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1.0 INTRODUCTION AND PROJECT OVERVIEW

The following project description and supporting documentation were compiled by Aera Energy LLC (Aera) with assistance from Padre Associates, Inc. and Insight Environmental Consultants, Inc. in support of Aera's proposed East Cat Canyon Oil Field Redevelopment Project (Project) located on 2,107.8 acres within a portion of the state-designated Cat Canyon Oil Field (Project site).

1.1 PROJECT PURPOSE AND OBJECTIVES

Aera is submitting this application package to the County of Santa Barbara Planning and Development Department to request approval of an Oil and Gas Drilling/Production Plan to reestablish oil production within the Brooks sand (reservoir) underlying the Project site. Aera has also submitted a separate Tentative Tract Map application for the Project site. Aera is requesting the County of Santa Barbara's approval to divide and/or reconfigure the Project site parcels consist with the Subdivision Map Act regulations.

The purpose of the Project is to safely and economically produce crude oil while protecting the environment and providing jobs and other benefits to Santa Barbara County.

The objectives for the Project are as follows:

1. Re-establish oil production at the East Cat Canyon Oil Field at a forecasted level of up to 10,000 barrels of oil per day in this existing oil field by drilling and operating oil/gas production wells, steam injection wells, observation wells, source water wells, water injection wells, fresh groundwater wells, production gathering systems, a central processing facility, steam generation and distribution systems, and related ancillary equipment;
2. Construct a natural gas pipeline and electric service to the Project site;
3. Protect human health and the environment by complying with all applicable laws and regulations and by implementing Aera's System of Operating Excellence;
4. Transport crude by trucking;
5. Use existing well pads, roads, and other infrastructure where practical and feasible to minimize land disturbance;
6. Use non-potable brackish water as the primary source of water for steam generation to minimize use of potable groundwater;
7. Generate economic benefits for Santa Barbara County with the creation of new jobs, new tax revenue, and community investment;
8. Reduce California's reliance on imported oil by providing in-state supplies.

1.2 EAST CAT CANYON SITE BACKGROUND

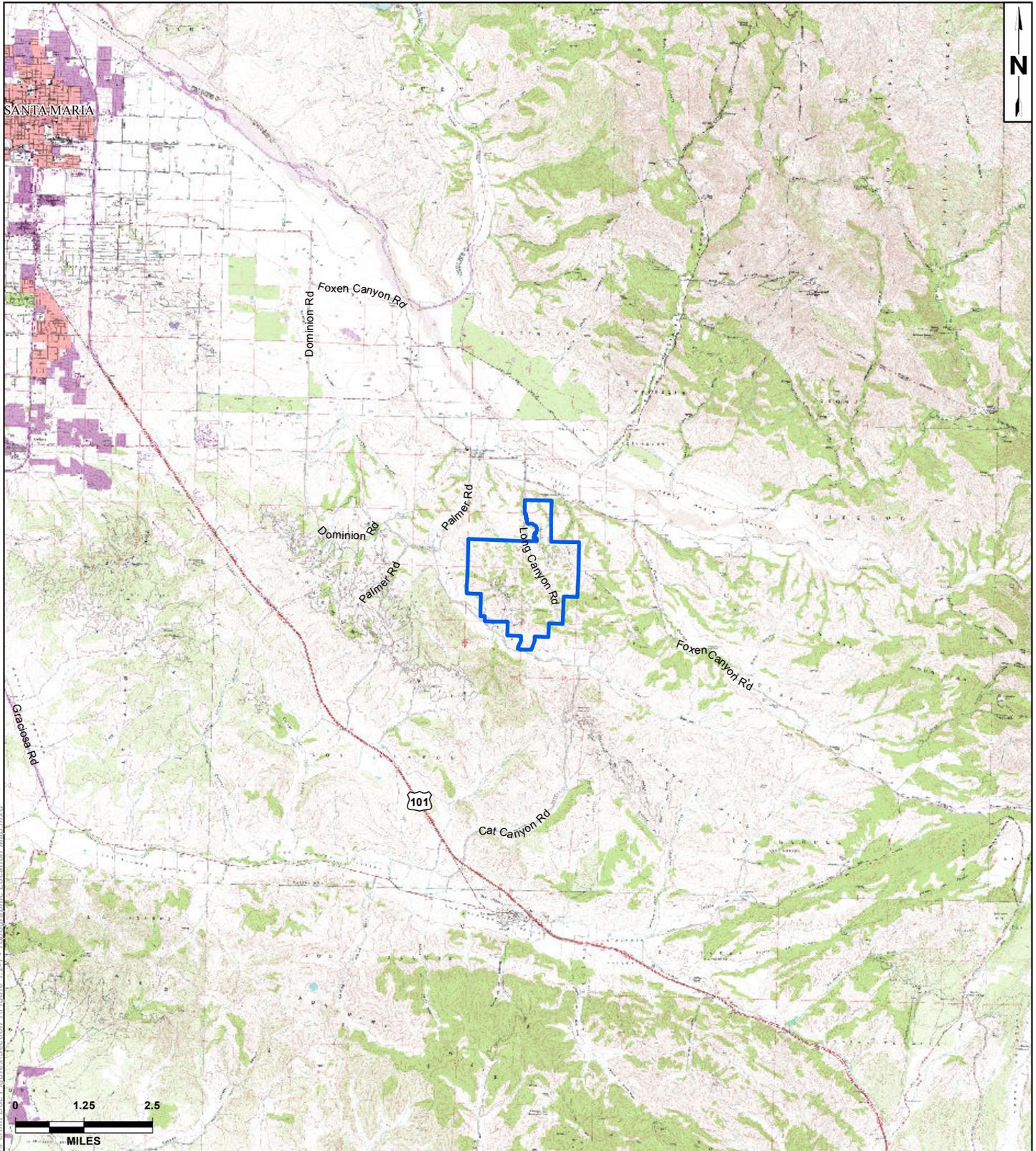
1.2.1 Site Location Description

The Project site is located within the Solomon Hills northeast of the Gato Ridge mountain ranges within Cat Canyon, approximately ten miles southeast of the City of Santa Maria and the community of Orcutt located in northern Santa Barbara County, California (5th Supervisorial District) (Figure 1.2-1 – Topographic Location Map). The main property entrance is located at 6516 Cat Canyon Road, south of the community of Sisquoc, California. The Project facilities will be focused predominantly on the southwest portion of the property, where a greater density of existing roads, well pads, and previous facility footprints already exist. The California Division of Oil, Gas, and Geothermal Resources divides the Cat Canyon Oil Field into four distinct areas: East Area, West Area, Central Area, and Sisquoc Area. The entire Project site lies within the Cat Canyon Oil Field (East Area) boundaries (Figure 1.2-2 – Oil Field Boundaries).

1.2.2 Operator and Permittee

The Project site consists of 2,107.8 acres, of which 1,552.8 acres are combined fee (both surface and mineral ownership) and 555 acres are divided interests (various surface owners and shared mineral ownership). Two small additional areas of the Project development footprint (approximately 3.9 acres of Project access roadways and entrances) are located on adjacent parcels (Assessor Parcel Numbers 101-040-017 and 101-070-003) that are located outside of the Project site boundaries and are not controlled by Aera (neither surface nor mineral ownership). These two parcels may be used for the Project, subject to the execution of access agreements with the property owners.

Aera land records commonly refer to the Aera-owned parcels by historic property names and boundaries, which do not directly correspond with County Assessor parcels. As shown in Figure 1.2-3 – Aera Energy LLC-Owned Parcels, some property boundaries encompass multiple parcels (e.g., Victory includes Assessor Parcel Numbers 101-050-013, 101-040-014, 101-040-020, and 101-050-014) while other property boundaries may divide a parcel (i.e., portions of Assessor Parcel Number 101-050-042 are located within the McCroskey Fee and portions of the Assessor Parcel Number are within the McNee boundary). Table 1.2-1 – Aera Energy LLC Property Details provides the property names and acreages, the status of Aera ownership (e.g., 100 percent ownership or divided property interest) of each property, the Assessor Parcel Number(s) associated with the property, and the Section, Township, and Range information for each property. Property ownership documentation, including preliminary Title Reports, is provided in Appendix D.



LEGEND:

 Aera Energy LLC Property



Source: USGS Topo Quad, DPSI 2013 Survey, Santa Barbara County, TIGER
 Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet
 Notes: This map was created for informational and display purposes only

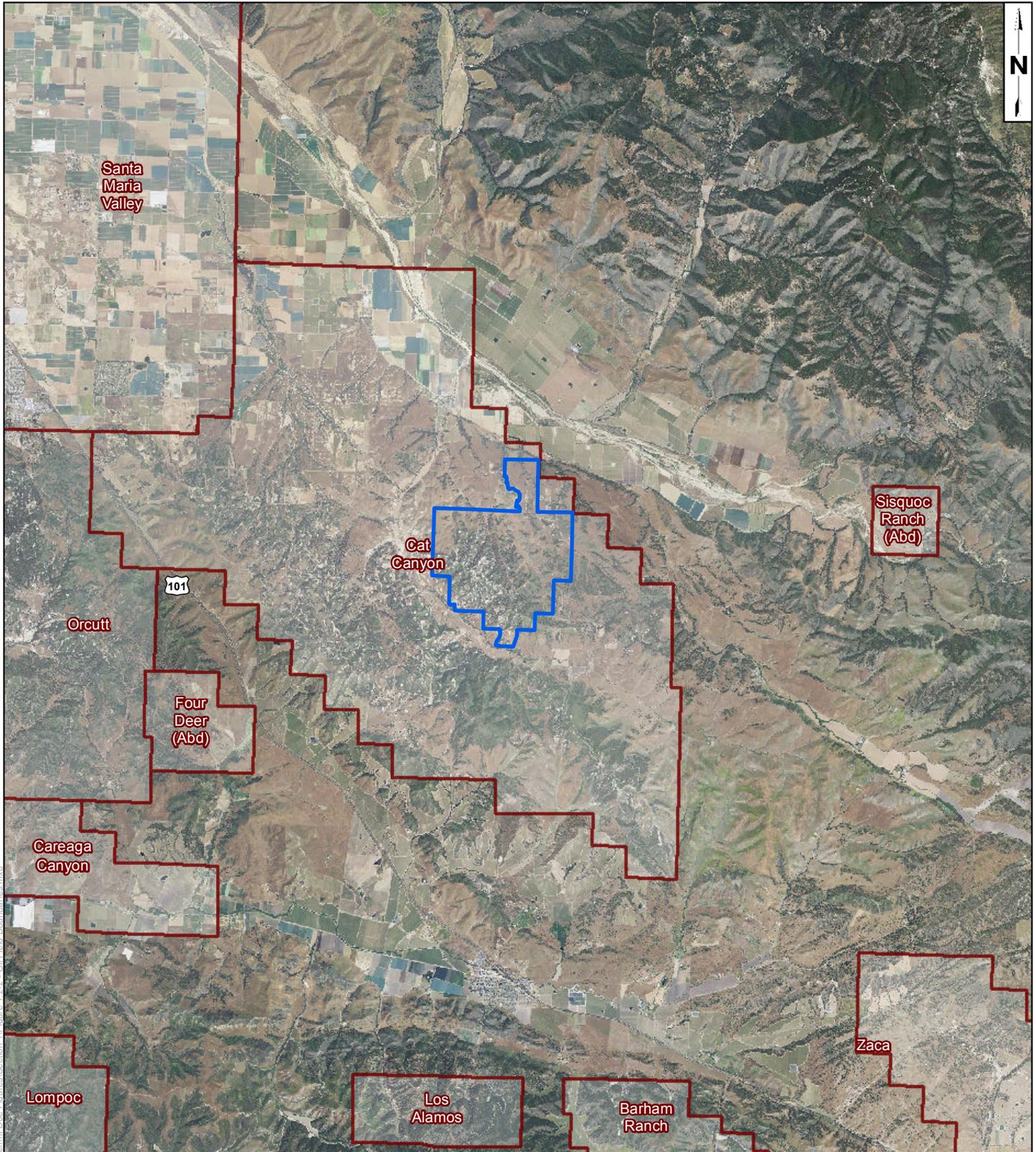
PROJECT NAME: EAST CAT CANYON OIL FIELD REDEVELOPMENT PROJECT	
PROJECT NUMBER: 1002-0455	DATE: October 2014

TOPOGRAPHIC LOCATION MAP

**FIGURE
1.2-1**

Z:\Kris\GIS\Maps\Map\Project\East Cat Canyon\Permit Doc\Figures\Section 1\Figure 1.2-1 - Topographic Location Map.mxd

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LEGEND:

Aera Energy LLC Property Oil Field Boundary



Source: DOGGR, NAIP 2012 Image, DPSI 2013 Survey, Santa Barbara County
 Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet
 Notes: Abd = Abandoned. This map was created for informational and display purposes only

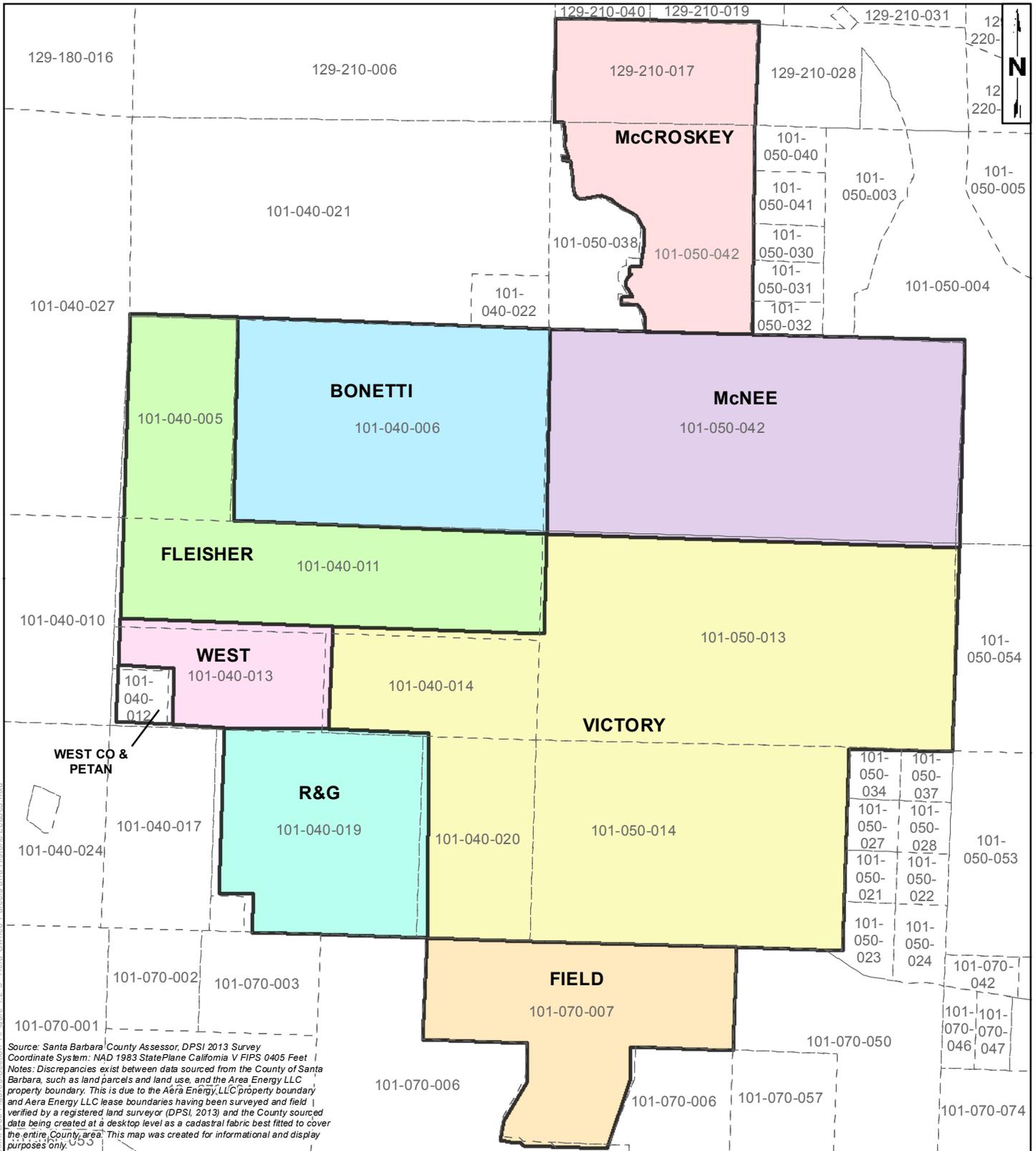
PROJECT NAME: EAST CAT CANYON OIL FIELD REDEVELOPMENT PROJECT	
PROJECT NUMBER: 1002-0455	DATE: October 2014

OIL FIELD BOUNDARIES

**FIGURE
1.2-2**

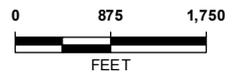
Z:\Kristin\GIS\Mapa\Map-Project\East-Cat-Canyon\Permit-Doc-Figures\Section-1\Figure-1.2-2-Oil-Field-Boundaries.mxd

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LEGEND:

- APN Boundary
- Property Boundary
- Bonetti
- Fleisher
- McNee
- Victory
- Westco & Petan
- Field
- McCrosky
- R&G
- West



PROJECT NAME: EAST CAT CANYON OIL FIELD REDEVELOPMENT PROJECT

PROJECT NUMBER: 1002-0455 DATE: February 2015

AERA ENERGY LLC-OWNED PARCELS

FIGURE 1.2-3

Z:\Krisin\GIS Maps\Map Project\East Cat Canyon\Permit\Doc Figures\Section 1\Figure 1.2-3 - Aera Owned Parcels and Historic Leases.mxd

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Table 1.2-1. Aera Energy LLC Property Details

Property Name	Acreage	Aera Surface Ownership	APN	Township	Range	Section
Bonetti	240.33	Divided	101-040-006	9N	32W	19
Field Fee	159.34	100%	101-070-007	9N	32W	31, 32
Fleisher	243.77	Divided	101-040-005	9N	32W	19
			101-040-011	9N	32W	30
McCroskey Fee	189.28	100%	101-050-042 (portion)	9N	32W	20
			129-210-017	9N	32W	17
McNee	320.77	100%	101-050-042 (portion)	9N	32W	20
R&G	155.20	100%	101-040-019	9N	32W	30
Victory	716.20	100%	101-040-014	9N	32W	30
			101-040-020	9N	32W	30
			101-050-013	9N	32W	29
			101-050-014	9N	32W	29
West	70.91	Divided	101-040-013	9N	32W	30
Westco & Petan Fee	11.99	100%	101-040-012	9N	32W	30
Total	2,107.80					

Note: Discrepancies exist between County of Santa Barbara Assessor Map Book pages and surveyed Aera property boundaries. The acreages provided in the table above are based on field surveys and mapping conducted by DPSI (2013).

1.2.3 Historical Site Uses

The Project site is located within the East Area of the Cat Canyon Oil Field in the Santa Maria Basin, where oil operations have been conducted since 1888. The Santa Maria Basin has produced more than one billion barrels of oil to date from the Monterey and Sisquoc formations.

Oil production in the Cat Canyon Oil Field began with the Palmer Union Oil Company's Palmer No. 1 well, which was drilled in 1908 and was located 1.5 miles northwest of the Project site within Palmer Canyon. Development of the West and East Areas of the Cat Canyon Oil Field expanded rapidly between 1909 and 1919, with most of the wells drilled by Brooks Oil Company and Palmer Union Oil Company (Franks et al, 1985, Palmer-Union, 1912). Figure 1.2-4 – Historical Timeline and Production shows that the development of the East Area of the Cat Canyon Oil Field started in 1917 and was in production for 72 years. A thermal enhanced oil recovery operation (cyclic steam stimulation) occurred from 1965 through 1989 and a thermal pilot operation (steam drive) was conducted from 1980 through 1983. Cumulative oil production at the Project site was approximately ten million barrels of oil from 100 wells producing initially by primary and later with thermal recovery methods. Figure 1.2-5 – Historical Aerial Photograph shows historical development of the Project site in the late 1960's.

Historically, oil production activities at the Project site were operated by independent operators starting around 1910 and were later taken over by Husky Oil Company. In 1984, the

Project site was transferred to Shell Oil Company. In 1997, Shell and Mobil combined their California exploration and production operations to form Aera. Intermittent production activities at the East Area of the Cat Canyon Oil Field were conducted until 1989, when the oilfield was shut down due to economics at that time. The field's wells were abandoned per California Department of Conservation Division of Oil, Gas and Geothermal Resources regulations and nearly all of the facilities were removed by 2002.

1.2.4 Existing Facilities and Operations

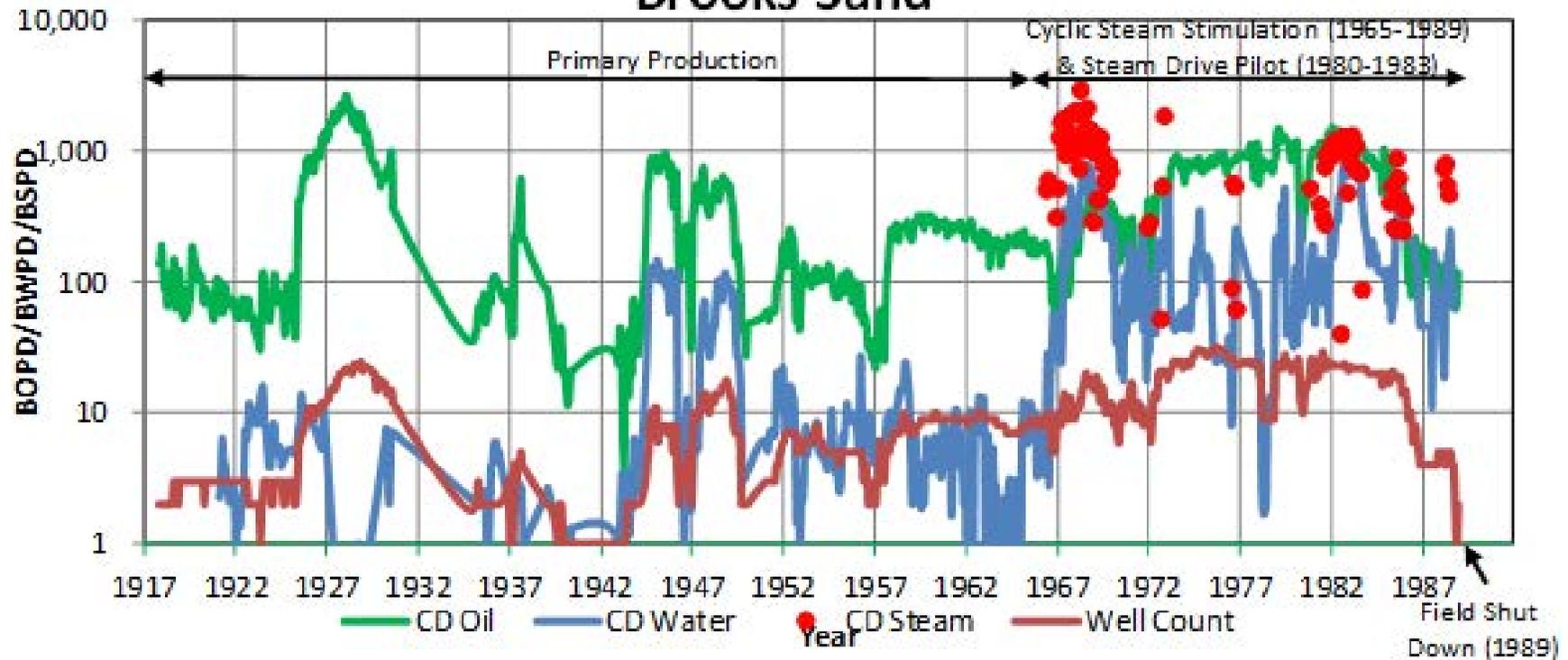
The Project site land use designations (as depicted on the County of Santa Barbara Land Use Designation Maps) are Agriculture (Ag-II-100) and Agricultural Commercial (AC) (Figure 1.2-6 – County Land Use Designations). In addition, the Project site is designated Agriculture on the County of Santa Barbara Unincorporated Zoning Maps, which are part of the County of Santa Barbara Land Use and Development Code (2014). Oil and gas exploration and production are approved uses in this zoning. The Project site currently supports office/warehouse buildings, abandoned oil wells, four non-producing test wells, a system of graded access roads and wells pads, former facility locations, a permitted beneficial reuse site, fresh groundwater wells, firewater and grazing tanks, and cattle grazing (Figures 1.2-7 through 1.2-9 – Site Photographs). ERG Resources, LLC currently operates five active oil and production wells within the Project site.

Approximately 131 oil wells were located at the Project site (including the southern half of Section 19, all of Section 30, and the western half of Section 29). Aera or its predecessors implemented an oil well decommissioning program between the late 1980s and 2003 under the supervision of the California Department of Conservation Division of Oil, Gas and Geothermal Resources. All of the oil wells at the Project site attributed to Aera or its predecessor companies are currently listed as plugged and abandoned (Department of Conservation Division of Oil, Gas and Geothermal Resources, 2013), with the exception of four non-producing test wells (Victory G1, G3, and G7 as well as Field Fee G2) that were drilled in 2012 in support of reservoir sampling and testing efforts (Figure 1.2-10 - DOGGR Well Map). Access roads and well pads remain intact.

1.2.5 Adjacent Site Uses Description

Parcels surrounding the Project site have land use designations of Agriculture (Ag-II-100; A-1-10; and A-II) and Agricultural Commercial (AC), as depicted on the County of Santa Barbara Land Use Designation Maps (Figure 1.2-6 – County Land Use Designations). As shown in Figure 1.2-11 Adjacent Land Uses, there are 48 known residential receptors, a winery tasting room, and an office within one mile of the Project site. Figure 1.2-11 also depicts the general location of existing roads, well pads, and infrastructure associated with past and current oil and gas operations located to the west and south of the Project site. The western portion of the Project site is located adjacent to the existing ERG Resources, LLC Cat Canyon development site (active field). In addition, Greka produces oil from the adjacent Bell lease. The surrounding oil field properties contain a network of narrow and steep dirt and remnant asphalt roads. Cat Canyon Road is located west of the Project site, and Long Canyon and Foxen Canyon Roads are located northeast of the Project site.

East Cat Canyon Production History Brooks Sand



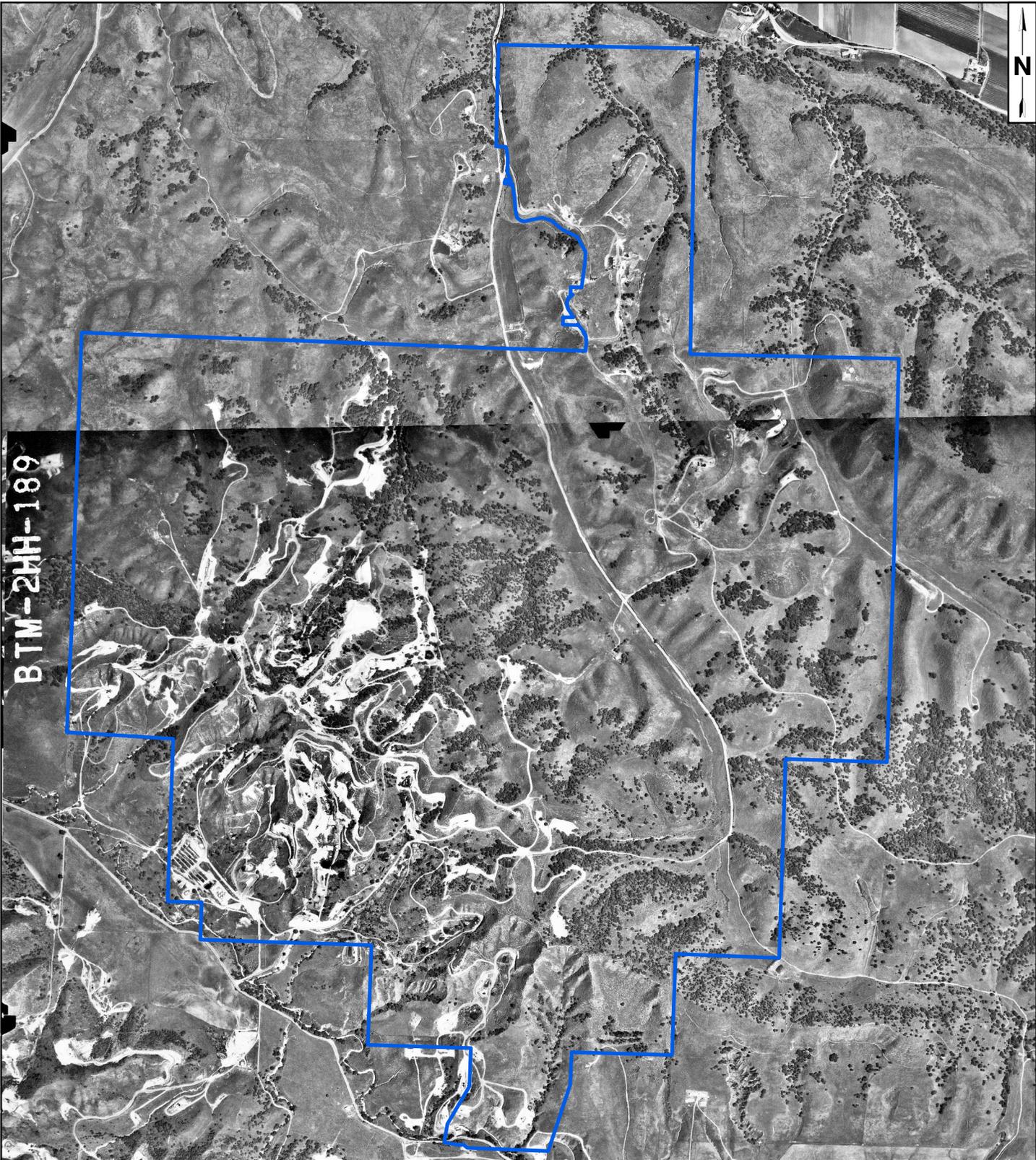
Z:\Kreim\GIS Maps\Map Project\East Cat Canyon\Permit\Doc Figures\Section 1\Figure 1.2-4 - Historical Timeline and Production.mxd

Source: Aera Energy LLC, January 2014
Notes: This figure was created for informational and display purposes only

PROJECT NAME: EAST CAT CANYON OIL FIELD REDEVELOPMENT PROJECT	
PROJECT NUMBER: 1002-0455	DATE: February 2015

HISTORICAL TIMELINE
AND PRODUCTION

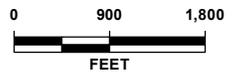
FIGURE
1.2-4



BTM-2HH-189



 Aera Energy LLC Property



Source: DPSI 2013 Land Survey, UCSB MIL 1967 Images
 Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet
 Notes: This map was created for informational and display purposes only.

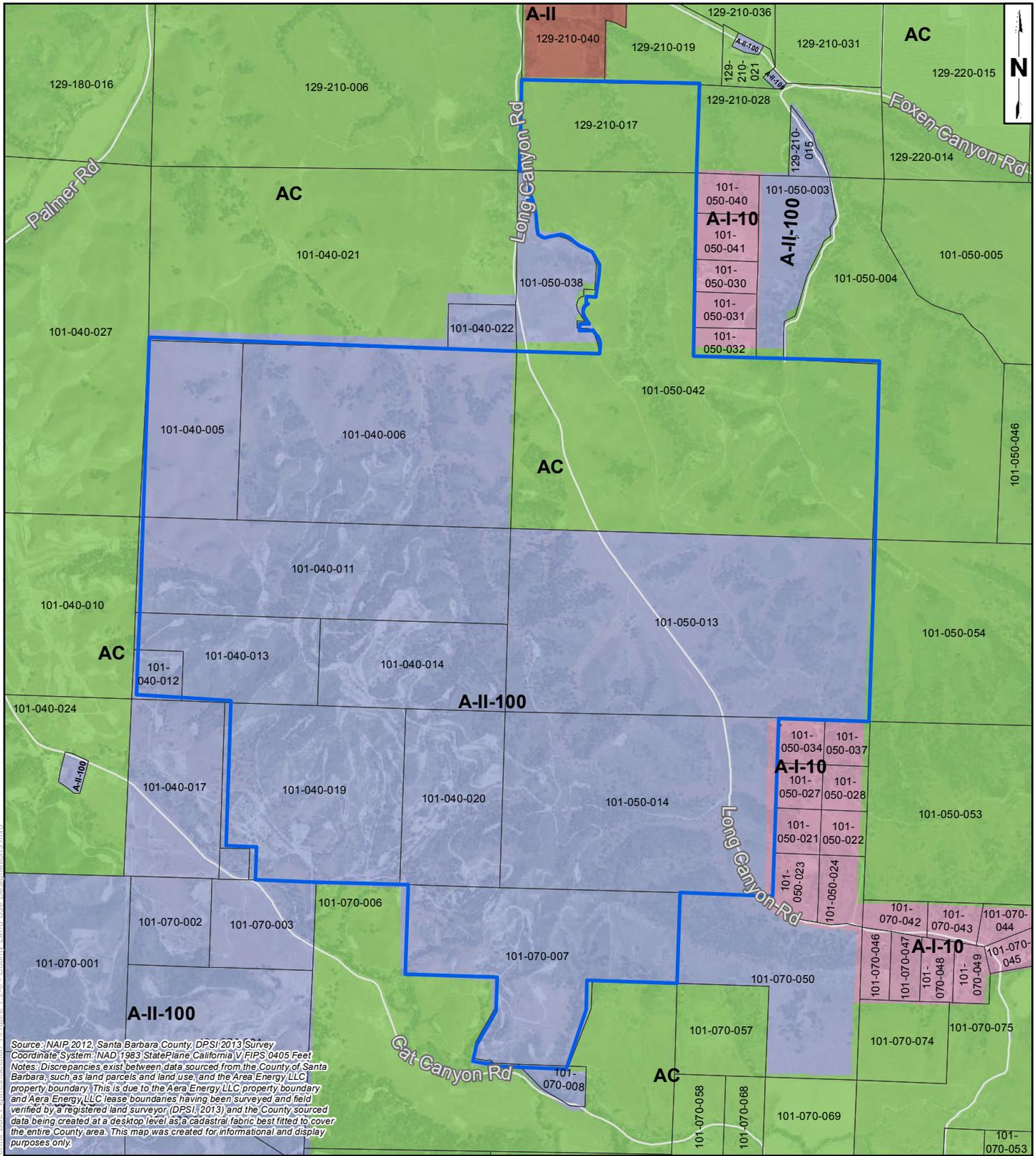
PROJECT NAME:	
EAST CAT CANYON OIL FIELD REDEVELOPMENT PROJECT	
PROJECT NUMBER:	DATE:
1002-0455	October 2014

HISTORICAL AERIAL PHOTOGRAPH

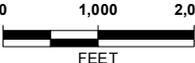
FIGURE
1.2-5

Z:\Krostin\GIS Maps\Map Project\East_Cat_Canyon\Permit_Doc_Figures\Section 1\Figure 1.2-5 - Historical Aerial Photos.mxd

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Source: NAIP 2012, Santa Barbara County, DPSI/2013 Survey Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet
 Notes: Discrepancies exist between data sourced from the County of Santa Barbara (such as land parcels and land use) and the Aera Energy LLC property boundary. This is due to the Aera Energy LLC property boundary and Aera Energy LLC lease boundaries having been surveyed and field verified by a registered land surveyor (DPSI, 2013) and the County sourced data being created at a desktop level as a cadastral fabric best fitted to cover the entire County area. This map was created for informational and display purposes only.

 Aera Energy LLC Property	 A-II - Agriculture II/Minimum parcel size- 40 acres	
 Assessor Parcel Boundary	 A-II-100 - Agriculture II/Minimum parcel size- 100 acres	
County Land Use Designation	 AC - Agricultural Commercial/Minimum parcel size- 40 acres	
 A-I-10 - Agriculture I/Minimum parcel size- 10 acres		

PROJECT NAME: EAST CAT CANYON OIL FIELD REDEVELOPMENT PROJECT	
PROJECT NUMBER: 1002-0455	DATE: December 2014

COUNTY LAND USE DESIGNATIONS	FIGURE 1.2-6
---	-------------------------

Z:\Kristin\GIS Maps\Map Project\East Cat Canyon\Permit Doc Figures\Section 1\Figure 1.2-6 - County Land Use Designations.mxd

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Photo 1
Latitude: 34°49'49.89"N
Longitude: 120°17'02.24"W
Aspect: SE
Date: 02/12/2014
Description: Existing well pad

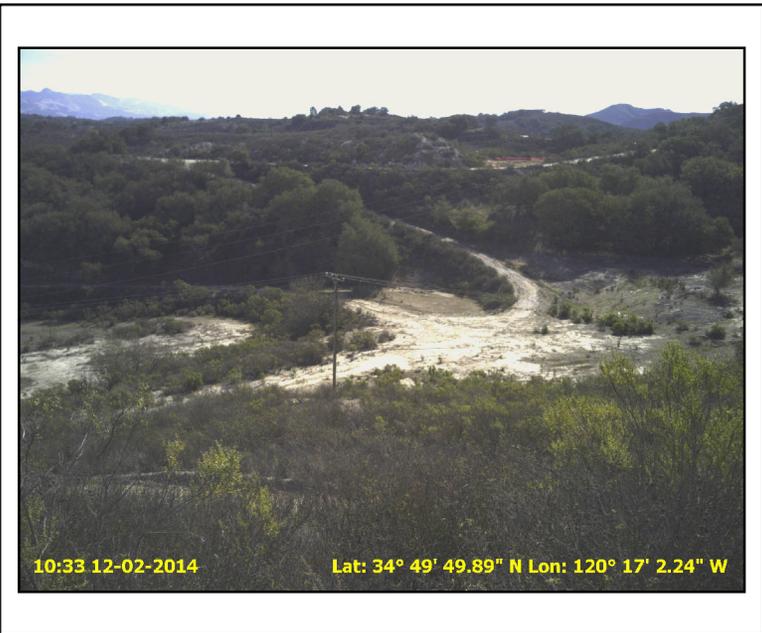
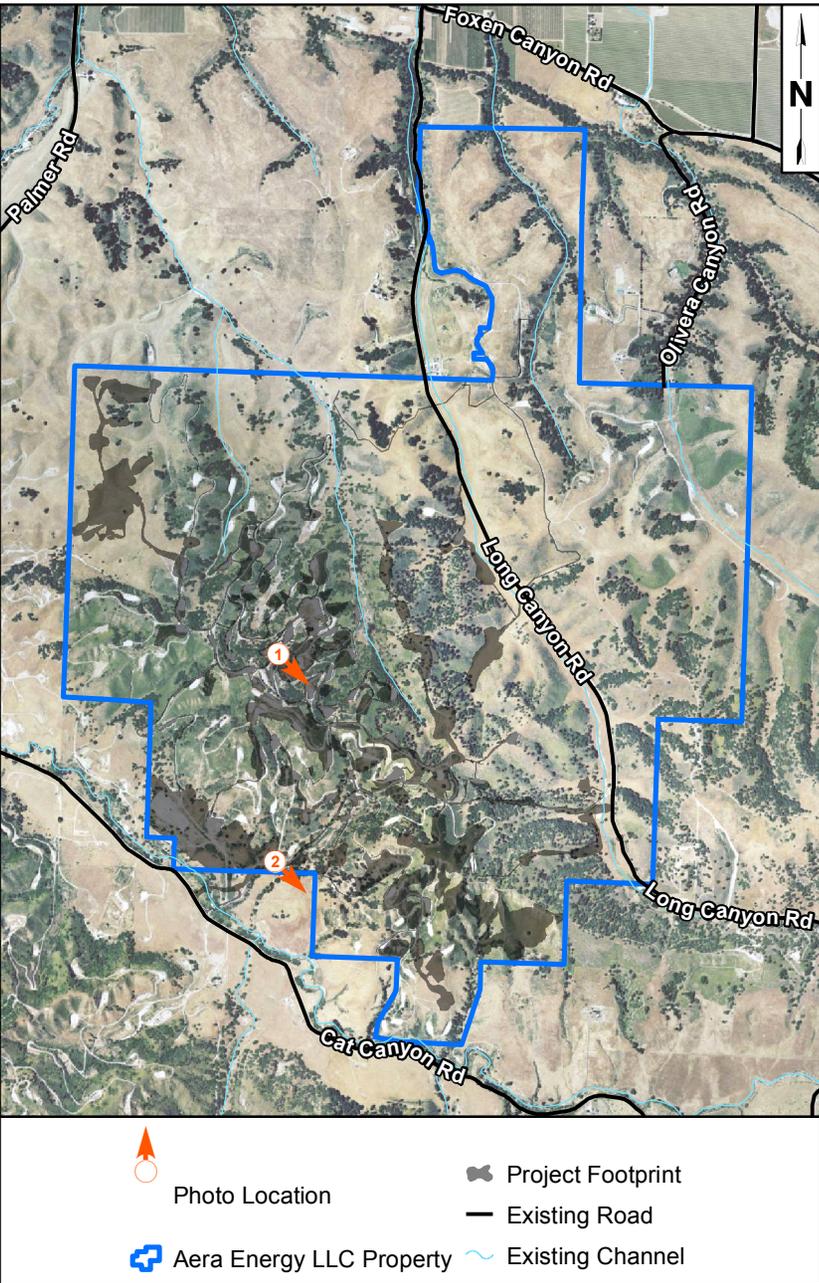


Photo 2
Latitude: 34°49'17.6"N
Longitude: 120°17'01.93"W
Aspect: SE
Date: 2/12/2014
Description: Existing access road



0 0.5 1 MILES
 Source: Santa Barbara County, Central Coast Aerial Mapping 2011, DPSI 2013
 Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet
 Notes: This map was created for informational and display purposes only.

PROJECT NAME:
EAST CAT CANYON OIL FIELD REDEVELOPMENT PROJECT
 PROJECT NUMBER: 1002-0455 DATE: October 2014

SITE PHOTOGRAPHS

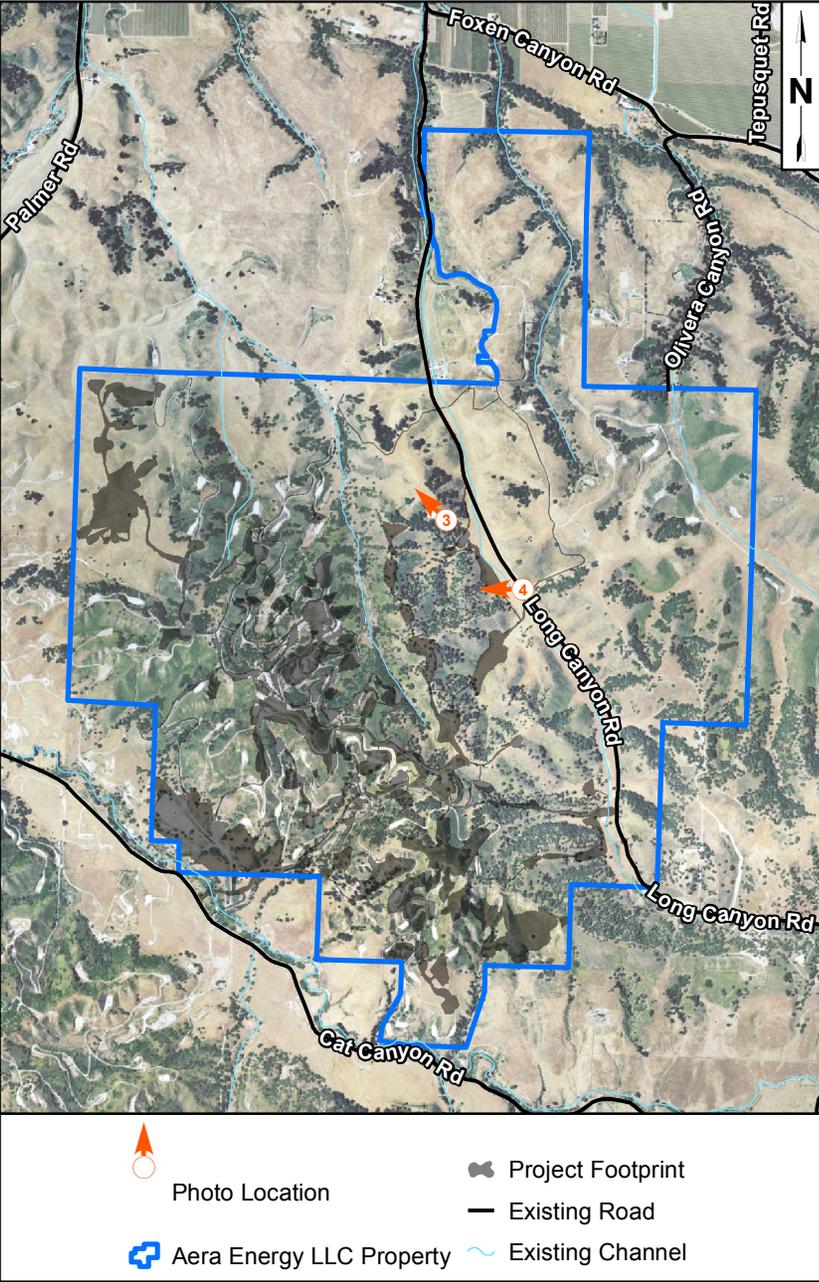
FIGURE 1.2-7

Z:\Krisin\GIS Maps\Map Project\East Cat Canyon\Permit_Doc Figures\Section A\Figure 1.2-7 - Site Photo 1.mxd

Photo 3
Latitude: 34°50'12"N
Longitude: 120°16'33"W
Aspect: NW
Date: 1/15/2013
Description: Oak woodland habitat



Photo 4
Latitude: 34°50'01"N
Longitude: 120°16'17"W
Aspect: W
Date: 7/16/2013
Description: Annual grassland habitat



- Photo Location
- Aera Energy LLC Property
- Project Footprint
- Existing Road
- Existing Channel

0 0.5 1
 MILES
 Source: Santa Barbara County, Central Coast Aerial Mapping 2011, DPSI 2013
 Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet
 Notes: This map was created for informational and display purposes only.

PROJECT NAME:
**EAST CAT CANYON
 OIL FIELD REDEVELOPMENT PROJECT**
 PROJECT NUMBER: 1002-0455 DATE: October 2014

SITE PHOTOGRAPHS

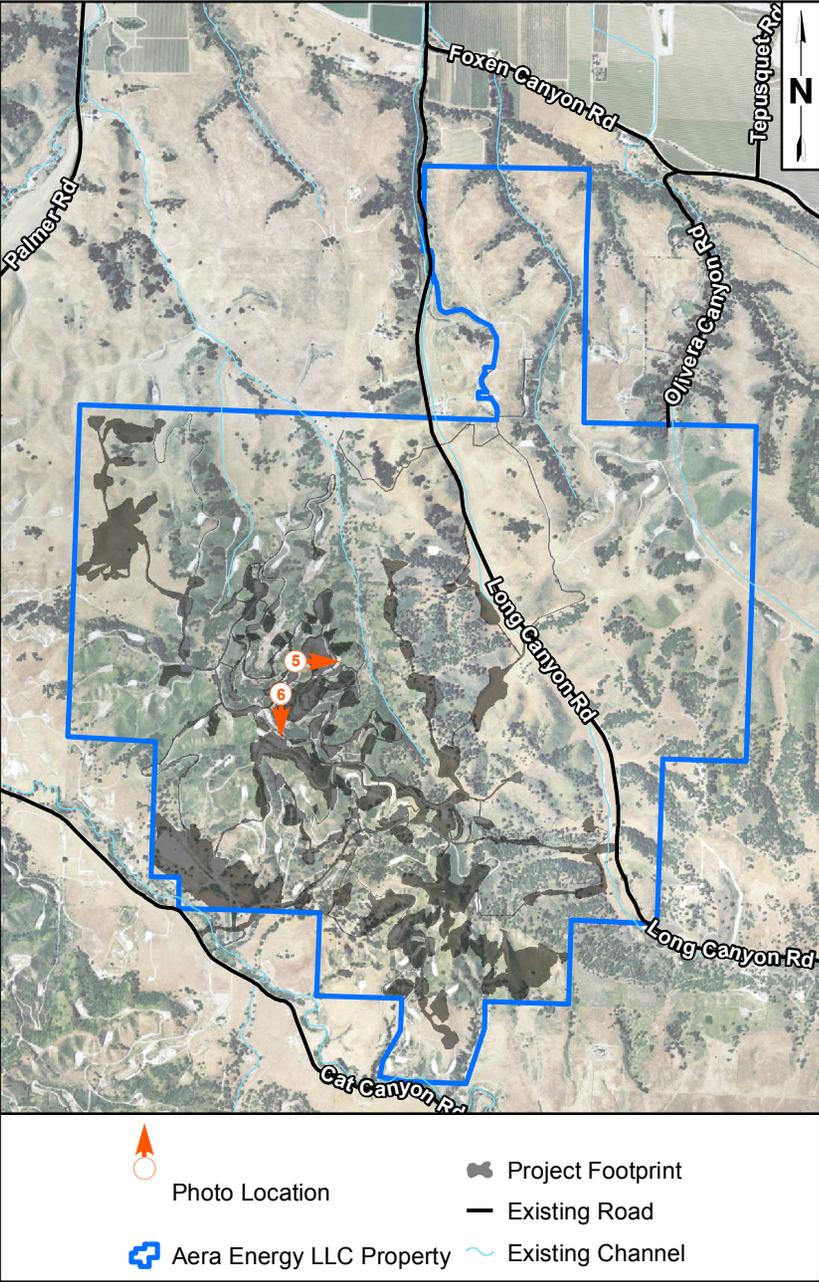
**FIGURE
 1.2-8**

Z:\Krisin\GIS Maps\Map Project\East Cat Canyon\Permit_Doc Figures\Section 1\Figure 1.2-8 - Site Photo 2.mxd

Photo 5
Latitude: 34°49'55"N
Longitude: 120°16'59.97"W
Aspect: E
Date: 2/12/2014
Description: Existing permitted beneficial reuse site



Photo 6
Latitude: 34°49'50.29"N
Longitude: 120°17'02.51"W
Aspect: S
Date: 2/12/2014
Description: Existing access road



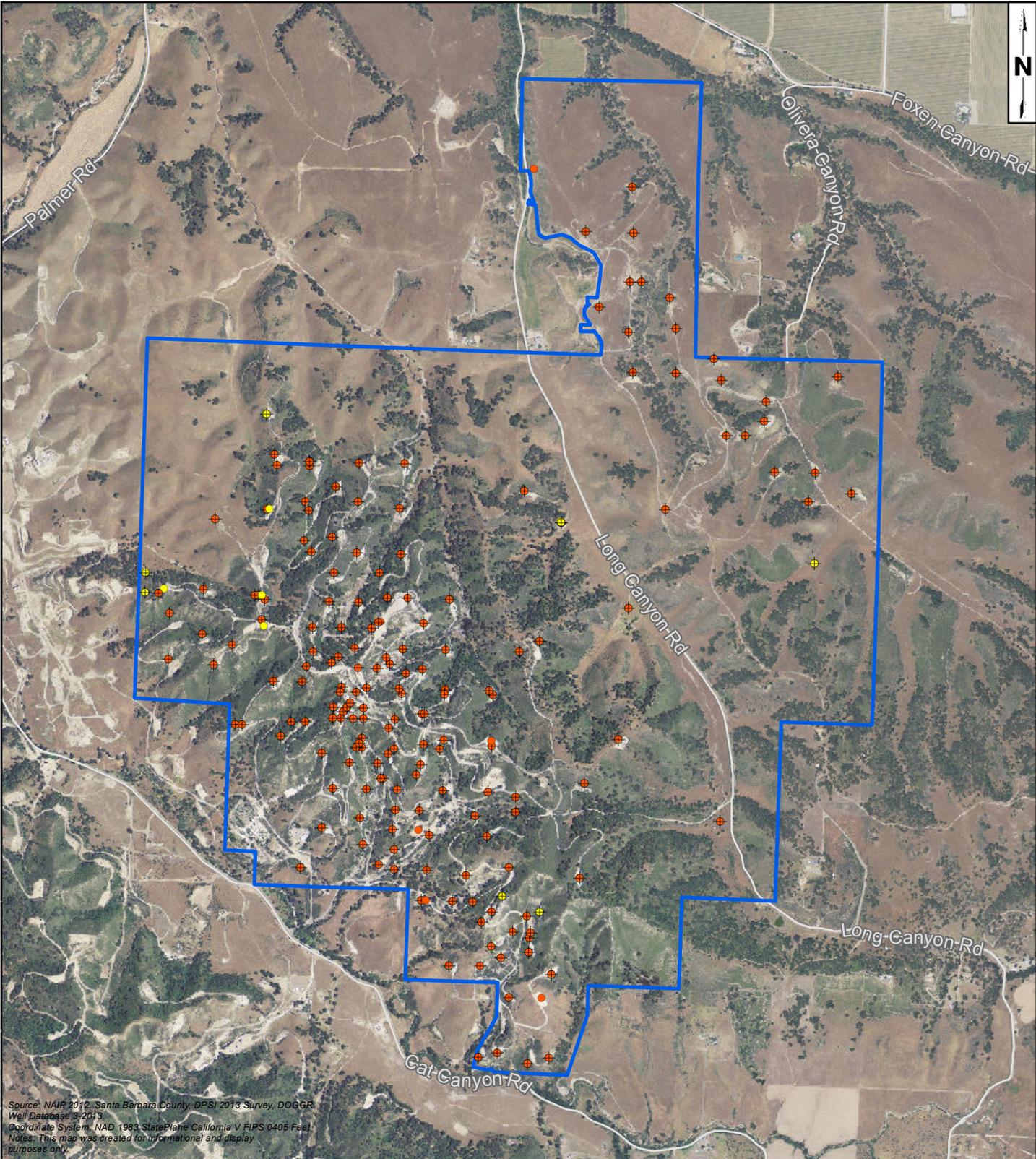
0 0.5 1
 MILES
 Source: Santa Barbara County, Central Coast Aerial Mapping 2011, DPSI 2013
 Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet
 Notes: This map was created for informational and display purposes only.

PROJECT NAME: EAST CAT CANYON OIL FIELD REDEVELOPMENT PROJECT
 PROJECT NUMBER: 1002-0455 DATE: October 2014

SITE PHOTOGRAPHS

FIGURE 1.2-9

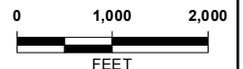
Z:\Krisin\GIS Maps\Map Project\East Cat Canyon\Permit_Doc Figures\Section 1\Figure 1.2-9 - Site Photo 3.mxd



Source: NAIP 2012, Santa Barbara County, DPSI 2013 Survey, DOGGR Well Database 3-2013.
 Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet.
 Notes: This map was created for informational and display purposes only.

LEGEND:

- Aera Energy LLC Property
- ◆ Aera Energy LLC Abandoned / Inactive Well
- Aera Energy LLC Active Test Well
- ◆ Other Operator Abandoned / Inactive Well
- Other Operator Active Well



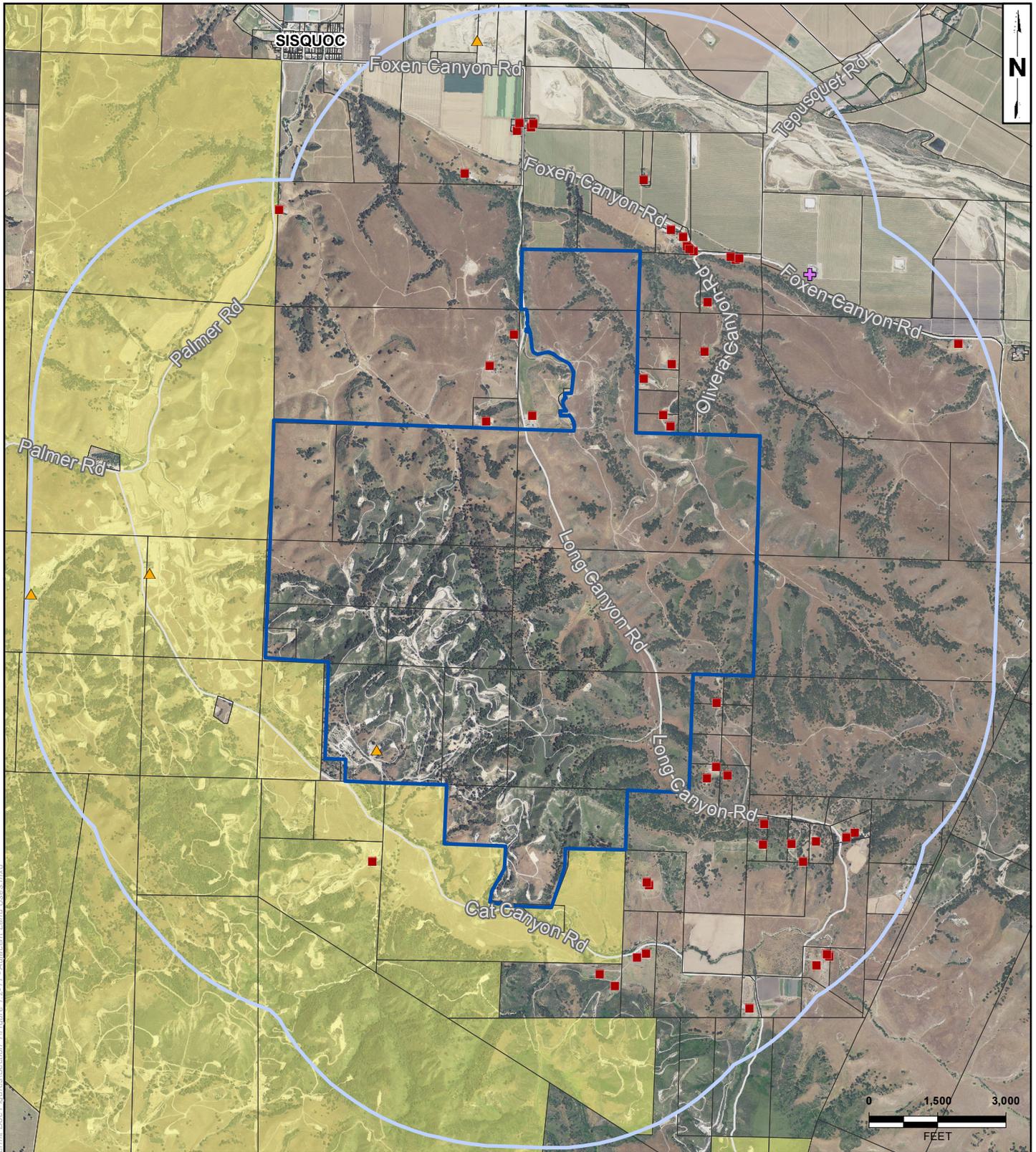
Z:\Kristin\GIS Maps\Map Project\East Cat Canyon\Permit Doc Figures\Section 1\Figure 1.2-10 - DOGGR Well Map.mxd

PROJECT NAME: EAST CAT CANYON OIL FIELD REDEVELOPMENT PROJECT	
PROJECT NUMBER: 1002-0455	DATE: December 2014

DOGGR WELL MAP

FIGURE
1.2-10

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- Residence
- ▲ Office
- + Winery Tasting Room
- Aera Energy LLC Property
- 1mi Buffer of Property Boundary
- Assessor Parcel Boundary
- Parcel with Existing Active Oil and Gas Operations

Source: NAIP 2012, Santa Barbara County, DPSI 2013 Survey, County of Santa Barbara
 Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet
 Notes: Discrepancies exist between data sourced from the County of Santa Barbara, such as land parcels and land use, and the Aera Energy LLC property boundary. This is due to the Aera Energy LLC property boundary and Aera Energy LLC lease boundaries having been surveyed and field verified by a registered land surveyor (DPSI, 2013) and the County sourced data being created at a desktop level as a cadastral fabric best fitted to cover the entire County area. This map was created for informational and display purposes only.

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PROJECT NUMBER:	DATE:
1002-0455	February 2015

ADJACENT LAND USES

FIGURE
1.2-11

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1.3 PROJECT OVERVIEW

The Project will re-establish oil production in an existing oil field by implementing a thermal enhanced oil recovery process that is technically, economically, and environmentally feasible. Project plans include construction and restoration of approximately 72 well pads, construction and restoration of over nine miles of field access roads, and drilling of up to 296 wells (Figure 1.3-1 – Project Overview). Planned wells include oil/gas production wells, steam injection wells, observation wells, non-potable water production wells, water injection wells, and fresh groundwater wells. No hydraulic fracturing (“fracking”) will be used for this Project.

New processing facilities and field systems will be constructed. Processing facilities will include: 1) a production group station for bulk separation of produced gas and liquids, 2) a central processing facility for oil cleaning, water cleaning, water softening, oil storage, and oil sales, and 3) a steam generation site (up to six once-through steam generators rated at 85 million British thermal units/hour each) for production of saturated steam to be used for thermal enhanced oil recovery. An additional 62.5 million British thermal units/hour steam generator will be used to generate steam from the project’s produced gas. No fresh water will be used to generate steam; only non-potable water will be used.

Field systems will include: 1) a production gathering network, 2) a steam distribution network, and 3) electrical power distribution and supervisory control and data acquisition networks. Project infrastructure will also include an office building, a multipurpose building, a warehouse and maintenance building, and a facility control building. A fresh water system with a 3,000 barrel tank and water distribution pipelines is planned for drinking water and ancillary purposes, including fire protection, lavatories, showers, equipment cleaning, dust control, and minor landscape irrigation.

Utility connections for the Project include a 14-mile, 8-inch natural gas pipeline and associated facilities, capable of providing 13 million cubic feet per day of natural gas to the Project at a delivery pressure of 300 pounds per square inch gage. The new pipeline will originate at the existing Southern California Gas Company Line Divide Station, located along Graciosa Road, and will terminate at Aera’s proposed central processing facility. Project electrical power will be provided by transmission-level service from Pacific Gas and Electric Company’s Sisquoc-Santa Ynez 115 kilovolt power line to a new Aera-owned substation located at the central processing facility.

Aera will operate the field under its well-established and proven management system that incorporates many processes, plans and programs to ensure public and worker health and safety, environmental protection, regulatory compliance, and community involvement. These programs include Spill Prevention, Incident Response, Site Safety, Site Security, Pollution Prevention, Species Protection, Environmental Compliance, Environmental Training, Safety Training, and Community Involvement.

Production from the Project is expected to continue for more than 30 years after initial production unless or until it is deemed uneconomic or undesirable to continue operation. At that time, any wells not yet previously abandoned will be permanently plugged and abandoned (including the removal of surface wellheads); equipment, facilities and infrastructure will be removed; and restoration of the property will be completed in accordance with applicable laws and regulations.

The following subsections provide a summary of Project components. For additional details, please refer to Section 2.0 – Project Description.

1.3.1 Thermal Oil Recovery Process

The Project will inject steam into the Brooks reservoir to thermally enhance oil recovery. By heating the oil with steam, viscosity will be reduced, allowing the oil to more readily flow out of the reservoir, into the wells, and into the surface pipelines and processing areas. Thermal enhanced oil recovery is a long-proven and well developed technology that continues to be successfully applied to many of California's oil fields, including others in Santa Barbara County. Although there are many variations, the two main thermal methods that will be applied to the Brooks reservoir are cyclic steam injection and pattern steam flood. While oil will be recovered mostly by steamflooding, the producer wells and possibly some injectors well will be initially cyclic steamed to decrease the reservoir pressure. Once the desired pressure conditions are established, steam will be injected only in the injectors and production will be through the producers, like in a typical steamflood.

1.3.1.1 Cyclic Steam Injection

Cyclic steam injection consists of three stages: injection, soaking, and production (Figure 1.3-2 – Cyclic Steam Injection). Steam is first injected into a well for a prescribed amount of time to heat the oil in the surrounding reservoir to a temperature at which it more readily flows. After a pre-determined amount of steam has been injected, the steam is usually left to “soak” for some time (typically a few days) to distribute the heat. The oil is then produced out of the same well. As the oil cools down, production will decrease until it reaches an economically determined level, when the steaming cycle is repeated.

The produced fluids consist of produced crude oil, connate water (the naturally occurring water in the pore space before injection begins), small amounts of naturally occurring reservoir gas, condensed water from injection, and sometimes steam. The produced fluids travel from the well to a gathering pipeline to the central processing facility where the crude is processed to meet sales specifications, the gas is treated and re-used for process heat, and the water is cleaned and recycled to produce steam.

1.3.1.2 Pattern Steam Flood

In a pattern steam flood, steam is injected into a well specifically designed for injection only (Figure 1.3-3 – Pattern Steam Flood). The crude is heated in the reservoir and flows to a production well by pressure differential and/or gravity drainage. The production well is cyclic steamed first in order to increase voidage in the vicinity of the production well and therefore establish a pressure differential between the injection well and production well. Continuous steam injection in the injection well commences at the same time as cyclic steaming starts in the production well. From time to time, an established production well may still be cyclic steamed to provide a more even heat distribution between the production and injection wells.

In both cyclic steam injection and pattern steam flood, the objective is to increase the temperature of the produced oil so that it has enough mobility (reduced viscosity) to flow. Steam can be more easily injected if the reservoir pressure is low enough to allow for new fluids (like steam) to occupy the pore space. No hydraulic fracturing will take place at the Project site. The geologic characteristics of the Brooks reservoir are not suited for hydraulic fracturing.

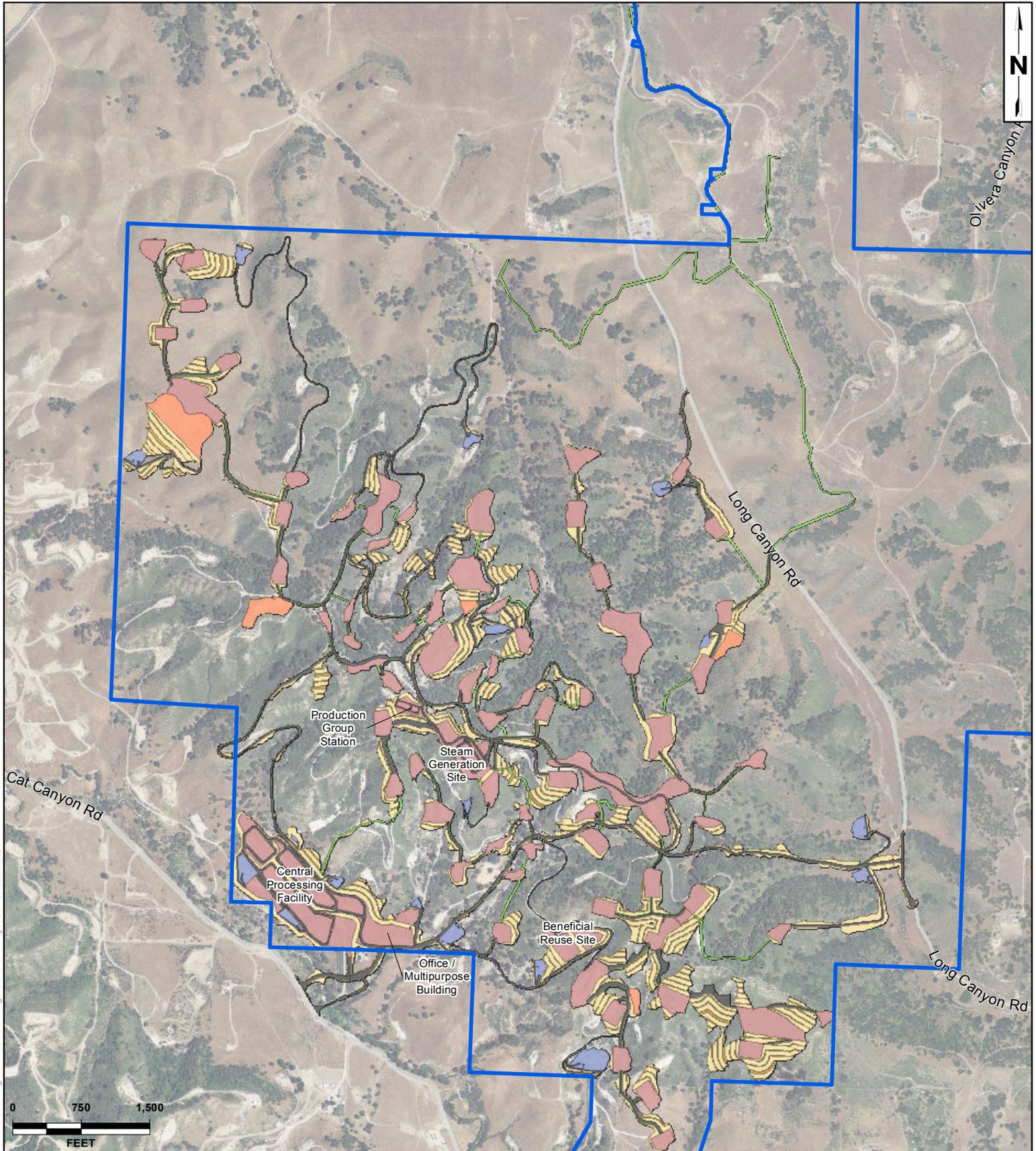
1.3.2 Subsurface – Wells

Well locations have been carefully selected to minimize disturbance by reusing existing well pads, where feasible, and to most effectively produce oil from the subsurface reservoir. Well pads have been designed to minimize the amount of surface disturbance while meeting the technical constraints of drilling and operating the wells and the containment requirements for spill control and storm water runoff management. Approximately 72 well pad locations are proposed, ranging in size from approximately 16,077 square feet for lower density well sites to 306,499 square feet for pads encompassing multiple wells.

Most of the well pads will service a five-spot flood pattern unit (Figure 1.3-3 – Pattern Steam Flood) that on average is equivalent to one injection well and four production wells. In addition to oil production and steam injection wells, additional wells will be drilled, including the following:

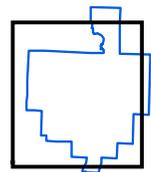
- Observation – to monitor steam movement and distribution in the formation;
- Upper Sisquoc Water Production – to produce non-potable brackish water for steam;
- Upper Sisquoc Water Injection – to re-inject produced water back into the reservoir;
and
- Fresh Water – to produce potable water for human consumption, fire protection, minor landscape irrigation and other auxiliary uses.

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- Aera Energy LLC Property
- Well or Other Facility Pad
- Laydown Area
- Road
- Cut / Fill Slope
- Slope Benching
- Pipeline Corridor
- Storm Water Basin

Source: County of Santa Barbara, TJCross 8-20-2014, DPSI 2013 Land Survey
 Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet
 Notes: This map was created for informational and display purposes only.



Z:\Kristin\GIS Maps\Map Project\East Cat Canyon\Permit.Doc\Figures\Section 1\Figure 1.3-1 - Project Overview.mxd

PROJECT NAME:	
EAST CAT CANYON OIL FIELD REDEVELOPMENT PROJECT	
PROJECT NUMBER:	DATE:
1002-0455	October 2014

PROJECT OVERVIEW

FIGURE
1.3-1

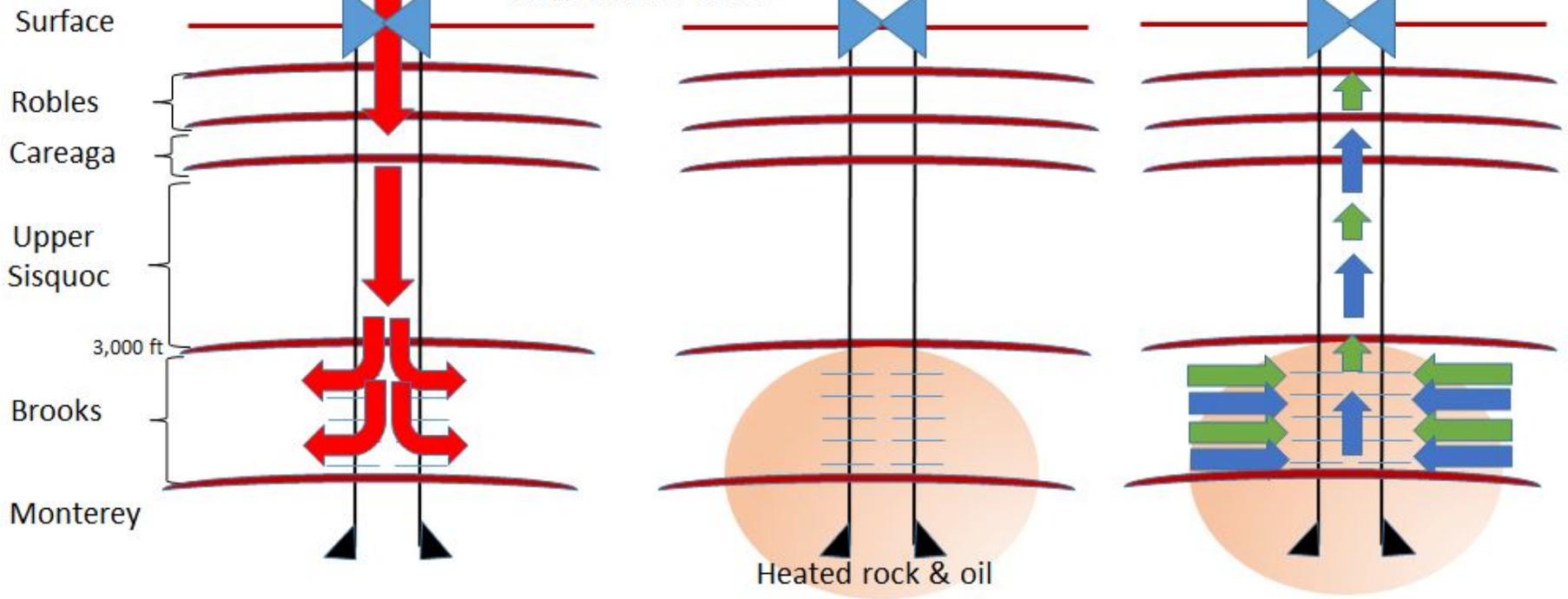
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1. Inject Steam Into Reservoir

3. Soak Well/
Heat Viscous Oil

4. Produce Mobile Oil & Water

2. Stop Injection & Shut In Well



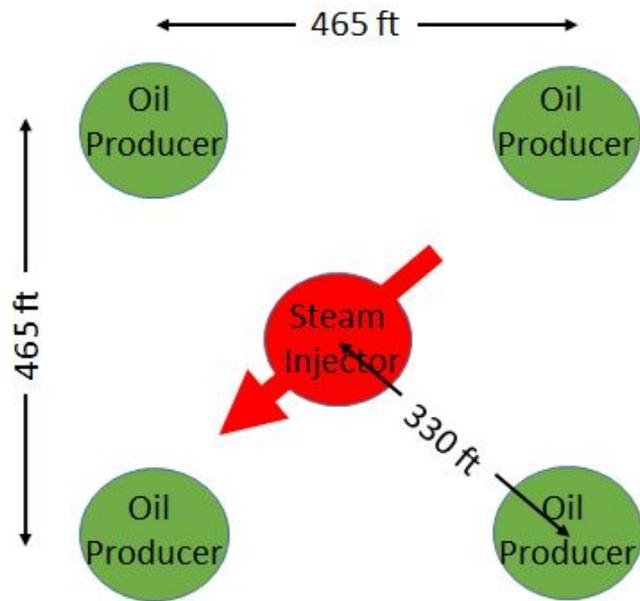
Z:\Kristin\GIS Maps\Map Project\East Cat Canyon\Permit Doc Figures\Section 1\Figure 1.3-2 - Cyclic Steam Injection.mxd

Source: Aera Energy LLC, January 2014
Notes: This figure was created for informational and display purposes only

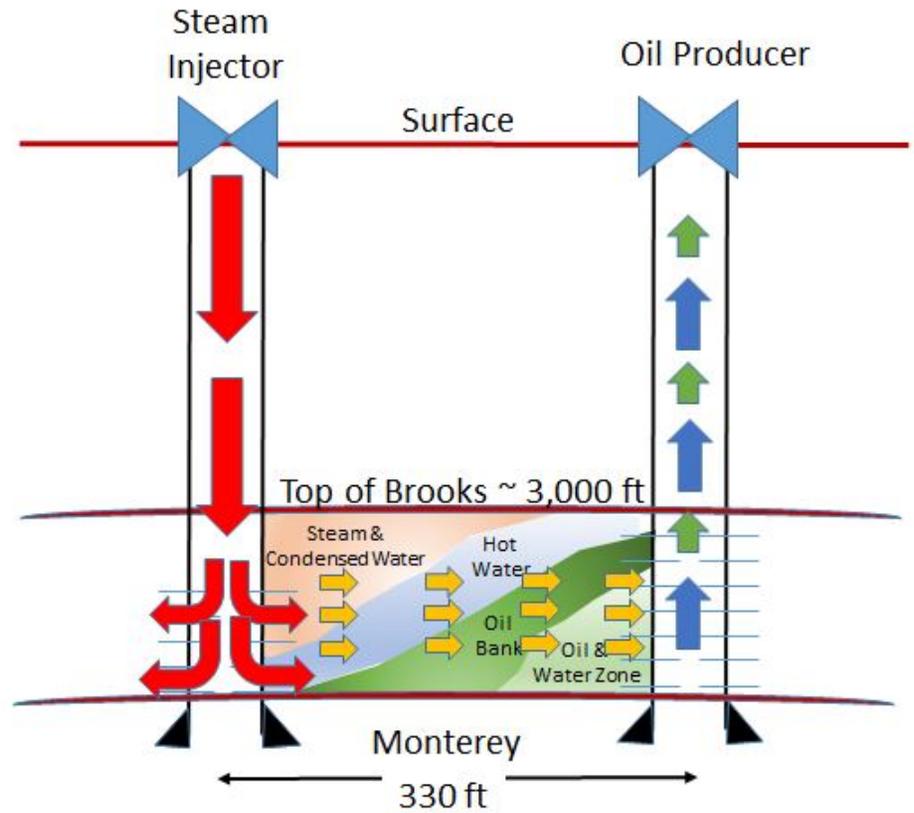
PROJECT NAME: EAST CAT CANYON OIL FIELD REDEVELOPMENT PROJECT	
PROJECT NUMBER: 1002-0455	DATE: February 2015

CYCLIC STEAM INJECTION

FIGURE
1.3-2



5-Acres Inverted 5-Spot Pattern Plan View



Cross-Section

PROJECT NAME:		EAST CAT CANYON OIL FIELD REDEVELOPMENT PROJECT	
PROJECT NUMBER:	1002-0455	DATE:	February 2015

PATTERN STEAM FLOOD

FIGURE
1.3-3

Source: Aera Energy LLC, January 2014
Notes: This figure was created for informational and display purposes only

1.3.3 Processing Systems

The relationship of fluid processing system features is shown in Figure 2.4-1 – Block Flow Diagram. Produced fluids are gathered from production well pads. Gas is separated from produced fluids at the production group station. From the group station, liquids flow to the central processing facility for oil cleaning, water cleaning, water softening, oil storage, and oil sales. Gas from the production group station flows to the steam generator site for treatment and use as fuel for steam generation. From the central processing facility, softened produced water (from oil production wells) and softened brackish water (from upper Sisquoc water production wells) are sent to the steam generation site where steam generators create a wet, saturated steam. The steam is then distributed back to well pads for injection.

The processing facilities from prior operations were removed between 1989 and 2002. The Project will incorporate all new processing facilities, including the following major systems:

- Intra-Field Gathering and Distribution System. The Project includes the installation of pipelines for on-site gathering and distribution. Gathering lines include: production, non-potable water, and fresh water. Distribution lines include steam, reservoir maintenance fluids, softened water, produced gas, fuel gas, and fire suppression water.
- Central Processing Facility. Most of the fluid processing will take place within a central processing facility. The central processing facility will include the following:
 - Oil cleaning plant;
 - Light oil storage and unloading;
 - Clean oil storage and loading;
 - Water cleaning plant;
 - Water softening plant; and
 - Solids concentrating plant.
- Steam Generation and Distribution. The steam generation site consists of six once-through steam generators: three will be installed in Phase I, and three in Phase II. The steam generation site also includes a produced gas steam generator and an emergency flare, both to installed in Phase I, and a produced gas treating plant, portions of which will be installed in both phases. Also included are associated ancillary equipment to support the steam generators, such as high-pressure feedwater pumps and pre-heaters. Generated steam will be routed to the steam distribution system.

Detailed descriptions of each major system are included in Section 2.0.

1.3.4 Support Infrastructure

1.3.4.1 Buildings

The Project will include a production office, warehouse and maintenance shops, a central processing facility control building, and a multi-purpose building. The multi-purpose building is planned for uses such as meetings, training, events, and personnel fitness activities. All buildings

have been designed to be Leadership in Energy and Environmental Design certifiable. Building footprints and layouts are included in Appendix P – Building Plans, Elevations, and Visual Simulations. Temporary, modular buildings may be used to provide required office/meeting space or storage.

1.3.4.2 Lighting

External pole lighting will be provided as needed for buildings, equipment, entrances, roads, parking lots, drilling sites, and other locations to support operational reliability, safety, and security. Lighting will be directed downward and shielded to avoid obtrusive light beyond the facility boundary, reflective glare, or illumination of the nighttime sky.

1.3.4.3 Fire Protection

The design and operation of the Project will meet provisions within the California Fire Code and standards of the National Fire Protection Association, including the requirements for the storage of hazardous materials, the installation and use of fire protection systems and devices, and the implementation of safety measures for employees and emergency responders. The Project has been designed in accordance with all applicable fire codes and standards as outlined within the Master Fire Protection Plan developed by Collings & Associates, LLC on behalf of the Project (August 2014) (Appendix Q).

1.3.5 Utility Connections

The Project site is currently serviced by a 12 kilovolt electrical line. This section provides an overview of additional utilities and upgrades that will be required for Project implementation including a utility grade natural gas pipeline and an upgraded electrical overhead transmission line connection.

1.3.5.1 Natural Gas Pipeline

A new natural gas pipeline is required in order to deliver natural gas fuel at sufficient rate to meet the needs for thermal enhanced oil recovery steam generation. It is expected that the new fuel gas supply pipeline will be designed and built by Southern California Gas Company. The proposed 14-mile, 8-inch natural gas pipeline and associated facilities will originate at the existing Southern California Gas Company Line 1010 at Divide Station, located along Graciosa Road, and will terminate at Aera's proposed central processing facility located in the southwest corner of the Project site. The pipeline will be primarily installed in the existing public utility corridor within the public right of way, under existing road pavement. This is a typical and preferred Southern California Gas Company pipeline location.

1.3.5.2 Electrical Power Transmission Line and Substation

The Project will be supported by transmission-level service from Pacific Gas and Electric Company. The expected electric load of the Project is approximately 12 megawatts. Aera has submitted an application to Pacific Gas and Electric Company for a transmission interconnect from PG&E to a new Aera-owned substation, which will be located within the central processing facility. Pacific Gas and Electric Company's preferred alternative is to service Aera with transmission voltage power by tapping into Pacific Gas and Electric Company's Sisquoc-Santa Ynez 115 kilovolt power line (Figure 2.6-4 – Proposed Electrical Line Route). The connection from Pacific Gas and Electric Company's existing line to the new onsite substation will be

constructed, operated, and maintained by Pacific Gas and Electric Company. Aera will take control of the power at the substation. The Project has been designed to satisfy the requirements of the Pacific Gas and Electric Company's Transmission Interconnection Handbook (Pacific Gas and Electric Company, 2013) and meet all applicable California Independent System Operator and Western Electricity Coordinating Council standards.

1.4 PERMITTING REQUIREMENTS

Land use permitting and planning in California is regulated by a set of rigorous requirements involving multiple jurisdictions, inter-agency environmental review and permitting processes, and public participation. A project that has the potential to significantly affect the environment will trigger review under the California Environmental Quality Act. If a project requires approval from more than one permit agency, then the Lead Agency must be determined. The Lead Agency takes on the principal responsibility for determining how the project will be reviewed under the California Environmental Quality Act and for implementing the California Environmental Quality Act review process. There are three levels of California Environmental Quality Act review: a negative declaration, a mitigated negative declaration, and an environmental impact report. An environmental impact report is typically required when it can be fairly argued that there is substantial evidence in the record that a project may have a significant effect on the environment. Otherwise, a negative declaration or mitigated negative declaration may be prepared.

This section discusses the regulatory agencies that will have jurisdiction over the Project and the agency permits that may be required by the Project. It is presumed that the Project will require an environmental review under the California Environmental Quality Act, as well as numerous federal, state, and local permits and approvals. Presented below is a description of each regulatory agency's anticipated or potential role in review and permitting of the Project (Table 1.4-1 – Anticipated Permit Approvals).

Table 1.4-1. Anticipated Permit Approvals

Agency	Permit/Approval	Regulated Activity	Authority
Federal Agencies			
U.S. Army Corps of Engineers	Section 404 Permit	Discharge of dredged or fill material into waters of the U.S. during construction. Jurisdictional waters include territorial seas, tidelands, rivers, streams, certain other drainages, and wetlands.	Section 404 Clean Water Act (33 USC 1344)
U.S. Environmental Protection Agency	Title V, New Source Review	Air emissions	Clean Air Act

Table 1.4-1. Anticipated Permit Approvals

Agency	Permit/Approval	Regulated Activity	Authority
U.S. Fish and Wildlife Service	Endangered Species Act, Section 7 consultation	Potential impacts to federally listed species and species proposed for listing.	16 USC 1513 50 CFR Section 17
State of California Agencies			
Division of Oil, Gas, and Geothermal Resources	Notice of Intent to Drill New Wells/Permit to Operate Well; and Class II Injection Well Permits Pipeline Management Plan	Drilling, operation, maintenance, and plugging and abandonment of oil production and injection wells. Pipelines located within environmentally sensitive areas.	California Code of Regulations- Title 14
California Department of Fish and Wildlife	1602 Permit (Streambed Alteration Agreement) Section 2081 Management Agreement	Crossing of streams and rivers that cause alteration or disturbance to the streambed. Potential adverse effects to State listed threatened or endangered species. California Environmental Quality Act Responsible Agency	California Fish and Game Code- Sections 1601-1607 California Fish and Game Code- Section 2081 CEQA
Caltrans	Encroachment Permit	Construction of pipeline in state highway right-of-way. California Environmental Quality Act Responsible Agency	Caltrans Project Development Procedures Manual California Environmental Quality Act
Regional Water Quality Control Board, Central Coast Region	Section 401 Water Quality Certification SWPPP Permit General Waste Discharge Requirements Enrollment for Soil Beneficial Re-use	Discharges that may affect surface and ground water quality.	Clean Water Act Porter-Cologne State Water Quality Act (1969)

Table 1.4-1. Anticipated Permit Approvals

Agency	Permit/Approval	Regulated Activity	Authority
State Historical Preservation Officer	Section 106 review and compliance	Impacts to historic and prehistoric resources.	National Historic Preservation Act 36 Code of Federal Regulations 800
Local Agencies			
Santa Barbara County Planning and Development Department, Energy Division	Land Use Permit (Oil Drilling and Production Plan)	Land use, grading, drainage, and environmental impacts. California Environmental Quality Act Lead Agency	County Code California Environmental Quality Act
Santa Barbara County Planning and Development Department, Building and Safety Division	Grading Permit Building Permit Electrical Permit	Grading, construction of structures	County Code
Santa Barbara County Public Works Department	Encroachment Permit	Work within public right-of-ways.	County Code California Environmental Quality Act
Santa Barbara County Environmental Health Services Department	Aboveground Storage Tank Permit Spill Prevention, Control, and Countermeasure review and approval Well Permits (if necessary)	Aboveground storage tanks. Drilling and use of new water wells.	California Health and Safety Code County Code California Environmental Quality Act
Santa Barbara County Petroleum Administrator	New Well Permit	Drilling new well or re-entering a well previously abandoned.	County Code-Chapter 25, Petroleum Ordinance
Santa Barbara County Air Pollution Control District	Authority to Construct/Permit to Operate	Air emissions from stationary equipment California Environmental Quality Act Responsible Agency	Clean Air Act California Environmental Quality Act
Definitions: USC = United States Code CFR = Code of Federal Regulations CEQA = California Environmental Quality Act			

1.4.1 Federal Agencies

U.S. Army Corps of Engineers. The U.S. Army Corps of Engineers will likely be the lead Federal agency for the proposed Project for placement of fill (including temporary trench spoils) within waters/wetlands of the U.S. under Section 404 of the Clean Water Act. The U.S. Army Corps of Engineers will consult with the U.S. Fish and Wildlife Service to identify potential effects to endangered and threatened species as required under Section 7 of the Federal Endangered Species Act. A biological assessment will be required as part of this consultation to provide sufficient information for the U.S. Army Corps of Engineers and U.S. Fish and Wildlife Service to fully determine the project's potential to affect threatened or endangered species.

A jurisdictional waters of the U.S. survey (wetlands survey) may also be required to identify specific wetland areas that may be impacted by the Project. The proposed Project is anticipated to fall within one or more Nationwide Permits developed by the U.S. Army Corps of Engineers for major routine types of construction within federal waters. A programmatic environmental impact statement was previously prepared for these nationwide permits to comply with National Environmental Policy Act.

U.S. Environmental Protection Agency. The U.S. Environmental Protection Agency is the federal agency responsible for implementing the Federal Clean Air Act. The Project will be required to obtain a facility operating permit (under Title V of the Clean Air Act) from the U.S. Environmental Protection Agency.

U.S. Fish and Wildlife Service. The U.S. Fish and Wildlife Service will be asked to review the project with respect to potential impacts to federal listed threatened or endangered species. Such consultation will be initiated by the U.S. Army Corps of Engineers during the Section 404 permit process. Potential impacts to unlisted sensitive species will be also addressed.

1.4.2 State Agencies

California Division of Oil, Gas and Geothermal Resources. The California Division of Oil, Gas and Geothermal Resources is the State agency responsible for oversight of the drilling, operation, maintenance, and plugging and abandonment of oil, gas, and geothermal wells; and the operation, maintenance, and removal of tanks and production facilities, including certain pipelines located in oil and gas fields. Prior to drilling, reworking, or plugging and abandoning an oil, gas, or service well in California, a Notice of Intention for the proposed activity must be filed with the appropriate Division of Oil, Gas and Geothermal Resources district office and approval received from the district deputy.

The Division of Oil, Gas and Geothermal Resources' two-tiered pipeline management program establishes general construction and operating guidelines for certain pipelines located within oil fields, and adds more extensive requirements for pipelines located within environmentally sensitive areas, as defined by Division of Oil, Gas and Geothermal Resources regulations. Operators of pipelines located within environmentally sensitive areas must submit a pipeline management plan to Division of Oil, Gas and Geothermal Resources.

California Department of Fish and Wildlife. The California Department of Fish and Wildlife administers Section 1600 of the California Fish and Game Code. That statute requires a Lake or Streambed Alteration Agreement between the California Department of Fish and Wildlife and the applicant before the initiation of any construction project that will: 1) substantially divert,

obstruct, or change the natural flow or the bed, channel, or bank of any river, stream, or lake; 2) use materials from a streambed; or 3) result in the disposal or deposition of debris, waste, or other material containing crumbled, flaked, or ground pavement where it can pass into any river, stream, or lake.

The California Department of Fish and Wildlife also administers a number of laws and programs designed to protect fish and wildlife resources. Principle of these is the California Endangered Species Act of 1984 (Fish and Game Code Section 2050), which regulates the listing and take of State endangered and state threatened species. Under Section 2081 of the California Endangered Species Act, the California Department of Fish and Wildlife may authorize the take of a State endangered or State threatened, or candidate species through an Incidental Take Permit. However, plant or animal species that are “fully protected” under state law cannot be taken and no California Department of Fish and Wildlife Incidental Take Permits may be issued for them.

California Department of Transportation. The California Department of Transportation is the State agency responsible for managing more than 50,000 miles of California's highway and freeway lanes. The California Department of Transportation will require encroachment permits for pipeline crossing locations at state highways.

Pursuant to California Environmental Quality Act statutes and guidelines, the California Department of Transportation is required to review Federal, State, and local planning and proposed development activity that has the potential to affect State transportation facilities or resources under the California Department of Transportation's jurisdiction. The California Department of Transportation's role is to recommend conditions of project approval that mitigate those impacts or reduce them to a level of insignificance. This typically involves the review of development proposals in which the California Department of Transportation is either a responsible (permitting) or commenting agency. The California Department of Transportation will review proposed projects and developments to determine if there will be any safety or operational impacts to state facilities.

Central Coast Regional Water Quality Control Board. The Central Coast Regional Water Quality Control Board's primary responsibility is to protect the quality of the surface and groundwater within the region for beneficial uses. The duty is carried out by formulating and adopting water quality plans for specific ground or surface water bodies, by prescribing and enforcing requirements on domestic and industrial waste discharges, and by requiring cleanup of water contamination and pollution.

Pursuant to Section 401 of the Clean Water Act, the U.S. Army Corps of Engineers permit under Section 404 is not active until the State of California first issues a Water Quality Certification to ensure that a Project will comply with State water quality standards. The authority to issue Water Quality Certifications in the Project area is vested with the Central Coast Regional Water Quality Control Board.

The Project will be required to comply with the State Water Resource Control Board's General Permit for Storm Water Discharges Associated with Construction and Land Disturbing Activities (Order No. 2009-0009-DWQ) for construction-related storm water discharges from the Project site.

Additionally, the Project will require Waste Discharge Requirements Conditional Waivers from the Central Coast Regional Water Quality Control Board for stockpiling of petroleum hydrocarbon-containing soil and beneficial re-use on-site for road base and berming, in accordance with Central Coast Regional Water Quality Control Board Order Nos. R3-2010-0036 and R3-2010-0037.

State Historical Preservation Officer. Section 106 of the National Historic Preservation Act of 1966 requires Federal agencies to take into account the effects of their undertakings on historic properties, and afford the Advisory Council on Historic Preservation a reasonable opportunity to comment. The responsible Federal agency first determines whether it has an undertaking that is a type of activity that could affect historic properties. Historic properties are properties that are included in the National Register of Historic Places or that meet the criteria for the National Register. If so, it must identify the appropriate State Historic Preservation Officer to consult with during the process. The State Historic Preservation Officer will be asked to review the project with respect to potential impacts to historic properties. Such consultation will be initiated by the U.S. Army Corps of Engineers during the Section 404 permit process.

1.4.3 Local Agencies

County of Santa Barbara. The Cat Canyon Oil Field lies within the jurisdiction of Santa Barbara County. The County will require approval of an Oil and Gas Drilling/Production Plan and issuance of a Land Use Permit and a Grading Permit for the construction and operation of the proposed project. The Project will be compared with all applicable County of Santa Barbara development standards and policies. The County of Santa Barbara Planning and Development Department (which includes the Development Review Division, Building and Safety Division, and the Energy Division) may require that specific requirements be met and that specific conditions be incorporated into the permit governing the design or operation of the proposed Project. The County of Santa Barbara Planning and Development Department may not approve the permit unless it is found to be consistent with the County's General Plan and the County Land Use and Development Code. The County of Santa Barbara Planning and Development Department, Energy Division will most likely be the lead agency for the Project under the California Environmental Quality Act. Once the California Environmental Quality Act review process is complete and an environmental impact report is certified, the County of Santa Barbara Planning and Development Department may issue the Land Use Permit and other approvals necessary for Project implementation (e.g., well permits issued under Section 25-5 of the County of Santa Barbara Petroleum Code (Chapter 25), erosion control and grading permits issued under Sections 14-9 and 14-10 of the Grading Code (Chapter 14), etc.).

Since the Project proposes to use on-site potable water sources for drinking water and ancillary Project purposes, additional permits will be required from the County of Santa Barbara Environmental Health Services Department. This agency has regulatory jurisdiction and management responsibility of water resources in the Santa Maria Groundwater Basin. Other key County agencies for the Project include the Santa Barbara County Fire Department and the County of Santa Barbara Public Works Department, including the Transportation Division and the Flood Control District.

Santa Barbara County Air Pollution Control District. The Santa Barbara County Air Pollution Control District will review the Project for compliance with applicable Federal, State and

local air quality control criteria. Detailed documentation of the potential Project emissions is required to process Project permits. Such emissions calculations need to be prepared based on established Santa Barbara County Air Pollution Control District Rules and other criteria and include detailed process descriptions and equipment specifications for all phases of the Project. The Project will be required to obtain an Authority to Construct and a Permit to Operate from the Santa Barbara County Air Pollution Control District for operation of certain stationary equipment that emits or controls emissions of regulated Criteria Pollutants. Equipment requiring permits includes steam generators, petroleum storage tanks, power generators, and flares.

1.5 KEY ENVIRONMENTAL CONSIDERATIONS AND PROJECT INCORPORATED MEASURES TO REDUCE POTENTIAL IMPACTS

An environmental impact analysis has been prepared for the proposed Project. Refer to Section 4.0 – Environmental Analysis for a detailed discussion of Project setting and impacts. Each issue area section (Section 4.1 through Section 4.10) provides detailed background information on the existing (baseline) environmental conditions, as well as how the Project would change or affect those conditions. In addition, Section 4.0 includes details regarding avoidance and minimization measures that have been considered within the Project design in order to reduce impacts. These measures are summarized in Table 1.5-1 – Project-Incorporated Avoidance and Minimization Measures.

Table 1.5-1. Project-Incorporated Avoidance and Minimization Measures

Number	Measure
AIR QUALITY	
AQ-1	<p>Short-Term Construction Emissions.</p> <p>a) During construction, use water trucks or sprinkler systems to keep all areas of vehicle movement damp enough to prevent dust from leaving the site. The Project should water exposed unpaved traffic areas two to three times per day or as needed, and with increasing frequency when wind speed exceeds 15 miles per hour. Reclaimed water should be used if available and practicable. Soil binders may be used instead of water if practical. The amount of disturbed area will be minimized. Vehicle speeds on unpaved roads will be limited to 15 miles per hour or less. If stockpiling of fill material is required, soil stockpiled for more than two days will be covered, kept moist, or treated with soil binders to mitigate dust generation. Trucks transporting fill material to and from the site will be covered with a tarp from the point of origin. Gravel pads or shakers will be installed at external access points to prevent tracking mud onto public roads. After clearing, grading, earth moving, or excavation is completed, disturbed areas will be watered, re-vegetated, or otherwise controlled to mitigate dust generation.</p> <p>b) All non-exempt portable diesel-powered construction equipment will be registered with the state's portable equipment registration program OR will obtain a Santa Barbara County Air Pollution Control District permit. Fleet owners of mobile construction equipment are subject to the California Air Resource Board Regulation for In-use Off-road Diesel Vehicles (Title 13 California Code of Regulations, Chapter 9, § 2449), the purpose of which is to reduce diesel particulate matter and criteria pollutant emissions from in-use (existing) off-road diesel-fueled vehicles. For more information, please refer to the California Air Resources Board website at www.arb.ca.gov/msprog/ordiesel/ordiesel.htm. All commercial diesel vehicles are subject to Title 13, § 2485 of the California Code of Regulations, limiting engine idling time. Idling of heavy-duty diesel construction equipment and trucks during loading and unloading will be limited to five minutes; electric auxiliary power units will be used whenever possible.</p> <p>c) Diesel construction equipment will meet the California Air Resources Board Tier 4 Final emission standards for off-road heavy-duty diesel engines.</p>
AQ-2	<p>Long-Term Operational Emissions.</p> <p>a) Aera will deploy and maintain a tanker truck fleet consisting of three years old or younger truck engines by replacing older trucks with newer trucks whenever they reach the three year threshold.</p> <p>b) In accordance with Santa Barbara County and Santa Barbara County Air Pollution Control District requirements, Aera will provide the required emission reduction credits for stationary source pollutants.</p> <p>c) Emissions will be mitigated to less than significant or to the greatest extent feasible, if less than significant cannot be achieved.</p>
AQ-3	<p>Odors.</p> <p>a) In order to mitigate odor releases from tanks due to hatch release, Aera will set up the vapor recovery system to notify the operator when the tank pressure is within ten percent of the tank relief pressure. Additionally, personal hydrogen sulfide monitors and wind socks that will be deployed onsite for employee safety will further mitigate the risk of objectionable odors leaving the Project site.</p>

Table 1.5-1. Project-Incorporated Avoidance and Minimization Measures

Number	Measure
	b) The operator will develop an Odor Minimization Plan which will address potential odors from oil field equipment and measures to reduce or eliminate these odors. The Plan will address issues such as facility information, buffer zones, signs with contact information, logs of odor complaints, protocol for handling odor complaints and odor event investigation and methods instituted to prevent re-occurrence.
AQ-4	Greenhouse Gas Emissions. Aera will implement a program to quantify, and where practicable and feasible, to reduce emissions. Operational stationary and mobile greenhouse gas emissions levels (including achieved reductions) will be quantified and reported to the California Air Resources Board as required. Greenhouse gas emissions exceeding the Santa Barbara County CEQA Greenhouse Gas significance threshold will be reduced, where practicable and feasible, through onsite reductions and/or offsite reduction programs approved by the County. Emissions off-sets or purchases required to satisfy California Assembly Bill 32 requirements will be completed according to the California Air Resource Board Cap-and-Trade Program requirements.
HAZARDOUS MATERIALS/RISK OF UPSET	
HAZ-1	Aera Environmental Health and Safety Program. During construction and operation of the facilities, Aera will be responsible for implementation of a site-specific Environmental Health and Safety Program. The program will include training to orient workers and contractors to the safety procedures that are to be implemented on-site.
HAZ-2	Built-In Safety Devices. The design and engineering of the facilities will include control systems to be installed on applicable equipment, piping, valves, tanks, etc. Aera will maintain records documenting that all facilities are built to specification and that all temporary systems equipped with safety devices are functional.
HAZ-3	Inspection and Maintenance Program. Aera will implement an inspection and maintenance program during Project operations to assure good operating condition and inspected and tested at regular intervals in accordance with California Department of Conservation Division of Oil, Gas and Geothermal Resources (Assembly Bill 1960) requirements and good oilfield practices. Records showing the present status and history of each well safety device installed will be maintained by Aera personnel, including dates, details and the results of inspections, tests and repairs. These records will be kept on-site for documentation and reference purposes.
HAZ-4	Emergency Response Plan. Prior to operations on-site, a site-specific Emergency Response Plan will be developed by Aera in order to provide for the safety of employees, customers, and the general public, as well as the protection of property in the event of a major emergency. The Emergency Response Plan will include detailed measures regarding response procedures and required notifications to 911, the Santa Barbara County Hazardous Materials Unit, the State Office of Emergency Services and all personnel working at the facility at the time in the event of a hazardous materials release/emergency shut-down. In accordance with the Emergency Response Plan, Aera personnel will inspect and maintain records of emergency response equipment at regular intervals to ensure that equipment is available and in good working order. These records will be kept on-site for documentation and reference purposes.
HAZ-5	Operational Hazardous Materials Management/Transportation (Business) Plan. A site-specific Operational Hazardous Materials Management/Transportation (Business) Plan will be developed by Aera to comply with State and Federal regulations contained

Table 1.5-1. Project-Incorporated Avoidance and Minimization Measures

Number	Measure
	within the Resource Conservation and Recovery Act policies. The Business Plan will specify liquid and solid waste handling procedures for personnel responsible for handling or hauling materials and wastes generated on-site. The Business Plan will be routed to the Santa Barbara County Environmental Health Services for review prior to Project operations.
HAZ-6	Spill Contingency Plan. In accordance with Assembly Bill 1960, prior to operations on-site Aera will develop a site-specific Spill Contingency Plan. The Spill Contingency Plan will include information such as emergency contact telephone numbers, available personal safety equipment, a quick action checklist for use during initial stages of a spill response and a list of required local, State and Federal agency notifications. Additionally, the plan will include a map of the production facilities which will label and identify tanks, equipment, pipelines, access roads for emergency response, sumps and catch basins, and volume of tanks and storage containers. Further, a list will be provided of all chemicals for which a Material Safety Data Sheet are required and their location. In accordance with the Spill Contingency Plan, Aera personnel will maintain records of spill response equipment at regular intervals to ensure that equipment is available. These records will be kept on-site for documentation and reference purposes.
HAZ-7	Spill Prevention, Control, & Countermeasures Plan. As outlined within Code of Federal Regulations 40 Section 112.9 (Spill Prevention, Control, and Countermeasure Plan Requirements for onshore oil production facilities) and Section 112.10 (Spill Prevention, Control, and Countermeasure Plan requirements for onshore oil drilling and workover facilities), prior to operations on-site Aera Energy LLC will develop a Spill Prevention Control and Countermeasures to mirror the Spill Contingency Plan and include specific prevention controls included within the design of the facility to ensure that potential releases will not flow into waterways. Aera Energy LLC will conduct regular inspections of these drainages. Aera Energy LLC will maintain records documenting the results of these inspections. The plan will also include countermeasures in the planning stages as far as engineering controls where adequate containment of an oil release will be provided. Additionally, the plan will address and document the regularity of inspections to verify that the equipment is functioning properly and make repairs promptly as necessary.
HAZ-8	Beneficial Re-use Plan. In order to address on-site and off-site reuse of petroleum-hydrocarbon containing soil encountered during initial grading and site preparation activities, Aera has developed a Beneficial Re-use Plan (Appendix K). At each Re-Use Source Site, excavated soil with total petroleum hydrocarbon concentrations in excess of concentrations specified by the Santa Barbara County Environmental Health Services Lease Restoration Program, will be either transported and processed on-site at the Re-Use Site for preparation for use as on-site road material, transported to Aera Energy LLC's Belridge road-mix facility for re-use, or disposed off-site at the Santa Maria Regional Landfill under the Non-Hazardous Impacted Soil program.
HAZ-9	Vehicle Impact Protection. Vehicle impact protection will be installed at piping as needed and at well sites in order to prevent unanticipated release of materials during loading/unloading.
HAZ-10	Loading/Unloading Supervision. Truck flow and loading rack supervision will be required by Aera for loading and unloading of crude oil.
HAZ-11	Site Security. Aera will provide site security and video surveillance of the Project site.

Table 1.5-1. Project-Incorporated Avoidance and Minimization Measures

Number	Measure
WATER RESOURCES	
WATER-1	<p>Spill Prevention, Control, and Countermeasures Plan and Storm Water Pollution Prevention Plan. The Project will comply with approved facilities-approved Spill Prevention, Control, and Countermeasures Plan, and the Project-specific construction Storm Water Pollution Prevention Plan, including:</p> <ul style="list-style-type: none"> a) All fueling of vehicles and heavy equipment will occur in designated areas. Designated areas will include spill containment devices (e.g., drain pans) and absorbent materials to clean up spills; b) Vehicles and equipment will be maintained properly to prevent leakage of hydrocarbons and other fluids. Vehicle engine maintenance will occur in designated areas, which will include spill containment devices and absorbent materials to clean up spills; c) Any accidental spill of hydrocarbons or other fluids that may occur at the work site will be cleaned immediately. Spill containment devices and absorbent materials will be maintained on the work site for this purpose. The Governor's Office of Emergency Services will be notified immediately in the event of a reportable quantity accidental spill to ensure proper notification, clean up, and disposal of waste; d) Waste and debris generated during construction will be stored in designated waste collection areas and containers away from drainage features, and will be disposed of regularly; e) Convenient, portable sanitary/septic facilities will be provided during construction activities. These facilities will be well maintained and serviced, and wastes will be treated and disposed of in accordance with state and local requirements; f) Storm water pollution prevention best management practices will be used around the construction area perimeters during construction and around any construction operations that could potentially generate storm water pollution, according to the project specific construction storm water best management practice plan, or surface water quality management plan, as required; g) Runoff will be conveyed to prevent erosion from slopes and channels and directed to project detention basins; and h) Disturbed slopes will be re-vegetated with appropriate native or drought tolerant vegetation.
WATER-2	<p>Channel Crossings. Permanent channel crossings will be stabilized and energy dissipaters such as rip rap will be used at the outlet of storm drains, culverts or channels that enter unlined channels to minimize erosion potential.</p>
WATER-3	<p>DOGGR Permits. The Project will produce non-potable water from the relatively high salinity hydrocarbon-bearing upper Sisquoc formation sands as a water source for steam production and then re-inject that water back into the formation following separation from other produced fluids. Aera Energy LLC will coordinate with the California Division of Oil, Gas, and Geothermal Resources Underground Injection Control program to obtain any required permits for that activity.</p>
BIOLOGICAL RESOURCES	
BIO-1	<p>Agency Permitting. Prior to Project initiation, all applicable permits, including California Department of Fish and Wildlife, U.S. Army Corps of Engineers, Regional Water Quality</p>

Table 1.5-1. Project-Incorporated Avoidance and Minimization Measures

Number	Measure
	Control Board, and Santa Barbara County permits, will be obtained, as necessary. Avoidance, minimization, and/or mitigation measures required by these agencies will be incorporated into the Project.
BIO-2	Oak Tree Protection. The Project Oak Tree Protection Plan, provided within Appendix F-1.M, will be submitted to the County for review and approval. The approved Plan will be incorporated into the Project. At no time will oak trees be removed as part of off-site natural gas pipeline or electrical transmission line activities. A certified arborist will oversee trimming of oak tree limbs that have the potential to be impacted as a result of vehicle or equipment usage associated with off-site activities.
BIO-3	<p>Oak Tree Replacement. The Project will implement an Oak Tree Replacement Plan for oak trees that will be removed. The Project Oak Tree Replacement Plan, provided in Appendix F-1.N, will be submitted to Santa Barbara County for approval. Following approval, the Plan will be implemented to mitigate oak tree removals. The Plan prescribes that each removed mature live oak tree six inches in diameter at breast height or greater than, will be mitigated using any combination of the following replacement alternatives:</p> <ul style="list-style-type: none"> a) For every mature live oak tree removed, ten acorns or ten one gallon saplings or smaller containers that support a longer taproot, will be planted within the Planting Area. Saplings may include those salvaged from the Project disturbance areas (10:1 - acorns or young saplings), and/or b) For every mature live oak tree removed, three 15 gallon saplings will be planted within the Planting Area (3:1 - 15 gallon saplings), and/or c) For every mature live oak tree removed, ten naturally occurring oak tree saplings between six inches and six feet tall will be protected and nurtured within Planting Area or in the Project site (10:1 - sapling/nurture trees), and/or d) Mature oak trees identified within the Project disturbance area and proposed for removal, will be transplanted to the Planting Area in order to salvage the tree. (1:1 - transplanted mature oak trees), and/or e) Some portion of off-site planting and nurturing, in other conservation or restoration areas such as La Purisima, or in burn areas of public lands, as agreed to by the County, may also be considered as mitigation for on-site removals.
BIO-4	<p>Dust Control Measures. During construction activities and periods of high vehicle/equipment traffic along unpaved roads and work areas, dust control methods to minimize dust impacts to surrounding vegetation will be implemented for all on-site and off-site Project activities, as necessary. Dust control methods include, but are not limited to, the following:</p> <ul style="list-style-type: none"> a) Light water spray or soil stabilizer application on stockpiles; b) Watering or stabilizing soil on vehicle movement surface areas to prevent the generation of fugitive dust; c) Reducing vehicle speed; and d) Suspending earth moving or other dust-producing activities during periods of high winds or when dust control measures are not able to prevent visible dust plumes.

Table 1.5-1. Project-Incorporated Avoidance and Minimization Measures

Number	Measure
BIO-5	<p>Fuel Management Plan. The Fuel Management Plan for the Project site, provided as Appendix F-1.A, will be submitted to the County for review and approval. The approved Plan will be incorporated into the Project.</p>
BIO-6	<p>Erosion Control Measures. A Storm Water Pollution Prevention Plan will be implemented for all applicable Project activities. Erosion and sediment controls (e.g., silt fences, straw wattles, mulching, and hydroseeding) will be installed properly and maintained regularly. Other Best Management Practices will also be implemented as necessary and/or as required by Project permits.</p>
BIO-7	<p>Environmental Sensitivity Orientation. A Project-specific environmental sensitivity orientation will be prepared by a biologist familiar with the Project region and incorporated into site-specific training that will be required for Project personnel working on-site. The purpose of the orientation is to educate Project personnel on local special-status wildlife species that may occur within the Project area and to provide an overview of the avoidance and minimization measures to be adhered to during the Project. In addition, personnel will be briefed on the reporting process in the event that an inadvertent injury should occur to a special-status species during construction or operations.</p>
BIO-8	<p>Delineation of Project Disturbance Limits. Prior to initial grading or construction, Project disturbance limits will be delineated in the field, under the guidance of a qualified biologist, using high visibility fencing or flagging to avoid impacts to special-status plant populations and other adjacent sensitive habitat areas. The use of heavy equipment and vehicles will be limited to the proposed work areas, existing roadways, and defined staging areas/access points.</p>
BIO-9	<p>Pre-Activity Surveys.</p> <p>Project site. Pre-activity surveys will be conducted prior to initial grading, excavation, and vegetation removal activities within two weeks of planned work. Pre-activity surveys will be completed by a qualified biologist experienced with regional wildlife and plant species. These surveys will consist of the following activities:</p> <ul style="list-style-type: none"> a) Woodrat nest destruction using hand tools to knock down nests and deter animals out of the immediate work area. Woodrat nest destruction will first be approved by the California Department of Fish and Wildlife by written or verbal approval; b) Large burrows in which display signs of badger or owls, will be, scoped, and dusted around the entrance for three consecutive days to determine if the burrow is active. All active and non-active American badger burrows will be avoided to the greatest extent possible; however, if the burrow cannot be avoided and the burrow is active, then the burrow will be closed by collapsing the soil around the entrance to deter the badgers out of the work area. If the burrow is an active natal den during the breeding season (February through August), then that burrow will be avoided until the pups have grown and left the burrow. All active burrowing owl burrows will be avoided within a 300 foot buffer. The California Department of Fish and Wildlife will be contacted to determine additional minimization measures for natal dens, if necessary. In the event a burrow is being used by a burrowing owl, the burrow will be avoided until the California Department of Fish and Wildlife is notified to determine appropriate avoidance and minimization measures; c) Biologists will place cover boards in the work area to attract reptiles using the area. The cover boards will be checked immediately prior to ground disturbing activities to capture and relocate reptiles to adjacent suitable habitat and out of harm's way. Raking of sandy soils within the immediate work areas will also be incorporated into

Table 1.5-1. Project-Incorporated Avoidance and Minimization Measures

Number	Measure
	<p>pre-activity surveys to help observe, capture, and relocate reptiles that may lie just under the soil surface;</p> <p>d) Biologists will identify, flag, and map with a global positioning unit any special-status plant species identified in the work area. These plant populations will be avoided to the extent practicable; however, if avoidance is not practicable, a revegetation/relocation plan will be implemented.</p> <p>Natural gas pipeline. Pre-activity surveys will be conducted prior to initial excavation and horizontal directional drilling activities. Pre-activity surveys will consist of the following:</p> <p>e) A qualified biologist with experience identifying special-status plants and associated habitats will conduct a pre-activity survey of all work areas, including staging and laydown areas, prior to any ground disturbing activities. Any special-status plant populations encountered will be flagged and avoided to the greatest extent possible. These areas will be avoided for staging or stockpiling of material or soil when feasible. La Graciosa thistle, Gaviota tarplant, and Lompoc yerba santa observations will be reported to the U.S. Fish and Wildlife; and</p> <p>f) A qualified biologist with experience identifying American badger and their potential dens will conduct a pre-activity survey prior to initial work activities. All potentially active badger dens that would be directly impacted by construction activities will be inspected by a qualified Biologist using an optic scope or monitored using tracking medium/remote sensor cameras (3 days) to ensure the den is vacant. After verification that the den is unoccupied it will be immediately excavated and backfilled. If badger activity is detected at a den, the entrance to the den will be blocked with soil, sticks, or debris for three to five days to discourage the use of the dens prior to project disturbance activities. After the biologist determines that the badger has stopped using an active den, the den will be hand-excavated with a shovel to prevent re-use during project construction.</p> <p>Electrical transmission line. Pre-activity surveys will be conducted prior to initial ground disturbance activities. Pre-activity surveys will consist of the following:</p> <p>g) A qualified biologist with experience identifying special-status plants and associated habitats shall conduct a pre-activity survey of all work areas, including staging and laydown areas, prior to any ground disturbing activities. The surveys shall be conducted within appropriate blooming periods for potentially occurring special-status plants. Any special-status plant populations encountered shall be avoided; however, if they cannot be avoided, a relocation and monitoring plan shall be prepared and approved by the appropriate regulatory agency prior to any disturbance to the plants. Observations of special-status species shall be reported to the California Department of Fish and Wildlife and/or U.S. Fish and Wildlife, as required; and</p> <p>h) A qualified Biologist with experience identifying American badger and burrowing owl and their potential burrows shall conduct a pre-activity survey prior to initial work activities. Potential badger and burrowing owl burrows will be avoided with a 50 foot buffer. If a burrow is identified within the immediate work area, the California Department of Fish and Wildlife will be contacted for further guidance on appropriate protective measures during Project activities.</p>
BIO-10	<p>Straight-awned Spineflower Avoidance or Revegetation/Relocation Plan. Project activities will avoid special-status species populations identified within the Project site to the extent practicable; however, where straight-awned spineflower has been identified within the Project grading footprint and in any other cases where Project activities cannot avoid straight-awned spineflower, an agency approved revegetation plan will be implemented. The revegetation plan will provide guidelines for seed collection and topsoil</p>

Table 1.5-1. Project-Incorporated Avoidance and Minimization Measures

Number	Measure
	salvage to ensure impacts to the population are reduced to the greatest extent possible. The plan will also incorporate monitoring and reporting methods for revegetated/ populations to ensure success.
BIO-11	Revegetation Plan. Project activities that require the temporary removal of vegetation for cut/fill slopes, above-ground pipeline installation, and on-site electrical transmission line installation activities will be revegetated per a County-approved revegetation plan. The plan will be prepared and submitted to the appropriate regulatory agencies for approval. The revegetation plan will incorporate goals, implementation methods, and maintenance and monitoring measures to ensure successful revegetation of native plant communities.
BIO-12	Nesting Bird Surveys. In the event that Project initial ground disturbing and vegetation removal activities are scheduled during the nesting bird season (March 15 through September 15), a nesting bird survey will be completed by a qualified biologist with experience in bird identification and nest searching within 24 hours of disturbance activities. No active nests of native bird species protected by the Migratory Bird Treaty Act will be removed by Project activities and appropriate buffers will be incorporated into the Project plans to ensure the protection of the nest. Buffers will be delineated by a qualified biologist based on an appropriate distance to minimize disturbance to the active nest, a standard of 300 feet for passerines and 500 feet for raptors, or as required by Project permits. These buffers may be minimized by a qualified biologist on a case-by-case basis, and consistent with permit conditions, where birds are not impacted by Project activities.
BIO-13	Spill Response Plan. A Spill Response Plan will be prepared prior to Project activities and will be implemented for the life of the Project. The Plan will include appropriate measures for containment of spills, agency notifications, clean-up protocols, and procedures for restoring lay down areas and other impacted areas to pre-disturbance conditions. Spill containment equipment will be available on-site during all Project drilling and fuel handling activities. The Plan will also include protocols for locating equipment at least 50 feet from stream channels and other standing water, and inspecting and maintaining equipment to prevent leaks.
BIO-14	A Drilling Fluid Release Contingency Plan. This plan will be prepared for all horizontal directional drilling operations during the installation of the natural gas pipeline and will be prepared with special emphasis on stream crossings. This plan will include appropriate measures for containment of spills, agency notifications, clean-up protocols, and procedures for restoring lay down areas and other impacted areas to pre-disturbance conditions. Spill containment equipment will be available on-site during all drilling and fuel handling activities. A qualified Biologist knowledgeable in horizontal directional drilling operations will be onsite during horizontal directional drilling operations along actively flowing streams or ponded water to document any spill or drilling fluid release and provide additional guidance to protect biological resources in the event of a spill or drilling fluid release. In the event that a spill or drilling fluid release occurs within a stream corridor, all work will be halted and the spill will be contained using the procedures outlined in the Project-specific Drilling Fluid Release Contingency Plan.
BIO-15	Removal of Trash. All food-related items and trash will be contained in trash bins with lids and will be removed from the work areas at the end of each working day.
BIO-16	Amphibian Avoidance. a) Project site. To minimize impacts to migrating amphibians that travel to aquatic breeding grounds during rainy nights (i.e., spadefoot, California red-legged frog,

Table 1.5-1. Project-Incorporated Avoidance and Minimization Measures

Number	Measure
	<p>California tiger salamander), vehicle travel within the Project site will be avoided during rainy nights to the extent practicable. In the event that vehicles must travel the roads within the Project area, speeds will be reduced. In the event a California red-legged frog or California tiger salamander is identified in a road, the U.S. Fish and Wildlife Service will be contacted immediately for further direction.</p> <p>b) Natural gas pipeline. Excavation activities for the natural gas pipeline will be completed during the daylight hours, to the greatest extent possible. Excavation activities will avoid rainy nights, when California tiger salamanders are most active. A qualified biologist will complete a pre-activity survey prior to work that follows a rainy night, to ensure no California tiger salamander are present within the work areas. Training will be provided to the crew and crew supervisors to recognize, report, and avoid California tiger salamander. In the event a California tiger salamander is observed in the work area, the work in the immediate area of the California tiger salamander will temporarily cease until agency notification is complete.</p> <p>c) Electrical transmission line. Construction activities will be completed during the daylight hours, to the greatest extent possible for the electrical transmission line construction off-site. Project activities shall avoid rainy nights, when California tiger salamanders are most active. A qualified biologist shall complete a pre-activity survey prior to work that follows a rainy night, to ensure no California tiger salamanders are present within the work areas. Training will be provided to the crew and crew supervisors to recognize, report, and avoid California tiger salamanders. A biologist will be on-site or on-call during all construction activities to respond to questions or incidents. In the event a California tiger salamanders is observed in the work area, the work shall cease and the U.S. Fish and Wildlife Service will be immediately contacted for further direction.</p>
<p>BIO-17</p>	<p>CTS Habitat Mitigation. Aera proposes to provide mitigation for the permanent removal and temporary disturbance of upland habitat based on mitigation ratios developed to reflect the potential occurrence of California tiger salamander within the acreage that would be impacted by Project activities. Mitigation includes the following:</p> <p>Temporary Impacts</p> <ul style="list-style-type: none"> • Two acres of mitigation for every one acre classified as high habitat value; • 0.5 acre of mitigation for every one acre classified as moderate habitat value; • 0.1 acre of mitigation for every one acre classified as low habitat value; <p>Permanent Impacts</p> <ul style="list-style-type: none"> • Four acres of mitigation for every one acre classified as high habitat value; • Two acres of mitigation for every one acre classified as moderate habitat value; or • One acre of mitigation for every one acre classified as low habitat value.
<p>GEOLOGIC PROCESSES</p>	
<p>GEO-1</p>	<p>Geologic Hazards Recommendations. Aera Energy LLC will implement the following during Project construction and operations:</p> <p>a) If structures are proposed in areas of possible landsliding, subsurface exploration will be performed to confirm the presence and geometry of the landslide deposits, to evaluate the stability of the materials;</p> <p>b) If landslide deposits are confirmed and their natural stability is found to be inadequate, Aera will either avoid those areas or implement measures recommended by a</p>

Table 1.5-1. Project-Incorporated Avoidance and Minimization Measures

Number	Measure
	<p>geotechnical engineer, such as removal and replacement with compacted fill, providing structural support, or compacted-fill buttressing;</p> <p>c) Areas of colluvium on slopes above proposed developments will be removed or supported;</p> <p>d) The overexcavation and remedial grading will be planned to remove existing artificial fill and colluvial soils beneath proposed structures and areas of development;</p> <p>e) Proposed cut slopes will be graded at inclinations of 2 horizontal to 1 vertical (2H:1V) or flatter; unless steeper inclinations are approved in the Grading Plan review.</p> <p>f) Site-specific geotechnical exploration and analyses will be conducted as needed to determine the potential for liquefaction, seismic settlement, and hydroconsolidation;</p> <p>g) A Project-specific grading and erosion control plan will be designed to minimize erosion and sedimentation;</p> <p>h) Geotechnical sampling and testing will be performed as necessary to confirm the presence or absence of expansive soil materials at the Project site; and</p> <p>i) Aera Energy LLC will adhere to recommendations detailed in both Fugro Consultants, Inc.'s December 2013 Phase I Services, Preliminary Geotechnical Engineering Study, East Cat Canyon Oil Field, Sisquoc Area, Santa Barbara County, California and Fugro Consultants, Inc.'s January 2014 Preliminary Geologic Hazards Evaluation, East Cat Canyon Oil Field, Sisquoc Area, Santa Barbara County, California (Appendix S).</p>
CULTURAL RESOURCES	
CUL-1	<p>Cultural and Paleontological Resource Monitoring Plan. Prior to Project ground-disturbing activities, a Cultural and Paleontological Monitoring Plan will be completed. The Plan will require monitoring by a qualified archaeologist during ground disturbing activities. In addition, the archaeological monitor will give workers associated with Project activities an orientation regarding the probability of exposing paleontological or cultural resources, tips on recognizing such resources and directions as to what steps are to be taken if a find is encountered.</p>
CUL-2	<p>Unanticipated or Undocumented Cultural Resources. If undocumented cultural resources are encountered during construction within the Project site, then work will be stopped within 50 feet of the area of the find pending consultation between the qualified archaeologist and Aera. The qualified archaeologist shall determine the potential significance of the find and, in consultation with Aera, develop measures designed to eliminate adverse impacts. Such measures can include avoidance through Project redesigns, or Phase II testing (excavation) to evaluate the significance of the find.</p> <p>If Phase II testing is required, then considerable delays may be warranted prior to completion of construction. The duration of work stoppages will vary depending on the extent, integrity, and potential significance of the encountered resource. CEQA provides a measure of protection for human remains (Guidelines section 15064.5[d]), and for the accidental discovery of cultural resources (Guidelines section 15064.5[e]). These guidelines are particularly important as they take into account the possibility that significant resources not noted as a result of previous research efforts may be present within a Project area and need to be treated in a way commensurate with CEQA standards.</p>
CUL-3	<p>Presence of Human Remains. If human remains are encountered during construction activities, any work in the vicinity will stop and a qualified archaeologist will be required to evaluate the situation. At the same time, the County coroner shall be contacted</p>

Table 1.5-1. Project-Incorporated Avoidance and Minimization Measures

Number	Measure
	immediately. If the human remains are Native American in origin, then the coroner must notify the Native American Heritage Commission within 24 hours of this identification.
CUL-4	<p>Avoidance of Cultural or Historic Resources During Natural Gas Import Pipeline Installation.</p> <p>a) The natural gas import pipeline will be located within the west side of Dominion Road in the area within 0.25 mile (1,320 feet) of SCGP-1 and the Roadamite area, in accordance with the Garcia and Associates' Review of a Previously Completed Records Search and Phase I Cultural Resources Survey and Evaluation for the Gas Pipeline Route in Support of the East Cat Canyon Oil Field Redevelopment Project, Santa Barbara County, California (2014b). No ground disturbing activities will occur on the east side of Dominion Road within 0.25 mile (1,320 feet) of SCGP-1 and the Roadamite area.</p> <p>b) Archaeological monitoring will occur within 0.25 mile (1,320 feet) of SCGP-1 and the Roadamite area of the Project Site to ensure no previously unidentified resources are discovered during construction.</p> <p>c) If avoidance of SCGP-1 is not feasible or in the event of the discovery of unanticipated cultural resources that are eligible or potentially eligible for the California Register of Historic Resources are found during construction, then Phase II testing (excavation) of the area will be required to evaluate archaeological sites for significance in accordance with the California Register of Historic Resources.</p>
CUL-5	<p>Avoidance of Cultural or Historic Resources During Electrical Line Route Installation. A 50 foot buffer will be staked around the resource boundary (PGE-1 and PGE-ISO-1). A qualified archaeologist will provide cultural resources awareness training for construction personnel prior to the start of work. Construction personnel will be briefed on laws that protect cultural resources and procedures to be followed in the event that a unique archaeological resource, historical resource, or human remains are encountered during construction.</p>
FIRE PROTECTION	
FIRE- 1	<p>Master Fire Protection Plan. All recommended measures included within the Master Fire Protection Plan (Collings, 2014) will be incorporated into the Project design. These measures include, but are not limited to, the following:</p> <p>a) The central processing facility area will be provided with a dedicated fire protection system;</p> <p>b) The facility includes a minimum of 76,500 gallon tank for dedicated fire protection water storage;</p> <p>c) The central processing facility hydrants and monitors will be hard piped and supplied by a new eight inch dedicated fire service water supply line/looped system;</p> <p>d) The pressurized hydrant piping system includes new hydrants as indicated Master Fire Protection Plan Sheets-1 through -5; are spaced not to exceed 500-foot intervals (300 feet in noted areas near buildings), and with a minimum fire flow of 750 gallons per minute;</p> <p>e) The application of the foam solution will be accomplished by on-site foam delivery systems;</p> <p>f) The emergency access roads will meet Santa Barbara County Fire Department requirements;</p>

Table 1.5-1. Project-Incorporated Avoidance and Minimization Measures

Number	Measure
	<p>g) Brush and vegetation clearance will be maintained in accordance with Santa Barbara County Fire Department Standard Code 6 (Clearances);</p> <p>h) Produced crude loading will comply with California Fire Code Section 3406.5;</p> <p>i) Electrical grounding or bonding will be provided in accordance with sections 6.5.4.1 through 6.5.4.5 of National Fire Protection Association Code 30;</p> <p>j) A means to quickly shut down the facility in the event of an emergency will be provided;</p> <p>k) Accessible, well-labeled emergency gas line shutoff valves on supply lines to all gas fired equipment at the site will be provided;</p> <p>l) Portable Fire Extinguishers with a minimum rating of 20-A:B:C will be provided where required by Santa Barbara County Fire Department, at a maximum of 75 feet between extinguisher locations;</p> <p>m) Premises identification at the main gate entrance to the facility will be in accordance with Santa Barbara County Fire Department Standard 2;</p> <p>n) All new tanks holding hazardous, toxic, flammable or combustible liquids will be provided with National Fire Protection Association Code 704, , with markings located where they can be readily seen by the Santa Barbara County Fire Department on approach from fire department access roads;</p> <p>o) National Fire Protection Association Code 13 compliant monitored fire sprinkler systems in the control, warehouse, shop and office buildings will be installed;</p> <p>p) A fire sprinkler fire alarm monitoring system, which has central station water flow alarm monitoring service, will be installed and maintained for automatic fire department notification;</p> <p>q) The steam generator site will be provided with portable fire extinguishers in accordance with California Fire Code and Santa Barbara County Fire Department requirements; and</p> <p>r) A pre-incident plan will be developed and provided to Santa Barbara County Fire Department.</p>
NOISE	
NOISE-1	<p>Temporary Acoustical Barriers at WP1. During drilling operations at WP1, a temporary acoustical barrier at least 16 feet in height should be installed along the north and west sides of the pad. In addition, 16 foot high acoustical barriers should be installed along the north, south, and west sides of the generator, along four sides of the drawworks, and the north, south, and west sides of the mud pumps.</p>
NOISE-2	<p>Temporary Acoustical Barriers at WP50. During drilling operations at WP50, temporary acoustical barriers at least 16 feet in height should be installed along the northwest and southwest sides of the generator and drawworks, and the southwest and southeast sides of the mud pumps.</p>
NOISE-3	<p>Temporary Acoustical Barriers at WP56. During drilling operations at WP56, a temporary acoustical barrier at least 16 feet in height should be installed along the south and east sides of the pad. In addition, 16 foot high acoustical barriers should be installed along the south and east sides of the generator and mud pumps, and the four sides of the drawworks.</p>

Table 1.5-1. Project-Incorporated Avoidance and Minimization Measures

Number	Measure
NOISE-4	Temporary Acoustical Barriers at WP17A. During drilling operations at WP17A, a temporary acoustical barrier at least 16 feet in height should be installed along the south and east sides of the pad. In addition, 16 foot high acoustical barriers should be installed along the south and east sides of the generator, the south, east and west sides of the drawworks, and the south side of the mud pumps.
NOISE-5	Pre-Drilling Noise Modeling. Before the commencement of drilling operations at the remaining well pads, create drilling noise models to determine the mitigation measures, if any, required at each pad to ensure a less than significant impact.
NOISE-6	WP16A and WP17A Drilling/Construction. Avoid concurrent grading operations at WP16A and drilling operations at WP17A.
AESTHETICS/VISUAL RESOURCES	
AEST-1	Neutral Paint Coloring for Permanent Facilities. Permanent structures and equipment will be painted and maintained with muted, natural colors to blend in with the existing visual character of the Project area.
AEST-2	Project Landscaping. In accordance with County of Santa Barbara Comprehensive Plan Land Use Element Visual Resource Policies, Aera will implement a landscaping plan for the central processing facility within the design package for the East Cat Canyon Oil Field Redevelopment Project. The landscaping plan will include a conceptual planting schedule that includes landscaping of trees, shrubbery and groundcover for erosion control. All Project landscaping will consist of drought-tolerant native and/or low-water use/Mediterranean type species. In accordance with County of Santa Barbara design requirements, Project landscaping will adequately screen the Project site from surrounding land uses. The landscaping plan will include drought tolerant natives and compatible species requiring minimal irrigation.
AEST-3	Night Lighting and Glare Reduction. Temporary construction lighting will be kept to the minimum feasible consistent with safety needs to minimize ambient light emissions during construction. To the extent practicable, nighttime lighting will be directed downward and light shields installed to reduce ambient lighting to adjacent properties and habitats.

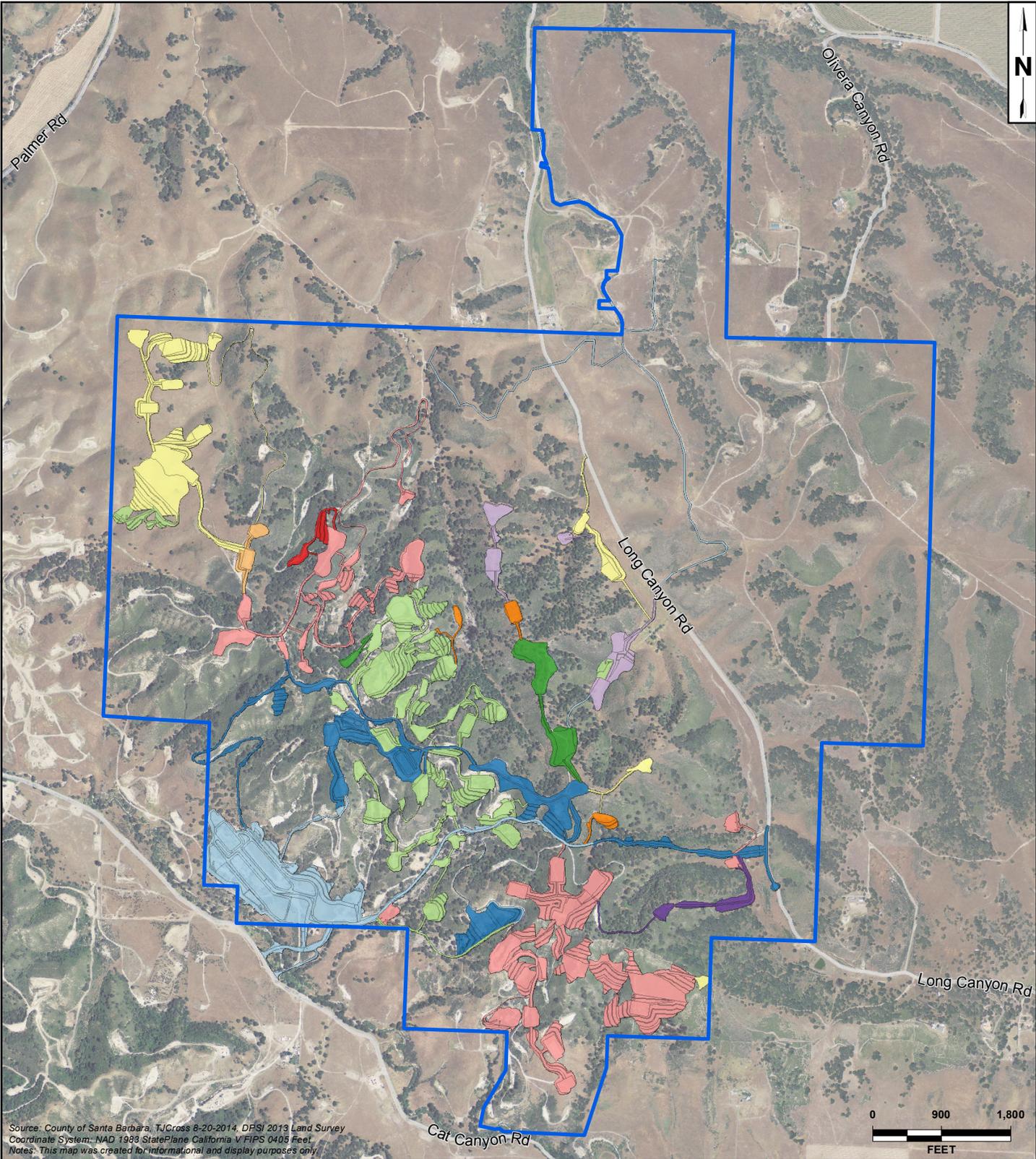
1.6 PROJECT SCHEDULE

The Project wells, roads, and transportation infrastructure will be built out in two phases. The operational results and monitoring data collected from Phase I will help to confirm the Project's reservoir models and production forecasts, prior to additional investment and construction. Aera has defined Project "Year 1" as the year when Project operations will commence with the first steam injection; therefore, construction/well-drilling activities that precede Year 1 will be referred to as "Year -1, Year -2, and Year -3" within this document. The Project phases are defined, as follows:

- Phase I- Year -3 through Year 1; and
- Phase II- Year 2 through Year 30.

Phase I plant and infrastructure construction will take place in the years preceding the first steam injection (Year -3 through Year -1) and continue into Year 1 (first year of steam injection). Grading of well pads and roadways, installation of intra-field gathering and distribution pipelines, installation of intra-field electrical distribution, well drilling and completion, and well hookups will occur throughout a multi-year field infrastructure program beginning in Year -2 (Phase I) and continuing through Year 30 (Phase II). Figure 1.6-1 – Annual Well Pad and Road Development Overview depicts the annualized construction of roads and well pads throughout the Project site. The timing of well drilling generally follows the well pad and roadway development, with approximately 103 wells drilled during Phase I and approximately 193 wells drilled during Phase II. Additional construction timing/phasing details are included within Section 3.0 Construction Procedures.

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|-----------------------------|---------|---------|---------|--------|---------|---------|---------|---------|---------|---------|
| Aera Energy LLC Property | Year -3 | Year -2 | Year -1 | Year 5 | Year 7 | Year 10 | Year 11 | Year 12 | Year 15 | Year 16 |
| Project Construction | Year -1 | Year 1 | Year 5 | Year 7 | Year 10 | Year 11 | Year 12 | Year 15 | | |

PROJECT NAME: EAST CAT CANYON OIL FIELD REDEVELOPMENT PROJECT
 PROJECT NUMBER: 1002-0455 DATE: February 2015

ANNUAL WELL PAD AND ROAD DEVELOPMENT OVERVIEW

FIGURE 1.6-1

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