

US EPA ARCHIVE DOCUMENT

**BIOLOGICAL ASSESSMENT  
FOR  
TWO SIMPLE-CYCLE COMBUSTION TURBINES AT THE  
ECTOR COUNTY ENERGY CENTER  
ECTOR COUNTY, TEXAS**

*Submitted To:*

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REGION 6  
DALLAS, TEXAS**

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## ACRONYMS

AOI	area of significant impact
AQRV	air quality related values
AVO	olfactory
BA	biological assessment
BACT	best available control technology
BMP	best management practices
CO	carbon monoxide
dBA	decibels
DLN	Dry Low NO <sub>x</sub>
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
ESL	effects screening level
FCAA	Federal Clean Air Act
FEMA	Federal Emergency Management Agency
FHPM	Federal-Aid High Program Manual
FIRM	flood insurance rate map
GAT	Geologic Atlas of Texas
GE	General Electric
GHG	greenhouse gas
LAER	Lowest Achievable Emission Rate
MW	megawatt
NAAQS	National Ambient Air Quality Standards
NH <sub>4</sub>	ammonia
NO <sub>2</sub>	nitrogen dioxide
NO <sub>x</sub>	nitrogen oxides
NRCS	Natural Resources Conservation Service
NSR	New Source Review
NWI	National Wetland Inventory
NWS/AHPS	National Weather Service/Advanced Hydrologic Prediction Service
Pb	lead
PM	particulate matter
PM <sub>10</sub>	particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
PM <sub>2.5</sub>	particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers
ppmvd	parts per million by volume, dry basis
PSD	Prevention of Significant Deterioration
RACT	Reasonably Available Control Technology
SIL	significant impact level
SO <sub>2</sub>	sulfur dioxide
TCAA	Texas Clean Air Act
TCEQ	Texas Commission on Environmental Quality

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TPWD	Texas Parks and Wildlife
TSP	total suspended particulate
TXNDD	Texas Natural Diversity Database
USFWS	U.S. Fish and Wildlife Service
VOC	volatile organic compounds

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## **EXECUTIVE SUMMARY**

Invenergy Thermal Development LLC (Invenergy) is seeking authorization from the U.S. Environmental Protection Agency (USEPA) to construct and operate two natural gas-fired, simple-cycle combustion turbine generating units (CTGs) at the Ector County Energy Center (ECEC), located approximately 20 miles northwest of Odessa, Texas in Ector County. In addition to the two CTGs to be installed at the ECEC, the additional items include a dew-point heater for the gas supply for the combustion turbines and an emergency diesel fire-water pump.

The combustion turbines that are being considered for the proposed project are General Electric 7FA.03 or 7FA.05 models. These models have a nominal base-load electrical power output of 165-193 MW. The new CTGs will operate as peaking units and will be limited to 2500 hours per year of operation each. Dry low-NO<sub>x</sub> (DLN) technology will be used to reduce the nitrogen oxide (NO<sub>x</sub>) emissions from the turbines.

The ECEC project triggers PSD review for greenhouse gas (GHG) regulated pollutants because the installation of the ECEC will produce annual GHG emissions of more than 100,000 tons/yr and annual emissions of the combined criteria Prevention of Significant Deterioration (PSD) pollutants of more than 250 tons/yr. Included in this application are a project scope description, emissions calculations, and a best available control technology (BACT) analysis.

This Biological Assessment (BA) is an evaluation of the associated potential environmental impacts that the proposed expansion project may have on federally-protected species and/or their potential habitat within the potential area of impact. Protected species included in this document include federally-threatened or endangered species of Ector County listed by U.S. Fish and Wildlife Service (USFWS) and Texas Parks and Wildlife (TPWD). Habitat evaluations for this BA were accomplished via pedestrian survey of the project site as well as a windshield assessment of publicly accessed portions within the Action Area. Subsequently, an evaluation of those resources based on air quality modeling results, construction, and operational methodologies determined or gathered by Zephyr Environmental Corporation (Zephyr) was accomplished.

Federally-protected species considered in this BA include the black-footed ferret, gray wolf and northern aplomado falcon. Data were collected to describe resident vegetation communities and assess the potential for occurrence of protected species. The dominant habitats within the Action Area are honey mesquite, yucca, prickly pear, sand bur and silver bluestem.

Invenergy performed dispersion modeling of air pollutants that will be emitted as a result of the proposed project in accordance with the PSD Permit Air Quality Analysis requirements and TCEQ effects screening level (ESL) analysis requirements.

Construction of the proposed project will have no direct or indirect impact on federally-listed species habitat. Invenergy will utilize the BACT to control emissions and thus minimize impacts to the surrounding environment to the maximum extent practicable. Based on the background

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research described in Section 6.1 and the determinations described in Section 6.4, the proposed project will have no direct or indirect impact on federally-listed species habitat.

This BA provides the results of an evaluation of the potential for the proposed project to impact species within the Action Area that are protected under the Endangered Species Act (ESA). The following table summarizes the effect determination for each federally-listed species.

<b>SUMMARY OF RECOMMENDED DETERMINATIONS OF EFFECT</b>		
<b>Federally-listed Species</b>	<b>Listing/Managing Agency</b>	<b>Recommended Determination of Effect</b>
Northern aplomado falcon	USFWS	No Effect
Gray wolf	USFWS/TPWD	No Effect
Black-footed ferret	USFWS/TPWD	No Effect

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## 1.0 INTRODUCTION

Invenergy is seeking authorization to construct and operate two natural gas-fired, simple-cycle CTGs at the ECEC, located approximately 20 miles northwest of Odessa, Texas, in Ector County. Two models of combustion turbine are being considered for this site: GE 7FA.03 turbines and GE 7FA.05 turbines. The final selection of the combustion turbine model will not be made until after the permit is issued. In addition to the two CTGs to be installed at the ECEC, the additional items include a dew-point heater for the gas supply for the combustion turbines and an emergency diesel fire-water pump. The proposed project is located on SW 3601 in Goldsmith, Texas.

The project is subject to PSD review for nitrogen oxides (NO<sub>x</sub>), carbon monoxide (CO), volatile organic compounds (VOC), particulate matter (PM), particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers (PM<sub>10</sub>), particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers (PM<sub>2.5</sub>), sulfuric acid mist (H<sub>2</sub>SO<sub>4</sub>), and GHG. The site-wide emissions are summarized in the following table.

<b>Sitewide Emission Summary</b>								
<b>VOC</b> (ton/yr)	<b>NO<sub>x</sub></b> (ton/yr)	<b>CO</b> (ton/yr)	<b>PM</b> (ton/yr)	<b>PM<sub>10</sub></b> (ton/yr)	<b>PM<sub>2.5</sub></b> (ton/yr)	<b>SO<sub>2</sub></b> (ton/yr)	<b>H<sub>2</sub>SO<sub>4</sub></b> (ton/yr)	<b>CO<sub>2</sub>e</b> (ton/yr)
41.51	160.88	298.85	67.13	67.13	67.13	69.8	31.80	286,551

This BA is an evaluation of the associated potential environmental impacts that the proposed project may have on federally protected species and/or their potential habitat within the potential area of impact.

Protected species included in this document include only federally-threatened or endangered species. A description of the federal agency regulations for the various protected species evaluated in this BA is presented in Section 2.0.

This BA was developed to investigate, qualify, quantify, and report the possible effects, including: direct and indirect, interdependent and interrelated actions that the proposed project may have on federally-protected species within the Action Area. Habitat evaluations for this BA were accomplished via pedestrian survey of the project site as well as a windshield and pedestrian assessment of publicly accessed portions of the Action Area. Subsequently, Zephyr completed an evaluation of impacts to those resources based on air quality modeling results, construction, and operational methodologies information determined or gathered.

Following a discussion of possible effects to federally-listed species, a determination of effect will be stated. Three possible determinations as described by USFWS are as follows:

1. No effect - "No effect" means there will be no impacts, positive or negative, to listed or proposed resources. Generally, this means no listed resources will be exposed to action and its environmental consequences. Concurrence from the USFWS is not required.

2. May affect, not likely to adversely affect - A "May affect, but not likely to adversely affect" means that all effects are beneficial, insignificant, or discountable. Beneficial effects have contemporaneous positive effects without any adverse effects to the species or habitat. Insignificant effects relate to the size of the impact and include those effects that are undetectable, not measurable, or cannot be evaluated. Discountable effects are those extremely unlikely to occur. These determinations require written concurrence from USFWS.
  
3. May affect, likely to adversely affect - A "may affect" and "is likely to adversely affect" means that listed resources are likely to be exposed to the action or its environmental consequences and will respond in a negative manner to the exposure.

Note: A finding of "may affect, likely to adversely affect" by an action agency and the USFWS requires "formal consultation" 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 FEDERAL REGULATIONS

### 2.1 REGULATIONS AND STANDARDS

#### 2.1.1 Clean Air Act

Both the Federal Clean Air Act (FCAA) and Texas Clean Air Act (TCAA) require that maximum ambient air quality concentration limits be established that are designed to protect public health, welfare and the environment. Ambient air is the air to which the general public has access, as opposed to air within the boundaries of an industrial facility.

The FCAA ambient standards are the National Ambient Air Quality Standards (NAAQS) and are established by the U.S. Environmental Protection Agency (EPA). The NAAQS are maximum concentration limits for specific pollutants in ambient air over a specific averaging time established in federal regulation (40 CFR 50). The NAAQS are classified into two categories: primary and secondary standards. Primary standards are established to protect public health, including "sensitive" populations such as asthmatics, children and the elderly. Secondary standards are established to protect public welfare, including visibility, animals, crops, vegetation and buildings. The FCAA requires periodic review of the science upon which the standards are based and the standards themselves to assure protection of the nation's public health and environment. This review is thorough and extensive involving a science policy workshop to identify key policy-relevant science issues to review, an integrated science assessment which is a comprehensive review, synthesis and evaluation of the science including risk and exposure assessments. Therefore these existing primary and secondary standards represent the current science related to protection of public welfare.

The EPA has established NAAQS for six principal air pollutants, also referred to as criteria air pollutants. These six criteria air pollutants are CO, lead (Pb), nitrogen dioxide (NO<sub>2</sub>), ozone, PM/PM<sub>10</sub>/PM<sub>2.5</sub>, and sulfur dioxide (SO<sub>2</sub>). The FCAA also establishes that geographic areas be classified as either having ambient concentrations above or below the established NAAQS. 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. There is no NAAQS pollutant for which Ector County (where the Invenergy plant is proposed to be located) is designated nonattainment; therefore Ector County is considered unclassified/attainment.

In addition to NAAQS, the EPA has established PSD increments which limit the increase in the ambient air concentration in an attainment area to an amount (the PSD increment) that will assure that the total ambient concentration in an attainment area continues to be below.

In order to obtain a PSD permit for criteria pollutants, an applicant is required to demonstrate with computer air dispersion modeling that the emissions from their proposed project will not exceed the NAAQS and the PSD Increment for each pollutant. This demonstration is conducted in a two-step process. First the emissions from the new project are modeled to determine

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maximum off-property impacts. If those impacts are below a defined significant impact level (SIL) for a specific pollutant and averaging period, then the increase in ambient concentration is considered to be insignificant and no further evaluation is required for that pollutant and averaging period. If the project impacts are above the SIL, then additional dispersion modeling is required in which the project emission increases are modeled along with other emissions sources in the area and that predicted impact is added to a background level and compared to the NAAQS. The dispersion modeling procedure for the PSD increments is a similar process except that only specified "increment consuming" emission sources are modeled and a background level is not added to the modeling result.

The TCAA establishes the TCEQ and its regulatory and permitting requirements to accomplish the TCAA purpose to control air pollution in order to protect human health or welfare, animal life, vegetation or property. To assess and assure that emission increases will be protective of health, welfare, animal life, vegetation or property the TCEQ has established an effects evaluation process using ESLs for pollutants for which a NAAQS has not been established. This ESL evaluation is implemented through the state permitting process in which computerized dispersion modeling is used to predict the ambient concentration of individual air contaminant species and then are compared to the published ESLs to determine acceptability of the proposed emissions.

ESLs are chemical-specific air concentrations set to protect human health and welfare. Short-term ESLs are based on data concerning acute health effects, the potential for odors to be a nuisance, and effects on vegetation, while long-term ESLs are based on data concerning chronic health and vegetation effects. Health-based ESLs are set below levels where health effects would occur whereas welfare-based ESLs (odor and vegetation) are set based on effect threshold concentrations. The short-term ESL is the lowest value of acute odor, vegetation- and health-based ESLs. The long-term ESL is defined as the lowest value of chronic vegetation- or health-based ESLs. The ESL Published List includes ESLs for thousands of chemicals and can be found at: [http://www.tceq.state.tx.us/implementation/tox/esl/list\\_main.html](http://www.tceq.state.tx.us/implementation/tox/esl/list_main.html).

ESLs are not ambient air standards but rather are screening levels used in TCEQ's air permitting process to evaluate air dispersion modeling's predicted impacts. As described by TCEQ, ESLs are "used to evaluate the potential for effects to occur as a result of exposure to concentrations of constituents in the air. ESLs are based on data concerning health effects, the potential for odors to be a nuisance, and effects on vegetation." Accordingly, if predicted concentrations of a constituent "do not exceed the screening level, adverse health or welfare effects are not expected."

### **2.1.2 Endangered Species Act (ESA)**

Regulation of the ESA is accomplished by the USFWS. "The purpose of the ESA is to protect and recover imperiled species and the ecosystems on which they depend." Imperiled species specifically includes those listed by the USFWS as threatened or endangered. Candidate species are those "that USFWS has enough information to warrant proposing them for listing but is precluded from doing so by higher listing priorities."

Section 7 of the ESA requires Federal agencies to insure that any action authorized, funded or carried out by them is not likely to jeopardize the continued existence of listed species or modify their habitat.

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."

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### 3.0 PROJECT DESCRIPTION

#### 3.1 PROJECT PURPOSE

The purpose of the project is to construct a new natural gas fired, simple cycle electric generating plant in Ector County, Texas. The development of the ECEC is to generate up to approximately 400 (MW), of gross electrical power in an efficient manner while increasing the reliability of the electrical supply for the State of Texas.

*Project location information:*

<i>USGS Quad</i>	<i>Latitude/Longitude</i>
<i>North Cowden</i>	<i>32.070040°N, -102.586120°W</i>

#### 3.2 CONSTRUCTION INFORMATION

Construction of the ECEC, associated infrastructure, and auxiliary equipment will take place within the proposed 11.4 acre project site and 13.9 acre construction laydown yard. Additional earth disturbances will be limited to the installation of a maximum of 113.2 acre natural gas supply pipeline and 15.4 acre electric utility corridor for a 138kV transmission line. The construction area is shown on Figure 3-2 (Appendix A).

The projected construction start date is June 1, 2014. The projected operation start date is June 1, 2015.

##### 3.2.1 Construction Activities

The total time estimated to complete the construction of the project is approximately 12 months and includes the following list of general construction activities.

Approximately 11.4 acres of green field undeveloped property will be converted to industrial purposes. In addition to the 11.4 acres to be used for the site, one pipeline and one electric utility corridor will also be constructed.

1. Clear and grade site to design elevation
2. Place concrete for combustion turbines, ancillary equipment, buildings, steel, etc.
3. Erect turbine generators, ancillary equipment, buildings, steel, piping; electrical, instrumentation installation
4. Erection of transmission towers and overhead conductors
5. Pipeline excavation, installation and backfilling
6. Insulation
7. Touch-up painting

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Equipment required to complete the site construction activities is listed below.

1. Light Duty Pickup Truck (6)
2. Tandem Axle Dump Truck (4)
3. Water Truck, 4000 gallon (1)
4. Tractor/Trailer 2-3 Axle (2)
5. Dozer Crawler D (2)
6. Excavator Crawler 2.61CY D (2)
7. Grader 28830LB 12 ft D (2)
8. Loader Backhoe 14 ft D (2)
9. Tractor Skid steer 1,600LBS D (4)
10. Tractor Industrial D (1)
11. Crane Crawler -600t D (1)
12. Super Lift 600t (1) or 600t Hydraulic Gantry
13. Luffer 600t (1)
14. Crane RT 890E (2)
15. Forklift WHS 4,000LB E (4)
16. Concrete Pump Truck D (2)
17. Miscellaneous Manlifts/Scissorlifts (15)
18. Crane Lattice Boom Crawler 120t (1)
19. Welding Machines (12)

### **3.2.2 Emission Controls**

As required by 30 TAC §116.111(a)(2)(c), new or modified facilities must apply Best Available Control Technology, with consideration given to the technical practicability and economic reasonableness of reducing or eliminating the emissions from the facility and thereby minimizing the impact of emissions on the ambient air. TCEQ has established BACT guidance by emission source type and the EPA Reasonably Available Control Technology (RACT)/BACT Lowest Achievable Emission Rate (LAER) Clearinghouse was consulted to determine if any additional controls should be considered. Section 7.0 (Conservation Measures) provides specific information on the project emission controls.

## **3.3 OPERATION AND MAINTENANCE INFORMATION**

### **3.3.1 Operation**

ECEC will generate electricity for sale to the Electric Reliability Council of Texas power grid. Each General Electric (GE) 7FA.03 combustion turbine model has a nominal base-load electric power output of approximately 165 MW, and the 7FA.05 variant outputs approximately 193 MW. The units may operate at reduced load to respond to changes in system power requirements and/or stability. The power generating equipment, as well as ancillary equipment that will be sources of GHG emissions at the site, are listed below:

- Two natural gas-fired combustion turbines equipped with lean pre-mix low-NO<sub>x</sub> combustors
- Lube oil vents for the turbine lube oil recirculation system

- Natural gas piping and metering
- One diesel fuel-fired emergency fire water pump engine
- One diesel fuel storage tank to serve the emergency fire water pump engine
- One natural gas-fired dewpoint heater

### **3.3.2 Water Use**

Water use at this facility will be fairly limited. The maximum water needed is expected to be no greater than 40 gpm. The main use of water will be for evaporative cooling to produce additional power on hot days. Minor uses include potable water for a small staff, service water for maintenance activities and compressor water wash on an infrequent basis. Water will be obtained from onsite wells.

### **3.3.3 Noise Effects**

The Project Site will be located in an area currently undeveloped that is surrounded by several oil/gas wells, and roadways. Current noise levels on or around the site are very low and mostly just affiliated with roadway traffic located to the north and west. Noise levels from construction or operation of the proposed project will be more significant than current noise levels. These noise levels however will have no impact to federally listed species or any other sensitive receptors.

### **3.3.4 Infrastructure-related Effects**

Land use impacts of the construction and operation of the ECEC will include the main 11.4 acre parcel, natural gas pipeline and the transmission corridor. Currently, the 11.4 acre parcel is undeveloped with sporadic vegetation of desert scrub and exposed soils. The pipeline routes are either located within an existing right-of-way (ROW) or adjacent to an existing road, both of which exhibit the same sporadic vegetation and exposed soil characteristics of the project site. Any increased noise, dust, and traffic from construction will be short-term for the duration of the project. BMP's will be applied during construction to reduce potential effects.

### **3.3.5 Human Activity Effects**

Construction and operation of the proposed project will require an increase of human activity compared to the current activities at or around the property. This increased activity would be due to the construction of the proposed project described in 3.2.1. Access to the project site would be from CR 3601.

The project location has been slightly disturbed in the past through clearing and other types of management beneficial to oil and gas production. This parcel does provide habitat for local wildlife such as deer, coyotes, rabbits, birds and several other species. Construction and the increase of human activity would most likely push some of this wildlife to surrounding areas in

any direction. Human activity during construction or operation would have no effect on any threatened or endangered species.

### **3.4 WASTE WATER AND STORM WATER INFORMATION**

Wastewater from the administration building will be processed through either a septic system or on-site septic tank. Stormwater runoff will be directed to a detention/sedimentation pond. Process waste water will be held in a tank and sent off site to be processed.

During construction of the proposed facility, Invenergy will follow any applicable TCEQ requirements to obtain construction storm water permits for the proposed project. The site will employ best management practices to prevent contamination due to storm water runoff, including erosion control and stabilization, minimization of offsite vehicle tracking and dust generation, and other practices as warranted by site. The site will also follow the notification, recordkeeping, and reporting requirements of TCEQ's construction storm water management program.

ECEC will have an Oil and Hazardous Materials Spill Prevention, Control, and Countermeasure (SPCC) Plan and Storm Water Pollution Prevention Plan (SWPPP) in place prior to operation. Facility employees will be trained to implement these plans, and will use them during operations and maintenance of the proposed facility.

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## 4.0 ACTION AREA

### 4.1 ACTION AREA DEFINITION

An Action Area is defined as “all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action” (50 CFR 402.02). The analysis of species or designated critical habitat likely to be affected by the proposed project is focused on effects within the project’s Action Area. For this BA, the Action Area was determined by identifying the maximum area in which the proposed project may result in significant direct and indirect impacts in and around the Project Site. Both construction and operation phases of the proposed combustion turbine project were considered. Indirect impacts to surrounding areas may include noise, lighting, dust, erosion, stream sedimentation, air emissions, and physical disturbances. Because air emissions have the potential for widest impact away from the project site, the Action Area was based on determining a de minimis effects boundary (see Section 2.1.1).

The Action Area was determined to extend up to 1.5 miles (2.4 kilometers) from the Project Site (see Figures 4-1 through 4-9, Appendix A) including the proposed rights-of-way for the utility corridor and the natural gas pipeline, which add linear area extending from the project site for up to 5 miles. The potential impacts to federally threatened and endangered species and designated critical habitat were evaluated within the identified Action Area. The following sections describe the methodology used to delineate the Action Area for this BA.

### 4.2 ACTION AREA DEFINITION METHODOLOGY

The Action Area was established using air emission dispersion modeling in such a manner as to ensure that any potential impact from emissions beyond the defined boundary of the Action Area would, by regulatory definitions, be de minimis, or trivial. The boundary of the Action Area was conservatively delineated by applying EPA SILs for criteria pollutants and “de minimis” levels for non-criteria pollutants.

The Action Area has been modified for the project to include construction of the natural gas pipeline and the transmission line that will be constructed in support of the project.

#### 4.2.1 Ambient Air Dispersion Modeling

Emissions associated with the proposed project were modeled using the EPA AERMOD air dispersion model in support of the PSD and state New Source Review (NSR) applications. The modeling results in this report were taken directly from the dispersion modeling being conducted for the TCEQ state/PSD air permit application. Emissions from the two models of combustion turbines under consideration were modeled. The Action Area was based on the maximum predicted results from the two considered combustion turbine models. The ambient air concentration results were then compared with de minimis levels associated with the Primary NAAQS, Secondary NAAQS, and TCEQ property line standards (Table 4-1). All short term

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modeling concentrations correspond to the maximum proposed emission rates during normal operations.

All annual modeling concentrations correspond to the proposed annual emission rates. The boundaries of the area of interest (AOI) for a given pollutant and averaging period are defined by the number of modeling receptors for which predicted concentrations are greater than the respective de minimis levels. The Action Area for the biological assessment is the cumulative number of modeling receptors for all pollutants and averaging periods for which predicted concentration are greater than the respective de minimis levels. The results of these modeling efforts are summarized in Table 4-1. As the table indicates, the Action Area extends up to 2.4 kilometers (1.5 miles) from the Project Site (not including fuel pipeline and electrical transmission lines) and is located entirely within Ector County. It is important to note that the Action Area is not defined by compliance with the NAAQS but rather the SILs and TCEQ de minimis levels, which are but a small fraction of the NAAQS, TCEQ Standards, and TCEQ ESL guideline values. The Action Area is identified on Figure 4-1 (Appendix A).

**TABLE 4-1**  
**INVENERGY THERMAL DEVELOPMENT LLC, ECTOR COUNTY ENERGY CENTER**  
**AREA OF INTEREST ANALYSIS RESULTS FROM PRELIMINARY MODELING<sup>1</sup>**

Pollutant	Averaging Period	NAAQS		TCEQ Property Line Standard <sup>2</sup>	Significant Impact Level (SIL)	AOI Modeling Results	
		Primary	Secondary			Maximum Predicted Concentration	Distance to Furthest Receptor Within Area of Significant Impacts (AOI)
		( $\mu\text{g}/\text{m}^3$ )	( $\mu\text{g}/\text{m}^3$ )				
NO <sub>2</sub>	1-Hour	188	None	---	7.5	8.96	0.6
	Annual	100	100	---	1	1.61	1.0
CO	1-Hour	40,000	None	---	2,000	22.6	0
	8-Hour	10,000	None	---	500	10.0	0
SO <sub>2</sub>	30-Minutes	---	---	715	---	4.85	0
	1-Hour	196	None	---	7.8	4.85	0
	3-Hour	None	1300	---	25	4.40	0
	24-Hour	365	None	---	5	1.29	0
	Annual	80	None	---	1	0.25	0
PM <sub>10</sub>	24-Hour	150	150	---	5	11.5	0.9
	Annual	None	None	---	1	2.67	---
PM <sub>2.5</sub>	24-Hour	35	35	---	1.2	5.71	2.4
	Annual	15	15	---	0.3	1.68	2.4
H <sub>2</sub> SO <sub>4</sub>	1-Hour	---	---	50	---	2.21	1.1
	24-Hour	---	---	15	---	0.55	1.2

<sup>1</sup>De minimis for emission increases of non-criteria pollutants with no federal or TCEQ ambient standards is 10% of the ESL (TCEQ, Modeling and Effects Review Applicability, APDG 5874, July 2009).

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## 5.0 EXISTING CONDITIONS

### 5.1 NATURAL RESOURCES

#### 5.1.1 Natural Diversity Database Results

On November 28, 2012, Zephyr forwarded a request to TPWD to provide Texas Natural Diversity Database information for reports of listed-species for the North Cowden NW, Clabber Hill Ranch, Coyote Corner, North Cowden, Turnbaugh Corner, and Goldsmith quadrangles in Andrews and Ector Counties. On December 7, 2012, TPWD forwarded data shapefiles for all reported listed-species for these six quadrangles. A review of those shapefiles indicates that no federally-listed species has been reported within the Action Area.

#### 5.1.2 Regional Setting

The proposed site is located northeast of the City of Odessa in Ector County, Texas, approximately 28 miles east of New Mexico. The site is in the southeast section of the Great Plains region northwest of the transition to the Edwards Plateau in West Texas

The climate is semiarid with little rainfall or water resources and is subject to prolonged drought. Rainfall averages about 14 inches annually occurring mostly during late spring- early summer storms. The region drains south to the Pecos River which ultimately contributes to the Colorado River basin. The land is developed mostly for mineral resource extraction and used as rangeland for cattle. This region is one of the most productive petroleum resources in the state as well as the nation.

#### 5.1.3 Land Use

The majority of land use in Ector County is devoted to rangeland and mineral resource extraction. Located in the geologic Permian Basin, major reserves of oil and gas are extracted and many fields are dedicated to these purposes.

Other land uses throughout Ector County include residential, commercial and industrial developments. The nearby City of Odessa was established early on as a petrochemical manufacturing center. Some farming and ranching continues and the county produces cattle, poultry, hay and pecans (TSHA, 2013). Based on the background review, land use and land cover within the Action Area is mainly rangeland and mineral extraction (USGS, 2012). Figure 5-1 (Appendix A) demonstrates land uses within and near the Action Area.

#### 5.1.4 Topography

The majority of Ector County is located in the lower shelf of the Great Plains in West Texas. The county is mostly level to shallow, rolling hills used dominantly as rangeland. Elevations range from 2,500 to 3,300 feet above sea level, sloping upward towards the northwest (USDA Soil

Survey 1978). The majority of the county drains to the south to the Pecos River. Locally, topography changes approximately 100 feet and an unnamed ephemeral stream drains south of the proposed project area.

According to the Federal Emergency Management Agency (FEMA) flood insurance rate map (FIRM), the proposed project site is located in Zone X – an area of minimal flood hazard above the 500-year floodplain. Areas surrounding the project site fall within the designated 100-year floodplain as demonstrated in Figure 5-2 (Appendix A).

### 5.1.5 Geology

The Geologic Atlas of Texas (GAT) indicates the proposed project area is underlain by unconsolidated Pleistocene-age deposits of the Blackwater Draw Formation, caliche and pond deposits (GAT 1994). Sediments of the Blackwater Draw Formation are massive fine-to medium-grained calcareous quartz sand with caliche nodules and minor silt and clay lenses. Caliche is a hard evaporite deposit and the pond deposits are lacustrine basins.

Located above the Permian Basin, oil and gas reserves are a significant resource and Ector County is the second largest producer of petroleum products in Texas (Leffler 2013). Other geologic resources include mining of caliche for local road construction and soils to produce livestock forage (USDA Soil Survey 1978). The geologic units found within the proposed project area are listed and described below in Table 5-1 and illustrated in Figure 5-3 (Appendix A).

<b>Map Unit</b>	<b>Formation Name</b>	<b>Description</b>
Qbd	Blackwater Draw Formation	Fine to medium grain quartz, silt sand with caliche nodules
Qc	Caliche Deposits	Caliche deposits up to 35 feet thick
Qun	Pond Deposits (Tahoka Fm.)	Gastropod-bearing pond deposits

### 5.1.6 Soils

Soils in the project vicinity are dominated by dry, sandy clay loams and fine sandy loams used mainly as rangeland (USDA 1978). These are gently sloping soils with moderate depth, drainage and permeability. The Natural Resources Conservation Service (NRCS) soil units mapped within the proposed project area are listed and described below in Table 5-2 and illustrated in Figure 5-4 (Appendix A).

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**TABLE 5-2**  
**NRCS SOIL UNITS SUMMARY**

NRCS Map Unit Name	NRCS Unit Characteristics	USDA Classification				NRCS Hydric Soil
		Depth	Drainage	Permeability	Landform	
Faskin-Douro association (FDA)	Nearly level, 0-3% slopes	Deep	Slow to moderate	Moderate	Uplands	No
Jalmar-Penwell association (JPC)	Undulating, 1-8% slopes	Deep	J-very slow; P-slow	J-moderate; P-rapid	Uplands	No
Kinco-Ima association (KWB)	Gently undulating, 1-5% slopes	Moderately deep	Slow	Moderately rapid	Uplands	No
Ratliff association (RFA)	Nearly level, 0-3% slopes	Moderately deep	Moderate	Moderate	Uplands	Yes
Triomas loamy fine sand (TrB)	0-3% slopes	Moderately deep	Slow to very slow	Moderate	Uplands	No

### 5.1.7 Vegetation

The primary vegetation within the Action Area represents that of the High Plains region. The Action Area is dominated by honey mesquite (*Prosopis glandulosa*), shin oak (*Quercus harvardii*), Lotebush (*Zizyphus obtusifolia*), and Soapweed yucca (*Yucca glauca*). Dominant grasses in the area are typically black grama (*Bouteloua eriopoda*), three-awn (*Aristida* sp.), and buffalo grass (*buchloe dactyloides*). Vegetation is often absent all together in small dunes, playa lakes (typically dry) and rocky outcrops.

### 5.1.8 Water Resources

Water resources account for less than 2 percent land cover in Ector County. No natural surface water features occur within the proposed project area. An unnamed ephemeral stream is located approximately three-quarters of a mile south of the project area but otherwise no streams occur near the site. The Texas Water Development Board identifies two aquifers that underlie the project area: the Dockum and Ogallala aquifers. Waters from these aquifers are used for irrigation, municipal supply, and oil field usages (TWDB 2011). According to USFWS National Wetland Inventory (NWI) maps, there are no wetlands located on the construction site or within the Action Area (see Figure 5-5 in Appendix A).

### 5.1.9 Climate

Ector County's climate is described as semi-arid with variable seasons and prolonged periods of drought. Dust storms are common in late winter and rain storms are most common in spring and early summer. The mean annual precipitation in the region is 14.28 inches (USDA Soil Survey 1978). Winter time average temperatures range from 31.3°F to 57.5°F with extreme lows down

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to 2°F. Average summertime temperatures range from 69.4°F to 95.4°F with extremes up to 102°F (NRCS, 2013). Prevailing winds come from the southeast. This wind direction coupled with the upslope in the same direction is the root for storms and cooler summers (USDA Soil Survey 1978).

At the time of this review, the U.S. Drought Monitor indicated the study area drought intensity as a D0 - abnormally dry (USDM, 2013), while the Long-term Palmer Drought Severity Index rates this area as a moderate drought (less 2 to 2.99 inches- CPC, 2012). According to the National Weather Service/Advanced Hydrologic Prediction Service (NWS/AHPS), the region has received no rain within the 30 days prior to this review. This is approximately 2 to 3 inches below the average rainfall for this time of year (NWS/AHPS 2013).

## 5.2 FEDERALLY LISTED THREATENED AND ENDANGERED SPECIES OF POTENTIAL OCCURRENCE WITHIN ECTOR COUNTY, TEXAS

**TABLE 5-3**  
**ALL SPECIES LISTED BY USFWS/NOAA AS HAVING THE POTENTIAL TO OCCUR IN ECTOR COUNTY**

Common Name	Scientific Name	Federal Status	Agency
Gray wolf	<i>Canis lupus</i>	LE	TPWD/USFWS
Black-footed ferret	<i>Mustela nigripes</i>	LE	TPWD/USFWS
Northern aplomado falcon	<i>Falco femoralis septentrionalis</i>	LE	USFWS

LE = Listed Endangered

LT = Listed Threatened

USFWS = US Fish and Wildlife Service

TPWD = Texas Parks and Wildlife

A brief description of these species and their habitat requirements are included below.

### 5.2.1 Gray Wolf

The Gray Wolf is a close relative of domestic dogs. Its thick fur ranges in color from creamy white, reddish-brown, to shades of gray and black. Gray wolves are the largest species of wolf and range between 50 - 90 pounds and 4 - 5 feet long. Adult males are larger than adult females. Gray wolves breed once a year. They mate in late winter and pups are born in the spring. Dens are usually ground burrows excavated in slopes where rocks will function to support the roof of the tunnel and burrow. Both parents and other pack members, if present, will bring food to the young, which average about 5 pups in a litter. The bond between mated wolves is very strong and commonly lasts their lifetime. Gray wolves can live up to 15 years. (TPWD 2013)

Gray wolves prey on large herbivores such as deer and Pronghorn antelope, but will also eat rabbits, ground squirrels, and mice. The decline of the Gray Wolf has been attributed mostly to

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predator control by humans. In the late 1800's and early 1900's, ranchers killed wolves to prevent loss of livestock and wild ungulates such as deer.

Gray wolves are found in forests, brushlands, or grasslands where suitable cover and denning sites are available. Gray wolves were once found throughout North America. Historically, gray wolves were found over the western 2/3 of the state. Today, none remain in Texas. (TPWD 2013)

### **5.2.2 Black-footed Ferret**

The Black-footed Ferret has a long, slender body with short legs. Its fur is a light brown color, with dark brown or black legs and feet and a black-tipped tail. Its face is distinctively marked with white fur and a black, raccoon-like mask. Black-footed ferrets live in burrows made by prairie dogs. It takes about 100 acres of prairie dog colony to support one ferret family (a female and her young). Predators such as owls, eagles, hawks, coyotes, badgers, foxes, and bobcats are the main cause of death for wild ferrets. (TPWD 2013)

Black-footed ferrets are endangered because much of the shortgrass prairie habitat on which the ferrets depend has been plowed for crops. Prairie dogs, which are the ferrets' main food, have been reduced in number due to habitat loss and disease. Prairie dogs have been killed because they eat grass used by livestock or winter wheat grown as a crop (TPWD 2013). Ideal habitat for the black footed ferret is short grass prairies.

Historically, the black-footed ferret occurred in the High Plains, Rolling Plains, and Trans-Pecos regions of North America. Black-footed ferrets have not been seen in Texas since 1963 and are considered extirpated (TPWD 2013).

### **5.2.3 Northern Aplomado Falcon**

The aplomado falcon has a steel grey back, red breast, black "sash" on its belly, and striking black markings on the top of its head, around its eyes, and extending down its face.

Aplomado falcons are usually seen in pairs. They use stick nests built by other birds instead of building a nest. Aplomados hunt as pairs and eat mostly birds and insects. They are fast fliers, and often chase prey animals as they try to escape into dense grass.

Aplomado falcons inhabit open grassland or savannah from Texas to Arizona and south to the southern tip of South America. Recent re-introduction efforts within south Texas Counties have re-established breeding populations of the species in the Texas Trans-Pecos region (Texas Parks and Wildlife Department Northern Aplomado Falcon (*Falco femoralis*) <http://www.tpwd.state.tx.us/huntwild/wild/species/aplomfal/> (accessed 5/21/13). There is currently no designated critical habitat for the species.

Aplomado falcon territories are generally situated in open grasslands and savannahs where tall cacti, yuccas and taller oaks grow in open stands. Due to conversion of habitat, the aplomado falcon is restricted to protected preserves or large ranching tracts with sufficient acreage of their necessary habitat.

#### **5.2.4 Natural Diversity Database Results**

Zephyr requested and received Texas Natural Diversity Database (TXNDD) information for reports of listed-species for all of Ector County in November 2012. TPWD forwarded ArcGis shapefiles for all reported listed-species in Ector County. A review of those shapefiles indicates that no federally-listed species have been reported within the Action Area.

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## 6.0 EFFECTS OF PROPOSED ACTION

### 6.1 AIR POLLUTION EFFECTS BACKGROUND RESEARCH

Zephyr performed an extensive search for research regarding the potential effects of air emissions on various flora and fauna. The various studies addressed only general effects of airborne pollutants. No research was found that specifically quantified the toxicological effects of air emissions on any of the specific threatened or endangered species addressed in this biological assessment.

The search was then broadened to include taxonomical equivalents to those protected species occurring within the Action Area. The results of this expanded search were limited to a study of poultry within confined animal feeding operations. This poultry study (Redwine, et. al. [2002]) characterized particulate matter less than 10 $\mu$ m (PM10) at the confined feeding operations, and did not address the effects of air emissions on these species. A separate study prepared by Smith and Levenson (1980) described a method for the creation of a screening procedure to assess the potential for air emissions causing significant impacts on flora and fauna. The study determined that concentrations of airborne pollutants which exceed the screening concentrations may have adverse impacts on plants or animals and is discussed further in the following section.

Another publication (Dudley and Stolton, 1996) summarized that the effects of air pollution on biodiversity generally indicate that air pollution has a greater impact on lower life forms such as lichens, mosses, fungi, and soft-bodied aquatic invertebrates than on higher life forms. Impacts to higher life forms are associated with food loss and reproductive effects, rather than to direct toxic effects on adults. Possible secondary impacts include acidification, changes in food or nutrient supply, or changes to biodiversity and competition. Lower order animals, such as amphibians and fish, are known to be impacted by acidification as a result of the subsequent release of metals into water whereas higher order animals often have the ability to move to more favorable conditions.

Acidification and eutrophication of aquatic ecosystems can occur from deposition of airborne nitrogen dioxide (Lovett and Tear, 2007). Acidification effects water quality by increasing acidity and reducing acid buffering capacity which results in hypoxia and the mobilization of aluminum. Increased acidity may result in increased algal growth by reducing organic carbon which allows increased light penetration and visibility of the water column. Eutrophication of an aquatic system can result from excess algal growth. Decomposition of the excess algae can result in a decrease in dissolved oxygen levels, which can be harmful to many aquatic organisms. Due to the distance between the proposed facility and any large aquatic ecosystems, Invenergy expects the likelihood of acidification and eutrophication to be low.

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## 6.2 IMPACTS OF AIR POLLUTION ON PLANTS, SOIL, AND ANIMALS

A detailed literature review was conducted to identify any documentation, data, or research of the potential effects of air emissions on flora and fauna and specifically on the threatened and endangered species of potential occurrence in the Action Area. The methods and results of the literature review are presented above in Sections 6.1.

Guidance from *A Screening Procedure for the Impacts of Air Pollution Sources on Plants, Soils, and Animals*, EPA 450/2-81-078, December 12, 1980 (*Screening Procedure*) was followed to assess the potential the project has for adversely affecting air quality related values (AQRV). *Screening Procedure* provides minimum levels at which adverse effects have been reported in the literature for use as screening concentrations. These screening concentrations can be concentrations of pollutants in ambient air, in soils or in aerial plant tissues. A summary of the *Screening Procedure* requirements follow:

- Estimate the maximum ambient concentrations for averaging times appropriate to the screening concentration for pollutants emitted by the source. Include background concentrations when appropriate
- To determine potential effects from airborne pollutants, check the maximum predicted ambient concentrations against the corresponding AQRV screening concentration, PSD increments or NAAQS – whichever is most restrictive
- To determine potential effects from trace metals, calculate the concentration deposited in the soil from the maximum annual average ambient concentrations assuming all deposited metals are soluble and available for uptake by plants
- Compare the increase in metal concentration in the soil to the existing endogenous concentrations,
- Calculate the amount of trace metal potentially taken up by plants
- Compare the trace metal concentrations with the corresponding screening concentrations,
- Reevaluate the results of the Step 4 and 6 comparisons using estimated solubilities of elements in the soil recognizing that actual solubilities may vary significantly from the conservatively estimated values
- If ambient concentration modeling results are unavailable, the significant levels for emissions may be used

No trace metals are associated with the combustion of natural gas in turbines. Therefore, only Steps 1 and 2 of the *Screening Procedure* guidance were required for this analysis.

The results from the ambient air modeling analyses conducted in support of the PSD and State NSR modeling analysis are summarized in Table 6-1 for pollutants included in *Screening Procedure*. The predicted concentrations were compared with the APRV screening concentrations.

**TABLE 6-1**  
**SCREENING ANALYSIS – IMPACTS ON PLANTS, SOIL, AND ANIMALS – DIRECT IMPACTS**

Pollutant	Averaging Period	Project Sources, Only			Project Sources, Nearby Sources Plus Background Concentration	
		Maximum Predicted Concentration ( $\mu\text{g}/\text{m}^3$ )	AQRV Screening Concentration <sup>1</sup> ( $\mu\text{g}/\text{m}^3$ )	PSD Class II Increment Consumption ( $\mu\text{g}/\text{m}^3$ )	Maximum Predicted Concentration ( $\mu\text{g}/\text{m}^3$ )	NAAQS ( $\mu\text{g}/\text{m}^3$ )
SO <sub>2</sub>	1-Hour	10.2	917	---	Not Required <sup>2</sup>	196
	3-Hour	9.6	786	512	Not Required <sup>2</sup>	1,300
	24-Hour	6	> 18 <sup>3</sup>	91	Not Required <sup>2</sup>	365
	Annual	1.2	18	20	Not Required <sup>2</sup>	80
NO <sub>2</sub>	1-Hour	13.3	>3,760 <sup>3</sup>	---	32.8	188
	4-Hour	-	3,760	---	---	---
	8-Hour	-	3,760	---	---	---
	1-Month	-	564	---	Not Required <sup>2</sup>	---
	Annual	46.4	100	---	52.9	100
CO	1-Hour	203.2	>1,800,000 <sup>3</sup>	---	Not Required <sup>2</sup>	40,000
	8-Hour	155.6	>1,800,000 <sup>3</sup>	---	0	10,000
	1-Week	-	1,800,000	---	---	---

<sup>1</sup>Table 3.1, *A Screening Procedure for the Impacts of Air Pollution Sources on Plants, Soils, and Animals*, EPA 450/2-81-078, December 12, 1980 – (Smith & Levenson, 1980)

<sup>2</sup>Project source concentrations are *de minimis* (insignificant) for this pollutant and averaging period. NAAQS modeling was not required.

<sup>3</sup>No AQRV screening value for this averaging period. Conservatively listing the AQRV for the next (longer) averaging period.

<sup>4</sup>NO<sub>2</sub> background values obtained from EPA Monitor 48-309-1037 (Waco Mazanek).

*Screening Procedure* (Smith and Levenson 1980) states that “no useable information other than that used to develop the ambient standards...was found in the review literature” for TSP matter and “EPA’s current procedure for TSP should suffice for the review of generic TSP.” The EPA’s “current procedure” for TSP review corresponds to demonstrating compliance with the PM<sub>10</sub> and PM<sub>2.5</sub> NAAQS. As discussed in Section 2.2, the Secondary NAAQS were developed to protect “public welfare” which includes effects on soils, water, crops and wildlife. *Screening Procedure* (Smith and Levenson, 1980) also states that “trace metals in TSP may have greater impacts on vegetation and soils than the total amount of particulates.” However, no trace metals are associated with the combustion of natural gas in turbines. The results from the PM<sub>10</sub> and PM<sub>2.5</sub> NAAQS modeling analysis conducted in support of the PSD modeling analysis are summarized in Table 6-2.

**TABLE 6-2**  
**NAAQS MODELING RESULTS**

Pollutant	Averaging Period	Project Sources, Only	Project Sources, Nearby Sources Plus Background Concentration	
		Maximum Predicted Concentration ( $\mu\text{g}/\text{m}^3$ )	Maximum Predicted Concentration <sup>1</sup> ( $\mu\text{g}/\text{m}^3$ )	NAAQS <sup>2</sup> ( $\mu\text{g}/\text{m}^3$ )
PM <sub>10</sub>	24-Hour	22.4	108.8	150
PM <sub>2.5</sub>	24-Hour	17.6	35	35
	Annual	3.8	12.3	15

<sup>1</sup>This is a conservative estimate. PM<sub>10</sub> background values obtained from EPA Monitor 48-141-0037 (El Paso UTEP), PM<sub>2.5</sub> background values obtained from EPA Monitor 48-135-1014 (Odessa Gonzales).

<sup>2</sup>Primary and Secondary NAAQS (have the same value).

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The predicted concentrations associated with the proposed project are less than or equal to the AQRV screening concentrations, PSD Class II increment consumption concentrations, Primary NAAQS and Secondary NAAQS. Therefore, according to the results of the analysis shown above, the proposed project will not cause significant impacts on soils, water, crops or wildlife.

## **6.3 CONSTRUCTION EFFECTS**

### **6.3.1 Onsite habitat Effects**

Construction of the ECEC facility will result in the conversion of approximately 11.4 acres of undeveloped mesquite/oak savannah property. Additional acreage will be converted for the natural gas line and the utility corridor where construction will occur outside existing ROW's. It is expected that approximately 124 acres of land will be cleared and maintained permanently for the construction and operation of the natural gas line and utility corridor. The conversion of the mostly undeveloped land may affect some local wildlife in the area due to clearing and construction. However, construction of the proposed facility would have no impact on sensitive habitat types, or any habitat preferred by federally listed species.

### **6.3.2 Noise Effects**

Few pieces of equipment required for the construction have the potential to exceed 85 decibels (dBA) at 50 feet from the source (crane derrick, jack hammer, paver, pile driver, rail saw, rock drill, and scraper). The best available technology will be used to maintain noise levels during construction below 85 dBA measured at a distance of 50 feet from the source as much as practical. The contractor will be required to utilize equipment that is well maintained and fitted with sound attenuation equipment that is in good working order. Construction activities are positioned at reasonable distances from property boundaries. When a number of machines are in use, arrangement of these machines is strategically staged or grouped with barriers and absorbent material.

During operation of the proposed facility, the equipment will be guaranteed to have a sound pressure level of 85 dBA at 3 feet from the equipment. The two combustion turbines are approximately 130 feet and 150 feet away from that property line and result in sound pressure levels of approximately 75 dBA or less at the property line. Based on these calculated levels no effect to wildlife is expected to result from construction or operation of the proposed facility.

Based on the 1974 EPA Noise Levels Document, outdoor noise levels for conclusions of no effect to humans is 55 decibels (dBA) averaged over a year. The 1990 Federal-Aid High Program Manual (FHPM) allow for higher levels of 67 dBA and 70 dBA during rush hour and other high traffic time periods. Noise levels from project activities at the closest residential structure (approximately 1.5 miles away) is expected to be less than 40 dBA, well below the FHPM standards.

### 6.3.3 Dust Effects

Dust mobilization will be minimized during construction and operations by routinely employed BMPs, and is expected to be negligible.

### 6.3.4 Human Activity

Construction of the ECEC facility and affiliated linear ROWs will require an increase of human activity when compared to the current lack of activity at the site. This increase will be temporary until construction is completed. Once construction is complete, human activity levels in the area will decrease, since construction of the facility requires more personnel than operation. Operation of the facility will still require an increase compared to existing conditions. The linear portions of the project would have no increase in human activity during operation aside from routine maintenance. Habitats present in the area of the construction site do support several species of wildlife such as deer, rabbits, coyotes, and multiple avian species. Construction would likely prevent most wildlife from entering the property and push most existing wildlife to adjacent properties. No additional effects to wildlife are expected due to increased human activity from the proposed project. Increased human activity would have no effect to any federally listed species.

## 6.4 FEDERALLY LISTED THREATENED AND ENDANGERED SPECIES HABITAT EVALUATION

### 6.4.1 Gray Wolf

#### 6.4.1.1.1 Potential of Occurrence

The gray wolf is extirpated from Texas and there is no potential of occurrence in the Action Area. There are no documented occurrences of the gray wolf within or near the Action Area (TXNDD 2013).

#### 6.4.1.1.2 Potential Effect

Because the gray wolf is extirpated in Texas, neither construction nor operation of the proposed facilities will have any impact on the gray wolf directly or indirectly.

#### 6.4.1.1.3 Recommended Determination of Effect

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

## 6.4.2 Black-footed Ferret

### 6.4.2.1.1 Potential of Occurrence

The black footed ferret is extirpated from Texas and there is no potential of occurrence in the Action Area. There are no documented occurrences of the black-footed ferret within or near the Action Area (TXNDD 2013).

### 6.4.2.1.2 Potential Effect

Because the black-footed ferret is extirpated in Texas, neither construction nor operation of the proposed facilities will have any impact on the black-footed ferret directly or indirectly.

### 6.4.2.1.3 Recommended Determination of Effect

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

## 6.4.3 Northern Aplomado Falcon

### 6.4.3.1.1 Potential of Occurrence

Northern aplomado falcons were extirpated from the United States until the 1990's when a re-introduction program was initiated. Reproducing populations of northern aplomado falcons currently exist near most current or former re-introduction sites in the Trans-Pecos region of Texas. The project area is approximately 150 miles east of the nearest re-introduction site. Northern aplomado falcons are not anticipated to occur in or near the project area. There are no documented occurrences of the northern aplomado falcon within or near the Action Area (TXNDD 2013)

### 6.4.3.1.2 Potential Effect

As mentioned above, there are no documented occurrences of the northern aplomado falcon and all experimental populations are located to the south and west of the Action Area. Neither construction nor operation of the proposed facilities will have any impact on the northern aplomado falcon directly or indirectly.

### 6.4.3.1.3 Recommended Determination of Effect

The proposed action will have no effect on the northern aplomado falcon.

## **6.5 DESIGNATED CRITICAL HABITAT ANALYSIS**

There are no designated critical habitats for any of the listed species within or near the Action Area. There would be no effect to designated critical habitat directly or indirectly during construction or operation of the ECEC.

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## 7.0 CONCLUSIONS

The following section provides a summary of recommended determination of effect for all federally protected species and a description of conservation measures designed to avoid and/or minimize potential impacts to the environment and its associated habitats.

### 7.1 DETERMINATION OF EFFECT

The recommended determination of effect for all federally protected species, with the potential to occur within the Action Area, is summarized below in Table 7.

<b>TABLE 7 RECOMMENDED DETERMINATION OF EFFECT FOR ALL FEDERALLY PROTECTED SPECIES</b>		
Federally-listed Species	Listing/Managing Agency	Recommended Determination of Effect
Gray wolf	USFWS/TPWD	No Effect
Black-footed ferret	USFWS/TPWD	No Effect
Northern aplomado falcon	USFWS	No Effect

### 7.2 POLLUTION CONTROLS

#### 7.2.1 Air Emissions

The proposed facility will utilize appropriate technologies to control emissions and avoid and/or minimize potential impacts to the environment and its associated habitats. The corresponding technologies to be utilized are discussed below.

##### 7.2.1.1 *NO<sub>x</sub> Emissions*

DLN combustors will be used to control NO<sub>x</sub> emissions to 9 parts per million by volume, dry basis (ppmvd) corrected to 15% O<sub>2</sub>, on a 24-hour rolling average, except during periods of startup/shutdown. This meets BACT requirements for the State and PSD NSR air permit for NO<sub>x</sub> emissions from the simple cycle generation units.

##### 7.2.1.2 *CO Emissions*

CO emissions associated with the combustion turbine should not exceed 9 ppmvd in the turbine exhausts over a rolling 24-hour period (on a dry basis at 15% O<sub>2</sub>), excluding periods of startup, shutdown, and reduced load operations less than 60% of base load.

US EPA ARCHIVE DOCUMENT

### 7.2.1.3 *VOC Emissions*

The use of natural gas and maintenance of optimum combustion conditions and practices is considered BACT for the control of VOC emissions from the simple cycle combustion turbines. VOC emissions from the combustion turbine unit are designed to meet 2.0 ppmvd at 15% O<sub>2</sub> for a rolling 3-hour period.

### 7.2.1.4 *PM/PM<sub>10</sub>/PM<sub>2.5</sub> Emissions*

Because the simple cycle generation units will only fire gaseous fuel, PM/PM<sub>10</sub>/PM<sub>2.5</sub> emissions are anticipated to be relatively low. The use of gaseous fuel and the application of good combustion controls meet BACT requirements for the air permit for PM/PM<sub>10</sub>/PM<sub>2.5</sub> emissions from the simple cycle generation units.

### 7.2.1.5 *Sulfur Compound Emissions*

The formation of SO<sub>2</sub>, H<sub>2</sub>SO<sub>4</sub> and (NH<sub>4</sub>)<sub>2</sub>SO<sub>4</sub> will be minimized by using pipeline-quality natural gas with a sulfur content not exceeding 5 grains sulfur per 100 standard cubic feet. The use of gaseous fuel meets BACT requirements for the air permit for SO<sub>2</sub> and H<sub>2</sub>SO<sub>4</sub> emissions from the combustion turbine.

### 7.2.1.5 *Turbine Oil Mist Vent Emissions*

The venting of turbine lubrication oil is a minor source of VOC emissions. These emissions will be controlled with the use of oil mist eliminators. The use of oil mist eliminators meets BACT requirements for the air permit for VOC emissions from these turbine lubrication oil vents.

### 7.2.1.6 *Fugitive Emissions from Gas Piping Components*

To ensure that fugitive emissions from the piping components in gas service are adequately controlled, ECEC will follow an audio, visual, and olfactory (AVO) inspection and maintenance program, performing periodic inspections. These measures meet BACT requirements for the air permit for VOC emissions from piping components.

## 7.2.2 **Wastewater and Storm Water**

### 7.2.2.1 *Mitigation of Construction Related Impacts to Surface Water*

Construction of the proposed ECEC will follow any applicable TCEQ requirement to obtain a construction storm water permit for the proposed project. The site will employ best management practices to prevent contamination due to storm water runoff, including erosion control and stabilization, minimization of offsite vehicle tracking and dust generation, and other practices as warranted by site specific conditions. The site will also follow the notification,

recordkeeping, and reporting requirements of TCEQ's construction storm water management program, as required.

#### *7.2.2.2 Mitigation of Operational Impacts to Surface Water*

The water discharge from the administration building ECEC will be processed either through a septic system or on-site septic tank. Therefore, there will be no impacts to surface waters from waste water. Storm water runoff will be directed to a detention/sedimentation pond. Process waste water will be held in a tank and sent off site to be processed such that there are no impacts to surface waters.

**US EPA ARCHIVE DOCUMENT**

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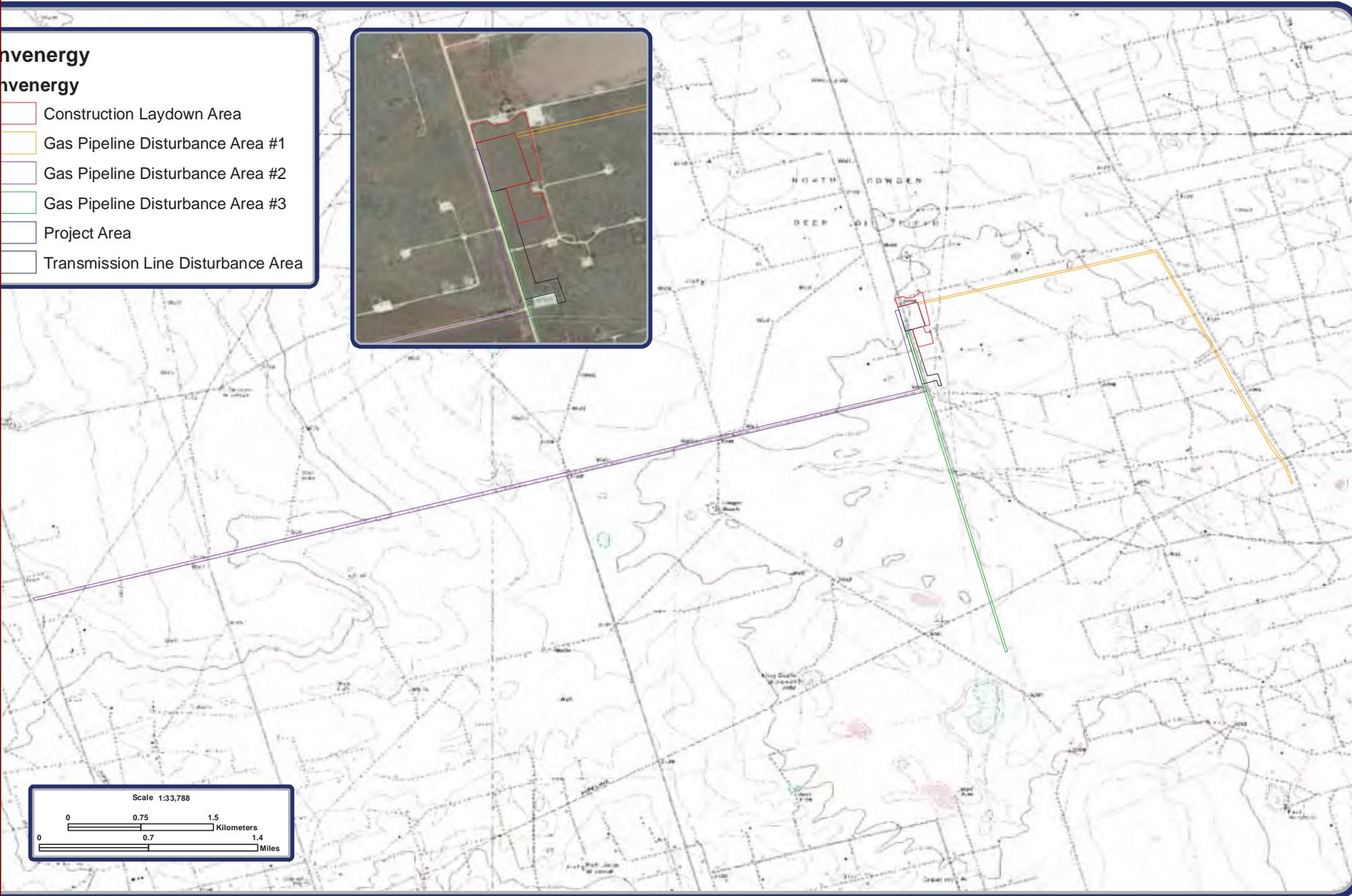
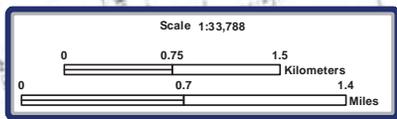
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APPENDIX A  
SITE MAPS

Invenergy

Invenergy

- Construction Laydown Area
- Gas Pipeline Disturbance Area #1
- Gas Pipeline Disturbance Area #2
- Gas Pipeline Disturbance Area #3
- Project Area
- Transmission Line Disturbance Area





Data Sources: ESRI-Bing Hybrid Basemap, Invenergy, LLC Datum: GCS NAD 83 UTM Zone 13

Scale 1:60,000



0 1 2 Kilometers

0 1 2 Miles



-  Action Area
-  Project and Construction Area
-  Gas Pipeline Disturbance Areas
-  Transmission Line Disturbance Area



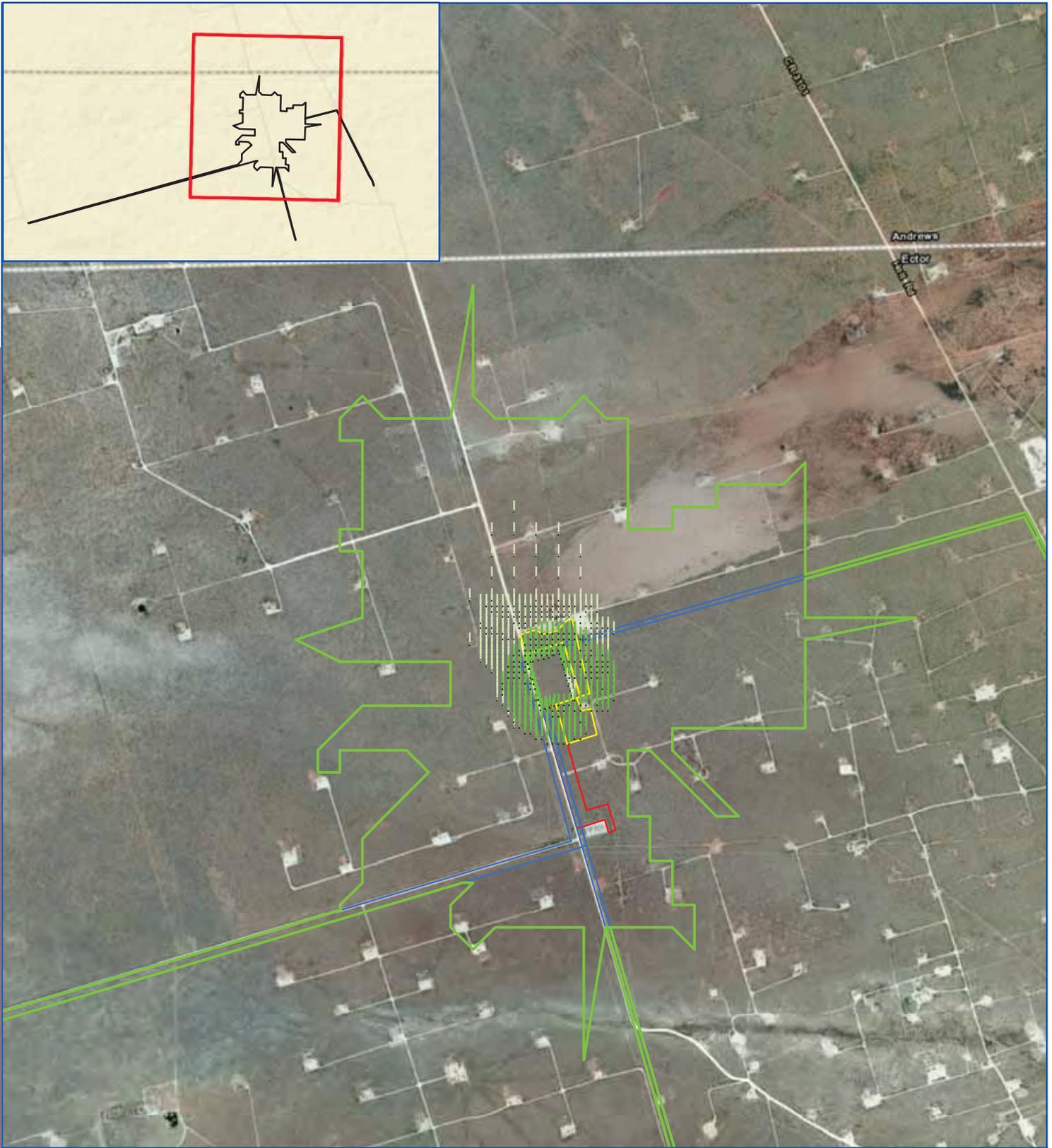
**FIGURE 4-1**  
**Action Area**  
**INVENERGY, LLC**  
**Ector County, Texas**

Drafted By:  
J. Knowles

Reviewed By:  
B. Osborne

Project No.:  
013003.004

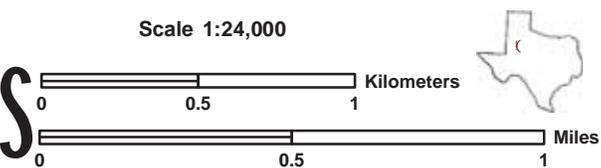
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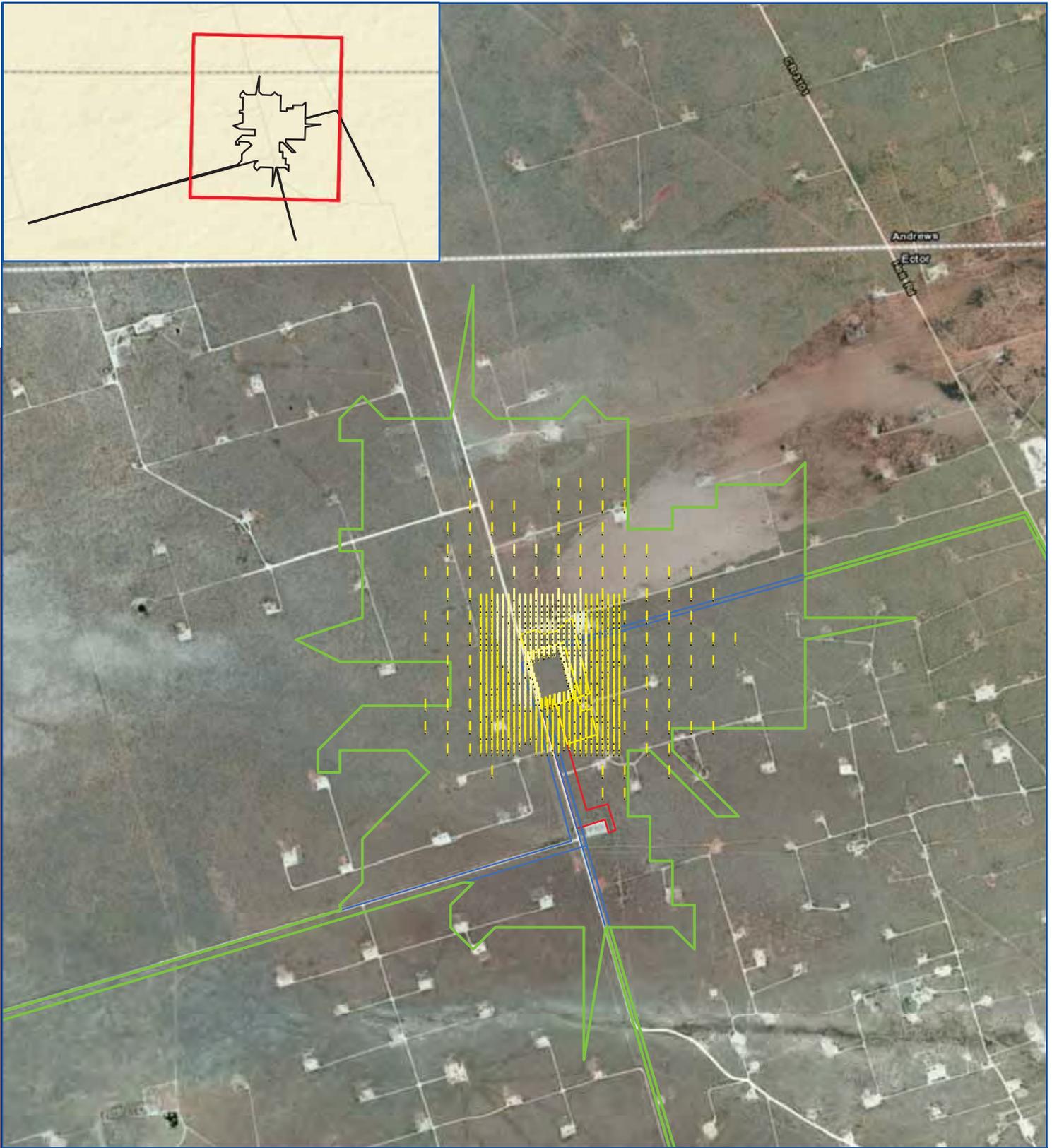
- 1-Hr NO2 Receptors Above SIL
- Annual NO2 Receptors Above SIL
- Action Area

- Project and Construction Area
- Gas Pipeline Disturbance Areas
- Transmission Line Disturbance Area



**FIGURE 4-x**  
**NO2 Receptors Above SIL**  
**INVENERGY, LLC**  
**Ector County, Texas**

Drafted By: J. Knowles	Reviewed By: B. Osborne	Project No.: 013003.004	Date: 05.31.2013
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Data Sources:  
 ESRI-Bing Hybrid Basemap,  
 Invenergy, LLC  
 Datum: GCS NAD 83  
 UTM Zone 13

- Annual PM2.5 Receptors Above SIL
- 24-Hr PM2.5 Receptors Above SIL
- Action Area

- Project and Construction Area
- Gas Pipeline Disturbance Areas
- Transmission Line Disturbance Area

Scale 1:24,000



**FIGURE 4-x**  
**PM2.5 Receptors Above SIL**

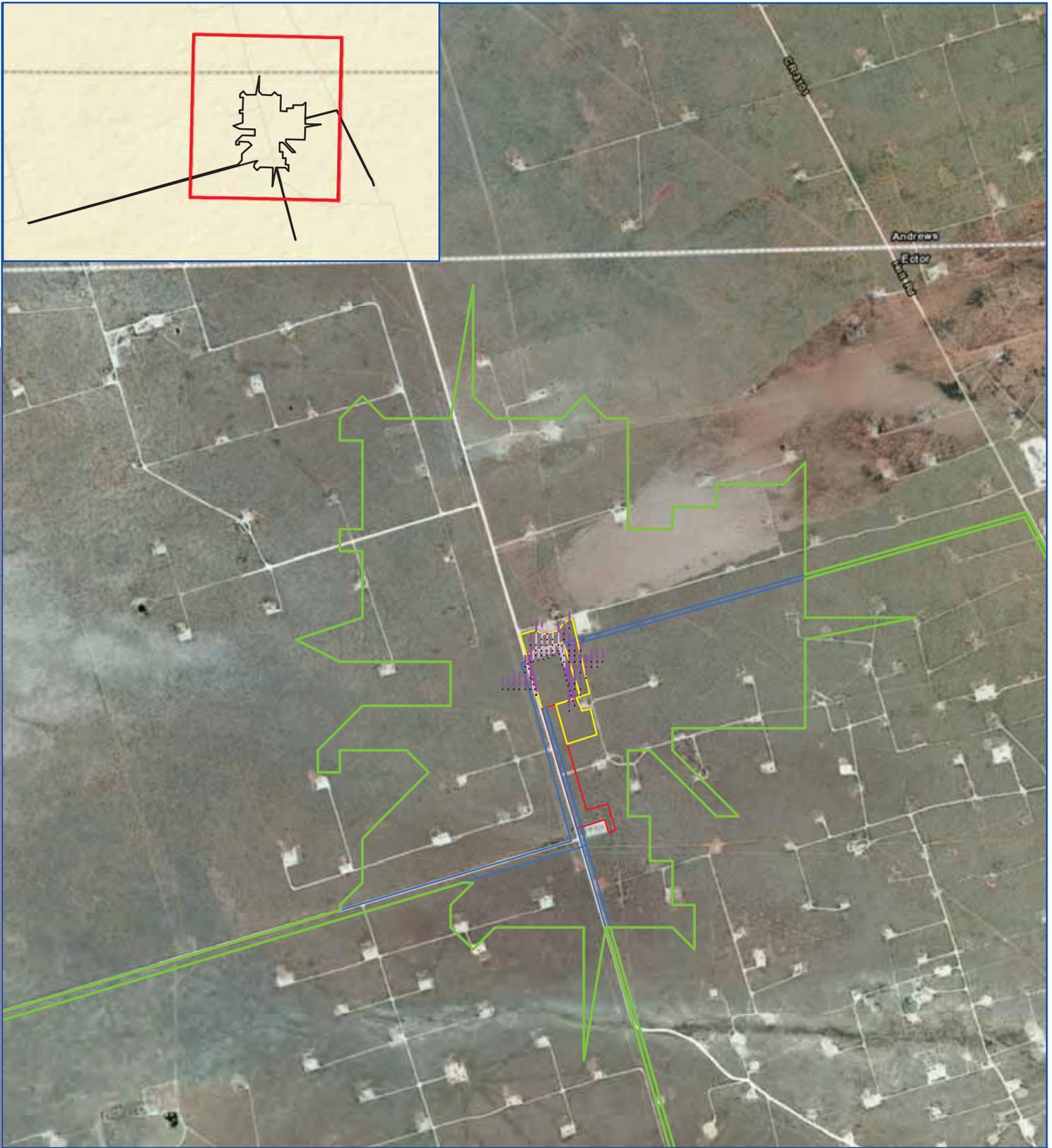
**INVENERGY, LLC**  
**Ector County, Texas**

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 J. Knowles

Reviewed By:  
 B. Osborne

Project No.:  
 013003.004

Date:  
 05.31.2013



Data Sources:  
 ESRI-Bing Hybrid Basemap,  
 Invenergy, LLC  
 Datum: GCS NAD 83  
 UTM Zone 13

- Annual PM10 Receptors Above SIL
- 24-Hr PM10 Receptors Above SIL
- Action Area

- Project and Construction Area
- Gas Pipeline Disturbance Areas
- Transmission Line Disturbance Area

Scale 1:24,000



**FIGURE 4-x**  
**PM10 Receptors Above SIL**

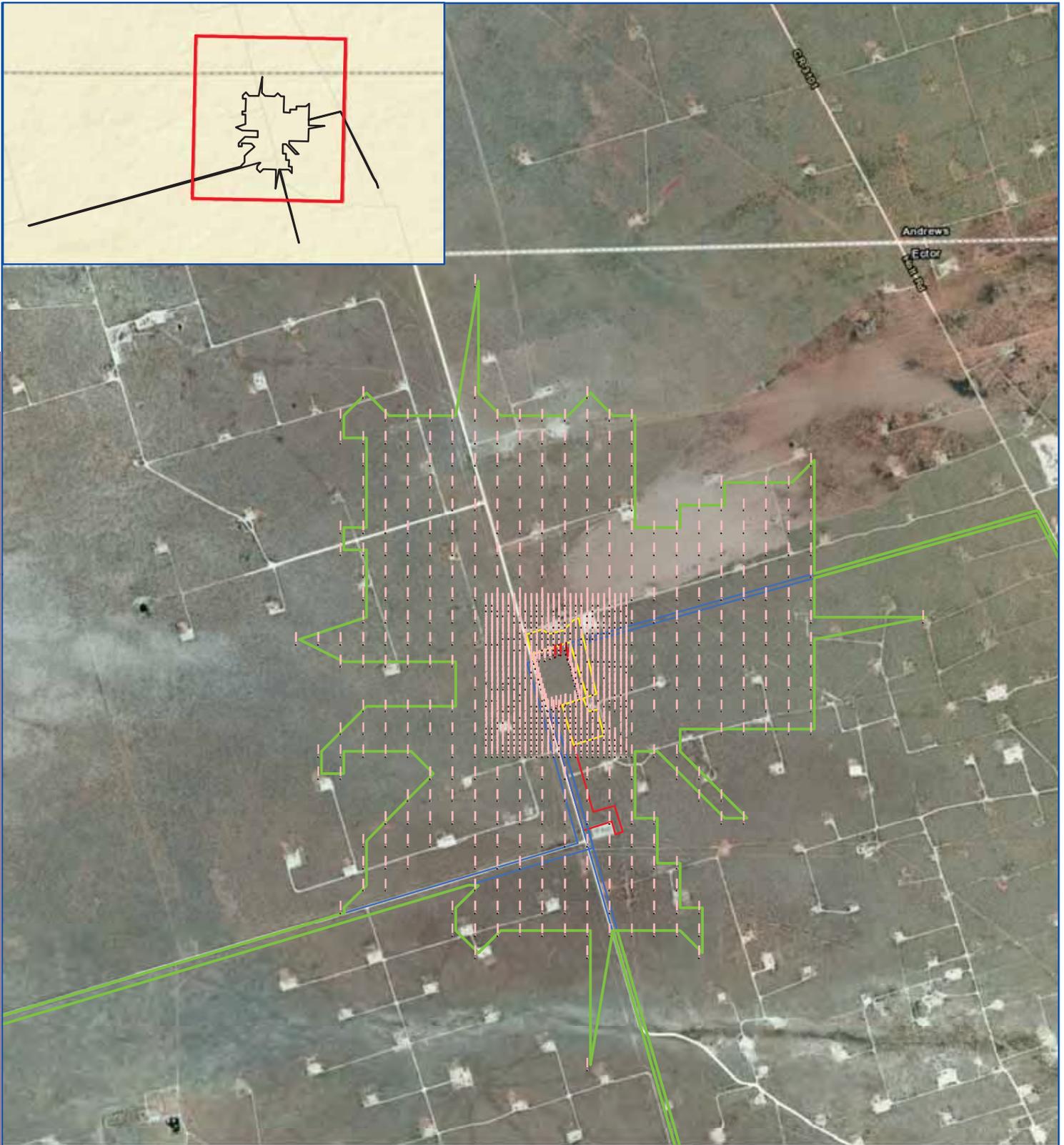
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**Ector County, Texas**

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Reviewed By:  
 B. Osborne

Project No.:  
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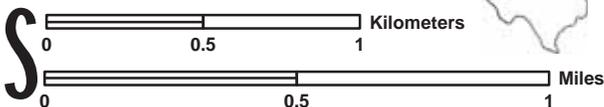
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- | 1-Hr SO2 Receptors Above SIL
- | 3-Hr & 24-Hr SO2 Receptors Above SIL
- | Annual SO2 Receptors Above SIL
- Action Area
- Project and Construction Area
- Gas Pipeline Disturbance Areas
- Transmission Line Disturbance Area

Data Sources:  
 ESRI-Bing Hybrid Basemap,  
 Invenergy, LLC  
 Datum: GCS NAD 83  
 UTM Zone 13

Scale 1:24,000



**FIGURE 4-x**  
**SO2 Receptors Above SIL**

**INVENERGY, LLC**  
**Ector County, Texas**

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Project No.:  
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 05.31.2013



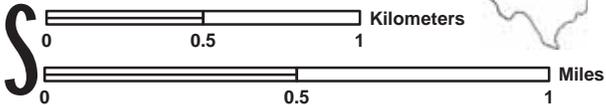
Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong

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Data Sources:  
 ESRI-Bing Hybrid Basemap,  
 Datum: GCS NAD 83  
 UTM Zone 14  
 \*Land Use determined  
 remotely using aerial imagery

**Land Use**  
 Rangeland / Mineral Extraction  
 Site Boundary

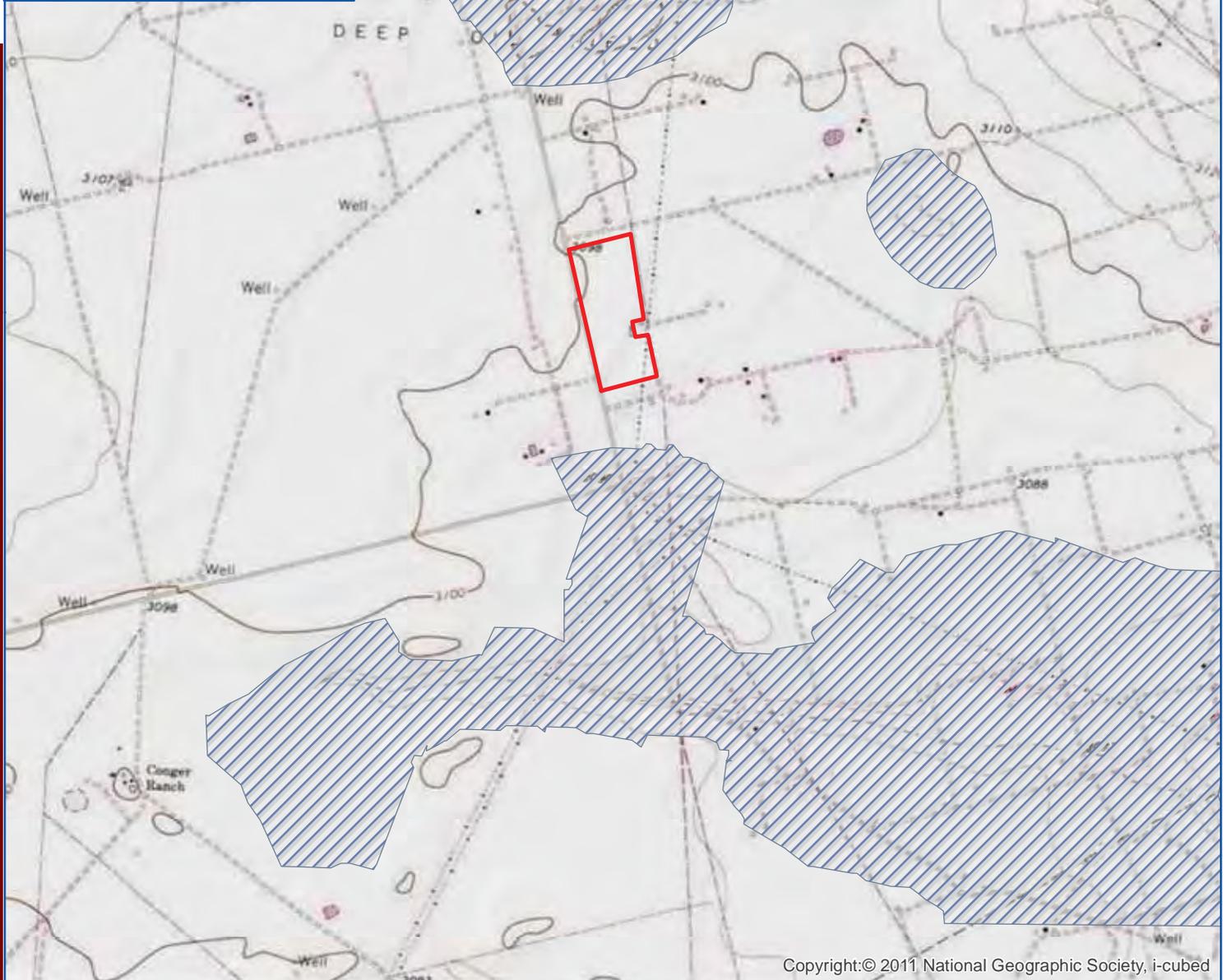
Scale 1:24,000



**FIGURE 5-1**  
**Land Use / Land Cover**

**INVENERGY, LLC**  
**Ector County, Texas**

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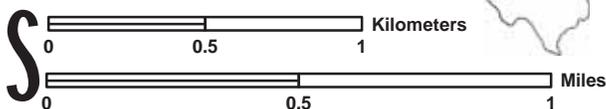


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Data Sources:  
 ESRI Bing Maps Hybrid Basemap;  
 FEMA DFIRM Map 48135C0075E  
 Datum: GCS NAD 83

- Stream
- Site Boundary
- FEMA Zones**
- A- 100-year floodplain

Scale 1:24,000



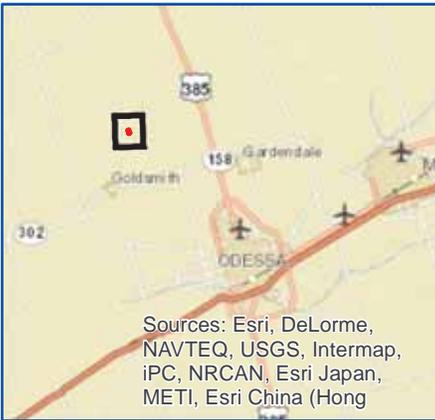
**FIGURE 5-2**  
**FEMA Zones**  
**INVENERGY, LLC**  
**Ector County, Texas**

Drafted By:  
 J. Knowles

Reviewed By:  
 B. Osborne

Project No.:  
 013003.004

Date:  
 03.13.2013



Data Sources:  
 ESRI-Bing Maps Hybrid Basemap,  
 Geologic Atlas of Texas  
 Datum: GCS NAD 83

— Stream  
 □ Site Boundary

Geologic Units  
 Qbd

Qc  
 Qun

Scale 1:24,000



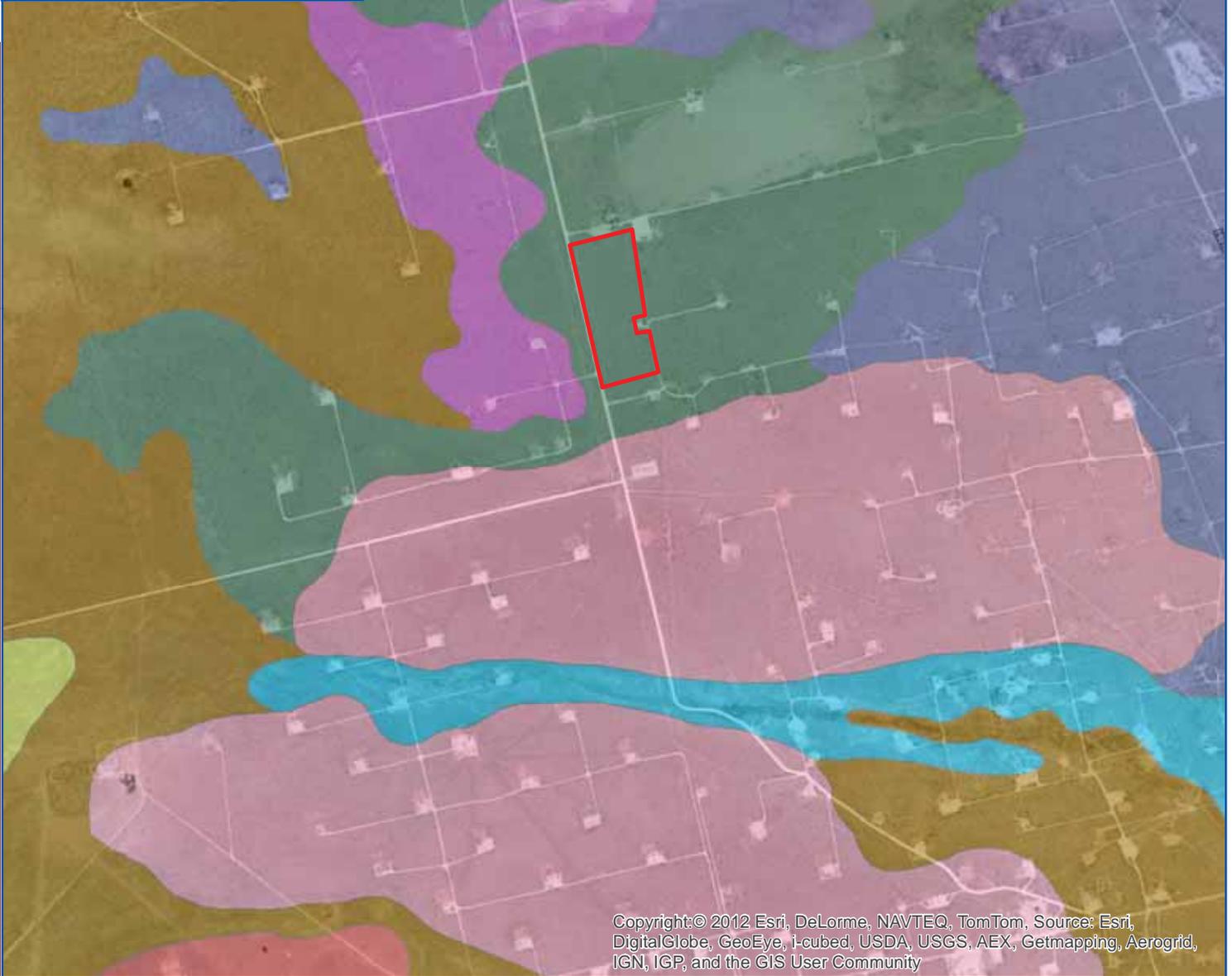
**FIGURE 5-3**  
**Geology**  
**INVENERGY, LLC**  
**Ector County, Texas**

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 J. Knowles

Reviewed By:  
 B. Osborne

Project No.:  
 013003.004

Date:  
 03.13.2013



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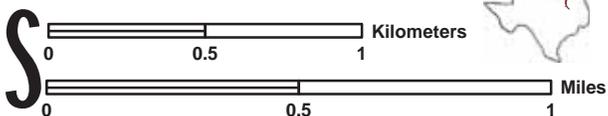
Data Sources:  
 ESRI-Bing Maps Hybrid Basemap,  
 NRCS- Soil Data  
 Datum: GCS NAD 83

— Stream  
 □ Site Boundary

**Soils**

BfA	JPC	KWA	RFA
CnA	KSA	Lc	SSA
		TrB	

Scale 1:24,000



**FIGURE 5-4**  
**Soils**  
**INVENERGY, LLC**  
**Ector County, Texas**

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 J. Knowles

Reviewed By:  
 B. Osborne

Project No.:  
 013003.004

Date:  
 03.27.2013



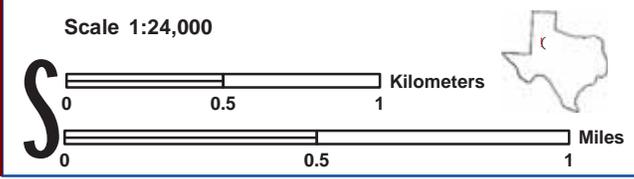
Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong



Image courtesy of USGS © 2013 Microsoft Corporation imagePatch.com © 2010 NAVTEQ © AND

- Site Boundary
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Minor Aquifer
- Major Aquifer
- EDWARDS-TRINITY
- OGALLALA

Data Sources:  
 ESRI-Bing Maps Hybrid Basemap,  
 National Wetlands Inventory &  
 Texas Water Development Board  
 Datum: GCS NAD 83



<b>FIGURE 5-5</b>			
<b>Water Resources</b>			
<b>INVENERGY, LLC</b>			
<b>Ector County, Texas</b>			
Drafted By: J. Knowles	Reviewed By: B. Osborne	Project No.: 013003.004	Date: 03.13.2013

**APPENDIX B**  
**SITE PHOTOGRAPHS**



**Photograph 1:** April 18, 2013 Looking north from southern terminus of proposed gas pipeline #1 along proposed ROW.



**Photograph 2:** April 18, 2013 Looking south down proposed gas pipeline #1 ROW towards location of photo 1.



**Photograph 3:** April 18, 2013 Looking north from same location as photo #2 down proposed gas pipeline #1 ROW.



**Photograph 4:** April 18, 2013 Looking south down proposed gas pipeline #1 ROW towards location of photo 3.



**Photograph 5:** April 18, 2013 Looking west down proposed gas pipeline #1 ROW towards proposed construction site and laydown yard.



**Photograph 6:** April 18, 2013 Looking northeast from proposed construction site and laydown yard at proposed gas pipeline #1 ROW.



**Photograph 7:** April 18, 2013 Looking southeast across proposed construction site from northwest corner of construction site.



**Photograph 8:** April 18, 2013 Looking northeast from northeast corner of proposed laydown yard at typical vegetation.



**Photograph 9:** April 18, 2013 Looking northeast across proposed construction site from southwest corner.



**Photograph 10:** April 18, 2013 Looking northwest across proposed laydown yard at proposed construction site from southeast corner of laydown yard.



**Photograph 11:** April 18, 2013 Looking southwest from southeast corner of proposed laydown yard.



**Photograph 12:** April 18, 2013 Looking southeast from southeast corner of proposed laydown yard at typical vegetation.



**Photograph 13:** April 18, 2013 Looking west from northwest corner of proposed construction site.



**Photograph 14:** April 18, 2013 Looking northeast at proposed construction site and northern terminus of proposed gas pipeline #2 and #3 ROW's.



**Photograph 15:** April 18, 2013 Looking south down the proposed gas pipeline #2 and #3 ROW's.



**Photograph 16:** April 18, 2013 Looking north down the proposed gas pipeline #2 and #3 ROW's towards proposed construction site.



**Photograph 17:** April 18, 2013 Looking south down the proposed gas pipelines #2 and #3 ROW's towards existing electric sub-station.



**Photograph 18:** April 18, 2013 Looking north along the proposed gas pipeline #3 ROW towards existing electric sub-station.



**Photograph 19:** April 18, 2013 Looking south along the proposed gas pipeline #3 ROW from same point as photo 18.



**Photograph 20:** April 18, 2013 Looking northeast at typical vegetation from same point as photos 18 and 19. (Southern boundary of Action Area)



**Photograph 21:** April 18, 2013 Looking north along the proposed gas pipeline #3 ROW.



**Photograph 22:** April 18, 2013 Looking south along the proposed gas pipeline #3 ROW.



**Photograph 23:** April 18, 2013 Looking north along the proposed gas pipeline #3 ROW from near the southern terminus.



**Photograph 24:** April 18, 2013 Looking north along the proposed gas pipeline #3 ROW at the southern terminus.



**Photograph 24:** April 18, 2013 Looking east at existing electric sub-station just north of point where proposed gas pipeline ROW's #2 and #3 diverge.



**Photograph 25:** April 18, 2013 Looking east along gas pipeline #2 ROW towards existing electric sub-station.



**Photograph 26:** April 18, 2013 Looking southeast from same location as photo 25 at typical vegetation. (Southwest boundary of Action Area)



**Photograph 27:** April 18, 2013 Looking north from same location as photos 25 and 26 at typical vegetation. (Western boundary of Action Area)



**Photograph 28:** April 18, 2013 Looking east along gas pipeline #2 ROW.



**Photograph 29:** April 18, 2013 Looking west along gas pipeline #2 ROW.



**Photograph 30:** April 18, 2013 Looking east along gas pipeline #2 ROW.



**Photograph 31:** April 18, 2013 Looking west along gas pipeline #2 ROW.



**Photograph 32:** April 19, 2013 Looking east along gas pipeline #2 ROW into dry playa lake.



**Photograph 33:** April 19, 2013 Looking west along gas pipeline #2 ROW.



**Photograph 34:** April 19, 2013 Looking east along gas pipeline #2 ROW.



**Photograph 35:** April 19, 2013 Looking west along gas pipeline #2 ROW.



**Photograph 36:** April 19, 2013 Looking east along gas pipeline #2 ROW from western terminus.



**Photograph 37:** April 18, 2013 Looking south at typical vegetation from northwest portion of Action Area.



**Photograph 38:** April 18, 2013 Looking southwest at typical vegetation from northeast portion of Action Area.



**Photograph 39:** April 18, 2013 Looking west at typical vegetation from eastern portion of Action Area.

**APPENDIX C**  
**FIELD NOTES SUMMARY**

**April 18 and 19, 2013**

**April 18<sup>th</sup> Weather: High temperature 62°F, Average humidity 35%, clear, wind speed 21 mph, no rain**

**April 19<sup>th</sup> Weather: High temperature 64°F, Average humidity 25%, clear, wind speed 7 mph, no rain**

**Site inspection of Ector Energy Center Action Area  
Surveyors: Clay V. Fischer and Bryan Osborne**

**Performed a windshield and pedestrian survey of portions of Ector Energy Center action area. The action area is dominated by rangeland developed for oil/gas production. Vegetation is generally described as mesquite/oak grassland.**

Latitude	Longitude	Summary
32.06996	-102.58528	Center of proposed site
32.08011	-102.58454	Northernmost extent of action area
32.05817	-102.58536	Southernmost extent of action area
32.06630	-102.57475	Easternmost extent of action area
32.07090	-102.59680	Westernmost extent of action area
32.0542	-102.5502	Eastern terminus of proposed gas pipeline #1
32.0436	-102.6674	Western terminus of proposed gas pipeline #2
32.08011	-102.58454	Southern terminus of proposed gas pipeline #3

#### TERRESTRIAL FAUNA

Within the Project area, no significant or sensitive wildlife habitats have been identified. Federally- protected species listed by USFWS as having the potential to occur in the area include: gray wolf (*Canis lupus*), black-footed ferret (*Mustela nigripes*), and northern aplomado falcon (*Falco femoralis septentrionalis*).

The gray wolf is considered extirpated from Texas and thus would not occur at the site. The black-footed ferret requires high concentrations of prairie dogs as a food source to survive. Neither prairie dogs nor their mounds or colonies were observed in the project area. Black-footed ferrets are not anticipated to occur in or near the project area. Northern aplomado falcons were extirpated from the United States until the 1990's when a re-introduction program was initiated. Reproducing populations of northern aplomado falcons currently exist near most current or former re-introduction site. The project area is approximately 150 miles east of the nearest re-introduction site. Northern aplomado falcons are not anticipated to occur in or near the project area.

Within the project area, significant development for oil/gas production has occurred. Several operating pump units in addition to associated piping and overhead power lines traverse the area. Several poorly maintained gravel and dirt roads traverse the project area as well.

No open waters, rivers, or streams are included within the action area. However, there is an old playa lake which appears to have been dry for several years as well as some swales or drainages which may flow for short period immediately after a rainfall event. These features do not exhibit herbaceous wetlands. They are almost always dry and do not carry water continuously.

A review of TXNDD data indicated that none of the above-mentioned federally-listed species has been reported as occurring within the action area.

## FLORA

Analysis of Action Area vegetation indicated the presence of a single distinct habitat/community type. The habitat/community type is described as mesquite/oak grassland. Lists of representative plant species that occur in the mesquite/grassland are provided below.

Vegetation in action area mesquite/oak grassland communities includes woody tree and shrub species growing in unsaturated conditions. Dominant species include, but are not limited to, the following species:

- Mesquite (*Prosopis glandulosa*)
- Shin oak (*Quercus harvardii*)
- Soapweed yucca (*Yucca glauca*)
- Lotebush (*Zizyphus obtusifolia*)
- Southern sandbur (*Cenchrus echinatus*)
- Black grama (*Bouteloua eriopoda*)
- Brazil (*Condalia hookeri*)
- Three-awn grasses (*Aristida* sp.)

## FAUNA

Animal species observed within the Action Area include the following:

- Scaled quail

- Swainson's Hawk (*Buteo swainsoni*)
- Mourning Dove (*Zenaida macroura*)
- Scissor-tailed Flycatcher (*Tyrannus forficatus*)
- Northern Harrier (*Circus cyaneus*)
- Red-tailed Hawk (*Buteo jamaicensis*)
- Black-tailed Jackrabbit (*Lepus californicus*)
- White-throated Woodrat (*Neotoma albigula*)