

**Draft Environmental Assessment  
for Strategic Petroleum Reserve Life  
Extension-II (SPR LE-II) Work Packages**



DOE/EA-2073

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## Acronyms

ACT	Allocation Custody Transfer
ADAS	Alarm Display and Annunciation System
BC	Bayou Choctaw
BH	Big Hill
BM	Bryan Mound
CCTV	Closed Captioned Television
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
COP	Crude Oil Pipeline
CWA	Clean Water Act
CX	Categorical Exclusion
dB	Decibel
DNL	Day-Night Average Sound Level
DOE	Department of Energy
EA	Environmental Assessment
EO	Executive Order
EPA	Environmental Protection Agency
ESA	Threatened and Endangered Species Act
FPPA	Farmland Protection Policy Act
FONSI	Finding of No Significant Impact
FY	Fiscal Year
GHG	Greenhouse Gas
IPaC	Information for Planning and Consultation
LAC	Louisiana Administrative Code
LDEQ	Louisiana Department of Environmental Quality
Leq	Equivalent Noise Level
MBD	Thousand Barrels per Day
MCC	Master Control Center



MCL	Maximum Contaminant Level
MMBD	Million Barrels per Day
MMB	Million Barrels
MSA	Metropolitan Statistical Area
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NOI	Notice of Intent
NO <sub>x</sub>	Oxides of Nitrogen
NO <sub>2</sub>	Nitrogen Dioxide
NRCS	Natural Resources Conservation Service
PM	Particulate Matter
POL	Petroleum, Oil and Lubricant
RWINJ	Raw Water Injection
RWIS	Raw Water Intake Structure
SHPO	State Historic Preservation Office(r)
SO <sub>2</sub>	Sulfur Dioxide
SPR	Strategic Petroleum Reserve
SPR LE-II	Strategic Petroleum Reserve Life Extension II
SWPPP	Stormwater Pollution Prevention Plan
TAP	Toxic Air Pollutant
TCEQ	Texas Commission on Environmental Quality
TMDL	Total Maximum Daily Load
tpy	tons per year
USCB	United States Census Bureau
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
VOC	Volatile Organic Compounds
WH	West Hackberry

# 1. Executive Summary

This Environmental Assessment (EA) was prepared to fulfill the need for analysis of proposed actions planned in support of the Strategic Petroleum Reserve Life Extension II (SPR LE-II) project. There are a total of 86 proposed actions represented with analysis including the application of categorical exclusion (CX), full individual National Environmental Policy Act (NEPA) analysis (for ten proposed actions) and cumulative effects for all. Detailed project descriptions for the ten proposed actions that underwent full NEPA analysis is presented in Appendix B.

## 1.1 Full Analysis Results

Analysis results for the ten proposed actions that received full individual analysis indicates the following:

No impact to:

- Cultural Resources
- Ecological Resources (includes Threatened and Endangered Species)
- Environmental Justice
- Prime Farmland/Soils

Where temporary, minor impact is anticipated, it is related to activities inherent to construction work for each of the ten proposed actions:

- Air Quality – fugitive dust, petroleum-powered generator emissions
- Noise - Heavy equipment, generators, demolition equipment/activities, jack and bore machinery, heavy earth-moving equipment and heavy trucks used to haul equipment, materials and construction debris removal
- Water Resources – The potential for soil erosion at construction sites may increase surface water turbidity
- Socioeconomics - Short-term, beneficial impact may be realized with local construction work hiring.

Two sites had special considerations for Land Use and Water Resources and indicated that the no action alternative may cause impact:

BC-MM-1360, Site Road Access to Bayou Choctaw-19, -101, -102 and Baily Bridge

- Long-term, minor beneficial impact is anticipated for Land Use. Completion of this project eliminates the current need to use private property for access to the well pads.
- Analysis of the no action alternative for this work package indicates long-term minor impact to Land Use with the need to continue to utilize adjacent private property.

BH-MM-756/756A, Replace Section of 36” Crude Oil Pipeline (COP) at Hillebrandt Bayou

- The no action alternative may result in significant impact to Water Resources if the pipe walls continue to erode.

## **1.2 Cumulative Effects Results**

The cumulative effects analysis looked at potential geographic and temporal overlap among all work packages, including those where a CX applies. The results are similar to the analysis of the work packages that received full individual analysis; whereas there is no anticipated impact to cultural resources, ecological resources (including threatened and endangered species), environmental justice and prime farmland/soils). There is temporal overlap of several work packages but only those where construction is involved will cause temporary, minor impact in the areas of air quality, noise, water resources and temporary, minor beneficial impact on socioeconomics.

There are two Corps of Engineer projects occurring with temporal overlap: Calcasieu River and Pass (operations and monitoring) and the Mississippi River and Tributaries Flood Control project. The West Hackberry location would be nearest to these projects. It is unlikely that any of the West Hackberry work packages will cumulatively cause impact, nor will the Corps of Engineer projects impact the work at West Hackberry. While temporal overlap may occur, the distance between the locations and nature of the scheduled work is unlikely to cause an impact.

## **2 Introduction**

The Strategic Petroleum Reserve (SPR) was created on December 22, 1975 by mandate of Congress through the Energy Policy and Conservation Act. The objective of the SPR is to provide the United States with crude oil should a supply disruption occur. Oil is currently stored by the SPR crude oil facilities in Louisiana (Bayou Choctaw and West Hackberry) and two in Texas (Big Hill and Bryan Mound). The current storage design capacity at the four facilities is 714 million barrels (MMB). Proposed actions are planned at all four locations:

### **2.1 Louisiana Locations**

#### **Bayou Choctaw**

The Bayou Choctaw storage site is located in Iberville Parish, Louisiana, approximately 12 miles southwest of Baton Rouge, Louisiana. The site was acquired in April 1977 and became operational in 1979. Bayou Choctaw currently has six storage caverns, a design storage capacity of 76.0 MMB and a cavern inventory of 73.6 MMB.

#### **West Hackberry**

The West Hackberry storage site is located in Cameron Parish, Louisiana, approximately 25 miles southwest of Lake Charles, Louisiana. The site was acquired in April 1977 and became operational in 1978. West Hackberry currently has 22 storage caverns, a design storage capacity of 221.0 MMB and a cavern inventory of 205.5 MMB.

### **2.2 Texas Locations**

#### **Big Hill**

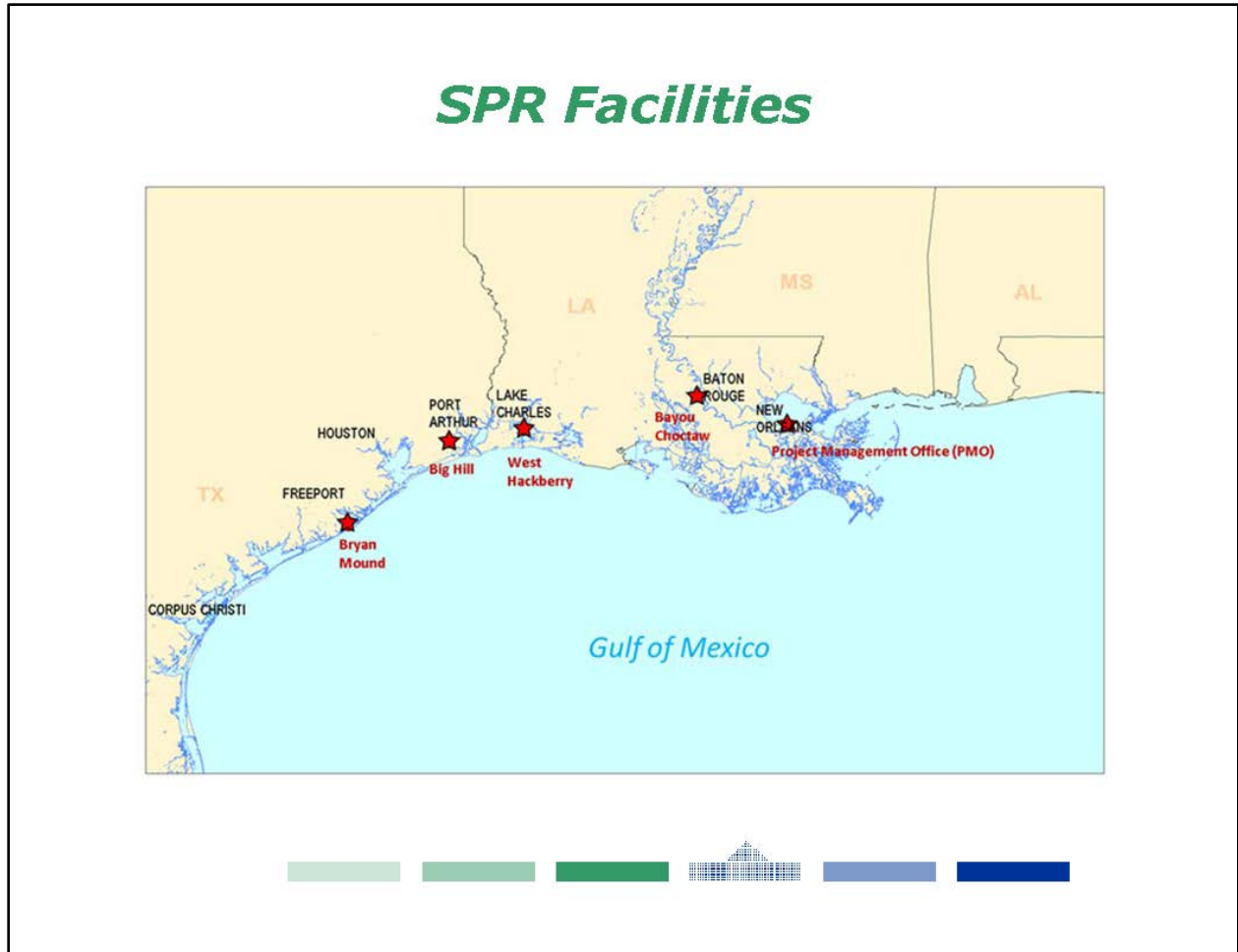
The Big Hill storage site is located in Jefferson County, Texas, approximately 26 miles southwest of Beaumont, Texas. The site was acquired in November 1982 and July 1983 and became operational in 1987. Big Hill currently has 14 storage caverns, a design storage capacity of 170.0 MMB and a cavern inventory of 158.3 MMB.

#### **Bryan Mound**

The Bryan Mound storage site is located in Brazoria County, Texas, approximately three miles southwest of Freeport, Texas. The site was acquired in April 1977 and became operational in 1978. Bryan Mound currently has 20 storage caverns, a design storage capacity of 247.0 MMB and a cavern inventory of 240.7 MMB.

Locations are indicated on Figure 1.

Figure 1 - SPR Facility Locations



The analysis of potential environmental impacts has been conducted in accordance with procedures set forth in NEPA, the Council on Environmental Quality’s Regulations for Implementing the Procedural Provisions of the NEPA (40 Code of Federal Regulations [CFR] 1500-1508) and the Department of Energy (DOE) NEPA Implementing Procedures (10 CFR 1021).

### 2.3 Stakeholder Involvement

In compliance with 10 CFR 1021.301 and the NEPA, the DOE submitted a Notice of Intent (NoI) to prepare an EA. The NoI was mailed to federal, state and local stakeholders and a copy of the letter is provided in Appendix A.

The EA will be made available for review during a 30-day public comment period as per 40 CFR 1506.6 and 10 CFR 1021.301. Legal public notice of the Draft EA availability and distribution

to Federal, State, local and tribal agencies will occur. Comments will be addressed in the Final EA and the Finding of No Significant Impact (FONSI) which will accompany it.

## **2.4 Document Structure**

In the spirit of NEPA at 40 CFR 1500.4 (b) and its goal of paperwork reduction, this document has been written to be “analytic, not encyclopedic” in nature, ensuring thorough, cited analysis and documentation that does not impose a burden to the reader. It has been written in such a way that the public will understand any technical, regulatory or agency terms as required by 40 CFR 1502.8 and 10 CFR 1021.301. Text across the four locations has been standardized where possible so that the reader may have an expectation of consistency throughout the document.

As defined above, this EA addresses projects related to four distinct locations. They are not co-located geographically and there is no reason to believe that a project at one location will affect the surrounding environment at another. For this reason, the information is presented in four separate sections unique to each SPR location. Each location will have discussion about nine major resources: air quality, cultural resources, ecological resources, environmental justice, land use, noise, socioeconomics, threatened and endangered species, and water resources. The information contained in the affected environments baseline information is focused upon applicable federal, state and local regulatory requirements and policy. It serves as a metric to determine if an action may be impactful or not. The discussion is further supplemented with a summary of the criteria used to determine significance placed in the analysis discussion.

Every effort has been made to streamline document organization and ensure that pertinent information is strategically placed to alleviate the need for referencing back to previous sections. The analysis is organized per facility as such:

- Details of the proposed actions (the proposed and no-action alternatives)
- Current affected environment conditions and regulatory requirements
- Project Analysis
  - Potentially impactful project activities
  - Analysis of each affected environment
    - Criteria for Determining Significance
    - Proposed Action Analysis
    - No-Action Alternative Analysis

### 3 Purpose and Need for Action

The SPR was determined to need substantial infrastructure improvement after an internal review identified needs that are critical to maintain operational readiness, mission requirement execution and environmental stewardship. A list of proposed actions necessary to bring the SPR into the desired state is shown in Tables 1 and 2.

Each proposed action has undergone rigorous analysis to determine the proper activities to achieve each goal. Complete details of the analysis, including the process, selection criteria and recommendations are found in the Life Extension 2 Conceptual Design Report Volumes I-VIII (DOE, 2016). Pertinent information from these volumes is presented in Appendix B.

The work packages listed in Table 1 received full environmental analysis. All but two of the activities listed in Table 2 meet criteria for a CX in accordance with 10 CFR 1021 Appendix B to Subpart D of Part 1021 – Categorical Exclusions Applicable to Specific Agency Actions. The remaining two are addressed in previously finalized EAs. Normally actions covered by a CX would be removed from consideration during an EA. Since there are a large number of actions being performed either simultaneously or within a short period of time, many of these actions will be analyzed for potential cumulative impact.

The following actions will be fully analyzed in the EA:

*Table 1 – Proposed actions to be analyzed in the EA*

Location	Work Package #	Proposed Action
<b>Bayou Choctaw</b>	BC-MM-1360	Site Road Access to Bayou Choctaw-19, -101, -102 and Bailey Bridge
<b>Big Hill</b>	BH-MM-596/596A	Replace Onshore Section of Brine Disposal Line
<b>Big Hill</b>	BH-MM-756/756A	Replace Section of 36" COP at Hillebrandt Bayou
<b>Big Hill</b>	BH-SP-1307/1307A	BH Simultaneous Distribution to Chevron/Unocal, Shell and Sun
<b>Big Hill</b>	BH-SP-1407/1407A	BH Pipeline – Beaumont Terminal Flow Control
<b>West Hackberry</b>	WH-MM-693	Marine Service Center
<b>West Hackberry</b>	WH-MM-1025	Replace the 42 Inch Pigging Water Underground Pipeline

<b>West Hackberry</b>	WH-MM-1349/649/337	Subsidence & Inundation Mitigation
<b>West Hackberry</b>	WH-MM-1350	Recomplete/Replace Brine Disposal Wells
<b>West Hackberry</b>	WH-MM-1359	Revise WH RWINJ Pump Exercise System

*Table 2 - SPR LE-II Categorically Excluded Proposed Actions to be Cumulatively Analyzed*

<b>Location: Bayou Choctaw</b>		
<b>Work Package #</b>	<b>Proposed Action</b>	<b>Categorical Exclusion</b>
<b>BC-MM-308</b>	Upgrade Outdoor Lighting	B5.1 Actions to Conserve Energy or Water
<b>BC-MM-437</b>	Sewage Treatment Plant	B1.26 Small Water Treatment Facilities
<b>BC-MM-770</b>	Upgrade and Automate Brine Disposal Well Valves and Flow Meters	B1.3 Routine Maintenance
<b>BC-MM-771</b>	Upgrade Brine Disposal Well MCC and MCC Electrical Service	B1.3 Routine Maintenance
<b>BC-MM-775</b>	Replace/Line Brine Disposal Well Branch Piping to Pads 1 and 2	B5.2 Modifications to Pumps and Piping
<b>BC-MM-810</b>	Replace Site Emergency Generator	B1.31 Installation or relocation of machinery and equipment
<b>BC-MM-1297</b>	Replace Timber Supports	B1.3 Routine Maintenance
<b>BC-MM-1339</b>	Replace Perimeter Security Detection System	B2.2 Building and Equipment Instrumentation
<b>BC-MM-1351</b>	Bayou Choctaw Degas	Addressed in DOE/EA-0954 Environmental Assessment of Oil Degasification at Four Strategic Petroleum Reserve Facilities in Texas and Louisiana dated September, 1994
<b>BC-MM-1361</b>	Replace and Relocate High Speed Barriers	B1.31 Installation or Relocation of Machinery and Equipment
<b>BC-MM-1461</b>	Replace Oil-in-Water Monitors	B1.3 Routine Maintenance
<b>BC-MM-1526</b>	Replace CCTV System at Bayou Choctaw	B2.2 Building and Equipment Instrumentation
<b>BC-MM-1531/1364</b>	Replace Fire Water Pumps	B5.2 Modification to Pumps and Piping
<b>BC-LE-1719</b>	Modify pond with cover inlet screens to booster pumps and eliminate fresh water source	B1.8 Screened water intake and outflow structures
<b>BC-LE-1719</b>	Replace Remaining Brine Header	B1.3 Routine Maintenance



<b>BC-LE-1722</b>	Replace Fire Pump Bldg; Diesel Tank	B1.3 Routine Maintenance
<b>BC-LE-1724</b>	Raw Water Header to Caverns	B1.3 Routine Maintenance
<b>BC-LE-1724</b>	Replace Raw Water Injection Pump System and Intake Piping to High Pressure Pump Pad	B5.2 Modification to Pumps and Piping
<b>Location: Big Hill</b>		
<b>Work Package #</b>	<b>Location</b>	<b>Categorical Exclusion</b>
<b>BH-MM-523</b>	Replace 5kV Outdoor Bus Ducts	B1.3 Routine Maintenance
<b>BH-MM-597/597A</b>	Replace Raw Water Intake Pipeline at BH	B5.4 Repair or Replacement of Pipelines
<b>BH-MM-611</b>	Replace Crude Oil Injection Pump Motors and Skids	B5.2 Modification to Pumps and Piping
<b>BH-MM-631</b>	Replace Raw Water Injection Pump Motors and Skids	B5.2 Modification to Pumps and Piping
<b>BH-MM-670</b>	Site Building Upgrades Phase 2 (E2P2)	B1.15 Support Buildings
<b>BH-MM-750</b>	Upgrade ADAS System Serves and Workstations	B2.2 Building and Equipment Instrumentation
<b>BH-MM-776/776A</b>	Replace Actuators on Meter Skid Valves	B1.3 Routine Maintenance
<b>BH-MM-782</b>	Replace Slop Oil Tank & Pumps (BHP-6, BHP-51 & 52)	B1.3 Routine Maintenance
<b>BH-MM-793/793A</b>	Replace Seal Flush Tank & Pumps (BHT-9, BHP-89 & 90)	B1.3 Routine Maintenance
<b>BH-MM-806</b>	Replace Mark V Circuit Switches	B1.3 Routine Maintenance
<b>BH-MM-1356</b>	Replace Raw Water Header Above Grade	B5.2 Modifications to Pumps and Piping
<b>BH-MM-1357</b>	Replace Crude Oil Header Above Grade	B5.2 Modifications to Pumps and Piping
<b>BH-MM-1362</b>	Replace and Relocate High Speed Barriers	B1.31 Installation or Relocation of Machinery and Equipment
<b>BH-MM-1370</b>	Heat Exchanger Bundle Spares	B1.3 Routine Maintenance
<b>BH-MM-1429</b>	Lighting Upgrades at BH	B5.1 Actions to Conserve Energy or Water
<b>BH-MM-1523</b>	RWIS Infrastructure Upgrades at BH	B1.3 Routine Maintenance
<b>BH-MM-1527</b>	Replace CCTV System at BH	B2.2 Building and Equipment Instrumentation
<b>BH-MM-1530</b>	Replace Perimeter Security Detection System	B2.2 Building and Equipment Instrumentation
<b>BH-MM-1552</b>	Replace Oil-in-Water Monitors	B1.3 Routine Maintenance

<b>BH-LE-1733</b>	Upgrade of 34.5kV Relaying in Main Substation Relay Building	B1.3 Routine Maintenance
<b>BH-LE-1738</b>	Replace Raw Water Injection Pumps	B5.2 Modification to Pumps and Piping
<b>BH-LE-1738</b>	Replace All Injection Pad Piping	B5.4 Repair or replacement of piping
<b>BH-LE-1738</b>	Service Water Piping Replacement	B5.4 Repair or replacement of piping
<b>Location: Bryan Mound</b>		
<b>Work Package #</b>	<b>Location</b>	<b>Categorical Exclusion</b>
<b>BM-MM-369</b>	Lighting Upgrades at Bryan Mound	B5.1 Actions to Conserve Energy or Water
<b>BM-MM-590/590A</b>	Replace Raw Water Intake Pipeline No. 1	B5.4 Repair or Replacement of Pipelines
<b>BM-MM-774/774A</b>	Replace Actuators on Meter Skid Valves	B1.3 Routine Maintenance
<b>BM-MM-1055</b>	Convert BMT-4 to External Floating Roof	B1.3 Routine Maintenance
<b>BM-MM-1171</b>	Replace Microwave Security System at CO Transfer Pumps	B2.2 Building and Equipment Instrumentation
<b>BM-MM-1340</b>	Replace Perimeter Security Detection System	B2.2 Building and Equipment Instrumentation
<b>BM-MM-1354</b>	Replace Crude Oil Injection Pumps BMP-1, -4	B5.2 Modification to Pumps and Piping
<b>BM-MM-1355</b>	Replace Brine Tank BMT-1 with Purpose Built System	B1.3 Routine Maintenance
<b>BM-MM-1365</b>	Replace Below Grade Firewater Headers	B5.2 Modification to Pumps and Piping
<b>BM-MM-1371</b>	Heat Exchanger Bundle Spares	B1.3 Routine Maintenance
<b>BM-MM-1462</b>	Replace Oil-in-Water Monitors	B1.3 Routine Maintenance
<b>BM-MM-1524</b>	RWIS Infrastructure Upgrades at Bryan Mound	B1.3 Routine Maintenance
<b>BM-MM-1528</b>	Replace CCTV System at Bryan Mound	B2.2 Building and Equipment Instrumentation
<b>BM-LE-1701</b>	Replace Site Crude Oil Piping	B5.2 Modification to Pumps and Piping
<b>BM-LE-1706</b>	Replace Site Raw Water Piping	B5.2 Modification to Pumps and Piping
<b>Location: West Hackberry</b>		
<b>Work Package #</b>	<b>Location</b>	<b>Categorical Exclusion</b>
<b>WH-MM-617&amp;A/652&amp;A</b>	Lighting Upgrades at West Hackberry	B5.1 Actions to Conserve Energy or Water

<b>WH-MM-753</b>	Upgrade ADAS System Servers and Workstations	B2.2 Building and Equipment Instrumentation
<b>WH-MM-788</b>	Replace Slop Oil Pumps (WHP-517 & 518)	B5.2 Modification to Pumps and Piping
<b>WH-MM-791/791A</b>	Replace CO Injection Pumps WHP-22, 23, 131 at WH	B5.2 Modification to Pumps and Piping
<b>WH-MM-794/794A</b>	Replace Meter Skid Actuators at WH & Sun	B1.3 Routine Maintenance
<b>WH-MM-1100/1100A</b>	Replace WHT-1 Flush Water and WHT-10 Seal Flush Tanks	B1.3 Routine Maintenance
<b>WH-MM-1144</b>	Enhance Access to Valve Stations	Addressed in existing DOE/SPR/EA-2040 Finding of No Significant Impact and Final Environmental Assessment for the Strategic Petroleum Reserve Repair/Enhancement of Access to Remote Pipeline Valve Stations West Hackberry, Calcasieu and Cameron Parishes, Louisiana dated December 2016
<b>WH-MM-1148</b>	Repair/Replace roofs on Buildings 301, 317 & 320	B1.3 Routine Maintenance
<b>WH-MM-1150</b>	Replace Fuel Source at WHEG-5 at LCMS	B1.3 Routine Maintenance
<b>WH-MM-1281</b>	Replace Perimeter Security Detection System	B2.2 Building and Equipment Instrumentation
<b>WH-MM-1334</b>	Recap Anhydrite Ponds	B1.3 Routine Maintenance
<b>WH-MM-1363</b>	Replace and Relocate High Speed Barriers	B1.31 Installation or Relocation of Machinery and Equipment
<b>WH-MM-1366</b>	Replace Below Grade Firewater Headers	B5.2 Modification to Pumps and Piping
<b>WH-MM-1372</b>	Heat Exchanger Bundle Spares	B1.3 Routine Maintenance
<b>WH-MM-1463</b>	Replace Oil-in-Water Monitors	B1.3 Routine Maintenance
<b>WH-MM-1525</b>	RWIS Infrastructure Upgrades at WH	B1.3 Routine Maintenance
<b>WH-MM-1529</b>	Replace CCTV System at WH	B2.2 Building and Equipment Instrumentation
<b>WH-LE-1710</b>	Replace Site Crude Oil Piping	B5.2 Modification to Pumps and Piping
<b>WH-LE-1713</b>	Redundant Power Feed to RWIS from Ellender Substation	B1.3 Routine Maintenance
<b>WH-LE-1717</b>	Replace Site Raw Water Piping	B5.2 Modification to Pumps and Piping

Pertinent pages from 10 CFR 1021 Appendix B to Subpart D of Part 1021 – Categorical Exclusions Applicable to Specific Agency Actions containing highlighted definitions of the applicable CX are provided in Appendix C.

## 4 Bayou Choctaw

### 4.1 Bayou Choctaw Affected Environments

The following section focuses on the current status of environmental resources that may potentially be affected directly, indirectly and/or cumulatively by implementing the SPR LE-II work packages at Bayou Choctaw. These resources include air quality, cultural resources, ecological resources, environmental justice, land use, noise, prime farmland, socioeconomics, threatened and endangered species, and water resources.

#### 4.1.1 Air Quality

The Louisiana Department of Environmental Quality's (LDEQ) Air Monitoring Program is responsible for carrying out the mandates of the Louisiana Air Control Law, as well as meeting Louisiana's federal obligations under the Clean Air Act. They are responsible for regulating stationary sources for which operating permits may be necessary. The air quality thresholds discussed here are to be used as guidance to determine if a proposed action would result in a significant impact to air quality (acute or cumulative) in relation to NEPA. This information should not be used to determine if an action would require a permit.

In Louisiana, seven pollutants are used to calculate the Air Quality Index: carbon monoxide, nitrogen dioxide, ozone, sulfur dioxide, particulate matter (PM) 2.5 and 10 and lead. Not all pollutants are monitored at each location in the state. The monitoring station nearest Bayou Choctaw is approximately 11 miles away in the city of Bayou Plaquemine, part of the Baton Rouge Metropolitan Statistical Area (MSA). It monitors ozone, nitrogen and sulfur dioxide and volatile organic compounds (VOCs). There are two other monitoring stations within the Baton Rouge MSA, Iberville Parish monitoring system: Geismar, which monitors PM 2.5 only (approximately 40 miles from Bayou Choctaw) and Carville, which monitors ozone and VOCs (approximately 33 miles away).

The list of pollutants mirrors the federal government's established standards which are known as the National Ambient Air Quality Standards (NAAQS). The pollutants of concern and the levels and thresholds specific to each are indicated in Table 3:

*Table 3 - National Ambient Air Quality Standards – Iberville Parish*

Pollutant	Primary <sup>2</sup> / Secondary <sup>3</sup>	Averaging Time & Level	Threshold	Current Status
Carbon Monoxide (CO)	Primary	8 hours = 9 ppm <sup>1</sup> 1 hour = 35 ppm	Not to be exceeded more than once per year.	Attainment

Pollutant	Primary <sup>2</sup> / Secondary <sup>3</sup>	Averaging Time & Level	Threshold	Current Status
Nitrogen Dioxide (NO <sub>2</sub> )	Primary (1 hour)	1 hour = 100 ppb	98 <sup>th</sup> % of 1-hour daily maximum concentrations, averaged over 3 years	Attainment
	Primary & Secondary (Annual)	Annual average = 53 ppb <sup>1</sup>	Annual Mean	Attainment
Lead	Primary & Secondary	Rolling 3 month average = 0.15 ug/m <sup>3</sup>	Not to be exceeded	Attainment
Ozone	Primary & Secondary	8-hour = .070 ppm	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years.	Maintenance
Particulate Matter 2.5 <sup>1</sup> (PM 2.5)	Primary	Annual = 12 ug/m <sup>3</sup> . <sup>1</sup>	Annual mean, averaged over 3 years	Attainment
	Secondary	Annual = 15 ug/m <sup>3</sup>	Annual mean, averaged over 3 years	Attainment
	Primary and Secondary	24-hour = 35 ug/m <sup>3</sup>	98th percentile, averaged over 3 years	Attainment
Particulate Matter 10 <sup>1</sup> (PM 10)	Primary and Secondary	24-hour = 150 ug/m <sup>3</sup>	Not to be exceeded more than once per year on average over 3 years	Attainment
Sulfur Dioxide (SO <sub>2</sub> )	Primary	1-hour = 75 ppb	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years	Attainment
	Secondary	3-hour = 0.5 ppm	Not to be exceeded more than once per year	Attainment

Source: U.S. Environmental Protection Agency (USEPA) website <http://www.epa.gov/air/criteria.html> accessed December 6, 2017

<sup>1</sup>**Units of measure:** parts per million (ppm), parts per billion (ppb), micrograms per cubic meter of air (ug/m<sup>3</sup>) for PM.

<sup>2</sup>**Primary standards** provide public health protection, including protecting the health of "sensitive" populations such as asthmatics, children, and the elderly.

<sup>3</sup>*Secondary standards* provide public welfare protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings.

<sup>4</sup>**PM 10** is not currently being monitored at the Plaquemine Bayou monitoring area.

<sup>5</sup>**Lead** is included in the full list of NAAQS pollutants. Not all pollutants are monitored at each monitoring station, and lead is not monitored at the Baton Rouge MSA stations.

## General Conformity Rule

Iberville Parish is located in the Baton Rouge Ozone Maintenance Area after having been removed from the eight-hour ozone non-attainment areas on March 21, 2017. A “maintenance area” is an area that was once located in non-attainment but has been re-designated to attainment. (Source: Louisiana Nonattainment/Maintenance Status for Each County by Year for All Criteria Pollutants accessed at [https://www3.epa.gov/airquality/greenbook/anayo\\_la.html](https://www3.epa.gov/airquality/greenbook/anayo_la.html) on December 7, 2017)

Each time an activity is proposed, the DOE performs analysis based on the General Conformity Rule to determine if the activity will exceed the thresholds de minimis presented in Table 4. If the emissions from the activities are below the de minimis levels, then a full General Conformity Analysis is not required.

40 CFR Part 93, Subpart B, 93.153, Applicability, provides in paragraph (b) (2) the following thresholds in maintenance areas:

*Table 4 - General Conformity Rule Thresholds for Maintenance Areas*

Pollutant	Tons/year
Ozone (Oxides of Nitrogen [NO <sub>x</sub> ], Sulfur Dioxide [SO <sub>2</sub> ] or Nitrogen Dioxide [NO <sub>2</sub> ]):	
All Maintenance Areas	100
Ozone (VOC's):	
Maintenance areas inside an ozone transport region	50
Maintenance areas outside an ozone transport region	100
Carbon monoxide: All Maintenance Areas	100
PM-10: All Maintenance Areas	100

Pollutant	Tons/year
PM <sub>2.5</sub> :	
Direct emissions	100
SO <sub>2</sub>	100
NO <sub>x</sub> (unless determined not to be a significant precursor)	100
VOC or ammonia (if determined to be significant precursors)	100
Lead: All Maintenance Areas	25

### Permits

In addition to being subject to the NAAQS, Bayou Choctaw operates under Permit #1280-00015-03 issued by the LDEQ dated June 12, 2017 in accordance with Louisiana Administrative Code (LAC) 33 Part III, Air. This facility is a minor source of LAC 33:III.Chapter 51 Toxic Air Pollutants (TAPs).

Table 5 reflects the estimated emissions from the facility in tons per year (tpy) for Criteria Pollutants and TAP emissions. The information in Tables 5 and 6 are from Permit #1280-00015-03 issued by the LDEQ dated June 12, 2017 and is the most comprehensive permit used at the facility. Project/activity-specific permits are obtained as needed. The Maintenance and Operations contractor will obtain all permits and approvals required for the maintenance, construction and operation of the project and will incorporate the project into the existing site-wide permitting programs as applicable.

*Table 5 - Estimated Emissions (Criteria Pollutants and TAP)*

Pollutant	Estimated emissions (tpy)
PM <sup>10</sup>	0.08
PM 2.5	0.08
SO <sup>2</sup>	0.05

Pollutant	Estimated emissions (tpy)
NOx	1.66
CO	.38
VOC	7.81
Benzene	0.09
Ethyl Benzene	0.09
n-Hexane	.73
Toluene	.09
Xylenes	.09

Source: Permit #1280-00015-03 issued by the LDEQ dated June 12, 2017

The tpy **emission limits** for each tank and emergency engine are similar but vary slightly. More information regarding emission limits may be found in the permit documentation, but the tpy limits per pollutant and equipment unit is listed below in Table 6:

*Table 6 - Emission rates for Criteria Pollutants and TAPS*

PM <sup>10</sup>	PM <sup>2.5</sup>	SO <sub>2</sub>	NO <sub>x</sub>	CO	VOC	Benzene	Ethyl Benzene	n-Hexane	Toluene	Xylenes
Emission Source		BCT-3 Underground Crude Oil Slop Tank (1,000 gal) (EQT0005)								
					0.68	<0.01	<0.01	0.06	<0.01	<0.01
Emission Source		BCT-32 Gasoline Storage Tank (2,000 gal) (EQT 0006)								
					0.21	<0.01	<0.01	0.01	<0.01	<0.01
Emission Source		BCT-BP Brine Pond System (EQT 0008)								
					1.26	<0.01	<.01	0.12	<0.01	<0.01



PM <sup>10</sup>	PM <sup>2.5</sup>	SO <sub>2</sub>	NO <sub>x</sub>	CO	VOC	Benzene	Ethyl Benzene	n-Hexane	Toluene	Xylenes
Emission Source		BCEG-11 Emergency Electrical Generator Diesel Motor (1,006hp) (EQT 0009)								
0.04	0.04	<0.01	1.21	0.28	0.03					
Emission Source		BC-AE Air Eliminator Meter Skid Vent (EQT 0010)								
					0.07	<0.01	<0.01	0.01	<0.01	<0.01
Emission Source		BC-FRAC Frac Tank for Workovers (EQT 0011)								
					2.7	0.01	<.0.01	0.25	0.01	<0.01
Emission Source		BCP-37 Emergency Firewater System Pump Diesel Motor (280hp) (EQT 0012)								
0.03	0.03	0.03	0.43	0.09	0.04					
Emission Source		BCP-79 Emergency Stormwater System Pump Diesel Motor (50 hp) (EQT 0013)								
<0.01	<0.01	<0.01	0.02	<0.01	<0.01					
Emission Source		BCT-100 Crude Oil Slop Tank (19,750 gal) (EQT 0014)								
					1.93	0.01	<0.01	0.18	<0.01	<0.01
Emission Source		BCT-39 Crude Oil Surge Tank (800 gal) (EQT 0015)								
					0.03	<0.01	<0.01	<0.01	<0.01	<0.01
Emission Source		BCT-40 Crude Oil Storage Tank (10,0000 gal) (EQT 0016)								
					0.79	<0.01	<0.01	0.08	<0.01	<0.01
Emission Source		BC-F Fugitive Emissions (FUG 0001)								
					0.06	<0.01	<0.01	0.01	<0.01	<.0.01
Emission Source		Unit or Facility-wide (UNF 0001)								
						0.09	0.09	0.73	0.09	0.09

## **Greenhouse Gas (GHG) (Executive Orders [EO] 13693)**

The Greenhouse Gas Reporting Program authority is carried out at the federal level of USEPA. The Consolidated Appropriations Act of 2008 triggered the issue of the Mandatory Reporting of Greenhouse Gases Rule (74 FR 56260/40 CFR 98). The rule states that any facility that emits 25,000 tpy or more of carbon dioxide equivalent (CO<sub>2</sub>e) is required to submit annual reports to the USEPA. Further information and guidance can be found at <http://www.epa.gov/ghgreporting/basic-info/index.html>.

There is an EO relevant to this effort: EO 13693.

EO 13693 directs government agencies to “reduce GHG emissions through reduction of energy intensity 30 percent by 2015, compared to a Fiscal Year (FY) 2003 baseline.” It also directs federal agencies to reduce targeted scope 1 and scope 2 GHG emissions by at least 40% by FY 2025 from a FY 2008 baseline. Section 2 of EO 13693 directs individual agencies to set scope 1 and 2 GHG emission reduction targets for FY 2025 from a FY 2008 baseline. In addition, the goal for scope 3 GHG emission reduction is 13% by 2025 from a 2008 baseline.

Scope 1 GHG emissions are direct emissions which result from sources owned or controlled by DOE. Included in this source are boilers/water heaters and intra-installation vehicular travel. The Bayou Choctaw facility’s major Scope 1 GHG source is emergency engines.

Scope 2 GHG emissions are indirect emissions resulting from consumption of purchased electricity, heat or steam. This includes electricity purchased for heating equipment and general electrical use.

Scope 3 GHG emissions are “other indirect emissions” which include extraction and production of purchased materials and fuels-transport related activity not covered in Scope 2. This also includes emissions from commuting and air-travel.

### **4.1.2 Cultural Resources**

There are no known archeological, historical, or cultural resources that would potentially be affected by the project. Given the disturbed state of almost all of the facility area, involvement with any potential unidentified resource is unlikely.

Section 106 of the National Historic Preservation Act (NHPA) requires federal agencies to take into account the effects of their undertakings on historic properties and afford the Advisory Council on Historic Properties and other parties with an interest a reasonable opportunity to comment (consultation) beginning at the early stages of project planning. An undertaking is defined as “a project, activity or program funded in whole or in part under the direct or indirect jurisdiction of a Federal Agency, including those carried out by or on behalf of a Federal

Agency; those carried out with Federal financial assistance; and those requiring a Federal permit, license or approval. Once an undertaking has been identified, the State Historic Preservation Officer (SHPO) will determine if it is a type of activity that has the potential to cause effects on historic properties.”

Please note that NEPA analysis does not replace or negate the need for NHPA Section 106 review. Therefore, any action that may affect the physical landscape are subject to review for possible adverse impacts to be identified. Coordination with the SHPO is required in all cases.

### 4.1.3 Ecological Resources

Vegetation is defined as plants and their geographic characteristics. Fish and wildlife are the animals and their habitats that occur within a region. Threatened and endangered species are any federally or state listed species in or around the facility. Section 7 of the Endangered Species Act, as amended (16 United States Code, Chapter 35 § 1531-1544), requires federal agencies evaluate the efforts of the proposed actions on protected plant and animal species and their habitats and take appropriate measures to conserve and protect these species. Special-status species include plants and animals listed as sensitive, threatened, or endangered by the United States Fish and Wildlife Service (USFWS), as well as those that are candidates or proposed for listing as threatened or endangered. Special status species also include those species protected by the Migratory Bird Treaty Act, the Bald and Golden Eagle Protection Act, and the Marine Mammal Protection Act.

The Louisiana Department of Wildlife and Fisheries Species by Parish List reports the following species in Iberville Parish: <http://www.wlf.louisiana.gov/wildlife/species-parish-list>

Table 7 - Plant Species in Iberville Parish

Common Name	Scientific Name	State Status	Federal Status
Sink-hole Fern	<i>Blechnum occidentale</i>	None	None
Snow Melanthera	<i>Melanthera nivea</i>	None	None
Powdery Thalia	<i>Thalia dealbata</i>	None	None
Nodding Pogonia	<i>Triphora trianthophora</i>	None	None

Table 8 - Mammals, Birds and Fish Species in Iberville Parish

Common Name	Scientific Name	State Status	Federal Status
American Swallow-tailed Kite	<i>Elanoides forficatus</i>	None	None
Bald Eagle	<i>Haliaeetus leucocephalus</i>	Endangered	Delisted
Osprey	<i>Pandion haliaetus</i>	None	None
Pallid Sturgeon	<i>Scaphirhynchus albus</i>	Endangered	Endangered
Interior Least Tern	<i>Sternula antillarum athalassos</i>	Endangered	Endangered
Louisiana Black Bear	<i>Ursus americanus luteolus</i>	Threatened	Threatened
Atlantic Sturgeon	<i>Acipenser oxyrinchus</i>	Threatened	Threatened

Source: Louisiana Department of Wildlife and Fisheries Species by Parish List accessed at <http://www.wlf.louisiana.gov/wildlife/species-parish-list> on December 8, 2017.

While members of the above-listed species reportedly live in Iberville Parish, none of them call the SPR Bayou Choctaw home. An Official Species List was generated using the USFWS Information for Planning and Consultation (IPaC). The list fulfills the requirement for Federal agencies to “request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action” pursuant to the aforementioned Section 7 of the Endangered Species List. It reports for SPR Bayou Choctaw facility: “There are no critical habitats within your project area under this office’s jurisdiction.” The IPaC report is presented in Appendix E.

The facility complies with EO 13186 *Responsibilities of Federal Agencies to Protect Migratory Birds & Migratory Bird Act*. Migratory birds are often spotted at each of the SPR facilities. Mitigation activities to ensure the protection of migratory birds include flagging, avoidance of nesting areas and selective mowing cessation during critical times of the year to allow for adequate food and shelter.

#### 4.1.4 Environmental Justice

Environmental justice addresses the disproportionate effect a federal action may have on low-income or minority populations or on children. In 1994, EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations was issued to focus

attention of federal agencies on human health and environmental conditions in minority and low-income communities and to ensure that disproportionately high and adverse human health or environmental effects on these communities are identified and addressed. EO 13045, Protection of Children from Environmental Health Risks and Safety Risks Protection of Children), was signed by President Clinton in 1997.

According to the US Census Bureau, the 2016 American Community Survey estimated total population for Iberville Parish was 33,159 and 49.2 percent of that number is made up of people of the African American race. A relatively small percentage of the community is Hispanic, at only 2.5 percent, and an even smaller percentage of the Parish consists of people of American Indian or Alaskan Native decent, at 0.2 percent.

As defined by the Council on Environmental Quality (CEQ) report, Environmental Justice Guidance Under the NEPA, a minority population should be identified where either:

- The minority population of the affected area exceeds 50 percent; or
- The minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis.

#### **4.1.5 Land Use**

Land use comprises the natural condition or human-modified activities occurring at a particular location. Land uses are frequently regulated by management plans, policies, ordinances and regulation that determine the types of activities that are allowable or provide protection for specially designated or environmentally sensitive areas.

The SPR Bayou Choctaw facility has been operational since 1979. The facility is strictly used for oil industry activities with personnel support buildings (office/restrooms). DOE maintains appropriate operational permits and performs all regulatory compliance activities as required.

#### **4.1.6 Noise**

Noise is any sound that is undesirable because it interferes with communication, is intense enough to damage hearing, or is otherwise intrusive. Human response to noise varies depending on the type and characteristics of the noise, the distance between the noise source and the receptor, receptor sensitivity, and the time of day. Noise is often generated by activities such as construction or vehicular traffic. Sound levels are expressed in decibels (dB) and various weighted dB scales (i.e. A, B C) are used to approximate how people perceive different types of sounds. USEPA defined a long-term average noise descriptor, the “equivalent” noise level, or Leq. The Day-Night Average Sound Level (DNL) consists of the Leq with a 10-dB penalty for night-time noise. This metric provides a single measure of overall noise impact and is the accepted measure of determining human noise impacts.

The Bayou Choctaw site is characterized by natural remote area ambient sound patterns (birds, frogs, insects, wind). On a reasonably calm day one could expect approximately 50 dBA in the area (in comparison, a truck travelling 65 miles per hour produces 88 dBA 50 feet away). (DOE, 1976) Noise from local traffic activity barely penetrates to the site due to sound attenuation from surrounding trees and vegetation.

Local Iberville Parish Ordinance does not specifically address excessive sound of noise from construction or other work sites; it only addresses such noise from motor vehicles. Noise concerns would be addressed from a worker health and safety perspective. All four SPR locations are governed by OSHA 1910.119, *Process Safety Management of Highly Hazardous Chemicals* per a 1994 determination by the Department of Labor. The four storage sites also participate in the OSHA Voluntary Protection Program meaning hazard analyses adhere to what OSHA considers industry best practices. A preliminary hazards review was performed and it indicates noise is not a concern from any of the proposed actions. (DOE, 2017)

#### 4.1.7 Prime Farmland/Soils

The Natural Resources Conservation Services (NRCS) has listed the majority of the soil map units within the proposed project area as prime farmland. More specifically, the soils in the project area are mapped as Sharkey clay (0 to 1 percent slopes), both rarely flooded and frequently flooded. The Sharkey series consists of very deep, poorly and very poorly drained, very slowly permeable soils that formed in clayey alluvium. These soils are on flood plains and low terraces of the Mississippi River. Slope is dominantly less than 1 percent, but ranges to 5 percent.

*Table 9: Soil Descriptions in the Project Area*

Soil Type	Drainage Class	Average Slope	Prime Farmland
Sharkey clay	Rarely flooded	0 to 1 Percent	Yes
Sharkey clay	Frequently flooded	0 to 1 Percent	No

Source: NRCS Web Soil Survey Tool at <https://websoilsurvey.sc.egov.usda.gov>

The purpose of the Farmland Protection Policy Act (FPPA) is to minimize the extent to which Federal programs contribute to the unnecessary conversion of farmland to non-agricultural uses. The FPPA stipulates that Federal programs be compatible with State, local and private efforts to protect farmland. Prime farmland soils have the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. In general, prime farmland soils experience adequate and dependable precipitation, a favorable temperature and growing season, have acceptable acidity or alkalinity, and have few or no surface stones. Prime

farmland soils are permeable to water and air. These soils are not excessively erodible or saturated with water for long periods of time. One soil map unit classified as prime farmland soil is located within the facility area (see Table 10 and Appendix D).

#### 4.1.8 Socioeconomics

Socioeconomics is the study and analysis of the human environment. For this EA, the focus of the socioeconomics section will focus on population, employment, personal income and housing.

Bayou Choctaw is located in Iberville Parish, Louisiana. Adjacent communities include Plaquemine and Addis. It is anticipated that any potential socioeconomic impacts due to the proposed actions would be concentrated within these areas surrounding the facility.

The population estimate for Iberville Parish as of 2016 was 32,920. This was a 1.4% decrease from the 2010 Census. The Addis population increased and Plaquemine saw a decrease. (USCB, 2016). The table below shows population numbers for the two cities.

*Table 10 - Population in Areas Surrounding Bayou Choctaw (2016)*

	Iberville Parish	Plaquemine	Addis	Total
Population Estimate 2016	33,159	6,920	4,420	44,260
Population 2010 Census	33,387	7,119	3,593	44,099
Percent Change	-0.7%	-2.8	23.02%	0.37%

The largest contributors to employment in the surrounding areas are educational services and health care and social assistance services. For Plaquemine, the next largest contributing sectors are arts, entertainment, recreation, accommodations and food services; and manufacturing. For Addis, the largest contributing sectors are manufacturing, educational services and health care and social assistance services; and construction. (USCB, 2016).

As shown in the table below, there is a median household income difference of \$23,526 between Addis and Plaquemine. Unemployment rates are very similar across the area.

*Table 11 - Employment in Areas Surrounding Bayou Choctaw (2016)*

Location	Civilian Labor Force	Armed Forces Labor Force	Unemployment Rate	Median Household Income	Per Capita Income in past 12 months
Iberville Parish	14,107	61	7.2%	46,480	62,741
Plaquemine	3,182	0	6.1%	42,430	56,693
Addis	2,499	0	6.3%	65,956	65,956

#### **4.1.9 Water Resources**

##### **Groundwater**

Potable water at the facility is provided by the city of Plaquemine, which draws groundwater from the shallow Plaquemine aquifer. This aquifer serves as the source of fresh water for the cities of Plaquemine and Addis. The brine disposal wells operate in a much deeper, lower aquifer that does not have hydraulic interaction with the Plaquemine aquifer. Operations at the facility includes constant monitoring that no petroleum-related contaminants are released to the environment. That includes the brine that is ultimately injected into the deep aquifer.

##### **Surface Water**

Surface water immediately surrounds the facility with the Mississippi River approximately 7 miles to the east. There are a series of channels associated with Port Allen Lock and Bayou Borbeaux to the west which influence a pond that was formed years ago when Salt Cavern No. 7 collapsed.

Section 303(d) of the Clean Water Act (CWA) requires states to identify waters where current pollution control technologies alone cannot meet the water quality standards set for that waterbody. Every two years, states are required to submit a list of impaired waters plus any that may soon become impaired to USEPA for approval. The impaired waters are prioritized based on the severity of the pollution and the designated use of the waterbody (e.g., fish propagation or human recreation). States must establish the total maximum daily load(s) (TMDL) of the pollutant(s) in the waterbody for impaired waters on their list. The most current cycle for Louisiana is 2016.



Port Allen Lock is an Intracoastal Waterway. The portion of the lock near Bayou Choctaw where Port Allen Locks water flows to Bayou Sorrel Locks is a 303(d) Listed Water for 2016. The contaminant for which it is listed is sulfates. The section (reach) of the Mississippi River nearest the facility is included in the Mississippi River from Monte Sano Bayou to Head of Passes location as it appears in the Louisiana Water Quality Assessment Report is considered to be “good” or “unimpaired” per the 2016 data. (EPA, 2016)

Impairment of surface water bodies is often due to stormwater runoff. The land at the facility is relatively flat with normal drainage toward Port Allen Lock canal (westward). Drainage can be variable due to the influence of the Mississippi River, Port Allen Lock canal and even the Gulf of Mexico tidal action. The SPR Stormwater Pollution Prevention Plan (SWPPP) addresses mitigation activities needed to ensure surface water quality is not impacted by normal facility operations.

## **Wetlands**

The main portion of the facility is nearly fully covered in impermeable surface but is surrounded by wetlands in various forms from permanent surface water bodies (ponds) to near-permanent, seasonally, or temporarily flooded states. Appendix F includes current USFWS National Wetlands Inventory maps for the facility accessible at <https://www.fws.gov/wetlands/data/mapper.html> (definitions of the codes used on the map are also available in the frequently asked questions section of the website).

Louisiana Department of Natural Resources manages a program that requires compensation for impact to coastal resources in the Louisiana Coastal Zone. If a proposed project action is determined to potentially impact a coastal resource, such as a wetland, then those responsible for the unavoidable loss of the resources will provide compensation using the following options:

- Purchase habitat credits from an Office of Coastal Management-approved mitigation bank
- Purchase credits from an approved In-Lieu Fee Mitigation Program
- Implementation of individual mitigation project
- Other options determined to be appropriate by the secretary which fully compensate for lost habitat values.

Source: <http://www.dnr.louisiana.gov>

The maintenance and operations contractor will comply with requirements to submit project plans to the Office of Coastal Management for a review to determine whether the proposed actions are consistent with the Louisiana Coastal Resources Program in accordance with Section 307 (c) of the Federal Coastal Zone Management Act of 1972.

## **4.2 Description of Proposed Actions/Alternatives and Project Analysis – Bayou Choctaw**

The following section is structured with the Proposed Action and Alternatives, followed by the Project Analysis. The proposed action and alternatives information is taken from the Life Extension 2 Conceptual Design Report Volumes I-VIII (Appendix B).

The analysis focuses upon the environmental resources that may potentially be affected directly, indirectly and/or cumulatively by implementing the SPR LE-II work packages at Bayou Choctaw. These resources include air quality, cultural resources, ecological resources environmental justice, land use, noise, prime farmland, socioeconomics, threatened and endangered species, and water resources. For convenience, the potentially impactful project activities and criteria for determining significance is included in this section.

### **4.2.1 Proposed Action and Alternative**

#### **4.2.1.1 BC-MM-1360 Site Road Access to BC-19, 101, 102, and Bailey Bridge**

##### **Mission Need**

Improve the North-South Bridge and roadway to allow workover rigs to access caverns BC-19, BC-101, 102 and Bailey Bridge. This project is to maintain the same level of security as exists now. In addition, to meet mission need, the East-West Bridge and Bailey Bridge will also be evaluated to be enhanced and/or replaced. In addition, upgrade the Brine Disposal Roadway Bridge and culvert.

##### **Functional Requirements**

The access road and bridges have multiple problems in terms of width and load bearing capacity. This necessitates that the well pads be accessed via adjacent property owners, a situation that can give rise to conflicts and restrict access. This roadway improvement task would ensure immediate, site controlled access to the well pads. It is absolutely imperative that the well pads be accessible from within the site and by vehicles the size of work-over rigs (~100,000 lbs.).

##### **Proposed Alternative:**

Replace Existing Bailey Bridge with New Higher Capacity Bailey Bridge; Replace North-South Bridge with Wider and Higher-Capacity Bridge; Replace East-West Bridge with Higher Capacity Bridge

Remove existing Bailey Bridge and replace with a higher capacity Bailey Bridge.

Reconstruct the existing Bailey Bridge adjacent to the North-South Bridge for temporary access. Remove the existing North-South bridge and replace with a wider, larger capacity bridge that provides access for the work over rig for a 25-year period. This will include a wider road, one that is suitable for the work over rig turning radius.

Use temporary access from Hwy 1148 and demolish existing East-West Bridge. Replace with a higher capacity bridge.

## 4.2.2 Project Analysis

### 4.2.2.1 BC-MM-1360 Site Road Access to Bayou Choctaw 19, 101, 102 and Bailey Bridge

BC-MM-1360 Site Road Access to Bayou Choctaw-19, -101, 102 and Bailey Bridge Potentially Impactful Activities: Land use (right of way), Construction, Demolition
Air Quality
<p><b>Criteria for Determining Significance:</b></p> <ul style="list-style-type: none"><li>• A status of non-attainment of the NAAQS thresholds as found in Table 3;</li><li>• An exceedance of an emission limit specified in the permit (summarized in Tables 5 and 6;</li><li>• An inability to meet the goals set forth in EO 13693; and</li><li>• An exceedance of a General Conformity Rule threshold as found in Table 4.</li></ul>
<p><b>Proposed Action Analysis: Temporary, minor impact is anticipated.</b> Earth-moving vehicles and heavy vehicle traffic will generate fugitive dust, increasing PM volume in the immediate area. Given that this work will take place in the water and the shoreline, it may not be as impactful as construction taking place on completely dry land.</p> <p>It is not anticipated to decrease air quality for the nearest residents within one-half mile of the facility. Emissions from gas-powered generators and increased vehicle traffic may increase VOC emissions, but not to a degree where NAAQS thresholds are exceeded. Project-specific permits will be obtained with appropriate, short-term emission limits which will be monitored to ensure no exceedances.</p> <p>The SPR LE-II Project Execution Plan indicates mitigation of noise will be considered early in the process so that it may be “reduced or eliminated at the design phase rather than when constructed or in use”. (DOE, 2017)</p>
<p><b>No Action Analysis:</b> There would be no impact to air quality.</p>
Cultural Resources
<p><b>Criteria for Determining Significance:</b> The results of a SHPO review will determine if the proposed action has the potential to cause impact to historic properties.</p>
<p><b>Proposed Action Analysis: No impact is anticipated.</b> There will be no impact to cultural resources given there are none present at the facility.</p>
<p><b>No Action Analysis:</b> There will be no impact to cultural resources.</p>

## Ecological Resources/Threatened and Endangered Species

### Criteria for Determining Significance:

- A requirement to engage in formal consultation with the USFWS.
- The “take” (as defined by the Threatened and Endangered Species Act [ESA]), or potential for “take”, of any individual or group of individuals of a listed species.
- The loss or degradation, or potential for such, of any critical habitat (as defined by the ESA).

**Proposed Action Analysis: No impact is anticipated.** The USFWS IPaC report indicates that “there are no critical habitats within the project area” (see Appendix E). There will be no impact to ecological resources, to include threatened and endangered species.

**No Action Analysis:** There will be no impact to ecological resources/threatened and endangered species

## Environmental Justice

### Criteria for Determining Significance:

- Create an environment where the health and safety of socioeconomically disadvantaged community members and their surrounding area is at risk;
- Create undesirable living conditions for socioeconomically disadvantaged community members; and
- Create health and safety risks that may disproportionately affect children (as indicated in EO 13045 *Protection of Children from Environmental Health Risks and Safety Risks*).

**Proposed Action Analysis: No impact is anticipated.** The proposed action will take place at the SPR Bayou Choctaw facility, which is highly secured with no access to unauthorized visitors. The temporary nature of the work, the distance from which the facility sits away from the closest neighboring communities, facility security (which removes risk of acute health and safety issues from unauthorized visitors to the construction site) and the roadway improvement which will result from the execution of the project will not create a negative impact upon the sensitive population to which environmental justice applies.

**No Action Analysis:** There will be no impact to environmental justice.

## Land Use

### Criteria for Determining Significance:

- An action that impairs the original viewshed of adjacent properties;
- An action that causes noise concerns outside noise decibel thresholds (see Noise); and
- An action that causes land use to be incompatible with existing adjacent land uses.

**Proposed Action Analysis: Long-term, minor beneficial impact is anticipated.** The work will require use of adjacent property as temporary access to the well pads as well as the project site. The property is already being used to access the well pads because the current bridges are in need of upgrade and repair/replacement. The adjacent property owners have granted right-of-way access during the project. A benefit from completion of this project includes no need to use private property for access to the well pads, eliminating the need for right-of-way access. The viewshed and land compatibility will not change, as bridges already exist at the project site and will be replaced. Post-project noise will not increase from current baseline conditions (project-specific noise impacts are discussed under “Noise”).

**No Action Analysis: Long-term, minor impact is anticipated.** If the bridges are not replaced, SPR Bayou Choctaw employees will need to continue to utilize adjacent private property to access the well pads. If the current land owners change their minds, or if land ownership changes, there is a potential that future access may be denied.

## Noise

### Criteria for Determining Significance:

- Exceedance of the long-term average noise descriptor, or Leq, with a 10-decibel penalty for night-time noise

**Proposed Action Analysis: Temporary, minor impact is anticipated.** Heavy equipment and vehicles will be utilized to complete the proposed project and will result in an increase in noise levels normally heard during SPR Bayou Choctaw facility operations. The largest contributors of noise would be on-site generators, demolition equipment/activities, jack and bore machinery, heavy earth-moving equipment and heavy trucks used to haul equipment, materials and construction debris. Human neighbors nearest the facility will not be impacted given the distance and the insulated forested area between. Birds and other wildlife may be bothered by the increased noise level and may avoid the area until construction is complete.

**No Action Analysis:** There will be no noise impact as the construction would not take place.

## Prime Farmland/Soils

### Criteria for Determining Significance:

- The unnecessary conversion of farmland to non-agricultural uses.

**Proposed Action Analysis: No impact is anticipated.** The predominant soil type at SPR Bayou Choctaw facility is considered to be a soil type that is classified as farmland. The facility has been used for industrial operation since 1987 and the proposed action will not be changing the use for the particular piece of land associated with it (the bridges). The proposed action will not necessitate the need to convert adjacent, prime farmland-classified land.

**No Action Analysis:** There will be no impact to prime farmland/soils.

## Socioeconomics

### Criteria for Determining Significance:

- Create an environment where the health and safety of socioeconomically disadvantaged community members and their surrounding area is at risk;
- Create the potential to substantially affect human health or the environment by excluding persons, denying persons benefits, or subjecting persons to discrimination because of their race, color, national origin, or income level; and
- Create undesirable living conditions for socioeconomically disadvantaged community members.

**Proposed Action Analysis: Short-term, beneficial impact anticipated.** Similar to the discussion of environmental justice, the proposed action will take place at the SPR Bayou Choctaw facility, which is highly secured with no access to unauthorized visitors. The temporary nature of the work, the distance from which the facility sits away from the closest neighboring communities, facility security (which removes risk of acute health and safety issues from unauthorized visitors to the construction site) and the roadway improvement which will result from the execution of the project will not create a negative impact upon the sensitive population to which socioeconomics applies.

Short-term, economical beneficial impact may be seen with local construction-work hiring.

**No Action Analysis:** No impact is anticipated if the current bridges remain.

## Water Resources

### **Criteria for Determining Significance:**

- Increases the amount of impervious surface significantly, creating measurably more stormwater runoff than was originally experienced in the area;
- Results in the creation of a new channel or relocation of a natural drainage channel;
- Results in the discharge of pollutants that exceed federal and state water quality standards such as TMDLs or drinking water maximum contaminant levels (MCLs).
- A loss of wetland habitat which could change the function and viability of the wetland;
- Wetland destruction or fill which would result in loss of wetlands or wetland function;
- A release of hazardous material, petroleum, oil, and lubricant (POL), or other contaminants to a wetland that would risk injury to wildlife and humans; and
- Introduction of an invasive species which could alter the function and viability of a wetland.

**Proposed Action Analysis: Temporary, minor impact is anticipated.** Soil erosion is inherent with construction work and it is anticipated that an increase of silt will travel overland via stormwater to temporarily impact the Port Allen Lock channel. This will be minimized by the implementation of best management practices consistent with the SPR Pollution Prevention Plan (Publication ASL5400.41), Version 10.0 (08-02-16). It is not anticipated that the Mississippi River would be impacted.

Although the work will be taking place in and near wetlands, it is not anticipated that permanent harm or loss of wetland will occur. Project-specific permits will be obtained from the Corps of Engineers and all practicable steps will be taken to ensure minimal harm to wetlands.

**No Action Analysis:** There will be no water quality impact as the construction would not take place.



## 5 West Hackberry

### 5.1 West Hackberry Affected Environments

The following section focuses on the current status of environmental resources that may potentially be affected directly, indirectly and/or cumulatively by implementing the SPR LE-II work packages at West Hackberry. These resources include air quality, cultural resources, ecological resources, environmental justice, land use, noise, prime farmland, socioeconomics, threatened and endangered species, and water resources.

#### 5.1.1 Air Quality

The LDEQ Air Monitoring Program is responsible for carrying out the mandates of the Louisiana Air Control Law, as well as meeting Louisiana's federal obligations under the Clean Air Act. They are responsible for regulating stationary sources for which operating permits may be necessary. The air quality thresholds discussed here are to be used as guidance to determine if a proposed action would result in a significant impact to air quality (acute or cumulative) in relation to NEPA. This information should not be used to determine if an action would require a permit.

In Louisiana, six pollutants are used to calculate the Air Quality Index: carbon monoxide, nitrogen dioxide, ozone, sulfur dioxide, and PM 2.5 and 10. Not all pollutants are monitored at each location in the state. The monitoring station nearest West Hackberry is Lake Charles – Lighthouse and is approximately 8 miles away in the city of Lake Charles which is part of the Lake Charles MSA and monitors VOCs only. Three other monitoring stations serve the Lake Charles MSA, are 17 to 35 miles away from the facility and collectively monitor PM 2.5, ozone, sulfur dioxide, nitrogen dioxide, and VOCs.

The pollutant list mirrors the federal government's established standards which are known as the NAAQS. The pollutants of concern and the levels and thresholds specific to each are indicated in Table 13.

*Table 12 - National Ambient Air Quality Standards – Cameron Parish*

Pollutant	Primary <sup>2</sup> / Secondary <sup>3</sup>	Averaging Time & Level	Threshold	Current Status
Carbon Monoxide (CO)	Primary	8 hours = 9 ppm <sup>1</sup> 1 hour = 35 ppm	Not to be exceeded more than once per year.	Attainment

Pollutant	Primary <sup>2</sup> / Secondary <sup>3</sup>	Averaging Time & Level	Threshold	Current Status
Nitrogen Dioxide (NO <sub>2</sub> )	Primary (1 hour)	1 hour = 100 ppb	98 <sup>th</sup> % of 1-hour daily maximum concentrations, averaged over 3 years	Attainment
	Primary & Secondary (Annual)	Annual average = 53 ppb <sup>1</sup>	Annual Mean	Attainment
Lead <sup>5</sup>	Primary & Secondary	Rolling 3 month average = 0.15 ug/m <sup>3</sup>	Not to be exceeded	Attainment
Ozone	Primary & Secondary	8-hour = .070 ppm	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years.	Attainment
Particulate Matter 2.5 <sup>1</sup> (PM 2.5)	Primary	Annual = 12 ug/m <sup>3</sup> , <sup>1</sup>	Annual mean, averaged over 3 years	Attainment
	Secondary	Annual = 15 ug/m <sup>3</sup>	Annual mean, averaged over 3 years	Attainment
	Primary and Secondary	24-hour = 35 ug/m <sup>3</sup>	98th percentile, averaged over 3 years	Attainment
Particulate Matter 10 <sup>1</sup> (PM 10)	Primary and Secondary	24-hour = 150 ug/m <sup>3</sup>	Not to be exceeded more than once per year on average over 3 years	Attainment
Sulfur Dioxide (SO <sub>2</sub> )	Primary	1-hour = 75 ppb	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years	Attainment
	Secondary	3-hour = 0.5 ppm	Not to be exceeded more than once per year	Attainment

Source: USEPA website <http://www.epa.gov/air/criteria.html> accessed December 6, 2017

<sup>1</sup>**Units of measure:** parts per million (ppm), parts per billion (ppb), micrograms per cubic meter of air (ug/m<sup>3</sup>) for PM.

<sup>2</sup>**Primary standards** provide public health protection, including protecting the health of "sensitive" populations such as asthmatics, children, and the elderly.

<sup>3</sup>**Secondary standards** provide public welfare protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings.

<sup>4</sup>PM 10 is not currently being monitored at the Lake Charles - Lighthouse monitoring area.

<sup>5</sup>Lead is included in the full list of NAAQS pollutants. Not all pollutants are monitored at each monitoring station, and lead is not monitored at the Lake Charles MSA monitoring stations.

## General Conformity Rule

Cameron County has been designated an attainment area since 1992. (Source: Louisiana Nonattainment/Maintenance Status for Each County by Year for All Criteria Pollutants accessed at [https://www3.epa.gov/airquality/greenbook/anayo\\_la.html](https://www3.epa.gov/airquality/greenbook/anayo_la.html) on December 7, 2017).

## Permits

In addition to being subject to the NAAQS, West Hackberry operates under Permit #0560-00019-04 issued by the LDEQ dated February 20, 2012 in accordance with LAC 33 Part III, Air. As part of permit requirements, the installation must submit annual comprehensive emission statements for each of the pollutants generated by each source, which are tanks and emergency engines. This facility is a minor source of LAC 33:III.Chapter 51 TAPs.

The Maintenance and Operations contractor will obtain all permits and approvals required for the maintenance, construction and operation of the project and will incorporate the project into the existing site-wide permitting programs as applicable.

Estimated emissions from the facility in tpy for Criteria Pollutants and TAP emissions are:

*Table 13 - Estimated Emissions (Criteria Pollutants and TAP)*

Pollutant	Estimated emissions (tpy)
PM <sup>10</sup>	1.81
PM 2.5	-
SO <sup>2</sup>	2.37
NO <sub>x</sub>	30.01
CO	22.68
VOC	53.93
Benzene	0.17

Pollutant	Estimated emissions (tpy)
Ethyl Benzene	0.16
n-Hexane	3.20
Toluene	0.03
Xylenes	0.09
Other VOCs	50.28

Source: #0560-00019-04 issued by the LDEQ dated February 20, 2012

The tpy **emission limits** for each tank and emergency engine are similar but vary slightly. More information regarding emission limits may be found in the permit documentation, but the tpy limits per pollutant and equipment unit is listed below in Table 15:

*Table 14 - Emission rates for Criteria Pollutants and TAPS*

PM <sup>10</sup>	PM <sup>2.5</sup>	SO <sub>2</sub>	NO <sub>x</sub>	CO	VOC	Benzene	Ethyl Benzene	n-Hexane	Toluene	Xylenes
Emission Source			6-78 Emergency Generator (EQT 0002)							
0.26		1.21	8.94	2.05	0.26					
Emission Source			3-78 Brine System (EQT 0003)							
					22.22	0.07	0.08	0.86	0.01	0.04
Emission Source			7-78 Air Eliminator (EQT 0004)							
					0.07	<0.01	<0.01	<0.01	<0.01	<0.01
Emission Source			8-78 Recovery Equipment (EQT 0005)							
0.17		0.78	5.76	1.32	0.17					
Emission Source			9-78 Frac Tanks for Workovers (EQT 0006)							
					26.29	0.08	0.06	2.21	0.01	0.04
Emission Source			12-78 Drain Oil Sump Tank (EQT 0007)							

PM <sup>10</sup>	PM <sup>2.5</sup>	SO <sub>2</sub>	NO <sub>x</sub>	CO	VOC	Benzene	Ethyl Benzene	n-Hexane	Toluene	Xylenes
					0.20	<0.01	<0.01	0.02	<0.01	<0.01
Emission Source			14-78 Slop Oil Tank (EQT 0008)							
					0.43	<0.01	<0.01	0.02	<0.01	<0.01
Emission Source			15-78 Slop Oil Tank (EQT 0009)							
					0.43	<0.01	<0.01	0.02	<0.01	<0.01
Emission Source			16-78 Slop Oil Tank (EQT 0010)							
					0.43	<0.01	<0.01	0.02	<0.01	<0.01
Emission Source			17-78 Slop Oil Tank (EQT 0011)							
					0.43	<0.01	<0.01	0.02	<0.01	<0.01
Emission Source			18-78 Gasoline Tank (EQT 0012)							
					0.81	0.01	0.01	<0.01	<0.01	<0.01
Emission Source			1-98 Oil/Water Separator (EQT 0013)							
					0.32	<0.01	<0.01	<0.01	<0.01	<0.01
Emission Source			1-11 Degas Plant – Amine Reboiler (EQT 0014)							
0.06		0.03	1.05	0.63	0.04					
Emission Source			2-11 Degas Plant – Emergency Flare (EQT 0015)							
<0.01		<0.01	0.04	0.24	0.04					
Emission Source			3-11 Degas Plant – Thermal Oxidizer (EQT 0016)							
1.31		0.34	14.02	18.4	1.43					
Emission Source			5-11 Degas Plant – Slop Oil Tank (EQT 0017)							
					0.19	<0.01	<0.01	0.01	<0.01	<0.01
Emission Source			6-11 Degas Plant – Slop Loading (EQT 0018)							

PM <sup>10</sup>	PM <sup>2.5</sup>	SO <sub>2</sub>	NO <sub>x</sub>	CO	VOC	Benzene	Ethyl Benzene	n-Hexane	Toluene	Xylenes
					0.02					
Emission Source			7-11 Emergency Fire Water Pump (EQT 0019)							
0.01		0.01	0.20	0.04	0.02					
Emission Source			4-78 Site Fugitive VOC Emissions (FUG 0001)							
					0.11	<0.01	<0.01	<0.01	<0.01	<0.01
Emission Source			4-11 Degas Plant Fugitive VOC Emissions (FUG 0002)							
					0.02					
Emission Source			Facility-wide (UNF 0001)							
						0.17	0.16	3.20	0.03	0.09

### Greenhouse Gas (EO 13693)

The Greenhouse Gas Reporting Program authority is carried out at the federal level of USEPA. The Consolidated Appropriations Act of 2008 triggered the issue of the Mandatory Reporting of Greenhouse Gases Rule (74 FR 56260/40 CFR 98). The rule states that any facility that emits 25,000 tpy or more of carbon dioxide equivalent (CO<sub>2</sub>e) is required to submit annual reports to the USEPA. Further information and guidance can be found at <http://www.epa.gov/ghgreporting/basic-info/index.html>.

There is an EO relevant to this effort: EO 13693.

EO 13693 directs government agencies to “reduce GHG emissions through reduction of energy intensity 30 percent by 2015, compared to a FY 2003 baseline.”

It also directs federal agencies to reduce targeted scope 1 and scope 2 GHG emissions by at least 40% by FY 2025 from a FY 2008 baseline. Section 2 of EO 13693 directs individual agencies to set scope 1 and 2 GHG emission reduction targets for FY 2025 from a FY 2008 baseline. In addition, the goal for scope 3 GHG emission reduction is 13% by 2025 from a 2008 baseline.

Scope 1 GHG emissions are direct emissions which result from sources owned or controlled by DOE. Included in this source are boilers/water heaters and intra-installation vehicular travel. The West Hackberry facility’s major Scope 1 GHG source is emergency engines.

Scope 2 GHG emissions are indirect emissions resulting from consumption of purchased electricity, heat or steam. This includes electricity purchased for heating equipment and general electrical use.

Scope 3 GHG emissions are “other indirect emissions” which include extraction and production of purchased materials and fuels-transport related activity not covered in Scope 2. This also includes emissions from commuting and air-travel.

### **5.1.2 Cultural Resources**

There are no known archeological, historical, or cultural resources that would potentially be affected by the project. Given the disturbed state of almost all the facility area, involvement with any potential unidentified resource is unlikely.

Section 106 of the NHPA requires federal agencies to take into account the effects of their undertakings on historic properties and afford the Advisory Council on Historic Properties and other parties with an interest a reasonable opportunity to comment (consultation) beginning at the early stages of project planning. An undertaking is defined as “a project, activity or program funded in whole or in part under the direct or indirect jurisdiction of a Federal Agency, including those carried out by or on behalf of a Federal Agency; those carried out with Federal financial assistance; and those requiring a Federal permit, license or approval. Once an undertaking has been identified, the CRM will determine if it is a type of activity that has the potential to cause effects on historic properties.”

It must be noted that NEPA analysis does not replace or negate the need for NHPA Section 106 review. Therefore, any action that may affect the physical landscape are subject to review for possible adverse impacts to be identified. Coordination with the SHPO is required in all cases.

### **5.1.3 Ecological Resources**

Vegetation is defined as plants and their geographic characteristics. Fish and wildlife are the animals and their habitats that occur within a region. Threatened and endangered species are any federally or state listed species in or around the facility. Section 7 of the Endangered Species Act, as amended (16 United States Code, Chapter 35 § 1531-1544), requires federal agencies evaluate the efforts of the proposed actions on protected plant and animal species and their habitats and take appropriate measures to conserve and project these species. Special-status species include plants and animals listed as sensitive, threatened, or endangered by the USFWS, as well as those that are candidates or proposed for listing as threatened or endangered. Special status species also include those species protected by the Migratory Bird Treaty Act, the Bald and Golden Eagle Protection Act, and the Marine Mammal Protection Act.

The Louisiana Department of Wildlife and Fisheries Species by Parish List reports the following species in Cameron Parish: <http://www.wlf.louisiana.gov/wildlife/species-parish-list>

Table 15 - Plant Species in Cameron Parish

Common Name	Scientific Name	State Status	Federal Status
Gregg's Amaranth	<i>Amaranthus greggii</i>	None	None
A Milk-vetch	<i>Astragalus nuttallianus</i>	None	None
Golden Canna	<i>Canna flaccida</i>	None	None
Dune Sandbur	<i>Cenchrus tribuloides</i>	None	None
Sand Dune Spurge	<i>Chamaesyce bombensis</i>	None	None
Wedge-leaf Prairie-clover	<i>Dalea emarginata</i>	None	None
Wedge-leaf Whitlow-grass	<i>Draba cuneifolia</i>	None	None
Slim Spike-rush	<i>Eleocharis elongata</i>	None	None
Punctate Cupgrass	<i>Eriochloa punctata</i>	None	None
Narrow-leaved Puccoon	<i>Lithospermum incisum</i>	None	None
Grapefruit Primrosewilow	<i>Ludwigia sphaerocarpa</i>	None	None
Saltflat-grass	<i>Monanthochloe littoralis</i>	None	None
Blue Water Lily	<i>Nymphaea elegans</i>	None	None
Roundleaf Scarf-pea	<i>Pedimelum rhombifolium</i>	None	None
Correll's False Dragon-head	<i>Physostegia correllii</i>	None	None
Wand Blackroot	<i>Pterocaulon virgatum</i>	None	None
Mexican Hat	<i>Ratibida peduncularis</i>	None	None
Small's Beaksedge	<i>Rhynchospora globularis var. pinetorum</i>	None	None
Southern Beaksedge	<i>Rhynchospora microcarpa</i>	None	None
Sand Rose-gentian	<i>Sabatia arenicola</i>	None	None
Brookweed	<i>Samolus ebracteatus</i>	None	None



Common Name	Scientific Name	State Status	Federal Status
Elliott Sida	<i>Sida elliottii</i>	None	None
Florida bully	<i>Sideroxylon reclinatum</i>	None	None
Powdery Thalia	<i>Thalia dealbata</i>	None	None
Woolly Honeysweet	<i>Tidestromia lanuginosa</i>	None	None
Sea Oats	<i>Uniola paniculata</i>	None	None

Table 16 - Mammals, Birds, and Fish Species in Cameron Parish

Common Name	Scientific Name	State Status	Federal Status
Red Wolf	<i>Canis rufus</i>	None	None
Crested Caracara	<i>Caracara cheriway</i>	None	None
Snowy Plover	<i>Charadrius alexandrinus</i>	None	None
Piping Plover	<i>Charadrius melodus</i>	Threatened and Endangered	Threatened
Wilson's Plover	<i>Charadrius wilsonia</i>	None	None
Red Knot	<i>Calidris canutus rufa</i>	Threatened	Threatened
Common Ground-Dove	<i>Columbina passerina</i>	None	None
Sandhill Crane	<i>Grus canadensis</i>	None	None
Diamondback Terrapin	<i>Malaclemys terrapin</i>	Restricted Harvest	None
Brown Pelican	<i>Pelecanus occidentalis</i>	Endangered	Delisted
Roseate Spoonbill	<i>Platalea ajaja</i>	None	None
Glossy Ibis	<i>Plegadis falcinellus</i>	None	None
Paddlefish	<i>Polyodon spathula</i>	None	None

Common Name	Scientific Name	State Status	Federal Status
Eastern Spotted Skunk	<i>Spilogale putorius</i>	None	None
Interior Least Tern	<i>Sternula antillarum athalassos</i>	Endangered	Endangered
Atlantic hawksbill sea turtle	<i>Eretmochelys imbricata</i>	Endangered	Endangered
Kemp's Ridley sea turtle	<i>Lepidochelys kempii</i>	Endangered	Endangered
Leatherback sea turtle	<i>Dermochelys coriacea</i>	Endangered	Endangered
Loggerhead sea turtle	<i>Caretta</i>	Threatened	Threatened
Ornate Box Turtle	<i>Terrapene ornata</i>	Restricted Harvest	None
West Indian Manatee	<i>Trichechus manatus</i>	Endangered	Endangered
Atlantic Sturgeon (gulf Subspecies)	<i>Acipenser oxyrinchus (=oxyrhynchus) desotoi</i>	Threatened	Threatened

Source: Louisiana Department of Wildlife and Fisheries Species by Parish List accessed at <http://www.wlf.louisiana.gov/wildlife/species-parish-list> on December 8, 2017.

While members of the above-listed species reportedly live in Cameron Parish, none of them call the SPR West Hackberry home. An Official Species List was generated using the USFWS IPaC. The list fulfills the requirement for Federal agencies to “request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action” pursuant to the aforementioned Section 7 of the Endangered Species List. It reports for SPR West Hackberry facility: “There are no critical habitats within your project area under this office’s jurisdiction.” The IPaC report is presented in Appendix E.

The facility complies with EO 13186 *Responsibilities of Federal Agencies to Protect Migratory Birds & Migratory Bird Act*. Migratory birds are often spotted at each of the SPR facilities. Mitigation activities to ensure the protection of migratory birds include flagging, avoidance of nesting areas and selective mowing cessation during critical times of the year to allow for adequate food and shelter.

#### 5.1.4 Environmental Justice

Environmental justice addresses the disproportionate effect a federal action may have on low-income or minority populations or on children. In 1994, EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations was issued to focus

attention of federal agencies on human health and environmental conditions in minority and low-income communities and to ensure that disproportionately high and adverse human health or environmental effects on these communities are identified and addressed. In 1997, EO 13045, Protection of Children from Environmental Health Risks and Safety Risks Protection of Children), was issued.

According to the US Census Bureau, the 2016 American Community Survey estimated total population for Cameron Parish was 6,739 and only 1.6 percent of that number is made up of people of the African American race. A small percentage of the community is Hispanic with only 5.1 percent, and no people of American Indian or Alaskan Native descent.

As defined by the Council on Environmental Quality report, Environmental Justice Guidance Under the Nation Environmental Policy Act, a minority population should be identified where either:

- The minority population of the affected area exceeds 50 percent; or
- The minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis.

According to the above definition, no minority population is present within the proposed project area.

### **5.1.5 Land Use**

Land use comprises the natural condition or human-modified activities occurring at a particular location. Land uses are frequently regulated by management plans, policies, ordinances and regulation that determine the types of activities that are allowable or provide protection for specially designated or environmentally sensitive areas.

The SPR West Hackberry facility has been operational since 1979. The facility is strictly used for oil industry activities with personnel support buildings (office/restrooms). DOE maintains appropriate operational permits and performs all regulatory compliance activities as required.

### **5.1.6 Noise**

Noise is any sound that is undesirable because it interferes with communication, is intense enough to damage hearing, or is otherwise intrusive. Human response to noise varies depending on the type and characteristics of the noise, the distance between the noise source and the receptor, receptor sensitivity, and the time of day. Noise is often generated by activities such as construction or vehicular traffic. Sound levels are expressed in dB and various weighted dB scales (i.e. A, B C) are used to approximate how people perceive different types of sounds. USEPA defined a long-term average noise descriptor, the “equivalent” noise level, or Leq. The

DNL consists of the Leq with a 10-dB penalty for night-time noise. This metric provides a single measure of overall noise impact and is the accepted measure of determining human noise impacts.

The West Hackberry site is generally quiet, characterized by natural remote area ambient sound patterns (e.g. birds, frogs, insects, wind, water). Local marine vessel traffic activity and the normal oil and gas operational noises are the only others in the area and they do not disturb the natural soundscape.

Noise concerns would be addressed from a worker health and safety perspective. All four SPR locations are governed by OSHA 1910.119, *Process Safety Management of Highly Hazardous Chemicals* per a 1994 determination by the Department of Labor. The four storage sites also participate in the OSHA Voluntary Protection Program meaning the hazards analyses follow what OSHA considers industry best practices. A preliminary hazards review was performed and it indicates noise is not a concern from any of the proposed actions. (DOE, 2016)

### 5.1.7 Prime Farmland

The NRCS has listed the majority of the soil map units within the proposed project area as prime farmland. More specifically, each of the soil classes that appear here (Table 10) are very deep, poorly and very poorly drained, very slowly permeable soils that formed in clayey sediments. Those with Vidrine class influences are moderately better drained than the others.

Table 17: Soil Descriptions in the Project Area

Soil Type	Drainage Class	Average Slope	Prime Farmland
Bancker muck	Very frequently flooded	0 to 0.2 Percent	No
Crowley-Vidrine complex		0 to 1 Percent	Yes
Gentilly muck	Very frequently flooded	0 to 0.5 Percent	No
Mowata-Vidrine complex	Rarely flooded	0 to 1 Percent	Yes
Scatland mucky clay	Tidal	0 to 0.2 Percent	No

Source: NRCS Web Soil Survey Tool at <https://websoilsurvey.sc.egov.usda.gov>

The purpose of the FPPA is to minimize the extent to which Federal programs contribute to the unnecessary conversion of farmland to non-agricultural uses. The FPPA stipulates that Federal programs be compatible with State, local and private efforts to protect farmland. Prime farmland soils have the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. In general, prime farmland soils experience adequate and dependable precipitation, a favorable temperature and growing season, have acceptable acidity or alkalinity, and have few or no surface stones. Prime farmland soils are permeable to water and air. These soils are not excessively erodible or saturated with water for long periods of time. Two soil map units are classified as prime farmland soils are located within the facility area (see Table 10 and Appendix D).

### 5.1.8 Socioeconomics

West Hackberry is located in Cameron Parish, Louisiana. Adjacent communities include Hackberry and Carlyss. It is anticipated that any potential socioeconomic impacts due to the proposed actions would be concentrated within these areas surrounding the facility.

The population estimate for Cameron Parish as of 2016 was 6,882. This was a 0.63% increase from the 2010 Census. The Hackberry population had no significant change and Carlyss saw an increase. (USCB, 2016). The table below shows population numbers for the two cities.

*Table 18 - Population in Areas Surrounding West Hackberry (2016)*

	Cameron Parish	Hackberry	Carlyss	Total
Population Estimate 2016	6,739	1,257	5,041	13,180
Population 2010 Census	6,839	1,261	4,670	12,770
Percent Change	-1.5%	-0.32	7.94%	3.21%

The largest contributors to employment in the surrounding areas are educational services and health care and social assistance services. For Hackberry, the largest contributing sectors are professional, scientific, management, administrative and waste management services; educational services and health care and social assistance; and construction. For Carlyss, the largest contributing sectors are educational services and health care and social assistance services; construction, and professional, scientific, management, administrative and waste management services. (USCB, 2016).

As shown in the table below, there is a median household income difference of \$11,500 between Hackberry and Carlyss. Unemployment ranges from 2.3% to 7.9% between the two cities.

*Table 19 - Employment in Areas Surrounding West Hackberry (2016)*

Location	Civilian Labor Force	Armed Forces Labor Force	Unemployment Rate	Median Household Income	Per Capita Income in past 12 months
Cameron Parish	3,384	26	3.5%	65,679	80,054
Hackberry	611	0	2.3%	62,269	81,869
Carlyss	2,330	0	7.9%	50,769	68,892

### **5.1.9 Water Resources**

#### **Groundwater**

Potable water at the facility is provided by the city of Hackberry, which draws groundwater from the shallow Chicot aquifer. This aquifer serves as the source of fresh water for fifteen parishes. Care is taken not to penetrate the upper confining unit of the aquifer. Operations at the facility include constant monitoring that no petroleum-related contaminants are released to the environment.

#### **Surface Water**

The nearest surface water body that could possibly be affected by work at the facility is Black Lake, which borders the northwest side of the facility.

Section 303(d) of the CWA requires states to identify waters where current pollution control technologies alone cannot meet the water quality standards set for that waterbody. Every two years, states are required to submit a list of impaired waters plus any that may soon become impaired to USEPA for approval. The impaired waters are prioritized based on the severity of the pollution and the designated use of the waterbody (e.g., fish propagation or human recreation). States must establish the TMDLs of the pollutant(s) in the waterbody for impaired waters on their list. The most current cycle for Louisiana is 2016.

Black Lake is considered to be “good” or “unimpaired” per the 2016 dataset. (EPA, 2016)

Impairment of surface water bodies is often due to stormwater runoff. The SPR (SWPPP) addresses mitigation activities needed to ensure surface water quality is not impacted by normal facility operations.

## **Wetlands**

The main portion of the facility drains well and is not considered a wetland, albeit the facility is surrounded on its peninsula borders by various classification of wetlands (from the lake to forested shrub wetland and freshwater ponds. Appendix F includes current USFWS National Wetlands Inventory maps for the facility accessible at

<https://www.fws.gov/wetlands/data/mapper.html> (definitions of the codes used on the map are also available in the frequently asked questions section of the website).

Louisiana Department of Natural Resources manages a program that requires compensation for impact to coastal resources in the Louisiana Coastal Zone. If a proposed action project is determined to potentially impact a coastal resource, such as a wetland, then those responsible for the unavoidable loss of the resources may provide compensation using the following options:

- Purchase habitat credits from an Office of Coastal Management-approved mitigation bank
- Purchase credits from an approved In-Lieu Fee Mitigation Program
- Implementation of individual mitigation project
- Other options determined to be appropriate by the secretary which fully compensate for lost habitat values.

Source: <http://www.dnr.louisiana.gov>

The maintenance and operations contractor will comply with requirements to submit project plans to the Office of Coastal Management for a review to determine whether the proposed actions are consistent with the Louisiana Coastal Resources Program in accordance with Section 307(C) of the Federal Coastal Zone Management Act of 1972.

## **5.2 Description of Proposed Actions/Alternatives and Project Analysis – West Hackberry**

The following section is structured with the Proposed Action and Alternatives, followed by the Project Analysis for each. The proposed action and alternatives information is taken from the Life Extension 2 Conceptual Design Report Volumes I-VIII (Appendix B).

The analysis focuses upon the environmental resources that may potentially be affected directly, indirectly and/or cumulatively by implementing the SPR LE-II work packages at West Hackberry. These resources include air quality, cultural resources, ecological resources environmental justice, land use, noise, prime farmland, socioeconomics, threatened and endangered species, and water resources.

### **5.2.1 Proposed Action and Alternative**

#### **5.2.1.1 WH-MM-693 Marine Service Center**

##### **Mission Need**

The marine boats used at the West Hackberry site are critical for the maintenance and operations of all the crude oil pipelines being used at the WH site. In addition, the boats are also critical for any water side work required at the Raw Water Intake Structure. This task will construct a marine service center for the site's work boats. The location of the center will be adjacent to the West Hackberry SPR boat slip near the northwest corner of the site. It will install a covered boat slip with hoist to raise the site's work boats out of the water while not in use.

##### **Functional Requirements**

The purpose of the marine service center is to raise the work boats out of the water to facilitate and reduce their maintenance. It will also allow for quick deployment of the boats in emergencies since the boats will no longer be trailered. In addition, the Marine Service Center will have fuel tanks for filling boats and oil boom deployment spools for quicker spill response.

##### **Proposed Alternative: Construct Marine Service Center**

This alternative involves the construction of a marine service center over water to raise the work boats out of the water to facilitate and reduce maintenance required on the boats. It will also allow quick deployment and ease of operation of the boats in emergencies since the boats will no longer be trailered. This will increase safety of operating due to less work involving launching boats. This facility will contain fuel tanks for refueling and a reel for deploying boom in the event of a spill. This Marine Service Center will house 3 DOE boats and be approximately 5000 sq.ft.



### **No Action Alternative**

If this work is not implemented, equipment maintenance cost will not be reduced and deployment time will remain unchanged.

This alternative has been screened out due to the functional requirement to continuously maintain pipeline and valves. In addition, it is imperative the site have emergency access to spills which may occur. With the boats in a ready state 24/7, response times can be greatly reduced.

## 5.2.2 Project Analysis

### 5.2.2.1 WH-MM-693 Marine Service Center

#### WH-MM-693 Marine Service Center

#### Potentially Impactful Activities: Construction

#### Air Quality

**Criteria for Determining Significance:**

- A status of non-attainment of the NAAQS thresholds as found in Table 13;
- An exceedance of an emission limit specified in the permit (summarized in Table 14 and 15; and
- An inability to meet the goals set forth in EO 13693.

**Proposed Action Analysis: Temporary, minor impact is anticipated.** Earth-moving vehicles and heavy vehicle traffic may generate fugitive dust, increasing PM volume in the immediate area. It is not anticipated to decrease air quality for the nearest off-facility residents. Emissions from gas-powered generators and increased vehicle traffic may increase VOC emissions, but not to a degree where NAAQS thresholds are exceeded. Project-specific permits will be obtained with appropriate, short-term emission limits which will be monitored to ensure no exceedances.

**No Action Analysis:** There would be no impact to air quality.

#### Cultural Resources

**Criteria for Determining Significance:** The results of a SHPO review will determine if the proposed action has the potential to cause impact to historic properties.

**Proposed Action Analysis: No impact is anticipated.** There will be no impact to cultural resources given there are none present at the facility.

**No Action Analysis:** There will be no impact to cultural resources.

## Ecological Resources/Threatened and Endangered Species

### Criteria for Determining Significance:

- A requirement to engage in formal consultation with the USFWS.
- The “take” (as defined by the ESA), or potential for “take”, of any individual or group of individuals of a listed species.
- The loss or degradation, or potential for such, of any critical habitat (as defined by the ESA).

**Proposed Action Analysis: No impact is anticipated.** The USFWS IPaC report indicates that “there are no critical habitats within the project area” (see Appendix E). There will be no impact to ecological resources, to include threatened and endangered species.

**No Action Analysis:** There will be no impact to ecological resources/threatened and endangered species.

## Environmental Justice

### Criteria for Determining Significance:

- Create an environment where the health and safety of socioeconomically disadvantaged community members and their surrounding area is at risk;
- Create undesirable living conditions for socioeconomically disadvantaged community members; and
- Create health and safety risks that may disproportionately affect children (as indicated in EO 13045 *Protection of Children from Environmental Health Risks and Safety Risks*).

**Proposed Action Analysis: No impact is anticipated.** The proposed action will take place at the SPR West Hackberry facility, which is highly secured with no access to unauthorized visitors. The temporary nature of the work, the distance from which the facility sits away from the closest neighboring communities, facility security (which removes risk of acute health and safety issues from unauthorized visitors to the construction site) and the roadway improvement which will result from the execution of the project will not create a negative impact upon the sensitive population to which environmental justice applies.

In addition, Cameron Parish does not meet the definition of having a minority population as the minority population does not exceed 50 percent.

**No Action Analysis:** There will be no impact to environmental justice.

## Land Use

### Criteria for Determining Significance:

- An action that impairs the original viewshed of adjacent properties;
- An action that causes noise concerns outside noise decibel thresholds (see Noise); and
- An action that causes land use to be incompatible with existing adjacent land uses.

**Proposed Action Analysis: No impact is anticipated.** The viewshed and land compatibility will not change. The construction of the settling pond is within context of the operations at the facility. Post-project noise will not increase from current baseline conditions (project-specific noise impacts are discussed under “Noise”).

**No Action Analysis:** No impact is anticipated.

## Noise

### Criteria for Determining Significance:

- Exceedance of the long-term average noise descriptor, or Leq, with a 10-decibel penalty for night-time noise

**Proposed Action Analysis: Temporary, minor impact is anticipated.** Heavy equipment and vehicles will be utilized to complete the proposed project and will result in an increase in noise levels normally heard during SPR West Hackberry facility operations. The largest contributors of noise would be on-site generators, jack and bore machinery, heavy earth-moving equipment and heavy trucks used to haul equipment, materials and construction debris. Human neighbors nearest the facility will not be impacted given the distance. Birds and other wildlife may be bothered by the increased noise level and may avoid the area until construction is complete.

The SPR LE-II Project Execution Plan indicates mitigation of noise will be considered early in the process so that it may be “reduced or eliminated at the design phase rather than when constructed or in use”. (DOE, 2017)

**No Action Analysis:** There will be no noise impact as the construction would not take place

## Prime Farmland/Soils

### Criteria for Determining Significance:

- The unnecessary conversion of farmland to non-agricultural uses.

**Proposed Action Analysis: No impact is anticipated.** There are two soil types present at SPR West Hackberry facility considered to be soil types that are classified as farmland. The facility has been in used for industrial operation since 1987 and the areas where the soil types occur have been part of the facility for that long. The proposed action will not be changing the use. The proposed action will not necessitate the need to convert adjacent, prime farmland–classified land.

**No Action Analysis:** There will be no impact to prime farmland/soils

## Socioeconomics

### Criteria for Determining Significance:

- Create an environment where the health and safety of socioeconomically disadvantaged community members and their surrounding area is at risk;
- Create the potential to substantially affect human health or the environment by excluding persons, denying persons benefits, or subjecting persons to discrimination because of their race, color, national origin, or income level; and
- Create undesirable living conditions for socioeconomically disadvantaged community members.

**Proposed Action Analysis: Short-term, beneficial impact anticipated.** Similar to the discussion of environmental justice, the proposed action will take place at the SPR West Hackberry facility, which is highly secured with no access to unauthorized visitors. The temporary nature of the work, the distance from which the facility sits away from the closest neighboring communities, facility security (which removes risk of acute health and safety issues from unauthorized visitors to the construction site) and the roadway improvement which will result from the execution of the project will not create a negative impact upon the sensitive population to which socioeconomics applies.

Short-term, economical beneficial impact may be seen with local construction-work hiring.

**No Action Analysis:** No impact is anticipated if the Marine Service Center is not built.

## Water Resources

### Criteria for Determining Significance:

- Increases the amount of impervious surface significantly, creating measurably more stormwater runoff than was originally experienced in the area;
- Results in the creation of a new channel or relocation of a natural drainage channel;
- Results in the discharge of pollutants that exceed federal and state water quality standards such as TMDLs or drinking water MCLs; and.
- A loss of wetland habitat which could change the function and viability of the wetland;
- Wetland destruction or fill which would result in loss of wetlands or wetland function;
- A release of hazardous material, POL, or other contaminants to a wetland that would risk injury to wildlife and humans; and
- Introduction of an invasive species which could alter the function and viability of a wetland.

**Proposed Action Analysis: Temporary, minor impact is anticipated.** Soil erosion/silt disturbance is inherent with construction work and it is anticipated that water turbidity will increase in the area of the lake where the work is being performed. This will be minimized by the implementation of best management practices consistent with the SPR Pollution Prevention Plan (Publication ASL5400.41), Version 10.0 (08-02-16). It is not anticipated that the Mississippi River would be impacted.

Although the work will be taking place in and near wetlands, it is not anticipated that permanent harm or loss of wetland will occur. Project-specific permits will be obtained by the Corps of Engineers and all practicable steps will be taken to ensure minimal harm to wetlands.

**No Action Analysis:** There will be no water quality impact as the construction would not take place.

## 5.2.3 Proposed Action and Alternative

### 5.2.3.1 WH-MM-1025 Replace the 42-inch Pigging Water Underground Pipeline

#### Mission Need

The West Hackberry site is able to launch a pig at the Raw Water Intake Structure, (RWIS), with a flow rate of approximately 7000 gallons per minute (GPM) to 13,700 GPM using one intake pump into the raw water intake pipeline. This pipeline must be in a serviceable condition prior to and during a Level 1 drawdown event. This piping diverts water away from the raw water injection (RWINJ) pumps and routes the water to the south raw water header at the Site. This piping is needed in order to inject water from the pipeline into the Site storage caverns. The volume of water produced when pigging the Raw Water pipeline is approximately 50,000+ barrels. Pushing this amount of fresh/brackish, dirty raw water into the Site storage caverns is not recommended. Pigging of the West Hackberry Raw Water Pipeline is required to be performed on a periodic basis to assure the pipeline is clean and able to support the Level 1 Drawdown rate for the site. The mission need is to ensure an operable RW pipeline to maintain the Level 1 drawdown rate.

#### Functional Requirements

- Assure a method of cleaning the raw water pipeline
- Piping material and components selection should provide for a 25-year life
- Provide capability for Periodic Pigging for cleaning the Raw Water Pipeline
- The brine disposal system was never a part of this system. To prevent excessive quantities of raw water, and associated solids from being injected into Site oil storage caverns.
- Minimum 60,000-barrel capacity containment, and solids settlement facility

This alternative would include the construction of a new settlement pond. It will involve replacing a portion of the existing 42-inch carbon steel pipeline WH-42-RW-10494-A with a tie-in spool which contains a size reduction to 30-inch a branch take-off, to feed to the new pond area and a pair of interlocked control valves. The new 30-inch branch line will remain above ground just downstream of the new 30-inch block valve and then go underground, and run over to the pond area. The pipe will transition from carbon steel to DR11 HDPE immediately before going underground and immediately upon emerging on the settlement pond end. The 30-inch carbon steel pipe will be routed up to and through a pressure reducing device and eventually to empty into the new 60,000-barrel Settlement Pond via a diffuser.

#### Proposed Alternative: Settlement Pond

The raw water will exit the new Settlement Pond into the cavern WHC-110 surface drain through four 12-inch outflows. These carbon steel outflows will exit through the containment area levee. Outside the levee, the lines will include a flanged branch connection and a 12-inch 150# isolation valve. The material transition will be made from 150# carbon steel to HDPE immediately after the 12-inch valve. The settlement pond located approximately 650 feet west of the pig

launcher/receiver and south of Cavern 110. The pond is intended to contain, for settlement purposes, and release approximately 60,000 barrels of processed raw water. The pond outflows will discharge into the Cavern 110 drainage ditches, located on the east and west sides of the 110 cavern containment levee. The settlement pond will have a concrete floor extending up and over the top of the levee, to allow for cleaning of sediment. The geometry of the pond will also include a center structure and a series of spillover weirs to aid in the processing of the pigging water.

### **No Action Alternative**

The Status Quo Option will still allow the contaminated raw water from pipeline pigging operations to continue to be disposed into site oil storage caverns causing undesirable collateral leaching that compromises cavern operability. The system is presently configured to bypass the RWINJ pumps during pigging and directly flow into the storage caverns. This will lead to higher maintenance and labor costs. The current flow is also limited to 25 thousand barrels per day (MBD) (730 gallons per minute(GPM)) and is unreliable for service. This option does not provide the operational assurance of the Pipeline to maintain the required Level 1 drawdown rate, and therefore, does not meet the functional requirement of this project.



## 5.2.4 Project Analysis

### 5.2.4.1 WH-MM-1025 Replace the 42 Inch Pigging Water Underground Pipeline

WH-MM-1025 Replace the 42 Inch Pigging Water Underground Pipeline
Potentially Impactful Activities: Construction
Air Quality
<p><b>Criteria for Determining Significance:</b></p> <ul style="list-style-type: none"><li>• A status of non-attainment of the NAAQS thresholds as found in Table 13;</li><li>• An exceedance of an emission limit specified in the permit (summarized in Table 14 and 15; and</li><li>• An inability to meet the goals set forth in EO 13693.</li></ul> <p><b>Proposed Action Analysis: Temporary, minor impact is anticipated.</b> Earth-moving vehicles and heavy vehicle traffic will generate fugitive dust, increasing PM volume in the immediate area. It is not anticipated to decrease air quality for the nearest residents within one-half mile of the facility. Emissions from gas-powered generators and increased vehicle traffic may increase VOC emissions, but not to a degree where NAAQS thresholds are exceeded. Project-specific permits will be obtained with appropriate, short-term emission limits which will be monitored to ensure no exceedances.</p> <p><b>No Action Analysis:</b> There would be no impact to air quality.</p>
Cultural Resources
<p><b>Criteria for Determining Significance:</b> The results of a SHPO review will determine if the proposed action has the potential to cause impact to historic properties.</p> <p><b>Proposed Action Analysis: No impact is anticipated.</b> There will be no impact to cultural resources given there are none present at the facility.</p> <p><b>No Action Analysis:</b> There will be no impact to cultural resources.</p>

## Ecological Resources/Threatened and Endangered Species

### Criteria for Determining Significance:

- A requirement to engage in formal consultation with the USFWS.
- The “take” (as defined by the ESA), or potential for “take”, of any individual or group of individuals of a listed species.
- The loss or degradation, or potential for such, of any critical habitat (as defined by the ESA).

**Proposed Action Analysis: No impact is anticipated.** The USFWS IPaC report indicates that “there are no critical habitats within the project area” (see Appendix E). There will be no impact to ecological resources, to include threatened and endangered species.

**No Action Analysis:** There will be no impact to ecological resources/threatened and endangered species.

## Environmental Justice

### Criteria for Determining Significance:

- Create an environment where the health and safety of socioeconomically disadvantaged community members and their surrounding area is at risk;
- Create undesirable living conditions for socioeconomically disadvantaged community members; and
- Create health and safety risks that may disproportionately affect children (as indicated in EO 13045 *Protection of Children from Environmental Health Risks and Safety Risks*).

**Proposed Action Analysis: No impact is anticipated.** The proposed action will take place at the SPR West Hackberry facility, which is highly secured with no access to unauthorized visitors. The temporary nature of the work, the distance from which the facility sits away from the closest neighboring communities, facility security (which removes risk of acute health and safety issues from unauthorized visitors to the construction site) and the roadway improvement which will result from the execution of the project will not create a negative impact upon the sensitive population to which environmental justice applies.

In addition, Cameron Parish does not meet the definition of having a minority population as the minority population does not exceed 50 percent.

**No Action Analysis:** There will be no impact to environmental justice.

## Land Use

### Criteria for Determining Significance:

- An action that impairs the original viewshed of adjacent properties;
- An action that causes noise concerns outside noise decibel thresholds (see Noise); and
- An action that causes land use to be incompatible with existing adjacent land uses.

**Proposed Action Analysis: No impact is anticipated.** The viewshed and land compatibility will not change. The construction of the settling pond is within context of the operations at the facility. Post-project noise will not increase from current baseline conditions (project-specific noise impacts are discussed under “Noise”).

**No Action Analysis:** No impact is anticipated.

## Noise

### Criteria for Determining Significance:

- Exceedance of the long-term average noise descriptor, or Leq, with a 10-decibel penalty for night-time noise

**Proposed Action Analysis: Temporary, minor impact is anticipated.** Heavy equipment and vehicles will be utilized to complete the proposed project and will result in an increase in noise levels normally heard during SPR West Hackberry facility operations. The largest contributors of noise would be on-site generators, jack and bore machinery, heavy earth-moving equipment and heavy trucks used to haul equipment, materials and construction debris. Human neighbors nearest the facility will not be impacted given the distance and the fact the work will be performed during daylight hours. Birds and other wildlife may be bothered by the increased noise level and may avoid the area until construction is complete.

The SPR LE-II Project Execution Plan indicates mitigation of noise will be considered early in the process so that it may be “reduced or eliminated at the design phase rather than when constructed or in use”. (DOE, 2017)

**No Action Analysis:** There will be no noise impact as the construction would not take place.

## Prime Farmland/Soils

### Criteria for Determining Significance:

- The unnecessary conversion of farmland to non-agricultural uses.

**Proposed Action Analysis: No impact is anticipated.** There are two soil types present at SPR West Hackberry facility classified as prime farmland. The facility has been used for industrial operation since 1978 and the areas where the soil types occur have been part of the facility for that long. The proposed action will not be changing the use; it will not necessitate the need to convert adjacent, prime farmland–classified land to non-farm usage.

**No Action Analysis:** There will be no impact to prime farmland/soils.

## Socioeconomics

### Criteria for Determining Significance:

- Create an environment where the health and safety of socioeconomically disadvantaged community members and their surrounding area is at risk;
- Create the potential to substantially affect human health or the environment by excluding persons, denying persons benefits, or subjecting persons to discrimination because of their race, color, national origin, or income level; and
- Create undesirable living conditions for socioeconomically disadvantaged community members.

**Proposed Action Analysis: Short-term, beneficial impact anticipated.** Similar to the discussion of environmental justice, the proposed action will take place at the SPR West Hackberry facility, which is highly secured with no access to unauthorized visitors. The temporary nature of the work, the distance from which the facility sits away from the closest neighboring communities, facility security (which removes risk of acute health and safety issues from unauthorized visitors to the construction site) and the roadway improvement which will result from the execution of the project will not create a negative impact upon the sensitive population to which socioeconomics applies.

Short-term, economical beneficial impact may be seen with local construction-work hiring.

**No Action Analysis:** No impact is anticipated.

## Water Resources

### **Criteria for Determining Significance:**

- Increases the amount of impervious surface significantly, creating measurably more stormwater runoff than was originally experienced in the area;
- Results in the creation of a new channel or relocation of a natural drainage channel;
- Results in the discharge of pollutants that exceed federal and state water quality standards such as TMDLs or drinking water MCLs
- A loss of wetland habitat which could change the function and viability of the wetland;
- Wetland destruction or fill which would result in loss of wetlands or wetland function;
- A release of hazardous material, POL, or other contaminants to a wetland that would risk injury to wildlife and humans; and
- Introduction of an invasive species which could alter the function and viability of a wetland.

**Proposed Action Analysis: Temporary, minor impact is anticipated.** Soil erosion is inherent with construction work and it is anticipated that water turbidity will increase in the area of the lake near where the work is being performed. This will be minimized by the implementation of best management practices consistent with the SPR Pollution Prevention Plan (Publication ASL5400.41), Version 10.0 (08-02-16). It is not anticipated that the Mississippi River would be impacted.

Although the work will be taking place in and near wetlands, it is not anticipated that permanent harm or loss of wetland will occur. Project-specific permits will be obtained by the Corps of Engineers and all practicable steps will be taken to ensure minimal harm to wetlands.

**No Action Analysis:** There will be no water quality impact as the construction would not take place.

## **5.2.6 Proposed Action and Alternative**

### **5.2.6.1 WH-MM-1349/649/337 Subsidence and Inundation Mitigation**

#### **Mission Need**

It is mission critical for the protection of critical infrastructure and equipment from storm surge and subsidence flooding. In addition, critical infrastructure must be protected from flooding to maintain drawdown ready status. In addition, keeping the cavern well pads accessible is mission critical for drawdown. If inundation is to continue on the cavern well pads, drawdown could be significantly impacted.

#### **Functional Requirements**

Inundation Prevention: West Hackberry has been flooded by storm surge in the past and is likely to be flooded more frequently in the future as coastal erosion progresses. Flooding can severely disrupt the site's ability to respond to a presidentially ordered drawdown and may be delayed many months pending repair. Recovery pumping is not sufficient to mitigate the risk of flooding as flooded ground would prevent the deployment of recovery assets. Subsidence Mitigation for Caverns: Subsidence reports including Sandia's reports "Analysis of Subsurface Subsidence of the Strategic Petroleum Reserve" (SAND88-1309), "Subsidence Monitoring and Evaluation Plan for the Strategic Petroleum Reserve Storage Sites" (SAND88-1175) and PB-KBB report "Assessment of the Effects on Surface Structures" indicate that the site adjacent to the northern well pads and Black Lake is subsiding at a rate of 0.2 to 0.3 feet per year. Although the subsidence rate along the northern end of the site has begun to level off, as subsidence continues, the waters of Black Lake slowly capture more and more of the site land around the northern well pads and site access roads. Eventually the water could flood access roads, equipment, and well pads, rendering these facilities.

#### **Proposed Alternative: Elevate All Equipment and Critical Infrastructure On-site (This is part of title 1 study and subject to change)**

This alternative will raise all infrastructures on caverns including the cavern pad and containment dike and will assure that critical infrastructure and equipment would be protected from storm surge and subsidence flooding. In addition, all instrument and supporting cables will need to be replaced. This would result in reducing the risk of impacting drawdown capability.

#### **No Action Alternative**

Without some flood protection, the temporary and perhaps repeated loss of drawdown capability in the indefinite future is relatively assured. Increased risk of future site flooding and operation problems are impacts as described in the purpose section above. This alternative has been screened out based on not meeting the mission need.

## 5.2.7 Project Analysis

### 5.2.7.1 WH-MM-1349/649/337 Subsidence and Inundation Mitigation

#### WH-MM-1349/649/337 Subsidence and Inundation Mitigation

#### Potentially Impactful Activities: Construction

#### Air Quality

**Criteria for Determining Significance:**

- A status of non-attainment of the NAAQS thresholds as found in Table 13;
- An exceedance of an emission limit specified in the permit (summarized in Table 14 and 15; and
- An inability to meet the goals set forth in EO 13693.

**Proposed Action Analysis: Temporary, minor impact is anticipated.** Earth-moving vehicles and heavy vehicle traffic will generate fugitive dust, increasing PM volume in the immediate area. It is not anticipated to decrease air quality for the nearest residents within one-half mile of the facility. Emissions from gas-powered generators and increased vehicle traffic may increase VOC emissions, but not to a degree where NAAQS thresholds are exceeded. Project-specific permits will be obtained with appropriate, short-term emission limits which will be monitored to ensure no exceedances.

**No Action Analysis:** There would be no impact to air quality.

#### Cultural Resources

**Criteria for Determining Significance:** The results of a SHPO review will determine if the proposed action has the potential to cause impact to historic properties.

**Proposed Action Analysis: No impact is anticipated.** There will be no impact to cultural resources given there are none present at the facility.

**No Action Analysis:** There will be no impact to cultural resources.

## Ecological Resources/Threatened and Endangered Species

### Criteria for Determining Significance:

- A requirement to engage in formal consultation with the USFWS.
- The “take” (as defined by the ESA), or potential for “take”, of any individual or group of individuals of a listed species.
- The loss or degradation, or potential for such, of any critical habitat (as defined by the ESA).

**Proposed Action Analysis: No impact is anticipated.** The USFWS IPaC report indicates that “there are no critical habitats within the project area” (see Appendix E). There will be no impact to ecological resources, to include threatened and endangered species.

**No Action Analysis:** There will be no impact to ecological resources/threatened and endangered species.

## Environmental Justice

### Criteria for Determining Significance:

- Create an environment where the health and safety of socioeconomically disadvantaged community members and their surrounding area is at risk;
- Create undesirable living conditions for socioeconomically disadvantaged community members; and
- Create health and safety risks that may disproportionately affect children (as indicated in EO 13045 *Protection of Children from Environmental Health Risks and Safety Risks*).

**Proposed Action Analysis: No impact is anticipated.** The proposed action will take place at the SPR West Hackberry facility, which is highly secured with no access to unauthorized visitors. The temporary nature of the work, the distance from which the facility sits away from the closest neighboring communities, facility security (which removes risk of acute health and safety issues from unauthorized visitors to the construction site) and the roadway improvement which will result from the execution of the project will not create a negative impact upon the sensitive population to which environmental justice applies.

In addition, Cameron Parish does not meet the definition of having a minority population as the minority population does not exceed 50 percent.

**No Action Analysis:** There will be no impact to environmental justice.



## Land Use

### Criteria for Determining Significance:

- An action that impairs the original viewshed of adjacent properties;
- An action that causes noise concerns outside noise decibel thresholds (see Noise); and
- An action that causes land use to be incompatible with existing adjacent land uses.

**Proposed Action Analysis: No impact is anticipated.** The viewshed and land compatibility will not change. The construction of the settling pond is within context of the operations at the facility. Post-project noise will not increase from current baseline conditions (project-specific noise impacts are discussed under “Noise”).

**No Action Analysis:** No impact is anticipated.

## Noise

### Criteria for Determining Significance:

- Exceedance of the long-term average noise descriptor, or Leq, with a 10-decibel penalty for night-time noise

**Proposed Action Analysis: Temporary, minor impact is anticipated.** Heavy equipment and vehicles will be utilized to complete the proposed project and will result in an increase in noise levels normally heard during SPR West Hackberry facility operations. The largest contributors of noise would be on-site generators, jack and bore machinery, heavy earth-moving equipment and heavy trucks used to haul equipment, materials and construction debris. Human neighbors nearest the facility will not be impacted given the distance and the fact the work will be performed during daylight hours. Birds and other wildlife may be bothered by the increased noise level and may avoid the area until construction is complete.

The SPR LE-II Project Execution Plan indicates mitigation of noise will be considered early in the process so that it may be “reduced or eliminated at the design phase rather than when constructed or in use”. (DOE, 2017)

**No Action Analysis:** There will be no noise impact as the construction would not take place.

## Prime Farmland/Soils

### Criteria for Determining Significance:

- The unnecessary conversion of farmland to non-agricultural uses.

**Proposed Action Analysis: No impact is anticipated.** The predominant soil type at SPR West Hackberry facility is considered to be a soil type that is classified as farmland. The facility has been in used for industrial operation since 1987 and the proposed action will not be changing the use. The proposed action will not necessitate the need to convert adjacent, prime farmland-classified land.

**No Action Analysis:** There will be no impact to prime farmland/soils.

## Socioeconomics

### Criteria for Determining Significance:

- Create an environment where the health and safety of socioeconomically disadvantaged community members and their surrounding area is at risk;
- Create the potential to substantially affect human health or the environment by excluding persons, denying persons benefits, or subjecting persons to discrimination because of their race, color, national origin, or income level; and
- Create undesirable living conditions for socioeconomically disadvantaged community members.

**Proposed Action Analysis: Short-term, beneficial impact anticipated.** Similar to the discussion of environmental justice, the proposed action will take place at the SPR West Hackberry facility, which is highly secured with no access to unauthorized visitors. The temporary nature of the work, the distance from which the facility sits away from the closest neighboring communities, facility security (which removes risk of acute health and safety issues from unauthorized visitors to the construction site) and the roadway improvement which will result from the execution of the project will not create a negative impact upon the sensitive population to which socioeconomics applies.

Short-term, economical beneficial impact may be seen with local construction-work hiring.

**No Action Analysis:** No impact to affected environments is anticipated if the work is not performed.

## Water Resources

### **Criteria for Determining Significance:**

- Increases the amount of impervious surface significantly, creating measurably more stormwater runoff than was originally experienced in the area;
- Results in the creation of a new channel or relocation of a natural drainage channel;
- Results in the discharge of pollutants that exceed federal and state water quality standards such as TMDLs or drinking water MCLs.
- A loss of wetland habitat which could change the function and viability of the wetland;
- Wetland destruction or fill which would result in loss of wetlands or wetland function;
- A release of hazardous material, POL, or other contaminants to a wetland that would risk injury to wildlife and humans; and
- Introduction of an invasive species which could alter the function and viability of a wetland.

**Proposed Action Analysis: Temporary, minor impact is anticipated.** Soil erosion is inherent with construction work and it is anticipated that water turbidity will increase in the area of the Black Lake near where the work is being performed. This will be minimized by the implementation of best management practices consistent with the SPR Pollution Prevention Plan (Publication ASL5400.41), Version 10.0 (08-02-16). It is not anticipated that the Mississippi River would be impacted.

Although the work will be taking place in and near wetlands, it is not anticipated that permanent harm or loss of wetland will occur. Project-specific permits will be obtained by the Corps of Engineers and all practicable steps will be taken to ensure minimal harm to wetlands.

**No Action Analysis:** There will be no water quality impact as the construction would not take place.

## 5.2.9 Proposed Action and Alternative

### 5.2.9.1 WH-MM-1350 Recomplete/Replace Brine Disposal Wells

#### Mission Need

To construct/repair a Brine Disposal System that has adequate capacity to handle Level 1 Performance Criteria for a brine disposal rate of 225 MBD at the West Hackberry site. Develop additional brine disposal capabilities for 25-year life span.

#### Functional Requirements

The repair/rework and/or installation of the Brine Disposal System requirements is to meet the following parameters:

- Brine Temperature Minimum: 60 °F; Average: 93 °F; Maximum: 108 °F
- Capable of Level 1 fill rate of 225 MBD This project is one component of a set of projects to upgrade the Brine Disposal System at West Hackberry in accordance with SPR Level 1 criteria. Other projects that are part of the completed Brine Disposal System that are affected by this WH-MM-1350, 1409 Project are: WH-MM-826. Lighting requirements for the Brine Disposal facilities are identified in Project WH-MM-652, 617.

#### **Proposed Alternative: Clean Existing Wells, Develop New Brine Disposal Wells, Utilize Existing Brine Injection Pumps and Add New Brine Injection Pumps at the Main Site**

The proposed alternative involves developing new brine disposal wells, utilizing existing brine injection pumps and adding new brine injection pumps at the main site. This alternative will include implementing the “get-well” plan for the existing screened and screen-less wells to increase the overall disposal capacity, and bring them to optimum performance. The remedial work would entail various processes including acid cleaning/nitrogen backwashing. Additionally, possible recompletion into a higher formation should the screens fail. The remediation of the wells is needed to clean away the sand that has covered the perforations or if they have sat unused for a period of time allowing the bacteria to build up on the sand face or screens.

This alternative would also add 2 new brine disposal wells, one well on pad 1 and one well on pad 2 to increase system capacity. A 2014 injection rate study by FFPO showed that with the eight remaining wells in use, the required well head injection pressure would increase to 540 Psig (30 days after clean out wells with continuous flows) to meet the 225 MBD design Brine Disposal rate. The well on pad 1 would be directionally drilled towards the south from the new extended section and would terminate 6,747 feet measured depth, 6,700 feet true vertical depth. The well on pad 2 would be directionally drilled towards the west-northwest from the new extended section and would terminate at 6,806 feet measured depth, 6,700 feet true vertical depth. The new disposal wells are intended to extend the reach of the injection zone, further into the lower zone to enhance the capabilities of the zone to take more volumes before building excessive pressures. Both pads will be enlarged, and the interconnecting road widened, requiring revisions to environmental permits to be obtained. The proposed expansion area needs to be

elevated with consideration given to U.S. Corps of Engineers requirements. Each existing pad has a chain-link fence to keep out the cattle. Initially, similar fencing will need to encompass the expansion areas. The proposed pad enlargements are shown in figure 5.

The exact surface location of the well will be dependent on equipment placement capabilities, and must be able to provide adequate room for a workover rig and associated equipment. The coiled tubing unit will require approximately the same footprint as the workover rig. The bottom hole location is an approximation but should be located in the same general area.

This alternative would add two new brine injection pumps to be operated in series with the existing brine injection pumps for increased brine injection pressure. The two new injection pump station would be sized for 225 MBD at approximately 500 Psig Total Dynamic Head (TDH). The installation will utilize as much existing infrastructure as possible including cable trays, pipe supports, motor control centers, etc but would require new supporting systems including electrical power, cabling, seal flush pumps, lighting, shelters and necessary process instrumentation and automation systems. These can be further developed during detailed design. The existing security system will be sufficient.

This option is only viable if the 24-inch diameter brine disposal pipeline has a Maximum Allowable Operating Pressure (MAOP) equal to or greater than the discharge pressure that would be produced by the two sets of pumps operating in series. A separate project, WH-MM-826 is addressing the installation of a new pipeline and this project must consider the design and/or the “As-Built” condition of the new 24-inch brine disposal pipeline. Additionally, the existing manifold piping at disposal well pads 1 and 2 would need to be replaced in order to be suitable for the higher operating pressures produced by the new, additional pumps.

### **No Action Alternative**

Not performing this work will result in outdated, fatigued equipment in need of cleaning and updates with inadequate capacity to handle Level 1 Performance Criteria for a brine disposal rate of 120 MBD at the West Hackberry site.

## 5.2.10 Project Analysis

### 5.2.10.1 WH-MM-1350 Recomplete/Replace Brine Disposal Wells

#### WH-MM-1350 Recomplete/Replace Brine Disposal Wells

#### Potentially Impactful Activities: Construction

#### Air Quality

**Criteria for Determining Significance:**

- A status of non-attainment of the NAAQS thresholds as found in Table 13;
- An exceedance of an emission limit specified in the permit (summarized in Table 14 and 15; and
- An inability to meet the goals set forth in EO 13693.

**Proposed Action Analysis: Temporary, minor impact is anticipated.** Earth-moving vehicles and heavy vehicle traffic may generate fugitive dust, increasing PM volume in the immediate area. It is not anticipated to decrease air quality for the nearest off-facility residents. Emissions from gas-powered generators and increased vehicle traffic may increase VOC emissions, but not to a degree where NAAQS thresholds are exceeded. Project-specific permits will be obtained with appropriate, short-term emission limits which will be monitored to ensure no exceedances.

**No Action Analysis:** There would be no impact to air quality.

#### Cultural Resources

**Criteria for Determining Significance:** The results of a SHPO review will determine if the proposed action has the potential to cause impact to historic properties.

**Proposed Action Analysis: No impact is anticipated.** There will be no impact to cultural resources given there are none present at the facility.

**No Action Analysis:** There will be no impact to cultural resources.

## Ecological Resources/Threatened and Endangered Species

### Criteria for Determining Significance:

- A requirement to engage in formal consultation with the USFWS.
- The “take” (as defined by the ESA), or potential for “take”, of any individual or group of individuals of a listed species.
- The loss or degradation, or potential for such, of any critical habitat (as defined by the ESA).

**Proposed Action Analysis: No impact is anticipated.** The USFWS IPaC report indicates that “there are no critical habitats within the project area” (see Appendix E). There will be no impact to ecological resources, to include threatened and endangered species.

**No Action Analysis:** There will be no impact to ecological resources/threatened and endangered species.

## Environmental Justice

### Criteria for Determining Significance:

- Create an environment where the health and safety of socioeconomically disadvantaged community members and their surrounding area is at risk;
- Create undesirable living conditions for socioeconomically disadvantaged community members; and
- Create health and safety risks that may disproportionately affect children (as indicated in EO 13045 *Protection of Children from Environmental Health Risks and Safety Risks*).

**Proposed Action Analysis: No impact is anticipated.** The proposed action will take place at the SPR West Hackberry facility, which is highly secured with no access to unauthorized visitors. The temporary nature of the work, the distance from which the facility sits away from the closest neighboring communities, facility security (which removes risk of acute health and safety issues from unauthorized visitors to the construction site) and the roadway improvement which will result from the execution of the project will not create a negative impact upon the sensitive population to which environmental justice applies.

In addition, Cameron Parish does not meet the definition of having a minority population as the minority population does not exceed 50 percent.

**No Action Analysis:** There will be no impact to environmental justice.

## Land Use

### Criteria for Determining Significance:

- An action that impairs the original viewshed of adjacent properties;
- An action that causes noise concerns outside noise decibel thresholds (see Noise); and
- An action that causes land use to be incompatible with existing adjacent land uses.

**Proposed Action Analysis: No impact is anticipated.** The viewshed and land compatibility will not change. The construction is within context of the operations at the facility. Post-project noise will not increase from current baseline conditions (project-specific noise impacts are discussed under “Noise”).

**No Action Analysis:** No impact is anticipated.

## Noise

### Criteria for Determining Significance:

- Exceedance of the long-term average noise descriptor, or Leq, with a 10-decibel penalty for night-time noise

**Proposed Action Analysis: Temporary, minor impact is anticipated.** Heavy equipment and vehicles will be utilized to complete the proposed project and will result in an increase in noise levels normally heard during SPR West Hackberry facility operations. The largest contributors of noise would be on-site generators, jack and bore machinery, heavy earth-moving equipment and heavy trucks used to haul equipment, materials and construction debris. Human neighbors nearest the facility will not be impacted given the distance and the fact the work will be performed during daylight hours. Birds and other wildlife may be bothered by the increased noise level and may avoid the area until construction is complete.

The SPR LE-II Project Execution Plan indicates mitigation of noise will be considered early in the process so that it may be “reduced or eliminated at the design phase rather than when constructed or in use”. (DOE, 2017)

**No Action Analysis:** There will be no noise impact as the construction would not take place.



## Prime Farmland/Soils

### Criteria for Determining Significance:

- The unnecessary conversion of farmland to non-agricultural uses.

**Proposed Action Analysis: No impact is anticipated.** The predominant soil type at SPR West Hackberry facility is considered to be a soil type that is classified as farmland. The facility has been in used for industrial operation since 1987 and the proposed action will not be changing the use. The proposed action will not necessitate the need to convert adjacent, prime farmland–classified land.

**No Action Analysis:** There will be no impact to prime farmland/soils.

## Socioeconomics

### Criteria for Determining Significance:

- Create an environment where the health and safety of socioeconomically disadvantaged community members and their surrounding area is at risk;
- Create the potential to substantially affect human health or the environment by excluding persons, denying persons benefits, or subjecting persons to discrimination because of their race, color, national origin, or income level;
- Create undesirable living conditions for socioeconomically disadvantaged community members; and

**Proposed Action Analysis: Short-term, beneficial impact anticipated.** Similar to the discussion of environmental justice, the proposed action will take place at the SPR West Hackberry facility, which is highly secured with no access to unauthorized visitors. The temporary nature of the work, the distance from which the facility sits away from the closest neighboring communities, and facility security (which removes risk of acute health and safety issues from unauthorized visitors to the construction site) will not create a negative impact upon the sensitive population to which socioeconomics applies.

Short-term, economical beneficial impact may be seen with local construction-work hiring.

**No action Analysis:** No impact is anticipated if the current bridges remain.

## Water Resources

### **Criteria for Determining Significance:**

- Increases the amount of impervious surface significantly, creating measurably more stormwater runoff than was originally experienced in the area;
- Results in the creation of a new channel or relocation of a natural drainage channel;
- Results in the discharge of pollutants that exceed federal and state water quality standards such as TMDLs or drinking water MCLs.
- A loss of wetland habitat which could change the function and viability of the wetland;
- Wetland destruction or fill which would result in loss of wetlands or wetland function;
- A release of hazardous material, POL, or other contaminants to a wetland that would risk injury to wildlife and humans; and
- Introduction of an invasive species which could alter the function and viability of a wetland.

**Proposed Action Analysis: Temporary, minor impact is anticipated.** Soil erosion is inherent with construction work and it is anticipated that water turbidity will increase in the area of the Black Lake near where the work is being performed. This will be minimized by the implementation of best management practices consistent with the SPR Pollution Prevention Plan (Publication ASL5400.41), Version 10.0 (08-02-16). It is not anticipated that the Mississippi River would be impacted.

Although the work will be taking place in and near wetlands, it is not anticipated that permanent harm or loss of wetland will occur. Project-specific permits will be obtained by the Corps of Engineers and all practicable steps will be taken to ensure minimal harm to wetlands.

**No Action Analysis:** There will be no water quality impact as the construction would not take place.

## **5.2.12 Proposed Action and Alternative**

### **5.2.12.1 WH-MM-1359 Revise WH RWINJ Pump Exercise System**

#### **Mission Need**

This description of work addresses the objectives of the work package, Task WH-MM-1359, Revise WH Raw Water Injection Pump Exercise System to change the routing of the RWINJ exercise loop cooling water discharge flows so that it does not involve flowing raw water into the caverns that could decrease cavern life expectancy.

#### **Functional Requirements**

The control loops shall be designed/calculated to assure that they are fast acting controls. The pump exercise requirement is to run each of the seven RWINJ pumps for approximately 90 minutes with enough water (500 gpm) removed from the exercise loop during exercise for cooling. The pumps are exercised on a quarterly basis. For the alternative of using brine tanks as a sink: A brine tank requires ~25 MB of saturated brine at the start of testing. Then adding 15MB water in the tank at 1.015 MB.

#### **Proposed Alternative: Combine with WH-MM-1025 and Share the Pond**

The construction of a holding pond in conjunction with WH-MM-1025 will allow for the RWINJ pump exercise water to be diverted into the holding pond.

#### **No Action Alternative**

Continuing to route cooling water to the caverns instead of the brine system will produce collateral leaching of caverns and will irreversibly compromise cavern life.

This alternative has been screened out because it doesn't meet the functional requirements of cavern integrity.

## 5.2.14 Project Analysis

### 5.2.14.1 WH-MM-1359 Revise HW RWINJ Pump Exercise System

#### WH-MM-1359 Revise HW RWINJ Pump Exercise System

#### Potentially Impactful Activities: Construction

#### Air Quality

**Criteria for Determining Significance:**

- A status of non-attainment of the NAAQS thresholds as found in Table 13;
- An exceedance of an emission limit specified in the permit (summarized in Table 14 and 15; and
- An inability to meet the goals set forth in EO 13693.

**Proposed Action Analysis: Temporary, minor impact is anticipated.** Earth-moving vehicles and heavy vehicle traffic may generate fugitive dust, increasing PM volume in the immediate area. It is not anticipated to decrease air quality for the nearest off-facility residents. Emissions from gas-powered generators and increased vehicle traffic may increase VOC emissions, but not to a degree where NAAQS thresholds are exceeded. Project-specific permits will be obtained with appropriate, short-term emission limits which will be monitored to ensure no exceedances.

**No Action Analysis:** There would be no impact to air quality.

#### Cultural Resources

**Criteria for Determining Significance:** The results of a SHPO review will determine if the proposed action has the potential to cause impact to historic properties.

**Proposed Action Analysis: No impact is anticipated.** There will be no impact to cultural resources given there are none present at the facility.

**No Action Analysis:** There will be no impact to cultural resources.

## Ecological Resources/Threatened and Endangered Species

### Criteria for Determining Significance:

- A requirement to engage in formal consultation with the USFWS.
- The “take” (as defined by the ESA), or potential for “take”, of any individual or group of individuals of a listed species.
- The loss or degradation, or potential for such, of any critical habitat (as defined by the ESA).

**Proposed Action Analysis: No impact is anticipated.** The USFWS IPaC report indicates that “there are no critical habitats within the project area” (see Appendix E). There will be no impact to ecological resources, to include threatened and endangered species.

**No Action Analysis:** There will be no impact to ecological resources/threatened and endangered species.

## Environmental Justice

### Criteria for Determining Significance:

- Create an environment where the health and safety of socioeconomically disadvantaged community members and their surrounding area is at risk;
- Create undesirable living conditions for socioeconomically disadvantaged community members; and
- Create health and safety risks that may disproportionately affect children (as indicated in EO 13045 *Protection of Children from Environmental Health Risks and Safety Risks*).

**Proposed Action Analysis: No impact is anticipated.** The proposed action will take place at the SPR West Hackberry facility, which is highly secured with no access to unauthorized visitors. The temporary nature of the work, the distance from which the facility sits away from the closest neighboring communities, facility security (which removes risk of acute health and safety issues from unauthorized visitors to the construction site) and the roadway improvement which will result from the execution of the project will not create a negative impact upon the sensitive population to which environmental justice applies.

In addition, Cameron Parish does not meet the definition of having a minority population as the minority population does not exceed 50 percent.

**No Action Analysis:** There will be no impact to environmental justice.

## Land Use

### Criteria for Determining Significance:

- An action that impairs the original viewshed of adjacent properties;
- An action that causes noise concerns outside noise decibel thresholds (see Noise); and
- An action that causes land use to be incompatible with existing adjacent land uses.

**Proposed Action Analysis: No impact is anticipated.** The viewshed and land compatibility will not change. The construction is within context of the operations at the facility. Post-project noise will not increase from current baseline conditions (project-specific noise impacts are discussed under “Noise”).

**No Action Analysis:** No impact is anticipated.

## Noise

### Criteria for Determining Significance:

- Exceedance of the long-term average noise descriptor, or Leq, with a 10-decibel penalty for night-time noise

**Proposed Action Analysis: Temporary, minor impact is anticipated.** Heavy equipment and vehicles will be utilized to complete the proposed project and will result in an increase in noise levels normally heard during SPR West Hackberry facility operations. The largest contributors of noise would be on-site generators, jack and bore machinery, heavy earth-moving equipment and heavy trucks used to haul equipment, materials and construction debris. Human neighbors nearest the facility will not be impacted given the distance and the fact the work will be performed during daylight hours. Birds and other wildlife may be bothered by the increased noise level and may avoid the area until construction is complete.

The SPR LE-II Project Execution Plan indicates mitigation of noise will be considered early in the process so that it may be “reduced or eliminated at the design phase rather than when constructed or in use”. (DOE, 2017)

**No Action Analysis:** There will be no noise impact as the construction would not take place.

## Prime Farmland/Soils

### Criteria for Determining Significance:

- The unnecessary conversion of farmland to non-agricultural uses.

**Proposed Action Analysis: No impact is anticipated.** The predominant soil type at SPR West Hackberry facility is considered to be a soil type that is classified as farmland. The facility has been in use for industrial operation since 1987 and the proposed action will not be changing the use. The proposed action will not necessitate the need to convert adjacent, prime farmland-classified land.

**No Action Analysis:** There will be no impact to prime farmland/soils.

## Socioeconomics

### Criteria for Determining Significance:

- Create an environment where the health and safety of socioeconomically disadvantaged community members and their surrounding area is at risk;
- Create the potential to substantially affect human health or the environment by excluding persons, denying persons benefits, or subjecting persons to discrimination because of their race, color, national origin, or income level; and
- Create undesirable living conditions for socioeconomically disadvantaged community members.

**Proposed Action Analysis: Short-term, beneficial impact anticipated.** Similar to the discussion of environmental justice, the proposed action will take place at the SPR West Hackberry facility, which is highly secured with no access to unauthorized visitors. The temporary nature of the work, the distance from which the facility sits away from the closest neighboring communities, and facility security (which removes risk of acute health and safety issues from unauthorized visitors to the construction site) will not create a negative impact upon the sensitive population to which socioeconomics applies.

Short-term, economical beneficial impact may be seen with local construction-work hiring.

**No Action Analysis:** No impact is anticipated if the current bridges remain.

## Water Resources

### **Criteria for Determining Significance:**

- Increases the amount of impervious surface significantly, creating measurably more stormwater runoff than was originally experienced in the area;
- Results in the creation of a new channel or relocation of a natural drainage channel;
- Results in the discharge of pollutants that exceed federal and state water quality standards such as TMDLs or drinking water MCLs.
- A loss of wetland habitat which could change the function and viability of the wetland;
- Wetland destruction or fill which would result in loss of wetlands or wetland function;
- A release of hazardous material, POL, or other contaminants to a wetland that would risk injury to wildlife and humans; and
- Introduction of an invasive species which could alter the function and viability of a wetland.

**Proposed Action Analysis: Temporary, minor impact is anticipated.** Soil erosion is inherent with construction work and it is anticipated that water turbidity will increase in the area of the Black Lake near where the work is being performed. This will be minimized by the implementation of best management practices consistent with the SPR Pollution Prevention Plan (Publication ASL5400.41), Version 10.0 (08-02-16). It is not anticipated that the Mississippi River would be impacted.

Although the work will be taking place in and near wetlands, it is not anticipated that permanent harm or loss of wetland will occur. Project-specific permits will be obtained by the Corps of Engineers and all practicable steps will be taken to ensure minimal harm to wetlands.

**No Action Analysis:** There will be no water quality impact as the construction would not take place.



## 6 Big Hill

### 6.1 Big Hill Affected Environments

#### 6.1.1 Air Quality

The Texas Commission of Environmental Quality’s (TCEQ) Air program is responsible for carrying out the mandates of the Texas Air Quality Rules, as well as meeting Texas’ federal obligations under the Clean Air Act. They are responsible for regulating stationary sources for which operating permits may be necessary. The air quality thresholds discussed here are to be used as guidance to determine if a proposed action would result in a significant impact to air quality (acute or cumulative) in relation to NEPA. This information should not be used to determine if an action would require a permit.

Six “priority pollutants” are used to calculate the Air Quality Index: carbon monoxide, nitrogen dioxide, ozone, sulfur dioxide, and PM 2.5 and 10. Not all pollutants are monitored at each location in the state. The closest monitoring station near Big Hill is Hamshire approximately 10 miles away in the city of Hamshire and it monitors NOx, ozone and PM 2.5. It is part of the TCEQ Beaumont Region which has 17 other stations 40 to 60 miles away monitoring the air in the Port Arthur area.

The pollutant list mirrors the federal government’s established standards which are known as the NAAQS. The pollutants of concern and the levels and thresholds specific to each are indicated in Table 21.

*Table 20 National Ambient Air Quality Standards – Jefferson County*

Pollutant	Primary <sup>2</sup> / Secondary <sup>3</sup>	Averaging Time & Level	Threshold	Current Status
Carbon Monoxide (CO)	Primary	8 hours = 9 ppm <sup>1</sup> 1 hour = 35 ppm	Not to be exceeded more than once per year.	Attainment
Nitrogen Dioxide (NO <sub>2</sub> )	Primary (1 hour)	1 hour = 100 ppb	98 <sup>th</sup> % of 1-hour daily maximum concentrations, averaged over 3 years	Attainment
	Primary & Secondary (Annual)	Annual average = 53 ppb <sup>1</sup>	Annual Mean	Attainment

Pollutant	Primary <sup>2</sup> / Secondary <sup>3</sup>	Averaging Time & Level	Threshold	Current Status
Lead <sup>5</sup>	Primary & Secondary	Rolling 3 month average = 0.15 ug/m <sup>3</sup>	Not to be exceeded	Attainment
Ozone	Primary & Secondary	8-hour = .070 ppm	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years.	Attainment
Particulate Matter 2.5 <sup>1</sup> (PM 2.5)	Primary	Annual = 12 ug/m <sup>3</sup> , <sup>1</sup>	Annual mean, averaged over 3 years	Attainment
	Secondary	Annual = 15 ug/m <sup>3</sup>	Annual mean, averaged over 3 years	Attainment
	Primary and Secondary	24-hour = 35 ug/m <sup>3</sup>	98th percentile, averaged over 3 years	Attainment
Particulate Matter 10 <sup>1</sup> (PM 10)	Primary and Secondary	24-hour = 150 ug/m <sup>3</sup>	Not to be exceeded more than once per year on average over 3 years	Attainment
Sulfur Dioxide (SO <sub>2</sub> )	Primary	1-hour = 75 ppb	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years	Attainment
	Secondary	3-hour = 0.5 ppm	Not to be exceeded more than once per year	Attainment

Source: USEPA website <http://www.epa.gov/air/criteria.html> accessed December 6, 2017

<sup>1</sup>**Units of measure:** parts per million (ppm), parts per billion (ppb), micrograms per cubic meter of air (ug/m<sup>3</sup>) for PM.

<sup>2</sup>**Primary standards** provide public health protection, including protecting the health of "sensitive" populations such as asthmatics, children, and the elderly.

<sup>3</sup>**Secondary standards** provide public welfare protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings.

<sup>4</sup>**PM 10** is not currently being monitored at the Jefferson County monitoring area.

<sup>5</sup>**Lead** is included in the full list of NAAQS pollutants. Not all pollutants are monitored at each monitoring station, and lead is not monitored at the Lake Charles MSA monitoring stations.

## General Conformity Rule

Jefferson County is currently considered an attainment area. (EPA, 2016a)

### Permit

In addition to being subject to the NAAQS, Big Hill operates under Permit #9256 issued by the TCEQ dated January 11, 2008 in accordance with Title 30 Texas Administrative Code 116.116(b). The permitted emission sources at the facility are tanks, emergency engines and painting operations.

The tpy emission limit for each source is listed below in Table 21:

*Table 21 Emission rates for Criteria Pollutants and TAPS (in tpy)*

PM <sup>10</sup>	PM <sup>2.5</sup>	SO <sub>2</sub>	NO <sub>x</sub>	CO	VOC	Acetone
<b>Emission Source</b>		<b>1001 Brine Pond</b>				
					3.15	
<b>Emission Source</b>		<b>1002 Fugitives (4)</b>				
					2.86	
<b>Emission Source</b>		<b>1004 Diesel Generator (122 Hrs/year operation)</b>				
0.06		0.66	1.95	0.45	0.06	
<b>Emission Source</b>		<b>1005 Diesel Generator (100 Hrs/year operation)</b>				
0.01		0.01	0.14	0.03	0.01	
<b>Emission Source</b>		<b>1006 Diesel Pump (100 Hrs/year operation)</b>				
0.03		0.03	0.45	0.10	0.04	
<b>Emission Source</b>		<b>1007 Diesel Fuel Tank, BHT-4</b>				
					0.01	
<b>Emission Source</b>		<b>1008 Slop Oil Tank Oil Tank BHT-6</b>				
					0.18	

PM <sup>10</sup>	PM <sup>2.5</sup>	SO <sub>2</sub>	NO <sub>x</sub>	CO	VOC	Acetone
Emission Source		1009 Crude Oil Tank BHT-7				
					1.37	
Emission Source		1010 Slop Oil Sump BHT-10				
					0.05	
Emission Source		1011 Diesel Fuel Tank BHT-11				
					0.01	
Emission Source		1012 Diesel Fuel Tank BHT-50				
					0.01	
Emission Source		1013 Diesel Fuel Tank BHT-51				
					0.01	
Emission Source		1014 Gasoline Tank BHT-52				
					0.34	
Emission Source		1015 Air Eliminator				
					0.08	
Emission Source		1016 Solvent Recycler (122 Hrs/year operation)				
					0.01	0.01
Emission Source		1017 Diesel Fuel Tank BHT-53				
					0.01	

### Greenhouse Gas (EO 13693)

The Greenhouse Gas Reporting Program authority is carried out at the federal level of USEPA. The Consolidated Appropriations Act of 2008 triggered the issue of the Mandatory Reporting of Greenhouse Gases Rule (74 FR 56260/40 CFR 98). The rule states that any facility that emits 25,000 tpy or more of carbon dioxide equivalent (CO<sub>2</sub>e) is required to submit annual reports to the USEPA. Further information and guidance can be found at:

<http://www.epa.gov/reporting/basic-info/index.html>.

There is an EO relevant to this effort: EO 13693.

EO 13693 directs government agencies to “reduce GHG emissions through reduction of energy intensity 30 percent by 2015, compared to a FY 2003 baseline.”

It also directs federal agencies to reduce targeted scope 1 and scope 2 GHG emissions by at least 40% by FY 2025 from a FY 2008 baseline. Section 2 of EO 13693 directs individual agencies to set scope 1 and 2 GHG emission reduction targets for FY 2025 from a FY 2008 baseline. In addition, the goal for scope 3 GHG emission reduction is 13% by 2025 from a 2008 baseline.

Scope 1 GHG emissions are direct emissions which result from sources owned or controlled by DOE. Included in this source are boilers/water heaters and intra-installation vehicular travel. The Big Hill facility’s major Scope 1 GHG source is emergency engines.

Scope 2 GHG emissions are indirect emissions resulting from consumption of purchased electricity, heat or steam. This includes electricity purchased for heating equipment and general electrical use.

Scope 3 GHG emissions are “other indirect emissions” which include extraction and production of purchased materials and fuels-transport related activity not covered in Scope 2. This also includes emissions from commuting and air-travel.

### **6.1.2 Cultural Resources**

There are no known archeological, historical, or cultural resources that would potentially be affected by the project. Given the disturbed state of almost all of the facility area, involvement with any potential unidentified resource is unlikely.

Section 106 of the NHPA requires federal agencies to take into account the effects of their undertakings on historic properties and afford the Advisory Council on Historic Properties and other parties with an interest a reasonable opportunity to comment (consultation) beginning at the early stages of project planning. An undertaking is defined as “a project, activity or program funded in whole or in part under the direct or indirect jurisdiction of a Federal Agency, including those carried out by or on behalf of a Federal Agency; those carried out with Federal financial assistance; and those requiring a Federal permit, license or approval. Once an undertaking has been identified, the CRM will determine if it is a type of activity that has the potential to cause effects on historic properties.”

Please note that NEPA analysis does not replace or negate the need for NHPA Section 106 review. Therefore, any action that may affect the physical landscape are subject to review for possible adverse impacts to be identified. Coordination with the SHPO is required in all cases.

### 6.1.3 Ecological Resources

Vegetation is defined as plants and their geographic characteristics. Fish and wildlife are the animals and their habitats that occur within a region. Threatened and endangered species are any federally or state listed species in or around the facility. Section 7 of the Endangered Species Act, as amended (16 United States Code, Chapter 35 § 1531-1544), requires federal agencies evaluate the efforts of the proposed actions on protected plant and animal species and their habitats and take appropriate measures to conserve and project these species. Special-status species include plants and animals listed as sensitive, threatened, or endangered by the USFWS, as well as those that are candidates or proposed for listing as threatened or endangered. Special status species also include those species protected by the Migratory Bird Treaty Act, the Bald and Golden Eagle Protection Act, and the Marine Mammal Protection Act.

The Texas Parks and Wildlife Department Species by County List reports the following species in Jefferson County: <http://tpwd.texas.gov/gis/rtest/>

Table 22 Plant Species in Jefferson County, TX

Common Name	Scientific Name	State Status	Federal Status
Awnless bluestem	<i>Bothriochloa exaristata</i>	None	None
Chapman's orchid	<i>Platanthera chapmanii</i>	None	None
Large beakrush	<i>Rhynchospora macra</i>	None	None

Table 23 Mammals, Birds and Fish Species in Jefferson County, TX

Common Name	Scientific Name	State Status	Federal Status
Southern Crawfish Frog	<i>Lithobates areolatus areolatus</i>	None	None
American Peregrine Falcon	<i>Falco peregrinus anatum</i>	Threatened	Delisted
Arctic Peregrine Falcon	<i>Falco peregrinus tundrius</i>	None	Delisted

Common Name	Scientific Name	State Status	Federal Status
Bald Eagle	<i>Haliaeetus leucocephalus</i>	Threatened	Delisted
Black Rail	<i>Laterallus jamaicensis</i>	None	None
Brown Pelican	<i>Pelecanus occidentalis</i>	None	Delisted
Henslow's Sparrow	<i>Ammodramus henslowii</i>	None	None
Peregrine Falcon	<i>Falco peregrinus</i>	Threatened	Delisted
Piping Plover	<i>Charadrius melodus</i>	Threatened	Threatened
Red Knot	<i>Calidris canutus rufa</i>	None	Threatened
Reddish Egret	<i>Egretta rufescens</i>	Threatened	None
Snowy Plover	<i>Charadrius alexandrinus</i>	None	None
Sprague's Pipit	<i>Anthus spragueii</i>	None	None
Swallow-tailed Kite	<i>Elanoides forficatus</i>	Threatened	None
Western Snowy Plover	<i>Charadrius alexandrinus nivosus</i>	None	None
White-faced Ibis	<i>Plegadis chihi</i>	Threatened	None
Wood Stork	<i>Mycteria americana</i>	Threatened	None
American eel	<i>Anguilla rostrata</i>	None	None
Smalltooth sawfish	<i>Pristis pectinata</i>	Endangered	Endangered
Bay skipper	<i>Euphyes bayensis</i>	None	None
Black bear	<i>Ursus americanus</i>	Threatened	None
Louisiana black bear	<i>Ursus americanus luteolus</i>	Threatened	Delisted
Plains spotted skunk	<i>Spilogale putorius interrupta</i>	None	None
Rafinesque's big-eared bat	<i>Corynorhinus rafinesquii</i>	Threatened	None

Common Name	Scientific Name	State Status	Federal Status
Red wolf	<i>Canis rufus</i>	Endangered	Endangered
Southeastern myotis bat	<i>Myotis austroriparius</i>	None	None
Louisiana pigtoe	<i>Pleurobema riddellii</i>	Threatened	None
Sandbank pocketbook	<i>Lampsilis satura</i>	Threatened	None
Southern hickorynut	<i>Obovaria jacksoniana</i>	Threatened	None
Texas heelsplitter	<i>Potamilus amphichaenus</i>	Threatened	None
Texas pigtoe	<i>Fusconaia askewi</i>	Threatened	None
Triangle pigtoe	<i>Fusconaia lananensis</i>	Threatened	None
Alligator snapping turtle	<i>Macrochelys temminckii</i>	Threatened	None
Atlantic hawksbill sea turtle	<i>Eretmochelys imbricata</i>	Endangered	Endangered
Green sea turtle	<i>Chelonia mydas</i>	Threatened	Threatened
Kemp's Ridley sea turtle	<i>Lepidochelys kempii</i>	Endangered	Endangered
Leatherback sea turtle	<i>Dermochelys coriacea</i>	Endangered	Endangered
Loggerhead sea turtle	<i>Caretta caretta</i>	Threatened	Threatened
Northern scarlet snake	<i>Cemophora coccinea copei</i>	Threatened	None
Texas diamondback terrapin	<i>Malaclemys terrapin littoralis</i>	None	None
Texas horned lizard	<i>Phrynosoma cornutum</i>	Threatened	None
Timber rattlesnake	<i>Crotalus horridus</i>	Threatened	None
West Indian Manatee	<i>Trichechus manatus</i>	Threatened	Threatened

Source: Texas Parks and Wildlife Department Species by County List accessed at: <http://tpwd.texas.gov/gis/rtest/> on December 8, 2017.



While members of the above-listed species reportedly live in Jefferson County, none of them call the SPR Big Hill home. An Official Species List was generated using the USFWS IPaC. The list fulfills the requirement for Federal agencies to “request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action” pursuant to the aforementioned Section 7 of the Endangered Species List. It reports for SPR Big Hill: “There are no critical habitats within your project area under this office’s jurisdiction.” The IPaC report is presented in Appendix E.

The facility complies with EO 13186 *Responsibilities of Federal Agencies to Protect Migratory Birds & Migratory Bird Act*. Migratory birds are often spotted at each of the SPR facilities. Mitigation activities to ensure the protection of migratory birds include flagging, avoidance of nesting areas and selective mowing cessation during critical times of the year to allow for adequate food and shelter.

#### **6.1.4 Environmental Justice**

Environmental justice addresses the disproportionate effect a federal action may have on low-income or minority populations or on children. In 1994, EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations was issued to focus attention of federal agencies on human health and environmental conditions in minority and low-income communities and to ensure that disproportionately high and adverse human health or environmental effects on these communities are identified and addressed. In 1997, EO 13045, Protection of Children from Environmental Health Risks and Safety Risks Protection of Children), was issued.

According to the US Census Bureau, the 2016 American Community Survey estimated total population for Jefferson County was 252,993 and 33.9 percent of that number is made up of people of the African American race A relatively small percentage of the community is Hispanic with only 19 percent, and 0.4 percent of people of American Indian or Alaskan Native descent.

As defined by the CEQ report, Environmental Justice Guidance Under the Nation Environmental Policy Act, a minority population should be identified where either:

- The minority population of the affected area exceeds 50 percent; or
- The minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis.

#### **6.1.5 Land Use**

Land use comprises the natural condition or human-modified activities occurring at a particular location. Land uses are frequently regulated by management plans, policies, ordinances and regulation that determine the types of activities that are allowable or provide protection for

specially designated or environmentally sensitive areas.

The SPR Big Hill facility has been operational since 1987. The facility is strictly used for oil industry activities with personnel support buildings (office/restrooms). DOE maintains appropriate operational permits and performs all regulatory compliance activities as required.

### 6.1.6 Noise

Noise is any sound that is undesirable because it interferes with communication, is intense enough to damage hearing, or is otherwise intrusive. Human response to noise varies depending on the type and characteristics of the noise, the distance between the noise source and the receptor, receptor sensitivity, and the time of day. Noise is often generated by activities such as construction or vehicular traffic. Sound levels are expressed in dB and various weighted dB scales (i.e. A, B C) are used to approximate how people perceive different types of sounds. USEPA defined a long-term average noise descriptor, the “equivalent” noise level, or Leq. The DNL consists of the Leq with a 10-Db penalty for night-time noise. This metric provides a single measure of overall noise impact and is the accepted measure of determining human noise impacts.

The Big Hill site is extremely remote with natural sound patterns (e.g birds, frogs, insects, wind). On a reasonably calm day one could expect approximately 50 dBA in the area (in comparison, a truck travelling 65 miles per hour produces 88 dBA 50 feet away). (DOE, 1976)

Noise concerns would be addressed from a worker health and safety perspective. All four SPR locations are governed by OSHA 1910.119, *Process Safety Management of Highly Hazardous Chemicals* per a 1994 determination by the Department of Labor. The four storage sites also participate in the OSHA Voluntary Protection Program meaning the hazards analyses follow what OSHA considers industry best practices. A preliminary hazards review was performed and it indicates noise is not a concern from any of the proposed actions. (DOE, 2017)

### 6.1.7 Prime Farmland/Soils

The NRCS has listed the majority of the soil map units within the proposed project area as prime farmland. More specifically, the soils in the project area are mapped, as seen below in Table 26, as rarely flooded, moderately well drained soil with slope ranges of 0 to 1 percent.

Table 24 Soil Descriptions in the Project Area

Soil Type	Drainage Class	Average Slope	Prime Farmland
Anahuac		0 to 2 Percent	Yes

Soil Type	Drainage Class	Average Slope	Prime Farmland
Meaton-Levac complex	Rarely flooded	0 to 1 Percent	No
Meaton-Spindletop complex	Rarely flooded	0 to 1 Percent	No
Urban land			No

The purpose of the FPPA is to minimize the extent to which Federal programs contribute to the unnecessary conversion of farmland to non-agricultural uses. The FPPA stipulates that Federal programs be compatible with State, local and private efforts to protect farmland. Prime farmland soils have the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. In general, prime farmland soils experience adequate and dependable precipitation, a favorable temperature and growing season, have acceptable acidity or alkalinity, and have few or no surface stones. Prime farmland soils are permeable to water and air. These soils are not excessively erodible or saturated with water for long periods of time. One soil map unit is classified as prime farmland soils and is located along the northern border of the facility (see Table 10 and Appendix D).

### 6.1.8 Socioeconomics

Big Hill is located in Jefferson County, Texas. The nearest communities include Stowell, Winnie and Port Arthur City but the distance between the facility and the nearest town is approximately 17 miles. It is anticipated that any potential socioeconomic impacts due to the proposed actions would be concentrated within these areas surrounding the facility

The population estimate for Jefferson County as of 2016 was 254,679. This was a 0.95% increase from the 2010 Census. The Stowell population decreased, Port Arthur City increased slightly and Winnie had no significant change. (USCB, 2016). The table below shows population numbers for the three cities.

*Table 25 Population in Areas Surrounding Big Hill (2016)*

	Jefferson County	Stowell	Winnie	Port Arthur City	Total
Population Estimate 2016	252,993	1,289	3,270	54,913	314,655
Population 2010 Census	252,273	1,756	3,254	53,818	311,101

	Jefferson County	Stowell	Winnie	Port Arthur City	Total
Percent Change	0.3%	-27.16	0.49%	2%	1.14%

The largest contributors to employment in the surrounding areas are educational services and health care and social assistance services. For Stowell, the largest contributing sectors are construction, educational services and health care and social assistance; and manufacturing. For Winnie, the largest contributing sectors are educational services and health care and social assistance; retail trade; and arts, entertainment, recreation, accommodation and food services. For Port Arthur City, the largest contributing sectors are construction, educational services and health care and social assistance; and retail trade. (USCB, 2016).

As shown in the table below, there is a median household income difference of \$13,244 between Port Arthur City and Winnie. Unemployment rates differ from 4.1% to 13.1% across the area.

*Table 26 Employment in Areas Surrounding Big Hill (2016)*

	Civilian Labor Force	Armed Forces Labor Force	Unemployment Rate	Median Household Income	Per Capita Income in past 12 months
Jefferson County	112,926	71	7.3%	44,965	63,582
Stowell	483	0	4.1%	42,014	60,146
Winnie	1,638	37	13.1%	45,247	65,020
Port Arthur City	22,650	34	10.4%	32,003	47,665

## 6.1.9 Water Resources

### Groundwater

Groundwater is monitored monthly and operations at the facility include constant monitoring that no petroleum-related contaminants are released to the environment. That includes the brine that is ultimately injected into the deep aquifer. There have been no compliance issues for groundwater.

## **Surface Water**

Besides a pond at the facility, the nearest surface water body in the intracoastal water approximately 4 miles to the east. The facility is permitted to withdraw water from it for use at the facility.

Section 303(d) of the CWA requires states to identify waters where current pollution control technologies alone cannot meet the water quality standards set for that waterbody. Every two years, states are required to submit a list of impaired waters plus any that may soon become impaired to EPA for approval. The impaired waters are prioritized based on the severity of the pollution and the designated use of the waterbody (e.g., fish propagation or human recreation). States must establish the TMDLs of the pollutant(s) in the waterbody for impaired waters on their list. The most current cycle for Texas is 2014.

Impairment of surface water bodies is often due to stormwater runoff. The land at the facility is relatively flat with normal drainage. The SPR SWPPP addresses mitigation activities needed to ensure surface water quality is not impacted by normal facility operations.

## **Wetlands**

The main portion of the facility is sparsely surrounded by wetlands in various forms from permanent surface water bodies (ponds) to emergent and forested/shrub wetlands. Appendix F includes current USFWS National Wetlands Inventory maps for the facility accessible at <https://www.fws.gov/wetlands/data/mapper.html> (definitions of the codes used on the map are also available in the frequently asked questions section of the website).

A portion of the pipeline that carries crude oil is located within Hillebrandt Bayou and is the subject of analysis for BH-MM-756/756A

Texas Parks and Wildlife manages a program that requires compensation for impact to wetlands. There are two types of mitigation banks in Texas: wetland and stream mitigation banks regulated by the US Army Corps of Engineers and species conservation banks regulated by the USFWS. Both types of banks are permanently protected and exist to replace natural resource values that are lost at an offsite location to development activity. The values of the natural resources replaced at a bank are quantified as a “credit”, which can be sold to developers to offset natural resource impacts. For more information, please see <https://valuwetlands.tamu.edu>.

## **6.2 Description of Proposed Actions/Alternatives and Project Analysis – Big Hill**

The proposed action and no action (status quo) alternative information presented in this section was taken from the Life Extension 2 Conceptual Design Report Volumes I-VIII (Appendix B).

### **6.2.1 Proposed Action and Alternative**

#### **6.2.1.1 BH-MM-596/596A Replace Onshore Section of Brine Disposal Line**

##### **Mission Need**

The current mission requirement for Big Hill to meet the SPR Level 1 Brine Disposal rate is 225,000 barrels per day (225 MBD). To achieve this, the Brine Disposal pumps transfer brine to the Gulf of Mexico through a 14-mile-long, 48-inch diameter, steel pipeline.

##### **Functional Requirements**

The functional requirements for this project is to assure that the Brine Disposal Pipeline will continue to support the Crude Oil Fill and Operational Mission of Big Hill Brine Disposal. The Pipeline must be able to be cleaned and inspected to determine its integrity.

##### **Proposed Alternative:**

Construct a New Appropriate-Diameter On-Shore Portion of the Pipeline; Optimize New Line Size with New Brine Disposal Pumps and Motors

This action optimizes the new line size with new, appropriately-sized brine disposal pumps and motors. The existing pumps, motors, and associated discharge valves and piping were designed for a very different mission and should be considered for replacement due to age and size / horsepower requirements. For this alternative, a new pipeline would be constructed and installed in a trench or directionally drilled adjacent to the existing pipeline. Preliminary design concept would suggest a 26-inch, DR 13.5 HDPE pipeline or a 24-inch lined carbon steel pipeline with approximately 500 horsepower electric motor driven, vertical turbine pumps.

Use of existing right of way is assumed.

##### **No Action Alternative**

This alternative would continue to operate the existing pipeline and conducting the same type of periodic testing and inspections to determine the integrity of the pipeline. Future inspections would indicate the trend data of localized areas of inspection and necessary repairs. The current program cannot assess nor assure the condition of the pipeline. This alternative is not recommended.

## 6.2.2 Project Analysis

### 6.2.2.1 BH-MM-596/596A Replace Onshore Section of Brine Disposal Line

#### BH-MM-596/596A Replace Onshore Section of Brine Disposal Line

#### Potentially Impactful Activities: Construction

#### Air Quality

**Criteria for Determining Significance:**

- A status of non-attainment of the NAAQS thresholds as found in Table 20;
- An exceedance of an emission limit specified in the permit (summarized in Table 21; and
- An inability to meet the goals set forth in EO13693.

**Proposed Action Analysis: Temporary, minor impact is anticipated.** Earth-moving vehicles and heavy vehicle traffic will generate fugitive dust, increasing PM volume in the immediate area. It is not anticipated to decrease air quality for the nearest residents within one-half mile of the facility. Emissions from gas-powered generators and increased vehicle traffic may increase VOC emissions, but not to a degree where NAAQS thresholds are exceeded. Project-specific permits will be obtained with appropriate, short-term emission limits which will be monitored to ensure no exceedances.

**No Action Analysis:** There would be no impact to air quality.

#### Cultural Resources

**Criteria for Determining Significance:** The results of a SHPO review will determine if the proposed action has the potential to cause impact to historic properties.

**Proposed Action Analysis: No impact is anticipated.** There will be no impact to cultural resources given there are none present at the facility.

**No Action Analysis:** There will be no impact to cultural resources.

## Ecological Resources/Threatened and Endangered Species

### Criteria for Determining Significance:

- A requirement to engage in formal consultation with the USFWS.
- The “take” (as defined by the ESA), or potential for “take”, of any individual or group of individuals of a listed species.
- The loss or degradation, or potential for such, of any critical habitat (as defined by the ESA).

**Proposed Action Analysis: No impact is anticipated.** The USFWS IPaC report indicates that “there are no critical habitats within the project area” (see Appendix E). There will be no impact to ecological resources, to include threatened and endangered species.

**No Action Analysis:** There will be no impact to ecological resources/threatened and endangered species.

## Environmental Justice

### Criteria for Determining Significance:

- Create an environment where the health and safety of socioeconomically disadvantaged community members and their surrounding area is at risk;
- Create undesirable living conditions for socioeconomically disadvantaged community members; and
- Create health and safety risks that may disproportionately affect children (as indicated in EO 13045 *Protection of Children from Environmental Health Risks and Safety Risks*).

**Proposed Action Analysis: No impact is anticipated.** The proposed action is in the path from the SPR Big Hill facility to the Gulf Coast. The area south of SPR Big Hill to the gulf is largely uninhabited.

**No Action Analysis:** There will be no impact to environmental justice.



## Land Use

### Criteria for Determining Significance:

- An action that impairs the original viewshed of adjacent properties;
- An action that causes noise concerns outside noise decibel thresholds (see Noise); and
- An action that causes land use to be incompatible with existing adjacent land uses.

**Proposed Action Analysis: No impact is anticipated.** The viewshed and land compatibility will not change. The replacement of the pipe is within context of the current land use. Post-project noise will not increase from current baseline conditions (project-specific noise impacts are discussed under “Noise”).

**No Action Analysis:** No impact is anticipated.

## Noise

### Criteria for Determining Significance:

- Exceedance of the long-term average noise descriptor, or Leq, with a 10-decibel penalty for night-time noise

**Proposed Action Analysis: Temporary, minor impact is anticipated.** Heavy equipment and vehicles will be utilized to complete the proposed project and will result in an increase in noise levels normally heard in the affected area. The largest contributors of noise would be on-site generators, jack and bore machinery, heavy earth-moving equipment and heavy trucks used to haul equipment, materials and construction debris. There are no quantifiable human neighbors to annoy with noise. Noise will be mitigated for health and safety of the workers. Birds and other wildlife may be bothered by the increased noise level and may avoid the area until construction is complete.

**No Action Analysis:** There will be no noise impact as the construction would not take place.

## Prime Farmland/Soils

### Criteria for Determining Significance:

- The unnecessary conversion of farmland to non-agricultural uses.

**Proposed Action Analysis: No impact is anticipated.** A variety of soils appear among the pipe path. Soil types consistent with prime farmland exists. It is assumed the new pipe will be constructed within the current right of way, therefore there is no concern of unnecessary conversion of farmland to non-agriculture uses.

**No Action Analysis:** There will be no impact to prime farmland/soils.

## Socioeconomics

### Criteria for Determining Significance:

- Create an environment where the health and safety of socioeconomically disadvantaged community members and their surrounding area is at risk;
- Create the potential to substantially affect human health or the environment by excluding persons, denying persons benefits, or subjecting persons to discrimination because of their race, color, national origin, or income level; and
- Create undesirable living conditions for socioeconomically disadvantaged community members.

**Proposed Action Analysis: Short-term, beneficial impact anticipated.** Similar to the discussion of environmental justice, the proposed action will take place among miles of uninhabited land. There are no surrounding communities that would be negatively impacted by the construction work or the resulting new pipeline.

Short-term, economical beneficial impact may be seen with local construction-work hiring.

**No Action Analysis:** No impact is anticipated if the current bridges remain.

## Water Resources

### **Criteria for Determining Significance:**

- Increases the amount of impervious surface significantly, creating measurably more stormwater runoff than was originally experienced in the area;
- Results in the creation of a new channel or relocation of a natural drainage channel;
- Results in the discharge of pollutants that exceed federal and state water quality standards such as TMDLs or drinking water MCLs.
- A loss of wetland habitat which could change the function and viability of the wetland;
- Wetland destruction or fill which would result in loss of wetlands or wetland function;
- A release of hazardous material, POL, or other contaminants to a wetland that would risk injury to wildlife and humans; and
- Introduction of an invasive species which could alter the function and viability of a wetland.

**Proposed Action Analysis: Temporary, minor impact is anticipated.** The pipe path will go through wetland areas as seen on the map in Appendix F. Construction inherently may cause soil erosion that may result in silt being carried overland and deposited into local water bodies, causing increased turbidity. There is no concern that TMDLs or MCLs will be exceeded due to this work. The SPR Pollution Prevention Plan (Publication ASL5400.41), Version 10.0 (08-02-16) will ensure impact to surface water bodies is minimal.

Although the work may be taking place near wetlands, it is not anticipated that permanent harm or loss of wetland will occur. Project-specific permits will be obtained by the Corps of Engineers and all practicable steps will be taken to ensure minimal harm to wetlands.

**No Action Analysis:** There will be no water quality impact as the construction would not take place.

## 6.2.3 Proposed Action and Alternative

### 6.2.3.1 BH-MM-756/756A Replace Section of 36" COP at Hillebrandt Bayou

The Big Hill 36-inch crude oil pipeline was installed in 1987 and is 24.7 miles long with 0.500-in wall thickness. The original crossing at Hillebrandt was constructed of 0.625-in wall materials. Several corrosion anomalies were identified during the 2009 and 2014 surveys. The 2014 survey identified 202 corrosion anomalies along the entire pipeline, with greater than 40% wall loss. Of the 202 locations, 29 (14 percent, including 2 anomalies with over 50 percent wall loss) were located within a 135-foot segment under Hillebrandt Bayou. The location is abutted by marsh area mostly on the south side of the bayou and pastureland on the north side. The pipeline segment is located north of FM 365, which runs east to west. This area is at a point just beyond the southern bank of the waterway.

#### Functional Requirements

- The design of the pipeline must be able to meet or exceed the 25-year life ascribed to the Life Extension 2 projects.
- The construction installation must ensure no more than 13-day outage of the pipeline per SPR guidelines

#### Scope

The AFC detailed design identified and outlined the following scope of work:

- Install two (2) 22.5-degree piping offsets to connect the existing pipeline into the new segment. These offsets will each be constructed of two (2) 22.5-degree 5-R bends with 3-D tangents length on each end. These offsets may also include engineered trust blocks to address the forces imparted while flowing. This will permit the new pipeline segment to be placed in a lateral position approximately 1020-feet away. Due to the size of the bends, the offsets will be assembled at or near the final installation position, with full NDT and coatings as required.
- Field-applied coatings are limited to weld joints and repairs. Coating system to be compatible with factory applied coating.
- Remove two to four (2-4) 100-foot pipeline sections to allow for the installation of the offsets and mobility of the required equipment. The final length of the pipeline segment to be installed is estimated at approximately 1,800 – 2,100 LF.
- Abandon in place 1250 – 1600 LF of 36-in line pipe across and below Hillebrandt Bayou. Line to be capped in place. Final length to be determined in field.
- The abandoned sections are to be cleaned, inspected, capped, and inserted in accordance with ASME B31.4, section 457, and TXRRC requirements.

- Removed pipe material to be cleaned and checked for NORM before removal from worksite for disposal.
- The spoil slurry from the drilling operations shall be collected with frac tanks and/or vacuum trucks for disposal at predetermined location(s) adjoining the pipeline work area for natural absorption into the ecosystem. The original bayou crossing segment, approximately 1250-foot long will be capped and left in place. The estimated volume for the bore is 750-800 cubic yards, based upon volume of 12.56 cu. Ft / LF of 48” bore. The total excavated material is estimated at 2200 cu yds. The non-drill material will be replaced as backfill over the pipeline, and drill site locations to restore the area.
- Install new pipeline crossing signage on both sides of Hillebrandt Bayou above the new crossing location. The existing signage will be left in position since the original pipeline segment will be left in position. It is recommended that the existing signage be modified to reflect that the pipeline is out of service.
- Civil / Site preparation activities, to include roadside site access points for contractors, drainage requirements, roads and defined matted work areas to support project activities before during and after execution. Traffic signage and control package as required by Texas Department of Transportation.
- Current SPR Spill Prevention Control and Contingency Plan, will be incorporated into project construction-specific plan as deemed necessary.
- Install 1650 LF of 36-inch x 0.75” wt. API-5LX-60-line pipe in a parallel route to the original with a minimum offset.
- Offset spool components in accordance with ASME B16.49.
- Employ Horizontal Directional Drilling to minimize ecological impacts to sensitive bayou area.
- Submittal and approval of U.S. Army Corps of Engineers drilling plan.
- Drilling location and profile drawings
- Drilling Fracture calculations
- Fracture Contingency recovery plan
- Submittal and Approval of Texas Department of Transportation-required traffic control plan, including:
  - o Signage and traffic control for two access points
  - o Temporary roadway and fencing construction and removal
- Install water crossing signage as required.

**No Action Alternative**

The life expectancy of the pipes needing to be replaced is low given there is already 40 percent pipe wall loss. Not replacing it creates risk the pipe will leak and impact the Hillebrandt Bayou.

## 6.2.4 Project Analysis

### 6.2.4.1 BH-MM-756/756A Replace Section of 36" COP at Hillebrandt Bayou

BH-MM-756/756A Replace Section of 36" C/O Pipeline at Hillebrandt Bayou

Potentially Impactful Activities: Construction

#### Air Quality

**Criteria for Determining Significance:**

- A status of non-attainment of the NAAQS thresholds as found in Table 20;
- An exceedance of an emission limit specified in the permit (summarized in Table 21; and
- An inability to meet the goals set forth in EO 13693.

**Proposed Action Analysis: Temporary, minor impact is anticipated.** Earth-moving vehicles and heavy vehicle traffic will generate fugitive dust, increasing PM volume in the immediate area. It is not anticipated to decrease air quality for the nearest residents within one-half mile of the facility. Emissions from gas-powered generators and increased vehicle traffic may increase VOC emissions, but not to a degree where NAAQS thresholds are exceeded. Project-specific permits will be obtained with appropriate, short-term emission limits which will be monitored to ensure no exceedances.

**No Action Analysis:** There would be no impact to air quality.

#### Cultural Resources

**Criteria for Determining Significance:** The results of a SHPO review will determine if the proposed action has the potential to cause impact to historic properties.

**Proposed Action Analysis: No impact is anticipated.** There will be no impact to cultural resources given there are none present at the facility.

**No Action Analysis:** There will be no impact to cultural resources.

## Ecological Resources/Threatened and Endangered Species

### Criteria for Determining Significance:

- A requirement to engage in formal consultation with the USFWS.
- The “take” (as defined by the ESA), or potential for “take”, of any individual or group of individuals of a listed species.
- The loss or degradation, or potential for such, of any critical habitat (as defined by the ESA).

**Proposed Action Analysis: No impact is anticipated.** The USFWS IPaC report indicates that “there are no critical habitats within the project area” (see Appendix E). There will be no impact to ecological resources, to include threatened and endangered species.

**No Action Analysis:** Potential significant impact. If the piping continues to corrode, the potential exists a leak could form and spill crude oil into the Hillebrandt Bayou. If this occurred, it would cause significant impact to ecological resources.

## Environmental Justice

### Criteria for Determining Significance:

- Create an environment where the health and safety of socioeconomically disadvantaged community members and their surrounding area is at risk;
- Create undesirable living conditions for socioeconomically disadvantaged community members; and
- Create health and safety risks that may disproportionately affect children (as indicated in EO 13045 *Protection of Children from Environmental Health Risks and Safety Risks*).

**Proposed Action Analysis: No impact is anticipated.** The proposed action will take place where the Hillebrandt Bayou intersects with Farm to Market Road (FM) 365. The immediate area is sparsely populated with the nearest community being in Port Arthur, TX approximately four miles away. The temporary nature of the work, the distance from which the facility sits away from the closest neighboring communities, and facility security (which removes risk of acute health and safety issues from unauthorized visitors to the construction site) will not create a negative impact upon the sensitive population to which environmental justice applies.

**No Action Analysis:** There will be no impact to environmental justice.



## Land Use

### **Criteria for Determining Significance:**

- An action that impairs the original viewshed of adjacent properties;
- An action that causes noise concerns outside noise decibel thresholds (see Noise); and
- An action that causes land use to be incompatible with existing adjacent land uses.

**Proposed Action Analysis: No impact is anticipated.** The viewshed and land compatibility will not change. The replacement of the pipe is within context of the operations at the location. Post-project noise will not increase from current baseline conditions (project-specific noise impacts are discussed under “Noise”).

**No Action Analysis:** No impact is anticipated.

## Noise

### **Criteria for Determining Significance:**

- Exceedance of the long-term average noise descriptor, or Leq, with a 10-decibel penalty for night-time noise

**Proposed Action Analysis: Temporary, minor impact is anticipated.** Heavy equipment and vehicles will be utilized to complete the proposed project and will result in an increase in noise levels normally heard in the area, which is predominantly traffic noise. The largest contributors of noise would be on-site generators, jack and bore machinery, heavy earth-moving equipment and heavy trucks used to haul equipment, materials and construction debris. Human neighbors nearest the facility will not be impacted given the distance and the fact the work will take place during daylight hours. Birds and other wildlife and the grazing animals in the pastureland may be bothered by the increased noise level. They may avoid the area until construction is complete.

**No Action Analysis:** There will be no noise impact as the construction would not take place.

## Prime Farmland/Soils

### Criteria for Determining Significance:

- The unnecessary conversion of farmland to non-agricultural uses.

**Proposed Action Analysis: No impact is anticipated.** The location is abutted by marsh area mostly on the south side of the bayou and pastureland on the north side. The assumption is that the work will be performed within the right of way and the new section placed adjacent to the old pipeline (which is being cleaned and left in place), there is no concern that there will be any conversion of farmland to non-agricultural uses.

**No Action Analysis:** There will be no impact to prime farmland/soils.

## Socioeconomics

### Criteria for Determining Significance:

- Create an environment where the health and safety of socioeconomically disadvantaged community members and their surrounding area is at risk;
- Create the potential to substantially affect human health or the environment by excluding persons, denying persons benefits, or subjecting persons to discrimination because of their race, color, national origin, or income level;
- Create undesirable living conditions for socioeconomically disadvantaged community members.

**Proposed Action Analysis: Short-term, beneficial impact anticipated.** Similar to the discussion of environmental justice, The proposed action will take place where the Hillebrandt Bayou intersects with Farm to Market Road (FM) 365. The immediate area is sparsely populated with the nearest community being in Port Arthur, TX approximately four miles away. The temporary nature of the work, the distance from which the facility sits away from the closest neighboring communities, and facility security (which removes risk of acute health and safety issues from unauthorized visitors to the construction site) will not create a negative impact upon the sensitive population to which socioeconomics applies.

Short-term, economical beneficial impact may be seen with local construction-work hiring.

**No Action Analysis:** No impact is anticipated if the current bridges remain.

## Water Resources

### Criteria for Determining Significance:

- Increases the amount of impervious surface significantly, creating measurably more stormwater runoff than was originally experienced in the area;
- Results in the creation of a new channel or relocation of a natural drainage channel;
- Results in the discharge of pollutants that exceed federal and state water quality standards such as TMDLs or drinking water MCLs.
- A loss of wetland habitat which could change the function and viability of the wetland;
- Wetland destruction or fill which would result in loss of wetlands or wetland function;
- A release of hazardous material, POL, or other contaminants to a wetland that would risk injury to wildlife and humans; and
- Introduction of an invasive species which could alter the function and viability of a wetland.

**Proposed Action Analysis: Temporary, minor impact is anticipated.** Soil erosion is inherent with construction work and could result in additional silt being deposited in the bayou causing turbidity to increase. This will be minimized by the implementation of best management practices consistent with the SPR Pollution Prevention Plan (Publication ASL5400.41), Version 10.0 (08-02-16).

This work has the potential to impact wetlands given it is being performed at and in the Hillebrandt Bayou. Project-specific permits will be obtained by the Corps of Engineers and all practicable steps will be taken to ensure minimal harm to wetlands. The project specifications indicate, “the area between Hillebrandt Bayou and FM-365 (Highway 365), approximately 1,600 feet long, is a marshland and requires safeguards to be used. With the use of proper matting materials and a large enough work area this area can be used for the drilling operations. The area north and east of Hillebrandt Bayou is firm land, in the dry season, with a shallow water table. This area is more accessible and better supports the pipeline segment staging and construction.”

In addition, all permits to work in the area, including Corps of Engineer permits for wetlands work, will be obtained and adhered to.

It is assumed the work will take place within the current right of way.

**No Action Analysis: Potentially significant impact.** If pipe wall erosion continues and results in a breach of the pipeline, crude oil could be spilled into the Hillebrandt Bayou, creating significant contamination and need for cleanup.

## **6.2.5 Proposed Action and Alternative**

### **6.2.5.1 BH-SP-1307/1307A Simultaneous Distribution to Chevron/Unocal, Shell & Sun (or Shell-Zydeco Custody Meter Station)**

#### **Mission Need**

The Big Hill site delivers crude oil via a single 36-inch pipeline leaving the site to one of three destinations: The Shell-Zydeco Pipeline System (Zydeco), the Phillips 66 Beaumont Terminal Marine Terminal, and the Sunoco Logistics Nederland Terminal. The current Big Hill site configuration does not have the capability to control flow rates to multiple destinations. In addition, there is no means of flow measurement at the Shell or Phillips 66 Beaumont Terminal junctures. Therefore, crude oil deliveries from Big Hill may be made to only one destination at a time. Big Hill distribution system will be modified for simultaneous controlled delivery with BH-SP-1407 to all three destinations. There are custody agreements in place for Phillips 66 and Sun Terminal. Additionally, BHSP-1407 Project will add ultrasonic meters at Phillips 66 and Sun Terminal. There is not a custody transfer meter or agreement at Shell-Zydeco; therefore, the delivered crude oil can only be measured with Big Hill site custody metering skid. A custody transfer metering skid at Shell-Zydeco is needed to allow for simultaneous delivery to all three destinations. Big Hill will have the ability to achieve Level 1 drawdown rate which the SPR is committed to maintaining.

#### **Functional Requirements**

- Big Hill is required to deliver 250 MBD to Shell-Zydeco Pipeline.
- The design of the metering station must be able to meet or exceed the 25-year life ascribed to the Life Extension 2 projects.
- The new custody metering station must be able to measure flow rates between 33 MBD and 250 MBD (maximum pipeline capacity).
- The reading accuracy should be  $\pm 0.25$  percent over the normal flow range with a repeatability of 0.02% in accordance with Level III, design criteria, paragraph 9.2.4-Metering, and API Manual of Petroleum Measurement Standards (MPMS)
- The metering skid must meet the strict definition of an Allocation Custody Transfer (ACT) skid.
- A prover will be required to verify the accuracy of the meter which is essential in ensuring sustainable measurement and appropriate compliance to accuracy and repeatability requirements over time.

- Onsite sample storage shall be provided for 60-day, in accordance with section 9.2.3 requirements
- The metering station area must be secured from intrusions.
- The accessibility to Shell-Zydeco site must be improved.

**Proposed Alternative:**

Local Control of ACT Flow Meter Skid at Shell-Zydeco (Habitable) with Standard Security Fence without Full SPR Security Measures

This alternative will add an ACT flow meter skid at Shell-Zydeco that will be locally controlled in a building not fully built-out but operational with remote monitoring and control from Big Hill's control room. The site will not have full SPR security measures.

**No Action Alternative**

Big Hill continues with batch sales of crude oil to single end point users. Due to the current delivery infrastructure design, sequential deliveries are made alternately between the Shell-Zydeco Pipeline at 250 MBD, the Phillips 66 Terminal at 225 MBD, and the Sun Terminal at up to 1.1 million barrels per day (MMBD), thus the average rate is lower than the required 1.1 MMBD site drawdown rate criteria. The crude oil drawdowns will be limited to 250 MBD when going to Shell-Zydeco and 225 MBD when going to Phillips 66 Terminal. The drawdown for Sun Terminal may not meet the required rate of 1.1 MMBD when delivering to the other destinations. The crude oil sales rate to Shell-Zydeco will be measured with Big Hill's ACT flow meter skid. The ACT for Phillips 66 crude rate will be based on contractual agreements. The ACT for Sun crude rate will be measured per manual tank strapping done by site operations. Big Hill will not be able to proceed with simultaneous deliveries to Shell/Zydeco Station, Phillips 66 Terminal, and Sun Terminal. Big Hill will not have the ability to maintain its Level 1 drawdown rate which the SPR is committed to maintaining. This alternative does not meet mission need or functional requirements set by the project. Therefore, this alternative is not feasible

## 6.2.6 Project Analysis

### 6.2.6.1 BH-MM-1307/1307A BH Simultaneous Distribution to Chevron/Unocal, Shell and Sun

BH-MM-1307/1307A BH Simultaneous Distribution to Chevron/Unocal, Shell and Sun  
Potentially Impactful Activities: Construction

#### Air Quality

**Criteria for Determining Significance:**

- A status of non-attainment of the NAAQS thresholds as found in Table 20;
- An exceedance of an emission limit specified in the permit (summarized in Table 21; and
- An inability to meet the goals set forth in EO 13693.

**Proposed Action Analysis: Temporary, minor impact is anticipated.** Earth-moving vehicles and heavy vehicle traffic will generate fugitive dust, increasing PM volume in the immediate area. It is not anticipated to decrease air quality for the nearest residents within one-half mile of the facility. Emissions from gas-powered generators and increased vehicle traffic may increase VOC emissions, but not to a degree where NAAQS thresholds are exceeded. Project-specific permits will be obtained with appropriate, short-term emission limits which will be monitored to ensure no exceedances.

**No Action Analysis:** There would be no impact to air quality.

#### Cultural Resources

**Criteria for Determining Significance:** The results of a SHPO review will determine if the proposed action has the potential to cause impact to historic properties.

**Proposed Action Analysis: No impact is anticipated.** There will be no impact to cultural resources given there are none present at the facility.

**No Action Analysis:** There will be no impact to cultural resources.

## Ecological Resources/Threatened and Endangered Species

### Criteria for Determining Significance:

- A requirement to engage in formal consultation with the USFWS.
- The “take” (as defined by the ESA), or potential for “take”, of any individual or group of individuals of a listed species.
- The loss or degradation, or potential for such, of any critical habitat (as defined by the ESA).

**Proposed Action Analysis: No impact is anticipated.** The USFWS IPaC report indicates that “there are no critical habitats within the project area” (see Appendix E). There will be no impact to ecological resources, to include threatened and endangered species.

**No Action Analysis:** There will be no impact to ecological resources/threatened and endangered species.

## Environmental Justice

### Criteria for Determining Significance:

- Create an environment where the health and safety of socioeconomically disadvantaged community members and their surrounding area is at risk;
- Create undesirable living conditions for socioeconomically disadvantaged community members; and
- Create health and safety risks that may disproportionately affect children (as indicated in EO 13045 *Protection of Children from Environmental Health Risks and Safety Risks*).

**Proposed Action Analysis: No impact is anticipated.** The proposed action will take place in a remote area where the remote meter and its housing will be constructed. The temporary nature of the work and the distance from which the facility sits away from the nearest neighboring communities will not create a negative impact upon the sensitive population to which environmental justice applies.

**No Action Analysis:** There will be no impact to environmental justice.

## Land Use

### Criteria for Determining Significance:

- An action that impairs the original viewshed of adjacent properties;
- An action that causes noise concerns outside noise decibel thresholds (see Noise); and
- An action that causes land use to be incompatible with existing adjacent land uses.

**Proposed Action Analysis: No impact is anticipated.** The land is currently being used for oil industry operation and the resulting meter will benefit the land owner (Shell-Zydeco). While a new building is being built, the viewshed is in context with the surrounding area. Operation of the meter will not create noise (additional project-specific noise discussion is under “Noise”)

**No Action Analysis:** There will be no impact to land use.

## Noise

### Criteria for Determining Significance:

- Exceedance of the long-term average noise descriptor, or Leq, with a 10-decibel penalty for night-time noise

**Proposed Action Analysis: Temporary, minor impact is anticipated.** Heavy equipment and vehicles will be utilized to complete the proposed project and will result in an increase in noise levels normally heard in the area, which is predominantly traffic noise. The largest contributors of noise would be on-site generators, jack and bore machinery, heavy earth-moving equipment and heavy trucks used to haul equipment, materials and construction debris. Human neighbors nearest the facility will not be impacted given the distance and the fact the work will take place during daylight hours. Birds and other wildlife and the grazing animals in the pastureland may be bothered by the increased noise level. They may avoid the area until construction is complete.

**No Action Analysis:** There will be no noise impact as the construction would not take place.



## Prime Farmland/Soils

### Criteria for Determining Significance:

- The unnecessary conversion of farmland to non-agricultural uses.

**Proposed Action Analysis: No impact is anticipated.** There are soils classified as farmland in the proposed area of construction. The new metering station will be placed in an area already being used for the oil industry and therefore there will be no unnecessary conversion of farmland to nonagricultural uses.

**No Action Analysis:** There will be no impact to prime farmland/soils.

## Socioeconomics

### Criteria for Determining Significance:

- Create an environment where the health and safety of socioeconomically disadvantaged community members and their surrounding area is at risk;
- Create the potential to substantially affect human health or the environment by excluding persons, denying persons benefits, or subjecting persons to discrimination because of their race, color, national origin, or income level; and
- Create undesirable living conditions for socioeconomically disadvantaged community members.

**Proposed Action Analysis: Short-term, beneficial impact anticipated** The proposed action will take place in a remote area where the remote meter and its housing will be constructed. The temporary nature of the work and the distance from which the facility sits away from the nearest neighboring communities will not create a negative impact upon the sensitive population to which environmental justice applies.

Short-term, economical beneficial impact may be seen with local construction-work hiring.

**No Action Analysis:** No impact to socioeconomics would occur if the metering station is not constructed.

## Water Resources

### Criteria for Determining Significance:

- Increases the amount of impervious surface significantly, creating measurably more stormwater runoff than was originally experienced in the area;
- Results in the creation of a new channel or relocation of a natural drainage channel;
- Results in the discharge of pollutants that exceed federal and state water quality standards such as TMDLs or drinking water MCLs.
- A loss of wetland habitat which could change the function and viability of the wetland;
- Wetland destruction or fill which would result in loss of wetlands or wetland function;
- A release of hazardous material, POL, or other contaminants to a wetland that would risk injury to wildlife and humans; and
- Introduction of an invasive species which could alter the function and viability of a wetland.

**Proposed Action Analysis: Temporary, minor impact is anticipated.** Soil erosion is inherent with construction work and could result in additional silt being deposited in nearby surface water bodies. This will be minimized by the implementation of best management practices consistent with the SPR Pollution Prevention Plan (Publication ASL5400.41), Version 10.0 (08-02-16).

There are no well-defined wetlands in the proposed area of work (categorized as “other” on the wetlands map found in Appendix F). There is no impact to wetlands anticipated. The above referenced SWPPP and appropriate Corps of Engineer permits will be followed to prevent impact.

**No Action Analysis:** There will be no water quality impact as the construction would not take place.

## **6.2.8 Proposed Action and Alternative**

### **6.2.8.1 BH-SP-1407/1407A Pipeline – Beaumont Terminal Flow Control**

#### **Mission Need**

The Big Hill site delivers crude oil via a single 36-inch pipeline leaving the site to one of three destinations: the Shell-Zydeco Pipeline System (Zydeco), the Phillips 66 Beaumont Terminal, and the Sunoco Logistics Nederland (Sun) Terminal. The current Big Hill site configuration does not have the capability to control flow rates to multiple destinations. In addition, there is no means of flow measurement at the Shell-Zydeco Pipeline. Therefore, crude oil deliveries from Big Hill may be made to only one destination at a time. The meter skid at Big Hill is used to meter the flow to each delivery point. System modifications will be necessary to permit simultaneous deliveries to the Shell-Zydeco Station, the Phillips 66 Terminal, and the Sun Terminal. Adding flow control to each of the three points will allow Big Hill to simultaneously deliver crude oil to multiple points. There are established custody transfer agreements with the Phillips 66 Terminal and the Sun Terminal. Shell-Zydeco Station requires a new custody transfer meter in order to proceed with simultaneous deliveries. Big Hill will have the ability to achieve Level 1 drawdown rate which the SPR is committed to maintaining.

#### **Functional Requirements**

- Simultaneous controlled delivery of crude oil to Shell-Zydeco Pipeline, the Phillips 66 Terminal, and the Sun Terminal. The total required delivery rate is MMBD of sweet crude oil or 1.1 MMBD of sour crude oil.
- The individual rates are Shell Pipeline at 250 MBD, the Phillips 66 Terminal at 225 MBD, and the Sun Terminal at up to 1.1 MMBD.
- The design of the control station must be able to meet or exceed the 25-year life ascribed to the Life Extension 2 projects. DOE I&E standards should be used in the design.
- Any measured flow rates must be within a range of plus-or-minus a certain percent of the desired flow rate.
- Address custody transfer requirements at Shell-Zydeco Station.
- The Big Hill pipeline must have the capability to be completely isolated from Phillips 66 Terminal, Sun Terminal, and the Shell-Zydeco Pipeline system.
- The design must incorporate the ability to equalize or verify pressures between the systems for maintenance purposes.

## **Proposed Alternative:**

Install remote ultrasonic flow meters control at Shell, Phillips 66 and Sun Delivery Points

Each location will be equipped with Krone AltoSonic III™ Ultrasonic meter, pressure and temperature transmitters, and a flow control valve, sized for full flow, into downstream piping segment. Manual block valves will be installed to provide isolation for the control valve. A bypass valve will allow continuous flow while the control valve is out of service. The mass flow system data stream from the meters shall feedback to a downstream flow control valve via controller/distributed control system to manage percent open. The signals will be fed back to the Big Hill site control room.

The Phillips 66 delivery point will require one new ultrasonic flow meter control station. The site is located in a major pipeline and electrical corridor near an accessible roadway. The access road to the site will be improved. The area will be stripped of vegetation and built up 12” with select fill. Foundations will be provided for the meter and flow control valve. Supplemental area lighting will be provided with 39' tall light poles that are installed on concrete drilled piers. The area will be paved with crushed stone. A security fence with double gate will be installed around the site perimeter. The electrical system will be updated for instrument requirements and protection.

The Sun delivery point will require two new ultrasonic flow meters and control valve station. The area will be stripped of vegetation and built up 12” with select fill. A foundation will be provided for the meter and flow control valve. Pipe Supports will be provided for the meter and above ground piping. The area will be paved with crushed stone. The site has an existing work area in the master control center (MCC) for operations. No additional development will be needed at Sun.

The Shell-Zydeco Pipeline delivery point will require one new ultrasonic flow meter control station. The access road to the site will be improved. The area will be stripped of vegetation and built up 12” with select fill. Area lighting will be provided with 39' tall light poles that are installed on concrete drilled piers. The area will be paved with crushed stone. A security fence with double gate will be installed around the site perimeter.

This alternative provides better distribution control of the overall Big Hill/Sun pipeline distribution system. It also provides for “validation” of volumes to the three different terminus points. The system will enhance the measurement capabilities at Shell-Zydeco. However, a single meter may not meet strict definition of an ACT skid for Shell-Zydeco. Big Hill will be able to proceed with simultaneous deliveries to Shell-Zydeco Station, Phillips 66 Terminal, and Sun Terminal. Big Hill will have the ability to maintain its Level 1 drawdown rate which the SPR is committed to maintaining.

## **No Action Alternative**

Big Hill continues with batch sales of crude oil to single end point users. The crude oil drawdowns will be limited to 300 MBD when going to Shell-Zydeco and 250 MBD when going to Phillips 66. However, because of the current delivery infrastructure design, sequential deliveries must be made alternately between the Shell pipeline at 250 MBD and the Sun Terminal at up to 1.1 MMBD and thus the average rate will be lower than the required 1.1 MMBD site drawdown rate criteria. The crude oil sales rate to Shell-Zydeco, Phillips 66, and Sun will be measured with Big Hill's ACT flow meter skid. In addition, the ACT for Phillips 66 crude rate will be based on contractual agreements. The ACT for Sun crude rate will be measured per manual tank strapping done by site operations.

Big Hill will not be able to proceed with simultaneous deliveries to Shell-Zydeco Station, Phillips 66 Terminal, and Sun Terminal. Big Hill will not have the ability to maintain its Level 1 drawdown rate, which the SPR is committed to maintaining. This alternative does not meet mission need or functional requirements set by the project. Therefore, this alternative is not feasible.

## 6.2.9 Project Analysis

### 6.2.9.1 BH-MM-1407/1407A BH Pipeline – Beaumont Terminal Flow Control

BH-MM-1407/1407A BH Pipeline – Beaumont Terminal Flow Control	
Potentially Impactful Activities: Construction	
<b>Air Quality</b>	
<b>Criteria for Determining Significance:</b> <ul style="list-style-type: none"><li>• A status of non-attainment of the NAAQS thresholds as found in Table 20;</li><li>• An exceedance of an emission limit specified in the permit (summarized in Table 21; and</li><li>• An inability to meet the goals set forth in EO 13693.</li></ul>	
<b>Proposed Action Analysis: Temporary, minor impact is anticipated.</b> Earth-moving vehicles and heavy vehicle traffic will generate fugitive dust, increasing PM volume in the immediate area. It is not anticipated to decrease air quality for the nearest residents within one-half mile of the facility. Emissions from gas-powered generators and increased vehicle traffic may increase VOC emissions, but not to a degree where NAAQS thresholds are exceeded. Project-specific permits will be obtained with appropriate, short-term emission limits which will be monitored to ensure no exceedances.	
<b>No Action Analysis:</b> There would be no impact to air quality.	
<b>Cultural Resources</b>	
<b>Criteria for Determining Significance:</b> The results of a SHPO review will determine if the proposed action has the potential to cause impact to historic properties.	
<b>Proposed Action Analysis: No impact is anticipated.</b> There will be no impact to cultural resources given there are none present at the facility.	
<b>No Action Analysis:</b> There will be no impact to cultural resources.	

## Ecological Resources/Threatened and Endangered Species

### Criteria for Determining Significance:

- A requirement to engage in formal consultation with the USFWS.
- The “take” (as defined by the ESA), or potential for “take”, of any individual or group of individuals of a listed species.
- The loss or degradation, or potential for such, of any critical habitat (as defined by the ESA).

**Proposed Action Analysis: No impact is anticipated.** The USFWS IPaC report indicates that “there are no critical habitats within the project area” (see Appendix E). There will be no impact to ecological resources, to include threatened and endangered species.

**No Action Analysis:** There will be no impact to ecological resources/threatened and endangered species.

## Environmental Justice

### Criteria for Determining Significance:

- Create an environment where the health and safety of socioeconomically disadvantaged community members and their surrounding area is at risk;
- Create undesirable living conditions for socioeconomically disadvantaged community members; and
- Create health and safety risks that may disproportionately affect children (as indicated in EO 13045 *Protection of Children from Environmental Health Risks and Safety Risks*).

**Proposed Action Analysis: No impact is anticipated.** The proposed action will take place in an area already used by the oil and gas industry. The temporary nature of the work and the established industrial location will not create a negative impact upon the sensitive population to which environmental justice applies.

**No Action Analysis:** There will be no impact to environmental justice.

## Land Use

### Criteria for Determining Significance:

- An action that impairs the original viewshed of adjacent properties;
- An action that causes noise concerns outside noise decibel thresholds (see Noise); and
- An action that causes land use to be incompatible with existing adjacent land uses.

**Proposed Action Analysis: No impact is anticipated.** The land is currently being used for oil industry operation at all three locations the resulting meters will benefit the land owners (Shell-Zydeco, Sun and Phillips 66). Buildings are not being built, but above-ground metering equipment on concrete foundations within a fenced area will be constructed. The addition to the viewshed is in context with the surrounding area. Operation of the meters will not create noise (additional project-specific noise discussion is under “Noise”)

**No Action Analysis:** No impact is anticipated for land use.

## Noise

### Criteria for Determining Significance:

- Exceedance of the long-term average noise descriptor, or Leq, with a 10-decibel penalty for night-time noise

**Proposed Action Analysis: Temporary, minor impact is anticipated.** Heavy equipment and vehicles will be utilized to complete the proposed project and will result in an increase in noise levels normally heard in the area. The area is highly populated and industrial; therefore construction noise will be in context with the surrounding noisescape. The largest contributors of noise would be on-site generators, heavy earth-moving equipment and heavy trucks used to haul equipment, materials and construction debris.

**No Action Analysis:** There will be no noise impact as the construction would not take place.



## Prime Farmland/Soils

### Criteria for Determining Significance:

- The unnecessary conversion of farmland to non-agricultural uses.

**Proposed Action Analysis: No impact is anticipated.** There are soils classified as farmland in the proposed area of construction. The new metering station will be placed in an area already being used for the oil industry and therefore there will be no unnecessary conversion of farmland to nonagricultural uses.

**No Action Analysis:** There will be no impact to prime farmland/soils.

## Socioeconomics

### Criteria for Determining Significance:

- Create an environment where the health and safety of socioeconomically disadvantaged community members and their surrounding area is at risk;
- Create the potential to substantially affect human health or the environment by excluding persons, denying persons benefits, or subjecting persons to discrimination because of their race, color, national origin, or income level; and
- Create undesirable living conditions for socioeconomically disadvantaged community members.

**Proposed Action Analysis: Short-term, beneficial impact anticipated** The proposed action will take place in a remote area where the remote meter and its housing will be constructed. The temporary nature of the work and the distance from which the facility sits away from the nearest neighboring communities will not create a negative impact upon the sensitive population to which environmental justice applies.

Short-term, economical beneficial impact may be seen with local construction-work hiring.

## Water Resources

### Criteria for Determining Significance:

- Increases the amount of impervious surface significantly, creating measurably more stormwater runoff than was originally experienced in the area;
- Results in the creation of a new channel or relocation of a natural drainage channel;
- Results in the discharge of pollutants that exceed federal and state water quality standards such as TMDLs or drinking water MCLs.
- A loss of wetland habitat which could change the function and viability of the wetland;
- Wetland destruction or fill which would result in loss of wetlands or wetland function;
- A release of hazardous material, POL, or other contaminants to a wetland that would risk injury to wildlife and humans; and
- Introduction of an invasive species which could alter the function and viability of a wetland.

**Proposed Action Analysis: Temporary, minor impact is anticipated.** Soil erosion is inherent with construction work and could result in additional silt being deposited in nearby surface water bodies. This will be minimized by the implementation of best management practices consistent with the SPR Pollution Prevention Plan (Publication ASL5400.41), Version 10.0 (08-02-16).

The highly developed area has some wetland areas but to encounter one at one of the three location where the meter stations will be placed is unlikely. There is no impact to wetlands anticipated.

**No Action Analysis:** There will be no water quality impact as the construction would not take place.

## 7 Bryan Mound

### 7.1 Bryan Mound Affected Environment

#### 7.1.1 Air Quality

The TCEQ Air program is responsible for carrying out the mandates of the Texas Air Quality Rules, as well as meeting Texas' federal obligations under the Clean Air Act. They are responsible for regulating stationary sources for which operating permits may be necessary. The air quality thresholds discussed here are to be used as guidance to determine if a proposed action would result in a significant impact to air quality (acute or cumulative) in relation to NEPA. This information should not be used to determine if an action would require a permit.

In Texas, six pollutants are used to calculate the Air Quality Index: carbon monoxide, nitrogen dioxide, ozone, sulfur dioxide, and PM 2.5 and 10. Not all pollutants are monitored at each location in the state. There are two monitoring stations near Bryan Mound. The first is the Clute monitoring station approximately 9 miles away in the city of Clute and it monitors VOCs only. The second is Lake Jackson which is approximately 12 miles away in the city of Lake Jackson. It monitors nitrogen oxides and ozone. Both are part of the TCEQ Houston Region.

The pollutant list mirrors the federal government's established standards which are known as the NAAQS. The pollutants of concern and the levels and thresholds specific to each are indicated in Table 26.

Table 27 National Ambient Air Quality Standards – Brazoria County

Pollutant	Primary <sup>2</sup> / Secondary <sup>3</sup>	Averaging Time & Level	Threshold	Current Status
Carbon Monoxide (CO)	Primary	8 hours = 9 ppm <sup>1</sup> 1 hour = 35 ppm	Not to be exceeded more than once per year.	Attainment
Nitrogen Dioxide (NO <sub>2</sub> )	Primary (1 hour)	1 hour = 100 ppb	98 <sup>th</sup> % of 1-hour daily maximum concentrations, averaged over 3 years	Attainment
	Primary & Secondary (Annual)	Annual average = 53 ppb <sup>1</sup>	Annual Mean	Attainment

Pollutant	Primary <sup>2</sup> / Secondary <sup>3</sup>	Averaging Time & Level	Threshold	Current Status
Lead <sup>5</sup>	Primary & Secondary	Rolling 3 month average = 0.15 ug/m <sup>3</sup>	Not to be exceeded	Attainment
Ozone	Primary & Secondary	8-hour = .070 ppm	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years.	Non-attainment
Particulate Matter 2.5 <sup>1</sup> (PM 2.5)	Primary	Annual = 12 ug/m <sup>3</sup> , <sup>1</sup>	Annual mean, averaged over 3 years	Attainment
	Secondary	Annual = 15 ug/m <sup>3</sup>	Annual mean, averaged over 3 years	Attainment
	Primary and Secondary	24-hour = 35 ug/m <sup>3</sup>	98th percentile, averaged over 3 years	Attainment
Particulate Matter 10 <sup>1</sup> (PM 10)	Primary and Secondary	24-hour = 150 ug/m <sup>3</sup>	Not to be exceeded more than once per year on average over 3 years	Attainment
Sulfur Dioxide (SO <sub>2</sub> )	Primary	1-hour = 75 ppb	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years	Attainment
	Secondary	3-hour = 0.5 ppm	Not to be exceeded more than once per year	Attainment

Source: USEPA website <http://www.epa.gov/air/criteria.html> accessed December 6, 2017

<sup>1</sup>**Units of measure:** parts per million (ppm), parts per billion (ppb), micrograms per cubic meter of air (ug/m<sup>3</sup>) for PM.

<sup>2</sup>**Primary standards** provide public health protection, including protecting the health of "sensitive" populations such as asthmatics, children, and the elderly.

<sup>3</sup>**Secondary standards** provide public welfare protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings.

<sup>4</sup>**PM 10** is not currently being monitored at the Brazoria County monitoring area.

<sup>5</sup>**Lead** is included in the full list of NAAQS pollutants. Not all pollutants are monitored at each monitoring station, and lead is not monitored at the Lake Charles MSA monitoring stations.

## General Conformity Rule

Brazoria County is located in a non-attainment area for 8-hour ozone. Once attainment has been achieved it will be designated as a “maintenance area”. A maintenance area is an area that was once designated as non-attainment but has been re-designated to attainment. (EPA, 2016)

Each time an activity is proposed, the DOE performs analysis based on the General Conformity Rule to determine if the activity will exceed the thresholds de minimis presented in Table 4. If the emissions from the activities are below the de minimis levels, then a full General Conformity Analysis is not required.

40 CFR Part 93, Subpart B, 93.153, Applicability, provides in paragraph (b) (2) the following thresholds in maintenance areas:

*Table 28 General Conformity Rule Thresholds for Maintenance Areas*

Pollutant	Tons/year
Ozone (NO <sub>x</sub> , SO <sub>2</sub> or NO <sub>2</sub> ):	
All Maintenance Areas	100
Ozone (VOC's):	
Maintenance areas inside an ozone transport region	50
Maintenance areas outside an ozone transport region	100
Carbon monoxide: All Maintenance Areas	100
PM-10: All Maintenance Areas	100
PM <sub>2.5</sub> :	
Direct emissions	100
SO <sub>2</sub>	100
NO <sub>x</sub> (unless determined not to be a significant precursor)	100
VOC or ammonia (if determined to be significant precursors)	100
Lead: All Maintenance Areas	25

**Permit**

In addition to being subject to the NAAQS, Bryan Mound operates under Permit #6176B issued by the TCEQ dated May 31, 2013 in accordance with Title 30 Texas Administrative Code 116.116(b). As part of permit requirements, the installation must submit annual comprehensive emission statements for each of the pollutants generated by each source, which are tanks, emergency engines and painting operations.

The tpy emission limits for each source is listed below in Table 30:

*Table 29 Emission rates for Criteria Pollutants and TAPS (in tpy)*

PM <sup>10</sup>	PM <sup>2.5</sup>	SO <sub>2</sub>	NO <sub>x</sub>	CO	VOC
Emission Source		1005 Brine Tank			
					5.42
Emission Source		1006 Sump Tank			
					0.01
Emission Source		1007 Site Fugitive Emissions (5)			
					0.07
Emission Source		1008-3 Crude Oil Surge Tank 3			
					3.35
Emission Source		1008-4 Crude Oil Surge Tank 4			
					3.35
Emission Source		1009 Diesel Storage Tank			
					0.01
Emission Source		1010 Diesel Storage Tank			
					0.01
Emission Source		1011 Gasoline Storage Tank			
					0.40

PM <sup>10</sup>	PM <sup>2.5</sup>	SO <sub>2</sub>	NO <sub>x</sub>	CO	VOC
Emission Source		1012 Emergency Generator			
0.05	0.05	0.60	1.78	0.41	0.05
Emission Source		1013 Emergency Pump			
0.02	0.02	0.01	0.21	0.05	0.02
Emission Source		1014 Emergency Pump			
0.01	0.01	0.01	0.08	0.02	0.01
Emission Source		1015 Painting Operation			
					0.68
Emission Source		1017 Crude Oil Recovery Tank			
					.024

### Greenhouse Gas (EO 13693)

The Greenhouse Gas Reporting Program authority is carried out at the federal level of USEPA. The Consolidated Appropriations Act of 2008 triggered the issue of the Mandatory Reporting of Greenhouse Gases Rule (74 FR 56260/40 CFR 98). The rule states that any facility that emits 25,000 tpy or more of carbon dioxide equivalent (CO<sub>2</sub>e) is required to submit annual reports to the USEPA. Further information and guidance can be found at <http://www.epa.gov/ghgreporting/basic-info/index.html>.

There is an EO relevant to this effort: EO 13693.

EO 13693 directs government agencies to “reduce GHG emissions through reduction of energy intensity 30 percent by 2015, compared to a FY 2003 baseline.”

It also directs federal agencies to reduce targeted scope 1 and scope 2 GHG emissions by at least 40% by FY 2025 from a FY 2008 baseline. Section 2 of EO 13693 directs individual agencies to set scope 1 and 2 GHG emission reduction targets for FY 2025 from a FY 2008 baseline. In addition, the goal for scope 3 GHG emission reduction is 13% by 2025 from a 2008 baseline.

Scope 1 GHG emissions are direct emissions which result from sources owned or controlled by DOE. Included in this source are boilers/water heaters and intra-installation vehicular travel. The

Bryan Mound facility's major Scope 1 GHG source is emergency engines.

Scope 2 GHG emissions are indirect emissions resulting from consumption of purchased electricity, heat or steam. This includes electricity purchased for heating equipment and general electrical use.

Scope 3 GHG emissions are "other indirect emissions" which include extraction and production of purchased materials and fuels-transport related activity not covered in Scope 2. This also includes emissions from commuting and air-travel.

### **7.1.2 Cultural Resources**

There are no known archeological, historical, or cultural resources that would potentially be affected by the project. Given the disturbed state of almost all of the facility area, involvement with any potential unidentified resource is unlikely.

Section 106 of the NHPA requires federal agencies to take into account the effects of their undertakings on historic properties and afford the Advisory Council on Historic Properties and other parties with an interest a reasonable opportunity to comment (consultation) beginning at the early stages of project planning. An undertaking is defined as "a project, activity or program funded in whole or in part under the direct or indirect jurisdiction of a Federal Agency, including those carried out by or on behalf of a Federal Agency; those carried out with Federal financial assistance; and those requiring a Federal permit, license or approval. Once an undertaking has been identified, the CRM will determine if it is a type of activity that has the potential to cause effects on historic properties."

It must be noted that NEPA analysis does not replace or negate the need for NHPA Section 106 review. Therefore, any action that may affect the physical landscape are subject to review for possible adverse impacts to be identified. Coordination with the SHPO is required in all cases.

### **7.1.3 Ecological Resources**

Vegetation is defined as plants and their geographic characteristics. Fish and wildlife are the animals and their habitats that occur within a region. Threatened and endangered species are any federally or state listed species in or around the facility. Section 7 of the Endangered Species Act, as amended (16 United States Code, Chapter 35 § 1531-1544), requires federal agencies evaluate the efforts of the proposed actions on protected plant and animal species and their habitats and take appropriate measures to conserve and project these species. Special-status species include plants and animals listed as sensitive, threatened, or endangered by the USFWS, as well as those that are candidates or proposed for listing as threatened or endangered. Special status species also include those species protected by the Migratory Bird Treaty Act, the Bald and Golden Eagle Protection Act, and the Marine Mammal Protection Act.



The Texas Parks and Wildlife Department Species by County List reports the following species in Brazoria County: <http://tpwd.texas.gov/gis/rtest/>

Table 30 Plant Species in Brazoria County, TX

Common Name	Scientific Name	State Status	Federal Status
Awnless bluestem	<i>Bothriochloa exaristata</i>	None	None
Coastal gay-feather	<i>Liatris bracteata</i>	None	None
Florida pinkroot	<i>Spigelia texana</i>	None	None
Giant sharpstem umbrella-sedge	<i>Cyperus cephalanthus</i>	None	None
South Texas spikesedge	<i>Eleocharis austrotexana</i>	None	None
Texas meadow-rue	<i>Thalictrum texanum</i>	None	None
Texas sunflower	<i>Helianthus praecox ssp. Praecox</i>	None	None
Texas tauschia	<i>Tauschia texana</i>	None	None
Texas windmill-grass	<i>Chloris texensis</i>	None	None
Threeflower broomweed	<i>Thurovia trifloral</i>	None	None

Table 31 Mammals, Birds and Fish Species in Brazoria County, TX

Common Name	Scientific Name	State Status	Federal Status
American Peregrine Falcon	<i>Falco peregrinus anatum</i>	Threatened	Delisted
Arctic Peregrine Falcon	<i>Falco peregrinus tundrius</i>	None	Delisted
Bald Eagle	<i>Haliaeetus leucocephalus</i>	Threatened	Delisted
Black Rail	<i>Laterallus jamaicensis</i>	None	None
Brown Pelican	<i>Pelecanus occidentalis</i>	None	Delisted
Eskimo Curlew	<i>Numenius borealis</i>	Endangered	Endangered

Common Name	Scientific Name	State Status	Federal Status
Henslow's Sparrow	<i>Ammodramus henslowii</i>	None	None
Peregrine Falcon	<i>Falco peregrinus</i>	Threatened	Delisted
Piping Plover	<i>Charadrius melodus</i>	Threatened	Threatened
Red Knot	<i>Calidris canutus rufa</i>	None	Threatened
Reddish Egret	<i>Egretta rufescens</i>	Threatened	None
Snowy Plover	<i>Charadrius alexandrinus</i>	None	None
Sooty Tern	<i>Sterna fuscata</i>	Threatened	None
Sprague's Pipit	<i>Anthus spragueii</i>	None	None
Western Snowy Plover	<i>Charadrius alexandrinus nivosus</i>	None	None
White-faced Ibis	<i>Plegadis chihi</i>	Threatened	None
White-tailed Hawk	<i>Buteo albicaudatus</i>	Threatened	None
Whooping Crane	<i>Grus Americana</i>	Endangered	Endangered
Wood Stork	<i>Mycteria Americana</i>	Threatened	None
American eel	<i>Anguilla rostrata</i>	None	None
Sharpnose shiner	<i>Notropis oxyrhynchus</i>	None	Endangered
Smalltooth sawfish	<i>Pristis pectinata</i>	Endangered	Endangered
Jaguarundi	<i>Herpailurus yaguarondi</i>	Endangered	Endangered
Louisiana black bear	<i>Ursus americanus luteolus</i>	Threatened	Delisted
Ocelot	<i>Leopardus pardalis</i>	Endangered	Endangered
Plains spotted skunk	<i>Spilogale putorius interrupta</i>	None	None
Red wolf	<i>Canis rufus</i>	Endangered	Endangered

Common Name	Scientific Name	State Status	Federal Status
West Indian manatee	<i>Trichechus manatus</i>	Endangered	Endangered
Smooth pimpleback	<i>Quadrula houstonensis</i>	Threatened	Candidate
Texas fawnsfoot	<i>Truncilla macrodon</i>	Threatened	Candidate
Alligator snapping turtle	<i>Macrochelys temminckii</i>	Threatened	None
Atlantic hawksbill sea turtle	<i>Eretmochelys imbricata</i>	Endangered	Endangered
Green sea turtle	<i>Chelonia mydas</i>	Threatened	Threatened
Kemp's Ridley sea turtle	<i>Lepidochelys kempii</i>	Threatened	Threatened
Leatherback sea turtle	<i>Dermochelys coriacea</i>	Endangered	Endangered
Loggerhead sea turtle	<i>Caretta caretta</i>	Threatened	Threatened
Texas diamondback terrapin	<i>Malaclemys terrapin littoralis</i>	None	None
Texas horned lizard	<i>Phrynosoma cornutum</i>	Threatened	None
Timber rattlesnake	<i>Crotalus horridus</i>	Threatened	None
Smooth Pimpleback	<i>Caretta caretta</i>	Candidate	Candidate
Texas Fawnsfoot	<i>Truncilla macrodon</i>	Candidate	Candidate

Source: Texas Parks and Wildlife Department Species by County List accessed at: <http://tpwd.texas.gov/gis/rtest/> on December 8, 2017.

While members of the above-listed species reportedly live in Brazoria County, none of them call the SPR Bryan Mound home. An Official Species List was generated using the USFWS IPaC. The list fulfills the requirement for Federal agencies to “request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action” pursuant to the aforementioned Section 7 of the Endangered Species List. It reports for SPR Bryan Mound: “There are no critical habitats within your project area under this office’s jurisdiction.” The IPaC report is presented in Appendix E.

The facility complies with EO 13186 *Responsibilities of Federal Agencies to Protect Migratory Birds & Migratory Bird Act*. Migratory birds are often spotted at each of the SPR facilities.

Mitigation activities to ensure the protection of migratory birds include flagging, avoidance of nesting areas and selective mowing cessation during critical times of the year to allow for adequate food and shelter.

#### **7.1.4 Environmental Justice**

Environmental justice addresses the disproportionate effect a federal action may have on low-income or minority populations or on children. In 1994, EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations was issued to focus attention of federal agencies on human health and environmental conditions in minority and low-income communities and to ensure that disproportionately high and adverse human health or environmental effects on these communities are identified and addressed. In 1997, EO 13045, Protection of Children from Environmental Health Risks and Safety Risks Protection of Children), was issued.

According to the US Census Bureau, the 2016 American Community Survey estimated total population for Brazoria County was 338,419 and 13 percent of that number is made up of people of the African American race The Hispanic community makes up 29.2 percent, and 0.4 percent of people of American Indian or Alaskan Native descent.

As defined by the CEQ report, Environmental Justice Guidance Under the Nation Environmental Policy Act, a minority population should be identified where either:

- The minority population of the affected area exceeds 50 percent; or
- The minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis.

According to the above definition, no minority population is present within the proposed project area.

#### **7.1.5 Land Use**

Land use comprises the natural condition or human-modified activities occurring at a particular location. Land uses are frequently regulated by management plans, policies, ordinances and regulation that determine the types of activities that are allowable or provide protection for specially designated or environmentally sensitive areas.

The SPR Bryan Mound facility has been operational since 1978. The facility is strictly used for oil industry activities with personnel support buildings (office/restrooms). DOE maintains appropriate operational permits and performs all regulatory compliance activities as required.

### 7.1.6 Noise

Noise is any sound that is undesirable because it interferes with communication, is intense enough to damage hearing, or is otherwise intrusive. Human response to noise varies depending on the type and characteristics of the noise, the distance between the noise source and the receptor, receptor sensitivity, and the time of day. Noise is often generated by activities such as construction or vehicular traffic. Sound levels are expressed in dB and various weighted dB scales (i.e. A, B C) are used to approximate how people perceive different types of sounds. USEPA defined a long-term average noise descriptor, the “equivalent” noise level, or Leq. The DNL consists of the Leq with a 10-dB penalty for night-time noise. This metric provides a single measure of overall noise impact and is the accepted measure of determining human noise impacts.

Noise concerns would be addressed from a worker health and safety perspective. All four SPR locations are governed by OSHA 1910.119, *Process Safety Management of Highly Hazardous Chemicals* per a 1994 determination by the Department of Labor. The four storage sites also participate in the OSHA Voluntary Protection Program meaning the hazards analyses follow what OSHA considers industry best practices. A preliminary hazards review was performed and it indicates noise is not a concern from any of the proposed actions. (DOE, 2017)

### 7.1.7 Prime Farmland/Soils

The NRCS has listed the majority of the soil map units within the proposed project area as prime farmland. More specifically, the soils in the project area are mapped as:

*Table 32 Soil Descriptions in the Project Area*

Soil Type	Drainage Class	Average Slope	Prime Farmland
Ijam clay	Rarely flooded		No
Lake Charles clay		2 to 5 percent	Yes
Velasco clay	Frequently flooded	0 to 1 percent	No

The purpose of the FPPA is to minimize the extent to which Federal programs contribute to the unnecessary conversion of farmland to non-agricultural uses. The FPPA stipulates that Federal programs be compatible with State, local and private efforts to protect farmland. Prime farmland soils have the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. In general, prime farmland soils experience adequate and dependable precipitation, a favorable temperature and growing season, have acceptable acidity or alkalinity, and have few or no surface stones. Prime farmland soils are permeable to water and air. These soils are not excessively erodible or saturated with water for long periods of time. One

soil map unit classified as prime farmland soils is located within the project area (see Table 1 and Appendix D).

### 7.1.8 Socioeconomics

Bryan Mound is located in Freeport City, Texas in Brazoria County. It is anticipated that any potential socioeconomic impacts due to the proposed actions would be concentrated within these areas surrounding the facility.

The population estimate for Brazoria County as of 2016 was 354,195. This was a 13.1% increase from the 2010 Census. The Freeport City population had no significant change. (USCB, 2016). The table below shows population numbers for the area.

*Table 33 Population in Areas Surrounding Bryan Mound (2016)*

	Brazoria County	Freeport City	Total
Population Estimate 2016	338,419	12,122	366,348
Population 2010 Census	313,166	12,049	325,215
Percent Change	7.5%	-0.7%	12.65%

The largest contributors to employment in the surrounding areas are educational services and health care and social assistance services. For Freeport City, the largest contributing sectors are construction, educational services and health care and social assistance; and arts, entertainment, recreation, accommodation and food services. (USCB, 2016).

As shown in the table below, there is a large income difference throughout the area. Unemployment rates differ greatly across the area as well.

*Table 34 Employment in Areas Surrounding Bryan Mound (2016)*

	Civilian Labor Force	Armed Forces Labor Force	Unemployment Rate	Median Household Income	Per Capita Income in past 12 months
Brazoria County	166,099	98	5.2%	72,006	89,752
Freeport City	5,292	0	13%	36,044	52,974

### **7.1.9 Water Resources**

Groundwater is monitored monthly and operations at the facility include constant monitoring that no petroleum-related contaminants are released to the environment. That includes the brine that is ultimately injected into the deep aquifer. There have been no compliance issues for groundwater.

#### **Surface Water**

There are several ponds at the facility, and the nearly surface water body in the intracoastal water approximately 4 miles to the east. The facility is permitted to withdraw water from it for use at the facility.

Section 303(d) of the CWA requires states to identify waters where current pollution control technologies alone cannot meet the water quality standards set for that waterbody. Every two years, states are required to submit a list of impaired waters plus any that may soon become impaired to EPA for approval. The impaired waters are prioritized based on the severity of the pollution and the designated use of the waterbody (e.g., fish propagation or human recreation). States must establish the TMDLs of the pollutant(s) in the waterbody for impaired waters on their list. The most current cycle for Texas is 2014.

Bryan Mound lies within one mile of the Gulf of Mexico and roughly parallels the shoreline from Freeport Harbor to the Brazos River Diversion Channel (intracoastal waterway) about five miles to the southwest. Impairment of surface water bodies is often due to stormwater runoff. The land at the facility is relatively flat with normal drainage. The SPR SWPPP addresses mitigation activities needed to ensure surface water quality is not impacted by normal facility operations.

#### **Wetlands**

The main portion of the facility has a few ponds, a lake to the north and is otherwise surrounded by estuarine and marine wetlands. Estuarine environments form a transition zone between river environments and marine environments, as is expected here with the facility so close to the Gulf

of Mexico. Appendix F includes current USFWS National Wetlands Inventory maps for the facility accessible at <https://www.fws.gov/wetlands/data/mapper.html> (definitions of the codes used on the map are also available in the frequently asked questions section of the website).

Texas Parks and Wildlife manages a program that requires compensation for impact to wetlands. There are two types of mitigation banks in Texas: wetland and stream mitigation banks regulated by the US Army Corps of Engineers and species conservation banks regulated by the USFWS. Both types of banks are permanently protected and exist to replace natural resource values that are lost at an offsite location to development activity. The values of the natural resources replaced at a bank are quantified as a “credit”, which can be sold to developers to offset natural resource impacts. For more information, please see <https://valuwetlands.tamu.edu>.



## 8 Cumulative Impacts

The CEQ regulations stipulate that the cumulative effects analysis within an EA should consider the potential environmental effects resulting from “the incremental effects of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other action” (40 CFR 1508.7). Recent CEQ guidance in *Considering Cumulative Impacts* affirms this requirement, stating that the first steps in assessing cumulative effects involve defining the scope of the other actions and their interrelationship with the Proposed Action. The scope must consider geographic and temporal overlaps among the Proposed Action and other actions. It must also evaluate the nature of interactions among these actions. Cumulative effects are most likely to arise when a relationship or synergism exists between a Proposed Action and other actions expected to occur in a similar location or during a similar time period. Actions overlapping with, or in close proximity to, the Proposed Action would be expected to have more potential for a relationship than actions that may be geographically separated. Similarly, actions that coincide, even partially, in time would tend to offer a higher potential for cumulative effects. To identify cumulative effects, this EA addresses three questions:

1. Does a relationship exist such that elements of the Proposed Action might interact with elements of past, present, and reasonably foreseeable future actions?
2. If one or more of the elements of the Proposed Action and another action could be expected to interact, would the Proposed Action affect or be affected by the effects of the other action?
3. If such a relationship exists, does an assessment reveal any potentially significant effects not identified when the Proposed Action is considered alone?

In this EA, an effort has been made to identify all actions that are being considered and that are in the planning phase at this time. To the extent that details regarding such actions exist and the actions have a potential to interact with the Proposed Action and the No Action Alternative in this EA, these actions are included in this cumulative analysis. This approach enables decision makers to have the most current information available so that they can evaluate the environmental consequences of the Proposed Action and the No Action Alternative.

The four SPR facilities are not co-located geographically and there is no reason to believe that a project at one location will affect the surrounding environment at another. Therefore, cumulative impacts will be addressed by location. Please note that at each location there are work packages that have not yet been added to the schedule and therefore cannot be analyzed for temporal overlap. These work packages appear in Table 2 with “LE” in the work package number.

### Bayou Choctaw

The following work packages will begin in the summer of 2020:

BC-MM-308	Upgrade Outdoor Lighting
BC-MM-437	Sewage Treatment Plant
BC-MM-770	Upgrade and Automate Brine Disposal Well Valves and Flow Meters

BC-MM-771	Upgrade Brine Disposal Well MCCs and MCC Electrical Service
BC-MM-775	Replace/Line Brine Disposal Well Branch Piping to Pads 1 and 2
BC-MM-810	Replace Site Emergency Generator
BC-MM-1297	Replace Timber Supports
BC-MM-1339	Replace Perimeter Security Detection System
BC-MM-1351	Bayou Choctaw Degas
BC-MM-1361	Replace and Relocate High Speed Barriers
BC-MM-1526	Replace CCTV System at Bayou Choctaw

Much of the work is electrical/mechanical with the exception of BC-MM-1297 and BC-MM-775, which will require construction activities. BC-MM-1351 was addressed in a previously submitted EA. All other work packages meet the criteria for a CX (see table 2), but the following affected environments may reasonably be exposed to **temporary, minor impacts**:

Air Quality – Fugitive dust from construction equipment and vehicles

Noise – Construction related noise may annoy birds and wildlife so that they may avoid the area until it is over. Noise avoidance measures will be built into the design phase.

Surface water – Soil erosion from construction activities may cause silt to travel overland and be deposited into surface water, causing turbidity.

Socioeconomics – may have a beneficial impact due to short-term construction employment.

Two work packages will not cause cumulative effects due to being scheduled at the same time as the others. They will end as the others are beginning:

- BC-MM-1461 is a very short-term project that will begin in April 2020 (before the others) and end in June 2020 as most others are beginning.
- BC-MM-1360 (see section 4.2.1.1 for full analysis) is scheduled to begin in June 2019 and end in June 2020.

## **West Hackberry**

The following work packages will not intersect in the schedule with others or they are very short in duration. They are also activities that will not cause an impact to any of the affected environments:

WH-MM-617&A/652&A	Lighting Upgrades at WH
WH-MM-753 Upgrade	ADAS System Servers and Workstations
WH-MM-788 Replace	Slop Oil Pumps (WHP-517 & 518)
WH-MM-1150	Replace Fuel Source at WHEG-5 at LCMS

WH-MM-1281	Replace Perimeter Security Detection System
WH-MM-1363	Replace and Relocate High Speed Barriers
WH-MM-1366	Replace Below Grade Firewater Headers

The below listed work packages' schedules will intersect with others. All but one are anticipated to have no impact. One work package, WH-MM-1148, may create a temporary, minor impact to noise as is inherent with roof repair and replacement.

WH-MM-791/791A	Replace CO Injection Pumps WHP-22, 23, 131 at WH
WH-MM-794/794A	Replace Meter Skid Actuators at WH & Sun
WH-MM-1100/1100A	Replace WHT-1 Flush Water and WHT-10 Seal Flush Tanks
WH-MM-1148	Repair/Replace roofs on Buildings 301, 317 & 320
WH-MM-1334	Recap Anhydrite Ponds
WH-MM-1372	Heat Exchanger Bundle Spares
WH-MM-1463	Replace Oil-in-Water Monitors
WH-MM-1525	RWIS Infrastructure Upgrades at WH
WH-MM-1529	Replace CCTV System at WH

The remaining work packages' schedules will intersect and each of them involve construction activities. Each of them have been fully analyzed in this EA with the exception of WH-MM-1144, which was analyzed in a separate EA and WH-LE-1710 and WH-LE-1717, which meet the criteria of a CX.

It is anticipated that the work packages listed below may create temporary, minor impact to the following affected environments as is inherent with construction work:

WH-MM-693	Marine Service Center
WH-MM-1025	Replace the 42 Inch Pigging Water Underground Pipeline
WH-MM-1349/649/337	Subsidence & Inundation Mitigation
WH-MM-1350/1409	Recomplete/Replace Brine Disposal Wells; Replace Brine
WH-MM-1359	Revise WH RWINJ Pump Exercise System
WH-MM-1144	Enhance Access to Valve Stations
WH-LE-1710	Replace Site Crude Oil Piping

Air Quality – Fugitive dust from construction equipment and vehicles

Noise – Construction related noise may annoy birds and wildlife so that they may avoid the area until it is over. Noise avoidance measures will be built into the design phase.

Surface water – Soil erosion from construction activities may cause silt to travel overland and be deposited into surface water, causing turbidity.

Socioeconomics – may have a beneficial impact due to short-term construction employment.

There are two Corps of Engineer projects occurring with temporal overlap: Calcasieu River and Pass (operations and monitoring) and the Mississippi River and Tributaries Flood Control project. The West Hackberry location would be nearest to these projects. It is unlikely that any of the West Hackberry work packages will cumulatively cause impact, nor will the Corps of Engineer projects impact the work at West Hackberry. While temporal overlap may occur, the distance between the locations and nature of the scheduled work is unlikely to cause an impact.

## Big Hill

The following work packages will not intersect in the schedule with others or they are very short in duration. They are also activities that will not cause an impact to any of the affected environments:

BH-MM-523	Replace 5kV Outdoor Bus Ducts
BH-MM-611	Replace Crude Oil Injection Pump Motors and Skids
BH-MM-670	Site Building Upgrades Phase 2 (E2P2)
BH-MM-750	Upgrade ADAS System Servers and Workstations
BH-MM-776/776A	Replace Actuators on Meter Skid Valves
BH-MM-1362	Replace and Relocate High Speed Barriers
BH-MM-1527	Replace CCTV System at BH
BH-MM-1552	Replace Oil-in-Water Monitors

The following work packages' schedules will intersect but none of the activities are such that would create an impact for any of the affected environments:

BH-MM-631	Replace Raw Water Injection Pump Motors and Skids
BH-MM-782	Replace Slop Oil Tank & Pumps (BHP-6, BHP-51 & 52)

BH-MM-793/793A	Replace Seal Flush Tank & Pumps (BHT-9, BHP-89 & 90)
BH-MM-806	Replace Mark V Circuit Switches
BH-MM-1356	Replace Raw Water Header Above Grade
BH-MM-1357	Replace Crude Oil Header Above Grade
BH-MM-1370	Heat Exchanger Bundle Spares
BH-MM-1429	Lighting Upgrades at BH
BH-MM-1523	RWIS Infrastructure Upgrades at BH
BH-MM-1530	Replace Perimeter Security Detection System

The remaining work packages' schedules will intersect and each of them involve construction activities. Each of them have been fully analyzed in this EA with the exception of BH-MM-597/597A, which meets the criteria of a CX.

It is anticipated that the work packages listed below may create temporary, minor impact to the following affected environments as is inherent with construction work:

BH-MM-596/596A	Replace Onshore Section of Brine Disposal Line
BH-MM-756/756A	Replace Section of 36" COP at Hillebrandt Bayou
BH-SP-1307/1307A	BH Simultaneous Distribution to Chevron/Unocal, Shell and Sun
BH-SP-1407/1407A	BH Pipeline – Beaumont Terminal Flow Control
BH-MM-597/597A	Replace Raw Water Intake Pipeline at BH

## **Bryan Mound**

All of the Bryan Mound work packages meet the criteria for a CX, therefore none of the following were fully analyzed in this EA. This work package involves construction and therefore it is anticipated that temporary, minor impact may occur:

BM-MM-590/590A	Replace Raw Water Intake Pipeline No. 1
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Air Quality – Fugitive dust from construction equipment and vehicles

Noise – Construction related noise may annoy birds and wildlife so that they may avoid the area until it is over. Noise avoidance measures will be built into the design phase.

Surface water – Soil erosion from construction activities may cause silt to travel overland and be deposited into surface water, causing turbidity.

Socioeconomics – may have a beneficial impact due to short-term construction employment.

The remaining work packages will not create an impact to the affected environments:

BM-MM-369	Lighting Upgrades at Bryan Mound
BM-MM-774/774A	Replace Actuators on Meter Skid Valves
BM-MM-1055	Convert BMT-4 to External Floating Roof
BM-MM-1171	Replace Microwave Security System at CO Transfer Pumps
BM-MM-1340	Replace Perimeter Security Detection System
BM-MM-1354	Replace Crude Oil Injection Pumps BMP-1, -4
BM-MM-1355	Replace Brine Tank BMT-1 with Purpose Built System
BM-MM-1365	Replace Below Grade Firewater Headers
BM-MM-1371	Heat Exchanger Bundle Spares
BM-MM-1462	Replace Oil-in-Water Monitors
BM-MM-1524	RWIS Infrastructure Upgrades at Bryan Mound
BM-MM-1528	Replace CCTV System at Bryan Mound

## 9 References

- 16 United States Code, Chapter 35 § 1531-1544 Endangered Species Act
- 40 CFR Parts 1500-1508, Council on Environmental Quality.
- EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks Protection of Children*
- Executive Order 13186 *Responsibilities of Federal Agencies to Protect Migratory Birds & Migratory Bird Act*
- Executive Order 13693, *Planning for Federal Sustainability in the Next Decade* signed March 19, 2015.
- EPA 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low -Income Populations*
- DOE, 2017 U.S. Department of Energy, Strategic Petroleum Reserve Life Extension Phase 2 Project Execution Plan, June, 2017
- DOE, 2016 U.S. Department of Energy Life Extension 2 Conceptual Design Report, Volumes I-V, Strategic Petroleum Reserve, Project Management Office, Revision 2, November 3, 2016.
- DOE, 2016 SPR Pollution Prevention Plan (Publication ASL5400.41), Version 10.0 August, 2016.
- DOE, 1976 U.S. Department of Energy, Strategic Petroleum Reserve Final Environmental Impact Statement, December 1976.
- EPA, 2016 U.S. EPA, Louisiana Water Quality Assessment Report, 2016 accessed at <https://ofmpub.epa.gov>
- EPA 2016a U.S. EPA Air Quality Green Book, accessible at [https://www3.epa.gov/airquality/greenbook/anayo\\_la.html](https://www3.epa.gov/airquality/greenbook/anayo_la.html)
- Louisiana Department of Wildlife and Fisheries Species by Parish List accessible at <http://www.wlf.louisiana.gov/wildlife/species-parish-list>
- Texas Parks and Wildlife Department Species by County List accessible at: <http://tpwd.texas.gov/gis/rtest/>
- USCB, 2016, U.S. Census Bureau Factfinder tool website: <http://factfinder2.census.gov>.

## 10 Appendices



# **Appendix A**

## Interagency Communication

**Summary of stakeholder comments received after submission of the Notice of Intent (NOI) letter dated November 2, 2017. Copies of the agency correspondence follow this page.**

**Comment from Louisiana Department of Natural Resources Division of Injection Mining:**

Please change addressee for the Louisiana Department of Natural Resources Division of Injection Mining to Steven Lee.

**Response:** Mr. Steven Lee has been added to the addressee list for future correspondence.

**Comment from Louisiana Department of Natural Resources Office of Coastal Zone**

**Management:** This comment focuses on the need for Coastal Zone Consistency Determination (CZCD).

**Response:** Applicable Coastal Zone Consistency Determination(s) will be completed by the proponent and submitted as a separate document, not part of or concurrent submittal with this Environmental Assessment.

**Comment from EPA Region 6:** This comment discusses recommendations for the following:

- Include full National Ambient Air Quality Standards (NAAQS), non-NAAQS pollutants, criteria pollutant non-attainment areas and potential air quality impacts of the proposed actions
- Quantification (estimate) of emissions from construction and maintenance activities.
- The submission of a Construction Emissions Mitigation Plan
- The submission of a wetlands and stream delineation for all wetlands and water of the United States (including ephemeral drainages) to help determine if Section 404 permits would be needed.
- The submission of a Wetland Compensatory Mitigation Plan

**Response:** This draft EA fully discusses the current baseline NAAQS pollutants, non-NAAQS pollutants and criteria pollutant non-attainment area conditions and permits of each SPR location. Potential air quality impacts are analyzed against criteria for determining significance to determine if an impact may occur.

In accordance with Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act, 40 CFR §1500.5 *Reducing Delay*, “Agencies shall reduce delay by: (a) Integrating the NEPA process into early planning (§1501.2)”. 40 CFR §1501.2 *Apply NEPA Early in the Process* directs agencies to integrate the NEPA process at the “earliest possible time” to “to ensure that planning and decisions reflect environmental values, to avoid delays later in the process, and to head off potential conflicts.” 40 CFR §1501.3 (b) indicates, “Agencies may prepare an environmental assessment on any action at any time in order to assist agency planning and decision-making”.

This EA has been developed early in the project design process. Appendix B provides the applicable work package descriptions from the SPR LE-II Conceptual Design Report which provides a great deal of project information and the process by which the proposed action was chosen among several alternatives. It is appropriate for the EA to have been developed at this point in the SPR LE-II project evolution. However, the time necessary to obtain the amount of

detailed information required to develop the recommended plans would delay the EA and in turn would delay the implementation of the SPR LE-II project.

DOE intends to comply with all regulatory documentation requirements, including permits, other documents and assessments required by EPA and the applicable State agencies in Louisiana and Texas.

**Comment from Louisiana Department of Environmental Quality, Air Planning and Assessment Division of the Office of Environmental Assessment:** The comment references that Iberville Parish was designated as an ozone attainment area as of March 21, 2017, and that information is reflected in the draft EA.

The comment further indicates “in order to determine if the proposed project in Iberville Parish is subject to the full requirements of the general conformity regulations, the project sponsor must first make a general conformity applicability determination. This determination can be made by summing the total of direct and indirect volatile organic compound (VOC) and nitrogen oxide (NO<sub>x</sub>) emissions caused by the project. If the net total of VOC and NO<sub>x</sub> emissions is determined to be less than the prescribed de minimis level of 100 tons per year per pollutant, then this action will comply with the conformity provisions of Louisiana’s State Implementation Plan (SIP) and the Air Planning and Assessment Division will not object to implementation of the project.”

This draft EA discusses general conformity rule requirements for the locations that are currently non-attainment or maintenance areas. The text provided in the EA indicates, “Each time an activity is proposed, the DOE performs analysis based on the General Conformity Rule to determine if the activities will exceed the thresholds de minimis. If the emissions from the activities are below the de minimis level, then a full General Conformity Analysis is not required.”

DOE intends to comply with all regulatory documentation requirements, including permits, other documents and assessments required by EPA and the applicable State agencies in Louisiana and Texas.

**Comment from U.S. Army Corps of Engineers (USACE):** This comment requests that Jeff Corbino be added to the addressee list.

The comment indicated that the “primary interest will be for improvements proposed for the West Hackberry and Bayou Choctaw sites, and how these improvements may interact with our Calcasieu River navigation project and Mississippi River & Tributaries flood control project”.

**Response:** Mr. Corbino has been added to the addressee list.

This comment was received during EA development and discussion of the two USACE projects was incorporated into the cumulative effects section of the EA.

**Comment from US Department of Agriculture, Natural Resources Conservation Service (NRCS), Soils Section:**

This comment requested that Prime Farmland be analyzed as a potentially affected environment.

**Response:** This EA does address Prime Farmland with the criteria for determining significance being the “unnecessary conversion of farmland to non-agricultural uses”. The analysis results indicate that no impact is anticipated for Prime Farmland for any of the proposed actions.

**Correspondence from the Texas Commission of Environmental Quality** indicated they had no comment at the time of the Notice of Intent.

**Comment from USDA NRCS:** The comment indicated there was no information about the location of the proposed actions.

**Response:** The NOI had the following text included:

“These actions will occur at four different sites where SPR facilities are located:

Bayou Choctaw, Plaquemine, LA (Iberville Parish)

West Hackberry, Hackberry, LA (Cameron Parish)

Big Hill, Winnie, TX (Jefferson County)

Bryan Mound, Freeport, TX (Brazoria County)”

An attachment to the NOI included each proposed action work package name and which location it is in. The draft EA is organized by location.

## Katie Watson

---

**From:** Reese, Stephen  
**Sent:** Tuesday, November 14, 2017 10:07 AM  
**To:** Auger, Jennifer  
**Subject:** FW: EA for SPR Life Extension Project

-----Original Message-----

From: Corbino, Jeffrey M CIV USARMY CEMVN (US) [mailto:Jeffrey.M.Corbino@usace.army.mil]  
Sent: Tuesday, November 14, 2017 8:47 AM  
To: Reese, Stephen <Stephen.Reese@SPR.DOE.GOV>  
Cc: Falk, Tracy F CIV USARMY CEMVN (US) <Tracy.A.Falk@usace.army.mil>  
Subject: EA for SPR Life Extension Project

Stephen,

As per your 2-Nov-2017 letter from William Gibson (DOE PM) to Tracy Falk (USACE Calcasieu River OM), please include me on your distribution list for NEPA documents and other correspondence related to the SPR Life Extension Project. Our primary interest will be for improvements proposed for the West Hackberry and Bayou Choctaw sites, and how these improvements may interact with our Calcasieu River navigation project and Mississippi River & Tributaries flood control project.

Thanks,  
Jeff Corbino  
Operations Division  
USACE - New Orleans District  
(504)862-1958

Bryan W. Shaw, Ph.D., P.E., *Chairman*  
Toby Baker, *Commissioner*  
Jon Niermann, *Commissioner*  
Richard A. Hyde, P.E., *Executive Director*



## TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

November 8, 2017

Mr. Stephen Reese  
Environmental Specialist  
DOE, SPRPMO, Environmental Division  
900 Commerce Road East  
New Orleans, Louisiana 70123

Via: E-mail

Re: Recommended Environmental Assessment for Strategic Petroleum Reserve Project: Life Extension 2 Project at the Bryan Mound, Big Hill, West Hackberry, and Bayou Choctaw Storage Sites

Dear Mr. Reese:

Thank you for submitting your letter concerning the above-referenced project to the Texas Commission on Environmental Quality (TCEQ).

Upon reviewing your letter, the TCEQ has no response at this time. We request that a completed draft of the Environmental Assessment be completed and submitted for review before the office can provide a comment.

We look forward to reviewing the completed EA for this project.

If you have any questions, please contact the agency NEPA Coordinator, at (512) 239-3500 or [NEPA@tceq.texas.gov](mailto:NEPA@tceq.texas.gov).

Sincerely,

A handwritten signature in black ink, appearing to read "R. Vise".

Ryan Vise  
Division Director  
Intergovernmental Relations



JOHN BEL EDWARDS  
GOVERNOR

State of Louisiana  
DEPARTMENT OF NATURAL RESOURCES  
OFFICE OF CONSERVATION

THOMAS F. HARRIS  
SECRETARY

RICHARD P. IEYOUNG  
COMMISSIONER OF CONSERVATION

January 11, 2018

TO: Mr. Stephen Reese  
Environmental Specialist  
DOE-SPRPMO Environmental Division  
900 Commerce Rd  
New Orleans, Louisiana 70123

RE: Solicitation of Views  
State Project No.17-ESH-009  
Bayou Choctaw and West Hackberry  
Cameron and Iberville Parishes

Dear Mr. Reese:

In response to your letter dated November 2, 2017, concerning the referenced matter, please be advised that the Office of Conservation collects and maintains many types of information regarding oil and gas exploration, production, distribution, and other data relative to the petroleum industry as well as related and non-related injection well information, surface mining and ground water information and other natural resource related data. Most information concerning oil, gas and injection wells for any given area of the state, including the subject area of your letter can be obtained through records search via the SONRIS data access application available at:

<http://www.dnr.louisiana.gov>

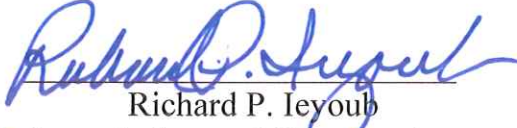
A review of our computer records for the referenced project area indicates that there are numerous oil and gas wells located in the vicinity of the project area. There are injection wells located in the area. The DNR water well database indicates that there are registered water wells in the vicinity of the project area. Also, unregistered water wells may be located in the area.

The Office of Conservation maintains records of all activities within its jurisdiction in paper, microfilm or electronic format. These records may be accessed during normal business hours, Monday through Friday, except on State holidays or emergencies that require the Office to be closed. Please call 225-342-5540 for specific contact information or for directions to the Office of Conservation, located in the LaSalle Building, 617 North Third Street, Baton Rouge, Louisiana. For pipelines and other underground hazards, please contact Louisiana One Call at 1-800-272-3020 prior to commencing operations. Should you need to direct your inquiry to any of our Divisions, you may use the following contact information:

<u>Division</u>	<u>Contact</u>	<u>Phone No.</u>	<u>E-mail Address</u>
Engineering	Jeff Wells	225-342-5638	jeff.wells@la.gov
Pipeline	Steven Giambrone	225-342-2989	steven.giambrone@la.gov
Injection & Mining	Heath Borden	225-342-8639	heath.borden@la.gov
Geological	Reid Bohlinger	225-342-0362	reid.bohlinger@la.gov
Environmental	Gary Snellgrove	225-342-7222	gary.snellgrove@la.gov

If you have difficulty in accessing the data via the referenced website because of computer related issues, you may obtain assistance from our technical support section by selecting Help on the SONRIS tool bar and submitting an email describing your problems and including a telephone number where you may be reached.

Sincerely,

  
 Richard P. Ieyoub  
 Commissioner of Conservation

RPI:RWB



Please change addressee for the Louisiana Department of Natural Resources Division of Injection Mining to Steven Lee.



**State of Louisiana**  
**DEPARTMENT OF NATURAL RESOURCES**  
**OFFICE OF COASTAL MANAGEMENT**

December 18, 2017

William C. Gibson, Jr.  
Department of Energy  
Strategic Petroleum Reserve  
Project Management Office  
900 Commerce East  
New Orleans, LA 70123  
Via e-mail: [william.gibson@spr.doe.gov](mailto:william.gibson@spr.doe.gov)

Re: **C20170231 Coastal Zone Consistency**  
Department of Energy Strategic Petroleum Reserve (SPR)  
Direct Federal Action  
Recommended Environmental Assessment (EA) for Strategic Petroleum Reserve (SPR)  
Project: Life Extension 2 Project at the Bryan Mound, Big Hill, West Hackberry, and  
Bayou Choctaw Storage Sites

Dear Mr. Gibson:

The Louisiana Department of Natural Resources, Office of Coastal Management (OCM), has received your November 2, 2017 letter requesting comments on the referenced Life Extension 2 project. The only SPR site located within the Louisiana coastal zone is located in West Hackberry, and so the following comments refer only to work proposed for that location.

The Coastal Zone Management Act of 1970, as amended (CZMA) requires that federal agencies must conduct their activities in a manner consistent with the Louisiana Coastal Resources Program (LCRP), and submission of a consistency determination to this office shall be necessary as your plans near completion. The review conducted by this office is independent from the requirements of the National Environmental Protection Act even though the two reviews require much the same information. Additionally, the CZMA does not incorporate categorical exclusions -- any federal activity which may have reasonably foreseeable effects on coastal uses or resources must be addressed in the consistency determination. OCM appreciates that DOE is choosing to review in the EA all proposed activities, due to the potential for cumulative effects.

The LCRP is particularly concerned with the prevention of the loss of coastal wetlands. After review of your submittal it appears that most of the proposed actions will occur on land which has already been developed, so impacts to wetlands may be relatively minor. Nevertheless, the consistency determination and EA should identify potential wetland impacts and discuss the measures that will be taken to avoid and minimize adverse impacts. Compensatory mitigation will be required for any unavoidable losses to habitat value, including indirect and cumulative

losses. This applies not only to the actual work, but also to access routes, work and staging areas, etc. Further, it is a general policy of OCM that out-of-service infrastructure be removed rather than abandoned in place.

OCM appreciates the chance to coordinate with the Department of Energy at this early stage of planning, and additional information about the enforceable policies of Louisiana's coastal management program is available upon request. If you should have any questions on this matter, please contact Jeff Harris of the Consistency Section at (225) 342-7949 or [Jeff.Harris@LA.gov](mailto:Jeff.Harris@LA.gov).

Sincerely yours,

**/S/ Charles Reulet**

Administrator

Interagency Affairs/Field Services Division

CR/SK/jdh

cc: Stephan Reese, DOE, SPRPMO  
Jennifer Auger, FFPO  
Darrell Barbara, COE-NOD  
Rod Peirce, OCM/FI  
Quintin Waguespack, OCM/FI  
Kara Bonsall, Cameron Parish  
Dave Butler, LDWF



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY**

**Region 6**

**1445 Ross Avenue, Suite 1200  
Dallas, TX 75202-2733**

January 5, 2018

Stephen Reese  
Department of Energy  
Strategic Petroleum Reserve  
Project Management Office  
Environmental Division  
900 Commerce Road East  
New Orleans, LA 70123

**Subject: Detailed Comments on the U. S. Department of Energy intention to prepare an Environmental Assessment to support the proposed Strategic Petroleum Reserve (SPR) Life Extension 2 Project at the storage sites in Bryan Mound, Big Hill, West Hackberry and Bayou Choctaw**

Dear Mr. Reese:

The Region 6 office of the U.S. Environmental Protection Agency (EPA) has reviewed the November 2, 2017, letter announcing the intention to prepare an Environmental Assessment (EA) for the Proposed Strategic Petroleum Reserve (SPR) Life Extension 2 Project. The project would consist of repair, replacement and upgrade of storage area equipment and facilities.

To assist in the scoping process for this project, EPA has identified several recommendations for your attention in the preparation of the EA and has enclosed detailed scoping comments for your consideration. Our comments are provided pursuant to the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500-1508) and Section 309 of the Clean Air Act.

EPA is most concerned about the following recommendations: mitigation, alternative development, impacts to water and biological resources, endangered species, invasive species management, habitat protection, air quality, cumulative impacts, cultural/ historic resource impacts, environmental justice and tribal coordination.

We appreciate the opportunity to review this Letter of Intention and are available to discuss our comments. Please send one hard copy of the Draft EA and a CD ROM copy to this office when completed and submitted for public comment. If you have any questions, please contact me or Gabe Gruta of my staff at (214) 665-8565 or (214) 665-2174; or by e-mail at [houston.robert@epa.gov](mailto:houston.robert@epa.gov) or [gruta.gabriel@epa.gov](mailto:gruta.gabriel@epa.gov), respectively.

Sincerely,

A handwritten signature in black ink, appearing to read "Robert Houston", is written over a horizontal line.

Robert Houston  
Chief, Special Projects Section  
6EN-WS

Enclosure

**DETAILED SCOPING COMMENTS  
ON THE  
THE DEPARTMENT OF ENERGY  
LETTER OF INTENTION  
TO PREPARE AN  
ENVIRONMENTAL ASSESSMENT (EA)  
FOR THE PROPOSED  
LIFE EXTENSION 2 PROJECT**

In compliance with the National Environmental Policy Act of 1969 (NEPA), the Act requires the Department of Energy (DOE) Strategic Petroleum Reserve (SPR) to take into account the environmental impacts that could result from an action whenever it considers the issuance of a Certificate of Public Convenience and Necessity. SPR is also required to discover and address concerns the public may have about proposals. The SPR intends to prepare an Environmental Assessment (EA) analyzing the impacts of the Life Extension 2 Project involving the repair, replacement and upgrade of storage area equipment and facilities at the Bryan Mound and Big Hill, storage sites in Texas; and West Hackberry and Bayou Choctaw storage sites in Louisiana.

**Project Plan and Description:**

The Life Extension 2 project proposes the following actions:

Big Hill site

- Replace Onshore Section of Brine Disposal Line;
- Simultaneous Distribution to Chevron/Unocal, Shell and Sun;
- Pipeline – Beaumont Terminal Flow Control;

Bayou Choctaw site

- Site Road Access to BC-19, 101;

Bryan Mound site

- RWIS Channel Upgrades to prevent Silt buildup;

West Hackberry site

- Drill and Complete New Brine Disposal Wells;

- Marine Service Center;
- Enhance Access to Valve Stations;
- Replace the 42-inch Pigging Water Underground Pipeline;
- Revise WH RWINJ Pump Exercise System;
- Subsidence and inundation Mitigation;

Each proposed action has undergone rigorous analysis to determine the proper activities to achieve each goal. There are a number of identified proposed actions that have already meet the criteria for a Categorical Exclusion in accordance with Appendix B to Subpart D of Part 102 – Categorical Exclusions Applicable to Specific Agency Actions. Due to large number of actions being performed either simultaneously or within a short period of time, many of these actions will be analyzed for potential cumulative impact.

### **Land Requirements for Construction and Operation**

The repair, replacement and upgrade of the proposed facilities would disturb the existing deep underground storage caverns created in salt domes along the Gulf Coast region: two sites in Texas (Bryan Mound and Big Hill) and two sites in Louisiana (West Hackberry and Bayou Choctaw). The four sites have a combined design storage capacity of 713.5 million barrels.

## **DETAILED COMMENTS**

### **Air Quality**

EPA recommends the EA provide a detailed discussion of ambient air conditions (baseline or existing conditions), National Ambient Air Quality Standards (NAAQS) and non-NAAQS pollutants, criteria pollutant nonattainment areas, and potential air quality impacts of the proposed project(s) (including cumulative and indirect impacts). Such an evaluation is necessary to understand the potential impacts from temporary, long-term, or cumulative degradation of air quality.

We further recommend the EA describe and estimate air emissions from potential construction and maintenance activities, as well as proposed mitigation measures to minimize those emissions. EPA recommends an evaluation of the following measures to reduce emissions of criteria air pollutants and hazardous air pollutants (air toxics).

## **Recommendations:**

Existing Conditions – We recommend the EA provide a detailed discussion of ambient air conditions, National Ambient Air Quality Standards, and criteria pollutant nonattainment areas in the vicinity of the interstate project (Texas and Louisiana).

Quantify Emissions – We recommend the EA estimate emissions of criteria and hazardous air pollutants (air toxics) from the proposed project and discuss the timeframe for release of these emissions over the lifespan of the project. We recommend the EA describe and estimate emissions from the loading and unloading of petroleum, potential construction activities, as well as proposed mitigation measures to minimize these emissions.

Specify Emission Sources – We recommend the EA specify all emission sources by pollutant from mobile sources (on and off-road vehicles including tankers), stationary sources (including portable and temporary emission units, compressor stations, sewage treatment plants etc.), fugitive/vapor emission sources, area sources, and ground disturbance (e.g., from construction, infrastructure upgrades and pipeline modifications/expansion.) This source specific information should be used to identify appropriate mitigation measures and areas in need of the greatest attention. All required permits for proposed actions should also be identified.

Construction Emissions Mitigation Plan – We recommend the EA include a draft Construction Emissions Mitigation Plan and ultimately adopt this plan in the Record of Decision. In addition to all applicable local, state, or federal requirements, we recommend the following control measures (Fugitive Dust, Mobile and Stationary Source and Administrative) be included in the Construction Emissions Mitigation Plan in order to reduce impacts associated with emissions of particulate matter and other pollutants from construction-related activities. Please see Attachment A.

## **Waters of the United States, including Wetlands**

Section 404 of the Clean Water Act (CWA) regulates the discharge of dredged or fill material into waters of the United States (WOUS), including wetlands and other special aquatic sites. The proposed projects may potentially require the placement of fill in WOUS. The DOE should coordinate with the U.S. Army Corps of Engineers (Corps) to determine if the proposed project requires a Section 404 permit under the CWA.

The EPA recommends that the DOE include a wetland and stream delineation for all potential WOUS, including ephemeral drainages, in accordance with the 1987 *Corps of Engineers Wetlands Delineation Manual* and the December 2010 *Atlantic and Gulf Coast Region*

*Regional Supplement to the Corps of Engineers Wetland Delineation Manual.* A jurisdictional determination from the Corps using the data provided by the delineation report will confirm the presence or absence of WOUS in the project area and help determine whether or not the proposed project would require a Section 404 permit.

If a permit is required, the EPA will review the project for compliance with *Federal Guidelines for Specification of Disposal Sites for Dredged or Fill Materials* (40 CFR 230), promulgated pursuant to Section 404(b)(1) of the CWA. Pursuant to 40 CFR 230, any permitted discharge into WOUS must be the least environmentally damaging practicable alternative available to achieve the project purpose. We recommend the EA includes an evaluation of the project alternatives in this context in order to demonstrate the project's compliance with the 404(b)(1) Guidelines. If, under the proposed project, dredged or fill material would be discharged into WOUS, we recommend the EA discuss alternatives to avoid and minimize those discharges.

Finally, the EPA recommends that the DOE include a wetland compensatory mitigation plan that would compensate for unavoidable impacts to aquatic resources in the EA for review and comment by EPA, the Corps, and other interested agencies and stakeholders. The mitigation plan should be included in the EA along with the applicant's alternatives analysis and any additional information relevant to potential impacts to wetlands and other aquatic resources. This would ensure that the EA has sufficient information to demonstrate whether potential adverse impacts to WOUS would occur.

**Recommendation:**

The EPA asks that the DOE consult with the Corps to determine the extent of jurisdictional wetlands and other WOUS present at the project site. We recommend the EA includes the results of the jurisdictional determination for the project site and address any other relevant requirements pursuant to the CWA Section 404(b)(1), including the requirements to consider less damaging practicable alternatives for any discharges of dredged or fill material into WOUS, to avoid and minimize impacts to aquatic habitats due to discharges of dredge and fill material, and to provide compensatory mitigation for all unavoidable impacts to WOUS.



## Attachment A

- *Construction Emissions Mitigation Plan* – we recommend the following control measures be included (**as applicable and practicable**) in the Construction Emissions Mitigation Plan in order to reduce impacts associated with emissions of particulate matter and other pollutants from construction-related activities:
  - Fugitive Dust Source Controls: We recommend that the plan include these general commitments:
    - Stabilize heavily used unpaved construction roads with a non-toxic soil stabilizer or soil weighting agent that will not result in loss of vegetation, or increase other environmental impacts.
    - During grading, use water, as necessary, on disturbed areas in construction sites to control visible plumes.
    - Vehicle Speed
      - Limit speeds to 25 miles per hour on stabilized unpaved roads as long as such speeds do not create visible dust emissions.
      - Limit speeds to 10 miles per hour or less on unpaved areas within construction sites on un-stabilized (and unpaved) roads.
      - Post visible speed limit signs at construction site entrances.
    - Inspect and wash construction equipment vehicle tires, as necessary, so they are free of dirt before entering paved roadways, if applicable.
    - Provide gravel ramps of at least 20 feet in length at tire washing/cleaning stations, and ensure construction vehicles exit construction sites through treated entrance roadways, unless an alternative route has been approved by appropriate lead agencies, if applicable.
    - Use sandbags or equivalent effective measures to prevent run-off to roadways in construction areas adjacent to paved roadways. Ensure consistency with the project's Storm Water Pollution Prevention Plan, if such a plan is required for the project.
    - Sweep the first 500 feet of paved roads exiting construction sites, other unpaved roads en route from the construction site, or construction staging areas whenever dirt or runoff from construction activity is visible on paved roads, or at least twice daily (less during periods of precipitation).
    - Stabilize disturbed soils (after active construction activities are completed) with a non-toxic soil stabilizer, soil weighting agent, or other approved soil stabilizing method.
    - Cover or treat soil storage piles with appropriate dust suppressant compounds and disturbed areas that remain inactive for longer than 10 days. Provide vehicles (used to transport solid bulk material on public roadways and that have potential to cause visible emissions) with covers.

Alternatively, sufficiently wet and load materials onto the trucks in a manner to provide at least one foot of freeboard.

- Use wind erosion control techniques (such as windbreaks, water, chemical dust suppressants, and/or vegetation) where soils are disturbed in construction, access and maintenance routes, and materials stock pile areas. Keep related windbreaks in place until the soil is stabilized or permanently covered with vegetation.
- 
- Mobile and Stationary Source Controls:
    - Plan construction scheduling to minimize vehicle trips.
    - Limit idling of heavy equipment to less than 5 minutes and verify through unscheduled inspections.
- 
- Administrative controls:
    - Develop a construction traffic and parking management plan that maintains traffic flow and plan construction to minimize vehicle trips.
    - Identify any sensitive receptors in the project area, such as children, elderly, and the infirm, and specify the means by which impacts to these populations will be minimized (e.g. locate construction equipment and staging zones away from sensitive receptors and building air intakes).
    - Include provisions for monitoring fugitive dust in the fugitive dust control plan and initiate increased mitigation measures to abate any visible dust plumes.

## Katie Watson

---

**From:** Auger, Jennifer  
**Sent:** Tuesday, December 19, 2017 10:21 AM  
**To:** mitchell.mouton@la.usda.gov  
**Cc:** Reese, Stephen; Sevcik, Bob  
**Subject:** Strategic Petroleum Reserve - Environmental Assessment - Life Extension 2 Project

Good Morning Mitchell,

Based on the initial analysis of the Life Extension 2 projects no impact to prime farmland is anticipated. If you need additional information before the draft EA is available for agency review please let Stephen Reese or myself know.

Best Regards,  
Jennifer Auger

---

Jennifer M. Auger, MAS | [Fluor Federal Petroleum Operations, LLC](#) | Program Manager Environmental Management System  
*Contractor to the U. S. Department of Energy SPR* | [jennifer.auger@spr.doe.gov](mailto:jennifer.auger@spr.doe.gov)  
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**From:** Mouton, Mitchell - NRCS, ALEXANDRIA, LA [<mailto:mitchell.mouton@la.usda.gov>]  
**Sent:** Tuesday, November 28, 2017 11:00 AM  
**To:** Reese, Stephen <[Stephen.Reese@SPR.DOE.GOV](mailto:Stephen.Reese@SPR.DOE.GOV)>  
**Subject:** RE: Strategic Petroleum Reserve - Environmental Assessment - Life Extension 2 Project

Stephen,

This is a follow-up email to the one below. Thanksgiving may have hindered your response.

Best Regards,

Mitchell

**From:** Mouton, Mitchell - NRCS, ALEXANDRIA, LA  
**Sent:** Tuesday, November 14, 2017 8:35 AM  
**To:** 'stephen.reese@spr.doe.gov' <[stephen.reese@spr.doe.gov](mailto:stephen.reese@spr.doe.gov)>  
**Subject:** Strategic Petroleum Reserve - Environmental Assessment - Life Extension 2 Project

Stephen,

This email is in regards to the letter that Mr. William Gibson, Jr. mailed to our agency on November 2<sup>nd</sup>. You were listed as a contact person. From our agency standpoint we look at Federal Projects to determine if they will potentially impact prime farmland as defined by the Farmland Policy Protection Act (FPPA) and if the projects will potentially impact NRCS projects in the vicinity. I am reviewing the

actions to be analyzed in the EA. Will any of those actions require acquisition of new land or conversion of land ( ex. new permanent road), that could potentially be prime farmland?

Thanks,

**Mitchell Mouton**

Assistant State Soil Scientist

USDA-NRCS Soils Section

3737 Government Street

Alexandria, LA 71302

Work (318) 473-7789

Email: [mitchell.mouton@la.usda.gov](mailto:mitchell.mouton@la.usda.gov)

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## Katie Watson

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**From:** Reese, Stephen  
**Sent:** Thursday, December 21, 2017 8:05 AM  
**To:** Auger, Jennifer  
**Subject:** FW: Strategic Petroleum Reserve Project - Bryan Mound and Big Hill

Sent from my Windows 10 phone

---

**From:** [Villarreal, Carlos - NRCS, Temple, TX](#)  
**Sent:** Thursday, December 21, 2017 7:03 AM  
**To:** [Reese, Stephen](#)  
**Subject:** Strategic Petroleum Reserve Project - Bryan Mound and Big Hill

Mr. Stephen Reese,

I have review the missive concerning the Environmental Assessment review for the Proposed Petroleum Reserve Project; however, I do not have the addresses for the proposed sites. The document I received includes a list of proposed activities but does not include where they will occur. If I have overlooked this information, please let me know.

Best Regards,

Carlos J. Villarreal  
Soil Scientist  
Natural Resources Conservation Service  
United States Department of Agriculture  
o. 254.742.9836  
c. 254.316.1458

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## **Appendix B**

Applicable work package descriptions from the Life Extension 2 Conceptual  
Design Report Volumes 1-VIII

**BC-MM-1360**

**Upgrade BC North-South Bridge and Roadway**

**VCI Project Engineer: Jason McCrossen**

**Recommended Alternative:**

***Replace existing Bailey Bridge with new higher capacity Bailey Bridge; Replace North-South Bridge with concrete box culvert roadway; Replace East-West Bridge with concrete box culvert roadway***

**Analysis of Alternatives  
Life Extension 2  
US Department of Energy  
Strategic Petroleum Reserve**

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## I. PROJECT CONCEPT

### Mission Need

Improve the North-South Bridge and roadway to allow workover rigs to access caverns BC-19 and BC-101. This project is to maintain the same level of security as exists now. In addition, to meet mission need, the East-West Bridge and Bailey Bridge will also be evaluated to be enhanced and/or replaced. In addition, upgrade the Brine Disposal Roadway Bridge and culvert.

### Functional Requirements

The access road and bridge have multiple problems in terms of width and load bearing capacity. This necessitates that the well pads be accessed via adjacent property owners, a situation that can give rise to conflicts and restrict access. This roadway improvement task would ensure immediate, site controlled access to the well pads. It is absolutely imperative that the well pads be accessible from within the site and by vehicles the size of work-over rigs (~100,000 lbs).

## II. PROCESS

### Alternatives Analysis Plan

The complete Analysis of Alternatives (AoA) Process Plan for selection of the preferred alternative has been standardized for all AoA's and is detailed in Volume 1 of this Conceptual Design Report.

### Alternative Analysis Team Members

#### Core Team Members

Claudia Carrol	DOE, Systems Engineer
Jason McCrossen	VCI, Project Engineer
Marc Gross	FFPO, Manger Design Engineering

#### Team Members

Zack Bergeron	VCI, Civil Engineer
Cory Jacob	VCI, Civil Designer
John Walker	VCI, Mechanical Engineer
Don Helms	VCI, Mechanical Designer
Russ Romero	FFPO, Site Director
Kevin Williams	FFPO, Sr. Site Engineer
Mark Blouin	FFPO, Manager Site Construction

## III. SELECTION CRITERIA

The AoA Team determined the below listed criteria as relevant to the Analysis of Alternatives. Once alternatives are analyzed by the AoA Team, these criteria are used to evaluate and select a recommended preferred alternative.

### Ease of Operations

The selected alternative when implemented will result in a system that is able to be operated without significant additional training and is similar to existing systems and equipment.

Weight: Most Important

### **Ease of Maintenance**

The selected alternative is similar in nature to existing equipment resulting in commonality of similar systems for future maintenance and sparing consideration.

Weight: Most Important

### **Safety During Construction**

The selected alternative when implemented will be able to be constructed safely and operated safely. Ability to address Safety and Security concerns during implementation.

Weight: Most Important

### **Security During Construction**

The selected alternative when implemented will be able to be constructed with minimal to zero impacts to Site Security detection systems.

Weight: Most Important

### **Sustainability**

The selected alternative when implemented will be able to achieve DOE Sustainability goals for energy consumption as outlined in the Strategic Sustainability Performance Plan. Design could call for 50-year life vs 25-year life and the potential for green material.

Weight: Important

### **Constructability During On-Going Oil Deliveries**

The selected alternative is able to be implemented with little or no impact to on-going oil delivery operations.

Weight: Less Important

## **IV. ALTERNATIVES IDENTIFICATION**

### **List of Alternatives**

The below listed alternatives are considered for analysis. Initial screenings conducted by the AoA Team determine the viability of each alternative.

#### **A. Status Quo**

If the site roadway is not improved SPR access to its caverns for maintenance will depend upon the goodwill of the abutting property owners.

This alternative has been eliminated because it does not meet the Mission Needs of full access to the caverns well pads via the North-South and East-West bridges.

Viability: No Further Analysis

#### **B. Replace existing Bailey Bridge with new higher capacity Bailey Bridge; Replace North-South Bridge with Wider and Higher Capacity Bridge; Replace East-West Bridge with Higher Capacity Bridge.**

Remove existing Bailey Bridge and replace with a higher capacity Bailey Bridge.

Reconstruct the existing Bailey Bridge adjacent to the North-South Bridge for temporary access. Remove the existing North-South bridge and replace with a wider, larger capacity bridge that provides access for the work over rig for a 25-year period. This will include a wider road, one that is suitable for the work over rig turning radius.

Use temporary access from Hwy 1148 and demolish existing East-West Bridge. Replace with a higher capacity bridge.

Viability: Continue Analysis

**C. Replace existing Bailey Bridge with new higher capacity Bailey Bridge; Replace North-South Bridge with concrete box culvert roadway; Replace East-West Bridge with concrete box culvert roadway.**

Remove existing Bailey Bridge and replace with a higher capacity Bailey Bridge.

Reconstruct the existing Bailey Bridge adjacent to the North-South Bridge for temporary access. Remove the existing North-South Bridge and replace with a wider concrete box culvert roadway that provide access for the work over rig for a 25-year period. This will include a wider road, one that is suitable for the work over rig turning radius.

Use temporary access from Hwy 1148 and demolish existing East-West Bridge leaving only the bridge supports for the pipe rack. Replace with concrete box culvert roadway and bank erosion protection.

Viability: Continue Analysis

**D. Retro Fit East-West Bridge to Accommodate Work Over Rig**

Replace pipe rack with independent support; then demo the E/W bridge & fix bank erosion; construct new all concrete Waskey Bridge with concrete piles to support workover rig loading. Add temporary bridge on Hwy 1148 for Cavern 102 access only if necessary.

This alternative has been eliminated due to the additional maintenance and inspection required of a bridge.

Viability: No Further Analysis

**E. Increase Bailey Bridge Capacity by Adding Supports/Replace Bailey Bridge with Higher Capacity Bridge**

The existing bridge can be strengthened by adding additional supports. Issue is the wooden structure below the Bailey Bridge. Investigation will have to be done to determine if the Bailey Bridge is resting on the wooden structure below or if during deflection, the bridge is in contact with the structure. This would be a very cost effective method if the wooden structure is not an issue. Remove existing Bailey Bridge and remove wooden structure. Replace with a higher capacity Bailey Bridge and enhance roadway leading up to bridge. Would temporarily shut down access to Brine Disposal Wells (BDW) from BC site.

This alternative has been eliminated due to the need to remove the existing Bailey Bridge and then the need to enhance and then reinstall. It is more economical to install a new higher capacity bridge that meets the Mission Need.

Viability: No Further Analysis

## V. ALTERNATIVES ANALYSIS

Based on initial analysis of the alternatives, alternatives A, D, and E are eliminated from further consideration. The remaining alternatives, B and C are examined below as alternatives A and B, respectively.

The below analyses provide the research and technical information gathered by the AoA Team. These analyses are not evaluative or comparative.

**A. Replace existing Bailey Bridge with new higher capacity Bailey Bridge; Replace North-South Bridge with Wider and Higher Capacity Bridge; Replace East-West Bridge with Higher Capacity Bridge.**

Remove existing Bailey Bridge and replace with a higher capacity Bailey Bridge.

Reconstruct the existing Bailey Bridge adjacent to the North-South Bridge for temporary access. Remove the existing North-South bridge and replace with a wider, larger capacity bridge that provides access for the work over rig for a 25-year period. This will include a wider road, one that is suitable for the work over rig turning radius.

Use temporary access from Hwy 1148 and demolish existing East-West Bridge. Replace with a higher capacity bridge.

**Assumptions & Constraints**

With the construction of the Bailey Bridge in advance, there is no loss of access to the wells. This alternative will not interfere with site operations and pose minimal security threat. In addition, this will allow for less traveling distance for the work-over rig, saving fuel, time, and money and providing for a safer work environment. Temporary access via private property would have to be obtained until work is completed.

**Benefits & Effectiveness**

This alternative would eliminate the need to use private property to access caverns BC-19 and BC-101 and BC-102.

**Risk & Mitigation Factors**

There are associated risks with this alternative which are summarized in the table below. The table describes the likelihood of occurrence at the site, along with how great of an impact the event would cause if it were to occur.

<b>Risk and Mitigation Strategies for Larger and Wider Road with Concrete Box Culverts In-Lieu of a Bridge</b>			
<b>Risks</b>	<b>Mitigation Strategy</b>	<b>Likelihood – Impact</b>	<b>Risk Code</b>
Would require a period of time that the workover rig cannot access caverns.	Determine an acceptable period of time that direct access can be restricted. Access is available via alternative routes.	High – Low	Low Risk Hazard
Security fence removal at North-South Bridge.	Temporary fence with card reader will be installed during construction.	Low – High	Low Risk Hazard

**B. Replace existing Bailey Bridge with new higher capacity Bailey Bridge;  
Replace North-South Bridge with concrete box culvert roadway; Replace East-West Bridge with concrete box culvert roadway.**

Remove existing Bailey Bridge and replace with a higher capacity Bailey Bridge.

Reconstruct the existing Bailey Bridge adjacent to the North-South Bridge for temporary access. Remove the existing North-South bridge and replace with a wider concrete box culvert roadway that provide access for the work over rig for a 25-year period. This will include a wider road, one that is suitable for the work over rig turning radius.

Use temporary access from Hwy 1148 and demolish existing East-West Bridge leaving only the bridge supports for the pipe rack. Replace with concrete box culvert roadway and bank erosion protection.

**Assumptions & Constraints**

With the construction of the Bailey Bridge in advance, there is no loss of access to the wells. No inspections required for a roadway as with a bridge. This alternative will not interfere with site operations and pose minimal security threat. In addition, this will allow for less traveling distance for the work-over rig, saving fuel, time, and money and providing for a safer work environment. Temporary access via private property would have to be obtained until work is completed.

**Benefits & Effectiveness**

This alternative would eliminate the North-South and East-West bridge that would need upkeep, and would provide a pipe rack independent from any other structure. It would also assure access for workover rigs to caverns BC-19 and BC-101 while providing a 25-year solution.

**Risk & Mitigation Factors**

There are associated risks with this alternative which are summarized in the table below. The table describes the likelihood of occurrence at the site, along with how great of an impact the event would cause if it were to occur.

<b>Risk and Mitigation Strategies for Replace East/West Bridge with a Culvert Roadway</b>			
<b>Risks</b>	<b>Mitigation Strategy</b>	<b>Likelihood – Impact</b>	<b>Risk Code</b>
Replacing pipe racks may damage existing pipes crossing bridge.	Place temporary pipe supports before removing existing pipe rack.	Low – High	Low Risk Hazard
Would require a period of time that the workover rig cannot access caverns.	Determine an acceptable period of time that direct access can be restricted. Access is available via alternative routes.	High – Low	Low Risk Hazard
Security fence removal at North-South Bridge.	Temporary fence with card reader will be installed during construction.	Low – High	Low Risk Hazard

## VI. ALTERNATIVE SELECTION

### List of Alternatives – Studied Alternatives

- A. Replace existing Bailey Bridge with new higher capacity Bailey Bridge; Replace North-South Bridge with Wider and Higher Capacity Bridge; Replace East-West Bridge with Higher Capacity Bridge.

Remove existing Bailey Bridge and replace with a higher capacity Bailey Bridge.

Reconstruct the existing Bailey Bridge adjacent to the North-South Bridge for temporary access. Remove the existing North-South bridge and replace with a wider, larger capacity bridge that provides access for the work over rig for a 25-year period. This will include a wider road, one that is suitable for the work over rig turning radius.

Use temporary access from Hwy 1148 and demolish existing East-West Bridge. Replace with a higher capacity bridge.

- B. Replace existing Bailey Bridge with new higher capacity Bailey Bridge; Replace North-South Bridge with concrete box culvert roadway; Replace East-West Bridge with concrete box culvert roadway.

Remove existing Bailey Bridge and replace with a higher capacity Bailey Bridge.

Reconstruct the existing Bailey Bridge adjacent to the North-South Bridge for temporary access. Remove the existing North-South bridge and replace with a wider concrete box culvert roadway that provide access for the work over rig for a 25-year period. This will include a wider road, one that is suitable for the work over rig turning radius.

Use temporary access from Hwy 1148 and demolish existing East-West Bridge leaving only the bridge supports for the pipe rack. Replace with concrete box culvert roadway and bank erosion protection.

### Comparison of Alternatives

Core Team Member Ratings:

	Ease of Operations	Ease of Maintenance	Safety During Construction	Security During Construction	Sustainability	Constructability During Ongoing Oil Deliveries
	<i>Most Important</i>	<i>Most Important</i>	<i>Most Important</i>	<i>Most Important</i>	<i>Important</i>	<i>Less Important</i>
<b>Alternative A</b>	<i>Adequate</i>	<i>Adequate</i>	<i>Good</i>	<i>Good</i>	<i>Adequate</i>	<i>Excellent</i>
	<i>Good</i>	<i>Adequate</i>	<i>Good</i>	<i>Good</i>	<i>Adequate</i>	<i>Excellent</i>
	<i>Excellent</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Excellent</i>	<i>Excellent</i>
<b>Alternative B</b>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Excellent</i>
	<i>Good</i>	<i>Excellent</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Excellent</i>
	<i>Excellent</i>	<i>Excellent</i>	<i>Good</i>	<i>Good</i>	<i>Excellent</i>	<i>Excellent</i>

**WH-MM-693**

**Marine Service Center**

**VCI Project Engineer: Jason McCrossen**

**Recommended Alternative:**  
***Construct Marine Services Center***

**Analysis of Alternatives  
Life Extension 2  
US Department of Energy  
Strategic Petroleum Reserve**

## I. PROJECT CONCEPT

### Mission Need

The marine boats used at the West Hackberry (WH) site are critical for the maintenance and operations of all the crude oil pipelines being used at the WH site. In addition, the boats are also critical for any water side work required at the Raw Water Intake Structure. This task will construct a marine service center for the site's work boats. The location of the center will be adjacent to the West Hackberry SPR boat slip near the northwest corner of the site. It will install a covered boat slip with hoist to raise the site's work boats out of the water while not in use.

### Functional Requirements

The purpose of the marine service center is to raise the work boats out of the water to facilitate and reduce their maintenance. It will also allow for quick deployment of the boats in emergencies since the boats will no longer be trailered. In addition, the Marine Service Center will have fuel tanks for filling boats and oil boom deployment spools for quicker spill response.

## II. PROCESS

### Alternatives Analysis Plan

The complete Analysis of Alternatives (AoA) Process Plan for selection of the preferred alternative has been standardized for all AoA's and is detailed in Volume 1 of this Conceptual Design Report.

### Alternative Analysis Team Members

#### Core Team Members

Claudia Carroll	DOE, Systems Engineer
Jason McCrossen	VCI, Project Engineer
Marc Gross	FFPO, Manger Design Engineering

#### Team Members

Ashley Thomas	DOE, Site Lead General Engineer
Zack Bergeron	VCI, Civil Engineer
Cory Jacob	VCI, Civil Designer
John Walker	VCI, Mechanical Engineer
Don Helms	VCI, Mechanical Designer
Timothy Croxdale	FFPO, Director of Site
Robert Bowles	FFPO, Manager Site Construction
Justin Rye	FFPO, Site Construction Maintenance Engineer
Steve Sleeman	FFPO, Sr Site Maintenance Engineer
Kenneth Swanson	FFPO, Manager Site Operations

## III. SELECTION CRITERIA

The AoA Team determined the below listed criteria as relevant to the Analysis of Alternatives. Once alternatives are analyzed by the AoA Team, these criteria are used to evaluate and select a recommended preferred alternative.

### Ease of Operations

The selected alternative when implemented will result in a system that is able to be operated without significant additional training and is similar to existing systems and equipment.

Weight: Most Important



### **Ease of Maintenance**

The selected alternative is similar in nature to existing equipment resulting in commonality of similar systems for future maintenance and sparing consideration.

Weight: Most Important

### **Safety During Construction**

The selected alternative when implemented will be able to be constructed safely and operated safely. Ability to address Safety and Security concerns during implementation.

Weight: Most Important

### **Security During Construction**

The selected alternative when implemented will be able to be constructed with minimal to zero impacts to Site Security detection systems.

Weight: Most Important

### **Sustainability**

The selected alternative when implemented will be able to achieve DOE Sustainability goals for energy consumption as outlined in the Strategic Sustainability Performance Plan.

Weight: Important

### **Constructability During On-Going Oil Deliveries**

The selected alternative is able to be implemented with little or no impact to on-going oil delivery operations.

Weight: Less Important

## **IV. ALTERNATIVES IDENTIFICATION**

### **List of Alternatives**

The below listed alternatives are considered for analysis. Initial screenings conducted by the AoA Team determine the viability of each alternative.

#### **A. Status Quo**

If this work is not implemented, equipment maintenance cost will not be reduced and deployment time will remain unchanged.

This alternative has been screened out due to the functional requirement to continuously maintain pipeline and valves. In addition, it is imperative the site have emergency access to spills which may occur. With the boats in a ready state 24/7, response times can be greatly reduced.

Viability: No Further Analysis

#### **B. Construct Marine Services Center over Water**

Construct Marine Service Center over water to raise the work boats out of the water to facilitate and reduce its maintenance. It will also allow quick deployment of the boats in emergencies since the boats will no longer be trailered. This facility will contain fuel tanks for refueling and a reel for deploying boom in the event of a spill. This Marine Service Center will house 3 DOE boats and be approximately 5000 sq.ft.

Viability: Continue Analysis

### **C. Construct Marine Services Center on Land**

Construct Marine Service Center near the water with quick boat access to the water. This will provide a place to perform maintenance and keep boats protected from the weather. This facility will be inside the security where the boats are currently stored. This facility will contain fuel tanks for refueling and a reel for deploying boom in the event of a spill. This Marine Service Center will house 3 DOE boats and be approximately 5000 sq.ft.

Viability: Continue Analysis

## **V. ALTERNATIVES ANALYSIS**

Based on initial analysis of the alternatives, alternatives A is eliminated from further consideration. The remaining alternatives, B and C are examined below as alternatives A and B, respectively.

The below analyses provide the research and technical information gathered by the AoA Team. These analyses are not evaluative or comparative.

## A. Construct Marine Services Center over Water

Construct Marine Service Center over water to raise the work boats out of the water to facilitate and reduce maintenance required on the boats. It will also allow quick deployment and ease of operation of the boats in emergencies since the boats will no longer be trailered. This will increase safety of operating due to less work involving launching boats. This facility will contain fuel tanks for refueling and a reel for deploying boom in the event of a spill. This Marine Service Center will house 3 DOE boats and be approximately 5000 sq.ft.

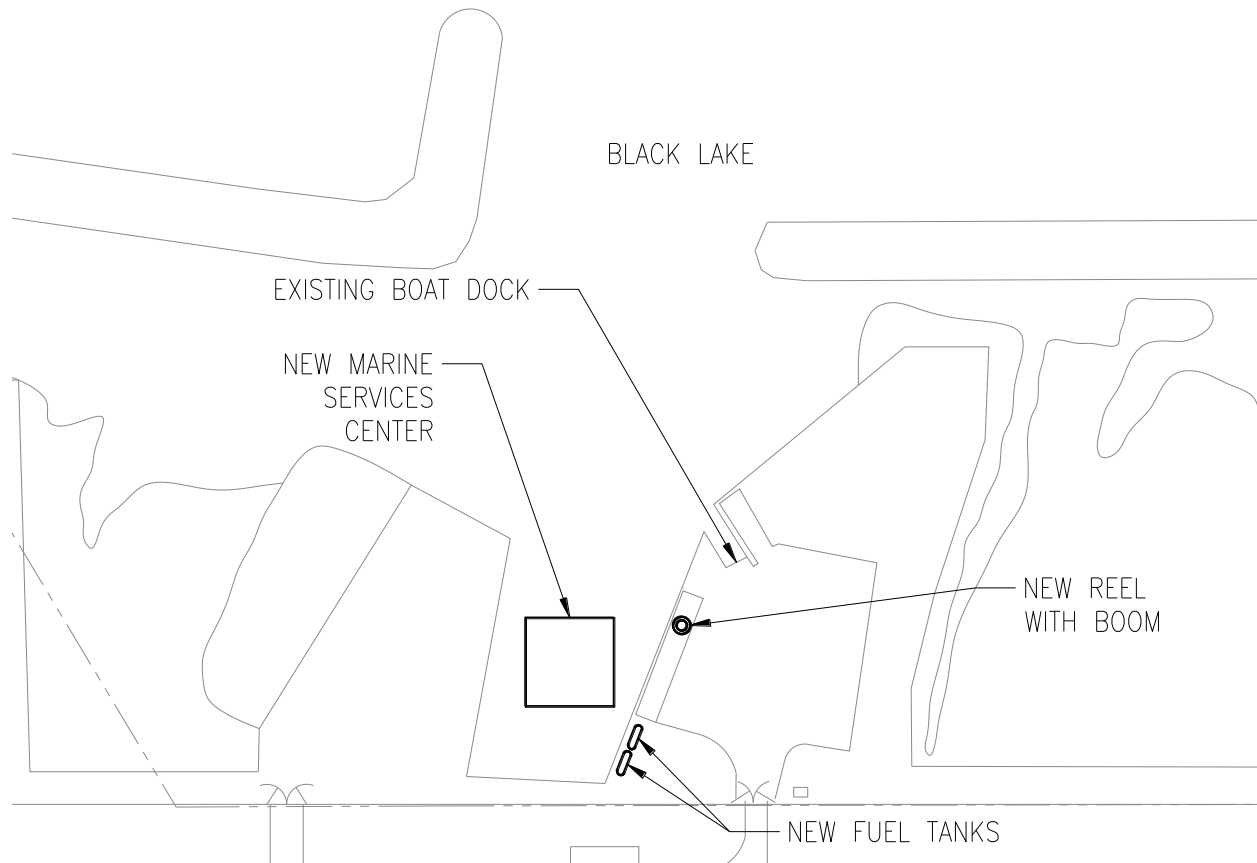


Figure 1 – New Marine Service Center Over Water

### Assumptions & Constraints

#### Assumptions:

Marine Service Center over water will allow for faster and safer deployment to the remote valve stations, intake structure, and potential spill response. It also reduces the amount of fuel consumed by trailering boats to and from the Ellender Bridge for deployment. Construction of the Marine Service Center will not inhibit any site operations as this facility will be located offsite outside the security perimeter.

#### Constraints:

One potential constraint is refueling boats over water and having the Service Center outside of security. Security during construction could impact existing security perimeter if contract workers are accessing the construction site from inside the SPR site. This constraint is only during construction and the threat level after construction is very low.

**Benefits & Effectiveness**

This alternative will provide a covered enclosure to protect the work boats from the elements and to prevent premature degradation. Having the Marine Service Center located on the water making it a convenient location for the deployment of the work boats. Spill response and response time to Raw Water Intake Structure will be significantly reduced.

**Risk & Mitigation Factors**

There are associated risks with the alternative which are summarized in the table below. The table describes the likelihood of occurrence at the site, along with how great of an impact the event would cause if it were to occur.

<b>Risk and Mitigation Strategies for Construct Marine Services Center</b>			
<b>Risks</b>	<b>Mitigation Strategy</b>	<b>Likelihood – Impact</b>	<b>Risk Code</b>
Marine service center will not be within security gate.	Security will have to monitor service center as an outside asset.	Low – Low	Low Risk Hazard

## B. Construct Marine Services Center On Land

Construct Marine Service Center near the water with quick boat access to the water. This will provide a place to perform maintenance and keep boats protected from the weather. This facility will be inside the security where the boats are currently stored. This facility will contain fuel tanks for refueling and a reel for deploying boom in the event of a spill. This Marine Service Center will house 3 DOE boats and be approximately 5000 sq.ft.

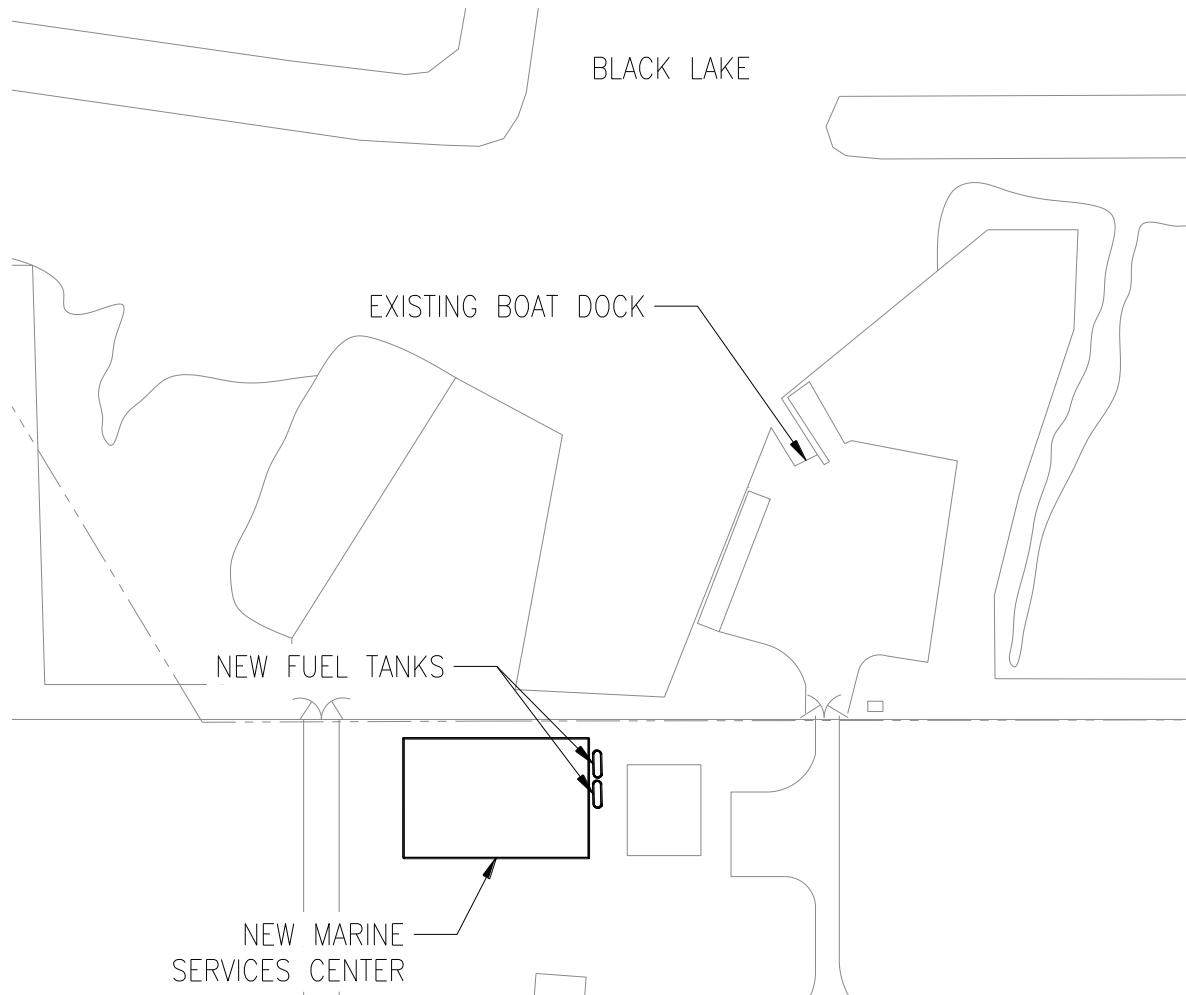


Figure 2 – New Marine Service Center On Land

### Assumptions & Constraints

#### Assumptions:

Marine Service Center on land will provide cover for the site boats and fueling tanks and boom reels for deploying boom during a spill. Construction of the Marine Service Center will not inhibit any site operations as this facility will be located inside the security perimeter, but away from major site activities.

#### Constraints:

Boats will still need to be launched every time increasing time and increasing the risk of injury.

### Benefits & Effectiveness

This alternative will provide a covered enclosure to protect the work boats from the elements and to prevent premature degradation.

**Risk & Mitigation Factors**

There are associated risks with the alternative which are summarized in the table below. The table describes the likelihood of occurrence at the site, along with how great of an impact the event would cause if it were to occur.

<b>Risk and Mitigation Strategies for Construct Marine Services Center on Land</b>			
<b>Risks</b>	<b>Mitigation Strategy</b>	<b>Likelihood – Impact</b>	<b>Risk Code</b>
Response time will be longer due to location.	Acceptable response times will have to be evaluated.	High – Low	Low Risk Hazard

## VI. ALTERNATIVE SELECTION

### List of Alternatives – Studied Alternatives

#### A. Construct Marine Services Center

Construct Marine Service Center over water to raise the work boats out of the water to facilitate and reduce its maintenance. It will also allow quick deployment of the boats in emergencies since the boats will no longer be trailered. This facility will contain fuel tanks for refueling and a reel for deploying boom in the event of a spill.

#### B. Construct Marine Services Center on Land

Construct Marine Service Center near the water with quick boat access to the water. This will provide a place to perform maintenance and keep boats protected from the weather. This facility will be inside the security where the boats are currently stored. This facility will contain fuel tanks for refueling and a reel for deploying boom in the event of a spill.

### Comparison of Alternatives

Core Team Member Ratings:

	Ease of Operations	Ease of Maintenance	Safety During Construction	Security During Construction	Sustainability	Constructability During Ongoing Oil Deliveries
	<i>Most Important</i>	<i>Most Important</i>	<i>Most Important</i>	<i>Most Important</i>	<i>Important</i>	<i>Less Important</i>
<b>Alternative A</b>	<i>Excellent</i>	<i>Good</i>	<i>Good</i>	<i>Marginal</i>	<i>Good</i>	<i>Excellent</i>
	<i>Excellent</i>	<i>Good</i>	<i>Good</i>	<i>Marginal</i>	<i>Good</i>	<i>Excellent</i>
	<i>Excellent</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Excellent</i>
<b>Alternative B</b>	<i>Adequate</i>	<i>Good</i>	<i>Good</i>	<i>Excellent</i>	<i>Adequate</i>	<i>Excellent</i>
	<i>Adequate</i>	<i>Good</i>	<i>Good</i>	<i>Excellent</i>	<i>Adequate</i>	<i>Excellent</i>
	<i>Good</i>	<i>Excellent</i>	<i>Good</i>	<i>Excellent</i>	<i>Good</i>	<i>Excellent</i>

**WH-MM-1025**

**WH Replace the 42-Inch Pigging Water Underground  
Pipeline**

**VCI Project Engineer: Bill Fogle**

**Recommended Alternative:**

***Settlement Pond***

**Analysis of Alternatives  
Life Extension 2  
US Department of Energy  
Strategic Petroleum Reserve**



Ken Swanson

FFPO, Manger Site Operations

### III. SELECTION CRITERIA

The AoA Team determined the below listed criteria as relevant to the Analysis of Alternatives. Once alternatives are analyzed by the AoA Team, these criteria are used to evaluate and select a recommended preferred alternative.

#### **Constructability during On-going Oil Deliveries**

The selected alternative is able to be implemented with little or no impact to on-going oil delivery operations. Settlement Pond plus Piping option must preserve or enhance drawdown readiness.

Weight: Most Important

#### **Safety during Construction**

The selected alternative when implemented will be able to be constructed safely and operated safely. Ability to address Safety and Security concerns during implementation.

Weight: Most Important

#### **Ease of Operations**

The selected alternative when implemented will result in a system that is able to be operated without significant additional training and is similar to existing systems and equipment. Settlement Pond Plus Piping option must ensure that Raw Water Injection Pipeline (RWIP) capacity must be met or exceeded.

Weight: Most Important

#### **Ease of Maintenance**

The selected alternative is similar in nature to existing equipment resulting in commonality of similar systems for future maintenance and sparing consideration. Settlement Pond Plus Piping option compatible with service requirements to meet or exceed the 25-year life of LE 2.

Weight: Important

#### **Sustainability**

The selected alternative when implemented will be able to achieve DOE Sustainability goals for energy consumption as outlined in the Strategic Sustainability Performance Plan.

Weight: Less Important

### IV. ALTERNATIVES IDENTIFICATION

#### **List of Alternatives**

The below listed alternatives are considered for analysis. Initial screenings conducted by the AoA Team determine the viability of each alternative.

#### **A. Status Quo**

The Status Quo Option will still allow the contaminated raw water from pipeline pigging operations to continue to be disposed into site oil storage caverns causing undesirable collateral leaching that compromises cavern operability. The system is presently configured to bypass the Raw Water Injection Pumps during pigging and directly flow into the storage caverns. This will lead to higher maintenance and labor costs. The current flow is also limited to 25 thousand barrels per day (MBD) (730 gallons per minute (GPM)) and is unreliable for service. This option does not provide the operational assurance of the Pipeline

to maintain the required Level 1 drawdown rate, and therefore, does not meet the functional requirement of this project.

Viability: No Further Analysis

**B. Replace Entire 2500 ft 42-inch Piping Using Cement Lined Welded Carbon Steel Pipe and Abandon Old Line**

Replacing the entire 2500 ft of piping using cement lined welded carbon steel pipe (CS) and abandon old line allows for continuing current operations but is not desirable, since this option will still allow the contaminated raw water used to pig the RWIS pipeline to continue to be disposed of into storage caverns causing undesirable collateral leaching that compromises cavern operability or similar. The system is presently configured to bypass the brine disposal tanks during pigging and directly flow into the storage caverns. The tanks are not susceptible to contamination by pigging water. This will lead to higher maintenance and labor costs.

Moreover, the selected material of CS is affected by external corrosion, biological growth internally, and is not chemically resistant. In addition, CS costs more for capital and maintenance. Truss support structures may be needed which will create additional overhead obstruction if an above ground piping layout is selected. If a CS pipe installed belowground option is selected, this would also need to be cathodically protected against external corrosion.

Hence, this option does not meet the functional requirement of this project to assure a method of cleaning the raw water pipeline while not compromising the brine system or injecting excessive quantities of raw water into the Site storage caverns, as required by the site.

Viability: No Further Analysis

**C. Replace Entire Piping Section with 2500 ft HDPE Pipe Using Existing Piping Section as a Casing**

While selection of HDPE as a suitable material based upon the service pressure and temperatures may be a good fit, there are other constructability issues. The geometry of the existing 42-inch piping will require excavating & removing the 42-inch fittings and fusing or welding the new piping in the ground. This option may not be able to meet velocity and delivery pressure numbers, which are being met with other piping options. This option will still permit the pushing of large amounts of fresh/brackish, pigging water to be disposed of into storage caverns causing undesirable collateral leaching that compromises cavern operability.

Viability: No Further Analysis

**D. Replace Corroded Sections In-Place**

Replace corroded sections in place. This is a patchwork approach and will result in additional downtime in the near future. Additionally, this option would still allow the contaminated raw water used to pig the RWIS pipeline to continue to be disposed of into storage caverns causing undesirable collateral leaching that compromises cavern operability. The system is presently configured to bypass the brine disposal tanks during pigging and directly flow into the storage caverns. The tanks are not susceptible to contamination by pigging water. This will lead to higher maintenance and labor costs. Corrosion, tuberculation, or biological growth over the future years will lead to lower flows, and inability to launch a pig at the Raw Water Intake at the required flow rates. This option does not provide the operational assurance of the Pipeline to maintain the required Level 1 drawdown rate.

Viability: No Further Analysis

**E. Replace Entire 2500 ft of 42-inch Piping Section with HDPE Pipe and Abandon Old Line**

The section to be replaced is limited to the remaining 2500 feet of 42-inch pipe. The piping on either end swages up from 24-inch on the inlet and down to 16-inch on the outlet. Therefore, the design of the line will be based upon the flowing velocity. Replacing the 2500 foot 42-inch segment by the installation of a HDPE pipeline segment allows for continuing current operations but is not desirable, since this option will still allow

the contaminated raw water produced from pigging the RWIS pipeline to continue to be disposed of into site oil storage caverns, causing undesirable collateral leaching that compromises cavern operability.

However, cleaning pigs for maintenance would be needed, and the use of ploy pigs or foam pigs is recommended. Also, special considerations are required to be followed for underground lay out of flexible pipe per appropriate code to prevent distortion, collapses and bursts.

Viability: No Further Analysis

#### **F. Settlement Pond**

This option includes demolishing a portion of the existing downstream 42-inch carbon steel pipe, Line# WH-42-RW-10494-A, and replacing the same with 30-inch 150# carbon steel pipe. A 30-inch 150# CS block valve is to be included in this portion of the piping. The new 30-inch pipe will remain above ground just downstream of the new 30-inch block valve and then go underground. A small portion of the underground piping will be carbon steel at which point there will be a transition made with flanges from 150# CS pipe to 30-inch HDPE DR11 pipe. The 30-inch HDPE underground piping will transition back to above ground 150# CS pipe routed to a new 60,000-barrel Settlement Pond. The 30-inch carbon steel pipe will be routed through a pressure reducing device and empty into the new 60,000-barrel Settlement Pond through a diffuser.

The raw water will exit the new settlement pond into the cavern WHC-110 surface drain through four 12-inch outflows. These outflows will exit through the containment area levee as carbon steel piping. Outside the levee, the lines will include a flanged branch connection and a 12-inch 150# isolation valve. The material transition will be made from 150# CS to HDPE immediately after the 12-inch valve.

The settlement pond will be located approximately 650 feet west of the pig launcher/receiver and south of Cavern 110. The pond is intended to contain, for settlement purposes, and release approximately 60,000 barrels of processed raw water. The pond outflows will discharge into the Cavern 110 drainage ditches, located on the east and west sides of the 110 cavern containment levee. The settlement pond will have a concrete floor extending up and over the top of the levee to allow for cleaning of sediment. The geometry of the pond will also include a center structure and a series of spillover weirs to aid in the processing of the pigging water.

The majority of the selected pipe material is HDPE which has all the advantages as described in the above stated HDPE alternative (alternative E). The remainder of the piping will be CS and aboveground. The use of CS is minimal, which can be easily inspected and maintained.

This Option provides the assurance of the operability and maintainability of the pigging line in service to maintain the Level 1 drawdown rate. Also, this option allows meeting the functional requirement of this project to assure a method of cleaning the raw water pipeline while not compromising the brine system or injecting excessive quantities of raw water into the site storage caverns, as required by the site.

Viability: Continue Analysis

#### **G. Purchase Cameron Brine Pipeline and Caverns (Outside to West of WH Site)**

This option involves purchasing Cameron Brine Pipeline and Caverns (Outside to the West of the WH Site). Cameron LNG is currently undergoing a cavern leaching process that utilizes a new brine pipeline. This may not be an immediate solution, based on the leaching operation currently being carried out. This option would not be able to be utilized for ~10-15 years due to the current leaching process.

This option does not provide the assurance of the operability and maintainability of the pigging line in service to maintain the Level 1 drawdown rate, as required by the site. Also, this option does not meet the functional

requirement of this project to assure a method of cleaning the raw water pipeline while not injecting excessive quantities of raw water into the site storage caverns, as required by the site.

Viability: No Further Analysis

## **V. ALTERNATIVES ANALYSIS**

Based on initial analysis of the alternatives, the Options A, B, C, D, E, and G have been eliminated from further consideration. The remaining alternative F is examined below as alternative A.

The below analyses provide the research and technical information gathered by the AoA Team. These analyses are not evaluative or comparative.

## A. Settlement Pond

This alternative would include replacing a portion of the existing 42-inch Carbon Steel pipeline WH-42-RW-10494-A with a tie-in spool which contains a size reduction to 30-inch a branch take-off, to feed to the new pond area and a pair of interlocked control valves. The new 30-inch branch line will remain above ground just downstream of the new 30-inch block valve and then go underground, and run over to the pond area. The pipe will transition from Carbon Steel to DR11 HDPE immediately before going underground and immediately upon emerging on the settlement pond end. The 30-inch Carbon Steel pipe will be routed up to and through a pressure reducing device and eventually to empty into the new 60,000-barrel Settlement Pond via a diffuser.

The Raw Water will exit the new Settlement Pond into the cavern WHC-110 surface drain through four 12-inch outflows. These outflows will exit through the containment area levee as Carbon Steel. Outside the levee, these lines will include a flanged branch connection and a 12-inch 150# isolation valve. The material transition will be made from 150# Carbon Steel to HDPE immediately after the 12-inch valve. The settlement pond located approximately 650 feet west of the pig launcher/receiver and south of Cavern 110. The pond is intended to contain, for settlement purposes, and release approximately 60,000 barrels of processed raw water. The pond outflows will discharge into the Cavern 110 drainage ditches, located on the east and west sides of the 110 cavern containment levee. The settlement pond will have a concrete floor extending up and over the top of the levee, to allow for cleaning of sediment. The geometry of the pond will also include a center structure and a series of spillover weirs to aid in the processing of the pigging water.

### Assumptions & Constraints

- The West Hackberry site is able to launch a pig at the Raw Water Intake at a flow rate of approximately 7000 GPM to 13,700 GPM using one intake pump. The Pigging line must be in a serviceable condition prior to and during a Level I drawdown.
- Provides a permanent solution for cleaning the raw water pipeline while not compromising the brine system or injecting excessive quantities of raw water into the Site storage caverns.
- Required Velocity Standards are followed per DOE Requirements for design of pipelines.
- Required Layout and Installation Standards are followed per DOE Requirements for design of pipelines.
- Design of the new Settlement Pond will treat and release approximately 50,000 barrels + of raw water (from RWIP).
- Required DOE Electrical/Instrument Standards and vendor recommendations are met to avoid and remediate possible MOV Malfunction basis.
- This option assumes installation of Partial Replacement of the existing 42-inch Pipe with a New 30-inch HDPE (underground) and CS (aboveground) pipeline segments routed to 60,000-barrel Settlement Pond for raw water, treatment and release scope.
- Alternative F assumes the installation of WH-MM-1359 – Raw Water Injection Pumps Exercise Loop Project.

### Benefits & Effectiveness

This alternative will allow for Pigging of the West Hackberry 42-inch Raw Water Pipeline, which is required to be performed on a periodic basis to assure the pipeline is clean and able to support the Level I Drawdown rate for West Hackberry. This alternative will allow enhancement of pigging operations as the raw water line can be cleaned out more frequently.

Using this alternative will assure a permanent solution of cleaning the raw water pipeline while not compromising the brine system or injecting excessive quantities of raw water into the Site storage caverns.

This alternative provides the assurance of the operability and maintainability of the pigging line in service to maintain the Level 1 drawdown rate, as required by the site. Also, this option allows meeting the functional requirement of this project to assure a method of cleaning the raw water pipeline while not injecting excessive quantities of raw water into the Site storage caverns, as required by the site.

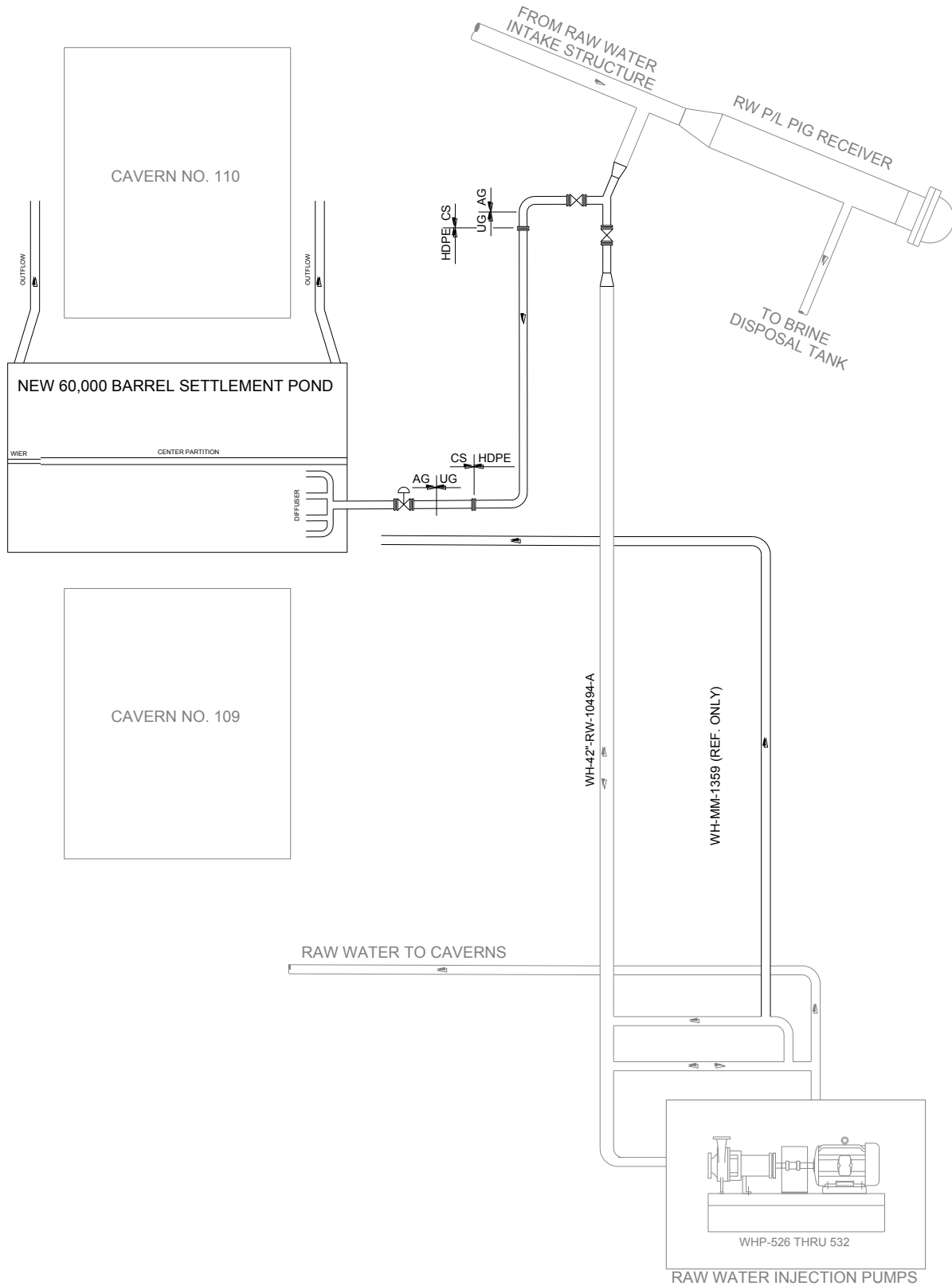


Figure 1 – Partial Replacement of Existing 42-inch Pipe and 60,000-barrel Settlement Pond

**Risk & Mitigation Factors**

There are associated risks with the Partial Replacement of the existing 42-inch Pipe with a New 30-inch HDPE (underground) and CS (aboveground) pipeline segments routed to 60,000-barrel Settlement Pond for raw water, treatment and release option. The risks include cost, scheduling, availability, and installation. The table below summarizes the risks with the correlating mitigation strategy. The table also describes the likelihood of occurrence at the site, along with how great of an impact the event would cause if it were to occur.

<b>Risk and Mitigation Strategies for Settlement Pond</b>			
<b>Risks</b>	<b>Mitigation Strategy</b>	<b>Likelihood – Impact</b>	<b>Risk Code</b>
Under-estimated cost	Make sure all possible project costs have been analyzed in the life cycle cost analysis.	Low – Low	Low Risk Hazard
Pipeline outage for installation	To avoid taking a pipeline outage for the installation, hot tap and stopple can be used access the pipeline while the cleaning is maintained through the bypass. The 30 Inch. HDPE&/CS Pipe can be pre-fabricated and flanges installed on existing pipeline.	Low – High	Low Risk Hazard
Hot Tap equipment un-available	Procure contractor and schedule work in advance to avoid delays with hot tap equipment availability.	High – High	High Risk Hazard
HDPE/CS Pipe un-available	Procure contractor and schedule work in advance to avoid delays Piping availability.	Low – High	Low Risk Hazard
HDPE Pipe Underground Layout & Deflection	Ensure project has looked at and avoided all possible underground obstacles and meets appropriate HDPE Pipe Standards to address safe and functional layout.	Medium – High	Medium Risk Hazard
HDPE Pipe Leakage/Bursts	Ensure project has looked at and avoided all possible causes for leaks and burst scenarios and meets appropriate HDPE Pipe Standards to address Pipeline Safety.	Low – High	Low Risk Hazard
MOV Malfunction	Ensure project meets appropriate Electrical /Instrument Standards and vendor recommendations to avoid and remediate possible MOV Malfunction basis	High – High	High Risk Hazard
Environmental Impacts due to Settlement Pond Construction	Ensure project performs required Environmental Due Diligence & obtain necessary Permits.	Low – High	Low Risk Hazard
Environmental Impacts due to Settlement Pond Operation	Ensure required Pond Design is per required standards, and sampling and disposal, Emergency Action plan is in place based on Environmental Due Diligence & necessary Permits. Provide SOP & Operator Training. Provide Cleaning &Maintenance requirements	High – High	High Risk Hazard
Safety Incidents during Project Construction.	Ensure project meets appropriate Federal & Industry Safety Standards during construction phase.	High – High	High Risk Hazard

## VI. ALTERNATIVE SELECTION

### List of Alternatives – Studied Alternatives

#### A. Settlement Pond

This alternative provides the assurance of the operability and maintainability of the Pigging Line in service to maintain the Level 1 drawdown rate, as required by the site. Also, this option allows meeting the functional requirement of this project to assure a method of cleaning the raw water pipeline while not injecting excessive quantities of raw water into the Site storage caverns, as required by the site.

### Comparison of Alternatives

Core Team Member Ratings

	Constructability During Ongoing Oil Deliveries	Safety During Construction	Ease of Operations	Ease of Maintenance	Sustainability
	<i>Most Important</i>	<i>Most Important</i>	<i>Most Important</i>	<i>Important</i>	<i>Less Important</i>
<b>Alternative A</b>	<i>Good</i>	<i>Excellent</i>	<i>Excellent</i>	<i>Excellent</i>	<i>Good</i>
	<i>Good</i>	<i>Excellent</i>	<i>Excellent</i>	<i>Excellent</i>	<i>Good</i>
	<i>Excellent</i>	<i>Excellent</i>	<i>Excellent</i>	<i>Excellent</i>	<i>Excellent</i>

### Recommended Alternative

#### A. Settlement Pond

Based on the screening process led by the Core Team Members that reviewed seven possible alternatives, Alternative A was the only viable alternative selected to be studied that would meet the mission need and functional requirements. Therefore, Alternative A is the recommended preferred alternative.



**WH-MM-1144**

**Enhance Access to Valve Stations**

**VCI Project Engineer: Jason McCrossen**

**Recommended Alternative:**

*This project has been issued as Approved for Construction (AFC)*

**Analysis of Alternatives  
Life Extension 2  
US Department of Energy  
Strategic Petroleum Reserve**

## I. PROJECT CONCEPT

### Mission Need

The existing valve station access is a safety concern and involves climbing over rip rap laid along the banks of the Gulf Intracoastal Waterway (GIWW). During low tide, it becomes more difficult to reach the access points along the bank of the GIWW. The existing bulkhead at Valve Station WH-2 access point is in need of repair due to extreme corrosion of the bulkhead and access ladder. Valve Station WH-4 access requires travel through the Vinton Ditch which has silted in over the years and becomes impassable during low tide events. Valve Station WH-5 access along the GIWW shoreline has eroded and silted in near the shoreline and has become difficult to navigate by boat during low tide. In addition, the United States Army Corps of Engineers constructed shoreline erosion protection in the form of rip-rap along the banks of the GIWW. Access to Valve Station WH-5 requires walking over the rip-rap to access the Valve Station. This has become a safety issue

### Functional Requirements

Provide enhanced access to Valve Stations WH-2, WH-4, WH-5, WH-6, and WH-11. This will involve constructing elevated walkways with boat landings with navigation aid lighting for safety.

## II. PROCESS

### Alternatives Analysis Plan

The Analysis of Alternatives (AoA) Process Plan is not applicable to projects with detailed design packages issued to DOE as Approved for Construction (AFC).

This document outlines completed design Scope of Work for WH-MM-1144.

## III. SELECTION CRITERIA

Formal selection criteria are not applicable to projects with detailed design packages issued as AFC.

## IV. ALTERNATIVES IDENTIFICATION

Alternative Identification is not applicable to projects with detailed design packages issued as AFC.

## V. ALTERNATIVES ANALYSIS

Alternative Analysis is not applicable to projects with detailed design packages issued as AFC.

The AFC detailed design identified and outlined the following scope of work:

### Valve Station WH-2 Access

- Remove davit crane from existing bulkhead landing along with anchor bolts; leave the concrete pad in place; recycle all metals in accordance with the contract documents.
- Construct a timber pile foundation to support a galvanized metal walkway, which shall be extended out approximately 30 feet towards the water from the existing sheet pile bulkhead near the shoreline. Construct a walkway of galvanized steel grating, channels, and angles complete with handrails. Construct a boat landing at the water's edge of the walkway for docking boats. Provide handrails and bumpers for safety.

- Construct an aggregate walking path approximately 605' in length starting at the walkway landing and ending at WH-2 valve site. The gravel walking path shall be 6' wide, with a layer of filter cloth, and 6" minimum aggregate surfacing. The walking path shall not be installed until all heavy work is completed.

#### Valve Station WH-4 Access

- Construct a timber pile foundation to support a galvanized metal walkway, beginning near the mouth of the Vinton Ditch and running at an angle of approx. 60° towards WH-4, to the pipeline Right-of-Way (ROW). Construct a walkway of galvanized steel grating, channels, and angles complete with handrails. Construct a boat landing at the water's edge of the walkway for docking boats. Provide handrails and bumpers for safety.
- Construct an aggregate walking path approximately 150' in length, starting at the walkway landing, and ending at the pipeline ROW. The gravel walking path shall be 6' wide, with a layer of filter cloth, and 6" minimum aggregate surfacing. The walking path shall not be installed until all heavy work is completed.
- Stair landing pad shall be minimum 3000 psi concrete with a light broom finish and all edges to have 3/4" 45° chamfer. Backfill under foundation shall be in accordance with Specification 02222.

#### Valve Station WH-5 Access

- Using the existing Colonial Pipeline crossing, east of the pipeline, construct a timber pile foundation to support a galvanized metal walkway, which shall extend out approximately 43 feet from the rip-rap near the shoreline. Construct walkway of galvanized steel grating, channels, and angles complete with handrails. Construct a boat landing at the water's edge of the walkway for docking boats. Provide handrails and bumpers for safety.
- Construct an aggregate walking path approximately 427' in length starting at the walkway landing and ending at WH-5 valve site. The gravel walking path shall be 6' wide, with a layer of filter cloth, and 6" minimum aggregate surfacing. The walking path shall not be installed until all heavy work is completed.
- Stair landing pad shall be minimum 3000 psi concrete with a light broom finish and all edges to have 3/4" 45° chamfer. Backfill under foundation shall be in accordance with Specification 02222.

#### Valve Station WH-6 Access

- **Construct an aggregate walking path approximately 476' in length starting at the shore and ending at WH-6 valve site. The gravel walking path shall be 6' wide, with a layer of filter cloth, and 6" minimum aggregate surfacing.**

#### Valve Station WH-11 Access

- **Construct an aggregate walking path approximately 244' in length, starting at the shore, and ending at WH-11 valve site. The gravel walking path shall be 6' wide, with a layer of filter cloth, and 6" minimum aggregate surfacing.**

## VI. ALTERNATIVE SELECTION

**WH-MM-1349; WH-MM-649; WH-MM-337**

**Inundation Mitigation; Subsidence Mitigation (Phase 3) –  
Caverns 115, 116; Subsidence Mitigation (Phase II) –  
Caverns 109, 114**

**VCI Project Engineer: Jason McCrossen**

**Recommended Alternative:**

***Install New Risers and Elevate All Equipment and Infrastructure on the Caverns***

**Analysis of Alternatives  
Life Extension 2  
US Department of Energy  
Strategic Petroleum Reserve**

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## I. PROJECT CONCEPT

### Mission Need

It is mission critical for the protection of critical infrastructure and equipment from storm surge and subsidence flooding. In addition, critical infrastructure must be protected from flooding to maintain drawdown ready status. In addition, keeping the cavern well pads accessible is mission critical for drawdown. If inundation is to continue on the cavern well pads, drawdown could be significantly impacted.

### Functional Requirements

Inundation Prevention: West Hackberry has been flooded by storm surge in the past and is likely to be flooded more frequently in the future as coastal erosion progresses. Flooding can severely disrupt the site's ability to respond to a presidentially ordered drawdown and may be delayed many months pending repair. Recovery pumping is not sufficient to mitigate the risk of flooding as flooded ground would prevent the deployment of recovery assets.

Subsidence Mitigation for Caverns: Subsidence reports including Sandia's reports "Analysis of Subsurface Subsidence of the Strategic Petroleum Reserve" (SAND88-1309), "Subsidence Monitoring and Evaluation Plan for the Strategic Petroleum Reserve Storage Sites" (SAND88-1175) and PB-KBB report "Assessment of the Effects on Surface Structures" indicate that the site adjacent to the northern well pads and Black Lake is subsiding at a rate of 0.2 to 0.3 feet per year. Although the subsidence rate along the northern end of the site has begun to level off, as subsidence continues, the waters of Black Lake slowly capture more and more of the site land around the northern well pads and site access roads. Eventually the water could flood access roads, equipment, and well pads, rendering these facilities.

## II. PROCESS

### Alternatives Analysis Plan

The complete Analysis of Alternatives (AoA) Process Plan for selection of the preferred alternative has been standardized for all AoA's and is detailed in Volume 1 of this Conceptual Design Report.

### Alternative Analysis Team Members

#### Core Team Members

Claudia Carrol	DOE, Systems Engineer
Jason McCrossen	VCI, Project Engineer
Marc Gross	FFPO, Manger Design Engineering

#### Team Members

Ashley Thomas	DOE, Site Lead General Engineer
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Robert Bowles	FFPO, Manager Site Construction
Justin Rye	FFPO, Site Construction Maintenance Engineer
Steve Sleeman	FFPO, Sr Site Maintenance Engineer
Kenneth Swanson	FFPO, Manager Site Operations

### III. SELECTION CRITERIA

The AoA Team determined the below listed criteria as relevant to the Analysis of Alternatives. Once alternatives are analyzed by the AoA Team, these criteria are used to evaluate and select a recommended preferred alternative.

#### **Constructability During On-Going Oil Deliveries**

The selected alternative is able to be implemented with little or no impact to on-going oil delivery operations. Raising equipment could cause large shut down of caverns that would prevent moving oil.

Weight: Most Important

#### **Ease of Operations**

The selected alternative when implemented will result in a system that is able to be operated without significant additional training and is similar to existing systems and equipment.

Weight: Most Important

#### **Ease of Maintenance**

The selected alternative is similar in nature to existing equipment resulting in commonality of similar systems for future maintenance and sparing consideration.

Weight: Most Important

#### **Safety During Construction**

The selected alternative when implemented will be able to be constructed safely and operated safely. Ability to address Safety and Security concerns during implementation.

Weight: Most Important

#### **Security During Construction**

The selected alternative when implemented will be able to be constructed with minimal to zero impacts to Site Security detection systems.

Weight: Most Important

#### **Sustainability**

The selected alternative when implemented will be able to achieve DOE Sustainability goals for energy consumption as outlined in the Strategic Sustainability Performance Plan.

Weight: Less Important

### IV. ALTERNATIVES IDENTIFICATION

#### **List of Alternatives**

The below listed alternatives are considered for analysis. Initial screenings conducted by the AoA Team determine the viability of each alternative.

**A. Status Quo**

Without some flood protection the temporary and perhaps repeated loss of drawdown capability in the indefinite future is relatively assured. Increased risk of future site flooding and operation problems are impacts as described in the purpose section above.

This alternative has been screened out based on not meeting the mission need.

Viability: No Further Analysis

**B. Elevate All Equipment and Critical Infrastructure on Site**

This alternative will raise all equipment and critical infrastructure on site but site will still be inundated and inaccessible.

This alternative has been screened out based on not meeting the mission need.

Viability: No Further Analysis

**C. Construct Ring Levee Around WH Site to 100-Year Base Flood Elevations**

This alternative will provide a storm water protection to the entire site and infrastructure.

Viability: No Further Analysis

**D. Construct Ring Levees Around Individual Cavern Pads to 100-Year Base Flood Elevations**

This alternative will provide storm water protection to the individual well pads and infrastructure. Caverns 109,110, 113, 114, 115, and 116 will have individual ring levees constructed around each cavern without the benefit of survey information to determine if the current ring levee is below the 100-year BFE. In addition, there will be storm water mitigating features such as sluice gates to gravity flow rain water and pumps to pump rain water during high surge times when sluice gates are closed.

This alternative will be studied further.

Viability: Continue Analysis

**E. Install New Risers and Elevate All Equipment and Infrastructure on the Caverns**

This alternative will raise all infrastructure on caverns but not the cavern pad and will assure that critical infrastructure and equipment would be protected from storm surge and subsidence flooding. In addition, all instrument and supporting cables will need to be replaced. This would result in reducing the risk of impacting drawdown capability. This alternative will be studied further.

Viability: Continue Analysis

**F. Perform Site Wide Study to Determine the Well Pads, Critical Infrastructure and Critical Buildings that are Below the 100-Year Base Flood Elevations (BFE) and Provide a Means for Protection**

Perform a site wide survey to determine which well pads and infrastructure are below the 100-year BFE. Construct ring levees around well pads, raise critical infrastructure, and raise or relocate buildings as needed. This alternative will be studied further.

Viability: Continue Analysis



## V. ALTERNATIVES ANALYSIS

Based on initial analysis of the alternatives, alternatives A, B, and C are eliminated from further consideration. The remaining alternatives, D, E, and F are examined below as alternatives A, B, and C, respectively.

The below analyses provide the research and technical information gathered by the AoA Team. These analyses are not evaluative or comparative.

## A. Construct Ring Levees Around Cavern Pads to 100-Year Base Flood Elevations

This alternative will provide storm water protection to the individual well pads and infrastructure. Caverns 109, 110, 113, 114, 115, and 116 will have individual ring levees constructed around each cavern without the benefit of survey information to determine if the current ring levee is below the 100-year BFE. In addition, there will be storm water mitigating features such as sluice gates to gravity flow rain water and pumps to pump rain water during high surge times when sluice gates are closed.

### Assumptions & Constraints

Caverns will remain in services during construction of ring levees. Electrical pumps will only need to be ran during times of expected high tidal surges limiting the amount of energy required. After initial cost of construction, long term maintenance is expected to be low. All work will take place within the security perimeter and not affect ongoing site operations.

### Benefits & Effectiveness

This alternative can be done without any shutdown of critical infrastructure and will assure that critical infrastructure and equipment would be protected from storm surge and subsidence flooding. This would result in reducing the risk of impacting drawdown capability.

### Risk & Mitigation Factors

There are associated risks with this alternative which are summarized in the table below. The table describes the likelihood of occurrence at the site, along with how great of an impact the event would cause if it were to occur.

<b>Risk and Mitigation Strategies for Construct Ring Levees Around Cavern Pads to 100-Year Base Flood Elevations</b>			
<b>Risks</b>	<b>Mitigation Strategy</b>	<b>Likelihood – Impact</b>	<b>Risk Code</b>
Minimal risk, would not require any sort of shutdown.	Perform safe work practices during construction.	High – Low	Low Risk Hazard

## B. Install New Risers and Elevate All Equipment and Infrastructure on the Caverns

This alternative will raise all infrastructure on caverns but not the cavern pad and will assure that critical infrastructure and equipment would be protected from storm surge and subsidence flooding. In addition, all instrument and supporting cables will need to be replaced. This would result in reducing the risk of impacting drawdown capability.

### Assumptions & Constraints

This construction is time consuming and will take caverns out of services for months. It would still require some type of high water vehicle to access caverns during high water events.

### Benefits & Effectiveness

This alternative would guarantee the protection of critical infrastructure at BFE, even with a containment breach.

### Risk & Mitigation Factors

There are associated risks with this alternative which are summarized in the table below. The table describes the likelihood of occurrence at the site, along with how great of an impact the event would cause if it were to occur.

<b>Risk and Mitigation Strategies for Install New Risers and Elevate All Equipment and Infrastructure on the Caverns</b>			
<b>Risks</b>	<b>Mitigation Strategy</b>	<b>Likelihood – Impact</b>	<b>Risk Code</b>
Would require a period of time with no drawdown capability.	Plan work to be completed within the acceptable shut down period.	High – High	High Risk Hazard
Cavern pad would still be inundated by flood waters	Cavern is inaccessible during high water events	High – High	High Risk Hazard

**C. Perform Site Wide Study to Determine the Well Pads, Critical Infrastructure and Critical Buildings that are Below the 100-Year Base Flood Elevations (BFE) and Provide a Means for Protection**

Perform a site wide survey to determine which well pads and infrastructure are below the 100-year BFE. Construct ring levees around well pads, raise critical infrastructure, and raise or relocate buildings as needed.

**Assumptions & Constraints**

This is an extensive look at the entire site as a whole. Provides the information to provide flood protection in the most efficient manner. Multiple means of protections can be used in an integrated system to provide site wide protection. Very low risk of shut downs or loss of use of caverns.

**Benefits & Effectiveness**

This alternative would determine the best solution for each asset, and would not be a “one size fits all” solution and will assure that critical infrastructure and equipment would be protected from storm surge and subsidence flooding. This would result in reducing the risk of impacting drawdown capability.

**Risk & Mitigation Factors**

There are associated risks with this alternative which are summarized in the table below. The table describes the likelihood of occurrence at the site, along with how great of an impact the event would cause if it were to occur.

<b>Risk and Mitigation Strategies for Perform Site Wide Study to Determine the Well Pads, Critical Infrastructure and Critical Buildings that are Below the 100-Year Base Flood Elevations (BFE) and Provide a Means for Protection</b>			
<b>Risks</b>	<b>Mitigation Strategy</b>	<b>Likelihood - Impact</b>	<b>Risk Code</b>
Would take the most time. Would have to endure several hurricane seasons before study is complete.	Study known low areas first so that construction time line can be fast tracked if ever needed.	Low – High	Low Risk Hazard

## VI. ALTERNATIVE SELECTION

### List of Alternatives – Studied Alternatives

A. Construct Ring Levees Around Cavern Pads to 100-Year Base Flood Elevations

This alternative will provide storm water protection to the individual well pads and infrastructure.

B. Install New Risers and Elevate All Equipment and Infrastructure on the Caverns

This alternative will raise all infrastructure on caverns but not the cavern pad.

C. Perform Site Wide Study to Determine the Well Pads, Critical Infrastructure and Critical Buildings that are Below the 100-Year Base Flood Elevations (BFE) and Provide a Means for Protection

Perform a site wide survey to determine which well pads and infrastructure are below the 100-year BFE. Construct ring levees around well pads, raise critical infrastructure, and raise or relocate buildings as needed.

### Comparison of Alternatives

#### Core Team Member Ratings

	Constructability During Ongoing Oil Deliveries	Ease of Operations	Ease of Maintenance	Safety During Construction	Security During Construction	Sustainability
	<i>Most Important</i>	<i>Most Important</i>	<i>Most Important</i>	<i>Most Important</i>	<i>Most Important</i>	<i>Less Important</i>
Alternative A	<i>Excellent</i>	<i>Excellent</i>	<i>Excellent</i>	<i>Good</i>	<i>Excellent</i>	<i>Adequate</i>
	<i>Excellent</i>	<i>Excellent</i>	<i>Excellent</i>	<i>Good</i>	<i>Excellent</i>	<i>Adequate</i>
	<i>Excellent</i>	<i>Excellent</i>	<i>Excellent</i>	<i>Good</i>	<i>Excellent</i>	<i>Good</i>
Alternative B	<i>Marginal</i>	<i>Good</i>	<i>Good</i>	<i>Adequate</i>	<i>Excellent</i>	<i>Adequate</i>
	<i>Marginal</i>	<i>Good</i>	<i>Good</i>	<i>Adequate</i>	<i>Excellent</i>	<i>Adequate</i>
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Excellent</i>	<i>Good</i>
Alternative C	<i>Excellent</i>	<i>Excellent</i>	<i>Excellent</i>	<i>Good</i>	<i>Excellent</i>	<i>Excellent</i>
	<i>Excellent</i>	<i>Excellent</i>	<i>Excellent</i>	<i>Good</i>	<i>Excellent</i>	<i>Excellent</i>
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Excellent</i>	<i>Good</i>

**WH-MM-1349; WH-MM-649; WH-MM-337**

**Inundation Mitigation; Subsidence Mitigation (Phase 3) –  
Caverns 115, 116; Subsidence Mitigation (Phase II) –  
Caverns 109, 114**

**VCI Project Engineer: Jason McCrossen**

**Recommended Alternative:**

***Install New Risers and Elevate All Equipment and Infrastructure on the Caverns***

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## I. PROJECT CONCEPT

### Mission Need

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**Subsidence Mitigation for Caverns:** Subsidence reports including Sandia's reports "Analysis of Subsurface Subsidence of the Strategic Petroleum Reserve" (SAND88-1309), "Subsidence Monitoring and Evaluation Plan for the Strategic Petroleum Reserve Storage Sites" (SAND88-1175) and PB-KBB report "Assessment of the Effects on Surface Structures" indicate that the site adjacent to the northern well pads and Black Lake is subsiding at a rate of 0.2 to 0.3 feet per year. Although the subsidence rate along the northern end of the site has begun to level off, as subsidence continues, the waters of Black Lake slowly capture more and more of the site land around the northern well pads and site access roads. Eventually the water could flood access roads, equipment, and well pads, rendering these facilities.

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### Alternatives Analysis Plan

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### III. SELECTION CRITERIA

The AoA Team determined the below listed criteria as relevant to the Analysis of Alternatives. Once alternatives are analyzed by the AoA Team, these criteria are used to evaluate and select a recommended preferred alternative.

#### **Constructability During On-Going Oil Deliveries**

The selected alternative is able to be implemented with little or no impact to on-going oil delivery operations. Raising equipment could cause large shut down of caverns that would prevent moving oil.

Weight: Most Important

#### **Ease of Operations**

The selected alternative when implemented will result in a system that is able to be operated without significant additional training and is similar to existing systems and equipment.

Weight: Most Important

#### **Ease of Maintenance**

The selected alternative is similar in nature to existing equipment resulting in commonality of similar systems for future maintenance and sparing consideration.

Weight: Most Important

#### **Safety During Construction**

The selected alternative when implemented will be able to be constructed safely and operated safely. Ability to address Safety and Security concerns during implementation.

Weight: Most Important

#### **Security During Construction**

The selected alternative when implemented will be able to be constructed with minimal to zero impacts to Site Security detection systems.

Weight: Most Important

#### **Sustainability**

The selected alternative when implemented will be able to achieve DOE Sustainability goals for energy consumption as outlined in the Strategic Sustainability Performance Plan.

Weight: Less Important

### IV. ALTERNATIVES IDENTIFICATION

#### **List of Alternatives**

The below listed alternatives are considered for analysis. Initial screenings conducted by the AoA Team determine the viability of each alternative.

**A. Status Quo**

Without some flood protection the temporary and perhaps repeated loss of drawdown capability in the indefinite future is relatively assured. Increased risk of future site flooding and operation problems are impacts as described in the purpose section above.

This alternative has been screened out based on not meeting the mission need.

Viability: No Further Analysis

**B. Elevate All Equipment and Critical Infrastructure on Site**

This alternative will raise all equipment and critical infrastructure on site but site will still be inundated and inaccessible.

This alternative has been screened out based on not meeting the mission need.

Viability: No Further Analysis

**C. Construct Ring Levee Around WH Site to 100-Year Base Flood Elevations**

This alternative will provide a storm water protection to the entire site and infrastructure.

Viability: No Further Analysis

**D. Construct Ring Levees Around Individual Cavern Pads to 100-Year Base Flood Elevations**

This alternative will provide storm water protection to the individual well pads and infrastructure. Caverns 109,110, 113, 114, 115, and 116 will have individual ring levees constructed around each cavern without the benefit of survey information to determine if the current ring levee is below the 100-year BFE. In addition, there will be storm water mitigating features such as sluice gates to gravity flow rain water and pumps to pump rain water during high surge times when sluice gates are closed.

This alternative will be studied further.

Viability: Continue Analysis

**E. Install New Risers and Elevate All Equipment and Infrastructure on the Caverns**

This alternative will raise all infrastructure on caverns but not the cavern pad and will assure that critical infrastructure and equipment would be protected from storm surge and subsidence flooding. In addition, all instrument and supporting cables will need to be replaced. This would result in reducing the risk of impacting drawdown capability. This alternative will be studied further.

Viability: Continue Analysis

**F. Perform Site Wide Study to Determine the Well Pads, Critical Infrastructure and Critical Buildings that are Below the 100-Year Base Flood Elevations (BFE) and Provide a Means for Protection**

Perform a site wide survey to determine which well pads and infrastructure are below the 100-year BFE. Construct ring levees around well pads, raise critical infrastructure, and raise or relocate buildings as needed. This alternative will be studied further.

Viability: Continue Analysis

## V. ALTERNATIVES ANALYSIS

Based on initial analysis of the alternatives, alternatives A, B, and C are eliminated from further consideration. The remaining alternatives, D, E, and F are examined below as alternatives A, B, and C, respectively.

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### Assumptions & Constraints

Caverns will remain in services during construction of ring levees. Electrical pumps will only need to be ran during times of expected high tidal surges limiting the amount of energy required. After initial cost of construction, long term maintenance is expected to be low. All work will take place within the security perimeter and not affect ongoing site operations.

### Benefits & Effectiveness

This alternative can be done without any shutdown of critical infrastructure and will assure that critical infrastructure and equipment would be protected from storm surge and subsidence flooding. This would result in reducing the risk of impacting drawdown capability.

### Risk & Mitigation Factors

There are associated risks with this alternative which are summarized in the table below. The table describes the likelihood of occurrence at the site, along with how great of an impact the event would cause if it were to occur.

<b>Risk and Mitigation Strategies for Construct Ring Levees Around Cavern Pads to 100-Year Base Flood Elevations</b>			
<b>Risks</b>	<b>Mitigation Strategy</b>	<b>Likelihood – Impact</b>	<b>Risk Code</b>
Minimal risk, would not require any sort of shutdown.	Perform safe work practices during construction.	High – Low	Low Risk Hazard

## B. Install New Risers and Elevate All Equipment and Infrastructure on the Caverns

This alternative will raise all infrastructure on caverns but not the cavern pad and will assure that critical infrastructure and equipment would be protected from storm surge and subsidence flooding. In addition, all instrument and supporting cables will need to be replaced. This would result in reducing the risk of impacting drawdown capability.

### Assumptions & Constraints

This construction is time consuming and will take caverns out of services for months. It would still require some type of high water vehicle to access caverns during high water events.

### Benefits & Effectiveness

This alternative would guarantee the protection of critical infrastructure at BFE, even with a containment breach.

### Risk & Mitigation Factors

There are associated risks with this alternative which are summarized in the table below. The table describes the likelihood of occurrence at the site, along with how great of an impact the event would cause if it were to occur.

<b>Risk and Mitigation Strategies for Install New Risers and Elevate All Equipment and Infrastructure on the Caverns</b>			
<b>Risks</b>	<b>Mitigation Strategy</b>	<b>Likelihood – Impact</b>	<b>Risk Code</b>
Would require a period of time with no drawdown capability.	Plan work to be completed within the acceptable shut down period.	High – High	High Risk Hazard
Cavern pad would still be inundated by flood waters	Cavern is inaccessible during high water events	High – High	High Risk Hazard

**C. Perform Site Wide Study to Determine the Well Pads, Critical Infrastructure and Critical Buildings that are Below the 100-Year Base Flood Elevations (BFE) and Provide a Means for Protection**

Perform a site wide survey to determine which well pads and infrastructure are below the 100-year BFE. Construct ring levees around well pads, raise critical infrastructure, and raise or relocate buildings as needed.

**Assumptions & Constraints**

This is an extensive look at the entire site as a whole. Provides the information to provide flood protection in the most efficient manner. Multiple means of protections can be used in an integrated system to provide site wide protection. Very low risk of shut downs or loss of use of caverns.

**Benefits & Effectiveness**

This alternative would determine the best solution for each asset, and would not be a “one size fits all” solution and will assure that critical infrastructure and equipment would be protected from storm surge and subsidence flooding. This would result in reducing the risk of impacting drawdown capability.

**Risk & Mitigation Factors**

There are associated risks with this alternative which are summarized in the table below. The table describes the likelihood of occurrence at the site, along with how great of an impact the event would cause if it were to occur.

<b>Risk and Mitigation Strategies for Perform Site Wide Study to Determine the Well Pads, Critical Infrastructure and Critical Buildings that are Below the 100-Year Base Flood Elevations (BFE) and Provide a Means for Protection</b>			
<b>Risks</b>	<b>Mitigation Strategy</b>	<b>Likelihood - Impact</b>	<b>Risk Code</b>
Would take the most time. Would have to endure several hurricane seasons before study is complete.	Study known low areas first so that construction time line can be fast tracked if ever needed.	Low – High	Low Risk Hazard

## VI. ALTERNATIVE SELECTION

### List of Alternatives – Studied Alternatives

A. Construct Ring Levees Around Cavern Pads to 100-Year Base Flood Elevations

This alternative will provide storm water protection to the individual well pads and infrastructure.

B. Install New Risers and Elevate All Equipment and Infrastructure on the Caverns

This alternative will raise all infrastructure on caverns but not the cavern pad.

C. Perform Site Wide Study to Determine the Well Pads, Critical Infrastructure and Critical Buildings that are Below the 100-Year Base Flood Elevations (BFE) and Provide a Means for Protection

Perform a site wide survey to determine which well pads and infrastructure are below the 100-year BFE. Construct ring levees around well pads, raise critical infrastructure, and raise or relocate buildings as needed.

### Comparison of Alternatives

#### Core Team Member Ratings

	Constructability During Ongoing Oil Deliveries	Ease of Operations	Ease of Maintenance	Safety During Construction	Security During Construction	Sustainability
	<i>Most Important</i>	<i>Most Important</i>	<i>Most Important</i>	<i>Most Important</i>	<i>Most Important</i>	<i>Less Important</i>
<b>Alternative A</b>	<i>Excellent</i>	<i>Excellent</i>	<i>Excellent</i>	<i>Good</i>	<i>Excellent</i>	<i>Adequate</i>
	<i>Excellent</i>	<i>Excellent</i>	<i>Excellent</i>	<i>Good</i>	<i>Excellent</i>	<i>Adequate</i>
	<i>Excellent</i>	<i>Excellent</i>	<i>Excellent</i>	<i>Good</i>	<i>Excellent</i>	<i>Good</i>
<b>Alternative B</b>	<i>Marginal</i>	<i>Good</i>	<i>Good</i>	<i>Adequate</i>	<i>Excellent</i>	<i>Adequate</i>
	<i>Marginal</i>	<i>Good</i>	<i>Good</i>	<i>Adequate</i>	<i>Excellent</i>	<i>Adequate</i>
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Excellent</i>	<i>Good</i>
<b>Alternative C</b>	<i>Excellent</i>	<i>Excellent</i>	<i>Excellent</i>	<i>Good</i>	<i>Excellent</i>	<i>Excellent</i>
	<i>Excellent</i>	<i>Excellent</i>	<i>Excellent</i>	<i>Good</i>	<i>Excellent</i>	<i>Excellent</i>
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Excellent</i>	<i>Good</i>

**WH-MM-1350; WH-MM-1409**

**Recomplete/Replace Brine Disposal Wells; Replace Brine Disposal Line to the Gulf**

**VCI Project Engineer: Bill Fogle**

**Recommended Alternative:**

***Clean Existing Wells, Develop New Brine Disposal Wells, Utilize Existing Brine Injection Pumps and Add New Brine Injection Pumps at the Main Site***

**Analysis of Alternatives  
Life Extension 2  
US Department of Energy  
Strategic Petroleum Reserve**



## I. PROJECT CONCEPT

### Mission Need

To construct/repair a Brine Disposal System that has adequate capacity to handle Level I Performance Criteria for a brine disposal rate of 225 thousand barrels a day (MBD) at the West Hackberry (WH) site. Develop additional brine disposal capabilities for 25-year life span.

### Functional Requirements

The repair/rework and/or installation of the Brine Disposal System requirements is to meet the following parameters:

- Brine Temperature Minimum: 60 °F; Average: 93 °F; Maximum: 108°F
- Capable of Level I fill rate of 225 MBD

This project is one component of a set of projects to upgrade the Brine Disposal System at West Hackberry in accordance with SPR Level I criteria. Other projects that are part of the completed Brine Disposal System that are affected by this WH-MM-1350, 1409 Project are: WH-MM-826. Lighting requirements for the Brine Disposal facilities are identified in Project WH-MM-652, 617.

## II. PROCESS

### Alternatives Analysis Plan

The complete Analysis of Alternatives (AoA) Process Plan for selection of the preferred alternative has been standardized for all AoA's and is detailed in Volume 1 of this Conceptual Design Report.

### Alternative Analysis Team Members

#### Core Team Members

Claudia Carrol	DOE, Systems Engineer
Bill Fogle	VCI, Project Engineer
Chris Vedros	FFPO, Manager Pipeline and Equipment Integrity

#### Team Members

Ashley Thomas	DOE, Lead General Engineer
Laren Tushim	VCI, Sr. Mechanical Engineer
David Wilkins	VCI, Process Engineer
Janet Robert	FFPO, Director Facilities Design and Integrity
Karen Wynn	FFPO, Sr. Cavern Engineer
Robert Bowles	FFPO, Manger Site Construction
Justin Rye	FFPO, WH Site Construction Specialist
Steve Sleeman	FFPO, Sr. Site Maintenance Engineer
Buddy Delaune	FFPO, Principal Mechanical Engineer
Charles Deluca	FFPO, Principal Operational Systems Engineer
Ken Swanson	FFPO, Manger Site Operations

## III. SELECTION CRITERIA

The AoA Team determined the below listed criteria as relevant to the Analysis of Alternatives. Once alternatives are analyzed by the AoA Team, these criteria are used to evaluate and select a recommended preferred alternative.

### **Technically Sound Solution**

The selected alternative can be engineered to meet mission goals and project functional requirements. The Level I Performance Criteria for Brine Disposal at a 225 MBD fill rate is critical to meeting mission needs. The New Brine Disposal Wells option should provide adequate brine disposal to accommodate every fill/refill event over the 25-year life of LE 2.

Weight: Most Important

### **Constructability During On-Going Oil Deliveries**

When implemented, the selected alternative is able to be implemented with little or no impact to on-going oil delivery operations. New Brine Disposal Wells option must preserve or enhance drawdown readiness.

Weight: Most Important

### **Ease of Operations**

When implemented, the selected alternative when implemented will result in a system that is able to be operated without significant additional training and is similar to existing systems and equipment. New Brine Disposal Wells option must ensure that the required brine disposal capacity must be met.

Weight: Most Important

### **Safety During Construction**

When implemented, the selected alternative will be able to achieve DOE Sustainability goals for energy consumption as outlined in the Strategic Sustainability Performance Plan.

Weight: Most Important

### **Ease of Maintenance**

The selected alternative is similar in nature to existing equipment resulting in commonality of similar systems for future maintenance and sparing consideration. New Brine Disposal Wells option should be compatible with service requirements to meet or exceed the 25-year life of LE 2.

Weight: Important

### **Sustainability**

When implemented, the selected alternative when implemented will be able to achieve DOE Sustainability goals for energy consumption as outlined in the Strategic Sustainability Performance Plan

Weight: Less Important

## **IV. ALTERNATIVES IDENTIFICATION**

### **List of Alternatives**

#### **A. Repair/Rework Existing Brine Disposal Line to Gulf**

The brine line to the gulf was decommissioned and removed from service in 1996. The decommissioning included removal of offshore discharge points, the abandonment and capping of the pipeline segments north and south of the Sabine Wildlife Management Area (WMA), and the removal of several pipe segments.

This option does not provide the assurance of a Brine Disposal System that has adequate capacity to handle the Level I Performance Criteria for Brine Disposal at a rate of 225 MBD.

Viability: No Further Analysis

## **B. Install New Brine Disposal Line to Gulf**

Presuming that the Department of Energy (DOE) still retains full ownership of the original right-of-way, there are two options for the material design of the pipeline, cement-lined carbon steel (CS) or high-density polyethylene (HDPE). Due to the length of the line and the required flowing volume of 6,600 gallons per minute (GPM), a single line may be sized between 24-inch and 30-inch in diameter, depending upon the desired flowing velocity.

In addition, the associated pressure drops could require a booster pump station. The booster pumps would require ~450-500hp for 250 feet of total dynamic head (TDH) as single units, requiring 460VAC / 3-Ph / 60 Hz power. Deep-well, multistage turbine units would be ideal units to use in this application. These pumps are readily available in corrosion resistant alloy (CRA) materials for extended duty. As an option, DOE may elect to have one electric and one diesel drive unit to address periods with no power.

Another option would be to split the flow between two pumps and have 2 or 3 units installed at the pump station. Those units would require ~225 to 250hp each rated for 3500 GPM @ 250 feet of TDH. This option provides for flexibility in the pumping rates.

However, the area to the south of the current disposal well area, through which this new disposal line would be laid out, has been designated as a wildlife refuge.

Since a new brine disposal line will not be permitted by law, this option is not viable.

Viability: No Further Analysis

## **C. Clean Existing Wells, Develop New Brine Disposal Wells, and Add Additional Pumping Capacity**

The current brine disposal wells are capacity limited to 155 MBD of brine. The wells are split between shallow and deep zones with different injection pressure requirements. The deep well zone appears to have a greater capacity for accepting brine.

This alternative will include implementing the “get well plan” for the existing screened and screen-less wells to increase the overall brine disposal capacity and bring them to optimum performance. The remedial work would use various processes including possible acid cleaning/nitrogen backwashing. Additionally, possible recompletion into a higher formation may be required if the screens are determined to have failed. The remediation is needed to clean away the sand that has covered the perforations or if they have sat unused for a period of time allowing the bacteria to build up on the sand face or screens

This alternative would also add 2 new brine disposal wells, one well on pad 1, going south and one well on pad 2, going west-northwest under Black Lake, as shown in Figure 5 below, to increase system capacity. Both pads, and the interconnecting road will need to be enlarged and environmental permits obtained. A 2014 injection rate study by FFPO showed that with the remaining eight wells, the required well head injection pressure would need to increase to 540 Psig (30 days after clean out wells with continuous flows) to meet the 225 MBD design Brine Disposal rate. The new wells are intended to extend the reach of the injection zone further into the lower zone to enhance the capabilities of the zone to take more volumes before building excessive pressures.

To address the additional pressure requirements and address other operational issues due to sharing the aquifer for injection by outside sources, additional pumping capacity may be required. This can be achieved in one of the following ways:

### **1. Utilize Existing Brine Injection Pumps and Add New Brine Injection Pumps at the Main Site (TDH of 500 Psig/1155 ft.)**

This alternative would add two new brine injection pumps to be operated in series with the existing brine injection pumps for increased brine injection pressure. The two new injection pump station would be sized for 225 MBD at approximately 500 Psig Total Dynamic Head (TDH). The installation will utilize as much existing infrastructure as possible including but not limited to cable trays, pipe supports, and motor control centers, but would require new supporting systems including electrical power, cabling, seal flush pumps,

lighting, shelters, and necessary process instrumentation and automation systems. These can be further developed during detailed design. The existing security system will be sufficient.

Since the new equipment is located on the West Hackberry main site, many advantages can be realized especially in the areas of operability and maintenance.

This option is only viable if the 24-inch diameter brine disposal pipeline that the new pumps will discharge into has a Maximum Allowable Operating Pressure (MAOP) equal to or greater than the discharge pressure that would be produced by the two sets of pumps operating in series. A separate project, WH-MM-826 is addressing the installation of a new pipeline and this project must consider the design and/or "As-Built" condition of the new, 24-inch, brine disposal pipeline. Additionally, the existing manifold piping at disposal well pads 1 and 2 would need to be replaced in order to be suitable for the higher operating pressures produced by the new, additional pumps.

This alternative provides the assurance of a Brine Disposal System that has adequate capacity to handle Level I Performance Criteria for Brine Disposal at a 225 MBD fill rate.

Viability: Continue Analysis

## **2. Replace the Existing Brine Injection Pumps and Add Additional Booster Pumps at Disposal Well Pad 2.**

This alternative would modify the existing brine injection pumps on the main site, to increase the system output pressure to ~600-650 Psig. The required brine injection pressure would then be achieved by an additional set of pumps located at or near brine disposal well pad 2. For this alternative, the new booster pump station can be sized for approximately 225 MBD at approximately 250 Psig TDH. Additionally, new utility electric power, transformers, motor control centers, and associated electrical infrastructure would be required for the new power service requirements of the new pumps and associated piping, motor operated valves, instrumentation, control, and communication. This option assumes that the operating pressure of the pipeline does not support the installation of the additional pumps at the main site as defined in Option 1. A separate project, WH-MM-826 is addressing the installation of a new pipeline and this project must consider the design and "As-Built" condition of the new 24-inch brine disposal pipeline. Additionally, the existing manifold piping at disposal well pads 1 and 2 would need to be replaced in order to be suitable for the higher operating pressures produced by the new, additional pumps.

For this alternative, the requirements of the new brine pumps is less than in above option 1; however, there are significant additional requirements associated with a new power line, transformers, motor control centers, and life cycle maintenance due to the remote location of the new equipment.

This option provides the assurance of a Brine Disposal System that has adequate capacity to handle Level I Performance Criteria for Brine Disposal at a 225 MBD fill rate.

Viability: Continue Analysis

## **D. Purchase Cameron LNG Brine Caverns and Associated Pipeline**

This option involves purchasing Cameron Brine Pipeline and Caverns (Outside to the West of the WH Site). Cameron LNG is currently undergoing a cavern leaching process and as part of that effort, they have developed one or more disposal wells which are connected via a pipeline to their main site. The idea is to offer to purchase the infrastructure from Cameron LNG when they are ready to sell it. It is suggested that DOE offer to share access with them as a maintenance option. Much more research would be needed to evaluate this alternative.

This would not be an immediate solution, as the current leaching process will not allow the caverns to be utilized for ~10-15 years.

This option does not provide the assurance of a Brine Disposal System that has adequate capacity to handle Level I Performance Criteria for Brine Disposal at a 225 MBD fill rate.

Viability: No Further Analysis

### **E. Reduce Disposal Rate to 110 MBD**

At the reduced rate of 110 MBD, the fill will take longer, but the pressure build-up can be better managed.

This option does not provide the assurance of a Brine Disposal System that has adequate capacity to handle Level I Performance Criteria for Brine Disposal at a 225 MBD fill rate.

Viability: No Further Analysis

## **V. ALTERNATIVES ANALYSIS**

Based on initial analysis of the alternatives, the options A, B, D, and E have been eliminated from further consideration. The remaining alternatives C1 and C2 are examined below as alternatives A and B, respectively.

The below analyses provide the research and technical information gathered by the AoA Team. These analyses are not evaluative or comparative.

### **Assumptions & Constraints**

- WH Brine Disposal System Temperature Requirements Minimum: 60 °F; Average: 93 °F; Maximum: 108°F are met.
- Provide adequate capacity to handle Level I Performance Criteria for Brine Disposal at a 225 MBD fill rate at the West Hackberry (WH) Site
- All existing wells have been recompleted and cleaned before they can be utilized for injection. Each recompleted well must pass a Louisiana Department of Natural Resources, Office of Conservation (LDNR) required mechanical integrity test.
- After the drilling, the new wells need to be perforated, acidized, and backwashed before they can be utilized for injection. Additionally, each new well must pass a LDNR required mechanical integrity test.
- Provide adequate pumping capacity to address well head injection pressure of 540 Psig (30 days after clean out wells with continuous flows), that meets the 225 MBD design rate. This may be safely done by ensuring any wells, if exceeding their maximum allowable surface injection pressure (MASIP), are taken offline.
- Obtain environmental permits for well pad enlargements and road improvements in a designated wetland area.
- The installation of WH-MM-826, Replace Brine Disposal Pipeline.

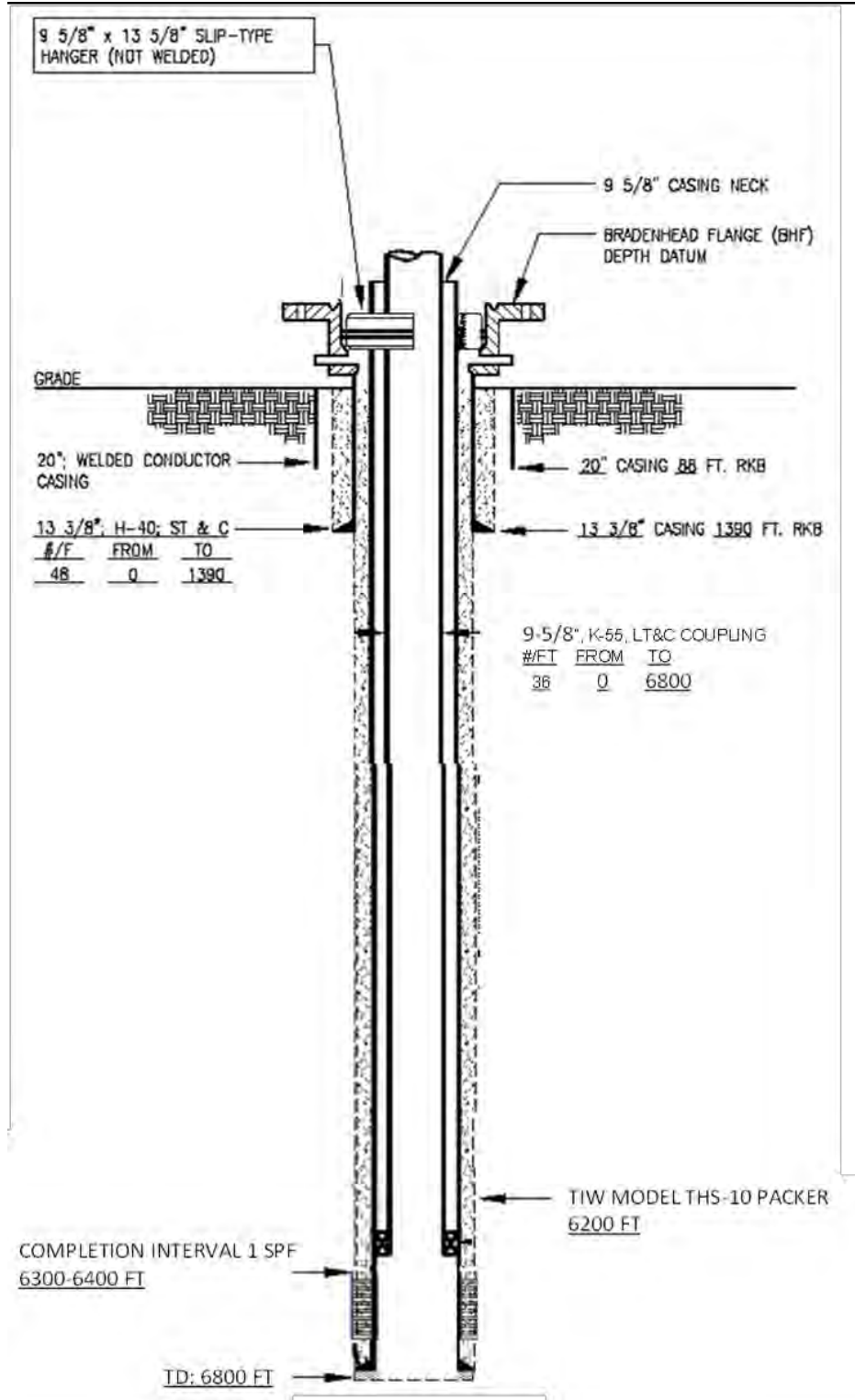


Figure 1 – Example Well Design

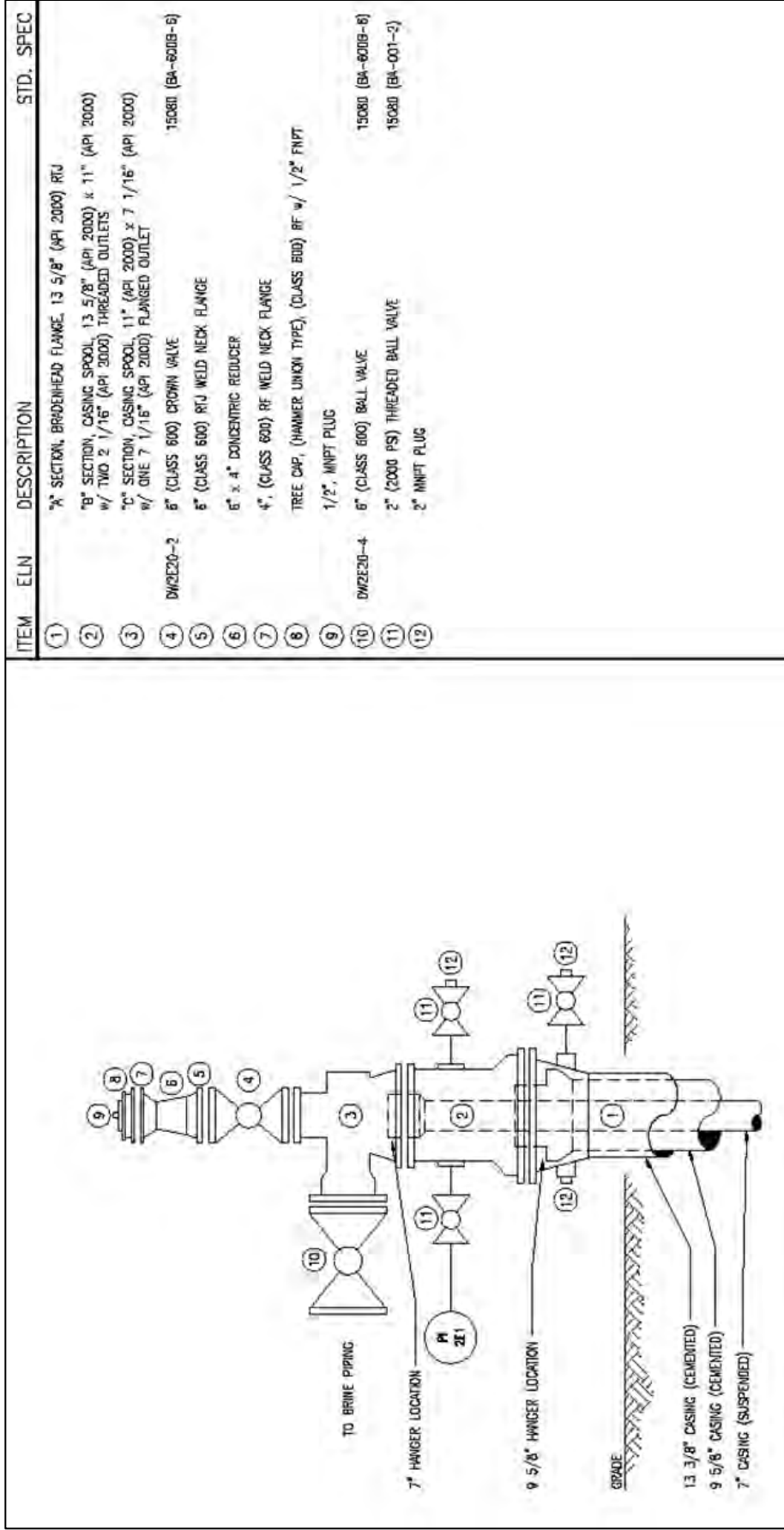


Figure 2 – Example Well Head Design

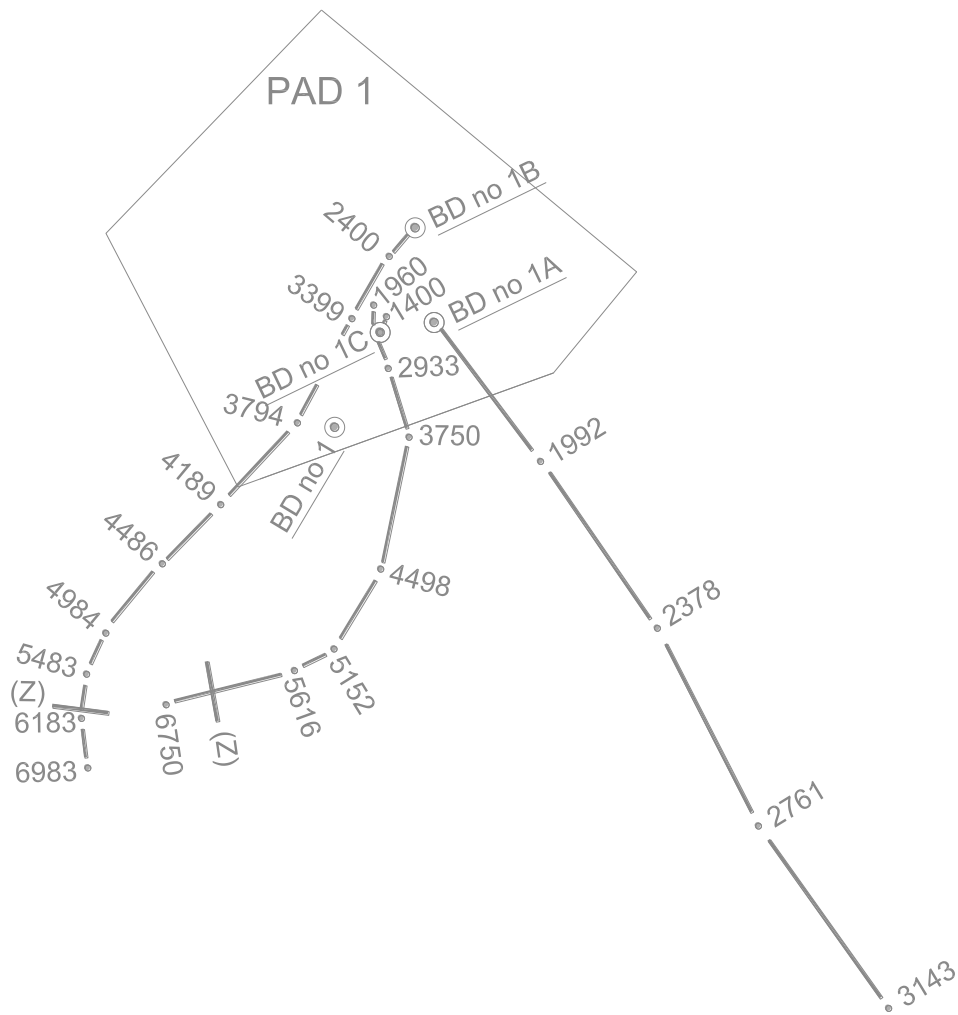


Figure 3 – Pad 1 Existing Well Locations and Depths



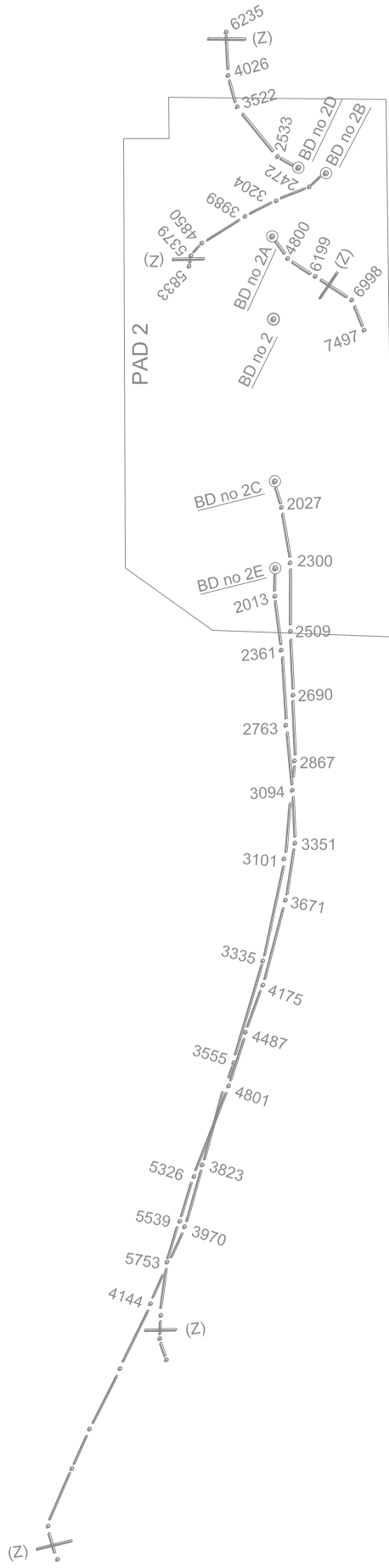


Figure 4 – Pad 2 Existing Well Locations and Depths

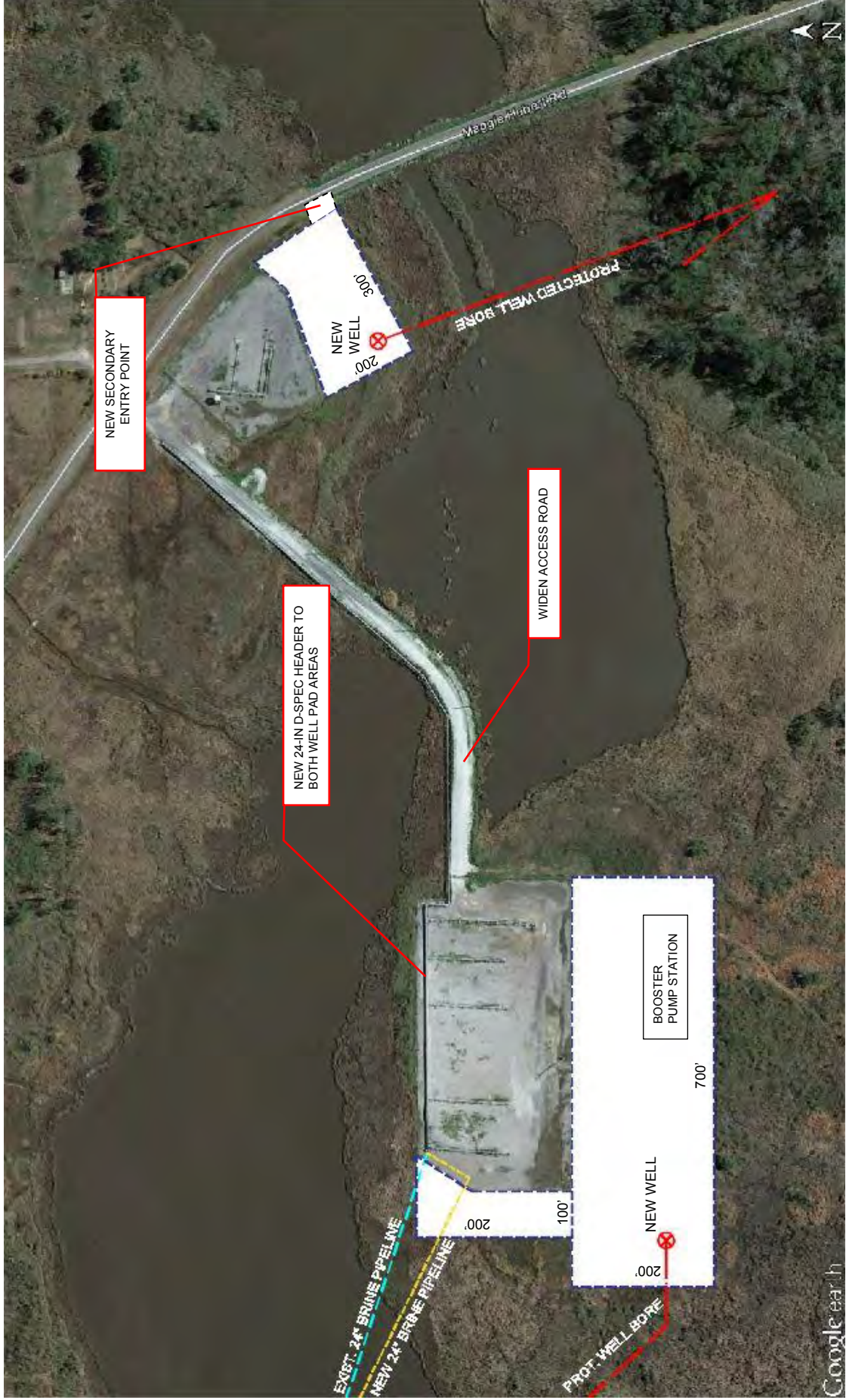


Figure 5 – Aerial View of Existing Well Pads and Proposed Wells and Well Pad Expansions  
(Not to Scale)

## **A. Clean Existing Wells, Develop New Brine Disposal Wells, Utilize Existing Brine Injection Pumps and Add New Brine Injection Pumps at the Main Site.**

This alternative will include implementing the “get-well” plan for the existing screened and screen-less wells to increase the overall disposal capacity, and bring them to optimum performance. The remedial work would entail various processes including acid cleaning/nitrogen backwashing. Additionally, possible recompletion into a higher formation should the screens fail. The remediation of the wells is needed to clean away the sand that has covered the perforations or if they have sat unused for a period of time allowing the bacteria to build up on the sand face or screens.

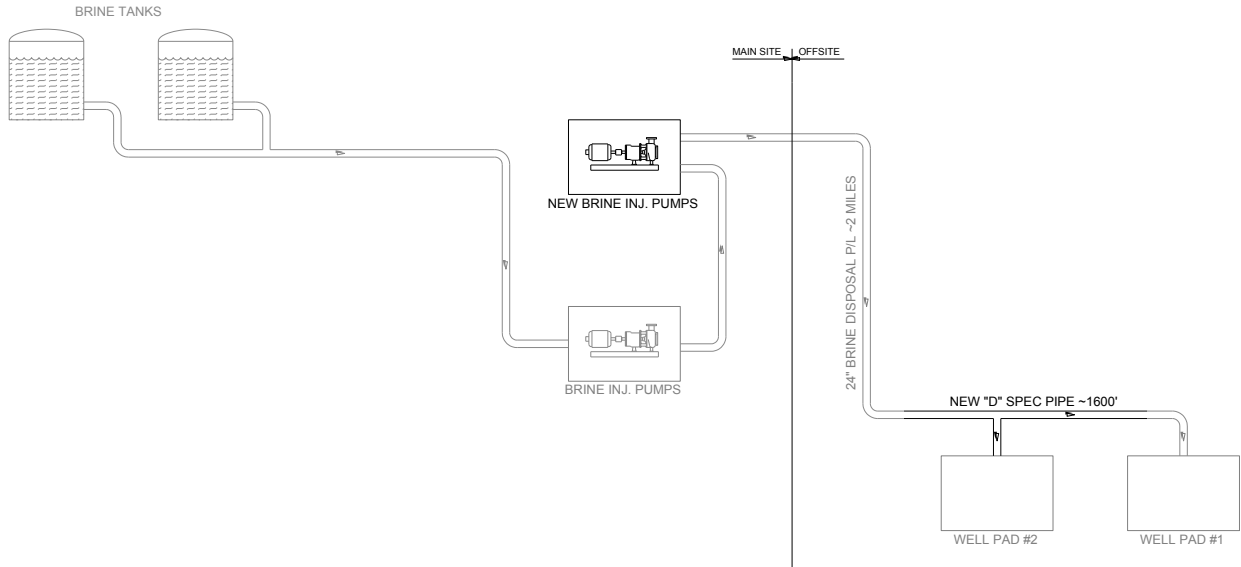
This alternative would also add 2 new brine disposal wells, one well on pad 1 and one well on pad 2 to increase system capacity. A 2014 injection rate study by FFPO showed that with the eight remaining wells in use, the required well head injection pressure would increase to 540 Psig (30 days after clean out wells with continuous flows) to meet the 225 MBD design Brine Disposal rate. The well on pad 1 would be directionally drilled towards the south from the new extended section and would terminate 6,747 feet measured depth, 6,700 feet true vertical depth. The well on pad 2 would be directionally drilled towards the west-northwest from the new extended section and would terminate at 6,806 feet measured depth, 6,700 feet true vertical depth. The new disposal wells are intended to extend the reach of the injection zone, further into the lower zone to enhance the capabilities of the zone to take more volumes before building excessive pressures. Both pads will be enlarged, and the interconnecting road widened, requiring revisions to environmental permits to be obtained. The proposed expansion area needs to be elevated with consideration given to USACE requirements. Each existing pad has a chain-link fence to keep out the cattle. Initially, similar fencing will need to encompass the expansion areas. The proposed pad enlargements are shown in figure 5.

The exact surface location of the well will be dependent on equipment placement capabilities, and must be able to provide adequate room for a workover rig and associated equipment. The coiled tubing unit will require approximately the same footprint as the workover rig. The bottom hole location is an approximation but should be located in the same general area.

This alternative would add two new brine injection pumps to be operated in series with the existing brine injection pumps for increased brine injection pressure. The two new injection pump station would be sized for 225 MBD at approximately 500 Psig Total Dynamic Head (TDH). The installation will utilize as much existing infrastructure as possible including cable trays, pipe supports, motor control centers, etc but would require new supporting systems including electrical power, cabling, seal flush pumps, lighting, shelters and necessary process instrumentation and automation systems. These can be further developed during detailed design. The existing security system will be sufficient.

This option is only viable if the 24-inch diameter brine disposal pipeline has a Maximum Allowable Operating Pressure (MAOP) equal to or greater than the discharge pressure that would be produced by the two sets of pumps operating in series. A separate project, WH-MM-826 is addressing the installation of a new pipeline and this project must consider the design and/or the “As-Built” condition of the new 24-inch brine disposal pipeline. Additionally, the existing manifold piping at disposal well pads 1 and 2 would need to be replaced in order to be suitable for the higher operating pressures produced by the new, additional pumps.

This option would continue the use of the existing brine injection pumps, in their current state. This may lead to higher operating, maintenance, and labor costs.



**Figure 6 – New Brine Injection Pumps**

**Risk & Mitigation Factors**

There are associated risks with Clean Existing Wells, Develop New Brine Disposal Wells, Utilize Existing Brine Injection Pumps and Add New Brine Injection Pumps at the Main Site. The risks include cost, scheduling, availability, and installation. The table below summarizes the risks with the correlating mitigation strategy. The table also describes the likelihood of occurrence at the site, along with how great of an impact the event would cause if it were to occur.

<b>Risk and Mitigation Strategies Clean Existing Wells, Develop New Brine Disposal Wells, Utilize Existing Brine Injection Pumps and Add New Brine Injection Pumps at the Main Site</b>			
<b>Risks</b>	<b>Mitigation Strategy</b>	<b>Likelihood – Impact</b>	<b>Risk Code</b>
Under-estimated cost	Make sure all possible project costs have been analyzed in the life cycle cost analysis.	Low – Low	Low Risk Hazard
Unknown subsurface	Ensure geological study of subsurface of planned route/well to verify obstacles. Drilling of test wells may be required.	High – High	High Risk Hazard
Equipment availability	Procure contractor and equipment in advance once the schedule has been determined to avoid delays with equipment availability.	Low – Medium	Low Risk Hazard
Scheduled outage extended	Ensure all equipment and parts have been delivered before beginning outage work. Verify availability of maintenance group to ensure schedules are aligned. Be aware of weather disturbances.	Low – High	Low Risk Hazard
Pumps and motors availability/delivery	Procure pumps and motors in advance to develop schedule to avoid delays with equipment delivery.	Low – Low	Low Risk Hazard
Inlet/Outlet pipe misaligned	Verify new pumps’ inlet and outlet will align with existing pipe. If not, design to modify inlet and outlet pipe to fit new pumps.	Medium – Medium	Medium Risk Hazard
Well completion issues and failure	Ensure well completions are done as per required permit applications and completion standards.	Medium – High	Medium Risk Hazard

<b>Risk and Mitigation Strategies for Clean Existing Wells, Develop New Brine Disposal Wells, Utilize Existing Brine Injection Pumps and Add New Brine Injection Pumps at the Main Site (continued)</b>			
<b>Risks</b>	<b>Mitigation Strategy</b>	<b>Likelihood – Impact</b>	<b>Risk Code</b>
Sanding issues in wells	Need to adhere to professional geologist recommendations and ensure injection pump minimum flow guidance into well.	Med – High	Medium Risk Hazard
Clay swelling and plugging of wells	Remediation strategy of additional pumping capacity and required space in Injection Piping for the must be in place.	Med – High	Medium Risk Hazard
Environmental impacts due to injection well work	Ensure project performs required environmental due diligence and obtain necessary permits.	Low – High	Low Risk Hazard
Safety incidents during project construction.	Ensure project meets appropriate federal and industry safety standards during construction phase.	High – High	High Risk Hazard
Security incidents during and after project construction.	Ensure project meets appropriate federal and industry security standards during construction phase, by installation of required barriers.	Med – High	Medium Risk Hazard

## **B. Clean Existing Wells, Develop New Brine Disposal Wells, Replace the Existing Brine Injection Pumps and Add Additional Booster Pumps at Brine Disposal Well Pad 2.**

This alternative will include implementing the “get-well” plan for the existing screened and screen-less wells to increase the overall disposal capacity, and bring them to optimum performance. The remedial work would entail various processes including acid cleaning/nitrogen backwashing. Additionally, possible recompletion into a higher formation should the screens fail. The remediation of the wells is needed to clean away the sand that has covered the perforations or if they have sat unused for a period of time allowing the bacteria to build up on the sand face or screens.

This alternative would also add 2 new brine disposal wells, one well on pad 1 and one well on pad 2 to increase system capacity. A 2014 injection rate study by FFPO showed that with the eight remaining wells in use, the required well head injection pressure would increase to 540 Psig (30 days after clean out wells with continuous flows) to meet the 225 MBD design Brine Disposal rate. The well on pad 1 would be directionally drilled towards the south from the new extended section and would terminate 6,747 feet measured depth, 6,700 feet true vertical depth. The well on pad 2 would be directionally drilled towards the west-northwest from the new extended section and would terminate at 6,806 feet measured depth, 6,700 feet true vertical depth. The new disposal wells are intended to extend the reach of the injection zone, further into the lower zone to enhance the capabilities of the zone to take more volumes before building excessive pressures. Both pads will be enlarged, and the interconnecting road widened, requiring revisions to environmental permits to be obtained. The proposed expansion area needs to be elevated with consideration given to USACE requirements. Each existing pad has a chain-link fence to keep out the cattle. Initially, similar fencing will need to encompass the expansion areas. Upgraded security measures, i.e., fencing, cameras and area lighting will be required as a part of the Booster Pump Station installation. The proposed pad enlargements are shown in figure 5.

The exact surface location of the well will be dependent on the final brine header design. The surface location must be able to provide adequate room for a workover rig and associated equipment. The coiled tubing unit will require approximately the same footprint as the workover rig. The bottom hole location is an approximation but should be located in the same general area.

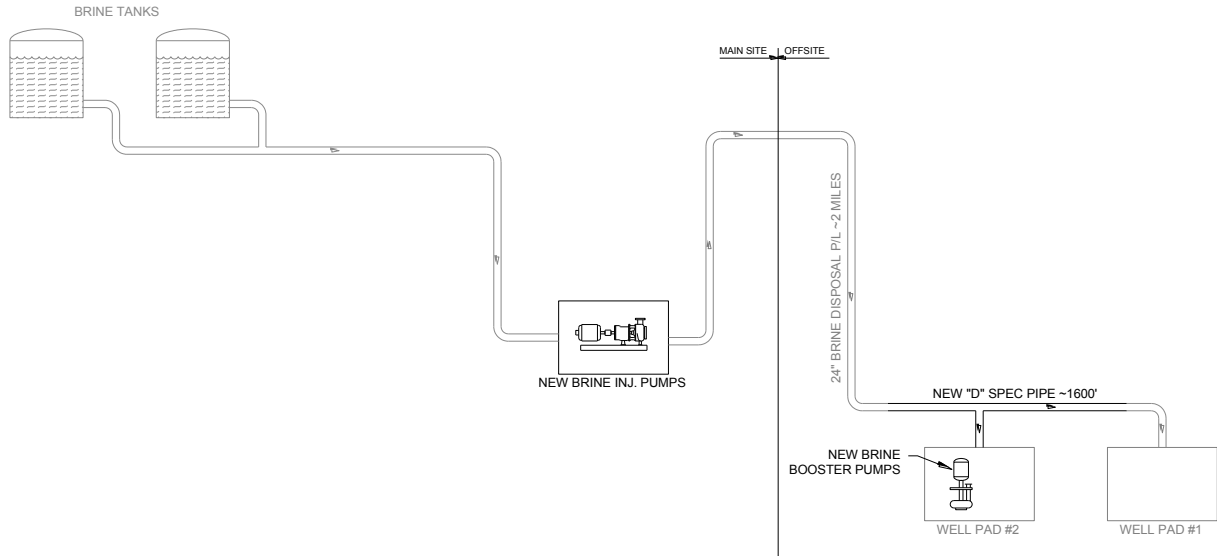
Additionally, this alternative would replace the existing brine injection pumps on the main site, to increase the system output pressure to ~600-650 Psig. The required brine injection pressure would then be achieved by an additional set of pumps located at or near brine disposal well pad 2. For this alternative, the new booster pump station can be sized for approximately 225 MBD at approximately 250 Psig TDH. Additionally, new utility electric power, transformers, and motor control centers would be required for the new power service requirements of the new pumps and associated piping, motor operated valves, instrumentation, control, and communication. This option assumes that the operating pressure of the pipeline does not support the installation of the new, additional pumps at the main site as defined in Alternative A. A separate project, WH-MM-826 is addressing the installation of a new pipeline and this project must consider the design and/or the “As-Built” condition of the new 24-inch brine disposal pipeline. Additionally, the existing manifold piping at disposal well pads 1 and 2 would need to be replaced in order to be suitable for the higher operating pressures produced by the new, additional pumps.

For this alternative, the requirements of the new brine pumps are less than in Alternative A; however, there are significant additional requirements associated with a new power line, transformers, motor control centers and life cycle maintenance due to the remote location of the new equipment.

### **Benefits & Effectiveness**

This alternative will allow for a Brine Disposal System that has adequate capacity to handle Level I Performance Criteria for Brine Disposal a 225 MBD fill rate at the West Hackberry (WH) Site. This option effectively eliminates the option to pass through north and south of the Sabine Wildlife Management Area, WMA.

There would be no additional security requirements for this option and this option optimizes the operating pressure of the associated pipeline.



**Figure 7 – New Brine Injection and Booster Pumps**

**Risk & Mitigation Factors**

There are associated risks with Clean Existing Wells, Develop New Brine Disposal Wells, Modify the Existing Brine Injection Pumps and Add Additional Booster Pumps at Brine Disposal Well pad 2. The risks include cost, scheduling, availability, and installation. The table below summarizes the risks with the correlating mitigation strategy. The table also describes the likelihood of occurrence at the site, along with how great of an impact the event would cause if it were to occur.

<b>Risk and Mitigation Strategies for Clean Existing Wells, Develop New Brine Disposal Wells, Replace the Existing Brine Injection Pumps and Add Additional Booster Pumps at Brine Disposal Well Pad 2 (Total Differential Head</b>			
<b>Risks</b>	<b>Mitigation Strategy</b>	<b>Likelihood – Impact</b>	<b>Risk Code</b>
Under-estimated cost	Make sure all possible project costs have been analyzed in the life cycle cost analysis.	Low – Low	Low Risk Hazard
Unknown subsurface	Ensure geological study of subsurface of planned route/well to verify obstacles. Drilling of test wells may be required.	High – High	High Risk Hazard
Equipment availability	Procure contractor and equipment in advance once the schedule has been determined to avoid delays with equipment availability.	Low – Medium	Low Risk Hazard
Scheduled outage extended	Ensure all equipment and parts have been delivered before beginning outage work. Verify availability of maintenance group to ensure schedules are aligned. Be aware of weather disturbances.	Low – High	Low Risk Hazard
Pumps and motors availability/delivery	Procure pumps and motors in advance to develop schedule to avoid delays with equipment delivery.	Low – Low	Low Risk Hazard
Pump base size inadequate for new pump and motors	Verify new pump and motor will fit on existing pump base. If not, modify pump base for new pump and motor. May extend outage schedule	Medium – High	Medium Risk Hazard
Inlet/Outlet pipe misaligned	Verify new pumps' inlet and outlet will align with existing pipe. If not, design to modify inlet and outlet pipe to fit new pumps.	Medium – Medium	Medium Risk Hazard

<b>Risk and Mitigation Strategies for Clean Existing Wells, Develop New Brine Disposal Wells, Replace the Existing Brine Injection Pumps and Add Additional Booster Pumps at Brine Disposal Well Pad 2 (continued)</b>			
<b>Risks</b>	<b>Mitigation Strategy</b>	<b>Likelihood – Impact</b>	<b>Risk Code</b>
Remaining life of existing brine injection pumps is not determined	Pursue more aggressive evaluation and routine fitness for service testing on site at WH to project remaining life of existing pumps.	Medium – Medium	Medium Risk Hazard
Well completion issues and failure	Ensure well completions are done as per required permit applications and completion standards.	Medium – High	Medium Risk Hazard
Sanding issues in wells	Need to adhere to professional geologist recommendations and ensure injection pump minimum flow guidance into well.	Med – High	Medium Risk Hazard
Clay swelling and plugging of wells	Remediation strategy of additional pumping capacity and required space in Injection Piping for the must be in place.	Med – High	Medium Risk Hazard
Environmental impacts due to injection well work	Ensure project performs required environmental due diligence and obtain necessary permits.	Low – High	Low Risk Hazard
Safety incidents during project construction.	Ensure project meets appropriate federal and industry safety standards during construction phase.	High – High	High Risk Hazard



## VI. ALTERNATIVE SELECTION

### List of Alternatives – Studied Alternatives

A. Clean Existing Wells, Develop New Brine Disposal Wells, Utilize Existing Brine Injection Pumps and Add New Brine Injection Pumps at the Main Site

This alternative would clean and rework existing wells and develop new brine disposal wells, thereby increasing the overall disposal capacity. This option addresses the additional injection well pressure requirements and other operational issues due to sharing the aquifer for injection by outside sources, by adding additional booster pumps for additional pumping capacity. There would be no changes to existing brine injection pumps.

The installation will utilize as much existing infrastructure as possible including cable trays, pipe supports, motor control centers, etc. but would require new supporting systems including electrical power, cabling, seal flush pumps, lighting, shelters and necessary process instrumentation and automation systems.

B. Clean Existing Wells, Develop New Brine Disposal Wells, Modify the Existing Brine Injection Pumps and Add Additional Booster Pumps at Brine Disposal Well Pad 2.

This alternative would clean and rework existing wells and develop new brine disposal wells, thereby increasing the overall disposal capacity. This option addresses the additional injection well pressure requirements and other operational issues due to sharing the aquifer for injection by outside sources, by upgrading the existing brine injection pumps to increase pressure output to ~600-650 psig and adding additional booster pumps to be located at brine disposal well pad 2.

New utility electric power, transformers, motor control centers would be required for the new power service requirements of the new pumps and associated piping, motor operated valves, instrumentation, control and communication.

### Comparison of Alternatives

#### Core Team Member Ratings

	Technically Sound Solution	Constructability During Ongoing Oil Deliveries	Ease of Operations	Ease of Maintenance	Safety During Construction	Sustainability
	<i>Most Important</i>	<i>Most Important</i>	<i>Most Important</i>	<i>Most Important</i>	<i>Less Important</i>	<i>Less Important</i>
<b>Alternative A</b>	<i>Not Rated</i>	<i>Excellent</i>	<i>Good</i>	<i>Excellent</i>	<i>Excellent</i>	<i>Adequate</i>
	<i>Excellent</i>	<i>Excellent</i>	<i>Excellent</i>	<i>Excellent</i>	<i>Excellent</i>	<i>Excellent</i>
	<i>Good</i>	<i>Excellent</i>	<i>Good</i>	<i>Good</i>	<i>Excellent</i>	<i>Excellent</i>
<b>Alternative B</b>	<i>Not Rated</i>	<i>Good</i>	<i>Excellent</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>
	<i>Good</i>	<i>Excellent</i>	<i>Excellent</i>	<i>Excellent</i>	<i>Excellent</i>	<i>Excellent</i>
	<i>Marginal</i>	<i>Excellent</i>	<i>Adequate</i>	<i>Adequate</i>	<i>Excellent</i>	<i>Good</i>

**WH-MM-1359**

**Revise West Hackberry RWINJ Pump Exercise System**

**VCI Project Engineer: Jason McCrossen**

**Recommended Alternative:**

***Combine with WH-MM-1025 and Share the Pond***

**Analysis of Alternatives  
Life Extension 2  
US Department of Energy  
Strategic Petroleum Reserve**

## I. PROJECT CONCEPT

### Mission Need

This Description of Work (DOW) addresses the objectives of the work package, Task WH-MM-1359, Revise WH Raw Water Injection (RWINJ) Pump Exercise System to change the routing of the RWINJ exercise loop cooling water discharge flows so that it does not involve flowing raw water into the caverns that could decrease cavern life expectancy.

### Functional Requirements

The control loops shall be designed/calculated to assure that they are fast acting controls. The pump exercise requirement is to run each of the seven RWINJ pumps for approximately 90 minutes with enough water (500 gpm) removed from the exercise loop during exercise for cooling. The pumps are exercised on a quarterly basis. For the alternative of using brine tanks as a sink: A brine tank requires ~25 MB of saturated brine at the start of testing. Then adding 15MB water in the tank at 1.015 MB.

## II. PROCESS

### Alternatives Analysis Plan

The complete Analysis of Alternatives (AoA) Process Plan for selection of the preferred alternative has been standardized for all AoA's and is detailed in Volume 1 of this Conceptual Design Report.

### Alternative Analysis Team Members

#### Core Team Members

Claudia Carrol	DOE, Systems Engineer
Jason McCrossen	VCI, Project Engineer
Lisa Eldredge	FFPO, Manager Design Engineering

#### Team Members

Ashley Thomas	DOE, Site Lead General Engineer
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Robert Bowles	FFPO, Manager Site Construction
Justin Rye	FFPO, Site Construction Maintenance Engineer
Steve Sleeman	FFPO, Sr Site Maintenance Engineer
Charles Deluca	FFPO, Principal Operational Systems Engineer
Ken Swanson	FFPO, Manager Site Operations

## III. SELECTION CRITERIA

The AoA Team determined the below listed criteria as relevant to the Analysis of Alternatives. Once alternatives are analyzed by the AoA Team, these criteria are used to evaluate and select a recommended preferred alternative.

### Constructability During On-Going Oil Deliveries

The selected alternative is able to be implemented with little or no impact to on-going oil delivery operations. Drawdown critical.

Weight: Most Important

### **Ease of Operations**

The selected alternative when implemented will result in a system that is able to be operated without significant additional training and is similar to existing systems and equipment.

Weight: Most Important

### **Ease of Maintenance**

The selected alternative is similar in nature to existing equipment resulting in commonality of similar systems for future maintenance and sparing consideration.

Weight: Most Important

### **Safety During Construction**

The selected alternative when implemented will be able to be constructed safely and operated safely. Ability to address Safety and Security concerns during implementation.

Weight: Most Important

### **Sustainability**

The selected alternative when implemented will be able to achieve DOE Sustainability goals for energy consumption as outlined in the Strategic Sustainability Performance Plan.

Weight: Less Important

### **Security During Construction**

The selected alternative when implemented will be able to be constructed with minimal to zero impacts to Site Security detection systems.

Weight: Less Important

## **IV. ALTERNATIVES IDENTIFICATION**

### **List of Alternatives**

The below listed alternatives are considered for analysis. Initial screenings conducted by the AoA Team determine the viability of each alternative.

#### **A. Status Quo**

Continuing to route cooling water to the caverns instead of the brine system will produce collateral leaching of caverns and will irreversibly compromise cavern life.

This Alternative has been screened out because it doesn't meet the Functional requirements of cavern integrity.

Viability: No Further Analysis

#### **B. Loop Around Cavern 103**

Make connections to the current raw water loop around Cavern 103 which will allow for raw water to cool.

This alternative will be studied further to determine the viability of this alternative. This loop will be separate from cavern maintenance.

Viability: Continue Analysis

**C. Use WHT-14 and WHT-15 Tanks**

One alternative is to re-route the cooling loop water to WHT-14 and 15. A detailed analysis will be required to determine the configuration and performance of the revised pump exercise system.

This alternative has been screened out because it doesn't meet the functional requirements of the salinity level in the BDW.

Viability: No Further Analysis

**D. Use Heat Exchangers to Increase Volume and Flow**

Using existing piping through the heat exchangers to increase the volume of water and time of cycles to assist in cooling the water.

This alternative has been screened out because it doesn't meet the functional requirements of the heat exchanger option.

Viability: No Further Analysis

**E. Combine with WH-MM-1025 and Share the Pond Alternative**

The construction of a holding pond in conjunction with WH-MM-1025 will allow for the RWINJ pump exercise water to be diverted into the holding pond.

This alternative will be studied further to determine the viability of this alternative.

Viability: Continue Analysis

**V. ALTERNATIVES ANALYSIS**

Based on initial analysis of the alternatives, alternatives A, C, and D are eliminated from further consideration. The remaining alternatives, B and E are examined below as alternatives A and B, respectively

The below analyses provide the research and technical information gathered by the AoA Team. These analyses are not evaluative or comparative.

## A. Loop Around Cavern 103

Make connections to the current raw water loop around Cavern 103 which will allow for raw water to cool. This loop will be separate from cavern maintenance.

### Assumptions & Constraints

Cavern 103 piping will be unavailable for use as a cooling loop during cavern maintenance. If this alternative is selected, Cavern 103 will be unavailable while constructing the exercise loop piping to existing piping. The additional valves needed to separate the extended loop and downhole piping will require additional maintenance.

### Benefits & Effectiveness

The alternative will provide the benefit of disposal of heated water from the Raw Water Injection Pump Exercise System without injecting raw water into the caverns. It will also greatly increase the size of the cooling loop, partially utilizing some existing infrastructure allowing the water to maintain the desired temperature without compromising cavern integrity. Some operational training will be required to properly operate valves that separate the loop around cavern 103 and the downhole piping. All work will be done within the existing security parameter and will not have an impact on site security detection systems. This alternative will require continuous use of pumps to cycle the water through the loop.

### Risk & Mitigation Factors

There are associated risks with the alternative Loop Around Cavern 103 which are summarized in the table below. The table describes the likelihood of occurrence at the site, along with how great of an impact the event would cause if it were to occur.

<b>Risk and Mitigation Strategies for Loop Around Cavern 103</b>			
<b>Risks</b>	<b>Mitigation Strategy</b>	<b>Likelihood – Impact</b>	<b>Risk Code</b>
Loop around Cavern 103 would be unavailable during cavern maintenance.	Schedule Cavern 103 maintenance around quarterly pump exercise program.	Low - High	Low Risk Hazard

**B. Combine with WH-MM-1025 and Share the Pond**

The construction of a holding pond in conjunction with WH-MM-1025 will allow for the RWINJ pump exercise water to be diverted into the holding pond.

**Assumptions & Constraints**

A separate project to provide a holding pond for disposal of water associate with pigging the raw water pipeline (WH-MM-1025) is implemented in conjunction with this project.

**Benefits & Effectiveness**

The alternative will provide the benefit of disposal of heated water from the Raw Water Injection Pump Exercise System and allowing it to function properly. It will also discharge all heated water to a cooling pond which will also be effective in allowing the exercise water to maintain the desired temperature without compromising cavern integrity. Construction of the pond and connecting piping will only effect site operation during final connection of piping to the Raw Water Injection Pump piping. All work will be done within the existing security parameter and will not have an impact on site security detection systems. Water discharged into the pond will not be pumped back to the Raw Water Injection Pumps. Discharging the heated water into the pond to cool will provide a simpler system to maintain.

**Risk & Mitigation Factors**

There are associated risks with the alternative Combine with WH-MM-1025 and Share the Pond which are summarized in the table below. The table describes the likelihood of occurrence at the site, along with how great of an impact the event would cause if it were to occur.

<b>Risk and Mitigation Strategies for Combine with WH-MM-1025 and Share the Pond</b>			
<b>Risks</b>	<b>Mitigation Strategy</b>	<b>Likelihood – Impact</b>	<b>Risk Code</b>
Contaminants released from the exercise loop could be released into the environment.	Implement a system of testing the water in holding pond prior to its release into the local watershed.	Low – High	Low Risk Hazard

## VI. ALTERNATIVE SELECTION

### List of Alternatives – Studied Alternatives

A. Loop Around Cavern 103

Make connections to the current raw water loop around Cavern 103 which will allow for raw water to cool.

B. Combine with WH-MM-1025 and Share the Pond

The construction of a holding pond in conjunction with WH-MM-1025 will allow for the RWINJ pump exercise water to be diverted into the holding pond.

### Comparison of Alternatives

Core Team Member Ratings

	<b>Constructability During Ongoing Oil Deliveries</b>	<b>Ease of Operations</b>	<b>Ease of Maintenance</b>	<b>Safety During Construction</b>	<b>Sustainability</b>	<b>Security During Construction</b>
	<i>Most Important</i>	<i>Most Important</i>	<i>Most Important</i>	<i>Most Important</i>	<i>Less Important</i>	<i>Less Important</i>
<b>Alternative A</b>	<i>Marginal</i>	<i>Adequate</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>
	<i>Marginal</i>	<i>Adequate</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<b>Excellent</b>
	<b>Excellent</b>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>
<b>Alternative B</b>	<i>Adequate</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<b>Excellent</b>	<i>Good</i>
	<i>Adequate</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<b>Excellent</b>	<b>Excellent</b>
	<b>Excellent</b>	<b>Excellent</b>	<b>Excellent</b>	<i>Good</i>	<b>Excellent</b>	<i>Good</i>



**BH-MM-596**

**Replace Onshore Section of Brine Disposal Pipeline**

**VCI Project Engineer: Brian Tuminello**

**Recommended Alternative:**

***Construct a New Appropriate Diameter On-Shore Portion of the Pipeline;  
Optimize New Line Size with New Brine Disposal Pumps and Motors***

## I. PROJECT CONCEPT

### Mission Need

The current mission requirement for Big Hill to meet the SPR Level I Brine Disposal rate is 225,000 barrels per day (225 MBD). To achieve this, the Brine Disposal pumps transfer brine to the Gulf of Mexico through a 14-mile-long, 48-inch diameter, steel pipeline.

### Functional Requirements

The functional requirements for this Project is to assure that the Brine Disposal Pipeline will continue to support the Crude Oil Fill and Operational Mission of Big Hill Brine Disposal. The Pipeline must be able to be cleaned and inspected to determine its integrity.

## II. PROCESS

### Alternatives Analysis Plan

The complete Analysis of Alternatives (AoA) Process Plan for selection of the preferred alternative has been standardized for all AoA's and is detailed in Volume 1 of this Conceptual Design Report.

### Alternative Analysis Team Members

#### Core Team Members

Claudia Carroll	DOE, Systems Engineer
Brian Tuminello	VCI, Project Engineer
Chris Vedros	FFPO, Manger Pipeline and Equipment Integrity

#### Team Members

Reza Zinolabedini	DOE, Lead General Engineer
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Danny Duff	FFPO, Site Maintenance Manager
Paul Riegert	FFPO, Site Construction Manager
Tony Deville	FFPO, Site Operations Manager

## III. SELECTION CRITERIA

The AoA Team determined the below listed criteria as relevant to the Analysis of Alternatives. Once alternatives are analyzed by the AoA Team, these criteria are used to evaluate and select a recommended preferred alternative.

### Ease of Maintenance

The selected alternative is similar in nature to existing equipment resulting in commonality of similar systems for future maintenance and sparing consideration.

Weight: Most Important

### **Safety During Construction**

The selected alternative when implemented will be able to be constructed safely and operated safely. Ability to address Safety and Security concerns during implementation.

Weight: Most Important

### **Sustainability**

The selected alternative when implemented will be able to achieve DOE Sustainability goals for energy consumption as outlined in the Strategic Sustainability Performance Plan.

Weight: Important

### **Constructability During On-Going Oil Deliveries**

The selected alternative is able to be implemented with little or no impact to on-going oil delivery operations.

Weight: Less Important

### **Ease of Operations**

The selected alternative when implemented will result in a system that is able to be operated without significant additional training and is similar to existing systems and equipment.

Weight: Less Important

### **Security During Construction**

The selected alternative when implemented will be able to be constructed with minimal to zero impacts to Site Security detection systems.

Weight: Less Important

## **IV. ALTERNATIVES IDENTIFICATION**

### **List of Alternatives**

The below listed alternatives are considered for analysis. Initial screenings conducted by the AoA Team determine the viability of each alternative.

#### **A. Status Quo**

This alternative would continue to operate the existing pipeline and conducting the same type of periodic testing and inspections to determine the integrity of the pipeline. Future inspections would indicate the trend data of localized areas of inspection and necessary repairs. The current program cannot assess nor assure the condition of the pipeline. This alternative is not recommended for further evaluation.

Viability: No Further Analysis

#### **B. Construct a New Appropriate Diameter On-Shore Portion of the Pipeline**

This alternative would include a new on-shore portion of the brine disposal pipeline and would assure a long term, high integrity on-shore portion of the brine disposal pipeline. Several considerations to be addressed are route, Gulf Intracoastal Waterway (GIWW) crossing, land acquisition, and tie-in at the beach. The mission requirements have significantly decreased from the original design of the existing pipeline. (The brine disposal pipeline was originally sized for 1,400,000 barrels per day.) The replacement would provide several different options regarding the material of construction including new steel, new alloy steel, non-metallic (HDPE), or internally lined piping.

This alternative is to replace the on-shore portion of the brine pipeline. Hydraulic analysis would dictate the pipeline size requirements and the replacement option would most likely result in a smaller line size. Various materials of construction and/or internal coatings could be analyzed, potentially providing superior

corrosion resistance to that of the existing steel pipeline. Depending on the size of the new pipeline, it may be possible to construct a new, appropriate diameter pipeline in the existing Right of Way (ROW) thus avoiding the requirement for land acquisition.

Viability: Continue Analysis

**C. Construct a New Appropriate Diameter On-Shore Portion of the Pipeline; Optimize New Line Size with New Brine Disposal Pumps and Motors**

This alternative would be the same as alternative B but it would optimize the new line size with new, appropriately sized brine disposal pumps, motors, and associated discharge valves and piping. The existing pumps and motors were designed for a very different mission and should be considered for replacement due to age and size / horsepower requirements.

This alternative would most likely be the costliest approach; however, it would assure the brine disposal system equipment meets the project functional requirements and assures the long term reliability and dependability of the new equipment. The existing brine disposal pumps are capable of much greater flow and pressure than what is required for the brine disposal mission. The existing 2,500 horsepower motors are reaching the end of their useful life and should be considered for replacement.

Viability: Continue Analysis

**D. Clean and Inspect the Existing Pipeline to Determine Extent of Condition and Extent of Required Repairs and / or Replacement**

This alternative would involve the use of an inspection “smart” pig to determine the condition of the pipeline. Significant cleaning would be required due to the anticipated amount of rust scale on the inside of the pipe. This would involve sending numerous pigs down the pipeline. A pig receiving tray would be required either at the beach crossing or the end of the pipeline in the Gulf of Mexico. Depending on the results of the pig run and pig data evaluation, the required extent of repairs and or replacement could be identified.

This alternative is feasible to determine the extent of condition of the existing pipeline and only address those areas needing attention. This inspection would most likely include the off-shore portion of the pipeline. This would involve the use of offshore marine equipment and underwater diver operations. There would be considerable expense in preparing the pipeline for an adequate inspection with no certainty of obtaining useful inspection results. If inspection data was deemed to be of good quality for integrity determination, verification efforts would be appropriate to validate the inspection results. The inspection data may necessitate some emergency based repairs if integrity data indicated pending failure or leak especially in the first 10 miles (on-shore portion) of the pipeline. SPR experience in a pipeline in this service and age has indicated that this line is near the useful end of life. Several repairs have already been made in certain sections of this pipeline.

Viability: No Further Analysis

**E. Develop Brine Injection Wells for Brine Disposal**

This alternative would require the feasibility analysis of drilling underground injection wells into an appropriate aquifer for disposal of brine. This approach would be similar to those used at the West Hackberry and Bayou Choctaw sites. Since the brine disposal requirements at Big Hill are currently only at 225 MBD, this approach may be viable. The facility for brine disposal wells would need to include the necessary piping, valving, lighting, well-pads, and acquisition of the required real estate.

the disposal wells could be located. This would most likely result in the need to acquire the necessary property and permits for deep injection of brine.

Viability: No Further Analysis

#### **F. Transfer Brine to 3<sup>rd</sup> Party for Disposal/Underground Injection**

This alternative would be to contract with a 3<sup>rd</sup> party to provide assurance of the capability to dispose of brine at the required rates to support DOE Mission requirements. This would put the life cycle expense of operating disposal facilities onto a 3<sup>rd</sup> party but would also put the DOE in a position of being dependent on a 3<sup>rd</sup> party to support the on-going operational and mission requirements for brine disposal.

This alternative may be viable if DOE can reach agreement with a nearby disposal facility. This would create a dependence on a 3<sup>rd</sup> party for the capability and availability to support DOE's brine disposal requirements. Additionally, this alternative does not provide the reliability of brine disposal and introduces a concern of lack of competition for someone to sell brine to.

Viability: No Further Analysis

#### **G. Construct a New Appropriate Diameter On-Shore Portion of the Pipeline using the existing 48-inch Pipeline as a Sleeve; Optimize New Line Size with New Brine Disposal Pumps and Motors.**

This alternative is the same as Alternative C except the new line would be constructed using appropriately sized HDPE pipe installed inside of the existing 48-inch brine line which would be used as a casing. Additionally, new pumps, motors, and associated discharge valves and piping would be installed. Hydraulic analysis would dictate the pipeline size requirements and the replacement option would most likely result in a smaller line size. Based on the hydraulics the size of the new pipeline will be able to utilize the existing brine line as a casing and would eliminate the need for any new Right of Way (ROW) thus avoiding the requirement for land acquisition.

### **V. ALTERNATIVES ANALYSIS**

Based on initial analysis of the alternatives, alternatives A, D, E, and F are eliminated from further consideration. The remaining alternatives, B, C, and G are examined below as alternatives A, B, and C, respectively.

The below analyses provide the research and technical information gathered by the AoA Team. These analyses are not evaluative or comparative.

## A. Construct a New Appropriate Diameter On-Shore Portion of the Pipeline

This alternative would include a new onshore portion of the brine disposal pipeline and would assure a long term, high integrity portion of the brine disposal pipeline. Several considerations to be addressed are route, Gulf Intracoastal Water Way (GIWW) crossing, land acquisition, and tie-in at the beach. The current mission requirements are significantly different from the original design of the existing pipeline. The replacement would provide several different options regarding the material of construction including new steel, new alloy steel, non-metallic (HDPE), or internally lined, steel piping. For this alternative, a new pipeline would be constructed and installed in a trench or directionally drilled adjacent to the existing pipeline presumably in the existing right of way while the existing pipeline remains in service.

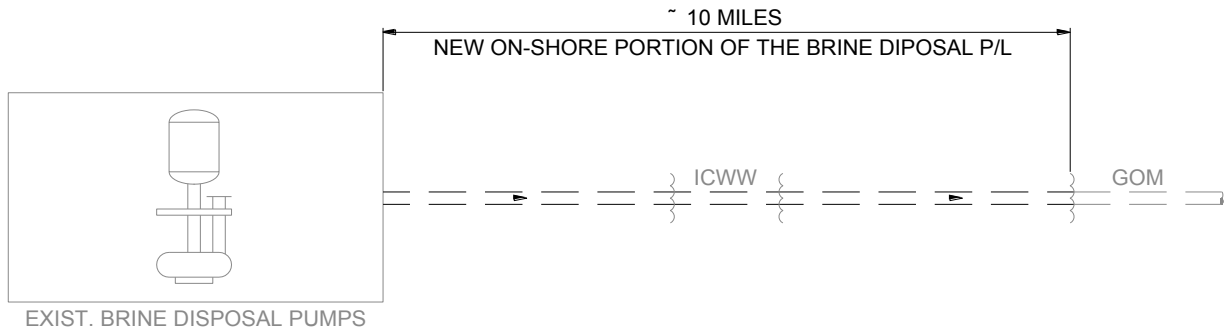


Figure 1 – New On-Shore Portion of Pipeline

### Assumptions & Constraints

There is an assumption that the pipeline will be able to be excavated at the beach and an appropriate transition can be made to continue the use of the existing offshore portion of the pipeline. It is assumed that the pipeline from the point of tie-in to the end of diffuser section offshore has integrity. It is further assumed that the necessary construction equipment can be mobilized through-out the length of the pipeline route including the beach tie-in location. An important constraint for this and all alternatives is the amount of time that the Big Hill Site can manage cavern pressures within the design parameters and be without brine disposal capability. Preliminary design concept would suggest a 26-inch diameter, DR 13.5, High Density Polyethylene (HDPE) pipeline or a 24-inch lined, externally coated, carbon steel pipeline. Additionally, while the use of HDPE offers excellent corrosion resistance, there is currently no known method of conducting an integrity assessment.

### Benefits & Effectiveness

This alternative provides an appropriately designed brine disposal system meeting the required 225,000 barrel per day brine disposal requirement. The replacement pipeline made of HDPE or lined, externally coated, carbon steel would offer excellent corrosion resistance and meet pressure requirements. The current brine disposal mission is very different from the mission of the original pipeline allowing the new pipeline to be a much smaller diameter pipeline.

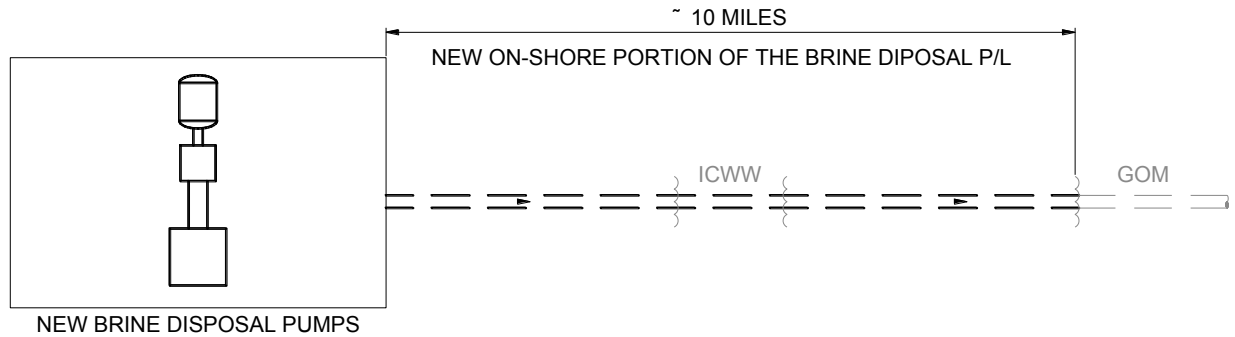
### Risk & Mitigation Factors

There are associated risks with this alternative which are summarized in the table below. The table describes the likelihood of occurrence at the site, along with how great of an impact the event would cause if it were to occur.

<b>Risk and Mitigation Strategies for Constructing New On-Shore Portion of the Brine Disposal Pipeline</b>			
<b>Risks</b>	<b>Mitigation Strategy</b>	<b>Likelihood – Impact</b>	<b>Risk Code</b>
Delays in obtaining necessary right of way and permits to construct new pipeline.	Determine the best alternative and proceed with necessary approvals at earliest possible date.	Low – High	Low Risk Hazard
Existing pipeline and brine disposal system would be out of service for an extended period of time depending on route and final tie-ins.	Detail engineering design would optimize the pipeline routing from the main Big Hill Site to the beach.	High - Medium	Medium Risk Hazard

**B. Construct a New Appropriate Diameter, On-Shore Portion of the Pipeline; Optimize New Line Size with New Brine Disposal Pumps and Motors**

This alternative would be the same as alternative A but it would optimize the new line size with new, appropriately sized brine disposal pumps and motors. The existing pumps, motors, and associated discharge valves and piping were designed for a very different mission and should be considered for replacement due to age and size / horsepower requirements. For this alternative, a new pipeline would be constructed and installed in a trench or directionally drilled adjacent to the existing pipeline. Preliminary design concept would suggest a 26-inch, DR 13.5 HDPE pipeline or a 24-inch lined carbon steel pipeline with approximately 500 horsepower electric motor driven, vertical turbine pumps.



**Figure 2 – New On-Shore Portion of Pipeline and New Brine Disposal Pumps**

**Assumptions & Constraints**

There is an assumption that the pipeline will presumably be installed in the existing right of way while the existing pipeline remains in service; the pipeline will be able to be excavated at the beach and an appropriate transition can be made to continue the use of the existing offshore portion of the pipeline. It is assumed that the pipeline from the point of tie-in to the end of diffuser section offshore has integrity. It is further assumed that the necessary construction equipment can be mobilized through-out the length of the pipeline route including the beach tie-in location. The existing motors (2,500 HP) would most likely be replaced with much lower horsepower motors. The new piping and pump/motors would be purchased as Long Lead Equipment. An important constraint for this and all alternatives is the amount of time that the Big Hill Site can manage cavern pressures within the design parameters and be without brine disposal capability. Additionally, while the use of HDPE offers excellent corrosion resistance, there is currently no known method of conducting an integrity assessment.

**Benefits & Effectiveness**

This alternative provides an appropriately designed brine disposal system meeting the required 225,000 barrel per day brine disposal requirement. The replacement pipeline made of HDPE would offer excellent corrosion resistance and meet pressure and temperature requirements. The current brine disposal mission is very different from the mission of the original pipeline allowing the new pipeline and pumps to be a much smaller diameter pipeline.

Optimizing the brine disposal pumps and motors will result in reduced power requirements and cost and will assure the pump and motors are meeting the 25-year life expectancy requirements.

The new motors, pumps, and pipeline will be sized to meet the project functional requirements and the equipment and operating expense should be significantly smaller with lower operating costs. The new motors could be installed on the existing brine disposal platform and the electrical system reconfigured to support the new, smaller motors.



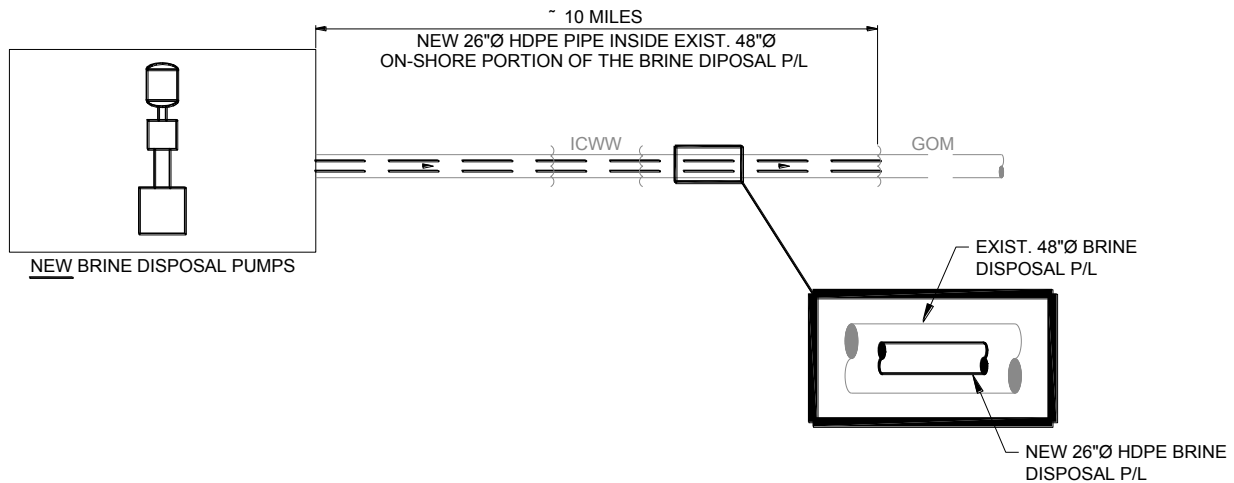
**Risk & Mitigation Factors**

There are associated risks with this alternative which are summarized in the table below. The table describes the likelihood of occurrence at the site, along with how great of an impact the event would cause if it were to occur.

<b>Risk and Mitigation Strategies for Constructing a New Appropriate Diameter On-Shore Portion of the Pipeline; Optimize New Line Size with New Brine Disposal Pumps and Motors</b>			
<b>Risks</b>	<b>Mitigation Strategy</b>	<b>Likelihood – Impact</b>	<b>Risk Code</b>
Delays in obtaining necessary right of way and permits to construct new pipeline.	Determine the best alternative and proceed with necessary approvals at earliest possible date.	Low – High	Low Risk Hazard
Existing pipeline and brine disposal system (pipeline and pumps) would be out of service for an extended period of time depending on route and final tie-ins.	Detail engineering design would optimize the pipeline routing from the main Big Hill Site to the beach. Purchase of new pump/motors and piping as Long lead equipment.	High – Medium	Medium Risk Hazard

**C. Construct a New Appropriate Diameter On-Shore Portion of the Pipeline using the existing 48-inch Pipeline as a Sleeve; Optimize New Line Size with New Brine Disposal Pumps and Motors**

This alternative would be the same as alternative B but it would utilize the existing 48-inch brine disposal pipeline as a sleeve in which to install a new, smaller diameter pipeline and with new, appropriately sized (smaller) brine disposal pumps and motors. The existing pumps, motors, and associated discharge valves and piping were designed for a very different mission and should be considered for replacement due to age and size / horsepower requirements. Preliminary design concept would suggest a 26-inch, DR 13.5, HDPE pipeline with approximately 500 horsepower electric motor driven, vertical turbine pumps. Additionally, this diameter pipe could be installed (pulled) in 5,000 + foot sections at a time resulting in approximately 10 to 11 pull points for the 10 mile on-shore segment.



**Figure 3 – New On-Shore Portion of Pipeline Inside of Existing Pipeline and New Brine Disposal Pumps**

**Assumptions & Constraints**

There is an assumption that the pipeline will be able to be excavated at the beach and an appropriate transition can be made to continue the use of the existing offshore portion of the pipeline. It is assumed that the pipeline from the point of tie-in to the end of diffuser section offshore has integrity. It is further assumed that the necessary construction equipment can be mobilized through-out the length of the pipeline route including the beach tie-in location. The existing motors (2,500 HP) would most likely be replaced with much lower horsepower motors. The new piping and pump/motors would be purchased as Long Lead Equipment. An important constraint for this and all alternatives is the amount of time that the Big Hill Site can manage cavern pressures within the design parameters and be without brine disposal capability. Additionally, while the use of HDPE offers excellent corrosion resistance, there is currently no known method of conducting an integrity assessment.

**Benefits & Effectiveness**

This alternative provides an appropriately designed brine disposal system meeting the required 225,000 barrel per day brine disposal requirement. The replacement pipeline made of HDPE pipe would offer excellent corrosion resistance and can meet the flow and pressure requirements. This alternative has the added benefit of the avoidance of acquisition of any new land for new pipeline right of way and with the anticipated 5000-foot-long pull segments, the impact in the marsh area would be minimal.

Optimizing the brine disposal pumps and motors will result in reduced power requirements and cost and will assure the pump and motors are meeting the 25-year life expectancy requirements.

The new motors, pumps and pipeline will be sized to meet the project functional requirements and the equipment and operating expense should be significantly smaller with lower operating costs. The new pump

/ motors could be installed on the existing brine disposal platform and the electrical system reconfigured to support the new, smaller motors.

**Risk & Mitigation Factors**

There are associated risks with this alternative which are summarized in the table below. The table describes the likelihood of occurrence at the site, along with how great of an impact the event would cause if it were to occur.

<b>Risk and Mitigation Strategies for Constructing a New Appropriate Diameter On-Shore Portion of the Pipeline using the existing 48” Pipeline as a Sleeve; Optimize New Line Size with New Brine Disposal Pumps and Motors.</b>			
<b>Risks</b>	<b>Mitigation Strategy</b>	<b>Likelihood – Impact</b>	<b>Risk Code</b>
Difficulty in preparing excavated pits to install (pull) 5,000 foot sections of new HDPE pipeline.	Detailed Engineering Design will determine the best location for pull points of the new HDPE pipeline	Low - Medium	Low Risk Hazard
Existing pipeline and brine disposal system (pipeline and pumps) would be out of service for an extended period of time depending on actual pull lengths and final tie-ins.	Detail engineering design would optimize the pipeline pull segments from the main Big Hill Site to the beach. Purchase new pump/motors and piping as Long lead equipment. A construction strategy would need to be developed to conduct as many segment pulls concurrently as possible.	High – Low	Low Risk Hazard

## VI. ALTERNATIVE SELECTION

### List of Alternatives – Studied Alternatives

#### A. Construct a New Appropriate Diameter On-Shore Portion of the Pipeline

This alternative would include a new onshore portion of the brine disposal pipeline and would assure a long term, high integrity portion of the brine disposal pipeline. Several considerations to be addressed are route, ICWW crossing, land acquisition and tie-in at the beach. The mission requirements are significantly different from the original design of the existing pipeline. The replacement would provide several different options regarding the material of construction including new steel, new alloy steel, non-metallic (HDPE) or internally lined piping.

#### B. Construct a New Appropriate Diameter On-Shore Portion of the Pipeline; Optimize New Line Size with New Brine Disposal Pumps and Motors

This alternative would be the same as alternative A but it would optimize the new line size with new, appropriately sized brine disposal pumps and motors. The existing pumps, motors and associated discharge valves and piping were designed for a very different mission and should be considered for replacement due to age and size / horsepower requirements.

#### C. Construct a New Appropriate Diameter On-Shore Portion of the Pipeline using the existing 48-inch Pipeline as a Sleeve; Optimize New Line Size with New Brine Disposal Pumps and Motors

This alternative would be the same as alternative B but it would utilize the existing 48-inch brine disposal pipeline as a sleeve in which to install a new, smaller diameter pipeline and with new, appropriately sized (smaller) brine disposal pumps and motors. The existing pumps and motors were designed for a very different mission and should be considered for replacement due to age and size / horsepower requirements. Early engineering analysis has indicated that 26-inch HDPE DR13.5 Pipe would meet the flow and pressure requirements and that this diameter pipe could be installed (pulled) in 5,000 + foot sections at a time.

### Comparison of Alternatives

#### Core Team Member Ratings

	Ease of Maintenance	Safety During Construction	Sustainability	Constructability During Ongoing Oil Deliveries	Ease of Operations	Security During Construction
	<i>Most Important</i>	<i>Most Important</i>	<i>Important</i>	<i>Less Important</i>	<i>Less Important</i>	<i>Less Important</i>
<b>Alternative A</b>	<i>Good</i>	<i>Good</i>	<i>Marginal</i>	<i>Excellent</i>	<i>Good</i>	<i>Excellent</i>
	<i>Good</i>	<i>Good</i>	<i>Marginal</i>	<i>Excellent</i>	<i>Good</i>	<i>Excellent</i>
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Excellent</i>	<i>Good</i>	<i>Good</i>
<b>Alternative B</b>	<i>Excellent</i>	<i>Good</i>	<i>Marginal</i>	<i>Excellent</i>	<i>Good</i>	<i>Excellent</i>
	<i>Excellent</i>	<i>Good</i>	<i>Marginal</i>	<i>Excellent</i>	<i>Good</i>	<i>Excellent</i>
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>
<b>Alternative C</b>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Marginal</i>	<i>Good</i>	<i>Excellent</i>
	<i>Excellent</i>	<i>Good</i>	<i>Excellent</i>	<i>Adequate</i>	<i>Good</i>	<i>Excellent</i>
	<i>Marginal</i>	<i>Good</i>	<i>Good</i>	<i>Marginal</i>	<i>Good</i>	<i>Good</i>

**BH-MM-756, BH-MM-756A**

**Replace Section of 36" COP at Hillebrandt Bayou (Install  
and Government Furnished Equipment)**

**VCI Project Engineer: Bill Fogle**

**Recommended Alternative:**

*This project has been issued as Approved for Construction (AFC)*

**Analysis of Alternatives  
Life Extension 2  
US Department of Energy  
Strategic Petroleum Reserve**

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## I. PROJECT CONCEPT

### Mission Need

The Big Hill 36-inch crude oil pipeline was installed in 1987 and is 24.7 miles long with 0.500-in wall thickness. The original crossing at Hillebrandt was constructed of 0.625-in wall materials. Several corrosion anomalies were identified during the 2009 and 2014 surveys. The 2014 survey identified 202 corrosion anomalies along the entire pipeline, with greater than 40% wall loss. Of the 202 locations, 29 (14 percent, including 2 anomalies with over 50 percent wall loss) were located within a 135-foot segment under Hillebrandt Bayou. The location is abutted by marsh area mostly on the south side of the bayou and pastureland on the north side. The pipeline segment is located north of FM 365, which runs east to west. This area is at a point just beyond the southern bank of the waterway.

### Functional Requirements

- The design of the pipeline must be able to meet or exceed the 25-year life ascribed to the Life Extension 2 projects.
- The construction installation must ensure no more than 13-day outage of the pipeline per SPR guidelines

## II. PROCESS

### Alternatives Analysis Plan

The Analysis of Alternatives (AoA) Process Plan is not applicable to projects with detailed design packages issued to DOE as Approved for Construction (AFC).

This document outlines completed design Scope of Work for BH-MM-756, BH-MM-756A

## III. SELECTION CRITERIA

Formal selection criteria are not applicable to projects with detailed design packages issued as AFC.

## IV. ALTERNATIVES IDENTIFICATION

Alternative Identification is not applicable to projects with detailed design packages issued as AFC.

## V. ALTERNATIVES ANALYSIS

Alternative Analysis is not applicable to projects with detailed design packages issued as AFC.

The AFC detailed design identified and outlined the following scope of work:

- Install two (2) 22.5-degree piping offsets to connect the existing pipeline into the new segment. These offsets will each be constructed of two (2) 22.5-degree 5-R bends with 3-D tangents length on each end. These offsets may also include engineered trust blocks to address the forces imparted while flowing. This will permit the new pipeline segment to be placed in a lateral position approximately 10-20-feet away. Due to the size of the bends, the offsets will be assembled at or near the final installation position, with full NDT and coatings as required.
- Field-applied coatings are limited to weld joints and repairs. Coating system to be compatible with factory applied coating.
- Remove two to four (2-4) 100-foot pipeline sections to allow for the installation of the offsets and mobility of the required equipment. The final length of the pipeline segment to be installed is estimated at approximately 1,800 – 2,100 LF.

- Abandon in place 1250 – 1600 LF of 36-in line pipe across and below Hillebrandt Bayou. Line to be capped in place. Final length to be determined in field.
- The abandoned sections are to be cleaned, inspected, capped, and inserted in accordance with ASME B31.4, section 457, and TXRRC requirements.
- Removed pipe material to be cleaned and checked for NORM before removal from worksite for disposal.
- The spoil slurry from the drilling operations shall be collected with frac tanks and/or vacuum trucks for disposal at predetermined location(s) adjoining the pipeline work area for natural absorption into the ecosystem. The original bayou crossing segment, approximately 1250-foot long will be capped and left in place. The estimated volume for the bore is 750-800 cubic yards, based upon volume of 12.56 cu. Ft / LF of 48" bore. The total excavated material is estimated at 2200 cu yds. The non-drill material will be replaced as backfill over the pipeline, and drill site locations to restore the area.
- Install new pipeline crossing signage on both sides of Hillebrandt Bayou above the new crossing location. The existing signage will be left in position since the original pipeline segment will be left in position. It is recommended that the existing signage be modified to reflect that the pipeline is out of service.
- Civil / Site preparation activities, to include roadside site access points for contractors, drainage requirements, roads and defined matted work areas to support project activities before during and after execution. Traffic signage and control package as required by TxDOT.
- Current SPR Spill Prevention Control and Contingency (SPCC) Plan, will be incorporated into project construction-specific plan as deemed necessary.
- Install 1650 LF of 36-inch x 0.75" wt. API-5LX-60-line pipe in a parallel route to the original with a minimum offset.
- Offset spool components in accordance with ASME B16.49.
- Employ Horizontal Directional Drilling (HDD) to minimize ecological impacts to sensitive bayou area.
- Submittal and approval of USACE of drilling plan.
- Drilling location and profile drawings
- Drilling Fracture calculations
- Fracture Contingency recovery plan
- Submittal and Approval of TX DOT required traffic control plan, including:
  - Signage and traffic control for two access points
  - Temporary roadway and fencing construction and removal
- Install water crossing signage as required.

## VI. ALTERNATIVE SELECTION

Alternative Selection is not applicable to projects with detailed design packages issued as AFC.

BH-MM-756, BH-MM-756A Scope of Work is outlined in Section V.: Alternatives of Analysis of this document.



**BH-SP-1307**

**Shell-Zydeco Custody Meter Station**

**VCI Project Engineer: Bill Fogle**

**Recommended Alternative:**

***Local Control of ACT Flow Meter Skid at Shell-Zydeco (Habitable) with Standard Security Fence without Full SPR Security Measures***

**Analysis of Alternatives  
Life Extension 2  
US Department of Energy  
Strategic Petroleum Reserve**

## I. PROJECT CONCEPT

### Mission Need

The Big Hill (BH) site delivers crude oil via a single 36-inch pipeline leaving the site to one of three destinations: The Shell-Zydeco Pipeline System (Zydeco), the Phillips 66 Beaumont Terminal Marine Terminal, and the Sunoco Logistics Nederland Terminal. The current BH site configuration does not have the capability to control flow rates to multiple destinations. In addition, there is no means of flow measurement at the Shell or Phillips 66 Beaumont Terminal junctures. Therefore, crude oil deliveries from BH may be made to only one destination at a time.

BH distribution system will be modified for simultaneous controlled delivery with BH-SP-1407 to all three destinations. There are custody agreements in place for Phillips 66 and Sun Terminal. Additionally, BH-SP-1407 Project will add ultrasonic meters at Phillips 66 and Sun Terminal. There is not a custody transfer meter or agreement at Shell-Zydeco; therefore, the delivered crude oil can only be measured with BH site custody metering skid.

A custody transfer metering skid at Shell-Zydeco is needed to allow for simultaneous delivery to all three destinations. Big Hill will have the ability to achieve Level I drawdown rate which the SPR is committed to maintaining.

### Functional Requirements

- Big Hill is required to deliver 250 thousand barrels per day (MBD) to Shell-Zydeco Pipeline.
- The design of the metering station must be able to meet or exceed the 25-year life ascribed to the Life Extension 2 projects.
- The new custody metering station must be able to measure flow rates between 33 MBD and 250 MBD (maximum pipeline capacity).
- The reading accuracy should be  $\pm 0.25$  percent over the normal flow range with a repeatability of 0.02% in accordance with Level III, design criteria, paragraph 9.2.4-Metering, and API Manual of Petroleum Measurement Standards (MPMS)
- The metering skid must meet the strict definition of an Allocation Custody Transfer (ACT) skid.
- A prover will be required to verify the accuracy of the meter which is essential in ensuring sustainable measurement and appropriate compliance to accuracy and repeatability requirements over time.
- Onsite sample storage shall be provided for 60-day, in accordance with section 9.2.3 requirements
- The metering station area must be secured from intrusions.
- The accessibility to Shell-Zydeco site must be improved.

## II. PROCESS

### Alternatives Analysis Plan

The complete Analysis of Alternatives (AoA) Process Plan for selection of the preferred alternative has been standardized for all AoA's and is detailed in Volume 1 of this Conceptual Design Report.

### Alternative Analysis Team Members

#### Core Team Members

Claudia Carroll	DOE, Systems Engineer
Bill Fogle	VCI, Project Engineer
Chris Vedros	FFPO, Manager Pipeline and Equipment Integrity

### Team Members

Christopher Roark	DOE, Crude Oil Marketing Analyst
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John Guidry	FFPO, Site Director
Tony DeVille	FFPO, Manager Site Operations
Mark Thorn	FFPO, Operations Superintendent

## III. SELECTION CRITERIA

The AoA Team determined the below listed criteria as relevant to the Analysis of Alternatives. Once alternatives are analyzed by the AoA Team, these criteria are used to evaluate and select a recommended preferred alternative.

### Constructability During On-Going Oil Deliveries

The selected alternative is able to be implemented with little or no impact to on-going oil delivery operations. BH must be able to provide crude deliveries to Shell-Zydeco during the construction of the custody metering station.

Weight: Most Important

### Ease of Operations

The selected alternative when implemented will result in a system that is able to be operated without significant additional training and is similar to existing systems and equipment. The operation of the custody metering station has to be understandable and functional for BH operators.

Weight: Important

### Ease of Maintenance

The selected alternative is similar in nature to existing equipment resulting in commonality of similar systems for future maintenance and sparing consideration. The maintenance of the custody metering station will be maintained by Shell-Zydeco after its installation.

Weight: Important

### Safety during Construction

The selected alternative when implemented will be able to be constructed safely and operated safely. Ability to address Safety and Security concerns during implementation.

Weight: Important

### Sustainability

The selected alternative when implemented will be able to achieve DOE Sustainability goals for energy consumption as outlined in the Strategic Sustainability Performance Plan.

Weight: Less Important

## IV. ALTERNATIVES IDENTIFICATION

The current BH site configuration does not have the ability to control flow rates to multiple destinations. BH-SP-1407 Project will allow simultaneous deliveries to all three destinations. There are custody agreements in place for Phillips 66 and Sun Terminal. Additionally, BH-SP-1407 Project will add ultrasonic meters at Phillips 66 and Sun Terminal. There is not a custody transfer meter or agreement at Shell-Zydeco; therefore, the delivered crude oil can only be measured with BH site custody metering skid.

A custody transfer metering skid at Shell-Zydeco is needed to allow for simultaneous delivery to all three destinations. Big Hill will have the ability to maintain its Level I drawdown rate which the SPR is committed to maintaining.

### List of Alternatives

The below listed alternatives are considered for analysis. Initial screenings conducted by the AoA Team determine the viability of each alternative.

#### A. Status Quo

Due to the current delivery infrastructure design, sequential deliveries are made alternately between the Shell-Zydeco Pipeline at 250 thousand barrels per day (MBD), the Phillips 66 Terminal at 225 MBD, and the Sun Terminal at up to 1.1 million barrels per day (MMBD), thus the average rate is lower than the required 1.1 MMBD site drawdown rate criteria.

Big Hill continues with batch sales of crude oil to single end point users. Due to the current delivery infrastructure design, sequential deliveries are made alternately between the Shell-Zydeco Pipeline at 250 thousand barrels per day (MBD), the Phillips 66 Terminal at 225 MBD, and the Sun Terminal at up to 1.1 MMBD, thus the average rate is lower than the required 1.1 MMBD site drawdown rate criteria.

The crude oil drawdowns will be limited to 250 MBD when going to Shell-Zydeco and 225 MBD when going to Phillips 66 Terminal. The drawdown for Sun Terminal may not meet the required rate of 1.1 MMBD when delivering to the other destinations. The crude oil sales rate to Shell-Zydeco will be measured with BH's Allocation Custody Transfer (ACT) flow meter skid. The ACT for Phillips 66 crude rate will be based on contractual agreements. The ACT for Sun crude rate will be measured per manual tank strapping done by site operations.

BH will not be able to proceed with simultaneous deliveries to Shell/Zydeco Station, Phillips 66 Terminal, and Sun Terminal. BH will not have the ability to maintain its Level I drawdown rate which the SPR is committed to maintaining. This alternative does not meet mission need or functional requirements set by the project. Therefore, this alternative is not feasible.

Viability: No Further Analysis

#### B. Install Ultrasonic Flow Meter at Shell-Zydeco with Flow Controlled and Monitored at BH Control Room.

Install Krone Altosonic III™ ultrasonic flow meters at Shell-Zydeco with Rosemount pressure / temperature indicator transmitters. The measurements will be linked through local A-B Slick 500/5000 PLC back through telecommunications to Big Hill's SPR Distributed Control System (DCS). This alternative is the minimal installation option. This option assumes installation of BH-SP-1407 flow control scope.

The system will enhance the measurement capabilities at Shell-Zydeco. BH will be able to proceed with simultaneous deliveries to Shell-Zydeco Station, Phillips 66 Terminal, and Sun Terminal. However, a single meter does not meet the strict definition of an ACT skid for Shell-Zydeco Station. In addition, there is no connection for a prover to verify flow accuracy, improvement to accessibility, or enhanced security measures. This alternative meets the mission need; however, it does not meet all of the functional requirements of the project. Therefore, this alternative is not feasible.

Viability: No Further Analysis

**C. Local Control of ACT Flow Meter Skid at Shell-Zydeco (Habitable) with Standard Security Fence without Full SPR Security Measures.**

A new 20-foot by 4000-foot road will be built from Hebert Road to the existing Shell-Zydeco site. The road will be paved with crushed stone. A drainage structure will be needed to cross a 54-inch culvert. In addition, water shed management must be addressed. The meter site area will be stripped of vegetation and built up 24 inches with select fill. Foundations will be provided for the Control Building, Prover Skid, Meter Skid, Sampler Skid, and Sampler Tank. Area lighting will be provided with 39-foot tall light poles that are installed on concrete drilled piers. The area will be paved with crushed stone. A security fence with double gates will be installed around the site perimeter.

Shell-Zydeco will have a skid mounted ACT unit equipped with 2 to 3 parallel helical turbine meter trains. The inlet and outlet headers will be sized to match Shell-Zydeco pipeline tie-ins. A vertical flow prover with separate master meter connections will be included. All valves and instrumentation will meet the requirements set by Shell. This option assumes installation of BH-SP-1407 flow control scope.

In addition, the installation will include a modular habitable building as the Control Building that is similar to the Lake Charles site. The site and habitable building will require a sanitary sump, oil/water sump, security measures, area lighting, Close Circuit (CC) security monitoring, full OSHA health and safety elements, and 24hr VDC back-up power supply for instrumentation to maintain operation in event of local outage. Shell-Zydeco location will require at a minimum electric power and access to city water supply for sanitary purposes. The final selected position will be dependent upon these factors. A minimum of 6 to 9 additional BH Operators are required during drawdowns (3 shifts at the new location).

BH will be able to proceed with simultaneous deliveries to Shell-Zydeco Station, Phillips 66 Terminal, and Sun Terminal. BH will have the ability to achieve the Level I drawdown rate which the SPR is committed to maintaining. This alternative meets the mission need and all of the functional requirements of the project. Therefore, this alternative is feasible.

Viability: Continue Analysis

**D. Local Control of ACT Flow Meter Skid at Shell-Zydeco (Habitable) with Security Fence that Meets Full SPR Security Measures**

A new 20-foot by 4000-foot road will be built from Hebert Road to the existing Shell-Zydeco site. The road will be paved with crushed stone. A drainage structure will be needed to cross a 54-inch culvert. In addition, water shed management must be addressed. The meter station area will be stripped of vegetation and built up 24 inches with select fill. Foundations will be provided for the Control Building, Prover Skid, Meter Skid, Sampler Skid, and Sampler Tank. Area lighting will be provided with 39-foot tall light poles that are installed on concrete drilled piers. The area will be paved with crushed stone. A security fence with double gates will be installed around the site perimeter. In addition, an Intelli-Flex Fence Sensor Zone 4 will be installed around the perimeter. A card reader and foundation will be required at the gate.

Shell-Zydeco will have a skid mounted ACT unit equipped with 2 to 3 parallel helical turbine meter trains. The inlet and outlet headers will be sized to match Shell-Zydeco pipeline tie-ins. A vertical flow prover with separate master meter connections will be included. All valves and instrumentation will meet the requirements set by Shell. This option assumes installation of BH-SP-1407 flow control scope.

In addition, the installation will include a modular habitable building as the Control Building that is similar to the Lake Charles site. The site and habitable building will require a sanitary sump, oil/water sump, MARSAC type security measures, area lighting, CC security monitoring, full OSHA health and safety elements, and 24hr VDC back-up power supply for instrumentation to maintain operation in event of local outage. Shell-Zydeco location will require at a minimum electric power and access to city water supply for sanitary purposes. The final selected position will be dependent upon these factors. A minimum of 6 to 9 additional BH Operators are required during drawdowns (3 shifts at the new location).

BH will be able to proceed with simultaneous deliveries to Shell/Zydeco Station, Phillips 66 Terminal, and Sun Terminal. BH will have the ability to achieve the Level I drawdown rate which the SPR is committed to maintaining. This alternative meets the mission need and all of the functional requirements of the project. Therefore, this alternative is feasible.

Viability: Continue Analysis

### E. Remote Control of ACT Flow Meter Skid at Shell-Zydeco

Shell-Zydeco will have a skid mounted ACT unit equipped with 2 to 3 parallel helical turbine meter trains. The inlet and outlet headers will be sized to match Shell-Zydeco pipeline tie-ins. A vertical flow prover with separate master meter connections will be included. All valves and instrumentation will meet the requirements set by Shell. This option assumes installation of BH-SP-1407 flow control scope.

The site will have local monitoring and control panel only. The primary control will be done at BH SPR site. The site will be secured with a perimeter fence and padlock. The Shell-Zydeco delivery point is located in a remote area that is not easily accessible with current roadways. Additional contract negotiation with Shell Pipeline is required if proceeding without a habitable site. It is not desired to renegotiate the terms with Shell Pipeline.

BH will be able to proceed with simultaneous deliveries to Shell-Zydeco Station, Phillips 66 Terminal, and Sun Terminal. BH will have the ability to achieve the Level I drawdown rate which the SPR is committed to maintaining. This alternative meets the mission need; however, it does not meet all of the functional requirements of the project. There is no improvement to accessibility or enhanced security measures. In addition, it requires contract renegotiation with Shell Pipeline. Therefore, this alternative is not feasible.

Viability: No Further Analysis

## V. ALTERNATIVES ANALYSIS

Based on initial analysis of the alternatives, alternatives A, B, and E are eliminated from further consideration. The remaining alternatives, C and D are examined below as alternatives A and B, respectively.

The below analyses provide the research and technical information gathered by the AoA Team. These analyses are not evaluative or comparative.

### Assumptions & Constraints

- The alternatives assume the installation of BH-SP-1407 flow control scope.
- The design of the metering station will meet or exceed the 25-year life ascribed to the Life Extension 2 projects.
- The new custody metering station will measure flow rates between 33 MBD and 250 MBD (maximum pipeline capacity). The reading accuracy will be  $\pm 0.25$  over the normal flow range with a repeatability of 0.02%.
- The metering skid will meet the strict definition of an Allocation Custody Transfer (ACT) skid.
- A prover will be required to verify the accuracy of the meter.
- The accessibility to Shell-Zydeco site will be improved by the construction of a new 20' by 4000' road from Hebert Rd.

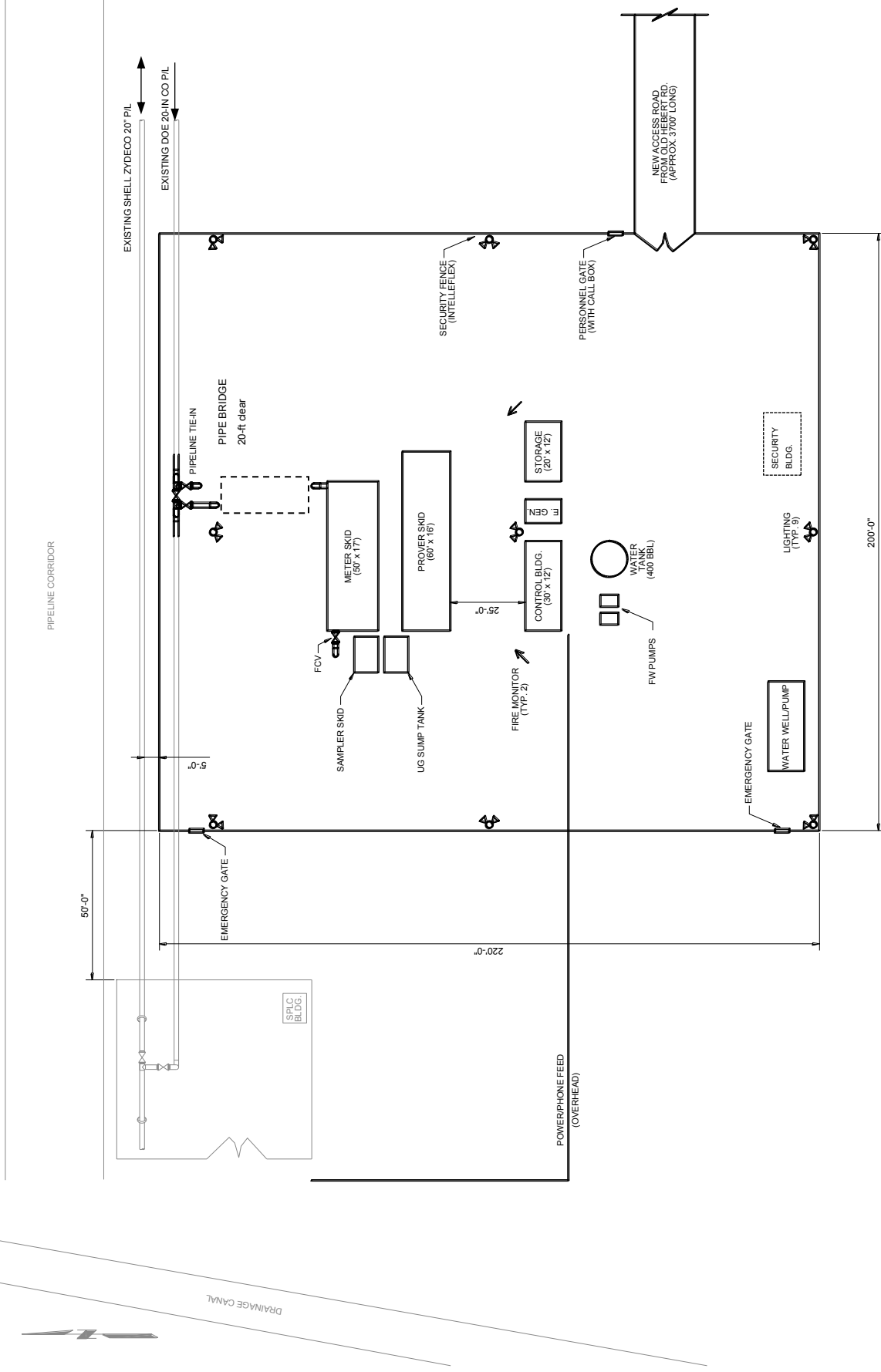


Figure 1 – Shell-Zydeco Meter Station

**A. Local Control of ACT Flow Meter Skid at Shell-Zydeco (Habitable) with Standard Security Fence without Full SPR Security Measures.**

This alternative will add an Allocation Custody Transfer (ACT) flow meter skid at Shell-Zydeco that will be locally controlled in a building not fully built out but operational with remote monitoring and control from Big Hill’s control room. The site will not have full SPR security measures.

**Benefits & Effectiveness**

Big Hill will be able to simultaneously deliver crude oil to Shell-Zydeco Station, Phillips 66 Terminal, and Sun Terminal with this alternative and the installation of BH-SP-1407 flow control scope. BH will meet the required delivery of 1.0 MMBD of sweet crude oil or 1.1 MMBD of sour crude oil.

This alternative will allow custody transfer metering of crude oil at the Shell-Zydeco Station with the ACT metering skid. The helical turbine meters and prover will accurately measure the crude oil rate delivered to Shell-Zydeco Station. The master meter connection will allow additional verification of the accuracy of the flow. The habitable building will provide adequate shelter and sanitary facility to operators during crude oil drawdowns. Big Hill’s control room will be able to monitor the activities at the metering station through telecommunication. The standard security fence without full SPR security measures will provide adequate security to deter intrusions.

Big Hill will be able to maintain the Level 1 drawdown rate, committed by the Strategic Petroleum Reserve (SPR), as it simultaneously delivers crude oil to Shell-Zydeco Station, Phillips 66 Terminal, and Sun Terminal.

**Risk & Mitigation Factors**

There are associated risks with the installation of flow meters and instrumentation and construction of a habitable building. The table below summarizes the risks with the correlating mitigation strategy. The table also describes the likelihood of occurrence at the site along with how great of an impact the event would cause if it were to occur.

<b>Risk and Mitigation Strategies for Local Control of ACT Flow Meter Skid at Shell-Zydeco (Habitable) with Standard Security Fence without Full SPR Security Measures</b>			
<b>Risks</b>	<b>Mitigation Strategy</b>	<b>Likelihood - Impact</b>	<b>Risk Code</b>
Under-estimated cost	Make sure all possible costs have been analyzed in the life cycle cost analysis.	Low - Low	Low Risk Hazard
Pipeline outage for installation	To avoid a pipeline outage for the installation, hot tap and stopple can be used to access the pipeline while the crude oil rate is maintained through the bypass. The flow meter station can be pre-fabricated and flanges installed on existing pipeline.	Low – High	Low Risk Hazard
Stopples/Hot-Tap equipment unavailable	GFP Procurement, contractor schedule work in advance to avoid delays with component/equipment availability.	Medium– High	Medium Risk Hazard
BH-SP-1407 flow control project cancelled	Ensure approval and project progression of BH-SP-1407 before planning the construction on BH-SP-1307	Low – High	Low Risk Hazard
Tie-in/Isolation Valve availability	GFP procurement strategy to order identified long-lead valves	Medium– High	Medium Risk Hazard
Helical turbine flow meter availability	GFP procurement of complete ACT meter skid and prover system	Medium – High	Medium Risk Hazard
PLC malfunctions	Robust PLC housing sustainable in all environmental conditions. Fail safe condition logic written into PLC program, Back-up UPS System, and. Alert functions to BH site of PLC failure.	Medium – High	Medium Risk Hazard



<b>Risk and Mitigation Strategies for Local Control of ACT Flow Meter Skid at Shell-Zydeco (Habitable) with Standard Security Fence without Full SPR Security Measures (continued)</b>			
<b>Risks</b>	<b>Mitigation Strategy</b>	<b>Likelihood - Impact</b>	<b>Risk Code</b>
Telecommunication failure	Alert to BH site for loss of telecommunication. PLC will still control flows and pressure, back-up UPS system.	Medium – Low	Low Risk Hazard
Stationary prover malfunctions	Alert to BH site for loss of prover communication. Set-up monthly site checks to verify flow meter and prover functionality.	Medium – High	Medium Risk Hazard
Utilities availability for habitable building	Local dedicated water well, shared water storage tank, and pressure set. Verify with local electrical utility for adequate supply to support the installed facility, including MCC/Operations Office/ Lab building, and fire pumps	Medium – High	Medium Risk Hazard
Modular building availability and suitability	GFP procurement of modular building. Select building that will meet the needs for habitability and functionality.	Low – Medium	Low Risk Hazard
Foundation support for modular building not adequate	Ensure the concrete pad will support the weight of the building and additional weight from operators and office/lab equipment.	Low – Medium	Low Risk Hazard

**B. Local Control of ACT Flow Meter Skid at Shell-Zydeco (Habitable) with Security Fence with Full SPR Security Measures.**

This alternative will add an Allocation Custody Transfer (ACT) flow meter skid at Shell-Zydeco that will be locally controlled in a habitable building with remote monitoring and control from Big Hill’s control room. The site will have full SPR security measures.

**Benefits & Effectiveness**

Big Hill (BH) will be able to simultaneously deliver crude oil to the 20-inch Shell Zydeco Pipeline, Phillips 66 Terminal, and Sun Terminal with this alternative and the installation of BH-SP-1407 flow control scope. BH will meet the required delivery of 1.0 MMBD of sweet crude oil or 1.1 MMBD of sour crude oil.

This alternative will allow custody transfer metering of crude oil at the Shell-Zydeco Station with the ACT metering skid. The helical turbine meters and prover will accurately measure the crude oil rate delivered to Shell-Zydeco Station. The master meter connection will allow additional verification of the accuracy of the flow. The habitable building will provide adequate shelter and sanitary facility to operators during crude oil drawdowns. Big Hill’s control room will be able to monitor the activities at the metering station through telecommunication. The security system will comply with all SPR security measures and provide adequate security to deter intrusions.

Big Hill will be able to maintain the Level 1 drawdown rate, committed by the Strategic Petroleum Reserve (SPR) as it simultaneously delivers crude oil to Shell-Zydeco Station, Phillips 66 Terminal, and Sun Terminal.

**Risk & Mitigation Factors**

There are associated risks with the installation of flow meters and instrumentation and construction of a habitable building. The table below summarizes the risks with the correlating mitigation strategy. The table also describes the likelihood of occurrence at the site along with how great of an impact the event would cause if it were to occur.

<b>Risk and Mitigation Strategies for Local Control of ACT Flow Meter Skid at Shell-Zydeco (Habitable) with Security Fence with Full SPR Security Measures</b>			
<b>Risks</b>	<b>Mitigation Strategy</b>	<b>Likelihood - Impact</b>	<b>Risk Code</b>
Under-estimated cost	Make sure all possible costs have been analyzed in the life cycle cost analysis.	Low – Low	Low Risk Hazard
Pipeline outage for installation	To avoid a pipeline outage for the installation, hot tap and stopple can be used to access the pipeline while the crude oil rate is maintained through the bypass. The flow meter station can be pre-fabricated and flanges installed on existing pipeline.	Low – High	Low Risk Hazard
Stopples/Hot-Tap equipment unavailable	GFP Procurement, contractor schedule work in advance to avoid delays with component/equipment availability.	Medium– High	Medium Risk Hazard
BH-SP-1407 flow control project cancelled	Ensure approval and project progression of BH-SP-1407 before planning the construction on BH-SP-1307	Low – High	Low Risk Hazard
Tie-in/Isolation Valve availability	GFP procurement strategy to order identified long-lead valves	Medium– High	Medium Risk Hazard
Helical turbine flow meter availability	GFP procurement of complete ACT meter skid and prover system	Medium – High	Low Risk Hazard
PLC malfunctions	Robust PLC housing sustainable in all environmental conditions. Fail safe condition logic written into PLC program, Back-up UPS System, and. Alert functions to BH site of PLC failure.	Medium – High	Medium Risk Hazard
Telecommunication failure	Alert signal at BH site for loss of telecommunication. PLC will still control flows and pressure, back-up UPS system.	Medium – Low	Low Risk Hazard

<b>Risk and Mitigation Strategies for Local Control of ACT Flow Meter Skid at Shell-Zydeco (Habitable) with Security Fence with Full SPR Security Measures (continued)</b>			
<b>Risks</b>	<b>Mitigation Strategy</b>	<b>Likelihood - Impact</b>	<b>Risk Code</b>
Stationary prover malfunctions	Back-up Alert signal to BH site for loss of prover communication. Manned/monitored oil sale operations. Maintenance and testing Set-up monthly site checks to verify flow meter and prover functionality.	Medium – High	Low Risk Hazard
Utilities availability for habitable building	Local dedicated water well, shared water storage tank, and pressure set. Verify with local electrical utility for adequate supply to support the installed facility, including MCC/Operations Office/ Lab building, and fire pumps	Medium – High	Medium Risk Hazard
Modular building availability and suitability	GFP procurement of modular building. Select building that will meet the needs for habitability and functionality.	Low – Medium	Low Risk Hazard
Foundation support for modular building not adequate	Ensure the concrete pad will support the weight of the building and additional weight from operators and office/lab equipment.	Low – Medium	Low Risk Hazard

## VI. ALTERNATIVE SELECTION

### List of Alternatives – Studied Alternatives

- A. Local Control of ACT Flow Meter Skid at Shell-Zydeco (Habitable) with Standard Security Fence without Full SPR Security Measures

This alternative will add an Allocation Custody Transfer (ACT) flow meter skid at Shell-Zydeco that will be locally controlled in a habitable building, with remote monitoring and control from Big Hill’s control room. The site will not have full SPR security measures.

- B. Local Control of ACT Flow Meter Skid at Shell-Zydeco (Habitable) with Security Fence with Full SPR Security Measures

This alternative will add an Allocation Custody Transfer (ACT) flow meter skid at Shell-Zydeco that will be locally controlled in a habitable building, with remote monitoring and control from Big Hill’s control room. The site will have full SPR security measures.

### Comparison of Alternatives

Core Team Member Ratings

	Constructability During Ongoing Oil Deliveries	Ease of Operations	Ease of Maintenance	Safety During Construction	Sustainability
	<i>Most Important</i>	<i>Important</i>	<i>Important</i>	<i>Important</i>	<i>Less Important</i>
<b>Alternative A</b>	<i>Excellent</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Excellent</i>
	<i>Excellent</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Excellent</i>
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>
<b>Alternative B</b>	<i>Excellent</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Excellent</i>
	<i>Excellent</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Excellent</i>
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>

**BH-SP-1407**

**BH Simultaneous Flow Control to Shell-Zydeco Station,  
Phillips 66 at the Beaumont Terminal at Hwy 347 Station  
and Sun Terminal**

**VCI Project Engineer: Bill Fogle**

**Recommended Alternative:**

***Install Remote Ultrasonic Flow Meters Control at Shell, Phillips 66, and Sun  
Delivery Points***

## I. PROJECT CONCEPT

### Mission Need

The Big Hill (BH) site delivers crude oil via a single 36-inch pipeline leaving the site to one of three destinations: the Shell-Zydeco Pipeline System (Zydeco), the Phillips 66 Beaumont Terminal, and the Sunoco Logistics Nederland (Sun) Terminal. The current BH site configuration does not have the capability to control flow rates to multiple destinations. In addition, there is no means of flow measurement at the Shell-Zydeco Pipeline. Therefore, crude oil deliveries from BH may be made to only one destination at a time. The meter skid at BH is used to meter the flow to each delivery point. System modifications will be necessary to permit simultaneous deliveries to the Shell-Zydeco Station, the Phillips 66 Terminal, and the Sun Terminal. Adding flow control to each of the three points will allow BH to simultaneously deliver crude oil to multiple points.

There are established custody transfer agreements with the Phillips 66 Terminal and the Sun Terminal. Shell-Zydeco Station requires a new custody transfer meter in order to proceed with simultaneous deliveries. Big Hill will have the ability to achieve Level I drawdown rate which the Strategic Petroleum Reserve (SPR) is committed to maintaining.

### Functional Requirements

- Simultaneous controlled delivery of crude oil to Shell-Zydeco Pipeline, the Phillips 66 Terminal, and the Sun Terminal. The total required delivery rate is one million barrels per day (MMBD) of sweet crude oil or 1.1 MMBD of sour crude oil.
- The individual rates are Shell Pipeline at 250 thousand barrels per day (MBD), the Phillips 66 Terminal at 225 MBD, and the Sun Terminal at up to 1.1 MMBD.
- The design of the control station must be able to meet or exceed the 25-year life ascribed to the Life Extension 2 projects. DOE I&E standards should be used in the design.
- Any measured flow rates must be within a range of plus-or-minus a certain percent of the desired flow rate.
- Address custody transfer requirements at Shell-Zydeco Station.
- The Big Hill pipeline must have the capability to be completely isolated from Phillips 66 Terminal, Sun Terminal, and the Shell-Zydeco Pipeline system.
- The design must incorporate the ability to equalize or verify pressures between the systems for maintenance purposes.

## II. PROCESS

### Alternatives Analysis Plan

The complete Analysis of Alternatives (AoA) Process Plan for selection of the preferred alternative has been standardized for all AoA's and is detailed in Volume 1 of this Conceptual Design Report.

### Alternative Analysis Team Members

#### Core Team Members

Claudia Carroll	DOE, Systems Engineer
Bill Fogle	VCI, Project Engineer
Chris Vedros	FFPO, Manager Pipeline and Equipment Integrity

#### Team Members

Christopher Roark	DOE, Crude Oil Marketing Analyst
Reza Zinolabedini	DOE, Lead General Engineer

**BH-SP-1407**

Levi Gabre	DOE, Lead General Engineer
Laren Tushim	VCI, Mechanical Engineer
David Wilkins	VCI, Lead Process Engineer
Janet Robert	FFPO, Director Facilities Design and Integrity
Charles DeLuca	FFPO, Principal Operational Systems Engineer
Austin Thompson	FFPO, Manager Crude Oil Program and Logistics
John Guidry	FFPO, Site Director
Tony DeVille	FFPO, Manager Site Operations
Mark Thorn	FFPO, Operations Superintendent

### III. SELECTION CRITERIA

The AoA Team determined the below listed criteria as relevant to the Analysis of Alternatives. Once alternatives are analyzed by the AoA Team, these criteria are used to evaluate and select a recommended preferred alternative.

#### **Constructability During On-Going Oil Deliveries**

The selected alternative is able to be implemented with little or no impact to on-going oil delivery operations. BH must be able to provide crude deliveries to all three locations individually during the construction period.

Weight: Important

#### **Ease of Operations**

The selected alternative when implemented will result in a system that is able to be operated without significant additional training and is similar to existing systems and equipment. The operation of the control station has to be understandable and functional for BH operators.

Weight: Important

#### **Ease of Maintenance**

The selected alternative is similar in nature to existing equipment resulting in commonality of similar systems for future maintenance and sparing consideration. The control station must have the capability to be isolated for maintenance purposes and maintain crude oil deliveries.

Weight: Important

#### **Safety during Construction**

The selected alternative when implemented will be able to be constructed safely and operated safely. Ability to address Safety and Security concerns during implementation.

Weight: Important

#### **Sustainability**

The selected alternative when implemented will be able to achieve DOE Sustainability goals for energy consumption as outlined in the Strategic Sustainability Performance Plan.

Weight: Less Important

### IV. ALTERNATIVES IDENTIFICATION

Big Hill (BH) is required to deliver one million barrels per day (MMBD) of sweet crude oil or 1.1 MMBD of sour crude oil. Due to the current delivery infrastructure design, sequential deliveries are made alternately between the Shell-Zydeco Pipeline at 300 thousand barrels per day (MBD), the Phillips 66 Terminal at 250 MBD, and the Sun Terminal at up to 1.1 MMBD, thus the average rate will be lower than the required 1.1 MMBD site drawdown rate criteria.

The current BH site configuration does not have the capability to control flow rates to multiple destinations. In addition, there is no means of flow measurement at the Shell or Phillips 66 Terminal junctures. Therefore, crude oil deliveries from BH may be made to only one destination at a time. The meter skid at BH is used to meter the flow to each delivery point.

System modifications will be necessary to permit simultaneous deliveries to the Shell-Zydeco Station, the Phillips 66 Terminal, and Sun Terminal. Adding flow control to each of the three points will allow BH to simultaneously deliver crude oil to multiple points. With simultaneous delivery, the total rate from Big Hill can be maintained at 1.1 MMBD with some portion of the flow delivered to the Shell-Zydeco Pipeline or Phillips 66 Terminal when necessary and the remainder flowing to the Sun Terminal. When deliveries to Shell-Zydeco Pipeline and Phillips 66 Terminal are not required, the entire 1.1 MMBD flow can be directed to Sun Terminal. A range of plus-or-minus a certain percent of the desired flow rate will have to be determined. The custody transfer meter requirements at Shell-Zydeco Station should be addressed. BH will have the ability to maintain its Level I drawdown rate which the Strategic Petroleum Reserve (SPR) is committed to maintaining.

The Big Hill pipeline must incorporate the capability to be completely isolated from Sun Terminal, Phillips 66 Terminal, and the Shell-Zydeco system. Consequently, valves are required to provide positive isolation. In addition, the ability to equalize or verify pressures between the systems may be required for maintenance purposes. Pressure equalization or differential verification requires at least one additional valve to by-pass the control valve.

#### **List of Alternatives**

The below listed alternatives are considered for analysis. Initial screenings conducted by the AoA Team determine the viability of each alternative.

##### **A. Status Quo**

Big Hill continues with batch sales of crude oil to single end point users. The crude oil drawdowns will be limited to 300 MBD when going to Shell-Zydeco and 250 MBD when going to Phillips 66. However, because of the current delivery infrastructure design, sequential deliveries must be made alternately between the Shell pipeline at 250 thousand barrels per day (MBD) and the Sun Terminal at up to 1.1 MMBD and thus the average rate will be lower than the required 1.1 MMBD site drawdown rate criteria. The crude oil sales rate to Shell-Zydeco, Phillips 66, and Sun will be measured with BH's Allocation Custody Transfer (ACT) flow meter skid. In addition, the ACT for Phillips 66 crude rate will be based on contractual agreements. The ACT for Sun crude rate will be measures per manual tank strapping done by site operations.

BH will not be able to proceed with simultaneous deliveries to Shell-Zydeco Station, Phillips 66 Terminal, and Sun Terminal. BH will not have the ability to maintain its Level I drawdown rate which the SPR is committed to maintaining. This alternative does not meet mission need or functional requirements set by the project. Therefore, this alternative is not feasible.

Viability: No Further Analysis

##### **B. Install Remote Ultrasonic Flow Meter Control at Shell-Zydeco, Phillips 66, and Sun Delivery Points.**

Each location will be equipped with Krone AltoSonic III™ Ultrasonic meter, pressure and temperature transmitters, and a flow control valve, sized for full flow, into downstream piping segment. Manual block valves will be installed to provide isolation for the control valve. A bypass valve will allow continuous flow while the control valve is out of service. The mass flow system data stream from the meters shall feedback to a downstream flow control valve via controller/DCS system to manage percent open. The signals will be fed back to the BH site control room.

The Phillips 66 delivery point will require one new ultrasonic flow meter control station. The site is located in a major pipeline and electrical corridor near an accessible roadway. The access road to the site will be improved. The area will be stripped of vegetation and built up 12" with select fill. Foundations will be provided for the meter and flow control valve. Supplemental area lighting will be provided with 39' tall light poles that are installed on concrete drilled piers. The area will be paved with crushed stone. A security



fence with double gate will be installed around the site perimeter. The electrical system will be updated for instrument requirements and protection.

The Sun delivery point will require two new ultrasonic flow meters and control valve station. The area will be stripped of vegetation and built up 12" with select fill. A foundation will be provided for the meter and flow control valve. Pipe Supports will be provided for the meter and above ground piping. The area will be paved with crushed stone. The site has an existing work area in the MCC for operations. No additional development will be needed at Sun.

The Shell-Zydeco Pipeline delivery point will require one new ultrasonic flow meter control station. The access road to the site will be improved. The area will be stripped of vegetation and built up 12" with select fill. Area lighting will be provided with 39' tall light poles that are installed on concrete drilled piers. The area will be paved with crushed stone. A security fence with double gate will be installed around the site perimeter.

This alternative provides better distribution control of the overall Big Hill/Sun pipeline distribution system. It also provides for "validation" of volumes to the three different terminus points. The system will enhance the measurement capabilities at Shell-Zydeco. However, a single meter may not meet strict definition of an Allocation Custody Transfer (ACT) skid for Shell-Zydeco. BH will be able to proceed with simultaneous deliveries to Shell-Zydeco Station, Phillips 66 Terminal, and Sun Terminal. BH will have the ability to maintain its Level I drawdown rate which the SPR is committed to maintaining. This alternative meets the mission need and all of the functional requirements of the project. Therefore, this alternative is feasible.

Viability: Continue Analysis

### **C. Install Remote Pressure Differential with Valve Positioning Control Valve Station**

This option utilizes pressure differential monitoring and valve positioning to control the flow to the three sites. Manual block valves will be installed to provide isolation for the control valve. A bypass valve will allow continuous flow while the control valve is out of service. This option also provides the side benefit of volumetric measurement, but those volumes would be inferred or calculated values based on the data available. As with Alternative B, the DCS/SCADA data streams will be fed back to the BH site. Local satellite panels are recommended for inclusion to provide access to the data stream during inspection/monitoring visits by site personnel.

The Phillips 66 delivery point is located in a major pipeline and electrical corridor near an accessible roadway. The access road to the site will be improved. The area will be stripped of vegetation and built up 12" with select fill. Foundation will be provided for the flow control valve. Supplemental area lighting will be provided with 39' tall light poles that are installed on concrete drilled piers. The area will be paved with crushed stone. A security fence with double gate will be installed around the site perimeter. The electrical system will be updated for instrument requirements and protection.

The Sun delivery point area will be stripped of vegetation and built up 12" with select fill. A foundation will be provided for the flow control valve. Pipe Supports will be provided for the valve and above ground piping. The area will be paved with crushed stone. The site has an existing work area in an MCC for operations. No additional development will be needed at Sun.

The flow to Shell will be handled by exclusion, again a calculated value based upon the total flow, as measured at BH and the outflows at Sun and Phillips. This is somewhat similar to the current operation, with the exception of the inclusion of new flow control valves at Sun and Phillips. The access road to the site will be improved. The area will be stripped of vegetation and built up 12" with select fill. Area lighting will be provided with 39' tall light poles that are installed on concrete drilled piers. The area will be paved with crushed stone. A security fence with double gate will be installed around the site perimeter.

BH will be able to proceed with simultaneous deliveries to Shell-Zydeco Station, Phillips 66 Terminal, and Sun Terminal. However, the flow rates are not measured, rather they are volumetrically inferred or calculated values.

This alternative does not meet the current DOE I&E design configuration as it will increase the number of components that will require spares. This alternative meets the mission need; however, it does not meet all of the functional requirements of the project. Therefore, this alternative is not feasible.

Viability: No Further Analysis

#### **D. Install Remote Control Valve Station with Ultrasonic Meters at Sun and Phillips and Pressure Differential at Shell-Zydeco with BH-SP-1307.**

This option is similar to alternatives B and C and includes Krone Altosonic III™ ultrasonic meter(s) and flow control valve(s) at the Sun and Phillips 66 site locations. Manual block valves will be installed to provide isolation for the control valve. A bypass valve will allow continuous flow while the control valve is out of service. The mass flow system data stream from the meters shall provide feedback to a downstream flow control valve via controller/DCS system to manage percent open. The signals will be fed back to the BH site control room.

The Phillips 66 delivery point will require one new ultrasonic flow meter control station. The site is located in a major pipeline and electrical corridor near an accessible roadway. The access road to the site will be improved. The area will be stripped of vegetation and built up 12" with select fill. Foundations will be provided for the meter and flow control valve. Supplemental area lighting will be provided with 39' tall light poles that are installed on concrete drilled piers. The area will be paved with crushed stone. A security fence with double gate will be installed around the site perimeter. The electrical system will be updated for instrument requirements and protection.

The Sun delivery point will require two new ultrasonic flow meters and control valve station. The area will be stripped of vegetation and built up 12" with select fill. A foundation will be provided for the meter and flow control valve. Pipe Supports will be provided for the meter and above ground piping. The area will be paved with crushed stone. The site has an existing work area in an MCC for operations. No additional development will be needed at Sun.

The Shell-Zydeco station will have a pressure differential type controller linked to the new flow control valve. The connection into the Shell-Zydeco pipeline will be also configured to incorporate an Allocation Custody Transfer (ACT) metering/prover skid. That unit will be included as a part of BH-SP-1307, which addresses metering and site modifications. The flow controller will be routed through a local PLC/HMI control panel that may be interconnected to the local control building. Also, the DCS/SCADA data streams will be fed back to the BH site.

BH will be able to proceed with simultaneous deliveries to Shell-Zydeco Station, Phillips 66 Terminal, and Sun Terminal. BH will have the ability to maintain its Level I drawdown rate which the SPR is committed to maintaining. This alternative meets the mission need and all of the functional requirements of the project. Therefore, this alternative is feasible.

Viability: Continue Analysis

## **V. ALTERNATIVES ANALYSIS**

Based on initial analysis of the alternatives, alternatives A and C have been eliminated from further consideration. The remaining alternatives, B and D are examined below as alternatives A and B, respectively.

The below analyses provide the research and technical information gathered by the AoA Team. These analyses are not evaluative or comparative.

### **Assumptions & Constraints**

- Simultaneous controlled delivery of crude oil to Shell-Zydeco Pipeline, the Phillips 66 Terminal, and the Sun Terminal. The total required delivery rate is one million barrels per day (MMBD) of sweet crude oil or 1.1 MMBD of sour crude oil.

- The individual rates are Shell Pipeline at 250 thousand barrels per day (MBD), the Phillips 66 Terminal at 250 MBD, and the Sun Terminal at up to 1.1 MMBD.
- The design of the control station must be able to meet or exceed the 25-year life ascribed to the Life Extension 2 projects. DOE I&E standards should be used in the design.
- Any measured flow rates within a range of plus-or-minus a certain percent of the desired flow rate.
- The Big Hill pipeline should be capable to be completely isolated from Phillips 66 Terminal, Sun Terminal, and the Shell Pipeline system.
- The design incorporates the ability to equalize or verify pressures between the systems for maintenance purposes.
- We are capable of addressing all custody transfer requirements at Shell-Zydeco Station.
- The standard security fence will deter intrusions.

## **A. Install Remote Ultrasonic Flow Meters Control at Shell, Phillips 66, and Sun Delivery Points.**

Each location will be equipped with Krone AltoSonic III™ Ultrasonic meter, pressure and temperature transmitters, and a flow control valve, sized for full flow, into downstream piping segment. Manual block valves will be installed to provide isolation for the control valve. A bypass valve will allow continuous flow while the control valve is out of service. The mass flow system data stream from the meters shall feedback to a downstream flow control valve via controller/DCS system to manage percent open. The signals will be fed back to the BH site control room.

The Phillips 66 delivery point will require one new ultrasonic flow meter control station. The site is located in a major pipeline and electrical corridor near an accessible roadway. The access road to the site will be improved. The area will be stripped of vegetation and built up 12" with select fill. Foundations will be provided for the meter and flow control valve. Supplemental area lighting will be provided with 39' tall light poles that are installed on concrete drilled piers. The area will be paved with crushed stone. A security fence with double gate will be installed around the site perimeter. The electrical system will be updated for instrument requirements and protection.

The Sun delivery point will require two new ultrasonic flow meters and control valve station. The area will be stripped of vegetation and built up 12" with select fill. A foundation will be provided for the meter and flow control valve. Pipe Supports will be provided for the meter and above ground piping. The area will be paved with crushed stone. The site has an existing work area in the MCC for operations. No additional development will be needed at Sun.

The Shell-Zydeco Pipeline delivery point will require one new ultrasonic flow meter control station. The access road to the site will be improved. The area will be stripped of vegetation and built up 12" with select fill. Area lighting will be provided with 39' tall light poles that are installed on concrete drilled piers. The area will be paved with crushed stone. A security fence with double gate will be installed around the site perimeter.

This alternative provides better distribution control of the overall Big Hill/Sun pipeline distribution system. It also provides for "validation" of volumes to the three different terminus points. The system will enhance the measurement capabilities at Shell-Zydeco. However, a single meter may not meet strict definition of an Allocation Custody Transfer (ACT) skid for Shell-Zydeco. BH will be able to proceed with simultaneous deliveries to Shell-Zydeco Station, Phillips 66 Terminal, and Sun Terminal. BH will have the ability to maintain its Level I drawdown rate which the SPR is committed to maintaining.

### **Benefits & Effectiveness**

Big Hill will be able to simultaneously deliver crude oil to Shell-Zydeco Station, Phillips 66 Terminal at the Hwy 347 Station, and Sun Terminal with this alternative. BH will meet the required delivery of 1.0 MMBD of sweet crude oil or 1.1 MMBD of sour crude oil.

The new ultrasonic flow meters at Phillips 66 and Sun will provide more accurate measurements than the existing ACT practices. The Phillips 66 measured crude rate will be compared to the contractual agreements. The Sun measured crude rate will be compared to the volume from manual tank strapping done by site operations. The new ultrasonic flow control valve at Shell-Zydeco will allow control of the flows from BH and measure flow rate. Big Hill's control room will be able to monitor the activities at the metering station through telecommunication. The control valve and bypass station will allow for isolation from the Big Hill pipeline while maintaining flow for future maintenance work.

Big Hill will be able to maintain its Level 1 drawdown rate, committed by the Strategic Petroleum Reserve (SPR) as it simultaneously delivers crude oil to the Shell-Zydeco Station, the Phillips 66 Terminal at the Hwy 347 Station, and Sun Terminal.

### **Risk & Mitigation Factors**

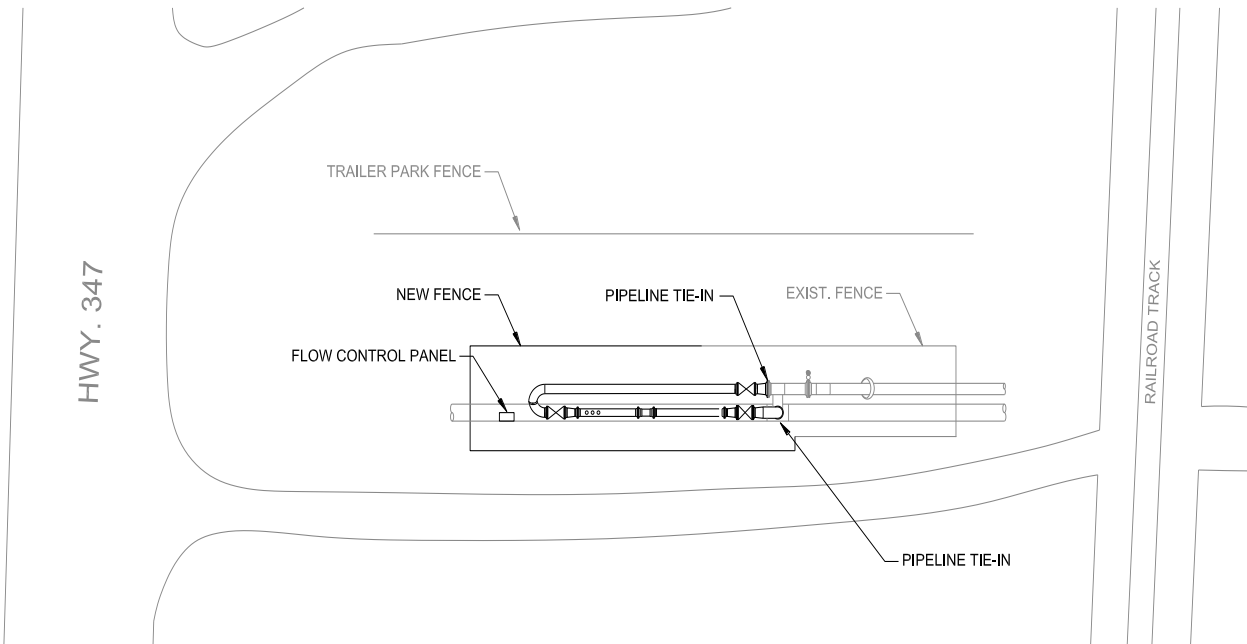
There are associated risks with the installation of flow meters, instrumentation, and valves. The table below summarizes the risks with the correlating mitigation strategy. The table also describes the likelihood of occurrence at the site along with how great of an impact the event would cause if it were to occur.

<b>Risk and Mitigation Strategies for Install Remote Ultrasonic Flow Meters Control at Shell, Phillips 66, and Sun Delivery Points</b>			
<b>Risks</b>	<b>Mitigation Strategy</b>	<b>Likelihood - Impact</b>	<b>Risk Code</b>
Under-estimated cost	Make sure all possible costs have been analyzed in the life cycle cost analysis.	Low - Low	Low Risk Hazard
Pipeline outage for installation	To avoid a pipeline outage for the installation, hot tap and stopple can be used to access the pipeline while the crude oil rate is maintained through the bypass. The control valve station can be pre-fabricated and flanges installed on existing pipeline.	Low – High	Low Risk Hazard
Hot Tap equipment un-available	Procure contractor and schedule work in advance to avoid delays with hot tap equipment availability.	High – High	High Risk Hazard
Ultrasonic flow meter compatibility with crude oil	Research and verify best flow meter type for crude oil application.	Low - Medium	Low Risk Hazard
Ultrasonic flow meter availability	Check with vendors on size availability and procure as a long lead time for delivery.	Medium – High	Medium Risk Hazard
Control valve availability	Check with vendors on size availability and procure as a long lead item for delivery.	Medium – High	Medium Risk Hazard
PLC malfunctions	Robust PLC housing sustainable in all environmental conditions. Fail safe condition logic written into PLC program. Alert functions to BH site of PLC failure.	Medium – High	Medium Risk Hazard
Telecommunication failure	Alert to BH site for loss of VSAT communication. PLC will still control flows and pressure.	Medium – Low	Medium Risk Hazard
Limited pumping capacity	Review the pump curve. Determine if the pump will be able to deliver the maximum required flow to all three sites simultaneously.	Medium – High	Medium Risk Hazard

**B. Install Remote Control Valve Station with Ultrasonic Meters at Sun and Phillips and Pressure Differential at Shell-Zydeco with BH-SP-1307.**

This option is similar to alternative A and includes Krone Altosonic III™ ultrasonic meter(s) and flow control valve(s) at the Sun and Phillips 66 site locations. Manual block valves will be installed to provide isolation for the control valve. A bypass valve will allow continuous flow while the control valve is out of service. The mass flow system data stream from the meters shall provide feedback to a downstream flow control valve via controller/DCS system to manage percent open. The signals will be fed back to the BH site control room.

The Phillips 66 delivery point will require one new ultrasonic flow meter control station. The site is located in a major pipeline and electrical corridor near an accessible roadway. The access road to the site will be improved. The area will be stripped of vegetation and built up 12” with select fill. Foundations will be provided for the meter and flow control valve. Supplemental area lighting will be provided with 39’ tall light poles that are installed on concrete drilled piers. The area will be paved with crushed stone. A security fence with double gate will be installed around the site perimeter. The electrical system will be updated for instrument requirements and protection.



**Figure 1 – DOE/Phillips 66 at Beaumont Terminal HWY 347 Station**

The Sun delivery point will require two new ultrasonic flow meters and control valve station. The area will be stripped of vegetation and built up 12” with select fill. A foundation will be provided for the meter and flow control valve. Pipe Supports will be provided for the meter and above ground piping. The area will be paved with crushed stone. The site has an existing work area in an MCC for operations. No additional development will be needed at Sun.

The Shell-Zydeco station will have a pressure differential type controller linked to the new flow control valve. The connection into the Shell-Zydeco pipeline will be also configured to incorporate an Allocation Custody Transfer (ACT) metering/prover skid. That unit will be included as a part of BH-SP-1307, which addresses metering and site modifications. The flow controller will be routed through a local PLC/HMI control panel that may be interconnected to the local control building. Also, the DCS/SCADA data streams will be fed back to the BH site.

BH will be able to proceed with simultaneous deliveries to Shell-Zydeco Station, Phillips 66 Terminal, and Sun Terminal. BH will have the ability to maintain its Level I drawdown rate which the SPR is committed to maintaining.

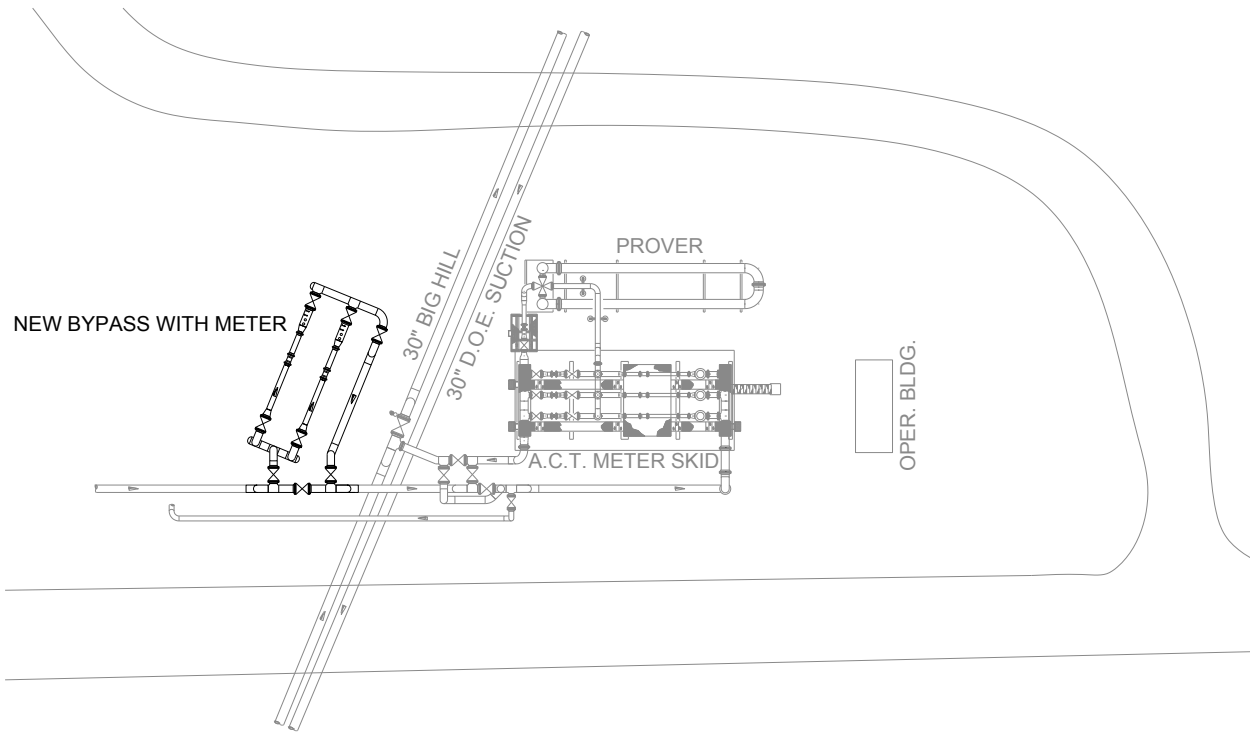


Figure 2 – Sun Logistics Nederland Terminal

### Assumptions & Constraints

- Assumes the installation of BH-SP-1307 Shell-Zydeco Custody Meter Skid

### Benefits & Effectiveness

Big Hill will be able to simultaneously deliver crude oil to Shell-Zydeco Station, Phillips 66 Terminal at the Hwy 347 Station, and Sun Terminal with this alternative and the installation of BH-SP-1407 flow control scope. BH will meet the required delivery of 1.0 MMBD of sweet crude oil or 1.1 MMBD of sour crude oil.

The new ultrasonic flow meters at Phillips 66 and Sun will provide more accurate measurements than the existing ACT practices. The Phillips 66 measured crude rate will be compared to the contractual agreements. The Sun measured crude rate will be compared to the volume from manual tank strapping done by site operations. The pressure differential control valve at Shell-Zydeco will allow control of the split flows from BH. Big Hill's control room will be able to monitor the activities at the metering station through telecommunication. The control valve and bypass station will allow for isolation from the Big Hill pipeline while maintaining flow for future maintenance work.

Project BH-SP-1407 adds flow control to the Shell-Zydeco Station, Phillips 66 at the HWY 347 Station, and Sun Terminal. There are established custody transfer agreements with the Phillips 66 Terminal at the HWY 347 Station and Sun Terminal. Project BH-SP-1307 adds custody transfer metering at the Shell-Zydeco Station. Projects BH-SP-1307 and BH-SP-1407 can be interdependent

Big Hill will be able to maintain its Level 1 drawdown rate, committed by the Strategic Petroleum Reserve (SPR) as it simultaneously delivers crude oil to Shell-Zydeco Station, Phillips 66 / Hwy 347 Station, and Sun Terminal.

### Risk & Mitigation Factors

There are associated risks with the installation of flow meters, instrumentation, and valves. The planning will significantly affect the pipeline operability during the installation. The table below summarizes the risks

with the correlating mitigation strategy. The table also describes the likelihood of occurrence at the site along with how great of an impact the event would cause if it were to occur.

<b>Risk and Mitigation Strategies for All Sites with Ultrasonic Meters and Flow Control Valve Station</b>			
<b>Risks</b>	<b>Mitigation Strategy</b>	<b>Likelihood - Impact</b>	<b>Risk Code</b>
Under-estimated cost	Make sure all possible costs have been analyzed in the life cycle cost analysis.	Low – Low	Low Risk Hazard
Pipeline outage for installation	To avoid a pipeline outage for the installation, hot tap and stopple can be used to access the pipeline while the crude oil rate is maintained through the bypass. The control valve station can be pre-fabricated and flanges installed on existing pipeline.	Low – High	Low Risk Hazard
Hot Tap equipment un-available	Procure contractor and schedule work in advance to avoid delays with hot tap equipment availability.	High – High	High Risk Hazard
BH-SP-1307 Shell-Zydeco Station Custody Metering cancelled	Ensure approval and project progression of BH-SP-1307 before planning the construction on BH-SP-1407	Low – High	Low Risk Hazard
Ultrasonic flow meter compatibility with crude oil	Research and verify best flow meter type for crude oil application.	Low - Medium	Low Risk Hazard
Ultrasonic flow meter availability	Check with vendors on size availability and procure as a long lead time for delivery.	Medium – High	Medium Risk Hazard
Control valve availability	Check with vendors on size availability and procure as a long lead time for delivery.	Medium – High	Medium Risk Hazard
PLC malfunctions	Robust PLC housing sustainable in all environmental conditions. Fail safe condition logic written into PLC program. Alert functions to BH site of PLC failure.	Medium – High	Medium Risk Hazard
Telecommunication failure	Alert to BH site for loss of VSAT communication. PLC will still control flows and pressure.	Medium – Low	Low Risk Hazard
Limited pumping capacity	Review the pump curve. Determine if the pump will be able to deliver the maximum required flow to all three sites simultaneously.	Medium – High	Medium Risk Hazard



## VI. ALTERNATIVE SELECTION

### List of Alternatives – Studied Alternatives

A. Install Remote Ultrasonic Flow Meters Control at Shell, Phillips 66, and Sun Delivery Points

This alternative will install ultrasonic meter control valve station at Shell-Zydeco, Sun, and Phillips 66 delivery points. All will be remotely controlled from the BH control room.

B. Install Remote Control Valve Station with Ultrasonic Meters at Sun and Phillips and Pressure Differential at Shell-Zydeco with BH-SP-1307

This alternative will install ultrasonic meter control valve station at Sun and Phillips 66 delivery points. Shell-Zydeco delivery point will have a pressure differential control valve station with an ACT from CDR BH-SP-1307. All will be remotely controlled from the BH control room.

### Comparison of Alternatives

Core Team Member Ratings

	Constructability During Ongoing Oil Deliveries	Ease of Operations	Ease of Maintenance	Safety During Construction	Sustainability
	<i>Important</i>	<i>Important</i>	<i>Important</i>	<i>Important</i>	<i>Less Important</i>
<b>Alternative A</b>	<i>Good</i>	<i>Excellent</i>	<i>Good</i>	<i>Excellent</i>	<i>Excellent</i>
	<i>Excellent</i>	<i>Good</i>	<i>Good</i>	<i>Excellent</i>	<i>Excellent</i>
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>
<b>Alternative B</b>	<i>Good</i>	<i>Excellent</i>	<i>Good</i>	<i>Excellent</i>	<i>Excellent</i>
	<i>Excellent</i>	<i>Excellent</i>	<i>Good</i>	<i>Excellent</i>	<i>Excellent</i>
	<i>Good</i>	<i>Excellent</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>

## **Appendix C**

Pertinent pages from 10 CFR 1021 Appendix B to Subpart D of Part 1021 –  
Categorical Exclusions Applicable to Specific Agency Actions

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### A9 INFORMATION GATHERING, ANALYSIS, AND DISSEMINATION

Information gathering (including, but not limited to, literature surveys, inventories, site visits, and audits), data analysis (including, but not limited to, computer modeling), document preparation (including, but not limited to, conceptual design, feasibility studies, and analytical energy supply and demand studies), and information dissemination (including, but not limited to, document publication and distribution, and classroom training and informational programs), but not including site characterization or environmental monitoring. (See also B3.1 of appendix B to this subpart.)

### A10 REPORTS AND RECOMMENDATIONS ON NON-DOE LEGISLATION

Reports and recommendations on legislation or rulemaking that are not proposed by DOE.

### A11 TECHNICAL ADVICE AND ASSISTANCE TO ORGANIZATIONS

Technical advice and planning assistance to international, national, state, and local organizations.

### A12 EMERGENCY PREPAREDNESS PLANNING

Emergency preparedness planning activities, including, but not limited to, the designation of onsite evacuation routes.

### A13 PROCEDURAL DOCUMENTS

Administrative, organizational, or procedural Policies, Orders, Notices, Manuals, and Guides.

### A14 APPROVAL OF TECHNICAL EXCHANGE ARRANGEMENTS

Approval of technical exchange arrangements for information, data, or personnel with other countries or international organizations (including, but not limited to, assistance in identifying and analyzing another country's energy resources, needs and options).

### A15 INTERNATIONAL AGREEMENTS FOR ENERGY RESEARCH AND DEVELOPMENT

Approval of DOE participation in international "umbrella" agreements for cooperation in energy research and development activities that would not commit the U.S. to any specific projects or activities.

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### APPENDIX B TO SUBPART D OF PART 1021—CATEGORICAL EXCLUSIONS APPLICABLE TO SPECIFIC AGENCY ACTIONS

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### B. CONDITIONS THAT ARE INTEGRAL ELEMENTS OF THE CLASSES OF ACTIONS IN APPENDIX B

The classes of actions listed below include the following conditions as integral elements of the classes of actions. To fit within the classes of actions listed below, a proposal must be one that would not:

(1) Threaten a violation of applicable statutory, regulatory, or permit requirements for environment, safety, and health, or similar requirements of DOE or Executive Orders;

(2) Require siting and construction or major expansion of waste storage, disposal, recovery, or treatment facilities (including incinerators), but the proposal may include categorically excluded waste storage, disposal, recovery, or treatment actions or facilities;

(3) Disturb hazardous substances, pollutants, contaminants, or CERCLA-excluded petroleum and natural gas products that preexist in the environment such that there would be uncontrolled or unpermitted releases;

(4) Have the potential to cause significant impacts on environmentally sensitive resources. An environmentally sensitive resource is typically a resource that has been identified as needing protection through Executive Order, statute, or regulation by Federal, state, or local government, or a Federally recognized Indian tribe. An action may be categorically excluded if, although sensitive resources are present, the action would not have the potential to cause significant impacts on those resources (such as construction of a building with its foundation well above a sole-source aquifer or upland surface soil removal on a site that has wetlands). Environmentally sensitive resources include, but are not limited to:

(i) Property (such as sites, buildings, structures, and objects) of historic, archeological, or architectural significance designated by a Federal, state, or local government, Federally recognized Indian tribe, or Native Hawaiian organization, or property determined to be eligible for listing on the National Register of Historic Places;

(ii) Federally-listed threatened or endangered species or their habitat (including critical habitat) or Federally-proposed or candidate species or their habitat (Endangered Species Act); state-listed or state-proposed endangered or threatened species or their habitat; Federally-protected marine mammals and Essential Fish Habitat (Marine Mammal Protection Act; Magnuson-Stevens

Fishery Conservation and Management Act); and otherwise Federally-protected species (such as the Bald and Golden Eagle Protection Act or the Migratory Bird Treaty Act);

(iii) Floodplains and wetlands (as defined in 10 CFR 1022.4, "Compliance with Floodplain and Wetland Environmental Review Requirements: Definitions," or its successor);

(iv) Areas having a special designation such as Federally- and state-designated wilderness areas, national parks, national monuments, national natural landmarks, wild and scenic rivers, state and Federal wildlife refuges, scenic areas (such as National Scenic and Historic Trails or National Scenic Areas), and marine sanctuaries;

(v) Prime or unique farmland, or other farmland of statewide or local importance, as defined at 7 CFR 658.2(a), "Farmland Protection Policy Act: Definitions," or its successor;

(vi) Special sources of water (such as sole-source aquifers, wellhead protection areas, and other water sources that are vital in a region); and

(vii) Tundra, coral reefs, or rain forests; or

(5) Involve genetically engineered organisms, synthetic biology, governmentally designated noxious weeds, or invasive species, unless the proposed activity would be contained or confined in a manner designed and operated to prevent unauthorized release into the environment and conducted in accordance with applicable requirements, such as those of the Department of Agriculture, the Environmental Protection Agency, and the National Institutes of Health.

### B1. CATEGORICAL EXCLUSIONS APPLICABLE TO FACILITY OPERATION

#### *B1.1 Changing rates and prices*

Changing rates for services or prices for products marketed by parts of DOE other than Power Marketing Administrations, and approval of rate or price changes for non-DOE entities, that are consistent with the change in the implicit price deflator for the Gross Domestic Product published by the Department of Commerce, during the period since the last rate or price change.

#### *B1.2 Training exercises and simulations*

Training exercises and simulations (including, but not limited to, firing-range training, small-scale and short-duration force-on-force exercises, emergency response training, fire fighter and rescue training, and decontamination and spill cleanup training) conducted under appropriately controlled conditions and in accordance with applicable requirements.

*B1.3 Routine maintenance*

Routine maintenance activities and custodial services for buildings, structures, rights-of-way, infrastructures (including, but not limited to, pathways, roads, and railroads), vehicles and equipment, and localized vegetation and pest control, during which operations may be suspended and resumed, provided that the activities would be conducted in a manner in accordance with applicable requirements. Custodial services are activities to preserve facility appearance, working conditions, and sanitation (such as cleaning, window washing, lawn mowing, trash collection, painting, and snow removal). Routine maintenance activities, corrective (that is, repair), preventive, and predictive, are required to maintain and preserve buildings, structures, infrastructures, and equipment in a condition suitable for a facility to be used for its designated purpose. Such maintenance may occur as a result of severe weather (such as hurricanes, floods, and tornados), wildfires, and other such events. Routine maintenance may result in replacement to the extent that replacement is in-kind and is not a substantial upgrade or improvement. In-kind replacement includes installation of new components to replace outmoded components, provided that the replacement does not result in a significant change in the expected useful life, design capacity, or function of the facility. Routine maintenance does not include replacement of a major component that significantly extends the originally intended useful life of a facility (for example, it does not include the replacement of a reactor vessel near the end of its useful life). Routine maintenance activities include, but are not limited to:

- (a) Repair or replacement of facility equipment, such as lathes, mills, pumps, and presses;
- (b) Door and window repair or replacement;
- (c) Wall, ceiling, or floor repair or replacement;
- (d) Reroofing;
- (e) Plumbing, electrical utility, lighting, and telephone service repair or replacement;
- (f) Routine replacement of high-efficiency particulate air filters;
- (g) Inspection and/or treatment of currently installed utility poles;
- (h) Repair of road embankments;
- (i) Repair or replacement of fire protection sprinkler systems;
- (j) Road and parking area resurfacing, including construction of temporary access to facilitate resurfacing, and scraping and grading of unpaved surfaces;
- (k) Erosion control and soil stabilization measures (such as reseeding, gabions, grading, and revegetation);
- (l) Surveillance and maintenance of surplus facilities in accordance with DOE Order

435.1, "Radioactive Waste Management," or its successor;

(m) Repair and maintenance of transmission facilities, such as replacement of conductors of the same nominal voltage, poles, circuit breakers, transformers, capacitors, crossarms, insulators, and downed powerlines, in accordance, where appropriate, with 40 CFR part 761 (Polychlorinated Biphenyls Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions) or its successor;

(n) Routine testing and calibration of facility components, subsystems, or portable equipment (such as control valves, in-core monitoring devices, transformers, capacitors, monitoring wells, lysimeters, weather stations, and flumes);

(o) Routine decontamination of the surfaces of equipment, rooms, hot cells, or other interior surfaces of buildings (by such activities as wiping with rags, using strippable latex, and minor vacuuming), and removal of contaminated intact equipment and other material (not including spent nuclear fuel or special nuclear material in nuclear reactors); and

(p) Removal of debris.

*B1.4 Air conditioning systems for existing equipment*

Installation or modification of air conditioning systems required for temperature control for operation of existing equipment.

*B1.5 Existing steam plants and cooling water systems*

Minor improvements to existing steam plants and cooling water systems (including, but not limited to, modifications of existing cooling towers and ponds), provided that the improvements would not: (1) Create new sources of water or involve new receiving waters; (2) have the potential to significantly alter water withdrawal rates; (3) exceed the permitted temperature of discharged water; or (4) increase introductions of, or involve new introductions of, hazardous substances, pollutants, contaminants, or CERCLA-excluded petroleum and natural gas products.

*B1.6 Tanks and equipment to control runoff and spills*

Installation or modification of retention tanks or small (normally under one acre) basins and associated piping and pumps for existing operations to control runoff or spills (such as under 40 CFR part 112). Modifications include, but are not limited to, installing liners or covers. (See also B1.33 of this appendix.)

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### *B1.7 Electronic equipment*

Acquisition, installation, operation, modification, and removal of electricity transmission control and monitoring devices for grid demand and response, communication systems, data processing equipment, and similar electronic equipment.

### *B1.8 Screened water intake and outflow structures*

Modifications to screened water intake and outflow structures such that intake velocities and volumes and water effluent quality and volumes are consistent with existing permit limits.

### *B1.9 Airway safety markings and painting*

Placement of airway safety markings on, painting of, and repair and in-kind replacement of lighting on powerlines and antenna structures, wind turbines, and similar structures in accordance with applicable requirements (such as Federal Aviation Administration standards).

### *B1.10 Onsite storage of activated material*

Routine, onsite storage at an existing facility of activated equipment and material (including, but not limited to, lead) used at that facility, to allow reuse after decay of radioisotopes with short half-lives.

### *B1.11 Fencing*

Installation of fencing, including, but not limited to border marking, that would not have the potential to significantly impede wildlife population movement (including migration) or surface water flow.

### *B1.12 Detonation or burning of explosives or propellants after testing*

Outdoor detonation or burning of explosives or propellants that failed (duds), were damaged (such as by fracturing), or were otherwise not consumed in testing. Outdoor detonation or burning would be in areas designated and routinely used for those purposes under existing applicable permits issued by Federal, state, and local authorities (such as a permit for a RCRA miscellaneous unit (40 CFR part 264, subpart X)).

### *B1.13 Pathways, short access roads, and rail lines*

Construction, acquisition, and relocation, consistent with applicable right-of-way conditions and approved land use or transportation improvement plans, of pedestrian walkways and trails, bicycle paths, small outdoor fitness areas, and short access roads and rail lines (such as branch and spur lines).

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### *B1.14 Refueling of nuclear reactors*

Refueling of operating nuclear reactors, during which operations may be suspended and then resumed.

### *B1.15 Support buildings*

Siting, construction or modification, and operation of support buildings and support structures (including, but not limited to, trailers and prefabricated and modular buildings) within or contiguous to an already developed area (where active utilities and currently used roads are readily accessible). Covered support buildings and structures include, but are not limited to, those for office purposes; parking; cafeteria services; education and training; visitor reception; computer and data processing services; health services or recreation activities; routine maintenance activities; storage of supplies and equipment for administrative services and routine maintenance activities; security (such as security posts); fire protection; small-scale fabrication (such as machine shop activities), assembly, and testing of non-nuclear equipment or components; and similar support purposes, but exclude facilities for nuclear weapons activities and waste storage activities, such as activities covered in B1.10, B1.29, B1.35, B2.6, B6.2, B6.4, B6.5, B6.6, and B6.10 of this appendix.

### *B1.16 Asbestos removal*

Removal of asbestos-containing materials from buildings in accordance with applicable requirements (such as 40 CFR part 61, "National Emission Standards for Hazardous Air Pollutants"; 40 CFR part 763, "Asbestos"; 29 CFR part 1910, subpart I, "Personal Protective Equipment"; and 29 CFR part 1926, "Safety and Health Regulations for Construction"; and appropriate state and local requirements, including certification of removal contractors and technicians).

### *B1.17 Polychlorinated biphenyl removal*

Removal of polychlorinated biphenyl (PCB)-containing items (including, but not limited to, transformers and capacitors), PCB-containing oils flushed from transformers, PCB-flushing solutions, and PCB-containing spill materials from buildings or other aboveground locations in accordance with applicable requirements (such as 40 CFR part 761).

### *B1.18 Water supply wells*

Siting, construction, and operation of additional water supply wells (or replacement wells) within an existing well field, or modification of an existing water supply well to restore production, provided that there would be no drawdown other than in the immediate vicinity of the pumping well, and

the covered actions would not have the potential to cause significant long-term decline of the water table, and would not have the potential to cause significant degradation of the aquifer from the new or replacement well.

*B1.19 Microwave, meteorological, and radio towers*

Siting, construction, modification, operation, and removal of microwave, radio communication, and meteorological towers and associated facilities, provided that the towers and associated facilities would not be in a governmentally designated scenic area (see B(4)(iv) of this appendix) unless otherwise authorized by the appropriate governmental entity.

*B1.20 Protection of cultural resources, fish and wildlife habitat*

Small-scale activities undertaken to protect cultural resources (such as fencing, labeling, and flagging) or to protect, restore, or improve fish and wildlife habitat, fish passage facilities (such as fish ladders and minor diversion channels), or fisheries. Such activities would be conducted in accordance with an existing natural or cultural resource plan, if any.

*B1.21 Noise abatement*

Noise abatement measures (including, but not limited to, construction of noise barriers and installation of noise control materials).

*B1.22 Relocation of buildings*

Relocation of buildings (including, but not limited to, trailers and prefabricated buildings) to an already developed area (where active utilities and currently used roads are readily accessible).

*B1.23 Demolition and disposal of buildings*

Demolition and subsequent disposal of buildings, equipment, and support structures (including, but not limited to, smoke stacks and parking lot surfaces), provided that there would be no potential for release of substances at a level, or in a form, that could pose a threat to public health or the environment.

*B1.24 Property transfers*

Transfer, lease, disposition, or acquisition of interests in personal property (including, but not limited to, equipment and materials) or real property (including, but not limited to, permanent structures and land), provided that under reasonably foreseeable uses (1) there would be no potential for release of substances at a level, or in a form, that could pose a threat to public health or the environment and (2) the covered actions would not have the potential to cause a sig-

nificant change in impacts from before the transfer, lease, disposition, or acquisition of interests.

*B1.25 Real property transfers for cultural resources protection, habitat preservation, and wildlife management*

Transfer, lease, disposition, or acquisition of interests in land and associated buildings for cultural resources protection, habitat preservation, or fish and wildlife management, provided that there would be no potential for release of substances at a level, or in a form, that could pose a threat to public health or the environment.

*B1.26 Small water treatment facilities*

Siting, construction, expansion, modification, replacement, operation, and decommissioning of small (total capacity less than approximately 250,000 gallons per day) wastewater and surface water treatment facilities whose liquid discharges are externally regulated, and small potable water and sewage treatment facilities.

*B1.27 Disconnection of utilities*

Activities that are required for the disconnection of utility services (including, but not limited to, water, steam, telecommunications, and electrical power) after it has been determined that the continued operation of these systems is not needed for safety.

*B1.28 Placing a facility in an environmentally safe condition*

Minor activities that are required to place a facility in an environmentally safe condition where there is no proposed use for the facility. These activities would include, but are not limited to, reducing surface contamination, and removing materials, equipment or waste (such as final defueling of a reactor, where there are adequate existing facilities for the treatment, storage, or disposal of the materials, equipment or waste). These activities would not include conditioning, treatment, or processing of spent nuclear fuel, high-level waste, or special nuclear materials.

*B1.29 Disposal facilities for construction and demolition waste*

Siting, construction, expansion, modification, operation, and decommissioning of small (less than approximately 10 acres) solid waste disposal facilities for construction and demolition waste, in accordance with applicable requirements (such as 40 CFR part 257, "Criteria for Classification of Solid Waste Disposal Facilities and Practices," and 40 CFR part 61, "National Emission Standards for Hazardous Air Pollutants") that would not release substances at a



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level, or in a form, that could pose a threat to public health or the environment.

### *B1.30 Transfer actions*

Transfer actions, in which the predominant activity is transportation, provided that (1) the receipt and storage capacity and management capability for the amount and type of materials, equipment, or waste to be moved already exists at the receiving site and (2) all necessary facilities and operations at the receiving site are already permitted, licensed, or approved, as appropriate. Such transfers are not regularly scheduled as part of ongoing routine operations.

### *B1.31 Installation or relocation of machinery and equipment*

Installation or relocation and operation of machinery and equipment (including, but not limited to, laboratory equipment, electronic hardware, manufacturing machinery, maintenance equipment, and health and safety equipment), provided that uses of the installed or relocated items are consistent with the general missions of the receiving structure. Covered actions include modifications to an existing building, within or contiguous to a previously disturbed or developed area, that are necessary for equipment installation and relocation. Such modifications would not appreciably increase the footprint or height of the existing building or have the potential to cause significant changes to the type and magnitude of environmental impacts.

### *B1.32 Traffic flow adjustments*

Traffic flow adjustments to existing roads (including, but not limited to, stop sign or traffic light installation, adjusting direction of traffic flow, and adding turning lanes), and road adjustments (including, but not limited to, widening and realignment) that are within an existing right-of-way and consistent with approved land use or transportation improvement plans.

### *B1.33 Stormwater runoff control*

Design, construction, and operation of control practices to reduce stormwater runoff and maintain natural hydrology. Activities include, but are not limited to, those that reduce impervious surfaces (such as vegetative practices and use of porous pavements), best management practices (such as silt fences, straw wattles, and fiber rolls), and use of green infrastructure or other low impact development practices (such as cisterns and green roofs).

### *B1.34 Lead-based paint containment, removal, and disposal*

Containment, removal, and disposal of lead-based paint in accordance with applicable requirements (such as provisions relating

to the certification of removal contractors and technicians at 40 CFR part 745, "Lead-Based Paint Poisoning Prevention In Certain Residential Structures").

### *B1.35 Drop-off, collection, and transfer facilities for recyclable materials*

Siting, construction, modification, and operation of recycling or compostable material drop-off, collection, and transfer stations on or contiguous to a previously disturbed or developed area and in an area where such a facility would be consistent with existing zoning requirements. The stations would have appropriate facilities and procedures established in accordance with applicable requirements for the handling of recyclable or compostable materials and household hazardous waste (such as paint and pesticides). Except as specified above, the collection of hazardous waste for disposal and the processing of recyclable or compostable materials are not included in this class of actions.

### *B1.36 Determinations of excess real property*

Determinations that real property is excess to the needs of DOE and, in the case of acquired real property, the subsequent reporting of such determinations to the General Services Administration or, in the case of lands withdrawn or otherwise reserved from the public domain, the subsequent filing of a notice of intent to relinquish with the Bureau of Land Management, Department of the Interior. Covered actions would not include disposal of real property.

## B2. CATEGORICAL EXCLUSIONS APPLICABLE TO SAFETY AND HEALTH

### *B2.1 Workplace enhancements*

Modifications within or contiguous to an existing structure, in a previously disturbed or developed area, to enhance workplace habitability (including, but not limited to, installation or improvements to lighting, radiation shielding, or heating/ventilating/air conditioning and its instrumentation, and noise reduction).

### *B2.2 Building and equipment instrumentation*

Installation of, or improvements to, building and equipment instrumentation (including, but not limited to, remote control panels, remote monitoring capability, alarm and surveillance systems, control systems to provide automatic shutdown, fire detection and protection systems, water consumption monitors and flow control systems, announcement and emergency warning systems, criticality and radiation monitors and alarms, and safeguards and security equipment).

*B2.3 Personnel safety and health equipment*

Installation of, or improvements to, equipment for personnel safety and health (including, but not limited to, eye washes, safety showers, radiation monitoring devices, fumehoods, and associated collection and exhaust systems), provided that the covered actions would not have the potential to cause a significant increase in emissions.

*B2.4 Equipment qualification*

Activities undertaken to (1) qualify equipment for use or improve systems reliability or (2) augment information on safety-related system components. These activities include, but are not limited to, transportation container qualification testing, crane and lift-gear certification or recertification testing, high efficiency particulate air filter testing and certification, stress tests (such as “burn-in” testing of electrical components and leak testing), and calibration of sensors or diagnostic equipment.

*B2.5 Facility safety and environmental improvements*

Safety and environmental improvements of a facility (including, but not limited to, replacement and upgrade of facility components) that do not result in a significant change in the expected useful life, design capacity, or function of the facility and during which operations may be suspended and then resumed. Improvements include, but are not limited to, replacement/upgrade of control valves, in-core monitoring devices, facility air filtration systems, or substation transformers or capacitors; addition of structural bracing to meet earthquake standards and/or sustain high wind loading; and replacement of aboveground or belowground tanks and related piping, provided that there is no evidence of leakage, based on testing in accordance with applicable requirements (such as 40 CFR part 265, “Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities” and 40 CFR part 280, “Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks”). These actions do not include rebuilding or modifying substantial portions of a facility (such as replacing a reactor vessel).

*B2.6 Recovery of radioactive sealed sources*

Recovery of radioactive sealed sources and sealed source-containing devices from domestic or foreign locations provided that (1) the recovered items are transported and stored in compliant containers, and (2) the receiving site has sufficient existing storage capacity and all required licenses, permits, and approvals.

## B3. CATEGORICAL EXCLUSIONS APPLICABLE TO SITE CHARACTERIZATION, MONITORING, AND GENERAL RESEARCH

*B3.1 Site characterization and environmental monitoring*

Site characterization and environmental monitoring (including, but not limited to, siting, construction, modification, operation, and dismantlement and removal or otherwise proper closure (such as of a well) of characterization and monitoring devices, and siting, construction, and associated operation of a small-scale laboratory building or renovation of a room in an existing building for sample analysis). Such activities would be designed in conformance with applicable requirements and use best management practices to limit the potential effects of any resultant ground disturbance. Covered activities include, but are not limited to, site characterization and environmental monitoring under CERCLA and RCRA. (This class of actions excludes activities in aquatic environments. See B3.16 of this appendix for such activities.) Specific activities include, but are not limited to:

(a) Geological, geophysical (such as gravity, magnetic, electrical, seismic, radar, and temperature gradient), geochemical, and engineering surveys and mapping, and the establishment of survey marks. Seismic techniques would not include large-scale reflection or refraction testing;

(b) Installation and operation of field instruments (such as stream-gauging stations or flow-measuring devices, telemetry systems, geochemical monitoring tools, and geophysical exploration tools);

(c) Drilling of wells for sampling or monitoring of groundwater or the vadose (unsaturated) zone, well logging, and installation of water-level recording devices in wells;

(d) Aquifer and underground reservoir response testing;

(e) Installation and operation of ambient air monitoring equipment;

(f) Sampling and characterization of water, soil, rock, or contaminants (such as drilling using truck- or mobile-scale equipment, and modification, use, and plugging of boreholes);

(g) Sampling and characterization of water effluents, air emissions, or solid waste streams;

(h) Installation and operation of meteorological towers and associated activities (such as assessment of potential wind energy resources);

(i) Sampling of flora or fauna; and

(j) Archeological, historic, and cultural resource identification in compliance with 36 CFR part 800 and 43 CFR part 7.

*B4.10 Removal of electric transmission facilities*

Deactivation, dismantling, and removal of electric transmission facilities (including, but not limited to, electric powerlines, substations, and switching stations) and abandonment and restoration of rights-of-way (including, but not limited to, associated access roads).

*B4.11 Electric power substations and interconnection facilities*

Construction or modification of electric power substations or interconnection facilities (including, but not limited to, switching stations and support facilities).

*B4.12 Construction of powerlines*

Construction of electric powerlines approximately 10 miles in length or less, or approximately 20 miles in length or less within previously disturbed or developed powerline or pipeline rights-of-way.

*B4.13 Upgrading and rebuilding existing powerlines*

Upgrading or rebuilding approximately 20 miles in length or less of existing electric powerlines, which may involve minor relocations of small segments of the powerlines.

**B5. CATEGORICAL EXCLUSIONS APPLICABLE TO CONSERVATION, FOSSIL, AND RENEWABLE ENERGY ACTIVITIES***B5.1 Actions to conserve energy or water*

(a) Actions to conserve energy or water, demonstrate potential energy or water conservation, and promote energy efficiency that would not have the potential to cause significant changes in the indoor or outdoor concentrations of potentially harmful substances. These actions may involve financial and technical assistance to individuals (such as builders, owners, consultants, manufacturers, and designers), organizations (such as utilities), and governments (such as state, local, and tribal). Covered actions include, but are not limited to weatherization (such as insulation and replacing windows and doors); programmed lowering of thermostat settings; placement of timers on hot water heaters; installation or replacement of energy efficient lighting, low-flow plumbing fixtures (such as faucets, toilets, and showerheads), heating, ventilation, and air conditioning systems, and appliances; installation of drip-irrigation systems; improvements in generator efficiency and appliance efficiency ratings; efficiency improvements for vehicles and transportation (such as fleet changeout); power storage (such as flywheels and batteries, generally less than 10 megawatt equivalent); transportation management systems (such as traffic signal control systems, car navigation, speed cameras, and automatic plate number recognition); devel-

opment of energy-efficient manufacturing, industrial, or building practices; and small-scale energy efficiency and conservation research and development and small-scale pilot projects. Covered actions include building renovations or new structures, provided that they occur in a previously disturbed or developed area. Covered actions could involve commercial, residential, agricultural, academic, institutional, or industrial sectors. Covered actions do not include rulemakings, standard-settings, or proposed DOE legislation, except for those actions listed in B5.1(b) of this appendix.

(b) Covered actions include rulemakings that establish energy conservation standards for consumer products and industrial equipment, provided that the actions would not: (1) Have the potential to cause a significant change in manufacturing infrastructure (such as construction of new manufacturing plants with considerable associated ground disturbance); (2) involve significant unresolved conflicts concerning alternative uses of available resources (such as rare or limited raw materials); (3) have the potential to result in a significant increase in the disposal of materials posing significant risks to human health and the environment (such as RCRA hazardous wastes); or (4) have the potential to cause a significant increase in energy consumption in a state or region.

*B5.2 Modifications to pumps and piping*

Modifications to existing pump and piping configurations (including, but not limited to, manifolds, metering systems, and other instrumentation on such configurations conveying materials such as air, brine, carbon dioxide, geothermal system fluids, hydrogen gas, natural gas, nitrogen gas, oil, produced water, steam, and water). Covered modifications would not have the potential to cause significant changes to design process flow rates or permitted air emissions.

*B5.3 Modification or abandonment of wells*

Modification (but not expansion) or plugging and abandonment of wells, provided that site characterization has verified a low potential for seismicity, subsidence, and contamination of freshwater aquifers, and the actions are otherwise consistent with best practices and DOE protocols, including those that protect against uncontrolled releases of harmful materials. Such wells may include, but are not limited to, storage and injection wells for brine, carbon dioxide, coalbed methane, gas hydrate, geothermal, natural gas, and oil. Covered modifications would not be part of site closure.

*B5.4 Repair or replacement of pipelines*

Repair, replacement, upgrading, rebuilding, or minor relocation of pipelines within

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existing rights-of-way, provided that the actions are in accordance with applicable requirements (such as Army Corps of Engineers permits under section 404 of the Clean Water Act). Pipelines may convey materials including, but not limited to, air, brine, carbon dioxide, geothermal system fluids, hydrogen gas, natural gas, nitrogen gas, oil, produced water, steam, and water.

### *B5.5 Short pipeline segments*

Construction and subsequent operation of short (generally less than 20 miles in length) pipeline segments conveying materials (such as air, brine, carbon dioxide, geothermal system fluids, hydrogen gas, natural gas, nitrogen gas, oil, produced water, steam, and water) between existing source facilities and existing receiving facilities (such as facilities for use, reuse, transportation, storage, and refining), provided that the pipeline segments are within previously disturbed or developed rights-of-way.

### *B5.6 Oil spill cleanup*

Removal of oil and contaminated materials recovered in oil spill cleanup operations and disposal of these materials in accordance with applicable requirements (such as the National Oil and Hazardous Substances Pollution Contingency Plan).

### *B5.7 Import or export natural gas, with operational changes*

Approvals or disapprovals of new authorizations or amendments of existing authorizations to import or export natural gas under section 3 of the Natural Gas Act that involve minor operational changes (such as changes in natural gas throughput, transportation, and storage operations) but not new construction.

### *B5.8 Import or export natural gas, with new cogeneration powerplant*

Approvals or disapprovals of new authorizations or amendments of existing authorizations to import or export natural gas under section 3 of the Natural Gas Act that involve new cogeneration powerplants (as defined in the Powerplant and Industrial Fuel Use Act of 1978, as amended) within or contiguous to an existing industrial complex and requiring generally less than 10 miles of new natural gas pipeline or 20 miles within previously disturbed or developed rights-of-way.

### *B5.9 Temporary exemptions for electric powerplants*

Grants or denials of temporary exemptions under the Powerplant and Industrial Fuel Use Act of 1978, as amended, for electric powerplants.

### *B5.10 Certain permanent exemptions for existing electric powerplants*

For existing electric powerplants, grants or denials of permanent exemptions under the Powerplant and Industrial Fuel Use Act of 1978, as amended, other than exemptions under section 312(c) relating to cogeneration and section 312(b) relating to certain state or local requirements.

### *B5.11 Permanent exemptions allowing mixed natural gas and petroleum*

For new electric powerplants, grants or denials of permanent exemptions from the prohibitions of Title II of the Powerplant and Industrial Fuel Use Act of 1978, as amended, to permit the use of certain fuel mixtures containing natural gas or petroleum.

### *B5.12 Workover of existing wells*

Workover (operations to restore production, such as deepening, plugging back, pulling and resetting lines, and squeeze cementing) of existing wells (including, but not limited to, activities associated with brine, carbon dioxide, coalbed methane, gas hydrate, geothermal, natural gas, and oil) to restore functionality, provided that workover operations are restricted to the existing wellpad and do not involve any new site preparation or earthwork that would have the potential to cause significant impacts on nearby habitat; that site characterization has verified a low potential for seismicity, subsidence, and contamination of freshwater aquifers; and the actions are otherwise consistent with best practices and DOE protocols, including those that protect against uncontrolled releases of harmful materials.

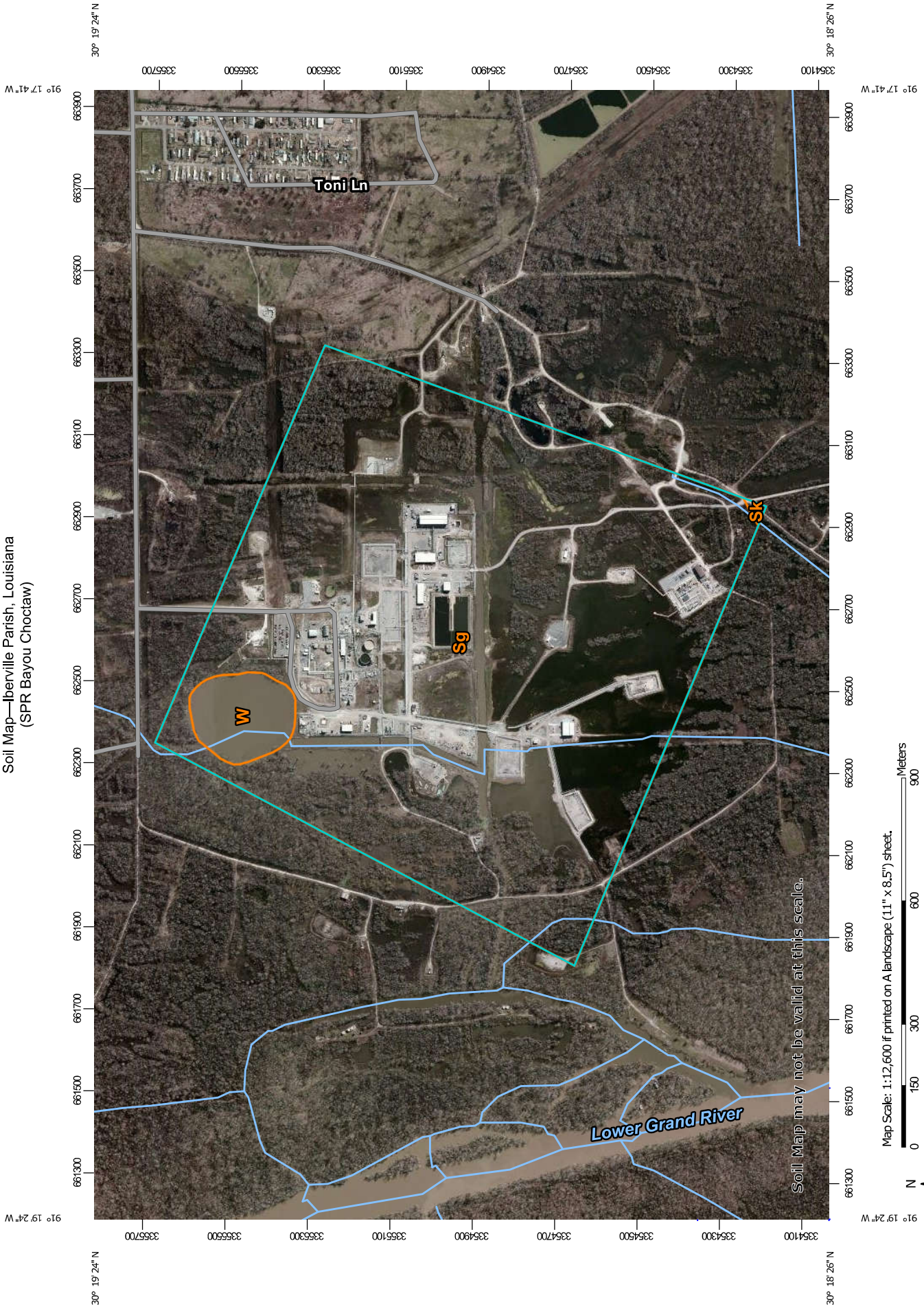
### *B5.13 Experimental wells for injection of small quantities of carbon dioxide*

Siting, construction, operation, plugging, and abandonment of experimental wells for the injection of small quantities of carbon dioxide (and other incidentally co-captured gases) in locally characterized, geologically secure storage formations at or near existing carbon dioxide sources to determine the suitability of the formations for large-scale sequestration, provided that (1) The characterization has verified a low potential for seismicity, subsidence, and contamination of freshwater aquifers; (2) the wells are otherwise in accordance with applicable requirements, best practices, and DOE protocols, including those that protect against uncontrolled releases of harmful materials; and (3) the wells and associated drilling activities are sufficiently remote so that they would not have the potential to cause significant impacts related to noise and other vibrations. Wells may be used for enhanced oil or natural gas recovery or for secure storage of carbon dioxide in saline formations or other

## **Appendix D**

Natural Resources Conservation Service Soil Classification Reports

Soil Map—Iberville Parish, Louisiana  
(SPR Bayou Choctaw)







































Map Scale: 1:12,600 if printed on A landscape (11" x 8.5") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 15N WGS84

## MAP LEGEND

<b>Area of Interest (AOI)</b>		Area of Interest (AOI)		Spoil Area
<b>Soils</b>		Soil Map Unit Polygons		Stony Spot
		Soil Map Unit Lines		Very Stony Spot
		Soil Map Unit Points		Wet Spot
<b>Special Point Features</b>		Blowout		Other
		Borrow Pit		Special Line Features
		Clay Spot		Streams and Canals
		Closed Depression	<b>Transportation</b>	
		Gravel Pit		Rails
		Gravelly Spot		Interstate Highways
		Landfill		US Routes
		Lava Flow		Major Roads
		Marsh or swamp		Local Roads
		Mine or Quarry	<b>Background</b>	
		Miscellaneous Water		Aerial Photography
		Perennial Water		
		Rock Outcrop		
		Saline Spot		
		Sandy Spot		
		Severely Eroded Spot		
		Sinkhole		
		Slide or Slip		
		Sodic Spot		

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service  
Web Soil Survey URL:  
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Iberville Parish, Louisiana  
Survey Area Data: Version 10, Oct 4, 2017

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 3, 2010—Feb 5, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Sg	Sharkey clay, 0 to 1 percent slopes, rarely flooded, south	310.0	96.4%
Sk	Sharkey clay, 0 to 1 percent slopes, frequently flooded	0.4	0.1%
W	Water	11.3	3.5%
<b>Totals for Area of Interest</b>		<b>321.7</b>	<b>100.0%</b>



## Prime and other Important Farmlands

This table lists the map units in the survey area that are considered important farmlands. Important farmlands consist of prime farmland, unique farmland, and farmland of statewide or local importance. This list does not constitute a recommendation for a particular land use.

In an effort to identify the extent and location of important farmlands, the Natural Resources Conservation Service, in cooperation with other interested Federal, State, and local government organizations, has inventoried land that can be used for the production of the Nation's food supply.

*Prime farmland* is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forestland, or other land, but it is not urban or built-up land or water areas. The soil quality, growing season, and moisture supply are those needed for the soil to economically produce sustained high yields of crops when proper management, including water management, and acceptable farming methods are applied. In general, prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, an acceptable salt and sodium content, and few or no rocks. The water supply is dependable and of adequate quality. Prime farmland is permeable to water and air. It is not excessively erodible or saturated with water for long periods, and it either is not frequently flooded during the growing season or is protected from flooding. Slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Natural Resources Conservation Service.

For some of the soils identified in the table as prime farmland, measures that overcome a hazard or limitation, such as flooding, wetness, and droughtiness, are needed. Onsite evaluation is needed to determine whether or not the hazard or limitation has been overcome by corrective measures.

A recent trend in land use in some areas has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and less productive and cannot be easily cultivated.

*Unique farmland* is land other than prime farmland that is used for the production of specific high-value food and fiber crops, such as citrus, tree nuts, olives, cranberries, and other fruits and vegetables. It has the special combination of soil quality, growing season, moisture supply, temperature, humidity, air drainage, elevation, and aspect needed for the soil to economically produce sustainable high yields of these crops when properly managed. The water supply is dependable and of adequate quality. Nearness to markets is an additional consideration. Unique farmland is not based on national criteria. It commonly is in areas where there is a special microclimate, such as the wine country in California.

In some areas, land that does not meet the criteria for prime or unique farmland is considered to be *farmland of statewide importance* for the production of food, feed, fiber, forage, and oilseed crops. The criteria for defining and delineating farmland of statewide importance are determined by the appropriate State agencies. Generally, this land includes areas of soils that nearly meet the requirements for prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods. Some areas may produce as high a yield as prime farmland if conditions are favorable. Farmland of statewide importance may include tracts of land that have been designated for agriculture by State law.

In some areas that are not identified as having national or statewide importance, land is considered to be *farmland of local importance* for the production of food, feed, fiber, forage, and oilseed crops. This farmland is identified by the appropriate local agencies. Farmland of local importance may include tracts of land that have been designated for agriculture by local ordinance.

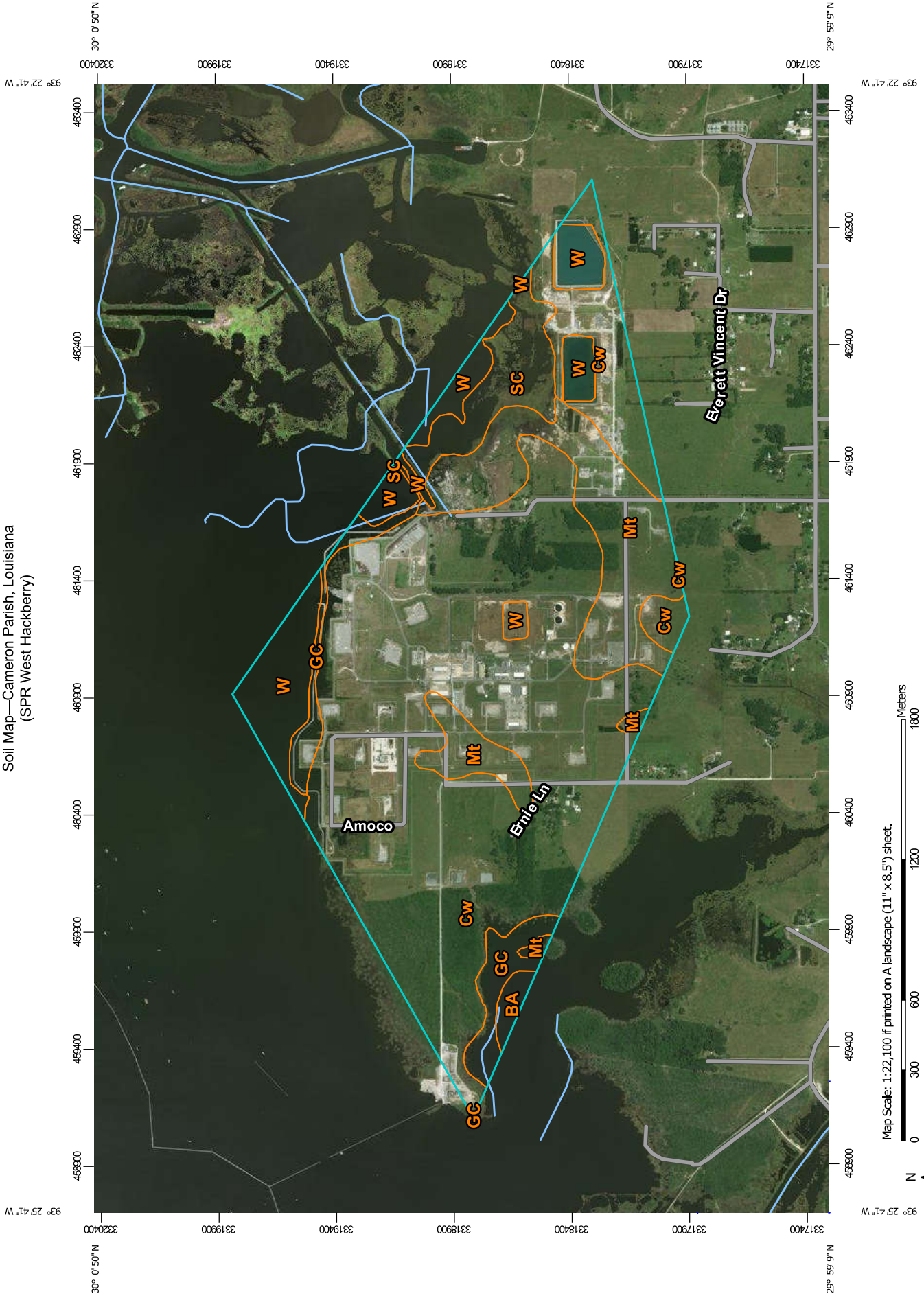
## Report—Prime and other Important Farmlands

Prime and other Important Farmlands—Iberville Parish, Louisiana		
Map Symbol	Map Unit Name	Farmland Classification
Sg	Sharkey clay, 0 to 1 percent slopes, rarely flooded, south	All areas are prime farmland
Sk	Sharkey clay, 0 to 1 percent slopes, frequently flooded	Not prime farmland
W	Water	Not prime farmland

## Data Source Information

Soil Survey Area: Iberville Parish, Louisiana  
 Survey Area Data: Version 10, Oct 4, 2017





































Soil Map—Cameron Parish, Louisiana  
(SPR West Hackberry)



Map Scale: 1:22,100 if printed on A landscape (11" x 8.5") sheet.



## MAP LEGEND

<b>Area of Interest (AOI)</b>	 Area of Interest (AOI)	 Spoil Area
<b>Soils</b>	 Soil Map Unit Polygons	 Stony Spot
	 Soil Map Unit Lines	 Very Stony Spot
	 Soil Map Unit Points	 Wet Spot
<b>Special Point Features</b>	 Blowout	 Other
	 Borrow Pit	 Special Line Features
	 Clay Spot	<b>Water Features</b>
	 Closed Depression	 Streams and Canals
	 Gravel Pit	<b>Transportation</b>
	 Gravelly Spot	 Rails
	 Landfill	 Interstate Highways
	 Lava Flow	 US Routes
	 Marsh or swamp	 Major Roads
	 Mine or Quarry	 Local Roads
	 Miscellaneous Water	<b>Background</b>
	 Perennial Water	 Aerial Photography
	 Rock Outcrop	
	 Saline Spot	
	 Sandy Spot	
	 Severely Eroded Spot	
	 Sinkhole	
	 Slide or Slip	
	 Sodic Spot	

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service  
Web Soil Survey URL:  
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Cameron Parish, Louisiana  
Survey Area Data: Version 15, Oct 3, 2017

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Dec 31, 2009—Nov 18, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
BA	Bancker muck, 0 to 0.2 percent slopes, very frequently flooded	7.1	0.7%
Cw	Crowley-Vidrine complex, 0 to 1 percent slopes	618.4	65.4%
GC	Gentilly muck, 0 to 0.5 percent slopes, very frequently flooded	39.8	4.2%
Mt	Mowata-Vidrine complex, 0 to 1 percent slopes, rarely flooded	141.2	14.9%
SC	Scatlake mucky clay, 0 to 0.2 percent slopes, tidal	47.3	5.0%
W	Water	91.5	9.7%
<b>Totals for Area of Interest</b>		<b>945.3</b>	<b>100.0%</b>

## Prime and other Important Farmlands

This table lists the map units in the survey area that are considered important farmlands. Important farmlands consist of prime farmland, unique farmland, and farmland of statewide or local importance. This list does not constitute a recommendation for a particular land use.

In an effort to identify the extent and location of important farmlands, the Natural Resources Conservation Service, in cooperation with other interested Federal, State, and local government organizations, has inventoried land that can be used for the production of the Nation's food supply.

*Prime farmland* is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forestland, or other land, but it is not urban or built-up land or water areas. The soil quality, growing season, and moisture supply are those needed for the soil to economically produce sustained high yields of crops when proper management, including water management, and acceptable farming methods are applied. In general, prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, an acceptable salt and sodium content, and few or no rocks. The water supply is dependable and of adequate quality. Prime farmland is permeable to water and air. It is not excessively erodible or saturated with water for long periods, and it either is not frequently flooded during the growing season or is protected from flooding. Slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Natural Resources Conservation Service.

For some of the soils identified in the table as prime farmland, measures that overcome a hazard or limitation, such as flooding, wetness, and droughtiness, are needed. Onsite evaluation is needed to determine whether or not the hazard or limitation has been overcome by corrective measures.

A recent trend in land use in some areas has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and less productive and cannot be easily cultivated.

*Unique farmland* is land other than prime farmland that is used for the production of specific high-value food and fiber crops, such as citrus, tree nuts, olives, cranberries, and other fruits and vegetables. It has the special combination of soil quality, growing season, moisture supply, temperature, humidity, air drainage, elevation, and aspect needed for the soil to economically produce sustainable high yields of these crops when properly managed. The water supply is dependable and of adequate quality. Nearness to markets is an additional consideration. Unique farmland is not based on national criteria. It commonly is in areas where there is a special microclimate, such as the wine country in California.

In some areas, land that does not meet the criteria for prime or unique farmland is considered to be *farmland of statewide importance* for the production of food, feed, fiber, forage, and oilseed crops. The criteria for defining and delineating farmland of statewide importance are determined by the appropriate State agencies. Generally, this land includes areas of soils that nearly meet the requirements for prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods. Some areas may produce as high a yield as prime farmland if conditions are favorable. Farmland of statewide importance may include tracts of land that have been designated for agriculture by State law.

In some areas that are not identified as having national or statewide importance, land is considered to be *farmland of local importance* for the production of food, feed, fiber, forage, and oilseed crops. This farmland is identified by the appropriate local agencies. Farmland of local importance may include tracts of land that have been designated for agriculture by local ordinance.

## Report—Prime and other Important Farmlands

Prime and other Important Farmlands—Cameron Parish, Louisiana		
Map Symbol	Map Unit Name	Farmland Classification
BA	Bancker muck, 0 to 0.2 percent slopes, very frequently flooded	Not prime farmland
Cw	Crowley-Vidrine complex, 0 to 1 percent slopes	All areas are prime farmland
GC	Gentilly muck, 0 to 0.5 percent slopes, very frequently flooded	Not prime farmland
Mt	Mowata-Vidrine complex, 0 to 1 percent slopes, rarely flooded	All areas are prime farmland
SC	Scatlake mucky clay, 0 to 0.2 percent slopes, tidal	Not prime farmland
W	Water	Not prime farmland

## Data Source Information

Soil Survey Area: Cameron Parish, Louisiana  
 Survey Area Data: Version 15, Oct 3, 2017

Soil Map—Jefferson and Orange Counties, Texas  
(SPR Big Hill)




















Soil Map may not be valid at this scale.

Map Scale: 1:8,960 if printed on A landscape (11" x 8.5") sheet.

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 15N WGS84



## MAP LEGEND

- Area of Interest (AOI)**
  -  Area of Interest (AOI)
- Soils**
  -  Soil Map Unit Polygons
  -  Soil Map Unit Lines
  -  Soil Map Unit Points
- Special Point Features**
  -  Blowout
  -  Borrow Pit
  -  Clay Spot
  -  Closed Depression
  -  Gravel Pit
  -  Gravelly Spot
  -  Landfill
  -  Lava Flow
  -  Marsh or swamp
  -  Mine or Quarry
  -  Miscellaneous Water
  -  Perennial Water
  -  Rock Outcrop
  -  Saline Spot
  -  Sandy Spot
  -  Severely Eroded Spot
  -  Sinkhole
  -  Slide or Slip
  -  Sodic Spot

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service  
Web Soil Survey URL:  
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.














This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Jefferson and Orange Counties, Texas  
Survey Area Data: Version 18, Nov 7, 2017

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Dec 31, 2009—Feb 8, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

-  Spoil Area
-  Stony Spot
-  Very Stony Spot
-  Wet Spot
-  Other
-  Special Line Features
- Water Features**
  -  Streams and Canals
- Transportation**
  -  Rails
  -  Interstate Highways
  -  US Routes
  -  Major Roads
  -  Local Roads
- Background**
  -  Aerial Photography

## Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
AnaB	Anahuac very fine sandy loam, 0 to 2 percent slopes	25.0	6.9%
MeIA	Meaton-Levac complex, 0 to 1 percent slopes, rarely flooded	5.9	1.6%
MesA	Meaton-Spindletop complex, 0 to 1 percent slopes, rarely flooded	105.3	28.9%
URLX	Urban land	223.9	61.4%
W	Water	4.5	1.2%
<b>Totals for Area of Interest</b>		<b>364.6</b>	<b>100.0%</b>

## Prime and other Important Farmlands

This table lists the map units in the survey area that are considered important farmlands. Important farmlands consist of prime farmland, unique farmland, and farmland of statewide or local importance. This list does not constitute a recommendation for a particular land use.

In an effort to identify the extent and location of important farmlands, the Natural Resources Conservation Service, in cooperation with other interested Federal, State, and local government organizations, has inventoried land that can be used for the production of the Nation's food supply.

*Prime farmland* is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forestland, or other land, but it is not urban or built-up land or water areas. The soil quality, growing season, and moisture supply are those needed for the soil to economically produce sustained high yields of crops when proper management, including water management, and acceptable farming methods are applied. In general, prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, an acceptable salt and sodium content, and few or no rocks. The water supply is dependable and of adequate quality. Prime farmland is permeable to water and air. It is not excessively erodible or saturated with water for long periods, and it either is not frequently flooded during the growing season or is protected from flooding. Slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Natural Resources Conservation Service.

For some of the soils identified in the table as prime farmland, measures that overcome a hazard or limitation, such as flooding, wetness, and droughtiness, are needed. Onsite evaluation is needed to determine whether or not the hazard or limitation has been overcome by corrective measures.

A recent trend in land use in some areas has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and less productive and cannot be easily cultivated.

*Unique farmland* is land other than prime farmland that is used for the production of specific high-value food and fiber crops, such as citrus, tree nuts, olives, cranberries, and other fruits and vegetables. It has the special combination of soil quality, growing season, moisture supply, temperature, humidity, air drainage, elevation, and aspect needed for the soil to economically produce sustainable high yields of these crops when properly managed. The water supply is dependable and of adequate quality. Nearness to markets is an additional consideration. Unique farmland is not based on national criteria. It commonly is in areas where there is a special microclimate, such as the wine country in California.

In some areas, land that does not meet the criteria for prime or unique farmland is considered to be *farmland of statewide importance* for the production of food, feed, fiber, forage, and oilseed crops. The criteria for defining and delineating farmland of statewide importance are determined by the appropriate State agencies. Generally, this land includes areas of soils that nearly meet the requirements for prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods. Some areas may produce as high a yield as prime farmland if conditions are favorable. Farmland of statewide importance may include tracts of land that have been designated for agriculture by State law.

In some areas that are not identified as having national or statewide importance, land is considered to be *farmland of local importance* for the production of food, feed, fiber, forage, and oilseed crops. This farmland is identified by the appropriate local agencies. Farmland of local importance may include tracts of land that have been designated for agriculture by local ordinance.

## Report—Prime and other Important Farmlands

Prime and other Important Farmlands--Jefferson and Orange Counties, Texas		
Map Symbol	Map Unit Name	Farmland Classification
AnaB	Anahuac very fine sandy loam, 0 to 2 percent slopes	All areas are prime farmland
MeIA	Meaton-Levac complex, 0 to 1 percent slopes, rarely flooded	Not prime farmland
MesA	Meaton-Spindletop complex, 0 to 1 percent slopes, rarely flooded	Not prime farmland
URLX	Urban land	Not prime farmland
W	Water	Not prime farmland

### Data Source Information

Soil Survey Area: Jefferson and Orange Counties, Texas  
 Survey Area Data: Version 18, Nov 7, 2017

Soil Map—Brazoria County, Texas  
(SPR Bryan Mound)














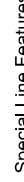


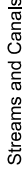




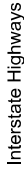



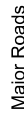

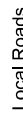









Map Scale: 1:13,300 if printed on A portrait (8.5" x 11") sheet.

0 150 300 600 900 Meters

0 500 1000 2000 3000 Feet

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 15N WGS84

## MAP LEGEND

<b>Area of Interest (AOI)</b>	 Area of Interest (AOI)	 Spoil Area
<b>Soils</b>	 Soil Map Unit Polygons	 Stony Spot
	 Soil Map Unit Lines	 Very Stony Spot
	 Soil Map Unit Points	 Wet Spot
<b>Special Point Features</b>	 Blowout	 Other
	 Borrow Pit	 Special Line Features
	 Clay Spot	<b>Water Features</b>
	 Closed Depression	 Streams and Canals
	 Gravel Pit	<b>Transportation</b>
	 Gravelly Spot	 Rails
	 Landfill	 Interstate Highways
	 Lava Flow	 US Routes
	 Marsh or swamp	 Major Roads
	 Mine or Quarry	 Local Roads
	 Miscellaneous Water	<b>Background</b>
	 Perennial Water	 Aerial Photography
	 Rock Outcrop	
	 Saline Spot	
	 Sandy Spot	
	 Severely Eroded Spot	
	 Sinkhole	
	 Slide or Slip	
	 Sodic Spot	

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service  
Web Soil Survey URL:  
Coordinate System: Web Mercator (EPSG:3857)

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This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Brazoria County, Texas  
Survey Area Data: Version 15, Nov 7, 2017

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Dec 31, 2009—Feb 22, 2017

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## Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
21	Ijam clay, rarely flooded	20.0	4.3%
25	Lake Charles clay, 2 to 5 percent slopes	350.6	75.7%
42	Velasco clay, 0 to 1 percent slopes, frequently flooded	46.8	10.1%
W	Water	45.9	9.9%
<b>Totals for Area of Interest</b>		<b>463.2</b>	<b>100.0%</b>

## Prime and other Important Farmlands

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## Report—Prime and other Important Farmlands

Prime and other Important Farmlands—Brazoria County, Texas		
Map Symbol	Map Unit Name	Farmland Classification
21	Ijam clay, rarely flooded	Not prime farmland
25	Lake Charles clay, 2 to 5 percent slopes	All areas are prime farmland
42	Velasco clay, 0 to 1 percent slopes, frequently flooded	Not prime farmland
W	Water	Not prime farmland

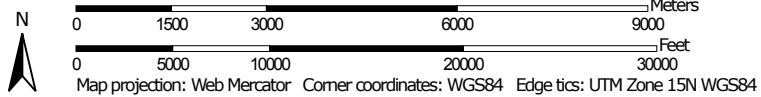
### Data Source Information

Soil Survey Area: Brazoria County, Texas  
 Survey Area Data: Version 15, Nov 7, 2017










































Soil Map—Jefferson and Orange Counties, Texas  
(596 Project)



Map Scale: 1:119,000 if printed on A portrait (8.5" x 11") sheet.



## MAP LEGEND

 Area of Interest (AOI)	 Spoil Area
 Soils	 Stony Spot
 Soil Map Unit Polygons	 Very Stony Spot
 Soil Map Unit Lines	 Wet Spot
 Soil Map Unit Points	 Other
 <b>Special Point Features</b>	 <b>Special Line Features</b>
 Blowout	 <b>Water Features</b>
 Borrow Pit	 Streams and Canals
 Clay Spot	 <b>Transportation</b>
 Closed Depression	 Rails
 Gravel Pit	 Interstate Highways
 Gravelly Spot	 US Routes
 Landfill	 Major Roads
 Lava Flow	 Local Roads
 Marsh or swamp	 <b>Background</b>
 Mine or Quarry	 Aerial Photography
 Miscellaneous Water	
 Perennial Water	
 Rock Outcrop	
 Saline Spot	
 Sandy Spot	
 Severely Eroded Spot	
 Sinkhole	
 Slide or Slip	
 Sodic Spot	

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service  
Web Soil Survey URL:  
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Jefferson and Orange Counties, Texas  
Survey Area Data: Version 18, Nov 7, 2017

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Dec 31, 2009—Feb 8, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
AmA	Allemands mucky peat, 0 to 0.5 percent slopes, tidal	593.2	0.9%
AnaB	Anahuac very fine sandy loam, 0 to 2 percent slopes	205.5	0.3%
AniA	Anahuac-Aris complex, 0 to 1 percent slopes, rarely flooded	208.4	0.3%
AstA	Aris-Spindletop complex, 0 to 1 percent slopes, rarely flooded	169.1	0.3%
BaA	Bancker mucky peat, 0 to 1 percent slopes, frequently flooded, tidal	49.0	0.1%
BcA	Barnett mucky peat, 0 to 1 percent slopes, frequently flooded, tidal	4,897.4	7.8%
BeA	Barnett silty clay loam, 0 to 1 percent slopes, frequently flooded, tidal	66.2	0.1%
BebA	Beaumont silty clay, 0 to 1 percent slopes, rarely flooded	3,807.5	6.1%
CeA	Caplen mucky peat, 0 to 1 percent slopes, frequently flooded, tidal	4,184.3	6.7%
CsA	Creole mucky peat, 0 to 1 percent slopes, frequently flooded, tidal	267.6	0.4%
FraA	Franeau clay, 0 to 1 percent slopes, occasionally flooded	5,419.9	8.7%
HarA	Harris clay, 0 to 1 percent slopes, frequently flooded, tidal	4,664.3	7.5%
IjmB	Ijam clay, 0 to 2 percent slopes, frequently flooded, tidal	375.3	0.6%
LaeA	Labelle clay loam, 0 to 1 percent slopes, rarely flooded	1,042.1	1.7%
LalA	Labelle-Levac complex, 0 to 1 percent slopes	0.2	0.0%
LamA	Labelle-Levac complex, 0 to 1 percent slopes, rarely flooded	1,288.0	2.1%
LegA	League clay, 0 to 1 percent slopes, rarely flooded	2,311.8	3.7%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
LetA	Leton loam, 0 to 1 percent slopes, occasionally flooded, frequently ponded	917.9	1.5%
LvA	Leerco muck, 0 to 1 percent slopes, frequently flooded, tidal	6,559.4	10.5%
MeIA	Meaton-Levac complex, 0 to 1 percent slopes, rarely flooded	8,778.8	14.1%
MesA	Meaton-Spindletop complex, 0 to 1 percent slopes, rarely flooded	4,747.9	7.6%
NeA	Neel clay, 2 to 5 percent slopes, occasionally flooded, tidal	1,325.9	2.1%
OWLX	Oil waste land	22.5	0.0%
SimA	Simelake clay, 0 to 1 percent slopes, frequently flooded	125.2	0.2%
URLX	Urban land	223.9	0.4%
VitA	Viterbo silty clay loam, 0 to 1 percent slopes, rarely flooded	355.1	0.6%
W	Water	4,449.9	7.1%
ZumA	Zummo muck, 0 to 1 percent slopes, frequently flooded, frequently ponded	5,398.5	8.6%
<b>Totals for Area of Interest</b>		<b>62,454.7</b>	<b>100.0%</b>

## Prime and other Important Farmlands

This table lists the map units in the survey area that are considered important farmlands. Important farmlands consist of prime farmland, unique farmland, and farmland of statewide or local importance. This list does not constitute a recommendation for a particular land use.

In an effort to identify the extent and location of important farmlands, the Natural Resources Conservation Service, in cooperation with other interested Federal, State, and local government organizations, has inventoried land that can be used for the production of the Nation's food supply.

*Prime farmland* is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forestland, or other land, but it is not urban or built-up land or water areas. The soil quality, growing season, and moisture supply are those needed for the soil to economically produce sustained high yields of crops when proper management, including water management, and acceptable farming methods are applied. In general, prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, an acceptable salt and sodium content, and few or no rocks. The water supply is dependable and of adequate quality. Prime farmland is permeable to water and air. It is not excessively erodible or saturated with water for long periods, and it either is not frequently flooded during the growing season or is protected from flooding. Slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Natural Resources Conservation Service.

For some of the soils identified in the table as prime farmland, measures that overcome a hazard or limitation, such as flooding, wetness, and droughtiness, are needed. Onsite evaluation is needed to determine whether or not the hazard or limitation has been overcome by corrective measures.

A recent trend in land use in some areas has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and less productive and cannot be easily cultivated.

*Unique farmland* is land other than prime farmland that is used for the production of specific high-value food and fiber crops, such as citrus, tree nuts, olives, cranberries, and other fruits and vegetables. It has the special combination of soil quality, growing season, moisture supply, temperature, humidity, air drainage, elevation, and aspect needed for the soil to economically produce sustainable high yields of these crops when properly managed. The water supply is dependable and of adequate quality. Nearness to markets is an additional consideration. Unique farmland is not based on national criteria. It commonly is in areas where there is a special microclimate, such as the wine country in California.

In some areas, land that does not meet the criteria for prime or unique farmland is considered to be *farmland of statewide importance* for the production of food, feed, fiber, forage, and oilseed crops. The criteria for defining and delineating farmland of statewide importance are determined by the appropriate State agencies. Generally, this land includes areas of soils that nearly meet the requirements for prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods. Some areas may produce as high a yield as prime farmland if conditions are favorable. Farmland of statewide importance may include tracts of land that have been designated for agriculture by State law.

In some areas that are not identified as having national or statewide importance, land is considered to be *farmland of local importance* for the production of food, feed, fiber, forage, and oilseed crops. This farmland is identified by the appropriate local agencies. Farmland of local importance may include tracts of land that have been designated for agriculture by local ordinance.

## Report—Prime and other Important Farmlands

Prime and other Important Farmlands—Jefferson and Orange Counties, Texas		
Map Symbol	Map Unit Name	Farmland Classification
AmA	Allemands mucky peat, 0 to 0.5 percent slopes, tidal	Not prime farmland
AnaB	Anahuac very fine sandy loam, 0 to 2 percent slopes	All areas are prime farmland
AniA	Anahuac-Aris complex, 0 to 1 percent slopes, rarely flooded	Prime farmland if drained
AstA	Aris-Spindletop complex, 0 to 1 percent slopes, rarely flooded	Not prime farmland
BaA	Bancker mucky peat, 0 to 1 percent slopes, frequently flooded, tidal	Not prime farmland
BcA	Barnett mucky peat, 0 to 1 percent slopes, frequently flooded, tidal	Not prime farmland
BeA	Barnett silty clay loam, 0 to 1 percent slopes, frequently flooded, tidal	Not prime farmland
BebA	Beaumont silty clay, 0 to 1 percent slopes, rarely flooded	Not prime farmland
CeA	Caplen mucky peat, 0 to 1 percent slopes, frequently flooded, tidal	Not prime farmland
CsA	Creole mucky peat, 0 to 1 percent slopes, frequently flooded, tidal	Not prime farmland
FraA	Franeau clay, 0 to 1 percent slopes, occasionally flooded	Not prime farmland

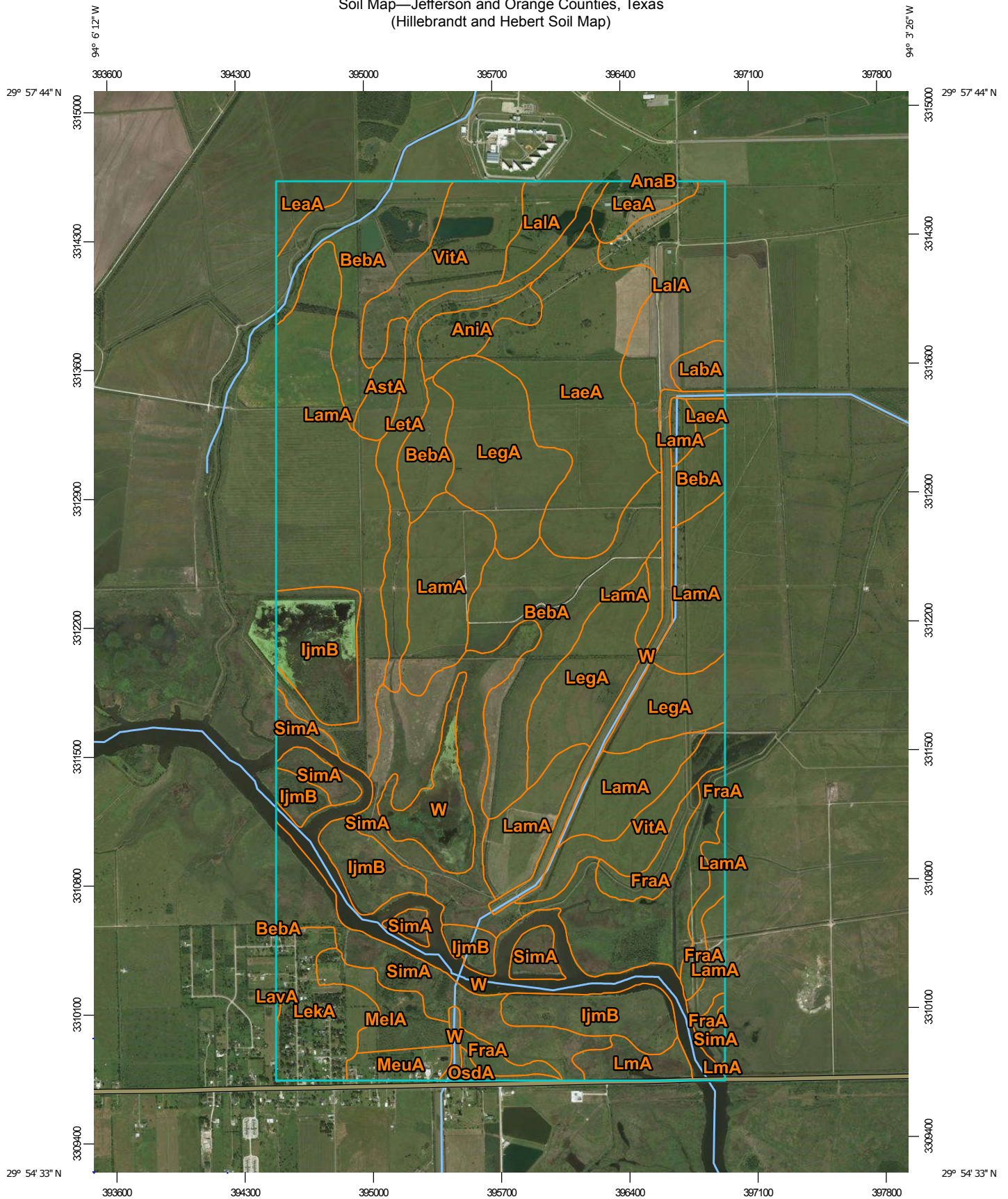
Prime and other Important Farmlands--Jefferson and Orange Counties, Texas		
Map Symbol	Map Unit Name	Farmland Classification
HarA	Harris clay, 0 to 1 percent slopes, frequently flooded, tidal	Not prime farmland
ljmB	ljam clay, 0 to 2 percent slopes, frequently flooded, tidal	Not prime farmland
LaeA	Labelle clay loam, 0 to 1 percent slopes, rarely flooded	All areas are prime farmland
LalA	Labelle-Levac complex, 0 to 1 percent slopes	All areas are prime farmland
LamA	Labelle-Levac complex, 0 to 1 percent slopes, rarely flooded	All areas are prime farmland
LegA	League clay, 0 to 1 percent slopes, rarely flooded	All areas are prime farmland
LetA	Leton loam, 0 to 1 percent slopes, occasionally flooded, frequently ponded	Not prime farmland
LvA	Leerco muck, 0 to 1 percent slopes, frequently flooded, tidal	Not prime farmland
MeIA	Meaton-Levac complex, 0 to 1 percent slopes, rarely flooded	Not prime farmland
MesA	Meaton-Spindletop complex, 0 to 1 percent slopes, rarely flooded	Not prime farmland
NeA	Neel clay, 2 to 5 percent slopes, occasionally flooded, tidal	Not prime farmland
OWLX	Oil waste land	Not prime farmland
SimA	Simelake clay, 0 to 1 percent slopes, frequently flooded	Not prime farmland
URLX	Urban land	Not prime farmland
VitA	Viterbo silty clay loam, 0 to 1 percent slopes, rarely flooded	Not prime farmland
W	Water	Not prime farmland
ZumA	Zummo muck, 0 to 1 percent slopes, frequently flooded, frequently ponded	Not prime farmland

## Data Source Information

Soil Survey Area: Jefferson and Orange Counties, Texas  
 Survey Area Data: Version 18, Nov 7, 2017



Soil Map—Jefferson and Orange Counties, Texas  
(Hillebrandt and Hebert Soil Map)



























































Map Scale: 1:28,700 if printed on A portrait (8.5" x 11") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 15N WGS84



## MAP LEGEND

 Area of Interest (AOI)	 Spoil Area
 Soil Map Unit Polygons	 Stony Spot
 Soil Map Unit Lines	 Very Stony Spot
 Soil Map Unit Points	 Wet Spot
 Soil Map Unit Points	 Other
 Soil Map Unit Points	 Special Line Features
 Soil Map Unit Points	 Streams and Canals
 Soil Map Unit Points	 RAILS
 Soil Map Unit Points	 Interstate Highways
 Soil Map Unit Points	 US Routes
 Soil Map Unit Points	 Major Roads
 Soil Map Unit Points	 Local Roads
 Soil Map Unit Points	 Aerial Photography
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## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service  
Web Soil Survey URL:  
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Jefferson and Orange Counties, Texas  
Survey Area Data: Version 18, Nov 7, 2017

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Dec 31, 2009—Nov 18, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
AnaB	Anahuac very fine sandy loam, 0 to 2 percent slopes	0.0	0.0%
AniA	Anahuac-Aris complex, 0 to 1 percent slopes, rarely flooded	35.6	1.2%
AstA	Aris-Spindletop complex, 0 to 1 percent slopes, rarely flooded	25.0	0.8%
BebA	Beaumont silty clay, 0 to 1 percent slopes, rarely flooded	343.2	11.6%
FraA	Franeau clay, 0 to 1 percent slopes, occasionally flooded	66.9	2.3%
IjmB	Ijam clay, 0 to 2 percent slopes, frequently flooded, tidal	193.7	6.5%
LabA	Labelle clay loam, 0 to 1 percent slopes	16.3	0.5%
LaeA	Labelle clay loam, 0 to 1 percent slopes, rarely flooded	231.9	7.8%
LalA	Labelle-Levac complex, 0 to 1 percent slopes	162.8	5.5%
LamA	Labelle-Levac complex, 0 to 1 percent slopes, rarely flooded	541.8	18.3%
LavA	Labelle-Urban land complex, 0 to 1 percent slopes, rarely flooded	0.7	0.0%
LeaA	League clay, 0 to 1 percent slopes	47.4	1.6%
LegA	League clay, 0 to 1 percent slopes, rarely flooded	254.6	8.6%
LekA	League-Urban land complex, 0 to 1 percent slopes, rarely flooded	79.5	2.7%
LetA	Leton loam, 0 to 1 percent slopes, occasionally flooded, frequently ponded	82.8	2.8%
LmA	Larose mucky peat, 0 to 1 percent slopes, frequently flooded	27.6	0.9%
MeIA	Meaton-Levac complex, 0 to 1 percent slopes, rarely flooded	42.0	1.4%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
MeuA	Meaton-Urban land complex, 0 to 1 percent slopes, rarely flooded	22.7	0.8%
OsdA	Orcadia-Aris complex, 0 to 1 percent slopes, rarely flooded	6.7	0.2%
SimA	Simelake clay, 0 to 1 percent slopes, frequently flooded	412.8	13.9%
VitA	Viterbo silty clay loam, 0 to 1 percent slopes, rarely flooded	144.4	4.9%
W	Water	230.3	7.8%
<b>Totals for Area of Interest</b>		<b>2,968.6</b>	<b>100.0%</b>

## Prime and other Important Farmlands

This table lists the map units in the survey area that are considered important farmlands. Important farmlands consist of prime farmland, unique farmland, and farmland of statewide or local importance. This list does not constitute a recommendation for a particular land use.

In an effort to identify the extent and location of important farmlands, the Natural Resources Conservation Service, in cooperation with other interested Federal, State, and local government organizations, has inventoried land that can be used for the production of the Nation's food supply.

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For some of the soils identified in the table as prime farmland, measures that overcome a hazard or limitation, such as flooding, wetness, and droughtiness, are needed. Onsite evaluation is needed to determine whether or not the hazard or limitation has been overcome by corrective measures.

A recent trend in land use in some areas has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and less productive and cannot be easily cultivated.

*Unique farmland* is land other than prime farmland that is used for the production of specific high-value food and fiber crops, such as citrus, tree nuts, olives, cranberries, and other fruits and vegetables. It has the special combination of soil quality, growing season, moisture supply, temperature, humidity, air drainage, elevation, and aspect needed for the soil to economically produce sustainable high yields of these crops when properly managed. The water supply is dependable and of adequate quality. Nearness to markets is an additional consideration. Unique farmland is not based on national criteria. It commonly is in areas where there is a special microclimate, such as the wine country in California.

In some areas, land that does not meet the criteria for prime or unique farmland is considered to be *farmland of statewide importance* for the production of food, feed, fiber, forage, and oilseed crops. The criteria for defining and delineating farmland of statewide importance are determined by the appropriate State agencies. Generally, this land includes areas of soils that nearly meet the requirements for prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods. Some areas may produce as high a yield as prime farmland if conditions are favorable. Farmland of statewide importance may include tracts of land that have been designated for agriculture by State law.

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## Report—Prime and other Important Farmlands

Prime and other Important Farmlands—Jefferson and Orange Counties, Texas		
Map Symbol	Map Unit Name	Farmland Classification
AnaB	Anahuac very fine sandy loam, 0 to 2 percent slopes	All areas are prime farmland
AniA	Anahuac-Aris complex, 0 to 1 percent slopes, rarely flooded	Prime farmland if drained
AstA	Aris-Spindletop complex, 0 to 1 percent slopes, rarely flooded	Not prime farmland
BebA	Beaumont silty clay, 0 to 1 percent slopes, rarely flooded	Not prime farmland
FraA	Franeau clay, 0 to 1 percent slopes, occasionally flooded	Not prime farmland
ljmB	ljam clay, 0 to 2 percent slopes, frequently flooded, tidal	Not prime farmland
LabA	Labelle clay loam, 0 to 1 percent slopes	All areas are prime farmland
LaeA	Labelle clay loam, 0 to 1 percent slopes, rarely flooded	All areas are prime farmland
LalA	Labelle-Levac complex, 0 to 1 percent slopes	All areas are prime farmland
LamA	Labelle-Levac complex, 0 to 1 percent slopes, rarely flooded	All areas are prime farmland
LavA	Labelle-Urban land complex, 0 to 1 percent slopes, rarely flooded	Not prime farmland
LeaA	League clay, 0 to 1 percent slopes	All areas are prime farmland
LegA	League clay, 0 to 1 percent slopes, rarely flooded	All areas are prime farmland

Prime and other Important Farmlands--Jefferson and Orange Counties, Texas		
Map Symbol	Map Unit Name	Farmland Classification
LekA	League-Urban land complex, 0 to 1 percent slopes, rarely flooded	Not prime farmland
LetA	Leton loam, 0 to 1 percent slopes, occasionally flooded, frequently ponded	Not prime farmland
LmA	Larose mucky peat, 0 to 1 percent slopes, frequently flooded	Not prime farmland
MelA	Meaton-Levac complex, 0 to 1 percent slopes, rarely flooded	Not prime farmland
MeuA	Meaton-Urban land complex, 0 to 1 percent slopes, rarely flooded	Not prime farmland
OsdA	Orcadia-Aris complex, 0 to 1 percent slopes, rarely flooded	Farmland of statewide importance
SimA	Simelake clay, 0 to 1 percent slopes, frequently flooded	Not prime farmland
VitA	Viterbo silty clay loam, 0 to 1 percent slopes, rarely flooded	Not prime farmland
W	Water	Not prime farmland

## Data Source Information

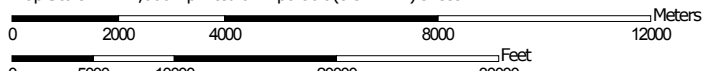
Soil Survey Area: Jefferson and Orange Counties, Texas

Survey Area Data: Version 18, Nov 7, 2017

Soil Map—Jefferson and Orange Counties, Texas  
(1407 Soil Map)



Map Scale: 1:142,000 if printed on A portrait (8.5" x 11") sheet.









































Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 15N WGS84





## MAP LEGEND

 Area of Interest (AOI)	 Spoil Area
 Soils	 Stony Spot
 Soil Map Unit Polygons	 Very Stony Spot
 Soil Map Unit Lines	 Wet Spot
 Soil Map Unit Points	 Other
 Special Point Features	 Special Line Features
 Blowout	 Streams and Canals
 Borrow Pit	 Rails
 Clay Spot	 Interstate Highways
 Closed Depression	 US Routes
 Gravel Pit	 Major Roads
 Gravelly Spot	 Local Roads
 Landfill	 Aerial Photography
 Lava Flow	
 Marsh or swamp	
 Mine or Quarry	
 Miscellaneous Water	
 Perennial Water	
 Rock Outcrop	
 Saline Spot	
 Sandy Spot	
 Severely Eroded Spot	
 Sinkhole	
 Slide or Slip	
 Sodic Spot	

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service  
Web Soil Survey URL:  
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Jefferson and Orange Counties, Texas  
Survey Area Data: Version 18, Nov 7, 2017

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Dec 31, 2009—Nov 18, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
AnaB	Anahuac very fine sandy loam, 0 to 2 percent slopes	584.3	1.1%
AnhA	Anahuac-Aris complex, 0 to 1 percent slopes	1.2	0.0%
AnuB	Anahuac-Urban land complex, 0 to 2 percent slopes	113.8	0.2%
BaA	Bancker mucky peat, 0 to 1 percent slopes, frequently flooded, tidal	1,259.7	2.4%
BbA	Barbary mucky clay, 0 to 1 percent slopes, frequently flooded	166.8	0.3%
BeaA	Beaumont clay, 0 to 1 percent slopes	2,635.1	5.1%
BecA	Beaumont-Urban land complex, 0 to 1 percent slopes	100.9	0.2%
CeA	Caplen mucky peat, 0 to 1 percent slopes, frequently flooded, tidal	346.1	0.7%
CsA	Creole mucky peat, 0 to 1 percent slopes, frequently flooded, tidal	1,293.6	2.5%
FraA	Franeau clay, 0 to 1 percent slopes, occasionally flooded	474.8	0.9%
HarA	Harris clay, 0 to 1 percent slopes, frequently flooded, tidal	1,918.5	3.7%
IjmB	Ijam clay, 0 to 2 percent slopes, frequently flooded, tidal	2,641.9	5.1%
LabA	Labelle clay loam, 0 to 1 percent slopes	148.7	0.3%
LaeA	Labelle clay loam, 0 to 1 percent slopes, rarely flooded	144.7	0.3%
LalA	Labelle-Levac complex, 0 to 1 percent slopes	105.1	0.2%
LamA	Labelle-Levac complex, 0 to 1 percent slopes, rarely flooded	25.2	0.0%
LauA	Labelle-Urban land complex, 0 to 1 percent slopes	122.0	0.2%
LeaA	League clay, 0 to 1 percent slopes	2,545.0	4.9%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
LehA	League-Urban land complex, 0 to 1 percent slopes	1,567.7	3.0%
LetA	Leton loam, 0 to 1 percent slopes, occasionally flooded, frequently ponded	2.7	0.0%
NeA	Neel clay, 2 to 5 percent slopes, occasionally flooded, tidal	402.2	0.8%
NecC	Neches coarse sand, 2 to 5 percent slopes	1,083.3	2.1%
NuC	Neel-Urban land complex, 2 to 5 percent slopes, rarely flooded, tidal	415.9	0.8%
OrdB	Orcadia silt loam, 0 to 2 percent slopes, rarely flooded	58.1	0.1%
OsvB	Orcadia-Urban land complex, 0 to 2 percent slopes, rarely flooded	89.2	0.2%
PITX	Pits	407.5	0.8%
URLX	Urban land	26,935.9	51.8%
VirA	Viterbo silty clay loam, 0 to 1 percent slopes	181.6	0.3%
ViuA	Viterbo-Urban land complex, 0 to 1 percent slopes	91.7	0.2%
W	Water	4,464.8	8.6%
ZumA	Zummo muck, 0 to 1 percent slopes, frequently flooded, frequently ponded	1,627.7	3.1%
<b>Totals for Area of Interest</b>		<b>51,955.8</b>	<b>100.0%</b>

## Prime and other Important Farmlands

This table lists the map units in the survey area that are considered important farmlands. Important farmlands consist of prime farmland, unique farmland, and farmland of statewide or local importance. This list does not constitute a recommendation for a particular land use.

In an effort to identify the extent and location of important farmlands, the Natural Resources Conservation Service, in cooperation with other interested Federal, State, and local government organizations, has inventoried land that can be used for the production of the Nation's food supply.

*Prime farmland* is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forestland, or other land, but it is not urban or built-up land or water areas. The soil quality, growing season, and moisture supply are those needed for the soil to economically produce sustained high yields of crops when proper management, including water management, and acceptable farming methods are applied. In general, prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, an acceptable salt and sodium content, and few or no rocks. The water supply is dependable and of adequate quality. Prime farmland is permeable to water and air. It is not excessively erodible or saturated with water for long periods, and it either is not frequently flooded during the growing season or is protected from flooding. Slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Natural Resources Conservation Service.

For some of the soils identified in the table as prime farmland, measures that overcome a hazard or limitation, such as flooding, wetness, and droughtiness, are needed. Onsite evaluation is needed to determine whether or not the hazard or limitation has been overcome by corrective measures.

A recent trend in land use in some areas has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and less productive and cannot be easily cultivated.

*Unique farmland* is land other than prime farmland that is used for the production of specific high-value food and fiber crops, such as citrus, tree nuts, olives, cranberries, and other fruits and vegetables. It has the special combination of soil quality, growing season, moisture supply, temperature, humidity, air drainage, elevation, and aspect needed for the soil to economically produce sustainable high yields of these crops when properly managed. The water supply is dependable and of adequate quality. Nearness to markets is an additional consideration. Unique farmland is not based on national criteria. It commonly is in areas where there is a special microclimate, such as the wine country in California.

In some areas, land that does not meet the criteria for prime or unique farmland is considered to be *farmland of statewide importance* for the production of food, feed, fiber, forage, and oilseed crops. The criteria for defining and delineating farmland of statewide importance are determined by the appropriate State agencies. Generally, this land includes areas of soils that nearly meet the requirements for prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods. Some areas may produce as high a yield as prime farmland if conditions are favorable. Farmland of statewide importance may include tracts of land that have been designated for agriculture by State law.

In some areas that are not identified as having national or statewide importance, land is considered to be *farmland of local importance* for the production of food, feed, fiber, forage, and oilseed crops. This farmland is identified by the appropriate local agencies. Farmland of local importance may include tracts of land that have been designated for agriculture by local ordinance.

## Report—Prime and other Important Farmlands

Prime and other Important Farmlands—Jefferson and Orange Counties, Texas		
Map Symbol	Map Unit Name	Farmland Classification
AnaB	Anahuac very fine sandy loam, 0 to 2 percent slopes	All areas are prime farmland
AnhA	Anahuac-Aris complex, 0 to 1 percent slopes	Prime farmland if drained
AnuB	Anahuac-Urban land complex, 0 to 2 percent slopes	Not prime farmland
BaA	Bancker mucky peat, 0 to 1 percent slopes, frequently flooded, tidal	Not prime farmland
BbA	Barbary mucky clay, 0 to 1 percent slopes, frequently flooded	Not prime farmland
BeaA	Beaumont clay, 0 to 1 percent slopes	Not prime farmland
BecA	Beaumont-Urban land complex, 0 to 1 percent slopes	Not prime farmland
CeA	Caplen mucky peat, 0 to 1 percent slopes, frequently flooded, tidal	Not prime farmland
CsA	Creole mucky peat, 0 to 1 percent slopes, frequently flooded, tidal	Not prime farmland
FraA	Franeau clay, 0 to 1 percent slopes, occasionally flooded	Not prime farmland
HarA	Harris clay, 0 to 1 percent slopes, frequently flooded, tidal	Not prime farmland
IjmB	Ijam clay, 0 to 2 percent slopes, frequently flooded, tidal	Not prime farmland
LabA	Labelle clay loam, 0 to 1 percent slopes	All areas are prime farmland

Prime and other Important Farmlands--Jefferson and Orange Counties, Texas		
Map Symbol	Map Unit Name	Farmland Classification
LaeA	Labelle clay loam, 0 to 1 percent slopes, rarely flooded	All areas are prime farmland
LalA	Labelle-Levac complex, 0 to 1 percent slopes	All areas are prime farmland
LamA	Labelle-Levac complex, 0 to 1 percent slopes, rarely flooded	All areas are prime farmland
LauA	Labelle-Urban land complex, 0 to 1 percent slopes	Not prime farmland
LeaA	League clay, 0 to 1 percent slopes	All areas are prime farmland
LehA	League-Urban land complex, 0 to 1 percent slopes	Not prime farmland
LetA	Leton loam, 0 to 1 percent slopes, occasionally flooded, frequently ponded	Not prime farmland
NeA	Neel clay, 2 to 5 percent slopes, occasionally flooded, tidal	Not prime farmland
NecC	Neches coarse sand, 2 to 5 percent slopes	Not prime farmland
NuC	Neel-Urban land complex, 2 to 5 percent slopes, rarely flooded, tidal	Not prime farmland
OrdB	Orcadia silt loam, 0 to 2 percent slopes, rarely flooded	Farmland of statewide importance
OsvB	Orcadia-Urban land complex, 0 to 2 percent slopes, rarely flooded	Not prime farmland
PITX	Pits	Not prime farmland
URLX	Urban land	Not prime farmland
VirA	Viterbo silty clay loam, 0 to 1 percent slopes	Not prime farmland
ViuA	Viterbo-Urban land complex, 0 to 1 percent slopes	Not prime farmland
W	Water	Not prime farmland
ZumA	Zummo muck, 0 to 1 percent slopes, frequently flooded, frequently ponded	Not prime farmland

## Data Source Information

Soil Survey Area: Jefferson and Orange Counties, Texas  
 Survey Area Data: Version 18, Nov 7, 2017

# **Appendix E**

U.S. Fish and Wildlife Service

Information for Planning and Consultation (IPaC) Reports



## United States Department of the Interior



FISH AND WILDLIFE SERVICE  
Louisiana Ecological Services Field Office  
646 Cajundome Boulevard, Suite 400  
Lafayette, LA 70506-4290  
Phone: (337) 291-3100 Fax: (337) 291-3139

In Reply Refer To:  
Consultation Code: 04EL1000-2018-SLI-0139  
Event Code: 04EL1000-2018-E-00276  
Project Name: Bayou Choctaw SPR LE-II

December 11, 2017

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered and candidate species, as well as designated and proposed critical habitat that may occur within the boundary of your proposed project and may be affected by your proposed project. The Fish and Wildlife Service (Service) is providing this list under section 7 (c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.). Changes in this species list may occur due to new information from updated surveys, changes in species habitat, new listed species and other factors. Because of these possible changes, feel free to contact our office (337/291-3126) for more information or assistance regarding impacts to federally listed species. The Service recommends visiting the ECOS-IPaC site or the Louisiana Ecological Services website ([www.fws.gov/lafayette](http://www.fws.gov/lafayette)) at regular intervals during project planning and implementation for updated species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the habitats upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to utilize their authorities to carry out programs for the conservation of Federal trust resources and to determine whether projects may affect Federally listed species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2) (c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may



affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected (e.g. adverse, beneficial, insignificant or discountable) by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the “Endangered Species Consultation Handbook” at <http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF> or by contacting our office at the number above.

Bald eagles have recovered and were removed from the List of Endangered and Threatened Species as of August 8, 2007. Although no longer listed, please be aware that bald eagles are protected under the Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C. 668 et seq.). The Service developed the National Bald Eagle Management (NBEM) Guidelines to provide landowners, land managers, and others with information and recommendations to minimize potential project impacts to bald eagles, particularly where such impacts may constitute “disturbance,” which is prohibited by the BGEPA. A copy of the NBEM Guidelines is available at: <http://www.fws.gov/southeast/es/baldeagle/NationalBaldEagleManagementGuidelines.pdf>. Those guidelines recommend: (1) maintaining a specified distance between the activity and the nest (buffer area); (2) maintaining natural areas (preferably forested) between the activity and nest trees (landscape buffers); and (3) avoiding certain activities during the breeding season. On-site personnel should be informed of the possible presence of nesting bald eagles within the project boundary, and should identify, avoid, and immediately report any such nests to this office. If a bald eagle nest occurs or is discovered within or adjacent to the proposed project area, then an evaluation must be performed to determine whether the project is likely to disturb nesting bald eagles. That evaluation may be conducted on-line at: <http://www.fws.gov/southeast/es/baldeagle>. Following completion of the evaluation, that website will provide a determination of whether additional consultation is necessary. The Division of Migratory Birds for the Southeast Region of the Service (phone: 404/679-7051, e-mail: [SEmigratorybirds@fws.gov](mailto:SEmigratorybirds@fws.gov)) has the lead role in conducting any necessary consultation. Should you need further assistance interpreting the guidelines or performing an on-line project evaluation, please contact this office.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g. cellular, digital television, radio and emergency broadcast) can be found at: <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm> ; <http://www.towerkill.com>; and <http://fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html>.

Activities that involve State-designated scenic streams and/or wetlands are regulated by the Louisiana Department of Wildlife and Fisheries and the U.S. Army Corps of Engineers, respectively. We, therefore, recommend that you contact those agencies to determine their interest in proposed projects in these areas.

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Activities that would be located within a National Wildlife Refuge are regulated by the refuge staff. We, therefore, recommend that you contact them to determine their interest in proposed projects in these areas.

Additional information on Federal trust species in Louisiana can be obtained from the Louisiana Ecological Services website at: [www.fws.gov/lafayette](http://www.fws.gov/lafayette) or by calling 337/291-3100.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

## Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

**Louisiana Ecological Services Field Office**

646 Cajundome Boulevard, Suite 400

Lafayette, LA 70506-4290

(337) 291-3100

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## Project Summary

Consultation Code: 04EL1000-2018-SLI-0139

Event Code: 04EL1000-2018-E-00276

Project Name: Bayou Choctaw SPR LE-II

Project Type: DEVELOPMENT

Project Description: Multi-project upgrades to SPR Bayou Choctaw Facility

Project Location:

Approximate location of the project can be viewed in Google Maps:

<https://www.google.com/maps/place/30.31498719236894N91.30825827310045W>



Counties: Iberville, LA

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## Endangered Species Act Species

There is a total of 2 threatened, endangered, or candidate species on this species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

### Fishes

NAME	STATUS
Atlantic Sturgeon (gulf Subspecies) <i>Acipenser oxyrinchus (=oxyrhynchus) desotoi</i> There is <b>final</b> critical habitat for this species. Your location is outside the critical habitat. Species profile: <a href="https://ecos.fws.gov/ecp/species/651">https://ecos.fws.gov/ecp/species/651</a>	Threatened
Pallid Sturgeon <i>Scaphirhynchus albus</i> No critical habitat has been designated for this species. Species profile: <a href="https://ecos.fws.gov/ecp/species/7162">https://ecos.fws.gov/ecp/species/7162</a>	Endangered

### Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

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## United States Department of the Interior



FISH AND WILDLIFE SERVICE  
Louisiana Ecological Services Field Office  
646 Cajundome Boulevard, Suite 400  
Lafayette, LA 70506-4290  
Phone: (337) 291-3100 Fax: (337) 291-3139

In Reply Refer To:  
Consultation Code: 04EL1000-2018-SLI-0138  
Event Code: 04EL1000-2018-E-00274  
Project Name: West Hackberry SPR LE-II

December 11, 2017

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered and candidate species, as well as designated and proposed critical habitat that may occur within the boundary of your proposed project and may be affected by your proposed project. The Fish and Wildlife Service (Service) is providing this list under section 7 (c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.). Changes in this species list may occur due to new information from updated surveys, changes in species habitat, new listed species and other factors. Because of these possible changes, feel free to contact our office (337/291-3126) for more information or assistance regarding impacts to federally listed species. The Service recommends visiting the ECOS-IPaC site or the Louisiana Ecological Services website ([www.fws.gov/lafayette](http://www.fws.gov/lafayette)) at regular intervals during project planning and implementation for updated species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the habitats upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to utilize their authorities to carry out programs for the conservation of Federal trust resources and to determine whether projects may affect Federally listed species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2) (c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may

affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected (e.g. adverse, beneficial, insignificant or discountable) by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the “Endangered Species Consultation Handbook” at <http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF> or by contacting our office at the number above.

Bald eagles have recovered and were removed from the List of Endangered and Threatened Species as of August 8, 2007. Although no longer listed, please be aware that bald eagles are protected under the Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C. 668 et seq.). The Service developed the National Bald Eagle Management (NBEM) Guidelines to provide landowners, land managers, and others with information and recommendations to minimize potential project impacts to bald eagles, particularly where such impacts may constitute “disturbance,” which is prohibited by the BGEPA. A copy of the NBEM Guidelines is available at: <http://www.fws.gov/southeast/es/baldeagle/NationalBaldEagleManagementGuidelines.pdf>. Those guidelines recommend: (1) maintaining a specified distance between the activity and the nest (buffer area); (2) maintaining natural areas (preferably forested) between the activity and nest trees (landscape buffers); and (3) avoiding certain activities during the breeding season. On-site personnel should be informed of the possible presence of nesting bald eagles within the project boundary, and should identify, avoid, and immediately report any such nests to this office. If a bald eagle nest occurs or is discovered within or adjacent to the proposed project area, then an evaluation must be performed to determine whether the project is likely to disturb nesting bald eagles. That evaluation may be conducted on-line at: <http://www.fws.gov/southeast/es/baldeagle>. Following completion of the evaluation, that website will provide a determination of whether additional consultation is necessary. The Division of Migratory Birds for the Southeast Region of the Service (phone: 404/679-7051, e-mail: [SEmigratorybirds@fws.gov](mailto:SEmigratorybirds@fws.gov)) has the lead role in conducting any necessary consultation. Should you need further assistance interpreting the guidelines or performing an on-line project evaluation, please contact this office.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g. cellular, digital television, radio and emergency broadcast) can be found at: <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm> ; <http://www.towerkill.com>; and <http://fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html>.

Activities that involve State-designated scenic streams and/or wetlands are regulated by the Louisiana Department of Wildlife and Fisheries and the U.S. Army Corps of Engineers, respectively. We, therefore, recommend that you contact those agencies to determine their interest in proposed projects in these areas.

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Activities that would be located within a National Wildlife Refuge are regulated by the refuge staff. We, therefore, recommend that you contact them to determine their interest in proposed projects in these areas.

Additional information on Federal trust species in Louisiana can be obtained from the Louisiana Ecological Services website at: [www.fws.gov/lafayette](http://www.fws.gov/lafayette) or by calling 337/291-3100.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List



## Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

**Louisiana Ecological Services Field Office**

646 Cajundome Boulevard, Suite 400

Lafayette, LA 70506-4290

(337) 291-3100

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## Project Summary

Consultation Code: 04EL1000-2018-SLI-0138

Event Code: 04EL1000-2018-E-00274

Project Name: West Hackberry SPR LE-II

Project Type: DEVELOPMENT

Project Description: Multi-project upgrades to SPR West Hackberry Facility

Project Location:

Approximate location of the project can be viewed in Google Maps:

<https://www.google.com/maps/place/30.00024849436263N93.40488475459566W>



Counties: Cameron, LA

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## Endangered Species Act Species

There is a total of 8 threatened, endangered, or candidate species on this species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

### Mammals

NAME	STATUS
West Indian Manatee <i>Trichechus manatus</i> There is <b>final</b> critical habitat for this species. Your location is outside the critical habitat. <b><i>This species is also protected by the Marine Mammal Protection Act, and may have additional consultation requirements.</i></b> Species profile: <a href="https://ecos.fws.gov/ecp/species/4469">https://ecos.fws.gov/ecp/species/4469</a>	Threatened

### Birds

NAME	STATUS
Piping Plover <i>Charadrius melodus</i> Population: [Atlantic Coast and Northern Great Plains populations] - Wherever found, except those areas where listed as endangered. There is <b>final</b> critical habitat for this species. Your location is outside the critical habitat. Species profile: <a href="https://ecos.fws.gov/ecp/species/6039">https://ecos.fws.gov/ecp/species/6039</a>	Threatened
Red Knot <i>Calidris canutus rufa</i> No critical habitat has been designated for this species. Species profile: <a href="https://ecos.fws.gov/ecp/species/1864">https://ecos.fws.gov/ecp/species/1864</a>	Threatened

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## Reptiles

NAME	STATUS
Hawksbill Sea Turtle <i>Eretmochelys imbricata</i> There is <b>final</b> critical habitat for this species. Your location is outside the critical habitat. Species profile: <a href="https://ecos.fws.gov/ecp/species/3656">https://ecos.fws.gov/ecp/species/3656</a>	Endangered
Kemp's Ridley Sea Turtle <i>Lepidochelys kempii</i> There is <b>proposed</b> critical habitat for this species. The location of the critical habitat is not available. Species profile: <a href="https://ecos.fws.gov/ecp/species/5523">https://ecos.fws.gov/ecp/species/5523</a>	Endangered
Leatherback Sea Turtle <i>Dermochelys coriacea</i> There is <b>final</b> critical habitat for this species. Your location is outside the critical habitat. Species profile: <a href="https://ecos.fws.gov/ecp/species/1493">https://ecos.fws.gov/ecp/species/1493</a>	Endangered
Loggerhead Sea Turtle <i>Caretta caretta</i> Population: Northwest Atlantic Ocean DPS There is <b>final</b> critical habitat for this species. Your location is outside the critical habitat. Species profile: <a href="https://ecos.fws.gov/ecp/species/1110">https://ecos.fws.gov/ecp/species/1110</a>	Threatened

## Fishes

NAME	STATUS
Atlantic Sturgeon (gulf Subspecies) <i>Acipenser oxyrinchus (=oxyrhynchus) desotoi</i> There is <b>final</b> critical habitat for this species. Your location is outside the critical habitat. Species profile: <a href="https://ecos.fws.gov/ecp/species/651">https://ecos.fws.gov/ecp/species/651</a>	Threatened

## Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

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## United States Department of the Interior



FISH AND WILDLIFE SERVICE  
Texas Coastal Ecological Services Field Office  
17629 El Camino Real #211  
Houston, TX 77058  
Phone: (281) 286-8282 Fax: (281) 488-5882  
<http://www.fws.gov/southwest/es/TexasCoastal/>  
[http://www.fws.gov/southwest/es/ES\\_Lists\\_Main2.html](http://www.fws.gov/southwest/es/ES_Lists_Main2.html)

In Reply Refer To:

December 11, 2017

Consultation Code: 02ETTX00-2018-SLI-0450

Event Code: 02ETTX00-2018-E-00946

Project Name: Big Hill SPR LE-II

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The U.S. Fish and Wildlife Service (Service) field offices in Clear Lake, Tx, and Corpus Christi, Tx, have combined administratively to form the Texas Coastal Ecological Services Field Office. A map of the Texas Coastal Ecological Services Field Office area of responsibility can be found at: <http://www.fws.gov/southwest/es/TexasCoastal/Map.html>. All project related correspondence should be sent to the field office responsible for the area in which your project occurs. For projects located in southeast Texas please write to: Field Supervisor; U.S. Fish and Wildlife Service; 17629 El Camino Real Ste. 211; Houston, Texas 77058. For projects located in southern Texas please write to: Field Supervisor; U.S. Fish and Wildlife Service; P.O. Box 81468; Corpus Christi, Texas 78468-1468. For projects located in six counties in southern Texas (Cameron, Hidalgo, Starr, Webb, Willacy, and Zapata) please write: Santa Ana NWR, ATTN: Ecological Services Sub Office, 3325 Green Jay Road, Alamo, Texas 78516.

The enclosed species list identifies federally threatened, endangered, and proposed to be listed species; designated critical habitat; and candidate species that may occur within the boundary of your proposed project and/or may be affected by your proposed project.

New information from updated surveys, changes in the abundance and distribution of species, changes in habitat conditions, or other factors could change the list. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. The Service recommends that verification be completed by visiting the ECOS-IPaC website <http://ecos.fws.gov/ipac/> at regular intervals during project planning and implementation for updates to species list and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

Candidate species have no protection under the Act but are included for consideration because they could be listed prior to the completion of your project. The other species information should help you determine if suitable habitat for these listed species exists in any of the proposed project areas or if project activities may affect species on-site, off-site, and/or result in "take" of a federally listed species.

"Take" is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. In addition to the direct take of an individual animal, habitat destruction or modification can be considered take, regardless of whether it has been formally designated as critical habitat, if the activity results in the death or injury of wildlife by removing essential habitat components or significantly alters essential behavior patterns, including breeding, feeding, or sheltering.

### **Section 7**

Section 7 of the Act requires that all Federal agencies consult with the Service to ensure that actions authorized, funded or carried out by such agencies do not jeopardize the continued existence of any listed threatened or endangered species or adversely modify or destroy critical habitat of such species. It is the responsibility of the Federal action agency to determine if the proposed project may affect threatened or endangered species. If a "may affect" determination is made, the Federal agency shall initiate the section 7 consultation process by writing to the office that has responsibility for the area in which your project occurs.

**Is not likely to adversely affect** - the project may affect listed species and/or critical habitat; however, the effects are expected to be discountable, insignificant, or completely beneficial. Certain avoidance and minimization measures may need to be implemented in order to reach this level of effects. The Federal agency or the designated non-Federal representative should seek written concurrence from the Service that adverse effects have been eliminated. Be sure to include all of the information and documentation used to reach your decision with your request for concurrence. The Service must have this documentation before issuing a concurrence.

**Is likely to adversely affect** - adverse effects to listed species may occur as a direct or indirect result of the proposed action or its interrelated or interdependent actions, and the effect is not discountable, insignificant, or beneficial. If the overall effect of the proposed action is beneficial to the listed species but also is likely to cause some adverse effects to individuals of that species, then the proposed action "is likely to adversely affect" the listed species. An "is likely to adversely affect" determination requires the Federal action agency to initiate formal section 7 consultation with this office.

**No effect** - the proposed action will not affect federally listed species or critical habitat (i.e., suitable habitat for the species occurring in the project county is not present in or adjacent to the action area). No further coordination or contact with the Service is necessary. However, if the project changes or additional information on the distribution of listed or proposed species becomes available, the project should be reanalyzed for effects not previously considered.

Regardless of your determination, the Service recommends that you maintain a complete record

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of the evaluation, including steps leading to the determination of affect, the qualified personnel conducting the evaluation, habitat conditions, site photographs, and any other related articles.

Please be advised that while a Federal agency may designate a non-Federal representative to conduct informal consultations with the Service, assess project effects, or prepare a biological assessment, the Federal agency must notify the Service in writing of such a designation. The Federal agency shall also independently review and evaluate the scope and contents of a biological assessment prepared by their designated non-Federal representative before that document is submitted to the Service.

The Service's Consultation Handbook is available online to assist you with further information on definitions, process, and fulfilling Act requirements for your projects at:  
[http://www.fws.gov/endangered/esa-library/pdf/esa\\_section7\\_handbook.pdf](http://www.fws.gov/endangered/esa-library/pdf/esa_section7_handbook.pdf)

### **Section 10**

If there is no federal involvement and the proposed project is being funded or carried out by private interests and/or non-federal government agencies, and the project as proposed may affect listed species, a section 10(a)(1)(B) permit is recommended. The Habitat Conservation Planning Handbook is available at:

[http://www.fws.gov/endangered/esa-library/pdf/HCP\\_Handbook.pdf](http://www.fws.gov/endangered/esa-library/pdf/HCP_Handbook.pdf)

### **Service Response**

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### **Proposed Species and/or Proposed Critical Habitat**

While consultations are required when the proposed action may affect listed species, section 7(a)(4) was added to the ESA to provide a mechanism for identifying and resolving potential conflicts between a proposed action and proposed species or proposed critical habitat at an early planning stage. The action agency should seek concurrence from the Service to assist the action agency in determining effects and to advise the agency on ways to avoid or minimize adverse effect to proposed species or proposed critical habitat.

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Candidate species are species that are being considered for possible addition to the threatened and endangered species list. They currently have no legal protection under the ESA. If you find you have potential project impacts to these species the Service would like to provide technical assistance to help avoid or minimize adverse effects. Addressing potential impacts to these species at this stage could better provide for overall ecosystem health in the local area and avert potential future listing.

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Several species of freshwater mussels occur in Texas and four are candidates for listing under the ESA. The Service is also reviewing the status of six other species for potential listing under the ESA. One of the main contributors to mussel die offs is sedimentation, which smothers and suffocates mussels. To reduce sedimentation within rivers, streams, and tributaries crossed by a project, the Service recommends that that you implement the best management practices found at: <http://www.fws.gov/southwest/es/TexasCoastal/FreshwaterMussels.html>.

Candidate Conservation Agreements (CCAs) or Candidate Conservation Agreements with Assurances (CCAAs) are voluntary agreements between the Service and public or private entities to implement conservation measures to address threats to candidate species. Implementing conservation efforts before species are listed increases the likelihood that simpler, flexible, and more cost-effective conservation options are available. A CCAA can provide participants with assurances that if they engage in conservation actions, they will not be required to implement additional conservation measures beyond those in the agreement. For additional information on CCAs/CCAAs please visit the Service's website at <http://www.fws.gov/endangered/what-we-do/cca.html>.

### **Migratory Birds**

The Migratory Bird Treaty Act (MBTA) implements various treaties and conventions for the protection of migratory birds. Under the MBTA, taking, killing, or possessing migratory birds is unlawful. Many may nest in trees, brush areas or other suitable habitat. The Service recommends activities requiring vegetation removal or disturbance avoid the peak nesting period of March through August to avoid destruction of individuals or eggs. If project activities must be conducted during this time, we recommend surveying for active nests prior to commencing work. A list of migratory birds may be viewed at <http://www.fws.gov/migratorybirds/regulationspolicies/mbta/mbtandx.html>.

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The construction of overhead power lines creates threats of avian collision and electrocution. The Service recommends the installation of underground rather than overhead power lines whenever possible. For new overhead lines or retrofitting of old lines, we recommend that project developers implement, to the maximum extent practicable, the Avian Power Line Interaction Committee guidelines found at <http://www.aplic.org/>.

Meteorological and communication towers are estimated to kill millions of birds per year. We recommend following the guidance set forth in the Service Interim Guidelines for

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Recommendations on Communications Tower Siting, Constructions, Operation and Decommissioning, found online at:

<http://www.fws.gov/habitatconservation/communicationtowers.html>, to minimize the threat of avian mortality at these towers. Monitoring at these towers would provide insight into the effectiveness of the minimization measures. We request the results of any wildlife mortality monitoring at towers associated with this project.

We request that you provide us with the final location and specifications of your proposed towers, as well as the recommendations implemented. A Tower Site Evaluation Form is also available via the above website; we recommend you complete this form and keep it in your files. If meteorological towers are to be constructed, please forward this completed form to our office.

More information concerning sections 7 and 10 of the Act, migratory birds, candidate species, and landowner tools can be found on our website at:

<http://www.fws.gov/southwest/es/TexasCoastal/ProjectReviews.html>.

### **Wetlands and Wildlife Habitat**

Wetlands and riparian zones provide valuable fish and wildlife habitat as well as contribute to food control, water quality enhancement, and groundwater recharge. Wetland and riparian vegetation provides food and cover for wildlife, stabilizes banks and decreases soil erosion. These areas are inherently dynamic and very sensitive to changes caused by such activities as overgrazing, logging, major construction, or earth disturbance. Executive Order 11990 asserts that each agency shall provide leadership and take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial value of wetlands in carrying out the agency's responsibilities. Construction activities near riparian zones should be carefully designed to minimize impacts. If vegetation clearing is needed in these riparian areas, they should be re-vegetated with native wetland and riparian vegetation to prevent erosion or loss of habitat. We recommend minimizing the area of soil scarification and initiating incremental re-establishment of herbaceous vegetation at the proposed work sites. Denuded and/or disturbed areas should be re-vegetated with a mixture of native legumes and grasses. Species commonly used for soil stabilization are listed in the Texas Department of Agriculture's (TDA) Native Tree and Plant Directory, available from TDA at P.O. Box 12847, Austin, Texas 78711. The Service also urges taking precautions to ensure sediment loading does not occur to any receiving streams in the proposed project area. To prevent and/or minimize soil erosion and compaction associated with construction activities, avoid any unnecessary clearing of vegetation, and follow established rights-of-way whenever possible. All machinery and petroleum products should be stored outside the floodplain and/or wetland area during construction to prevent possible contamination of water and soils.

Wetlands and riparian areas are high priority fish and wildlife habitat, serving as important sources of food, cover, and shelter for numerous species of resident and migratory wildlife. Waterfowl and other migratory birds use wetlands and riparian corridors as stopover, feeding, and nesting areas. We strongly recommend that the selected project site not impact wetlands and riparian areas, and be located as far as practical from these areas. Migratory birds tend to concentrate in or near wetlands and riparian areas and use these areas as migratory yways or

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corridors. After every effort has been made to avoid impacting wetlands, you anticipate unavoidable wetland impacts will occur; you should contact the appropriate U.S. Army Corps of Engineers office to determine if a permit is necessary prior to commencement of construction activities.

If your project will involve filling, dredging, or trenching of a wetland or riparian area it may require a Clean Water Act Section 404 permit from the U.S. Army Corps of Engineers (COE). For permitting requirements please contact the U.S. Corps of Engineers, District Engineer, P.O. Box 1229, Galveston, Texas 77553-1229, (409) 766-3002.

### **Beneficial Landscaping**

In accordance with Executive Order 13112 on Invasive Species and the Executive Memorandum on Beneficial Landscaping (42 C.F.R. 26961), where possible, any landscaping associated with project plans should be limited to seeding and replanting with native species. A mixture of grasses and forbs appropriate to address potential erosion problems and long-term cover should be planted when seed is reasonably available. Although Bermuda grass is listed in seed mixtures, this species and other introduced species should be avoided as much as possible. The Service also recommends the use of native trees, shrubs, and herbaceous species that are adaptable, drought tolerant and conserve water.

### **State Listed Species**

The State of Texas protects certain species. Please contact the Texas Parks and Wildlife Department (Endangered Resources Branch), 4200 Smith School Road, Austin, Texas 78744 (telephone 512/389-8021) for information concerning fish, wildlife, and plants of State concern or visit their website at:

[http://www.tpwd.state.tx.us/huntwild/wild/wildlife\\_diversity/texas\\_rare\\_species/listed\\_species/](http://www.tpwd.state.tx.us/huntwild/wild/wildlife_diversity/texas_rare_species/listed_species/).

If we can be of further assistance, or if you have any questions about these comments, please contact 281/286-8282 if your project is in southeast Texas, or 361/994-9005, ext. 246, if your project is in southern Texas. Please refer to the Service consultation number listed above in any future correspondence regarding this project.

Attachment(s):

- Official Species List

## Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

**Texas Coastal Ecological Services Field Office**

17629 El Camino Real #211

Houston, TX 77058

(281) 286-8282

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## Project Summary

Consultation Code: 02ETTX00-2018-SLI-0450

Event Code: 02ETTX00-2018-E-00946

Project Name: Big Hill SPR LE-II

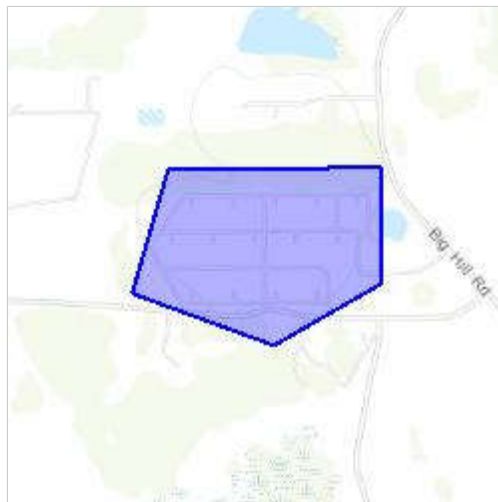
Project Type: DEVELOPMENT

Project Description: SPR LE-II Big Hill Facility

Project Location:

Approximate location of the project can be viewed in Google Maps:

<https://www.google.com/maps/place/29.749623725103866N94.2447127463007W>



Counties:

Jefferson, TX

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## Endangered Species Act Species

There is a total of 8 threatened, endangered, or candidate species on this species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

### Mammals

NAME	STATUS
West Indian Manatee <i>Trichechus manatus</i> There is <b>final</b> critical habitat for this species. Your location is outside the critical habitat. <b><i>This species is also protected by the Marine Mammal Protection Act, and may have additional consultation requirements.</i></b> Species profile: <a href="https://ecos.fws.gov/ecp/species/4469">https://ecos.fws.gov/ecp/species/4469</a>	Threatened

### Birds

NAME	STATUS
Piping Plover <i>Charadrius melodus</i> Population: [Atlantic Coast and Northern Great Plains populations] - Wherever found, except those areas where listed as endangered. There is <b>final</b> critical habitat for this species. Your location is outside the critical habitat. Species profile: <a href="https://ecos.fws.gov/ecp/species/6039">https://ecos.fws.gov/ecp/species/6039</a>	Threatened
Red Knot <i>Calidris canutus rufa</i> No critical habitat has been designated for this species. Species profile: <a href="https://ecos.fws.gov/ecp/species/1864">https://ecos.fws.gov/ecp/species/1864</a>	Threatened

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## Reptiles

NAME	STATUS
<p>Green Sea Turtle <i>Chelonia mydas</i>            Population: North Atlantic DPS            No critical habitat has been designated for this species.            Species profile: <a href="https://ecos.fws.gov/ecp/species/6199">https://ecos.fws.gov/ecp/species/6199</a></p>	Threatened
<p>Hawksbill Sea Turtle <i>Eretmochelys imbricata</i>            There is <b>final</b> critical habitat for this species. Your location is outside the critical habitat.            Species profile: <a href="https://ecos.fws.gov/ecp/species/3656">https://ecos.fws.gov/ecp/species/3656</a></p>	Endangered
<p>Kemp's Ridley Sea Turtle <i>Lepidochelys kempii</i>            There is <b>proposed</b> critical habitat for this species. The location of the critical habitat is not available.            Species profile: <a href="https://ecos.fws.gov/ecp/species/5523">https://ecos.fws.gov/ecp/species/5523</a></p>	Endangered
<p>Leatherback Sea Turtle <i>Dermochelys coriacea</i>            There is <b>final</b> critical habitat for this species. Your location is outside the critical habitat.            Species profile: <a href="https://ecos.fws.gov/ecp/species/1493">https://ecos.fws.gov/ecp/species/1493</a></p>	Endangered
<p>Loggerhead Sea Turtle <i>Caretta caretta</i>            Population: Northwest Atlantic Ocean DPS            There is <b>final</b> critical habitat for this species. Your location is outside the critical habitat.            Species profile: <a href="https://ecos.fws.gov/ecp/species/1110">https://ecos.fws.gov/ecp/species/1110</a></p>	Threatened

## Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

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In Reply Refer To:

December 11, 2017

Consultation Code: 02ETTX00-2018-SLI-0451

Event Code: 02ETTX00-2018-E-00948

Project Name: Bryan Mound SPR LE-II

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The U.S. Fish and Wildlife Service (Service) field offices in Clear Lake, Tx, and Corpus Christi, Tx, have combined administratively to form the Texas Coastal Ecological Services Field Office. A map of the Texas Coastal Ecological Services Field Office area of responsibility can be found at: <http://www.fws.gov/southwest/es/TexasCoastal/Map.html>. All project related correspondence should be sent to the field office responsible for the area in which your project occurs. For projects located in southeast Texas please write to: Field Supervisor; U.S. Fish and Wildlife Service; 17629 El Camino Real Ste. 211; Houston, Texas 77058. For projects located in southern Texas please write to: Field Supervisor; U.S. Fish and Wildlife Service; P.O. Box 81468; Corpus Christi, Texas 78468-1468. For projects located in six counties in southern Texas (Cameron, Hidalgo, Starr, Webb, Willacy, and Zapata) please write: Santa Ana NWR, ATTN: Ecological Services Sub Office, 3325 Green Jay Road, Alamo, Texas 78516.

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<http://www.fws.gov/southwest/es/TexasCoastal/ProjectReviews.html>.

### **Wetlands and Wildlife Habitat**

Wetlands and riparian zones provide valuable fish and wildlife habitat as well as contribute to food control, water quality enhancement, and groundwater recharge. Wetland and riparian vegetation provides food and cover for wildlife, stabilizes banks and decreases soil erosion. These areas are inherently dynamic and very sensitive to changes caused by such activities as overgrazing, logging, major construction, or earth disturbance. Executive Order 11990 asserts that each agency shall provide leadership and take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial value of wetlands in carrying out the agency's responsibilities. Construction activities near riparian zones should be carefully designed to minimize impacts. If vegetation clearing is needed in these riparian areas, they should be re-vegetated with native wetland and riparian vegetation to prevent erosion or loss of habitat. We recommend minimizing the area of soil scarification and initiating incremental re-establishment of herbaceous vegetation at the proposed work sites. Denuded and/or disturbed areas should be re-vegetated with a mixture of native legumes and grasses. Species commonly used for soil stabilization are listed in the Texas Department of Agriculture's (TDA) Native Tree and Plant Directory, available from TDA at P.O. Box 12847, Austin, Texas 78711. The Service also urges taking precautions to ensure sediment loading does not occur to any receiving streams in the proposed project area. To prevent and/or minimize soil erosion and compaction associated with construction activities, avoid any unnecessary clearing of vegetation, and follow established rights-of-way whenever possible. All machinery and petroleum products should be stored outside the floodplain and/or wetland area during construction to prevent possible contamination of water and soils.

Wetlands and riparian areas are high priority fish and wildlife habitat, serving as important sources of food, cover, and shelter for numerous species of resident and migratory wildlife. Waterfowl and other migratory birds use wetlands and riparian corridors as stopover, feeding, and nesting areas. We strongly recommend that the selected project site not impact wetlands and riparian areas, and be located as far as practical from these areas. Migratory birds tend to concentrate in or near wetlands and riparian areas and use these areas as migratory yways or

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corridors. After every effort has been made to avoid impacting wetlands, you anticipate unavoidable wetland impacts will occur; you should contact the appropriate U.S. Army Corps of Engineers office to determine if a permit is necessary prior to commencement of construction activities.

If your project will involve filling, dredging, or trenching of a wetland or riparian area it may require a Clean Water Act Section 404 permit from the U.S. Army Corps of Engineers (COE). For permitting requirements please contact the U.S. Corps of Engineers, District Engineer, P.O. Box 1229, Galveston, Texas 77553-1229, (409) 766-3002.

### **Beneficial Landscaping**

In accordance with Executive Order 13112 on Invasive Species and the Executive Memorandum on Beneficial Landscaping (42 C.F.R. 26961), where possible, any landscaping associated with project plans should be limited to seeding and replanting with native species. A mixture of grasses and forbs appropriate to address potential erosion problems and long-term cover should be planted when seed is reasonably available. Although Bermuda grass is listed in seed mixtures, this species and other introduced species should be avoided as much as possible. The Service also recommends the use of native trees, shrubs, and herbaceous species that are adaptable, drought tolerant and conserve water.

### **State Listed Species**

The State of Texas protects certain species. Please contact the Texas Parks and Wildlife Department (Endangered Resources Branch), 4200 Smith School Road, Austin, Texas 78744 (telephone 512/389-8021) for information concerning fish, wildlife, and plants of State concern or visit their website at:

[http://www.tpwd.state.tx.us/huntwild/wild/wildlife\\_diversity/texas\\_rare\\_species/listed\\_species/](http://www.tpwd.state.tx.us/huntwild/wild/wildlife_diversity/texas_rare_species/listed_species/).

If we can be of further assistance, or if you have any questions about these comments, please contact 281/286-8282 if your project is in southeast Texas, or 361/994-9005, ext. 246, if your project is in southern Texas. Please refer to the Service consultation number listed above in any future correspondence regarding this project.

Attachment(s):

- Official Species List

## Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

**Texas Coastal Ecological Services Field Office**

17629 El Camino Real #211

Houston, TX 77058

(281) 286-8282

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## Project Summary

Consultation Code: 02ETTX00-2018-SLI-0451  
Event Code: 02ETTX00-2018-E-00948  
Project Name: Bryan Mound SPR LE-II  
Project Type: DEVELOPMENT  
Project Description: SPR LE-II Bryan Mound Facility

**Project Location:**

Approximate location of the project can be viewed in Google Maps:  
<https://www.google.com/maps/place/28.917442652108143N95.3768331278622W>



Counties: Brazoria, TX

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## Endangered Species Act Species

There is a total of 11 threatened, endangered, or candidate species on this species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

### Mammals

NAME	STATUS
West Indian Manatee <i>Trichechus manatus</i> There is <b>final</b> critical habitat for this species. Your location is outside the critical habitat. <b><i>This species is also protected by the Marine Mammal Protection Act, and may have additional consultation requirements.</i></b> Species profile: <a href="https://ecos.fws.gov/ecp/species/4469">https://ecos.fws.gov/ecp/species/4469</a>	Threatened

### Birds

NAME	STATUS
Piping Plover <i>Charadrius melodus</i> Population: [Atlantic Coast and Northern Great Plains populations] - Wherever found, except those areas where listed as endangered. There is <b>final</b> critical habitat for this species. Your location is outside the critical habitat. Species profile: <a href="https://ecos.fws.gov/ecp/species/6039">https://ecos.fws.gov/ecp/species/6039</a>	Threatened
Red Knot <i>Calidris canutus rufa</i> No critical habitat has been designated for this species. Species profile: <a href="https://ecos.fws.gov/ecp/species/1864">https://ecos.fws.gov/ecp/species/1864</a>	Threatened
Whooping Crane <i>Grus americana</i> Population: Wherever found, except where listed as an experimental population There is <b>final</b> critical habitat for this species. Your location is outside the critical habitat. Species profile: <a href="https://ecos.fws.gov/ecp/species/758">https://ecos.fws.gov/ecp/species/758</a>	Endangered

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## Reptiles

NAME	STATUS
<p>Green Sea Turtle <i>Chelonia mydas</i>            Population: North Atlantic DPS            No critical habitat has been designated for this species.            Species profile: <a href="https://ecos.fws.gov/ecp/species/6199">https://ecos.fws.gov/ecp/species/6199</a></p>	Threatened
<p>Hawksbill Sea Turtle <i>Eretmochelys imbricata</i>            There is <b>final</b> critical habitat for this species. Your location is outside the critical habitat.            Species profile: <a href="https://ecos.fws.gov/ecp/species/3656">https://ecos.fws.gov/ecp/species/3656</a></p>	Endangered
<p>Kemp's Ridley Sea Turtle <i>Lepidochelys kempii</i>            There is <b>proposed</b> critical habitat for this species. The location of the critical habitat is not available.            Species profile: <a href="https://ecos.fws.gov/ecp/species/5523">https://ecos.fws.gov/ecp/species/5523</a></p>	Endangered
<p>Leatherback Sea Turtle <i>Dermochelys coriacea</i>            There is <b>final</b> critical habitat for this species. Your location is outside the critical habitat.            Species profile: <a href="https://ecos.fws.gov/ecp/species/1493">https://ecos.fws.gov/ecp/species/1493</a></p>	Endangered
<p>Loggerhead Sea Turtle <i>Caretta caretta</i>            Population: Northwest Atlantic Ocean DPS            There is <b>final</b> critical habitat for this species. Your location is outside the critical habitat.            Species profile: <a href="https://ecos.fws.gov/ecp/species/1110">https://ecos.fws.gov/ecp/species/1110</a></p>	Threatened

## Clams

NAME	STATUS
<p>Smooth Pimpleback <i>Quadrula houstonensis</i>            No critical habitat has been designated for this species.            Species profile: <a href="https://ecos.fws.gov/ecp/species/8967">https://ecos.fws.gov/ecp/species/8967</a></p>	Candidate
<p>Texas Fawnsfoot <i>Truncilla macrodon</i>            No critical habitat has been designated for this species.            Species profile: <a href="https://ecos.fws.gov/ecp/species/8965">https://ecos.fws.gov/ecp/species/8965</a></p>	Candidate

## Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

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# United States Department of the Interior



FISH AND WILDLIFE SERVICE  
Texas Coastal Ecological Services Field Office  
17629 El Camino Real #211  
Houston, TX 77058  
Phone: (281) 286-8282 Fax: (281) 488-5882  
<http://www.fws.gov/southwest/es/TexasCoastal/>  
[http://www.fws.gov/southwest/es/ES\\_Lists\\_Main2.html](http://www.fws.gov/southwest/es/ES_Lists_Main2.html)

In Reply Refer To:

December 18, 2017

Consultation Code: 02ETTX00-2018-SLI-0502

Event Code: 02ETTX00-2018-E-01069

Project Name: 596 Project

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The U.S. Fish and Wildlife Service (Service) field offices in Clear Lake, Tx, and Corpus Christi, Tx, have combined administratively to form the Texas Coastal Ecological Services Field Office. A map of the Texas Coastal Ecological Services Field Office area of responsibility can be found at: <http://www.fws.gov/southwest/es/TexasCoastal/Map.html>. All project related correspondence should be sent to the field office responsible for the area in which your project occurs. For projects located in southeast Texas please write to: Field Supervisor; U.S. Fish and Wildlife Service; 17629 El Camino Real Ste. 211; Houston, Texas 77058. For projects located in southern Texas please write to: Field Supervisor; U.S. Fish and Wildlife Service; P.O. Box 81468; Corpus Christi, Texas 78468-1468. For projects located in six counties in southern Texas (Cameron, Hidalgo, Starr, Webb, Willacy, and Zapata) please write: Santa Ana NWR, ATTN: Ecological Services Sub Office, 3325 Green Jay Road, Alamo, Texas 78516.

The enclosed species list identifies federally threatened, endangered, and proposed to be listed species; designated critical habitat; and candidate species that may occur within the boundary of your proposed project and/or may be affected by your proposed project.

New information from updated surveys, changes in the abundance and distribution of species, changes in habitat conditions, or other factors could change the list. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. The Service recommends that verification be completed by visiting the ECOS-IPaC website <http://ecos.fws.gov/ipac/> at regular intervals during project planning and implementation for updates to species list and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

Candidate species have no protection under the Act but are included for consideration because they could be listed prior to the completion of your project. The other species information should help you determine if suitable habitat for these listed species exists in any of the proposed project areas or if project activities may affect species on-site, off-site, and/or result in "take" of a federally listed species.

"Take" is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. In addition to the direct take of an individual animal, habitat destruction or modification can be considered take, regardless of whether it has been formally designated as critical habitat, if the activity results in the death or injury of wildlife by removing essential habitat components or significantly alters essential behavior patterns, including breeding, feeding, or sheltering.

### **Section 7**

Section 7 of the Act requires that all Federal agencies consult with the Service to ensure that actions authorized, funded or carried out by such agencies do not jeopardize the continued existence of any listed threatened or endangered species or adversely modify or destroy critical habitat of such species. It is the responsibility of the Federal action agency to determine if the proposed project may affect threatened or endangered species. If a "may affect" determination is made, the Federal agency shall initiate the section 7 consultation process by writing to the office that has responsibility for the area in which your project occurs.

**Is not likely to adversely affect** - the project may affect listed species and/or critical habitat; however, the effects are expected to be discountable, insignificant, or completely beneficial. Certain avoidance and minimization measures may need to be implemented in order to reach this level of effects. The Federal agency or the designated non-Federal representative should seek written concurrence from the Service that adverse effects have been eliminated. Be sure to include all of the information and documentation used to reach your decision with your request for concurrence. The Service must have this documentation before issuing a concurrence.

**Is likely to adversely affect** - adverse effects to listed species may occur as a direct or indirect result of the proposed action or its interrelated or interdependent actions, and the effect is not discountable, insignificant, or beneficial. If the overall effect of the proposed action is beneficial to the listed species but also is likely to cause some adverse effects to individuals of that species, then the proposed action "is likely to adversely affect" the listed species. An "is likely to adversely affect" determination requires the Federal action agency to initiate formal section 7 consultation with this office.

**No effect** - the proposed action will not affect federally listed species or critical habitat (i.e., suitable habitat for the species occurring in the project county is not present in or adjacent to the action area). No further coordination or contact with the Service is necessary. However, if the project changes or additional information on the distribution of listed or proposed species becomes available, the project should be reanalyzed for effects not previously considered.

Regardless of your determination, the Service recommends that you maintain a complete record

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of the evaluation, including steps leading to the determination of affect, the qualified personnel conducting the evaluation, habitat conditions, site photographs, and any other related articles.

Please be advised that while a Federal agency may designate a non-Federal representative to conduct informal consultations with the Service, assess project effects, or prepare a biological assessment, the Federal agency must notify the Service in writing of such a designation. The Federal agency shall also independently review and evaluate the scope and contents of a biological assessment prepared by their designated non-Federal representative before that document is submitted to the Service.

The Service's Consultation Handbook is available online to assist you with further information on definitions, process, and fulfilling Act requirements for your projects at:  
[http://www.fws.gov/endangered/esa-library/pdf/esa\\_section7\\_handbook.pdf](http://www.fws.gov/endangered/esa-library/pdf/esa_section7_handbook.pdf)

### **Section 10**

If there is no federal involvement and the proposed project is being funded or carried out by private interests and/or non-federal government agencies, and the project as proposed may affect listed species, a section 10(a)(1)(B) permit is recommended. The Habitat Conservation Planning Handbook is available at:

[http://www.fws.gov/endangered/esa-library/pdf/HCP\\_Handbook.pdf](http://www.fws.gov/endangered/esa-library/pdf/HCP_Handbook.pdf)

### **Service Response**

Please note that the Service strives to respond to requests for project review within 30 days of receipt, however, this time period is not mandated by regulation. Responses may be delayed due to workload and lack of staff. Failure to meet the 30-day timeframe does not constitute a concurrence from the Service that the proposed project will not have impacts to threatened and endangered species.

### **Proposed Species and/or Proposed Critical Habitat**

While consultations are required when the proposed action may affect listed species, section 7(a)(4) was added to the ESA to provide a mechanism for identifying and resolving potential conflicts between a proposed action and proposed species or proposed critical habitat at an early planning stage. The action agency should seek concurrence from the Service to assist the action agency in determining effects and to advise the agency on ways to avoid or minimize adverse effect to proposed species or proposed critical habitat.

### **Candidate Species**

Candidate species are species that are being considered for possible addition to the threatened and endangered species list. They currently have no legal protection under the ESA. If you find you have potential project impacts to these species the Service would like to provide technical assistance to help avoid or minimize adverse effects. Addressing potential impacts to these species at this stage could better provide for overall ecosystem health in the local area and avert potential future listing.

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Several species of freshwater mussels occur in Texas and four are candidates for listing under the ESA. The Service is also reviewing the status of six other species for potential listing under the ESA. One of the main contributors to mussel die offs is sedimentation, which smothers and suffocates mussels. To reduce sedimentation within rivers, streams, and tributaries crossed by a project, the Service recommends that that you implement the best management practices found at: <http://www.fws.gov/southwest/es/TexasCoastal/FreshwaterMussels.html>.

Candidate Conservation Agreements (CCAs) or Candidate Conservation Agreements with Assurances (CCAAs) are voluntary agreements between the Service and public or private entities to implement conservation measures to address threats to candidate species. Implementing conservation efforts before species are listed increases the likelihood that simpler, flexible, and more cost-effective conservation options are available. A CCAA can provide participants with assurances that if they engage in conservation actions, they will not be required to implement additional conservation measures beyond those in the agreement. For additional information on CCAs/CCAAs please visit the Service's website at <http://www.fws.gov/endangered/what-we-do/cca.html>.

### **Migratory Birds**

The Migratory Bird Treaty Act (MBTA) implements various treaties and conventions for the protection of migratory birds. Under the MBTA, taking, killing, or possessing migratory birds is unlawful. Many may nest in trees, brush areas or other suitable habitat. The Service recommends activities requiring vegetation removal or disturbance avoid the peak nesting period of March through August to avoid destruction of individuals or eggs. If project activities must be conducted during this time, we recommend surveying for active nests prior to commencing work. A list of migratory birds may be viewed at <http://www.fws.gov/migratorybirds/regulationspolicies/mbta/mbtandx.html>.

The bald eagle (*Haliaeetus leucocephalus*) was delisted under the Act on August 9, 2007. Both the bald eagle and the golden eagle (*Aquila chrysaetos*) are still protected under the MBTA and BGEPA. The BGEPA affords both eagles protection in addition to that provided by the MBTA, in particular, by making it unlawful to "disturb" eagles. Under the BGEPA, the Service may issue limited permits to incidentally "take" eagles (e.g., injury, interfering with normal breeding, feeding, or sheltering behavior nest abandonment). For more information on bald and golden eagle management guidelines, we recommend you review information provided at <http://www.fws.gov/midwest/eagle/pdf/NationalBaldEagleManagementGuidelines.pdf>.

The construction of overhead power lines creates threats of avian collision and electrocution. The Service recommends the installation of underground rather than overhead power lines whenever possible. For new overhead lines or retrofitting of old lines, we recommend that project developers implement, to the maximum extent practicable, the Avian Power Line Interaction Committee guidelines found at <http://www.aplic.org/>.

Meteorological and communication towers are estimated to kill millions of birds per year. We recommend following the guidance set forth in the Service Interim Guidelines for

Recommendations on Communications Tower Siting, Constructions, Operation and Decommissioning, found online at:

<http://www.fws.gov/habitatconservation/communicationtowers.html>, to minimize the threat of avian mortality at these towers. Monitoring at these towers would provide insight into the effectiveness of the minimization measures. We request the results of any wildlife mortality monitoring at towers associated with this project.

We request that you provide us with the final location and specifications of your proposed towers, as well as the recommendations implemented. A Tower Site Evaluation Form is also available via the above website; we recommend you complete this form and keep it in your files. If meteorological towers are to be constructed, please forward this completed form to our office.

More information concerning sections 7 and 10 of the Act, migratory birds, candidate species, and landowner tools can be found on our website at:

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### **Wetlands and Wildlife Habitat**

Wetlands and riparian zones provide valuable fish and wildlife habitat as well as contribute to food control, water quality enhancement, and groundwater recharge. Wetland and riparian vegetation provides food and cover for wildlife, stabilizes banks and decreases soil erosion. These areas are inherently dynamic and very sensitive to changes caused by such activities as overgrazing, logging, major construction, or earth disturbance. Executive Order 11990 asserts that each agency shall provide leadership and take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial value of wetlands in carrying out the agency's responsibilities. Construction activities near riparian zones should be carefully designed to minimize impacts. If vegetation clearing is needed in these riparian areas, they should be re-vegetated with native wetland and riparian vegetation to prevent erosion or loss of habitat. We recommend minimizing the area of soil scarification and initiating incremental re-establishment of herbaceous vegetation at the proposed work sites. Denuded and/or disturbed areas should be re-vegetated with a mixture of native legumes and grasses. Species commonly used for soil stabilization are listed in the Texas Department of Agriculture's (TDA) Native Tree and Plant Directory, available from TDA at P.O. Box 12847, Austin, Texas 78711. The Service also urges taking precautions to ensure sediment loading does not occur to any receiving streams in the proposed project area. To prevent and/or minimize soil erosion and compaction associated with construction activities, avoid any unnecessary clearing of vegetation, and follow established rights-of-way whenever possible. All machinery and petroleum products should be stored outside the floodplain and/or wetland area during construction to prevent possible contamination of water and soils.

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corridors. After every effort has been made to avoid impacting wetlands, you anticipate unavoidable wetland impacts will occur; you should contact the appropriate U.S. Army Corps of Engineers office to determine if a permit is necessary prior to commencement of construction activities.

If your project will involve filling, dredging, or trenching of a wetland or riparian area it may require a Clean Water Act Section 404 permit from the U.S. Army Corps of Engineers (COE). For permitting requirements please contact the U.S. Corps of Engineers, District Engineer, P.O. Box 1229, Galveston, Texas 77553-1229, (409) 766-3002.

### **Beneficial Landscaping**

In accordance with Executive Order 13112 on Invasive Species and the Executive Memorandum on Beneficial Landscaping (42 C.F.R. 26961), where possible, any landscaping associated with project plans should be limited to seeding and replanting with native species. A mixture of grasses and forbs appropriate to address potential erosion problems and long-term cover should be planted when seed is reasonably available. Although Bermuda grass is listed in seed mixtures, this species and other introduced species should be avoided as much as possible. The Service also recommends the use of native trees, shrubs, and herbaceous species that are adaptable, drought tolerant and conserve water.

### **State Listed Species**

The State of Texas protects certain species. Please contact the Texas Parks and Wildlife Department (Endangered Resources Branch), 4200 Smith School Road, Austin, Texas 78744 (telephone 512/389-8021) for information concerning fish, wildlife, and plants of State concern or visit their website at:

[http://www.tpwd.state.tx.us/huntwild/wild/wildlife\\_diversity/texas\\_rare\\_species/listed\\_species/](http://www.tpwd.state.tx.us/huntwild/wild/wildlife_diversity/texas_rare_species/listed_species/).

If we can be of further assistance, or if you have any questions about these comments, please contact 281/286-8282 if your project is in southeast Texas, or 361/994-9005, ext. 246, if your project is in southern Texas. Please refer to the Service consultation number listed above in any future correspondence regarding this project.

Attachment(s):

- Official Species List

## Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

**Texas Coastal Ecological Services Field Office**

17629 El Camino Real #211

Houston, TX 77058

(281) 286-8282

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## Project Summary

Consultation Code: 02ETTX00-2018-SLI-0502

Event Code: 02ETTX00-2018-E-01069

Project Name: 596 Project

Project Type: DEVELOPMENT

Project Description: 596 Project

Project Location:

Approximate location of the project can be viewed in Google Maps:

<https://www.google.com/maps/place/29.66533375637003N94.27115027871372W>



Counties:

Chambers, TX | Jefferson, TX



## Endangered Species Act Species

There is a total of 8 threatened, endangered, or candidate species on this species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

### Mammals

NAME	STATUS
West Indian Manatee <i>Trichechus manatus</i> There is <b>final</b> critical habitat for this species. Your location is outside the critical habitat. <b><i>This species is also protected by the Marine Mammal Protection Act, and may have additional consultation requirements.</i></b> Species profile: <a href="https://ecos.fws.gov/ecp/species/4469">https://ecos.fws.gov/ecp/species/4469</a>	Threatened

### Birds

NAME	STATUS
Piping Plover <i>Charadrius melodus</i> Population: [Atlantic Coast and Northern Great Plains populations] - Wherever found, except those areas where listed as endangered. There is <b>final</b> critical habitat for this species. Your location is outside the critical habitat. Species profile: <a href="https://ecos.fws.gov/ecp/species/6039">https://ecos.fws.gov/ecp/species/6039</a>	Threatened
Red Knot <i>Calidris canutus rufa</i> No critical habitat has been designated for this species. Species profile: <a href="https://ecos.fws.gov/ecp/species/1864">https://ecos.fws.gov/ecp/species/1864</a>	Threatened

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## Reptiles

NAME	STATUS
<p>Green Sea Turtle <i>Chelonia mydas</i>            Population: North Atlantic DPS            No critical habitat has been designated for this species.            Species profile: <a href="https://ecos.fws.gov/ecp/species/6199">https://ecos.fws.gov/ecp/species/6199</a></p>	Threatened
<p>Hawksbill Sea Turtle <i>Eretmochelys imbricata</i>            There is <b>final</b> critical habitat for this species. Your location is outside the critical habitat.            Species profile: <a href="https://ecos.fws.gov/ecp/species/3656">https://ecos.fws.gov/ecp/species/3656</a></p>	Endangered
<p>Kemp's Ridley Sea Turtle <i>Lepidochelys kempii</i>            There is <b>proposed</b> critical habitat for this species. The location of the critical habitat is not available.            Species profile: <a href="https://ecos.fws.gov/ecp/species/5523">https://ecos.fws.gov/ecp/species/5523</a></p>	Endangered
<p>Leatherback Sea Turtle <i>Dermochelys coriacea</i>            There is <b>final</b> critical habitat for this species. Your location is outside the critical habitat.            Species profile: <a href="https://ecos.fws.gov/ecp/species/1493">https://ecos.fws.gov/ecp/species/1493</a></p>	Endangered
<p>Loggerhead Sea Turtle <i>Caretta caretta</i>            Population: Northwest Atlantic Ocean DPS            There is <b>final</b> critical habitat for this species. Your location is outside the critical habitat.            Species profile: <a href="https://ecos.fws.gov/ecp/species/1110">https://ecos.fws.gov/ecp/species/1110</a></p>	Threatened

## Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

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# United States Department of the Interior



FISH AND WILDLIFE SERVICE  
Texas Coastal Ecological Services Field Office  
17629 El Camino Real #211  
Houston, TX 77058  
Phone: (281) 286-8282 Fax: (281) 488-5882  
<http://www.fws.gov/southwest/es/TexasCoastal/>  
[http://www.fws.gov/southwest/es/ES\\_Lists\\_Main2.html](http://www.fws.gov/southwest/es/ES_Lists_Main2.html)

In Reply Refer To:

December 18, 2017

Consultation Code: 02ETTX00-2018-SLI-0499

Event Code: 02ETTX00-2018-E-01063

Project Name: SPR 1307 Project

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The U.S. Fish and Wildlife Service (Service) field offices in Clear Lake, Tx, and Corpus Christi, Tx, have combined administratively to form the Texas Coastal Ecological Services Field Office. A map of the Texas Coastal Ecological Services Field Office area of responsibility can be found at: <http://www.fws.gov/southwest/es/TexasCoastal/Map.html>. All project related correspondence should be sent to the field office responsible for the area in which your project occurs. For projects located in southeast Texas please write to: Field Supervisor; U.S. Fish and Wildlife Service; 17629 El Camino Real Ste. 211; Houston, Texas 77058. For projects located in southern Texas please write to: Field Supervisor; U.S. Fish and Wildlife Service; P.O. Box 81468; Corpus Christi, Texas 78468-1468. For projects located in six counties in southern Texas (Cameron, Hidalgo, Starr, Webb, Willacy, and Zapata) please write: Santa Ana NWR, ATTN: Ecological Services Sub Office, 3325 Green Jay Road, Alamo, Texas 78516.

The enclosed species list identifies federally threatened, endangered, and proposed to be listed species; designated critical habitat; and candidate species that may occur within the boundary of your proposed project and/or may be affected by your proposed project.

New information from updated surveys, changes in the abundance and distribution of species, changes in habitat conditions, or other factors could change the list. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. The Service recommends that verification be completed by visiting the ECOS-IPaC website <http://ecos.fws.gov/ipac/> at regular intervals during project planning and implementation for updates to species list and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

Candidate species have no protection under the Act but are included for consideration because they could be listed prior to the completion of your project. The other species information should help you determine if suitable habitat for these listed species exists in any of the proposed project areas or if project activities may affect species on-site, off-site, and/or result in "take" of a federally listed species.

"Take" is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. In addition to the direct take of an individual animal, habitat destruction or modification can be considered take, regardless of whether it has been formally designated as critical habitat, if the activity results in the death or injury of wildlife by removing essential habitat components or significantly alters essential behavior patterns, including breeding, feeding, or sheltering.

### **Section 7**

Section 7 of the Act requires that all Federal agencies consult with the Service to ensure that actions authorized, funded or carried out by such agencies do not jeopardize the continued existence of any listed threatened or endangered species or adversely modify or destroy critical habitat of such species. It is the responsibility of the Federal action agency to determine if the proposed project may affect threatened or endangered species. If a "may affect" determination is made, the Federal agency shall initiate the section 7 consultation process by writing to the office that has responsibility for the area in which your project occurs.

**Is not likely to adversely affect** - the project may affect listed species and/or critical habitat; however, the effects are expected to be discountable, insignificant, or completely beneficial. Certain avoidance and minimization measures may need to be implemented in order to reach this level of effects. The Federal agency or the designated non-Federal representative should seek written concurrence from the Service that adverse effects have been eliminated. Be sure to include all of the information and documentation used to reach your decision with your request for concurrence. The Service must have this documentation before issuing a concurrence.

**Is likely to adversely affect** - adverse effects to listed species may occur as a direct or indirect result of the proposed action or its interrelated or interdependent actions, and the effect is not discountable, insignificant, or beneficial. If the overall effect of the proposed action is beneficial to the listed species but also is likely to cause some adverse effects to individuals of that species, then the proposed action "is likely to adversely affect" the listed species. An "is likely to adversely affect" determination requires the Federal action agency to initiate formal section 7 consultation with this office.

**No effect** - the proposed action will not affect federally listed species or critical habitat (i.e., suitable habitat for the species occurring in the project county is not present in or adjacent to the action area). No further coordination or contact with the Service is necessary. However, if the project changes or additional information on the distribution of listed or proposed species becomes available, the project should be reanalyzed for effects not previously considered.

Regardless of your determination, the Service recommends that you maintain a complete record

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of the evaluation, including steps leading to the determination of affect, the qualified personnel conducting the evaluation, habitat conditions, site photographs, and any other related articles.

Please be advised that while a Federal agency may designate a non-Federal representative to conduct informal consultations with the Service, assess project effects, or prepare a biological assessment, the Federal agency must notify the Service in writing of such a designation. The Federal agency shall also independently review and evaluate the scope and contents of a biological assessment prepared by their designated non-Federal representative before that document is submitted to the Service.

The Service's Consultation Handbook is available online to assist you with further information on definitions, process, and fulfilling Act requirements for your projects at:  
[http://www.fws.gov/endangered/esa-library/pdf/esa\\_section7\\_handbook.pdf](http://www.fws.gov/endangered/esa-library/pdf/esa_section7_handbook.pdf)

### **Section 10**

If there is no federal involvement and the proposed project is being funded or carried out by private interests and/or non-federal government agencies, and the project as proposed may affect listed species, a section 10(a)(1)(B) permit is recommended. The Habitat Conservation Planning Handbook is available at:

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### **Service Response**

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### **Proposed Species and/or Proposed Critical Habitat**

While consultations are required when the proposed action may affect listed species, section 7(a)(4) was added to the ESA to provide a mechanism for identifying and resolving potential conflicts between a proposed action and proposed species or proposed critical habitat at an early planning stage. The action agency should seek concurrence from the Service to assist the action agency in determining effects and to advise the agency on ways to avoid or minimize adverse effect to proposed species or proposed critical habitat.

### **Candidate Species**

Candidate species are species that are being considered for possible addition to the threatened and endangered species list. They currently have no legal protection under the ESA. If you find you have potential project impacts to these species the Service would like to provide technical assistance to help avoid or minimize adverse effects. Addressing potential impacts to these species at this stage could better provide for overall ecosystem health in the local area and avert potential future listing.

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Several species of freshwater mussels occur in Texas and four are candidates for listing under the ESA. The Service is also reviewing the status of six other species for potential listing under the ESA. One of the main contributors to mussel die offs is sedimentation, which smothers and suffocates mussels. To reduce sedimentation within rivers, streams, and tributaries crossed by a project, the Service recommends that that you implement the best management practices found at: <http://www.fws.gov/southwest/es/TexasCoastal/FreshwaterMussels.html>.

Candidate Conservation Agreements (CCAs) or Candidate Conservation Agreements with Assurances (CCAAs) are voluntary agreements between the Service and public or private entities to implement conservation measures to address threats to candidate species. Implementing conservation efforts before species are listed increases the likelihood that simpler, flexible, and more cost-effective conservation options are available. A CCAA can provide participants with assurances that if they engage in conservation actions, they will not be required to implement additional conservation measures beyond those in the agreement. For additional information on CCAs/CCAAs please visit the Service's website at <http://www.fws.gov/endangered/what-we-do/cca.html>.

### **Migratory Birds**

The Migratory Bird Treaty Act (MBTA) implements various treaties and conventions for the protection of migratory birds. Under the MBTA, taking, killing, or possessing migratory birds is unlawful. Many may nest in trees, brush areas or other suitable habitat. The Service recommends activities requiring vegetation removal or disturbance avoid the peak nesting period of March through August to avoid destruction of individuals or eggs. If project activities must be conducted during this time, we recommend surveying for active nests prior to commencing work. A list of migratory birds may be viewed at <http://www.fws.gov/migratorybirds/regulationspolicies/mbta/mbtandx.html>.

The bald eagle (*Haliaeetus leucocephalus*) was delisted under the Act on August 9, 2007. Both the bald eagle and the golden eagle (*Aquila chrysaetos*) are still protected under the MBTA and BGEPA. The BGEPA affords both eagles protection in addition to that provided by the MBTA, in particular, by making it unlawful to "disturb" eagles. Under the BGEPA, the Service may issue limited permits to incidentally "take" eagles (e.g., injury, interfering with normal breeding, feeding, or sheltering behavior nest abandonment). For more information on bald and golden eagle management guidelines, we recommend you review information provided at <http://www.fws.gov/midwest/eagle/pdf/NationalBaldEagleManagementGuidelines.pdf>.

The construction of overhead power lines creates threats of avian collision and electrocution. The Service recommends the installation of underground rather than overhead power lines whenever possible. For new overhead lines or retrofitting of old lines, we recommend that project developers implement, to the maximum extent practicable, the Avian Power Line Interaction Committee guidelines found at <http://www.aplic.org/>.

Meteorological and communication towers are estimated to kill millions of birds per year. We recommend following the guidance set forth in the Service Interim Guidelines for

Recommendations on Communications Tower Siting, Constructions, Operation and Decommissioning, found online at:

<http://www.fws.gov/habitatconservation/communicationtowers.html>, to minimize the threat of avian mortality at these towers. Monitoring at these towers would provide insight into the effectiveness of the minimization measures. We request the results of any wildlife mortality monitoring at towers associated with this project.

We request that you provide us with the final location and specifications of your proposed towers, as well as the recommendations implemented. A Tower Site Evaluation Form is also available via the above website; we recommend you complete this form and keep it in your files. If meteorological towers are to be constructed, please forward this completed form to our office.

More information concerning sections 7 and 10 of the Act, migratory birds, candidate species, and landowner tools can be found on our website at:

<http://www.fws.gov/southwest/es/TexasCoastal/ProjectReviews.html>.

### **Wetlands and Wildlife Habitat**

Wetlands and riparian zones provide valuable fish and wildlife habitat as well as contribute to food control, water quality enhancement, and groundwater recharge. Wetland and riparian vegetation provides food and cover for wildlife, stabilizes banks and decreases soil erosion. These areas are inherently dynamic and very sensitive to changes caused by such activities as overgrazing, logging, major construction, or earth disturbance. Executive Order 11990 asserts that each agency shall provide leadership and take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial value of wetlands in carrying out the agency's responsibilities. Construction activities near riparian zones should be carefully designed to minimize impacts. If vegetation clearing is needed in these riparian areas, they should be re-vegetated with native wetland and riparian vegetation to prevent erosion or loss of habitat. We recommend minimizing the area of soil scarification and initiating incremental re-establishment of herbaceous vegetation at the proposed work sites. Denuded and/or disturbed areas should be re-vegetated with a mixture of native legumes and grasses. Species commonly used for soil stabilization are listed in the Texas Department of Agriculture's (TDA) Native Tree and Plant Directory, available from TDA at P.O. Box 12847, Austin, Texas 78711. The Service also urges taking precautions to ensure sediment loading does not occur to any receiving streams in the proposed project area. To prevent and/or minimize soil erosion and compaction associated with construction activities, avoid any unnecessary clearing of vegetation, and follow established rights-of-way whenever possible. All machinery and petroleum products should be stored outside the floodplain and/or wetland area during construction to prevent possible contamination of water and soils.

Wetlands and riparian areas are high priority fish and wildlife habitat, serving as important sources of food, cover, and shelter for numerous species of resident and migratory wildlife. Waterfowl and other migratory birds use wetlands and riparian corridors as stopover, feeding, and nesting areas. We strongly recommend that the selected project site not impact wetlands and riparian areas, and be located as far as practical from these areas. Migratory birds tend to concentrate in or near wetlands and riparian areas and use these areas as migratory yways or

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corridors. After every effort has been made to avoid impacting wetlands, you anticipate unavoidable wetland impacts will occur; you should contact the appropriate U.S. Army Corps of Engineers office to determine if a permit is necessary prior to commencement of construction activities.

If your project will involve filling, dredging, or trenching of a wetland or riparian area it may require a Clean Water Act Section 404 permit from the U.S. Army Corps of Engineers (COE). For permitting requirements please contact the U.S. Corps of Engineers, District Engineer, P.O. Box 1229, Galveston, Texas 77553-1229, (409) 766-3002.

### **Beneficial Landscaping**

In accordance with Executive Order 13112 on Invasive Species and the Executive Memorandum on Beneficial Landscaping (42 C.F.R. 26961), where possible, any landscaping associated with project plans should be limited to seeding and replanting with native species. A mixture of grasses and forbs appropriate to address potential erosion problems and long-term cover should be planted when seed is reasonably available. Although Bermuda grass is listed in seed mixtures, this species and other introduced species should be avoided as much as possible. The Service also recommends the use of native trees, shrubs, and herbaceous species that are adaptable, drought tolerant and conserve water.

### **State Listed Species**

The State of Texas protects certain species. Please contact the Texas Parks and Wildlife Department (Endangered Resources Branch), 4200 Smith School Road, Austin, Texas 78744 (telephone 512/389-8021) for information concerning fish, wildlife, and plants of State concern or visit their website at:

[http://www.tpwd.state.tx.us/huntwild/wild/wildlife\\_diversity/texas\\_rare\\_species/listed\\_species/](http://www.tpwd.state.tx.us/huntwild/wild/wildlife_diversity/texas_rare_species/listed_species/).

If we can be of further assistance, or if you have any questions about these comments, please contact 281/286-8282 if your project is in southeast Texas, or 361/994-9005, ext. 246, if your project is in southern Texas. Please refer to the Service consultation number listed above in any future correspondence regarding this project.

Attachment(s):

- Official Species List



## Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

**Texas Coastal Ecological Services Field Office**

17629 El Camino Real #211

Houston, TX 77058

(281) 286-8282

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## Project Summary

Consultation Code: 02ETTX00-2018-SLI-0499

Event Code: 02ETTX00-2018-E-01063

Project Name: SPR 1307 Project

Project Type: DEVELOPMENT

Project Description: SPR 1307 Project

Project Location:

Approximate location of the project can be viewed in Google Maps:

<https://www.google.com/maps/place/29.912189769456138N94.07927339155404W>



Counties:

Jefferson, TX

## Endangered Species Act Species

There is a total of 8 threatened, endangered, or candidate species on this species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

### Mammals

NAME	STATUS
West Indian Manatee <i>Trichechus manatus</i> There is <b>final</b> critical habitat for this species. Your location is outside the critical habitat. <b><i>This species is also protected by the Marine Mammal Protection Act, and may have additional consultation requirements.</i></b> Species profile: <a href="https://ecos.fws.gov/ecp/species/4469">https://ecos.fws.gov/ecp/species/4469</a>	Threatened

### Birds

NAME	STATUS
Piping Plover <i>Charadrius melodus</i> Population: [Atlantic Coast and Northern Great Plains populations] - Wherever found, except those areas where listed as endangered. There is <b>final</b> critical habitat for this species. Your location is outside the critical habitat. Species profile: <a href="https://ecos.fws.gov/ecp/species/6039">https://ecos.fws.gov/ecp/species/6039</a>	Threatened
Red Knot <i>Calidris canutus rufa</i> No critical habitat has been designated for this species. Species profile: <a href="https://ecos.fws.gov/ecp/species/1864">https://ecos.fws.gov/ecp/species/1864</a>	Threatened

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## Reptiles

NAME	STATUS
<p>Green Sea Turtle <i>Chelonia mydas</i>            Population: North Atlantic DPS            No critical habitat has been designated for this species.            Species profile: <a href="https://ecos.fws.gov/ecp/species/6199">https://ecos.fws.gov/ecp/species/6199</a></p>	Threatened
<p>Hawksbill Sea Turtle <i>Eretmochelys imbricata</i>            There is <b>final</b> critical habitat for this species. Your location is outside the critical habitat.            Species profile: <a href="https://ecos.fws.gov/ecp/species/3656">https://ecos.fws.gov/ecp/species/3656</a></p>	Endangered
<p>Kemp's Ridley Sea Turtle <i>Lepidochelys kempii</i>            There is <b>proposed</b> critical habitat for this species. The location of the critical habitat is not available.            Species profile: <a href="https://ecos.fws.gov/ecp/species/5523">https://ecos.fws.gov/ecp/species/5523</a></p>	Endangered
<p>Leatherback Sea Turtle <i>Dermochelys coriacea</i>            There is <b>final</b> critical habitat for this species. Your location is outside the critical habitat.            Species profile: <a href="https://ecos.fws.gov/ecp/species/1493">https://ecos.fws.gov/ecp/species/1493</a></p>	Endangered
<p>Loggerhead Sea Turtle <i>Caretta caretta</i>            Population: Northwest Atlantic Ocean DPS            There is <b>final</b> critical habitat for this species. Your location is outside the critical habitat.            Species profile: <a href="https://ecos.fws.gov/ecp/species/1110">https://ecos.fws.gov/ecp/species/1110</a></p>	Threatened

## Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

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## United States Department of the Interior



FISH AND WILDLIFE SERVICE  
Texas Coastal Ecological Services Field Office  
17629 El Camino Real #211  
Houston, TX 77058  
Phone: (281) 286-8282 Fax: (281) 488-5882  
<http://www.fws.gov/southwest/es/TexasCoastal/>  
[http://www.fws.gov/southwest/es/ES\\_Lists\\_Main2.html](http://www.fws.gov/southwest/es/ES_Lists_Main2.html)

In Reply Refer To:

December 18, 2017

Consultation Code: 02ETTX00-2018-SLI-0501

Event Code: 02ETTX00-2018-E-01067

Project Name: Hillebrandt and Hebert Rd

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

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<http://www.fws.gov/southwest/es/TexasCoastal/ProjectReviews.html>.

### **Wetlands and Wildlife Habitat**

Wetlands and riparian zones provide valuable fish and wildlife habitat as well as contribute to food control, water quality enhancement, and groundwater recharge. Wetland and riparian vegetation provides food and cover for wildlife, stabilizes banks and decreases soil erosion. These areas are inherently dynamic and very sensitive to changes caused by such activities as overgrazing, logging, major construction, or earth disturbance. Executive Order 11990 asserts that each agency shall provide leadership and take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial value of wetlands in carrying out the agency's responsibilities. Construction activities near riparian zones should be carefully designed to minimize impacts. If vegetation clearing is needed in these riparian areas, they should be re-vegetated with native wetland and riparian vegetation to prevent erosion or loss of habitat. We recommend minimizing the area of soil scarification and initiating incremental re-establishment of herbaceous vegetation at the proposed work sites. Denuded and/or disturbed areas should be re-vegetated with a mixture of native legumes and grasses. Species commonly used for soil stabilization are listed in the Texas Department of Agriculture's (TDA) Native Tree and Plant Directory, available from TDA at P.O. Box 12847, Austin, Texas 78711. The Service also urges taking precautions to ensure sediment loading does not occur to any receiving streams in the proposed project area. To prevent and/or minimize soil erosion and compaction associated with construction activities, avoid any unnecessary clearing of vegetation, and follow established rights-of-way whenever possible. All machinery and petroleum products should be stored outside the floodplain and/or wetland area during construction to prevent possible contamination of water and soils.

Wetlands and riparian areas are high priority fish and wildlife habitat, serving as important sources of food, cover, and shelter for numerous species of resident and migratory wildlife. Waterfowl and other migratory birds use wetlands and riparian corridors as stopover, feeding, and nesting areas. We strongly recommend that the selected project site not impact wetlands and riparian areas, and be located as far as practical from these areas. Migratory birds tend to concentrate in or near wetlands and riparian areas and use these areas as migratory yways or

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corridors. After every effort has been made to avoid impacting wetlands, you anticipate unavoidable wetland impacts will occur; you should contact the appropriate U.S. Army Corps of Engineers office to determine if a permit is necessary prior to commencement of construction activities.

If your project will involve filling, dredging, or trenching of a wetland or riparian area it may require a Clean Water Act Section 404 permit from the U.S. Army Corps of Engineers (COE). For permitting requirements please contact the U.S. Corps of Engineers, District Engineer, P.O. Box 1229, Galveston, Texas 77553-1229, (409) 766-3002.

### **Beneficial Landscaping**

In accordance with Executive Order 13112 on Invasive Species and the Executive Memorandum on Beneficial Landscaping (42 C.F.R. 26961), where possible, any landscaping associated with project plans should be limited to seeding and replanting with native species. A mixture of grasses and forbs appropriate to address potential erosion problems and long-term cover should be planted when seed is reasonably available. Although Bermuda grass is listed in seed mixtures, this species and other introduced species should be avoided as much as possible. The Service also recommends the use of native trees, shrubs, and herbaceous species that are adaptable, drought tolerant and conserve water.

### **State Listed Species**

The State of Texas protects certain species. Please contact the Texas Parks and Wildlife Department (Endangered Resources Branch), 4200 Smith School Road, Austin, Texas 78744 (telephone 512/389-8021) for information concerning fish, wildlife, and plants of State concern or visit their website at:

[http://www.tpwd.state.tx.us/huntwild/wild/wildlife\\_diversity/texas\\_rare\\_species/listed\\_species/](http://www.tpwd.state.tx.us/huntwild/wild/wildlife_diversity/texas_rare_species/listed_species/).

If we can be of further assistance, or if you have any questions about these comments, please contact 281/286-8282 if your project is in southeast Texas, or 361/994-9005, ext. 246, if your project is in southern Texas. Please refer to the Service consultation number listed above in any future correspondence regarding this project.

Attachment(s):

- Official Species List

## Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

**Texas Coastal Ecological Services Field Office**

17629 El Camino Real #211

Houston, TX 77058

(281) 286-8282

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## Project Summary

Consultation Code: 02ETTX00-2018-SLI-0501

Event Code: 02ETTX00-2018-E-01067

Project Name: Hillebrandt and Hebert Rd

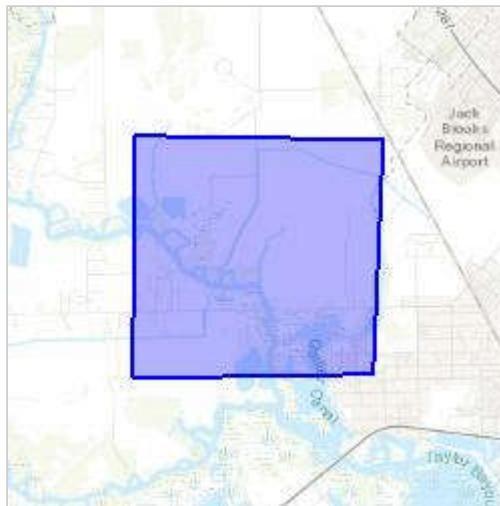
Project Type: DEVELOPMENT

Project Description: Hillebrandt and Hebert

Project Location:

Approximate location of the project can be viewed in Google Maps:

<https://www.google.com/maps/place/29.924511956949246N94.07130884452508W>



Counties: Jefferson, TX

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## Endangered Species Act Species

There is a total of 8 threatened, endangered, or candidate species on this species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

### Mammals

NAME	STATUS
West Indian Manatee <i>Trichechus manatus</i> There is <b>final</b> critical habitat for this species. Your location is outside the critical habitat. <b><i>This species is also protected by the Marine Mammal Protection Act, and may have additional consultation requirements.</i></b> Species profile: <a href="https://ecos.fws.gov/ecp/species/4469">https://ecos.fws.gov/ecp/species/4469</a>	Threatened

### Birds

NAME	STATUS
Piping Plover <i>Charadrius melodus</i> Population: [Atlantic Coast and Northern Great Plains populations] - Wherever found, except those areas where listed as endangered. There is <b>final</b> critical habitat for this species. Your location is outside the critical habitat. Species profile: <a href="https://ecos.fws.gov/ecp/species/6039">https://ecos.fws.gov/ecp/species/6039</a>	Threatened
Red Knot <i>Calidris canutus rufa</i> No critical habitat has been designated for this species. Species profile: <a href="https://ecos.fws.gov/ecp/species/1864">https://ecos.fws.gov/ecp/species/1864</a>	Threatened

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## Reptiles

NAME	STATUS
<p>Green Sea Turtle <i>Chelonia mydas</i>            Population: North Atlantic DPS            No critical habitat has been designated for this species.            Species profile: <a href="https://ecos.fws.gov/ecp/species/6199">https://ecos.fws.gov/ecp/species/6199</a></p>	Threatened
<p>Hawksbill Sea Turtle <i>Eretmochelys imbricata</i>            There is <b>final</b> critical habitat for this species. Your location is outside the critical habitat.            Species profile: <a href="https://ecos.fws.gov/ecp/species/3656">https://ecos.fws.gov/ecp/species/3656</a></p>	Endangered
<p>Kemp's Ridley Sea Turtle <i>Lepidochelys kempii</i>            There is <b>proposed</b> critical habitat for this species. The location of the critical habitat is not available.            Species profile: <a href="https://ecos.fws.gov/ecp/species/5523">https://ecos.fws.gov/ecp/species/5523</a></p>	Endangered
<p>Leatherback Sea Turtle <i>Dermochelys coriacea</i>            There is <b>final</b> critical habitat for this species. Your location is outside the critical habitat.            Species profile: <a href="https://ecos.fws.gov/ecp/species/1493">https://ecos.fws.gov/ecp/species/1493</a></p>	Endangered
<p>Loggerhead Sea Turtle <i>Caretta caretta</i>            Population: Northwest Atlantic Ocean DPS            There is <b>final</b> critical habitat for this species. Your location is outside the critical habitat.            Species profile: <a href="https://ecos.fws.gov/ecp/species/1110">https://ecos.fws.gov/ecp/species/1110</a></p>	Threatened

## Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

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## **Appendix F**

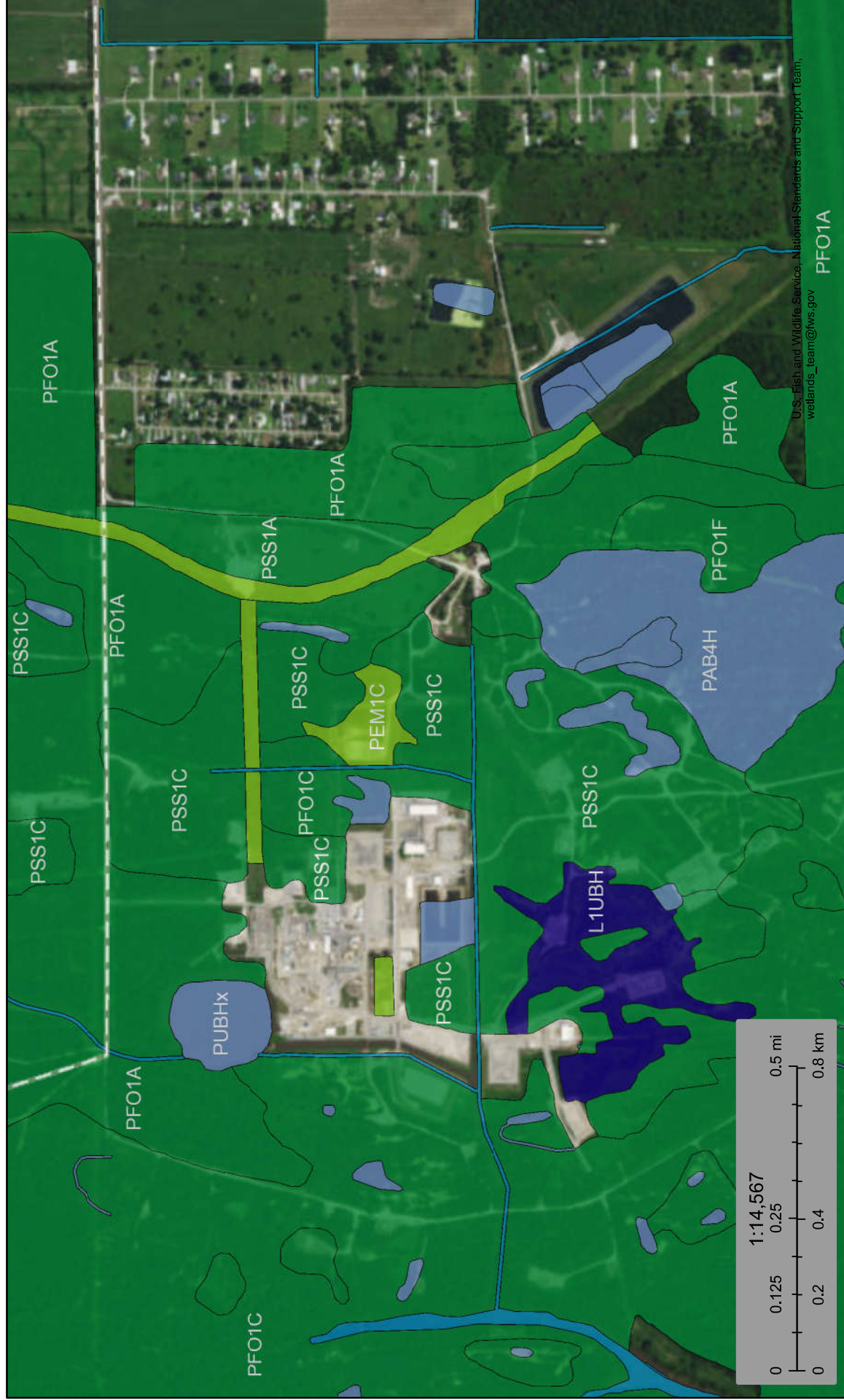
U.S. Fish and Wildlife Service Wetland Maps



U.S. Fish and Wildlife Service

# National Wetlands Inventory

## SPR Bayou Choctaw Wetland Map



December 13, 2017

### Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.





U.S. Fish and Wildlife Service

# National Wetlands Inventory

## SPR West Hackberry Wetlands Map



U.S. Fish and Wildlife Service, National Standards and Support Team, wetlands\_team@fws.gov

December 13, 2017

### Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

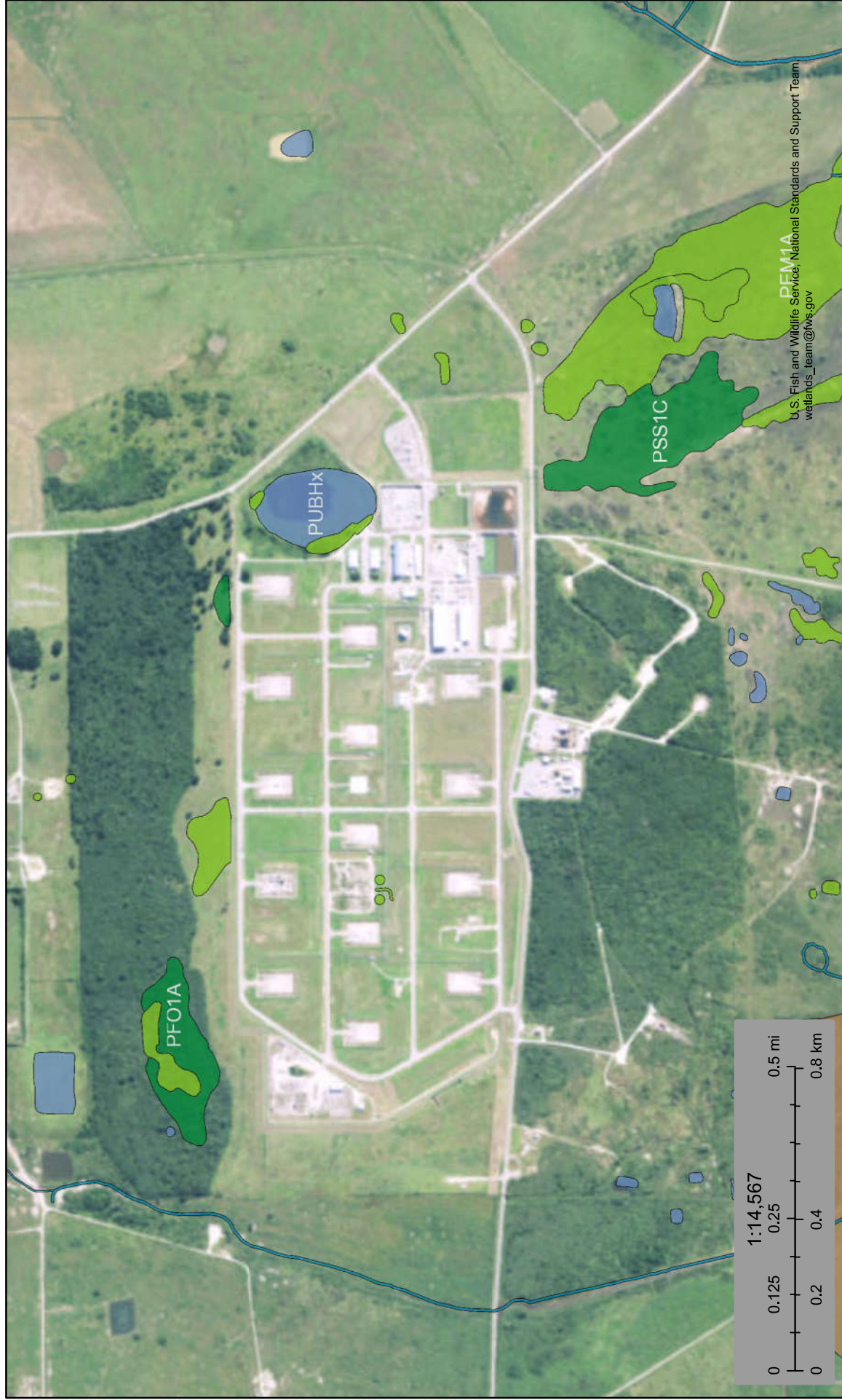
This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.



U.S. Fish and Wildlife Service

# National Wetlands Inventory

## SPR Big Hill Wetlands Map



December 13, 2017

### Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

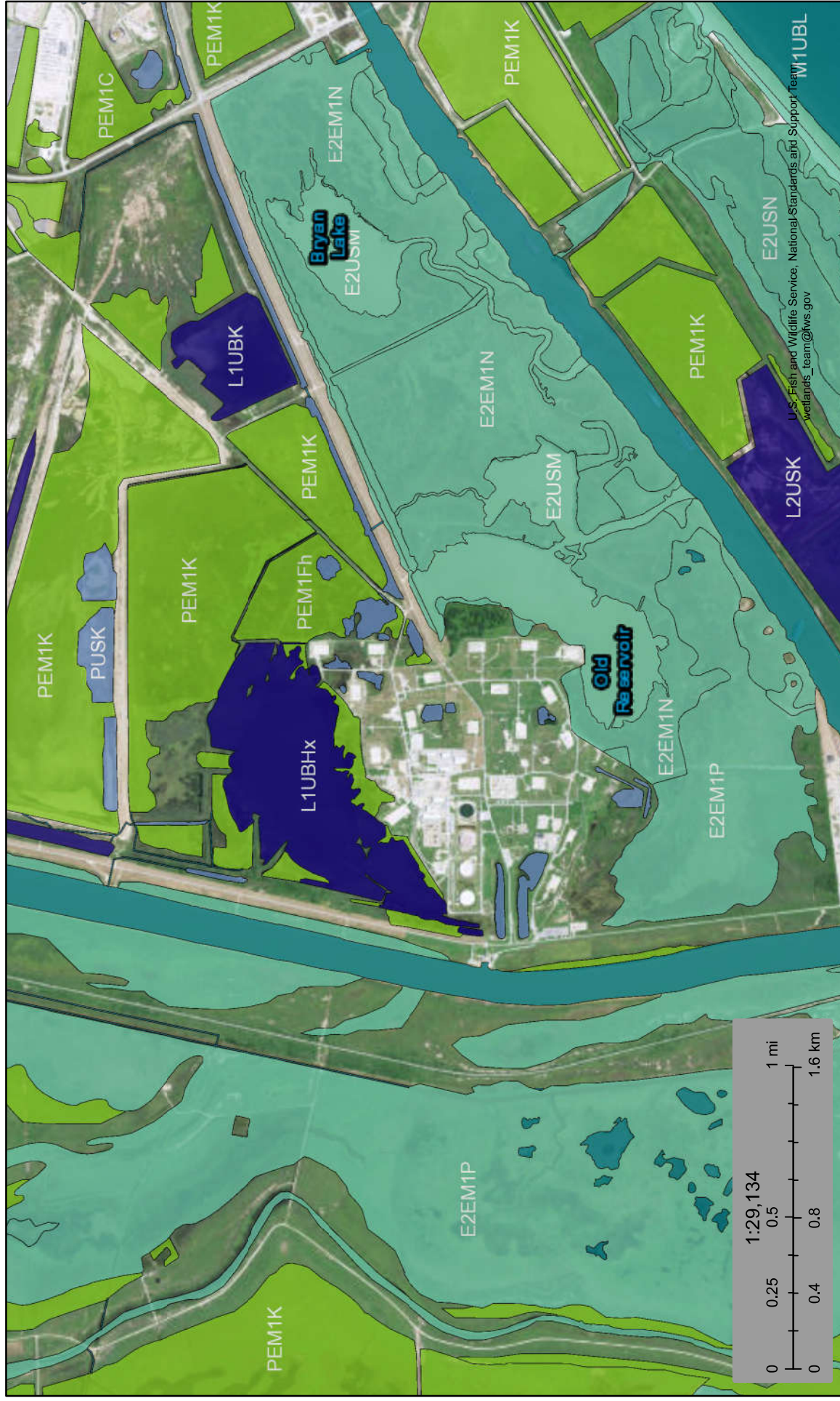
This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.



U.S. Fish and Wildlife Service

# National Wetlands Inventory

## SPR Bryan Mound Wetlands Map



December 13, 2017

### Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

This map is for general reference only. The U.S. Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

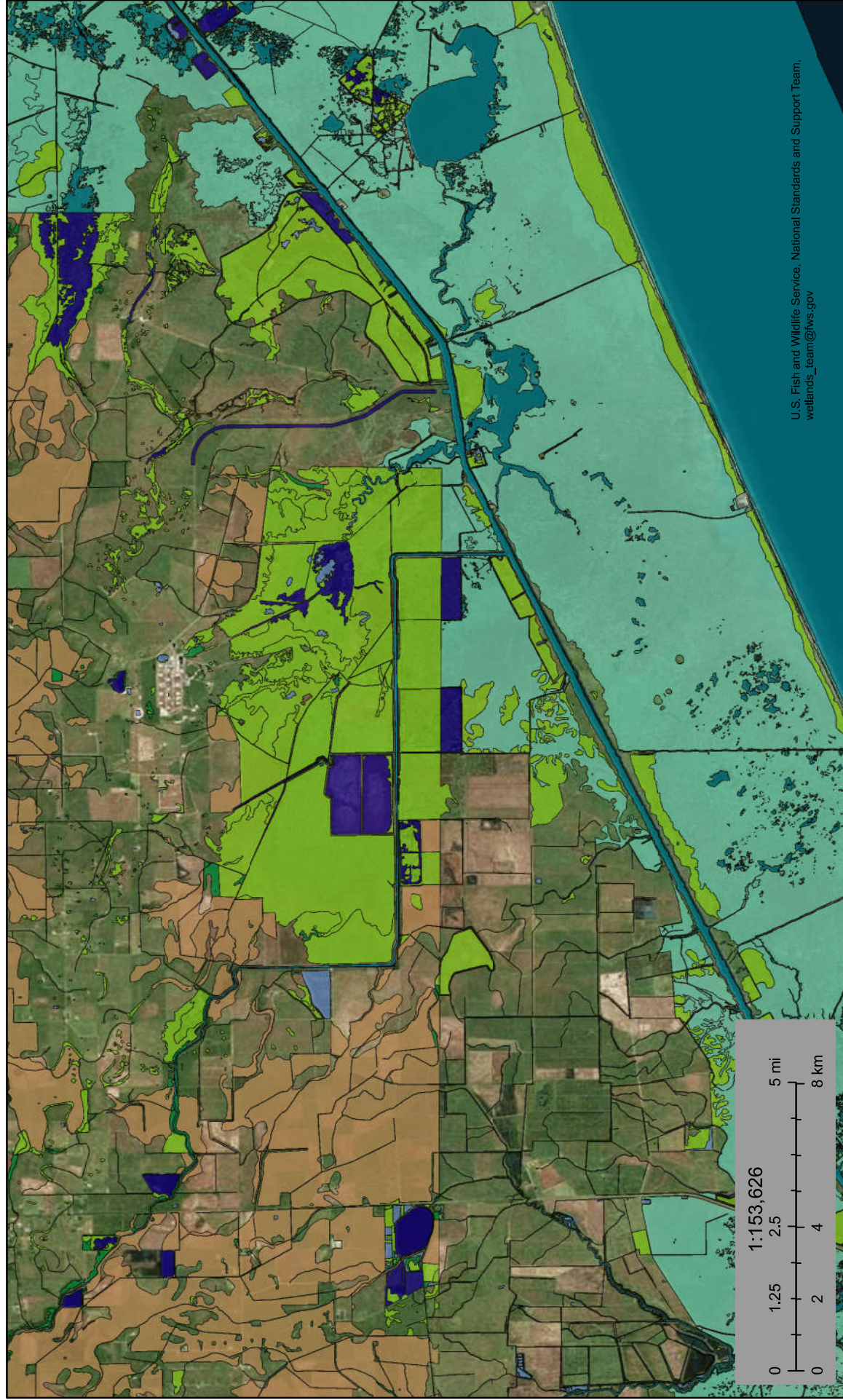


U.S. Fish and Wildlife Service

# National Wetlands Inventory

BH-MM-596/596A

## 596 wetlands map



December 19, 2017

### Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

U.S. Fish and Wildlife Service, National Standards and Support Team, wetlands\_team@fws.gov

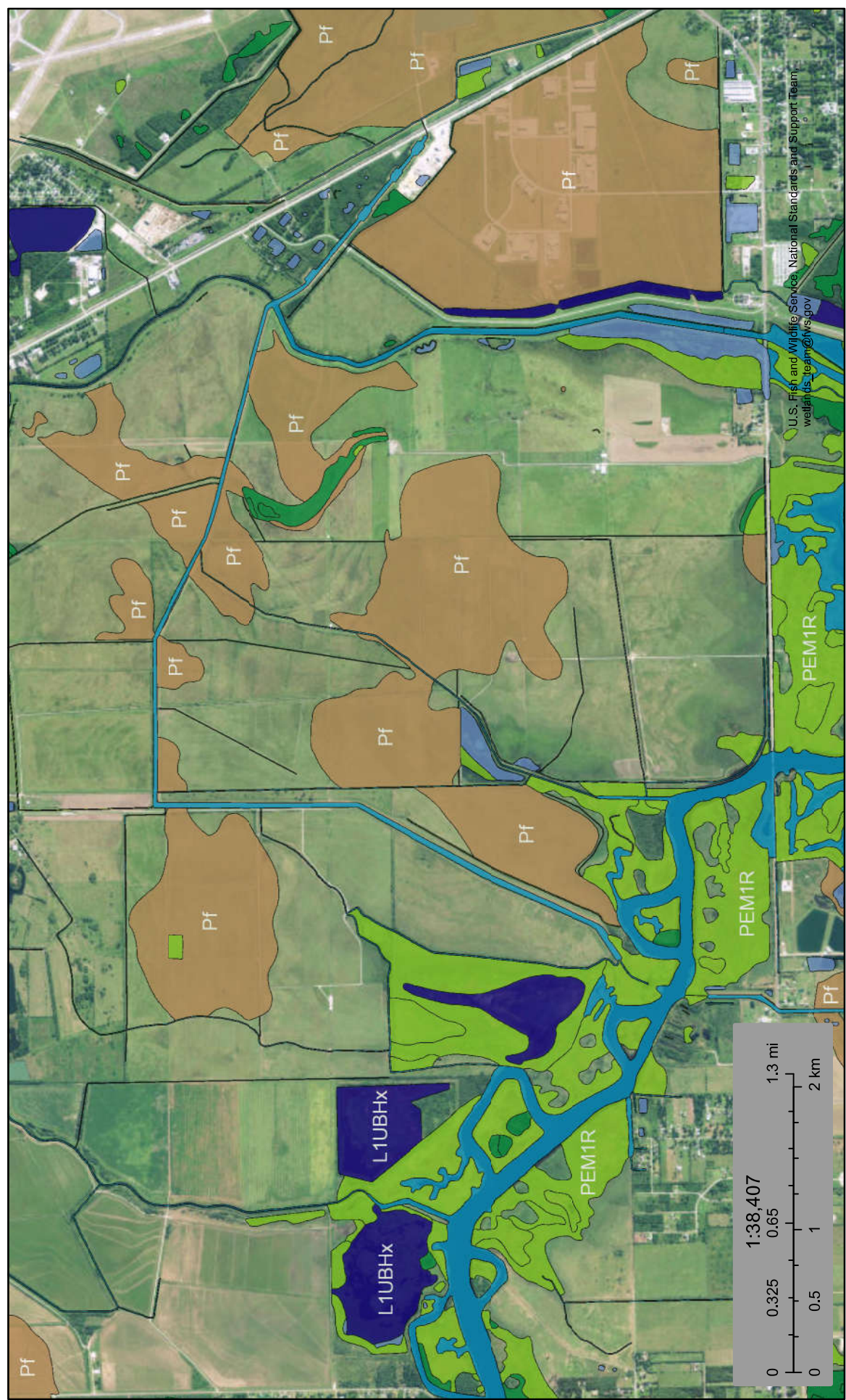


U.S. Fish and Wildlife Service

# National Wetlands Inventory

BH-MM-756/756A and BH-MM-1307/1307A

## Hillebrandt and Hebert wetland maps



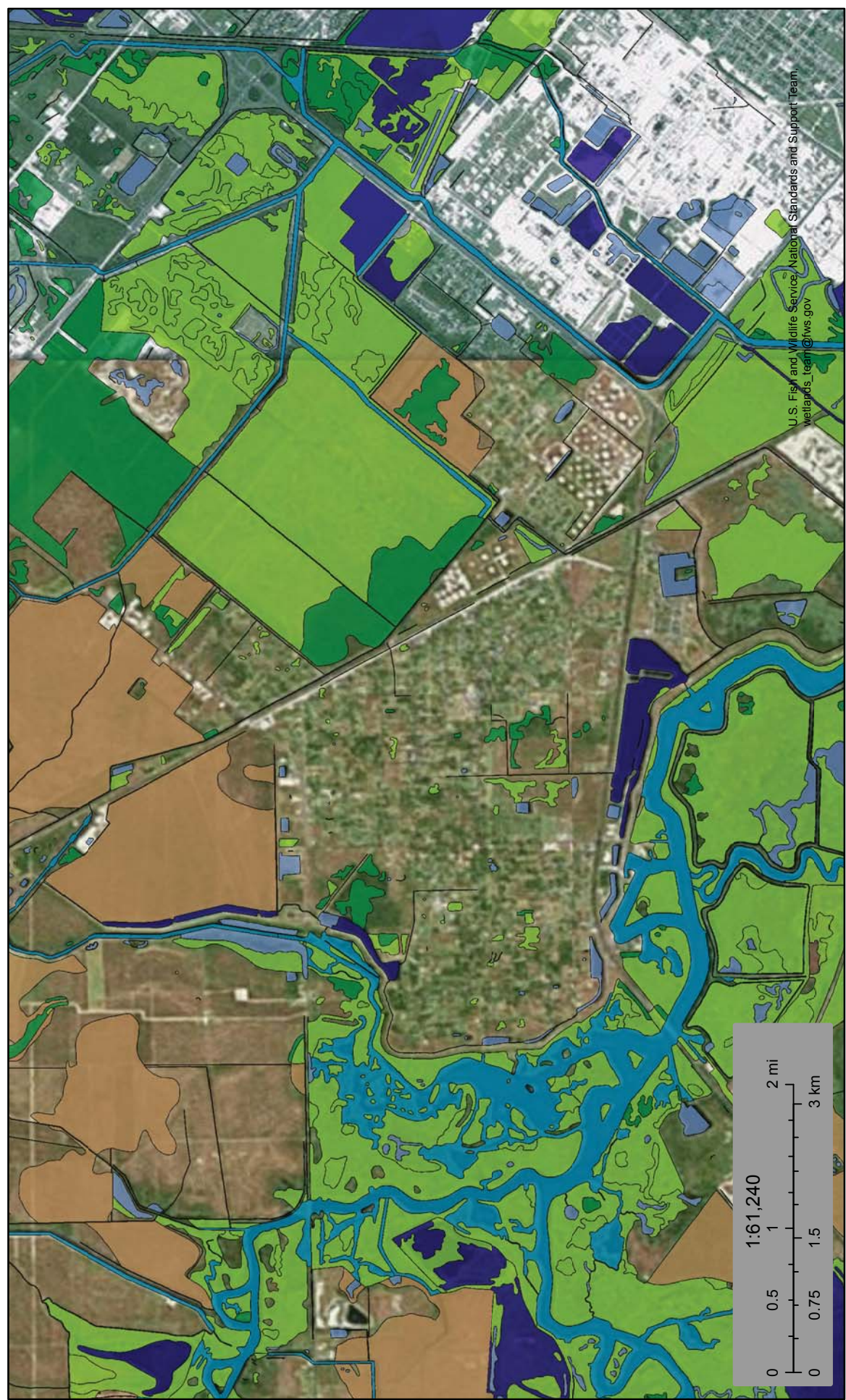
U.S. Fish and Wildlife Service, National Standards and Support Team  
wetlands\_team@fws.gov

December 19, 2017

### Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine









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December 18, 2017

**Wetlands**

	Estuarine and Marine Deepwater		Lake
	Estuarine and Marine Wetland		Other
			Riverine
			Freshwater Emergent Wetland
			Freshwater Forested/Shrub Wetland
			Freshwater Pond