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Environmental Consulting

BIOLOGICAL ASSESSMENT

Sand Hill Energy Center

Del Valle, Travis County, Texas

May 15, 2014

Prepared for
City of Austin dba Austin Energy

Submitted to:

U.S. Environmental Protection Agency
Region VI
Multimedia Planning and Permitting Division
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SAND HILL ENERGY CENTER: BIOLOGICAL ASSESSMENT

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Executive Summary

The City of Austin (dba Austin Energy) is proposing to build-out the Sand Hill Energy Center (SHEC) located in Del Valle, Travis County, Texas by adding to the existing combined cycle unit at the facility. The existing combined cycle unit at the SHEC was conceived and constructed to include this new unit when Austin's energy demands grew to the point where additional generating capacity would be required. The proposed project will add a new pipeline natural gas (PNG) fired combustion turbine and heat recovery steam generator (HRSG) to the existing combined cycle electricity generating unit at SHEC. Construction will include the installation of a General Electric (GE) model 7FA.04 combustion turbine and a heat recovery steam generator (HRSG) with natural gas fired duct burners (the Project). The new combustion turbine generator (CTG) is rated at 173.9 MW at base load at 68°F. The new combined cycle unit will share an existing 189 MW steam turbine generator (STG) which is part of the existing combined cycle unit. Proposed emission controls technology includes dry low-NOx (DLN) combustion and selective catalytic reduction (SCR) for nitrogen oxides (NOx) emission control and an oxidation catalyst to reduce emissions of carbon monoxide (CO) and volatile organic compounds (VOC).

Pursuant to the Clean Air Act (CAA), the City of Austin is seeking a permit under the U.S. Environmental Protection Agency's (EPA) Greenhouse Gas (GHG) Prevention of Significant Deterioration (PSD) Program to authorize construction of the project. The purpose of this Biological Assessment (BA) is to determine whether any species listed as threatened or endangered under the federal Endangered Species Act (ESA) or designated critical habitat for any listed species would be affected by EPA's issuance of the permit, and if so, to what extent.

This BA is based on the best available information, including the results of a field survey, a literature review, information regarding mapped habitat for various species, recorded occurrence data collected and maintained by Texas Parks and Wildlife Department's Texas Natural Diversity Database, and an analysis of the potential effects of the action on species and habitats by qualified biologists.

Based on the analysis presented in this BA, no federally-listed species or habitat for federally-listed species occurs within the Action Area. One federal candidate for listing, the Texas fatmucket, has been reported to occur within the Action Area; however, no stormwater discharges would take place within the creek within which the species has been reported. Therefore, the Texas fatmucket and its habitat would not be affected as a result of the project.

For the reasons set forth in this BA, there would be no effect to species listed as threatened or endangered under the ESA, or any candidates for listing, as a result of the project.

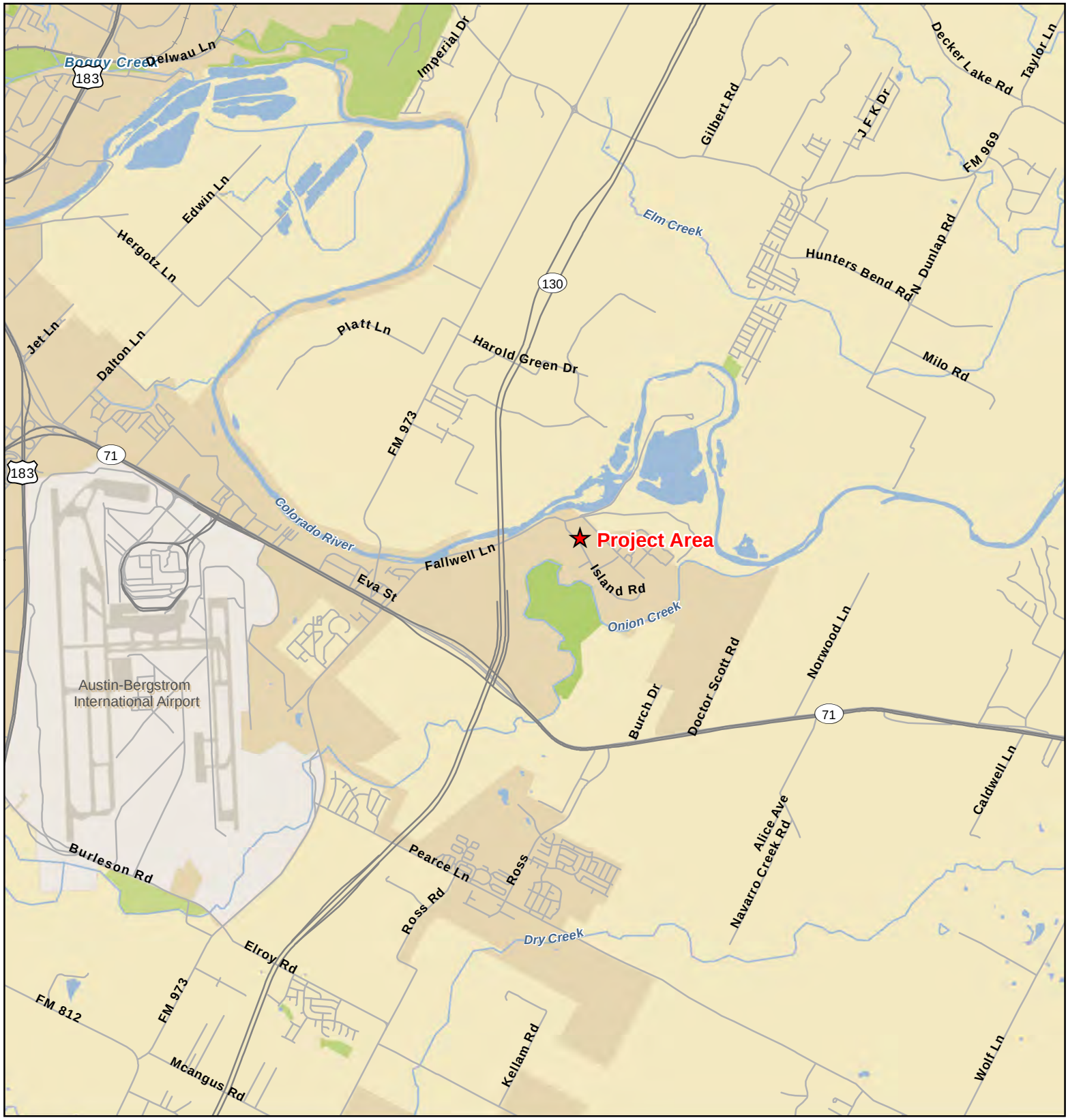
1.0 Introduction

The City of Austin (dba Austin Energy) is proposing to build-out the Sand Hill Energy Center (SHEC) located in Del Valle, Travis County, Texas by adding to the existing combined cycle unit at the facility. The existing combined cycle unit at the SHEC was conceived and constructed to include this new unit when Austin's energy demands grew to the point where additional generating capacity would be required. The proposed project will add a new pipeline natural gas (PNG) fired combustion turbine and heat recovery steam generator (HRSG) to the existing combined cycle electricity generating unit at SHEC. **Figure 1** shows the project location.

Construction will include the installation of a General Electric (GE) model 7FA.04 combustion turbine and a heat recovery steam generator (HRSG) with natural gas fired duct burners (the Project). The new combustion turbine generator (CTG) is rated at 173.9 MW at base load at 68°F. The new combined cycle unit will share an existing 189 MW steam turbine generator (STG) which is part of the existing combined cycle unit. Proposed emission controls technology includes dry low-NOx (DLN) combustion and selective catalytic reduction (SCR) for nitrogen oxides (NOx) emission control and an oxidation catalyst to reduce emissions of carbon monoxide (CO) and volatile organic compounds (VOC).

The City of Austin will submit an amendment application to the Texas Commission on Environmental Quality (TCEQ) to authorize the addition of this second combustion turbine and HRSG at its SHEC facility. On June 3, 2010, the U.S. Environmental Protection Agency (EPA) published final rules for permitting sources of greenhouse gases (GHGs) under the prevention of significant deterioration (PSD) and Title V air permitting programs, known as the GHG Tailoring Rule (75 FR 31514 (June 3, 2010). After July 1, 2011, new sources having the potential to emit more than 100,000 tons per year of GHGs and modifications increasing GHG emissions more than 75,000 tons per year on a carbon dioxide equivalent (CO2e) basis at existing major sources are subject to GHG PSD review, regardless of whether PSD is triggered for other pollutants. The existing SHEC facility is an existing PSD major source based on potential criteria pollutant emissions greater than 250 tons per year and GHG emissions greater than 100,000 tons per year of CO2e.

This BA was prepared to support the SHEC PSD GHG Permit Application by evaluating the project's potential impacts with regard to protected species. The likelihood of effects to species resulting from air deposition within the Action Area was evaluated. This BA is based on the best available information, including the results of a field survey, literature review, information regarding mapped habitat for various species, recorded occurrence data collected and maintained by Texas Parks and Wildlife Department's Texas Natural Diversity Database, and an analysis of the potential effects of the action on species and habitats by qualified biologists. Guidelines provided in 50 CFR Part 402.12 were used to prepare this BA. U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) guidance provides for use of the following possible determinations for BAs:


Project Area
Austin-Bergstrom International Airport
Boggy Creek
Colorado River
Elm Creek
Onion Creek
Dry Creek
Delwau Ln
Imperial Dr
Gilbert Rd
J F K Dr
Decker Lake Rd
Taylor Ln
FM 969
Edwin Ln
Hergotz Ln
Jet Ln
Dalton Ln
Platt Ln
Harold Green Dr
Hunters Bend Rd
N Dunlap Rd
Milo Rd
FM 973
Fallwell Ln
Eva St
Island Rd
Burch Dr
Doctor Scott Rd
Norwood Ln
Caldwell Ln
Alice Ave
Navarro Creek Rd
Burleson Rd
Pearce Ln
Ross
Ross Rd
Elroy Rd
FM 812
Mcangus Rd
Kellam Rd
Wolf Ln
183
71
130
Austin City Limit
Park
Travis County
Austin
290
1
45
35
0
0.5
1 Miles
2,500
5,000 Feet
Figure 1
Project Location
Prepared for: City of Austin
Project No.: 071-001-002
Prepared by: AT
1 inch = 1 mile
Scale: 1:63,360
Date: 1-9-13
G:\Projects\CityofAustin\Sand_Hill_Energy\Figures\Project_Loc_20130109.mxd

- *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 significant (small in size), discountable (extremely unlikely to occur), or beneficial. "No effect" determinations do not require written concurrence for the Service unless the National Environmental Policy Act analysis is an Environmental Impact Statement.*

- *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). 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 Service exempts the proposed action from formal consultation.*

- *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 Service when a "may affect, likely to adversely affect" determination is made* (USFWS, 2003).

2.0 Applicable Federal Regulations

2.1 Clean Air Act

Under the Clean Air Act of 1970 (CAA), the EPA sets limits on the maximum concentration of a given pollutant allowed in the air for a set average time. These limits are represented by National Ambient Air Quality Standards (NAAQS), which have been established for the protection of public health and welfare. The CAA identified six criteria pollutants which can be harmful to human health and the environment; these include carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter (coarse and fine), and sulfur dioxide. NAAQS for the criteria pollutants are listed in **Table 1**.

Table 1: NAAQS for Criteria Pollutants as set by the EPA

Pollutant	Primary/ Secondary	Average Time	Concentration Level	Form
Carbon monoxide	Primary	8-hour	9 ppm	Not to be exceeded more than once per year
		1-hour	35 ppm	
Lead	Primary and Secondary	Rolling 3-month average	0.15 ug/m^3	Not to exceed
Nitrogen dioxide	Primary	1-hour	75 ppb	98th percentile, averaged over 3 years
	Primary and Secondary	Annual	53 ppb	Annual mean
Ozone	Primary and Secondary	8-hour	0.075 ppm	Annual 4th-highest daily maximum 8-hour concentration, averaged over 3 years
Particulate Pollution PM 2.5	Primary and Secondary	Annual	15ug/m^3	Annual mean, averaged over 3 years
		24-hour	35 ug/m^3	98th percentile, averaged over 3 years
Particulate Pollution PM10	Primary and Secondary	24-hour	150 ug/m^3	Not to be exceeded more than once per year on average over 3 years
Sulfur dioxide	Primary	1-hour	75 ppb	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
	Secondary	3-hour	0.5 ppm	Not to be exceeded more than once per year

Areas meeting the NAAQS for any given criteria pollutant are designated as "in attainment"; areas not meeting the standards are designated as "not in attainment" for that pollutant. EPA has established regulations for prevention of significant deterioration (PSD) of ambient air quality in attainment areas, in order to reduce the chance of attainment areas failing to meet NAAQS. PSD Increments are the maximum allowable rise in criteria pollutant concentrations that will not cause or contribute to the area being in non-attainment. According to the EPA, for a PSD permit to be issued, the applicant must demonstrate that the project "will not cause or contribute to a violation of a NAAQS or to an increase above a PSD Increment for each pollutant emitted in significant amounts by the project." Austin is currently in attainment for all NAAQS pollutants.

2.2 Endangered Species Act

Federally-listed threatened/endangered species and their habitats are protected under the Endangered Species Act of 1973, as amended (16 U.S.C. 1531-1544, 87 Stat. 884). Specifically, the Act authorizes the determination and listing of species as endangered and threatened; prohibits unauthorized taking, possession, sale, and transport of endangered species; provides authority for land acquisition for conservation of listed species using land and water conservation funds; authorizes establishment of cooperative agreements and grants-in-aid to states that establish and maintain threatened and endangered species programs; authorizes assessment of civil and criminal penalties for violating the Act; and authorizes payment of rewards for information leading to arrest and conviction of violations of the Act. There have been various amendments to the Act, among which are

included: provisions for designation of critical habitat; recovery plans; and monitoring for candidate and recovered species.

3.0 Project Description

3.1 Need for the Facility and Conceptual Design

Austin Energy requires additional generation to support a fast growing population and job growth in both the City of Austin and Travis County. Austin has been the fastest growing city in the country for the past three years. Since 2009 the population of Travis County has increased by 98,415 individuals, an increase of almost 10 percent (Perryman Group). Current projections indicate that county population is expected to continue to increase at this rate adding another 102,000 people by 2017 (Perryman Group). Travis County has added 67,186 new jobs since 2009 (Travis County employment from the Texas Workforce Commission) and this trend is expected to continue and keep pace with the projected population growth. The existing STG at the SHEC was sized to allow for population growth and increased power demands by accommodating the installation of an additional combustion turbine and HRSG.

Annual residential electricity consumption in Texas for 2011 was 145,654,228 MWh, an increase of 15,857,077 MWh (or 10.9 percent) from just two years earlier (Energy Information Administration). The population of the state increased by 892,379 individuals over this same two-year period, growing from 24,782,302 to 25,674,681 as of July 1, 2011 (U.S. Census).

Based on the current average residential electricity usage per person of 5.673 MWh/yr/person for Texas, and a projected population increase in Travis County of over 200,000 persons from 2009 to 2017, the residential electricity demand is projected to increase by 1,136,968 MWh/year. The maximum additional capacity of the new unit is approximately 206 MW and this translates to 1,443,648 MWh annually based on a capacity factor of 80 percent. Therefore, the projected increase in local residential demand alone (over an eight-year period) represents 79 percent of the additional power available from the project.

3.2 The Existing SHEC Facility

The existing facility equipment, operations and emissions are regulated under Prevention of Significant Deterioration (PSD) permit No PSDTX1012M1 and Texas Commission on Environmental Quality (TCEQ) Permit No. 48106. The current generating units include six natural gas fired GE LM6000 aero derivative design simple cycle combustion turbines and the existing natural gas fired GE Frame 7FA combustion turbine combined cycle unit including natural gas fired duct burners, a HRSG and a steam turbine generator. The six simple cycle units are designated in the permit as EPN's SH1, SH2, SH3, SH4, SH6 and SH7. The first four units (SH1-4) commenced operation in 2001 and the two newer units (SH6 and SH7) commenced operation in 2010. These units have a nominal output rating of 50 MW each and serve as "peaking" units that start up to help meet demand during peak (higher) periods. The LM6000 turbines utilize GE's spray inter-cooled turbine (Sprint) design and power augmentation and include water injection and SCR for NOx control.

The existing combined cycle unit commenced operation in 2004 and is designated in the TCEQ PSD permit as EPN SH5 and has a GE 7FA.03 combustion turbine – a previous version of the 7FA model. The turbine is equipped with DLN (model DLN2.6) combustors. Its HRSG is equipped with natural gas fired duct burners and SCR. The steam turbine generator for this unit was sized to accommodate the addition of a second similarly sized combustion turbine, with a space immediately adjacent to the southeast of the SH5 unit for the proposed SH8 unit. The current combined cycle unit is a one-on-one (1x1) configuration (one CTG with HRSG and one STG), but following the addition of the proposed new turbine and HRSG it will be a 2x1 configuration (two CTGs/HRSGs and one STG). The present combustion turbine has a nominal rated output of 164 MW and the steam turbine generator currently produces up to 157 MW but will be capable of up to 189 MW output with the addition of the proposed second combustion turbine. As such, the maximum combined generating output of the combined cycle unit will increase from 321 MW for the existing 1x1 configuration to 527 MW for the proposed 2x1 configuration. The STG was originally sized for the planned build-out to a 2x1 configuration.

The existing cooling tower was sized for the full STG capacity in the 2x1 configuration, so no new cooling tower capacity is needed. Saturated steam from the STG is condensed prior to being recirculated along with makeup water to the HRSG for reheating. Condenser cooling is provided by circulating water that is in turn cooled by ambient air in the direct-contact mechanical draft cooling tower. The water that is used in the cooling tower makeup is reclaimed water that is treated onsite. The reclaimed water is obtained from the adjoining South Austin Regional (SAR) wastewater treatment plant.

Ancillary equipment includes two existing aqueous ammonia storage tanks (19 percent aqueous ammonia solution) that store the SCR reagent for the units. One aqueous ammonia tank stores SCR reagent for all six simple cycle turbines. The other tank stores ammonia solution for the combined cycle unit and would also serve the proposed new unit. The aqueous ammonia goes to a vaporizer unit and is then injected into the flue gas upstream of the SCR catalyst. There are also four existing cooling towers and three natural gas fired inlet air heaters associated with the simple cycle units and one existing cooling tower associated with the combined cycle unit.

3.3 The Proposed Project

The new combined cycle unit is anticipated to operate as a base-loaded unit, with up to 8,760 full-load hours per year, but may also operate at partial loads, and/or start-up and shutdown as needed to meet electricity demand. The duct burners for the new unit will be rated at 681.5 MMBtu/hour based on the higher heating value (HHV) of the pipeline natural gas fuel, and may operate at full capacity for up to 8760 hours per year. The new combined cycle turbine is expected to start-up numerous times per year.

As described above, the new combustion turbine and HRSG will be located alongside the existing GE 7FA.03 turbine that is presently operating in combined cycle mode in a 1x1 configuration with a single CTG/HRSG supplying steam to a single STG. The existing STG is sized such that it will be able

to accommodate the build-out with additional steam from the new HRSG of the proposed GE 7FA.04 combustion turbine; thus the new configuration will be 2x1 with two CTGs/HRSGs supplying steam to one STG.

The proposed combustion turbine will utilize DLN combustors and SCR to control NOx emissions. Aqueous ammonia from the existing combined cycle ammonia storage tank will be vaporized in a new ammonia vaporizer dedicated to the SCR for the proposed unit. The proposed PNG-fired duct burner will have a maximum heat input capacity of 681.5 MMBtu/hour (HHV). An oxidation catalyst will be located in the HRSG downstream of the duct burners and upstream of the SCR ammonia injection grid and will control emissions of CO as well as VOC.

There are no upstream or downstream impacts that would preclude addition of the proposed unit to the SHEC, because the existing the plant natural gas piping and infrastructure is designed to handle a second GE 7FA combustion turbine and duct burner. The existing steam turbine was designed to achieve full capacity with a second GE 7FA and HRSG, which would improve the heat rate and thermal efficiency of the unit, providing more electricity per unit of natural gas consumed. The existing balance of plant equipment including circulating water, condensate water, cooling water systems and the cooling tower were designed to support an additional 7FA and HRSG. The existing condenser was constructed to support steam flow from a second HRSG operating in bypass. The plant switchyard is designed to support the electrical production of the additional unit. The plant access road is adequate to support construction and maintain operation of the additional unit. There will be small increases of natural gas fugitives from piping associated with the proposed CTG.

The cooling tower, which uses water from the adjacent City of Austin waste water treatment plant, will require additional make-up water. There would also be an increased volume of process water and equipment cooling water usage. There will also be small increases in wastewater due to blow-down from the new HRSG.

3.4 Process Description

The GE 7FA.04 CTG consists of a compressor, burners, turbine and generator on a single shaft. Ambient air is introduced to the unit after inlet air filtration and (on high temperature days) evaporative cooling, where an atomized mist of water is used to reduce the air temperature, increasing air density and thus increasing the output of the turbine. Filtered (and cooled) air is compressed in the compressor section prior to combustion with PNG in the combustion zone. Products of combustion from the burner go to the turbine section where they expand to rotate the turbine that drives the compressor and the generator. The exhaust gas exits the turbine at approximately 1100°F and is delivered to the HRSG via ductwork. The HRSG design is a three-pressure reheat design with high-pressure (HP), intermediate pressure (IP) and low pressure (LP) sections. A duct burner may be used to deliver additional heat to the HP section of the HRSG by combustion of pipeline natural gas using residual oxygen in the flue gas. Heat recovered in the HRSG will be utilized to produce steam.

High pressure steam generated within the HRSG will be used to drive the existing STG and associated electrical generator attached to the same shaft. After expansion in the steam turbine, saturated steam goes to a condenser and is cooled back to water before being returned to the HRSG for reuse. The condenser is cooled via a closed cycle cooling water loop that uses a cooling tower to maintain the circulating water temperature low enough for effective condenser operation. The mechanical induced draft cooling tower uses large fans to draw air into the tower and across the path of the water so that direct contact and heat transfer is made between the hot water and cooler air. Some of the cooling water is lost via evaporation and drift (droplets) and some additional water is lost to blow-down (used to keep solids concentrations from building up) and must be made up via introduction of make-up water to the circulating cooling water. The cooling tower is equipped with mist eliminators to minimize drift and conserve water.

3.4.1 EMISSION CONTROL EQUIPMENT FOR THE COMBINED CYCLE UNIT

The emission control technologies proposed for the combustion turbine and duct burner exhaust gases include DLN combustors located within the combustion turbine and an SCR system located within the HRSG to control NOx emissions. An oxidation catalyst and efficient combustion controls will be used to control emissions of CO and VOC. Emissions of other pollutants are minimized through the proposed use of low-sulfur pipeline natural gas, as well as efficient combustion in the combustion turbine and duct burner.

3.5 Natural Gas Piping

Austin Energy is proposing to utilize PNG as the only fuel for the proposed combustion turbine and duct burner. The natural gas is delivered to the site via an existing natural gas pipeline that serves the site. Gas will be metered and piped to the new combustion turbine and duct burner. The natural gas is assumed to have a HHV of 1,022 Btu/standard cubic foot (scf) and a maximum sulfur content of 0.23 grains per 100 scf. Fugitive emissions from any new gas piping components associated with the new combined cycle unit will include emissions of methane and carbon dioxide, components of the natural gas.

3.6 Electrical Equipment Insulated with Sulfur Hexafluoride (SF_6)

Sulfur hexafluoride (SF6) is a fluorinated compound with an extremely stable molecular structure. The unique chemical properties of SF6 make it an efficient electrical insulator. The gas is used for electrical insulation, arc quenching and current interruption in high voltage electrical equipment. The capacity of the generator circuit breaker associated with the proposed unit will be approximately 59 pounds SF6 is only used in sealed and safe systems which under normal circumstances do not leak gas, however we account for potential emissions from this equipment in this application to be conservative.

The proposed circuit breaker at the generator output will have a low pressure alarm and a low pressure lockout. The alarm will alert operating personnel of any leakage in the system and the lockout prevents any operation of the breaker due to lack of “quenching and cooling” SF6 gas.

3.7 Greenhouse Gas Emission Calculations

3.7.1 GHG EMISSIONS FROM COMBINED CYCLE COMBUSTION TURBINE

GHG emission calculations for the combined cycle combustion turbine (see **Table 2**) are calculated in accordance with the procedures outlined in the Mandatory Greenhouse Gas Reporting Rules. CO2, methane (CH4) and nitrous oxide (N2O) are calculated using the emission factors for natural gas combustion from Tables C-1 and C-2 of 40 CFR Part 98. The global warming potential factors used to calculate carbon dioxide equivalent (CO2e) emissions are based on 40 CFR Part 98, Table A-1.

Table 2: Annual GHG Emissions – Combustion Turbine Combined Cycle Unit

Source	Annual Heat Input[1] (MMBtu/yr)	Pollutant	Emission Factor[2] (kg/MMBtu)	GHG Mass Emissions (tons/yr)	Global Warming Potential[3]	CO_2e (tons/yr)
Combustion turbine plus duct burner	22,716,339	CO_2	53.02	1,327,624	1	1,327,624
		CH_4	1.0E-03	25.0	21	526
		N_2O	1.0E-04	2.5	310	776
		GHG	**Totals**	**1,327,651**		**1,328,926**
		CO2e	+10% margin added for measurement error			1,461,818

[1] Annual heat input based on 8760 hours per year of operation of the combustion turbine at maximum heat input rate and with duct burner firing at 681.5 MMBtu/hr for 8760 hours per year
[2] CO2, CH4 and N2O emission factors based on Tables C-1 and C-1 of 40 CFR 98
[3] Global warming potential factors based on Table A-1 of 40 CFR 98

3.7.2 GHG EMISSIONS FROM NATURAL GAS PIPING FUGITIVES AND NATURAL GAS MAINTENANCE AND STARTUP/SHUTDOWN RELATED RELEASES

GHG emission calculations for natural gas piping component fugitive emissions (see **Table 3**) are based on emission factors from Table W-1A of the Mandatory Greenhouse Gas Reporting Rules. The concentrations of CH4 and CO2 in the natural gas are based on a typical natural gas analysis. The global warming potential factors used to calculate CO2e emissions are based on Table A-1 of 40 CFR Part 98.

GHG emission calculations for releases of natural gas related to piping maintenance and turbine startup/shutdowns are calculated using the same CH4 and CO2 concentrations as natural gas piping fugitives.

Table 3: Annual GHG Emission Calculations – Natural Gas Piping

Source	Component Type	Fluid State	Count	Emission Factor[1] (scf/hr/comp)	CO2[2] (tons/yr)	CH4[3] (tons/yr)	Total (tons/yr)
Additional Natural Gas Fugitives	Valves	Gas/Vapor	194	0.121	0.093	4.017	
	Flanges		161	0.017	0.011	0.468	
	Relief Valve		35	0.193	0.027	1.156	
GHG Mass Based Emissions					0.130	5.642	5.77
Global Warming Potential[4]					1	21	
CO_2e Emissions					0.13	118.48	**118.6**

[1] Emission factors from Table W-1A of 40 CFR Part 98 Mandatory Greenhouse Gas Reporting
[2] CO2 emissions based on vol% CO2 in natural gas of 0.79%
[3] CH4 emissions based on vol% CH4 in natural gas of 94.14%
[4] Global warming potential based on Table A-1 of 40 CFR Part 98 Mandatory Greenhouse Gas Reporting

3.7.3 GHG EMISSIONS FROM ELECTRICAL EQUIPMENT INSULATED WITH SF6

SF6 emissions from the new generator circuit breaker associated with the proposed unit (see **Table 4**) are calculated using a predicted SF6 annual leak rate of 0.5 percent by weight per year, the IEC standard for new equipment leakage (International Electrotechnical Commission Standard 62271-1, 2004). The global warming potential factors used to calculate CO2e emissions are based on Table A-1 of 40 CFR Part 98.

Table 4: GHG Emission Calculations – Electrical Equipment Insulated with SF6

Estimated Quantity of SF6 in New Equipment	59	pounds
Annual Leak Rate	0.50%	of quantity present
Annual Emission Rate	0.295	lb/yr
	0.0001475	ton/yr of SF6
Global Warming Potential Factor for SF6	23,900	
Annual CO2e Emissions	**3.53**	**ton/yr of CO2e**

3.7.4 TOTAL PROJECT GHG EMISSIONS

Table 5 summarizes total Project GHG emissions based on the sum of CO2e emissions for the proposed combined cycle unit, natural gas pipeline fugitives and SF6 emissions from the new generator circuit breaker. Emissions are speciated as CO2, CH4, N2O and SF6 and converted to equivalent CO2e and summed to calculate total project GHG.

Table 5: Annual GHG Emissions - Total Project

Source	Annual Potential Emissions, tons/year				
	CO2	CH4	N2O	SF6	GHG, CO2e
Combined Cycle Unit (with 10% margin)	1,460,386	27.5	2.8	0	1,461,818
Natural Gas Pipeline Fugitives	0.13	5.64	0	0	118.6
Electrical Equipment Leaks	0	0	0	0.00015	3.53
Total Project	1,460,386	33.2	2.8	0.0001475	1,461,941

3.8 Water Quality Impacts

3.8.1 WASTEWATER IMPACTS

Wastewater from the Project will be discharged to the existing, permitted on-site wastewater treatment facility. Most of the water used by the Project will be recycled and reused. Only blowdown water will be discharged by the Project. Because of this the increase in wastewater will be minimal. **Table 6** shows the facility's water quality parameters, as required by the existing TCEQ permit, for the past 12 months.

Table 6: Water Quality Parameters

Parameter	Monthly Average or Minimum	Monthly Maximum
August, 2012		
Flow (MGD)	0.6083	0.7530
pH	7.2	7.7
Chlorine (mg/L)	0.0220	0.0300
BOD (mg/L)	2.5	2.6
September, 2012		
Flow (MGD)	0.4561	0.6630
pH	7.2	7.5
Chlorine (mg/L)	0.0200	0.0300
BOD (mg/L)	3.3	4.4
October, 2012		
Flow (MGD)	0.4258	0.5760
pH	7.1	7.6
Chlorine (mg/L)	0.0250	0.0300
BOD (mg/L)	3.3	4.7
November, 2012		
Flow (MGD)	0.3003	0.4770
pH	7.2	7.6
Chlorine (mg/L)	0.0320	0.0500
BOD (mg/L)	4.0	6.8
December, 2012		
Flow (MGD)	0.3506	0.4550
pH	7.2	7.4
Chlorine (mg/L)	0.0250	0.0300
BOD (mg/L)	3.9	5.7
January, 2013		
Flow (MGD)	0.3506	0.4550
pH	7.2	7.4
Chlorine (mg/L)	0.0250	0.0300
BOD (mg/L)	2.2	3.0
February, 2013		
Flow (MGD)	0.2913	0.5030
pH	7.2	7.4
Chlorine (mg/L)	0.0275	0.0400
BOD (mg/L)	2.6	3.0
March, 2013		
Flow (MGD)	0.2681	0.5740
pH	6.8	7.2
Chlorine (mg/L)	0.0250	0.0300
BOD (mg/L)	3.6	5.8

Table 6: Water Quality Parameters

Parameter	Monthly Average or Minimum	Monthly Maximum
April, 2013		
Flow (MGD)	0.0388	0.1420
pH	7.2	7.4
Chlorine (mg/L)	0.0000	0.0000
BOD (mg/L)	N/A	N/A
May, 2013		
Flow (MGD)	0.0503	0.3630
pH	7.2	7.7
Chlorine (mg/L)	N/A	N/A
BOD (mg/L)	N/A	N/A
June, 2013		
Flow (MGD)	0.1992	0.7800
pH	7.1	7.6
Chlorine (mg/L)	0.0500	0.0500
BOD (mg/L)	2.0	2.0
July, 2013		
Flow (MGD)	0.6024	0.7300
pH	6.9	7.4
Chlorine (mg/L)	0.0400	0.0700
BOD (mg/L)	3.1	5.6

Permit Limits

1. Flow shall not exceed 1.5 MGD
2. pH shall not be less than 6.0 standard units nor greater than 9.0 standard units

The treated blowdown water effluent to the Colorado River will not have a significant change in volume or pollutant concentration as a result of the Project. The effluent flow will increase by 42 gpm (0.06048 MGD) as a result of the Project. By way of comparison the115 year mean flow for the Colorado River is 2,200 ft^3 per second (3,403 MGD). The SHEC wastewater treatment system was designed for the added water from this Project. As a result the Project will not cause any change in water quality of the Colorado River.

The Colorado River within the Action Area of the Project does not provide habitat for any listed species. No literature was found that suggests that the permitted wastewater discharge with the above pollutant concentration would have an impact on listed species or their habitat. If, hypothetically a listed species was present within the Action Area the wastewater discharge associated with the Project would have no effect on the species.

3.8.2 STORMWATER IMPACTS

The Project area is currently a maintained lawn and therefore stormwater infiltrates into the soil. Once the Project is constructed stormwater will be routed through the facilities stormwater system. Prior to construction SHEC will apply for coverage under the Texas General Permit for Stormwater Discharges Associated with Construction Activity. The construction contractor will use appropriate best management practices (i.e. sediment and erosion control) to manage stormwater runoff associated with construction to stay in compliance with the aforementioned permit.

The Colorado River within the Action Area of the Project does not provide habitat for any listed species. Proper implementation of sediment erosion control during the project will prevent increased turbidity in the Colorado River from Project construction. If, hypothetically a listed species was present within the Action Area the stormwater discharge associated with the Project would have no effect on the species.

Stormwater associated with operation of the SHEC, including the proposed Project, is covered under an existing Municipal Separate Storm Sewer System (MS4) permit. Under this permit stormwater will be diverted to the Colorado River system.

3.9 Noise Impacts

Increases in noise levels can have an impact to listed species; however noise levels from construction or operation will be similar to the existing background noise level of the operating facility and therefore it is not anticipated that listed species will be impacted. The noise level from acoustic enclosures associated with the new unit will be restricted to 85dBA at three feet from the equipment (five feet vertical). The new unit will be located 800 feet from the fenceline. Therefore, the noise level at the fenceline will theoretically not exceed 54 dBA (based on logarithmic attenuation of noise). The Action Area does not contain suitable habitat for listed species. If, hypothetically a listed species was present within the Action Area the noise associated with construction or operation of the Project would have no effect on the species.

4.0 Biological Assessment Methodology

4.1 Definition and Delineation of the Action Area

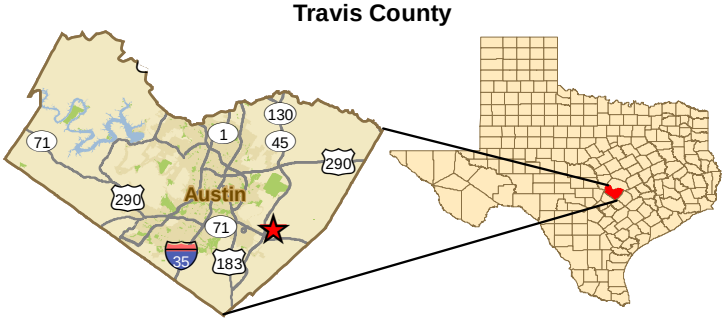
Modeling of pollutant dispersion from project emissions was conducted in accordance with the U.S. EPA's Guideline on Air Quality Models, and other applicable federal and state guidance. The results of this modeling will be presented in the PSD Air Quality Analysis (AQA) under separate covers. For the purpose of this BA the Action Area is determined by the point at which the pollutant concentration reaches the significant impact levels (SIL). The methodology for determining the Action Area was conservatively delineated by applying the EPA's SILs. The boundary of the Action Area was based on preliminary air dispersion modeling prepared in support of the PSD air permit application for criteria pollutants. When pollutant concentrations are at or below the SIL the EPA has determined that no measurable adverse impacts occur.

For all pollutants subject to PSD review only NO2 for the one-hour averaging period is the only pollutant that is over the SIL at the source. For this reason the modeled radius of NO2 was used to determine the Action Area. The Action Area for the project includes the SHEC plant site as well as the surrounding area within which effects from the project will be analyzed. The Action Area includes a circle with an approximate 0.76-mile radius centered at the SHEC plant site. **Figure 2** shows the boundary of the Action Area.

Project Area

Action Area Boundary

Travis County



0 400 800 Feet

0 150 300 Meters

Figure 2

Action Area Boundary

Source: ESRI, 2012

Prepared for: City of Austin	1 inch = 1,500 feet
Project No.: 071-001-002	Scale: 1:18,000
Prepared by: AT	Date: 1-9-13

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4.2 Habitat Assessment Methodology

4.2.1 LITERATURE REVIEW

The list of threatened and endangered species maintained by the U.S. Fish and Wildlife Service (USFWS) was consulted in July, 2013 for Travis County in order to determine which species could potentially occur in the Action Area and if critical habitat has been designated for those species (see **Section 5.1**).

Habitat requirements for each species were determined based upon a number of sources including USFWS, Texas Parks and Wildlife Department (TPWD), and other published documents (referenced as appropriate in **Section 5.2**).

The live version of the Texas Natural Diversity Database (TXNDD), maintained by TPWD, was consulted in July, 2013 to determine if any known occurrences of threatened or endangered species have been reported within the Action Area. Element of Occurrence (EO) data was requested for U.S. Geological Survey (USGS) topographic quadrangles within an approximate 15-mile radius around the Action Area, including the *Webberville, Bastrop, Bastrop SW, Lytton Springs, Creedmoor, Montopolis, Oak Hill, Austin West, Austin East, Manor*, and *Elgin West, Texas* quadrangles. EO data is represented by polygons, the sizes of which are roughly indicative of the accuracy of the reported location. Recorded occurrences of each species are discussed with habitat descriptions in **Section 5.2**.

4.2.2 FIELD HABITAT ASSESSMENT

Project biologists from Cox|McLain Environmental Consulting and TRC conducted a site visit in October 2012. Accompanied by Austin Energy staff, biologists walked the SHEC property and characterized vegetation and habitat on the site. Portions of the Action Area on properties adjacent to the SHEC boundary were walked if right-of-entry was available; otherwise, they were observed from the nearest accessible locations. Vegetation types on these properties were characterized and dominant species were identified. Aerial imagery was used to determine general habitat types identified within portions of the Action Area where right-of-entry was not available. The habitat types in those portions of the Action Area are assumed to be similar in species composition to similar habitat types observed during the field visit (see **Section 6.7**). The specific habitat requirements for each species were then compared to the vegetation present in order to determine whether appropriate habitat for the species occurs within the Survey Area (see **Section 8.0**).

5.0 Listed Threatened and Endangered Species and Designated Critical Habitat of Potential Occurrence in the Action Area

5.1 Threatened and Endangered Species of Travis County

Table 7 lists the threatened and endangered species that could occur in Travis County, the listing status for each species, and whether critical habitat has been designated for the species within the county.

Table 7: Threatened and Endangered Species of Potential Occurrence in Travis County

Species	Federal Listing Status	Critical Habitat Designated in Travis County?
Plants		
Bracted twistflower *Streptanthus bracteatus*	C	No
Mollusks		
Smooth pimpleback *Quadrula houstonensis*	C	No
Texas fatmucket *Lampsilis bracteata*	C	No
Texas fawnsfoot *Truncilla macrodon*	C	No
Texas pimpleback *Quadrula petrina*	C	No
Arachnids		
Bee Creek Cave harvestman *Texella reddelli*	E	No
Bone Cave harvestman *Texella reyesi*	E	No
Tooth Cave pseudoscorpion *Tartarocreagris texana*	E	No
Tooth Cave spider *Neoleptoneta myopica*	E	No
Warton's cave meshweaver *Cicurina wartoni*	C	No
Insects		
Kretschmarr Cave mold beetle *Texamaurops reddelli*	E	No
Tooth Cave ground beetle *Rhadine persephone*	E	No
Fishes		
Smalleye shiner *Notropis buccula*	Proposed E	No
Amphibians		
Austin blind salamander *Eurycea waterlooensis*	E	Yes (but not within Action Area)
Barton Springs salamander *Eurycea sosorum*	E	No
Jollyville Plateau salamander *Eurycea tonkawae*	T	Yes (but not within Action Area)
Birds		
Black-capped vireo *Vireo atricapilla*	E	No
Golden-cheeked warbler *Setophaga chrysoparia*	E	No
Interior least tern *Sterna antillarum athalassos*	E	No
Sprague's pipit *Anthus spragueii*	C	No
Whooping crane *Grus americana*	E	No
Mammals		
Red wolf *Canis rufus*	E	No

Status codes: E = Endangered; T = Threatened; C = Candidate for listing.
Sources: USFWS, 2013a; USFWS, 2013c.

5.2 Descriptions of Federally-Listed Threatened and Endangered Species, Their Habitats, and Recorded Occurrences

Bracted twistflower (*Streptanthus bracteatus*) – Federal Candidate for Listing

The bracted twistflower is a species endemic to the Edwards Plateau in Bandera, Bexar, Comal, Medina, Real, Travis and Uvalde counties (Poole et al., 2007). Habitat for the species includes oak-juniper woodlands on steep to moderate slopes and canyon bottoms, where it is found in shallow, well-drained gravelly clay and clay loam soils over limestone (Poole et al., 2007). The bracted twistflower is threatened by habitat destruction from urban development, severe herbivory from very dense herds of white-tailed deer, and the increased density of woody plant cover (USFWS, 2011a).

A total of five recorded occurrences of this species have been reported within approximately 11.3-13.5 miles to the northwest of the outer boundary of the Action Area (TPWD, 2013). These occurrences were associated with locations such as Bee Creek Preserve, Bright Leaf Preserve, Mount Bonnell, Vireo Preserve, and the Barton Creek and Bull Creek drainages. No occurrences of this species have been reported within the Action Area.

Smooth pimpleback (*Quadrula houstonensis*) – Federal Candidate for Listing

The smooth pimpleback is a freshwater mussel that lives in small to moderate streams and rivers and moderate-sized reservoirs in mixed mud, sand and fine gravel (USFWS, 2011a). There is no information on age, size at maturity, or host fish, but it is possible that they parasitize catfish (USFWS, 2011a). The species is no longer found in the Colorado River and all but one of its tributaries, or in the upper Brazos River and several tributaries; however, it remains in the San Saba River, lower Brazos River, Navasota River, Leon River, and Yegua Creek (USFWS, 2011a).

TXNDD data does not include any recorded occurrences of this species within the Action Area or within approximately 15 miles of the outer boundary of the Action Area (TPWD, 2013).

Texas fatmucket (*Lampsilis bracteata*) – Federal Candidate for Listing

The Texas fatmucket is a freshwater mussel that lives in streams and rivers on sand, mud, and gravel substrates, (USFWS, 2011a). Individuals have been found in shallow water (less than five feet), typically where one or both banks are relatively low (USFWS, 2011a). The Texas fatmucket is known currently from only nine streams in the Colorado and Guadalupe River systems, including the South Concho River, Spring Creek, Llano River, Pedernales River, Onion Creek, Jim Ned Creek, Elm Creek, the San Saba River, and in the Guadalupe River downstream of Louise Hays Park (USFWS, 2011a).

According to data from TXNDD, this species has been reported to occur in Onion Creek within the Action Area, at a distance of approximately 0.27 miles southwest of the SHEC plant site (TPWD, 2013). The species occurrence was reported in August 2010. Mussel surveys conducted within Onion Creek on Travis County properties in the vicinity of Highway 71 found one live individual of the species and two recently dead shells.

Texas fawnsfoot (*Truncilla macrodon*) – Federal Candidate for Listing

Little is known about the Texas fawnsfoot, but available information suggests that it may be found in sand, gravel, and sandy-mud substrates in moderate-flowing rivers and larger streams (USFWS, 2011a). There is no specific information available on age, size at maturity, or host fish, but it is possible that they parasitize freshwater drum (USFWS, 2011a). The Texas fawnsfoot may occur in the Colorado River, San Saba River, the Brazos River, Clear Fork Brazos River, Navasota River and Deer Creek.

TXNDD data does not include any recorded occurrences of this species within the Action Area or within approximately 15 miles of the outer boundary of the Action Area (TPWD, 2013).

Texas pimpleback (*Quadrula petrina*) – Federal Candidate for Listing

The Texas pimpleback is generally found in slow-flowing waters with mud, gravel, and sand substrates (USFWS, 2011a). Little information exists on age, size at maturity, or host fish, but glochidia have been reported to parasitize flathead catfish, yellow bullhead, and bluegill (USFWS, 2011a). Specimens may still exist in the Colorado and San Saba Rivers (Howells, 2002).

TXNDD data does not include any recorded occurrences of this species within the Action Area or within approximately 15 miles of the outer boundary of the Action Area (TPWD, 2013).

Bee Creek Cave harvestman (*Texella reddelli*) – Federally-listed Endangered

The Bee Creek Cave harvestman is a small, blind, cave-adapted harvestman endemic to a few caves in Travis and Williamson counties (USFWS, 1994b). They complete their life cycles underground but are dependent on moisture and nutrient inputs from the surface (USFWS, 1994b). The species was listed as endangered in 1988 due to habitat loss, cave collapse or filling, alteration of drainage patterns, alteration to surface plant and animal communities, contamination of habitat and groundwater, leakages and spills of hazardous materials, and human influence above or in caves (USFWS, 2009a).

Four occurrences of the Bee Creek Cave harvestman have been reported approximately 10.2-12.2 miles west and northwest of the outer boundary of the Action Area (TPWD, 2013). These occurrences are associated with Airman's Cave, Bee Creek Cave, Bandit Cave, and Cave Y. Note that all of the geologic zones known to contain endangered or threatened cave species occur in the western portion of Travis County (associated with the Edwards Plateau) and are not known to occur within the Action Area. There are no recorded occurrences within the Action Area.

Bone Cave harvestman (*Texella reyesi*) – Federally-listed Endangered

The Bee Creek Cave harvestman is a small, blind, cave-adapted harvestman endemic to a few caves in Travis and Williamson counties. This species is weakly differentiated from the Bee Creek Cave harvestman (USFWS, 1994a). The Bone Cave harvestman was not described at the time of the original listing because it was thought to be the same species as the Bee Creek Cave harvestman

(USFWS, 1994a). The harvestman occurs in more locations and is more widespread than originally believed, but the expansion of the overall range is not significant and the caves in which these species occur are subject to numerous threats (USFWS, 1994a).

The Bone Cave harvestman has been reported to occur approximately 12.4-13.5 miles northwest of the outer boundary of the Action Area (TPWD, 2013). There were two occurrences at this approximate distance, one of which was at West Rim Cave and the other was at an unnamed cave. There are no recorded occurrences within the Action Area.

Tooth Cave pseudoscorpion (*Tartarocreagris texana*) – Federally-listed Endangered

The Tooth Cave pseudoscorpion is a small, cave-adapted pseudoscorpion known from small limestone caves of the Edwards Plateau. In 2009 a review was conducted to determine if the species' current status as endangered could be changed; however, no change was recommended due to the lack of karst fauna areas (USFWS, 2009b).

TXNDD data does not include any recorded occurrences of this species within the Action Area or within approximately 15 miles of the outer boundary of the Action Area (TPWD, 2013).

Tooth Cave spider (*Neoleptoneta myopica*) – Federally-listed Endangered

The Tooth Cave spider is a very small, cave-adapted, sedentary spider. They must complete their life cycles underground, but they are dependent on moisture and nutrient inputs from the surface (USFWS, 1994b). In 2009 a review was conducted to determine if the species' current status as endangered could be changed; however, no change was recommended due to the lack of karst fauna areas (USFWS, 2009b).

TXNDD data does not include any recorded occurrences of this species within the Action Area or within approximately 15 miles of the outer boundary of the Action Area (TPWD, 2013).

Warton's cave meshweaver (*Cicurina wartoni*) – Federal Candidate for Listing

The Warton's cave meshweaver is a very small, cave-adapted spider. It is known from only one cave in Travis County, Texas (USFWS, 2011b). Primary threats to the species and its habitat are predation and competition from red imported fire ants, surface and subsurface effects from runoff, unauthorized entry into the area, and trash dumping that may include toxic features (USFWS, 2011b). However, the cave is in a protected area, and the magnitude of threats is low to moderate. Although, the USFWS has stated that the species warrants removal from consideration for listing (USFWS, 2011b), Warton's cave meshweaver remains on the USFWS list for Travis County as a federal candidate species.

TXNDD data does not include any recorded occurrences of this species within the Action Area or within approximately 15 miles of the outer boundary of the Action Area (TPWD, 2013).

Kretschmarr Cave mold beetle (*Texamaurops reddelli*) – Federally-listed Endangered

The Kretschmarr Cave mold beetle is a small, cave-adapted beetle found under rocks buried in silt in small Edwards Limestone caves of the Jollyville Plateau (USFWS, 1994a). At the time of listing, the beetle was believed to occur in four caves in Travis and Williamson counties but is currently known from four caves in a 1.2 mile radius in Travis County (USFWS, 1994a). The species continues to require the protection provided by the Endangered Species Act because of their extremely small, vulnerable, and limited habitats located within an area that is experiencing continued pressures from economic and population growth (USFWS, 1994a).

TXNDD data does not include any recorded occurrences of this species within the Action Area or within approximately 15 miles of the outer boundary of the Action Area (TPWD, 2013).

Tooth Cave ground beetle (*Rhadine persephone*) – Federally-listed Endangered

The Tooth Cave ground beetle is a small, cave-adapted beetle found in small Edwards Limestone caves in Travis and Williamson counties. The beetle is known only from the Cedar Park and Jollyville karst fauna regions as delineated by Veni and Associates (USFWS, 2005b). Primary threats to the species include urban development, alteration of topography, vegetation or drainage patterns, contaminated groundwater, and red imported fire ants (USFWS, 2005b).

TXNDD data does not include any recorded occurrences of this species within the Action Area or within approximately 15 miles of the outer boundary of the Action Area (TPWD, 2013).

Smalleye shiner (*Notropis buccula*) – Proposed for Listing as Endangered

The smalleye shiner is endemic to the Brazos River drainage. Historically it was found throughout the Brazos River system and its tributaries, but the species is currently only found upstream of Possum Kingdom Reservoir and may be extirpated from the downstream reach (USFWS, 2011b). The smalleye shiner was been introduced into the Colorado River near Austin, but the species has not been found in the Colorado River drainage for over 20 years (USGS, 2013). Threats to the species include reservoir development, irrigation and water diversion, sedimentation, desalination, industrial and municipal discharges, agricultural activities, in-stream sand and gravel mining, and the spread of saltcedar (*Tamarix ramosissima*) (USFWS, 2011b).

On August 6, 2013 the USFWS issued a press release proposing this species for listing as endangered (USFWS, 2013b). The proposal includes the designation of critical habitat for the species. None of the designated critical habitat occurs within Travis County.

The smalleye shiner has been reported to occur at Waller Creek, approximately 7.7 miles northwest of the outer boundary of the Action Area (TPWD, 2013). The occurrence of the species was noted in 1980, and only one specimen was found. It was postulated that the individual may have been introduced from a fisherman's bait bucket. There are no recorded occurrences within the Action Area.

Austin blind salamander (*Eurycea waterlooensis*) – Federally-listed Endangered

The Austin blind salamander is known from outlets of the Barton Springs segment of the Edwards Aquifer, and is dependent upon water flow/quality from Barton Springs (USFWS, 2012). Given the reduced eye structure of the Austin blind salamander, and the fact that it is rarely seen at the water's surface, it is thought to be more subterranean (USFWS, 2012). The species requires specific hydrologic and chemical conditions, a rocky substrate with interstitial spaces, aquatic invertebrates for food, and access to the subsurface water table (USFWS, 2012).

Designated critical habitat for the species is present in Travis County and consists of approximately 120 acres in the vicinity of Barton Springs. The critical habitat area includes the City of Austin's Zilker Park (which is the location of several springs occupied by the species), as well as some private land along Barton Springs Road in Austin (USFWS, 2013d). The critical habitat unit is approximately 9.1 miles west/northwest of the outer boundary of the Action Area.

According to TXNDD data, the species has been reported to occur at Barton Springs approximately 9.1 miles northwest of the outer boundary of the Action Area (TPWD, 2013). There are no recorded occurrences within the Action Area.

Barton Springs salamander (*Eurycea sosorum*) – Federally-listed Endangered

The Barton Springs salamander has been documented at four spring outlets of the Barton Springs segment of the Edwards Aquifer, within the City of Austin's Zilker Park in Travis County, Texas (USFWS, 2005a). The species is found under rocks, in gravel, or among aquatic vascular plants and algae and feeds primarily on amphipods (USFWS, 2005a). Primary threats to the species are due to the degradation of the quality and quantity of water that feeds Barton Springs as a result of urban expansion over the watershed (USFWS, 2005a).

According to TXNDD data, the species has been reported to occur at Barton Springs approximately 9.3 miles northwest of the outer boundary of the Action Area and at Blowing Sink Preserve, approximately 13.3 miles west of the outer boundary of the Action Area (TPWD, 2013). There are no recorded occurrences within the Action Area.

Jollyville Plateau salamander (*Eurycea tonkawae*) – Federally Listed Threatened

The Jollyville Plateau salamander occurs in Bull Creek, Cypress Creek, Long Hollow Creek, Shoal Creek and Walnut Creek drainages of the Jollyville Plateau and in Brushy Creek of the Edwards Plateau in Travis and Williamson Counties, Texas (USFWS, 2012). Habitat for the species is characterized by well-oxygenated water with a typical depth of less than one foot, near springs or seep outflows with constant temperatures (USFWS, 2012).

Several critical habitat units have been designated for this species, 24 of which are located within Travis County (USFWS, 2013d). The nearest critical habitat unit is approximately 12.4 miles northwest of the outer boundary of the Action Area.

Four occurrences of the Jollyville Plateau salamander have been reported approximately 12.4-13.9 miles northwest of the outer boundary of the Action Area (TPWD, 2013). These occurrences were at Stillhouse Hollow Springs, Spicewood Springs, Barrow Hollow Springs, and Indian Springs. There are no recorded occurrences within the Action Area.

Black-capped Vireo (*Vireo atricapilla*) – Federally-listed Endangered

The black-capped vireo is a small songbird that once ranged from Kansas south into Mexico but is now found primarily in Texas and Mexico with a restricted range in Oklahoma (Campbell, 1995). Habitat for the species consists of oak-juniper woodlands that have a distinct structure with tree and shrub layers occurring in a patchy mosaic with grasslands. Dense shrub vegetation reaching to ground level is required for nesting cover (Campbell, 1995). Black-capped vireos arrive in Texas in mid-March and nesting takes place through late summer; the birds tend to return to the same nesting territory or one nearby each year (Campbell, 1995).

Four occurrences of the black-capped vireo have been reported approximately 11.8-14.0 miles west and northwest of the outer boundary of the Action Area (TPWD, 2013). These occurrences were associated with the Oak Hill area, Bull Creek Park, Wild Basin Preserve, and near Coldwater Creek and Cow Fork Bull Creek. There are no recorded occurrences within the Action Area.

Golden-cheeked warbler (*Setophaga chrysoparia*) – Federally-listed Endangered

The golden-cheeked warbler is a small songbird that breeds in central Texas and winters in Central America (Pulich, 1976). It inhabits woodlands comprised of mature Ashe juniper (*Juniperus ashei*) mixed with oaks and a variety of other hardwood species, preferring steep-sided canyons and slopes above drainages (Campbell, 1995). The long, fine bark strips from mature, shredding Ashe juniper trees are used for nest construction and cemented in place with spider webs (Pulich, 1976). Nesting takes place from March to early summer (Campbell, 1995).

There have been 25 recorded occurrences of the golden-cheeked warbler within 15 miles of the outer boundary of the Action Area (TPWD, 2013). These occurrences range from 10.5-15.0 miles west and northwest of the outer boundary of the Action Area, and were associated with Barton Creek (including the Barton Creek Greenbelt park as well other parts of the Barton Creek drainage area), Wild Basin Preserve and Bee Creek (which passes through the preserve), Emma Long Park, and drainages to Lake Austin, Bull Creek, Coldwater Creek, and the Colorado River. There are no recorded occurrences within the Action Area.

Interior least tern (*Sterna antillarum athalassos*) – Federally-listed Endangered

The interior least tern is a shorebird that is considered listed only when inland (i.e., more than 50 miles from coastline) (Campbell, 1995). The species nests on sand and gravel bars within braided streams and rivers and is also known to nest on man-made structures, such as sand and gravel mines, water treatment plants, ash disposal areas at power plants, and inland beaches such as those at reservoirs (Campbell, 1995). They prefer open areas, and tend to avoid habitats with thick vegetation or narrow beaches. Breeding takes place from early April to late August (Campbell, 1995). The interior least tern historically bred along the Mississippi, Red, and Rio Grande River systems (USFWS, 1990).

The species still breeds along these river systems, although they are generally found in less disturbed areas, and breeding has also been reported in the Arkansas and Ohio River systems.

TXNDD data does not include any recorded occurrences of this species within the Action Area or within approximately 15 miles of the outer boundary of the Action Area (TPWD, 2013). According to the Recovery Plan for the species, the interior least tern is not known to nest in the Colorado River basin (USFWS, 1990). There are no recorded occurrences within the Action Area.

Sprague's pipit (*Anthus spragueii*) – Federal Candidate for Listing

Sprague's Pipit breeds in northern North America (North Dakota, South Dakota, Montana, Minnesota, and portions of Canada) and winters in the southern U.S. (Arizona, Texas, Oklahoma, Arkansas, Mississippi, and Louisiana) and northern Mexico (USFWS, 2010). Because it winters in Texas, the species only occurs in Texas from mid-September to early April (USFWS, 2010). Generally, the species prefers native upland prairie habitats and coastal grasslands, but its migration and wintering ecology is poorly known (USFWS, 2010). The species is known to utilize grasslands and pastures, but is not generally found in fallow agricultural fields. The species also demonstrates a sensitivity to patch size, avoiding edge habitats (USFWS, 2010).

TXNDD data does not include any recorded occurrences of this species within the Action Area or within approximately 15 miles of the outer boundary of the Action Area (TPWD, 2013); however, according to data from eBird, Sprague's Pipit has been reported to occur at Hornsby Bend, approximately 1.2 miles west of the outer boundary of the Action Area (eBird, 2013).

Whooping crane (*Grus americana*) Federally-listed Endangered

The whooping crane is a large bird which breeds in the northern U.S. and Canada and winters in the coastal marshes of Texas at Aransas National Wildlife Refuge (USFWS, 2011c). During migration, whooping cranes utilize a variety of habitats, including wetland mosaics, riverine complexes, prairies, and croplands. Croplands are utilized for feeding, while open wetland areas are preferred for roosting (Campbell, 1995). Isolated areas away from human disturbance are generally preferred. The nearest known major migration stops to whooping crane wintering grounds in the Aransas National Wildlife Refuge are at the Salt Plains National Wildlife Refuge in northern Oklahoma and along the Red River in Texas (CWS and USFWS, 2007). In July 2010 the total wild population of the species was estimated to be 383 individuals, and the combined wild and captive population was estimated to be 535 individuals (USFWS, 2011c).

TXNDD data does not include any recorded occurrences of this species within the Action Area or within approximately 15 miles of the outer boundary of the Action Area (TPWD, 2013). For the past two years, several individuals have been known to winter at Granger Lake, located more than 30 miles northeast of the outer boundary of the project area. As recently as December 29, 2012, five individuals (consisting of one family group and a pair of adults) were photographed at Granger Lake (eBird, 2013).

Red wolf (*Canis rufus*) – Federally-listed Endangered

The red wolf was formerly known throughout the eastern half of Texas in brushy and forested areas and in coastal prairies; however, this species has been extinct in the wild in Texas since the early to mid-1970s, having succumbed to hunting pressure and genetic suppression due to hybridization with coyotes (Schmidly, 2004).

TXNDD data does not include any recorded occurrences of this species within the Action Area or within approximately 15 miles of the outer boundary of the Action Area (TPWD, 2013).

6.0 Description of Existing Conditions/Environmental Baseline

6.1 General Regional Information

The Action Area for the project (0.76-mile radius centered at the SHEC plant site) is located within the Blackland Prairie Natural Region (Gould, et al., 1960) and the Texan Biotic Province (Blair, 1950). Vegetation of the Action Area is mapped as "Crops" (McMahan, et al., 1984). Topography of the Action Area is generally level to gently rolling, and ranges from approximately 400-500 feet above mean sea level (USGS Webberville quadrangle).

6.2 Geology and Soils

The Action Area is mapped as Quarternary terrace (Qt) that overlooks the Colorado River, which is late Pleistocene in age and estimated to postdate 30,000 B.P. (Thurmond, 1982). The alluvial deposits are likely a composite of the Colorado River and Onion Creek deposits. These generally consist of gravel, sand, and clay in various proportions with gravel more prominent in the older, higher terraces. The gravels contain mainly dolomite, limestone, chert, quartz, and various igneous and metamorphic rocks from the Llano region and the Edwards Plateau to the west (Barnes, 1974). Navarro (Kemp Clay, Corsicana Marl, and Neylandvelle Formation) and Marlbrook Mark (upper Taylor marl) deposits or Upper Cretaceous age border the alluvial deposits to the north and south (Barnes, 1974).

Blackland prairies are distinguished from other prairies by its deep, fertile soils created by large quantities of invertebrate fauna and fundal flora. These vertisol soils contain gilgai, which helps store water to keep soils moist even during drought. It is found in predominately clay soils and noticeably expands when wet and contracts when dry (cracking).

The original soils across the SHEC were classified as part of the Bergstrom Series, specifically the Bergstrom silty clay loam (BgA), which are found on slopes from 0 to 1 percent. The soils typically occupy broad, smooth, nearly level benches on flood plains. The soil has a surface layer of dark-brown (10YR 3/3) silty clay loam about 25 inches thick. The next layer is reddish-brown (5YR 5/4) silt loam to a depth of about 60 inches (Werchan et al., 1974; NRCS, 2013).

6.3 Climate

Travis County is humid subtropical with long, hot summers influenced by tropical Maritime air masses while short, mild winters are often modified by polar air masses. During the winter, less than 25 days reach below freezing temperatures. Lower winter temperatures are influenced by precipitation in the form of fog and light rain. Strong northerly winds accompanied by sharp drops in temperatures occur in the winter (Werchan et al., 1974).

The average annual precipitation is 32.5 inches. The growing season for most crops falls between March and November (270 days). The sun shines 75 percent during the summer and 50 percent in winter with an average of 62 percent for the year. The highest temperature, on September 12, 2000, was 112^{0}F. The lowest temperature on record was -2^{0}F on January 21, 1949. In summer, high temperatures over 90^{0}F occur 80 percent of the time with August being the hottest, driest month. The average temperature is 68^{0}F and the average daily mean temperature is 85.3^{0}F (Werchan et al. 1974).

6.4 Water Resources

The Action Area is located within the Colorado River basin, and water runoff from the Action Area flows to Onion Creek and the Colorado River below Town Lake (TCEQ, 2004). The Colorado River crosses the north and western parts of the Action Area, and Onion Creek is found along the southeast boundary. FEMA floodplains are associated with both of these water bodies.

6.5 Karst Zones and Habitat Maps for Endangered Bird Species

The project is located outside of the area mapped as containing potential karst habitat by George Veni and Associates (Veni and Martinez, 2007).

The Action Area is located outside of the area mapped by Travis County as having the potential to provide habitat for the black-capped vireo and golden-cheeked warbler (Travis County and USFWS, 1996).

6.6 Land Use within the Action Area

The Action Area is generally comprised of the following land uses: undeveloped land (737 acres), developed uses (123 acres), quarry (190 acres), parkland (141 acres), open water (89 acres), transportation use (61 acres), agricultural/farm use (26 acres), and residential use (eight acres). Land uses are depicted on **Figure 3**. Developed portions of the Action Area are used for energy purposes (SHEC and a substation) and for a wastewater treatment plant (The South Austin Regional Wastewater Treatment Plant). The SHEC plant site and electrical substation are shown in **Photos 1** and **2**. Photo locations are noted on **Figure 4**. Parkland within the Action Area includes City of Austin's Onion Creek Wildlife Sanctuary, located to the south of the SHEC. Undeveloped land includes woodland and grassland, as described in **Section 6.7**.

- Project Area
- Action Area Boundary
- Developed Energy Uses
- Farm
- Undeveloped
- Park
- Quarry
- Residential Property
- Transportation
- Wastewater Treatment Plant
- Water

0 400 800 Feet
0 150 300 Meters

Figure 3

Land Use

Source: CMEC 2012, 2013; ESRI 2013

Prepared for: City of Austin	1 inch = 1,020 feet
Project No.: 071-001-002	Scale: 1:12,240
Prepared by: AT, SL	Date: 8/7/2013

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- Project Area
- Action Area Boundary
- Developed/Residential/Transportation
- Grassland
- Park
- Quarry
- Riparian Woodland
- Water
- Photo Location

0 400 800 Feet
0 150 300 Meters

Figure 4

Habitat Types and Photo Locations

Source: CMEC 2012, 2013; ESRI 2013

Prepared for: City of Austin	1 inch = 1,020 feet
Project No.: 071-001-002	Scale: 1:12,240
Prepared by: AT, SL	Date: 9/9/2013

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PHOTO 1: SHEC PLANT SITE

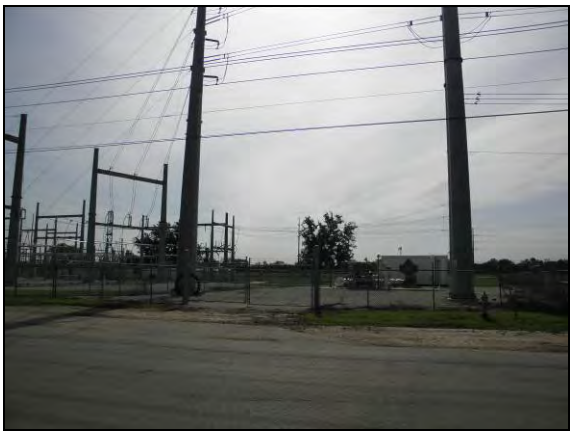

PHOTO 2: ELECTRICAL SUBSTATION

6.7 Vegetation/Habitat Descriptions

Habitat types identified within the Action Area include grassland, riparian woodland, quarry, open water, and vegetation associated with developed uses. The locations of each of the habitat types identified within the Action Area, as well as photo locations, are depicted on **Figure 4**.

Grassland

The majority of the Action Area (approximately 368 acres) consists of grasslands, some of which are maintained/cultivated for hay (see **Photo 3**). Grass species observed in the grasslands include Johnsongrass (*Sorghum halepense*) and bermudagrass (*Cynodon dactylon*) (see **Photo 4**).

PHOTO 3: HAY FIELD, IMMEDIATELY ADJACENT TO THE SHEC, TO THE WEST

PHOTO 4: JOHNSONGRASS GRASSLAND, IMMEDIATELY ADJACENT TO THE SHEC, TO THE SOUTH

Riparian Woodland

Approximately 449 acres of riparian woodlands associated with the Colorado River and Onion Creek occur within the Action Area. Riparian woodlands along the Colorado River includes woody species such as sugarberry (*Celtis laevigata*), sycamore (*Platanus occidentalis*), wax-leaf ligustrum (*Ligustrum lucidum*), chinaberry (*Melia azedarach*), American elm (*Ulmus americana*), cedar elm (*Ulmus crassifolia*),

Virginia creeper (*Parthenocissus quinquefolia*), grapevine (*Vitis* sp.), greenbrier (*Smilax bona-nox*), retama (*Parkinsonia aculeata*), prickly pear (*Opuntia* sp.), and nandina (*Nandina domestica*). Herbaceous species observed include giant ragweed (*Ambrosia trifida*), Turk's cap (*Malvaviscus arboreus*), johnsongrass, sow thistle (*Sonchus* sp.), silverleaf nightshade (*Solanum eleagnifolium*), inland sea-oats (*Chasmanthium latifolium*), morning glory (*Ipomoea lindheimeri*), poison ivy (*Toxicodendron radicans*), bastard cabbage (*Rapistrum rugosum*), bermudagrass, croton (*Croton* sp.), Canada wildrye (*Elymus canadensis*), dewberry (*Rubus trivialis*), and cocklebur (*Xanthium strumarium*). Elephant ears (*Colocasia* sp.), sedges (*Cyperus* sp.), switchgrass (*Panicum virgatum*), cattails (*Typha* sp.), and black willow (*Salix nigra*) were observed growing in close proximity to the river. An inactive/former harvester ant colony was observed. Damage caused by feral hog (*Sus scrofa*) rooting was also noted. The riparian woodland is shown in **Photo 5**, and the Colorado River is shown in **Photo 6**.

Riparian woodland found along Onion Creek includes woody species such as cedar elm, sugarberry, pecan (*Carya illinoinensis*), American elm, chinaberry, mesquite (*Prosopis glandulosa*), Texas persimmon (*Diospyros texana*), poison ivy, and greenbrier. Herbaceous species observed include inland sea oats, four-o'clocks (*Mirabilis jalapa*), bastard cabbage, Johnsongrass, croton, straggler daisy (*Calyptocarpus vialis*), Turk's cap, and Canada wildrye. A portion of the City of Austin's Onion Creek Wildlife Sanctuary, a narrow strip of woodland alongside Onion Creek, is located to the south of the SHEC. The riparian woodland is shown in **Photo 7**, and Onion Creek is shown in **Photo 8**.

PHOTO 5: RIPARIAN WOODLAND ALONG THE COLORADO RIVER, APPROXIMATELY 20 FEET NORTH/NORTHWEST OF THE SHEC

PHOTO 6: COLORADO RIVER, APPROXIMATELY 700 FEET NORTHWEST OF THE SHEC

PHOTO 7: RIPARIAN WOODLAND ALONG ONION CREEK, APPROXIMATELY 64 FEET SOUTH/SOUTHWEST OF THE SHEC

PHOTO 8: ONION CREEK, APPROXIMATELY 450 FEET SOUTH/SOUTHWEST OF THE SHEC

Quarry

There are some portions of the quarry property that are vegetated. These vegetated areas consist of a mixture of woodland and disturbed grassland/shrubland. Species composition is similar to the riparian woodland and grassland descriptions provided above.

Open Water

Open water habitats associated with water bodies in the project area provide habitat for various aquatic species.

Vegetation Associated with Developed Uses

The SHEC plant site is mostly developed. Undeveloped areas within the plant boundary fence consist of bermudagrass lawn (see **Photo 9**) and some ornamental plantings, including crape myrtle (*Lagerstroemia indica*), redbud (*Cercis canadensis*), and pecan trees and shrubs.

An electrical substation is located northwest of the plant site along Fallwell Lane. A large active harvester ant colony was observed along the substation fence beside the adjacent hay field (see **Photo 10**).

PHOTO 9: BERMUDAGRASS LAWN WITH ORNAMENTAL PLANTINGS AT THE PLANT SITE

PHOTO 10: HARVESTER ANT COLONY ALONG THE ELECTRICAL SUBSTATION FENCE

7.0 Background Information on Air Quality Effects

A method for understanding air quality effects on terrestrial species and their habitats has been developed by Smith and Levenson (1980). While the screening tool they provide allows for some quantification of impacts, they note that determining actual effects is extremely difficult due to the varying and fluctuating nature of biological systems and individual organisms. The procedure, therefore, relies on a number of broad assumptions and a number of variables, in an effort to simplify complex ecological systems.

Air pollutants can affect terrestrial plants through either direct exposure to gaseous pollutant in the ambient air or by uptake of pollutants that have been deposited in soil (Smith and Levenson, 1980). Impacts to plants can include growth retardation, visible damage, or mortality. Available data related to plant impacts has concentrated on crops rather than native plants, and a number of uncontrolled variables (such as age, health, season, temperature, soil moisture, soil pH, etc.) have not been considered. Further, very little research has been done on the effects of atmospheric pollutants on soils, from which plants may take in pollutants (Smith and Levenson, 1980).

Terrestrial vertebrates generally ingest toxins through the consumption of plant tissue; however, none of the available data suggest how long of a time period would be required for ingestion of a toxic element before a harmful effect is observed (Smith and Levenson, 1980). Exposure could also be by means of inhalation of pollutants in the ambient air.

Aquatic organisms can be affected by increased algal growth due to over-enrichment of the water, decreased water clarity, and decreased dissolved oxygen (Lovett and Tear, 2008). These effects can result in decreased species richness and a reduction in ecosystem productivity.

8.0 Habitat Assessment Results

Bracted twistflower – Federal Candidate for Listing

No oak-juniper woodlands on slopes or in canyons occur within the Action Area, and no shallow, well-drained gravelly clay or clay loam soils over limestone are found in the area. Further, no occurrences of the species have been reported in the Action Area. Although seven occurrences of the species have been reported within approximately 13.5 miles of the outer boundary of the Action Area, the nearest recorded occurrence of the species is 11.3 miles away. Appropriate habitat for this species was not identified in the area surrounding the SHEC, and the preferred canyon habitat for the species does not occur within the Action Area. The bracted twistflower would not be anticipated to occur within the Action Area.

Potential Impacts

The project will not impact the bracted twistflower or its habitat.

Smooth pimpleback – Federal Candidate for Listing

Although the Colorado River and Onion Creek, a tributary to the Colorado River, are found within the Action Area, the species is no longer believed to be found in these water bodies (USFWS, 2011b), and no occurrences of the species have been recorded within the Action Area or within a radius of approximately 15 miles of the outer boundary of the Action Area. The project will not have a significant increase (either volume of discharge or pollutant concentration) in wastewater discharge to the Colorado River. The smooth pimpleback is not believed to be present within the Colorado River or the Action Area. Further, best management practices (BMPs) would be utilized during the construction phase of the project to prevent water quality impacts, thus preventing harm to the smooth pimpleback, should an unknown population occur in Onion Creek.

Potential Impacts

The project will not impact the smooth pimpleback or its habitat.

Texas fatmucket – Federal Candidate for Listing

According to data from TXNDD, this species has been reported to occur in Onion Creek within the Action Area, at a distance of approximately 0.27 miles southwest of the SHEC plant site (TPWD, 2013). Although the Texas fatmucket occurs within the Action Area, no discharges into Onion Creek would occur as a result of the project, and water quality of the creek would not be impacted. The project will not have a significant increase (either volume of discharge or pollutant concentration) in wastewater discharge to the Colorado River. The utilization of BMPs during the construction phase of the project would prevent water quality impacts, thus preventing impacts to the Texas fatmucket, should it occur in the Colorado River.

Potential Impacts

The project will not impact the Texas fatmucket or its Onion Creek habitat.

Texas fawnsfoot– Federal Candidate for Listing

The Texas fawnsfoot is known to occur in the Colorado River; however, TXNDD data does not include any recorded occurrences of this species within the Action Area or within a radius of approximately 15 miles of the outer boundary of the Action Area. Habitat for the Texas fawnsfoot is not present within the Action Area. The project will not have a significant increase (either volume of discharge or pollutant concentration) in wastewater discharge to the Colorado River. Further, BMPs would be utilized during the construction phase of the project to prevent water quality impacts, thus preventing harm to the Texas fawnsfoot, should it occur in the Colorado River.

Potential Impacts

The project will have no impacts on the Texas fawnsfoot or its habitat.

Texas pimpleback– Federal Candidate for Listing

The Texas pimpleback is known to occur in the Colorado River; however, TXNDD data does not include any recorded occurrences of this species within the Action Area or within a radius of approximately 15 miles of the outer boundary of the Action Area. Habitat for the Texas fawnsfoot is not present within the Action Area. The project will not have an increase (either volume of discharge or pollutant concentration) in wastewater discharge to the Colorado River. Further, BMPs would be utilized during the construction phase of the project to prevent water quality impacts, thus preventing harm to the Texas pimpleback, should it occur in the Colorado River.

Potential Impacts

The project will have no impacts on the Texas pimpleback or its habitat.

Bee Creek Cave harvestman- Federally-listed Endangered

The Bee Creek Cave harvestman is a karst invertebrate species. Although four occurrences of the Bee Creek Cave harvestman have been reported within approximately 12.2 miles of the outer boundary of the Action Area, the nearest occurrence is over 10.2 miles away in known karst geology. No caves or potential karst habitat occur within the Action Area. The lack of suitable habitat means the Bee Creek Cave harvestman would not occur within the Action Area.

Potential Effects

The project will have "no effect" on the Bee Creek Cave harvestman or its habitat.

Bone Cave harvestman- Federally-listed Endangered

The Bone Cave harvestman is a karst invertebrate species. Although two occurrences of the Bee Creek Cave harvestman have been reported within approximately 13.5 miles of the outer boundary of the Action Area, the nearest occurrence is over 12.4 miles away from the edge of the Action Area. No caves or potential karst habitat occur within the Action Area. The lack of suitable habitat means the Bone Cave harvestman would not occur within the Action Area.

Potential Effects

The project will have "no effect" on the Bone Cave harvestman or its habitat.

Tooth Cave pseudoscorpion- Federally-listed Endangered

The Tooth Cave pseudoscorpion is a karst invertebrate species. No occurrences of the species have been recorded within the Action Area or within a radius of approximately 15 miles of the outer boundary of the Action Area. No caves or potential karst habitat occur within the Action Area. The lack of suitable habitat means the Tooth Cave pseudoscorpion would not occur within the Action Area.

Potential Effects

The project will have "no effect" on the Tooth Cave pseudoscorpion or its habitat.

Tooth Cave spider- Federally-listed Endangered

The Tooth Cave spider is a karst invertebrate species. No occurrences of the species have been recorded within the Action Area or within a radius of approximately 15 miles of the outer boundary of the Action Area. No caves or potential karst habitat occur within the Action Area. The lack of suitable habitat means the Tooth Cave spider would not occur within the Action Area.

Potential Effects

The project will have "no effect" on the Tooth Cave spider or its habitat.

Warton's cave meshweaver– Federal Candidate for Listing

The Warton's cave meshweaver is a karst invertebrate species. No occurrences of the species have been recorded within the Action Area or within a radius of approximately 15 miles of the outer boundary of the Action Area. No caves or karst habitat occur within the Action Area. The lack of suitable habitat means the Warton's cave meshweaver would not occur within the Action Area.

Potential Impacts

The project will have no impact on the Warton's cave meshweaver or its habitat.

Kretschmarr Cave mold beetle- Federally-listed Endangered

The Kretschmarr Cave mold beetle is a karst invertebrate species. No occurrences of the species have been recorded within the Action Area or within a radius of approximately 15 miles of the outer boundary of the Action Area. No caves or karst habitat occur within the Action Area. The lack of suitable habitat means the Kretschmarr Cave mold beetle would not occur within the Action Area.

Potential Effects

The project will have "no effect" on the Kretschmarr Cave mold beetle or its habitat.

Tooth Cave ground beetle- Federally-listed Endangered

The Tooth Cave ground beetle is a karst invertebrate species. No occurrences of the species have been recorded within the Action Area or within a radius of approximately 15 miles of the outer boundary of the Action Area. No caves or karst habitat occur within the Action Area. The lack of suitable habitat means the Tooth Cave ground beetle would not occur within the Action Area.

Potential Effects

The project will have "no effect" on the Tooth Cave ground beetle or its habitat.

Smalleye shiner– Federally Proposed for Listing as Endangered

The smalleye shiner is historically known to occur primarily in the Brazos River basin. One occurrence of the species has been reported approximately 7.7 miles from the outer boundary of the Action Area within the Colorado River basin; however, this occurrence was in Waller Creek, not in the Colorado River. Waller Creek is outside of the Action Area. Further, no occurrence of the species has been reported within the Colorado River for over 20 years, and the species may no longer occur there (USGS, 2013). The smalleye shiner is not anticipated to occur within the Action Area due to lack of historical occurrences and its distance from the Brazos River. Habitat for the smalleye shiner is not present within the Action Area. The project will not have a significant increase (either volume of discharge or pollutant concentration) in wastewater discharge to the Colorado River. Further, best management practices (BMPs) would be utilized during the construction phase of the project to prevent water quality impacts, thus preventing harm to the species, should it occur within the Colorado River or other streams within the Action Area.

Potential Effects

The project will have "no effect" on the smalleye shiner or its preferred Brazos River habitat.

Austin blind salamander- Federally-listed Endangered

The Austin blind salamander is known only from the outlets of Barton Springs. The Barton Springs critical habitat unit is located approximately 9.1 miles northwest of the outer boundary of the Action Area and would not be affected by the project. Water runoff from the project area is routed to the onsite wastewater treatment facility and discharged to the Colorado River and therefore would not flow to the Barton Springs watershed. The Austin blind salamander would not occur within the Action Area due to lack of habitat, and surface and subsurface flow from the project area would not flow to Barton Springs, the only known location of the species.

Potential Effects

The project will have "no effect" on the Austin blind salamander or its habitat.

Barton Springs salamander- Federally-listed Endangered

The Barton Springs salamander is known only from the outlets of Barton Springs, located approximately 9.3 miles northwest of the outer boundary of the Action Area, and Blowing Sink

Preserve, and located approximately 13.3 miles west of the outer boundary of the Action Area. Water runoff from the project area is routed to the onsite wastewater treatment facility and once treated is discharged to the Colorado River and therefore would not flow to the watersheds serving Barton Springs or Blowing Sink Preserve. The Barton Springs salamander would not occur within the Action Area due to lack of habitat, and water runoff from the project area would not flow to Barton Springs or Blowing Sink Preserve, the only known locations of the species.

Potential Effects

The project will have "no effect" on the Barton Springs salamander or its habitat.

Jollyville Plateau salamander- Federally-listed Threatened

The Jollyville Plateau salamander is associated with spring or seep outflows in areas with shallow water. It is not known to occur in the Colorado River or Onion Creek. Further, the nearest occurrence of the species is over 12.4 miles northwest of the outer boundary of the Action Area. No designated critical habitat for the species occurs within the Action Area, and the nearest critical habitat unit is approximately 12.4 miles northwest of the outer boundary of the Action Area. Critical habitat for the species would not be affected by the project. No springs or seep outflows occur within the Action Area. Water runoff from the project area is routed to the onsite wastewater treatment facility and once treated is discharged to the Colorado River and therefore would not reach the watersheds within which the species is known to occur. The Jollyville Plateau salamander would not occur within the Action Area due to lack of habitat, and water runoff from the project area would not flow to any known locations of the species.

Potential Effects

The project will have "no effect" on the Jollyville Plateau salamander or its habitat.

Black-capped vireo- Federally-listed Endangered

No oak-juniper woodlands or other vegetative types with the structure required by the black-capped vireo occur within the Action Area. Although four occurrences of the species have been reported within approximately 15 miles of the outer boundary of the Action Area, the nearest recorded occurrence of the species is over 11 miles away. Habitat for the species does not occur within the Action Area, and the black-capped vireo would not be anticipated to occur within the Action Area.

Potential Effects

The project will have "no effect" on the black-capped vireo or its habitat.

Golden-cheeked warbler- Federally-listed Endangered

No juniper-oak woodlands with mature Ashe juniper occur within the Action Area. Although 25 occurrences of the species have been reported within approximately 15 miles of the outer boundary of the Action Area, the nearest recorded occurrence of the species is over 10 miles away. Oak-juniper

habitat required by the species does not occur within the Action Area, and the golden-cheeked warbler would not be anticipated to occur within the Action Area.

Potential Effects

The project will have "no effect" on the golden-cheeked warbler or its habitat.

Interior least tern- Federally-listed Endangered

The interior least tern utilizes sand and gravel bars along streams and rivers for nesting. As shown in **Photo 8**, Onion Creek does have an exposed gravelly area along its banks. However, field investigations for this project were undertaken at a time when drought had led to low water levels in many area creeks. In a wetter year, the exposed gravelly area would likely be submerged. Further, no individuals of the species were observed during field investigations and there have been no reported occurrences of the species within approximately 15 miles of the outer boundary of the Action Area. The interior least tern would not be anticipated to occur within the Action Area due to the lack of habitat.

Potential Effects

The project will have "no effect" on the interior least tern or its habitat.

Sprague's pipit– Federal Candidate for Listing

Sprague's pipit is known to utilize grasslands, but they are sensitive to patch size and avoid edge habitats. Project area grasslands are not large enough contiguous tracts to provide appropriate habitat for this species, as they are made up of relatively small patches with an abundance of edge habitat. TXNDD data does not include any recorded occurrences of this species within the Action Area or within approximately 15 miles of the outer boundary of the Action Area (TPWD, 2013); however, according to data from eBird, Sprague's Pipit has been reported to occur at Hornsby Bend, approximately 1.2 miles west of the outer boundary of the Action Area (eBird, 2013). Habitat for Sprague's pipit is not present within the Action Area.

Potential Impacts

The project will have no impact on the Sprague's pipit or its habitat.

Whooping crane- Federally-listed Endangered

Although the whooping crane has been wintering at Granger Lake in Williamson County for the past two winters, the lake is located more than 30 miles from the Action Area. Further, TXNDD data does not show any recorded occurrences of the species within approximately 15 miles of the outer boundary of the Action Area. Preferred feeding and/or roosting habitat for the species does not occur within the Action Area. Habitat for the whooping crane is not present within the Action Area, and the species would not be anticipated to occur within the Action Area.

Potential Effects

The project will have "no effect" on the whooping crane or its habitat.

Red wolf- Federally-listed Endangered
The red wolf has been extirpated from Texas and would not occur within the Action Area.

Potential Effects

The project will have "no effect" on the red wolf or its habitat.

9.0 Summary of Effects/Impacts Determinations

Based on the analysis presented in this Biological Assessment (BA), no federally-listed species or habitat for federally-listed species occurs within the Action Area. One federal candidate for listing, the Texas fatmucket, has been reported to occur within the Action Area; however, no wastewater discharges would take place into the creek within which the species is known to occur. Therefore, neither the Texas fatmucket nor its habitat would be affected by the project.

For the reasons set forth in this BA, it is recommended that USEPA make a "no effect" determination for all federally-listed species in Travis County, Texas within the Action Area for this project.

10.0 Interdependent and Interrelated Actions

The project is limited to the construction and operation of a PNG fired combustion turbine combined cycle electricity generating unit at the existing SHEC. There are no interdependent or interrelated actions associated with this project.

11.0 Cumulative Effects

The land use surrounding the project is a mix of agriculture, industrial, quarry, and parkland. Although there is the potential for future development of the surrounding area, Austin Energy is not aware of any future State, Tribal, local or private actions that are reasonably certain to occur in the Action Area. In any event, a cumulative effects analysis is not necessary insofar as no listed resources will be adversely affected and a formal consultation is not required for the project.

12.0 Conservation Measures

Austin Energy will utilize Best Available Control Technology (BACT) to reduce emissions of air pollutants and, therefore, reduce the impacts to the environment. The predicted emission concentration for each pollutant subject to PSD review is in line with the TCEQ BACT guidance and the most stringent limit in the RACT/BACT/LAER Clearinghouse (RBLC).

The construction and operation of the project will have no direct or indirect impact on federally-protected species or their habitats.

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15.0 List of Acronyms

BA	Biological Assessment
BACT	Best Available Control Technology
BgA	Bergstrom Silty Clay Loam
BMP	Best Management Practices

CAA	Clean Air Act
CH_4	Methane
CO	Carbon Monoxide
CO2e	Carbon Dioxide Equivalent
CTG	Combustion Turbine Generator
DLN	Dry Low-NOx
EO	Element of Occurrence
EPA	Environmental Protection Agency
ESA	Endangered Species Act
GE	General Electric
GHG	Greenhouse Gas
IP	Intermediate Pressure
HHV	Higher Heating Value
HP	High-pressure
HRSG	Heat Recovery Steam Generator
LP	Low Pressure
MS4	Municipal Separate Storm Sewer System
NAAQS	National Ambient Air Quality Standards
NMFS	National Marine Fisheries Service
N20	Nitrous Oxide
PNG	Pipeline Natural Gas
PSD	Prevention of Significant Deterioration
Qt	Quaternary Terrace
RBLC	RACT/BACT/LAER Clearinghouse
SAR	South Austin Regional
SCR	Selective Catalytic Reduction
SF_6	Sulfur Hexafluoride
SHEC	Sand Hill Energy Center

STG	Steam Turbine Generator
TCEQ	Texas Commission on Environmental Quality
TPWD	Texas Parks and Wildlife Department
TXNDD	Texas Natural Diversity Database
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VOC	Volatile Organic Compounds