Horizon™
Environmental Services, Inc.

Biological Assessment
Golden Spread Electrical Cooperative, Inc.
Antelope Station Expansion
Hale County, Texas
HJN 120128 04 BA

Prepared for

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ACRONYMS AND ABBREVIATIONS

AERMIC	American Meteorological Society/Environmental Protection Agency Regulatory Model Improvement Committee
AERMOD	AERMIC dispersion modeling system
AERMAP	AERMOD terrain processor
AERMET	AERMOD meteorological preprocessor
AHPS	Advanced Hydrologic Prediction Service
AVO	Audio/Visual/Olfactory
BGEPA	Bald and Golden Eagle Protection Act
BACT	Best Available Control Technology
BA	Biological Assessment
CO_2	Carbon Dioxide
CO	Carbon Monoxide
CR	County Road
DEM	Digital Elevation Model
Edge	Edge Engineering and Science
ESL	Effects Screening Levels
EO	Element of Occurrence
ESA	Endangered Species Act
EPA	Environmental Protection Agency
ERCOT	Electric Reliability Council of Texas
FEMA	Federal Emergency Management Agency
GE	General Electric
GSEC	Golden Spread Electric Cooperative, Inc.
GPM	Gallons per minute
GHG	Greenhouse gases
GEP	Good Engineering Practice
H_2S	Hydrogen Sulfide
Horizon	Horizon Environmental Services, Inc.
IH	Interstate Highway
km	Kilometer
Pb	Lead
LAER	Lowest Achievable Emission Rate
MSS	Maintenance, Startup and Shutdown
MW	Megawatt
MWh	Megawatt hour
MBTA	Migratory Bird Treaty Act
MMBTU	Million British Thermal Units
MMPA	Marine Mammal Protection Act
Murin	Murin Environmental, Inc.
NAAQS	National Ambient Air Quality Standards
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System Program
NWS	National Weather Service
NWI	National Wetland Inventory
NGL	Natural Gas Liquids
NRCS	Natural Resources Conservation Service

NO_2	Nitrogen Dioxide
NO_X	Nitrogen Oxides
O&M	Operations and maintenance
O_3	Ozone
PM	Particulate Matter
$PM_{2.5}$	Particulate Matter that is 2.5 micrometers or less in size
PM_{10}	Particulate Matter that is 10 micrometers or less in size
ppm	Parts per million
ppmvd	Parts per million, volumetric dry
PSD	Prevention of Significant Deterioration
POTW	Publicly Owned Treatment Works
RO	Reverse Osmosis
SIL	Significant Impact Level
SWPPP	Stormwater Pollution Prevention Plan
SO_2	Sulfur Dioxide
SF_6	Sulfur Hexafluoride
TCEQ	Texas Commission on Environmental Quality
TNDD	Texas Natural Diversity Database
TPWD	Texas Parks and Wildlife Department
TPDES	Texas Pollutant Discharge Elimination System
US	United States
USDA	US Department of Agriculture
USACE	US Army Corps of Engineers
USFWS	US Fish and Wildlife Service
USGS	US Geological Survey
VOC	Volatile Organic Compound

EXECUTIVE SUMMARY

Golden Spread Electric Cooperative, Inc. (GSEC) owns and operates the Antelope Station, an electrical generation facility near Abernathy in Hale County, Texas. Antelope Station is currently a 168-megawatt (MW) generating facility comprising 18 quick start gas-fired engine generators. GSEC proposes to install a General Electric (GE) 7F 5-Series gas turbine in a simple-cycle application at the existing Antelope Station. GSEC expects the new facility to provide primarily peaking and intermediate power needs in a highly cyclical operation. Under the Environmental Protection Agency's (EPA) Prevention of Significant Deterioration (PSD) rules, the project to install a gas turbine at Antelope Station is required to obtain a pre-construction air quality permit for greenhouse gas (GHG) emissions from the EPA. GSEC submits this Biological Assessment (BA) in support in of its PSD GHG permit application with the EPA for the proposed project. The proposed project is also subject to PSD review by the Texas Commission on Environmental Quality (TCEQ) for non-GHG emissions. Authorizations for those emissions are being sought separately from the TCEQ.

The 7F 5-Series turbine is the latest development of GE's F-class turbine technology, which is used in over 1100 gas turbines worldwide. As a result of various improvements, the 7F 5-Series turbine achieves an efficiency above 38.7% in a simple-cycle application. The unit can produce up to 202 MW in cold-weather conditions, and nominally 190.1 MW in peak summer operation. Compared to other F class turbines, the 5-Series turbine also has improvements in start-up and turndown capability, ramp-up rate, and lifecycle costs in peaking, cyclic, and steady-state operation. During normal start-up, the 5-Series turbine will achieve 50% capacity load in 30 minutes, and thereafter operate at design emission limits. During "peaking start-up," a combination of measures allows the unit to achieve 75% load in about 10 minutes, full load operation in about 11.5 minutes, and to operate within design emission limits within 22 minutes.

Power from this unit may be used to provide emergency and other power to both the Southwest Power Pool and the Electric Reliability Council of Texas (ERCOT). GSEC requests that the review of this permit application and issuance of a permit be completed by the end of 2013, to enable construction to be completed by the first quarter of 2015. Production from this unit is one critical element of GSEC's response to predicted system power shortages and demands in 2015 and later years.

This BA is a complete evaluation of the potential environmental effects the proposed project may have on federally protected species and/or their potential habitats. Protected species evaluated in this document include threatened, endangered, and candidate species, migratory birds, and bald and golden eagles. This BA includes a field survey and an evaluation of potential environmental impacts based on air quality modeling results, construction information, and Texas Pollutant Discharge Elimination System[1] (TPDES) information provided

[1]The State of Texas assumed the authority to administer the National Pollutant Discharge Elimination System (NPDES) program in Texas on September 14, 1998.

by GSEC and Murin Environmental, Inc. (Murin),GSEC's air quality permitting consultant for the project.

Antelope Station is located north of County Road (CR) 315, east of Interstate Highway (IH) 27 and bounded on the east by CR P in Hale County, Texas. The location is approximately 1.6 miles north of the City of Abernathy.

Federally protected species considered in this BA include the whooping crane, bald and golden eagles, gray wolf, black-footed ferret, migratory birds, and marine mammals. Marine mammals are ecologically restricted to marine and estuarine habitats. The closest marine or estuarine habitat to the action area (Matagorda Bay) is approximately 500 miles to the southeast; as such, marine mammals were excluded from further consideration.

One field survey was completed, which included a pedestrian protected species habitat evaluation of the proposed action area and the portions of the surrounding facility that are not restricted by stringent safety requirements; a windshield habitat evaluation of all publicly accessible habitats within a 1.0-kilometer (km) radius of the project area; and an aerial photography map evaluation of all areas within a 1.0-km radius. Data were collected to describe resident vegetation communities and assess the potential for occurrence of protected species. The only habitat types observed in the area surrounding the Antelope Station Facility were improved pastureland and cropland.

In support of this BA and the air quality permit applications, Edge Engineering and Science (Edge), performed atmospheric dispersion modeling of air pollutants that will be emitted by the proposed project. All predicted impacts from the project on the ambient air, as well as existing concentrations in the area, are demonstrated to comply with both the primary and secondary National Ambient Air Quality Standards (NAAQS). Primary standards provide public health protection, including protecting the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards provide public welfare protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings. All the predicted ambient air concentrations due to the project are less than the Significant Impact Levels (SILs) designated by the EPA for each pollutant and averaging period for which SILs have been established[2].

The area demonstrating ambient air impacts above the SILs is usually used to establish the project action area. Since the project demonstrates no significant ambient air impacts, the action area was established with a default maximum radius of 1.0 km. The only area thus potentially affected by the project is observed agricultural habitat type. This habitat

[2]On January 22, the DC Circuit Court of Appeals vacated the SILs for particulate matter with diameters less than 2.5 microns ($PM_{2.5}$). At this time, therefore, there are no SILs for $PM_{2.5}$; there are also no SILs for ozone. For both of these pollutants, however, the ambient air impacts of the project, when combined with the background ambient air concentrations in the surrounding environment, have been found to comply with the NAAQS. The project impacts of $PM_{2.5}$ were also found to be well below the SIL which had been established prior to it being vacated.

could potentially be utilized by migratory birds. However, no federally protected species have been observed in these areas and none are likely to utilize these areas.

The maximum predicted concentrations of all modeled pollutants are also well below 10% of the respective TCEQ Effects Screening Levels (ESLs)[3]. Accordingly, no adverse welfare impacts are expected to occur within the action area as the result of the project's emissions of these pollutants.

The construction of the proposed project will have no direct or indirect impact on federally protected species habitat. GSEC will utilize Best Available Control Technology (BACT) to control emissions and thus minimize impacts to the surrounding environment to the maximum extent practicable. The effectiveness of these emission controls is reflected in the insignificant air quality impacts predicted by the atmospheric dispersion modeling.

According to the US Fish and Wildlife Service (USFWS), there is no designated critical habitat for any federally listed threatened or endangered species within at least 50 miles of the action area.

Based on the information gathered for this BA, Horizon biologists recommend that a finding of "no effect" be accepted for the federally protected whooping crane, gray wolf (extirpated), black-footed ferret (extirpated), and marine mammals. No take of migratory birds, or bald or golden eagles, can reasonably be anticipated as a result of this project.

Note: The term "take" represents the more specific language of the Endangered Species Act, Migratory Bird Treaty Act, Bald and Golden Eagle Protection Act, and Marine Mammal Protection Act, described below in Sections 2.2, 2.3, 2.4, and 2.5, respectively.

[3]Effects Screening Levels are screening levels used in TCEQ's air permitting process to evaluate ambient air impacts. They are used to evaluate the potential for effects to occur as a result of exposure to concentrations of air contaminants. ESLs are based on data concerning health effects, the potential for odors to be a nuisance, and effects on vegetation. They are not ambient air standards. If predicted airborne levels of a contaminant do not exceed the screening level, adverse health or welfare effects are not expected. If predicted ambient levels of contaminants exceed the screening levels, it does not necessarily indicate a problem but rather triggers a more detailed review.

1.0 INTRODUCTION

Golden Spread Electric Cooperative, Inc. (GSEC) owns and operates the Antelope Station, an electrical generation facility near Abernathy in Hale County, Texas. Antelope Station is currently a 168-megawatt (MW) generating facility comprising 18 quick start gas-fired engine generators. GSEC proposes to install a General Electric (GE) 7F 5-Series gas turbine in a simple-cycle application at the existing Antelope Station. GSEC expects the new facility to provide primarily peaking and intermediate power needs in a highly cyclical operation. Under the Environmental Protection Agency's (EPA) Prevention of Significant Deterioration (PSD) rules, the project to install a gas turbine at Antelope Station is required to obtain a pre-construction air quality permit for greenhouse gas (GHG) emissions from the EPA. GSEC submits this Biological Assessment (BA) in support in of its PSD GHG permit application with the EPA for the proposed project. The proposed project is also subject to PSD review by the Texas Commission on Environmental Quality (TCEQ) for non-GHG emissions. Authorizations for those emissions are being sought separately from the TCEQ.

This BA is a complete evaluation of the potential environmental impacts the proposed project may have on federally protected species and/or their potential habitats. Protected species evaluated in this document include threatened, endangered, and candidate species, migratory birds, bald and golden eagles, and marine mammals. Federal agency regulations for protected species evaluated in this BA are described in Section 2.0.

The purpose of this BA is to research, evaluate, analyze, and document the potential for direct and indirect effects, interdependent and interrelated actions, and cumulative effects on federally protected species as a result of the proposed project. This BA includes a pedestrian protected species habitat evaluation of the proposed construction area, a windshield and aerial photography map assessment of habitats in a 1.0-km radius of the proposed construction area, and an evaluation of potential environmental impacts based on air quality modeling results, construction information, operation information, and Texas Pollutant Discharge Elimination System (TPDES) information provided by GSEC and Murin Environmental, Inc. (Murin), GSEC's air quality permitting consultant for the project.

The conclusion of this BA will include a recommended determination of effect on federally protected species and their habitats. Three possible determinations offered by the US Fish and Wildlife Service (USFWS) for the purpose of BAs and Evaluations are described below (USFWS, 2013a).

1. **No effect** – A "no effect" determination means that there are absolutely no effects from the proposed action, positive or negative, to listed species. A "no effect" determination does not include effects that are insignificant (small in size), discountable (extremely unlikely to occur), or beneficial. "No effect" determinations do not require written concurrence from the USFWS unless the National Environmental Policy Act analysis is an Environmental Impact Statement. However, the USFWS may request copies of no effect assessments for its files.

2. **May affect, not likely to adversely affect** – A "may affect, not likely to adversely affect" determination may be reached for a proposed action where all effects are beneficial, insignificant, or discountable. Beneficial effects have contemporaneous positive effects without any adverse effects to the species or habitat (i.e., there cannot be a "balancing," where the benefits of the proposed action would be expected to outweigh the adverse effects – see below). Insignificant effects relate to the size of the effects and should not reach the scale where take occurs. Discountable effects are those that are extremely unlikely to occur. This conclusion is usually reached through the informal consultation process, and written concurrence from the USFWS exempts the proposed action from formal consultation. The federal action agency's written request for USFWS concurrence should accompany the biological assessment/biological evaluation.

   Note: With a conclusion or finding of "may affect, but is not likely to adversely affect" by an action agency and the USFWS, consultation with the USFWS is considered complete. This is known as "informal consultation."

3. **May affect, likely to adversely affect**– A "may affect, likely to adversely affect" determination means that all adverse effects cannot be avoided. A combination of beneficial and adverse effects is still "likely to adversely affect" even if the net effect is neutral or positive. Section 7 of the Endangered Species Act requires that the federal action agency request initiation of formal consultation with the USFWS when a "may affect, likely to adversely affect" determination is made. A written request for formal consultation should accompany the biological assessment/biological evaluation.

   Note: With a conclusion or finding of "may affect, likely to adversely affect" by an action agency and the USFWS, or if the USFWS does not concur with an action agency's finding of "not likely to adversely affect" determination, then "formal consultation" is required between the action agency and the USFWS. Formal consultation results in the USFWS issuing a biological opinion as to whether or not the action, as proposed, will jeopardize the continued existence of any listed species.

2.0 AGENCY REGULATIONS

2.1 REGULATIONS AND STANDARDS

The Clean Air Act requires that air quality standards be maintained to protect public health and the environment. These standards are the National Ambient Air Quality Standards (NAAQS) and are regulated by the EPA and the TCEQ. Ambient air is the air to which the general public has access, as opposed to air within the boundaries of an industrial facility. The NAAQS are concentration limits of pollutants in ambient air over specific averaging times. The averaging time is the time period over which the air pollutant concentrations must be met to comply with the NAAQS. The NAAQS are classified into two categories: primary and secondary

standards. Primary standards provide public health protection, including protecting the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards provide public welfare protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings (EPA, 2013a).

The EPA sets NAAQS for six principal air pollutants, also referred to as criteria air pollutants. These six criteria air pollutants are nitrogen dioxide (NO_2), ozone (O_3), sulfur dioxide (SO_2), particulate matter (PM), carbon monoxide (CO), and lead (Pb) (EPA, 2013a). A geographic area whose ambient air concentration for a criteria pollutant is equal to or less than the primary standard is an attainment area. A geographic area with an ambient air concentration greater than the primary standard is a nonattainment area. A geographic area will have a separate designation for each criteria pollutant (EPA, 2013b).

To demonstrate compliance with NAAQS and other applicable air quality standards and guidelines, air quality analysis is performed using computer models to simulate the dispersion of the emitted pollutants into the atmosphere and predict ground level concentrations at specified receptor locations in the area around the source of emissions. If the modeled concentration for a given pollutant and averaging period is less than the EPA-specified Significant Impact Levels (SIL), the project is determined to have no significant impact on ambient air quality, and no further analysis is required for that pollutant and averaging period. If the SIL is predicted by the model to be exceeded for a given pollutant, further analysis of the project emissions combined with existing concentrations in the area is required to estimate total ambient concentrations. The analysis must demonstrate that the total concentration does not exceed the applicable NAAQS.

2.2 ENDANGERED SPECIES ACT

The USFWS and the National Oceanic and Atmospheric Administration – National Marine Fisheries Service (NOAA-NMFS) regulate the Endangered Species Act (ESA) of 1973. "The purpose of the ESA is to protect and recover imperiled species and the ecosystems on which they depend." Imperiled species are defined specifically to include those listed by the USFWS as threatened or endangered (USFWS, 2013b). Candidate species are those for which "the USFWS has enough information to warrant proposing them for listing but is precluded from doing so by higher listing priorities" (USFWS, 2013c). Candidate species are not specifically protected by the ESA, but will be included for the purposes of this BA.

Section 9 of the ESA prohibits the "take" of threatened and endangered species. "Take" is defined as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct." "Harm" is defined as "an act which actually kills or injures wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering" (USFWS, 2013d).

2.3 MIGRATORY BIRD TREATY ACT

"A migratory bird is any species or family of birds that live, reproduce, or migrate within or across international borders at some point during their annual life cycle." According to the USFWS, there are approximately 836 bird species protected by the Migratory Bird Treaty Act of 1918 (MBTA) (USFWS, 2013e).

All migratory birds are protected under the MBTA, which is regulated in the US by the USFWS. The MBTA prohibits the following: "pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess, offer for sale, sell, offer to purchase, purchase, deliver for shipment, ship, cause to be shipped, deliver for transportation, transport, cause to be transported, carry, or cause to be carried by any means whatever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird . . . or any part, nest, or egg of any such bird" (USFWS, 2013e).

2.4 BALD AND GOLDEN EAGLE PROTECTION ACT

Bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (BGEPA) of 1940, which is regulated by the USFWS. The BGEPA prohibits the following: ''take, possess, sell, purchase, barter, offer to sell, purchase, or barter, transport, export or import, at any time or any manner, any bald eagle (or golden eagle), alive or dead, or any part, nest, or egg thereof.'' "Take" is defined as ''pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, or molest or disturb.'' ''Disturb'' is defined as ''to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, (1) injury to an eagle; (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior; or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior'' (USFWS, 2013f).

2.5 MARINE MAMMAL PROTECTION ACT

The USFWS and NOAA-NMFS regulate the Marine Mammal Protection Act of 1972 (MMPA). The MMPA prohibits the "take" of marine mammals in US waters or by US citizens outside US waters and the importation of marine mammals or marine mammal products into the US. "Take" is defined as "hunt, harass, capture, or kill" (NOAA, 2013).

3.0 PROJECT DESCRIPTION

3.1 PROJECT PURPOSE AND LOCATION

The purpose of this project is to construct new facilities to allow for the installation of a new GE 7F 5-Series gas turbine in a simple-cycle application to serve GSEC's load. Due to concerns about the adequacy of future power reserve margins in West Texas and in other areas in Texas, GSEC is proposing to build a new combustion turbine-generator facility at Antelope Station near Abernathy, Texas. GSEC expects the new facility to provide primarily peaking and

intermediate power needs in a highly cyclical operation. A process flow diagram for the proposed new equipment is provided in Appendix A (Murin, 2013).

The proposed project is located at 1454 County Road (CR) 315, which is east of Interstate Highway (IH) 27 and bounded on the east by CR P (see Figure 1 in Appendix B).

Project location information:

USGS Quad	Latitude/Longitude
Abernathy, TX	33°51'56.5"/101°50'37.6"

3.2 CONSTRUCTION INFORMATION

3.2.1 Construction Description

Installation of the new gas turbine, associated infrastructure, switchyard, and auxiliary equipment will take place within approximately 500 feet of the existing Antelope Station infrastructure (Appendix B, Figure 2). The project footprint will also include a tie-in to an existing gas line approximately 500 yards from the existing Antelope facility and will be located on the existing site. The new project will tie into an existing water well on the existing site. The civil construction activities include site preparation and drainage, installation of concrete piles, concrete foundations and mats, concrete slab on grade, structural steel, stairs, and ladders.

The projected construction start date is scheduled for the end of 2013. The projected operation start date is expected to occur mid-March 2015.

3.2.2 Construction Activities and Schedule

The total time estimated to complete the project is approximately 60 weeks (8 weeks for site preparation and 52 weeks of field erection and startup) and includes the following list of general construction activities:

- Grading and site fill to the agreed-upon elevation
- Install pilings
- Install underground facilities and grounding grid
- Install switchyard
- Install equipment and pipe rack foundations
- Construct storage tanks
- Install equipment and pre-fab electrical buildings
- Install piping and instrumentation
- Finalize piping to tanks
- Complete of instrumentation & electrical work
- Insulate
- Touch-up painting

- Commissioning and startup

The estimated number of personnel required for construction of the project is 130 for a maximum timeframe of 60 weeks (based on a 50-hours-per-week schedule).

3.2.3 Construction Equipment Required

The equipment required to complete the installation of the new gas turbine unit and estimated schedule for use of the equipment is listed below. The schedule will be based on the final sizing and configuration of the equipment selected (per erection requirements).

- Heavy lift equipment for major lifts (TBD per final weights, and lift study) – Duration TBD by final delivery schedule
- 2 cherry pickers (20 ton) – 60 weeks
- 2 forklifts – 60 weeks (as needed)
- 5-10 welding machines – 60 weeks
- 2 dozers (8-10 weeks)
- 2 graders (8-10 weeks)
- 2 rollers (8-10 weeks)
- 2 excavators (8-10 weeks)
- 1 backhoe – 60 weeks (as needed)
- 2 track crane (32-40 weeks)
- 2 electric welding machines with diesel operated generators – 60 weeks (as needed)
- 3-4 scissor lifts – 60 weeks (as needed)
- Water and fuel trucks – 60 weeks (as needed)

3.2.4 Stormwater

Erosion and sedimentation controls will be utilized to protect water quality during the construction of the proposed project, in accordance with the TPDES and as prescribed in the Storm Water Pollution Prevention Plan (SWPPP) required for construction.

If ancillary areas are disturbed in support of the construction project, structural controls may be used to protect surrounding areas from impacted surface runoff. Additional erosion control measures (e.g., silt fence, sandbags) may be used if excess erosion and/or sedimentation are observed during the construction phases. Additionally, construction personnel will be trained to respond to and address spills.

3.2.5 Construction Noise Levels

During most construction activities, the noise levels are estimated to be generally similar to those encountered during normal operations and/or maintenance events at the existing Antelope Station; however, some construction activities will have noise levels that are

somewhat above the current noise levels. The construction contractor will implement hearing protection procedures to protect the workers and the surrounding environment from noise pollution to the extent practical. The equipment that is used for construction will be in good condition and will be well maintained. The equipment's sound attenuation devices will be in good working order. A few pieces of equipment required for construction have the potential to exceed 85 decibels at 3 feet from the source (jackhammer, crane, air compressors, vehicle backup horns, etc.), but the use of this equipment will be limited to the extent practicable. When feasible, alternative work methods will be used that lessen or eliminate the use of noisy equipment.

As no threatened or endangered species are expected to occur on or in the general vicinity of the proposed expansion project, it is not anticipated that the construction noise levels will have any effect on protected species or other wildlife.

3.3 OPERATION AND MAINTENANCE INFORMATION

3.3.1 Operation Description

The generation station to be installed at the Antelope Station in Abernathy, Texas, will have one GE 7FA combustion turbine generator (CT) that operates as a simple-cycle unit. The expected operation of the CT is to provide primarily peaking and intermediate power for the cooperative capacity needs as well as be available to provide capacity to both the Southwest Power Pool and Electric Reliability Council of Texas (ERCOT). It is expected that the CT will be available for operation at all times unless the unit is made unavailable for planned maintenance or other impacts to CT operation. For each shift, a minimum of one outside operator and one control-room operator will be required for operation. GSEC is permitting the unit to operate no more than 4,571 hours per year. The expected maintenance on this unit is primarily dependent on the number of starts and the amount of run hours. As a result, the minimum frequency between major equipment inspections would occur every 18 months while the maximum frequency between major equipment inspections could extend beyond every 6 years. During a major inspection, the unit is offline and unavailable for operation. The length of these major equipment inspections can range from two weeks to six weeks. In addition to the major equipment inspections, minor outages are scheduled to address maintenance on the balance of plant equipment, which would include such equipment as electrical relays, seasonal (winter vs. summer) operations, water washes, and borescope inspections. These minor outages are expected to occur approximately one to two times a year and can range from a couple of days to several weeks. No additional environmental impacts are anticipated as a result of maintenance activities required for the project.

The natural gas source will be supplied from an existing gas yard located on the GSEC property and will require a fuel gas heater prior to the combustion turbine. The water source is produced from a water well, also located on the property. Because of the water quality, and in order to be as efficient as possible, GSEC will install a single pass reverse osmosis (RO) system that will provide better cycles of concentration and reduce the

maintenance on the equipment. In addition, the project will include a storage tank to provide on-demand water without the constant cycling of the water well motor/pump. The wastewater generated will consist primarily of the evaporative blow down, wash water, and the RO rejection. The preferred disposal method for all generated wastewater from the facility is to be pumped into a local Publicly Owned Treatment Work's (POTW) wastewater pond at a maximum flow rate between 50 and 60 gallons per minute (gpm). The wastewater is expected to be treated along with the rest of the POTW's wastewater and discharged in accordance with its wastewater discharge permit. Alternatively, a second option exists should the POTW disposal be determined not to be a viable option. The wastewater may be pumped to and disposed of at a future evaporation pond that would be constructed on land recently acquired by GSEC immediately east of the proposed gas turbine unit.

3.3.2 Water Use

Water consumption at Antelope station is expected to increase by no more than 100 gpm in order to operate the simple-cycle gas turbine. The turbine is expected to also require a water wash of the turbine once a year in order to remove residue and maintain efficiency. The source of the wash water will also be RO-processed well water that is stored in a supply tank.

3.3.3 Wastewater

Antelope Station's operations currently discharge zero wastewater and it does not require a permit under the TPDES program. The proposed project will discharge between 50 and 60 gpm of wastewater that is anticipated to be collected via sump and sent via hard pipe to a local POTW's wastewater-storage pond. The wastewater will consist primarily of the evaporative blow down, wash water, and the RO rejection. These streams will comply with the POTW's wastewater permit and will be tested according to the permit requirements for verification.

As discussed previously, a second option exists should POTW disposal be determined not to be a viable option. The wastewater may be pumped to and evaporated at a future evaporation pond that would be constructed on land recently acquired by GSEC immediately east of the proposed gas turbine unit, in accordance with the TPDES program.

3.3.4 Stormwater

All industrial activities and materials are expected to be isolated from rain, snow, snowmelt and runoff by storm-resistant shelters. Additionally, the existing operations and maintenance (O&M) operator at this facility has an Emergency Response Plan in place to address spills. Facility employees are trained to implement the Plan. The Plan will be updated to incorporate the new gas turbine unit as appropriate, and will be utilized during operation, and maintenance of the proposed project. The O&M operator has a contract with Safety-Kleen to address any major spills. GSEC anticipates filing a No Exposure Certification in accordance with the TPDES program.

3.3.5 Operation Noise Levels

Project engineers estimate that noise levels during operation should be comparable (within 2 to 3 dBA) to noise levels from operation and maintenance activities that currently take place at Antelope Station.

3.3.6 Emission Controls

As demonstrated in both the EPA and TCEQ permit applications (Murin, 2013), GSEC will use emission controls which meet requirements to employ the Best Available Control Technology (BACT). The emission controls used in this facility are described below.

Gas Turbine

The power generation unit to be used in this project is an efficient gas turbine technology; each component of the gas turbine train will be maintained and operated properly. The turbine will use GE's Dry Low NOx (DLN) control technology to meet the following emission levels:

TABLE 1
Performance Level of the Proposed Gas Turbine DLN Technology

Pollutant	Maximum Pollutant Concentrations in Turbine Exhaust
NO_X	9 ppmvd @ 15% O_2
CO	9ppmvd
VOC	7 ppmvw

The turbine also uses low-sulfur natural gas as fuel to minimize emissions of SO_2, PM that is 10 micrometers or less in size (PM_{10}), and PM that is 2.5 micrometers or less in size ($PM_{2.5}$). Emissions during maintenance, startup, and shutdown (MSS) operations are limited by an hourly emission rate and operating hour limits. The emission limits proposed for this turbine reflect the use of the best combustion practices and operating modes for the dry low NOx combustor control technology used on GE 7F turbines.

Natural Gas Line Fugitives

Piping fugitive leaks will be controlled by use of audio/visual/olfactory (AVO) observations of leaks in periodic walkthroughs as part of normal operations, with the subsequent repair of any observed leaks.

Sulfur Hexafluoride Leaks from Circuit Breakers

GSEC proposes to use modern circuit breaker technology and a comprehensive leak detection and disposition program to minimize sulfur hexafluoride (SF_6) emissions. The

comprehensive leak detection and disposition program will involve inventory and use tracking, leak detection by hand-held halogen detectors, and low-gas density alarms. It will also include a recycling program so that SF_6 is evacuated into portable cylinders rather than vented to atmosphere.

Emergency Generator

The backup and emergency generator will normally operate less than 100 hours per year in non-emergency operations. Except for its periodic testing, the emergency generator is intended to operate only for emergency situations when grid power may not be available, when its entire electrical output is required for the emergency situation. It will be maintained and operated properly, according to manufacturer specifications, and comply with applicable requirements of 40 CFR 60 Subpart IIII.

Fuel Gas Heater

The fuel gas heater is a small heater with a fired capacity of 5.5 MMBTU per hour as required to ensure that temperature of the natural gas fuel is maintained at levels above the dew point. The heater uses a low-NOx burner and low-sulfur natural gas fuel. It will be maintained and operated properly according to manufacturer specifications.

4.0 BACKGROUND INFORMATION

4.1 GENERAL ENVIRONMENTAL INFORMATION

This section provides applicable environmental characteristics for the general region in which the project is located.

4.1.1 General Region Information

The action area includes a1.0-km radius from the project area (Appendix B, Figure 3) and is located in the Great Plains physiographic province of North America (USGS, 2004), and, more specifically, within the High Plains eco-region of Texas (Gould, 1975).

The Great Plains physiographic province lies between the Rocky Mountains to the west and the Canadian Shield, Central Lowlands, and Gulf Coastal Plain regions to the east, and stretches from the Canadian Prairies in the north and south to the Edwards Plateau in Texas (Fenneman, 1931). Described as the low relief portion of the North American interior, the Great Plains topography is divided into eco-regions dominated by fluvial, eolian, volcanic, and glacial landforms. One eco-region of the Great Plains, the High Plains, stretches from Nebraska to Texas, is described as a vast featureless landscape, and includes the action area. The southern end of the High Plains in Texas is constructed of a thick accumulation of wind-blown sediments which cover historic fluvial deposits to produce the present day flat landscape that is

dotted with thousands of dry lake basins, playas, and a series of narrow ephemeral stream channels, draws (Blum, 2013).

The High Plains eco-region of Texas is primarily a short-grass prairie including species such as sideoats grama, big bluestem, and Indian blanket. This eco-region was historically known for small isolated stands of shrubby mesquite, juniper, and cottonwood. Suppression of fire, due to human population growth in the High Plains, resulted in a dramatic increase in juniper and mesquite populations and degradation of the short-grass prairie ecosystem (TFS, 2013). A majority of the present-day High Plains eco-region is devoted to agricultural and livestock production.

4.1.2 Land Use

The proposed expansion project is located in Hale County. The primary land use in the area is agricultural. The chief agricultural products in Hale County include cotton, soybeans, sorghums, wheat, and vegetables. Other land uses throughout Hale County include ranchland for cattle production, residential, urban, commercial, and industrial developments (Leffler, 2013). Based on the background review, the land use within the action area is industrial development, pastureland, and cropland.

4.1.3 Climate

The growing season in Hale County is 211 days with an annual rainfall of 19.34 inches. The average minimum temperature in January is 26°F and the average maximum temperature in July is 93°F (Leffler, 2013). Prevailing winds are from the south-southwest (NRCS, 2006) with an average speed of 14.92 miles per hour and the average humidity is 75.42% (USA, 2013).

As of 2 July 2013, the US Drought Monitor indicated the action area is in D4 Drought – Exceptional (USDA, 2013). According to the National Weather Service/Advanced Hydrologic Prediction Service (NWS/AHPS), the area has received approximately 1.0 to 2.0 inches of rain within the 30 days prior to the publication of this report, is approximately 0.5 to 2 inches below normal for the previous 30 days, and is approximately 1 to 3 inches below normal for the previous 60 days (NWS, 2013).

4.1.4 Topography

Hale County consists of flat terrain with elevations ranging from 3200 to 3600 feet above sea level (Leffler, 2013). The action area is flat with an elevation of approximately 3350 to 3355 feet above sea level (USGS, 1985) (Appendix B, Figure 4).

According to the Federal Emergency Management Agency (FEMA) flood insurance rate maps, the proposed project site is not within a designated 100-year floodplain (Appendix B,

Figure 5) (FEMA, 2011). Portions of the surrounding areas are located within a designated 100-year floodplain.

4.1.5 Geology

The geologic formation within the action area is the Blackwater Draw Formation (Qbd) (UT-BEG, 1992). Geologic units found within and surrounding the action area are listed and described below in Table 2.

TABLE 2
Geologic Units Summary

MapUnit	UnitName	Description
Qbd	Blackwater Draw Formation	sand or silt
Qp	Playa deposits	sand, silt, or clay

Source: UT-BEG, 1992.

The Blackwater Draw Formation (Qbd) is approximately 25 feet thick and feathers out locally (UT-BEG, 1992). It consists of sand, fine to medium-grained quartz, and silty, calcareous, caliche nodules. Playa deposits (Qp) consist of shallow gray depressions containing clay, silt, and sand. Depressions are usually covered by a thin deposit of recent sediment that weathers light gray.

4.1.6 Soils

Dominant soils found in Hale County include fertile sand and loamy soils with many playas (TSHA, 2013). The US Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) soil units mapped within the action area are listed and described below in Table 3 (see Appendix B, Figure 6).

4.1.7 Water Resources

Hale County has minimal water resources and no major rivers bisect or border Hale County. The only prominent water features in the area include numerous playa lakes and local ephemeral creeks, or draws. Playa lakes are isolated areas of topographic depression and are ephemeral in nature, filled by sheetflow usually during spring rainfall.

No watersheds or river basins contribute water resources into the project region. The proposed project site is located within the Brazos River watershed (TPWD, 2013b).

Available digital data from the Texas Parks and Wildlife Department (TPWD) designate no Ecologically Unique River and Stream Segments in or around the project site (TPWD, 2011).

TABLE 3
NRCS Soil Units Summary

Soil Name	Soil Type	Soil Depth (feet)	Underlying Material	Permeability	Available Water Capacity	Shrink-Swell Capacity
Acuff loam, 0 to 1% slopes (AcA)	loam	0 to 6.7	Loamy eolian deposits from the Blackwater Draw Formation of Pleistocene age	moderately high	high	low
Olton loam, 0 to 1% slopes (OtA)	loam	0 to 6.0	Clayey lacustrine deposits derived from the Blackwater Draw Formation of Pleistocene age	moderately high	high	moderate
Pullman clay loam, 0 to 1% slopes (PuA)	clay	0 to 6.6	Clayey eolian deposits from the Blackwater Draw Formation of Pleistocene age	moderately low	high	high

Source: NRCS, 2013a and 2013b

Based on the background review and site reconnaissance, the water resources in the action area include 3 playa lakes.

The USFWS National Wetland Inventory (NWI) data within and immediately adjacent to the action area are demonstrated in Figure 7 (Appendix B) (USFWS, 2013h).

4.1.8 Air Quality

For all of the criteria or major category air pollutants, the EPA has designated Hale County as having air quality better than the national standards, or categorically "unclassifiable" with respect to the NAAQS.[4] Hale County has not been designated as a nonattainment area for any air pollutant: no monitoring data or atmospheric dispersion modeling analysis classifies the area as noncompliant with any of the NAAQS.[5]

The nearest existing ambient air monitor measures $PM_{2.5}$ and is located south of Antelope Station in Lubbock (EPA, 2013). Quality assured data from 2008 to 2010 at that monitor are presented in Table 4. Raw data for 2010 to date from the same monitor are presented in Table 5 (TCEQ, 2013). These values reflect the area's compliance with the PM NAAQS.

[4] NAAQS are listed in Section 6.2.1.
[5] 40 CFR §81.344.

TABLE 4
Ambient Air Monitor Data, 2008 to 2010

Year of Data	24-hour $PM_{2.5}$ Concentration, µg/m³ (Note a)	Annual $PM_{2.5}$ Concentration, µg/m³ (Note b)
2008	17.3	9.0
2009	16.3	7.7
2010	19.3	6.4

[a] Compliance with the 24-hour NAAQS is based on the three-year average of the 98th percentile of the 24-hour measured concentrations. The tabulated values reflect the 98th percentile for each year.

[b] Compliance with the annual NAAQS is based on the three-year average of the annual arithmetic means of measured concentrations.

TABLE 5
Ambient Air Monitor Data, 2010 to Date

Year of Data	Annual $PM_{2.5}$ Concentration, µg/m³
2011	8.92
2012	9.09
2013 YTD	8.48

4.2 PROTECTED SPECIES

4.2.1 Threatened or Endangered Species List

Federally listed threatened, endangered, and candidate species listed by the USFWS and TPWD as having the potential to occur in Hale County are provided in Table 6.

TABLE 6
USFWS/TPWD Federally Listed
Threatened or Endangered Species for Hale County,Texas

Common Name	Scientific Name	Species Group	USFWS List Status	TPWD List Status
whooping crane	*Grus americana*	Birds	E	E
black-footed ferret	*Mustela nigripes*	Mammals	N/A	E
gray wolf	*Canis lupis*	Mammals	N/A	E

Source: TPWD, 2013a; USFWS, 2013g.

4.2.2 Threatened or Endangered Species Descriptions

A brief description of the listed species and their habitat requirements are included below. According to the USFWS, there is no designated critical habitat for any of the federally listed threatened or endangered species within at least 50 miles of the action area (USFWS, 2013).

4.2.2.1 Whooping Crane

The whooping crane is a large bird that stands approximately 5 feet tall with a wingspan of approximately 7 feet. These birds have long necks and legs, a white body, a red crown, black primary feathers, and a long, pointed beak.

Whooping cranes inhabit a variety of habitats due to migration; however, they primarily inhabit large wetlands. During migration, these cranes prefer to feed and roost in wetlands, rivers, and upland grain fields with other bird species. They feed on crustaceans, mollusks, amphibians, fish, rodents, small birds, and berries.

Parents prefer to build their nests in marshes among taller vegetation, such as sedges, for protection. Females usually lay 2 eggs per clutch and one clutch per year in April or May. The eggs hatch approximately one month later. Parents share the rearing duties, but the female takes the primary role in raising the young.

The main population of whooping crane migrates across the central US and Canada. This population breeds (May to October) in Wood Buffalo National Park in Alberta, Canada, and spends the winter (November to March) on the Texas coast at the Aransas National Wildlife Refuge near Rockport, Texas. They migrate (October to November and April) through the central US (North Dakota, South Dakota, Nebraska, Oklahoma, and Texas), primarily utilizing a recognized 200-mile-wide corridor through central and east Texas (USFWS, 2007).

The whooping crane was federally listed in March 1967 and is protected under the MBTA, ESA, and Convention on International Trade in Endangered Species, and is listed as an endangered species by the TPWD (USFWS, 2013; TPWD, 2013a).

4.2.2.2 Gray Wolf

The gray wolf is the largest of the wild dogs and can reach a total length of 80 inches, with a tail up to 20 inches. Their coats range from nearly black to white; however, in most areas they are some shade of gray (Hall, 1981).

Gray wolves inhabit a variety of habitats including areas with few roads and minimal human access and semi-wild lands; desert, forest, shrubland and mixed woodlands. Packs consist of one or more family groups (generally 2 to 8 members, up to 21) with dominance hierarchy (Bangs and Fritts, 1993). Gray wolves are highly mobile and readily disperse or

migrate hundreds of miles. They predominantly prey upon ungulates; however, when ungulate quantities are low or unavailable, the gray wolf will hunt alternative prey such as beaver, rodents, and carrion (NatureServe, 2013).

Gray wolves are considered extirpated from Texas and the last known sightings were in December 1970 in Brewster County (MOT, 2013). A proposal to delist the gray wolf from the endangered species list was published in the federal register on 13 June 2013 (50 CFR Part 17 Vol 78 No 114 Part II).

4.2.2.3 Black-footed Ferret

The black-footed ferret is shaped like a mink, but the dorsal color is yellowish brown or buff, with a brownish wash on the back and a slightly lighter belly. The tail tip and feet are dark brown to black and the face has a dark mask around the eyes with white on the face above and below the mask (Whitaker, 1996).

Black-footed ferrets inhabit open herbaceous and grassland habitat, the same used by prairie dogs. Resting and birthing sites are in underground burrows. The black-footed ferret feeds predominantly on prairie dogs. Alternate prey includes ground squirrels, cottontail rabbits, and deer mice.

Their range formerly encompassed a large area of the Great Plains, mountain basins, and semi-arid grassland of North America. Although the black-footed ferret has made a comeback over the last 20 years, the species is still considered extirpated from Texas (NatureServe, 2013).

4.2.3 Bald and Golden Eagle Protection Act

4.2.3.1 Bald Eagle

A large raptor, the bald eagle has a wingspread of about 7 feet. Adults have a dark brown body and wings, white head and tail, and a yellow beak. Juveniles are mostly brown with white mottling on the body, tail, and undersides of wings. Adult plumage usually is obtained by the 6th year. In flight, the bald eagle often soars or glides with the wings held at a right angle to the body.

Breeding habitat most commonly includes areas close to (within 4 km) coastal areas, bays, rivers, lakes, reservoirs, or other bodies of water that reflect the general availability of primary food sources including fish, waterfowl, or seabirds (Andrew and Mosher 1982, Green 1985, Campbell et al. 1990). For example, in Saskatchewan lakes, bald eagle density was positively correlated with abundance of large fishes (Dzus and Gerrard 1993).

Nests usually are in tall trees or on pinnacles or cliffs near water. Tree species used for nesting vary regionally and may include pine, spruce, fir, cottonwood, poplar, willow,

sycamore, oak, beech, or others. Ground nesting has been reported on the Aleutian Islands in Alaska, in Canada's Northwest Territories, and in Ohio, Michigan, and Texas. The same nest may be used year after year, or a pair may use alternate nest sites in successive years. See Livingston et al. (1990) for a model of nesting habitat in Maine. See Wood et al. (1989) for characteristics of nesting habitat in Florida (most nests were in live pine trees). In Oregon, most nests were within 1.6 km of water, usually in the largest tree in a stand (Anthony and Isaacs 1989). In Colorado and Wyoming, forest stands containing nest trees varied from old-growth ponderosa pine to narrow strips of riparian vegetation surrounded by rangeland (Kralovec et al. 1992). In Arizona, recent nests were on cliffs or pinnacles, or in large cottonwoods, willows, sycamores, or ponderosa pines, usually within 1 km of a riparian corridor (J. T. Driscoll, in Corman and Wise-Gervais, 2005).

In winter, bald eagles may associate with waterfowl concentrations or congregate in areas with abundant dead fish (Griffin et al. 1982) or other food resources. Wintering areas are commonly associated with open water, though in some regions (e.g., Great Basin) some bald eagles use habitats with little or no open water (e.g., montane areas) if upland food resources (e.g., rabbit or deer carrion, livestock afterbirths) are readily available (GBBO 2010). Wintering eagles tend to avoid areas with high levels of nearby human activity (boat traffic, pedestrians) and development (buildings) (Buehler et al. 1991). Bald eagles preferentially roost in conifers or other sheltered sites in winter in some areas; typically they select the larger, more accessible trees (Buehler et al. 1991, 1992). Perching in deciduous and coniferous trees is equally common in other areas (e.g., Bowerman et al. 1993). Communal roost sites used by two or more eagles are common, and some may be used by 100 or more eagles during periods of high use. Winter roost sites vary in their proximity to food resources (up to 33 km) and may be determined to some extent by a preference for a warmer microclimate at these sites. Available data indicate that energy conservation may or may not be an important factor in roost-site selection (Buehler et al. 1991). Communal night roosts often are in trees that are used in successive years.

The bald eagle was federally delisted in August of 2007 due to successful recovery efforts, but is still protected under the BGEPA, MBTA, and the Lacey Act (USFWS, 2013; TPWD, 2013a).

4.2.3.2 Golden Eagle

This powerful eagle is North America's largest bird of prey and the national bird of Mexico. These birds are dark brown, with lighter golden-brown plumage on their heads and necks. They are extremely swift, and can dive upon their quarry at speeds of more than 150 miles (241 kilometers) per hour.

Golden eagles use their speed and sharp talons to snatch up rabbits, marmots, and ground squirrels. They also eat carrion, reptiles, birds, fish, and smaller fare such as large insects. They have even been known to attack full grown deer. Ranchers once killed many of

these birds for fear that they would prey on their livestock, but studies showed that the animal's impact was minimal. Today, golden eagles are protected by law.

Golden eagle pairs maintain territories that may be as large as 60 square miles (155 square kilometers). They are monogamous and may remain with their mate for several years or possibly for life. Golden eagles nest in high places including cliffs, trees, or human structures such as telephone poles. They build huge nests to which they may return for several breeding years. Females lay from one to four eggs, and both parents incubate them for 40 to 45 days. Typically, one or two young survive to fledge in about three months.

These majestic birds range from Mexico through much of western North America as far north as Alaska; they also appear in the east but are uncommon. Golden eagles are also found in Asia, northern Africa, and Europe.

Some golden eagles migrate, but others do not—depending on the conditions of their geographic location. Alaskan and Canadian eagles typically fly south in the fall, for example, while birds that live in the western continental US tend to remain in their ranges year-round.

4.2.4 Texas Natural Diversity Database Results

A records review of the Texas Natural Diversity Database (TNDD) was completed for the action area and surrounding areas by the TPWD on 8 July 2013. According to the TNDD, there are no recorded elements of occurrence (EOs) within the action area; however,the action area and surrounding areas have either not been surveyed or collected data was not made public (TPWD, 2013c). TPWD notes that the TNDD does not include a representative inventory of rare resources in the state, and data from the TNDD do not provide a definitive statement as to the presence, absence, or condition or special species, natural communities, or other significant features within the action area and surrounding areas. TPWD also notes that TNDD data cannot substitute for an on-site evaluation by a qualified biologist.

4.2.5 Marine Mammal Habitat

Marine mammals are ecologically restricted to marine and estuarine habitats. The closest marine or estuarine habitat to the actionarea (Matagorda Bay) is approximately 500 miles to the southeast; as such, marine mammals were excluded from further consideration.

5.0 PROTECTED SPECIES HABITAT EVALUATION

Horizon completed a protected species habitat evaluation on 18 October 2012 to determine if habitat within the project area was likely to support any of the federally protected species known to occur in Hale County. The field surveys included a pedestrian survey of the proposed construction area and portions of the surrounding facility that were not restricted by stringent safety requirements. The field surveys also included a windshield survey of all terrestrially accessible habitats visible from public areas within the action area (1.0-km radius of

the project area). The majority of the lands within the action area are privately owned and, although visible, they were not accessible from public areas. Data was collected to describe resident vegetation communities and assess the potential for occurrence of protected species. The dominant habitats observed within the action area are described below and depicted in Figure 8 (Appendix B).

Photographs of the project area and accessible surrounding areas are included as Appendix C. A summary of the field survey data is provided in Appendix D.

5.1 PLANT COMMUNITIES OBSERVED

The project area currently consists of partially developed fallow cropland, with a portion of the site utilized as an active electric generation facility. On-site vegetation was sparse and consisted primarily of tumbleweed and assorted native grasses.

Immediately to the west of the proposed construction area is the existing GSEC electric generation facility. Immediately to the south is a laydown yard/parking area for the existing facility. To the north and east is a mosaic of cropland and pastureland. The majority of the Antelope Station property is industrial infrastructure, concrete, road base, or fallow cropland.

Blackwater Draw is the closest waterbody, approximately 5.36 miles to the southwest of the project area at its closest point, and was a dry stream bed at the time of the survey.

The dominant habitat observed in the areas surrounding the project area include: pastureland and cropland, 2 small playa lakes, and 1 small pond. Significant portions of these habitats have historically been manipulated or impacted by agricultural activities, and each is described further below.

Pastureland – This habitat is primarily maintained or heavily grazed and dominated by non-native species. Dominant species observed included tumbleweed and assorted native grasses.

Cropland – This habitat includes large square tracts of land with crops grown in circular or straight rows. Crops grown in this region include cotton, soybeans, sorghums, wheat, and vegetables.

Open water – This habitat includes one small, rectangular, man-made stock pond. During Horizon's site reconnaissance, the stock pond was dry and native and non-native upland plant species were observed in and around the pond area.

Wetland Habitat –Three ephemeral isolated wetlands (playa lakes) were observed within the action area. During Horizon's site reconnaissance, the wetlands were dry and vegetation mimicked surrounding upland vegetation. Isolated wetlands, including playa lakes, are not currently regulated by the US Army Corps of Engineers (USACE).

5.2 PROTECTED SPECIES HABITAT ANALYSIS

The following habitat analysis is based on the background review and general protected species habitat evaluation data.

The proposed project area consists of an electric generation plant, laydown yard, and associated roadways on the western and southern portions, and fallow cropland on the eastern portion. Sparse vegetation was observed within the fallow cropland. The project area does not possess habitat with the potential to support any federally protected species that occur in Hale County. Land use and habitat types outside the proposed project area include industrial land use, cropland, pastureland, open water habitat, and wetland habitat. The areas surrounding the project location have historically been impacted by agricultural activities.

Industrial development areas are comprised of infrastructure, road base, or impervious cover with minimal vegetation and significant disturbance. Therefore, these areas are not likely to support any federally protected species.

The observed croplands have the potential to support migratory birds, bald or golden eagles, and other wildlife. However, the potential is minimal as these birds prefer undisturbed native grasslands near water sources. There are no permanent water resources and essentially no native grasslands in the area. No bald or golden eagles or their nests were observed in or near this habitat.

The pastureland habitat is primarily maintained or grazed and dominated by non-native species. The observable quality of this habitat ranges from low to moderate. The potential exists for migratory birds, bald or golden eagles, and other wildlife to utilize this habitat. However, the potential is minimal as these birds prefer undisturbed native grasslands near water sources. No bald or golden eagles or their nests were observed in or near this habitat.

The open water habitat includes onesmall rectangular-shaped man-made stock pond that contains a limited amount of water. The observable quality of this open water habitat was low. The potential does not exist for migratory birds, bald or golden eagles, or other wildlife to utilize this habitat, due to the small size and lack of sufficient water in the pond. No bald or golden eagles or their nests were observed in or near this habitat.

Three small ephemeral wetlands (playa lakes) were observed within the action area. The wetland habitat areas have the potential to support migratory birds, bald or golden eagles, and other wildlife during short periods following heavy rainfall, usually during the spring, that fill the depressional areas with water. No bald or golden eagles or their nests were observed in or near this habitat.

6.0 AIR QUALITY ANALYSIS RESULTS

6.1 OVERVIEW OF PROJECT EMISSIONS

The new sources of emissions on the site from the proposed project will include the following:

- The combustion turbine
- Natural gas line equipment fugitive releases
- SF_6 fugitive leaks from circuit breakers
- A small natural gas heater operated during low ambient temperatures
- A small emergency diesel generator

Maximum emissions from these sources are summarized in Table 7. Emission calculations for these sources are contained in the EPA and TCEQ permit applications submitted for this project.

6.2 ATMOSPHERIC DISPERSION MODELING RESULTS

Edge Engineering and Science, LLC (Edge) performed dispersion modeling of the proposed emissions of air pollutants from the proposed expansion project to support this BA and the TCEQ permit application. This section provides the methods and results of the dispersion modeling.

6.2.1 Dispersion Modeling Methods

The proposed project emission increases were first modeled to determine predicted ground level pollutant concentrations that would result from the project area. The predicted concentrations were then compared to the SILs shown in Table 8. A SIL is a concentration, defined by the EPA, resulting from a proposed project, below which the project emissions are considered to make no significant contribution to the total ambient air quality concentration. If the project impact is less than the SIL, no further analysis is required for the pollutant and averaging period, and compliance with the NAAQS is assured. If the project impact is above the SIL, further analysis is required to consider the impacts of other sources of air pollutants that occur in the significant impact area for the project emissions. The combination of these impacts would then be compared to the NAAQS. The NAAQS are shown in the last column of Table 8. Note that for this project, the maximum impacts of all project pollutants on ambient air quality was predicted by Edge's modeling analysis to be less than the SILs for all pollutants with established SILs.[6]

[6]On January 22, the DC Circuit Court of Appeals vacated the SILs for particulate matter with diameters less than 2.5 microns ($PM_{2.5}$). At this time, therefore, there are no SILs for $PM_{2.5}$; there are also no SILs for ozone. For both of these pollutants, however, the ambient air impacts of the project, when combined with the background ambient air concentrations in the surrounding environment, have been found to comply with the NAAQS. The project impacts of $PM_{2.5}$ were also found to be well below the SIL which had been established prior to it being vacated.

TABLE 7
Maximum Emissions

	Turbine 1			SF_6 Fug	NG-Fugitives		Fuel Gas Heater		Emergency Generator		TOTAL	
	Normal, lb/hr	SSM, lb/hr	Total, tons/yr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	tons/yr	PSD Significant Increase Levels, tons/yr
NO_X	64	56	141				0.19	0.43	21.88	1.09	142.52	40
CO	32	338.7	260.22				0.45	1.03	12.64	0.63	261.88	100
VOC	3	45.3	31.24		0.042	0.184	0.030	0.069	1.46	0.070	31.56	40
PM_{10}	9.3	9.3	21.26				0.041	0.094	0.73	0.037	21.39	15
$PM_{2.5}$	9.3	9.3	21.26				0.041	0.094	0.73	0.037	21.39	10
SO_2	2.72	2.72	6.21				0.008	0.018	0.53	0.027	6.25	40
HAPs	1.99	1.99	4.56				0.0004	0.0010	0.02	0.0010	4.56	N/A
CO_2	232,749	232,749	532,007		0.018	0.079	647.06	1,479	2,558	127.89	533,614	N/A
CH_4	12.00	178.20	124.97		0.93	4.07	0.012	0.028	0.15	0.010	129.08	N/A
N_2O	5.82	5.82	13.3				0.0119	0.027			13.33	N/A
SF_6				0.0073							0	N/A
GHG	232,767	232,933	532,145	0.0073	0.95	4.15	647.08	1,479	2,558	127.90	533,756	75,000
CO_2-e	234,806	237,767	538,754	174.47	19.5	85.55	651.01	1,488	2,561	128.00	540,630	75,000

TABLE 8
Standards and SILs for Criteria Pollutants

Pollutant	Regulation	Averaging Period	Significant Impact Level (µg/m³)	National Ambient Air Quality Standard (µg/m³)
SO_2	NAAQS	1-hr	7.8	195
		3-hr	25	1300
		24-hr	5	365
		Annual	1	80
NO_2	NAAQS	1-hr	7.5	188.7
		Annual	1	100
	PSD Increment	Annual	1	25
CO	NAAQS	1-hr	2000	40,000
		8-hr	500	10,000
PM_{10}	NAAQS	24-hr	5	150
	PSD Increment	24-hr	5	30
		Annual	1	17
$PM_{2.5}$	NAAQS	24-hr	1.2[a]	35
		Annual	0.3[a]	12
	PSD Increment	24-hr	1.2[a]	9
		Annual	0.3[a]	4
Ozone	NAAQS	8-hr	N/A[a]	75 ppb

[a]On January 22, the DC Circuit Court of Appeals vacated the SILs for particulate matter with diameters less than 2.5 microns ($PM_{2.5}$). At this time, therefore, there are no SILs for $PM_{2.5}$; there are also no SILs for ozone. For both of these pollutants, however, the ambient air impacts of the project, when combined with the background ambient air concentrations in the surrounding environment, have been found to comply with the NAAQS. The project impacts of $PM_{2.5}$ were also found to be well below the SIL which had been established prior to it being vacated.

6.2.1.1 Model Used

The American Meteorological Society/EPA Regulatory Model Improvement Committee (AERMIC) modeling program (AERMOD), version 12345 with PRIME downwash algorithms, was used to predict off-site impacts for the modeling analysis. The AERMAP preprocessor program was also used to process terrain data in conjunction with the receptor grids and sources as input to AERMOD.

6.2.1.2 Building Wake Effects

Building wake effects occur when the air flow around buildings influences the dispersion from sources in the model input, resulting in variations to air concentrations. A building wake (downwash) analysis was performed to determine appropriate downwash parameters for the major structures at the facility. For the stacks calculated to have a discharge height lower than the Good Engineering Practice (GEP), the EPA's Building Profile Input Processor program with PRIME downwash algorithms (BPIP-PRIME) was used to identify the appropriate downwash parameters for the sources.

6.2.1.3 Terrain

The topography of the area in the vicinity of the proposed project site is characterized by moderate elevation changes; therefore, simple and/or complex terrain was considered in the modeling analysis. Elevations were calculated from 7.5-minute US Geological Survey (USGS) 10-meter Digital Elevation Model (DEM) files.

6.2.1.4 Receptor Grid

The modeled Cartesian receptor grids used for this analysis are as follows:

- Fence-line grid receptors were placed along the property line with a 25-meter spacing;
- Tight grid receptors (25-meter spacing) were placed starting at the property line out to a distance of 50 meters;
- Fine grid receptors (50-meter spacing) were placed starting 50 meters from the property line to a distance of 500 meters;
- Small grid receptors (100-meter spacing) were placed starting 500 meters from the property line to a distance of 1,000 meters; and
- Medium grid receptors (250-meter spacing) were placed starting 1,000 meters from the property line to a distance of 2,000 meters.

The modeled grid was necessary to ensure that it was sufficient to capture the maximum predicted concentrations at those locations.

6.2.1.5 Meteorological Data

The meteorological data used in the models includes observed hourly wind speed, wind direction, temperature and numerous other parameters. Representative meteorological data sets for Abernathy, Hale County, Texas, for the 2006 to 2010 calendar years were downloaded from the TCEQ website. The data set is comprised of surface station data from Lubbock, Texas, and upper air station data from Amarillo, Texas. A profile base elevation of 1,000 meters was used in the model. The AERMET (AERMOD meteorological preprocessor) dataset was processed with the rural/suburban surface roughness parameter appropriate for the rural location of Antelope Station.

6.2.1.6 Background Concentrations

No project emissions were predicted to have concentrations above the SILs for those pollutants for which SILs have been established. However, due to the $PM_{2.5}$ SIL being vacated, the predicted ambient air impacts from the project were added to the background concentrations of $PM_{2.5}$ measured by an ambient air monitor at Lubbock. Because no SIL has been established for ozone, a separate protocol was used to evaluate the impact of the project emissions on ozone air concentrations.

6.2.2 Dispersion Modeling Results

Table 9 shows the maximum predicted concentrations due to the turbine project for each pollutant and averaging period. Project impacts are predicted to be less than the SIL for all pollutants and averaging periods for which SILs exist. For all pollutants and averaging periods except for $PM_{2.5}$and ozone, no further analysis was performed, and the impacts demonstrate that the project would not cause or contribute to any exceedance of the standard. For $PM_{2.5}$, a conservative background concentration as described in Section 6.2.1.6 was added to the project impact to determine the total ambient concentration for comparison to the applicable standard. A separate protocol was used to evaluate the impact of the project emissions on ozone air concentrations. The total ambient concentrations were determined to comply with the applicable standards for both pollutants. These results are also shown in Table 9.

The area demonstrating ambient air impacts above the SILs is usually used to establish the project action area. Since the project demonstrates no significant ambient air impacts, the action area was established with a default maximum radius of 1.0 km. That is, the action area for the biological assessment was defined as the area within a circle with a 1.0-km radius centered on the project sources (Appendix B, Figure 3). This action area was utilized to analyze the potential impacts to protected species and/or their habitats by the proposed expansion project and is demonstrated in Figure 8 (Appendix B). The results of the analysis of potential impacts to protected species are presented in Section 7 below.

In addition to the air quality analysis performed for criteria pollutants, Edge performed dispersion modeling of emissions increases of other pollutants that will be emitted by the project. This analysis was performed in accordance with TCEQ guidelines for the modeling

of non-criteria pollutants. The predicted increases in pollutant concentrations were compared to the TCEQ ESLs.[8] Pollutants considered included 1,3-butadiene, acetaldehyde, acrolein, benzene, ethylbenzene, formaldehyde, naphthalene, PAHs, propylene oxide, toluene, and xylene. All predicted maximum impacts from the project were less than 10% of the respective ESLs. According to TCEQ guidance, these impact levels indicate that the project will cause no adverse ambient air impacts on human health and the environment.

TABLE 9
Criteria Pollutant Modeling Results

Pollutant	Averaging Period	Maximum Project Concentration (µg/m3)	SIL (µg/m3)	Project Impact Greater Than SIL?	Total Concentration (Modeled+ Background)	NAAQS
					(µg/m3)	(µg/m3)
CO	1-hr	48.19	2,000	No	N/A	40,000
	8-hr	27.15	500	No	N/A	10,000
NO_2	1-hr	5.93	7.5	No	N/A	188.7
	Annual	0.11	1	No	N/A	100
PM_{10}	24-hr	0.37	5	No	N/A	150
	Annual	0.0265	1	No	N/A	N/A
$PM_{2.5}$	24-hr	0.37	1.2[a]	N/A	18.00	35
	Annual	0.0265	0.3[a]	N/A	7.72	12
SO_2	1-hr	0.36	7.8	No	N/A	195
	3-hr	0.34	25	No	N/A	1300
	24-hr	0.13	5	No	N/A	365
	annual	0.0056	1	No	N/A	80
Ozone	8-hr	1.91ppm	N/A[a]	N/A	58.91	75 ppb

[a]On January 22, the DC Circuit Court of Appeals vacated the SILs for particulate matter with diameters less than 2.5 microns ($PM_{2.5}$). At this time, therefore, there are no SILs for $PM_{2.5}$; there are also no SILs for ozone. For both of these pollutants, however, the ambient air impacts of the project, when combined with the background ambient air concentrations in the surrounding environment have been found to comply with the NAAQS. The project impacts of $PM_{2.5}$ were also found to be well below the SIL which had been established prior to it being vacated.

[8]Effects Screening Levels are screening levels used in TCEQ's air permitting process to evaluate ambient air impacts for non-criteria pollutants. They are used to evaluate the potential for effects to occur as a result of exposure to concentrations of air contaminants. ESLs are based on data concerning health effects, the potential for odors to be a nuisance, and effects on vegetation. They are not ambient air standards. If predicted airborne levels of a contaminant do not exceed the screening level, adverse health or welfare effects are not expected. If predicted ambient levels of contaminants exceed the screening levels, it does not necessarily indicate a problem but rather triggers a more detailed review.

7.0 EFFECTS OF THE PROPOSED ACTION

This section presents the results of the analysis of potential impacts to federally protected species as a result of the proposed project. The following impact sources are included in the analysis: air quality, water quality, noise pollution, infrastructure-related disturbance, human-related disturbance, and federally protected species effects. This analysis is based on total emissions and dispersion modeling data provided by Murin and Edge, field survey and background review data collected by Horizon, and literature review and research of potential effects of known pollutants on flora and fauna.

7.1 AIR QUALITY EFFECTS

As previously described, all predicted impacts from the project on the ambient air, as well as existing concentrations in the area, are demonstrated by atmospheric dispersion modeling to comply with both the primary and secondary NAAQS. Primary standards provide public health protection, including protecting the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards provide public welfare protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings. In addition, all the predicted ambient air concentrations due to the project are less than the SILs designated by the EPA for each pollutant and averaging period for which SILs have been established.

Because the impacts of air emissions from the project will not adversely affect the area's continued compliance with the NAAQS, are well below the TCEQ's ESLs, and because the project emissions are in fact de minimis for all pollutants for which SILs have been established, there will be no adverse effects on any biological resources in the project impact area during process operations.

During the construction phase of the project, some fugitive dust and other emissions will be generated. However, these emissions will be minimal and temporary, and will not have adverse impacts on biological resources in the impact area, except for the disturbed ground areas and the areas immediately adjacent to the disturbed ground areas.

7.2 WATER QUALITY EFFECTS

7.2.1 Wastewater

Antelope Station's operation currently produces zero wastewater discharge and it does not require a permit under the TPDES. The proposed project will discharge between 50 and 60 gpm of wastewater that is anticipated to be collected via sump and sent via hard pipe to a local POTW's wastewater storage pond. The wastewater will consist primarily of the evaporative blow down, wash water, and the RO rejection. These streams will comply with the POTW's wastewater permit requirements for incoming waste streams and will be tested according to the permit requirements for verification. Since the POTW will likely treat Antelope

Station's wastewater, GSEC will not be required to have a TPDES permit for wastewater discharges. Alternatively, a second option exists should POTW disposal be determined not to be a viable option. The wastewater may be pumped to and disposed of at a future evaporation pond that would be constructed on land recently acquired by GSEC immediately east of the proposed gas turbine unit, in accordance with the TPDES program. Either method of wastewater disposal will have no effect on migratory birds due to the highly unlikely chance of the birds utilizing the action area.

7.2.2 Surface Water

The potential for airborne contaminants to directly alter the pH of surface waters was also considered. Again, because of the low impacts of project emissions on ambient air quality concentrations for NO_2 and PM, air emissions from the project will not affect surface water pH. Any potential pH impact would be a rare and short-term event. Potential direct effects resulting from the maximum 1-hour NO_2 and 24-hour PM_{10} and $PM_{2.5}$ concentrations are not expected. Therefore, the protected species with the potential to utilize habitats within the action area will not likely be directly impacted by the ambient air concentrations. Based on the predicted ambient air impacts, acidification resulting from deposition or leaching is not likely to occur as a result of the proposed expansion project. If acidification is not likely to occur as a result of the proposed project, it is reasonable to assume subsequent eutrophication will not occur.

Since it has been determined that potential indirect effects from the maximum 1-hour NO_2 and 24-hour PM concentrations are unlikely to occur as a result of the proposed expansion project, the protected species with the potential to utilize surface water habitats within the action area (bald or golden eagles and migratory birds) will not likely be indirectly impacted by the proposed expansion project.

7.2.3 Stormwater

Best Management Practices will be utilized in accordance with the TPDES and as prescribed in the SWPPP required for construction. No stormwater effects to wildlife are expected as a result of the infrastructure construction or operation of the project.

7.3 NOISE EFFECTS

During most construction activities, noise levels are estimated to be generally similar to those encountered during normal operations and/or maintenance events at the existing Antelope Station; however, some construction activities will have noise levels that are somewhat above the current noise levels. The construction contractor will implement hearing protection procedures to protect the workers and the surrounding environment from noise pollution to the extent practical. The equipment that is used for construction will be in good condition and will be well maintained. The equipment's sound attenuation devices will be in good working order. A few pieces of equipment required for construction have the potential to exceed 85 decibels at 3 feet from the source (jackhammer, crane, air compressors, vehicle

backup horns, etc.), but the use of this equipment will be limited to the extent practicable. When feasible, alternative work methods will be used that lessen or eliminate the use of noisy equipment.

Project engineers estimate that noise levels during operation should be comparable (within 2 to 3 dBA) to noise levels from operation and maintenance activities that currently take place at Antelope Station at a level of approximately 63 dBA. It is not anticipated that the construction or operation noise levels will have any effect on threatened or endangered species.

7.4 INFRASTRUCTURE-RELATED EFFECTS

Construction of the proposed project will take place within approximately 500 feet from the existing Antelope Station facility area. The project footprint will also include a tie-in to an existing gas line approximately 500 yards from the existing Antelope facility and will be located on the existing site. The new project will also tie into an existing water well on the existing site. The civil construction activities include site preparation and drainage, installation of concrete piles, concrete foundations and mats, concrete slab on grade, structural steel, stairs and ladders.

Antelope Station consists of an industrial infrastructure, concrete, and roadbase. No impacts to protected species are anticipated as a result of the proposed project.

7.5 HUMAN ACTIVITY EFFECTS

Construction of the proposed project will involve a temporary increase in human activity, but operation will not require significant additional human activity compared to typical maintenance activities that occur at the plant on a regular basis. No additional effects to wildlife are expected as a result of the increase in human activity associated with the project.

7.6 FEDERALLY PROTECTED SPECIES EFFECTS

7.6.1 Federally Listed Threatened or Endangered Species

7.6.1.1 Whooping Crane

Potential to Occur in the Action Area

Whooping cranes are migratory birds and their breeding habitat is known to be the northern US and Canada. Therefore, the consideration of potential nesting habitat was excluded from this analysis. Their wintering habitat is known to be limited to the Aransas National Wildlife Refuge near Rockport, Texas (located 500 miles to the southeast of the project area), and a few other coastal counties. Therefore, the consideration of potential wintering habitat was excluded from this analysis. Potential habitat within the action area would be limited to temporary foraging and roosting habitat during migration. These cranes prefer to feed and roost in wetlands, rivers, and upland grain fields with other bird species (USFWS, 2007).

The recognized whooping crane migration corridor is approximately 200 miles wide and spans portions of central and eastern Texas. This 200-mile-wide corridor represents the location of approximately 94% of all reported migrating whooping crane observations. Additionally, the primary migration corridor is only 100 miles wide and accounts for 88% of the same observations. As shown on Figure 9 (Appendix B), the proposed project is located well outside of this recognized migration corridor. More specifically, Antelope Station is located 96 miles to the west of the 200-mile-wide migration corridor and 143 miles west of the more heavily utilized 100-mile-wide migration corridor (Stehn, 2008).

Whooping cranes are a rare species in the wild. Only 245 individuals were observed in Texas in 2012 (WCCA, 2012).

Habitat with the potential to support the whooping crane was not observed within Antelope Station. No known observations of the whooping crane in or near the action area have been found.

Open maintained or grazed pasturelands observed within the 1.0-km action area have the potential to be a stopover location for migrating cranes. However, no significant wetlands or water sources with the potential to support the whooping crane were observed within the action area.

Potential habitat for the whooping crane does not exist within the action area, which lies 146 miles west of the recognized and most heavily utilized migration route. Whooping cranes are not known to occur, and are unlikely to occur, within the action area for this project.

Potential Effects to Whooping Cranes

Since no habitat with the potential to support the whooping crane was identified within the action area, and Antelope Station is not located within the recognized whooping crane migration corridor, this species will not be directly or indirectly impacted by the construction or operation of the proposed project. Significant air emissions and stormwater from the project will not reach whooping crane habitat.The proposed wastewater discharge methods will have no effect on the whooping crane.

Determination of Effect

The proposed action will have “no effect” on the whooping crane.

7.6.1.2 Gray wolf

Potential to Occur in the Action Area

The Gray wolf has been extirpated from Texas since 1970 and there is no potential for the gray wolf to occur in the action area.

Potential Effects to Gray wolf

The Gray wolf has been extirpated from Texas since 1970 and there is no potential to affect the gray wolf in the action area.

Determination of Effect

The proposed action will have “no effect” on the gray wolf.

7.6.1.3 Black-footed ferret

Potential to Occur in the Action Area

The black-footed ferret is considered to be extirpated from Texasand there is no potential for the black-footed ferret to occur in the action area.

Potential Effects to black-footed ferret

The black-footed ferret is considered extirpated from Texas and there is no potential to affect the black-footed ferret in the action area.

Determination of Effect

The proposed action will have “no effect” on the black-footed ferret.

7.6.2 Migratory Birds

Potential to Occur in the Action Area

Habitat with the potential to support migratory birds was not observed within the Antelope Station facility.

A variety of migratory birds have the potential to utilize the habitats within the action area. A variety of species of migratory birds were observed in select habitats surrounding the project location, including hawks and songbirds. The habitats surrounding the facility range in quality from low to moderate and have historically been subject to agricultural and industrial activities.

Select migratory birds are likely to occur in all observed habitats within the action area, excluding existing industrial facilities. The frequency of occurrence and species of migratory birds in each habitat is dependent upon habitat characteristics and quality.

Potential Effects to Migratory Birds

As described in Section 7.0, migratory birds would not be impacted by air emissions resulting from the proposed project. Potential exposure to nitrogen oxides from the proposed project would not be sufficient to harm individual migratory birds or cause long-term effects, such as nitrate accumulation or leaching, acidification, or eutrophication. No stormwater impacts to migratory bird habitat are anticipated. The proposed project will produce very little wastewater, which is anticipated to be piped to a local POTW's wastewater storage pond. Alternatively, a second option exists should the POTW disposal be determined not to be a viable option. The wastewater may be pumped to and disposed of at a future evaporation pond that would be constructed on land recently acquired by GSEC immediately east of the proposed gas turbine unit. Either method of wastewater disposal will have no effect on migratory birds due to the highly unlikely chance of the birds utilizing the action area.

Migratory birds will not be directly or indirectly impacted by the construction or operation of the proposed project.

Determination of Effect

The "take" of migratory birds is not anticipated as a result of this project. Note: The term "take" represents the more specific language of the MBTA described previously in Section 2.3.

7.6.3 Bald and Golden Eagles

Potential to Occur in the Action Area

No habitat with the potential to support bald or golden eagles was observed within Antelope Station or the proposed turbine location.

Select areas surrounding the proposed project area are potential loafing habitats for bald or golden eagles. The areas surrounding the project site are impacted by agricultural and industrial development.

No bald or golden eagles or eagle nests were observed during the windshield survey of the action area.

No sources have been found to indicate bald or golden eagles have been observed near the proposed project area. No occurrences of bald or golden eagles have been recorded in the vicinity of the project site (TPWD, 2013c). Bald or golden eagles are unlikely to occur within the action area for this project.

Potential Effects to Bald and Golden Eagles

Bald or golden eagles will not be directly or indirectly impacted by the construction or operation of the proposed project.

As described in Section 7.0, bald or golden eagles would not be impacted by air emissions resulting from the proposed project. Potential exposure to nitrogen oxides from the proposed project would not be sufficient to harm individual bald or golden eagles or cause long-term effects, such as nitrate accumulation or leaching, acidification, or eutrophication. No stormwater impacts to bald or golden eagle habitat are anticipated. The proposed project will produce very little wastewater, which will be piped to a municipal treatment facility one mile to the south or disposed of at an evaporation pond that may be constructed immediately east of the proposed facility.

Determination of Effect

The "take" of bald or golden eagles is not anticipated as a result of this project.

Note: The term "take" represents the more specific language of the Bald and Golden Eagle Protection Act described previously in Section 2.4.

7.6.4 Marine Mammals

Potential to Occur in the Action Area

Marine mammals are ecologically restricted to marine or estuarine habitats. No habitats with the potential to support marine mammals are located within at least 500 miles of the project area.

Potential Effects to Marine Mammals

Since no habitat with the potential to support marine mammals was identified within the action area, this species will not be directly or indirectly impacted by the construction or operation of the proposed project. Significant air emissions, wastewater, and stormwater from the project will not reach marine mammal habitat.

Determination of Effect

The "take" of marine mammals is not anticipated as a result of this project.

Note: The term "take" represents the more specific language of the Marine Mammal Protection Act described above in Section 2.5.

8.0 CONCLUSIONS

This section is a summary of Horizon's recommended determination of effect for all federally protected species, a description of any interdependent and interrelated actions, and a description of any anticipated cumulative effects resulting from the proposed project.

8.1 DETERMINATION OF EFFECT

The recommended determinations of effect for all federally protected species with the potential to occur within habitat located within the action area (approximately 1.0-km radius) are summarized below in Table 10.

TABLE 10
Determination of Effect Summary

Federally or State Listed Species	Determination of Effect
Whooping Crane	No Effect
Gray wolf	No Effect
Black-footed ferret	No Effect

As described in Section 7.7, the take of migratory birds, bald or golden eagles, or marine mammals is not anticipated as a result of this project.

8.2 INTERDEPENDENT AND INTERRELATED ACTIONS

The proposed project includes the installation of a new gas turbine, associated infrastructure, switchyard, and auxiliary equipment at the existing Antelope Station facility. No additional interdependent or interrelated actions are proposed at this time. Additional transmission lines will likely be constructed by other private companies in order to provide distribution of the electricity generated by the expansion project. However, the location or extent of these potential facilities cannot be anticipated at this time.

8.3 CUMULATIVE EFFECTS

The project site is located within a predominately agricultural area. While industrial activities are currently limited, it is not unreasonable to expect additional industrial activities in the future. However, the cumulative impacts are not expected to have an impact on any federally threatened or endangered species due to the fact that:

- no threatened or endangered species were observed in the area based on the pedestrian survey;
- no critical habitat exists in the area;
- the area does not provide what would be considered desirable habitat for any threatened or endangered species;

- the nearby areas are routinely disturbed by ongoing agricultural activities; and
- except for the possible addition of a wastewater evaporation pond, there are no permanent water resources. Limited temporary water resources may occur that are available only following precipitation events.

It is not anticipated that the cumulative impacts will have any effect on threatened or endangered species or other wildlife.

8.4 CONSERVATION MEASURES

At this time no conservation measures are proposed, as the construction of the proposed project will likely have no direct or indirect impact on federally protected species or their habitats.

GSEC plans to utilize the BACT to control the project emissions and thus minimize impacts to the surrounding environment to the maximum extent practicable. The proposed emissions of each pollutant subject to review are consistent with the TCEQ guidance and are considered to be the top level of control available.

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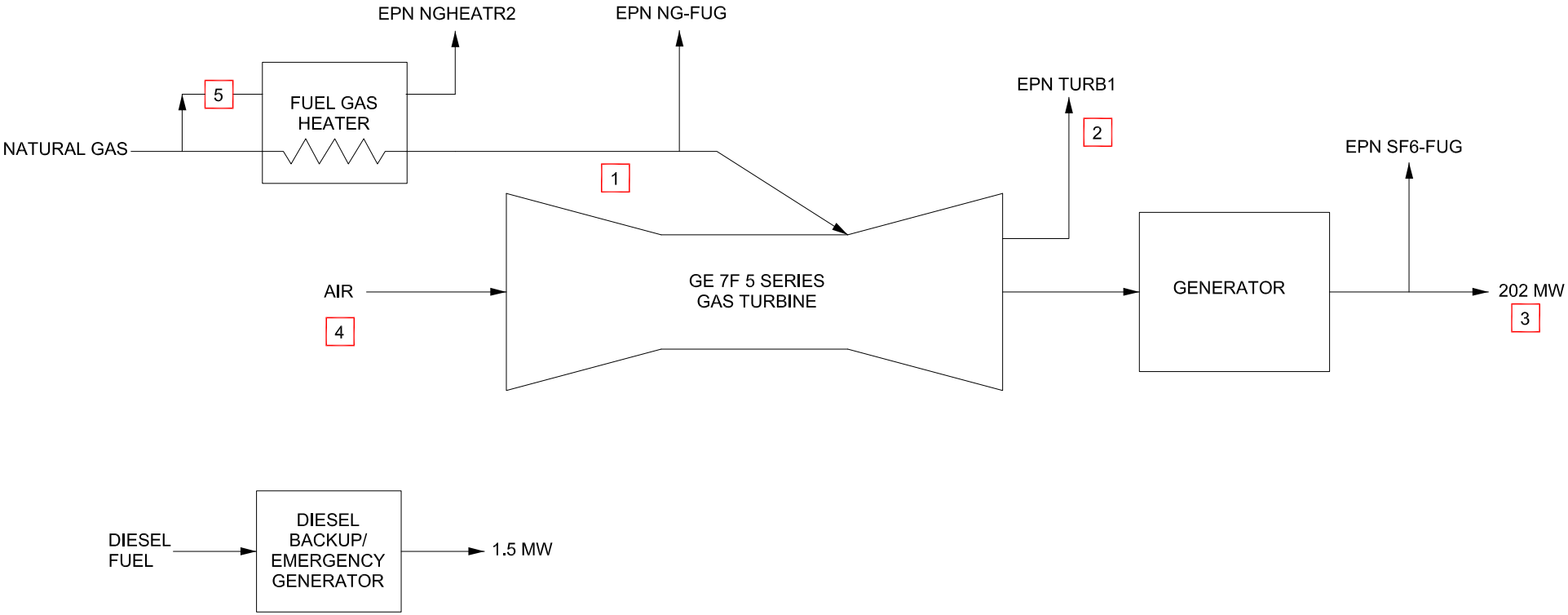
APPENDIX A

FLOW DIAGRAM

PROCESS FLOW DIAGRAM

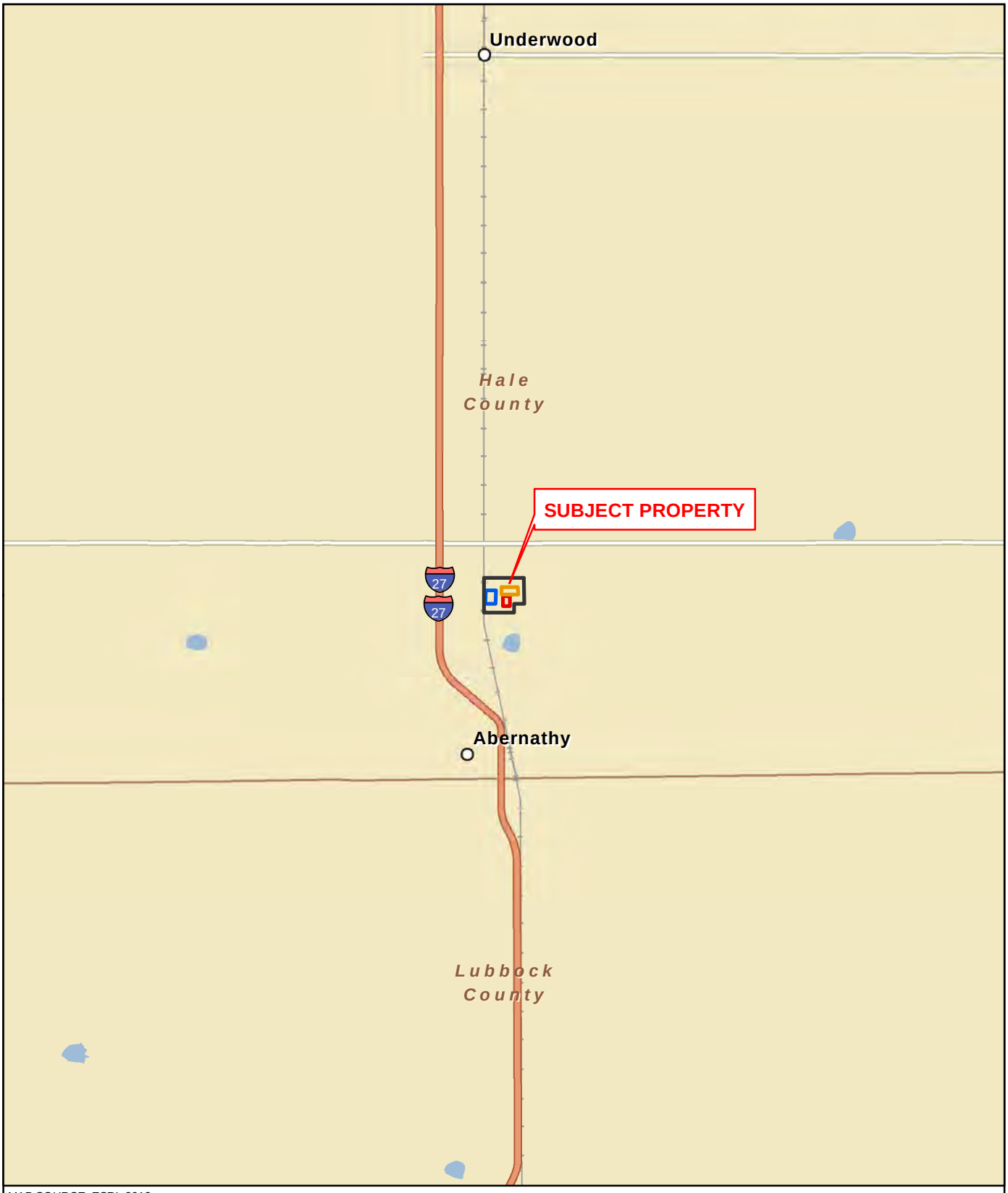


Drawn By	Eng. By	Date		REV
DWW	PJM	12/19/12 - 7/25/13	GSEC - Antelope	4
H:\Clients\MUR4615\GSEC-ANTALOPE\FLOW			Name FLOW	

APPENDIX B

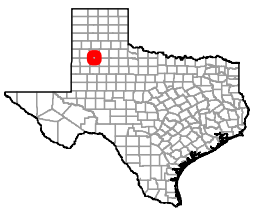
FIGURES

120128-Golden Spread\Graphics\Antelope Station\120128A06BG4BA_Vicinity.mxd | REM | 07-08-2013



MAP SOURCE: ESRI, 2012.

0 1 2
Miles

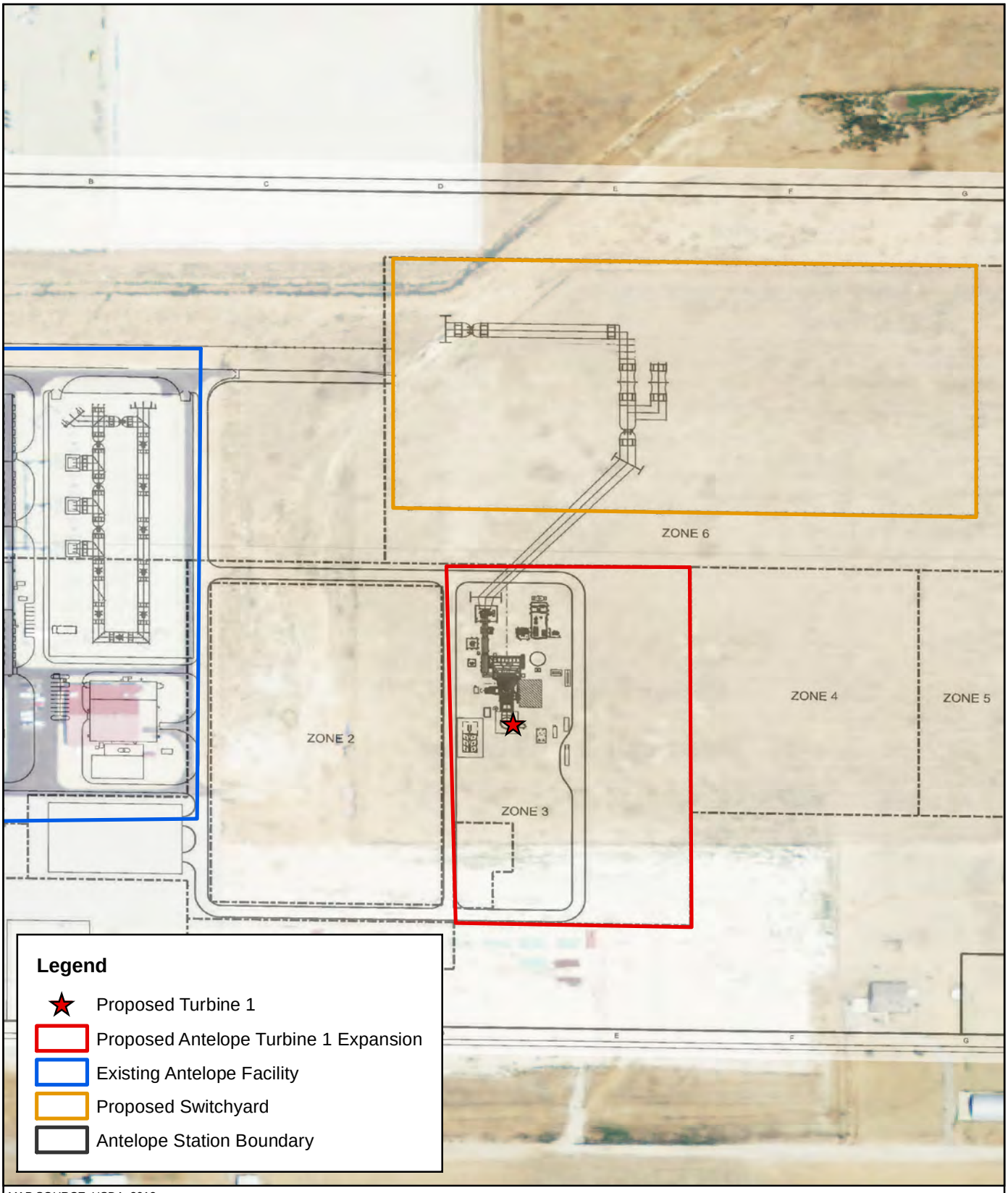


Horizon Environmental Services, Inc.

FIGURE 1

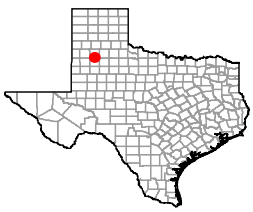
VICINITY MAP
GOLDEN SPREAD
ANTELOPE STATION EXPANSION
ABERNATHY, HALE COUNTY, TEXAS

120128-Golden Spread\Graphics\Antelope Station\120128A05BG4BA_ConstructionArea.mxd | REM | 07-08-2013



MAP SOURCE: USDA, 2012.

0 150 300
Feet

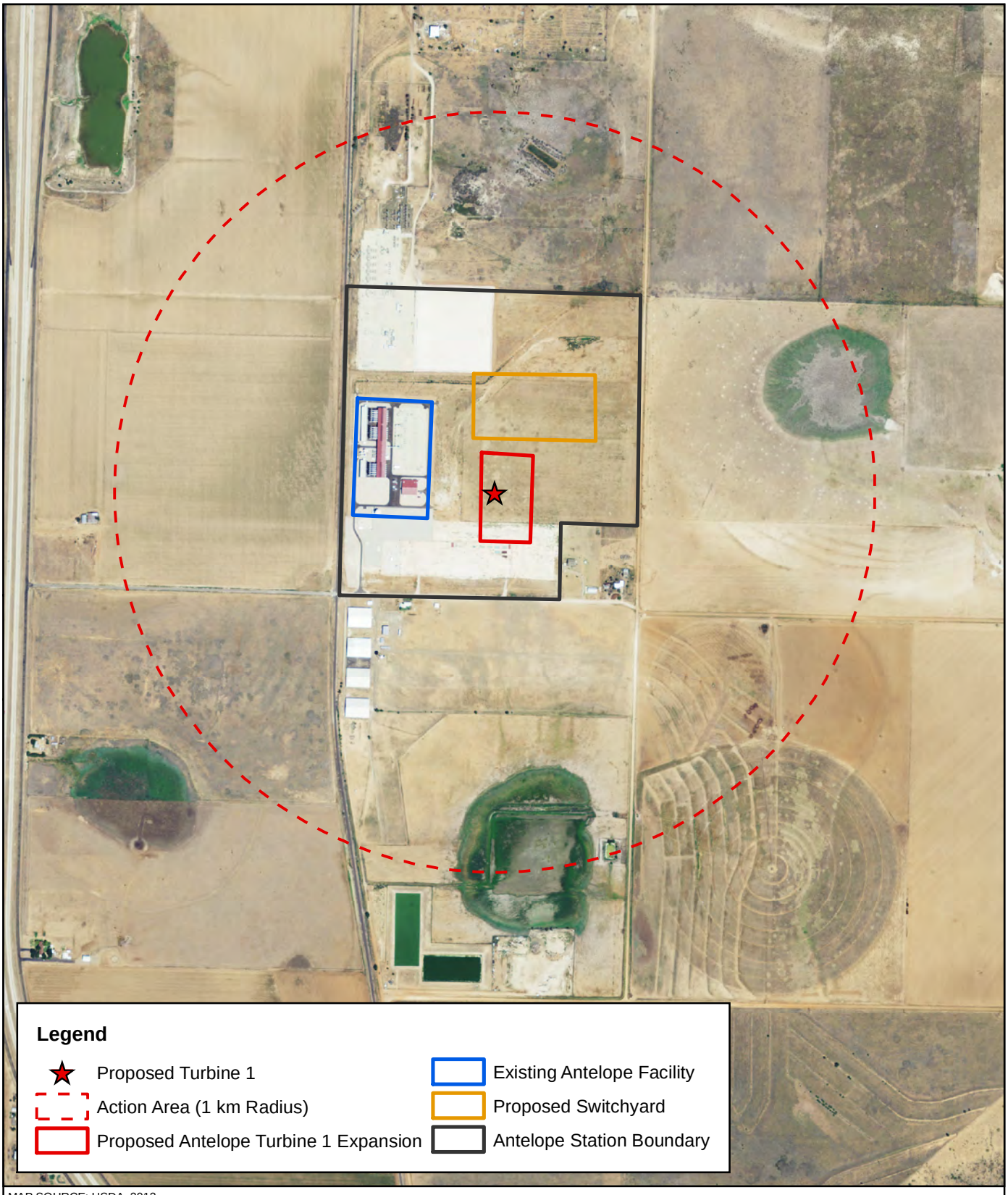


Horizon Environmental Services, Inc.

FIGURE 2

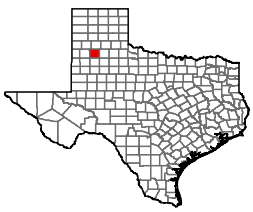
CONSTRUCTION AREA MAP
GOLDEN SPREAD
ANTELOPE STATION EXPANSION
ABERNATHY, HALE COUNTY, TEXAS

120128-Golden Spread\Graphics\Antelope Station\120128A07BG4BA_ActionAreaAerial.mxd | REM | 07-08-2013



MAP SOURCE: USDA, 2012.

0 600 1,200
Feet

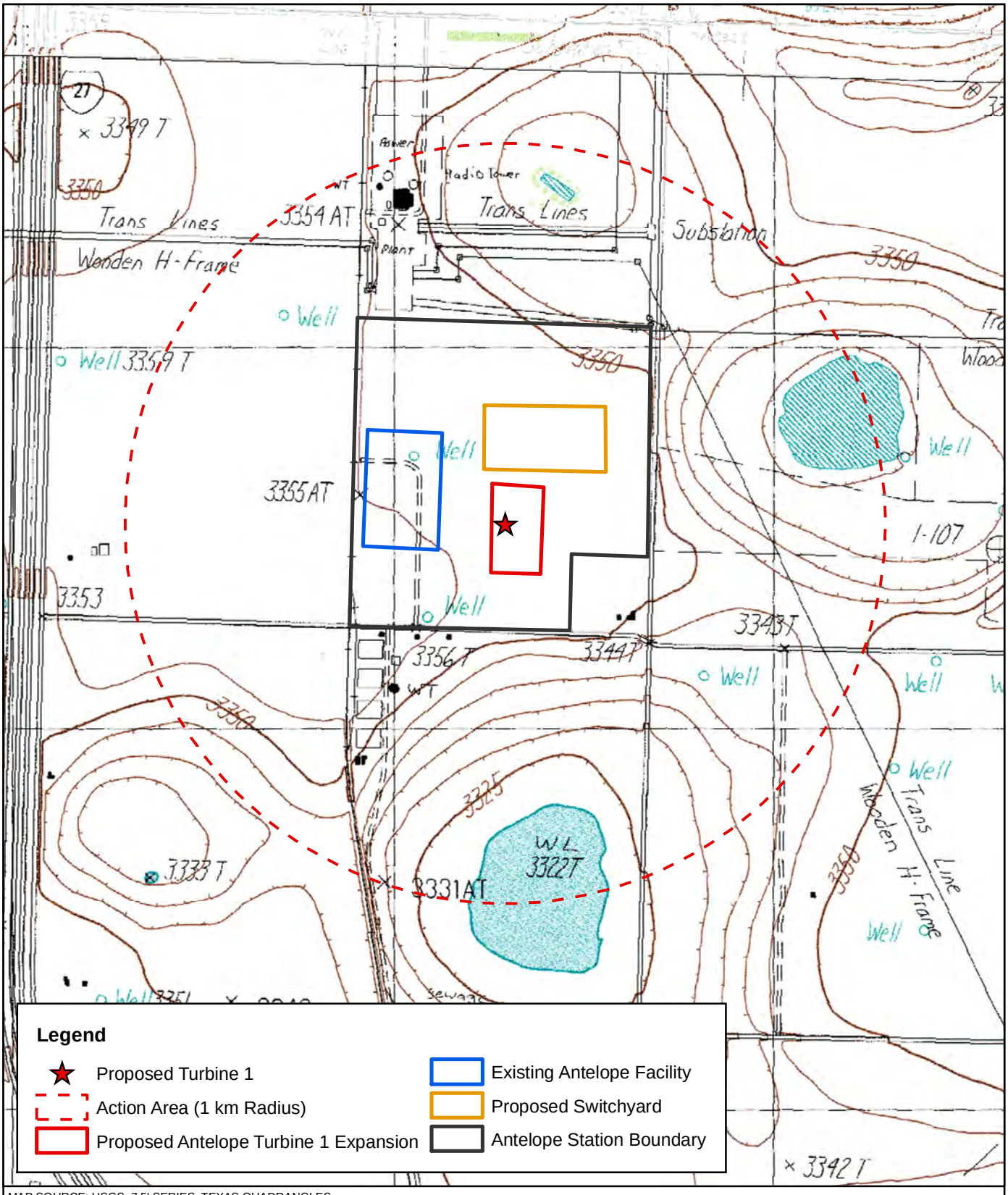


Horizon Environmental Services, Inc.

FIGURE 3

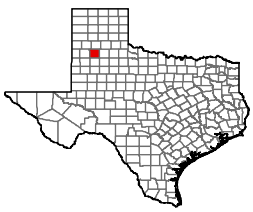
ACTION AREA AERIAL PHOTOGRAPH
GOLDEN SPREAD
ANTELOPE STATION EXPANSION
ABERNATHY, HALE COUNTY, TEXAS

120128-Golden Spread\Graphics\Antelope Station\120128A01BG4BA_ActionAreaTopo.mxd | REM | 07-08-2013



MAP SOURCE: USGS, 7.5' SERIES, TEXAS QUADRANGLES, ABERNATHY AND UNDERWOOD, 1985.

0 600 1,200
Feet

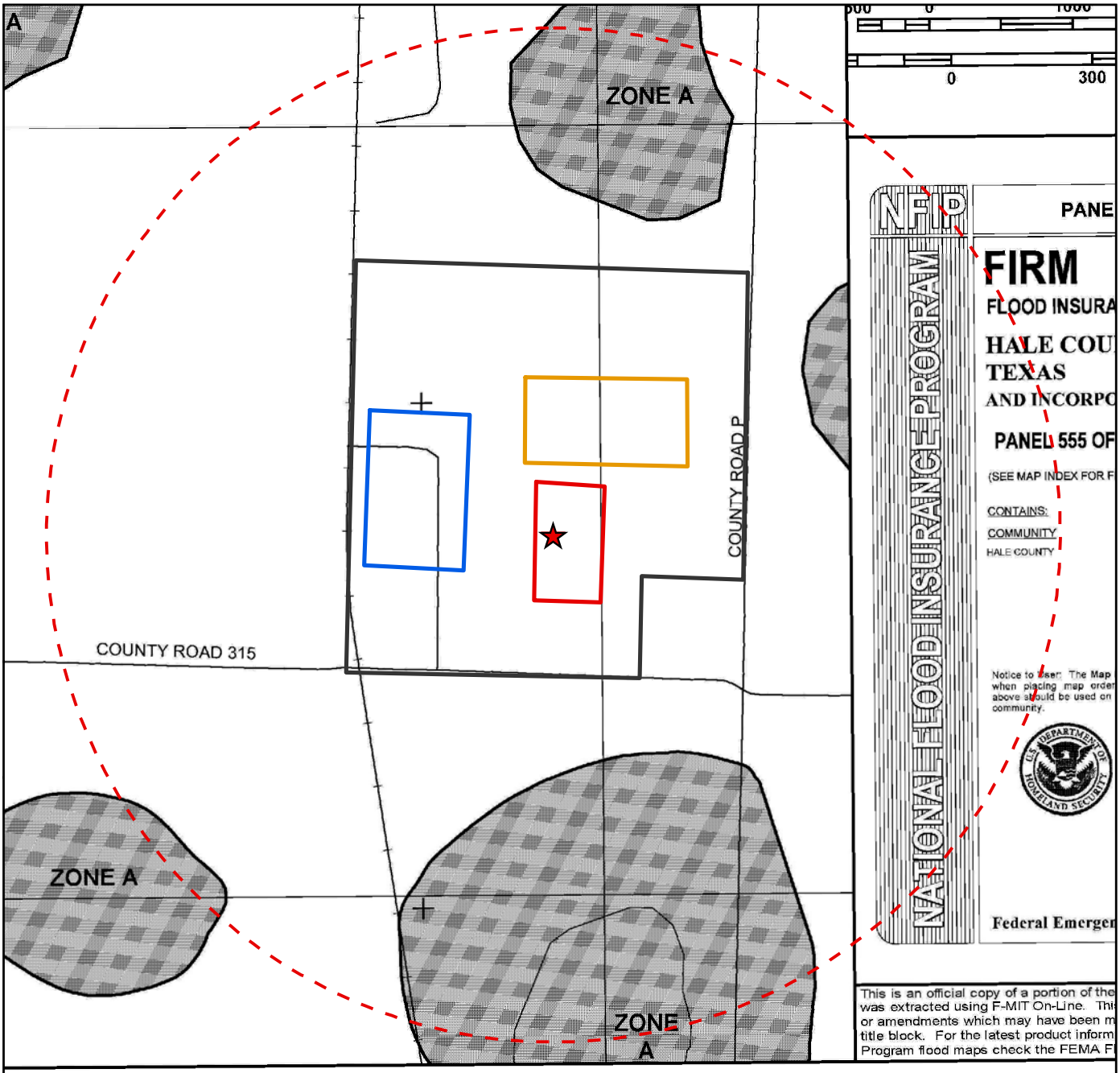


Horizon Environmental Services, Inc.

FIGURE 4

ACTION AREA TOPOGRAPHIC MAP
GOLDEN SPREAD
ANTELOPE STATION EXPANSION
ABERNATHY, HALE COUNTY, TEXAS

120128-Golden Spread\Graphics\Antelope Station\120128A04BG4BA_FEMA.mxd | REM | 07-08-2013

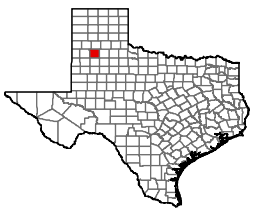


Legend

- Proposed Turbine 1
- Action Area (1 km Radius)
- Proposed Antelope Turbine 1 Expansion
- Existing Antelope Facility
- Proposed Switchyard
- Antelope Station Boundary

MAP SOURCE: FEMA, 2011.

0 500 1,000
Feet

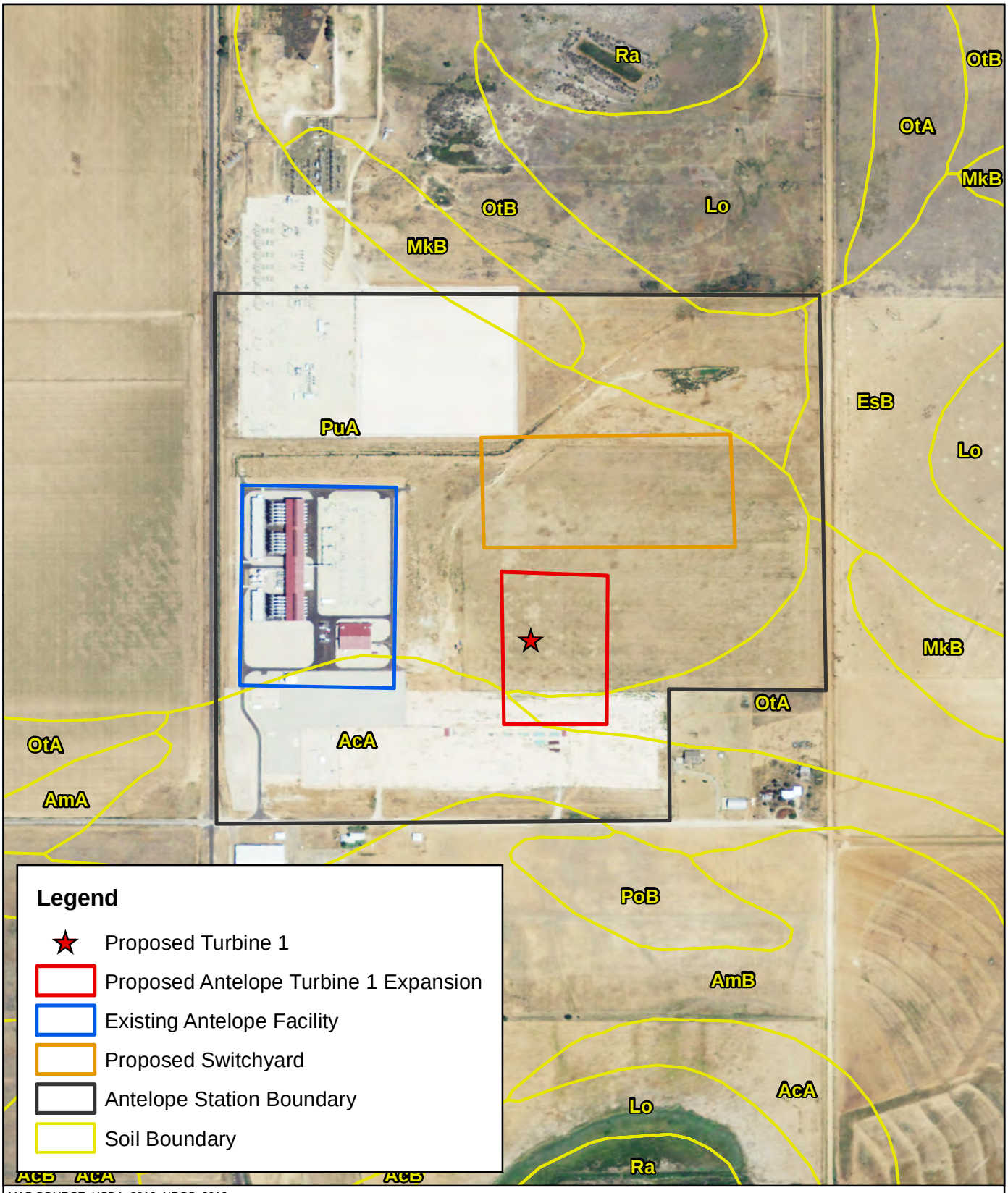


Horizon Environmental Services, Inc.

FIGURE 5

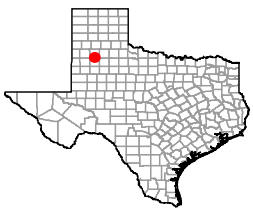
FEMA FLOOD MAP
GOLDEN SPREAD
ANTELOPE STATION EXPANSION
ABERNATHY, HALE COUNTY, TEXAS

120128-Golden Spread\Graphics\Antelope Station\120128A02BG4BA_Soil.mxd | REM | 07-08-2013



MAP SOURCE: USDA, 2012; NRCS, 2012.

0 350 700
Feet

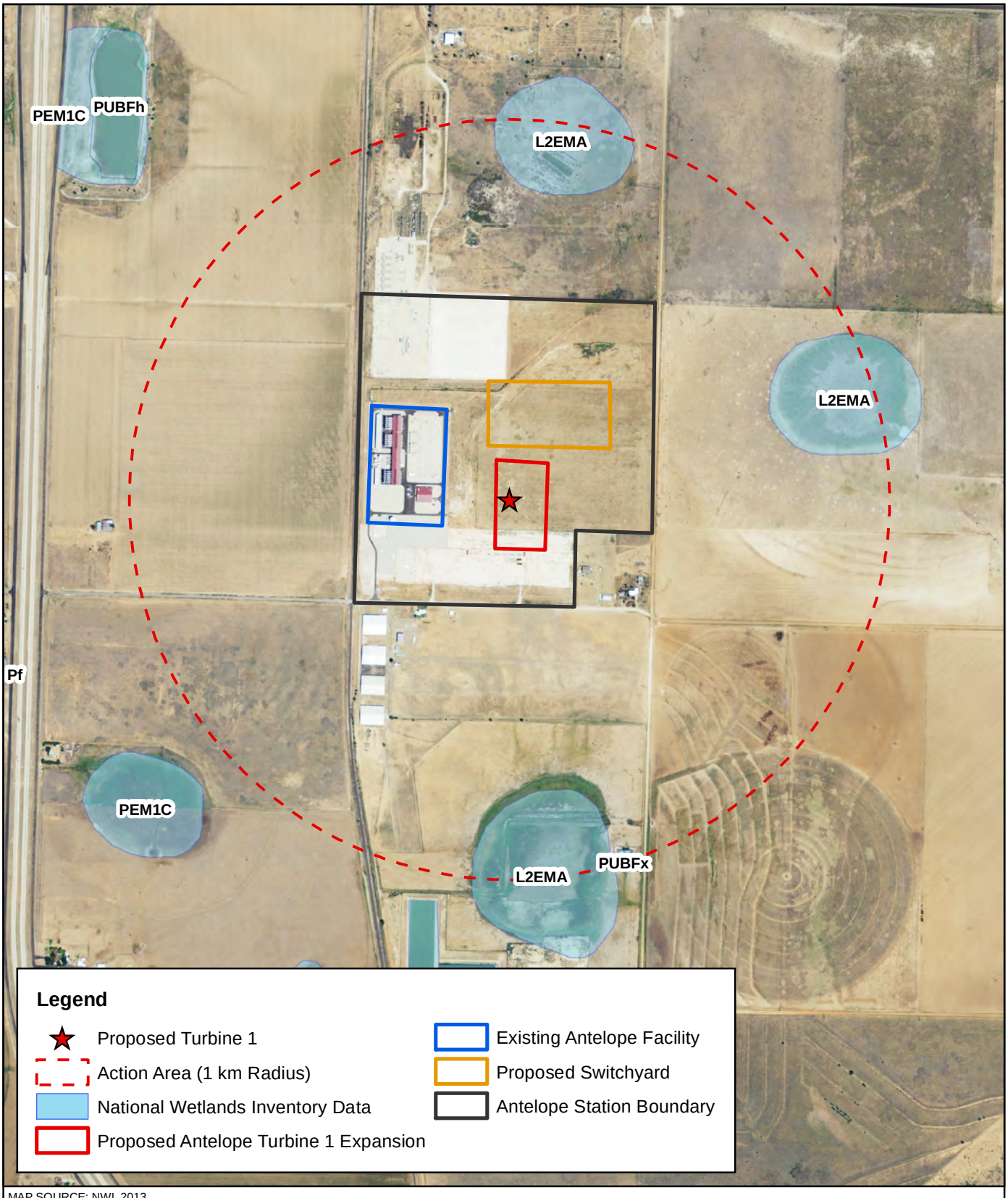


Horizon Environmental Services, Inc.

FIGURE 6

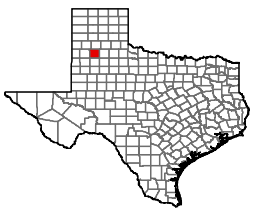
SOILS MAP
GOLDEN SPREAD
ANTELOPE STATION EXPANSION
ABERNATHY, HALE COUNTY, TEXAS

120128-Golden Spread\Graphics\Antelope Station\120128A03BG4BA_NWI.mxd | REM | 07-08-2013



MAP SOURCE: NWI, 2013.

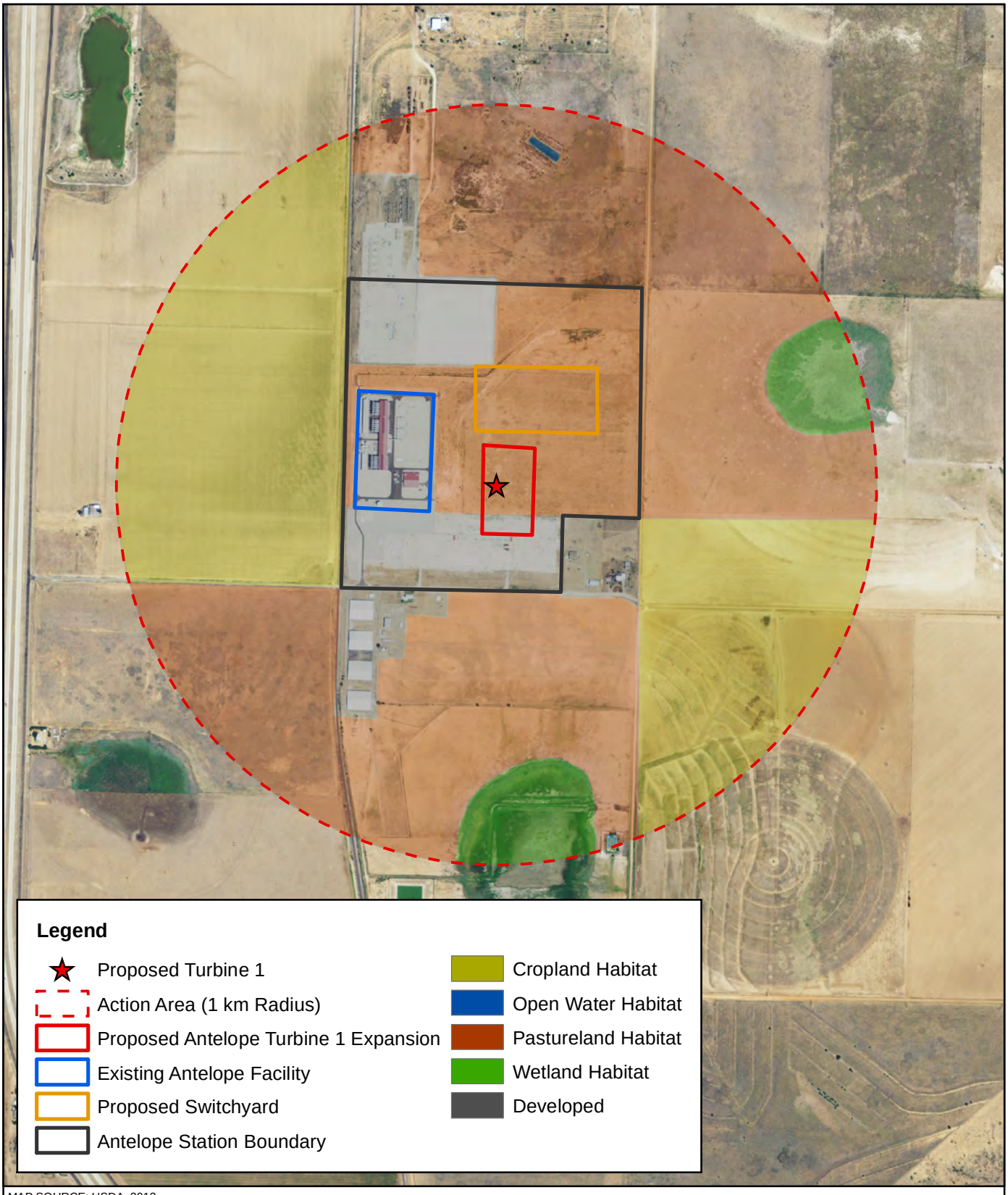
0 600 1,200
Feet



Horizon Environmental Services, Inc.

FIGURE 7

NATIONAL WETLANDS INVENTORY MAP
GOLDEN SPREAD
ANTELOPE STATION EXPANSION
ABERNATHY, HALE COUNTY, TEXAS



MAP SOURCE: USDA, 2012.

0 600 1,200
Feet

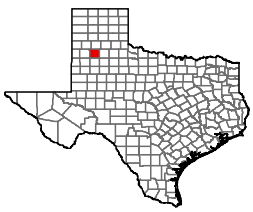


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FIGURE 8

OBSERVED HABITAT MAP
GOLDEN SPREAD
ANTELOPE STATION EXPANSION
ABERNATHY, HALE COUNTY, TEXAS

120128-Golden Spread\Graphics\Antelope Station\120128A10BG4BA_WhoopingCraneCorridor.mxd | REM | 07-19-2013

MAP SOURCE: ESRI, 2012; STEHN AND WASSENICH, 2008.

0 35 70
Miles

Horizon Environmental Services, Inc.

FIGURE 9

WHOOPING CRANE CORRIDOR
GOLDEN SPREAD
ANTELOPE STATION EXPANSION
ABERNATHY, HALE COUNTY, TEXAS

APPENDIX C

PHOTOGRAPHS

PHOTO 1

View of Antelope Station expansion area looking towards existing Antelope Facility

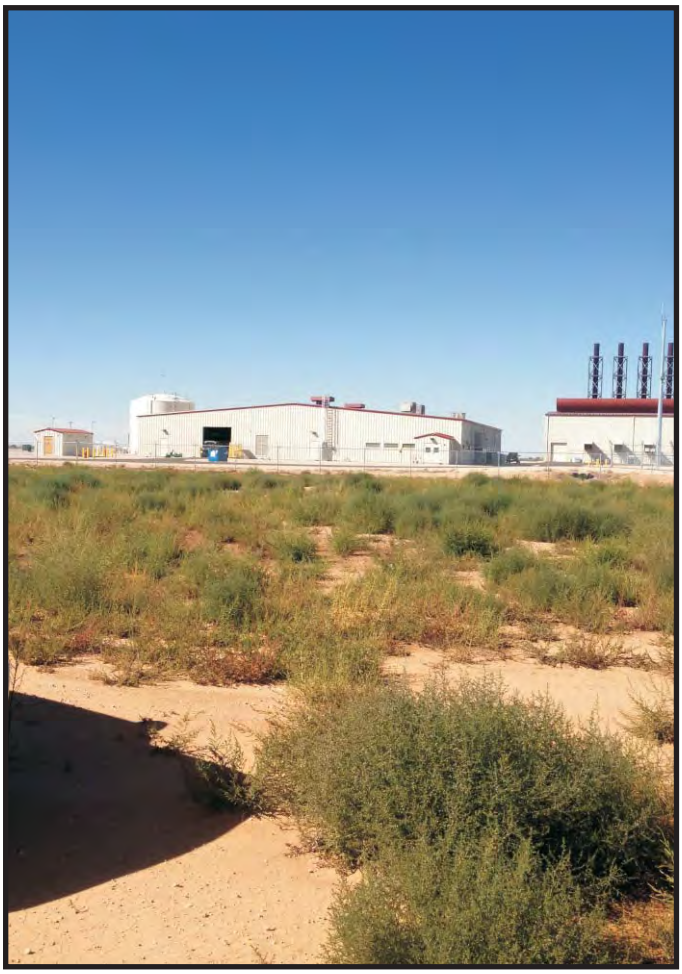

PHOTO 2

View of Antelope Station expansion area looking towards existing Antelope Facility

Horizon
Environmental Services, Inc.

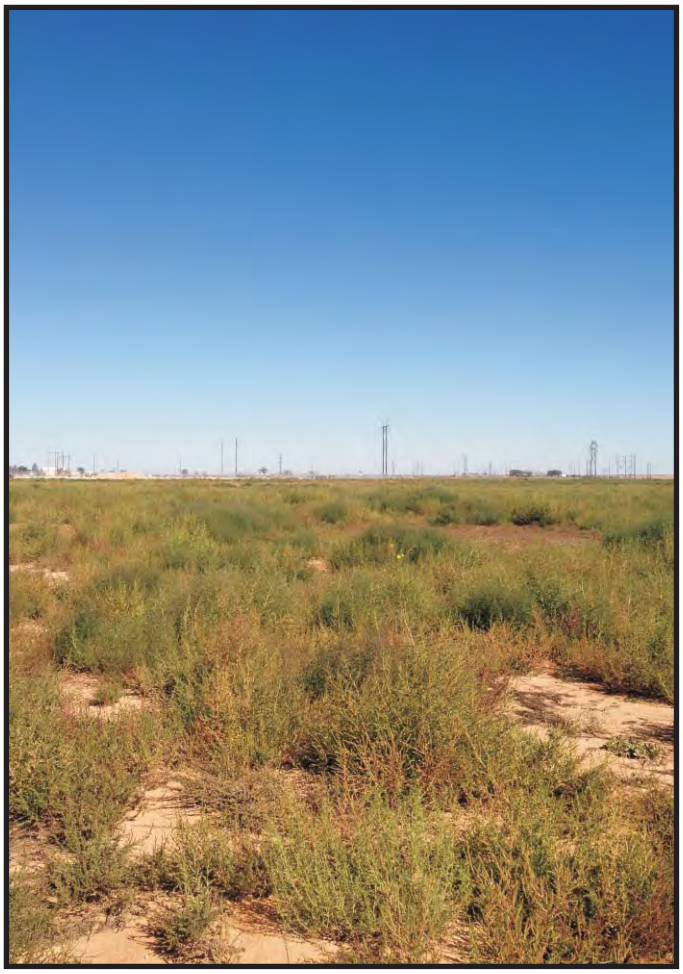

PHOTO 3
Typical view of Antelope Station expansion area

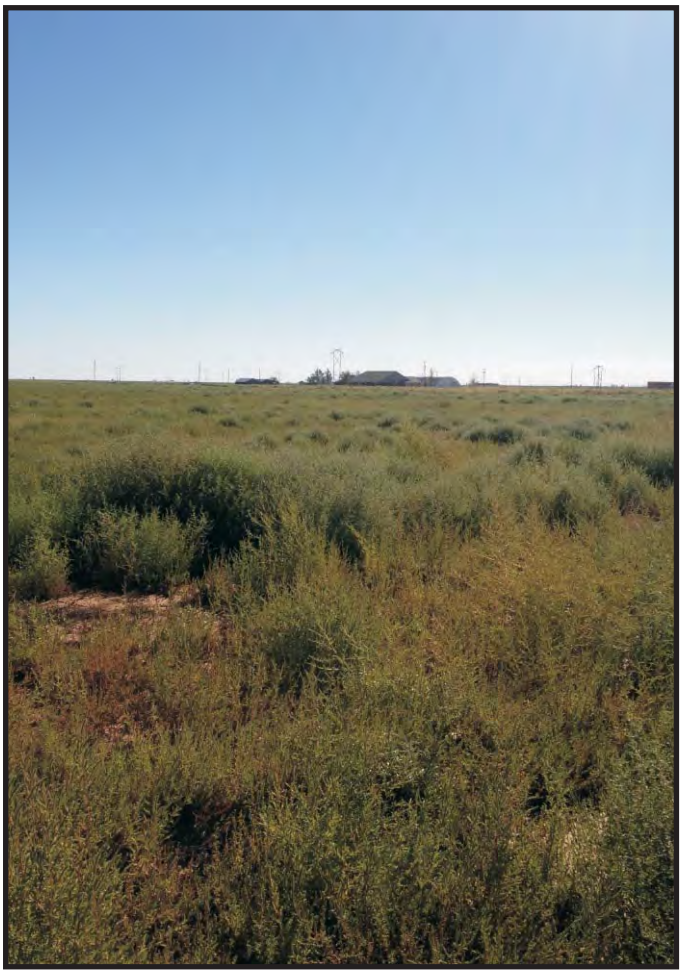

PHOTO 4
Typical view of Antelope Station expansion area

Horizon
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APPENDIX D

PREPARER QUALIFICATIONS

Horizon
Environmental Services, Inc.

Shannon M. Dorsey, PWS

Principal/Senior Project Manager

Education

M.S., Wildlife Management, Southwest Texas State University, 1995

B.A., Biology, University of Texas at Austin, 1992

Certifications – Qualifications – Training

Certified Professional Wetland Scientist (PWS) No. 1760

Registered Environmental Professional (REP No. 5914)

Qualified Environmental Professional under ASTM Practice E 1527-05 and 40 CFR 312 "All Appropriate Inquiries" (AAI) Rule

US Army COE Approved Wetland Delineation Training

Areas of Relevant Expertise

FERC Environmental Inspection and Permitting

NEPA Compliance

Phase I ESAs (ASTM Practice E 1527-05)

Phase II ESA Sampling

Wildlife Management

Wetland Delineation and Section 404 Permitting

Threatened/Endangered Species Permitting

Years of Experience

With This Firm:	16
With Other Firms:	2

Relevant Experience Summary

- Section 404/10 Permitting
- Expert Witness Testimony
- CWSRF EID Preparation
- FERC Filings
- Public Meetings
- Phase I ESAs
- Expert Testimony
- Threatened/Endangered Species Survey and Section 10(a) Permitting
- Aquatic Ecology
- Wildlife Ecology
- Wetland Delineation
- Wetland Mitigation
- Wildlife and Game Management

Experience Summary

Shannon Dorsey is a graduate of Southwest Texas State University's master's program in Wildlife Biology. A Principal and Senior Project Manager, Mr. Dorsey has had extensive experience in the field of wildlife biology, project management, permitting, and consulting. He has been involved with native wildlife and endangered species, conducting both habitat assessments and presence/absence surveys and territorial mapping for several local and nationwide species. Mr. Dorsey has prepared several Section 10(a)(1)(B) permits for incidental take of endangered species. He has extensive experience in acquisition of both individual and nationwide Section 404 permits for impacts to wetlands and other "waters of the US." He is certified as a "Professional Wetland Scientist" (PWS No. 1760) by the Society of Wetland Scientists Certification Program, Inc. He is skilled and experienced in on-site investigations that include habitat assessment, wetland determinations and delineations, Phase I Environmental Site Assessments and Phase II sampling, recognition of karst characteristics, recharge features, and suitable endangered species habitats. Mr. Dorsey has extensive experience in FERC filing and compliance for both 7(c) and non-7(c) projects as well as training pipeline personnel in Environmental Compliance. Mr. Dorsey serves as the manager of Horizon's Ecology Department and oversees ecological and due diligence investigations. Mr. Dorsey is a Registered Environmental Professional (REP No. 5914) and Horizon Principal with more than 18 years of consulting experience.

APPENDIX E

CORPORATE DESCRIPTION

Horizon™

Environmental Services, Inc.

CORPORATE DESCRIPTION

Horizon Environmental Services, Inc. (Horizon) is particularly well qualified to provide both the technical and administrative support required for project planning and permitting efforts related to various federal, state, and local permits and/or approvals. Horizon's capabilities and experience are very broad in the area of National Environmental Policy Act (NEPA) compliance support, particularly as related to multidisciplinary Environmental Assessments/Environmental lmpact Statements (EAs/EISs), jurisdictional wetlands, endangered species, cultural resources issues, and expert testimony.

Services that Horizon provides for various clients include multidisciplinary EAs/EISs in support of federal and state environmental reviews; jurisdictional wetland determinations; endangered species habitat assessments and surveys; archeological surveys and mitigation (prehistoric and historic); ecological risk and damage assessments; wildlife habitat and wetlands restoration/creation; baseline aquatic and terrestrial investigations (inland and coastal); geologic resource assessments; real estate environmental site assessments; environmental constraints analyses for alternative project sites, routes, and land development scenarios ("fatal flaw" analyses); post-project land use planning and mitigation; and permit management, including preparation, agency coordination, and expert testimony.

Horizon is based in Austin, Texas, and provides services nationally. Horizon was founded in 1987 and is a certified Historically Underutilized Business (HUB), Disadvantaged Business Enterprise (DBE), and Women-owned Business Enterprise (WBE). Composed of senior professional personnel with many years of applied experience and specific training in environmental assessments, permitting, and management, members of Horizon's staff have worked on the majority of energy development and reservoir projects, either proposed or developed, in Texas and Louisiana from 1976 to the present. Our staff's experience and background have allowed Horizon to gain an applied knowledge of the environmental requirements of various federal and state regulations and permits affecting natural resource development and an excellent identity with agency personnel.

Horizon's key personnel assigned to various work efforts are committed to being available from work initiation through expert testimony, if required. Depending on the scope of environmental investigations required for a given project, Horizon may network with other qualified firms, not only to provide both environmental and engineering services in a cost- and time-efficient manner, but to assure that only the most technically qualified and experienced persons are providing personal attention to the work effort.

Please visit our web site at **www.horizon-esi.com**.

CORPORATE HEADQUARTERS
1507 South IH 35 ★ Austin, Texas 78741 ★ 512.328.2430 ★ Fax 512.328.1804 ★ www.horizon-esi.com
Certified HUB/DBE/WBE