

Office of  
Energy Projects

October 2017

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Texas Eastern Transmission, L.P.  
Brazoria Interconnector Gas Pipeline, LLC

Docket Nos. CP17-56-000  
CP17-57-000

# Stratton Ridge Expansion Project

Environmental Assessment

Washington, DC 20426

FEDERAL ENERGY REGULATORY COMMISSION

WASHINGTON, D.C. 20426

OFFICE OF ENERGY PROJECTS

In Reply Refer To:

OEP/DG2E/Gas Branch 3  
Texas Eastern Transmission, L.P.  
Brazoria Interconnector Gas  
Pipeline, LLC  
Docket Nos. CP17-56-000  
CP17-57-000

TO THE PARTY ADDRESSED:

The staff of the Federal Energy Regulatory Commission (FERC or Commission) has prepared an environmental assessment (EA) for the Stratton Ridge Expansion Project (Project), proposed by Texas Eastern Transmission, L.P. and Brazoria Interconnector Gas Pipeline, LLC (together referred to as Applicants) in the above-referenced dockets. The Applicants request authorization to construct certain facilities designed to transport up to 322 million cubic feet per day of natural gas on a firm basis from Texas Eastern Transmission, L.P.'s existing interconnections to a delivery point on the Brazoria Interconnector Gas Pipeline near Stratton Ridge, Texas.

The EA assesses the potential environmental effects of the construction and operation of the Project in accordance with the requirements of the National Environmental Policy Act (NEPA). The FERC staff concludes that approval of the proposed Project, with appropriate mitigating measures, would not constitute a major federal action significantly affecting the quality of the human environment.

The proposed Project includes the following facilities:

- a 0.5-mile-long new pipeline lateral (BIG Interconnect) connecting the proposed new Angleton Compressor Station to the existing BIG Pipeline in Brazoria County, Texas;
- the new Angleton Compressor Station, a 12,500 horsepower electrically-powered compressor station in Brazoria County, Texas;
- pressure regulation modifications at the existing Joaquin Compressor Station in Shelby County, Texas;

- installation of Clean Burn technologies at the existing Mont Belvieu Compressor Station in Chambers County, Texas;
- modifications to existing pig<sup>1</sup> launchers at the at the existing Huntsville Compressor Station, in San Jacinto County, Texas; and Hempstead Compressor Station in Waller County, Texas;
- modifications to an existing pig launcher/receiver, facility crossover piping and a valve at the existing Provident City Station in Lavaca County, Texas;
- a new aboveground wire-line launcher/receiver assembly site and interconnect valve site near milepost 0.5 of the BIG Interconnect Pipeline in Brazoria County, Texas; and
- replacement of existing 16-inch-diameter crossover piping and valve with new 24-inch-diameter crossover piping and valve at an existing facility in Lavaca County, Texas.

The FERC staff mailed copies of the EA to federal, state, and local government representatives and agencies; elected officials; environmental and public interest groups; Native American tribes; potentially affected landowners and other interested individuals and groups; and newspapers and libraries in the Project area. In addition, the EA is available for public viewing on the FERC's website ([www.ferc.gov](http://www.ferc.gov)) using the eLibrary link. A limited number of copies of the EA are available for distribution and public inspection at:

Federal Energy Regulatory Commission  
Public Reference Room  
888 First Street NE, Room 2A  
Washington, DC 20426  
(202) 502-8371

Any person wishing to comment on the EA may do so. Your comments should focus on the potential environmental effects, reasonable alternatives, and measures to avoid or lessen environmental impacts. The more specific your comments, the more useful they will be. To ensure that the Commission has the opportunity to consider your comments prior to making its decision on this project, it is important that we receive your comments in Washington, DC on or before **November 4, 2017**.

For your convenience, there are three methods you can use to file your comments with the Commission. In all instances please reference the project docket numbers **(CP17-56-000 and CP17-57-000)** with your submission. The Commission encourages electronic filing of comments and has expert staff available to assist you at 202-502-8258 or [FercOnlineSupport@ferc.gov](mailto:FercOnlineSupport@ferc.gov).

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<sup>1</sup> A pig is an internal pipeline device used to clean or inspect the pipeline.

- (1) You can file your comments electronically using the eComment feature located on the Commission’s website ([www.ferc.gov](http://www.ferc.gov)) under the link to Documents and Filings. This is an easy method for submitting brief, text-only comments on a project;
- (2) You can also file your comments electronically using the eFiling feature on the Commission’s website ([www.ferc.gov](http://www.ferc.gov)) under the link to Documents and Filings. With eFiling, you can provide comments in a variety of formats by attaching them as a file with your submission. New eFiling users must first create an account by clicking on “eRegister.” You must select the type of filing you are making. If you are filing a comment on a particular project, please select “Comment on a Filing”; or
- (3) You can file a paper copy of your comments by mailing them to the following address:

Kimberly D. Bose, Secretary  
Federal Energy Regulatory Commission  
888 First Street NE, Room 1A  
Washington, DC 20426

Any person seeking to become a party to the proceeding must file a motion to intervene pursuant to Rule 214 of the Commission’s Rules of Practice and Procedures (18 CFR 385.214).<sup>2</sup> Only intervenors have the right to seek rehearing of the Commission’s decision. The Commission grants affected landowners and others with environmental concerns intervenor status upon showing good cause by stating that they have a clear and direct interest in this proceeding which no other party can adequately represent. **Simply filing environmental comments will not give you intervenor status, but you do not need intervenor status to have your comments considered.**

Additional information about the project is available from the Commission’s Office of External Affairs, at **(866) 208-FERC**, or on the FERC website ([www.ferc.gov](http://www.ferc.gov)) using the eLibrary link. Click on the eLibrary link, click on “General Search,” and enter the docket number excluding the last three digits in the Docket Number field (i.e., CP17-56 or CP17-57). Be sure you have selected an appropriate date range. For assistance, please contact FERC Online Support at [FercOnlineSupport@ferc.gov](mailto:FercOnlineSupport@ferc.gov) or toll free at (866) 208-3676, or for TTY, contact (202) 502-8659. The eLibrary link also provides access to the texts of formal documents issued by the Commission, such as orders, notices, and rulemakings.

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<sup>2</sup> See the previous discussion on the methods for filing comments.

In addition, the Commission offers a free service called eSubscription which allows you to keep track of all formal issuances and submittals in specific dockets. This can reduce the amount of time you spend researching proceedings by automatically providing you with notification of these filings, document summaries, and direct links to the documents. Go to [www.ferc.gov/docs-filing/esubscription.asp](http://www.ferc.gov/docs-filing/esubscription.asp).

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## TECHNICAL ABBREVIATIONS AND ACRONYMS

AMSL	above mean sea level
BCC	Birds of Conservation Concern
BCR	bird conservation regions
BIA	United States Department of Interior, Bureau of Indian Affairs
BIG	Brazoria Interconnector Pipeline, LLC
CAA	Clean Air Act of 1970
Certificate	Certificate of Public Convenience and Necessity
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO	carbon monoxide
CO <sub>2</sub>	carbon dioxide
CO <sub>2</sub> e	carbon dioxide equivalents
Commission	Federal Energy Regulatory Commission
dB	decibel
dBA	A-weighted decibel
EA	environmental assessment
Edge	Edge Engineering & Science
EIs	environmental inspectors
EPA	United States Environmental Protection Agency
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
GHG	greenhouse gas
GWP	global warming potential
HAP	hazardous air pollutants
hp	horsepower
kW	kilowatt
L <sub>dn</sub>	day-night sound level
L <sub>eq</sub>	equivalent sound level
MP	mile post
Memorandum	Memorandum of Understanding on Natural Gas Transportation Facilities
MBTA	Migratory Bird Treaty Act
MOU	Memorandum of Understanding
N <sub>2</sub> O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act of 1969
NESHAPs	National Emissions Standards for Hazardous Air Pollutants
NGA	Natural Gas Act



NNSR	Nonattainment New Source Review
NO <sub>2</sub>	nitrogen dioxide
NOI	<i>Notice of Intent to Prepare an Environmental Assessment for the Proposed Stratton Ridge Expansion Project, and Request for Comments on Environmental Issues</i>
NO <sub>x</sub>	Oxides of Nitrogen
NPDES	National Pollutant Discharge Elimination System
NPS	U.S. Department of the Interior, National Park Service
NRHP	National Register of Historic Places
NSA	Noise Sensitive Area
NSR	New Source Review
NWR	National Wildlife Refuges
O <sub>2</sub>	Oxygen
OEP	Office of Energy Projects
PHMSA	Pipeline and Hazardous Materials Safety Administration
Plan	Upland Erosion Control, Revegetation, and Maintenance Plan
PM	particulate matter
PM <sub>2.5</sub>	particulate matter with an aerodynamic diameter less than or equal to 2.5 microns
PM <sub>10</sub>	particulate matter with an aerodynamic diameter less than or equal to 10 microns
ppm	parts per million
PEM	Palustrine Emergent marshes
Procedures	Wetland and Waterbody Construction and Mitigation Procedures
PTE	potential-to-emit
PSD	Prevention of Significant Deterioration
Secretary	Secretary of the Commission
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SO <sub>2</sub>	sulfur dioxide
SPCC Plan	Spill Prevention Containment and Countermeasure Plan
Texas Eastern	Texas Eastern Transmission, L.P.
T&E	Threatened and Endangered species
TCEQ	Texas Commissions on Environmental Quality
TPWD	Texas Parks and Wildlife Department
tpy	tons per year
TWS	Temporary Work Space
USACE	United States Army Corps of Engineers
USDOT	United States Department of Transportation
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VOC	volatile organic compounds

## **SECTION A – PROPOSED ACTION**

### **A.1 INTRODUCTION**

The staff of the Federal Energy Regulatory Commission (Commission or FERC) has prepared this environmental assessment (EA) to assess the environmental effects of constructing and operating the natural gas facilities proposed by Texas Eastern Transmission, L.P. (Texas Eastern) and Brazoria Interconnector Gas Pipeline, LLC (BIG). We<sup>3</sup> prepared this EA in compliance with the requirements of the National Environmental Policy Act of 1969 (NEPA), Title 40 of the Code of Federal Regulations, Parts 1500-1508 [40 CFR 1500-1508]), and with the Commission’s implementing regulations under 18 CFR 380.

On February 3, 2017, Texas Eastern and BIG filed a joint application with the Commission in Docket Nos. CP17-56-000, and CP17-57-000 for the Stratton Ridge Expansion Project (Project) under section 7(c) of the Natural Gas Act (NGA) and part 157 of the Commission's regulations. Texas Eastern and BIG (together referred to as Applicants) seek to construct and operate interstate natural gas transmission facilities in Texas.

The EA is an important and integral part of the Commission's decision on whether to issue the Applicants a Certificate of Public Convenience and Necessity (Certificate) to construct and operate the proposed facilities. Our principal purposes in preparing this EA are to:

- identify and assess potential impacts on the natural and human environment that could result from implementation of the proposed action;
- identify and recommend reasonable alternatives and specific mitigation measures, as necessary, to avoid or minimize project-related environmental impact; and
- facilitate public involvement in the environmental review process.

### **A.2 PURPOSE AND NEED**

The Applicants state that purpose of the Project is designed to provide the capacity necessary for Texas Eastern to transport up to 322 million cubic feet per day of natural gas on a firm basis from certain of Texas Eastern’s existing interconnections to a delivery point on the BIG pipeline near Stratton Ridge, Texas.

Under Section 7 of the NGA, the Commission determines whether interstate natural gas transportation facilities are in the public convenience and necessity and, if so, grants a Certificate to construct and operate them. The Commission bases its decisions

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<sup>3</sup> “We,” “us,” and “our” refers to environmental staff of the Office of Energy Projects.

on technical competence, financing, rates, market demand, gas supply, environmental impact, long-term feasibility, and other issues concerning a proposed project.<sup>4</sup>

### **A.3 PROPOSED FACILITIES**

The Project would involve the installation of new facilities and modification of existing facilities as described below. All activities would occur within the state of Texas.

The Project includes construction of the proposed Angleton Compressor Station at an existing site owned by Texas Eastern in Brazoria County, just north of Angleton with the following components:

- one 12,500 horsepower (hp), electrically-driven centrifugal compressor;
- gas cooler;
- three liquid storage tanks;
- six separator vessels;
- one 585 hp, natural gas-fired emergency generator engine;
- one parts washer;
- associated piping equipment leak fugitives;
- truck loading of liquids; and
- gas blowdown stack.

Other structures at the compressor station would include, filter separators, a meter station, an electrical substation, and other buildings and appurtenances. The compressor station buildings and outdoor structures would be surrounded by a chain link security fence.

The Applicants would construct a 0.5-mile-long new pipeline lateral (BIG Interconnect) connecting the proposed new Angleton Compressor Station to the existing BIG Pipeline system. Additional pipeline facilities include a new aboveground wire-line launcher/receiver assembly site and interconnect valve site near milepost 0.5 of the BIG Interconnect; a new 25-foot-wide, 520-foot-long permanent access road to access BIG Interconnect and associated valve site; and replacement of existing 16-inch-diameter crossover piping and valve with new 24-inch-diameter crossover piping and valve at an existing facility approximately 0.2 mile southwest of the Provident City station site in Lavaca County.

The modifications proposed at the existing Joaquin Compressor Station in Shelby County, Texas; include pressure regulation. Construction associated with the Project would occur within the fence line of the existing previously certificated station.

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<sup>4</sup> Commission Policy Statement PL99-3

The modifications proposed at the existing Mont Belvieu Compressor Station in Chambers County include installing Clean Burn technologies<sup>5</sup> and an oxidation catalyst system to reduce operating emissions from one reciprocating engine.

The modifications proposed at the existing Huntsville Compressor Station, in San Jacinto County; and Hempstead Compressor Station in Waller County, include modification to existing pig launcher/receivers.

The modifications proposed at the existing Provident City Station in Lavaca County include modifications to an existing pig launcher/receiver and facility crossover piping and valve.

The general locations of the Project facilities are shown in figure 1, aerial images of the BIG Interconnect and the Angleton Compressor Station, as well as United States Geological Service Quad Maps for all facilities can be found in in appendixes 1-3.

#### **A.4 NONJURISDICTIONAL FACILITIES**

Under Section 7 of the Natural Gas Act, the Commission is required to consider, as part of its decision to approve facilities under Commission jurisdiction, all factors bearing on the public convenience and necessity. Occasionally, proposed projects have associated facilities that do not come under the jurisdiction of the Commission. These “non-jurisdictional” facilities may be integral to the need for the proposed facilities, such as a power plant at the end of a jurisdictional pipeline, or they may be minor, non-integral components of the facilities under the Commission’s jurisdiction.

A new power line would be required to service the Angleton Compressor Station. The new 138kV power line would be approximately 0.21 mile long and would require installation of new power poles. The power line would connect with the proposed substation that would be built on the southeast side of the proposed Angleton Compressor Station by CenterPoint Energy Houston Electric (CEHE). We requested additional information on the new power line. The Applicants have stated that U.S. Army Corps of Engineers Section 404 permitting may be necessary. If any impacts to jurisdictional wetlands are required, CEHE would construct the transmission line connection under Nationwide Permit 12, in compliance with the permit conditions. In addition, CEHE has completed an Avian Protection Plan incorporating Avian Power Line Interaction Committee (APLIC) guidelines.

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<sup>5</sup> Clean Burn technology at the Mont Belvieu Compressor Station would reduce the brake specific fuel consumption rate of natural gas which would also result in a decrease in certain emissions.

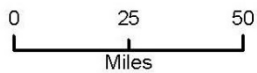


Scale: 1" = 36 miles

*This information is for environmental review purposes only.*

**Legend**

-  Project Facility Sites
-  Existing Texas Eastern Pipeline



**Stratton Ridge Expansion Project  
Project Vicinity Map**  
Texas Eastern Transmission, LP  
Brazoria, Shelby, Chambers, San Jacinto,  
Waller, and Lavaca Counties, Texas

**Figure 1**

## **Nonjurisdictional Related Facilities**

The related facilities associated with the Project include various modifications to the BIG pipeline system.

The BIG pipeline is a 42-inch-diameter intrastate natural gas pipeline that extends about 30.5 miles between Stratton Ridge and to Iowa Colony in Brazoria County, Texas. BIG is planning modifications to its pipeline system in connection with the lease of capacity as part of the Stratton Ridge Expansion Project.

BIG would construct the new Ineos Meter Station in Stratton Ridge, Brazoria County, Texas on a greenfield site about 8 miles from the nearest Project areas. The Ineos Meter Station would include the installation of metering facilities, a filter-separator, two 42-inch barred tees, and a 42-inch mainline valve near the terminus of the BIG pipeline. The Meter station site would permanently impact about 1.5 acres of open land, <0.1 acres palustrine emergent wetland impacts. The site is relatively flat with little cover so the meter station would also have impacts on the visual environment.

BIG would modify the Launcher/Receiver at Freeport LNG's existing meter station, in Stratton Ridge, Brazoria County. The modifications include changes to a pig launcher/receiver within an existing facility at the terminus of the BIG pipeline. The modifications would entail about 9.1 acres of commercial land impacts.

BIG would modify the launcher/receiver at the existing Juliff Station in Iowa Colony, Texas. The modifications would include changes to a pig launcher/receiver within an existing facility at the origin of the BIG pipeline. The modification would result in about 0.91 acre of commercial/industrial land impacts.

The meter station facilities would have noise impacts during operation and may cause elevated noise impacts at local residences and the community. We do not expect operational noise impacts to change based on the launcher/receiver changes. During construction, fugitive dust and other pollutants would be emitted from construction equipment as well as potential waterbody impacts from sediment runoff. We have estimated the construction emissions in Section B.7 table 8. The new metering facilities would have operational air emissions of a scale similar to the filter separator facilities at the Angleton Compressor Station identified in section B.7. The launcher/receivers would have fugitive methane emissions similar to the pig/launcher receivers identified at the Huntsville, Hempstead, and Provident City Compressor Stations in Section B.7.

To ensure that we take these facilities into account for the General Conformity Applicability Determination, we have estimated certain construction emissions for these facilities which are also identified in Section B.7, table 6.

There would be additional visual impacts at the new meter station site at the terminus of the BIG pipeline, but visual impacts would be negligible at the existing facilities.

## **A.5 PUBLIC REVIEW AND COMMENT**

On March 24, 2017, the Commission issued a *Notice of Intent to Prepare an Environmental Assessment for the Stratton Ridge Expansion Project and Request for Comments on Environmental Issues* (NOI). The NOI was mailed to federal, state, and local government representatives and agencies; elected officials; Native American tribes; newspapers and libraries in the project area; and parties to this proceeding.

In response to the NOI, the Commission received comments from the Texas Parks and Wildlife Department (TPWD), United States Environmental Protection Agency (EPA), and one local resident, Mr. Charles Lloyd Green. Mr. Green requested clarification on the scope of work that would be done at the Joaquin Compressor Station in Shelby County. Specifically, he questioned whether all work would be on the property of the station, whether earth would be disturbed along the existing easements in and out of the station, and expressed concerns regarding hazardous material on site and contamination avoidance. These comments are generally addressed in section A.6 regarding general construction measures to avoid offsite sediment impacts, section B.2 Soils, and section B.8 Land Use.

We also received several recommendations from the TPWD. TPWD's recommendations include general impacts avoidance measures for wildlife and are discussed in Section B.3 Vegetation and Wildlife, and Section B.4 Waterbodies. The comment letter from the EPA contains several general recommendations for the analysis in the EA, including alternatives; surface waters; groundwater; biological resources; air quality; hazardous wastes; cumulative and direct impacts; environmental justice; tribal coordination; and compliance with the National Historic Preservation Act. These comments are addressed in the appropriate sections of this EA.

## **A.6 CONSTRUCTION, OPERATION, AND COMPLIANCE**

The Applicants are required to construct, operate, and maintain the proposed Project in compliance with all applicable federal and state permit requirements, regulations, and environmental guidelines. Specifically, the Applicants are required to construct the Project in compliance with 49 CFR 192 – Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards which is administered by the United States Department of Transportation (USDOT) and was developed to ensure adequate protection for the public and prevent natural gas facility accidents and failures.



The Applicants have committed to construct the Project consistent with Texas Eastern's Erosion and Sediment Control Plan (E&SCP). The E&SCP contains all elements of FERC's *Upland Erosion Control, Revegetation, and Maintenance Plan* (Plan) and *Wetland and Waterbody Construction and Mitigation Procedures* (Procedures).<sup>6</sup> The applicants requested one alternative measure from the Procedures to site workspace at the existing Hempstead Compressor Station within a wetland area. We assessed the workspace limitations at the site and conclude the impact is unavoidable. The Applicants would minimize impacts on wetlands within construction workspace by implementing the measures in its E&SCP; using low ground-weight equipment; or using timber or terra matting to support construction equipment to minimize rutting and soil compaction. We conclude the workspace location is acceptable. Additionally, the Applicants would implement a *Dust Control Plan* and *Spill Prevention, Control, and Countermeasure Plan* (SPCC) and adhere to all applicable federal regulations. We have reviewed these plans and find them acceptable.

The Applicants would use at least one full-time environmental inspector (EI) for each construction spread. The EI, or EIs would be trained in, and responsible to ensure that construction of the Project complies with the construction procedures and mitigation measures identified by the Applicants' plans; the FERC Certificate; other federal environmental permits and approvals; and environmental requirements in landowner easement agreements. The EIs would have peer status with all other activity inspectors, and have the authority to stop activities that violate the environmental conditions of the FERC Certificate, other permits, or landowner requirements, and to order the appropriate corrective action. The EIs would also be responsible for maintaining status reports and training records. In addition, the EIs would be responsible for advising the chief construction inspector when conditions (such as wet weather) make it advisable to restrict construction activities. The Applicants would conduct training sessions in advance of construction to ensure that all personnel working on the Project are familiar with the environmental mitigation measures appropriate to their jobs. In addition, the FERC would conduct its own independent compliance inspections during construction and restoration to verify compliance with the FERC's orders.

The Applicants have no definitive future plans for expansion or abandonment of the Project facilities. Future expansion or abandonment activities would require new, separate applications to the FERC.

The Applicants have requested an approval to allow construction to commence in April of 2018. Construction of the BIG pipeline would require approximately 4 months

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<sup>6</sup> The Plan and Procedures include best management practices for pipeline facility construction to minimize resource impacts. Copies of the Plan and Procedures may be accessed on our website (<http://www.ferc.gov/industries/gas/enviro/guidelines.asp>).



and construction of the proposed Angleton Compressor Station would require approximately 8 months. The Applicants intend to put the Project into service by February 1, 2019.

## **General Construction Procedures**

The Applicants have stated that construction is expected to occur during the day and not during nighttime hours, with crews typically working eleven hours per day, six days per week. However, as explained further in Section B.6 Land Use, the Applicants have not committed to constructing only during daytime hours.

Initial clearing operations would include the removal of vegetation, as needed, within the construction right-of-way and additional temporary workspace (ATWS). The limits of clearing would be identified and flagged prior to any clearing operations. The BIG Interconnect pipeline construction right-of-way would be a nominal 100-foot-wide, and the permanent right-of-way would be 50-foot-wide.

After clearing and before grading activities, erosion controls would be installed at the required locations, as outlined in the E&SCP and maintained until final stabilization has occurred. Temporary erosion and sedimentation controls typically consist of mulch, silt fence, hay bales or combinations of these measures.

A trench would be excavated to the proper depth to allow for the burial of the pipe. In general, a backhoe or ditching machine would be used to excavate the trench to provide a minimum of 3 feet of cover over the pipeline, or as required under USDOT regulations. Should it become necessary to remove water from the trench, it would be pumped to an off-right-of-way, stable, vegetated upland area (where practical) and/or filtered through a filter bag or siltation barrier in accordance with the E&SCP.

Once the trench is excavated, the next process in constructing a pipeline is stringing the pipe along the trench. The pipe would be off-loaded from trucks and placed next to the trench using a sideboom tractor. The pipe joints are lined up end-to-end to allow for welding into continuous lengths known as strings. As necessary, a hydraulic pipe-bending machine would be used to bend the pipe to fit the contours of the trench.

The individual joints of pipe are welded together and each completed weld is inspected to ensure its structural integrity is consistent with the USDOT's regulations. Those welds that fail inspection are marked for repair or replacement. All repaired and replaced welds are re-inspected to ensure proper repair and integrity.

In addition, external protective coating is applied to the pipe to prevent corrosion. After welding, the pipe joints would be coated with similar or compatible materials. The

entire pipe coating would be inspected for defects, and any damage would be repaired prior to lowering the pipe into the trench.

During backfilling of the pipeline and compressor station piping, the Applicants would minimize erosion potential by restoring the natural contour of the ground and surface drainage patterns as close to pre-construction conditions as practicable. Remaining topsoil is spread across the graded construction right-of-way. The soil surface would be inspected for compaction, and scarified as necessary.

Once clean, the pipeline would be pressure tested with water to ensure its integrity for the intended service and operating pressures. Information regarding sourcing and disposal of hydrostatic test water is provided in section B.3.

Following backfilling, construction workspaces would be restored and revegetated. Permanent slope breakers would be constructed and maintained in accordance with the E&SCP. Fences would be restored or repaired as necessary. Revegetation would be completed in accordance with permit requirements and written recommendations on seeding mixes, rates, and dates obtained from the local soil conservation authority or land management agency in accordance with the E&SCP. The Applicants have indicated that the right-of-way would be seeded within six working days following final grading, weather and soil conditions permitting, unless otherwise recommended by the local soil conservation authorities. Alternative seed mixes specifically requested by the landowner may be used. Any soil disturbance that occurs outside the permanent seeding season or any bare soil left unstabilized by vegetation would be mulched in accordance with the E&SCP.

The Applicants would cross two waterbodies and one public roadway (County Road 48) by using the conventional bore method. Conventional boring consists of creating a tunnel-like shaft for a pipeline to be installed below roads, waterbodies, wetlands, or other sensitive resources without affecting the surface of the resource. Bore pits would be excavated on both sides of the resource to the depth of the adjacent trench and graded to match the proposed slope of the pipeline. A boring machine would then be used within the bore pit to tunnel under the feature of concern by using a cutting head mounted on an auger. The auger would rotate and be advanced forward as the hole is bored. The pipeline would then be pushed through the bore hole and welded to the adjacent section of pipeline.

The Applicants would clear and grade the Angleton Compressor Station site and other aboveground facilities. Erosion control devices would be installed as needed to prevent erosion and offsite impacts in accordance with the E&SCP. Access to the new aboveground facilities would be provided by new access roads. After construction, all temporary workspaces would be revegetated in accordance with the E&SCP. Areas within fence lines may either be converted to grassy areas, or graveled.

## **Operation and Maintenance**

The Applicants have stated that they would operate and maintain the newly constructed pipeline facilities in the same manner as it currently operates and maintains its existing system, including compliance with the USDOT regulations. The pipeline would be patrolled on a routine basis and personnel well-qualified to perform both emergency and routine maintenance on interstate pipeline facilities would handle emergencies and maintenance.

The applicants would maintain vegetation on the permanent easement in upland areas by mowing, cutting, and trimming in accordance with the E&SCP. Areas within aboveground facilities, or aboveground area workspaces would be entirely cleared and areas within aboveground facilities would be permanently graveled or maintained in a low cropped vegetative state. Pipeline inspection would be accomplished by ground and aerial surveys. The local operations supervisor would be notified of any conditions that need attention. Prompt corrective measures would be performed as needed in accordance with the E&SCP.

The Applicants would operate and maintain the newly constructed Angleton Compressor Station facilities as well as the Joaquin, Mont Belvieu, Huntsville, Hempstead, and Provident City facility modifications in accordance with USDOT, and other federal requirements.

### **A.7 LAND REQUIREMENTS**

Constructing the Project would temporarily affect 143.3 acres; of this, 48.2 acres would be permanently affected by operation. Land not permanently affected would be allowed to revert to previous use. Section B.6 discusses the land requirements for each of the proposed facilities including access roads and ATWS. Although the Applicants have identified areas where extra workspace would be required, additional or alternative areas could be identified in the future due to changes in site-specific construction requirements. The Applicants would be required to file information on each of those areas for our review and approval prior to use.

### **A.8 PERMITS, APPROVALS, AND REGULATORY CONSULTATIONS**

The Applicants would obtain all necessary permits, licenses, clearances, and approvals related to construction and operation of the Project. Table 1 below summarizes the major federal, and state permits for the Project.

<b>Table 1 Permits and Approvals Required for Construction of the Project</b>		
<b>Administering Agency</b>	<b>Permit/Approval</b>	<b>Status</b>
<b>Federal</b>		
U.S. Army Corps of Engineers - Galveston District (USACE)	Clean Water Act, Section 404 Permit (Nationwide Permit 12)	The Project would be constructed in accordance with the conditions of Nationwide Permit 12 (Utility Line Activities). Because the Project would not result in permanent loss of wetlands and would not impact forested wetlands, pre-construction notification to the USACE is not required.
U.S. Fish and Wildlife Service, Texas Coastal Ecological Service Field Office	Endangered Species Act, Section 7 consultation (federally listed species). Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act Consultation	Consultation initiated July 18, 2016; receipt acknowledged July 21, 2016. Official species list obtained August 12, 2016.
<b>State</b>		
Railroad Commission of Texas	Hydrostatic Test Water Discharge Approval	Permit applications to be filed prior to hydrostatic testing (2nd Quarter, 2018)
Texas Commission on Environmental Quality	Hempstead and Provident City station sites, air permit authorization via Permit by Rule, 30 TAC 106, No Agency approval required – only maintain proper documentation.	Permit by rule documentation completed April 28, 2017; The permits are complete.
	Huntsville minor permit and Joaquin Compressor Station Title V Permit air permit authorization	State permit application submittal by October 31, 2017. Anticipated agency permit issuance by December 31, 2017.
	Mont Belvieu Compressor Station Title V air permit authorization	Permit issued April 27, 2017.
	Angleton greenfield electric compressor station, air permit authorization via Permit by Rule, 30 TAC 106, submit for Agency registration	Air permit application submitted on January 19, 2017. Permit issued on February 6, 2017
Texas Parks and Wildlife Department	Threatened and Endangered Species Clearance	Consultation initiated July 22, 2016. Response received September 2, 2016.
Texas State Historic Preservation Office	Section 106 of the National Historic Preservation Act Consultation	Consultation initiated July 18, 2016. Concurrence received July 29, 2016.
Texas General Land Office	Consistency with the Texas Coastal Management Program under the Coastal Zone Management Act	Notification not required. The Texas General Land Office has determined that the Nationwide Permit Program is consistent with the Texas Coastal Management Program.

## **SECTION B – ENVIRONMENTAL ANALYSIS**

Construction and operation of the Project would have temporary, short-term, long-term, and permanent impacts. A temporary effect generally occurs during construction with the resource returning to pre-construction condition immediately after restoration or within a few months. A short-term effect could continue between 2 and 5 years following construction. Long-term effects would last more than 5 years, but the affected resource would eventually recover to pre-construction conditions. A permanent effect would result from an activity that modifies a resource to the extent that it would not return to pre-construction conditions. In the following sections, we address direct and indirect effects collectively, by resource. We use the term “Project area” to characterize the geographic scope of impacts caused by construction and operation of the proposed facilities. Direct and indirect impacts that may occur in combination with other projects in the area are discussed in the cumulative impact section of the EA, section B.10.

### **B.1 GEOLOGY**

#### **Geologic Setting**

The Project is located in the Coastal Prairie region of the Gulf Coastal Plains physiographic province of Texas. The Coastal Prairie sub-province begins at the edge of the Gulf of Mexico and extends to the northwest for approximately 50 to 75 miles. The sediments are composed of young (Pleistocene and Holocene) unconsolidated deltaic sands, silts, and clays incised by streams that discharge into the Gulf of Mexico. The topography of the region is nearly flat with subsurface sediments that dip gently toward the Gulf of Mexico and are dissected by highly sinuous streams.

The elevation at the proposed 0.5-mile-long new pipeline lateral, including the BIG Interconnect valve site, and wire-line launcher/receiver assembly site at milepost 0.5, ranges from 30 to 35 feet above mean sea level (amsl).

The topography at each aboveground site consists of relatively flat terrain with minimal relief, as shown by the following elevation ranges.

- proposed Angleton Compressor Station: 30 to 35 feet amsl;
- Joaquin Compressor Station: 245 to 260 feet amsl;
- Mont Belvieu Compressor Station: 29 to 32 feet amsl; and
- Huntsville Compressor Station: 350 to 355 feet amsl;
- Hempstead Station: 175 to 180 feet amsl; and
- Provident City Station: 170 to 175 feet amsl.

## **Mineral Resources**

A variety of exploitable mineral resources occur in the vicinity of the Project facilities. These resources include aluminum, salt, industrial sand, gravel, oil, and gas. Based on a review of the 2011 United States Geological Survey (USGS) Mineral Resources Data System and information obtained from the Railroad Commission of Texas (RRC), no mineral resources are located within 0.25 mile of the proposed Project. Due to the lack of these resources within proximity to the Project facilities, no associated impacts to mineral resources are anticipated. There are no active mineral resources within 4 miles of any Project facilities.

According to records maintained by the RRC, there are 21 oil and gas wells within 0.25 mile of the Project areas, including 6 active gas wells, 3 sidetracked locations, 2 permitted locations, 1 shut-in gas well, 5 plugged wells, and 4 dry holes, which should also be plugged. One of the dry holes (Well API Number 03900) is located within the boundaries of the proposed Angleton Compressor Station. No evidence of the dry hole was identified during civil surveys conducted within the proposed construction or operational footprints of the Angleton Compressor Station site. The next closest oil and gas well lies about 290 feet from construction areas.

## **Geologic Hazards**

Seismic hazards include earthquakes, surface faulting, and soil liquefaction. The proposed Project is located in a region of the U.S. where seismic activity is low. No significant earthquakes have been recorded within the Project area since record keeping began. Therefore, earthquakes and seismic hazards are unlikely to interfere with the Project.

Soil liquefaction is a condition whereby soil loses strength and stiffness, causing it to flow like liquid. This condition typically occurs when loose, saturated soil is subjected to intense vibration or shockwaves, most commonly from a nearby major earthquake. The low probability of a major earthquake within the Project area makes the occurrence of soil liquefaction unlikely. Seismic risk is not anticipated to be a hazard associated with construction or operation of the proposed Project facilities. Similarly, soil liquefaction is likewise unlikely.

The Project is not located within any documented sites containing karst terrain or soil subsidence.

## **Flash Flooding**

See Section B.3 Water Resources.

## **Blasting**

The Project area consists of a thick sequence of unconsolidated deposits and based on analysis of county soils data, blasting is not anticipated to be necessary for construction of the Project facilities.

## **Paleontological Resources**

Late Pleistocene fossils have been discovered in South Texas, mainly in river channels and floodplain deposits of the Beaumont Formation, as well as in the terrace deposits cut into the Beaumont Formation (Baskin 2016). In addition, the Lissie Formation may contain early Pleistocene vertebrate fauna (Hosman 1996). Based on a desktop study of available reports, no significant paleontological resources have been identified within the Project areas (Paleo Central 2016). As such, paleontological resources are not expected to be affected by construction or operation of the proposed BIG Interconnect or Angleton Compressor Station. All other Project disturbance would be confined to existing facility footprints.

Ground excavation would be generally limited to trenching and facility installation during construction; no additional ground impacts would occur operation of the Project. Therefore no operational impacts on geologic resources would be expected. With strict adherence to the mitigation measures identified, impacts on geologic resources and from geologic hazards are not anticipated to be significant.

## **B.2 SOILS**

Soil series are soils that are grouped together due to their similar soil chemistry and physical properties. Each soil series is delineated as a single map unit and represents the dominant soil patterns or characteristics. A description of the soil series crossed by the Project was compiled from information presented in the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Soil Survey Geographic (SSURGO) database. Descriptions regarding the general characteristics of each soil series within the Project area are also presented below. Soils with depth to bedrock shallower than six feet are not present in the Project areas.

### **Pipeline Facilities**

The BIG Interconnect and its associated permanent access road, construction workspaces and ATWS would cross Lake Charles clay, 0 to 1 percent slopes (milepost ["MP"] 0.0 to 0.2 and MP 0.3 to 0.5) and Bernard Edna complex, 0 to 1 percent slopes (MP 0.2 to 0.3). One additional soil unit is within the workspace for the BIG Interconnect (Edna loam, 0 to 1 percent slopes). The associated valve site and wire-line

launcher/receiver assembly site would be located wholly within the permanent right-of-way for the BIG Interconnect pipeline. The Bernard Edna complex and Lake Charles Clay, is classified as prime farmland while the Edna Loam is classified as farmland of statewide importance.

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### **Aboveground Facilities**

Three soil units are mapped within the boundaries of the proposed Angleton Compressor Station site which includes the proposed meter station site. These include Bernard Edna complex, 0 to 1 percent slopes, Lake Charles clay, 0 to 1 percent slopes, and Edna loam, 0 to 1 percent slopes. The Bernard Edna complex and Lake Charles Clay are classified as prime farmland while the Edna Loam is classified as farmland of statewide importance.

Two soil units are mapped within the boundary of the existing Joaquin Compressor Station. These include Austonio fine sandy loam, 5 to 12 percent slopes and Latex fine sandy loam with 1 to 3 percent slopes. The Latex fine sandy loam is classified as prime farmland.

One soil unit, League clay, 0 to 1 percent slopes, is mapped within the boundary of the existing Mont Belvieu Compressor Station. A description of this soil unit is provided below. This soil unit is classified as prime farmland (NRCS 2016, 1976).

One soil unit, Edna Loam, 0 to 1 percent slopes, is mapped within the boundary of the existing Hempstead Station.

Two soil units are mapped within the boundary of the existing Huntsville Compressor Station. These include Doucette loamy fine sand, 1 to 5 percent slopes and Woodville fine sandy loam, 5 to 12 percent slopes. The Doucette loamy fine sand soil unit is classified as farmland of statewide importance.

One soil unit, Morales-Cieno complex, 0 to 1 percent slopes, is mapped within the boundary of the existing Provident City Station. The Provident City crossover site and access roads are within the same soil map unit as the Provident City Station.

### **Prime Farmland**

The USDA defines prime farmland as land that is best suited to food, feed, fiber, and oilseed crops. This designation includes cultivated land, pasture, woodland, or other lands that are either used for food or fiber crops or are available for these uses. Urbanized land and open water are excluded from prime farmland. Prime farmland typically contains few to no rocks, is permeable to water and air, is not excessively erodible or saturated with water for long periods, and is not subject to frequent, prolonged



flooding during the growing season. Soils that do not meet the above criteria may be considered prime farmland if the limiting factor is mitigated.

Approximately 7.1 acres of soil designated as prime farmland or farmland of statewide importance would be crossed by the proposed pipeline facilities. The majority of the affected site of the proposed Angleton Compressor Station, about 71.4 acres, would be prime farmland. These proposed Project facilities would not affect agricultural land, which includes actively rotated or cultivated cropland

To minimize impacts on soils, the Applicants would comply with the measures in the E&SCP. The implementation of the measures in the E&SCP would ensure successful vegetation reestablishment along the pipeline right-of-way. Therefore, no significant soil erosion is expected during or after Project construction.

To the extent practicable, the Applicants would avoid construction during periods of heavy rainfall or unusual soil saturation. Timber, equipment, or terra mats or low ground-pressure equipment would be used to minimize rutting and compaction in saturated wetland soils. Grading to restore natural site contours and repair rutted areas would be completed prior to final revegetation seeding and mulching. Given these measures, soil structure and compaction would not be adversely affected by Project activities.

The construction and operation of the Project would result in the removal of prime farmland soils from future use as cropland and permanent conversion of the land use to industrial. None of this would affect soils currently utilized as cropland. The large amount of prime farmland soils within Brazoria county and south Texas make the loss of these acres insignificant.

### **Inadvertent Spills or Discovery of Contaminants**

Soil contamination in the Project area may result from at least two sources: hazardous material or fuel spills during construction; and/or those occurring prior to construction in pre-existing contaminated areas that are encountered during construction. Contamination from spills or leaks of fuels, lubricants, and coolant from construction equipment could adversely affect soils. The spill prevention and response procedures in the Applicants' SPCC Plan would minimize and mitigate any impacts caused by spills or releases.

Based on a review of various federal and state databases, no potentially contaminated sites or landfills were identified within 0.25 mile of the proposed Project facilities. If contaminated or suspect soils (e.g., hydrocarbon contamination) are encountered during construction of the Project, the Applicants would stop work activities

in the immediate vicinity of the site, notify the appropriate federal and state agencies, and proceed in accordance with local, state, and federal regulations.

Should any hazardous materials be encountered during construction, the Applicants would identify, dispose of and/or mitigate for the hazardous materials in accordance with all applicable regulations.

We conclude that the Applicants implementation of E&SCP during construction and restoration would adequately minimize impacts on soils for the proposed Project.

### **B.3 WATER RESOURCES AND WETLANDS**

#### **Groundwater**

The Gulf Coast aquifer is the principal aquifer system underlying the Project facilities. The existing Mont Belvieu Compressor Station located in Chambers County, the existing Huntsville Compressor Station in San Jacinto, the existing Hempstead Station in Waller County, the existing Provident City Station and crossover in Lavaca County and the proposed Angleton Compressor Station all rely on the Gulf Coast aquifer for drinking water and other purposes to residents.

According to the Texas Water Development Board (TWDB), in 2010 the Gulf Coast aquifer had approximately 1.8 million acre-foot per year of groundwater available. The Gulf Coast aquifer is composed of sand, silt, clay, and gravel beds with a maximum total sand thickness that ranges from 700 feet to 1,300 feet. The aquifer is generally used for municipal, industrial, and irrigation purposes.

The existing Joaquin Compressor Station, located in Shelby County, is underlain by the Carrizo-Wilcox aquifer. In 2010, the Carrizo-Wilcox aquifer had approximately 1 million acre-feet per year of groundwater available. The Carrizo-Wilcox aquifer is composed of mostly sand with gravel, silt, clay, and interbedded lignite. The freshwater saturated thickness of the sands averages approximately 670 feet. Most of the groundwater within the aquifer is used for irrigation and municipal water supply. The primary drinking water source in the area of the Project is groundwater.

The Texas Commissions on Environmental Quality (TCEQ) implements a voluntary program called the Source Water Protection program that attempts to protect drinking water sources for public water systems. An inquiry was submitted to the TCEQ requesting the identification of any Source Water Protection Areas in the vicinity of each Project facility, and the TCEQ Source Water Assessment Viewer was reviewed within 1-mile of the Project's components.

According to maps received from the TCEQ, the BIG Interconnect, associated valve site and wire-line launcher/receiver assembly site located at milepost 0.5, the Angleton Compressor Station, Joaquin Compressor Station, Hempstead Station, and Provident City Station and crossover are not located within 1 mile of a Source Water Protection Area. However, the workspaces associated with the Mont Belvieu Compressor Station are located within one mile of four Source Water Protection Areas associated with groundwater wells and the Huntsville Compressor Station is located one mile from one Source Water Protection Area associated with a groundwater well. Based on the limited construction and surface disturbance proposed at the existing Mont Belvieu Compressor Station and Huntsville Compressor Station sites, and implementation of the spill prevention and response procedures in the Applicants' SPCC Plan, no impacts to Source Water Protection Areas are anticipated during construction or operation of the facilities

The Project would not be underlain by any EPA-designated Sole Source Aquifers. No springs or public or private drinking wells were identified within 150 feet of the Project area. In addition, the Project would not be located in a wellhead protection area.

Impacts on groundwater could occur during construction of the Project. These include impacts on the overland water flow and recharge of shallow aquifers due to the construction of the compressor station and other aboveground facilities. In addition clearing of vegetation, excavation, and soil compaction could impact the infiltration rate of water into the ground which could impact vegetation.

To minimize impacts on groundwater resources, the Applicants would implement measures contained in its SPCC Plan and in its E&SCP.

We conclude that with implementation of the Applicant's proposed construction procedures and mitigation measures, the Project would not have a significant impact on existing groundwater resources.

## **Surface Water Resources**

The Project would be located within six watersheds. Specifically, the BIG Interconnect and Angleton Compressor Station site are located in the Austin-Oyster Watershed, the existing Joaquin Compressor Station is located within the Toledo Bend Reservoir Watershed, the existing Mont Belvieu Compressor Station is located within the Lower Trinity Watershed; the existing Huntsville Compressor Station is located within the East Fork San Jacinto Watershed; the existing Hempstead Station is located within the Lower Brazos Watershed and the existing Provident City Station is located within the Navidad Watershed.

Sensitive surface waters include: waters that do not meet water quality standards; are designated for water quality management or improvement; contain threatened or endangered species or critical habitat; are crossed less than three miles upstream of potable water intake structures; are listed as having outstanding or exceptional quality; or are located in sensitive or protected watershed areas.

No sensitive waterbodies are located within the Project areas. The Project would not cross exceptional quality waterbodies, waterbodies listed on the National Rivers Inventory, or waterbodies within three miles of a surface water intake. However, one ditch (Waterbody D0026) crossed by the pipeline flows into Flores Bayou approximately 1.7 miles to the northeast of the Project. Flores Bayou is impaired on the 303(d) list of the Clean Water Act for recreational use due to the presence of bacteria. Waterbody D0026 would be crossed by bore and construction of the BIG Interconnect would not directly impact water quality in Flores Bayou.

The Project would impact 10 waterbodies. Two waterbodies would be crossed by conventional bore. Of the remaining 8 waterbodies, none is perennial and all are less than 10 feet wide. The waterbody crossings are identified in table 2 below.

<b>TABLE 2 Waterbodies Affected by the Stratton Ridge Expansion Project</b>						
<b>Facility</b>	<b>Waterbody Name</b>	<b>MP</b>	<b>Flow Type</b>	<b>FERC Classification</b>	<b>Width (feet)</b>	<b>Crossing Method</b>
<b>Pipeline Facilities</b>						
BIG Pipeline Interconnect	S0025	0.20	Perennial	Intermediate	22	Bore
	D0026	0.21	Ephemeral	Minor	5	Bore
Mont Belvieu Compressor Station	D-CH-04	N/A	Ephemeral	Minor	2	Install erosion controls
	D-CH-11	N/A	Ephemeral	Minor	2	Install erosion controls
	D-CH-14	N/A	Ephemeral	Minor	2	Install erosion controls
	D-CH-17	N/A	Ephemeral	Minor	2	Install erosion controls
Huntsville Compressor Station	D0010	N/A	Ephemeral	Minor	1	Install erosion controls
	D0011	N/A	Ephemeral	Minor	4	Install erosion controls
Provident City Station	D0005	N/A	Ephemeral	Minor	3	Install erosion controls
Provident City Access Road 002	D0006	N/A	Ephemeral	Minor	8	Install erosion controls; cross via existing culvert

As indicated above, the BIG Interconnect would cross two waterbodies. Waterbody S0025 is a perennial, man-made agricultural irrigation canal and waterbody D0026 is an ephemeral ditch. One ephemeral ditch was identified across Access Road 002 at the Provident City Station. The Applicants would install erosion controls to minimize the potential for sedimentation of the ditch in compliance with its E&SCP. Where the ditch is crossed by the access road, it would be crossed using an existing culvert.

During construction of the aboveground facilities, the Project would also impact 8 waterbodies, all of which are ditches. Four ditches are located within the construction workspace for the Mont Belvieu Compressor Station. Two ditches are located within the construction workspace for the Huntsville Compressor Station. One ditch is located within the Provident City Station workspace. No waterbodies were identified within the construction workspace for the existing Joaquin Compressor Station and Hempstead Station.

The Applicants would install erosion and sediment control devices in accordance with the E&SCP to protect waterbodies within construction workspace from impacts from sediment-laden runoff during construction. Based on the Applicants' implementation of its E&SCP and its SPCC Plan, we conclude that there would not be a significant impact on surface water resources.

## **Hydrostatic Testing**

In accordance with USDOT regulations, the Applicants would conduct hydrostatic testing of the pipeline prior to placing it into service. Hydrostatic testing is a method by which water is introduced and then pressurized to verify structural integrity. The Applicant would obtain hydrostatic test water from a municipal source. The Project facilities would be constructed of new materials free of chemicals or lubricants.

The rate of discharge would be the lowest possible rate to minimize any potential erosion and would be minimized by implementing measures prescribed in the E&SCP. The approximate volume needed for testing would be approximately 147,000 gallons of water. After hydrostatic testing is complete, the water would be discharged into a well-vegetated upland area within or adjacent to the existing facility. Discharge waters would be dispersed by an energy-dissipating device to minimize erosion and sedimentation and to provide additional filtering.

## **Floodplains**

Flash flooding is possible in wetlands and waterbodies in the Project areas. Wetlands, and drainage ditches are located within the fence lines of the proposed and existing Project facilities. The named streams closest to the Project facilities include the

Angleton Lateral (a waterbody about 0.8 mile from the proposed Angleton Compressor Station and BIG Interconnect), Styles Creek (about 0.8 mile from the Joaquin Compressor Station), Cotton Bayou (about 0.9 mile from the Mont Belvieu Compressor Station), Pea Creek (about 0.3 mile from the Huntsville Compressor Station), Harris Creek (about 0.3 mile from the Hempstead Station), and Hay Branch (about 0.3 mile from the Provident City Station and crossover site). Based on the distance between the Project areas and Gulf of Mexico, flooding associated with storm surges from hurricanes is not anticipated in any of the Project areas; however, heavy precipitation events associated with hurricanes can cause flooding.

Areas within mapped Federal Emergency Management Agency (FEMA) floodplains are susceptible to flash flooding. The BIG Interconnect between mileposts 0.0 and 0.2 and the proposed Angleton Compressor Station are located within the 500 year floodplain (0.2-percent annual chance). All other Project facilities are located outside the 500-year floodplain and would not require the addition of impervious cover nor would the facilities otherwise reduce floodplain functions. No Project facilities are located within the 100-year floodplain. Based on the minimal conversion of flood storage capacity required to construct the proposed facilities, we conclude that the Project would not have discernable impacts on floodplains.

## **Wetlands**

The United States Army Corps of Engineers (USACE) defines wetlands “those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.” We define wetlands as any area that is not actively cultivated or rotated cropland and that satisfies the requirements of the current federal methodology for identifying and delineating wetlands. Wetlands generally include swamps, marshes, bogs, and similar areas. Wetland surveys were conducted in the Project area between August 2014 and May 2016.

The BIG Interconnect would not cross any wetlands; however, two wetland types were identified in the Project work areas: Palustrine emergent marshes (PEM) and palustrine scrub-shrub wetlands (PSS). The classification of wetlands is based on the vegetation present. A total of 0.1 acre of PEM and PSS wetlands lie within the construction workspace for the Angleton Compressor Station. Construction of the aboveground facilities would temporarily impact approximately 3.1 acres of PEM wetlands at the Hempstead Station. The Applicants would minimize impacts on wetlands within construction workspace by implementing the measures in its E&SCP, and would use low ground-weight equipment or timber, equipment, or terra matting to support construction equipment to minimize rutting and soil compaction.

The dominate vegetation associated with these wetlands include alligator weed (*Alternanthera philoxeroides*), and Chinese tallow (*Triadica sebifera*).

Temporary construction impacts on wetlands could include the loss of herbaceous vegetation; wildlife habitat disruption; soil disturbance; sedimentation and turbidity increases; and hydrological profile changes. However, temporary impacts on wetlands within the construction workspace would be restored to pre-Project conditions, and no wetlands would be permanently filled due to the aboveground facilities and access roads. The Applicants would minimize impacts on wetlands within construction workspace by implementing the measures in the E&SCP, and by using low ground-weight equipment or timber, equipment, or terra matting to support construction equipment to minimize rutting and soil compaction. The Project will be constructed in accordance with the conditions of Nationwide Permit No. 12.

Following construction, PEM and PSS wetlands would be allowed to revegetate to their original condition following restoration of the construction workspace. Therefore, permanent impacts on wetlands would be avoided. In PEM wetlands, the herbaceous vegetation would regenerate quickly (typically within one to three years). We conclude that impacts on wetlands would be minor and largely temporary.

## **B.4 VEGETATION, WILDLIFE AND FISHERIES**

### **Vegetation**

The Project is located in primarily open land; however, emergent and scrub-shrub wetlands, and isolated patches of forested land are also present. Based on aerial photography and field surveys conducted in 2014 and 2016, the land cover types in the immediate vicinity of the Project areas consist of open fallow fields, active agricultural areas, cultivated pine forest, and wetlands. None of the areas affected by the Project contain undisturbed, natural vegetation.

Construction and operation of the BIG Interconnect and associated access road would mostly affect open upland characterized by bushy bluestem (*Andropogon glomeratus*), southern crabgrass (*Digitaria ciliaris*), and St. Augustine grass (*Stenotaphrum secundatum*). The BIG Interconnect would not cross wetlands.

The temporary impacts associated with the aboveground facilities such as the new Angleton Compressor Station includes open land, forested upland, herbaceous and scrub-shrub wetlands, isolated stands of live oak (*Quercus virginiana*) and yaupon holley (*Ilex vomitoria*) ranging from a few trees to stands no greater than 0.9 acre.

Existing aboveground facilities are generally classified as commercial/industrial land, since the Project areas are within existing facility fence lines and are subject to

routine maintenance. Vegetated areas within existing facilities are maintained by mowing and trimming. While trees are present within the Project workspace at some facilities, they are part of landscaping or visual screening. The Applicants state that no trees would be cleared for Project construction at existing facilities.

The proposed Angleton Compressor Station would impact approximately 69.6 acres of open land (including 1.1 acre of scrub-shrub land), 1.0 acre of forested upland, and 0.1 acre of herbaceous and scrub-shrub wetland during construction. Construction of the Angleton Compressor Station would result in the permanent conversion of 43.9 acres of open land (including 0.6 acre of scrub-shrub land) and 0.5 acre of forested upland, which would be maintained as commercial/industrial land or maintained lawn for the life of the Project.

The Applicants would be performing modifications to aboveground facilities at five locations, including their existing Joaquin, Mont Belvieu, and Huntsville Compressor Stations, and at the Hempstead and Provident City Stations. Construction at these locations would utilize existing industrial/commercial land, including maintained open land within the existing fence lines.

The loss and conversion of vegetation could affect soils and wildlife. To avoid and minimize these affects, the Applicants would implement measures described in its E&SCP and would restore/revegetate affected land. As described in the E&SCP, the Applicants would install erosion control measures following initial disturbance of the soil.

Revegetation would be considered successful when native vegetation cover and diversity within the disturbed areas are similar to adjacent, undisturbed lands. No unique, sensitive, or federally or state protected plant species were identified at, or adjacent to, any of the Project facilities. Based on the types and amounts of vegetation affected by the Project and Applicants' proposed avoidance, minimization, and mitigation measures to limit Project impacts, we conclude that impacts on vegetation from the proposed Project would not be significant.

## **Wildlife**

The general habitat types that exist in the Project area include: open land, which includes open fields, existing right-of-way, herbaceous and scrub-shrub uplands; emergent and scrub-shrub wetlands; upland forest; and industrial/commercial land that includes existing natural gas facilities

Wildlife is generally not present within the fence lines of the existing facilities, although small animals, such as squirrels and reptiles, may occasionally occur. Within the open land at the Angleton Compressor Station site, and the associated pipeline



facilities, game animals may include white-tailed deer (*Odocoileus virginianus*), rabbits (*Lepus californicus* and *Sylvilagus auduboni*), eastern fox squirrels (*Sciurus niger*), and feral pigs. Non-game wildlife common to this ecoregion include the armadillo (*Dasypus novemcinctus*), coyote (*Canis latrans*), gray fox (*Urocyon cinereoargenteus*), several pocket gopher species (*Thomomys bottae* and *Geomys* spp.), and opossum (*Didelphis virginiana*).

The Applicants consulted with the United States Fish and Wildlife Service (USFWS) and TPWD regarding wildlife impacts and significant habitats in the Project area. The Applicants also requested and reviewed records from the Texas Natural Diversity Database (TXNDD), which maintains records of occurrences of tracked federally and state listed species in Texas. TPWD recommended that revegetation include planting or seeding native milkweed (*Asclepia* spp.) to support migrating monarch butterflies (*Danaus plexippus*) in the Project areas. If commercially available, and with landowner consent, the Applicants may incorporate native milkweed into seed mixes at the time of restoration for areas of disturbance outside of the regularly mowed lawn to be established within the fence line at the proposed Angleton Compressor Station.

Construction and operation of the Project would result in short- and long-term impacts on wildlife. Potential short-term impacts on wildlife include the displacement of individuals from construction areas and adjacent habitats and the direct mortality of small, less mobile mammals, reptiles and amphibians that are unable to leave the construction area. Long-term impacts would include permanent conversion of forested or scrub-shrub habitats to cleared and maintained right-of-way, and periodic disturbance of wildlife during operation and maintenance.

Based on the presence of similar habitats adjacent to and in the vicinity of construction activities, and the implementation of the E&SCP, we conclude that construction and operation of the Project would not significantly impact wildlife.

## **Migratory Birds**

Migratory birds are species that nest in the United States and Canada during the summer and then migrate to and from the tropical regions of Mexico, Central and South America, and the Caribbean for the non-breeding season. Migratory birds are protected under the Migratory Bird Treaty Act (MBTA) (16 U.S. Code 703-711), and bald and golden eagles are additionally protected under the Bald and Golden Eagle Act (16 U.S. Code 668-668d). The MBTA, as amended, prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests. Executive Order 13186 (66 FR 3853) was enacted in 2001 to, among other things; ensure that environmental analyses of federal actions evaluate the impacts of actions on migratory birds. Executive Order 13186 directs federal agencies to identify where unintentional

take is likely to have a measurable negative effect on migratory bird populations and avoid or minimize adverse impacts on migratory birds through enhanced collaboration with the USFWS. The environmental analysis should further emphasize species of concern, priority habitats, and key risk factors, and that particular focus should be given to population-level impacts.

On March 30, 2011, the USFWS and the Commission entered into a Memorandum of Understanding (USFWS MOU) that focuses on avoiding or minimizing adverse impacts on migratory birds and strengthening migratory bird conservation through enhanced collaboration between the Commission and the USFWS. This voluntary USFWS MOU does not waive legal requirements under the MBTA, the Endangered Species Act (ESA), the NGA, or any other statutes and does not authorize the take of migratory birds.

The primary concern for impacts on migratory birds is mortality of eggs and/or young as mature birds could avoid active construction. Tree clearing and ground disturbing activities could cause disturbance during critical breeding and nesting periods, resulting in the loss of nests, eggs, or young. The Applicants consulted with the USFWS Texas Coastal Ecological Services Field Office and the Arlington Ecological Services Field Office regarding potential impacts on migratory birds as a result of construction. The USFWS and TPWD recommended that activities requiring vegetation removal avoid the peak nesting season of March through August, or that pre-construction surveys for active nests be completed for any clearing that would occur during the peak nesting season. Clearing would likely be required during the nesting season (between March 1 and August 31) in order to meet the Project's proposed in-service date.

Therefore, for any clearing that would occur during the nesting season, the Applicants will have a qualified biologist conduct a pedestrian field survey no more than two weeks prior to clearing activities to identify active nests. During operation, full right-of-way maintenance along the BIG Interconnect would not occur more frequently than every three years and would not occur between April 15 and August 1. Land affected within the fence lines of existing facilities are currently disturbed and maintained; therefore, suitable habitat for migratory birds is not present. No eagle nests were observed within one mile of the Project areas during field studies.

Based on the characteristics and habitat requirements of wildlife and migratory birds known to occur in the proposed Project areas, the amount of similar habitat adjacent to and in the vicinity of the Project, and the Applicants implementation of its E&SCP, we have determined that the Project would not result in population-level impacts or significant measureable negative impacts on migratory birds.

## **Special Status Species**

Special status species are those species for which state or federal agencies provide an additional level of protection by law, regulation, or policy. Included in this category are federally listed and federally proposed species that are protected under the ESA, or are considered as candidates for such listing by the USFWS, and those species that are state-listed as threatened or endangered.

## **Federal Listed Species**

The Applicants, acting as the FERC's non-federal representative for the purpose of complying with Section 7(a)(2) of the ESA, initiated informal consultation with the USFWS regarding federally listed threatened and endangered species potentially affected by the Project.

Federal species were obtained from the USFWS Information for Planning and Conservation ("IPaC") system and agency consultation. The system identified 15 state and federally listed species that occur in the counties affected by the Project. Appendix 4 lists each species potentially occurring within the Project area along with our determination for each species. No suitable habitat for species exists in the affected Project area.

State listed species are based upon were obtained from the TPWD County Rare, Threatened, and Endangered Species lists. The TXNDD maintains records of occurrences of tracked federally and state listed species in Texas. No documented occurrences of listed species are within one mile of the Project. No designated critical habitat occurs within the Project areas

Based on our review of available data and field survey results, the Applicants stated that the Project would have "no effect" on federal and state listed species. We agree with this determination.

## **Fisheries**

The proposed pipeline would cross two waterbodies. Waterbody S0025 is a perennial, manmade agricultural irrigation canal and waterbody D0026 is an ephemeral ditch. The Applicants would cross both waterbodies via conventional bore, thereby avoiding in-water construction. Based on the size and flow regime, and observations during field surveys, the waterbodies affected by the Project do not contain fishery resources. Should fisheries occur in these two streams, impacts would be avoided by using the bore crossing method.

Eight waterbodies were identified within the construction workspace of aboveground facilities, all of which are intermittent ditches. The Applicants would protect waterbodies in construction workspace of proposed and existing aboveground facilities by installing erosion and sediment controls and, if necessary, cross the waterbodies using timber mats or equipment bridges to avoid construction-related impacts. The Applicants would implement the measures in the E&SCP and the measures to minimize the potential for sedimentation into waterbodies. Therefore, we conclude that impacts on fisheries would be either completely avoided or would be minor and temporary.

## **B.5 CULTURAL RESOURCES**

The National Historic Preservation Act (NHPA) of 1966, as amended (54 U.S.C. 3001 et seq.), is the linchpin piece of legislation in the nation's historic preservation program. While there are other federal historic preservation laws and regulations, most of them do not apply to FERC, although they may apply to federal land managing agencies.<sup>7</sup> The NHPA set-up the Advisory Council on Historic Preservation (ACHP), created the National Register of Historic Places (NRHP), and established State Historic Preservation Offices (SHPO).

Section 101 of the NHPA requires the identification of religious and cultural properties in the area of potential effect (APE) that may be important to Indian tribes that historically occupied or used the Project area, and may be eligible for listing on the NRHP. Indian tribes are defined in 36 CFR Part 800.16(m) as: "an Indian tribe, band, nation, or other organized group or community, including a Native village, Regional Corporation, or Village Corporation, as those terms are defined in Section 3 of the Alaska Native Claims Settlement Act (43 U.S.C. 1602), which is recognized as eligible for the special programs and services provided by the United States to Indians because of their special status as Indians." FERC acknowledges that we have trust responsibilities to Indian tribes; so on July 23, 2003, the Commission issued a "Policy Statement on Consultations with Indian Tribes in Commission Proceedings" in Order 635. It is the obligation of FERC, on behalf of all of the federal cooperating agencies, to consult on a government-to-government basis with Indian tribes that may have an interest in the Project.

Section 106 of the NHPA requires that all federal agencies, including FERC, take into account the effects of their undertakings on historic properties and afford the ACHP an opportunity to comment. Historic properties are archaeological sites, historic districts, buildings, structures, objects, or properties of traditional, religious, or cultural importance that are listed on or eligible for the NRHP. The Applicants are assisting us by providing

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<sup>7</sup> For example, the Archaeological Resources Protection Act of 1979 applies to federal and tribal lands, but FERC does not own or manage any lands.

information, analyses, and recommendations, as allowed by the regulations for implementing Section 106 at Part 800.2(a)(3), and FERC's regulations at 18 CFR 380.12(f). FERC remains responsible for all findings and determinations under the NHPA. As the lead federal agency for this Project,<sup>8</sup> FERC would address compliance with Section 106 on behalf of all the federal cooperating agencies in this EA. This section summarizes the current status of compliance with the NHPA for this Project.

## **Consultations**

We sent copies of our NOI to a wide range of stakeholders, including other federal agencies, such as the ACHP, EPA, USACE, the U.S. Department of the Interior's National Park Service (NPS) and Bureau of Indian Affairs (BIA); state agencies, including the Texas SHPO; and Indian tribes that may have an interest in the Project area. The NOI contained a paragraph about Section 106 of the NHPA, and stated that we use the notice to initiate consultations with the SHPO, and to solicit their views, and those of other government agencies, interested Indian tribes, and the public on the Project's potential effects on historic properties.

On May 11, 2017, EPA provided comments. The EPA recommended that the FERC conduct government-to-government consultations with Indian tribes about the Project, and the EA should discuss potential impacts on sacred sites. In addition, it was recommended that the Applicants should prepare a Cultural Resources Management Plan, and this EA should summarize compliance with the NHPA. No other federal, state, or local government agencies filed comments with FERC on cultural resources issues in response to our NOI.

The FERC NOI was sent to the Indian tribes listed in table 3. No Indian tribes filed comments with FERC in response to our NOI.

In addition to FERC's consultations, the Applicants separately communicated with interested Indian tribes and the Texas SHPO. In letters dated July 19, 2016, Edge Engineering & Science (Edge), the Applicants' consultant, introduced the Project to the nine Indian tribes listed in table 3. Only three tribes responded back. In an August 1, 2016 email to Edge, the Cultural Preservation Director for the Ysleta del sur Pueblo indicated that the Project would have no impacts on cultural or traditional properties important to the tribe. In an August 8, 2016 letter to Edge, the Tribal Historic Preservation Officer (THPO) for the Kiowa Tribe indicated that the Project would have a low potential to impact known archaeological, historical, or sacred sites important to the tribe. In an August 10, 2016 letter to Edge, a representative of the Tonkawa Tribe

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<sup>8</sup> Pursuant to 36 CFR 800.2(a)(2), the May 2002 "Interagency Agreement on Early Coordination of Required Environmental and Historic Preservation Reviews," and the Energy Policy Act of 2005.

indicated the Project is located in counties of interest, and that the tribe should be contacted in the event of a discovery of human remains, funerary objects, or evidence of historical or cultural significance.

<b>Table 3 Indian Tribes Contacted About the Stratton Ridge Project</b>		
<b>Sent FERC's March 24, 2017 NOI</b>	<b>Sent Texas Eastern's July 19, 2016 Letter</b>	<b>Responses</b>
Alabama Coushatta Tribe of Texas c/o Colabe Clem Sylestine, Chief	Alabama Coushatta Tribe of Texas c/o Bryant Celestine, THPO <sup>1</sup>	None filed to date.
	Apache Tribe of Oklahoma c/o Donald Cabaniss, Chair	None filed to date.
Caddo Nation of Oklahoma c/o Tamara Francis Fourkiller, Chair	Caddo Nation of Oklahoma c/o Robert Cast	None filed to date.
	Comanche Tribe of Oklahoma c/o Jimmy Arteberry, THPO	None filed to date.
	Kickapoo Tribe of Oklahoma c/o Gilbert Salazar, Chair	None filed to date.
	Kickapoo Traditional Tribe of Texas c/o Juan Garza, Chair	None filed to date.
	Kiowa Tribe of Oklahoma c/o Amber Toppah, Chair	8/8/16 letter to Applicants' consultant
Tonkawa Tribe of Oklahoma c/o Russell Martin, President	Tonkawa Tribe of Oklahoma c/o Donald Patterson, President	8/10/16 letter to Applicants' consultant.
Wichita and Affiliated Tribes of Oklahoma c/o Terri Parton, President		None filed to date.
	Ysleta de Sur Pueblo in Texas c/o Frank Paiz, Governor	8/1/16 email to Applicants' consultant
1: THPO = Tribal Historic Preservation Officer		

Edge, on behalf of the Applicants, initiated communications with the Texas Historical Commission, representing the SHPO, on July 18, 2016. That letter included the results of overviews and surveys. On July 29, 2016, the Texas SHPO stamped a copy of that letter with the finding: "No Historic Properties Affected – Project May Proceed."

### **Areas of Potential Effect**

Resource Report 4 of the Applicant's application to the FERC defined the direct APE for archaeological sites at the proposed Angleton Compressor Station, 0.5-mile-long pipeline lateral as having a combined footprint of about 79 acres. The cultural resources survey report covering the Angleton Compressor Station and lateral (Soltysiak 18 July 2016) indicated that the direct APE included a footprint of about 262 acres. Because the SHPO apparently accepted the survey report on July 29, 2016, we agree with this definition of the direct APE. At the five existing facilities to be modified (Joaquin, Mont Belvieu, Huntsville, Hempstead, and Provident City Stations) the direct APE was defined in Resource Report 4 as the current fenced boundary around each facility. The indirect

APE for historic architectural resources was a 0.5-mile radius around the proposed facilities.

### **Overview Results**

Edge identified multiple historic standing structures on USGS topographic quadrangle maps within the indirect APE for architectural sites for the Angleton Compressor Station and lateral. None of those historic sites were recommended to be eligible for the NRHP (Soltysiak 18 July 2016). The overview report for the Project indicated that one previous survey had been conducted within one mile of the Angleton Compressor Station and lateral. A single historic structure was identified on the 1947 USGS topographic map within one mile of the Angleton Compressor Station and lateral. That structure is no longer extant, having been razed prior to 1963 (Soltysiak 30 May 2017).

Background research was conducted for the five existing facilities that would be modified. The overview report indicated that five cultural resources investigations had previously been conducted within one mile of the existing Joaquin Compressor Station; two surveys had previously been conducted within one mile of the existing Provident City Station; and one previous survey had been conducted within one mile of the existing Mont Belvieu Compressor Station. Two archaeological sites (41SY21 and 66) and an historic cemetery (SY-C119) were previously recorded within one mile of the existing Joaquin Compressor Station. The previously recorded St. Thomas Church cemetery (WL-C22) is within one mile of the existing Hempstead Compressor Station. One previously recorded archaeological site (41CH4) is within one mile of the existing Mont Belvieu Compressor Station (Soltysiak 30 May 2017).

### **Inventory Results**

In March 2016, Edge conducted an intensive pedestrian cultural resources inventory of the proposed Angleton Compressor Station and the 0.6-mile-long pipeline lateral. In addition 106 shovel tests were excavated. No archaeological resources were identified in the direct APE (Soltysiak 18 July 2016).

### **Unanticipated Discovery Plan**

An “Unanticipated Discoveries Plan and Emergency Procedures” (Discovery Plan) was attached as appendix C to the cultural resources survey report covering the Angleton Compressor Station and lateral (Soltysiak 18 July 2016). The SHPO accepted this Discovery Plan when it accepted the survey report on July 29, 2016. We reviewed Plan and also find it generally acceptable; however, the plan does not address a request by the Tonkawa Tribe to be contacted in the event of the discovery of human remains, funerary objects, or evidence of historical or cultural significance. To address these comments and

ensure that the FERC's responsibilities under the NHPA and its implementing regulations are met, we recommend that:

**The Applicants should not begin construction of the Project facilities or use of contractor yards, ATWS, or new or to-be-improved access roads until a revised Unanticipated Discovery Plan is filed with the Secretary of the Commission (Secretary) that includes tribal contact information for the Tonkawa Tribe of Oklahoma for notification of the discovery of archaeological sites, including human remains, during Project activities.**

**All material filed with the Commission that contains location, character, and ownership information about cultural resources must have the cover and any relevant pages therein clearly labeled in bold lettering "CUI//PRIV – DO NOT RELEASE."**

### **Compliance with the National Historic Preservation Act**

No traditional cultural properties, sacred sites, aboriginal burials, or objects of cultural patrimony were identified in the APE by the NPS, BIA, SHPOs, Edge or the Applicants, or any Indian tribes. After consultations with the SHPOs and Indian tribes, FERC concludes that the Stratton Ridge Project would have no effect on sites of traditional, cultural, or religious importance to Indian tribes, and therefore, we have completed compliance with Section 101(d)(6) of the NHPA.

We and the SHPO agree that construction and operation of the project would have no effect on historic properties. We have completed the process of complying with Section 106 of the NHPA. In accordance with 36 CFR Part 800, because no historic properties would be adversely affected by the Project, we do not have consult with the ACHP.

## **B.6 LAND USE, RECREATION, AND AESTHETICS**

### **Land Use**

Land use classification of the Project areas was determined through field surveys and a review of USGS quadrangle maps and current aerial photographs. The general land use categories identified and used in this resource report are defined below:

- forest land – forested uplands;
- open land – wetlands, open fields, pasture, existing right-of-way, herbaceous and scrub-shrub uplands, non-forested uplands, emergent wetlands, and scrub-shrub wetlands;



- open water – water crossings greater than 100 feet in width and streams visible on aerial photography but less than 100 feet in width; and
- commercial/industrial – natural gas utility facilities, manufacturing or industrial plants, commercial facilities, and active construction of such facilities.

In total, the Project would temporarily affect 143.3 acres of land during construction. Of the 143.3 acres, 48.2 acres would be used during operations. No impacts would occur on residential or agricultural land.

Land uses in the Project areas consist of agriculture, commerce/industrial, open land, and wetlands. Brazoria County Jail is about 1.5 miles to the East; a crocodile and animal park is about 1 mile northeast; a race track is about 2.5 miles north; and a private airport is about 2 miles northeast. Agriculture and open land is the dominate land use surrounding the Project facilities. Construction of the Project would affect almost equal proportions of three land use categories: agricultural, commercial/industrial, and open. Table 4 summarizes the land use requirements associated with construction and operation of the Project, including ATWS.

The Project would not affect any federally-designated or recognized natural, recreational, or scenic areas, wildlife refuges, National Parks, state parks, golf courses, public or private hunting areas, Indian reservations, wild and scenic rivers, trails, wilderness areas, or natural landmarks or other public lands. The Project would not cross or impact coastal zone management areas. Furthermore, there are no residences within 50 feet of the Project and no planned residences within 0.25 mile.

Land use would be temporarily affected by construction activities and permanently affected by operations. However, with the exception of the new compressor stations, permanent right-of-way, and aboveground facilities, land use would return to its previous use.

There are numerous residences between 1,000 and 1,599 feet to the north; and between 1,800 and 2,000 feet to the south of the Angleton Compressor Station. As indicated previously, the Applicants have not committed to limiting construction to daytime hours. They state that should unforeseen circumstances occur dictating the need for additional hours, construction may take place during nighttime hours or federal holidays in order to meet the contractual in-service date. In general, construction should be short term, and minor at most aboveground facilities where construction could take place at one location for a significant amount of time. The exception is the proposed Angleton Compressor Station. To ensure that any potential nighttime construction would not cause significant impacts to the local community, **we recommend that:**

**Prior to starting any construction activities at the Angleton Compressor Station between 10 pm and 7 am, the Applicants should file with the**

Secretary, for review and written approval by the Director of the Office of Energy Projects (OEP), a Night Construction Plan that details the projected noise, dust, and light pollution impacts, and identifies the measures that the Applicants would implement to mitigate these impacts.

## Visual Resources

The Project would not be located within any federal, state, or locally designated scenic areas, such as National Wild and Scenic Rivers and scenic highways. The Project could alter existing visual resources in three ways: (1) construction activity and equipment may temporarily alter the viewshed; (2) clearing along the right-of-way during construction would alter existing vegetation patterns; and (3) aboveground facilities would create permanent alterations to the viewshed.

Facility	Commercial or Industrial		Open Lands		Open Water		Forested		Totals	
	Con.	Op.	Con.	Op.	Con.	Op.	Con	Op.	Con.	Op.
BIG Interconnect	0.1	0.1	5.3	2.7	<0.1	<0.1	0	0	5.5	2.8
Pipeline ATWS	0	0	1.4	0	0	0	0	0	1.4	0
Access Road	0	0	0.2	0.2	0	0	0	0	0.2	0.2
Angleton Compressor Station	0.7	0.7	69.7	44.0	0	0	1.0	0.5	71.4	45.1
Joaquin Compressor Station	22.6	0	0	0	0	0	0	0	22.6	0
Mont Belvieu Compressor Station	19.1	0	0	0	0	0	0	0	19.1	0
Huntsville Compressor Station	10.5	0	0	0	0	0	0	0	10.5	0
Hempstead Station	0.5	0	3.1	0	0	0	0	0	3.6	0
Provident City Station	5.7	0	0	0	0	0	0	0	5.7	0
Provident City Crossover	0.7	0	0.2	0	0	0	0	0	1.0	0
Provident City Access Road	2.4	0	0	0	0	0	0	0	2.4	0
<b>Totals</b>	<b>62.2</b>	<b>0.8</b>	<b>79.9</b>	<b>46.9</b>	<b>&lt;0.1</b>	<b>&lt;0.1</b>	<b>1.0</b>	<b>0.5</b>	<b>143.3</b>	<b>48.2</b>

The proposed Angleton Compressor Station would be visible from the adjacent roadways (north, east, west and south), as well as the numerous residences directly north and south of the location identified previously, as well as a horse farm about 2000 feet to the west. There does not appear to be any other industrial facilities in the immediate viewshed of the existing nearby homes. We received no comments from landowners in these communities regarding concerns over visual impacts of the proposed Angleton Compressor Station. Based on distance and location within the existing landscape, as well as some vegetation or existing structures that would screen or partially obscure views, the proposed Angleton Compressor Station would pose varying degrees of viewshed impacts on the nearby residences. The BIG Interconnect pipeline, modifications to compressor stations, and construction of other aboveground facilities would involve minor modifications to the local viewshed. We conclude that the Project would constitute a new visual impact, but it would not be significant.

We conclude that the Project would cause permanent impacts on visual resources, but we do not anticipate that the Project would have a significant impact on land use, recreational activities, visual resources, or coastal zone management areas.

## **B.7 AIR QUALITY AND NOISE**

### **Air Quality**

Construction and operation of the Project could potentially have effects on local and regional air quality. The section summarizes federal and state air quality regulations that are applicable to the proposed facilities. The section also characterizes the existing air quality and describes potential impacts the facilities may have on air quality regionally and locally.

The term air quality refers to relative concentrations of pollutants in the ambient air. Pollutants of concern are primarily ground-level ozone (ozone), carbon monoxide (CO), oxides of nitrogen (NO<sub>x</sub>), sulfur dioxide (SO<sub>2</sub>), respirable and fine particulate matter (inhalable particulate matter with an aerodynamic diameter less than or equal to 10 microns [PM<sub>10</sub>] and less than or equal to 2.5 microns [PM<sub>2.5</sub>]). Ozone is not directly emitted into the atmosphere from an emissions source. Ozone develops as a result of a chemical reaction between NO<sub>x</sub> and volatile organic compounds (VOC) in the presence of sunlight. VOCs are a subset of organic compounds that are emitted during fossil fuel combustion and can cause a variety of health effects, from irritation to serious health impacts as well as the reactant to form ozone. Hazardous air pollutants (HAP) are also emitted during fossil fuel combustion and contain compounds that, at certain concentrations, are known or suspected of causing cancer and other serious health effects.

Additionally, fugitive dust would be produced during Project construction and operation from earth moving, road dust, etc. The majority of fugitive dust would be particulate matter in excess of 10 microns, but a portion would be PM<sub>10</sub> and PM<sub>2.5</sub>.

Greenhouse Gases (GHG) produced by fossil-fuel combustion are carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), and nitrous oxide (N<sub>2</sub>O). GHGs status as a pollutant is not related to toxicity as they are non-hazardous to health at normal ambient concentrations. GHGs absorb infrared radiation in the atmosphere, and an increase in emissions of these gasses due to human activity are the primary cause of increased levels of CO<sub>2</sub> levels since the industrial age. These elevated levels of GHGs are the primary cause of rapid warming of the climate system, especially since the 1950s. These existing and future emissions of GHGs, unless significantly curtailed, would cause further warming and changes to the local, regional and global climate systems. During construction and operation of the Project, these GHGs would be emitted from construction and operational equipment.

### **Existing Air Quality**

The climate in the Gulf Coastal Plain is influenced by warm, moist air from the Gulf of Mexico. In the Project area temperatures are generally highest in August and lowest in January.

High temperatures of at least 90 degrees Fahrenheit (°F) or higher occur about 103 days per year on average, while minimum temperatures of 32 °F or lower occur 16 days per year on average. The mean annual precipitation is 49.8 inches, with monthly average precipitation ranging from a low of 3.2 inches in February to a maximum of 5.9 inches in June. Precipitation is common, with of 0.01 inch or greater occurs on about 1 in every 4 days on average. The average annual snowfall is 0.1 inch.

Federal and state air quality standards are designed to protect human health. The EPA has developed the National Ambient Air Quality Standards (NAAQS) for criteria air pollutants such as NO<sub>x</sub>, CO, SO<sub>2</sub>, PM<sub>2.5</sub>, PM<sub>10</sub>. The NAAQS were set at levels the EPA believes are necessary to protect human health and welfare. VOC and HAPs are also emitted during fossil fuel combustion. At the state level TCEQ has adopted the NAAQS, as promulgated by the EPA, and does not have any additional standards.

Air quality control regions (AQCR) are areas established by the EPA and local agencies for air quality planning purposes, and through State Implementation Plans, describe how the NAAQS would be achieved and maintained. The AQCRs are intra- and interstate regions, such as large metropolitan areas, where improvement of the air quality in one portion of the AQCR requires emission reductions throughout the AQCR. Each AQCR, or portion thereof, is designated based on compliance with the NAAQS for each pollutant. Shelby County, San Jacinto County, and Lavaca County are currently designated as attainment/unclassifiable for all pollutants. Brazoria County, Chambers

County, and Waller County are designated as 8-hour ozone nonattainment areas and attainment/unclassifiable for all other pollutants. For the Houston-Galveston-Brazoria (HGB) ozone nonattainment area is currently designated nonattainment for the 2008 8-hour ozone NAAQS, classified as “moderate.”

GHG produced by fossil-fuel combustion are carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), and nitrous oxide (N<sub>2</sub>O). There are no applicable ambient standards or emission limits for GHG under the Clean Air Act.

### **Permitting/Regulatory Requirement**

Air quality in the United States is regulated by federal statutes in the Clean Air Act (CAA) and its amendments. All of the planned modifications at the nonjurisdictional BIG Pipeline and aboveground facilities in the Project will result in air pollutant emission changes below the major New Source Review, Non-attainment New Source Review, or Prevention of Significant Deterioration permit thresholds. Therefore, the modified facilities within the Project would not require air permitting under these permits.

The existing Joaquin Compressor Station is subject to the Title V operating permitting program and has obtained Operating Permit No. O3054. The proposed station modifications would require the existing Title V Operating Permit to be revised.

Similarly, existing Mont Belvieu Compressor Station is subject to the Title V operating permitting program and has obtained Operating Permit No. O3065. The proposed station modifications will require the existing Title V operating Permit to be revised.

The Angleton and Huntsville Compressor Stations, as well as, the Hempstead and Provident City Stations, have air pollutant emissions below the Title V major source thresholds. Therefore, these stations are not currently subject to the Title V permitting program, nor would they be should the Project be approved.

### **New Source Performance Standards**

The EPA promulgates New Source Performance Standards (NSPS) to establish emission limits and fuel, monitoring, notification, reporting, and recordkeeping requirements for stationary source types or categories. These regulations apply to new, modified, or reconstructed sources.

NSPS Subpart JJJJ would apply to the emergency generators at the Angleton Compressor Station. The various components of Subpart OOOOa would apply, as applicable, to the compressor stations. The Applicants would also be required to perform leak survey and repairs at the compressor stations as required, to address fugitive

equipment emissions. Note that at the time of this document's publication, Subpart OOOOa is currently under review by the court and the EPA.

### **National Emission Standards for Hazardous Air Pollutants**

The 1990 CAA Amendments established a list of 189 HAPs, resulting in the promulgation of National Emission Standards for Hazardous Air Pollutants. The National Emission Standards for Hazardous Air Pollutants regulate HAP emissions from specific source types located at major or area sources of HAPs by setting emission limits, monitoring, testing, record keeping, and notification requirements.

Thus, by complying with 40 CFR 60 Subpart JJJJ, the Project emergency generator at the Angleton Compressor Station would also be in compliance with 40 CFR 63 Subpart ZZZZ.

### **General Conformity**

The lead federal agency must conduct a conformity analysis if a federal action would result in the generation of emissions that would exceed the conformity threshold levels of the pollutant(s) for which a county is designated nonattainment or maintenance.

General Conformity assessments must be completed when the total direct and indirect emissions of a project would equal or exceed specified pollutant thresholds on a calendar year basis for each nonattainment or maintenance area. The operational emissions that would be permitted or otherwise covered by major or minor NSR permitting programs are not subject to the general conformity applicability analysis. Tables 5 and 6 show the estimated emissions for both jurisdictional and nonjurisdictional facilities for each year of construction. As can be seen in the tables, estimated construction emissions are below the General Conformity Applicability thresholds, and thus the Project would not require a General Conformity Determination.

### **Greenhouse Gas Emissions and the Mandatory Reporting Rule**

The EPA's Mandatory Reporting of Greenhouse Gases Rule requires reporting from applicable sources of GHG emissions if they emit greater than or equal to 25,000 metric tons of GHG (as CO<sub>2e</sub>) in one year. The Mandatory Reporting Rule does not require emission control devices and is strictly a reporting requirement for stationary sources based on actual emissions. Operational GHG emission estimates for the Project are presented, as CO<sub>2e</sub>, in tables 7 and 8. Based on the emission estimates presented, actual GHG emissions from operation of the Angleton Compressor Station would not likely exceed the 25,000 tpy reporting threshold for the Mandatory Reporting Rule. The various components of the Mandatory Reporting Rule would apply to the existing

compressor stations and if the actual emissions from any of the compressor stations are greater than 25,000 metric tpy, reporting would be required.

### State Air Quality Regulations

This section discusses the potentially applicable state air regulations for the proposed facility. In addition to federal standards, the TCEQ establishes permit review procedures for all facilities with pollutant emissions. Any new or modified facility is required to obtain an air quality permit prior to initiating construction. As a result, the proposed Project will be subject to and will need to comply with the regulations that apply to the new and modified stations.

### Construction Impacts and Mitigation

Air emissions would be generated during construction of all Project components. Construction activities for the proposed activities would result in temporary increases in emissions of some pollutants due to the use of equipment powered by diesel or gasoline engines. Construction activities would also result in the temporary generation of fugitive dust due to land clearing and grading, ground excavation, and driving on unpaved roads. Emissions would also be generated by delivery vehicles and construction workers commuting to and from work areas on paved roads.

<b>Source</b>	<b>NO<sub>x</sub></b>	<b>CO</b>	<b>SO<sub>2</sub></b>	<b>VOC</b>	<b>PM<sub>10</sub></b>	<b>PM<sub>2.5</sub></b>	<b>GHG</b>	<b>Total HAPs</b>
BIG Interconnect	6.84	4.89	0.01	0.39	8.95	1.52	2,985	0.07
Angleton Compressor Station	7.06	5.61	0.02	0.39	9.15	1.57	3,090	0.07
Joaquin Compressor Station	2.75	1.49	0.01	0.12	0.80	0.42	1,277	0.02
Mont Belvieu Compressor Station	3.37	1.78	0.01	0.21	25.3	2.92	1,463	0.03
Huntsville Compressor Station	0.92	0.59	0.00	0.05	7.18	0.10	402	0.01
Hempstead Compressor Station	2.02	1.06	0.00	0.16	8.36	1.13	785	0.03
Provident Compressor Station	2.01	1.31	0.00	0.12	8.25	1.10	928	0.01
<b>Totals</b>	<b>25.0</b>	<b>16.7</b>	<b>0.06</b>	<b>1.44</b>	<b>63.4</b>	<b>9.41</b>	<b>10,929</b>	<b>0.25</b>

Construction emission estimates were based on the fuel type and anticipated frequency, duration, capacity and levels of use of various types of construction equipment. Table 6 provides Project total construction emissions, including tailpipe emissions from on-road and off-road construction equipment and vehicles, construction worker vehicles for commuting, and vehicles used to deliver equipment/materials to the site, as well as fugitive dust from construction activities and wind erosion of disturbed areas prior to revegetation.

Fugitive dust would result from land clearing, grading, excavation, concrete work, and vehicle traffic on paved and unpaved roads. The amount of dust generated would be a function of construction activity, soil type, soil moisture content, wind speed, precipitation, vehicle traffic, vehicle types, and roadway characteristics. Emissions would be greater during dry periods and in areas of fine-textured soils subject to surface activity. The Applicants prepared a Dust Control Plan that describes the mitigation measures that would be implemented to control fugitive dust during Project construction. We have reviewed the Dust Control Plan and find it acceptable.

These construction emissions would occur over the duration of construction activity and would be emitted at different times and locations throughout the Project. Construction emissions would be minor and would result in short-term impacts in the vicinity of the compressor stations, pipeline and aboveground facilities. Open-burning is not anticipated for Project construction. With the mitigation measures proposed by the Applicants, air quality impacts from construction equipment would be temporary and should not result in a significant impact on regional air quality.

<b>Table 6</b> <b>Estimate of Nonjurisdictional Construction Emissions 2018-2019</b> <b>Brazoria County</b> <b>(tons)</b>								
Source	NO <sub>x</sub>	CO	SO <sub>2</sub>	VOC	PM <sub>10</sub>	PM <sub>2.5</sub>	GHG	Total HAPs
BIG Terminus Facilities <sup>1</sup>	7.0	6.0	0.02	0.4	10.0	2.0	3,500	0.1
PIG Launcher/receiver Stratton Ridge <sup>2</sup>	2.02	1.06	0.00	0.16	8.36	1.13	785	0.03
PIG Launcher/receiver-Iowa Colony <sup>2</sup>	2.02	1.06	0.00	0.16	8.36	1.13	785	0.03
1: Estimated from construction emissions from Angleton Compressor Station. 2: Estimated from similar emissions from Hempstead Compressor Station Pig Launcher/receiver construction emissions.								

## Operational Impacts and Mitigation

There would be limited operational emissions from the Project. At the Angleton Compressor Station, the compressor would be driven by an electric motor with no air emissions. Primary operational emissions would be fugitive methane and VOC emissions from pipeline components, tanks, gas releases, and intermittent emissions from



the emergency generators. There would be reductions of emissions from the Mont Belvieu Compressor Station from the oxidation catalyst that would be installed on one of the reciprocating engines.

Estimates of fugitive emissions from all piping components, tanks, and venting at the Angleton Compressor Station is included in table 7. In order to minimize fugitive emissions from valves, seals and other piping components, and from operation and maintenance activities, the Applicants would comply with EPA’s 40 CFR Part 98, Subpart W and would comply with EPA’s proposed 40 CFR Part 60, Subpart OOOOa standards, which both require leak detection and repair programs. Due to the short length of pipeline and minor modifications along the pipeline and at the compressor stations, we did not specifically request that the Applicants provide the fugitive methane emissions form these components, however, the Applicants provided the TCEQ Permit By Rule Permits which included estimates for the launcher/receives, and valves, which are identified in table 8.

<b>Table 7 Compressor Station Emissions (tons/year)</b>								
<b>SO<sub>2</sub></b>	<b>PM<sub>10</sub></b>	<b>PM<sub>2.5</sub></b>	<b>NO<sub>x</sub></b>	<b>CO</b>	<b>VOC</b>	<b>Total HAP</b>	<b>Individual HAP</b>	<b>GHG</b>
<b>Angleton Compressor Station</b>								
0.00	0.00	0.00	0.13	0.26	22.5	1.49	0.76 <sup>1</sup> 0.04 <sup>2</sup>	13,040 <sup>3</sup>
<b>Mont Belvieu Compressor Station</b>								
	<b>SO<sub>2</sub></b>	<b>PM<sub>10</sub></b>	<b>PM<sub>2.5</sub></b>	<b>NO<sub>x</sub></b>	<b>CO</b>	<b>VOC</b>	<b>Total HAP</b>	<b>GHG<sup>4</sup></b>
Existing	0.25	19.5	19.5	100	150	100	65.41	--
Total Proposed	5.45	18.8	18.8	49.49	59.39	49.49	33.26	--
<b>Change in Emission</b>	<b>5.21<sup>5</sup></b>	<b>-0.7</b>	<b>-0.7</b>	<b>-50.51</b>	<b>-90.62</b>	<b>-50.51</b>	<b>-32.14</b>	--
1: Hexane 2: Benzene 3: CO <sub>2e</sub> 4: GHG emissions would decrease due to lower fuel usage 5: The represented SO <sub>2</sub> emissions have increased solely due to a change in emission calculation methodology based on TCEQ requests.								

<b>Table 8 Fugitive Emissions from Aboveground Facilities (tons/year)</b>		
	<b>VOC</b>	<b>GHG</b>
Joaquin Compressor Station <sup>1</sup>	<1	80-120
Huntsville Compressor Station <sup>1</sup>	<1	80-120
Hampstead Compressor Station <sup>1</sup>	<1	80-120
Provident City Station <sup>2</sup>	0.1	111
BIG Facilities <sup>1</sup>	<1	100-200
1: Estimated 2: TCEQ, Permit-by-rule application		

Based upon the limited amount of criteria, VOC and HAP emissions, we did not require air quality modeling. The primary emissions from the Project operation are fugitive methane, VOCs and GHGs. These are below all regulatory thresholds and should not cause or contribute to any exceedances of the NAAQS, nor would it delay the region from meeting air quality attainment goals.

The Project would result in direct and indirect GHG emissions. GHG emissions were included in tables 7, and 8. While we do not know the ultimate fate of the Project's requested natural gas capacity, it may be used domestically, or may be designated for liquefaction and shipped overseas. The downstream emissions were quantified assuming full capacity and assuming that the emissions were burned and not used as feedstock. With this assumption, downstream emissions would be 6.2 million metric tonnes of CO<sub>2e</sub> per year. If this were to be burned, and not replace coal or fuel-oil in Texas, this volume of GHG emissions would result in a 1 percent increase of GHG emissions from fossil fuel combustion in Texas<sup>9</sup> and a 0.1 percent increase in national GHG emissions<sup>10</sup>.

Based on the short duration, and low emissions during construction activities, and the limited fugitive emissions from operations, we do not believe there would be local or regionally significant impacts on air quality.

## Noise

Construction and operation of the Project would affect overall noise levels in the Project area. The magnitude and frequency of environmental noise may vary considerably over the course of the day, throughout the week, and across seasons, in part due to changing weather conditions and the effects of seasonal vegetative cover. Two measures that relate the time-varying quality of environmental noise to its known effect on people are the 24-hour equivalent sound level ( $L_{eq}$ ) and day-night sound level ( $L_{dn}$ ). The  $L_{eq}$  is an A-weighted sound level containing the same energy as the instantaneous sound levels measured over a specific time period. Noise levels are perceived differently, depending on length of exposure and time of day. The  $L_{dn}$  takes into account the duration and time the noise is encountered. Specifically, the  $L_{dn}$  is the  $L_{eq}$  plus a 10 decibel on the A-weighted scale (dBA) penalty added to account for people's greater sensitivity to nighttime sound levels (typically considered between the hours of 10:00 p.m. and 7:00 a.m.). The A-weighted scale is used to assess noise impacts because human hearing is less sensitive to low and high frequencies than mid-range frequencies. The human ear's threshold of perception for noise change is considered to be 3 dBA; 6 dBA is clearly noticeable to the human ear, and 10 dBA is perceived as a doubling of noise.

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<sup>9</sup> Based upon Texas GHG emission of 640 million metric tonnes per year the U.S. Energy Information Administration (EIA) 2014.

<sup>10</sup> Based upon the Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2015, EPA, 2017

## **Federal and State Noise Regulations**

In 1974, the EPA published *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety*. This document provides information for state and local governments to use in developing their own ambient noise standards. The EPA has indicated that an  $L_{dn}$  of 55 dBA protects the public from indoor and outdoor activity interference. We have adopted this criterion and use it to evaluate the potential noise impacts from the proposed Project at noise-sensitive areas (NSAs). Due to the 10 dBA nighttime penalty added prior to the calculation of the  $L_{dn}$ , for a facility to meet the 55 dBA  $L_{dn}$  limit, it must be designed such that actual constant noise levels on a 24-hour basis do not exceed 48.6 dBA  $L_{eq}$  at any NSA.

No state or local noise regulations were identified for the Project.

## **Ambient Noise Conditions**

We have analyzed the noise impacts only for the Angleton and Joaquin Compressor Stations. The minor modifications at the Mont Belvieu, Huntsville, Hampstead, and Provident City Compressor Stations would not cause any significant changes to the noise environment and are not analyzed further.

Land use in the vicinity of the proposed Angleton and Joaquin Compressor Stations consists of agriculture, pasture, residential, and open land. The proposed ambient noise surveys at the NSAs nearest to the Angleton and Joaquin Compressor Stations are summarized in table 9, along with predicted noise impacts.

## **Construction Noise Impacts and Mitigation**

Noise would be generated during construction of the Project. Construction activities in any one area could last from several weeks to several months on an intermittent basis. Construction equipment would be operated on an as-needed basis during this period. While individuals in the immediate vicinity of the construction activities would experience an increase in noise, this effect would be temporary and local at most location. Construction at the Angleton compressor station would take place over several months. Noise mitigation measures that would be employed during construction include ensuring that the sound muffling devices, which are provided as standard equipment by the construction equipment manufacturer, are kept in good working order. If needed, additional noise abatement techniques and other measures could be implemented during the construction phase to mitigate construction noise disturbances at NSAs. Nighttime noise is not expected to increase during construction because most construction activities would be limited to daytime hours. However, we have recommended in section B.6 that the Applicants prepare a Night Construction Plan that

details the impacts and mitigation that would be implemented in the event of construction between 10pm and 7am.

### Operational Noise Impacts and Mitigation

The proposed Angleton and modified compressor stations would generate noise on a continuous basis (i.e., up to 24 hours per day) when operating. The noise impact associated with the compressor stations would attenuate with distance from the compressor stations. The specific operational noise sources associated with the compressor stations and the estimated impacts at the nearest NSAs are identified in Section A.3. The main sources at the Angleton Compressor Station would be the electric motor, compressor, filter separator, meter station, and gas cooler. The main sources of noise from the modifications at the Joaquin Compressor Station would be the pressure regulator.

The Applicants provided ambient noise surveys and acoustical analyses for NSAs nearest to the proposed Angleton and modified Joaquin Compressor Stations, including standard mitigation measures. Existing noise at the Angleton Compressor Station is elevated due to distant noise traffic, distant air traffic and local insect noise (which can cause very elevated noise readings). The results of the noise surveys are presented in table 9.

<b>Table 9 Operation Noise Impacts from the Angleton and Joaquin Compressor Stations</b>					
<b>Nearest NSA / Type</b>	<b>Distance and Direction to NSA</b>	<b>Existing Ambient Sound Level (dBA)</b>	<b>Estimated Sound Level Attributable to compressor station (dBA)</b>	<b>Total Sound Level (Station L<sub>dn</sub> + Ambient L<sub>dn</sub>) (dBA)</b>	<b>Potential Change in Noise Level Attributable to the Station (dB)</b>
<b>Angleton Compressor Station</b>					
NSA #1, (residences)	1,050 ft. (north- northeast)	52.3	48.6	53.8	1.5
NSA #2 (Residence)	1,150 ft. (north)	54.6	47.5	55.4	0.8
NSA #3 (residence)	1,450 ft. (northwest)	54.6	45.0	55.1	0.5
NSA #4 (residences)	1,800 ft. (south)	52.7	42.5	53.1	0.4
NSA #5 (residence)	2,050 ft. (southeast)	50.4	41.0	50.9	0.5
<b>Joaquin Compressor Station</b>					
NSA #1 (Residence)	850 ft (west)	55.5	40.6	55.5	0.0
NSA #2 (Residence)	1,000 ft (northwest)	50.8	34.1	50.8	0.0
NSA #3 (Residence)	1,550 ft (southwest)	56.6	27.1	56.6	0.0

In addition to the operational noise discussed above, there would also be blowdown events during which the compressor stations would generate noise for short periods of time (e.g., 1 to 5 minutes). The Applicants have indicated that these potential blowdown events would be associated with the compressor at the Angleton Compressor Station. The noise of a gas blowdown associated with the station compressor unit would be lower than 55 dBA Ldn at the NSAs. Given the non-routine nature and short-term duration of these blowdown events, we do not believe that blowdown events would be a significant contributor to operational noise from the Project.

Noise impacts at the Joaquin Compressor Station should not result in and increases in noise, however at the Angleton Compressor Station, the station would cause a slight elevation in the local noise environment. There would be elevation of the total noise levels at Angleton above 55 dBA Ldn, however the noise attributable to the Angleton Compressor Station would be below 55dBA Ldn. To verify compliance with the FERC's noise standard and sure that the noise from the Angleton and Joaquin Compressor Stations is not significant, **we recommend that:**

**The Applicants should file a noise survey with the Secretary no later than 60 days after placing the Angleton Compressor Station and Meter Station in service. If a full load condition noise survey is not possible, the Applicants should provide an interim survey at the maximum possible horsepower load and provide the full load survey within 6 months. If the noise attributable to the operation of all of the equipment at the Angleton Compressor Station, including the Meter Station, under interim or full horsepower load conditions exceeds an  $L_{dn}$  of 55 dBA at any nearby NSAs, the Applicants should file a report on what changes are needed and should install the additional noise controls to meet the level within 1 year of the in-service date. The Applicants should confirm compliance with the above requirement by filing a second noise survey with the Secretary no later than 60 days after it installs the additional noise controls.**

**The Applicants should conduct a noise survey at the Joaquin Compressor Station to verify that the noise from all the equipment, including the newly installed equipment, operated at full capacity does not exceed the previously existing noise levels that are at or above an  $L_{dn}$  of 55 dBA at the nearby NSAs. The results of this noise survey should be filed with the Secretary no later than 60 days after placing the modified units in service. If any of these noise levels are exceeded, the Applicants should, within 1 year of the in-service date, implement additional noise control measures to reduce the operating noise level at the NSAs to or below the previously existing noise level. The Applicants should confirm compliance with this requirement by filing a second noise survey with the Secretary no later than 60 days after it installs the additional noise controls.**

We requested that the Applicant provide additional information confirming that the Angleton Compressor Station would not cause a perceptible increase in vibration. The Applicants provided information on the estimated low-frequency noise levels that would be generated by the Angleton Compressor Station during full load operation, and confirmed that the low frequency airborne noise levels at the closest NSAs would be significantly below 65 dB (non-A weighted). Therefore, there should not be any increase in the noise-induced perceptible vibration at any NSA as a result of operating the Angleton Compressor Station equipment.

Similarly, the potential ground vibration due to the operation of this type of electric motor-driven centrifugal compressor unit and associated gas aftercooler should only be perceptible at distances of less than 200 feet, and the nearby NSAs are located significantly farther than 200 feet.

Based on the analyses conducted, and mitigation measures proposed, and our recommended noise conditions, we believe that the Project would not result in significant noise impacts on residents, and the surrounding communities.

## **B.8 RELIABILITY AND SAFETY**

The transportation of natural gas by pipeline involves some incremental risk to the public due to the potential for accidental release of natural gas. The greatest hazard is a fire or explosion following a major pipeline rupture.

Methane, the primary component of natural gas, is colorless, odorless, and tasteless. It is not toxic, but is classified as a simple asphyxiate, possessing a slight inhalation hazard. If breathed in high concentration, oxygen deficiency can result in serious injury or death.

Methane has an auto-ignition temperature of 1,000 degrees Fahrenheit and is flammable at concentrations between 5.0 percent and 15.0 percent in air. An unconfined mixture of methane and air is not explosive, however it may ignite and burn if there is an ignition source. A flammable concentration within an enclosed space in the presence of an ignition source can explode. It is buoyant at atmospheric temperatures and disperses rapidly in air.

### **Safety Standards**

The USDOT is mandated to prescribe minimum safety standards to protect against risks posed by pipeline facilities under Title 49, U.S.C. Chapter 601. The USDOT's Pipeline and Hazardous Materials Safety Administration (PHMSA) administers the national regulatory program to ensure the safe transportation of natural gas and other hazardous materials by pipeline. It develops safety regulations and other approaches to

risk management that ensure safety in the design, construction, testing, operation, maintenance, and emergency response of pipeline facilities. Many of the regulations are written as performance standards which set the level of safety to be attained and allow the pipeline operator to use various technologies to achieve safety. PHMSA's safety mission is to ensure that people and the environment are protected from the risk of pipeline incidents. This work is shared with state agency partners and others at the federal, state, and local level.

Title 49, U.S.C. Chapter 601 provides for a state agency to assume all aspects of the safety program for intrastate facilities by adopting and enforcing the federal standards. A state may also act as USDOT's agent to inspect interstate facilities within its boundaries; however, the USDOT is responsible for enforcement actions.

The USDOT pipeline standards are published in Parts 190-199 of Title 49 of the CFR. Part 192 specifically addresses natural gas pipeline safety issues.

Under a Memorandum of Understanding on Natural Gas Transportation Facilities (Memorandum) dated January 15, 1993, between the USDOT and the FERC, the USDOT has the exclusive authority to promulgate federal safety standards used in the transportation of natural gas. Section 157.14(a)(9)(vi) of the FERC's regulations require that an applicant certify that it will design, install, inspect, test, construct, operate, replace, and maintain the facility for which a Certificate is requested in accordance with federal safety standards and plans for maintenance and inspection. Alternatively, an applicant must certify that it has been granted a waiver of the requirements of the safety standards by the USDOT in accordance with section 3(e) of the Natural Gas Pipeline Safety Act. The FERC accepts this certification and does not impose additional safety standards. If the Commission becomes aware of an existing or potential safety problem, there is a provision in the Memorandum to promptly alert USDOT. The Memorandum also provides for referring complaints and inquiries made by state and local governments and the general public involving safety matters related to pipelines under the Commission's jurisdiction.

The FERC also participates as a member of the USDOT's Technical Pipeline Safety Standards Committee which determines if proposed safety regulations are reasonable, feasible, and practicable.

The pipeline and aboveground facilities associated with the Project must be designed, constructed, operated, and maintained in accordance with the USDOT Minimum Federal Safety Standards in 49 CFR 192. The regulations are intended to ensure adequate protection for the public and to prevent natural gas facility accidents and failures. The USDOT specifies material selection and qualification; minimum design requirements; and protection from internal, external, and atmospheric corrosion.

The USDOT also defines area classifications, based on population density in the vicinity of the pipeline, and specifies more rigorous safety requirements for populated areas. The class location unit is an area that extends 220 yards on either side of the centerline of any continuous 1-mile length of pipeline. The four area classifications are defined below:

- Class 1      Location with 10 or fewer buildings intended for human occupancy.
- Class 2      Location with more than 10 but less than 46 buildings intended for human occupancy.
- Class 3      Location with 46 or more buildings intended for human occupancy or where the pipeline lies within 100 yards of any building, or small well-defined outside area occupied by 20 or more people on at least 5 days a week for 10 weeks in any 12-month period.
- Class 4      Location where buildings with four or more stories aboveground are prevalent.

Class locations representing more populated areas require higher safety factors in pipeline design, testing, and operation. For instance, pipelines constructed on land in Class 1 locations must be installed with a minimum depth of cover of 30 inches in normal soil and 18 inches in consolidated rock. Class 2, 3, and 4 locations, as well as drainage ditches of public roads and railroad crossings, require a minimum cover of 36 inches in normal soil and 24 inches in consolidated rock.

Class locations also specify the maximum distance to a sectionalizing block valve (*e.g.*, 10.0 miles in Class 1, 7.5 miles in Class 2, 4.0 miles in Class 3, and 2.5 miles in Class 4). Pipe wall thickness and pipeline design pressures; hydrostatic test pressures; maximum allowable operating pressure (MAOP); inspection and testing of welds; and frequency of pipeline patrols and leak surveys must also conform to higher standards in more populated areas. Preliminary class locations for the project have been developed based on the relationship of the pipeline centerline to other nearby structures and manmade features. The BIG pipeline would consist of 0.5 mile of Class 1 pipe.

If a subsequent increase in population density adjacent to the right-of-way results in a change in class location for the pipeline, the Applicants would reduce the MAOP or replace the segment with pipe of sufficient grade and wall thickness, if required to comply with the USDOT requirements for the new class location.

The USDOT Pipeline Safety Regulations require operators to develop and follow a written integrity management program that contain all the elements described in 49 CFR 192.911 and address the risks on each transmission pipeline segment. The rule establishes an integrity management program which applies to all high consequence areas (HCA).



The USDOT has published rules that define HCAs where a gas pipeline accident could do considerable harm to people and their property and requires an integrity management program to minimize the potential for an accident. This definition satisfies, in part, the Congressional mandate for USDOT to prescribe standards that establish criteria for identifying each gas pipeline facility in a high-density population area.

The HCAs may be defined in one of two ways. In the first method an HCA includes:

- current class 3 and 4 locations,
- any area in Class 1 or 2 where the potential impact radius<sup>11</sup> is greater than 660 feet and there are 20 or more buildings intended for human occupancy within the potential impact circle<sup>12</sup>, or
- any area in Class 1 or 2 where the potential impact circle includes an identified site.

An identified site is an outside area or open structure that is occupied by 20 or more persons on at least 50 days in any 12-month period; a building that is occupied by 20 or more persons on at least 5 days a week for any 10 weeks in any 12-month period; or a facility that is occupied by persons who are confined, are of impaired mobility, or would be difficult to evacuate.

In the second method, an HCA includes any area within a potential impact circle which contains:

- 20 or more buildings intended for human occupancy, or
- an identified site.

Once a pipeline operator has determined the HCAs along its pipeline, it must apply the elements of its integrity management program to those segments of the pipeline within HCAs. The USDOT regulations specify the requirements for the integrity management plan at section 192.911. The Applicants have not identified any HCAs along the proposed pipeline route.

The pipeline integrity management rule for HCAs requires inspection of the pipeline HCAs every 7 years.

The USDOT prescribes the minimum standards for operating and maintaining pipeline facilities, including the requirement to establish a written plan governing these

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<sup>11</sup> The potential impact radius is calculated as the product of 0.69 and the square root of: the MAOP of the pipeline in psig multiplied by the square of the pipeline diameter in inches.

<sup>12</sup> The potential impact circle is a circle of radius equal to the potential impact radius.

activities. Each pipeline operator is required to establish an emergency plan that includes procedures to minimize the hazards of a natural gas pipeline emergency. Key elements of the plan include procedures for:

- receiving, identifying, and classifying emergency events, gas leakage, fires, explosions, and natural disasters;
- establishing and maintaining communications with local fire, police, and public officials, and coordinating emergency response;
- emergency system shutdown and safe restoration of service;
- making personnel, equipment, tools, and materials available at the scene of an emergency; and
- protecting people first and then property, and making them safe from actual or potential hazards.

The USDOT requires that each operator establish and maintain liaison with appropriate fire, police, and public officials to learn the resources and responsibilities of each organization that may respond to a natural gas pipeline emergency, and to coordinate mutual assistance. The operator must also establish a continuing education program to enable customers, the public, government officials, and those engaged in excavation activities to recognize a gas pipeline emergency and report it to appropriate public officials. The Applicants would provide the appropriate training to local emergency service personnel before the pipeline is placed in service.

### **Pipeline Accident Data**

The USDOT requires all operators of natural gas transmission pipelines to notify the USDOT of any significant incident and to submit a report within 30 days. Significant incidents are defined as any leaks that:

- caused a death or personal injury requiring hospitalization; or
- involve property damage of more than \$50,000 (1984 dollars)<sup>13</sup>.

During the 20 year period from 1995 through 2014, a total of 1,265 significant incidents were reported on the more than 300,000 total miles of natural gas transmission pipelines nationwide.

Additional insight into the nature of service incidents may be found by examining the primary factors that caused the failures. Table 10 provides a distribution of the causal factors as well as the number of each incident by cause.

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<sup>13</sup> \$50,000 in 1984 dollars is approximately \$112,955.73 as of May 2015 (CPI, Bureau of Labor Statistics, 2015)

The dominant causes of pipeline incidents are corrosion and pipeline material, weld or equipment failure constituting 49.6 percent of all significant incidents. The pipelines included in the data set in Table 10 vary widely in terms of age, diameter, and level of corrosion control. Each variable influences the incident frequency that may be expected for a specific segment of pipeline.

The frequency of significant incidents is strongly dependent on pipeline age. Older pipelines have a higher frequency of corrosion incidents and material failure, because corrosion and pipeline stress/strain is a time-dependent process.

<b>Cause</b>	<b>No. of Incidents</b>	<b>Percentage</b>
Corrosion	291	23.0
Excavation <sup>2</sup>	207	16.4
Pipeline material, weld or equipment failure	337	26.6
Natural force damage	147	11.6
Outside force <sup>3</sup>	79	6.2
Incorrect operation	40	3.2
All other causes <sup>4</sup>	164	13.0
<b>TOTAL</b>	<b>1,265</b>	<b>-</b>

1. All data gathered from PHMSA Significant incident files, January 14, 2016.  
<http://www.phmsa.dot.gov/pipeline/library/data-stats/pipelineincidenttrends>  
 2. Includes third party damage  
 3. Fire, explosion, vehicle damage, previous damage, intentional damage  
 4. Miscellaneous causes or unknown causes

The use of both an external protective coating and a cathodic protection system<sup>14</sup>, required on all pipelines installed after July 1971, significantly reduces the corrosion rate compared to unprotected or partially protected pipe.

Outside force, excavation, and natural forces are the cause in 34.2 percent of significant pipeline incidents. These result from the encroachment of mechanical equipment such as bulldozers and backhoes; earth movements due to soil settlement, washouts, or geologic hazards; weather effects such as winds, storms, and thermal strains; and willful damage. Table 11 provides a breakdown of external force incidents by cause.

Older pipelines have a higher frequency of outside forces incidents partly because their location may be less well known and less well marked than newer lines. In addition, the older pipelines contain a disproportionate number of smaller-diameter pipelines;

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<sup>14</sup> Cathodic protection is a technique to reduce corrosion (rust) of the natural gas pipeline through the use of an induced current or a sacrificial anode (like zinc) that corrodes at faster rate to reduce corrosion.

which have a greater rate of outside forces incidents. Small diameter pipelines are more easily crushed or broken by mechanical equipment or earth movement.

Since 1982, operators have been required to participate in "One Call" public utility programs in populated areas to minimize unauthorized excavation activities in the vicinity of pipelines. The "One Call" program is a service used by public utilities and some private sector companies (*e.g.*, oil pipelines and cable television) to provide preconstruction information to contractors or other maintenance workers on the underground location of pipes, cables, and culverts.

<b>Cause</b>	<b>No. of Incidents</b>	<b>Percent of all Incidents</b>
Third party excavation damage	172	13.6
Operator excavation damage	24	1.9
Unspecified excavation damage/previous damage	11	0.9
Heavy rain/floods	72	5.7
Earth movement	34	2.7
Lightning/temperature/high winds	26	2.1
Natural force (other)	15	1.2
Vehicle (not engaged with excavation)	47	3.7
Fire/explosion	8	0.6
Previous mechanical damage	6	0.5
Fishing or maritime activity	7	0.5
Intentional damage	1	0.1
Electrical arcing from other equipment/facility	1	0.1
Unspecified/other outside force	7	0.6
<b>TOTAL</b>	<b>433</b>	<b>-</b>
1. Excavation, Outside Force, and Natural Force from Table 10		

## **Impact on Public Safety**

The service incidents data summarized in table 10 include natural gas transmission system failures of all magnitudes with widely varying consequences.

Table 12 presents the annual injuries and fatalities that occurred on natural gas transmission lines from incidents for the 5 year period between 2010 and 2014. The majority of fatalities from pipelines are due to local distribution pipelines not regulated by FERC. These are natural gas pipelines that distribute natural gas to homes and businesses. In general, these distribution lines are smaller diameter pipes and/or plastic pipes which are more susceptible to damage. Local distribution systems do not have large right-of-ways and pipeline markers common to the FERC regulated natural gas transmission pipelines. Therefore, incident statistics inclusive of distribution pipelines are inappropriate to use when considering natural gas transmission projects.

Year	Injuries	Fatalities
2010 <sup>1</sup>	61	10
2011	1	0
2012	7	0
2013	2	0
2014	1	1

1. All of the fatalities in 2010 were due to the Pacific Gas and Electric pipeline rupture and fire in San Bruno, California on September 9, 2010.

The nationwide totals of accidental fatalities from various anthropogenic and natural hazards are listed in table 13 in order to provide a relative measure of the industry-wide safety of natural gas transmission pipelines. Direct comparisons between accident categories should be made cautiously, however, because individual exposures to hazards are not uniform among all categories. The data nonetheless indicate a low risk of death due to incidents involving natural gas transmission pipelines compared to the other categories. Furthermore, the fatality rate is much lower than the fatalities from natural hazards such as lightning, tornados, or floods.

Type of Accident	Annual No. of Deaths
All accidents	117,809
Motor Vehicle	45,343
Poisoning	23,618
Falls	19,656
Injury at work	5,113
Drowning	3,582
Fire, smoke inhalation, burns	3,197
Floods <sup>2</sup>	81
Lightning <sup>2</sup>	49
Tornado <sup>2</sup>	72
Tractor Turnover <sup>3</sup>	62
Natural gas distribution lines <sup>4</sup>	14
Natural gas transmission pipelines <sup>4</sup>	2

1. All data, unless otherwise noted, reflects 2005 statistics from U.S. Census Bureau, Statistical Abstract of the United States: 2010 (129th Edition) Washington, DC, 2009; <http://www.census.gov/statab>.

2. NOAA National Weather Service, Office of Climate, Water and Weather Services, 30 year average (1985-2014) <http://www.weather.gov/om/hazstats.shtml>

3. Bureau of Labor Statistics, 2007 Census of Occupational Injuries

4. PHMSA significant incident files, January 14, 2016. <http://www.phmsa.dot.gov/pipeline/library/data-stats/pipelineincidenttrends>, 20 year average.

The available data show that natural gas transmission pipelines continue to be a safe, reliable means of energy transportation. From 1995 to 2014, there were an average of 63 significant incidents, 9 injuries and 2 fatalities per year. The number of significant incidents over the more than 303,000 miles of natural gas transmission lines indicates the

risk is low for an incident at any given location. The operation of the Project would represent a very slight increase in risk to the nearby public.

## **B.9 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE**

This section evaluates the effect of the Project on socioeconomics in the area. It also includes an assessment of environmental justice. The assessment includes an evaluation of the proposed Project's effect on local population, employment, the economy, housing, public services, traffic, property values, and tax revenue.

The modifications and upgrades at the five existing stations are very minor in nature, limited to those existing sites, and located various distances from the proposed BIG Interconnect and Angleton Compressor Station where the majority of the work will occur. Therefore, because of the limited scope of this work, we determine that the socioeconomic impacts would be limited, and no further discussion is provided.

We are focusing the analysis on the activities associated with the Angleton, Compressor Station in Brazoria County. The construction workforce for the Project would be 80 workers, most of which will likely be local (i.e., from within the southeast Texas area); therefore, workers are not expected to relocate to the Project area for the relatively short duration of construction. In addition, it is anticipated that the permanent workforce for the new Angleton Compressor Station will consist of one full-time employee. Given the nominal construction and operational workforces required for the BIG Interconnect and Angleton Compressor Station, impacts on the communities located near these facilities would be limited to increased demand for health and safety-related public services, particularly during construction.

The top employment sectors for Brazoria County in terms of employee numbers are: educational services, health care, and social assistance (over 30,000 persons); manufacturing (18,000 persons); and professional, scientific, management, administrative and waste management services (14,000 persons). The addition of 80 temporary workers and 1 permanent employee would have a negligible impact.

There are a total of 13 police departments and 25 fire departments in Brazoria County (Brazoria County 2016, FireDepartment.net 2016). Most of the fire departments in Brazoria County consist of volunteers and some career employees (FireDepartment.net 2016). Brazoria County has four hospitals with over 240 beds (CHI St. Luke's Health 2016, FastHealth Corporation 2016, and Sweeny Community Hospital 2016). In the event of accidents at the facility during construction and operation, we conclude that the Project would not cause a significant burden to emergency services in Brazoria County.

The public services in Brazoria County have adequate infrastructure and services to temporarily accommodate the nominal construction workforce that will commute to

the construction area each day. Because all workers would be hired locally (i.e., from within southeast Texas), there would be no increased demand for services such as schools. In the event of an accident, emergency services provided by police, fire, and medical services could be required by construction workers. The Applicants would require its contractors to have a Health and Safety Plan in place to minimize the potential for on-the-job accidents. The Applicants would continue to work closely with police, fire and medical services in each county or municipality as necessary. The estimated one permanent employee required for Project operations and maintenance would minimally impact existing public services.

## **Traffic**

The Projects would generate roadway traffic related to deliveries of construction supplies, and traffic generated by construction workers along roadways to the Angleton Compressor Station location. The total of 80 construction worker, and deliveries would have a moderate deleterious effect on County Roads 45 and 48 during construction. County Road 48 would be the location of the access road, and we expect slightly more slow-downs in traffic at this location to allow for material deliveries. Outside of these local roads, we do not expect significant traffic issues as the 4-lane divided high Route 88 is about 1 mile from Angleton Compressor Station entrance. During operation, the 1 permanent employee would have a negligible impact on traffic.

Thus, based upon our analysis of socioeconomic factors, we conclude that local and regional impacts to socioeconomic factors would not be significantly affected by construction and operation of the Project.

## **Environmental Justice**

The EPA commented on potential environmental justice impacts from the Project. We used EPA EJSCREEN to analyze the environmental impacts on the communities within ½ mile of the Angleton Compressor Station. We used a ½ mile distance as the operational impacts would be limited to minor fugitive methane emissions as well as noise impacts to the local community. Construction impacts would occur but would have minor and transient impacts to air quality, and noise. Within ½ mile of the boundary of the compressor station, we found an approximate population of 105, with 48% minority, 38% low income, and 10% who may be linguistically isolated.<sup>15</sup>

Overall, the area around the compressor station is more heavily minority and poorer than either the Texas or National average, however, the wider geographic area is

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<sup>15</sup> A household in which all members age 14 years and over speak a non-English language and also speak English less than "very well" (have difficulty with English) is linguistically isolated.

similar in makeup. Considering the insignificant nature of the Project's impacts, and our condition to ensure that operation noise would not result in impacts greater than 55 dBA Ldn at homes, we conclude that the impacts on minority or low-income communities from the Project is neither significant nor would the populations be disproportionately affected.

## **B.10 CUMULATIVE IMPACTS**

The Project area was settled by American and European settlers in the 1800s, during which the primary industries were cattle ranching and agriculture. This continued and by the 1900s most of the Project area's labor force worked in cattle ranching and agriculture. By the first quarter of the 20th century, farming had overtaken the region, with cotton becoming the most important cash crop. Today, the Project area economy is supported by energy, chemical and maritime industries, agriculture, and industrial manufacturing.

In accordance with NEPA, we identified other actions located in the vicinity of the Project facilities and evaluated the potential for a cumulative impact on the environment. As defined by the Council on Environmental Quality (CEQ), a cumulative effect is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions. CEQ guidance states that an adequate cumulative effects analysis may be conducted by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions.

In this analysis, we consider the impacts of past projects as part of the affected environment (environmental baseline) which was described and evaluated in the preceding environmental analysis. However, present effects of past actions that are relevant and useful are considered. Actions located outside the geographic scope are generally not evaluated because their potential to contribute to a cumulative impact diminishes with increasing distance from the Project.

As described in the environmental analysis section of this EA, constructing and operating the Project would temporarily and permanently impact the environment. The Project would impact geology, soils, water resources, vegetation, wetlands, wildlife, cultural resources, visual resources, air quality, noise, and some land uses. However, we conclude that these impacts would not be significant.

We have determined, based on the scope and location of the Project components, that the environmental impacts of the certain Project components are not consequential enough to cause meaningful cumulative impacts with other projects in the area.



Therefore, we will only be analyzing the cumulative impact of the Angleton Compressor Station, BIG Interconnect pipeline, Mont Belvieu Compressor Station, and the Joaquin Compressor Station.

Based on the impacts of the Project as identified and described in this EA, we do not consider cumulative impacts from operational emissions because the primary emissions from Project operations would be fugitive methane emissions. Similarly, we determine that the Project impacts for geology, soils, vegetation, wildlife, fisheries, reliability and safety, and cultural resources would not be sufficient to cause cumulative impacts. We established resource-specific geographic scopes appropriate to assess cumulative impacts for the Project area, as described below

- Construction emissions and noise: Impacts on noise and air quality (including fugitive dust) would be largely limited to areas immediately around active construction areas. Therefore, we established a geographic scope of 0.25 mile.
- Land use, water, wetlands: Because the majority of the Project's impacts on these resources are minor and are associated with fixed point locations, we used a radius of 0.5 mile.
- Socioeconomic: Because socioeconomic data are primarily presented at the county level, we used Brazoria County.
- Environmental Justice: As previously described, noise impacts and impacts on other resources would be highly localized. Therefore, we used a 0.5 mile radius.
- Operational Noise: New or proposed sources that may impact NSAs within 1 mile.

We evaluated other projects/actions that overlap in time and location with construction activities. The nonjurisdictional BIG Pipeline modifications would be outside the Geographic Scope for all Project components.

### **Projects in the Geographic Scope**

We have identified the present and reasonably foreseeable projects or actions that occur within the geographic scopes. These projects were identified by a review of publicly available information; aerial and satellite imagery; and information provided by the Applicants. In addition to the geographic relationship between the Project and other projects in the area, we also consider the temporal relationship between the Project and other projects in the area.

We identified one project that would be cumulative with the clean-air modifications at the Mont Belvieu Compressor Station and construction of the new Angleton Compressor Station: the South Texas Expansion Project proposed by Texas Eastern (STEP, Docket Numbers CP15-499-000 and CP15-499-001). In STEP, Texas Eastern would upgrade existing compression facilities at the Mont Belvieu Compressor Station to reduce emissions, install a new gas measurement enclosure, and modify piping

at the existing launcher/receiver on Texas Eastern Line 16 pipeline. Texas Eastern would also modify the launcher/receiver at the Angleton Station, which is immediately adjacent to the proposed Angleton Compressor Station.

We also evaluated the nonjurisdictional electrical facilities for the proposed Angleton Compressor Station, involving expansion of an existing power line to provide electricity to the site. However considering the short length of 0.21 mile, we determine that the impacts from this project are negligible and are not considered further. We find no other projects within the geographic scope of the Joaquin Compressor Station or the BIG Interconnect.

## **Land Use**

The past, present and reasonably foreseeable future actions would result in temporary disturbances/losses of use and permanent conversions of land uses. As described previously, about 143 acres of land would be disturbed during construction of the Project. About 52 acres of land would be maintained for permanent operation of the Project. Potentially affected land use would include primarily agricultural lands, open land, and commercial/industrial lands. At both the Mont Belvieu and the Angleton Compressor Station locations, the STEP project would be making minor modifications to existing facilities. These impacts are minor, about 7.3 acres of agricultural land and 0.6 acre of industrial land for construction, and 0.6 acre of industrial land for permanent impact adjacent to the Angleton Compressor Station; and about 19 acres of industrial land for construction, and 2.4 acres permanent impacts at the Mont Belvieu station. As these permanent impacts are industrial land within an existing facility as well as a small magnitude, we conclude that cumulative land use impacts are minor.

These modifications could also temporarily and permanently impact visual resources. These impacts include changes to the viewshed resulting from the placement of permanent buildings/structures. Other land use conversions and new structures built in support of other projects within the geographic scope could potentially result in a cumulative impact. However, as the modifications adjacent to the Angleton and Mont Belvieu Compressor Stations are minor, and at existing facilities, we have determined that the impacts of the Project on land use and visual resources when added to the impacts of other past, present and reasonably foreseeable future actions would not result in a significant cumulative impact.

## **Water and Wetland Impacts**

The impacts from the STEP project have the potential to affect waterbodies, and wetlands at the locations adjacent to the Angleton and Mont Belvieu Compressor Stations. As the STEP project would not impact wetlands at either location, there is no

possibility of cumulative impacts. Waterbodies have the potential to be cumulatively affected, either through direct impacts or through sedimentation. The E&SCP used for the Project, and the adherence to Texas Eastern's E&SCP for the STEP Project would minimize runoff and sediment transport from the construction workspaces. The STEP Project and the Project would both affect ditches at the Mont Belvieu Compressor Station. They were classified as non-flowing linear features absent of an Ordinary High Water Mark. Although the seven drainage features occur within the boundary of the proposed staging areas, no impacts are anticipated to occur during construction or operation of the proposed facilities. Texas Eastern indicated in its STEP Project application that it would cross the drainage features with timber mats to avoid construction related impacts. Therefore, we conclude that there would be no cumulative water or wetland impacts.

## **Air Quality**

Construction of reasonably foreseeable future projects and activities within the geographic scope that may impact air quality. Construction would involve the use of heavy equipment that would generate emissions of air contaminants, fugitive dust, and noise. Construction and operation of the Angleton Compressor Station would contribute cumulatively to air quality impacts.

Construction equipment emissions would result in short-term emissions that would be highly localized, temporary, and intermittent. There is only one project that is located within 0.25-mile of the Project that would have construction and operation activities occurring at the same time as the Project. The facilities from the STEP Project adjacent to the Angleton Compressor Station would only emit minor fugitive emissions during operation, and the modifications at the Mont Belvieu Compressor Station would entail emission reduction which should reduce overall regional air impacts. Other projects with construction occurring concurrently are located sufficiently far away so as not to result in cumulative air quality impacts. For regional cumulative air quality, we confirmed that the construction emissions from construction activities are far below the General Conformity Applicability Threshold, as seen in tables 5 and 6. We conclude that these emissions are in compliance with the State Implementation Plan for the Brazoria-Houston-Galveston AQCR. Therefore with the minor construction, and operation emissions, we conclude that there would be no significant cumulative impacts to local or regional air quality.

## **Noise**

The Project could contribute to cumulative noise impacts as a result of both construction and operation of the Project. Noise impacts due to construction would be temporary, highly localized, and attenuate quickly as distance from the noise source increases. There are no projects that are located close enough to the Project to contribute to

cumulative noise impacts during construction with the exception of the potential overlaps at the Angleton Compressor Station and the Mont Belvieu Compressor Stations. Although these may overlap, the scope from the STEP Project is minor and while the impacts around each project would be greater together, these impacts would not be significant.

Operation of the Angleton and Joaquin Compressor Stations would contribute to noise impacts within the nearby community. There are no new or proposed projects that we found within geographic scope to cumulatively add to the noise at the Joaquin Compressor Station.

Modifications from the STEP Project would add facilities at the Angleton and Mont Belvieu Station. The analysis completed in section B.7 quantifies predicted noise levels, including estimates of Project-related noise based on proposed equipment and existing ambient noise levels collected by noise surveys. At the Angleton and Mont Belvieu Stations, the modifications from the STEP project have the potential to cumulative add to the local noise impacts. The modifications at the Mont Belvieu Compressor Station are minor air quality modifications, and we do not expect noise impacts from the modification to have cumulative impacts with the Project. The noise impact of the existing facilities at the Angleton Site should be accounted for within the baseline ambient noise survey that the Applicants provided. The noise impacts from operation of the STEP facilities adjacent to the Angleton Compressor Station should be minor. Therefore, we conclude that cumulative noise impacts in the area of the Angleton, and Mont Belvieu Compressor Stations would not be significant.

### **Socioeconomics and Environmental Justice**

As stated in the Socioeconomics sections, the Project would have limited county and regional impact, and would only have potential cumulative impacts at the Angleton Compressor Station. The STEP Project would modify the Angleton Station, adjacent to the Angleton Compressor Station. There would be no operational impacts due to the minor modifications, however there could be construction overlap which would slightly increase impacts due to traffic, and noise to nearby residents. We don't expect these cumulative socioeconomic impacts to be significant. Similarly, with the limited environmental and socioeconomic impacts to the local residents near the Angleton Compressor Station from the Project and the STEP Project, we conclude that the cumulative impacts on minority or low-income communities would not be significant, nor would the populations be disproportionately affected.

## **Cumulative Impact Conclusion**

Overall, the cumulative impacts of the Project are anticipated to be minimal due to the limited scope of the Project, as well as the limited number of resource impacts from other projects identified within the Project's geographic scopes that could occur during the construction and operation of the Project.

We conclude that cumulative impacts of the Project when combined with past, present, and reasonably foreseeable projects would have minimal cumulative effects on all resources.

## **SECTION C – ALTERNATIVES**

In accordance with NEPA, we evaluated alternatives to the Applicants' proposed action. Our evaluation criteria for selecting potentially preferable alternatives are:

- ability to meet the objectives of the proposed action (i.e., providing additional capacity to transport 322 MMcf/day of natural gas to a delivery point on the BIG pipeline near Stratton Ridge),
- technically and economically feasible and practical; and
- provides a significant environmental advantage over the proposed action.

Our evaluation of alternatives is based on Project-specific information provided by the Applicants; concerned parties; publicly available information; our consultations with federal and state resource agencies; and our expertise and experience regarding the siting, construction, and operation of natural gas transmission facilities and their potential impact on the environment.

### **Evaluation Process**

Through environmental comparison and application of our professional judgment, each alternative is considered to a point where it becomes clear if the alternative could or could not meet the three evaluation criteria. To ensure a consistent environmental comparison and to normalize the comparison factors, we generally use desktop sources of information (e.g., publicly available data, GIS data, aerial imagery) and assume the same right-of-way widths and general workspace requirements. Where appropriate, we also use site-specific information (e.g., field surveys or detailed designs). Our environmental analysis and this evaluation consider quantitative data (e.g., acreage or mileage) and uses common comparative factors such as total length, amount of collocation, and land requirements.

The alternatives were reviewed against the evaluation criteria in the sequence presented above. The first consideration for including an alternative in our analysis is whether or not it could satisfy the stated purpose of the Project. An alternative that cannot achieve the purpose for the project cannot be considered as an acceptable replacement for the project. All of the alternatives considered here are able to meet the Project purpose stated in section A.2 of this EA.

Many alternatives are technically and economically feasible. Technically practical alternatives, with exceptions, would generally require the use of common construction methods. An alternative that would require the use of a new, unique or experimental construction method may not be technically practical because the required technology is not available or unproven. Economically practical alternatives would result in an action that generally maintains the price competitive nature of the proposed action. Generally, we do not consider the cost of an alternative as a critical factor unless the added cost to

design, permit, and construct the alternative would render the project economically impractical.

Determining if an alternative provides a significant environmental advantage requires a comparison of the impacts on each resource as well as an analysis of impacts on resources that are not common to the alternatives being considered. In comparing the impact between resources, we also considered the degree of impact anticipated on each resource. Ultimately, an alternative that results in equal or minor advantages in terms of environmental impact would not compel us to shift the impacts from the current set of landowners to a new set of landowners.

One of the goals of an alternatives analysis is to identify alternatives that avoid significant impacts. In section B of this EA, we evaluated each environmental resource potentially affected by the Project and concluded that constructing and operating the Project would not significantly impact these resources. Consistent with our conclusions, the value gained by further reducing the (not significant) impacts of the Project when considered against the cost of relocating the route/facility to a new set of landowners was also factored into our evaluation.

## **C.1 NO-ACTION ALTERNATIVE**

Under the no-action alternative, new compression and modifications to existing compression or appurtenant facilities would not be constructed and the Project objectives to provide additional natural gas supplies and firm transportation services would not be met. The facilities would continue to operate under current conditions and the environmental impacts identified in this EA would not occur. If the Project is not built, the Applicants' customers would likely seek alternatives to meet increasing demand of natural gas supplies, which could include the construction and operation of other facilities. Because of the limited footprint of the proposed action, we conclude that it is likely that the other facilities that would need to be constructed to replace the Project would have equal or greater impacts. Therefore, the no-action alternative would not offer a significant environmental advantage over the proposed Project. In addition, the no-action alternative would not meet the objectives of the proposed action to supply natural gas.

## **C.2 SYSTEM ALTERNATIVES**

The purpose of identifying and evaluating system alternatives is to determine whether the environmental impacts associated with the construction and operation of the proposed Project could be avoided or reduced by using existing, modified, or other proposed facilities rather than constructing new facilities.

The Applicants have indicated that due to its unique transportation paths and its long distance mileages between the receipt points and the delivery point of the Project, no single existing interstate or intrastate pipeline systems are strategically situated to meet the purpose and need of the proposed Project without extensive modifications and/or system additions. The only system alternative that closely replicates the Texas Eastern and BIG transportation paths would be the combination of the existing Gulf South Pipeline, Boardwalk Field Services and the under-construction Coastal Bend Header project. However, this system alternative would require extensive system upgrades and modifications on the Gulf South Pipeline to handle the increased flow reversal together with an additional 24,000 hp at the Wilson Compressor Station on the Coastal Bend Header project, currently under-construction. Therefore this system alternative would result in much greater impacts to environmental resources than the proposed Project. Also, the Applicants state that transportation rates on this alternative would render it economically uncompetitive.

In conclusion, we did not identify system alternatives that would meet the Project objectives and provide a significant environmental advantage.

### **C.3 PIPELINE ROUTE ALTERNATIVES**

The BIG Interconnect was sited based on the location of the proposed new Angleton Compressor Station, and is based on landowner preference. The Applicants stated that they reviewed alternative configurations of the BIG Interconnect north and south of the proposed Project route; however, the current route is consistent with the request of the landowner on the eastern portion of the pipeline route. Due to the limited environmental impact associated with the BIG Interconnect and landowner preference, other route alternatives were not considered.

### **C.4 COMPRESSOR STATION ALTERNATIVES**

We did not consider alternative locations for the proposed modifications to existing compressor stations with the exception of the Joaquin Compressor Station modifications. For most facilities, expansion within existing facilities offers minimal impacts and we did not identify alternative locations that could provide a significant environmental advantage. In this analysis, we consider alternatives to the proposed site for the proposed Angleton Compressor Station. Additionally, we consider alternatives to the modifications at the Joaquin Compressor Station facilities, primarily for noise and air impacts.

The capacity of a pipeline is primarily a function of the diameter of the pipeline. Once the capacity of the pipeline is reached, the pipeline capacity needs to be expanded in order to transport additional gas. This expansion can be achieved by building a new



compressor station or adding a new pipeline parallel to the existing pipeline (i.e., looping). We evaluated both approaches.

In evaluating compressor station siting alternatives, we considered:

- **Footprint** – The site size needs to be adequate for constructing and operating the facilities. Larger sites can provide opportunity to set the facility back from surrounding properties.
- **Site Use** – Vacant land is preferred as pre-existing development on a site may present an unreasonable obstacle to securing control.
- **Availability** – Although section 7(h) of the NGA grants a Certificate holder the right of eminent domain, we prefer that the site be available (such as by purchase, lease, or restrictive easement).
- **Access Road and Lateral Pipeline Length** – We consider the location of the site relative to existing roads and the associated pipeline, as the location would determine the length of the permanent access road and whether a pipeline lateral is required to connect the compressor station to the mainline facilities.
- **Engineering Constraints** – The general location of a compressor station is determined in large part by hydraulic modeling of the natural gas flow in the pipeline. A compressor station must be sited within a MP range determined by the gas flow modeling in order to sustain the pressure needed to deliver the gas.
- **Environmental** – We consider environmental impacts on resources that may include, but not limited to, noise receptors, prime farmland, wetlands and water resources, vegetation, critical habitat, threatened and endangered species, cultural resources, visual resources, geologic hazards and surrounding land use.

### **Angleton Compressor Station Alternative**

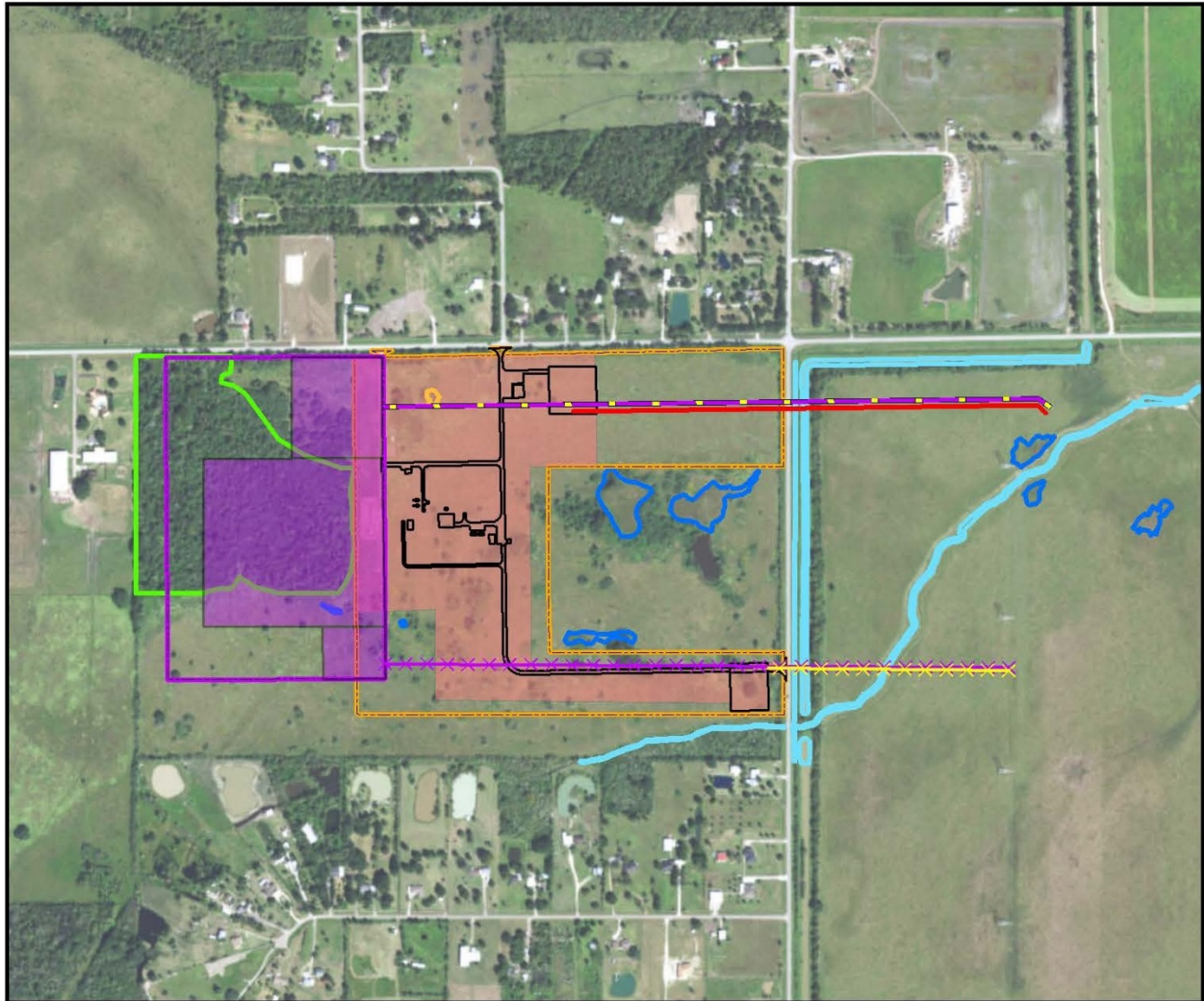
In order to reduce impacts on environmental resources, we requested that the Applicants provide at least one viable alternative for the Angleton Compressor Station location. After studying the system hydraulics, the Applicants determined that the location of the proposed Angleton Compressor Station site could potentially be shifted up to two miles north or up to five miles south along Texas Eastern's mainline Line 16 pipeline from the proposed site without impacting the compressor size or the operation of the unit. However, a review of land plots for sale within these parameters found none available which were large enough to support the construction and operation of the proposed compressor station.

The Applicants did provided information for an alternative located at its existing 40-acre Angleton Station site (alternative site) to the west of and adjacent to the currently proposed Angleton Compressor Station location (proposed site). The position of the alternative site over the No. 16 pipeline would minimize construction and operations

impacts to landowners, simplify construction logistics, and decrease the length of pipeline needed to deliver gas to the BIG System pipeline. Both sites are located wholly within the 500-year floodplain, so the alternative site would not provide any environmental advantage regarding impacts on flood storage capacity. Table 14 provides a comparison of the proposed site with the alternative site based on a review of available data and aerial imagery.

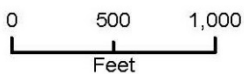
<b>Environmental Factor</b>	<b>Unit of Measurement</b>	<b>Proposed Angleton Compressor Station</b>		<b>Alternative Angleton Compressor Station</b>	
		<b>Construction</b>	<b>Operation</b>	<b>Construction</b>	<b>Operation</b>
Forested Wetlands	Acres	0	0	21.4	12.4
Scrub/Shrub Wetlands	Acres	0.1	0.1	<0.1	<0.1
Forested Uplands	Acres	1.0	0.5	2.4	2.4
Prime Farmland or Farmlands of Statewide Importance	Acres	71.4	45.1	45.1	27.4
NSAs within 1 mile	Number		73		73
Powerline Length	Miles		0.2		0.6
Length of Pipeline Lateral	Miles		0.5		0.7

For most of the resources, the impacts are similar. The proposed site affects more prime farmland. However, for forested wetlands, the alternative would affect 21.4 acres, whereas the proposed would not affect any. The alternative also would impact 1.4 more acres of forested upland. Therefore, based upon these environmental factors, the proposed Angleton Compressor Station is recommended as the preferred site since it meets the hydraulic design criteria and minimizes adverse impacts on wetlands. Therefore, we conclude that the alternative site would not provide a significant environmental advantage and do not consider it further.



Scale: 1" = 833'

*This information is for environmental review purposes only.*



**Figure 2**  
 Alternative Compressor Station Location  
 Angleton Compressor Station and BIG Interconnect  
 Stratton Ridge Expansion Project  
 Texas Eastern Transmission, LP  
 Brazoria, County, Texas

Date: 06/01/2017

Revised: 6/2/2017

## **Alternative to Joaquin Compressor Station**

Without modifying the station piping at the Joaquin Compressor Station, the gas supply would not be able to flow through the station to the final destination for the customer. The Applicants' hydraulic study indicated that it would require either to install 1,600 hp at the greenfield Lufkin Compressor Station site or install 88.0 miles of 36-inch-diameter pipeline looping between Joaquin and Huntsville Compressor Stations in order to effectively replace the proposed piping modifications at Joaquin Compressor Station (see Figure 10-2). The construction of a greenfield compressor station or the installation of the pipeline looping as the alternative to the station piping modifications at an existing compressor station would increase disturbance to local residents and businesses, and would cause more environmental impact. Much more than the minor noise and air emissions from the modifications to the Joaquin Compressor Station site. Therefore, we conclude that the alternatives considered would not provide a significant environmental advantage and are not considered further.

We reviewed alternatives to the Applicants proposal based on our independent analysis. During our review, we received no requests from stakeholders to consider alternatives. Our analysis concludes that no system or alternative site alternatives provide a significant environmental advantage over the Project. In summary, we have determined that the proposed action, as modified by our recommended mitigation measures, is the preferred alternative that can meet the Project's objectives.

## SECTION D – STAFF CONCLUSIONS AND RECOMMENDATIONS

Based on the analysis in this EA, we have determined that if the Applicant constructs and operates the proposed facilities in accordance with its application and supplements, and the staff's recommended mitigation measures listed below, approval of the Project would not constitute a major federal action significantly affecting the quality of the human environment. We recommend that the Commission Order contain a finding of no significant impact and include the measures listed below as conditions in any authorization the Commission may issue to the Applicants.

1. The Applicants shall follow the construction procedures and mitigation measures described in its application and supplements (including responses to staff data requests) and as identified in the EA, unless modified by the Order. The Applicants must:
  - a. request any modification to these procedures, measures, or conditions in a filing with the Secretary;
  - b. justify each modification relative to site-specific conditions;
  - c. explain how that modification provides an equal or greater level of environmental protection than the original measure; and
  - d. receive approval in writing from the Director of OEP **before using that modification.**
2. The Director of OEP, or the Director's designee, has delegated authority to address any requests for approvals or authorizations necessary to carry out the conditions of the order, and take whatever steps are necessary to ensure the protection of all environmental resources during construction and operation of the Project. This authority shall allow:
  - a. the modification of conditions of the Order;
  - b. stop work authority; and
  - c. the imposition of any additional measures deemed necessary to ensure continued compliance with the intent of the conditions of the Order as well as the avoidance or mitigation of unforeseen adverse environmental impact resulting from project construction and operation.
3. **Prior to any construction**, the Applicants shall file an affirmative statement with the Secretary, certified by a senior company official, that all company personnel, EIs, and contractor personnel would be informed of the EI's authority and have been or would be trained on the implementation of the environmental mitigation measures appropriate to their jobs **before** becoming involved with construction and restoration activities.
4. The authorized facility locations shall be as described in the EA, as supplemented by filed maps and/or alignment sheets. **As soon as they are available, and**

**before the start of construction**, the Applicants shall file with the Secretary any revised detailed survey alignment maps/sheets at a scale not smaller than 1:6,000 with station positions for all facilities approved by the Order. All requests for modifications of environmental conditions of the Order or site-specific clearances must be written and must reference locations designated on these alignment maps/sheets.

The Applicants exercise of eminent domain authority granted under Natural Gas Act (NGA) section 7(h) in any condemnation proceedings related to the Order must be consistent with these authorized facilities and locations. The Applicants' right of eminent domain granted under NGA section 7(h) does not authorize it to increase the size of its natural gas pipeline and facilities to accommodate future needs or to acquire a right-of-way for a pipeline to transport a commodity other than natural gas.

5. The Applicants shall file with the Secretary detailed alignment maps/sheets and aerial photographs at a scale not smaller than 1:6,000 identifying all route realignments or facility relocations, and staging areas, storage/equipment yards, new access roads, and other areas that would be used or disturbed and have not been previously identified in filings with the Secretary. Approval for each of these areas must be explicitly requested in writing. For each area, the request must include a description of the existing land use/cover type, documentation of landowner approval, whether any cultural resources or federally listed threatened or endangered species would be affected, and whether any other environmentally sensitive areas are within or abutting the area. All areas shall be clearly identified on the maps/sheets/aerial photographs. Each area must be approved in writing by the Director of OEP **before construction in or near that area**.

This requirement does not apply to extra workspace allowed by the FERC's *Upland Erosion Control, Revegetation, and Maintenance Plan* and/or minor field realignments per landowner needs and requirements that do not affect other landowners or sensitive environmental areas such as wetlands.

Examples of alterations requiring approval include all workspace realignments and facility location changes resulting from:

- a. implementation of cultural resources mitigation measures;
- b. implementation of endangered, threatened, or special concern species mitigation measures;
- c. recommendations by state regulatory authorities; and
- d. agreements with individual landowners that affect other landowners or could affect sensitive environmental areas.

6. **Within 60 days of the acceptance of this authorization and before construction begins**, the Applicants shall file an Implementation Plan with the Secretary for review and written approval by the Director of the OEP. The Applicants must file revisions to the plan as schedules change. The plan shall identify:
  - a. how the Applicants would implement the construction procedures and mitigation measures described in its application and supplements (including responses to staff data requests), identified in the EA, and required by the Order;
  - b. how the Applicants would incorporate these requirements into the contract bid documents, construction contracts (especially penalty clauses and specifications), and construction drawings so that the mitigation required at each site is clear to onsite construction and inspection personnel;
  - c. the number of EIs assigned per spread, and how the company would ensure that sufficient personnel are available to implement the environmental mitigation;
  - d. company personnel, including EIs and contractors, who would receive copies of the appropriate material;
  - e. the location and dates of the environmental compliance training and instruction the Applicants would give to all personnel involved with construction and restoration (initial and refresher training as the project progresses and personnel change);
  - f. the company personnel (if known) and specific portion of the Applicants' organization having responsibility for compliance;
  - g. the procedures (including use of contract penalties) the Applicants would follow if noncompliance occurs; and
  - h. for each discrete facility, a Gantt or PERT chart (or similar project scheduling diagram), and dates for:
    - i. the completion of all required surveys and reports;
    - ii. the environmental compliance training of onsite personnel;
    - iii. the start of construction; and
    - iv. the start and completion of restoration.
7. The Applicants shall employ at least one EI. The EI shall be:
  - a. responsible for monitoring and ensuring compliance with all mitigation measures required by the Order and other grants, permits, certificates, or other authorizing documents;
  - b. responsible for evaluating the construction contractor's implementation of the environmental mitigation measures required in the contract (see condition 6 above) and any other authorizing document;
  - c. empowered to order correction of acts that violate the environmental conditions of the Order, and any other authorizing document;

- d. a full-time position, separate from all other activity inspectors;
  - e. responsible for documenting compliance with the environmental conditions of the Order, as well as any environmental conditions/permit requirements imposed by other federal, state, or local agencies; and responsible for maintaining status reports.
8. Beginning with the filing of its Implementation Plan, the Applicants shall file updated status reports with the Secretary on a **monthly basis until all construction and restoration activities are complete**. On request, these status reports would also be provided to other federal and state agencies with permitting responsibilities. Status reports shall include:
- a. an update on the Applicants' efforts to obtain the necessary federal authorizations;
  - b. the construction status of the project, work planned for the following reporting period, and any schedule changes for stream crossings or work in other environmentally sensitive areas;
  - c. a listing of all problems encountered and each instance of noncompliance observed by the EI during the reporting period both for the conditions imposed by the Commission and any environmental conditions/permit requirements imposed by other federal, state, or local agencies;
  - d. a description of the corrective actions implemented in response to all instances of noncompliance, and their cost;
  - e. the effectiveness of all corrective actions implemented;
  - f. a description of any landowner/resident complaints that may relate to compliance with the requirements of the Order, and the measures taken to satisfy their concerns; and
  - g. copies of any correspondence received by the Applicants from other federal, state, or local permitting agencies concerning instances of noncompliance, and the Applicants' response.
9. The Applicants must receive written authorization from the Director of the OEP **before commencing construction of any Project facilities**. To obtain such authorization, the Applicants must file with the Secretary documentation that it has received all applicable authorizations required under federal law (or evidence of waiver thereof).
10. The Applicants must receive written authorization from the Director of OEP **before placing the Project into service**. Such authorization would only be granted following a determination that rehabilitation and restoration of the areas affected by the Project are proceeding satisfactorily.



11. **Within 30 days of placing the authorized facilities in service**, the Applicants shall file an affirmative statement with the Secretary, certified by a senior company official:
  - a. that the facilities have been constructed in compliance with all applicable conditions, and that continuing activities would be consistent with all applicable conditions; or
  - b. identifying which of the Certificate conditions the Applicants has complied with or would comply with. This statement shall also identify any areas affected by the project where compliance measures were not properly implemented, if not previously identified in filed status reports, and the reason for noncompliance.
12. **Prior to starting any construction activities at the Angleton Compressor Station between 10pm and 7am**, the Applicants shall file with the Secretary, for review and approval by the Director of OEP, a Night Construction Plan that details the projected noise, dust, and light pollution impacts, and identifies the measures that the Applicants will implement to mitigate these impacts.
13. The Applicants shall **not begin** construction of the Project facilities or use of contractor yards, ATWS, or new or to-be-improved access roads **until** a revised Unanticipated Discovery Plan is filed with the Secretary that includes tribal contact information for the Tonkawa Tribe of Oklahoma for notification of the discovery of archaeological sites, including human remains, during Project activities.

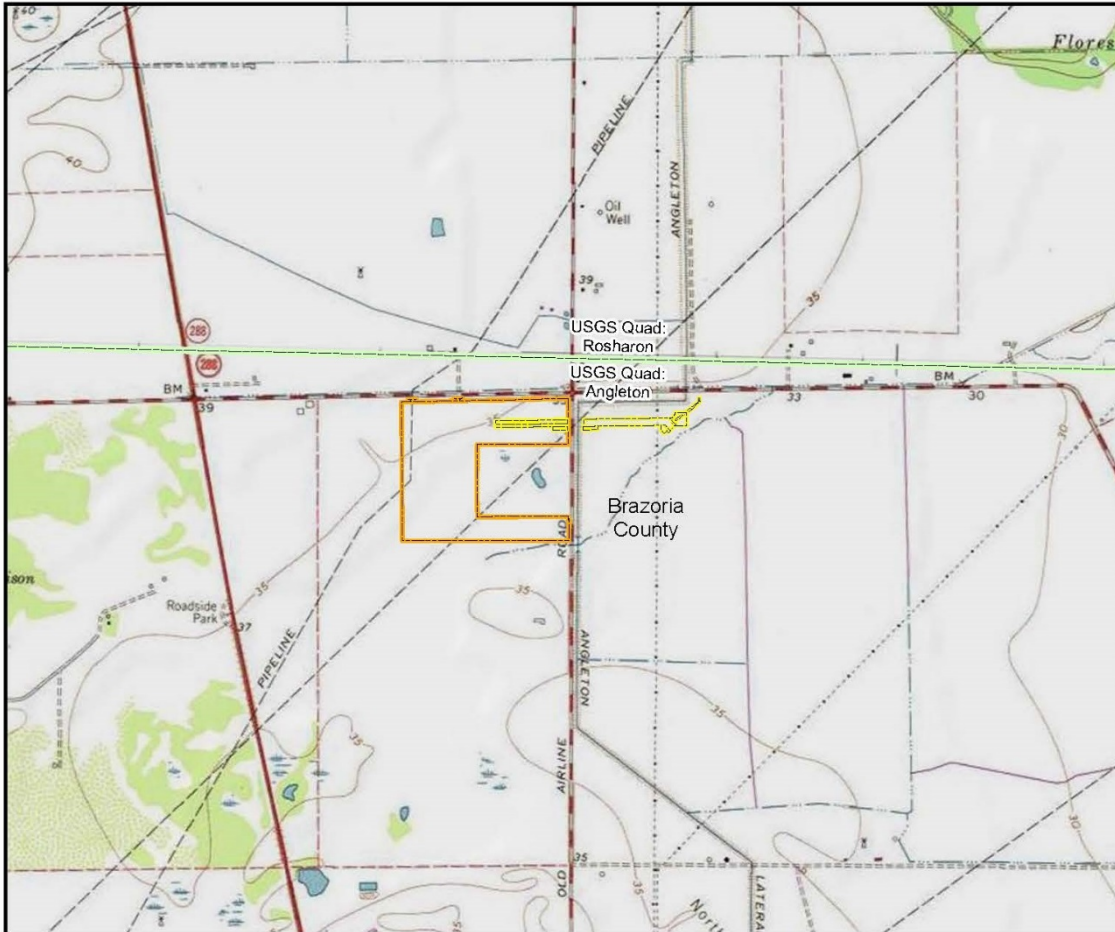
All material filed with the Commission that contains location, character, and ownership information about cultural resources must have the cover and any relevant pages therein clearly labeled in bold lettering “**CUI//PRIV – DO NOT RELEASE.**”

14. The Applicants shall file a noise survey with the Secretary **no later than 60 days** after placing the Angleton Compressor Station and Meter Station in service. If a full load condition noise survey is not possible, the Applicants shall provide an interim survey at the maximum possible horsepower load and provide the full load survey **within 6 months**. If the noise attributable to the operation of all of the equipment at the Angleton Compressor Station, including the Meter Station, under interim or full horsepower load conditions exceeds an  $L_{dn}$  of 55 dBA at any nearby NSAs, the Applicants shall file a report on what changes are needed and shall install the additional noise controls to meet the level **within 1 year** of the in-service date. The Applicants shall confirm compliance with the above requirement by filing a second noise survey with the Secretary **no later than 60 days** after it installs the additional noise controls.

15. The Applicants shall conduct a noise survey at the Joaquin Compressor Station to verify that the noise from all the equipment, including the newly installed equipment, operated at full capacity does not exceed the previously existing noise levels that are at or above an  $L_{dn}$  of 55 dBA at the nearby NSAs. The results of this noise survey shall be filed with the Secretary **no later than 60 days** after placing the modified units in service. If any of these noise levels are exceeded, the Applicants shall, **within 1 year** of the in-service date, implement additional noise control measures to reduce the operating noise level at the NSAs to or below the previously existing noise level. The Applicants shall confirm compliance with this requirement by filing a second noise survey with the Secretary **no later than 60 days** after it installs the additional noise controls.

## **APPENDIX 1**




### **Site of Proposed Angleton Compressor Station and BIG Interconnect**

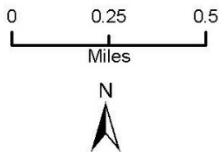


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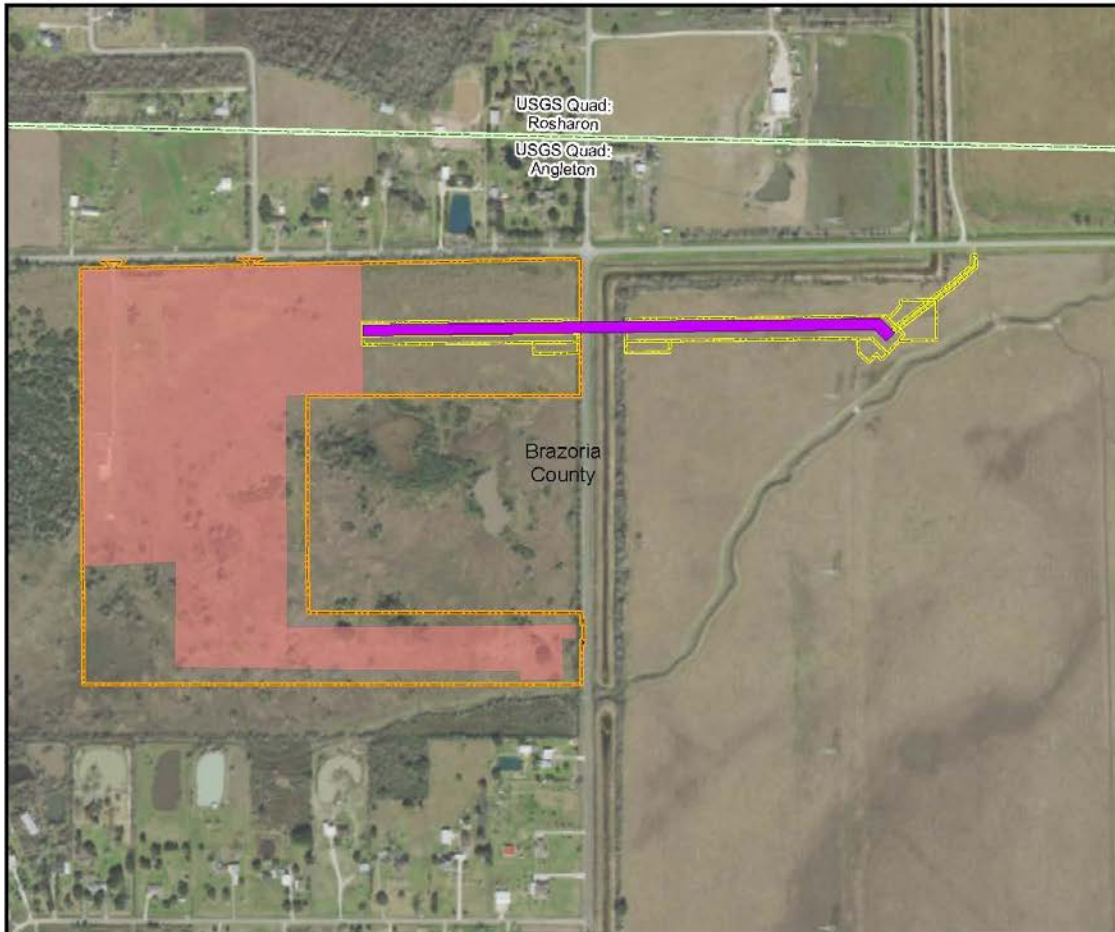
*This information is for environmental review purposes only.*

**Legend**

-  Angleton Compressor Station Construction Workspace
-  BIG Interconnect
-  USGS 7.5 min quad



USGS Topographic Location Map  
 Angleton Compressor Station and BIG Interconnect  
 Stratton Ridge Expansion Project  
 Texas Eastern Transmission, LP  
 Brazoria, County, Texas

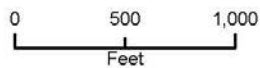


Scale: 1" = 667'

*This information is for environmental review purposes only.*

**Legend**

- Permanent Angleton Compressor Station
- Permanent Right-of-Way
- Angleton Compressor Station Construction Workspace
- BIG Interconnect Construction Workspace
- USGS 7.5 min quad

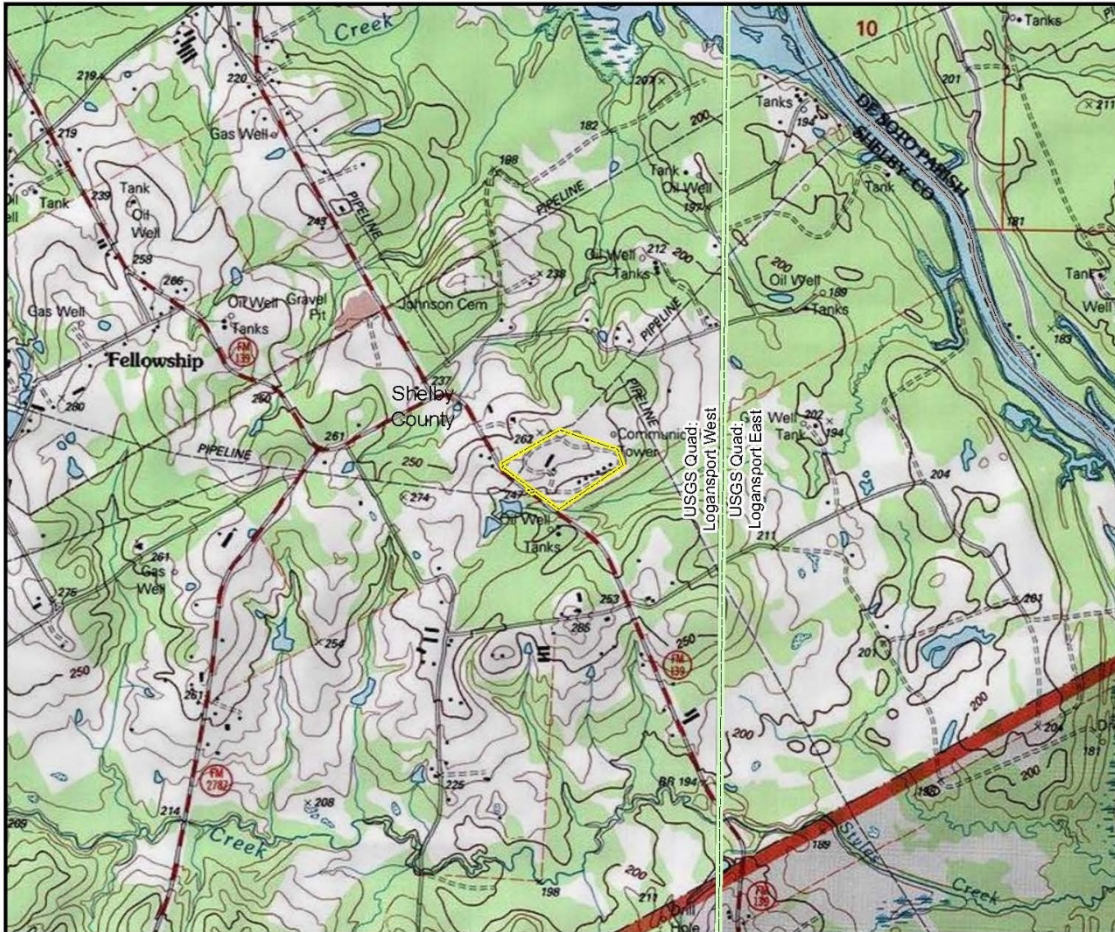


**Aerial Location Map**  
**Angleton Compressor Station and BIG Interconnect**  
**Stratton Ridge Expansion Project**  
**Texas Eastern Transmission, LP**  
**Brazoria, County, Texas**

## **APPENDIX 2**

### **Site of Proposed Joaquin, Mont Belvieu Compressor Station Modifications**



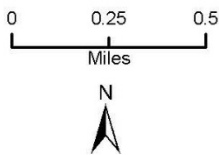
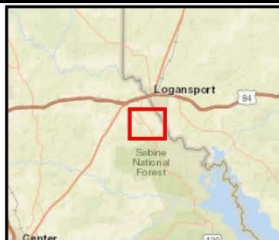


Scale: 1" = 2,000'

This information is for environmental review purposes only

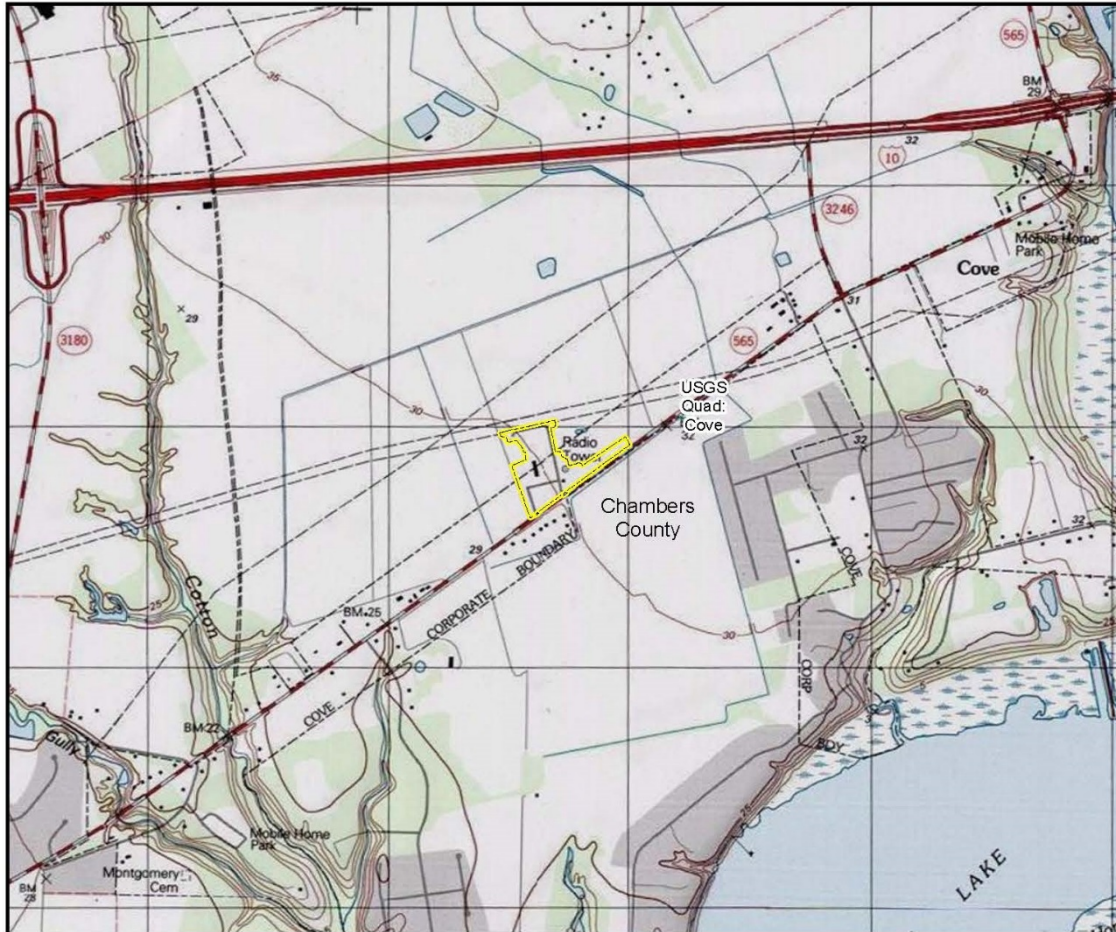
**Legend**

- Project Location
- USGS 7.5 min quad



USGS Topographic Location Map  
 Joaquin Compressor Station  
 Stratton Ridge Expansion Project  
 Texas Eastern Transmission, LP  
 Shelby, County, Texas



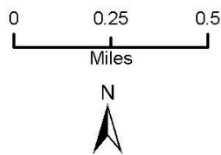
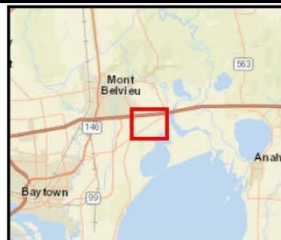


Scale: 1" = 2,000'

This information is for environmental review purposes only

**Legend**

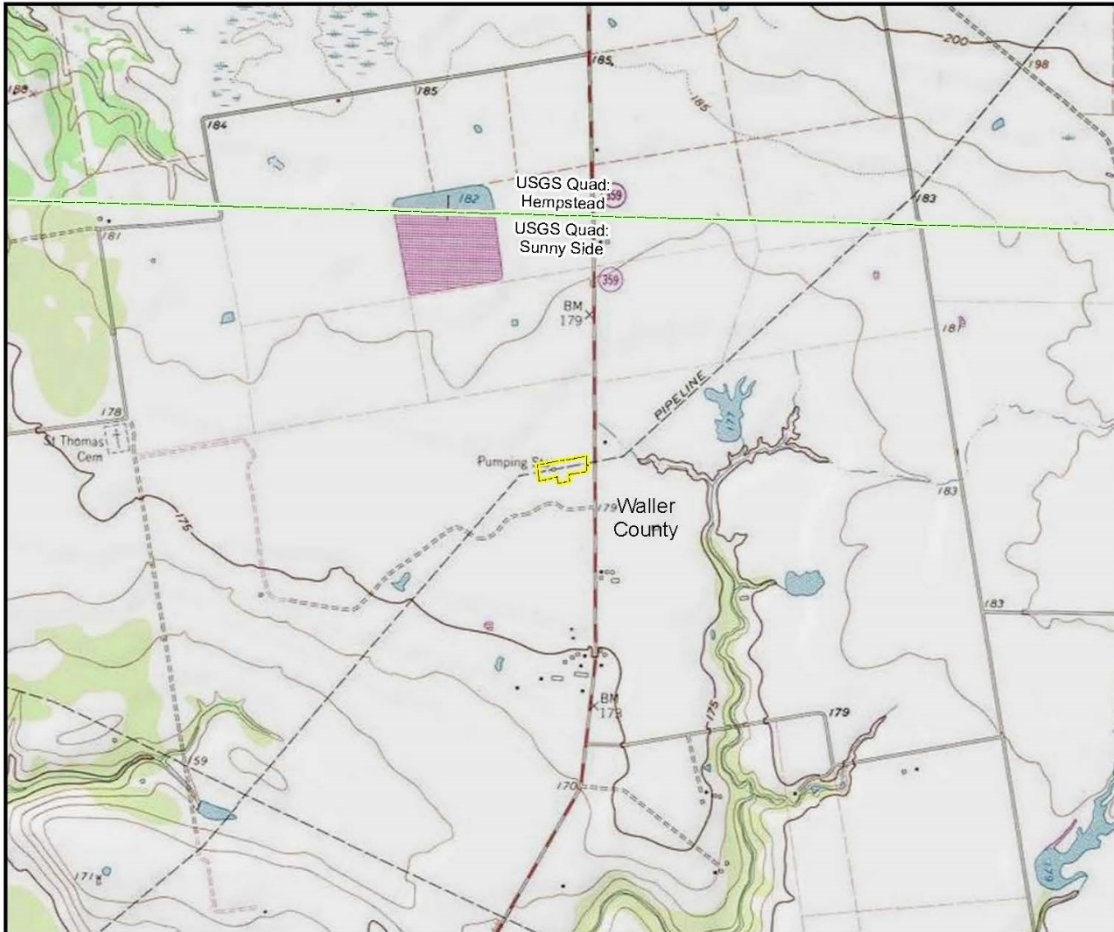
- Project Location
- USGS 7.5 min quad



USGS Topographic Location Map  
 Mont Belvieu Compressor Station  
 Stratton Ridge Expansion Project  
 Texas Eastern Transmission, LP  
 Chambers, County, Texas





**APPENDIX 3**  
**Site of the Hempstead, Huntsville, and Provident City**  
**Compressor Station Modifications**

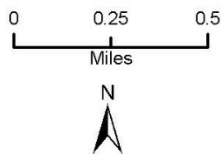


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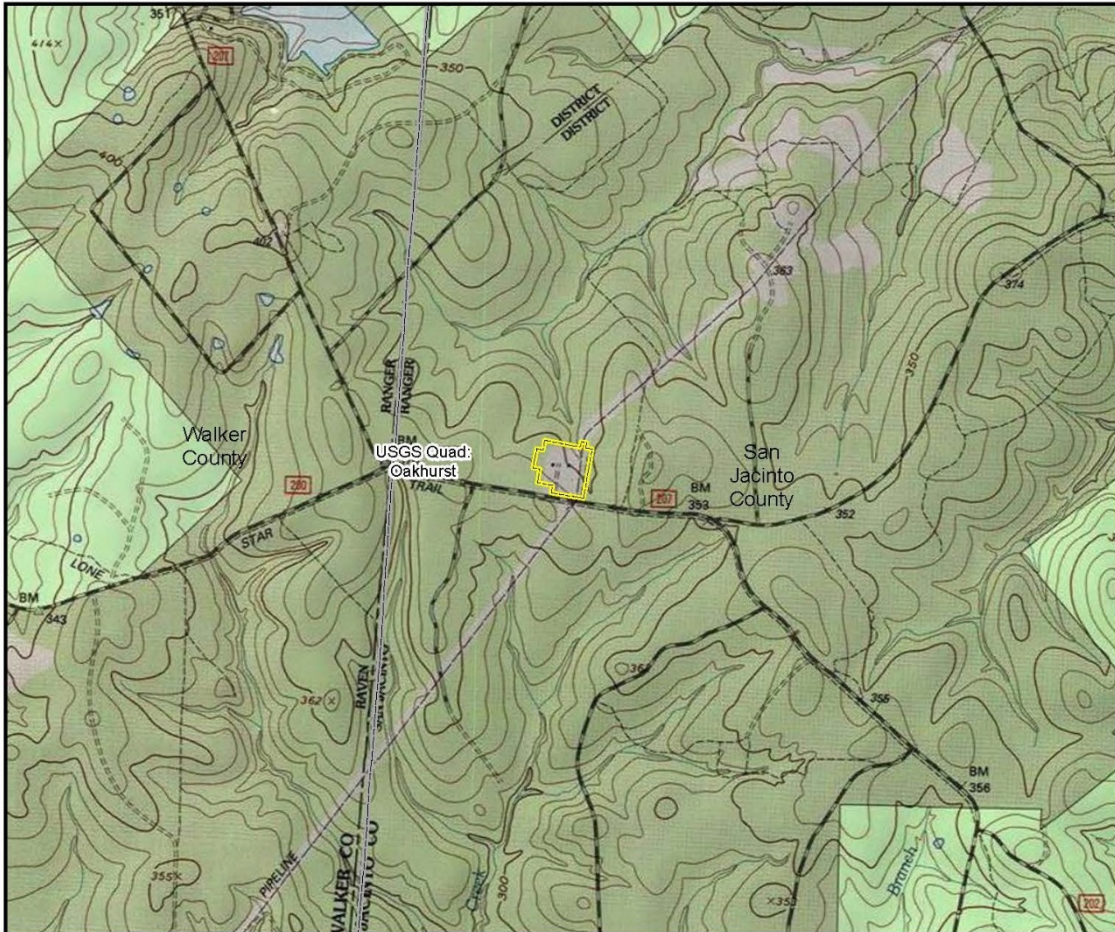
This information is for environmental review purposes only.

**Legend**

-  Project Location
-  USGS 7.5 min quad



USGS Topographic Location Map  
 Hempstead Station  
 Stratton Ridge Expansion Project  
 Texas Eastern Transmission, LP  
 Waller, County, Texas

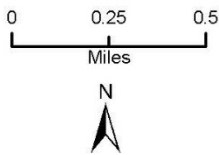


Scale: 1" = 2,000'

This information is for environmental review purposes only.

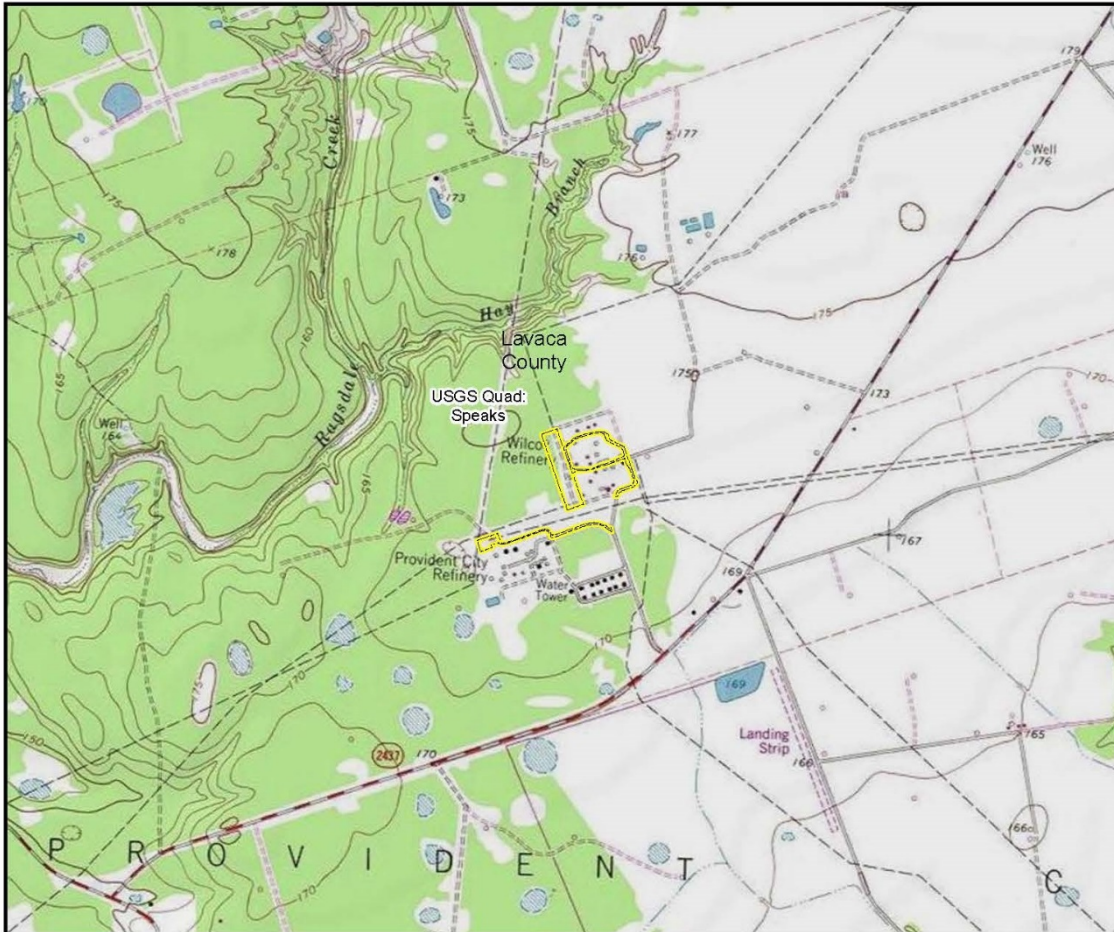
**Legend**

- Project Location
- USGS 7.5 min quad



USGS Topographic Location Map  
 Huntsville Compressor Station  
 Stratton Ridge Expansion Project  
 Texas Eastern Transmission, LP  
 San Jacinto, County, Texas



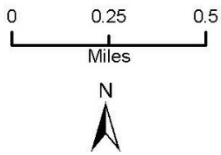
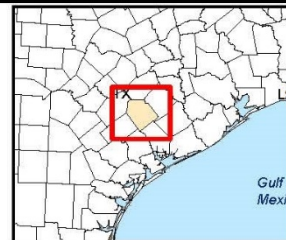


Scale: 1" = 2,000'

This information is for environmental review purposes only.

**Legend**

- Project Location
- USGS 7.5 min quad



USGS Topographic Location Map  
 Provident City Station  
 Stratton Ridge Expansion Project  
 Texas Eastern Transmission, LP  
 Lavaca, County, Texas

## APPENDIX 4 – LIST OF SPECIAL STATUS SPECIES

<b>Appendix 4</b> <b>Federal and State Listed Species identified as potentially occurring in Brazoria, Shelby, Chambers, San Jacinto, Waller, and Lavaca Counties, Texas.</b>				
Common Name	Scientific Name	Federal Listing	State Listing	Comments
<b>Amphibians</b>				
Houston toad	<i>Bufo houstonensis</i>	Endangered	Endangered	<b>No Effect.</b> All Project activities would be within previously disturbed and currently maintained facility boundaries. No suitable habitat
<b>Reptiles</b>				
Alligator snapping turtle	<i>Macrochelys temminckii</i>	--	Threatened	<b>No Effect.</b> No marine or shoreline areas, including mudflats, dunes, beaches, bays, estuaries, lagoons, lakes, or rivers, would be affected by the Project's workspaces. There is no suitable habitat within the Project workspaces.
Hawksbill sea turtle	<i>Eretmochelys imbricata</i>	Endangered	Endangered	<b>No Effect.</b> No marine or shoreline areas, including mudflats, dunes, beaches, bays, estuaries, lagoons, lakes, or rivers, would be affected by the Project's workspaces. There is no suitable habitat within the Project
Cagle's map turtle	<i>Graptemys caglei</i>	--	Threatened	<b>No Effect.</b> No marine or shoreline areas, including mudflats, dunes, beaches, bays, estuaries, lagoons, lakes, or rivers, would be affected by the Project's workspaces. There is no suitable habitat within the Project
Green sea turtle	<i>Chelonia mydas</i>	Threatened	Threatened	<b>No Effect.</b> No marine or shoreline areas, including mudflats, dunes, beaches, bays, estuaries, lagoons, lakes, or rivers, would be affected by the Project's workspaces. There is no suitable habitat within the Project
Kemp's Ridley sea turtle	<i>Lepidochelys kempii</i>	Endangered	Endangered	<b>No Effect.</b> No marine or shoreline areas, including mudflats, dunes, beaches, bays, estuaries, lagoons, lakes, or rivers, would be affected by the Project's workspaces. There is no suitable habitat within the Project
Leatherback sea turtle	<i>Dermochelys coriacea</i>	Endangered	Endangered	<b>No Effect.</b> No marine or shoreline areas, including mudflats, dunes, beaches, bays, estuaries, lagoons, lakes, or rivers, would be affected by the Project's workspaces. There is no suitable habitat within the Project

Loggerhead sea turtle	<i>Caretta caretta</i>	Threatened	Threatened	<b>No Effect.</b> No marine or shoreline areas, including mudflats, dunes, beaches, bays, estuaries, lagoons, lakes, or rivers, would be affected by the Project's workspaces. There is no suitable habitat within the Project workspaces.
Louisiana pine snake	<i>Pituophis ruthveni</i>	Candidate	--	<b>No Effect.</b> All Project activities would be within previously disturbed and currently maintained facility boundaries. No suitable habitat.
Northern scarlet snake	<i>Cemophora coccinea copei</i>	--	Threatened	<b>No Effect.</b> No suitable habitat.
Texas horned	<i>Phrynosoma cornutum</i>	--	Threatened	<b>No Effect.</b> No suitable habitat.
Texas tortoise	<i>Gopherus berlandieri</i>	--	Threatened	<b>No Effect.</b> No suitable habitat.
Timber rattlesnak	<i>Crotalus horridus</i>	--	.	<b>No Effect.</b> No suitable habitat.
<b>Fish</b>				
Blackside darter	<i>Percina maculata</i>	--	Threatened	<b>No Effect.</b> No suitable habitat.
Creek	<i>Erimyzon oblongus</i>	--	Threatened	<b>No Effect.</b> No suitable habitat.
Paddlefish	<i>Polyodon spathula</i>	--	Threatened	<b>No Effect.</b> No suitable habitat.
Smalltooth h sawfish	<i>Pristis pectinata</i>	--	Endangered	<b>No Effect.</b> No suitable habitat.
<b>Birds</b>				
American peregrine	<i>Falco peregrinus anatum</i>	--	Threatened	<b>No Effect.</b> Migratory stopover habitat is not present.
Peregrine falcon	<i>Falco peregrinus</i>	--	Threatened	<b>No Effect.</b> Migratory stopover habitat is not present..
Attwater's greater prairie-	<i>Tympanuchus cupido attwateri</i>	--	Endangered	<b>No Effect.</b> No suitable habitat.
Bachman's sparrow	<i>Aimophila aestivalis</i>	--	Threatened	<b>No Effect.</b> All Project activities in Shelby County would be within previously disturbed and currently maintained facility boundaries. No
Bald eagle	<i>Haliaeetus leucocephalus</i>	-- <sup>a</sup>	Threatened	<b>No Effect.</b> No large lakes or rivers with sufficient woody habitat are located in proximity to the Project.
Eskimo curlew	<i>Numenius borealis</i>	--	Endangered	<b>No Effect.</b> No suitable habitat.
Interior least tern	<i>Sterna antillarum</i>	Endangered	Endangered	<b>No Effect.</b> No suitable habitat.
Piping plover	<i>Charadrius melodus</i>	Threatened	Threatened	<b>No Effect.</b> No suitable habitat.
Red knot	<i>Calidris canutus</i>	Threatened	--	<b>No Effect.</b> No suitable habitat.
Red-cockaded	<i>Calidris canutus rufa</i>	Endangered	Endangered	<b>No Effect.</b> No suitable habitat.
Reddish egret	<i>Egretta rufescens</i>	--	Threatened	<b>No Effect.</b> No suitable habitat.
Sooty tern	<i>Sterna fuscata</i>	--	Threatened	<b>No Effect.</b> No suitable habitat.
Swallow-tailed kite	<i>Elanoides forficatus</i>	--	Threatened	<b>No Effect.</b> No suitable habitat.
White-faced ibis	<i>Plegadis chihi</i>	--	Threatened	<b>No Effect.</b> No suitable habitat.

White-tailed	<i>Buteo albicaudatus</i>	--	Threatened	<b>No Effect.</b> No suitable habitat.
White-faced ibis	<i>Plegadis chihi</i>	--	Threatened	<b>No Effect.</b> No suitable habitat.
Whooping crane	<i>Grus americana</i>	Endangered	Endangered	<b>No Effect.</b> No suitable habitat.
Wood stork	<i>Mycteria americana</i>	--	Threatened	<b>No Effect.</b> No suitable habitat.
<b>Mammals</b>				
Black bear	<i>Ursus americanus</i>	--	Threatened	<b>No Effect.</b> Project areas located in fenced and maintained areas.
Jaguarundi	<i>Herpailurus yaguarondi</i>	--	Endangered	<b>No Effect.</b> No suitable habitat
Louisiana black bear	<i>Ursus americanus luteolus</i>	--	Threatened	<b>No Effect.</b> Project areas located in fenced and maintained areas.
Ocelot	<i>Leopardus pardalis</i>	--	Endangered	<b>No Effect.</b> No suitable habitat.
Rafinesque's big-eared bat	<i>Corynorhinus rafinesquii</i>	--	Threatened	<b>No Effect.</b> No suitable habitat.
Red wolf	<i>Canis rufus</i>	--	Endangered	<b>No Effect.</b> No suitable habitat.
West Indian manatee	<i>Trichechus manatus</i>	Endangered	Endangered	<b>No Effect.</b> No marine or shoreline areas, including mudflats, dunes, beaches, bays, estuaries, lagoons, lakes, or rivers, would be affected by the Project's workspaces. There is no suitable habitat within the Project workspaces.
<b>Freshwater Mussels</b>				
Louisiana pigtoe	<i>Pleurobema riddellii</i>	--	Threatened	<b>No Effect.</b> No marine or shoreline areas, including mudflats, dunes, beaches, bays, estuaries, lagoons, lakes, or rivers, would be affected by the Project's workspaces. There is no suitable habitat within the Project
Sandbank pocketbook	<i>Lampsilis satura</i>	--	Threatened	<b>No Effect.</b> No marine or shoreline areas, including mudflats, dunes, beaches, bays, estuaries, lagoons, lakes, or rivers, would be affected by the Project's workspaces. There is no suitable habitat within the Project workspaces.
Southern hickorynut	<i>Obovaria jacksoniana</i>	--	Threatened	<b>No Effect.</b> No marine or shoreline areas, including mudflats, dunes, beaches, bays, estuaries, lagoons, lakes, or rivers, would be affected by the Project's workspaces. There is no suitable habitat within the Project
Smooth pimpleback	<i>Quadrula houstonensis</i>	Candidate	Threatened	<b>No Effect.</b> No marine or shoreline areas, including mudflats, dunes, beaches, bays, estuaries, lagoons, lakes, or rivers, would be affected by the Project's workspaces. There is no suitable habitat within the Project
Texas fawnsfoot	<i>Truncilla macrodon</i>	Candidate	Threatened	<b>No Effect.</b> No marine or shoreline areas, including mudflats, dunes, beaches, bays, estuaries, lagoons, lakes, or rivers, would be affected by the Project's workspaces. There is no suitable habitat within the Project workspaces.

Texas heelsplitter	<i>Potamilus amphichaenus</i>	--	Threatened	<b>No Effect.</b> No marine or shoreline areas, including mudflats, dunes, beaches, bays, estuaries, lagoons, lakes, or rivers, would be affected by the Project's workspaces. There is no suitable habitat within the Project workspaces.
Texas pigtoe	<i>Fusconaia askewi</i>	--	Threatened	<b>No Effect.</b> No marine or shoreline areas, including mudflats, dunes, beaches, bays, estuaries, lagoons, lakes, or rivers, would be affected by the Project's workspaces. There is no suitable habitat within the Project
Triangle pigtoe	<i>Fusconaia lananensis</i>	--	Threatened	<b>No Effect.</b> No marine or shoreline areas, including mudflats, dunes, beaches, bays, estuaries, lagoons, lakes, or rivers, would be affected by the Project's workspaces. There is no suitable habitat within the Project



## APPENDIX 5 - LIST OF PREPARERS

<b>NAME</b>	<b>EDUCATION</b>	<b>RESPONSIBILITY</b>
Tomasi, Eric	B.S. Aerospace Engineering, 1994 Boston University	Project Manager – Air Quality, Noise, Pipeline Safety, Geology, Soils, Socioeconomics, Land use, Cumulative Impacts, Alternatives
Muñoz, Kelley	B.S. Environmental Science, 1997 Lubbock Christian University	Water Resources, Vegetation, Wildlife, Threatened and Endangered Species
Friedman, Paul	M.A History, 1980 University of California – Santa Barbara B.A. Anthropology and History, 1976, University of California – Santa Barbara	Cultural Resources