the Project would increase the atmospheric concentration of GHGs, in combination with past and future emissions from all other sources (including those listed in table 4.14.1-1) and would contribute incrementally to future climate change impacts. While the climate change impacts taken individually may be manageable for certain communities, the impacts of compounded extreme events (such as simultaneous heat and drought, or flooding associated with high precipitation on top of saturated soils) may exacerbate preexisting community vulnerabilities and have a cumulative adverse impact on environmental justice communities.

This EIS is not characterizing the Project's GHG emissions as significant or insignificant. GHG impacts are more fully addressed in section 4.12.1 and cumulative GHG impacts are discussed in this section.

4.14.2.9 Cultural Resources

The geographic scope for cumulative impacts on cultural resources was determined to be the area directly affected by the Project or, for indirect effects, are closely adjacent. As described in section 4.11.1, the APE for direct impacts on historic properties along the Pipeline System includes the pipeline corridor and associated workspace and footprints of aboveground facilities, access roads, and other work areas. For the Terminal Facilities, the APE includes the Terminal Site, Marine Facilities, and LNG transfer lines as well as offshore acres within Calcasieu Pass. The indirect APE for visual impacts is the direct line of site to a historic property up to 0.5 mile from the Terminal Facilities, pipeline corridor, and other aboveground facilities.

Where direct impacts on significant cultural resources are unavoidable, mitigation (e.g., recovery of data and curation of materials) would occur before construction of the Project. All projects that are listed in table 4.14.1-1 that are within the geographic scope involve a federal action, like the Project, and are required to comply with Section 106 of the NHPA, which involves conducting surveys to identify sensitive cultural resources and historic properties that could be affected by the Project and developing a plan to address unanticipated discoveries of cultural resources and human remains during construction.

As described in section 4.11.2, cultural resources surveys are complete for the Terminal Facilities, and no historic properties would be directly or indirectly affected by the Terminal Facilities. In addition, CP2 LNG has developed a plan regarding unanticipated discovery of cultural resources or human remains during construction (i.e., UDP), which we reviewed and found to be acceptable. Therefore, we find that the Terminal Facilities would not contribute to cumulative impacts on cultural resources.

Cumulative impacts on cultural resources would occur if the Pipeline System and another project were to result in overlapping effects on a cultural resource. CP Express has initiated consultation with the SHPO; however, all the necessary cultural resource surveys are not complete along the Pipeline System. Therefore, consultation is not complete. However, once cultural resources surveys are complete, if any historic properties would be adversely affected by the Pipeline System, CP Express would follow their UDP for Louisiana and Texas, as described above. As such, impacts on cultural resources would be minimized and would not contribute to significant cumulative impacts on cultural resources.

4.14.2.10 Air Quality

Construction

Air emissions during construction would be limited to vehicle and construction equipment emissions and fugitive dust and would be localized to near the project construction sites. Construction of the Project would result in increases in emissions of criteria pollutants, HAPs, GHG primarily from combustion of fuel in vehicle and equipment engines; dust (particulate matter) generated from excavation, grading, and fill activities and driving on unpaved roads; and general construction activities. Generally, construction projects within the geographic scope for construction air quality with multiple-year overlapping construction schedules or single-year projects that occur in the same timeframe could cumulatively contribute to air quality impacts. Construction impacts vary based on factors such as timing of the construction projects, intensity, and type of construction activity underway at any given time, quantity and size of emission-producing equipment in operation, distance separating the projects, soil silt content, quantity of dust-producing material being handled, and dry or windy conditions. Specifically, other projects that could occur within the geographic scope for analysis of the cumulative impact on air quality during Project construction include construction of the Commonwealth LNG project terminal facilities, maintenance dredging of the Calcasieu Ship Channel, and operation of the Calcasieu Pass LNG project.

Construction activities at the CP2 LNG project could overlap with construction of the Commonwealth LNG facility. Each project has 1.0-mile geographic scope for the air quality resource, which overlap in geographic scope for a significant portion of the Commonwealth LNG project area as measured from the CP2 LNG Marine Terminal) Commonwealth LNG facility and the CP2 LNG Marine Terminal. Fugitive dust emissions would be at their peak during facility footprint clearing and earth moving, and if these activities were to occur at the same time, there could be a temporary cumulative air quality impact from fugitive dust. These emissions would be minimized by dust control measures outlined in dust control plans for each project. Emissions of pollutants from combustion of fuel in vehicles and offroad equipment from construction of both projects could also contribute to cumulative air impacts in the region. These emissions would be minimized by typical control techniques such as the use of low-sulfur diesel fuel and proper operation of equipment. If intensive construction activities were occurring simultaneously, there would be a temporary cumulative air quality impact from such fuel combustion emissions.

If maintenance dredging of the Calcasieu Ship Channel were to occur at the same time as construction of the Terminal Facilities, emissions of criteria pollutants from combustion of fuel in equipment and vehicle exhausts from the combined projects could also contribute to cumulative air impacts in the region. CP2 LNG would minimize impacts on air quality during construction by adopting the following measures:

- maintaining construction equipment in accordance with manufacturers' and employ equipment that meets relevant emission standards;
- properly operating construction equipment to minimize exhaust emissions, including minimizing engine idling time, when practical;

- applying water to dirt stockpiles, unpaved roads, and staging areas;
- covering open haul trucks, as needed;
- limiting vehicle speeds (via posted speed limit signs);
- installing gravel pads or wheel shakers or wheel washers for construction site entrances; and
- applying water to active work areas during earthmoving operations, as needed.

CP2 LNG also agreed to implement the following additional measures to reduce fugitive emissions:

- Ensuring that all field construction personnel receive training on environmental compliance requirements and the measures outlined in the fugitive dust control plan;
- Making available in a local newspaper and on the project website a phone number to use to report complaints, including those related to fugitive dust;
- Requiring the EI to keep a daily log of weather and site conditions and incidences when special dust abatement measures were needed, the measures employed, and the reason for the measures; and
- If a dust-related complaint is received by the LDEQ and communicated to CP2 LNG, providing a record of that complaint and its resolution to FERC.

Regarding engine emissions, CP2 LNG would require vehicular and/or barge exhaust and crankcase emissions from gasoline and diesel engines to comply with applicable EPA mobile source emission regulations (40 CFR 85) by using equipment manufactured to meet these specifications.

The combustion and fugitive dust emissions that would occur during construction would be largely limited to the immediate vicinity of the Project construction sites, including the Terminal Facilities area and the areas where the Moss Lake Compressor Station and pipeline would be constructed. These emissions would subside once construction has been completed. Therefore, we conclude the construction-related cumulative impact on local air quality during construction of the Terminal Facilities, Moss Lake Compressor Station, and pipeline would not be significant.

CP2 LNG committed to develop a Project Ambient Air Quality Mitigation and Monitoring Plan, in coordination with the LDEQ, prior to commencement of initial site preparation, to monitor $PM_{2.5}$ (24 hour), PM_{10} (24 hour), and NO_2 (1-hour) concentrations during construction and commissioning of the CP2 LNG Terminal. CP2 LNG would file updates in their construction status reports when the plan is in use and would document the duration of and reasons for measured elevated $PM_{2.5}$, PM_{10}, and NO_2 concentrations, and to the extent there are NAAQS exceedances, what minimization or mitigation measures CP2 LNG implemented to reduce levels and documentation of the reduction to below the NAAQS.

Given CP2 LNG's commitment to implementation of mitigation (as outlined in their Fugitive Dust Plan and including the additional mitigation-related measures outlined above), the ambient air quality monitoring and mitigation plan, and the temporary timeframe of construction activities plus the minor overlap of construction activities with the Commonwealth LNG project (i.e., only a portion of the construction of the Commonwealth LNG project would be within the geographic cumulative impacts scope of the Project), we conclude that the Project would not contribute significantly to cumulative impacts on air quality during construction.

Operations

Emissions from operation of the Terminal Facilities would be generated primarily by the gas turbines, hot oil heaters, thermal oxidizers, flare systems, LNG carriers and tugboats, and vehicles. Emissions from operation of the Moss Lake Compressor Station would be generated primarily by the gas turbines. Under federal and LDEQ regulations, the Terminal Facilities and Moss Lake Compressor Station are considered major PSD emission sources and would contribute to cumulative impacts on air quality within their respective cumulative impact areas. The potential for other projects to cumulatively interact with emissions from the Project depends on the type of project, its stage of development, and the location (direction and distance) of the other projects relative to the Project facilities.

Air quality would be affected by operation of the present and future actions considered in the cumulative impact analysis (figure 4.14.1-1). Table 4.14.1-1 lists the reasonably foreseeable future actions identified within the geographic scope for operational air quality impacts. (This geographic scope is based on the significant impact analysis required for the PSD permitting. The largest geographic scope for the Terminal Facilities, based on the results of the 1-hour NO_2 significant impact analysis plus 20 km, is 43.7 km. The largest geographic scope for the Moss Lake Compressor Station, based on the results of the 1-hour NO_2 significant impact analysis plus 20 km, is 21.4 km.) These projects include eight FERC-jurisdictional projects, one industrial project, and one transportation/road improvement project. Impacts on air quality from projects beyond the geographic scope are not expected to significantly contribute to a cumulative impact that includes Project impacts. We note that some foreseeable future actions, particularly those actions that would be required to obtain an air quality permit at some point in the future, are not included in the NAAQS compliance demonstration modeling analyses conducted by CP2 LNG and CP Express.

Operational emissions from some projects (e.g., underground pipelines) within the operational cumulative geographic scope for air quality are small, dispersed, and accounted for in background concentrations used in the NAAQS compliance assessment modeling for the Project (assuming such sources were operating prior to 2022). Therefore, these projects are not discussed individually.

Construction of the other projects with operational air emissions requiring permits for point source emissions (e.g., Commonwealth LNG, Calcasieu Pass LNG) would result in air quality impacts similar to the Project. These projects that are considered major sources of air emissions would be required to conduct a PSD air quality impact analysis to demonstrate compliance with the NAAQS. In addition, any other potential future projects that are considered major sources of air emissions would be required to conduct a detailed air quality impact analysis. Should operational emissions for a proposed future project show an adverse impact to air quality, the LDEQ would enforce operational limitations or require emissions controls that ensure compliance with the state implementation plan and attainment with the NAAQS. In addition, the Terminal Facilities and Moss Lake Compressor Station, as well as any other future major source, would be required to comply with LDEQ air permit conditions during operation.

As detailed in section 4.12.1.4, CP2 LNG and CP Express performed a cumulative modeling analysis for each pollutant that exceeded the SIL (1-hour and annual NO_2; 1-hour CO; 1-hour, 3-hour, and 24-hour SO_2; and 24-hour and annual $PM_{2.5}$ for the Terminal Facilities; and 1-hour NO_2 and 24-hour $PM_{2.5}$ for the Moss Lake Compressor Station). CP2 LNG Terminal Facilities and Moss Lake Compressor Station air emission sources were modeled along with an inventory of offsite sources (obtained from LDEQ's Emissions and Inventory Reporting Center) within the pollutant-specific area of impact and added to a background concentration with the resulting total impacts compared with the NAAQS. The area of impact was established as the distance from the Project to the farthest receptor that showed a modeled impact greater than the SIL in the significance modeling analysis. The offsite sources inventory included all sources within the area of impact plus 15 km and all major sources within the area of impact plus 20 km, per guidance from the LDEQ. The sources modeled included the nearby Commonwealth and Calcasieu Pass LNG facilities.

The NAAQS cumulative impact assessments for the Terminal Facilities and the Moss Lake Compressor Station indicated that the maximum 1-hour NO_2 impacts - 201 and 263.5 $\mu g/m^3$, respectively

- exceed the 1-hour NO_2 NAAQS of 188 μg/m^3. Additionally, the NAAQS cumulative impact assessment for the Moss Lake Compressor Station indicated that the maximum 24-hour $PM_{2.5}$ impact - 44.5 μg/m^3 - exceeds the 24-hour $PM_{2.5}$ NAAQS of 35 μg/m^3. No other pollutants exceeded their respective NAAQS in the cumulative NAAQS assessment.

Based on these findings, CP2 LNG and CP Express conducted a cause-and-contribute analysis, per federal and state guidelines, that demonstrated that the Project would not contribute significantly to the predicted 1-hour NO_2 NAAQS and 24-hour $PM_{2.5}$ NAAQS exceedances. The findings of that cause-and-contribute analysis are as follows:

- for the Terminal Facilities, considering all the predicted exceedances of the 1-hour NO_2 NAAQS, the highest Project-only concentration contribution - 3.89 μg/m^3 - is below the 1-hour NO_2 SIL concentration (7.5 μg/m^3);
- for the Moss Lake Compressor Station, considering all the predicted exceedances of the 1-hour NO_2 NAAQS, the highest Project-only concentration contribution - 1.52 μg/m^3 - is below the 1-hour NO_2 SIL concentration (7.5 μg/m^3); and
- for the Moss Lake Compressor Station, considering all the predicted exceedances of the 24-hour $PM_{2.5}$ NAAQS, the highest Project-only concentration contribution - 0.19 μg/m^3 - is below the 24-hour $PM_{2.5}$ SIL concentration (1.2 μg/m^3).

It should be noted that NAAQS exceedances would still be predicted in the absence of the concentration contributions from the Project (i.e., the modeled impacts from the existing, permitted off-site sources plus background concentrations are driving the predicted NAAQS exceedances).

FERC staff conducted a HHRA of HAP emissions based on the maximum model-predicted 1-hour and annual off-property concentrations of HAPs emitted from the Terminal Facilities stationary sources and mobile marine sources (LNG carriers and tugs). The complete HHRA report is available in Appendix O and is summarized below.

The results of the HHRA showed that the estimated adult and child resident cancer risk for each HAP is at least an order of magnitude (i.e., 10-fold) below EPA's risk management objective of 1-in-1 million for individual HAPs. Moreover, the total cancer risks summed across all HAPs are well below (by almost 100-fold) EPA's target of 1-in-100,000 for a single facility. This 1-in-100,000 individual facility risk management objective is ten times more stringent than the highest cancer risk that EPA deems acceptable to account for potential exposure to background levels of air contaminants (i.e., existing air quality). Therefore, use of this facility risk management objective addresses the potential for cumulative risk (i.e., risk associated with multiple HAPs and other sources in the area).

The results of the HHRA also indicated that no chronic HQ for any HAP is greater than the non-cancer risk management objective of 1 for individual HAPs. In addition, all segregated chronic Hazard Index values (derived by summing HQ values for all HAPs with similar chronic effects) are well below 1 (by almost 100-fold). Similarly, all acute HQ and segregated acute Hazard Index values are well below the acute risk management objective of 1 (by almost 100-fold).

It is important to recognize that the cancer risks for the adult and child resident in this HHRA were estimated at the off-property location of maximum model-predicted impacts for each HAP, not necessarily at occupied residences. In addition, summing cancer risk across all carcinogenic HAPs is an extremely conservative approach (i.e., health protective) that is likely to substantially overestimate cumulative cancer risk from a particular source. Likewise, summing chronic HQ or acute HQ values across HAPs, even those that have similar effects, is highly conservative and likely overestimates chronic and acute hazards.

In conclusion, the NAAQS cumulative impact assessments demonstrate that the proposed Project (CP2 LNG Terminal Facilities and Moss Lake Compressor Station) would not cause or contribute to a potential NAAQS exceedance and would only contribute a minor amount to cumulative air impacts within the geographic scope of this analysis. Also, the results of the HHRA demonstrated that all chronic cancer, chronic non-cancer, and acute non-cancer hazards are below EPA risk management objectives.

4.14.2.11 Noise

Construction

Construction noise at the Terminal Facilities would be generated over an extended period of approximately four years and for about 16 months along the Pipeline System. Construction activity and associated noise levels associated with the Project or with other projects within the geographic scope for cumulative impacts would vary depending on the construction activities. The sound level impacts on NSAs due to construction activities would depend on the type of equipment used, the duration of use for each piece of equipment, the number of construction vehicles and machines used simultaneously, and the distance between the sound source and receptor.

The proposed Terminal Site is in a rural area, with industrial sites to the northwest along the Calcasieu Ship Channel. The Calcasieu Pass LNG facility is immediately to the west. The nearest NSA relative to the proposed Terminal Facilities, an RV site used as a year-round residence by the landowner (NSA 2), is about 330 feet northeast of the corner of the storm protection wall. The next-closest NSA, also an RV park (NSA 1), is approximately 360 feet east of the storm wall. The last NSA that was evaluated (NSA 3) is north of the Project on Marshall Street (Route 27), approximately 3,900 feet from the center of the Project. The pilot station, which we requested to be evaluated as an NSA in our recommendation in section 4.12.2.2 is about 150 feet southeast of the edge of the Marine Facilities.

At the Terminal Site, the highest level of construction noise would likely occur during earth-moving (civil phase) and pile-driving work. CP2 LNG expects peak construction noise to occur for the first 18 months of construction, when earth moving activities would coincide with pile driving. Construction at CP2 LNG and the Commonwealth LNG facilities may overlap if both projects are permitted and constructed at the same time. Both projects would conduct pile-driving activities during daytime hours. However, at approximately 2.75 miles southwest of NSA 2, the Commonwealth facility would be beyond the geographic scope for cumulative noise impacts on NSA 2.

There are no projects that overlap in scope and schedule for the Moss Lake Compressor Station or the CP Express meter stations; therefore, the Project would not contribute to cumulative noise impacts on nearby NSAs due to construction at the compressor or meter stations.

The CP Express Pipeline would traverse mostly rural areas, with ambient sound levels along the pipeline route influenced by rural background sources. At MP 50.8, the pipeline would be installed via HDD beneath Ship Channel Mile 20 to Mile 21. It is possible that dredging at and/or periodic channel maintenance associated with the Calcasieu River and Pass Operations and Maintenance Project could occur simultaneously with Project drilling activities at the Calcasieu Ship Channel HDD. However, there are no NSAs within 0.5 mile of the Calcasieu Ship Channel HDD entry/exit locations. Therefore, the Project HDD activities would not contribute to cumulative noise impacts on nearby NSAs.

Per the LDOTD, the I-10 State Line to East of Coone Gully Project area ends approximately 300 feet west of the CP Express Pipeline near MP 33.7. The two projects do not intersect. CP Express Pipeline would cross I-10 via HDD, avoiding direct impacts at the highway crossing. With respect to the I-10 State Line to East of Coone Gully project, the CP Express Pipeline construction workspace and HDD entry on the north side of I-10 are more than 500 feet north and the HDD entry/exit on the south side is about 0.25

mile south. Noise attributable to construction would have cumulative and minor indirect effects where the CP Express Pipeline workspace is less than 0.25 mile north of the highway project. However, there are no NSAs within 0.5 mile of those locations. Noise levels attributable to pipeline construction would be short-term and intermittent, depending upon the nature of the construction activity, the number and type of equipment units operating, and the distance between sources and receptors.

Noise attributable to construction of the Hackberry Storage Project, where it intersects with the CP Express Pipeline at MP 47.2, could have cumulative and minor direct noise impacts given the proposed conventional pipeline construction methods at the intersection of the two projects. Noise levels attributable to pipeline construction would be short-term and intermittent. There is one NSA, the Intracoastal Park, within 0.5 mile of the CP Express HDD entry/exit location. This is near MP 49.5 on the west side of the Intracoastal Waterway. The southern boundary of the Intracoastal Park NSA is SH 27, which is 0.6 mile from the nearest Hackberry Storage Project saltwater disposal well sites, SWD 3 and SWD 1. If the saltwater well construction timing overlaps with the CP Express HDD of the Intracoastal Waterway, cumulative noise impacts could occur at the Intracoastal Park NSA. The Hackberry Storage Project has committed to employing temporary noise barriers at well pad locations, including SWD 3 and SWD 1, to restrict noise attributable to well installation to an L_{dn} of 55 dBA or less at Hackberry Storage Project NSAs. Similarly, CP Express has committed to implementing mitigation measures for nighttime construction noise associated with HDDs near NSAs that exceed the FERC criterion, as discussed in section 4.12.2.3. Given the commitment by both projects to conduct most construction activities during daytime hours and to adopt appropriate mitigation measures during nighttime activities, cumulative construction noise may result in minor, temporary noise impacts on the Intracoastal Park NSA.

There are no additional projects or project impacts to include in the cumulative construction noise impacts analysis. Cumulative noise impacts due to Project construction would not result in significant impacts on nearby residents or NSAs.

Operations

Noise

An assessment of cumulative impacts considers the potential impact of a proposed project in the context of existing and foreseeable developments, to ensure that any potential environmental noise impacts are not considered in isolation. The other major planned facility in the vicinity of the Calcasieu Pass and CP2 LNG facilities is the Commonwealth LNG Terminal.

Table 4.14.2-2 shows the cumulative sound levels attributable to the Project and the Calcasieu Pass LNG Project, in the absence of any other ambient sound (roadway traffic, etc.). The contribution from Calcasieu Pass LNG was not available at NSA 4 (Monkey Island). However, Table 4.12.2-8 shows that the Project is not expected to result in any significant increase in the ambient sound at Monkey Island.

Table 4.14.2-2

Contribution from Calcasieu Pass and CP2 at NSAs

NSA	Direction & Distance from CP2 liquefaction area noise center	CP2 Facility	Calcasieu Pass LNG [a]	Total Facilities
		L_{dn}	L_{dn}	L_{dn}
1	2,700 ft. east	51.8	44.7	52.8
2	2,450 ft. northeast	53.2	44.8	53.8

Table 4.14.2-2

Contribution from Calcasieu Pass and CP2 at NSAs

NSA	Direction & Distance from CP2 liquefaction area noise center	CP2 Facility	Calcasieu Pass LNG [a]	Total Facilities
		L_{dn}	L_{dn}	L_{dn}
3	3,900 ft. north	50.1	43.6	50.8
4	8,600 ft west	46.6	-	46.6

[a] July 13, 2022 Environmental Noise Assessment report, Hoover and Keith.

The combined, cumulative operation of the Project and the Calcasieu Pass LNG Project results in total facility calculated sound levels of 53.8 dBA L_{dn} at NSA 2. Operation of the Terminal Facilities would produce noise on a continuous basis, primarily from compressor piping and air coolers. Blowdown events for the Project pipeline would be routed through the Terminal Site flaring system. Due to their temporary nature, blowdown events (planned or unplanned) would cause a negligible contribution to potential cumulative noise impacts on NSAs.

The highest sound level attributable to the Commonwealth LNG facility is 52.3 dBA L_{dn} at the southern tip of Monkey Island (which is identified as NSA 1 for the Commonwealth LNG Project, the pilot station). Calculated sound levels at NSA 4 can be extrapolated to the NSAs associated with the CP2 LNG Project. The pilot station is approximately 4,000 feet (0.8 mile) from the Commonwealth Terminal. The Commonwealth LNG terminal is approximately 2.7 miles from the RV Park NSAs (NSA 1 and NSA 2). If the 52.3 dBA L_{dn} contribution from Commonwealth LNG is extrapolated to the RV Park NSAs located east of CP2 LNG, the contribution from Commonwealth LNG becomes approximately 42.3 dBA L_{dn}. Given that this is 10 dBA lower than the combined contribution from CP2 LNG and Calcasieu Pass LNG (53.8 dBA L_{dn}), Commonwealth LNG would have almost no cumulative additive impact at NSA 1 and NSA 2. When including the contribution from Commonwealth LNG, CP2 LNG and Calcasieu Pass LNG, calculated cumulative sound level from the three LNG facilities does not exceed 52.3 dBA L_{dn} at the RV Park (NSA 1 and NSA 2). This remains below the FERC required noise criterion of 55 dBA L_{dn}.

We have included a recommendation in section 4.12.2.3 for CP2 LNG to modify operation of the liquefaction facilities or install additional noise controls to keep operation noise levels below 55 dBA if a full power load noise survey conducted by after start-up indicates that noise levels due to facility operation are above the 55 dBA L_{dn} threshold. Based on our recommendations discussed above, we conclude that the proposed Project is not expected to result in any cumulative significant noise impacts.

There are no projects that overlap in scope and schedule for the Moss Lake Compressor Station or the CP Express meter stations; therefore, the Project would not contribute to cumulative noise impacts on nearby NSAs due to construction at the compressor or meter stations.

4.14.2.12 Reliability and Safety

Potential impacts on public safety would be mitigated through implementation of applicable federal, state, and local rules and regulations for the proposed Project. These rules and regulations, described in Section 4.13 would ensure appropriate standards would be applied to design and engineering, construction, operation, and maintenance to protect the public and avoid or minimize the potential for accidental or intentional incidents. The other LNG projects listed in table 4.14.1-1 would be required to follow the same rules and regulations, and other large industrial projects listed in table 4.14.1-1 would be subject to similar rules and regulations. These rules and regulations are intended to protect the public from the potential impacts of industrial projects singularly and cumulatively, and no significant cumulative impact on public safety is anticipated. Public services, including emergency services, would need to be appropriately sized to accommodate the population at the time the Project was constructed and operated. In addition, the Project and the other LNG projects would be required to prepare a comprehensive ERP and identify the cost sharing mechanisms for funding these emergency response activities. These plans would minimize the potential for impacts on public safety from individual projects or when considered cumulatively with the other concurrent projects. In the unlikely event that major incidents occur at multiple facilities concurrently, the acute cumulative demand on emergency services would likely be significant; however, assistance from emergency service providers from neighboring parishes and communities would serve to mitigate the demand. Therefore, we conclude that the impact of the Project, when considered cumulatively with the other concurrent projects, would not have a significant impact on demand for public services.

4.14.2.13 Climate Change

Several commentors, including the EPA, raised concerns regarding the Project's emissions of GHGs and associated climate change impacts. Climate change is the variation in the Earth's climate (including temperature, precipitation, humidity, wind, and other meteorological variables) over time. Climate change is driven by accumulation of GHGs in the atmosphere due to the increased consumption of fossil fuels (e.g., coal, petroleum, and natural gas) since the early beginnings of the industrial age and accelerating in the mid- to late-20th century.[262] The GHGs produced by fossil fuel combustion are CO_2, CH_4, and N_2O.

In 2017 and 2018, the USGCRP issued its *Climate Science Special Report: Fourth National Climate Assessment*, Volumes I and II (USGCRP, 2017; and USGCRP, 2018, respectively). This report and the recently released report by the Intergovernmental Panel on Climate Change (IPCC), *Climate Change 2021: The Physical Science Basis*, state that climate change has resulted in a wide range of impacts across every region of the country and the globe. Those impacts extend beyond atmospheric climate change alone and include changes to water resources, transportation, agriculture, ecosystems, human health, and ocean systems. According to the Fourth Assessment Report, the U.S. and the world are warming; global sea level is rising and oceans are acidifying; and certain weather events are becoming more frequent and more severe. These impacts have accelerated throughout the end of the 20th and into the 21st century (USGCRP, 2018).

GHG emissions do not result in proportional local and immediate impacts; it is the combined concentration in the atmosphere that affects the global climate system. These are fundamentally global impacts that feed back to local and regional climate change impacts. Thus, the geographic scope for the cumulative analysis of GHG emissions is global, rather than local or regional. For example, a project 1 mile away emitting 1 ton of GHGs would contribute to climate change in a similar manner as a project 2,000 miles distant also emitting 1 ton of GHGs.

The EPA comments that the EIS should consider ongoing and project regional and local climate change impacts. Climate change is a global concern; however, for this analysis, we focus on the existing and projected climate change impacts on the general Project area. The USGCRP's Fourth Assessment

[262] Intergovernmental Panel On Climate Change, United Nations, Summary for Policymakers of Climate Change 2021: The Physical Science Basis (Valerie Masson-Delmotte et al. eds.) (2021), https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_SPM.pdf (IPCC Report) at SPM-5. Other forces contribute to climate change, such as agriculture, forest clearing, and other anthropogenically driven sources.

Report notes that the following observations of environmental impacts are attributed to climate change in the U.S. Gulf Coast region (USGCRP, 2017; USGCRP, 2018):

- The region has experienced an increase in annual average temperature of 1-2°F since the early 20th century, with the greatest warming during the winter months. There have been increasing number of days above 95°F and nights above 75°F, with a decreasing number of extremely cold days since the 1970s.
- The region has experienced an increase in precipitation. Most notably, fall precipitation has increased by 40 percent since 1948. The number of heavy downpours has increased throughout the region.
- The number of strong (Category 4 and 5) Atlantic hurricanes (including the Gulf of Mexico) has increased since the early 1980s.
- Along the Gulf Coast, sea levels have risen 5 inches to 17 inches over the past 100 years depending on local topography and subsidence.
- Many coastal areas in Louisiana are subsiding; local land elevation is sinking relative to sea level. Observed subsidence rates in the southeast are significant. The highest rise in relative sea level in the U.S. is found in Louisiana (0.3 inch to 0.4 inch per year).

The USGCRP's Fourth Assessment Report notes the following projections of climate change impacts in the Project region with a high or very high level of confidence (USGCRP, 2018):

- Annual average temperatures are projected to increase by 3.6°F to 5.1°F by the mid-21st century and by 4.4°F to 8.4°F by the late 21st century, compared to the average for 1976-2005.
- The change in the number of hot days and warm nights is projected to increase dramatically by mid-century for the Gulf Coast. The region is projected to experience an additional 30 to 60 days per year above 100°F than it does currently.
- Tropical storms are projected to be fewer in number globally, but stronger in force, exacerbating the loss of barrier islands and coastal habitats.
- The region is projected to see longer dry spells, although the number of days with heavy precipitation is expected to increase by mid-century. Longer periods of time between rainfall events may lead to declines in recharge of groundwater, which would likely lead to saltwater intrusion into shallow aquifers and decreased freshwater availability.
- Sea level rise along the Gulf of Mexico during the remainder of the 21st century is likely to be greater than the projected global average of 1 foot to 4 feet or more, which would result in the loss of a large portion of remaining coastal wetlands. Combined with sea level rise, local subsidence will lead to a higher "relative" change in the sea level at the local scale.

It should be noted that while the impacts described above taken individually may be manageable for certain communities, the impacts of compound extreme events (such as simultaneous heat and drought, wildfires associated with hot and dry conditions, or flooding associated with high precipitation on top of saturated soils) can be greater than the sum of the parts (USGCRP, 2018).

The GHG emissions associated with construction, commissioning, and operation of the Project are presented in sections 4.12.1.3 and 4.12.1.4. Construction and commissioning of the Project may result in total emissions of up to about 3,034,891 tons (2,753,207 metric tons) of CO_2e over the duration of construction and commissioning. Operation of the new emission sources associated with the Project would result in annual emissions of up to 9,380,776 tpy (8,510,099 metric tpy) of CO_2e (see table 4.12.1-19).

These estimates for operational emissions are based on assuming that the proposed facilities (Terminal Facilities, Moss Lake Compressor Station, and natural gas pipeline) are operated at maximum annual capacity and include fugitive emissions.

We received comments from the EPA, Sierra Club, and members of the general public stating that indirect, upstream and downstream greenhouse gas emissions caused by the Project should be assessed as part of the cumulative impacts analysis. As stated in Sections 1.1, the natural gas transported and liquefied by the Project would be exported as LNG overseas. The courts have explained that because the authority to authorize LNG exports rests with DOE, NEPA does not require the Commission to consider the upstream or downstream GHG emissions that may be indirect effects of the export itself when determining whether the related LNG export facility satisfies section 3 of the NGA.[263] Nevertheless, NEPA requires that the Commission consider the direct GHG emissions associated with a proposed LNG export facility.[264] Therefore, the upstream and downstream emissions from the Project are not analyzed in this EIS.

The construction and operation of the Project would increase the atmospheric concentration of GHGs, in combination with past, current, and future emissions from all other sources globally and contribute incrementally to future climate change impacts. In order to assess impacts on climate change associated with the Project, Commission staff considered whether it could identify discrete physical impacts resulting from the Project's GHG emissions or compare the Project's GHG emissions to targets established to combat climate change.

The EPA states that the EIS should include a discussion of the Project's GHG emissions in the context of national GHG emissions reduction goals and address the increasing conflict over time between continued emissions and national GHG goals, including ways to avoid or mitigate that conflict, such as GHG mitigation. To date, Commission staff have not identified a methodology to attribute discrete, quantifiable, physical effects on the environment resulting from the Project's incremental contribution to GHGs. Without the ability to determine discrete resource impacts, Commission staff are unable to assess the Project's contribution to climate change through any objective analysis of physical impact attributable to the Project. Additionally, Commission staff have not been able to find an established threshold for determining the Project's significance when compared to established GHG reduction targets at the state or federal level. Ultimately, this EIS is not characterizing the Project's GHG emissions as significant or insignificant.[265] However, as we have done in prior NEPA analyses, we disclose the Project's GHG emissions in comparison to national and state GHG emission inventories.

The EPA recommends that FERC avoid percentage comparisons between Project and national GHG emissions. However, the Commission has stated that the comparisons provide additional context in considering a project's potential impact on climate change. Accordingly, we have included those comparisons in our NEPA analysis. Therefore, in order to provide context of the Project emissions on a national level, we compare the Project's GHG emissions to the total GHG emissions of the United States as a whole. At a national level, 5,586 million metric tons (MMT) of CO_2e were emitted in 2021 (inclusive of CO_2e sources and sinks) (EPA, 2023b). The total of construction and commissioning emissions from the Project could potentially increase CO_2e emissions based on the national 2021 levels by 0.05 percent; in subsequent years, the Project operations could potentially increase emissions nationally by 0.15 percent.

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263 *See Freeport*, 827 F.3d at 46-47; *Ctr. for Biological Diversity v. FERC*, 67 F.4th 1176, 1185 (D.C. Cir. 2023); *see also Sierra Club v. FERC*, 867 F.3d 1357, 1373 (D.C. Cir. 2017) (*Sabal Trail*) (discussing *Freeport*).

264 *See Freeport*, 827 F.3d at 41, 46.

265 *See e.g., Driftwood Pipeline LLC*, 183 FERC ¶ 61,049, at P 63 (2023) ("…there currently are no accepted tools or methods for the Commission to use to determine significance, therefore the Commission is not herein characterizing these emissions as significant or insignificant.)

In order to provide context of the Project emissions on a state level, we compare the Project's GHG emissions to the total CO_2 emissions for the State of Louisiana alone. For Louisiana, 183.3 MMT of CO_2 were emitted in 2020 (EIA, 2022). The total of construction and commissioning emissions from the Project (for the multi-year construction period) would temporarily increase CO_2e emissions, based on the state 2020 level, by no more than 0.6 percent in any one year of construction/commissioning; in subsequent years, the Project operations could potentially increase annual emissions in Louisiana by 4.6 percent.

The Louisiana Climate Action Plan ("the Plan") outlined strategies and actions to address the causes of climate change.[266] The Plan presented GHG emissions reduction goals, which are based in part on the IPCC's findings that global net human-caused emissions of CO_2 would need to fall by about 45 percent from 2010 levels by 2030, reaching "net-zero" around 2050. With the IPCC findings in mind, Louisiana established goals of achieving a 26 to 28 percent reduction in GHG emissions by 2025 and a 40 to 50 percent reduction in GHG emissions by 2030, compared to baseline 2005 emission levels. According to the Plan, statewide GHG emissions were 215 MMT CO_2e in 2005; therefore, the goals are to have emission levels in Louisiana at about 157 MMT CO_2e in 2025 (based on 27 percent reduction) and between 108 and 129 MMT CO_2e in 2030. The Project would not start initial operations until 2026; therefore, this analysis focuses on the 2030 goal. Based on the operational emissions for the Project (8.44 MMT CO_2e), the Project would contribute approximately 7.1 percent of CO_2e emissions level goal (midpoint of range) in 2030.

Below, we include a disclosure of the social cost of GHGs (also referred to as the "social cost of carbon" [SCC]). Calculating the social cost of GHGs does not enable the Commission to determine whether the reasonably foreseeable GHG emissions associated with the project are significant or not significant in terms of their impact on global climate change.[267] In addition, there are no criteria to identify what monetized values are significant for NEPA purposes, and we are currently unable to identify any such appropriate criteria.[268]

As both EPA and CEQ participate in the IWG, Commission staff used the methods and values contained in the IWG's current draft guidance but note that different values will result from the use of other methods.[269]

Accordingly, Commission staff calculated the social cost of CO_2, N_2O, and CH_4. For the calculation, staff assumed discount rates of 5 percent, 3 percent, and 2.5 percent, assumed the Project would begin service in 2026 and that the operational emissions would be at a constant rate throughout the life of

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266 Climate Initiatives Task Force. 2022. *Louisiana Climate Action Plan, Climate Initiatives Task Force Recommendations to the Governor*. February 1, 2022.

267 *See Mountain Valley Pipeline, LLC*, 161 FERC ¶ 61,043 at P296, (2017), *aff'd sub nom*., *Appalachian Voices v. FERC*, 2019 WL 847199 (D.C. Cir. 2019); *Del. Riverkeeper v. FERC*, 45 F.th 104, 111 (D.C. Cir. 2022); and *Driftwood Pipeline LLC*, 183 FERC ¶ 61,049, at P 61 (2023). The Social Cost of GHGs tool merely converts GHG emissions estimates into a range of dollar-denominated figures; it does not, in itself, provide a mechanism or standard for judging "significance."

268 *Tenn. Gas Pipeline Co., L.L.C.*, 181 FERC ¶ 61,051 at P 37; *see also Mountain Valley Pipeline, LLC*, 161 FERC ¶ 61,043 at P 296, *order on reh'g*, 163 FERC ¶ 61,197, at PP 275-297 (2018), *aff'd*, *Appalachian Voices v. FERC*, No. 17-1271, 2019 WL 847199, at 2 (D.C. Cir. Feb. 19, 2019) (unpublished) ("[The Commission] gave several reasons why it believed petitioners' preferred metric, the Social Cost of Carbon tool, is not an appropriate measure of project-level climate change impacts and their significance under NEPA or the Natural Gas Act. That is all that is required for NEPA purposes."); *EarthReports*, 828 F.3d 949, 956 (D.C. Cir. 2016) (accepting the Commission's explanation why the social cost of carbon tool would not be appropriate or informative for project-specific review, including because "there are no established criteria identifying the monetized values that are to be considered significant for NEPA purposes"); *Tenn. Gas Pipeline Co., L.L.C.*, 180 FERC ¶ 61,205, at P 75 (2022); *See, e.g., LA Storage, LLC*, 182 FERC ¶ 61,026, at P 14 (2023); *Columbia Gulf Transmission, LLC*, 180 FERC ¶ 61,206, at P 91 (2022); and *Driftwood Pipeline LLC*, 183 FERC ¶ 61,049, at P 61 (2023).

269 *Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimates under Executive Order 13990*, Interagency Working Group on Social Cost of Greenhouse Gases, United States Government, February 2021 (IWG Interim Estimates Technical Support Document).

a generic 20-year contract. Noting these assumptions, the emissions from increased GHGs disclosed in the Project are calculated to result in a total social cost of GHGs equal to $2,171,634,661, $8,163,209,390, and $12,317,496,889 and respectively (all in 2020 dollars). Using the 95th percentile of the social cost of GHGs using the 3 percent discount rate, the total social cost of GHGs from the Project is calculated to be $24,759,892,905 (in 2020 dollars).

As stated in section 1.4, CL2 LNG proposes to capture and sequester about 500,000 tons of CO_2 per year. During scoping, the Sierra Club stated that LNG Terminals, with or without CCS, should not be part of a climate solution. Sierra Club also states that FERC should explore and consider requiring that CP2 LNG's CCS system capture at least 90 percent of the Project's direct CO_2 emissions, including emissions that are the product of combustion to power the terminal, rather than the 5.6 percent currently proposed to be captured by CP2 LNG. Consideration of GHG mitigation to offset the Projects GHG emissions, including the use of CCS beyond that already proposed to be included as part of this Project, is beyond the scope of this EIS.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 CONCLUSIONS OF THE ENVIRONMENTAL ANALYSIS

The conclusions and recommendations in this EIS are those of the FERC environmental staff. Our conclusions and recommendations will be further developed with input from the COE, DOE, Coast Guard, PHMSA, and NMFS, as cooperating agencies. However, the cooperating agencies will present their own conclusions and recommendations in their respective Records of Decision or determinations. The cooperating agencies can adopt this EIS consistent with 40 CFR 1501.3 if, after an independent review of the document, they conclude that their requirements have been satisfied. Otherwise, they may elect to conduct their own supplemental environmental analyses.

We conclude that construction and operation of the Project would result in limited adverse environmental impacts, except for significant impacts on visual resources, including within environmental justice communities, and the Project's contribution to significant cumulative visual impacts. Most adverse environmental impacts would be temporary or short-term during construction and operation, but long-term and permanent environmental impacts would also occur as part of the Project. As part of our analysis, we developed specific mitigation measures that are practical, appropriate, and reasonable for the construction and operation of the Project. We are, therefore, recommending that these mitigation measures be attached as conditions to any authorization issued by the Commission. Implementation of our recommended mitigation and the mitigation and minimization measures proposed by CP2 LNG and CP Express would avoid or reduce impacts. Our conclusions are based on our review of information filed by CP2 LNG and CP Express, and further developed from data requests, scoping, literature research, and contacts with federal agencies. A summary of the Project impacts and our conclusions are presented below by resource.

5.1.1 Geologic Resources

The Project exists within West Gulf Coastal Plain section of the Coastal Plain physiographic province. The topography at the Terminal Facilities is generally flat, with an average elevation of about 2.8 feet NAVD 88. To construct the Terminal in accordance with federal safety regulations, CP2 LNG would raise site topographic elevations approximately 1.1 foot NAVD 88 using fill sourced off-site from locations free of contamination. Topographic elevations along the Pipeline System range from about 0 feet NAVD 88 along the southern portion to about 47.5 feet NAVD 88 in the northern portion. The northern portion of the Pipeline System is characterized by terraces interspersed with wetlands and the southern portion of the Pipeline System crosses a landscape dominated by open water and marshland.

Oil and natural gas resources are prevalent in Texas, Louisiana, and offshore of its coastline. There are 257 oil and natural gas wells within 0.25 mile of the Project. Of these wells, 227 are listed as plugged and abandoned, dry and plugged, or permitted but have no drill date. The nearest nonfuel mineral resource deposits to the Project are three salt domes: the Starks salt dome, Big Lake salt dome, and Sweet Lake salt dome, all of which are within 0.25 mile of the CP Express Pipeline in Louisiana. The closest area of active mining to the Project is approximately 0.8 mile south. The Project would not significantly affect active mining or nonfuel mineral resources would during construction or operation.

Generally, the potential for geologic hazards such as earthquakes, soil liquefaction, landslides, tsunamis, or fault-induced subsidence to significantly affect construction or operation of the Project is low. Conclusions for the potential for impacts on the Terminal Facilities due to geologic hazards are discussed section 5.1.12. The potential impacts on the Pipeline System are discussed here. Increased storm activities, sea level rise, and flooding have made shoreline erosion a major concern in southern Louisiana. We received numerous scoping comments regarding the potential susceptibility of the Project to these processes. The Project could potentially be affected by erosion of the Gulf of Mexico coast immediately south of the Project. The average shoreline erosion rate along the 9-mile stretch of the coastal shoreline from the Calcasieu Ship Channel to approximately 2 miles west of Holly Beach is typically between 5 to 30 feet per year. The southern boundary of the Pipeline System would be within the Terminal Site and is over 1,000 feet north of the shoreline at the closest point. Therefore, at the erosion rate of 5 to 30 feet per year, and given additional protective measures that would be incorporated into the Terminal Site design, the Pipeline System would not be affected by erosion of the Gulf of Mexico shoreline within the lifespan of the Project.

Sea level rise can further exacerbate the erosion of the shoreline. The Pipeline System aboveground facilities buildings would be elevated above base flood elevations with service facilities designed and/or located to prevent water from entering or accumulating within the components. Flood protection measures may also include anchoring systems to prevent floatation, collapse, and lateral movement; flood protection fencing to prevent flood debris damage; concrete or structural steel supports; and elevated platforms or site grading. The proposed pipelines would be buried with a minimum of 3 feet of cover in upland and wetland areas and a minimum of 4 feet of cover in open water areas, which would protect the pipelines from the direct physical forces of storm surges and floodwater. The pipelines would have a concrete coating or other anti-buoyancy measures to prevent the pipelines from floating. In compliance with PHMSA regulations at 49 CFR 192, CP Express would monitor for pipeline exposure and potential third-party intrusions onto its permanent easement to determine if there have been any changes in the pipeline cover over time. CP Express would conduct additional inspections after significant storm events.

The primary mitigation technique against flooding for facilities proposed within a floodplain is to elevate all buildings or aboveground appurtenances above the BFE identified by FEMA. Because Project facilities would be elevated above BFE ranges identified by FEMA and based on the estimated volume of floodplain storage capacity lost from the aboveground facilities, we conclude that Project operation would cumulatively displace a negligible volume of floodplain storage capacity.

CP Express would utilize the HDD method to install pipelines at 13 locations (see table 2.5.3-1). CP Express has filed site-specific HDD plans and a HDD Monitoring and Contingency Plan that describes drilling fluid composition and management, HDD monitoring procedures and frequency, and response procedures should an inadvertent return of drilling fluid occur, which we have reviewed and find acceptable. CP Express has also committed to filing results of geotechnical investigations at each of the proposed HDD crossing locations for FERC staff review and approval. In our experience, a feasibility/hydrofracture assessment is necessary to further refine drill feasibility and predict the risk of inadvertent returns of drilling fluid to the ground surface. In response to our recommendation in the draft EIS, CP Express filed geotechnical investigations and corresponding hydrofracture assessments for 9 of the 13 proposed HDDs. Additionally, due to collocation with the operating Venture Global TransCameron Pipeline, CP Express would incorporate geotechnical information previously collected on the FERC-jurisdictional TransCameron Pipeline into its HDD design. CP Express and CP2 LNG have committed to filing results of geotechnical investigations and corresponding hydrofracture assessments at each of the remaining HDD crossing locations pending regulatory approval. This information is anticipated to be completed in Fall 2023 and filed prior to construction for FERC staff review and approval. Therefore, we have updated our recommendation for CP Express and CP2 LNG to file the outstanding feasibility/hydrofacture assessments prior to construction. Additionally, we have included a recommendation for CP2 LNG to file an HDD monitoring, inadvertent return response, and contingency plan for the proposed HDDs for the LNG transfer lines, BOG pipeline, and utilities.

With implementation of our recommendation and CP Express' proposed construction and mitigation, we conclude that impacts on geological resources would be adequately minimized and the potential for impacts on the Project from geologic hazards also would not be significant. As stated previously, conclusions of geologic hazard impacts with respect to the Terminal Facilities is presented in section 5.1.12.

5.1.2 Soils

The majority of impacts on soils along the Pipeline System would be temporary to short-term (lasting until revegetation is successful); however, permanent impacts would result from construction and operation of the Pipeline System aboveground facilities, permanent access roads, and Terminal Facilities. No soils with shallow depth to bedrock or rocky soils occur in the Project area. Construction of the Terminal Facilities would impact 823.8 acres of soils and the impacts on 681.6 acres would be permanent. Construction of the Pipeline System would impact 1,816.8 acres, of which 608.1 acres would be permanent, which is inclusive of the pipeline rights-of-way.

As discussed in section 4.3.1, the Project would cross soils designated as prime or important farmland, compaction prone soils, shrink-swells soils, erosion-prone soils, and soils with poor revegetation potential. CP2 LNG and CP Express would implement their Project-specific Plan and Procedures during construction to minimize impacts on soil resources. Mitigation measures include minimizing the quantity and time of soil exposure, protecting critical areas during construction by redirecting and reducing the velocity of storm water runoff, installing and maintaining erosion and sedimentation controls, reestablishing vegetation as soon as possible after final grading, and inspecting disturbed areas and maintenance of erosion and sedimentation controls until final stabilization is achieved. CP2 LNG and CP Express would minimize rutting and compaction by constructing in dry conditions to the extent practicable. Timber mats or low ground-pressure equipment would be used if standing water or saturated soils are present, or if standard construction equipment would otherwise cause ruts or mixing of the topsoil and subsoil in wetlands. To mitigate wind erosion, CP2 LNG and CP Express would apply mulch or tackifier over dry topsoil piles; wet construction workspaces, as necessary; and implement other methods of topsoil and subsoil conservation in accordance with their Traffic, Noxious Weed, and Fugitive Dust Control Plans, as applicable.

In open water and marshland where soils are saturated along the Pipeline System rights-of-way, CP Express would use a 150-foot-wide construction right-of-way to contain excavated trench spoil to reduce sediment runoff potential. Disturbed areas designated for revegetation would be allowed to return to a vegetated state naturally or seeded with an NRCS-approved seed mix included in the Revegetation Plan, which identifies the proposed seed mixes and other measures to promote successful revegetation. CP Express would ensure establishment of vegetation in accordance with the Project-specific Plan and Procedures and specific measures to be developed in coordination with landowners, land-management authorities, and permitting agencies.

Project facilities were designed and would be constructed per industry standards based on soil conditions and geotechnical survey results to mitigate structural challenges caused by soil properties, including shrink-swell soils.

After construction is complete, prime farmland soils within temporary workspaces and permanent pipeline rights-of-way would be available for agricultural use. The Project would result in minor permanent impacts on the availability of prime farmland (19.3 and 75.4 acres of prime farmland and farmland of statewide importance would be encumbered by the Terminal Site and the Pipeline System's aboveground facilities and permanent access roads, respectively). However, this acreage is negligible when compared to the total acreage of prime and important farmland in the counties that would be crossed by the Project.

Based on a review of federal and state sources, no active hazardous waste sites, Superfund sites, Brownfield sites, leaking underground storage tanks, or other known areas of existing soil contamination were identified within 1 mile of the Project. If contaminated media is encountered during construction, CP2 LNG and CP Express would halt construction activities in the vicinity of the identified contamination, and implement measures in accordance with applicable permit requirements and their Project-specific Plan and Procedures, and SPCC Plan. As of this writing, CP2 LNG and CP Express have not submitted a final version of the SPCC Plan[270] In accordance with the Procedures, we note that final versions of these plans would need to be filed with FERC prior to construction. Terminal Site ground elevations would be raised to a finish grade elevation of -0.9 ft NAVD88 by grading and potential import of fill materials, such as commercially available aggregate materials, including gravel and crushed stone. CP2 LNG would require assurance from the imported fill suppliers to ensure it is free from environmental contaminants and meets applicable environmental standards.

CP2 LNG estimates approximately 6.4 million cubic yards of material would be excavated and dredged landward of Monkey Island's existing southwest shoreline and seaward of the existing shoreline to the eastern limit of the Federal Navigation Channel. CP2 LNG anticipates that the dredge material would be transported for disposal via temporary slurry pipelines. CP2 LNG would perform characterization analyses of the sediments to be dredged and the nearshore soils to be excavated in the Marine Facilities area to confirm the viability of specific reuse and sediment analyses would be undertaken as necessary to comply with applicable regulations or landowner requirements for dredged material disposal.[271] The dredging activities would be reviewed under the COE/LDNR Joint Permit Application process and dredged material placement areas are still being evaluated by the COE and LDNR OCM. The final dredged material disposal plan, including total volumes and placement areas, would be included in COE and LDNR OCM permit applications for dredge and fill activities in waters of the United States and development in the coastal zone, respectively. The final dredged material disposal plan would also be provided to FERC and NMFS.

Based on the overall soil conditions present in the Project area and the Project's proposed construction and restoration methods, we conclude that construction and operation of the Project would not significantly alter the soils of the region.

5.1.3 Water Resources

5.1.3.1 Groundwater Resources

The Chicot aquifer, which makes up the upper part of the Coastal Lowlands Aquifer System, underlies approximately 9,000 square miles of southwestern Louisiana, including the Project area, and is the principal source of fresh groundwater for the region.

Based on civil surveys completed by CP2 LNG and CP Express, and review of publicly available data from the LDNR and TWDB, one active groundwater monitoring well and one active irrigation well were identified within 150 feet of the Project workspace; however, no active public or private domestic water supply wells were identified.

The Project would cross one wellhead protection area in Texas and three wellhead protection areas in Louisiana. CP2 LNG and CP Express would notify the appropriate entities prior to construction and follow the communication protocol outlined in the Project's SPCC Plans. Further, CP2 LNG and CP Express would implement the LDEQ recommended BMPs for construction in wellhead protection areas from correspondence dated October 14, 2021, which includes measures detailed in documents developed by the EPA and USDA.

[270] Draft SPCC Plans for the Terminal Facilities and Pipeline System can be viewed at accession no. 20220331-5608.

[271] Preliminary geotechnical investigation information can be viewed at accession nos. 20220610-5127 and 20220311-5288.

Project activities with the greatest potential to affect groundwater include excavation, pile installation, potential spills of hazardous materials, and groundwater withdrawals. However, we conclude these minor impacts would be highly localized, temporary, and would not significantly affect groundwater resources or change aquifer flow patterns. During operation of the Terminal Facilities, CP2 LNG would convert permanently occupied areas of the site to impervious or semi-pervious surfaces associated with aboveground facilities and roads, which would result in minor and localized impacts on overland flow and groundwater recharge/infiltration. CP2 LNG anticipates that deep pile driving could extend to depths of 150 feet below ground surface (NAVD 88) for construction of the Terminal Facilities. The top of the Chicot aquifer is about 190 feet below the ground surface at the Terminal Site; therefore, piles would likely enter the surficial aquifer, but would not intersect the Chicot aquifer. Subsurface stratification of stiff clays that occur between the ground surface and the top of the aquifer provides restrictive layers slowing or preventing the downward migration of surface and near-surface waters or contaminants, further minimizing the potential for impacts on groundwater quality to result from pile driving.

CP2 LNG and CP Express would use sump and well point systems for groundwater dewatering during construction activities. Existing water supply wells within the Project area are completed at depths greater than the anticipated depths of dewatering activities. CP Express anticipates the bottom of the pipeline trench would be above the depth of the underlying aquifer; although shallow groundwater would likely be encountered in lowland areas, including the marsh wetlands that characterize much of the route in Cameron Parish. Dewatering of the Terminal Site would be limited to groundwater at or near the ground surface. Groundwater discharges would be managed in accordance with the Project-specific Procedures and Plan, and applicable construction water discharge permits, including general permits issued by the LDEQ. Therefore, we anticipate dewatering activities during construction of the Project would not adversely affect nearby groundwater users.

Shallow groundwater could also sustain minor, indirect impacts from changes in overland water flow and recharge caused by clearing and grading of the work areas. Near-surface soil compaction caused by heavy construction vehicles and the addition of impervious surfaces could reduce the soil's ability to absorb water. However, impacts would occur only during the construction period or at aboveground facility locations. Based on CP2 LNG's proposed measures to install stormwater controls to mitigate potential runoff and erosion, we conclude that impacts would be mostly temporary and not significant.

An accidental release of hazardous substances, such as fuels, lubricants, coolants, HDD drilling fluid loss and/or inadvertent return, or hydrostatic testing while constructing or operating the Project could potentially impact groundwater. CP2 LNG and CP Express' Project -specific Plan and Procedures and SPCC Plans would be implemented to reduce the potential for groundwater impacts, including contamination. CP Express would minimize the potential impacts from an inadvertent release of drilling fluid during HDD activities by following the measures outlined in the HDD Monitoring and Contingency Plan. The Pipeline Hydrostatic Testing Specification Plan for the Pipeline System includes procedures that would minimize potential contamination of groundwater resources.

The Project would cross one wellhead protection area in Texas and three wellhead protection areas in Louisiana. CP2 LNG and CP Express would notify the appropriate entities prior to construction and follow the communication protocol outlined in the Project's SPCC Plans. Further, CP2 LNG and CP Express would implement the LDEQ recommended BMPs for construction in wellhead protection areas from correspondence dated October 14, 2021, which includes measures detailed in documents developed by the EPA and USDA.

The Terminal Site's process and potable water requirements would be sourced from five new onsite groundwater wells, four for process water (two per phase) and one for potable water, to be developed during Project construction. The screened interval for each new water well is anticipated to be approximately 285 feet (screen top depth) to 325 feet (screen bottom depth) (e.g., "200-foot" sand or "upper" sand of the Chicot aquifer) and would be designed to produce 600 gpm (up to 316 million gallons per year). Using a 5-year pumping duration, a reasonably sufficient time for the cone of depression to equilibrate with aquifer recharge, CP2 LNG estimated drawdown at the nearest well (approximately 4,000 feet to the northeast) is between 5 and 7 feet, which we conclude would not be significant. Further, based on Venture Global Calcasieu Pass' studies for the Calcasieu Pass LNG Terminal and subsequent model drawdown for the CP2 LNG Terminal Site (discussed in section 4.4.1.4), the Chicot aquifer has sufficient volume to support water supply at the CP2 LNG Terminal Site with minimal impact on nearby groundwater users.

5.1.3.2 Surface Water

Construction and operational activities that have the potential to impact surface waters include: clearing and grading activities; construction of the LNG loading docks and temporary berthing structures for construction equipment; vessel ballast water discharges; construction-related discharges (e.g., stormwater and hydrostatic test water); the use of HDD, open-cut, and push method for pipeline installation; dredging and dredge material placement; vessel traffic; fire water system; and potential spills or leaks of hazardous liquids from the refueling of construction vehicles or storage of fuel, oil, and other fluids. Temporary impacts on waterbodies caused by construction activities such as clearing, grading, and potential spills or leaks of hazardous materials would be minimized through implementation of the Project-specific Plan and Procedures, HDD Monitoring and Contingency Plan, and SPCC Plans.

Waterbody crossings during construction would be completed in accordance with the Project-specific Procedures and applicable permit requirements. CP2 LNG and CP Express would adhere to any permit conditions and BMPs related to surface water protection and the Project-specific Procedures to reduce the risk and severity of potential surface water impacts.

Construction activities involving dredge and fill within waters of the United States are regulated by the COE under Section 404 of the CWA, and construction activities in or over navigable waters of the United States (e.g., berthing docks and temporary marine facilities) are regulated by the COE under Section 10 of the RHA. The Project would require permit authorization from the COE under the CWA and the RHA, Coastal Use Permits and Coastal Zone Consistency Determinations from the LDNR OCM for the Terminal Facilities and Pipeline System separately, a Section 401 Water Quality Certification from the LDEQ and RRC, and LPDES, RRC, and TCEQ permits for various water discharges during construction and operation. CP2 LNG and CP Express would coordinate with the COE and LDNR OCM to determine appropriate mitigation for unavoidable permanent and long-term impacts on waters of the United States.

Water for construction of the Terminal Site would be obtained from Cameron Parish and brought to the site via tanker trucks. Surface water is proposed for hydrostatic testing of the LNG storage tanks and would be sourced from Calcasieu Pass. Water used for HDD installation and hydrostatic testing of the LNG transfer lines, and water for piping and non-LNG hydrostatic testing, would be sourced from a municipal source or the new onsite groundwater wells. During surface withdrawals from Calcasieu Pass, CP2 LNG would conduct withdrawal, testing, and discharge of hydrostatic test water in accordance with LPDES permit requirements, and the Project-specific Plan and Procedures to minimize impacts on surface water resources. During construction of the Pipeline System, CP Express would withdraw water for hydrostatic testing of the pipelines, hydrostatic testing of aboveground facilities, HDD hydrostatic testing, HDD installation, and dust suppression from municipal sources or surface waterbodies. CP Express would minimize environmental impacts from the discharge of hydrostatic test water by implementing all of the measures contained in the Project-specific Procedures. CP Express would locate hydrostatic test manifolds outside of wetlands and riparian areas, where feasible, and would comply with the Project-specific

Procedures and all appropriate requirements of the LPDES, TCEQ, and RRC permit requirements for hydrostatic test wastewater discharges.

Increased turbidity from the dredging activities associated with the Project are expected to be temporary and limited to the immediate vicinity of construction. All CP2 LNG dredging would be regulated by the COE and LDNR OCM. Permit issuance by the COE would be dependent on receipt of CWA Section 401 water quality certification from the LDEQ. This certification would only be issued if the LDEQ determines that the turbidity associated with dredging is permissible with respect to state water quality standards. CP2 LNG would adhere to all permit conditions, as well as the BMPs included in its Project-specific Procedures, and use a cutterhead suction dredge to minimize the impacts associated with dredging activities and would promote the stability of the excavated shoreline during and after construction of the LNG berthing area.

Construction and operation of the Project, as well as marine traffic to and from the Terminal Facilities, have the potential to adversely impact water quality in the event of an accidental release of a hazardous substance such as fuel, lubricants, coolants, or other material. CP2 LNG and CP Express would minimize the risk of a spill by implementing general preventative BMPs, including personnel training, equipment inspection, secondary and spill containment structures for fuels, vehicles, or equipment, and refueling procedures. Although LNG carriers are not within FERC's jurisdiction, they are required to develop and implement a SOPEP, which includes measures to be taken when an oil pollution incident has occurred, or a ship is at risk of one.

The LNG carriers would discharge ballast water into the Calcasieu Ship Channel during LNG loading in accordance with federal regulations. Coast Guard regulations require that all vessels equipped with ballast water tanks that enter or operate in waters maintain a vessel-specific ballast water management plan and assign responsibility to the master or appropriate official to understand and execute the ballast water management strategy for that vessel (33 CFR 151.2025). Further, during operation, LNG carriers would withdraw and discharge cooling water to Calcasieu Pass. Discharges of cooling and hoteling water are regulated under the VIDA, which establishes a framework for the regulation of discharges incidental to the normal operation of a vessel under the CWA. Both the Coast Guard and the EPA provide regulatory and enforcement oversight with respect to such discharges and their impacts. CP2 LNG would comply with the applicable VIDA regulations and Vessel General Permit standards for cooling and hoteling water.

Construction and operation of the Terminal Site would permanently fill 2.0 acres of waterbodies and operation of the Pipeline System aboveground facilities would require placement of permanent fill within waterbodies at the Moss Lake Compressor Station, MLV 5, and the Enable Receiver and MLV 3. CP2 LNG and CP Express would coordinate with the COE and LDNR OCM to determine appropriate mitigation for unavoidable permanent and long-term impacts on waters of the United States. Additionally, CP2 LNG and CP Express would adhere to all permit conditions and implement the mitigation measures discussed previously in this section to minimize impacts on waterbodies.

Construction and operation of the Project would impact water quality within the vicinity of the Project resulting from dredging, maintenance dredging, marine traffic, stormwater runoff, permanent fill, and pipeline waterbody crossings. However, through implementation of CP2 LNG and CP Express' Project-specific Procedures, SPCC plans, BMPs, and applicable permit conditions, potential construction and operation impacts on surface waters would be adequately minimized, temporary or avoided, and mitigated and would not be significant.

5.1.4 Wetlands

Construction of the Terminal Facilities would impact 394.4 acres of wetlands, of which 355.0 acres would be permanent. Construction of the Terminal Site would result in impacts on 286.8 acres of PEM wetlands, 32.7 acres of PSS wetlands, 1.7 acres of PFO wetlands, and 7.8 acres of E2EM wetlands. Of these wetlands, 274.8 acres of PEM wetlands, 32.0 acres of PSS wetlands, 1.7 acres of PFO wetlands, and 5.3 acres of E2EM wetlands would be permanently impacted (permanent loss). The construction of the LNG transfer lines would result in temporary impacts on 11.3 acres of PEM wetlands, 12.9 acres of PSS wetlands, and permanent conversion of 0.1 acre of PSS to PEM. The remaining wetlands, which are associated with temporary workspace outside the Terminal Site perimeter floodwalls, would be temporarily affected during construction. Construction of the Marine Facilities would result in the permanent loss of 41.2 acres of PEM, PSS, PFO, and E2EM wetlands, the majority of which would be converted to open water in the dredge prism for the berthing area.

Construction of the Pipeline System would affect approximately 1,026.3 acres of wetlands. Construction of the aboveground facilities and permanent access roads would result in the permanent fill/loss of approximately 39.3 acres of E2EM, PEM, PFO, and PSS wetlands. An additional 58.4 acres would be converted from PSS and PFO wetlands to PEM wetlands within the CP Express Pipeline and Enable Gulf Run Lateral permanent pipeline easements. Approximately 23.2 acres would be avoided via the HDD method. The remaining 905.2 acres would be temporarily affected by construction of the Pipeline System. Following construction of the CP Express Pipeline and Enable Gulf Run Lateral, wetlands temporarily affected by the Pipeline System would be restored to pre-construction conditions and would be allowed to revegetate naturally or re-seeded in accordance with the Project-specific Procedures.

Sixteen of the 26 proposed HDD entry and exit sites would be in wetlands based on the limited availability of upland habitat in the Project area, but the footprint of these locations would be limited and impacts would be temporary. If an inadvertent release of HDD drilling fluid occurred within a wetland, the resulting sedimentation could affect water quality. CP Express would implement its HDD Monitoring and Contingency Plan. During operation and in compliance with its Project-specific Procedures, CP Express would limit routine vegetation maintenance to the mowing of a 10-foot-wide corridor centered on the pipeline in wetlands. Additionally, CP Express would selectively clear trees within 15 feet of the centerline in PFO and PSS wetlands that could damage the pipeline during operation. As the remainder of the permanent right-of-way would not be maintained, wetlands would be allowed to return to pre-Project vegetation conditions outside of the 10-foot-wide corridors as applicable.

CP2 LNG and CP Express are evaluating the anticipated permanent conversion and loss impacts associated with the Project and would coordinate with the LDNR/OCM and COE to develop a CMP in accordance with the Mitigation Rule and CWA Section 404(b)(1) Guidelines to replace the loss of aquatic resource functions. CP2 LNG and CP Express' proposed wetland mitigation calculations are still under review by the COE and LDNR OCM at the time of writing of this EIS. However, the COE and LDNR OCM would require wetland mitigation to sufficiently offset permanent impacts on wetlands. Further, CP2 LNG and CP Express would minimize construction related impacts on the adjacent wetlands by implementing its Project-specific Procedures, which include wetland crossing procedures, temporary sediment control procedures, and trench dewatering procedures. CP2 LNG would also implement measures contained in its SPCC Plan during construction.

CP Express has requested modifications to the FERC Procedures regarding construction right-of-way width in unsaturated and saturated wetlands and access roads within wetlands.[272] We conclude these modifications are adequately justified, associated impacts have been minimized to the extent practicable,

[272] The Project-specific Plan and Procedures are provided in accession nos. 20220304-5046 and 20211202-5104, respectively.

and these impacts would not be significant. We reviewed areas where CP Express has requested ATWS within wetlands (such as for spoil storage, extra depth in a push method construction, and at conventional bore and HDD construction locations). In response to our recommendation in the draft EIS, CP Express provided additional justification for certain ATWS we previously determined had insufficient justifications. We have reviewed CP Express' additional justifications for these locations and conclude that the proposed ATWS are justified.

5.1.5 Vegetation

Vegetated land within the construction and operational footprint of the proposed Terminal Facilities includes four different vegetative land cover types: wetland (54 percent), hay/pasture, cultivated crops (28 percent), herbaceous upland (15 percent), and shrub/scrub (3 percent). Vegetation impacted during construction and operation of the Pipeline System would include five different vegetative land cover types: wetland (66 percent), hay/pasture, cultivated crops (19 percent), forest (12 percent), shrub/scrub (2 percent), and herbaceous (1 percent). Additionally, three vegetation communities of special concern, all within Louisiana, have been identified within about 1 mile of the Project. These communities are the brackish marsh, Coastal Prairie, and Coastal Live Oak-Hackberry Forest. The presence of Coastal Prairie and Coastal Live Oak Hackberry Forest were not identified during field surveys for the Terminal Facilities; therefore, these vegetative communities would not be affected by the proposed Project. A total of 2,308.1 acres of vegetation would be within the construction footprint of the Terminal Facilities and Pipeline System. Following construction, approximately 1,113.2 acres would be restored to pre-construction conditions. A total of 1,194.9 acres would be within the operational footprint of the Project, of which approximately 701.3 acres would be permanently converted to developed land and 493.4 acres would generally be maintained as herbaceous or scrub-shrub vegetation. In general, CP Express would minimize disturbance impacts on vegetation resources by collocating 45 percent of the Pipeline System with existing linear infrastructure. After construction, temporarily disturbed areas along the Pipeline System route would be returned to their preconstruction contours to the extent practicable and the temporary right-of-way would be revegetated according to CP Express' Revegetation Plan.

CP2 LNG and CP Express would implement its Project-specific Plan and Procedures, Traffic, Noxious Weed, and Fugitive Dust Control Plan, and SPCC Plans during construction to minimize impacts on vegetation communities, including impacts on brackish marsh. CP2 LNG and CP Express would be required to impelement effective mitigation for impacts on wetlands and associated vegetation. We conclude that collocation of the pipelines with existing maintained rights-of-way and implementation of the measures outlined in CP Express' Project-specific Plan and Procedures and Noxious Weed and Invasive Species Management Plan would adequately minimize impacts on upland vegetation resources and impacts would not be significant.

5.1.6 Wildlife and Aquatic Resources

5.1.6.1 Wildlife Resources

A total of about 2,640.6 acres of wildlife habitat would be impacted by the footprint of the Terminal Facilities and Pipeline System (including the 18.2-acre area of open water within the Calcasieu Ship Channel that would be dredged for the Marine Facilities). Following construction, approximately 1,350.9acres would be restored to pre-construction conditions. A total of 1,289.7 acres would be within the operational footprint of the Project, of which 743.2 acres would be permanently converted to developed land. A total of 546.5 acres would be maintained as herbaceous or scrub-shrub land within the pipeline rights-of-way.

A total of 31 BCCs were identified as having the potential to occur in the Project area due to suitable habitat present, of which 5 BCC species are known to breed, in the Project area. All vegetated habitat throughout the Project area has the potential to support various migratory bird species; therefore, potential impacts on migratory birds would include the temporary and permanent loss of habitat associated with the removal of existing vegetation. Project-specific vegetation clearing during site preparation is projected to be completed outside the nesting window of March 1 through July 15. The *Migratory Bird Nesting Impact Mitigation Plan*[273] includes details related to migratory bird mitigation.

The Sabine Island WMA in Calcasieu Parish would be crossed by the CP Express Pipeline from MP 20.0 to MP 20.6. The pipeline crossing would be completed using the HDD construction method, beginning at MP 19.90 and ending at MP 21.07, which would avoid direct ground-disturbing activities within the WMA. The Project would require a Permit and Lease for State Water Bottoms to cross the Sabine Island WMA; therefore, CP Express is coordinating with the Louisiana Office of State Lands to seek approval for the crossing, which CP Express anticipates obtaining in 2023. Further, the LDWF issued a Letter of Authorization on June 29, 2022 for the Sabine Island WMA crossing. Additionally, the East Cove Unit of the Cameron Prairie NWR is approximately 0.1 mile from the CP Express Pipeline at MP 69.1, but would not be crossed. No other sensitive or managed wildlife habitats, or habitats of concern, are within 2 miles of the proposed Project.

Construction of new aboveground facilities could result in the mortality of less mobile animals, such as small rodents, reptiles, amphibians, and invertebrates, unable to escape the immediate construction area. In addition, some wildlife would likely be permanently displaced as a result of habitat conversion to non-vegetated and/or impervious cover (i.e., slab, gravel, aboveground structures) or maintained vegetation (i.e., ornamentals and maintained lawn), and the erection of security fences around the facilities. Vegetation removal for construction of the aboveground facilities could cause mortality of nesting birds or cause adult birds to abandon their nests, depending on the extent and proximity of construction disturbance.

Artificial lighting can interfere with the behavior of nocturnal animals, seemingly having the greatest impact on nocturnal migrating birds, causing disorientation and collisions with over-lit structures. Artificial lighting could also affect aquatic species in the Calcasieu Ship Channel adjacent to the Terminal Site. To minimize impacts on migratory birds and wildlife in the vicinity of the Project area, CP2 LNG developed a *Facility Lighting Plan*.

Construction-related noise could affect animal behavior, foraging, or breeding patterns, and cause wildlife species to move away from the noise or relocate in order to avoid the disturbance. Sound would attenuate with increased distance from construction activity. Although construction noise levels could deter wildlife in the area, the Terminal Site is proposed in an industrial area, which experiences regular vehicle or marine vessel traffic. Therefore, the increase in noise during construction is not anticipated to result in significant changes in wildlife behaviors.

Permanent impacts on wildlife would occur in areas where Project infrastructure would permanently replace habitat, including the majority of the Terminal Site. Additionally, operational noise would result in an increase in the ambient sound levels in the immediate vicinity of the Project. The direct loss of habitat and the indirect effects associated with displacement indicate that the construction and operation of the proposed Terminal Site would result in a moderate, but not significant, permanent impact on local wildlife.

[273] CP2 LNG and CP Express' *Migratory Bird Nesting Impact Mitigation Plan* can be viewed on FERC's eLibrary as Attachment General 1-n of accession number 20220729-5342.

Operation of the Pipeline System would primarily result in temporary wetland habitat impacts, with permanent impacts resulting from the permanent loss or conversion of wetland habitat for pipeline rights-of-way, aboveground facilities, and permanent access roads. In forested areas, construction and operation of the pipelines could increase forest fragmentation resulting in less interior forest and increased edge habitats, which are used by various wildlife species, such as songbirds and small mammals. Overall, the impact of the permanent conversion of forested habitat to non-forested habitat would be minimized by installing the proposed pipelines adjacent to existing rights-of-way to the extent practicable, which is maintained in an herbaceous state

CP2 LNG and CP Express would minimize impacts on wildlife and habitat by implementing its mitigation plans for impacts on wildlife habitat, by following the measures outlined in the Project-specific Plan and Procedures, Project-specific HDD Monitoring and Contingency Plan, and by adhering to avoidance and minimization methods recommended by the FWS and LDWF. We conclude that constructing and operating the Project would not significantly affect wildlife populations and wildlife habitat.

5.1.6.2 Aquatic Resources

The Project area includes freshwater, estuarine, and marine waterbodies that are classified as perennial, intermittent, or ephemeral, as well as freshwater and estuarine wetlands. Rivers, creeks, and streams within the watersheds crossed by the Pipeline System provide recreational fishing opportunities in Texas and Louisiana. In Louisiana, commercial freshwater and saltwater fishing opportunities exist for finfish, crawfish, crab, oyster, and shrimp. The Terminal Site is on property that borders Davis Road and marine-based industrial facilities along Calcasieu Pass to the northwest, Cameron Wastewater Treatment Facilities, and Venture Global Calcasieu Pass, LLC's LNG Terminal to the west; state land along the Gulf of Mexico shoreline to the south; and private open land historically used for cattle grazing to the south and east. The Marine Facilities are on the southwest shoreline of Monkey Island, between the Calcasieu Ship Channel and Calcasieu Pass.

The CP Express Pipeline from MP 49.6 to MP 85.4 and the Terminal Facilities are below the saltwater–freshwater line in Louisiana; these waters are considered saltwater according to commercial and recreational fishing regulations. Coastal marsh (salt, brackish, intermediate, and fresh) habitat extends discontinuously from MP 49.6 to MP 85.4.

The predominant impacts on potential fish habitat are associated with construction of the Marine Facilities, which would involve excavating and dredging approximately 6.4 million cubic yards of material. Excavating and dredging for the Marine Facilities would be conducted in accordance with federal and state permits, as well as other applicable laws and regulations. Dredging is not expected to impact SAV due to the lack of habitat and absence during 2021 surveys. Most of the dredging and excavation of Monkey Island would convert existing terrestrial habitat into marine habitat. Physical injury or mortality may occur as a result of excavation and dredging, particularly in the case of less mobile marine species. Pilings for the LNG loading docks would be installed in the excavated and dredged area. The LNG transfer lines and utilities constructed between the Terminal Site and the Marine Facilities would be completed using a combination of conventional and trenchless (HDD) construction techniques. However, CP2 LNG would install the LNG transfer lines and utilities under Calcasieu Pass using the HDD technique, which would avoid disturbing the bed and banks of the waterbody.

Periodic maintenance dredging by CP2 LNG would be required at the Marine Facilities during operation to maintain the depths required for LNG carriers and this activity would be consistent with periodic maintenance dredging by COE in the Calcasieu Ship Channel and Calcasieu Pass. If CP2 LNG's the proposed maintenance dredging occurs concurrently with COE's maintenance dredging of the Calcasieu

Ship Channel and Calcasieu Pass, cumulative adverse impacts on EFH and benthic habitat in the Project area may occur. Temporary increases in turbidity in the water column may affect the health of fish, shrimp, and other marine fauna through gill blockage caused by increased suspended sediment. Impacts on marine species (e.g., zooplankton, shrimp, fish, benthic organisms) as a result of Project maintenance dredging during operation are not expected to exceed impacts caused by current periodic COE maintenance dredging; therefore, the current impact profile would not change. Given the temporary nature of dredging and dredged materials placement operations, and because CP2 LNG would be required to implement the measures in applicable COE permits and the state water quality requirements for dredging and dredged material management, we conclude that dredging and dredged materials placement for construction and operation of the Terminal Facilities would have short-term and not significant impacts on fisheries resources.

Pile driving during construction of the Marine Facilities would temporarily increase underwater noise levels within the Calcasieu Ship Channel. The noise analysis when consulting with NMFS evaluates the potential for physical injury and behavioral effects to the ESA-listed fish, sea turtles, and marine mammals that NMFS believes may be affected by the proposed action. Underwater noise pressure levels generated by pile driving can affect aquatic fauna, including sea turtles, marine mammals, and fish. Potential noise impacts on aquatic fauna may be lessened because the Marine Facilities are on a heavily traveled portion of the Calcasieu Ship Channel, where background noise levels reflect a high level of vessel activity, including multiple large ships and barges visiting the Port of Lake Charles. Also, in-stream noise at the Marine Facilities is expected to quickly attenuate to background levels due to the local sinuosity of the channel banks, which consequently function as barriers to sound traveling through the water. In order to mitigate the potential impacts on marine fauna caused by pile installation, CP2 LNG would implement the use of ramp-up procedures (i.e., a soft start) at the beginning of each pile installation or when a delay of 15 minutes or more has occurred to minimize its impact on marine species. CP2 LNG would also utilize double bubble curtains around the larger steel piles to reduce noise impacts and would utilize biological monitors to monitor for the West Indian manatee, giant manta ray, and marine turtle species during marine construction. If a sea turtle or other protected species is spotted within the buffer zone, in-water work would not start or, if underway, would be halted until the animal moves outside of the buffer zone or has not been observed in the area for 30 minutes.

Based on proposed mitigation measures during pile driving activities, CP2 LNG's ongoing Section 7 consultation with NMFS, and a letter from NMFS filed on the docket on March 28, 2023,[274] the proposed Project is *not likely to adversely affect* marine species occurring in the Project vicinity during the in-water construction period. We anticipate that the implementation of soft starts and noise attenuation measures such as double bubble curtains would minimize harassment of fish during pile driving activities and any impacts would be temporary; therefore, with the implementation of noise mitigation measures developed in consultation with NMFS, we conclude that the overall impacts on fish would not be significant. Terminal Site construction activities would be designed to direct stormwater discharges to holding basins and filtration devices, allowing sufficient retention time to preclude high sediment loads from reaching receiving waters. During and after construction of the Terminal Facilities, the conversion of land to impervious surface areas would increase the volume of stormwater runoff in the area. Water quality impacts would be minimized, as much as practicable, through the implementation of applicable BMPs. Stormwater treatment and discharge facilities would be designed and operated in accordance with applicable regulations and permits, including the LPDES regulations.

Vessel traffic in the Calcasieu Ship Channel during construction and operation of the Marine Facilities would increase underwater noise levels and increase the potential of collision with marine species. Construction activities would be temporary and would occur in areas that experience underwater noise from commercial shipping and recreational boaters. During Terminal Facilities operations, the noise associated

[274] This document can be viewed on the FERC eLibrary under accession number 20230328-5189.

with visiting LNG carriers and tug boats would be consistent with existing conditions given the numerous large ships that travel though the adjacent heavily used section of the Calcasieu Ship Channel. To minimize potential collisions between vessel traffic and marine species, the Southeast Region of NOAA Fisheries has developed *Vessel Strike Avoidance Measures*. Although LNG carriers are outside of the Commission's jurisdiction, CP2 LNG would provide the *Vessel Strike Avoidance Measures* to LNG carrier captains, who would be responsible for implementing the measures. CP2 LNG would conduct mandatory training for construction vessel operators, which would include review of the recommended BMPs outlined in the *Vessel Strike Avoidance Measures* and a visual component to assist with identification of protected marine species that may be encountered in the Project area. In addition, to address the potential marine pollution impacts associated with offshore spills of fuel, lubricants, or other hazardous materials, the Coast Guard requires LNG carriers to develop and implement a SOPEP, which includes measures to be taken if an oil pollution incident occurs or a ship is at risk of one. Further, since consultation with NMFS is ongoing, we recommended in section 3.8.3 that CP2 LNG consult with NMFS Marine Mammal Branch to confirm an Incidental Take Authorization is not required for the Project.

LNG carriers could affect fisheries and habitat within the Calcasieu Ship Channel during operation through the discharge of ballast water. Based on the small volume of discharged ballast water relative to the volume of ambient water, differences in temperature, salinity, pH, and dissolved oxygen levels are expected to be slight, minimizing adverse impacts associated with ballast water discharges. As required by 33 CFR 151, Subpart D, vessels equipped with ballast water tanks and operating in United States waters are required to manage and control the discharge of nonindigenous (e.g., invasive) species. In addition, under 33 CFR 160, Subpart B, the Coast Guard Captain of the Port would ensure a vessel is compliant with the International Maritime Organization signatory conventions on ballast water treatment and can deny entry of any vessel into the navigable waters of the United States if a ballast water treatment and/or management system has failed to operate in accordance with type-approved certificates. Vessels calling on the Terminal Facilities would be required to adhere to the EPA and Coast Guard regulations that prevent the introduction of exotic species.

LNG carriers berthed at the Marine Facilities during operation would withdraw from and then return water for cooling to the Calcasieu Ship Channel. Intake of water can result in the entrainment of aquatic resources. Cooling water intake pumps would have a section caisson extending down roughly five feet below the pump entrance. The intake would be screened with 0.5-inch steel screen to allow small turtles, fish, and other mobile organisms to avoid entrainment and impingement. Discharges of cooling and hoteling water are regulated under the VIDA, which establishes a framework for the regulation of discharges incidental to the normal operation of a vessel under the CWA. Both the Coast Guard and EPA provide regulatory and enforcement oversight with respect to such discharges and their impacts. CP2 LNG would comply with the applicable VIDA regulations and Vessel General Permit standards for cooling and hoteling water. Given the volume of cooling water discharged relative to the total volume of water withing the Calcasieu Ship Channel, the intake pump screens, the mobility of resident species, and CP2 LNG's compliance with the EPA regulations, we conclude that impacts on aquatic resources from cooling water discharge would not be significant.

The Terminal Facilities lighting during construction and operation would be consistent with similar industrial lighting at facilities along the Calcasieu Ship Channel and Calcasieu Pass. Artificial light sources can create undesirable effects on aquatic resources, such as altering foraging behavior and spatiotemporal patterns of species density. To minimize impacts on aquatic resources, CP2 LNG has developed a *Facility Lighting Plan* that considers mitigation of light pollution in the lighting system design. In addition to facility lighting, shading from over-water structures, such as the LNG loading docks and marine offloading facilities can also affect aquatic resources. CP2 LNG would construct LNG loading docks and marine offloading facilities to a minimum of 33.7 feet MSL, minimizing potential secondary impacts resulting from shading. Additionally, the shallow water in the affected area immediately off Monkey Island is not likely to support SAV EFH and no evidence of SAV was found in this area during the 2021 field surveys.

During construction and operation, hazardous materials such as fuel, antifreeze, and other fluids could inadvertently be released into adjacent aquatic habitat. To reduce the risk and severity of potential impacts from releases of hazardous materials to the Calcasieu Ship Channel, Calcasieu Pass, and adjacent surface waters, CP2 LNG would adhere to all permit conditions and the BMPs included in the Project-specific Procedures. With implementation of the BMPs, impacts on fisheries from potential releases of hazardous materials would not be significant. Additionally, CP2 LNG and CP Express would implement spill response procedures and remedial response actions to ensure that spills and leaks of hazardous materials are controlled and cleaned up before affecting groundwater or surface water quality for construction of the Terminal Facilities and Pipeline System. Additionally, LNG carriers are required to develop and implement a SOPEP that includes measures to be taken when an oil pollution incident has occurred or a ship is at risk of one.

The Project would require fresh water during Pipeline System construction and Terminal Facilities construction and operation. Potential impacts on fisheries during the water withdrawal process could include altered localized flow, disturbance of bottom sediments and increased turbidity, and the entrainment or impingement of fish eggs, juvenile fish, and food resources near the intake hose. CP2 LNG and CP Express would implement a number of mitigation measures to reduce impacts on aquatic resources, including placement of water intakes above the channel bed, using 0.5-inch mesh wire fabric or equivalent screens on water intakes, and limiting water withdrawal rates. In addition, CP2 LNG and CP Express would comply with its Project-specific Procedures and would comply with applicable regulatory requirements for water withdrawal to minimize the potential for entrainment and impingement of aquatic organisms during surface water withdrawal.

During and following construction, CP Express would ensure that the surface water and wetland impacts associated with construction of the pipeline facilities are appropriately addressed through adherence to COE and LDNR OCM permit conditions, CWA Section 401 water quality certification requirements, and implementation of the protective measures in the Project-specific Plan and Procedures. CP Express would also minimize impacts by developing site-specific crossing plans for major waterbodies and by adhering to the procedures set forth in its HDD Monitoring and Contingency Plan. In conclusion, construction of the Project would result in permanent, minor impacts on EFH and the species and life stages that use EFH through the alteration of habitat and the mortality or displacement of individuals. Impacts would be adequately minimized by implementation of mitigation measures proposed by CP2 LNG and CP Express, and our recommendations in section 4.7.2.2 for aquatic resources.

5.1.6.3 Essential Fish Habitat

Impacts associated with the Project would occur in the estuarine and nearshore marine zones. Within the Project area, open water EFH is within Calcasieu Lake, Calcasieu Pass, the Calcasieu Ship Channel, and the Gulf of Mexico. In addition, CP2 LNG and CP Express identified palustrine and estuarine wetlands and waterbodies that may function as EFH because of some level of tidal connectivity. Construction of the Terminal Site would affect 7.6 acres of estuarine EFH associated with estuarine wetlands along the southern boundary of the Terminal Site. Of these 7.6 acres, 5.3 acres would be permanently impacted and 2.3 acres would be temporarily impacted. Construction of the Marine Facilities would permanently impact 14.2 acres of estuarine EFH and 0.5 acre of waterbody EFH, associated with habitat loss and conversion due to dredging, excavation, fill, and pile installation.

The Pipeline System would temporarily affect about 402.2 acres of estuarine and palustrine EFH and 19.6 acres of waterbody EFH (421.8 acres total) and would result in the permanent fill of about 0.3

acre of estuarine EFH for the construction of MLV 5 near MP 53.2, along with its associated access road. Impacts on estuarine EFH have been minimized through use of the HDD crossing method to install the pipeline under Calcasieu Lake, the Intracoastal Waterway, and about 2 miles of estuarine EFH.

The disposal of dredged material could have permanent impacts on EFH at the disposal sites, depending on the location. CP2 LNG and CP Express' CMP facilitates EFH impact mitigation through the creation/restoration of brackish marsh at the Cameron Prairie NWR. CP2 LNG is continuing to consult with agencies to finalize their BUDM Plan; the final dredged material disposal plan would be included in the COE and LDNR/OCM permit applications for dredge and fill activities in waters of the United States and development in the coastal zone, respectively.

The Project is also expected to cause temporary impacts associated with in-water construction (i.e., hydrostatic testing, HDD method, turbidity, vessel traffic, and pile driving-related underwater noise). Construction of the Project would result in permanent, minor impacts on EFH and the species and life stages that use EFH through the alteration of habitat and the mortality or displacement of individuals. Impacts would be adequately minimized by implementation of mitigation measures proposed by CP2 LNG and CP Express. As part of the consultation under the MSFCMA, we are requesting that NMFS consider this EIS as initiation of EFH consultation, and NMFS may provide recommendations to FERC regarding further measures that can be taken to conserve EFH. We would respond to any such recommendations per the requirements of the MSFCMA.

5.1.7 Threatened, Endangered, and Other Special Status Species

A total of 18 federally listed threatened or endangered species, one candidate species, one species proposed for listing, and one species under review are potentially present in the Project vicinity. Of these species, four are birds, four are fish, one is an insect, five are marine mammals, six are reptiles, and one is a plant. Potential impacts on aquatic and terrestrial habitats and species are described above and those same impacts apply to threatened and endangered species. Of these species, nine are under the jurisdiction of the FWS, six are under the jurisdiction of NMFS, and six live in habitats that fall within an area where both services manage the species. No species under NMFS jurisdiction would be impacted in Texas. We conclude the Project would have *no effect* or would be *not likely to adversely affect* 12 federally listed species, would be *not likely to adversely affect* the species proposed as threatened, would not contribute to a trend toward federal listing for the 1 species under federal review and 1 candidate species, and is *likely to adversely affect* the threatened eastern black rail. The Project would additionally have *no effect* on 5 species of sea turtles when under FWS jurisdiction and would *not likely adversely affect* the 5 species of sea turtles when under NMFS jurisdiction. In addition, designated critical habitat is in proximity to the Project area for the piping plover.

CP2 LNG and CP Express completed field habitat assessment surveys on all accessible parcels in the summer of 2021 and would complete surveys of the remaining parcels when permission to access those parcels has been obtained.

A total of 15 species listed as state threatened or endangered in Texas and/or Louisiana that have the potential to occur in the counties or parishes crossed by the Project (i.e., Newton and Jasper Counties, Texas and Cameron and Calcasieu Parishes, Louisiana). Some federally listed species are also state-listed as threatened or endangered. We have determined that five state-listed species would not be impacted by the Project because the Project is not within the known range of the species, the species has been extirpated in the Project area, there is no suitable habitat in the Project area, or the species would only occur in the Project area as an occasional transient. In addition, we have determined an additional five species (two fish and three mollusk species) would not be impacted as suitable habitat would be avoided via HDD. We have determined that the remaining five state-listed species would likely not be adversely impacted by the Project based on CP2 LNG and CP Express' proposed mitigation measures, outlined in section 4.8.2.

Because ESA consultation with the FWS and NMFS is ongoing and to ensure that CP2 LNG and CP Express does not begin construction until section 7 consultation is complete, we recommended that CP2 LNG and CP Express should not begin construction of the Project until all outstanding biological surveys are completed and filed, the FERC staff completes any necessary ESA section 7 consultation with the FWS and NMFS, and CP2 LNG and CP Express have received written notification from the Director of OEP, or the Director's designee, that construction and/or use of mitigation (including implementation of conservation measures) may begin. Additionally, CP Express filed BMPs to minimize impacts on the AST developed in ongoing consultation with FWS (see section 4.8.1.5).

5.1.8 Land Use, Recreation, and Visual Resources

The Project comprises two major components, the CP2 LNG Terminal Facilities and the CP Express Pipeline System. CP2 LNG would construct the Terminal Facilities in Cameron Parish, Louisiana. CP Express' Pipeline System consists of 85.4 miles of new 48-inch-diameter pipeline, 6.0 miles of new 24-inch-diamater lateral pipeline, the Moss Lake Compressor Station, and other associated aboveground facilities across four counties in Texas and Louisiana. The Terminal Facilities and approximately 45.5 miles of the Pipeline System are within the Louisiana Coastal Management Zone Boundary. All activities or developments that may affect Louisiana's coastal zone require a federal consistency review under the National Coastal Zone Management Program and must obtain a Coastal Use Permit from the LDNR/OCM. To ensure compliance with this federal requirement, we recommend in section 4.9.6 that CP2 LNG and CP Express file the consistency determination with FERC prior to any Project construction.

CP2 LNG has contractually secured, through agreements with landowners, all land required for construction and operation of the Terminal Facilities. Terminal Site construction would affect 670.0 acres of land, 543.8 acres of which would be permanently converted to industrial use. Land use types at the Terminal Site consist of hay/ pasture and cultivated crops, herbaceous land, developed land, open water, wetlands, and scrub/shrub. Construction of the Marine Facilities would affect 122.2 acres, which would be retained for facility operation. Land use types at the Marine Facilities consist of herbaceous land, developed land, open water, wetlands, and shrub/scrub. CP2 LNG would install LNG transfer lines and utilities between the Terminal Site and Marine Facilities via a combination of conventional and trenchless (i.e., HDD) construction techniques, which would require an additional 31.6-acre construction corridor between the Terminal Site and the Marine Facilities. Land use types along the LNG transfer lines consist of hay/pasture and cultivated crops, herbaceous land, developed land, open water, and wetlands. During operations, a nominal 150-foot-wide easement would be retained over the LNG transfer lines and utilities, which would affect 15.6 acres between the Terminal Site and Marine Facilities site boundaries. Construction and operation of the Terminal Facilities would not conflict with current land use plans, future land use plans, and/or zoning ordinances of Cameron Parish. Zoning laws in Cameron Parish relate solely to flood zones and protection from flooding; therefore, re-zoning of the site would not be required. The Project would be designed to comply with LNG facility safety and siting requirements including the U.S. Department of Transportation (DOT), 49 CFR 193 (Liquefied Natural Gas Facilities - Federal Safety Standards); NFPA 59A (version and applicable sections referenced in 49 CFR Part 193) (Standard for the Production, Storage, and Handling of LNG); and Coast Guard, 33 CFR Part 127 (Waterfront Facilities Handling Liquefied Natural Gas and Liquefied Hazardous Gas regulations). Due to the industrial use of lands in the general vicinity and the previously disturbed nature of the surrounding area, impacts on land use from the Terminal Facilities would not be significant.

Construction of the CP Express Pipeline and Enable Gulf Run Lateral, including ATWS, would affect 1,602.1 acres of land. Land use types affected by construction of the Pipeline System consist of hay/pasture and cultivated crops, herbaceous land, barren land, developed land, open water, wetlands, shrub/scrub, and forests. Construction of the pipelines would temporarily disturb land use by grading, trenching, backfilling, and restoration, except at the location of aboveground facilities, where impacts would be permanent. Permanent impacts would occur at MLVs, meter station sites, permanent access roads, interconnection receiver site for the Enable Gulf Run Lateral, and the Moss Lake Compressor Station. All construction would be performed in accordance with the Project-specific Plan and Procedures. Aboveground facilities constructed for the Pipeline System are considered part of the operational footprint and are expected to be encumbered by an easement or would be leased by CP Express (see section 4.10.9.2). Land use types affected by the contractor yards include hay/pasture, cultivated crops, and developed land. Following construction, the land affected by the temporary contractor yards would be returned to preconstruction conditions or as otherwise specified in the landowner agreement.

Overall, the proposed Terminal Facilities would be visible to varying degrees to users of the Calcasieu Ship Channel; visitors to the Jetty Pier Facility (if it reopens), Lighthouse Bend Park, and nearby beaches; employees and operators of industrial facilities along Davis Road; motorists along the Creole Nature Trail (SH 27); and other areas surrounding the Project site. Although the addition of the facility would be consistent with the general character of the area, the addition of the Terminal Facilities at this location would represent a significant impact on the viewshed of boaters, beachgoers, tourists, and local residents, as it would detract from the overall quality of the scenic views of this portion of the region. In order to minimize impacts on the nearby residents and passersby of the Terminal Facilities, CP2 LNG would install vegetative screening by planting native live oak trees and native groundsel bushes (see section 4.9.5.1). The Creole Nature Trail would be crossed by the CP Express Pipeline at MP 48.0 and MP 84.5 and would be installed by the HDD constrution method at these two locations. In addition, the Cameron Prairie NWR East Cove Unit and the Sabine Island WMA are within 0.25 mile of the Pipeline System, but impacts would be temporary given the CP Express Pipeline would be buried near these resources. We received a comment from a nearby landowner concerned with the impacts of ambient lighting of the Moss Lake Compressor Station. Given the proximity of nearby residences and open landscape surrounding the Moss Lake Compressor Station and Kinder Morgan Meter Station, CP Express filed a visual screening plan and committed to planting native Carolina cherry laurel trees and native groundsel bushes along the northern and northwestern sides of the facility.

5.1.9 Socioeconomics

Construction of the Project would result in temporary positive impacts due to increases in construction jobs, payroll taxes, purchases made by the workforce, and expenses associated with the acquisition of material goods and equipment. Construction of the Project would not have a significant adverse impact on local populations, employment, provision of community services, housing, or property values.

Vehicle traffic is anticipated to temporarily increase during construction of the Project due to worker vehicles, construction vehicles, and trucks taking materials and equipment to and from the site. During peak construction (Stage 4) when all P&Rs would be utilized, it is anticipated approximately 3,000 to 6,000 onsite construction personnel would be onsite. A total of 1,410 worker trips associated with dayshift personnel during peak traffic hours are anticipated, including 492 worker trips associated with future onsite parking, 210 worker trips to and from the Liberty P&R, 600 worker trips to and from the Helms P&R, and 108 worker trips to and from the PHI P&R for dayshift workers. At the P&Rs, workers would be shuttled from the P&Rs to the Terminal Site using buses and vans. A maximum of 10, 25, and 5 buses would operate from the Liberty P&R, Helms Road P&R, and PHI Yard P&R, respectively, for dayshift workers during Stage 4 of CP2 LNG Terminal construction. CP2 LNG would stagger shift start times to avoid large peak traffic surges. CP2 LNG has developed a Terminal Facilities Traffic Management

Plan [275], which identifies anticipated construction traffic volumes (vehicular traffic) and describes plans for safely and effectively managing the construction volumes throughout the construction of the Terminal Facilities. CP2 LNG completed a Traffic Study to assess impacts from construction vehicles, including deliveries and workers, on traffic within the Project area. During Stage 3, an LOS F would be experienced during peak morning and evening hours at the intersection of Helms Road and LA 385 and at the intersection of Helms Road and Tom Hebert Road. During Stage 4 construction activities, the LOS of roads in the Project area would the most be impacted. An LOS of E or F would be experienced during peak morning and/or evening hours at the intersections of Helms Road and LA 385, Helms Road and Tom Hebert Road, LA 27 and Helms Road, LA 27 and Marshall Street, and LA 27 and East Creole Highway. These roads would also be nearing full capacity, with a volume/capacity ratio of 0.96 and 0.74 at LA 27 and LA 1142 and at LA 27 south of Helms Road, respectively. Based on the findings in the Traffic Study, CP2 LNG would utilize additional traffic mitigation measures during Stages 3 and 4, including flagger police vehicles or traffic signals during times of heavy traffic. With the implementation of the proposed measures, we have determined that impacts from construction of the Terminal Facilities would have short-term and less than significant impacts on roadway transportation. Operating the Terminal Facilities would require an estimated 250 employees; therefore, we have determined that operation of the Terminal Facilities would have permanent but minor impacts on roadway transportation..

Construction of the Pipeline System would result in minor, temporary impacts on traffic in the Project area, and operation would not result in significant impacts on traffic or roadways as the Moss Lake Compressor Station would only have 10 permanent employees.

A 2018 marine traffic study commissioned by the Port of Lake Charles found that a projected twofold increase of vessel traffic within the Calcasieu Ship Channel would not affect the capability of the channel to effectively provide deep-water access for maritime commerce. During construction of the Terminal Facilities, materials (including piles), equipment, and modular plant components (including the liquefaction units) would be brought to the Terminal Facilities by barge. At the Phase 1 construction peak, 32 barges a week are anticipated. During operation and after completion of the Phase 2, seven to eight LNG carrier visits are anticipated per week at the Marine Facilities. CP2 LNG developed a Waterway Suitability Assessment for the Terminal Facilities, which constitutes the Project's Marine Traffic Management Plan. The Waterway Suitability Assessment was developed in coordination with the Coast Guard and Lake Charles Pilots' Association. On December 17, 2021, the Coast Guard issued a LOR recommending that the Calcasieu River Ship Channel be considered suitable in its current state for accommodating the type and frequency of LNG marine traffic associated with the Terminal Facilities.

During the draft EIS comment period, we received several comments from individuals expressing concern regarding the impact of the Project on commercial fisheries and shrimping. As discussed in section 4.4.3.1, dredging would be conducted using a cutterhead suction dredge and the area immediately surrounding the dredge activities would likely not be suitable for shrimp harvesting. However, this impact would be limited to the extent of the sediment plume (approximately 2 meters) and temporary during dredge activities; therefore, dredging is expected to have a temporary but not significant impact on commercial harvest activities. Based on consultations between FERC and LDWF,[276] impacts on shrimping vessels would be greatest near the Terminal south of the Firing Line where shrimping occurs year-round and vessel traffic and dredging associated with the Terminal Facilities would occur. It is likely that commercial fishing vessels would experience increased burdens and impediments to transiting the Ship Channel with the increased frequency of construction vessel traffic. CP2 LNG and CP Express prepared an Engagement Plan with the objective of facilitating communication, addressing concerns, providing updates, and

[275] CP2 LNG's Traffic Management Plan can be viewed on FERC's eLibrary as Appendix B of accession no. 20230407-5100.

[276] See accession number 20230609-3003.

encouraging collaboration with local shrimp fisherman.[277] CP2 LNG state they provided the Engagement Plan to the Community Advisory Group and requested its members review the document for discussion during the next quarterly meeting in August 2023. Further, CP2 LNG committed to continuing the development of the Engagement Plan and would provide updated on its engagement effort and on Community Advisory Group meetings within the monthly construction reports. Additionally, Calcasieu Pass and CP2 LNG would comply with project permits, including those issued by the applicable Louisiana resource agencies, which were developed with the feedback provided by all stakeholders, including any provided by the fishing and shrimping industry.

5.1.9.1 Environmental Justice

The proposed Project would have a range of impacts on the environment and on individuals living in the vicinity of the Project facilities, including environmental justice populations. Seventeen block groups out of 31 block groups within the geographic scope of the Project are environmental justice communities. Of the 17 block groups, five block groups[278] within the Project's area of review are identified as environmental justice communities based on the minority population that either exceeds 50 percent or is meaningfully greater than their respective counties/parishes. Eight block groups[279] within the Project's area of review are identified as environmental justice communities based on a low-income population that is equal to or greater than their respective counties/parishes. Four block groups[280] within the Project's area of review have both minority and low-income populations that are equal to or greater than their respective counties/parishes.

Temporary and permanent adverse impacts on environmental justice communities from construction and operation of the Terminal Facilities include impacts associated with water resources, wetlands, socioeconomic, recreational and commercial fishing, traffic, air quality, noise, and visual resources. The construction and operation of the Terminal Facilities would have a disproportionately high and adverse impact on environmental justice communities because the impacts are predominately borne by those communities. Visual impacts on environmental justice communities near the Terminal would be significant. In addition, as discussed in section 4.14.2.8, the Project would contribute to significant cumulative visual impacts on environmental justice communities. CP2 LNG would install vegetative screening by planting native live oak trees and native groundsel bushes on the northeastern and eastern sides of the Terminal Site (see section 4.9.5.1). The remainder of the temporary and permanent adverse impacts on environmental justice communities associated with the construction and operation of the Terminal Facilities would be less than significant.

Temporary adverse impacts on environmental justice communities from construction of the Pipeline System include impacts associated with water resources, wetlands, socioeconomic, recreational and commercial fishing, traffic, air quality, and construction noise. Operation of the Pipeline System would include an increase in noise levels at the Florida Gas Transmission Meter Station, Enable Interconnect Meter Station, CPX Meter Station; however, there are no NSAs within identified environmental justice block groups within 0.5 mile of meter stations. Permanent adverse impacts on visual resources in environmental justice communities would occur as a result of operation of the Pipeline System, including removal of forested vegetation and periodic vegetation clearing within the permanent right-of-way. Permanent adverse impacts on visual resources would occur as a result of the CPX Meter Station, Enable Interconnect Meter Station, and Florida Gas Transmission Interconnect Meter Station; however, these

[277] See attachment EIR 10 Socioeconomics-2 at accession number 20230522-5195.

[278] Census Tract (CT) 35, Block Group (BG) 1; CT 9701.01, BG 1; CT 9701.02, BG 1; CT 16, BG 3; and CT 17, BG 4

[279] CT 34, BG 1; CT 36.02, BG 1; CT 9504, BG 1; CT 9701.01, BG 2; CT 9702.02, BG 2; CT 9702.03, BG 2; CT 35, BG 2; and CT 35, BG 4

[280] CT 9702.03, BG 1; CT 17, BG 5; CT 17, BG 6; and CT 16, BG 1

changes would not be visible from nearby residences. The construction and operation of the Pipeline System (including meter stations, contractor yards, and park & ride locations) would cross environmental justice communities and would have a disproportionately high and adverse impact on these communities, but the impacts would be less than significant.

5.1.10 Cultural Resources

Section 106 of the NHPA, as amended, requires that the FERC consider the effects of its undertakings on historic properties, or those eligible for listing, and to afford the ACHP an opportunity to comment on proposed projects. CP2 LNG completed marine, terrestrial, and historic architecture investigations for the Terminal Facilities APE in Louisiana. After the surveys, the SHPO provided letters stating that no properties listed in or eligible for listing in the NRHP would be affected by the Project. We concur with the SHPO.

CP2 LNG and CP Express provided a plan addressing the unanticipated discovery of cultural resources or human remains during construction to the FERC and SHPOs. We and the SHPOs requested revisions to the plan. CP2 LNG and CP Express submitted a revised plan which we find acceptable. The Louisiana SHPO concurred with the plan on July 26, 2021. The Texas SHPO has yet to provide their concurrence of the plan.

On September 15, 2021, we sent letters to the following tribes: Alabama-Coushatta Tribe of Texas, Alabama-Quassarte Tribal Town, Apache Tribe of Oklahoma, Caddo Nation of Oklahoma, Chitimacha Tribe of Louisiana, Comanche Nation of Oklahoma, Coushatta Tribe of Louisiana, Jena Band of the Choctaw Indians, Muscogee (Creek) Nation, Tonkawa Tribe of Indians of Oklahoma, Tunica-Biloxi Tribe of Louisiana, and Wichita and Affiliated Tribes. In a letter to FERC dated October 14, 2021, the Choctaw Nation of Oklahoma requested to consult with FERC on the portion of the Project in Calcasieu and Cameron Parishes, Louisiana. The Choctaw Nation also requested copies of the Project's cultural resource surveys and FERC's EIS when available. As mentioned above, CP2 LNG and CP Express provided the survey reports on November 21, 2021. The Choctaw Nation of Oklahoma was on our environmental mailing list to receive the Notice of Availability of the draft EIS. The draft EIS is available on the FERC website.[281] No further comments have been received from the Choctaw Nation of Oklahoma. In email correspondence dated December 6, 2021, the Muscogee (Creek) Nation stated "The project area is currently outside of the Muscogee (Creek) Nation historic area of interest" and deferred to the other federally-recognized Tribes. No further comments have been received from the Muscogee (Creek) Nation. On February 19, 2022, we sent the NOI for the Project to the same federally-recognized tribes. To date, no tribe has responded to our letter or the NOI.

To date, Phase I surveys as well as deep testing at select locations have not been completed for portions of the Pipeline System in Louisiana and Texas due to land access restrictions. CP Express has signed survey permission for 63 percent of the Pipeline System right-of-way and is in active negotiations with the remaining 37 percent. Because surveys and consultation are not complete for the Pipeline Facilities, and to ensure our responsibilities under Section 101(d)(6) NHPA and its implementing regulations are met, we recommended CP Express should not begin construction of the facilities and/or use of staging, storage, or temporary workspace areas and new or to-be improved access roads until CP Express file any remaining cultural resources survey report(s), site evaluation report(s), avoidance/treatment plan(s), as required; and comments on the cultural resources reports and plans from the Texas and Louisiana SHPOs and/or any interested Indian tribes. Additionally in our recommendation the ACHP would be afforded the

[281] FERC-issued Environmental documents including Draft Environmental Impact Statements, Final Environmental Impact Statements and Environmental Assessments can be viewed at https://www.ferc.gov/industries-data/natural-gas/environmental-overview/environmental-documents-2022.

opportunity to comment if historic properties would be adversely affected and the FERC staff reviews and the Director of OEP, or the Director's designee, approves the cultural resources reports and plans, and notifies CP Express in writing that treatment plans/mitigation measures (including archaeological data recovery) may be implemented and/or construction may proceed.

5.1.11 Air Quality and Noise

5.1.11.1 Air Quality

Air quality would be affected by construction and operation of the Project; however, the largest source of emissions associated with the Project would result from the long-term operation of the Terminal Facilities. The Project would be potentially subject to a variety of federal and state regulations pertaining to the construction and operation of air emission sources. The LDEQ has the primary jurisdiction over air emissions produced by stationary sources associated with the Project. The LDEQ is delegated by the EPA to implement federal air quality programs.

Construction activities would increase air pollutant emissions and ambient concentrations in the vicinity of the Project site at various points during the approximate 48-month construction period. Emission increases associated with the Project construction activities could have localized impacts on air quality, including at residences and recreational vehicle parks within a quarter mile of the construction site, during construction. Construction activities that would generate air emissions include site preparation, construction of Project facilities, operation of the concrete batch plant during construction, operation of off-road construction equipment and trucks during construction, operation of marine vessels, offshore dredging, and vehicles used for commuting to and from the construction site and delivery trucks (i.e., on-road vehicles). The magnitude of the effect on air quality would vary with time due to the construction schedule (i.e., intensity of construction activities), mobility of the sources, the variety/type of construction equipment, and the overlap of emissions from Phase 1 commissioning and operation and Phase 2 construction activities. Mitigation and minimization measures to reduce construction-related emissions are detailed in section 4.12.1.3. In addition, CP2 LNG committed to develop a Project Ambient Air Quality Mitigation and Monitoring Plan, in coordination with the LDEQ, involving the installation of air quality monitors to measure ambient concentrations of $PM_{2.5}$, PM_{10}, and NO_2 during construction and commissioning of the CP2 LNG Terminal. Implementation of this plan would result in the identification and reporting of periods of elevated concentrations, which, in combination with other information about conditions (e.g., weather) and specific activities at the site, would help to pinpoint the reasons for the elevated concentrations, allowing for the implementation of effective mitigation measures to minimize the potential for future NAAQS exceedances. Based on these mitigation measures, construction emissions would not have any long-term, significant impacts on air quality.

Impacts on air quality during operation of the Project would result from emissions related to the CP2 LNG Terminal Facilities and CP Express Moss Lake Compressor Station and pipeline, (e.g., combustion turbines, heaters, flares, oxidizers, fugitive sources) and marine vessels (e.g., LNG carriers and tugs). Operational-phase emissions from these sources would be permanent (lasting the life of the Project). Based on the analysis in section 4.12.1, including the results of the Significance Impact Analysis and the cumulative NAAQS Impact Analysis, we find that the Project would not cause or contribute to an exceedance of the NAAQS, which are established to be protective of human health, including sensitive populations such as children, the elderly, and those with compromised respiratory function, i.e., asthmatics. Further, we conducted an HHRA in order to estimate chronic (long-term) cancer risk and non-cancer hazard, as well as acute (short-term) non-cancer hazard via inhalation of HAP compounds potentially emitted from stationary and mobile marine sources at the Terminal Facilities. The results of the HHRA indicate that the estimated cancer and non-cancer risks for communities near the CP2 LNG Terminal Facilities would be below EPA's risk management objectives described in detail in section

4.12.1.4. While the Project would have minor impacts on local air quality during operation, the Project would not result in significant impacts on air quality.

5.1.11.2 Noise

Noise would affect the local environment during both construction and operation of the Project. Construction equipment type, use, and quantity would vary depending on the construction stage in progress at the particular time.

Construction activities at the Terminal Facilities would occur 24 hours per day for the duration of construction of both Phase 1 and Phase 2, which is estimated to last up to 4 years in total. The most prevalent noise-generating activity and equipment during Terminal Facilities construction is anticipated to be pile driving and the internal combustion engines associated with construction equipment. CP2 LNG commits to not conduct pile driving during evening or nighttime hours between 7:00 p.m. and 7:00 a.m. There are phases of construction that may result in nighttime levels exceeding 48.6 dBA at the NSA locations, particularly at NSA 1 and NSA 2 during the civil phase. Construction of the floodwall near the affected NSAs would occur as early as possible during Project construction. The floodwall is expected to reduce the noise levels at the NSAs by 5 to 10 dBA, depending on the location of construction activities. Additional noise mitigation measures during nighttime construction may include broadband backup alarms, local equipment barriers, and reduced activities, as needed. CP2 LNG has stated that it would develop a nighttime construction plan to address potential noise impacts during nighttime construction. Based on the short-term nature of construction, CP2 LNG's commitment to limit pile driving to daytime hours, and our recommendations in section 4.12.2.3 limiting construction noise, we conclude that noise impacts during Terminal construction would not be significant.

Operation of the Terminal Facilities would produce noise on a continuous basis, with the primary noise-generating sources from fan-driven, air-cooled heat exchangers, mixed refrigerant compressor electric motor drive units, mixed refrigerant and boil-off gas compressor units, power plant electric generation units, inlet and discharge piping, and LNG carriers. Calculated sound levels attributable to the CP2 LNG facility are below FERC's requirement to be less than 55 dBA L_{dn} at the existing NSAs with all the liquefaction trains in full load operation. CP2 LNG would need to complete several noise surveys to ensure that the total noise levels of the phased-in liquefaction blocks are below 55 dBA L_{dn} at the nearest NSAs. If the noise levels reported in any of the noise surveys from the Project facilities are over 55 dBA L_{dn}, CP2 LNG would need to implement the recommended mitigation to reduce the noise impacts on the nearest NSAs within the time specified in the recommendation. Therefore, based on our analysis and our recommendations, we conclude that noise impacts due to LNG Terminal operation would not be significant.

Noise associated with construction of pipelines would be temporary at any given location because of the assembly-line method of pipeline installation, during which construction activities are concentrated in one area while the pipeline is installed and continue in a linear fashion along the pipeline route. While the noise levels attributable to construction equipment could noticeably increase ambient noise levels at the NSAs nearest the workspace, this noise would be temporary and localized. Additionally, due to the temporary nature of these activities, no associated long-term impacts would occur. Noise associated with unmitigated HDD activities would likely exceed 55 dBA L_{dn} at NSAs in proximity to eight HDD entry/exit locations. Based on the temporary nature of construction, and CP Express' commitment to restrict HDD activities to daylight hours (with the exception of pipeline pullback) and to implement noise mitigation measures as outlined in their HDD noise mitigation plan, we do not believe these impacts would be significant. For construction of the Pipeline System aboveground facilities, CP Express has committed to conducting construction primarily during daytime hours. Additionally, compressor unit blowdowns would occur occasionally as part of normal compressor station maintenance. Noise generated during these maintenance blowdown events would be temporary, short in duration, and are anticipated to occur once per year per compressor unit. CP Express filed a noise impact analysis that estimated the L_{max} at the closest NSAs due to blowdown events at each aboveground facility would be 45 dBA L_{max}. Based on the temporary nature of construction, and CP Express' commitments to noise mitigation, we conclude that compressor and meter station construction would not result in significant impacts on nearby residents or NSAs.

Operation of the Pipeline System, specifically the Moss Lake Compressor Station, would produce noise on a continuous basis. CP Express would install and maintain equipment according to manufacturer's specifications; therefore, no perceptible offsite vibration is anticipated. CP Express provided a noise impact analysis for the Moss Lake Compressor Station that estimated the noise impact due to full-load operations. Calculated contributions from future station equipment were modeled below the 55-dBA L_{dn} FERC limit at all NSAs. Further, based on our recommendation that because the Moss Lake Compressor Station would be required to demonstrate that full load operational noise impacts from the station (Phase 1 and Phase 2 combined) would be less than 55 L_{dn} dBA at all nearby NSAs, we conclude the Project would not result in significant impacts to nearby residents or NSAs.

Noise generated during the operation of the meter stations would be minimal and would be primarily associated with aboveground piping and valves at the meter station sites. The noise attributable to the operation of the two meter stations with NSAs within 0.5 mile would be less than 55 dBA L_{dn} at the nearest NSA and, therefore, in compliance with FERC requirements. At these meter stations, increases in ambient sound levels are expected to be about 3 dBA at the NSAs. Based on our analysis and recommendations in section 4.12.2.3, we conclude operation of the meter stations would not result in significant impacts on nearby NSAs.

5.1.12 Reliability and Safety

As part of the NEPA review and NGA determinations, Commission staff assesses the potential impact to the human environment in terms of safety and whether the proposed facilities would operate safely, reliably, and securely.

As a cooperating agency, the DOT assists the FERC by determining whether CP2 LNG Project's proposed design would meet the DOT's 49 CFR 193 Subpart B siting requirements. The PHMSA provided an LOD on the Project's compliance with 49 CFR 193 Subpart B on June 28, 2023. This determination is provided to the Commission as further consideration on its decision to authorize or deny the Project. If the Project is authorized, constructed, and operated, the facility would be subject to the DOT's inspection and enforcement program and final determination of whether a facility is in compliance with the requirements of 49 CFR 193 would be made by the DOT PHMSA.

As a cooperating agency, the Coast Guard also assisted the FERC staff by reviewing the proposed LNG terminal and the associated LNG marine vessel traffic. The Coast Guard reviewed a WSA submitted by CP2 LNG that focused on the navigation safety and maritime security aspects of LNG marine vessel transits along the affected waterway. On December 17, 2021, the Coast Guard issued an LOR that recommended the Calcasieu River Ship Channel be considered suitable for accommodating the type and frequency of LNG marine traffic associated with this Project based on the WSA and in accordance with the guidance in the Coast Guard's NVIC 01-11. If the Project is authorized, constructed, and operated, the facilities would be subject to the Coast Guard's inspection and enforcement program to ensure compliance with the requirements of 33 CFR 105 and 33 CFR 127.

FERC staff conducted a preliminary engineering and technical review of the CP2 LNG Project design, including potential external impacts based on the site location. Based on this review, we recommend a number of mitigation measures, which would ensure continuous oversight prior to initial site preparation, prior to construction of final design, prior to commissioning, prior to introduction of hazardous fluids, prior to commencement of service, and throughout the life of the facility to enhance the reliability and safety of the facility to mitigate the risk of impact on the public. With the incorporation of these mitigation measures and oversight, FERC staff concluded that the CP2 LNG Project design would include acceptable layers of protection or safeguards that would reduce the risk of a potentially hazardous scenario from developing into an event that could impact the offsite public.

The Pipeline System and associated aboveground facilities would be constructed, operated, and maintained in compliance with DOT standards published in 49 CFR 192. These regulations are intended to minimize the potential for natural gas facility accidents and protect the public and environment. The DOT specifies material selection and qualifications; minimum design requirements; and protection from internal, external, and atmospheric corrosion. Because the Pipeline would be constructed according to the DOT regulations, we conclude that the Pipeline System would not have a significant impact on public safety.

5.1.13 Cumulative Impacts

Our analysis of cumulative impacts includes other projects in the vicinity of the proposed Project that could affect the same resources as the Project in the same approximate timeframe. We generally conclude that the potential impacts of the Project, when combined with the impacts from the other projects considered in the geographic scopes, would not result in a significant impact on resources. CP2 LNG and CP Express' proposed mitigation measures would minimize or offset Project impacts on local resources.

The exceptions to this conclusion are the Project's cumulative impacts on visual resources and visual impacts on environmental justice communities. Residences and businesses adjacent to new Pipeline System aboveground facilities would likely experience moderate visual impacts. Minor to moderate visual impacts would also occur where residences and businesses are adjacent to a new pipeline corridor or where new developments are constructed. However, the overall contribution would be relatively minor given the majority of the Pipeline System facilities as well as the other FERC-regulated pipeline projects in the cumulative impacts area would be buried (i.e., the pipeline).

Construction of the Terminal Facilities would create temporary visual impacts associated with construction activities occurring during the period of active construction. During operation, the Terminal Site would be partially screened by the floodwall which, per our recommendation in section 4.9.5, would have vegetative screening alongside it, that would help to limit the visual impact on those traveling on nearby roads; however, the addition of the Terminal Facilities at this location would represent a significant impact on the viewshed of boaters, beachgoers, tourists, and local residents, as it would detract from the overall quality of the scenic views of this portion of the region. The Commonwealth LNG Facility, Calcasieu Pass LNG Terminal, and the proposed Terminal Facilities would result in several industrial sites in a concentrated area and would contribute to cumulative visual impacts on users of the Calcasieu Ship Channel; users of the Jetty Pier Facility, Lighthouse Bend Park, and nearby beaches; residents in the town of Cameron; and motorists along the Creole Nature Trail. The Jetty Pier Facility, a recreational facility, is situated at the confluence of the Calcasieu Ship Channel and the Gulf of Mexico and was closed to the public in 2019 (it was supposed to reopen in 2022, but is still currently closed). Lighthouse Bend Park (scheduled to open in 2022; however, as of this writing, construction is ongoing and the new opening date is summer of 2023). Lighthouse Bend Park is adjacent to the north of the Terminal Site on Calcasieu Pass. For users visiting these facilities, the Terminal Facilities, in addition to the Calcasieu Pass LNG Terminal and potentially the Commonwealth LNG Facility, would be visible and add to permanent visual impacts. During Project operation, the Terminal Facilities, including flares, lighting, and storage tanks, may be visible for several miles. The extent of these impacts would vary depending on the proximity to the sites. Motorists along the approximate 2-mile stretch of road between the Commonwealth LNG Facility and the

Cameron Ferry West Landing and those traveling along the 2.5-mile stretch between the Cameron Ferry East Landing through the town of Cameron would have direct views of all three facilities and associated structures. Due to the addition of these three facilities, cumulative visual impacts in this area would be significant.

Regarding environmental justice communities, we have determined environmental justice communities in the study area would experience cumulative impacts on wetlands, surface water, visual resources, socioeconomics, recreational and commercial fishing, traffic, noise, and air quality related to the project and the additional projects within the respective geographic scopes of the Project. Cumulative impacts on environmental justice communities related to wetlands, surface water, aquatic resources, socioeconomics, traffic, noise, and air quality would be less than significant. However, cumulative impacts related to visual resources would be significant.

Finally, CP2 LNG and CP Express' filings indicate the Project would increase the atmospheric concentration of GHGs, in combination with past and future emissions from all other sources and would contribute to climate change. This EIS is not characterizing the Project's GHG emissions as significant or insignificant.[282]

5.1.14 Alternatives

We evaluated several alternatives to the proposed Project, including the No-Action Alternative; system alternatives for the Terminal Facilities and Pipeline System; alternative Terminal Site locations and layouts, alternative CP Express Pipeline routes, and alternative compressor station sites. While the No-Action Alternative would eliminate the short- and long-term environmental impacts identified in the EIS, the stated objectives of the proposed action would not be met.

System alternatives evaluated for the Terminal Facilities included 11 existing LNG import terminals with approved, proposed, or planned expansions to provide liquefaction capabilities and 11 approved, proposed, or planned stand-alone LNG projects. Five existing or approved projects and one planned project have a design capacity equaling or exceeding the Project's initial nameplate capacity of 20.0 MTPA. We cannot speculate or conclude that excess capacity would be available to accommodate CP2 LNG's purpose and need. Consequently, we must conclude that the proposed export capacity at any other existing or proposed LNG facility would require an expansion or new facilities similar to the facilities proposed for the Terminal Facilities, resulting in environmental impacts similar to the Project. These systems alternatives, therefore, offer no significant environmental advantage over the proposed Project and are not considered to be preferable.

The alternative sites we evaluated in addition to the Terminal Site included six locations: two sites on or adjacent to the Calcasieu Ship Channel approximately 22 miles further north in Calcasieu Parish, Louisiana of the proposed Terminal Site and one site on the Sabine Pass Channel in Jefferson County, Texas. Additionally, based on internal conversations with the COE following issuance of the draft EIS, three additional locations were evaluated: two sites on the west side of the Calcasieu Ship Channel approximately 3 miles further northwest in Cameron Parish, Louisiana, and one site on Pelican Island in Galveston Bay, approximately 95 miles further west in Galveston County, Texas. In general, these sites did not provide clear evidence of a significant environmental advantage to CP2 LNG's proposed site.

We also evaluated alternative layout designs for the Terminal Site. The design and configuration of liquefied natural gas facilities is subject to the safety and siting requirements of Title 49 of CFR Part

[282] *See e.g., Driftwood Pipeline LLC*, 183 FERC ¶ 61,049, at P 63 (2023) ("…there currently are no accepted tools or methods for the Commission to use to determine significance, therefore the Commission is not herein characterizing these emissions as significant or insignificant.)

193. These standards require that potential thermal exclusion and vapor dispersion zones remain on site, which limits the potential locations for specific pieces of equipment. In addition, thermal radiation zones for flares require that they be set back a minimum distance from other equipment and property lines.

We identified two Pipeline System alternatives that would use existing, modified, or proposed pipeline systems to meet the purpose and need of the Project. In general, these alternatives would require significant expansion to transport the volume of natural gas required by the Project and would therefore not provide a significant environmental advantage relative to the proposed Pipeline System.

We evaluated four major alternative CP Express Pipeline routes and five minor alternative routes, in addition to the proposed route to assess whether an alternate route would significantly reduce the environmental impacts of the CP Express Pipeline. Two additional major route alternatives were evaluated based on comments received on the draft EIS to minimize impacts on environmental justice communities and/or evaluate additional routes for the portion of the pipeline through Texas. Ultimately, none of the major or minor route alternatives assessed provided a significant environmental advantage and/or reduction in impacts on the properties of landowners relative to the proposed route. Therefore, we conclude that CP Express' proposed CP Express Pipeline route would be the preferred route for the Project. Additionally, CP Express adopted minor route variations and small adjustments into the Project design throughout FERC's pre-filing process. Many of these small route adjustments were adopted without a detailed alternatives analysis because the basis for the adjustment was intuitive and practical (e.g., a slight shift in the centerline to avoid a wetland; agency preferences; landowner preferences; and survey findings).

We evaluated three compressor station site alternatives in addition to the proposed site. Upon review of the environmental and technical factors, we conclude that the alternative site options do not provide a significant environmental advantage over the Proposed Site.

5.2 FERC STAFF'S RECOMMENDED MITIGATION

If the Commission authorizes the Project, we are recommending that the following measures be included as specific conditions in the Commission's Order. We conclude that these measures would further mitigate the environmental impacts associated with the construction and operation of the Project.

1. CP2 LNG and CP Express shall follow the construction procedures and mitigation measures described in its application and supplements, including responses to staff data requests and as identified in the EIS, unless modified by the Order. CP2 LNG and CP Express must:

    a. request any modification to these procedures, measures, or conditions in a filing with the Secretary;

    b. justify each modification relative to site-specific conditions;

    c. explain how that modification provides an equal or greater level of environmental protection than the original measure; and

    d. receive approval in writing from the Director of OEP, or the Director's designee, **before using that modification**.

2. The Director of OEP, or the Director's designee, has delegated authority to address any requests for approvals or authorizations necessary to carry out the conditions of the Order, and take whatever steps are necessary to ensure the protection of life, health, property, and the environment during construction and operation of the Project. This authority shall allow:

a. the modification of conditions of the Order;

b. stop-work authority and authority to cease operation; and

c. the imposition of any additional measures deemed necessary to ensure continued compliance with the intent of the conditions of the Order as well as the avoidance or mitigation of unforeseen adverse environmental impacts resulting from Project construction and operation.

3. **Prior to any construction,** CP2 LNG and CP Express shall file an affirmative statement with the Secretary, certified by senior company officials, that all company personnel, EIs, and contractor personnel will be informed of the EI's authority and have been or will be trained on the implementation of the environmental mitigation measures appropriate to their jobs **before** becoming involved with construction and restoration activities.

4. The authorized facility locations shall be as shown in the EIS, as supplemented by filed plot plans, alignment sheets, and facility diagrams. **As soon as they are available, and before the start of construction,** CP2 LNG and CP Express shall file with the Secretary any revised detailed plans, diagrams, and alignment sheets at a scale not smaller than 1:6,000 with station positions for all facilities approved by the Order. All requests for modifications of environmental conditions of the Order or site-specific clearances must be written and must specify locations designated on these plans, diagrams, and alignment sheets

   CP Express' exercise of eminent domain authority granted under NGA section 7(h) in any condemnation proceedings related to the Order must be consistent with the authorized Pipeline System facilities and locations. CP Express' right of eminent domain granted under NGA section 7(h) does not authorize it to increase the size of its natural gas pipeline to accommodate future needs or to acquire a right-of-way for a pipeline to transport a commodity other than natural gas.

5. CP2 LNG and CP Express shall file with the Secretary detailed alignment maps/sheets and aerial photographs at a scale not smaller than 1:6,000 identifying all route realignments or facility relocations, staging areas, pipe storage yards, new access roads, and other areas that would be used or disturbed that have not been previously identified in filings with the Secretary. Approval for each of these areas must be explicitly requested in writing. For each area, the request must include a description of the existing land use or cover type, documentation of landowner approval, whether any cultural resources or federally listed threatened or endangered species would be affected, and whether any other environmentally sensitive areas are within or abutting the area. All areas shall be clearly identified on the maps, or aerial photographs. Use of each area must be approved in writing by the Director of OEP, or the Director's designee, **before construction in or near that area.**

   This requirement does not apply to extra workspace allowed by the Commission's *Upland Erosion Control, Revegetation, and Maintenance Plan* and/or minor field realignments per landowner needs and requirements which do not affect other landowners or sensitive environmental areas such as wetlands.

   Examples of alterations requiring approval include all route alignments and facility location changes resulting from:

   a. implementation of cultural resources mitigation measures;

b. implementation of endangered, threatened, or special concern mitigation measures;

c. recommendations by state regulatory authorities; and

d. agreements with individual landowners that affect other landowners or could affect sensitive environmental areas.

6. **At least 60 days before construction begins,** CP2 LNG and CP Express shall file an Implementation Plan with the Secretary for review and written approval by the Director of OEP, or the Director's designee. CP2 LNG and CP Express must file revisions to the plan as schedules change. The plan shall identify:

a. how CP2 LNG and CP Express will implement the construction procedures and mitigation measures described in its application and supplements (including responses to staff data requests), identified in the EIS, and required by the Order;

b. how CP2 LNG and CP Express will incorporate these requirements into the contract bid documents, construction contracts (especially penalty clauses and specifications), and construction drawings so that the mitigation required at each site is clear to onsite construction and inspection personnel;

c. the number of EIs assigned, and how the company will ensure that sufficient personnel are available to implement the environmental mitigation;

d. company personnel, including EIs and contractors, who will receive copies of the appropriate material;

e. the location and dates of the environmental compliance training and instructions CP2 LNG and CP Express will give to all personnel involved with construction and restoration (initial and refresher training as the project progresses and personnel change); (with the opportunity for OEP staff to participate in the training sessions(s));

f. the company personnel (if known) and specific portion of CP2 LNG and CP Express' organization having responsibility for compliance;

g. the procedures (including use of contract penalties) CP2 LNG and CP Express will follow if noncompliance occurs; and

h. for each discrete facility, a Gantt or PERT chart (or similar project scheduling diagram), and dates for:

i. the completion of all required surveys and reports;

ii. the environmental compliance training of onsite personnel;

iii. the start of construction; and

iv. the start and completion of restoration.

7. CP2 LNG shall employ at least one EI and CP Express shall employ at least one EI per construction spread. The EI(s) shall be:

a. responsible for monitoring and ensuring compliance with all mitigation measures required by the Order and other grants, permits, certificates, or other authorizing documents;

b. responsible for evaluating the construction contractor's implementation of the environmental mitigation measures required in the contract (see condition 6 above) and any other authorizing document;

c. empowered to order correction of acts that violate the environmental conditions of the Order, and any other authorizing document;

d. a full-time position, separate from all other activity inspectors;

e. responsible for documenting compliance with the environmental conditions of the Order, as well as any environmental conditions/permit requirements imposed by other federal, state, or local agencies; and

f. responsible for maintaining status reports.

8. Beginning with the filing of its Implementation Plan, CP2 LNG shall file updated status reports with the Secretary on a **monthly** basis and CP Express shall file updated status reports with the Secretary on a **biweekly** basis until all construction and restoration activities are complete. Problems of a significant magnitude shall be reported to the FERC **within 24 hours**. On request, these status reports will also be provided to other federal and state agencies with permitting responsibilities. Status reports shall include:

a. an update on CP2 LNG and CP Express' efforts to obtain the necessary federal authorizations;

b. project schedule, including current construction status of the project and work planned for the following reporting period;

c. a listing of all problems encountered, contractor nonconformance/deficiency logs, and each instance of noncompliance observed by the EI during the reporting period (both for the conditions imposed by the Commission and any environmental conditions/permit requirements imposed by other federal, state, or local agencies);

d. a description of the corrective and remedial actions implemented in response to all instances of noncompliance, nonconformance, or deficiency;

e. the effectiveness of all corrective and remedial actions implemented;

f. a description of any landowner/resident complaints which may relate to compliance with the requirements of the order, and the measures taken to satisfy their concerns; and

g. copies of any correspondence received by CP2 LNG and CP Express from other federal, state, or local permitting agencies concerning instances of noncompliance, and CP2 LNG and CP Express response.

9. CP2 LNG and CP Express shall develop and implement an environmental complaint resolution procedure, and file such procedure with the Secretary, for review and approval by the Director of OEP, or the Director's designee. The procedure shall provide landowners with clear and simple

directions for identifying and resolving their environmental mitigation problems/concerns during construction of the project and restoration of the right-of-way. **Prior to construction**, CP2 LNG and CP Express shall mail the complaint procedures to each landowner whose property will be crossed by the project.

a. In its letter to affected landowners, CP2 LNG and CP Express shall:

(1) provide a local contact that the landowners should call first with their concerns; the letter should indicate how soon a landowner should expect a response;

(2) instruct the landowners that if they are not satisfied with the response, they should call CP2 LNG and CP Express Hotline; the letter should indicate how soon to expect a response; and

(3) instruct the landowners that if they are still not satisfied with the response from CP2 LNG and CP Express Hotline, they should contact the Commission's Landowner Helpline at 877-337-2237 or at LandownerHelp@ferc.gov.

b. In addition, CP2 LNG and CP Express shall include in its status report a copy of a table that contains the following information for each problem/concern:

(1) the identity of the caller and date of the call;

(2) the location by milepost and identification number from the authorized alignment sheet(s) of the affected property;

(3) a description of the problem/concern; and

(4) an explanation of how and when the problem was resolved, will be resolved, or why it has not been resolved.

10. CP2 LNG and CP Express must receive written authorization from the Director of OEP, or the Director's designee, **before commencing construction** of any Project facilities. To obtain such authorization, CP2 LNG and CP Express must file with the Secretary documentation that it has received all applicable authorizations required under federal law (or evidence of waiver thereof).

11. CP2 LNG must receive written authorization from the Director of OEP, or the Director's designee, **prior to introducing hazardous fluids into the Terminal Facilities**. Instrumentation and controls, hazard detection, hazard control, and security components/systems necessary for the safe introduction of such fluids shall be installed and functional.

12. CP2 LNG must receive written authorization from the Director of OEP, or the Director's designee, **before placing into service** the Terminal Facilities. Such authorization will only be granted following a determination that the facilities have been constructed in accordance with FERC approval, can be expected to operate safely as designed, and the rehabilitation and restoration of areas affected by the project are proceeding satisfactorily.

13. CP Express must receive written authorization from the Director of OEP, or the Director's designee, **before placing the Pipeline System into service**. Such authorization will only be granted following a determination that rehabilitation and restoration of the right-of-way and other areas affected by the project are proceeding satisfactorily.

14. **Within 30 days of placing the authorized facilities in service**, CP2 LNG and CP Express shall file an affirmative statement with the Secretary, certified by a senior company official:

a. that the facilities have been constructed in compliance with all applicable conditions, and that continuing activities will be consistent with all applicable conditions; or

b. identifying which of the conditions in the Order CP2 LNG and CP Express has complied with or will comply with. This statement shall also identify any areas affected by the project where compliance measures were not properly implemented, if not previously identified in filed status reports, and the reason for noncompliance.

15. **Within 5 days of receipt of a water quality certification issued by the Railroad Commission of Texas and/or Louisiana Department of Environmental Quality,** CP2 LNG and CP Express shall file the complete certification, including all conditions, for review by the Director of OEP, or the Director's designee, under 40 C.F.R. § 121.9. All conditions attached to the water quality certification except those that the Director of OEP, or the Director's designee, may identify as waived pursuant to 40 C.F.R. § 121.9, constitute mandatory conditions of this Authorization Order. **Prior to construction**, CP2 LNG and CP Express shall file, for review and written approval of the Director of OEP, or the Director's designee, any revisions to its Project design necessary to comply with the water quality certification conditions.

16. **Prior to construction,** CP Express shall file with the Secretary, for review and written approval by the Director of OEP, or the Director's designee:

a. the Interstate 10, Energy Corridor, and Houston River HDDs alignment plan and profile that incorporates site-specific geotechnical information; and

b. for each proposed HDD, a description of any subsurface conditions that were identified during geotechnical investigations that may increase the risk of HDD complications (e.g., loss of drilling fluids; drill transition between overburden/bedrock, drill hole collapse, existing groundwater and/or soil contamination) as well as the measures that CP Express would implement to minimize these risks.

17. **Prior to construction**, CP2 LNG shall file with the Secretary, for review and written approval by the Director of the OEP, or the Director's designee, for the six proposed Calcasieu Pass HDDS:

a. an HDD monitoring, inadvertent return response, and contingency plan which describes drilling fluid composition and management, monitoring procedures during drilling operations, and response procedures for an inadvertent return of drilling fluid to the ground surface;

b. an alignment plan and profile that incorporates site-specific geotechnical information; and

c. a description of any subsurface conditions that were identified during geotechnical investigations that may increase the risk of HDD complications (e.g., loss of drilling fluids; drill transition between overburden/bedrock, drill hole collapse, existing groundwater and/or soil contamination) as well as the measures that CP2 LNG would implement to minimize these risks

18. **Prior to construction**, CP2 LNG shall provide a plan for review and written approval by the Director of the OEP, or the Director's designee, to maintain an intake velocity of less than 0.5 feet per second at the hydrostatic test water intake structure screen.

19. CP2 LNG and CP Express shall **not begin** construction of the Project **until**:

   a. all outstanding biological surveys are completed and filed with the Secretary;

   b. the FERC staff completes any necessary ESA section 7 consultation with the FWS and NMFS; and

   c. CP2 LNG and CP Express have received written notification from the Director of OEP, or the Director's designee, that construction and/or use of mitigation (including implementation of conservation measures) may begin.

20. **Prior to construction**, CP2 LNG shall consult with the NMFS Marine Mammal Branch to confirm that an Incidental Take Authorization is not required for the Project. CP2 LNG shall file the documentation of the consultation with the Secretary.

21. CP2 LNG and CP Express shall **not begin** construction of the Project **until** they file with the Secretary a copy of the determination of consistency with the Coastal Zone Management Plan issued by the LDNR/OCM.

22. CP Express shall **not begin** construction of the facilities and/or use of staging, storage, or temporary workspace areas and new or to-be improved access roads **until**:

   a. CP Express files with the Secretary:

      i. any remaining cultural resources survey report(s);

      ii. site evaluation report(s) and avoidance/treatment plan(s), as required; and

      iii. comments on the cultural resources reports and plans from the Texas and Louisiana SHPOs and/or any interested Indian tribes.

   b. the ACHP is afforded the opportunity to comment if historic properties would be adversely affected; and

   c. the FERC staff reviews and the Director of OEP, or the Director's designee, approves the cultural resources reports and plans, and notifies CP Express in writing that treatment plans/mitigation measures (including archaeological data recovery) may be implemented and/or construction may proceed.

   All material filed with the Commission containing **location, character, and ownership** information about cultural resources much as the cover and any relevant pages therein clearly labeled in bold lettering: **"CUI/PRIV – DO NOT RELEASE."**

31. **Prior to construction**, CP2 LNG shall file a nighttime noise mitigation plan with the Secretary, for review and written approval by the Director of OEP, or the Director's designee, that includes the measures it will implement to reduce the projected nighttime (7 pm to 7 am) construction noise

levels to at or below 48.6 dBA L_{eq} at NSAs/NELs, and how it will monitor the noise levels during construction activities.

32. **Prior to construction**, CP2 LNG shall file a pile driving noise mitigation plan with the Secretary, for review and written approval by the Director of OEP, or the Director's designee, that includes the measures it will implement to reduce the projected L_{max} pile driving noise levels to at or below 70 dBA L_{max} at NSAs/NELs, and how it will monitor the noise levels during pile driving activities. The mitigation plan shall identify the number of piles and expected duration for pile driving for those piles that are predicted to cause sound levels in excess of 70 dBA L_{max} at NSAs/NELs. The mitigation plan shall include mitigation measures, such as temporary barriers or shrouds.

33. **During construction activities at the Terminal Facilities between 7:00 p.m. and 7:00 a.m.**, CP2 LNG shall monitor noise levels, document the noise levels in the construction status reports, and restrict the noise attributable to construction activities to no more than 55 dBA L_{dn} (48.6 dBA L_{eq}) at any nearby NSAs.

34. CP2 LNG shall file with the Secretary, a full power load noise survey for the Terminal **no later than 60 days** after each phase of liquefaction blocks are placed into service. If the noise attributable to operation of the equipment at the Terminal exceeds an L_{dn} of 55 dBA at any nearby NSA, **within 60 days** CP2 LNG shall modify operation of the liquefaction facilities or install additional noise controls until a noise level below an L_{dn} of 55 dBA at the NSA is achieved. CP2 LNG shall confirm compliance with the above requirement by filing a second noise survey with the Secretary **no later than 60 days** after it installs the additional noise controls.

35. CP2 LNG shall file a noise survey with the Secretary, **no later than 60 days** after placing the entire Terminal into service. If a full load condition noise survey is not possible, CP2 LNG shall provide an interim survey at the maximum possible horsepower load **within 60 days** of placing the Terminal into service and provide the full load survey **within 6 months**. If the noise attributable to operation of the equipment at the Terminal exceeds an L_{dn} of 55 dBA at any nearby NSA under interim or full horsepower load conditions, CP2 LNG shall file a report on what changes are needed and shall install the additional noise controls to meet the level **within 1 year** of the in-service date. CP2 LNG shall confirm compliance with the above requirement by filing an additional noise survey with the Secretary **no later than 60 days** after it installs the additional noise controls.

36. CP Express shall file a noise survey for the Moss Lake Compressor Station with the Secretary **no later than 60 days** after placing the station into service. If a full power load conditions are not possible, CP Express shall file an interim survey at the maximum possible horsepower load **within 60 days** of placing the station into service and file the full load survey **within 6 months**. If the noise attributable to operation of the equipment at the Moss Lake Compressor Station exceeds an L_{dn} of 55 dBA at any nearby NSA under interim or full horsepower load conditions, CP Express shall file a report on what changes are needed and shall install the additional noise controls to meet the level **within 1 year** of the in-service date. CP Express shall confirm compliance with the above requirement by filing an additional noise survey with the Secretary **no later than 60 days** after it installs the additional noise controls.

37. CP Express shall file a noise survey for the TETCO & Boardwalk Interconnect and Florida Gas Meter Stations with the Secretary **no later than 60 days** after placing the stations into service. If full power load conditions are not possible, CP Express shall file an interim survey at the maximum possible horsepower load **within 60 days** of placing the station into service and file the full load survey **within 6 months**. If the noise attributable to operation of the equipment at the meter stations exceeds an Ldn of 55 dBA at any nearby NSAs under interim or full horsepower load conditions,

CP Express shall file a report on what changes are needed and shall install the additional noise controls to meet the level **within 1 year** of the in-service date. CP Express shall confirm compliance with the above requirement by filing an additional noise survey with the Secretary **no later than 60 days** after it installs the additional noise controls.

38. **Prior to initial site preparation**, CP2 LNG shall file with the Secretary the following information, stamped and sealed by the professional engineer-of-record, registered in the State of Louisiana:

    a. the erosion control and prevention plan for the dock area; and

    b. the finalized foundation design criteria for the project; and the associated quality assurance and quality control procedures.

39. **Prior to initial site preparation,** CP2 LNG shall file with the Secretary the finalized pile load test program (e.g., pile load test procedure, locations, configuration, quality assurance, and quality control, etc.), which shall comply with ASTM D1143, ASTM 3689, ASTM 3966, or approved equivalent. The filing shall be stamped and sealed by the professional engineer-of-record, registered in the State of Louisiana.

40. **Prior to initial site preparation**, CP2 LNG shall file with the Secretary the finalized wind design basis for the project facility, which shall include the tornado loads determination and consideration for the design loads combination cases as required by ASCE/SEI 7 (2022).

41. **Prior to construction of final design**, CP2 LNG shall file with the Secretary the following information, stamped and sealed by the professional engineer-of-record, registered in the State of Louisiana:

    a. the corrosion control and prevention plan for any underground piping, structure, foundations, equipment, and components;

    b. the finalized site settlement analysis for the project site, which shall include total settlement, differential settlement, subsidence, sea level rise, potential soil liquefaction, etc.; and

    c. the total and differential settlement of final designed structures, systems, and components foundations for the Project site; and

    d. the finalized settlement monitoring program and procedures for the Project site;

    e. the total and differential settlement monitoring system of LNG storage tank foundation design shall comply with applicable LNG industrial code/standards, including but not limited to API 620 (12th edition), API 625 (1st edition), API 650 (13th edition), API 653 (5th edition), and ACI 376 (2011 edition) or approved equivalents.

42. **Prior to construction of final design**, CP2 LNG shall file with the Secretary the following information, stamped and sealed by the professional engineer-of-record, registered in the State of Louisiana:

    a. site preparation drawings and specifications;

    b. finalized civil and structural design basis, criteria, specifications;

c. LNG terminal structures, LNG storage tank, and foundation design drawings and calculations (including prefabricated and field constructed structures);

d. seismic design specifications for procured Seismic Category I equipment;

e. quality control procedures to be used for civil/structural design and construction; and

f. a determination of whether soil improvement is necessary to counteract soil liquefaction.

In addition, CP2 LNG shall file, in its Implementation Plan, the schedule for producing this information.

43. **Prior to construction of the final design**, CP2 LNG shall file with the Secretary the finalized projectile/missile impact analysis to demonstrate that the outer concrete container wall of the full containment LNG storage tank could withstand projectile/missile impact. The analysis shall detail the projectile/missile speeds and characteristics and methods used to determine penetration resistance and perforation depths. The finalized projectile/missile impact analysis shall be stamped and sealed by the professional engineer-of-record, registered in the State of Louisiana.

44. **Prior to construction of final design**, CP2 LNG shall file with the Secretary a final design basis of the structure, system, and components in consideration of flood loads, erosion and scour and hydrostatic loads, etc.; and final maintenance program of inspection of hydrographic survey of the submerged slope conducted with enough frequency to detect any erosion in the areas vulnerable to bow thrusters and propellers. The filing shall be stamped and sealed by the professional engineer-of-record, registered in the State of Louisiana.

a. Information pertaining to the following specific recommendations, including any of the equivalents, shall be filed with the Secretary for review and written approval by the Director of OEP, or the Director's designee, within the timeframe indicated by each recommendation. Specific engineering, vulnerability, or detailed design information meeting the criteria specified in Order No. 833 (Docket No. RM16-15-000), including security information, shall be submitted as critical energy infrastructure information pursuant to 18 CFR §388.113. See Critical Electric Infrastructure Security and Amending Critical Energy Infrastructure Information, Order No. 833, 81 Fed. Reg. 93,732 (December 21, 2016), FERC Stats. & Regs. 31,389 (2016). Information pertaining to items such as offsite emergency response, procedures for public notification and evacuation, and construction and operating reporting requirements would be subject to public disclosure. All information shall be filed <u>a minimum of 30 days</u> before approval to proceed is requested.

45. **Prior to initial site preparation**, CP2 LNG shall file the finalized geotechnical investigation report that includes the performance of boreholes and CPT soundings on the route from LNG storage tank area to dock area; the performance of the boreholes and CPT soundings for each LNG storage tank foundation area in accordance with the provisions of ACI 376 (2011 edition) or approved equivalent; and details on the number, location, and depth of boreholes and CPT soundings. The finalized geotechnical investigation report shall be stamped and sealed by the professional engineer-of-record, registered in the State of Louisiana.

46. **Prior to initial site preparation,** CP2 LNG shall file with the finalized civil plot plan with slopes and elevations contour lines for the Project site. The finalized civil plot plan shall demonstrate that the CP2 LNG site would not be flooded during mean higher high water (MHHW) after accounting for sea level rise and subsidence using intermediate values over 30 years. The MHHW shall be

based upon tidal datum from station 8768094 recorded by NOAA or approved equivalent. The sea level rise and vertical land movement shall be in accordance with a minimum intermediate curve corresponding to design life of facility in Global and Regional Sea Level Rise Scenarios for the United States. U.S. Department of Commerce. National Ocean and Atmospheric Administration, National Ocean Service Center for Operational Oceanographic Products and Services, February 2022 or approved equivalent.

47. **Prior to initial site preparation**, CP2 LNG shall file the final design of floodwalls (storm surge protection barriers) to comply with applicable code/standards requirements including but are not limited to NFPA 59A (2019 edition) as incorporated by 33 CFR 127, and NFPA 59A (2001 edition) in 49 CFR 193. In addition, the floodwalls shall be designed and maintained in accordance with ASCE/SEI 7 (2022 edition) or approved equivalent and ASCE/SEI 24 (2014 edition) or approved equivalent to withstand a minimum of a 500-year mean occurrence interval in consideration of relative sea level rise, local subsidence, site settlement, shoreline recession, erosion and scour effect, and wind-driven wave effects, etc. The sea level rise and vertical land movement shall be in accordance with a minimum intermediate curve corresponding to design life of facility in Global and Regional Sea Level Rise Scenarios for the United States. U.S. Department of Commerce. National Ocean and Atmospheric Administration, National Ocean Service Center for Operational Oceanographic Products and Services, February 2022 or approved equivalent.

48. **Prior to construction of final design**, CP2 LNG shall file the settlement monitoring and maintenance plan, which ensures the storm surge floodwalls to be no less than a minimum elevation of 500-year mean recurrence interval flood event; and facilities are protected for the life of the LNG terminal considering settlement, subsidence, and sea level rise.

49. **Prior to initial site preparation**, CP2 LNG shall file an overall Project schedule, which includes the proposed stages of initial site preparation, construction, commissioning, and in-service plan relative to notice to proceed requests and related conditions.

50. **Prior to initial site preparation**, CP2 LNG shall file procedures for controlling access during construction.

51. **Prior to initial site preparation**, CP2 LNG shall file quality assurance and quality control procedures for construction activities, including initial equipment laydown receipt and preservation.

52. **Prior to initial site preparation**, CP2 LNG shall file its design wind speed criteria for all other facilities not covered by PHMSA's LOD to be designed to withstand wind speeds commensurate with the risk and reliability associated with the facilities in accordance with ASCE/SEI 7 (2022) or approved equivalent.

53. **Prior to initial site preparation**, CP2 LNG shall develop an ERP (including evacuation and any sheltering and re-entry) and coordinate procedures with the Coast Guard; state, county, and local emergency planning groups; fire departments; state and local law enforcement; and other appropriate federal agencies. This plan shall be consistent with recommended and good engineering practices, as defined in National Fire Protection Association (NFPA) 1600, NFPA 1616, NPFA 1620, NFPA 470, NFPA 475, or approved equivalents and based on potential impacts and onsets of hazards from accidental and intentional events along the LNG marine vessel route and potential impacts and onset of hazards from accidental and intentional events at the LNG terminal, including but not limited to a catastrophic failure of the largest LNG tank. This plan shall

address any special considerations and pre-incident planning for infrastructure and public with access and functional needs and shall include at a minimum:

a. materials and plans for periodic dissemination of public education and training materials for evacuation and/or shelter in place of the public within any transient hazard areas along the LNG marine vessel route and within LNG terminal hazard areas;

b. plans to competently train emergency responders required to effectively and safely respond to hazardous material incidents including, but not limited to, LNG fires and dispersion;

c. plans to competently train emergency responders to effectively and safely evacuate or shelter public within transient hazard areas along the LNG marine vessel route and within hazard areas from LNG terminal;

d. designated contacts with federal, state and local emergency response agencies responsible for emergency management and response within any transient hazard areas along the LNG marine vessel route and within hazard areas from LNG terminal;

e. scalable procedures for the prompt notification of appropriate local officials and emergency response agencies based on the level and severity of potential incidents;

f. scalable procedures for mobilizing response and establishing a unified command, including identification, location, and design of any emergency operations centers and emergency response equipment required to effectively and safely to respond to hazardous material incidents and evacuate or shelter public within transient hazard areas along the LNG marine vessel route and within LNG terminal hazard areas;

g. scalable procedures for notifying public, including identification, location, design, and use of any permanent sirens or other warning devices required to effectively communicate and warn the public prior to onset of debilitating hazards within any transient hazard areas along the LNG marine vessel route and within hazard areas from LNG terminal;

h. scalable procedures for evacuating the public, including identification, location, design, and use of evacuation routes/methods and any mustering locations required to effectively and safely evacuate the public within any transient hazard areas along the LNG marine transit route and within hazard areas from LNG terminal; and

i. scalable procedures for sheltering the public, including identification, location, design, and use of any shelters demonstrated to be needed and demonstrated to effectively and safely shelter the public prior to onset of debilitating hazards within transient hazard areas that may better benefit from sheltering in place (i.e., those within Zones of Concern 1 and 2), along the route of the LNG marine vessel and within hazard areas of the LNG terminal that may benefit from sheltering in place (i.e., those within areas of 1,600 BTU/ft^2-hr and 10,000 BTU/ft^2-hr radiant heats from fires with farthest impacts, including from a catastrophic failure of largest LNG tank).

CP2 LNG shall notify the FERC staff of all planning meetings in advance and shall report progress on the development of its ERP **at 3-month intervals**. CP2 LNG shall file public versions of offsite emergency response procedures for public notification, evacuation, and shelter in place.

54. **Prior to initial site preparation**, CP2 LNG shall file a Cost-Sharing Plan identifying the mechanisms for funding all Project-specific security/emergency management costs that would be imposed on state and local agencies. This comprehensive plan shall include funding mechanisms for the capital costs associated with any necessary security/emergency management equipment and personnel base. This plan shall include sustained funding of any requirement or resource gap analysis identified to effectively and safely evacuate and shelter the public and to effectively and safely respond to hazardous material incidents consistent with recommended and good engineering practices. CP2 LNG shall notify FERC staff of all planning meetings in advance and shall report progress on the development of its Cost Sharing Plan **at 3-month intervals**.

55. **Prior to initial site preparation**, CP2 LNG shall file calculations demonstrating the loads on buried pipelines and utilities at temporary road crossings would be adequately distributed. The analysis shall be based on American Petroleum Institute (API) RP 1102 or other approved methodology.

56. **Prior to initial site preparation**, CP2 LNG shall file pipeline and utility damage prevention procedures for personnel and contractors. The procedures shall include provisions to mark buried pipelines and utilities prior to any site work and subsurface activities.

57. **Prior to construction of final design**, CP2 LNG shall file change logs that list and explain any changes made from the FEED provided in CP2 LNG's application and filings. A list of all changes with an explanation for the design alteration shall be provided, and all changes shall be clearly indicated on all diagrams and drawings.

58. **Prior to construction of final design**, CP2 LNG shall file information/revisions pertaining to CP2 LNG's response numbers 37, 50, 60, 75b, 175, 176 of its June 10, 2022 filing; numbers 35, 86, 195, 197 of its July 7, 2022 filing; numbers 55, 59, 184, 191, 206 of its July 19, 2022 filing; numbers 15 of its August 2, 2022 filing; 196, 205 of its August 4, 2022 filing; number 87 of its September 14, 2022 filing, numbers 13, 18 and 24 of its October 28, 2022 filing; number 22 of its November 3, 2022 filing; number 6 of its November 28, 2022 filing; number 11 of its May 19, 2023 filing; and numbers 1, 6, 7, 8, 9, 10 of its May 26, 2023 filing, which indicated features to be included or considered in the final design.

59. **Prior to construction of final design**, CP2 LNG shall file drawings and specifications for crash rated vehicle barriers in accordance with ASTM F2656 (2015) or approved equivalent at each facility entrance for access control. The crash rating vehicle type shall be supported by a security vulnerability assessment that takes into account the potential target attractiveness, threats, vulnerabilities, consequences, and mitigation effectiveness consistent with American Institute of Chemical Engineers, *Guidelines for Analyzing and Managing the Security Vulnerabilities of Fixed Chemical Sites*, or equivalent. The crash rating speed shall be supported by an analysis of the maximum attainable vehicle velocity based on vehicle type acceleration and road characteristics (e.g., straight length, radius of curvature, sloped/banked, coefficient of friction, etc.).

60. **Prior to construction of final design**, CP2 LNG shall file drawings of vehicle protections internal to the plant, such as guard rails, barriers, and bollards to protect transfer piping, pumps, compressors, hydrants, monitors, etc. to ensure that the facilities would be protected from inadvertent damage from vehicles, unless the facilities are located sufficiently away from in-plant roadways and areas accessed by vehicle.

61. **Prior to construction of final design**, CP2 LNG shall file drawings of the security fence. The fencing drawings shall provide details of fencing that demonstrate it is in accordance with NFPA

59A (2019 edition) and would restrict and deter access around the entire facility and have a setback from exterior features (e.g., power lines, trees, etc.) and from interior features (e.g., piping, equipment, buildings, etc.) by at least 10 feet and that would not allow the fence to be overcome.

62. **Prior to construction of final design,** CP2 LNG shall file security camera and intrusion detection drawings. The security camera drawings shall show the locations, mounting elevation, areas covered, and features of each camera (e.g., fixed, tilt/pan/zoom, motion detection alerts, low light, etc.) and shall provide camera coverage at access points and along the entire perimeter of the terminal with redundancies and camera coverage of the interior of the terminal to enable rapid monitoring of the terminal, including a camera at the top of each LNG storage tank, and coverage within pretreatment areas, within liquefaction areas, within truck transfer areas, within marine transfer areas, and within buildings. Drawings shall also show or note the location and type of the intrusion detection and shall cover the entire perimeter of the facility.

63. **Prior to construction of final design**, CP2 LNG shall file photometric analyses or equivalent and associated lighting drawings. The lighting drawings shall show the location, elevation, type of light fixture, and lux levels of the lighting system and shall depict illumination coverage along the perimeter of the terminal, process equipment, mooring points, and along paths/roads of access and egress to facilitate security monitoring and emergency response operations in accordance with federal regulations (e.g., 49 CFR 193, 29 CFR 1910, and 29 CFR 1926) and API 540 or approved equivalent.

64. **Prior to construction of final design**, CP2 LNG shall file a plan to implement the security risk analysis countermeasure recommendations and provide justification for any that would not be implemented as recommended.

65. **Prior to construction of final design**, CP2 LNG shall file a plot plan of the final design showing all major equipment, structures, buildings, and impoundment systems.

66. **Prior to construction of the final design**, CP2 LNG shall file an evaluation of the final design that quantitatively confirms the congestion levels used in overpressure modeling, considering the volume blockage ratios with all of the equipment, structural components, and piping included. In addition, CP2 LNG shall file details for mitigation of overpressures onto the emergency diesel generators and any other significant components, unless final overpressure calculations demonstrate this is not necessary.

67. **Prior to construction of final design**, CP2 LNG shall file three-dimensional plant drawings to confirm plant layout for maintenance, access, egress, and the extent and density of congested areas used in overpressure modeling.

68. **Prior to construction of final design**, CP2 LNG shall file up-to-date process flow diagrams (PFDs), heat and mass balances (HMBs), and piping and instrument diagrams (P&IDs) including vendor P&IDs. The HMBs shall demonstrate a peak export rate of 28 million metric tonnes per annum . The P&IDs shall include the following information:

    a. equipment tag number, name, size, duty, capacity, and design conditions;

    b. equipment insulation type and thickness;

    c. storage tank pipe penetration size and nozzle schedule;

d. valve high pressure side and internal and external vent locations;

e. piping with line number, piping class specification, size, and insulation type and thickness;

f. piping specification breaks and insulation limits;

g. all control and manual valves numbered;

h. relief valves with size and set points; and

i. drawing revision number and date.

69. **Prior to construction of final design**, CP2 LNG shall file P&IDs, specifications, and procedures that clearly show and specify the tie-in details required to safely connect subsequently constructed facilities with the operational facilities.

70. **Prior to construction of final design**, CP2 LNG shall file a car seal and lock philosophy and car seal and lock program, including a list of all car-sealed and locked valves consistent with the P&IDs. The car seal and lock program shall include monitoring and periodically reviewing correct car seal and lock placement and valve position.

71. **Prior to construction of final design**, CP2 LNG shall file information to verify how the EPC contractor has addressed all FEED HAZID recommendations.

72. **Prior to construction of final design**, CP2 LNG shall file a hazard and operability review of the final design P&IDs, a list of the resulting recommendations, and action taken on the recommendations. The issued for construction P&IDs shall incorporate the hazard and operability review recommendations and justification shall be provided for any recommendations that are not implemented.

73. **Prior to construction of final design**, CP2 LNG shall file information to demonstrate adherence to NFPA 59A (2019) Chapter 10 or approved equivalent, and, or including, the following information for the final design of the LNG transfer pipe-in-pipe systems:

a. the detailed design, materials of construction, and a plot plan layout of the pipe-in-pipe system, including identification of all conventional process lines extending from or attached to the pipe-in-pipe, as well as the locations of any reliefs, instrumentation or other connections along the inner or outer pipes;

b. an assessment of the vapor production and vapor handling capacities within the annular space during a full inner pipe rupture or smaller release into the outer pipe;

c. stress analysis (thermal, mechanical, seismic, etc.) for the pipe-in-pipe systems, including the differential stresses between the inner pipe and outer pipe for a full inner pipe rupture, or any smaller release, at any location along the system;

d. an evaluation demonstrating that pressure surge events will not exceed the design pressures;

e. leak testing details, including pressures, for the outer pipe, consistent with ASME B31.3;

f. details of the maintenance procedures that will be followed over the life of the facility to determine that the outer pipe will be continuing to adequately serve as spill containment;

g. procedures for purging or draining LNG from the outer pipe;

h. details of loading and any external features that will protect against external common cause failures of the inner and outer pipes, including resulting stresses during horizontal directional drilling and fabrication processes;

i. drawings and calculations for the sizing and configuration of any pressure relief for the annular space of the pipe-in-pipe and for the inner pipe in case of isolation while containing LNG; and

j. plans to detect and monitor the LNG transfer line for leak monitoring.

74. **Prior to construction of final design**, CP2 LNG shall provide a check valve upstream of the acid gas removal column to prevent backflow or provide a dynamic simulation that shows that upon plant shutdown, the vertical piping segment would be sufficient for this purpose.

75. **Prior to construction of final design**, CP2 LNG shall include LNG tank fill flow measurement with high flow alarm.

76. **Prior to construction of final design**, CP2 LNG shall specify the discretionary vent valve be operable through the Distributed Control System (DCS). In addition, car sealed open manual block valves shall be provided upstream and downstream of the discretionary vent valve operable through the DCS. CP2 LNG shall also specify a discretionary vent valve on each LNG storage tank to safely vent pressure when the tank is isolated from the common BOG system.

77. **Prior to construction of final design**, CP2 LNG shall file the safe operating limits (upper and lower), alarm and shutdown set points for all instrumentation (e.g., temperature, pressures, flows, and compositions).

78. **Prior to construction of final design**, CP2 LNG shall file cause-and-effect matrices for the process instrumentation, fire and gas detection system, and emergency shutdown system. The cause-and-effect matrices shall include alarms and shutdown functions, details of the voting and shutdown logic, and set points.

79. **Prior to construction of final design**, CP2 LNG shall specify that all ESD valves are to be equipped with open and closed position switches connected to the Distributed Control System (DCS)/SIS.

80. **Prior to construction of final design**, CP2 LNG shall file an up-to-date equipment list, process and mechanical data sheets, and specifications. The specifications shall include:

a. building specifications (e.g., control buildings, electrical buildings, compressor buildings, storage buildings, pressurized buildings, ventilated buildings, blast resistant buildings);

b. mechanical specifications (e.g., piping, valve, insulation, rotating equipment, heat exchanger, storage tank and vessel, other specialized equipment);

c. electrical and instrumentation specifications (e.g., power system, control system, safety instrument system [SIS], cable, other electrical and instrumentation); and

d. security and fire safety specifications (e.g., security, passive protection, hazard detection, hazard control, firewater).

81. **Prior to construction of final design**, CP2 LNG shall file a list of all codes and standards and the final specification document number where they are referenced.

82. **Prior to construction of final design**, CP2 LNG shall file complete specifications and drawings of the proposed LNG tank design and installation.

83. **Prior to construction of final design**, CP2 LNG shall file an evaluation of emergency shutdown valve closure times. The evaluation shall account for the time to detect an upset or hazardous condition, notify plant personnel, and close the emergency shutdown valve(s).

84. **Prior to construction of final design**, CP2 LNG shall file an evaluation of dynamic pressure surge effects from valve opening and closure times and pump operations that demonstrate that the surge effects do not exceed the design pressures.

85. **Prior to construction of final design**, CP2 LNG shall file a pipe stress analysis for critical or potential higher consequence lines that evaluates all loads in ASME B31.3 (2016 edition and after), including but not limited to consideration of hazardous fluid lines that are cryogenic, high temperature, subject to slug flow, and that include 2-phase flow. CP2 LNG shall also demonstrate, for hazardous fluids, piping and piping nipples 2 inches or less in diameter are designed to withstand external loads, including vibrational loads in the vicinity of rotating equipment and operator live loads in areas accessible by operators.

86. **Prior to construction of final design**, CP2 LNG shall clearly specify the responsibilities of the LNG tank contractor and the EPC contractor for the piping associated with the LNG storage tank.

87. **Prior to construction of final design**, CP2 LNG shall file the sizing basis and capacity for the final design of the flares and/or vent stacks as well as the pressure and vacuum relief valves for major process equipment, vessels, and storage tanks.

88. **Prior to construction of final design**, CP2 LNG shall specify that the common, non-spared process vessels are installed with spare pressure relief valves to ensure overpressure protection during relief valve testing or maintenance.

89. **Prior to construction of final design**, CP2 LNG shall file an updated fire protection evaluation of the proposed facilities. A copy of the evaluation, a list of recommendations and supporting justifications, and actions taken on the recommendations shall be filed. The evaluation shall justify the type, quantity, and location of hazard detection and hazard control, passive fire protection, emergency shutdown and depressurizing systems, firewater, and emergency response equipment, training, and qualifications in accordance with NFPA 59A (2001). The justification for the flammable and combustible gas detection and flame and heat detection systems shall be in accordance with ISA 84.00.07 or approved equivalent methodologies and would need to demonstrate 90 percent or more of releases (unignited and ignited) that could result in an off-site or cascading impact would be detected by two or more detectors and result in isolation and de inventory within 10 minutes. The analysis shall take into account the set points, voting logic, wind speeds, and wind directions. The justification for firewater shall provide calculations for all

firewater demands based on design densities, surface area, and throw distance as well as specifications for the corresponding hydrant and monitors needed to reach and cool equipment.

90. **Prior to construction of final design**, CP2 LNG shall file spill containment system drawings with dimensions and slopes of curbing, trenches, impoundments, tertiary containment and capacity calculations considering any foundations and equipment within impoundments, as well as the sizing and design of the down-comers. The spill containment drawings shall show containment for all hazardous fluids including all liquids handled above their flashpoint, from the largest flow from a single line for 10 minutes, including de-inventory, or the maximum liquid from the largest vessel (or total of impounded vessels) or otherwise demonstrate that providing spill containment would not significantly reduce the flammable vapor dispersion or radiant heat consequences of a spill. Any elevated stainless steel that would convey spills of cold liquefied gases shall be demonstrated suitable to handle the thermal shock combined with any applicable jetting forces of a pressurized release.

91. **Prior to construction of final design**, CP2 LNG shall file an analysis that demonstrates the flammable vapor dispersion from design spills will be prevented from dispersing underneath the elevated jetty control room, or the control room will be able to withstand an overpressure due to ignition of the flammable vapor that disperses underneath the elevated jetty control room.

92. **Prior to construction of final design**, CP2 LNG shall file electrical area classification drawings, including cross sectional drawings. The drawings shall demonstrate compliance with NFPA 59A, NFPA 70, NFPA 497, and API RP 500, or approved equivalents. In addition, the drawings shall include revisions to the electrical area classification design or provide technical justification that supports the electrical area classification using most applicable API RP 500 figures (i.e., figures 20 and 21) or hazard modeling of various release rates from equivalent hole sizes and wind speeds (see NFPA 497 release rate of 1 lb-mole/minute).

93. **Prior to construction of final design**, CP2 LNG shall file analysis of the buildings containing hazardous fluids and the ventilation calculations that limit concentrations below the LFLs (e.g., 25-percent LFL), including an analysis of off gassing of hydrogen in battery rooms, and shall also provide hydrogen detectors that alarm (e.g., 20- to 25-percent LFL) and initiate mitigative actions (e.g., 40- to 50-percent LFL) or alarms in the event the ventilation is not functioning as designed, in accordance with NFPA 59A and NFPA 70, or approved equivalents.

94. **Prior to construction of final design**, CP2 LNG shall file drawings and details of how process seals or isolations installed at the interface between a flammable fluid system and an electrical conduit or wiring system meet the requirements of NFPA 59A (2001) and NFPA 70 (1999 or 2020, as applicable).

95. **Prior to construction of final design**, CP2 LNG shall file details of an air gap or vent installed downstream of process seals or isolations installed at the interface between a flammable fluid system and an electrical conduit or wiring system. Each air gap shall vent to a safe location and be equipped with a leak detection device that shall continuously monitor for the presence of a flammable fluid, alarm the hazardous condition, and shut down the appropriate systems. Alternatively, CP2 LNG shall file details on a system providing an approved equivalent protection, in accordance with NFPA 59A (2023 edition), from the migration of flammable fluid through the electrical conduit or wiring.

96. **Prior to construction of final design**, CP2 LNG shall file complete drawings and a list of the hazard detection equipment. The drawings shall clearly show the location and elevation of all

detection equipment as well as their coverage area. The list shall include the instrument tag number, type, manufacturer, model, location, alarm indication locations, and shutdown functions of the hazard detection equipment.

97. **Prior to construction of final design**, CP2 LNG shall file a technical review of facility design that:

    a. identifies all combustion/ventilation air intake equipment; and

    b. demonstrates that these areas are adequately covered by flammable gas detection devices, and applicable toxic gas detection devices, and indicates how these devices would isolate or shutdown any combustion or ventilation air intake equipment whose continued operation could add to or sustain an emergency.

98. **Prior to construction of final design**, CP2 LNG shall file a design that includes hazard detection suitable to detect high temperatures and smoldering combustion products in electrical buildings and control room buildings.

99. **Prior to construction of final design**, CP2 LNG shall file an evaluation of the voting logic and voting degradation for hazard detectors.

100. **Prior to construction of final design**, CP2 LNG shall file a list of alarm and shutdown set points for all hazard detectors that account for the calibration gas of the hazard detectors when determining the lower flammable limit set points for methane, ethylene, propane, isopentane, and condensate.

101. **Prior to construction of final design**, CP2 LNG shall file a list of alarm and shutdown set points for all hazard detectors that account for the calibration gas of hazard detectors when determining the set points for toxic components such as condensate and hydrogen sulfide.

102. **Prior to construction of final design**, CP2 LNG shall file a drawing showing the location of the emergency shutdown buttons, including, but not limited to the refrigerant storage, LNG storage areas and area/unit emergency isolation and equipment shutdown. Emergency shutdown buttons shall be easily accessible, conspicuously labeled, and located in an area which would be accessible during an emergency.

103. **Prior to construction of final design**, CP2 LNG shall file facility plan drawings and a list of the fixed and wheeled dry-chemical, hand-held fire extinguishers, and other hazard control equipment. Plan drawings shall clearly show the location by tag number of all fixed, wheeled, and hand-held extinguishers and shall demonstrate the spacing of extinguishers meet prescribed NFPA 10 travel distances. The list shall include the equipment tag number, type, manufacturer and model, capacity, equipment covered, discharge rate, and automatic and manual remote signals initiating discharge of the units and shall demonstrate they meet NFPA 59A.

104. **Prior to construction of final design**, CP2 LNG shall file drawings and specifications for the structural passive protection systems to protect equipment and supports from low temperature releases below minimum design metal temperatures.

105. **Prior to construction of final design**, CP2 LNG shall file calculations or test results for the structural passive protection systems to protect equipment and supports from low temperature releases below minimum design metal temperatures.

106. **Prior to construction of final design**, CP2 LNG shall file drawings and specifications for the structural passive protection systems to protect equipment and supports from pool fires and from jet fires of design spills that may exacerbate the initial hazard, as well as for electrical and control equipment that activate emergency systems to protect this equipment from a minimum 20-minute UL 1709 fire exposure.

107. **Prior to construction of final design**, CP2 LNG shall file a detailed quantitative analysis to demonstrate that adequate mitigation would be provided for each pressure vessel that could fail within the 4,000 BTU/ft^2-hr zone from a pool or jet fires; each critical structural component (including the LNG marine vessel) and emergency equipment item that could fail within the 4,900 BTU/ft^2-hr zone from a pool or jet fire; and each occupied building that could expose unprotected personnel within the 1,600 BTU/ft^2-hr zone from a pool or jet fire. Trucks at truck transfer stations shall be included in the analysis of potential pressure vessel failures, as well as measures needed to prevent cascading impact due to the 10-minute sizing spill at the marine area. A combination of passive and active protection for pool fires and passive and/or active protection for jet fires shall be provided and demonstrate the effectiveness and reliability. Effectiveness of passive mitigation shall be supported by calculations or test results for the thickness limiting temperature rise over the fire duration, and active mitigation shall be supported by reliability information by calculations or test results, such as demonstrating flow rates and durations of any cooling water would mitigate the heat absorbed by the component. The total firewater demand shall account for all components that could fail due to a pool or jet fire.

108. **Prior to construction of final design**, CP2 LNG shall file an evaluation and associated specifications, drawings, and datasheets for transformers and transformer fluid demonstrating prevention of cascading damage of transformers (e.g., fire walls or spacing) in accordance with NFPA 850 or approved equivalent.

109. **Prior to construction of final design**, CP2 LNG shall provide additional information on final design for any blast walls, hardened structures, and blast resistant design, including supporting hazard analysis and building risk assessment studies, in order to prevent cascading damage.

110. **Prior to construction of final design**, CP2 LNG shall file facility plan drawings showing the proposed location of the firewater systems. Plan drawings shall clearly show the location of firewater piping, post indicator and sectional valves, and the location and area covered by, each monitor, hydrant, hose, water curtain, deluge system, water-mist system, and sprinkler. The drawings shall demonstrate that each process area, fire zone, or other sections of piping with several users can be isolated with post indicator or sectional valves in accordance with NFPA 24 (2013 or thereafter) or approved equivalent, and that firewater coverage is provided by at least two monitors or hydrants with sufficient firewater flow to cool exposed surfaces subjected to a fire. The drawings shall also include piping and instrumentation diagrams of the firewater systems. Drawings of the sprinkler system design shall show coverage in applicable buildings per NFPA 850 and in applicable closed roofed buildings around the site, per NFPA 13.

111. **Prior to construction of final design**, CP2 LNG shall specify that the firewater pump shelter is designed to remove the largest firewater pump or other component for maintenance with an overhead or external crane.

112. **Prior to construction of final design**, CP2 LNG shall demonstrate that the firewater storage tank is in compliance with NFPA 22 or approved equivalent.

113. **Prior to construction of final design**, CP2 LNG shall specify that the firewater flow test meter is equipped with a transmitter and that a pressure transmitter is installed upstream of the flow transmitter. The flow transmitter and pressure transmitter shall be connected to the DCS and recorded.

114. **Prior to construction of the final design**, CP2 shall file the finalized seismic monitoring program for the Project site. The seismic monitoring program shall comply with NFPA 59A (2019 edition) sections 8.4.14.10, 8.4.14.12, 8.4.14.12.1, 8.4.14.12.2, and 8.4.14.13; ACI 376 (2011 edition) sections 10.7.5 and 10.8.4; U.S. Nuclear Regulatory Commission Regulatory Guide RG 1.12 (Revision 3) sections 1 and 3 through 9 and all subsections, or approved equivalents. A free-field seismic monitoring device shall be included in the seismic monitoring program for the Project site. The proposed seismic monitoring system must include installation location plot plan; description of the triaxial strong motion recorders or other seismic instrumentation; the proposed alarm set points and operating procedures (including emergency operating procedures) for control room operators in response to such alarms/data obtained from seismic instrumentation; and testing and maintenance procedures.

115. **Prior to construction of final design**, CP2 LNG shall file drawings of the storage tank piping support structure and support of horizontal piping at grade including pump columns, relief valves, pipe penetrations, instrumentation, and appurtenances.

116. **Prior to construction of final design**, CP2 LNG shall file the structural analysis of the LNG storage tank and outer containment demonstrating they are designed to withstand all loads and combinations.

117. **Prior to construction of final design**, CP2 LNG shall file an analysis of the structural integrity of the outer containment of the full containment LNG storage tank demonstrating it can withstand the radiant heat from an adjacent external pipeline fire or from an adjacent tank roof fire modeled using LNGFIRE3 or a similarly approved and validated pool fire model with application of uncertainty factors commensurate with its validation results including consideration of extrapolation. If the LNG storage tank walls will not be designed to withstand the predicted radiant heat for the maximum duration, CP2 LNG shall demonstrate firewater coverage, or other mitigation that can be remotely or automatically activated or manually activated from a safe accessible distance based on appropriate Personal Protective Equipment ratings, for the LNG storage tank walls in addition to any other firewater coverage needs.

118. **Prior to construction of final design**, CP2 LNG shall file an analysis of the structural integrity of the outer containment of the full containment LNG storage tank demonstrating it can withstand the thermal shock caused by a failure of the inner tank, including specification of the leakage rate.

119. **Prior to construction of final design**, CP2 LNG shall file the final wheel load evaluations for underground hazardous fluid lines, including feed gas lines within the plant, in accordance with API RP 1102 or approved equivalent, and address any recommendations.

120. **Prior to commissioning**, CP2 LNG shall file a detailed schedule for commissioning through equipment startup. The schedule shall include milestones for all procedures and tests to be completed: prior to introduction of hazardous fluids and during commissioning and startup. CP2 LNG shall file documentation certifying that each of these milestones has been completed before authorization to commence the next phase of commissioning and startup will be issued.

121. **Prior to commissioning**, CP2 LNG shall file detailed plans and procedures for: testing the integrity of onsite mechanical installation; functional tests; introduction of hazardous fluids; operational tests; and placing the equipment into service.

122. **Prior to commissioning**, CP2 LNG shall file settlement results during the hydrostatic tests of the LNG storage containers and shall file a plan to periodically thereafter to verify settlement is as expected and does not exceed the applicable criteria set forth in API 620 (12th edition), API 625 (1st edition), API 650 (13th edition), API 653 (5th edition), and ACI 376 (2011 edition) or approved equivalents. The program shall also specify what actions would be taken after various levels of seismic events.

123. **Prior to commissioning**, CP2 LNG shall file the operation and maintenance procedures and manuals, as well as safety procedures, hot work procedures and permits, abnormal operating conditions procedures, simultaneous operations procedures, and management of change procedures and forms. The operational maintenance and testing procedures for fire protection components shall be in accordance with the current versions of the applicable standards listed in NPFA 59A (2019) or equivalent.

124. **Prior to commissioning**, CP2 LNG shall file a plan for clean-out, dry-out, purging, and tightness testing. This plan shall address the requirements of the American Gas Association's Purging Principles and Practice, and shall provide justification if not using an inert or non-flammable gas for clean-out, dry-out, purging, and tightness testing.

125. **Prior to commissioning**, CP2 LNG shall tag all equipment, instrumentation, and valves in the field, including drain valves, vent valves, main valves, and car-sealed or locked valves.

126. **Prior to commissioning**, CP2 LNG shall file a plan to maintain a detailed training log to demonstrate that operating, maintenance, and emergency response staff have completed the required training. In addition, CP2 LNG shall file signed documentation that demonstrates training has been conducted, including ESD and response procedures, prior to the respective operation.

127. **Prior to commissioning**, CP2 LNG shall file the procedures for pressure/leak tests which address the requirements of ASME BPVC Section VIII and ASME B31.3. In addition, CP2 LNG shall file a line list of pneumatic and hydrostatic test pressures.

128. **Prior to introduction of hazardous fluids**, CP2 LNG shall complete and document a pre-startup safety review to ensure that installed equipment meets the design and operating intent of the facility. The pre-startup safety review shall include any changes since the last hazard review, operating procedures, and operator training. A copy of the review with a list of recommendations, and actions taken on each recommendation, shall be filed.

129. **Prior to introduction of hazardous fluids**, CP2 LNG shall complete and document all pertinent tests (Factory Acceptance Tests, Site Acceptance Tests, Site Integration Tests) associated with the DCS and SIS that demonstrates full functionality and operability of the system.

130. **Prior to introduction of hazardous fluids**, CP2 LNG shall develop and implement an alarm management program consistent with ISA 18.2 (2016 edition) or approved equivalent to reduce alarm complacency and maximize the effectiveness of operator response to alarms.

131. **Prior to introduction of hazardous fluids**, CP2 LNG shall complete and document clean agent acceptance tests.

132. **Prior to introduction of hazardous fluids**, CP2 LNG shall complete and document a firewater pump acceptance test and firewater monitor and hydrant coverage test. The actual coverage area from each monitor and hydrant shall be shown on facility plot plan(s).

133. **Prior to introduction of hazardous fluids**, CP2 LNG shall complete and document sprinkler system acceptance tests.

134. CP2 LNG shall file a request for written authorization from the Director of OEP **prior to unloading or loading the first LNG commissioning cargo**. After production of first LNG, CP2 LNG shall file weekly reports on the commissioning of the proposed systems that detail the progress toward demonstrating the facilities can safely and reliably operate at or near the design production rate. The reports shall include a summary of activities, problems encountered, and remedial actions taken. The weekly reports shall also include the latest commissioning schedule, including projected and actual LNG production by each liquefaction train, LNG storage inventories in each storage tank, and the number of anticipated and actual LNG commissioning cargoes, along with the associated volumes loaded or unloaded. Further, the weekly reports shall include a status and list of all planned and completed safety and reliability tests, work authorizations, and punch list items. Problems of significant magnitude shall be reported to the FERC within 24 hours.

135. **Prior to commencement of service**, CP2 LNG shall file a request for written authorization from the Director of OEP. Such authorization would only be granted following a determination by the Coast Guard, under its authorities under the Ports and Waterways Safety Act, the Magnuson Act, the MTSA of 2002, and the Security and Accountability For Every Port Act, that appropriate measures to ensure the safety and security of the facility and the waterway have been put into place by CP2 LNG or other appropriate parties.

136. **Prior to commencement of service**, CP2 LNG shall notify the FERC staff of any proposed revisions to the security plan and physical security of the plant.

137. **Prior to commencement of service**, CP2 LNG shall label piping with fluid service and direction of flow in the field consistent with ASME A13.1 (2020 edition) or approved equivalent, in addition to the pipe labeling requirements of NFPA 59A (2001).

138. **Prior to commencement of service**, CP2 LNG shall provide plans for any preventative and predictive maintenance program that performs periodic or continuous equipment condition monitoring.

139. **Prior to commencement of service**, CP2 LNG shall develop procedures for offsite contractors' responsibilities, restrictions, monitoring, training, and limitations and for supervision of these contractors and their tasks by CP2 LNG staff. Specifically, the procedures shall address:

   a. selecting a contractor, including obtaining and evaluating information regarding the contract employer's safety performance and programs;

   b. informing contractors of the known potential hazards, including flammable and toxic release, explosion, and fire, related to the contractor's work and systems they are working on;

   c. developing and implementing provisions to control and monitor the entrance, presence, and exit of contract employers and contract employees from process areas, buildings, and the plant;

d. developing and implementing safe work practices for control of personnel safety hazards, including lockout/tagout, confined space entry, work permits, hot work, and opening process equipment or piping;

e. developing and implementing safe work practices for control of process safety hazards, including identification of layers of protection in systems being worked on, recognizing abnormal conditions on systems they are working on, and re-instatement of layers of protection, including ensuring bypass, isolation valve, and car-seal programs and procedures are being followed;

f. developing and implementing provisions to ensure contractors are trained on the emergency action plans and that they are accounted for in the event of an emergency; and

g. monitoring and periodically evaluating the performance of contract employers in fulfilling their obligations above, including successful and safe completion of work and re-instatement of all layers of protection.

In addition, we recommend that the following measures shall apply throughout the life of the CP2 LNG Project.

140. The facility shall be subject to regular FERC staff technical reviews and site inspections on at least an **annual** basis or more frequently as circumstances indicate. Prior to each FERC staff technical review and site inspection, CP2 LNG shall respond to a specific data request including information relating to possible design and operating conditions that may have been imposed by other agencies or organizations. Up-to-date detailed P&IDs reflecting facility modifications and provision of other pertinent information not included in the semi-annual reports described below, including facility events that have taken place since the previously submitted semi-annual report, shall be submitted.

141. **Semi-annual** operational reports shall be filed with the Secretary to identify changes in facility design and operating conditions; abnormal operating experiences; activities (e.g., ship arrivals, quantity and composition of imported and exported LNG, liquefied and vaporized quantities, boil off/flash gas); and plant modifications, including future plans and progress thereof. Abnormalities shall include, but not be limited to, unloading/loading/shipping problems, potential hazardous conditions from offsite vessels, storage tank stratification or rollover, geysering, storage tank pressure excursions, cold spots on the storage tank, storage tank vibrations and/or vibrations in associated cryogenic piping, storage tank settlement, significant equipment or instrumentation malfunctions or failures, non-scheduled maintenance or repair (and reasons therefore), relative movement of storage tank inner vessels, hazardous fluids releases, fires involving hazardous fluids and/or from other sources, negative pressure (vacuum) within a storage tank, and higher than predicted boil off rates. Adverse weather conditions and the effect on the facility also shall be reported. Reports shall be submitted **within 45 days after each period ending June 30 and December 31**. In addition to the above items, a section entitled "Significant Plant Modifications Proposed for the Next 12 Months (dates)" shall be included in the semi-annual operational reports. Such information would provide the FERC staff with early notice of anticipated future construction/maintenance at the LNG facilities.

142. In the event the temperature of any region of the LNG storage container, including any secondary containment and imbedded pipe supports, becomes less than the minimum specified operating temperature for the material, the Commission shall be notified **within 24 hours** and procedures for corrective action shall be specified.

143. Significant non-scheduled events, including safety-related incidents (e.g., LNG, condensate, refrigerant, or natural gas releases; fires; explosions; mechanical failures; unusual over pressurization; and major injuries) and security-related incidents (e.g., attempts to enter site, suspicious activities) shall be reported to the FERC staff. In the event that an abnormality is of significant magnitude to threaten public or employee safety, cause significant property damage, or interrupt service, notification shall be made **immediately**, without unduly interfering with any necessary or appropriate emergency repair, alarm, or other emergency procedure. In all instances, notification shall be made to the FERC staff **within 24 hours**. This notification practice shall be incorporated into the liquefaction facility's emergency plan. Examples of reportable hazardous fluids-related incidents include:

a. fire;

b. explosion;

c. estimated property damage of $50,000 or more;

d. death or personal injury necessitating in-patient hospitalization;

e. release of hazardous fluids for 5 minutes or more;

f. unintended movement or abnormal loading by environmental causes, such as an earthquake, landslide, or flood, that impairs the serviceability, structural integrity, or reliability of an LNG facility that contains, controls, or processes hazardous fluids;

g. any crack or other material defect that impairs the structural integrity or reliability of an LNG facility that contains, controls, or processes hazardous fluids;

h. any malfunction or operating error that causes the pressure of a pipeline or LNG facility that contains or processes hazardous fluids to rise above its maximum allowable operating pressure (or working pressure for LNG facilities) plus the build-up allowed for operation of pressure-limiting or control devices;

i. a leak in an LNG facility that contains or processes hazardous fluids that constitutes an emergency;

j. inner tank leakage, ineffective insulation, or frost heave that impairs the structural integrity of an LNG storage tank;

k. any safety-related condition that could lead to an imminent hazard and cause (either directly or indirectly by remedial action of the operator), for purposes other than abandonment, a 20 percent reduction in operating pressure or shutdown of operation of a pipeline or an LNG facility that contains or processes hazardous fluids;

l. safety-related incidents from hazardous fluids transportation occurring at or en route to and from the LNG facility; or

m. an event that is significant in the judgment of the operator and/or management even though it did not meet the above criteria or the guidelines set forth in an LNG facility's incident management plan.

In the event of an incident, the Director of OEP has delegated authority to take whatever steps are necessary to ensure operational reliability and to protect human life, health, property, or the environment, including authority to direct the LNG facility to cease operations. Following the initial company notification, the FERC staff would determine the need for a separate follow-up report or follow up in the upcoming semi-annual operational report. All company follow-up reports shall include investigation results and recommendations to minimize a reoccurrence of the incident.