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Chevron U.S.A., Inc.
Hayhurst Master Development Plan

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BLM

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Appendix C Well Pad Typical (Drilling and Production)
Appendix D Hydraulic Fracturing Process
Appendix E Vascular Plant List

Acronyms and Abbreviations

˚F	degrees Fahrenheit
ACEC	Area of Critical Environmental Concern
APD	Application for Permit to Drill
APLIC	Avian Power Line Interaction Committee
AQRV	air quality related value
ARTSD	Air Resources Technical Support Document
AUM	Animal Unit Month
BACT	Best Available Control Technology
bbl	barrel (unit of measurement equal to 42 gallons)
BISON-M	Biota Information System of New Mexico
BLM	Bureau of Land Management
BMP	best management practice
BOP	blowout preventer
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFO	Carlsbad Field Office
CFR	Code of Federal Regulations
Chevron	Chevron U.S.A., Inc.
CIA	Cumulative Impact Area
CO	carbon monoxide
COA	Conditions of Approval
CTB	central tank battery
DNA	Determination of NEPA Adequacy
EA	Environmental Assessment
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FLM	Federal Land Manager
FONSI	Finding of No Significant Impact
GHG	greenhouse gas
GIS	geographic information system
IM	Instruction Memorandum
HAP	hazardous air pollutant
HDA	Hayhurst Development Area
HDPE	high-density polyethylene
HP	high pressure
HUC	hydrologic unit code

kV	kilovolt
LACT	Lease Automated Custody Transfer
LDAR	leak detection and repair
LP	low pressure
MACT	Maximum Achievable Control Technology
MDP	Master Development Plan
mg/L	milligram per liter
mph	miles per hour
MSDS	Material Safety Data Sheet
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act (of 1990)
NATA	National Air Toxics Assessment
NEPA	National Environmental Policy Act of 1970
NESHAP	National Emission Standards for Hazardous Air Pollutants
NHPA	National Historic Preservation Act of 1966
NMAC	New Mexico Administrative Code
NMBGMR	New Mexico Bureau of Geology and Mineral Resources
NMDA	New Mexico Department of Agriculture
NMDGF	New Mexico Department of Game and Fish
NMED	New Mexico Environment Department
NMED/NMAQB	New Mexico Environment Department/Air Quality Bureau
NMOCD	New Mexico Oil Conservation Division
NMSO	New Mexico State Office
NMOSE	New Mexico Office of the State Engineer
NMPIF	New Mexico Partners in Flight
NMRPTC	New Mexico Rare Plant Technical Council
NMSA	New Mexico State Act
NNSR	Nonattainment New Source Review
NO_2	nitrogen dioxide
NHPA	National Historic Preservation Act
NP	National Park
NPS	National Park Service
NRHP	National Register of Historic Places
NSPS	New Source Performance Standards
NSR	New Source Review
O_3	ozone
OSHA	Occupational Safety and Health Act
PCBs	polychlorinated biphenyls
Pecos Valley WUO	Pecos Valley Water Users Organization

PFYC	Potential Fossil Yield Classification
ppb	parts per billion
ppm	parts per million
Project Area	MDP Project Area
PSD	Prevention of Significant Deterioration
psi	pounds per square inch
psig	pounds per square inch gauge
RCRA	Resource Conservation and Recovery Act of 1976
RFD	reasonable foreseeable development
RMP	Resource Management Plan
ROW	right-of-way
SAAQS	State Ambient Air Quality Standards
SCADA	supervisory control and data acquisition
SHPO	State Historic Preservation Office
SLO	State Land Office
SMA	Special Management Area
SO_2	sulfur dioxide
SPCC	Spill Prevention, Control, and Countermeasures
SUPO	Surface Use Plans of Operations
SWD	Salt Water Disposal
T&E	threatened and endangered
TCEQ	Texas Commission on Environmental Quality
TCP	traditional cultural property
TDS	total dissolved solids
TRRC	Texas Railroad Commission
USC	United States Code
USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
VRM	Visual Resource Management
VRU	vapor recovery unit
WCA	Wildlife Conservation Act
WEG	wind erodibility group
$\mu g/m^3$	micrograms per cubic meter

1. PURPOSE AND NEED FOR ACTION

1.1. Background

Chevron U.S.A., Inc. (Chevron) has submitted a proposed Master Development Plan (MDP) to the Bureau of Land Management (BLM) Carlsbad Field Office (CFO) for oil and natural gas exploration and development within the Hayhurst Development Area (HDA), located in Eddy County, New Mexico (**Figure** 1.1-1). An MDP provides information common to multiple planned wells, including drilling plans, Surface Use Plans of Operations (SUPOs), and plans for future production. MDPs also include information on associated facilities (e.g., roads, pipelines, utility corridors, and compressor stations). Instead of treating the development of multiple wells as a series of individual actions, the BLM encourages the use of multi-well development plans to more effectively manage federal lease development (BLM Instruction Memorandum [IM] 2005-247).

Chevron's proposed MDP includes development within an approximate 8,866-acre area on lands primarily administered by the BLM CFO, but also includes state-owned and private lands. If the proposed MDP is approved, Chevron would develop up to 436 oil and gas wells on 109 well pads. The proposed MDP also addresses all necessary infrastructure such as roads, pipelines, and facilities.

Twelve Applications for Permit to Drill (APDs) have been submitted with the proposed MDP. Information about these and other wells planned for future submission, including surface hole location, is provided in **Appendix A**.

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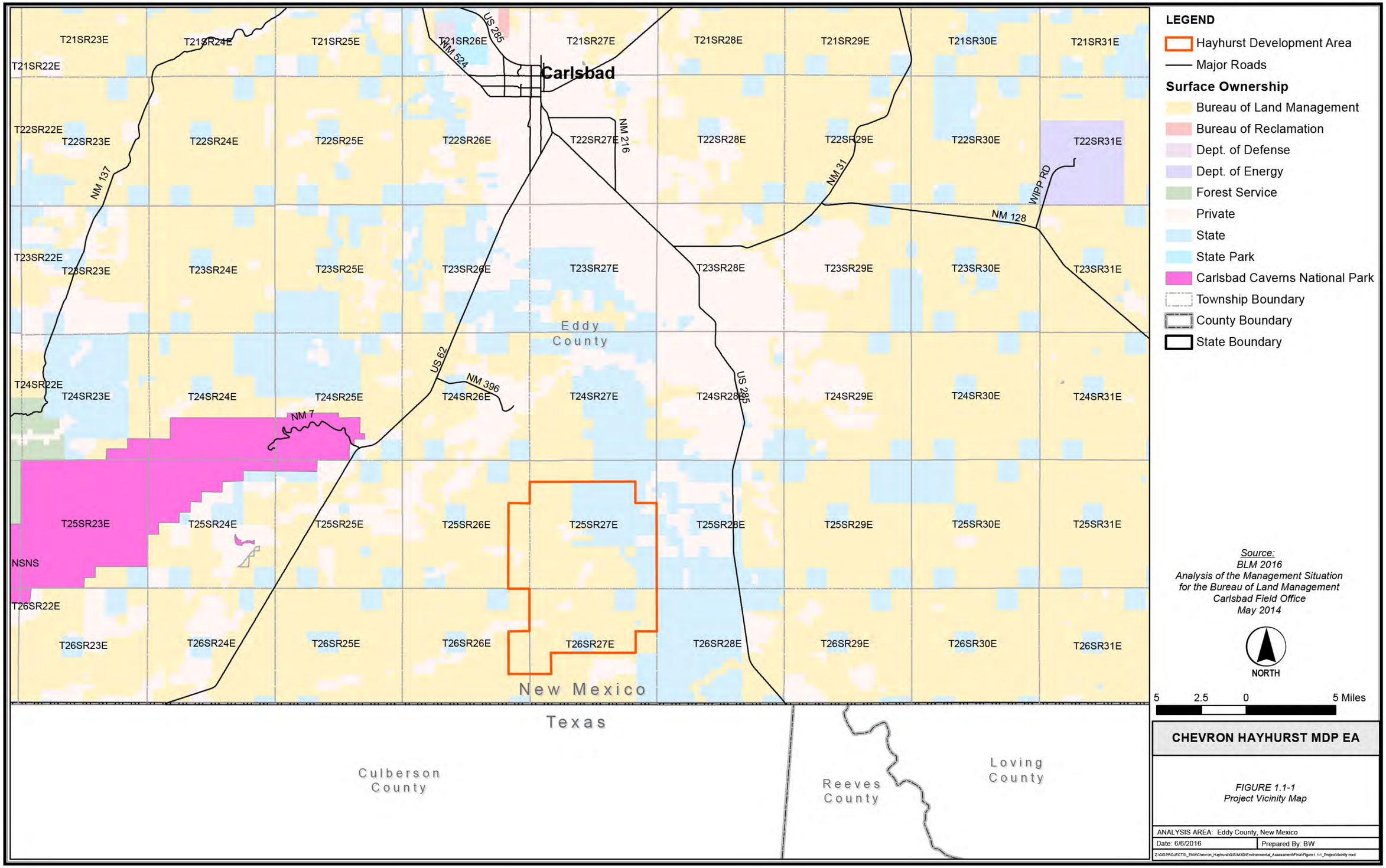

CHEVRON HAYHURST MDP EA

FIGURE 1.1-1
Project Vicinity Map

ANALYSIS AREA: Eddy County, New Mexico

Date: 6/6/2016 | Prepared By: BW

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1.2. Purpose and Need for Action

The BLM's purpose of this action is to consider the proponent's (Chevron's) request for an MDP to develop federal fluid minerals within the Hayhurst Development Area, while also considering the BLM's multiple-use mission.

The need for the action is established by the BLM's responsibility under the Mineral Leasing Act of 1920 as amended, the Mining and Minerals Policy Act of 1970, the Federal Land Policy and Management Act of 1976, and the Federal Onshore Oil and Gas Leasing Reform Act of 1987 to allow reasonable access to develop a federal oil and gas lease. To increase the orderly development of oil and natural gas resources consistent with the Energy Policy Acts of 2001 and 2005, which emphasize the development of domestic oil and gas reserves for supply and economic stability, and to better facilitate the planning of infrastructure, the BLM is considering the proposed MDP. The MDP takes into account field development as a whole rather than as individual actions.

The proposed action is needed to facilitate efficient and effective development of the oil and gas resources in the defined area through the use of an MDP. Accordingly, the MDP provides an effective planning process to identify infrastructure and resource needs for a larger area of development; whereas individual wells may result in more duplication of infrastructure and thus more development and related impacts.

1.3. Decision to be Made

The BLM will decide whether to approve the MDP, and if so, under what terms and conditions.

Approval of the MDP would also serve as approval of the 12 APDs submitted with the MDP. A Notice of Staking was filed for each of the 12 APDs, and the BLM conducted onsite inspections for each APD on December 8, 2015. Actions not included in the 12 APDs would require additional authorizations from the BLM (Section 1.6). Any decisions made in the Decision Record will provide a blueprint for future anticipated actions.

1.4. Conformance with Applicable Land Use Plan(s)

The 1988 Carlsbad Resource Management Plan (RMP), as amended by the 1997 Carlsbad Approved RMP Amendment, has been reviewed, and it has been determined that the proposed action conforms with the land use plan terms and conditions as required by Title 43 of the Code of Federal Regulations (CFR), Section 1610.5. The BLM is revising its RMP for the CFO. The existing RMP decisions will remain in effect during the RMP revision process until the revision is completed and approved. Any future actions associated with the MDP would need to comply with the approved RMP.

Name of Plan: 1997 Carlsbad Approved Resource Management Plan Amendment

Date Approved: October 1997

Decision: [Page 4] "Approximately 3,907,700 acres (95 percent of the oil and gas mineral estate) will be open to leasing and development under the BLM's standard terms and conditions, the Surface Use and Occupancy Requirements (Appendix 1), the Roswell District Conditions of Approval (Appendix 2), and the Practices for Oil and Gas Drilling and Operations in Cave and Karst Areas (Appendix 3)." The proposed action lies within the 95 percent of oil and gas mineral estate open to development and complies with the Surface Use and Occupancy Requirements.

Name of Plan: 2008 Special Status Species Approved Resource Management Plan Amendment

Date Approved: April 2008

Decision: [Page 7] "The BLM will continue to require oil and gas lessees to conduct operations in a manner that will minimize adverse impacts to resources, land uses, and other uses. To that end, the BLM

will continue to apply reasonable mitigation measures to all oil and gas activities." The proposed action will utilize best management practices (BMPs) when developing leases in Lesser Prairie-Chicken and Sand Dune Lizard Habitat. Special mitigation measures will be included into the Pecos District Conditions of Approval.

1.5. Relationship to Statutes, Regulations or Other Plans

This Environmental Assessment (EA) has been prepared in accordance with the National Environmental Policy Act of 1970 (NEPA) and is in compliance with all applicable subsequent regulations and laws, including the Council on Environmental Quality (CEQ) regulations (40 CFR 1500-1508) and the BLM NEPA Handbook, H-1790-1 (BLM 2008a). The proposed action would also comply with federal, state, and local laws and regulations. The following is a list of federal statutes that apply to the proposed action:

- **National Historic Preservation Act of 1966, as amended (16 United States Code [USC] 470)** - Preserves historical and archaeological sites.
- **Archaeological and Historic Preservation Act of 1974 (16 USC 469)** - Provides for the preservation of historical and archaeological data (including relics and specimens) that might otherwise be irreparably lost or destroyed as the result of (1) flooding, the building of access roads, the erection of workmen's communities, the relocation of railroads and highways, and other alterations of the terrain caused by the construction of a dam by any agency of the United States, or by any private person or corporation holding a license issued by any such agency or (2) any alteration of the terrain caused as a result of any federal construction project or federally licensed activity or program.
- **Archaeological Resources Protection Act of 1979, as amended (16 USC 470 et seq.)** - Secures, for the present and future benefit of the American people, the protection of archaeological resources and sites that are on public lands and Indian lands, and fosters increased cooperation and exchange of information among governmental authorities, the professional archaeological community, and private individuals.
- **National American Graves Protection and Repatriation Act of 1990 (25 USC 301)** - Provides a process for museums and federal agencies to return certain Native American cultural items such as human remains, funerary objects, sacred objects, or objects of cultural patrimony to lineal descendants and culturally affiliated Indian tribes and Native Hawaiian organizations, and includes provisions for unclaimed and culturally unidentifiable Native American cultural items, intentional and inadvertent discovery of Native American cultural items on federal and tribal lands, and penalties for noncompliance and illegal trafficking.
- **Clean Air Act of 1970, as amended (42 USC 7401 et seq.)** - Defines the U.S. Environmental Protection Agency's (EPA's) responsibilities for protecting and improving the nation's air quality and the stratospheric ozone layer.
- **Clean Water Act of 1977, as amended (30 USC 1251)** - Establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating quality standards for surface waters.
- **Endangered Species Act of 1973 (16 USC 1531 et seq.)** - Protects critically imperiled species from extinction as a consequence of economic growth and development untempered by adequate concern and conservation.
- **Migratory Bird Treaty Act of 1918 (16 USC 703-712)** - Implements the convention for the protection of migratory birds.
- **Federal Cave Resources Protection Act of 1988 (16 USC 4301 et seq.)** - Protects significant caves on federal lands by identifying their location, regulating their use, requiring permits for removal of their resources, and prohibiting destructive acts.

The following are regulatory exemptions for petroleum industry operations that are relevant to the proposed action:

- **Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA or Superfund), Sections 101(14) and (33)**, exclude petroleum from the definitions of "hazardous substances" and "pollutant or contaminant." Petroleum derivatives to which this exclusion applies include crude oil or any fraction thereof (if the fraction is not specifically listed or designated a hazardous substance by other listed acts), natural gas, natural gas liquids, liquefied natural gas, and synthetic gas usable for fuel.
- According to the **Resource Conservation and Recovery Act of 1976 (RCRA)**, drilling fluids, produced waters, and other wastes associated with the exploration, development, or production of crude oil, natural gas, or geothermal energy are exempt by regulatory definition. The term “other wastes associated” is specifically included to designate waste materials “intrinsically derived from primary field operations associated with the exploration, development, or production of crude oil, natural gas or geothermal energy” (Bohannon 2009). This definition includes hydrocarbon-bearing soil in and around related facilities; drill cuttings; and materials (such as hydrocarbons, water, sand, and emulsion) produced from a well in conjunction with crude oil, natural gas, or geothermal energy; and the accumulated material (such as hydrocarbons, water, sand, and emulsion) from production separators, fluid treating vessels, storage vessels, and production impoundments.
- The 2005 Energy Policy Act exempts fracturing wastes and fluids, such as flowback, from regulation under the **Safe Drinking Water Act of 1974** and the **Clean Water Act of 1972.**

State of New Mexico regulations would also apply to the Project. When handling, storing, and disposing of produced water and fracturing fluids, Chevron would comply with Title 19, Chapter 15, Part 34 of the State of New Mexico’s Energy, Minerals and Natural Resources Department, Oil Conservation Commission. Releases or spills by Chevron would be handled in accordance with Title 19, Chapter 15, Part 29 of the State of New Mexico’s Energy, Minerals and Natural Resources Department, Oil Conservation Commission.

Air quality standards in New Mexico (with the exception of Bernalillo County) are under the jurisdiction of the New Mexico Environment Department/Air Quality Bureau (NMED/NMAQB). The Environmental Improvement Act, New Mexico State Act (NMSA) 1978, and the Air Quality Control Act, NMSA 1978, dictate state air quality standards. Also, 40 CFR 60 “Standards of Performance for New Stationary Sources” is administered by the NMED/NMAQB. Other relevant air quality regulations include 40 CFR Subpart OOOO, Standards of Performance for Crude Oil and Natural Gas Production; Regulation #40 CFR part 52 EPA-R06-OAR-2011-0079; FRI-9932-51-Region 6, control of Volatile Organic Compound emissions from degassing of storage tanks, transport vessels and marine vessels. The BLM New Mexico State Office (NMSO) also published the following relevant document, *Air Resources Technical Report for Oil and Gas Development in New Mexico, Texas and Oklahoma* (BLM 2016a).

Additionally, Chevron would comply with all applicable federal, state, and local laws and regulations; obtain the necessary permits for drilling, construction, completion, and operation; and certify that Surface Use Agreements have been reached with the private landowners, where required.

1.6. Scope of Analysis

As stated previously, 12 APDs were submitted with the MDP. Therefore, approval of the MDP also indicates approval of the 12 APDs. Site-specific design information is known for the 12 APDs but is not known for the remainder of the MDP. Therefore, two approaches were taken for the analysis. The scope of the analysis was conducted at a site-specific level for the actions contained in the 12 APDs and at a programmatic level for all other actions in the MDP. For the programmatic analysis, this EA considers the impacts associated with potential development of all actions included in the MDP and provides an analytical framework to which subsequent analyses of site-specific decisions may be tiered. In this manner, the BLM is able to analyze future potential energy development.

All phases of oil and gas field development are included in the scope of the analysis, including siting, construction, drilling, completion, interim reclamation, production and maintenance, final wellbore

abandonment, and final reclamation. At the programmatic analysis level, the information for the well pad locations, road alignments, pipeline routes, and other facilities is approximate. The technologies described herein are representative of those most likely to be deployed over the life of the project. While actual production years may vary for individual wells, for the purpose of this analysis, it is assumed that the life of the project, through the end of production and final reclamation, is 45 years.

The environmental consequences sections provide the decision maker with the information necessary to compare and contrast the predicted effects of the proposed action and alternatives and make a reasoned and informed decision regarding which alternative or combination of actions should be selected in the Decision Record.

Requirements for Future NEPA Analysis

Components of the Hayhurst MDP EA alternatives are programmatic in nature (with the exception of the 12 APDs submitted with the MDP), meaning that the well pad and well locations, pipeline routes, and other facility placements are conceptually illustrated for the purposes of assessing impacts of proposed development within the HDA. The exact locations of wells, roads, pipelines, and other facilities would be determined when those wells and facilities are proposed for drilling or construction (e.g., when the BLM receives an APD or Right-of-Way [ROW] application for review). Siting of these locations would be subject to design features, BMPs, mitigation measures, and Conditions of Approval (COAs) adopted in the Decision Record for this EA. Implementation of the MDP would be phased over time.

Approval of the MDP would allow this EA to function as a higher level of analysis to which analysis of subsequent federal actions (e.g., approval of APDs) proposed for the HDA would be tiered. Approval of these actions would require additional NEPA analysis, such as a tiered EA, a Determination of NEPA Adequacy (DNA), or a Categorical Exclusion. Categorical Exclusions that may apply to some future development activities include those provided in Section 390 of the Energy Policy Act of 2005, 42 USC 15942(b). Phases of development would be subject to the appropriate NEPA-level and Field Office-required documentation, review, approval, and inspections. The BLM would apply appropriate mitigation measures, design features, and BMPs to all permitted actions in accordance with federal and state oil and gas regulations, the 1997 Carlsbad RMP (as amended), or the future revised Carlsbad RMP.

1.7. Scoping, Public Involvement, and Issues

The CFO publishes a NEPA log for public review. This log contains a list of proposed actions under review and actions approved by the field office. The log is located in the lobby of the CFO as well as on the BLM New Mexico website (http://www.blm.gov/nm/st/en/prog/planning/nepa_logs.html). The BLM also has an ePlanning website (https://eplanning.blm.gov/epl-front-office/eplanning/lup/lup_register.do) that allows the public to review and comment online on BLM NEPA and planning projects. Hard copies of this EA are also available at the BLM CFO as well as the BLM Santa Fe and Albuquerque Offices. The draft EA will be made available for a 30-day public review and comment period.

The CFO uses geographic information systems (GISs) to identify resources that may be affected by the proposed action. The proposed action was reviewed by CFO resource specialists to identify any issues associated with the project. The programmatic nature of the proposed action was discussed and reviewed with resource specialists during this process. Some adjustments to the proposed action were made based on identification of issues by resource specialists and subsequent discussion with Chevron. These adjustments are reflected in this EA as revised design features or other modified components of the proposed action that differ slightly from the proposed action submitted by Chevron to the BLM. The issues that were raised include:

- How would air quality be impacted by the proposed action?
- How would climate change be impacted by the proposed action?
- How would range management be impacted by the proposed action?
- How would soils be impacted by the proposed action?

- How would vegetation be impacted by the proposed action?
- How would wildlife habitat be impacted by the proposed action?
- How would special status species be impacted by the proposed action?
- How would visual resources be impacted by the proposed action?
- Could noxious weeds be introduced to the project area as a result of the proposed action?
- How would cultural resources be impacted by the proposed action?
- How would paleontological resources be impacted by the proposed action?
- How would karst resources be impacted by the proposed action?
- How would watershed resources (including surface and groundwater) be impacted by the proposed action?

As determined by CFO resource specialists, no issues associated with the following were identified and are not evaluated further in this EA:

- Wilderness Study Areas (not present in EA area of analysis)
- Wilderness Areas (not present in EA area of analysis)
- Wild and Scenic Rivers (not present in EA area of analysis)

Additionally, multiple protected biological species (e.g., threatened, endangered, BLM special status species) are listed in state and federal databases as occurring within Eddy County, New Mexico (Biota Information System of New Mexico [BISON-M] 2016; New Mexico Rare Plant Technical Council [NMRPTC] 1999a,b,c,d; U.S. Fish and Wildlife Service [USFWS] 2016b). Based on the absence of suitable habitat, the species listed in Table 1.7-1 are not expected to occur within the EA area of analysis.

Table 1.7-1 Biological Species Not Expected in EA Area of Analysis

Common Name	Scientific Name	Listing Status[1]
Arid land ribbonsnake	*Thamnophis proximus*	ST
Bald Eagle	*Haliaeetus leucocephalus*	ST
Bell's vireo	*Vireo bellii*	ST
Bigscale logperch	*Percina macrolepida*	ST
Black tern	*Chlidonias niger surinamensis*	NMSO
Blue sucker	*Cycleptus elongatus*	NMSO, SE
Broad-billed hummingbird	*Cynanthus latirostris*	ST
Brown pelican	*Pelecanus occidentalis*	SE
Common blackhawk	*Buteogallus anthracinus*	ST
Dunes sagebrush lizard	*Sceloporus arenicolus*	NMSO, SE
Gray redhorse	*Moxostoma congestum*	SE
Greenthroat darter	*Etheostoma lepidum*	ST
Gypsum wild-buckwheat	*Eriogonum gypsophilum*	FT, SE
Headwater chub	*Ictalurus lupus*	NMSO
Kuenzler's hedgehog cactus	*Echinocereus fendleri var. kuenzleri*	FE, SE
Least tern	*Sterna antillarum*	FE, SE
Lee's pincushion cactus	*Coryphantha sneedii var. leei*	FT
Lesser prairie-chicken	*Tympanuchus pallidicinctus*	FT[2], NMSO
Lucifer hummingbird	*Calothorax lucifer*	ST
Mexican spotted owl	*Strix occidentalis lucida*	FT
Mexican tetra	*Astyanax mexicanus*	ST
Neotropic cormoranat	*Phalacrocorax brasilianus*	ST
New Mexico meadow jumping mouse	*Zapus hudsonius luteus*	NMSO

Table 1.7-1 Biological Species Not Expected in EA Area of Analysis

Common Name	Scientific Name	Listing Status[1]
Northern aplomado falcon	*Falco femoralis septentrionalis*	EXPE/NE[3]
Northern beardless-tyrannulet	*Camptostoma imberbe*	ST
Northern goshawk	*Accipiter gentilis*	NMSO
Ovate vertigo snail	*Vertigo ovata*	ST
Pecos bluntnose shiner	*Notropis simus pecosensis*	FT, SE
Pecos gambusia	*Gambusia nobilis*	FE, SE
Pecos River muskrat	*Ondatra zibethicus ripensis*	NMSO
Pecos springsnail	*Pyrgulopsis pecosensis*	NMSO, ST
Peppered chub	*Macrhybopsis tetranema*	NMSO
Piping plover	*Charadrius melodus*	FT, ST
Plain-bellied water snake	*Nerodia erythrogaster*	SE
Rio Grande shiner	*Notropis jemezanus*	NMSO
Sacramento Mountain salamander	*Aneides hardii*	NMSO
Scheer's pincushion cactus	*Coryphantha scheeri var. scheeri*	SE
Shining coralroot	*Hexalectris nitida*	SE
Sneed pincushion cactus	*Coryphantha sneedii var. sneedii*	FE and SE
Southwestern willow flycatcher	*Empidonax traillii extimus*	FE, SE
Texas hornshell	*Popenaias popei*	C, SE[4]
Tharp's bluestar	*Amsonia tharpii*	SE
Thick-billed kingbird	*Tyrannus crassirostris*	SE
Western river cooter	*Pseudemys gorzugi*	ST
Wright's marsh thistle	*Cirsium wrightii*	C and SE
Yellow-billed cuckoo	*Coccyzus americanus*	FT

Notes:

Sources: BISON-M 2016; NMRPTC 1999a,b,c,d; USFWS 2016b

1 C = Candidate for Federal Listing; FE = Federally Endangered; FT = Federally Threatened; EXPE/NE = Experimental Population, Non-Essential; NMSO = BLM CFO Sensitive Species; SE = State Endangered; ST = State Threatened.

2 The USFWS listed the lesser prairie-chicken as threatened on May 12, 2014; however, on September 1, 2015, a U.S. district judge in Texas vacated the USFWS's listing decision. The listing status is still in the courts; therefore, currently (at the time of writing this EA), the lesser prairie-chicken is not protected under the Endangered Species Act.

3 Experimental populations are members of a listed species that are geographically separated from other populations of the same species. Experimental, non-essential populations are treated as threatened species on public lands under the Endangered Species Act for the purposes of Section 9 (Prohibited Acts).

4 Baseline field surveys did not identify suitable habitat for Texas hornshell (Arcadis U.S., Inc. 2016).

2. PROPOSED ACTION AND ALTERNATIVE(S)

2.1. Proposed Action

Under the proposed action, Chevron would construct, drill, complete, operate, plug, and abandon up to 436 horizontal oil and gas wells and five water disposal wells. Approval of the proposed action would also approve the 12 APDs submitted with the MDP (**Appendix A**). Approval of these 12 APDs would authorize the construction of two well pads and related infrastructure, including access roads, and water storage ponds. This section describes features that are common to all components of the MDP first, followed by site-specific descriptions of components included in the 12 APDs. APDs for the remaining 424 wells would be submitted at a later time.

The oil and gas wells would be drilled on a maximum of 109 new well pads (**Appendix B**). As described below, the MDP also includes the construction and operation of production, storage, and compression facilities; water disposal and recycling facilities; gathering pipelines for oil, gas, and produced water; pipelines for fresh, brackish, or recycled water to support hydraulic fracturing operations; and upgraded and new access roads.

A SUPO and Drilling Use Plan for the MDP have been submitted to the CFO as part of the proposed action (**Appendix B**). These plans contain planning elements common to all wells and facilities included in the MDP. Each APD would reference the SUPO and Drilling Use Plan to the extent practicable and would contain site-specific information as necessary in APD-specific SUPO and Drilling Plans (e.g., drilling and casing programs, reclamation seed mixes).

The proposed action would occur on a combination of BLM-administered, state-owned, and private lands (**Figure 2.1-1**). One hundred of the well pads would be located on BLM-administered surface lands, and wells drilled from these pads would produce federal minerals for which Chevron has existing leases (**Figure 2.1-2**). Nine well pads would be located on surface lands owned by the State of New Mexico (state lands) and would partially produce both federal and state leases. The numbers of well pads proposed assume development of four wells per pad. As technology improves, Chevron may increase the number of wells per pad and likewise decrease the total number of pads, while drilling the same number of wells. In the event that more wells are drilled on each pad, the configuration and size of individual pads may differ; however, surface disturbances would not increase beyond a total of 1,808 acres. This EA analyzes the predicted impacts associated with a maximum of 109 well pads and associated development.

Exact locations for the majority of proposed well pads, roads, and other facilities have not been determined through APD or ROW procurement processes. Therefore, Chevron's proposed action presents probable locations for these project components. The following description of the proposed action, descriptions of the affected environment, and analysis of environmental consequences are based on these probable locations, with more specific information for those locations specified in the 12 APDs submitted with the MDP. As stated in Section 1.6, future proposed actions that tier to the proposed MDP would require additional documentation of NEPA compliance. The "MDP Project Area (Project Area)" illustrated on **Figure 2.1-1**, **Figure 2.1-2**, and others provides the area within which Chevron would potentially shift locations of well pads, roads, and other facilities.

Chevron would obtain and comply with all appropriate federal, state, county, municipal, and local permits, including all necessary environmental clearances and permits before commencing any work.

<u>Submitted APDs</u>

Figure 2.1-3 and **Figure 2.1-4** illustrate the locations and layouts of facilities associated with the 12 submitted APDs. The 12 wells included in the submitted APDs would be drilled on a total of two well pads (six wells per pad). Because each of the six wells on each pad would share the same well pad, access road, and other infrastructure, discussion of the submitted APDs is combined into two groups. APD

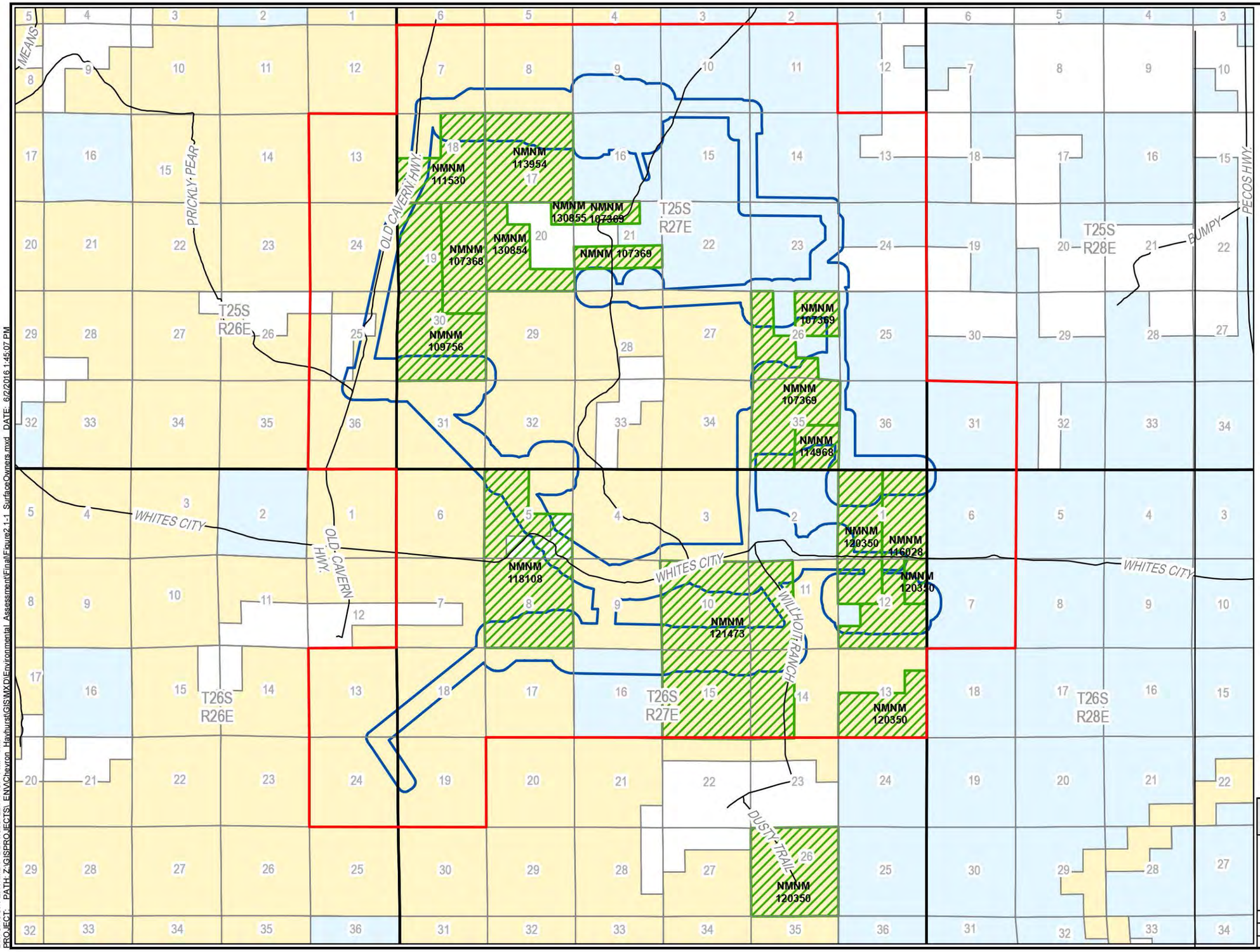
Group 1 includes all wells to be drilled on well pad HH SO 8 P2, plus associated facilities and infrastructure. APD Group 2 includes all wells to be drilled on well pad HH SO 10 P3, plus associated facilities and infrastructure. This approach is intended to simplify descriptions of the proposed APDs, as well as facilitate disclosure of potential environmental impacts. These two well pads would contain more than four wells in order to test the feasibility of increasing the numbers of wells on future pads and reducing the total number of pads.

Surface Requirements

Table 2.1-1 provides estimates of short-term (less than 18 months) and long-term (up to 45 years, assuming well production into the 2050s) disturbance for each wellfield component. **Table 2.1-2** summarizes disturbances for the 12 submitted APDs. A total of 1,808 acres of short-term surface disturbance would occur, of which approximately 1,437 acres would be on BLM-administered lands, 365 acres on state lands, and 6 acres on private lands (**Table 2.1-3**). All proposed surface disturbances on private lands would occur on a single parcel in Township 26 South (T26S), Range 27 East (R27E), Section 5. Interim reclamation would decrease project-wide long-term disturbances to an approximate total of 806 acres.

At the programmatic level of analysis for MDP features where an APD has not been submitted, estimating surface requirements for construction of project facilities requires some assumptions. The assumptions used in this analysis are conservative in order to provide a worst-case scenario for potential environmental impacts while leaving some operational flexibility. For example, the dimensions of well pads needed for operations are expected to average 475 feet by 330 feet; however, the required surface disturbance during construction may be larger to account for areas of cut or fill and storage of topsoil and spoil. To account for additional construction surface requirements for cut, fill, and topsoil or spoil storage, each non-linear feature (e.g., well pads, tank batteries, water containment ponds) was estimated to have additional surface disturbances extending 55 feet in all directions (**Table 2.1-3**). Areas where the 55-foot buffer for surface disturbances overlapped between neighboring features were double-counted to account for disturbances that could occur due to relocating the feature in the future.

Estimating surface disturbances for linear features (e.g., roads, pipelines, utility lines) also requires similar assumptions. The actual configuration of linear disturbance corridors (e.g., ROWs) would vary according to the number and types of components within the corridor. For example, the number of flowlines within a particular portion of a corridor may range from one to a few dozen. Therefore, although a typical ROW width of 106 feet is anticipated for most areas, the actual width and configuration may vary from that shown in **Table 2.1-4**. This analysis assumes that all linear disturbances would occur within a 654-acre area that encompasses all proposed roads, pipelines, flowlines, and utility lines as conceptually envisioned. This area includes approximately 0.7 miles of existing road that would be upgraded in T25S, R27E, Section 16 that was not included in the proposed MDP as submitted to the BLM. Within the 654-acre linear disturbance area, disturbances from each type of linear feature were estimated based on the total length and estimated width of disturbance for each feature type. As described above, surface requirements for each linear feature type would be larger than the trench or road width. Some areas between linear features may be disturbed multiple times (e.g., if utility construction follows pipeline reclamation) but are not double-counted.



LEGEND:

- EA Area of Analysis
- MDP Project Area
- Federal Oil and Gas Leases

Land Ownership

- BLM
- State
- Private
- County Roads
- Townships
- Sections

Notes:
-Impact analysis for some resources utilizes a different Area of Analysis as illustrated on resource-specific figures

Projection:
WGS 1984

NORTH

0 6,800 13,600 Feet

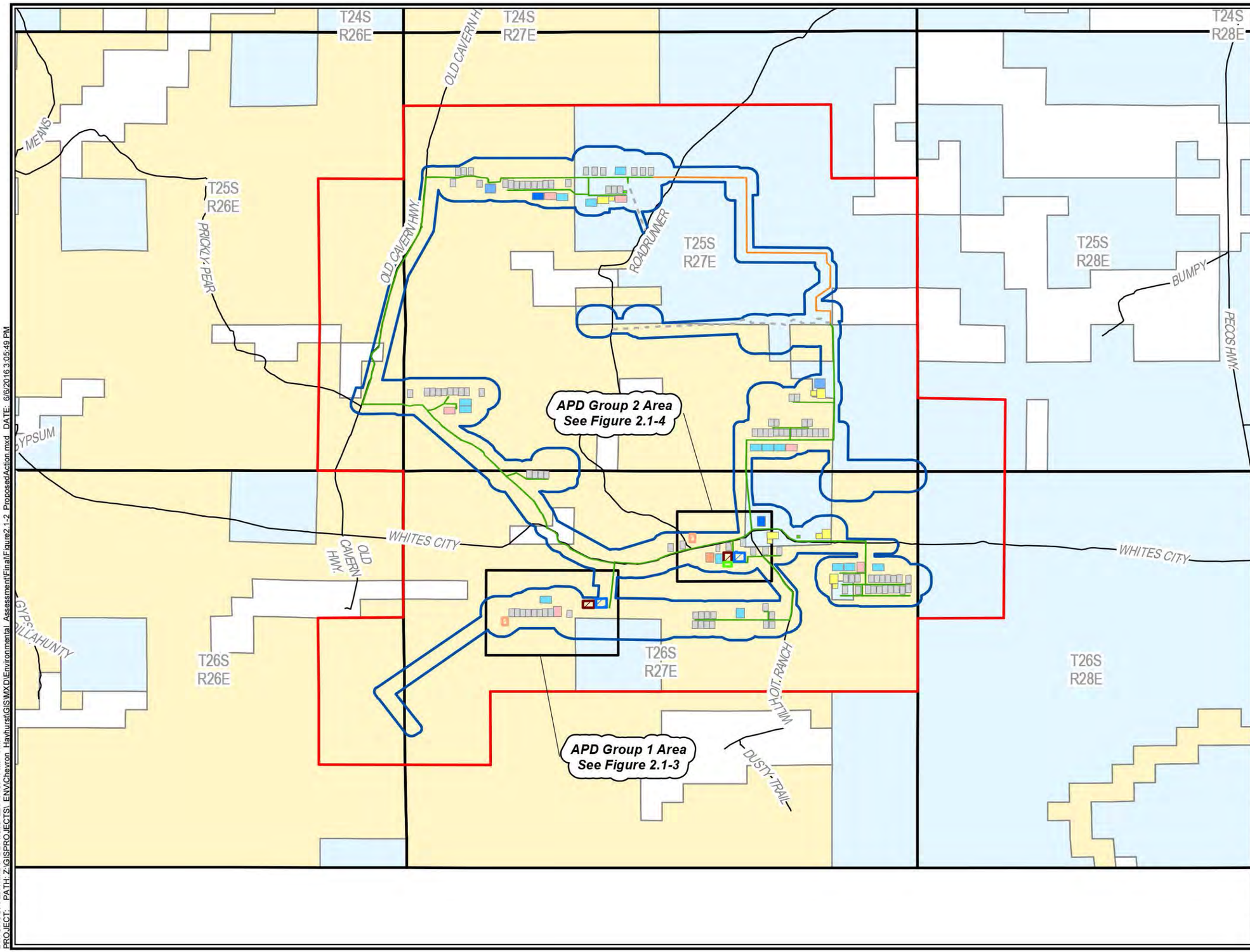
CHEVRON HAYHURST MDP EA

FIGURE 2.1-1
Proposed Action Project Area and Surface Ownership

ANALYSIS AREA: Eddy County, New Mexico

Date: 6/6/2016 | Prepared By: BW

DIV/GROUP: ENV/MDV DB: webb LD: PIC: PM: TM:
PROJECT: PATH: Z:\GISPROJECTS_ENV\Chevron_Hayhurst\GIS\MXD\Environmental_Assessment\Final\Figure2.1-1_SurfaceOwners.mxd DATE: 6/2/2016 1:45:07 PM



LEGEND:

- EA Area of Analysis
- MDP Project Area

Land Ownership

- BLM
- State
- Private
- County Roads
- Major Lease Roads
- Townships
- Major Access Road and Pipeline/Flowline Corridors
- Pipeline and Maintenance Road (Two-Track) Corridor

MDP Features

- Central Tank Batteries
- Compression Station
- Frac Ponds
- Man Camp
- Salt Water Disposal Wells and Facilities
- Sub Station
- Water Tank Farm
- Well Pad

APD Features

- Well Pad
- Tank Battery
- Frac Pond
- Compression Station

Notes:
-Impact analysis for some resources utilizes a different Area of Analysis as illustrated on resource-specific figures
-ROWs included in APDs are not depicted. See Figures 2.1-3 and 2.1-4 for more details

Projection:
WGS 1984

NORTH

0 6,800 13,600 Feet

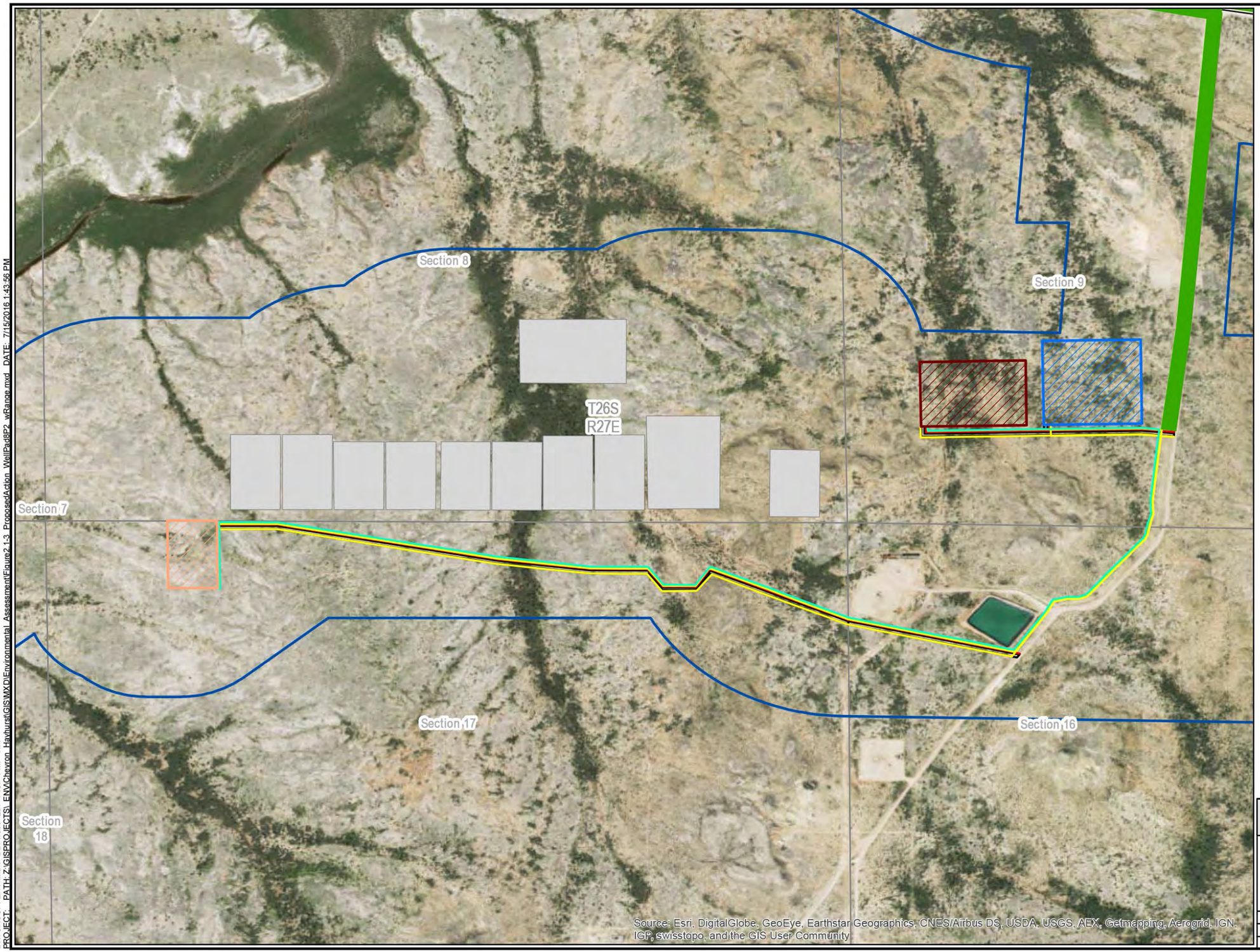
CHEVRON HAYHURST MDP EA

FIGURE 2.1-2
Proposed Action Overview

ANALYSIS AREA: Eddy County, New Mexico

Date: 6/6/2016 | Prepared By: BW

DIV/GROUP: ENV/MDV DB: webb LD: PIC: PM: TM:
PROJECT: PATH: Z:\GISPROJECTS\ ENV\Chevron_Hayhurst\GIS\MXD\Environmental_Assessment\Final\Figure2.1-2_ProposedAction.mxd DATE: 6/6/2016 3:05:49 PM



LEGEND:

- MDP Project Area
- MDP Features - See Figure 2.1-2
- County Roads
- Sections
- Major Access Road and Pipeline/Flowline Corridors

APD Features

- Frac Pond
- Tank Battery
- Well Pad
- Flowline
- Pipeline
- Powerline
- Road

Notes:
- MDP Features final locations pending APD submittal to BLM.
- Facility sizes shown are for working area only and do not include extra space for cut and fill, or topsoil/spoil storage.

Projection:
WGS 1984

NORTH

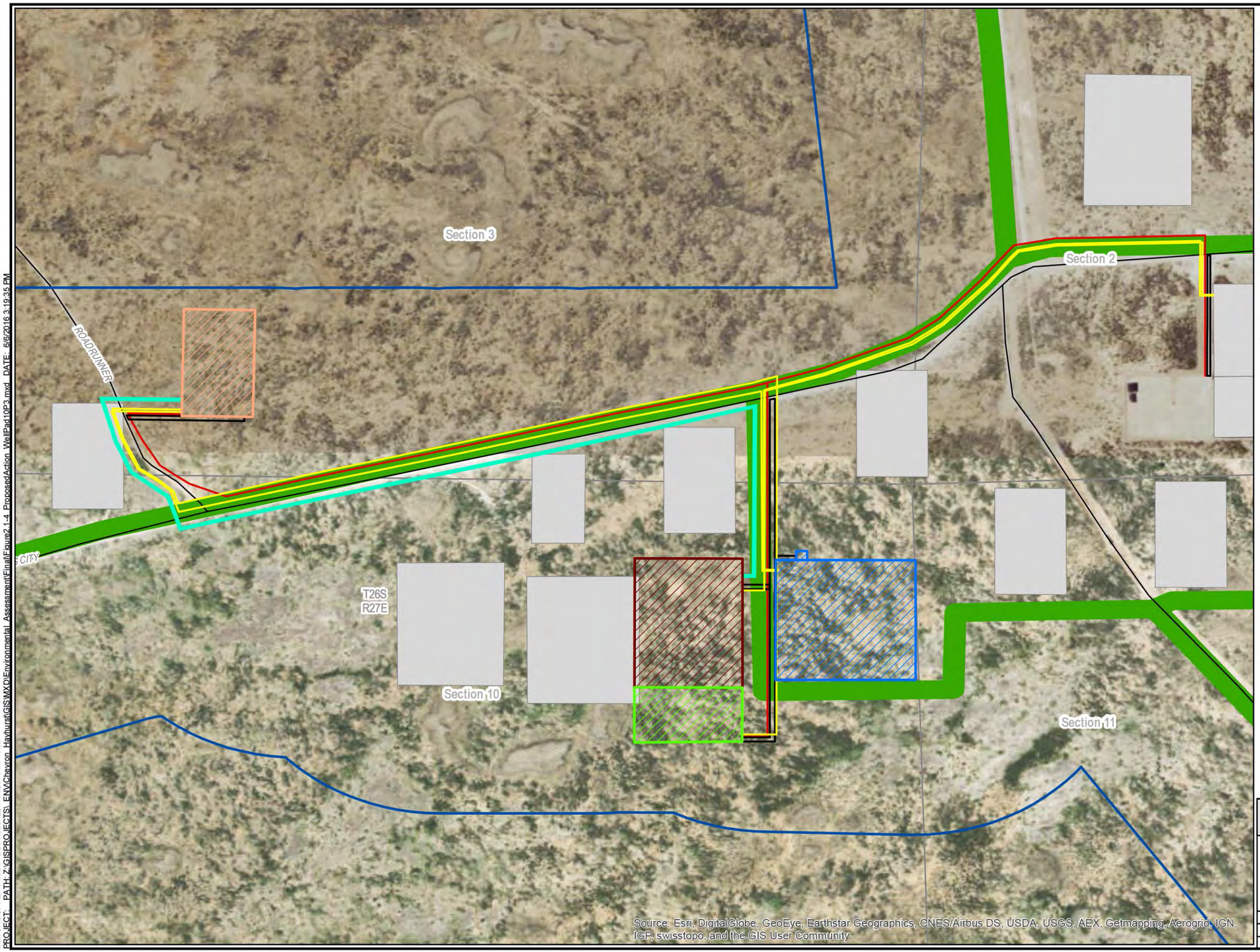
0 750 1,500 Feet

CHEVRON HAYHURST

FIGURE 2.1-3
Proposed Action
Well Pad HH SO 8 P2 Overview

ANALYSIS AREA: Eddy County, New Mexico
Date: 7/20/2016 | Prepared By: BW

DIV/GROUP: ENV/MDV DB: webb LD: PIC: PM: TM:
PROJECT: PATH: Z:\GISPROJECTS_ENV\Chevron_Hayhurst\GIS\MXD\Environmental_Assessment\Figure2.1-3_ProposedAction_WellPad8P2_wRange.mxd DATE: 7/15/2016 1:43:56 PM



LEGEND:

- MDP Project Area
- MDP Features - See Figure 2.1-2
- County Roads
- Sections
- Major Access Road and Pipeline/Flowline Cooridors

APD Features

- Well Pad
- Tank Battery
- Frac Pond
- Compression Station
- Flowline
- Pipeline
- Powerline
- Road

Notes:
- MDP Features final locations pending APD submittal to BLM.
- Facility sizes shown are for working area only and do not include extra space for cut and fill, or topsoil/spoil storage.

Projection:
WGS 1984

NORTH

0 525 1,050 Feet

CHEVRON HAYHURST

FIGURE 2.1-4
Proposed Action
Well Pad HH SO 10 P3 Overview

ANALYSIS AREA: Eddy County, New Mexico
Date: 6/6/2016 | Prepared By: BW

DIV/GROUP: ENV/MDV DB: webb LD: PIC: PM: TM:
PROJECT: PATH: Z:\GISPROJECTS_ENV\Chevron_Hayhurst\GIS\MXD\Environmental_Assessment\Final\Figure2.1-4_ProposedAction_WellPad10P3.mxd DATE: 6/6/2016 3:19:35 PM

Table 2.1-1 Proposed Action Estimated Surface Disturbance – MDP

Project Component[1,2,3]	Length (miles)	Width (feet)[4]	Quantity	Buried or Surface-Laid	Short-term Disturbance (acres)	Long-term Disturbance (acres)
Well Pads	---	--	109	---	723	163[5]
Tank Battery Pads	---	--	16	---	184	184
Compressor Station Pads	---	--	7	---	74	74
Salt Water Disposal Pads[6]	---	--	5	---	82	44
Containment Ponds	---	--	4	---	53	53
Water Storage Facilities	---	--	2	---	23	23
Electrical Substation	---	--	1	---	11	11
Central Housing Facilities	---	--	2	---	4	4
Linear Features						
Roads[7]	51	28	---	---	226	226
Roads – Maintenance and Inspection Only[8]	4	10	---	---	6	6
Flowlines[9,10]	223	4	---	Buried	140	0
Gas Pipelines[11,12]	100	6	---	Buried	94	5
Oil Gathering Pipelines	25	4	---	Buried	15	1
Water Pipelines[13]	43	8	---	Buried	54	3
Powerlines	38	20	---	Overhead	118	6
				Total	**1,808**	**806**

Notes:
1 Actual permitted disturbances for specific features will be refined during the APD or ROW review process.
2 All non-linear features assume that an additional 55 feet in all directions would be required to account for topsoil and spoil storage, cut and fill areas, and other site-specific needs.
3 All linear disturbances are anticipated to occur within an approximately 654-acre area as illustrated in **Appendix B**. Disturbances for linear feature type are estimated based on total length and average width within this 654-acre area. Actual disturbances will depend on specific ROW configuration (e.g., number of flowlines and other features).
4 Includes trench, driving surface, and roadside ditch width only. Actual width will be greater to account for topsoil and spoil stockpiles, safety offset, etc. Increased width is reflected in disturbance acreage estimates. Widths are estimated based on a weighted average of line lengths and widths presented in **Table 2.1-4**.
5 Long-term disturbance assumes all well pads reduced to 200 x 325 feet during interim reclamation.
6 Includes both salt water disposal facilities and salt water disposal well pads.
7 Roads include resource roads and well pad/surface facility access roads. Disturbances potentially required to upgrade or maintain existing roads are included.
8 Includes two-track road in northeastern corner of HDA (**Figure 2.1-2**).
9 Flowlines transport produced fluid from all target formations to the first collection point.
10 Flowline construction disturbance would be 100% reclaimed immediately following installation.
11 Gas pipelines include gas lift, high-pressure gathering, and low-pressure gathering lines. The 6-foot width is an estimated average for all gas lift (4-foot trench), high-pressure gathering (8-foot trench), and low-pressure gathering (4-foot trench) lines.
12 Pipeline and powerline disturbance would be 95% reclaimed immediately following installation. Locations of permanent risers for isolation valves and tie-ins would not be reclaimed until final reclamation
13 Water pipelines include hydraulic fracturing water and salt water disposal flowlines.

Table 2.1-2 Proposed Action Surface Disturbances – APDs

Project Component	Length (feet) or Initial Dimensions (feet)	Short-term Disturbance (acres)	Long-term Disturbance (acres)
APD Group 1			
Well Pad	600 x 400[1]	5.5	1.5
Roads	7,325	0[2]	4.7[2]
Flowlines (Temporary Surface)	8,622	0[3]	0[3]
Pipelines (Permanent Buried)	9,492[4]	22.6[5]	1.1[6]
Tank Battery Pad	550 x 750[1]	9.5	9.5
Containment Pond	760 x 760[1]	13.3	13.3
Powerlines	7,285	0[7]	0[5,6]
	Total	**50.9**	**30.1**

Table 2.1-2 Proposed Action Surface Disturbances – APDs

Project Component	Length (feet) or Initial Dimensions (feet)	Short-term Disturbance (acres)	Long-term Disturbance (acres)
APD Group 2			
Well Pad	600 x 375[1]	5.2	1.5
Roads	2,658	0[2]	1.7[2]
Flowlines (Temporary Surface)	4,823	0[3]	0[3]
Pipelines (Permanent Buried)	8,440[4]	21.3[5]	1.1[6]
Combined Tank Battery and Compressor Station Pad	1,100 x 600[1]	15.2	15.2
Containment Pond	760 x 760[1]	13.3	13.3
Powerlines	8,642	0[7]	0[5,6]
	Total	**55.0**	**32.8**
	Grand Total	**105.9**	**62.9**

Notes:
1 Includes areas for topsoil and spoil storage and areas of cut and fill.
2 Assumes 28-foot road width (including ditches) for long-term disturbance. All roads would be constructed parallel to pipelines and flowlines. Short-term road disturbances are included in calculations for Pipelines (Permanent Buried).
3 Flowline construction disturbance would be 100% reclaimed immediately following installation. In this table, short-term flowline construction disturbances are included in calculations for Pipelines (Permanent Buried).
4 Maximum length – does not equal combined length of individual flowlines. APD Group 2 includes salt water disposal flowlines to a future salt water disposal facility in T26S, R27E, Section 2 SW1/4. Surface Use Plats for salt water disposal and salt water disposal access road have not been submitted to the BLM at this time.
5 Assumes 106-foot-width, including flowlines, powerlines, and access roads.
6 Pipeline and powerline disturbance would be 95% reclaimed immediately following installation.
7 Disturbances are included in calculations for Pipelines (Permanent Buried). APD Group 2 includes salt water disposal utility lines.

Table 2.1-3 Proposed Action Estimated Surface Disturbance by Landowner

Landowner/ Management Agency	Short-term Disturbance (acres)	Long-term Disturbance (acres)
MDP		
Federal (BLM)	1,437	623
State of New Mexico	365	178
Private[1]	6	6
APD Groups 1 and 2 (combined)		
Federal (BLM)	95.3	62.4
State of New Mexico	10.6	0.5
Private	0	0
Total	**1,808[2]**	**806[2]**

Notes:
1 All disturbances on private lands would be from road or ROW construction.
2 All APD Group 1 and Group 2 disturbances are included in MDP disturbances and are not additive.

Construction

This section describes the proposed construction of well pads, access roads, gathering pipelines, and powerlines. Facilities associated with oil and gas production (e.g., tank batteries, compressor stations, salt water disposal facilities, and water storage and recycling facilities), the electrical substation, and central housing facilities are described in the “Production – Operation and Maintenance” or “Workforce” sections below. For each APD, construction, maintenance, restoration, and reclamation would be conducted in accordance with the MDP SUPO unless otherwise specified in the APD-specific SUPO, as described below.

Well Pads

Chevron is proposing to construct 109 production well pads. The well pad construction schedule has yet to be determined, but Chevron expects to construct between three and seven pads annually. The working surface (drilling and completion operations area) of the well pads would average 475 feet by 330 feet (3.6 acres) and would be surfaced with caliche. Including cut and fill slopes and topsoil storage, average surface disturbance per pad would be approximately 6.6 acres. Construction of the 109 well pads would result in an estimated 723 acres of short-term surface disturbance. Following interim reclamation (reduction of the pad size as areas unnecessary for long-term production are reshaped and revegetated), a working area of approximately 1.3 acres per well pad would remain disturbed throughout the long-term production phase of the wells. Following interim reclamation, total long-term disturbance for all well pads is estimated to be 163 acres. As stated above, Chevron may increase the number of wells per pad and likewise decrease the total number of well pads. If more than four wells are drilled on a pad, the size of the pad may need to be increased; however, the total short-term and long-term surface disturbances for well pads would not exceed 723 and 163 acres, respectively. Typical drawings of the proposed well pads during drilling and production are included in **Appendix C**.

Each proposed production well pad would accommodate approximately four wells, and would be constructed from native soil and rock materials present at the site or mined from approved caliche pits. Pads would be constructed by clearing vegetation, salvaging and storing topsoil, and leveling the drilling area using cut-and-fill techniques where appropriate. Topsoil would be placed adjacent to the pad where interim reclamation is planned to be conducted following well completion. Chevron would conduct interim reclamation within six months after well completion. If an approved APD is planned to be drilled from a location in which interim reclamation has yet to be initiated, Chevron would request an extension through Sundry Notice – Notice of Intent to delay interim reclamation until either six months following the approved APD's well completion or the APD expires, whichever occurs first.

Access Roads – Existing

Chevron proposes to use approximately 4.9 miles of existing county roads and 11.8 miles of existing lease roads for access within the HDA during construction, drilling, and completion operations. Road maintenance and upgrades on BLM-administered surface would comply with Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development (also known as the BLM Gold Book; BLM 2007). Maintenance and upgrades for existing roads are included in estimates of surface disturbances. All roads would be surfaced with caliche, crushed gravel, or river rock during construction. Chevron would restrict activities to permitted roads, facilities, and established or approved sites. Chevron would follow posted speed limits.

Chevron would improve or maintain existing roads in a condition the same as or better than before operations begin. All existing roads would be used in their present condition with the exception of minor maintenance as needed. All existing structures on the entire access route such as cattle guards, other range improvement projects, culverts, etc. would be properly repaired or replaced if they are damaged or have deteriorated beyond practical use due to Chevron's activities. Chevron would abate and, where reasonably possible, prevent fugitive dust as needed, whether created by vehicular traffic, equipment operations, or wind events. BLM written approval would be acquired before application of surfactants, binding agents, or other dust suppression chemicals on roadways.

Access Roads – New

Prior to construction, ROWs would be applied for through the BLM and all construction activity would be confined to the approved ROW. Chevron would run all ROWs parallel to existing disturbances wherever possible. Proposed ROWs would include new access roads, pipelines, and powerlines. The typical ROW configuration is provided in **Table 2.1-4** and shown on **Figure 2.1-5**. The third-party oil gathering pipeline is provided to estimate disturbances; however, Chevron would not be applying for this ROW. BLM CFO Realty would evaluate the third-party ROW application and may tier its analysis to this EA.

Table 2.1-4 Right-of-Way Configuration and Services in Each Trench

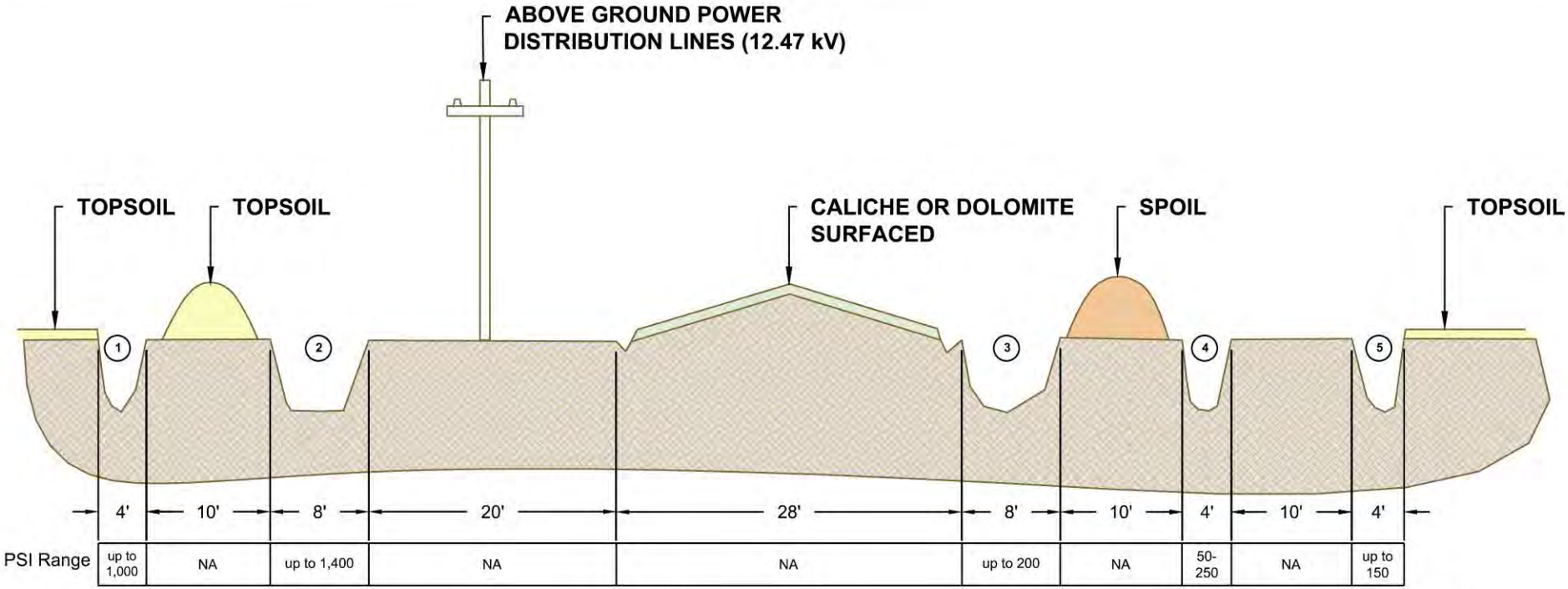
Trench ID	ROW Component	Service Description	ROW Width (feet)
1	Gas Lift Pipeline	Lift-gas distribution	4
Safety Offset			10
2	High-Pressure Gas Pipeline	Gas gathering at up to 1,400 pounds per square inch gauge (psig), dual lines in some cases	8
Aboveground (overhead) distribution powerlines (12.47 kilovolts)			20
Two-lane access road with ditches			28
3	Water Pipelines	Distribution pipelines for hydraulic fracturing water and gathering pipelines for produced water	8
Safety Offset			10
4	Low-Pressure Gas Pipeline	Gas gathering at 50 to 250 psig	4
Safety Offset			10
5	Oil Pipeline	Third-party oil gathering pipeline	4
		Total Width	**106**

Chevron proposes approximately 16 miles of new resource roads under the proposed action. New resource roads up to 24 feet wide (28 feet including ditches) would be constructed at the same time as the well pads and facilities they are intended to serve. Road construction, maintenance, and upgrades on BLM-administered surface, state, and private surface estate would comply with the BLM Gold Book (BLM 2007). All roads would be surfaced with caliche or river rock during construction. Reclamation of new access roads is not proposed and Chevron estimates a short- and long-term disturbance of approximately 45 acres for new roads.

New access roads would be constructed as crowned and ditched roads and would be graveled as needed for drilling. If requested by the surface tenant, upgrading of this portion of the road would be kept to a minimum. In accordance with BLM standards, drainage control would be ensured over the entire road through the use of drainage dips, in-slipping and ditches, natural rolling topography, ditch turnouts, armored crossings, or culverts. Site-specific road design would consider grades, soils, and local hydrology. Culverts, low water crossings, and cattle guards would be installed as needed. Where culverts or drainage crossings are required, they would be designed for a 100-year, 24-hour storm event without development of a static head at the pipe inlet.

The following design specifications would be observed while constructing all access roads:

- No additional construction easement would be required outside the total ROW (see “Flowlines and Gathering Pipelines” subsection below).
- No turnouts are anticipated to be constructed due to the 24-foot road width; if a turnout is deemed necessary, it would be approved on a case-by-case basis.
- If the road gradient exceeds 8 percent over a 300-foot length, a site-specific engineering design would be submitted to the CFO for approval prior to construction.
- A cross slope of 2 percent would be used to allow water to drain from the crown.
- Major cuts-and-fills would use a 2:1 horizontal to vertical slope initially, and would be modified to a 3:1 slope when the road is completed.
- Six inches of base material, leadoff ditching, low water crossings, culverts, and water bars would be installed where needed to control erosion.



Notes:
1. Topsoil and Spoil pile locations would vary according to timing of component construction.
2. Working space location and width would vary according to timing and component being constructed.
3. Dolomite to be used in areas of gypsum soils.

Trench ID	ROW Component	Service Description	ROW Width (feet)
1	Gas Lift Pipeline	Lift-gas distribution	4
Safety Offset			10
2	High-Pressure Gas Pipeline	Gas gathering at up to 1,400 psig, dual lines in some cases	8
Aboveground distribution powerlines (12.47 kV			20
Two-lane access road, including drainage ditches			28
3	Water Pipelines	Distribution pipelines for hydraulic fracturing water and gathering pipelines for produced water	8
Safety Offset			10
4	Low-Pressure Gas Pipeline	Gas gathering at 50-250 psig	4
Safety Offset			10
5	Oil Pipeline	Third party oil gathering pipeline	4
		Total Width	106

CHEVRON HAYHURST MDP EA

FIGURE 2.1-5
Example ROW Trench Configuration

ANALYSIS AREA: Eddy County, New Mexico

Date: 5/18/2016 | Prepared By: BAR

CITY:ROSEVILLE DIV:GROUP:ENVCAD DB:ENVCAD PM:(Reqd)
G:\ENVCAD\Roseville-CA\ACT\B0048783\0000\0004\AIB0048783.0000 ROW Trench.dwg LAYOUT: 2.1-X SAVED: 5/25/2016 10:19 AM ACADVER: 19.1S (LMS TECH) PAGESETUP: LTR.LAND PLOTSTYLETABLE: ARCADIS.CTB
PLOTTED: 6/2/2016 9:18 AM BY: ROBITAILLE, BEVERLY

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While not a BLM CFO requirement for resource roads, Chevron may elect to windrow, segregate, and store topsoil along the road for later spreading across the disturbed ROW corridor. If so, topsoil would be promptly seeded to control erosion, prevent weed establishment, and maintain soil microbial activity. In areas of high wind or water erosion, staked soil retention blankets would be used in combination with seeding to prevent topsoil erosion. Retention blankets would be a straw/coconut blend (or similar) and would be covered on the top and bottom with 100 percent fiber netting to reduce entanglement of small animals. Retention blanket stakes or anchors would be constructed of wood or other non-hazardous materials, not steel. All disturbed areas would be seeded by broadcast or drill-and-crimp during interim reclamation. Ground conditions would determine the seeding method used.

Flowlines and Gathering Pipelines

Proposed flowlines and gathering pipelines will be constructed immediately adjacent to roads. A flowline transports produced fluids and gases from the well head to the first collection point, and the gathering pipelines transport fluids and gases that have been separated at a collection point to another facility. Some new pipelines and flowlines would be installed adjacent to approximately 16.7 miles of existing improved roads (no upgrading needed) or adjacent to existing roads planned for upgrading. The remainder of pipelines and flowlines would be constructed adjacent to new roads or within an existing utility line corridor in the northeast portion of T25S R27E. For pipelines within the existing utility line corridor, no roads would be constructed or upgraded and the pipeline ROW would be used for inspection and maintenance access. Chevron proposes to reclaim approximately 95 percent of surface disturbances required for pipeline construction (**Table 2.1-1**). As a result, Chevron estimates a short-term disturbance of 163 acres for pipelines and a long-term disturbance of 9 acres. These estimates include pipelines for the transport of water for drilling and hydraulic fracturing operations.

All flowlines and gathering pipelines would be buried – none would be surface-laid. Flowline and pipeline trenches would be excavated mechanically; pipe segments would then be welded together and tested, lowered into the trench, and covered with excavated material. Topsoil would be salvaged and windrowed separately from the underlying subsoil and stored alongside the road until the trench is backfilled. All pipelines would be buried to a minimum depth of 2 feet from surface to top of pipe. Temporary water lines for hydraulic fracturing water would be installed on the ground surface, and located where practical within areas of previous surface disturbance.

The pipelines would be installed in separated trenches for each service (i.e., type of pipeline). **Table 2.1-4** shows the configuration of services in each trench, and **Table 2.1-5** provides detailed information about each pipeline required for drilling, completions, and production operations. Buried flowlines would also be constructed and reclaimed immediately following construction. Total short-term disturbance from flowline construction is estimated to be 140 acres.

Table 2.1-5 Pipeline Detailed Information

Pipeline Service	Nominal Size (inches)	Length (miles)	Pressure (psig)	Material of Construction	ROW Width (feet)
Gas Lift	4	26.2	1,100	Flexpipe	4
HP Gas Gathering[1]	12	14.7	1,400	Steel	8
Hydraulic Fracturing Water[2]	12	14.3	200	HDPE	8
Produced Water	12	17.8	150	HDPE	4
LP Gas Gathering	24	22.9	150	Steel	4
Oil Gathering[3]	12	22.9	150	Steel	4

Notes:
1 HP gas gathering ROW would include some third-party pipelines.
2 Hydraulic fracturing water includes all water to be used for hydraulic fracturing, which may be fresh, brackish, or recycled.
3 Oil gathering pipeline would be managed by a third-party.

Abbreviations:
psig = pounds per square inch gauge; HDPE = high-density polyethylene; HP = high pressure; LP = low pressure

Each pipeline and flowline would be pressure tested with freshwater to ensure integrity. All hydrostatic test (hydrotest) water would be purchased from local owners of water rights or sourced by Chevron and would be transported to the testing location by truck. After testing, the water would be disposed of in a produced-water injection facility where it would either be injected into a disposal well or be recycled for hydraulic fracturing operations. Cathodic protection will be used for metallic gathering pipelines. Flowlines will be made of nonmetallic material and would not require cathodic protection.

Powerlines

All powerlines would be overhead (none would be buried) and would be constructed to Avian Power Line Interaction Committee (APLIC) standards. The electrical distribution system would operate at 12.47 kilovolts (kV) with an average span of 250 feet between poles. Chevron estimates that 788 power poles would be required for a total of 37.3 miles of powerline. Chevron estimates a short-term disturbance of 118 acres for powerline construction and a long-term disturbance of 6 acres. Powerlines would be located within the same ROW as roads and pipelines as shown in **Table 2.1-4**. Chevron may post the powerline height at each road crossing.

Caliche Sources

Caliche would be required for surfacing of well pads, access roads, and some surface facilities. An existing BLM-approved caliche pit in T26S, R27E, Section 9, SWNE and SENE (Lease Number: NMNM91806) has been identified as the most likely source of caliche for the project. Disturbances associated with use of the existing caliche pit were assessed during permitting of the caliche pit and are not considered disturbances associated with the proposed action (EA-NM-067-3-1312). If additional caliche source areas are needed, Chevron would include the caliche pit in future APDs. Each APD will identify the caliche sources for that well and associated facilities. Potential future caliche pit locations have been identified in T24S R27E, Section 7 NESE (approximately 5 miles north of the HDA) and in T26S R27E, Section 17 SENE (within the HDA). Chevron will make payment to the BLM prior to removing any federal mineral materials.

Drilling and Completion

Up to 436 horizontal oil and gas wells and five vertical water disposal wells would be drilled under this proposed action. Fewer wells could be drilled than are proposed due to geologic conditions, market uncertainties, or other technological considerations. Chevron's drilling operations would be conducted in compliance with all Federal Onshore Oil and Gas Orders, as well as with all other applicable laws, rules, and regulations. As required by 43 CFR 3162.6, well signs would be installed for each well and would include the surface hole lease number, bottom hole lease number, and communitization agreement number. The seven potential target zones for the 436 total wells along with the target zone for the five water disposal wells are detailed in **Table 2.1-6**. As geology is more fully developed, Chevron may increase or decrease the number of target zones as it deems advisable.

Table 2.1-6 Potential Target Zones in the HDA

Target Zone	Approximate Depth Range[1] (feet)	Approximate Thickness Range (feet)
First Bone Spring	6,513 – 6,888	130 – 190
Second Bone Spring	7,492 – 7,621	1,080 – 1,250
Harkey Sand	7,771 – 8,123	55 – 115
Third Bone Spring Sand	8,050 – 8,617	810 – 850
Wolfcamp A	8,400 – 9,014	130 – 190
Wolfcamp C	9,459 – 9,870	130 - 145
Wolfcamp D	9,570 – 9,992	270 – 300
Disposal Zone (Devonian)	14,100 – 15,300	1,000 – 1,200

Notes:
1 Approximate depth to top of target reservoir below ground surface.

Up to four drilling rigs may be simultaneously deployed in the HDA. Drilling rigs with onsite diesel generators would maintain 4,500-foot spacing from other drilling rigs with onsite diesel generators to minimize the impact on air quality.

Drilling Plan

The Hayhurst MDP contains a 10-point drilling plan that would apply to all oil and gas wells drilled under the proposed action. Each APD would tier to this drilling plan and provide additional information specific to each well. A well is expected to require 24 to 60 days to drill and an additional 34 to 47 days to complete, depending on the targeted reservoir.

For all wells, surface casing would be run to a minimum depth of 100 feet below freshwater aquifers. The surface hole would be cased with steel casing and would be cemented in place from ground level to the depth specified in each well's approved APD. Prior to drilling below the surface casing, a Blowout Preventer (BOP) would be installed on the surface casing and both the BOP and surface casing would be tested for pressure integrity. The BOP and related equipment would meet the requirements of Federal Onshore Oil and Gas Order No. 2 and the BLM would be notified in advance of all pressure tests. Intermediate casing would also be set and cemented as specified in each well's approved APD. BOPs with a minimum system pressure rating of 10,000 pounds per square inch (psi) would be installed for the intermediate liner string for wells completed in the Wolfcamp Formation and for salt water disposal (SWD) wells.

Figure 2.1-6 provides a schematic example of the proposed casing and cementing program.[1] As stated above, the bottom of the surface casing would be placed at least 100 feet below the lowest occurrence of freshwater aquifers (e.g., Rustler Formation on diagram). Progressively smaller-diameter intermediate and production casing would be installed at greater depths. Production tubing, which transports hydrocarbons and produced water to the surface, is located in the center of the casing string. The annular space between the outside of the casing and the rock formations is filled with cement. For surface and intermediate casing, the cement extends from the bottom of the casing to the ground surface. For the production casing, cement extends from the bottom of the casing to above the base of the intermediate casing. The specific depth of each type of casing and amount of cement will vary from well to well.

Specific directional plans for each well would be included with a well's APD. Downhole operations would be completed with tools to facilitate proper direction and path of the well bore. Some wells may require a pilot hole to facilitate drilling the horizontal section of the well; these would be specified in a well's APD.

After drilling each hole section to its final depth, logging tools would be run into the well to evaluate the potential hydrocarbon resource. Once the evaluation is complete, steel production casing would be run and cemented into place in accordance with the well design as approved by the BLM. The proposed casing and cementing program would be designed to protect and isolate all usable water zones, potential productive zones, lost circulation zones, abnormally pressured zones, and any prospectively valuable deposits of minerals. BLM approval is required prior to the use of any isolating medium other than cement.

Upon cementing production casing in place, the drilling rig would be removed and replaced by a completion rig. Well completion primarily consists of hydraulic fracturing operations to stimulate a well's lateral section. Completion operations would be conducted according to "green completion" guidelines per 40 CFR 60, subpart OOOOa. A general description of the hydraulic fracturing process is included **Appendix D** (BLM 2015).

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[1] The main purpose of cementing casing is to prevent fluid loss in production zones or aquifers and to prevent contamination of freshwater zones. The process of installing steel casing (a series of pipes that are screwed together end to end), which is then encased in cement, isolates and cushions the wellbore and casing from surrounding geologic formations and aquifers. The amount of each type of casing, depth to which they are installed, and cementing program are reviewed by the BLM prior to APD approval.

Production – Operation and Maintenance

This section describes components of the proposed action that would be required for the operation and maintenance of producing oil and gas wells. This includes facilities such as central tank batteries (CTBs), produced fluid (oil, gas, water) management, compression, work-overs, and completion. Production equipment at well pads is also described. Chevron anticipates drilling until 2033 and that production could continue until the late 2050s; however, this is dependent on funding and drill rig availability

All wells would be produced by gas lift and would not initially require a pumping unit or rotaflex. Gas lift would be accomplished by transporting produced natural gas to a centralized compressor station, where the gas would be dehydrated and compressed. The gas would then be transported via gas lift pipeline to each well pad where a valve and meter skid would control the amount of gas that is sent into the wellbore.

All permanent aboveground structures that would remain longer than six months would be painted a non-reflective BLM Standard Environmental Color, such as Shale Green. The exception would be that the Occupational Safety and Health Act (OSHA) Rules and Regulations would be complied with where special safety colors are required.

All production facilities with the potential to leak or spill oil-produced water, glycol, or other fluids that might be a hazard to public health or safety would be placed within secondary containment structures in accordance with Spill Prevention, Control, and Countermeasures (SPCC) guidelines. Secondary containment structures would consist of earthen containment berms. Secondary containment would be sized to contain a minimum of 150 percent of the storage capacity of the largest tank within the berm. All loading lines would be placed outside the containment berm with the valve protected by a drip bucket.

Well Pads

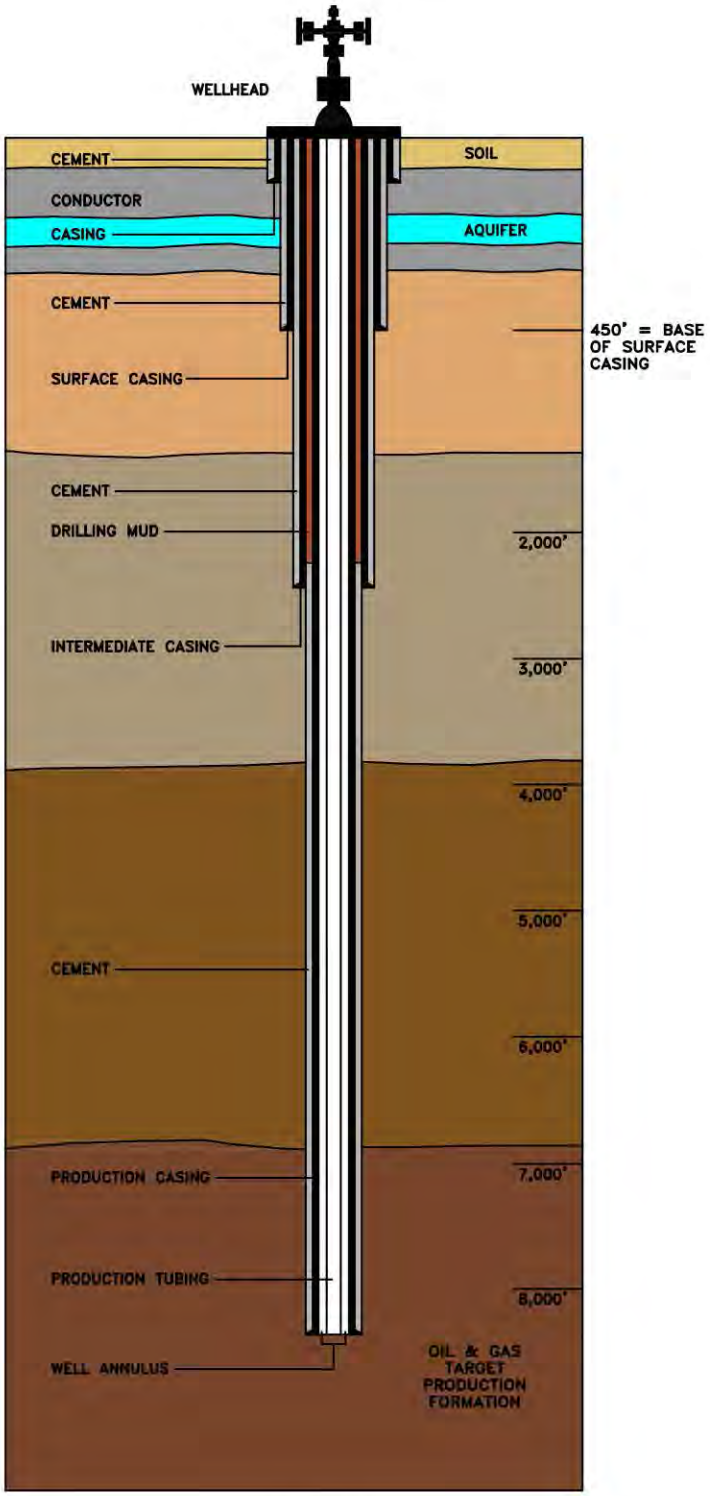
Surface facilities at each well pad location would consist of wellheads, gas lift metering units, and chemical injection equipment. Chemical injection equipment would be used to pump chemicals into flowlines to prevent freezing (e.g., methanol), or to pump chemicals into wellbores for operational purposes (e.g., scale inhibitor, paraffin inhibitor). Temporary equipment, such as sand separators and pressure let-down skids, may be installed during the first six to twelve months of production. No other equipment, including gas handling equipment, would be permanently installed on a well pad until after drilling and completion operations have finished. Telemetry and supervisory control and data acquisition (SCADA) equipment would be used to remotely monitor oil and gas wells and would reduce traffic to and from the well locations in order to minimize impacts on air quality, wildlife, and plants. A pumper truck would periodically visit the pads based upon information gathered from telemetry equipment. The approximate life of a well pad is anticipated to be 30 years.

Existing Facilities

Within the boundary of the HDA, Chevron currently operates two oil and gas facilities on BLM-administered surface lands and two facilities on state surface lands. These facilities would not be used as part of the proposed action as they are not designed for the scale of production envisioned in the MDP. Chevron would decommission these existing facilities as new facilities become operational, pending the approval of commingling agreements. The surface disturbance from the existing facilities would then be remediated or re-purposed.

Proposed Surface Facilities

Table 2.1-7 provides the expected number and pad size for each of the proposed surface facility types described below (with the exception of well pads, which are described above). Locations of these facilities, as proposed in the MDP, are shown on **Figure 2.1-2**. As for well pads, the locations of these facilities as proposed in APDs may move slightly, but would stay within the “MDP Project Area” shown on **Figure 2.1-2**.



NOT TO SCALE

NOTES:

1. Not to scale.
2. Actual depth of casing will depend on well geologic characteristics.
3. Deeper wells may have additional production casing segments of other sizes.
4. Wellhead type shown is for illistration purposes only.
5. Figure modified from ProPublica (https://www.propublica.org/artical/anatomy-of-a-gas-well-426).

CHEVRON HAYHURST

FIGURE 2.1-6
WELL CASING AND CEMENT SCHEMATIC

ANALYSIS AREA: Eddy County, New Mexico

Date: 7/8/2016 | Prepared By: RTS

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Table 2.1-7 Proposed Pad Size for Production-Related Surface Facilities

Facility Type	Total Number	Pad Dimensions (feet x feet)[1]	Pad Size (acres)
Centralized Tank Battery	16	500 x 700	8
Compressor Station	7	500 x 700	8
Salt Water Disposal Facility	5	500 x 700	8
Containment Pond	4	710 x 710	12
Water Storage	2	500 x 700	8
Electrical Substation	1	500 x 650	7

Notes:
1 Facility dimensions are for working area only. For the purposes of estimating surface disturbances, each pad was buffered by an additional 55 feet to account for topsoil and spoil storage, cut and fill areas, and other site-specific needs.

Central Tank Batteries

Chevron expects all wells drilled in the HDA to produce oil, water, and gas. Produced oil, water, and gas would flow via buried flowlines from the wells to one of 16 proposed CTB facilities, where oil, water, and gas are separated and treated to meet sales specifications. **Table 2.1-8** and **Figure 2.1-2** detail the location of each CTB. All CTBs would have adequate oil and water tankage to minimize the risk of spills and to provide adequate time for field personnel to respond to production variations. Each CTB facility would have approximately three oil tanks and approximately six to eight water tanks. More oil and water tanks may be required based on site-specific production needs. All tanks located at a CTB would have a capacity of 750 barrels (bbl) and would be installed inside lined berms in accordance with SPCC guidelines. Secondary containment would be sized to contain a minimum of 150 percent of the storage capacity of the largest tank within each berm.

Table 2.1-8 Proposed Central Tank Battery Locations

ID	Township	Range	Section	Quarter-Quarter Section
1	26S	27E	10	NENE
2	25S	27E	9	SWSE
3	26S	27E	9	SWSW
4	25S	27E	35	NWSW
5	25S	27E	17	SENE
6	26S	27E	12	SWNW
7	25S	27E	35	NWSW
8	25S	27E	31	NWNE
9	26S	27E	12	SWNW
10	26S	27E	10	NWNE
11	26S	27E	12	SWNE
12	26S	27E	10	SESE
13	26S	27E	8	SWSE
14	25S	27E	35	NESW
15	25S	27E	16	SWNW
16	25S	27E	31	NWNE

Vapor recovery units (VRUs) would be installed to capture flash gases produced from tanks storing both oil and water. Chevron would install appropriate redundancy in VRU capacity to ensure 99 percent recovery of vapors. VRUs would typically consist of a switch that detects pressure and triggers a compressor, and a scrubber that traps and separates liquids and gas and feeds them to their respective pipelines. Leak detection and repair (LDAR) programs would be implemented at the facilities to minimize the quantity of fugitive emissions from valves and flanges. All production equipment with a chimney, vent, or stack would be fitted with a device, such as an excluder cone or equivalent, to prevent birds from

entering the chimney. Open top tanks or open containments (e.g., containment pans less than 5 bbl in capacity used at chemical tanks) will be netted.

Produced Water

Produced water would be pumped via pipeline to centralized SWD and treating facilities, where it would either be injected into a disposal well via electric pumps or be treated to remove oil, solids, and some dissolved metals for reuse in hydraulic fracturing operations. Once treated, this water would be stored in permanent containment ponds (i.e., “frac ponds”), each sized to hold approximately 770,000 bbl of water. When operational, treatment capacity of the system is anticipated to provide the required volume of water for drilling and completion activities (except freshwater for drilling in karst zones) for all proposed wells. The proposed locations of SWD and containment facilities are detailed in **Table 2.1-9** and **Table 2.1-10**, respectively, and are illustrated on **Figure 2.1-2**.

Table 2.1-9 Proposed Salt Water Disposal Locations

ID	Township	Range	Section	Quarter-Quarter Section
1	26S	27E	2	SESW
2	25S	27E	16	SENW
3	25S	27E	26	SESE
4	26S	27E	12	NWSE
5	26S	27E	2	SESE

Table 2.1-10 Proposed Permanent Containment Pond Locations

ID	Township	Range	Section	Quarter-Quarter Section
1	26S	27E	10	NENE
2	26S	27E	9	SESW
3	25S	27E	18	NENE
4	25S	27E	26	SESE

Notes:
All permanent containment facilities would have a capacity of 770,000 bbl.

Prior to completion of the permanent water recycling system, the containment ponds would be used to store water from other sources. Containment ponds would be designed as “multiwell fluid management pits” in compliance with New Mexico Administrative Code (NMAC) Section 19.15.34 and would include the following design features:

- Berms: Berms shall be sloped at 3:1 both internally and externally. Berm tops would have at least 12 feet of working area and be capable of supporting light vehicle traffic. Berm height, thickness, and depth would be determined based on site-specific information and included in each APD and ROW application (SF-299).
- Liners: Ponds shall be double-lined and have a method of leak detection, typically trenched high-density polyethylene (HDPE) pipe, between liners. An 8-ounce geotextile fabric shall be used to line the soil prior to installation of a secondary (bottom) liner. Primary liner of 60-mil smooth HDPE and secondary liner of 60-mil smooth HDPE shall be installed. Minimum 200-mil geonet shall be installed between the primary and secondary liner to maintain an interstitial space.
- Fencing: Ponds shall have 8-foot game fencing installed around the perimeter, outside of the bottom berm. The fence bottom shall be keyed-in around the perimeter of the pond site and include the use of 2-foot silt fencing to prevent access of smaller animals.
- Wildlife Protection: Typical bird deterrent options include molded decoy owls and noise-making streamers. Wildlife protection measures, including those for migratory birds, shall be monitored at least monthly to ensure deterrents are effective. Additional bird deterrent options include sound-

activated devices that mimic predatory calls. These deterrents would be monitored on a periodic basis and enhanced as necessary to ensure effectiveness.

Until the permanent HDA water disposal and recycling system is available, produced water would be hauled off location in trucks for disposal at a state-approved facility. Chevron may construct up to two water storage facilities if produced water volumes meet or exceed forecasts. Each facility would utilize site-fabricated tanks larger than 3,000 bbl and would minimize the number of 750 bbl water tanks that would need to be installed at each CTB. The water storage facilities would each be approximately 8 acres in size (16 acres total) and would be located in T26S, R27E, Section 2 NWSW and T25S, R27E, Section 17 NE1/4.

Gas and Gas Compression

Gas would be piped to one of seven compressor stations, where it would be compressed to 1,200 pounds per square inch gauge (psig), dehydrated to meet sales specifications and to reduce the risk of methane hydrate formation, and sold into a third-party gas pipeline system. The location of each compressor station is detailed in **Table 2.1-11** and illustrated on **Figure 2.1-2**. If gas-driven engines are used for compression, all engines would be designed to meet Tier 4 emissions standards. Chevron may elect to use electrically-driven compression rather than gas-driven compression. The surface disturbance for an electrical substation (which involves slightly higher surface impact) is included in the proposed action (**Table 2.1-1**). If constructed, the electrical substation would be located in T25S, R27E, Section 17 NE1/4. Prior to sales, some of the gas would be diverted for use in artificial lift operations at each wellhead. Lift gas would be metered in accordance with the Federal Onshore Oil and Gas Order No. 5 prior to injection into each well's production tubing to ensure accurate production royalty accounting.

Table 2.1-11 Proposed Gas Compressor Station Locations

ID	Township	Range	Section	Quarter-Quarter Section
1	26S	27E	10	SENE
2	25S	27E	16	SENW
3	26S	27E	8	NENE
4	25S	27E	35	NWSE
5	25S	27E	17	SWNE
6	26S	27E	12	SWNE
7	25S	27E	31	NWNE

Oil

Oil would be sold via Lease Automated Custody Transfer (LACT) to a third-party oil pipeline system, although oil may be trucked during upset conditions or periods of pipeline curtailment.

Work-overs or Recompletions

Periodically, the work-over or recompletion of wells might be required to ensure that efficient production is maintained. Work-overs can include repairs to wellbore equipment (casing, tubing, valves, rods, or pumps), a wellhead, or production facilities. Cleaning or swabbing the wellbore may also be necessary for efficient production. Repairs would usually be completed during daylight. The frequency of this work cannot be accurately predicted because the need for work-overs varies from well to well. Recompletion of horizontal hydraulically-fractured wells is not anticipated.

Plugging, Abandonment, and Reclamation

New non-producing wells would be plugged, abandoned, and reclaimed within 90 days of well completion, weather permitting. Upon abandonment, each borehole would be plugged, capped, and its related surface equipment removed. Subsurface pipelines would be purged and plugged at specific intervals. A Sundry Notice would be submitted by Chevron to the BLM proposing the engineering,

technical, and/or environmental aspects of final plugging and abandonment. This notice would include final reclamation procedures and mitigation measures, and BLM standards for plugging would be followed.

Interim Reclamation

The objectives of interim reclamation, which reestablishes vegetation, ecological function, and other natural resource values during the productive life of a well pad, are to restore vegetative cover and a portion of the landform sufficient to maintain healthy, biologically active topsoil; to control erosion and sediment transport; and to minimize loss of habitat, forage, and visual resources throughout the project life. Chevron would complete interim reclamation of a well pad within six months following the completion of the last well on the pad. Following interim reclamation, Chevron would submit the required Sundry Notice-Sundry Report (Form 3160-5) to the CFO, informing the BLM that reclamation occurred. The following best practices will be followed during interim reclamation and discussion with the BLM CFO during the APD process:

- Within six months after a well pad has been placed on production, Chevron would implement the best strategies to reduce the size of the location that were discussed with contact BLM Surface Management Specialists during the APD submittal.
- Within 30 days of completion of the last well on a pad, the well location and surrounding areas would be cleared of, and maintained free of, all materials, trash, and equipment not required for production. A plan would be submitted, with the APD, showing where interim reclamation would be completed in order to allow for safe operations and protection of the environment outside of the drilled well, and would follow BMPs found in the BLM Gold Book (BLM 2007).
- In areas planned for interim reclamation, all surfacing material (e.g., caliche) would be removed and recycled to repair or build roads and well pads.
- The areas planned for interim reclamation would then be recontoured to the original contour if feasible, or if not feasible, to an interim contour that blends with the surrounding topography as much as possible. Where applicable, the fill material of the well pad would be backfilled into the cut to bring the area back to the original contour. The interim cut and fill slopes prior to re-seeding would not be steeper than a 3:1 ratio, unless the adjacent native topography is steeper. Note: constructed slopes may be much steeper during drilling, but would be recontoured to the above ratios during interim reclamation.
- Topsoil would be evenly respread and revegetated over the entire disturbed area not needed for all-weather operations, including cuts and fills. To seed the area, a BLM-approved seed mixture, free of noxious weeds, would be used.
- Erosion controls would be used on the disturbed areas to control erosion, runoff, and siltation of the surrounding area.
- Interim reclamation would be monitored periodically to ensure that vegetation has reestablished.

Final Reclamation

The long-term objective of final reclamation is to return the land, following authorized use, to a condition approximating that which existed prior to disturbance. This includes reclaiming of the landform, natural vegetative community, hydrologic systems, visual resources, and wildlife habitats.

A well pad that no longer has a producing well would undergo final reclamation within six months following plugging and abandonment of the final well on that pad. Buried pipelines would be purged and abandoned in place and not removed, and any remaining surface disturbance associated with pipelines would be reclaimed to final reclamation standards at the time of installation. Following abandonment of the final well, all associated overhead powerlines and access roads no longer required for operations and maintenance would be removed and reclaimed as required by the BLM.

Prior to final reclamation of a well pad, Chevron would submit a Sundry Notice – Notice of Intent detailing the reclamation plan (including the appropriate seed mixture to be used) and follow any Conditions of Approval added to the plan.

Prior to re-contouring and re-seeding the well pad, Chevron would complete the following:

- All equipment, facilities, and trash would be removed from the location.
- All surfacing material would be removed and returned to the original mineral pit or recycled to repair or build roads and well pads.
- Each borehole would be plugged, capped, and its related surface equipment removed.
- Subsurface pipelines would be purged and plugged at specific intervals.
- Dry hole markers would be installed subsurface, to prevent their use as perching sites by raptors.

Re-contouring for final reclamation would consist of returning the pad, material storage piles, cut and fill slopes, and stormwater control features to natural contours that blend with adjacent undisturbed areas, as specified in the final reclamation plan or final reclamation plat approved by the BLM. Requirements for seedbed preparation, soil amendments, seed, seeding procedures, mulching, erosion control fencing, security, and monitoring would be as specified for interim reclamation.

Water Supply and Management

Chevron expects that a variety of water sources would need to be utilized over the life of the project for drilling, completion, dust control, and hydrostatic testing. A number of potential water sources are outlined in **Table 2.1-12** and **Table 2.1-13**. Chevron may include additional water sources in subsequent APDs and would be analyzed through a separate NEPA analysis. The MDP does not propose completion of any new water wells. Any such wells would be applied for and evaluated separately under NEPA. Water obtained from the sources below would be obtained from existing, permitted water wells.

Table 2.1-12 Water Sources for Drilling and Completion

Source	Location[1]	Quality (mg/L TDS)	Transport Method
Local groundwater	Within 15 miles of HDA	Zero – 5,000	Pipeline or Truck
Recycled produced water	Within HDA	150,000 – 210,000	Pipeline

Notes:
1 Locations of potential water wells to be used under the proposed action are included in MDP Appendix B.
Abbreviations: mg/L = milligrams per liter; TDS – total dissolved solids

Table 2.1-13 Vendors Potentially Supplying Local Groundwater

Gregory Rockhouse Ranch, Inc.	1108 West Pierce Street, Carlsbad, NM 88220
MMX Excavating, Inc.	2373 Pecos Highway, Carlsbad, NM 8820
Wolfcamp Water Partners	4800 Bryan Irvin Court, Fort Worth, TX 76107
XRI Blue	415 West Wall Street #130, Midland, TX 79701

Notes:
1 Actual location of water source is not reflected in mailing address; water would not be transported from Fort Worth or Midland, TX.

Drilling and completion of each well are estimated to require 90,000 to 380,000 bbl of water. Of this, up to 7,000 bbl of freshwater per well may also be needed for karst zone drilling requirements (i.e., a maximum total of approximately 3,050,000 bbl). Chevron estimates that 2,000,000 bbl of freshwater would be required to construct all pads and roads under the proposed action. An additional 1,700,000 bbl of freshwater would be required for dust control during construction and operations and 70,000 bbl of

freshwater would be required to hydrotest all pipelines and flowlines. Once all wells are in the production phase, freshwater would only be used for dust control.

The remainder of drilling and completion water would be brackish, produced, or recycled. Chevron expects that all non-fresh drilling and completion water for oil and gas wells would be supplied by the project water recycling system. Drilling and completion water for the initial SWD well would be obtained from local groundwater sources. The water recycling system would be operational prior to drilling the first oil and gas wells. Chevron expects to recycle produced water from currently producing wells within the HDA and to utilize the recycled water for drilling and completion operations for the initial wells in APD Groups 1 and 2. Recycled produced flowback water from these initial wells would then be used to drill and complete subsequent wells. As operations expand to additional well pads, additional recycling units would be constructed adjacent to proposed containment ponds locations (**Figure 2.1-2** and **Table 2.1-10**).

During the well drilling and completion process, water would be transported to each well location by temporary 10-inch-diameter, expanding surface-laid pipelines installed along the edge of the access roads or cross country. Chevron would secure all necessary ROWs prior to laying of temporary surface lines. All temporary surface lines would be removed within 30 days following last use.

Waste Management

Wastes associated with the proposed action may include produced water, garbage, sewage, drill cuttings, water recycling wastes, and other waste materials associated with drilling and completion. The following measures are proposed regarding handling waste, including those for hazardous materials management:

- Chevron would use a closed loop drilling system (constructed, maintained, and operated in accordance with rules and regulations of the New Mexico Oil Conservation Division [NMOCD] [Pit Rule 19.15.17 NMAC]) to capture drill cuttings and to recycle drilling mud. Drill cuttings, drilling fluids, and produced oil and water would be stored in steel tanks, trucked to an NMOCD-approved disposal site (**Table 2.1-14**), and disposed of properly. Additional disposal sites may be included in subsequent APDs.
- Produced water would be transported via truck outside of the HDA for disposal at a state-approved facility, or would be transported via pipeline to SWD facilities, where it would either be injected into a disposal well or be treated to remove oil, solids, and some dissolved metals for reuse in hydraulic fracturing operations.
- Garbage, trash, and other waste materials would be collected in portable, self-contained, and fully enclosed trash cages during drilling and completion. Upon completion of operations, or as needed, the accumulated trash would be disposed of at a state-approved facility. No trash would be burned or buried on location.
- Immediately after the removal of the drilling rig, all debris and other waste materials not contained in the trash cage would be cleaned up and removed from the well location.
- Self-contained chemical toilets would be provided for human waste. Upon completion of operations, or as needed, the toilet holding tanks would be pumped and the contents thereof disposed of in the nearest approved sewage disposal facility.
- Hazardous materials would be handled in the following manner:
  - Project-related activities involving hazardous materials would be conducted in a manner that minimizes environmental impacts. A file would be maintained containing current Material Safety Data Sheets (MSDSs) for all chemicals, compounds, and/or substances used in the course of construction, drilling, completion, production, and reclamation.
  - Spills of any potentially hazardous substance would be reported immediately to the BLM and other responsible parties. Spills would be mitigated immediately. Appropriate measures for

cleanup would be implemented, and spilled material removed and transported to an approved disposal site according to the SPCC plan. Any release of toxic substance (leaks, spills, etc.) in excess of the reportable quantity established by 40 CFR, Part 117 would be reported per CERCLA Section 102b. Spills or leakages of oil, gas, produced water, toxic liquids, or other materials would be reported in accordance with 43 CFR 3162.5-1(c). Copies of any report to any federal agency or state government as a result of a reportable release/spill of any toxic substances would be furnished to the BLM, concurrently with the filing of the repots to any federal agency or state government.

Table 2.1-14 Approved Drilling Waste Disposal Sites

Nearest City	Disposal Facility	Address
Carlsbad	R360 – Halfway	6601 Hobbs Highway, Carlsbad, NM
Eunice	Sundance Services	5 miles east of Eunice, NM, on Highway 18 and Wallach Lane
Seminole, TX	Permian Disposal	587 US Highway 385 South, Seminole, TX

Schedule

The schedule of construction for the proposed action has yet to be determined. However, activity is expected to begin within six months of obtaining all BLM and other federal, state, and local approvals. Chevron expects to construct between three and seven pads annually and to drill and complete between 12 and 28 wells annually. Chevron may delay activity and control the pace of its operations according to lease obligations and market conditions.

Workforce, Access, and Traffic

Chevron estimates that 18 workers (nine per shift) would be required per drilling rig, which would drill 24 hours per day and seven days per week. Chevron also estimates that a peak of 70 workers (35 per shift) would be required per pad during completion operations, which would occur 24 hours per day and seven days per week. Additional personnel would be required for facility construction, pipeline construction, commissioning, and operations. **Table 2.1-15** provides an estimate of peak construction and operations workforces. Personnel may be housed at temporary, centralized housing facilities or at the drilling location (T26S, R27E, Section 2 SWSE). If constructed, the centralized housing facilities would be removed and reclaimed following drilling and completion of the final well, or earlier.

Table 2.1-15 Estimated Daily Peak Construction and Operations Workforces

Workforce Category	Number of Workers at Peak
Construction	
Well pad construction	4
Well drilling	72[1]
Well completion	70[2]
Interim reclamation	2
Road/pipeline/facility construction	20
Construction Total	**168**
Operations	
Commissioning	6
Production operations and maintenance	8
Compression operations and maintenance	10
Operations Total	**24**

Notes:
1 Assumes a maximum of four rigs operating at one time.
2 Assumes one completions spread – may temporarily increase to two spreads if required by logistics.

All access into the HDA would be via White City Road (CR 724). This county road can be accessed from Pecos Highway (NM 285) either from Carlsbad, New Mexico from the north or Pecos, Texas from the south.

Substantial traffic is not expected as part of the proposed action. Light vehicles for construction and operations are expected to travel to and from the HDA regularly from Carlsbad, Eunice, or Jal, New Mexico or Pecos, Texas, or other towns. Heavy vehicles (e.g., drilling rigs, hydraulic fracturing spreads, cranes, and facility equipment delivery trucks) would travel to and from the HDA sporadically during mobilization and demobilization. Heavy vehicle traffic would be routed away from the Village of Loving, New Mexico so as to avoid the school zone near the Loving Municipal Schools campus on Pecos Highway (NM 285).

Design Features

Design features are those specific means, measures, or practices that make up the proposed action. Additional design features may be added as needed, particularly after APD submittal and onsite review. Regulations, standard operating procedures, stipulations, operator-committed measures, and BMPs are usually considered design features. For example, if the proposed action sites a reserve pit for drilling fluids away from areas of shallow groundwater, this is a design feature, not mitigation. Design features are incorporated into the proposed action to reduce or avoid adverse effects.

Because the formulation of alternatives and the impact analysis is often an iterative process, additional means, measures, or practices can be identified through the impact analysis process. If any means, measures, or practices are not incorporated into the proposed action, they are considered mitigation measures. Mitigation measures, if needed, are listed at the end of each environmental consequence section in Chapter 3 of this EA. Mitigation measures are added only if the design features do not reduce or avoid adverse effects to protected resources.

Some of the more relevant design features and environmental protection measures that would reduce or eliminate adverse effects after the initial formulation of alternatives are discussed below. If deviation from these design features is necessary, Chevron would include a request for deviation as part of the APD associated with the deviation. Additional design features identified for the 12 APDs submitted with the MDP are described individually for each APD.

<u>Archaeological, Paleontological, and Historical Sites</u>

- In the event that prehistoric or historic archaeological material or bones are uncovered during construction or earth-disturbing activities, Chevron shall cease work immediately, protect the remains from further disturbance, and notify the appropriate land owner. On BLM land, if skeletal remains or associated funerary objects are found, Chevron shall immediately cease activities in the area of discovery, protect the remains, and notify the BLM pursuant to 43 CFR Section 10.5 (e) within 24 hours of discovery. The BLM will determine the nature and extent of the remains and determine appropriate treatment of the remains in consultation with tribes under the Native American Graves Protection and Repatriation Act of 1990 (NAGPRA). Construction will resume only after clearance is provided by the BLM.
- If bones are found on State Trust Land, Chevron shall immediately notify local law enforcement and the Office of the Medical Investigator pursuant to 18-6-11.2C (Cultural Properties Act NMSA 1978). In accordance with 18-6-11.2C and/or 36 CFR 800 et seq. implementing Section 106 of the National Historic Preservation Act of 1966 (NHPA) as amended (54 USC 306108 et seq.), and the NAGPRA (25 USC, 3001, et seq.), Chevron shall notify the State Historic Preservation Office (SHPO) or the State Archaeologist immediately. The New Mexico State Land Office (SLO) and the SHPO will determine the necessary steps to evaluate significance and document, protect, or remove the material or remains, in compliance with the law. Construction will resume only after clearance is provided by the SLO and the SHPO.

- If the inadvertent discovery is composed of archaeological material not associated with skeletal remains, Chevron shall cease work immediately, protect the find, and notify the relevant land management agency or owner pursuant to the Antiquities Act of 1906 (34 Statute 225; 16 USC 431-433). Construction will resume only after clearance is provided by the land management agency.
- Indirect impacts will be controlled by limiting access to cultural resources, educating employees about the significance of cultural resources, and implementing a strict management policy restricting the casual collection of artifacts from the project area. All construction and monitoring personnel will be briefed on protective measures implemented for cultural resources and the importance of resource preservation.

Chemical and Fuel Secondary Containment and Exclosure Screening

- Chevron shall install and maintain an impervious secondary containment system for any tank or barrel containing hazardous, poisonous, flammable, or toxic substances sufficient to contain the contents of the tank or barrel and any drips, leaks, and anticipated precipitation.
- Chevron would dispose of fluids within the containment system in accordance with state law, and will not drain the fluids to soil or ground.
- Chevron would design, construct, and maintain all secondary containment systems to prevent wildlife and livestock exposure to harmful substances by installing effective exclosure systems such as fencing, netting, expanded metal mesh, lids, and grate covers (using a maximum netting mesh size of 1.5 inches).

Communitization Agreement

- Communitization agreements would be required for some wells. When required, Chevron shall submit the communitization agreement to the CFO when the APD is submitted.

Construction Notification

- Chevron shall notify the CFO at least three days prior to commencing construction of an access road or pad, and shall have the approved MDP, APD, and Conditions of Approval onsite and shall make them available upon request by the Authorized Officer.

Dark Skies

- Chevron would install lighting on fixed equipment and surface facilities in a way that minimizes light pollution and protects visual resources while ensuring adequate light for safe and reliable production operations.

Enclosure Fencing

- Chevron shall install and maintain enclosure fencing for all open well cellars before and after drilling operations until the pit is free of fluids and backfilling has been initiated.

Flaring

- Chevron would not flare produced or recycled gas except for instances where flaring is necessary to protect operating personnel or to ensure the safe operation of surface facilities.

Karst

- A 200-meter avoidance buffer will initially be placed around karst features. In cases where the 200-meter karst feature avoidance buffer is not reasonably achievable, karst features may be avoided by a lesser distance if deemed appropriate in consultation with BLM Karst Specialists.
- During construction, Chevron would halt all activities and immediately notify the BLM in the event that any underground voids are encountered.
- During construction, Chevron would not use blasting as a construction method.

- During construction, Chevron would berm all pads to minimize the effects of any spilled contaminant.
- While drilling, Chevron would use a closed mud system using steel tanks with all fluids and cuttings hauled off.
- While drilling, Chevron would use freshwater where cave or karst features are expected to prevent contamination of freshwater aquifers.
- While drilling, Chevron would only directional drill after at least 100 feet below the cave occurrence zone.
- While drilling, Chevron would log and report all lost circulation zones in the drilling report.
- During production operations, Chevron would install automatic shutdown systems, check valves, or similar systems on pipelines and tanks to minimize the effects of line failures.
- During production operations, Chevron would perform annual pressure monitoring on well casing and would undertake remedial action if any casing failures are identified.

Netting of Open-Topped Tanks.

- Chevron shall net, screen, or cover open-topped tanks until the tanks are removed or until the tanks no longer contain the substances that could be harmful to wildlife or livestock. If netting is used, Chevron would cover and secure the open portion of the tank to prevent wildlife entry. A maximum netting size of 1.5 inches would be used, and the netting would not be in contact with fluids and would not have holes or gaps.

Noise Control

- Chevron would install exhaust mufflers on fixed equipment so as not to exceed 75 decibels measured at 30 feet from the source of the noise.

Noxious Weeds

- Chevron would use appropriate weed control methods (per the Authorized Officer) on disturbed land where noxious weeds exist, including roads, pads, associated pipeline corridors, and adjacent lands affected by the establishment of weeds due to Chevron's action.

Open-Vent Exhaust Stack Exclosures

- Chevron would construct, modify, equip, and maintain all open-vent exhaust stacks on production equipment to prevent birds and bats from entering, and to discourage perching, roosting, and nesting. Exclosure systems would be in the shape of a cone.

Painting Requirement

- Chevron would paint all aboveground structures that are not subject to safety requirements a flat non-reflective paint color, Shale Green from the BLM Standard Environmental Color Chart (CC-001: June 2008). Exceptions would apply where special safety colors are required by OSHA.

Range Features, including Fences and Cattle Guards

- Chevron would avoid or pay to relocate structures that provide water to livestock, such as windmills, pipelines, drinking troughs, and earthen reservoirs.
- Where entry is granted across a fence line, Chevron would brace the fence and tie off on both sides of the passageway with H-braces prior to cutting. A wire gate or appropriately sized cattle guard would be installed in the fence opening during infrastructure installation to prevent livestock from crossing the fence and would remain in place during construction inactivity.

- Chevron would repair or replace new or existing cattle guards on the route if they are damaged or have deteriorated beyond practical use. Once the work is completed or the road is abandoned, Chevron would restore the fence to its prior condition, or better.
- Chevron would notify the private surface landowner or the grazing allotment holder prior to crossing any fences or livestock water pipelines.

Topsoil

- Chevron would strip the top portion of the soil (root zone – typically 6 inches in depth) from the entire ROW, road, or pad area and stockpile the topsoil, where possible, along the uphill edge of the ROW, road, or pad as depicted in the MDP SUPO. Other subsoil would be completely segregated from the topsoil stockpile. Stockpiled topsoil would be redistributed over the interim reclamation areas. Topsoil would not be used for berming the pad or facilities. For final reclamation, topsoil would be spread over the entire pad area for seeding preparation. Large rocks or subsoil clods shall be buried within the approved area for interim reclamation or scattered to match surrounding baseline surface texture.
- Blading would not be conducted in areas of gypsum soils.

Watershed

- Chevron would berm the entire well pad to prevent oil, salt, and other chemical contaminants from leaving the well pad. No water flow from the uphill side of the pad would be allowed to enter the well pad.

Well Pad Surfacing

- Chevron would surface roads and well pads with caliche, crushed gravel, or river rock which would be removed at the time of reclamation. Well pads would be constructed in a manner that creates the smallest possible surface disturbance, consistent with safety and operational needs.

Wildlife

- Chevron would protect raptor nests on special, natural habitat features – such as trees, large brush, cliff faces, and escarpments – by not allowing surface disturbance within up to 200 meters of active nests or by delaying activity for up to 90 days, or a combination of both.
- Prior to initiating construction activities, Chevron or the BLM would perform a wildlife survey to identify raptor nests in the proximity and to determine if the raptor nests are active. Chevron would contact a BLM Wildlife Biologist if any raptor nests within 200 meters of the construction site are active.
- Chevron would only consider construction within 200 meters of a raptor nest if the nest is inactive, the proposed activity is of short duration (e.g., habitat enhancement projects, fences, pipelines), and if construction would not result in continuing activity in proximity to the nest.

APD Group 1

Six APDs submitted with the MDP are for wells that would be drilled from the HH SO 8 P2 well pad. These wells and associated infrastructure would share the same well pad, access road, CTB, and containment pond (**Figure 2.1-3**). Total surface disturbances for APD Group 1 are estimated to be 50.9 acres (45.0 on BLM-administered surface; 5.9 on state surface). Following interim reclamation, long-term disturbances would be 30.1 acres (29.8 on BLM-administered surface; 0.3 on state surface). Surface disturbances for APD Group 1 are summarized in **Table 2.1-2**. These disturbances are included in the MDP estimates summarized in **Table 2.1-1** and are not additive to those totals. The well pad, tank battery, and containment pond would be located on BLM-administered surface. Access roads, pipelines, flowlines, and powerlines would be constructed on a combination of BLM and state lands. An existing well pad, containment pond, and tank battery are present in T26S, R27E, Section 16. The existing lease road for that pad would be utilized for APD Group 1.

Proposed Well Pad

To drill the proposed wells with a closed loop system, a 525-foot by 330-foot surfaced well pad would be needed, with additional surface requirements for topsoil and spoil storage and areas of cut and fill. Because six wells would be drilled from this well pad, surface dimensions are greater than for four well pads described previously in this section. Chevron would construct the well pad in accordance with the MDP SUPO. After the sixth well is drilled and completed on the well pad, the proposed well pad would be downsized to a 200-foot by 325-foot surfaced pad. All areas not needed for production would be reclaimed in accordance with the interim reclamation components of the MDP SUPO.

Proposed Access Roads

Chevron proposes to construct an access road for the well pad and separate access roads for the CTB and water containment pond. The well pad access road would connect an existing lease road with the northeast corner of the well pad. The well pad access road would be 5,538 feet long (4,384 feet on BLM surface; 1,154 feet on state surface) and would require approximately 3.6 acres of surface disturbance for construction, including roadside ditches (approximately 2.8 acres on BLM surface; 0.8 acres on state surface). Combined, the CTB and containment pond access roads would be 1,787 feet long (all BLM surface) and would require approximately 1.1 acres of surface disturbance for construction. All access roads would use waterbars, lead-off ditches, and low-water crossings for water control and would not require the installation of culverts.

Proposed Electrical Lines

Chevron proposes to construct a total of 7,285 feet of electrical utility lines parallel to the access roads. The electrical lines would connect with an existing four-wire electrical line at the existing lease road in T26S, R27E, Section 16, NWNW. The electrical lines would be constructed within the same disturbance corridor as the flowlines and pipelines. Surface disturbance calculations incorporate all components within the corridor and assume that the entire corridor would be disturbed (**Table 2.1-4**).

Proposed Flowlines and Pipelines

Chevron proposes to construct multiple flowlines and pipelines as summarized in **Table 2.1-5**. As described for the MDP, these would be constructed within a shared corridor, with safety offsets between lines. Proposed pipelines include a produced fluids flowline cluster (high-pressure gas, low-pressure gas, oil, water), gas lift flowline, SWD water flowline, and frac water flowline. The maximum combined length of buried flowlines and pipelines would be approximately 9,492 feet (6,960 feet on BLM-administered surface; 2,532 feet on state surface). Total disturbance for the pipelines would be 22.6 acres (16.7 acres on BLM-administered surface; 5.9 acres on state surface). The final permanent water recycling and disposal system described for the MDP would be determined prior to constructing water transfer pipelines. Until that determination has been made, produced water would be hauled off location in trucks. The gas purchaser pipeline is already in place at the existing tank battery.

Proposed Central Tank Battery

The CTB for APD Group 1 would be located in T26S, R27E, Section 9, SW1/4 approximately 0.9 miles east of the proposed well pad location. The CTB would be 550 feet by 750 feet (including areas for topsoil and spoil storage and areas of cut and fill) and would occupy approximately 9.5 acres of BLM-administered surface. The CTB would be designed and constructed as described for the MDP.

Proposed Water Containment Pond

One containment pond for water to be used in hydraulic fracturing operations would be located in T26S, R27E, Section 9, SW1/4 approximately 1.0 mile east of the proposed well pad location. The pond would require a construction footprint of 760 feet by 760 feet and occupy approximately 13.3 acres of BLM-administered surface. The containment pond would initially be used to hold freshwater brought to the site

by truck and would be used to store recycled water after the water recycling system has been constructed and associated water transfer pipelines (see above) have been constructed.

APD Group 2

Six APDs submitted with the MDP are for wells that would be drilled from the HH SO 10 P3 well pad. These wells and associated infrastructure would share the same well pad, access road, CTB, compressor station, and containment pond (**Figure 2.1-4**). Total surface disturbances for APD Group 2 are estimated to be 55.0 acres (50.3 acres on BLM-administered surface; 4.7 acres on state surface). Following interim reclamation, long-term disturbances would be 32.8 acres (32.6 acres on BLM-administered surface; 0.2 acres on state surface). Surface disturbances for APD Group 2 are summarized in **Table 2.1-2**. These disturbances are included in the MDP estimates summarized in **Table 2.1-1** and are not additive to those totals. The well pad, tank battery, and containment pond would be located on BLM-administered surface. Access roads, pipelines, flowlines, and powerlines would be constructed on a combination of BLM and state lands.

Proposed Well Pad

To drill the proposed wells with a closed loop system, a 580-foot by 330-foot surfaced well pad would be needed, with additional surface requirements for topsoil and spoil storage and areas of cut and fill. Because six wells would be drilled from this well pad, surface dimensions are greater than for four well pads described previously in this section. Chevron would construct the well pad in accordance with the MDP SUPO. After the sixth well is drilled and completed on the well pad, the proposed well pad would be downsized to a 200-foot by 325-foot surfaced pad. All areas not needed for production would be reclaimed in accordance with the interim reclamation components of the MDP SUPO.

Proposed Access Roads

Chevron would need to construct an access road for the well pad as well as separate access roads for the CTB, compressor station, and water containment pond. The well pad access road would connect the existing Roadrunner Road with the southern boundary of the well pad. The well pad access road would be 542 feet long (all BLM surface) and would require approximately 0.3 acres of surface disturbance for construction. The other access roads would intersect with Whites City Road. Combined, the CTB, compressor station, and containment pond access roads would be 2,116 feet long (all BLM surface) and would require approximately 1.2 acres of surface disturbance for construction. All access roads would use waterbars, lead-off ditches, and low-water crossings for water control and would not require the installation of culverts.

Proposed Electrical Lines

Chevron would need to construct a total of 8,642 feet of electrical utility lines parallel to the access roads. The electrical lines would connect with an existing four-wire electrical line at Whites City Road. The electrical lines would be constructed within the same ROW as the flowlines and pipelines and would not represent additional surface disturbance (**Table 2.1-4**).

Proposed Flowlines and Pipelines

Chevron would need to construct multiple flowlines and pipelines as summarized in **Table 2.1-5**. As described for the MDP, these would be constructed within a shared corridor, with safety offsets between lines. Proposed pipelines include a produced fluids flowline cluster (high-pressure gas, low-pressure gas, oil, water), gas lift flowline, SWD water flowline, and frac water flowline. The maximum combined length of buried flowlines and pipelines would be approximately 8,440 feet (6,504 feet on BLM-administered surface; 1,936 feet on state surface). Total disturbance for the pipelines would be 19.8 acres (15.3 acres on BLM-administered surface; 4.7 acres on state surface). The final permanent water recycling and disposal system described for the MDP (including location of SWD facilities connected to APD Group 2) would be determined prior to constructing water transfer pipelines. Until that determination has been

made, produced water would be hauled off location in trucks. The gas purchaser pipeline is already in place at the existing tank battery.

Proposed Central Tank Battery

The CTB for APD Group 2 would be located in T26S, R27E, Section 10, NW1/4, approximately 0.3 miles southeast of the proposed well pad location. Surface requirements for a combined CTB and compressor station pad would be 1,100 feet by 600 feet (including areas for topsoil and spoil storage and areas of cut and fill) and would occupy approximately 8.0 acres of BLM-administered surface. The CTB would be designed and constructed as described for the MDP.

Proposed Compressor Station

The compressor station for APD Group 2 would be located immediately south of the proposed CTB pad. The compressor station would occupy approximately 3.4 acres of the combined CTB and compressor station pad, all of which would be located on BLM-administered surface. The compressor station would be designed and constructed as described for the MDP. Once necessary pipelines are constructed, this compressor station would also serve APD Group 1.

Proposed Water Containment Pond

One containment pond for water to be used in hydraulic fracturing operations would be located in T26S, R27E, Section 10, NW1/4, approximately 0.5 miles southeast of the proposed well pad location. The pond would require a construction footprint of 760 feet by 760 feet and occupy approximately 13.3 acres of BLM-administered surface. The containment pond would initially be used to hold freshwater brought to the site by truck and would be used to store recycled water after the water recycling system has been constructed and associated water transfer pipelines (see above) have been constructed.

2.2. No Action

The BLM NEPA Handbook (H-1790-1; BLM 2008a) states that for EAs for externally initiated proposed actions, the no action alternative generally means that the proposed activity would not take place. This option is provided in 43 CFR 3162.3-1 (h) (2). This alternative would deny the approval of the proposed MDP. Under the no action alternative, the coordinated exploration of the HDA area proposed by Chevron would not be authorized by the BLM. The BLM would consider APDs and other authorizations within the HDA on a case-by-case basis outside the scope of this EA. Similar design features would likely be incorporated on a case-by-case basis and the same mitigation measures would be required. However, approval of wells on a case-by-case basis may result in separate infrastructure being constructed for individual wells, which would increase surface disturbance and lead to greater effects to the environment and resources.

Under the no action alternative, the proposed action would not be completed; no new oil and gas wells would be constructed, drilled, completed, operated, plugged, or abandoned and no access roads or other infrastructure would be constructed or upgraded. Therefore, there would be no new impacts to natural or cultural resources. The no action alternative would result in the continuation of the current land and resources uses in the project area and is used as the baseline for comparison of environmental effects of the analyzed alternatives.

2.3. Alternatives Considered but Eliminated from Detailed Study

All areas of proposed surface disturbance for the proposed action were inspected to ensure that potential impacts to natural and cultural resources would be minimized through the implementation of mitigation measures. These measures for all resources potentially impacted are described in Section 3 of this EA. Therefore, no additional alternatives other than those listed above and below have been considered for this project.

One alternative was considered, but eliminated from further consideration. This alternative would not approve road construction along 4,200 feet of existing disturbance in T25S, R27, Section 26. Chevron proposes this road to connect the northern portion of the HDA (T25S, R27E, Sections 16-20 and 30) with leases to the south. Use of the proposed road would reduce routine operational traffic passing through southern portions of the HDA, including along Whites City Road and portions of Roadrunner Road. The proposed road would be constructed in an area that is currently disturbed from an existing overhead powerline and buried water line. No significant natural or cultural resource constraints were identified in the proposed area during baseline surveys (Arcadis 2016a). Overall, the alternative is substantially similar to the proposed action and would have similar effects as the proposed action. Therefore, this alternative was not carried forward for analysis.

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3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This section describes the affected environment and the environmental consequences. The affected environment varies for each resource. Both the nature of the resource and components of the proposed action define this variation. The project area shown on **Figure 2.1-1** and many of the figures in Section 3 encompass the proposed action. The project area is larger than the proposed action. In addition, individual resource sections in this document may discuss an analysis area that is larger than the project area. The analysis area defined for a given resource consists of areas of potential direct disturbance in the project area as well as adjacent areas of indirect effects. For some resources, such as geology, soils, and vegetation, the affected area is the physical location and immediate vicinity of the areas that the proposed action would disturb. For other resources, such as air resources, the affected environment is larger (e.g., airshed).

Environmental effects are described in terms of context (site-specific, local, or regional effects), duration (short- or long-term), and intensity (negligible, minor, moderate, or major).

Duration of effects is defined as:

- Short-term - Short-term effects are defined as those effects that would not last longer than the life of the proposed action, including initial reclamation.
- Long-term - Long-term effects are effects that would remain following completion of the proposed action.

The thresholds of change for the intensity of an impact are defined as:

- Negligible - the impact is at the lowest levels of detection.
- Minor - the impact is slight, but detectable.
- Moderate - the impact is readily apparent.
- Major - the impact is a severe or adverse impact or of exceptional benefit.

With the exception of the 12 APDs filed with the MDP, due to the uncertainty of the number of wells per pad and alignments for roads and pipelines, the disturbance areas used in the environmental effects discussion are estimates only and were developed based on the assumption that the disturbance area would need to be large enough to reasonably accommodate future permitted construction or realignments. Actual and specific well pad size, pipeline width, or road width will be determined in future APDs or ROW applications and analyzed in subsequent NEPA actions, such as a DNA.

During the analysis process, the interdisciplinary team considered several resources and supplemental authorities. The interdisciplinary team determined that the resources discussed below would be affected by the proposed action. Projects requiring approval from the BLM, such as MDPs, can be denied when the BLM determines that adverse effects to resources (direct or indirect) cannot be mitigated to reach a Finding of No Significant Impact (FONSI).

3.1. Cumulative Impacts Assessment

This section describes the cumulative impacts of the proposed action described in Section 2. Cumulative impacts are the combined effect of past projects, specific planned projects, and other reasonably foreseeable future actions within the Cumulative Impact Area (CIA) to which oil and gas exploration and development may add incremental impacts. This includes all actions, not just oil and gas actions that may occur in the area, including foreseeable non-federal actions.

All resources are expected to sustain some level of cumulative impacts over time; however, these impacts fluctuate with the gradual abandonment and reclamation of wells. As new wells are being drilled, others are being abandoned and reclaimed. As the oil field plays out, the cumulative impacts will lessen as more areas are reclaimed and less are developed.

The combination of all land use practices across a landscape has the potential to change the visual character, disrupt natural water flow and infiltration, disturb cultural sites, cause minor increases in greenhouse gas emissions, fragment wildlife habitat, and contaminate groundwater. However, the likelihood of these impacts occurring is minimized through standard mitigation measures, special Conditions of Approval, and ongoing monitoring studies.

Cumulative Impacts Area

The CIA boundary is the area of analysis for cumulative impacts. The CIA is reasonably sized to prevent dilution of the cumulative impacts over large areas. Guidance from the CEQ was used to identify geographic boundaries (CEQ 1997).

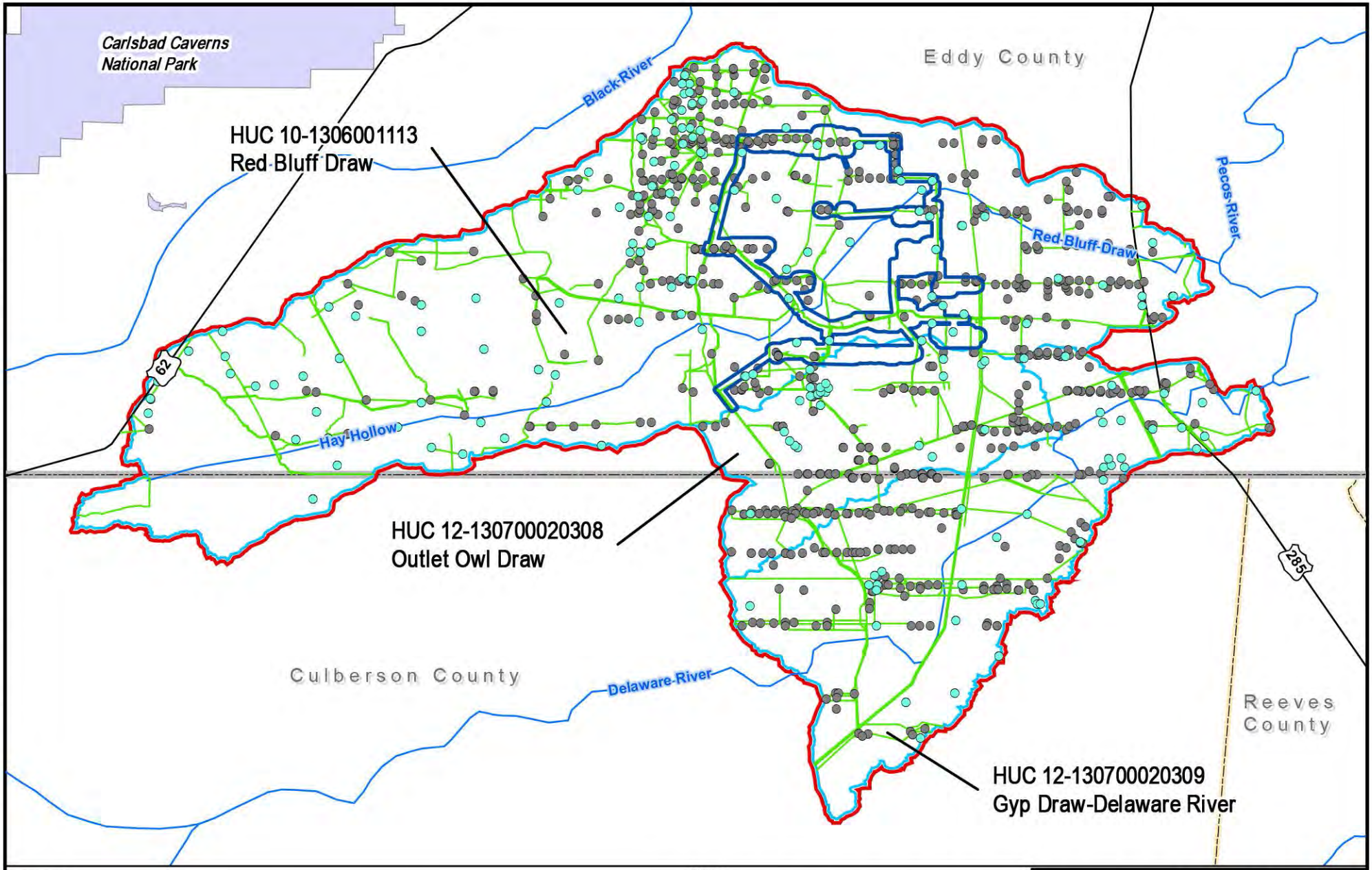
The CIA for this project has been defined as the combined Red Bluff Draw watershed (10-digit hydrologic unit code [HUC-10] 1306001113) and the 12-digit (HUC-12) Outlet Owl Draw (130700020308) and Gyp Draw-Delaware River (130700020309) sub-watersheds (**Figure 3.1-1**). Variations to this CIA for the various resources are described in the applicable individual resource sections below. This CIA was selected, and is appropriate for the assessed resources, because it would be the area potentially impacted by the proposed activities during the project and before the area would be reclaimed. This area is particularly suited for resources impacted by surface disturbances (e.g., soil, water, vegetation), because, as surface disturbances occur and water flows continue downstream, localized impacts become more and more diluted, and eventually reach a point where they become non-measurable. Watersheds provide a discrete boundary within which cumulative impacts can be quantified and analyzed. The CIA comprises approximately 259 square miles (about 165,927 acres), including 82,816 acres of BLM-administered surface.

Past, Present, and Reasonably Foreseeable Future Actions

Past, present, and reasonably foreseeable future actions in the CIA include oil and gas exploration and development, utility construction, mineral (non-hydrocarbon) exploration and extraction, livestock grazing, recreation, and off-road travel. Oil and gas exploration and development are the most prevalent activities within the CIA and are expected to continue to be over the life of the proposed action. Therefore, this analysis focuses on oil and gas industry-related actions. Quantifying cumulative impacts of livestock grazing, recreation, and off-road travel is not practicable; therefore, cumulative impacts resulting from these actions are discussed qualitatively. Estimated surface disturbances within the CIA are summarized in **Table 3.1-1**. Total surface disturbances from past, present, and reasonably foreseeable future actions are estimated to affect approximately 8,342 acres within the CIA, or approximately 5 percent of the CIA.

Within the CIA, approximately 848 oil and gas-related wells (including injection and disposal sites) have been permitted (NMOCD 2016; Texas Railroad Commission [TRRC] 2016). This evaluation assumes that all wells were drilled on single-well pads (a conservative assumption) and that 50 percent of the wells drilled in the CIA were vertical wells, and 50 percent horizontal (based on review of NMOCD data). Using per-well surface disturbance estimates presented in the reasonable foreseeable development (RFD) (1.67 acres for vertical well pads; 2.0 acres for horizontal well pads), approximately 1,919 acres are estimated to have been disturbed within the CIA.

CFO and TRRC data indicate that approximately 900 miles of ROWs, pipelines, and powerlines were previously constructed within the CIA. ROWs within the CIA typically include an access road as well as one or more pipeline/flowline and/or powerlines. Each linear component is assumed to have an average initial disturbance width of 30 feet. Total construction disturbance for existing linear features is estimated to be approximately 3,300 acres. Because the amount of access roads compared to pipelines and utility lines has not been determined, an estimate of reclaimed areas is not calculated.



LEGEND:

- MDP Project Area
- National Hydrographic Dataset
- Cumulative Impacts Area
- Rivers
- Major Roads
- State Boundary
- County Boundary
- Past or Currently Permitted Oil and Gas Well Locations
- Past or Currently Permitted Well Locations (plugged/abandoned/cancelled/dry hole)
- Past or Currently Permitted Pipelines and ROWs
- Carlsbad Caverns National Park

Notes:
-The Cumulative Impact Area for some resources may differ as described in the EA text.

Projection:
WGS 1984

NORTH

0 3.75 7.5 Miles

CHEVRON HAYHURST MDP EA

FIGURE 3.1-1
Cumulative Impacts Area

ANALYSIS AREA: Eddy County, New Mexico

Date: 7/5/2016 | Prepared By: BW

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PROJECT: PATH: Z:\GIS\PROJECTS_ENV\Chevron_Hayhurst\GIS\MXD\Environmental_Assessment\Final\Figure3.1-1_CumulativeImpacts.mxd DATE: 6/6/2016 10:30:17 PM

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Table 3.1-1 Estimated Cumulative Actions

	Number or Miles	Estimated Size (acres) or Width (feet)	Estimated Disturbance (acres)
Past and Present Activities			
Oil and Gas Wells (NMOCD)	650	2 acres (horizontal); 1.67 acres (vertical)[1]	1,193
Oil and Gas Wells (TRRC)	198		363
ROWs (CFO)	702	30	2,554
Utility Lines (CFO)	100	30	364
Pipelines (TRRC)	107	30	389
Reasonably Foreseeable Future Activities (Oil and Gas)			
Oil and Gas Wells (CFO APDs)	65	NA[2]	217
Oil and Gas Wells (RFD)	573[3]	2 acres (horizontal); 1.67 acres (vertical)[4]	1,108
Oil and Gas Flowlines (CFO APDs)	20	30	71
Oil and Gas Pipelines (CFO APDs)	13	30	46
Roads (CFO APDs)	24	30	88
Utility Lines (CFO APDs)	6	30	23
ROWs (CFO Realty)	NA	NA	767
Xcel Energy Transmission Lines and Substations			74
Proposed Action			
Components except Oil and Gas Wells[5]	**Table 2.1-1**		1,085
		Total	**8,342**

Notes:
1 Assumes existing oil and gas wells are 50% vertical and 50% horizontal.
2 Disturbances for future wells within the CFO based on well pad and associated facility sizes included in APDs.
3 Through 2034 – see **Table 3.1-2**.
4 Assumes future oil and gas wells are 20% vertical and 80% horizontal.
5 Assumes proposed action wells are included in reasonably foreseeable future action totals.

In 2012 and 2014, the BLM New Mexico State Office published an RFD scenario for hydrocarbon production in southeast New Mexico for the next 20 years (i.e, through 2034) (BLM 2012 and 2014b). The RFD included a comprehensive review of existing and emerging hydrocarbon plays. The wells drilled under the proposed action would be included in the RFD. New oil and gas wells are estimated to be drilled at a rate of 800 per year within the RFD analysis area; however, the CIA encompasses only a fraction (approximately 2 percent) of the RFD analysis area. To determine the potential future oil and gas activity within the CIA, the BLM reviewed the distribution of oil and gas plays identified in the RFD. According to the RFD, the Bone Spring play within the CIA has high development potential, and portions of the Delaware Mountain Group play have high to low potential (BLM 2012 and 2014b). Other plays within the CIA (e.g., Morrow) have lower development potential and were not specifically factored into estimates of future development. The RFD only assessed lands in New Mexico; therefore, based on the presence of similar geologic conditions in Texas, the Bone Spring and Delaware Mountain Group play boundaries were extended to the south. **Table 3.1-2** summarizes the extent of these plays within the CIA and numbers of wells estimated to be drilled through 2034.

Electrical transmission infrastructure construction is considered a reasonably foreseeable future action. Xcel Energy plans to construct a 115 kV transmission line between the proposed China Draw and Yeso Hills substations. Both substations and the entire transmission line would be within the CIA. Construction of the substations is assumed to require approximately 20 acres of total surface disturbances (10 acres for each substation). Approximately 11.1 miles of this transmission line would be within the CIA. Based on a likely ROW construction width of 30 feet, approximately 40 acres of temporary surface disturbance are expected to occur. Reclamation would likely occur immediately following construction. The proposed in-service date for this transmission line is June 1, 2018 (Xcel Energy 2016a).

Table 3.1-2 Estimated Future Oil and Gas Development

Play Name and Development Potential	Extent within CIA (miles^2)	New Wells per Section	Estimated New Wells
Bone Spring (High)	65	4	260
Delaware Mountain Group (High)	12	4	48
Delaware Mountain Group (Medium)	55	2	110
Delaware Mountain Group (Low)	118	1	118
All Other Areas (Lowest)	74	0.5	37
		Total	**573**

Notes:
Bone Spring play overlaps with portions of the Delaware Mountain Group play. All areas of overlap assume both plays would be developed.
Assumption of four wells per section for high potential plays from the BLM (2014b).
One section equals one square mile.

Xcel Energy also plans to construct a 345 kV transmission line between the proposed China Draw substation and a proposed North Loving substation along US Highway 285 approximately 9 miles south of Carlsbad. Approximately 3.9 miles of this transmission line would be within the CIA. The North Loving substation would be outside the CIA. Based on a ROW width of 30 feet, approximately 14 acres of temporary surface disturbance are expected to occur. Reclamation would likely occur immediately following construction. The proposed in-service date for this transmission line is June 1, 2018 (Xcel Energy 2016b).

3.2. Air Resources

Affected Environment

The proposed action would occur within the boundaries of the BLM CFO. Air resources within the CFO are managed according to the CFO's revised RMP. As such, much of the information referenced in this section is incorporated from the Air Resources Technical Support Document (ARTSD) prepared in support of the RMP (URS Group, Inc. 2013). The ARTSD summarizes the technical information related to air resources and climate change associated with oil and gas development and the methodology and assumptions used for analysis. As described below, the two components of air resources are climate and air quality.

The area of analysis for air resources is the Permian Basin; this basin's airshed covers southeastern New Mexico and the northern panhandle of Texas. Air quality within the HDA has the potential to be affected by emissions from the construction and operation of oil and gas facilities, pipelines, and other infrastructure. Regional air quality also is affected by natural events such as windstorms and wildfires. These natural events generally are short lived, lasting from several hours to perhaps several days. The effects during these events may impact human health and the environment, and generally are considered part of the natural and physical environment. This section describes the existing air quality resources of the region and the applicable air regulations that would apply to the HDA.

Climate

The area of analysis is located in a semiarid climate regime typified by dry windy conditions, limited rainfall, hot summers, and mild winters. Summertime maximum temperatures are generally in the 90s (all temperatures are in degrees Fahrenheit [˚F]) with occasional temperatures over 110˚F. Winter minimum temperatures are generally between the 20s and 30s with extremes remaining above zero. Precipitation is mainly in the form of summer thunderstorms associated with the Southwest Monsoon, although occasional Pacific storms occur south into New Mexico during the winter. **Table 3.2-1** shows climate normals for 1981 through 2010 for the Carlsbad Monitoring Station (National Oceanic and Atmospheric Administration 2011).

Table 3.2-1 Climate Normals for Carlsbad, 1981-2010

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average Temperature (°F)	42.6	47.2	54.0	62.4	71.5	79.3	81.2	79.9	73.2	62.9	51.5	42.8
Average Maximum Temperature (°F)	57.5	62.7	70.2	78.5	86.9	94.4	94.6	93.1	87.0	78.1	67.1	57.5
Average Minimum Temperature (°F)	27.6	31.7	37.9	46.2	56.0	64.3	67.7	66.6	59.4	47.7	35.8	28.0
Average Precipitation (inches)	0.47	0.54	0.51	0.64	1.17	1.53	2.01	1.83	2.11	1.16	0.81	0.63

Source: National Oceanic and Atmospheric Administration 2011

Prevailing winds are from the southeast with speeds varying from 0 to 20 miles per hour (mph), rarely exceeding 31 mph (Cedar Lake 2016). **Figure 3.2-1** and **Figure 3.2-2** show the distribution of magnitude and direction of local winds for 2014 from the Cavern City Airport in Carlsbad, New Mexico and the Lea County Regional Airport in Hobbs, New Mexico, respectively (National Climatic Data Center 2014).

Existing Air Quality

Air quality in a given location is defined by pollutant concentrations in the atmosphere and is generally expressed in units of parts per million (ppm) or micrograms per cubic meter (µg/m^3). The existing air quality in the proposed development area is considered to be acceptable for human health and the environment since it is in attainment of the National Ambient Air Quality Standards (NAAQS) and State AAQS (SAAQS) or has insufficient data to establish compliance. The EPA Green Book web page (EPA 2015) reports that the Permian Basin is in attainment for all NAAQS as defined by the Clean Air Act (CAA).

The CFO recently installed monitors in the HDA airshed, including in Carlsbad, Carlsbad Caverns National Park, and Hobbs (URS Group, Inc. 2013), to monitor ambient concentrations of criteria air pollutants. Monitored design values for ozone (O_3), nitrogen dioxide (NO_2), particulate matter with aerodynamic diameter less than 10 microns and 2.5 microns (PM_{10} and $PM_{2.5}$, respectively), carbon monoxide (CO), and sulfur dioxide (SO_2) are shown in varied units in **Table 3.2-2**. Design values are the concentrations of air pollution at a specific monitoring site represented in the averaging period that can be compared to the NAAQS. Monitoring is not conducted for lead and CO in southeastern New Mexico; however, concentrations of these pollutants are expected to be low in rural areas and are therefore not monitored. CO is monitored, however, in Texas. The New Mexico Environment Department (NMED) discontinued monitoring for SO_2 in Eddy County due to very low monitored concentrations. Design values for PM_{10} in southeastern New Mexico are not available due to incomplete data collection.

Table 3.2-2 Design Concentrations of Criteria Pollutants in the HDA Airshed

Pollutant	Averaging Period	Location	Design Value (units vary)					NAAQS
			2008	2011	2012	2013	2014	
O_3	8-hour	Hobbs	0.067 ppm(1)	0.061 ppm	--	--	0.065	0.070 ppm(4)
		Carlsbad	0.067 ppm(1)	0.069 ppm	--	--	--	
NO_2	Annual	Hobbs	--	6 ppb	--	--	--	53 ppb
		Carlsbad	--	3 ppb	--	--	2.8 ppb(2)	
	1-hour	Carlsbad	--	42 ppb	18.4 ppb(3)	18.4 ppb(3)	18.4 ppb(3)	100 ppb(5)
$PM_{2.5}$	Annual	Hobbs	--		7.8 µg/m^3(6)	7.8 µg/m^3(6)	7.8 µg/m^3(6)	12 µg/m^3
	24-hour	Hobbs	--	21.9 µg/m^3(7)	21.9 µg/m^3(7)	21.9 µg/m^3(7)	--	35 µg/m^3
PM_{10}(8)	24-hour	--	--	--	--	--	--	150 µg/m^3
CO	8-hour	El Paso, TX	--	--	1.5 ppm(9)	1.5 ppm(9)	1.5 ppm(9)	9 ppm
	1-hour	El Paso, TX	--	--	2.1 ppm(9)	2.1 ppm(9)	2.1 ppm(9)	35 ppm
SO_2	Annual	El Paso, TX	--	--	0.0006 ppm(9)	0.0006 ppm(9)	0.0006 ppm(9)	0.03 ppm
	24-hour	El Paso, TX	--	--	0.0017 ppm(10)	0.0017 ppm(10)	0.0017 ppm(10)	0.14 ppm

Table 3.2-2 Design Concentrations of Criteria Pollutants in the HDA Airshed

Pollutant	Averaging Period	Location	Design Value (units vary)					NAAQS
			2008	2011	2012	2013	2014	
	3-hour	El Paso, TX	--	--	0.0065 ppm(10)	0.0065 ppm(10)	0.0065 ppm(10)	0.5 ppm
	1-hour	El Paso, TX	--	--	4.7 ppb(11)	4.7 ppb(11)	4.7 ppb(11)	75 ppb

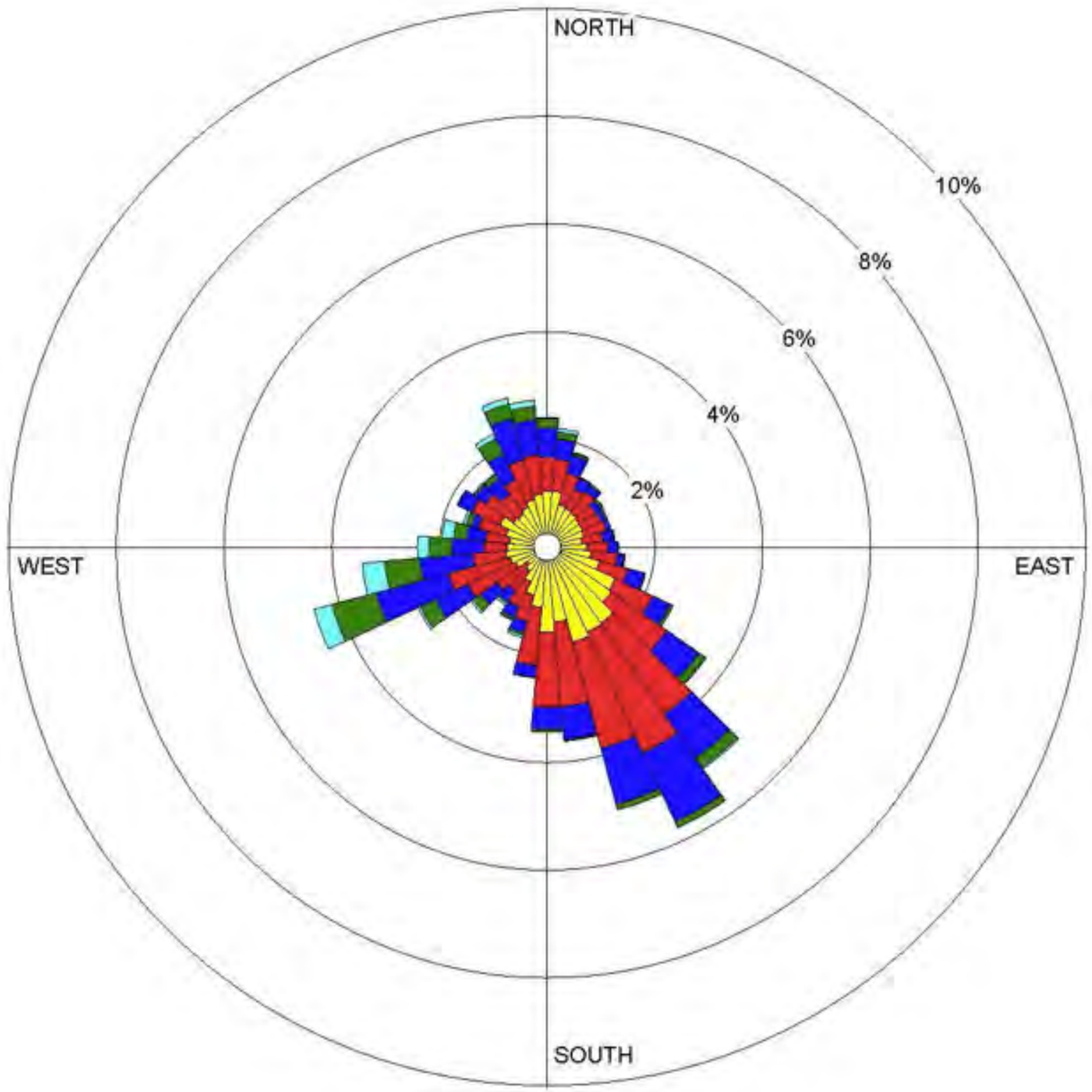
Notes:
1 Annual fourth-highest daily maximum 8-hour concentration (URS Group, Inc. 2013, Table 4-7)
2 Highest annual value from the most recent year monitored (2014) (1 part per billion [ppb] = 1.88 µg/m^3) (NMED 2014a).
3 Three-year average of 98th percentile of 1-hour maximum used (2012-2014) (1 ppb = 1.88 µg/m^3) (NMED 2014a).
4 Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years.
5 98th percentile, averaged over 3 years.
6 Average of annual values from 3 years of data set (2012-2014) (NMED 2014a).
7 Three-year average of 98th percentile of 24-hour maximum used (2011-2013) (NMED 2014a).
8 No PM_{10} data are available as there are no PM_{10} monitors within the HDA airshed.
9 Highest annual value over 3 years (2012-2014) (TCEQ 2014).
10 Highest annual value of the 3-hour maximum over three years (2012-2014) (TCEQ 2014).
11 Three-year average of 99th percentile of 1-hour maximum used (2012-2014) (TCEQ 2014).

The EPA conducts a periodic National Air Toxics Assessment (NATA) to quantify hazardous air pollutant (HAP) impacts by county and to identify areas where HAP emissions result in high health risks and therefore further emissions reduction strategies are necessary. A review of the 2011 NATA results shows that cancer, neurological, and respiratory risks in Eddy and Lea Counties are generally increasing compared to statewide and national levels (EPA 2011).

Regulatory Framework and Standards of Significance

The CAA of 1970 (42 USC 7401 et seq.) as amended in 1977 and 1990 is the basic federal statute governing air pollution. Provisions of the CAA of 1970 that potentially are relevant to the HDA are listed and discussed below:

- **NAAQS** – These standards set limits to protect public health (primary standards) and public welfare (secondary standards). Details on the NAAQS are described in the following section.
- **New Source Review (NSR)** – This program protects air quality by reviewing newly constructed or modified stationary sources to ensure that adequate controls, emission limits, and operational practices to prevent a violation of the NAAQS or other standard are in place. This program is administered by the state of New Mexico, tribal authorities, or the EPA through approved implementation plans.
- **Prevention of Significant Deterioration (PSD)** – This program serves to protect public health and welfare, and preserve, protect, and enhance air quality in areas currently compliant with the NAAQS. PSD does not prevent sources from increasing emissions, but provides a review process for large stationary sources to ensure that Best Available Control Technology (BACT) is applied and the project will not contribute to a violation of the NAAQS or degrade ambient air quality above established baselines. Special protection is given to Class I areas, which are defined as areas of special national or regional natural, scenic, recreational, or historic value. Class I areas are protected by Federal Land Managers (FLMs) by management of air quality related values (AQRVs) such as visibility and acid deposition. FLMs review the issuance of a PSD permit for any impacts that exceed guideline thresholds.
- **Nonattainment New Source Review (NNSR)** – This program ensures that new projects in areas with existing air quality that does not comply with the NAAQS are compliant. This review process requires the highest level of emission controls and must result in net emissions reductions to achieve compliance.



LEGEND

WIND SPEED
(m/s)

- >= 11.10
- 8.80 - 11.10
- 5.70 - 8.80
- 3.60 - 5.70
- 2.10 - 3.60
- 0.50 - 2.10

Calms: 13.73%

Notes:
Windrose Plot = Cavern City Air Terminal
Display = Wind speed direction (blowing from)
Start Date = 1/1/2014 - 00:00
End Date = 12/31/2014 - 23:00
Calm Winds = 13.73%
Avg. Wind Speed = 3.89 m/s
Modeler = Jalbert
Total Count = 8748 hrs.

CHEVRON HAYHURST

FIGURE 3.2-1
Carlsbad, NM Windrose, 2014

ANALYSIS AREA: Eddy County, New Mexico

Date: 3/14/2016	Prepared By: BW

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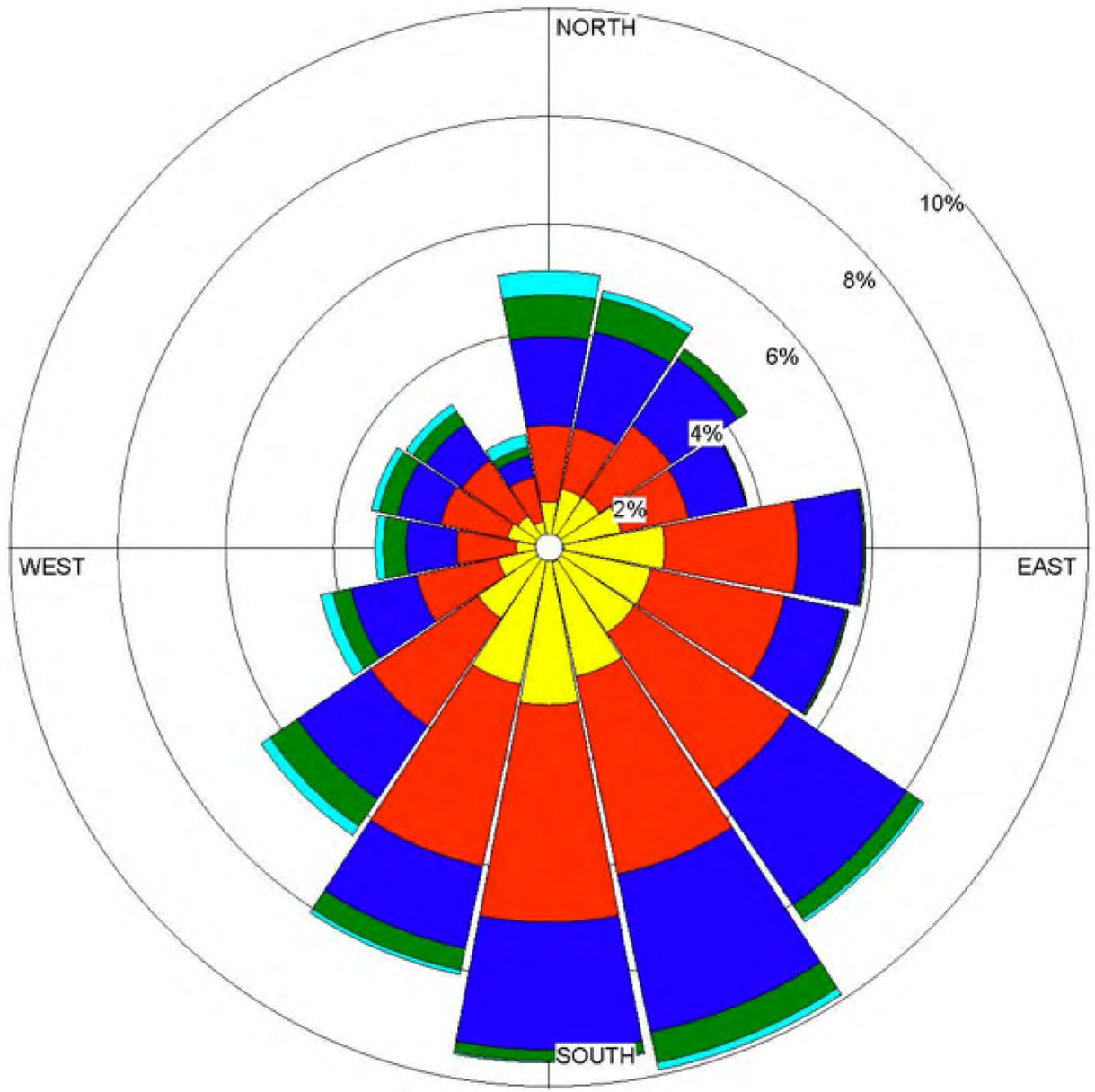

LEGEND

WIND SPEED
(m/s)

- >= 11.1
- 8.8 - 11.1
- 5.7 - 8.8
- 3.6 - 5.7
- 2.1 - 3.6
- 0.5 - 2.1

Calms: 11.66%

Notes:
Windrose Plot = Lea County Regional Airport (Hobbs, NM)
Display = Wind speed direction (blowing from)
Start Date = 1/1/2014 - 02:00
End Date = 12/31/2014 - 23:00
Calm Winds = 11.66%
Avg. Wind Speed = 4.43 m/s
Modeler = Jalbert
Total Count = 8345 hrs.

CHEVRON HAYHURST

FIGURE 3.2-2
Hobbs, NM Windrose, 2014

ANALYSIS AREA: Eddy County, New Mexico

Date: 3/14/2016 | Prepared By: BW

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- **Conformity for General Federal Actions** – The purpose of these rules are to ensure that the actions taken by federal agencies in nonattainment and maintenance areas do not interfere with a state's plans to meet national standards for air quality.
- **New Source Performance Standards (NSPS)** –This program sets standards for new, modified and reconstructed stationary sources irrespective of permitting requirements. These rules establish emission limits, control requirements, and work practice standards for different source categories.
- **Maximum Achievable Control Technology (MACT) Standards** – This program promulgated under the National Emission Standards for Hazardous Air Pollutants (NESHAP) establishes technology-based standards for HAPs that require top-tier controls for affected sources.
- **Mandatory Greenhouse Gas (GHS) Reporting Rule: 40 CFR 98, Subpart W** – This rule requires data collection, monitoring, and reporting of GHG emissions to guide development of policy to reduce GHG emissions.

Details of these programs are described in the Air Quality Technical Support Document developed for the proposed action.

National Ambient Air Quality Standards

The federal CAA amendments of the 1990s require all states to control air pollution emission sources so that the NAAQS are met and maintained. In addition to these requirements, the National Park Service (NPS) Organic Act requires the NPS to protect the natural resources of the lands it manages from the adverse effects of air pollution.

The NAAQS establishes maximum acceptable concentrations for NO_2, CO, SO_2, PM_{10}, $PM_{2.5}$, ozone, and lead. Given the extremely low levels of lead emissions from project sources, the lead standards are not addressed in this analysis. These pollutants are known as criteria pollutants. The NAAQS are established by the EPA and are outlined in 40 CFR 50. These standards represent the maximum allowable atmospheric concentrations that may occur without jeopardizing public health and welfare, and include a reasonable margin of safety to protect the more sensitive individuals in the population. The NAAQS represent maximum acceptable concentrations that generally may not be exceeded more than once per year; the annual standards may never be exceeded. An area that does not meet the NAAQS is designated as a nonattainment area on a pollutant-by-pollutant basis. Applicable federal and state criteria are presented in **Table 3.2-3**.

Table 3.2-3 National Ambient Air Quality Standards

Pollutant (units)	Averaging Period	Ambient Air Quality Standards[1]	
		National	New Mexico
NO_2 (varies)	Annual[2]	100 µg/m^3	0.05 ppm
CO (varies)	1-hour[3]	40,000 µg/m^3	13.1 ppm
	8-hour[3]	10,000	8.7 ppm
SO_2 (varies)	3-hour[3]	1,300	N/A
	24-hour[3]	260 µg/m^3	0.10 ppm
	Annual[2]	60	0.02 ppm
PM_{10} (µg/m^3)	24-hour[4]	150	150
	Annual[2, 7]	50	60
$PM_{2.5}$ (µg/m^3)	24-hour[5]	35	N/A
	Annual[6]	15	N/A
Ozone (ppm)	8-hour[8]	0.070	N/A

Notes:
1 Sources: EPA 2016 and NMED 2016.
2 Never to be exceeded.
3 Not to be exceeded more than once per year.
4 Not to be exceeded more than once per year on average over 3 years.

Table 3.2-3 National Ambient Air Quality Standards

5 Three-year average of the 98th percentile of the 24-hour concentrations at each population-oriented monitor within an area must not exceed this standard.
6 Three-year average of the weighted annual mean concentrations from single or multiple community-oriented monitors must not exceed this standard.
7 The annual PM_{10} NAAQS of 50 µg/m^3 was revoked by EPA on September 21, 2006. See Federal Register Volume 71, Number 200, October 17, 2006.
8 Values provided reflect the new standard of 0.070 ppm. Three-year average of the fourth highest daily maximum 8-hour average measured at each monitor within an area over each year must not exceed this standard.

Prevention of Significant Deterioration and Federally Protected Areas

PSD regulations restrict the degree of ambient air quality deterioration allowed and apply to proposed new or modified major stationary sources located in an attainment area that have the potential to emit criteria pollutants in excess of predetermined threshold values (40 CFR Part 51). In New Mexico, PSD permits are required prior to construction or modification of sources subject to 20.2.74 NMAC. Increments for criteria pollutants are based on the PSD classification of the area. Class I area status is assigned to federally protected wilderness areas and allows the lowest amount of permissible deterioration. Class I areas allow the lowest amount of air quality increment consumption, while Class II designations allow higher increment consumption. There are no designated Class III or heavy industrial use areas.

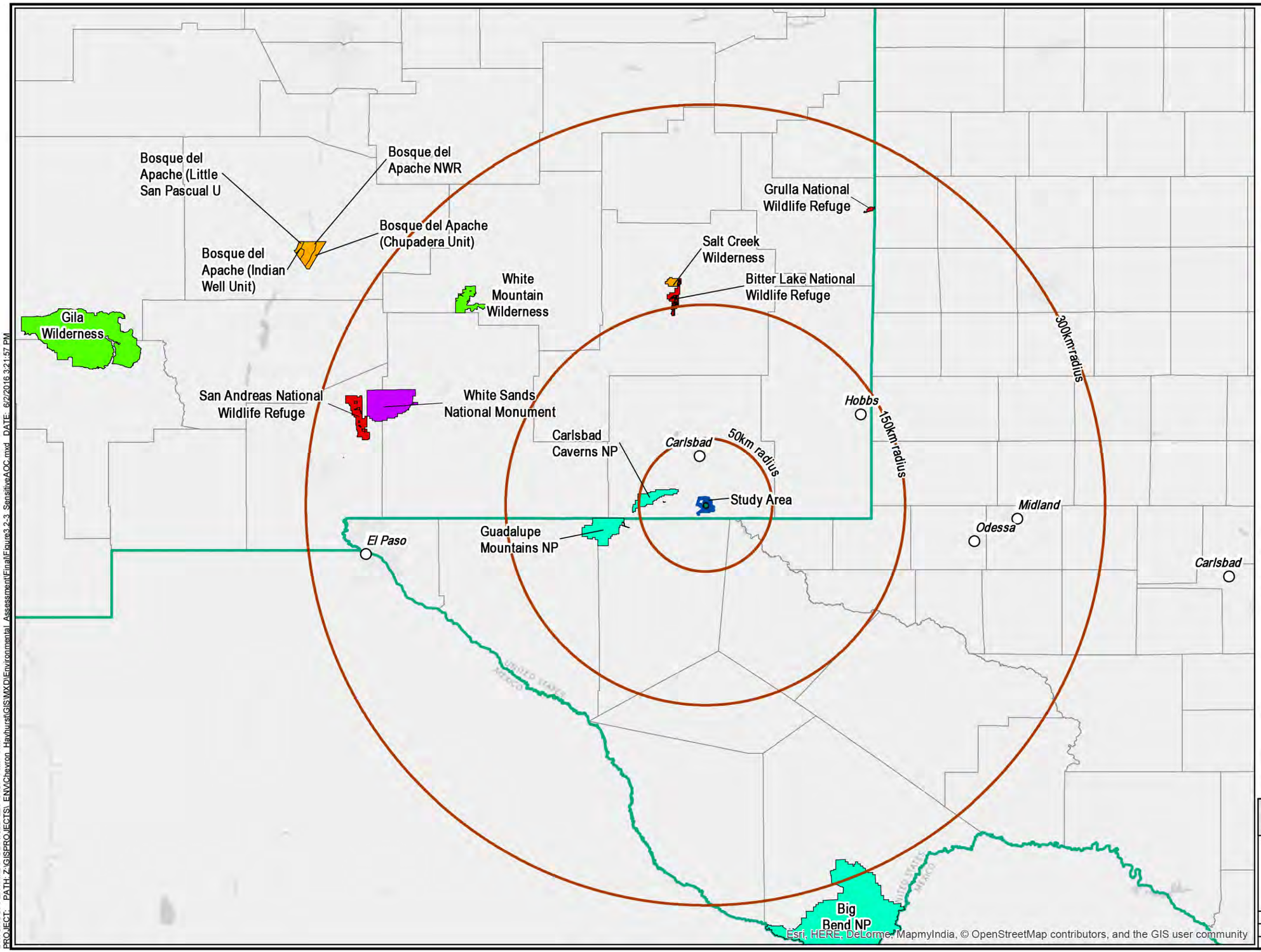
In addition to more stringent PSD increments, Class I areas are protected by FLMs by management of AQRVs such as visibility and acid deposition. Though not a regulatory program under PSD, FLMs review the issuance of a PSD permit for any impacts that exceed guideline thresholds for these parameters. The air quality impacts in the area must meet the NAAQS, which apply nationwide. The locations of Class I and sensitive Class II areas within 300 kilometers of the HDA are shown on **Figure 3.2-3** and are summarized in **Table 3.2-4**. The nearest Class I area is Carlsbad Caverns National Park approximately 28 kilometers northwest of the HDA. The proximity of this Class I area provides concern that ambient air quality could experience both near-field and regional impacts.

Table 3.2-4 Class I and Sensitive Class II Areas of Concern for Air Quality Impact Analysis

Class I Areas	Sensitive Class II Areas
Carlsbad Caverns NP (NPS)	Bitter Lake National Wildlife Refuge (USFWS)
Guadalupe Mountains NP (NPS)	Grulla National Wildlife Refuge (USFWS)
White Mountain Wilderness Area (USFS)	San Andreas National Wildlife Refuge (USFWS)
Salt Creek Wilderness Area (USFWS)	White Sands National Monument (NPS)
Big Bend NP (NPS)	

Abbreviations:
NP = National Park
NPS = National Park Service
USFS = U.S. Forest Service
USFWS = U.S. Fish and Wildlife Service

Allowable deterioration to air quality can be expressed as the incremental increase to ambient concentrations of criteria pollutants, or PSD increment. Modeled air concentrations of NO_2, SO_2, and PM_{10} predicted at near-field receptors that result from emissions due to project sources are compared with the convenient threshold of allowable PSD increments. This comparison to PSD Class II increments does not represent a regulatory PSD increment consumption analysis because the focus of this study is the proposed action and alternatives under NEPA, not increment-affecting sources, which are not evaluated for regulatory purposes under NEPA. The allowable PSD increments for Class II areas are provided in **Table 3.2-5**.



LEGEND:

- MDP Project Area
- State Boundary
- County Boundary
- City

Clean Air Act Class I

- U.S. Fish and Wildlife Service
- U.S. National Park Service
- U.S. Forest Service

Sensitive Class II Areas

- U.S. Fish and Wildlife Service
- U.S. National Park Service

Notes:
-Impact analysis for some resources utilizes a different Area of Analysis as illustrated on resource-specific figures

Projection:
WGS 1984

NORTH

0 45 90 Miles

CHEVRON HAYHURST MDP EA

FIGURE 3.2-3
Class I and Sensitive Class II Areas of Concern Map

ANALYSIS AREA: Eddy County, New Mexico
Date: 6/2/2016 | Prepared By: BW

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Table 3.2-5 PSD Increments for Class I and Class II Areas

PSD Class	Pollutant	Allowable Increment (µg/m³)		
		Annual Arithmetic Mean	24-hour Maximum	3-hour Maximum
Class I	NO_2	2.5	-	-
	SO_2	2	5	25
	PM_{10}	4	8	-
Class II	NO_2	25	-	-
	SO_2	20	91	512
	PM_{10}	17	30	-

Impacts from the Proposed Action

Direct and Indirect Impacts

The purpose of the air quality analysis was to assess local and regional air quality impacts from the proposed action. The approach was to develop an emissions inventory for a project base year to tabulate emissions for comparison to emissions estimates and impacts evaluated in the ARTSD prepared in support of the RMP (URS 2013). The ARTSD evaluated impacts of a 20 year projected RFD of oil and gas exploration and production within the CFO area of responsibility. This study found no significant impact from the RFD, and as such, if the proposed action's emission contributions conformed to the ARTSD analysis, then no significant impact is predicted. In cases where emissions did not conform to the ARTSD, additional modeling analysis was conducted to characterize impacts.

Emissions Data Development

Emissions data for the proposed action were developed from available emission factors, analytical methods, applicant-provided equipment specifications, and any applicant committed environmental protection measures. Further, the emissions development relied on anticipated activity levels as provided by Chevron and described in the AQTSD (Arcadis 2016b) that was developed for the proposed action. Emission rates were developed for the criteria pollutants, selected HAPs, and GHG for the maximum anticipated annual drilling, completion, and production activity. Emissions for a full list of HAPs were reviewed, but only those with greatest emissions in relation to health effects were evaluated. **Table 3.2-6** summarizes the maximum annual emissions of each pollutant by activity.

Table 3.2-6 Summary of Maximum Annual Emissions of Criteria and Hazardous Air Pollutants from the Proposed Action (in tons per year)[1]

Activity	Criteria Pollutants						Hazardous Air Pollutants			
	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$	VOC	BTEX[2]	HCHO[3]	n-Hexane	Total
Drilling and Completion	522.5	297.9	0.5	29.1	20.3	27.5	3.8	8.0	0.2	12.0
Production	221.6	155.6	0.3	6.4	0.4	735.9	23.1	11.8	12.5	47.5
Total	744.1	453.5	0.8	35.5	20.7	763.4	26.9	19.9	12.7	59.5

Notes:
1 Arcadis 2016b
2 Total of benzene, toluene, ethylbenzene, and xylene
3 Formaldehyde

Impacts on Ambient Air Quality

As shown in **Table 3.2-6**, the greatest emissions would occur during the drilling and completion of wells, particularly from diesel-fired engines powering fluid pumps during hydraulic fracturing operations. In particular, the hourly and annual emissions of NO_2 would exceed the parameters evaluated in the ARTSD (URS 2013) as shown in **Table 3.2-7**. The maximum air pollutant emissions from each well would be temporary (i.e. only occurring during well drilling and completion), would occur in unpopulated areas, and would not significantly interact with adjacent well locations. Given the temporary, transient and remote nature of these emissions, impacts to nearby receptors are not anticipated to be significant. However, due to the proximity of Carlsbad Caverns National Park, impacts to ambient air quality, specifically the hourly

NO_2 standards, were evaluated using the CALPUFF modeling system and found to not contribute to a violation of the NAAQS (Arcadis 2016b). Other Class I areas are further from the project area and presumed to have less ambient air quality impact. A summary of these impacts are provided in **Table 3.2-8**.

Table 3.2-7 Comparison of Drilling and Completion Emissions from the Proposed Action to ARTSD

Activity / Phase	Proposed Action[1]				ARTSD[2]			
	Power[3]	NO_X Emissions			Power[3]	NO_X Emissions		
	(hp)	(g/hp-hr)[4]	(lb/hr)	(ton/well)	(hp)	(g/hp-hr)[5]	(lb/hr)	(ton/well)
Drilling[6]	2,760	4.56	27.7	4.9	1,482	0.3	1.0	0.14
Fracturing and Flowback[7]	19,784	4.56	198.9	6.0	1,336	0.3	0.9	0.13
Completion	750	4.56	7.5	1.0	350	0.3	0.2	0.03
Total	23,294		198.9[8]	11.9	3,168		1.0[8]	0.30

Notes
1 Arcadis 2016b.
2 URS 2013.
3 Maximum hourly load of total engine capacity of multiple engines in simultaneous use.
4 USEPA Tier 2 emission standards for engines greater than 750 hp assuming 95% of non-methane hydrocarbon (NMHC) + NOX based on California Air Resources Board (CARB) "Emissions Factors for Compression Ignition Diesel Engines".
5 USEPA Tier 4 emissions standards for engines between 175 and 750 hp.
6 Includes primary drill rig and power generation.
7 Includes engines to power pumps to inject fluids for hydraulic fracturing, blending, and flowback. ARTSD (URS 2013) did not include hydraulic fracturing.
8 Represents maximum hourly emission rate from each phase.

Table 3.2-8 Summary of 1-hr NO_2 Ambient Air Quality Impacts Near the Project Area[3]

Criteria Pollutant	Averaging Period	Modeled Meteorological Year	Concentration ($\mu g/m^3$)			Ambient Standard ($\mu g/m^3$)[2]	Percent of Standard
			Modeled	Background[1]	Total		
NO_2	1-hr	2008	58.6	34.6	93.2	188	49.5

Notes:
1 3-year average of 98th percentile of 1-hour max used (2012-2014) (1 ppb = 1.88 $\mu g/m^3$) (NMED 2014a).
2 National Ambient Air Quality Standard of 100 ppb (1 ppb = 1.88 $\mu g/m^3$)
3 CALPUFF predicted impacts approximately 2 to 3 kilometers from the Project Area.

Acid Deposition at Class I Areas

The ARTSD (URS 2013) provided an analysis of acid deposition in nearby Class I areas. However, due the increase in NO_X emissions, CALPUFF modeling was also used to provide updated acid deposition results for nitrates in these Class I areas. **Table 3.2-9** shows the acid deposition for proposed action with the maximum added deposition from the project-related sources. The analysis predicts the incremental impacts from the project would exceed the deposition analysis threshold (DAT) of 0.005 kilogram per hectare-year (kg/ha-yr) in Carlsbad Cavern National Park. As prescribed in Federal Land Managers' Air Quality Related Values Work Group (FLAG) guidance (USFS et al. 2011), a refined analysis of acid deposition is required that must address the following criteria:

- Is the affected area sensitive to deposition?
- Is the affected area currently impacted by deposition?
- Have critical loads or target loads been developed for the affected area?
- Does current deposition exceed the critical load or target load

This refined analysis, in consultation with the National Park Service, is currently underway.

Table 3.2-9 CALPUFF Modeled Results for Nitrogen Deposition in Class I Areas from the Proposed Action

Class I Area	Maximum Modeled Deposition	Deposition Analysis Threshold (DAT)[1]
	(kg/ha-yr)	
Carlsbad Cavern National Park	0.0175	0.005
Guadalupe Mountains National Park	0.0023	0.005

Notes:
1 The Deposition Analysis Threshold (DAT) is a significance threshold. If the modeled deposition rate (without adding background concentration) is below the DAT, the predicted impacts are considered to be insignificant

Impacts on Visibility in Class I Areas

CALPUFF was used to evaluate impacts on visibility on nearby Class I areas. **Table 3.2-10** provides results of the visibility analysis for the proposed action. The results show minimal impacts to visibility from the proposed action with a maximum of 1 day greater than than 0.5 deciview (dv) above the annual average and 4 days greater than the 20 percent best natural background days at Carlsbad Cavern National Park (Arcadis 2016b).

Table 3.2-10 CALPUFF Modeled Results for Impacts to Visibility in Class I Areas from the Proposed Action

Class I Area	# days with Visibility Change > 0.5 dV[1]	
	Annual Avg	20% Best
Carlsbad Cavern National Park	1	4
Guadalupe Mountains National Park	0	0

Notes:
1 USFS et al. 2010

Cumulative Impacts

Greenhouse Gases and Climate Change

The primary sources of GHG associated with oil and gas exploration and production are carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). While sources of GHG from oil and gas activities may contribute to global climate change, it is not currently possible to correlate the degree of impact from these sources to any specific climate-related effect. Climate change analyses are complex and comprised of several factors, including but not limited to GHG emissions, land use management practices, mesoscale meteorology, and albedo effects. The tools necessary to quantify climatic impacts presently are unavailable. Consequently, impact assessment of specific effects of anthropogenic activities cannot be determined and specific levels of significance have not yet been established. Therefore, the climate change analysis for the purpose of this document is limited to accounting and disclosing GHG emissions that may contribute to climate change, and putting them in context of current inventories.

The ARTSD (URS 2013) evaluated GHG emissions from the RFD in context of the New Mexico GHG Inventory. **Table 3.2-11** summarizes GHG contribution from the proposed action as a percentage of both the RFD and the New Mexico inventory. The proposed action constitutes 436 of the RFD's 10,117 proposed wells (4.3%), but only contributes 2.2% of the GHG from the RFD. As such, the proposed action's impact to climate change shows a reduction in GHG relative to the level of activity compared to the ARTSD.

Table 3.2-11 Comparison of Maximum Annual Emissions of Criteria and Hazardous Air Pollutants from the Proposed Action to ARTSD (in tons per year)[1]

Activity	Greenhouse Gas			
	CO_2	CH_4	N_2O	CO_2e[2]
Drilling and Completion	59.326	2.4	0.5	59,528
Production	212,985	117.6	2.1	216,550
Total Proposed Action	272,311	119.9	2.6	276,078
CFO RMP[3]	11,547,017	46,191	208	12,763,776
% of CFO RMP	2.4	0.3	1.3	2.2
% of New Mexico Inventory[4]				0.4

Notes:

1 Arcadis 2016b

2 Carbon dioxide equivalents (CO_2e) are calculated based on the Global Warming Potential of each pollutant from Table A-1 of 40 CFR §98 (CO_2 =1 CO_2e, 1 CH_4 = 25 CO_2e, 1 N_2O = 298 CO_2e

3 RMP AQTSD, Table 5-1 2028 Project GHG Emissions as Percentage of State Annual Inventory for RFDOTB; CO2e revised for updated GWP (See Note 2)

4 Based on *Inventory of New Mexico Greenhouse Gas Emissions: 2000-2007* (NMED 2010b)

Ozone

As part of the ARTSD (URS 2013) detailed photochemical modeling was performed to examine the ozone forming potential of the RFD in the CFO Planning Area. The proposed action lays within this planning area and the impacts from the proposed actionwere a part of the foreseen development analyzed in the RMP.

The emissions modeled in the Reasonable Foreseeable Development On The Books (RFDOTB) scenario and the proposed action are presented in **Table 3.2-12**. The ARTSD analyzed a future year scenario looking at the modeled ozone impacts of 10,117 producing wells. The proposed action represents a total of 436 producing wells by the end of the development. On a well count basis, the proposed action represents 4.3 percent of the foreseen new production. On an emissions basis, the proposed action represents 7.4% of the CO emissions, 8.3% of the NOx emissions and 2.1 percent of the VOC emissions. Thus, the emissions from the proposed action are a small fraction of the emissions foreseen in the RMP.

The RMP presents several different ozone metrics. On a relative basis, the full impact of the RFDOTB case is to increase the forecast design value by 0.001 ppm (URS 2013). Other absolute change metrics showed impacts of the RFDOTB case of from 0.0 to 3.0 percent. The conclusion of the ARTSD (URS 2013) was that the “Ozone impacts attributable to CFO Project and cumulative emissions are not expected to cause or contribute to violations of the ozone NAAQS” and “the two alternatives show little to no change from the future year base case”. Since the emissions increases from the proposed action are a small fraction of the emissions that simulated these impacts, the project impact will be a correspondingly small percentage.

Since the ARTSD was completed the ozone standard has been lowered from 0.075 ppb to 0.070 ppb.[2] Recommendations for ozone designations for the new standard are currently being prepared and will be submitted to EPA by October 1, 2016 with formal designations to by October 1, 2017. The 2012-2014 8-hour ozone design value near the project area is 0.071 ppm at the Carlsbad monitor (AIRS ID 350151005).[3] Final guidance does not exist on application, analysis, or interpretation of single project ozone impact analysis. Thus, the analysis and interpretation of the results is handled on an ad-hoc, case-by-case basis. It is anticipated that the ozone impact of the project would be quite small and would not significantly contribute to or cause a violation of the new 0.070 ppm ozone standard.

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2 https://www.epa.gov/ozone-pollution/2015-national-ambient-air-quality-standards-naaqs-ozone

3 https://www3.epa.gov/airtrends/pdfs/Ozone_DesignValues_20122014_FINAL_08_03_15.xlsx. Accessed July 13, 2016 Table 1. County Status.

Table 3.2-12 CFO Oil and Gas RMP Reasonably Foreseeable Development and Proposed Action Well Counts and Emissions Comparison

Parameter / Pollutant	CFO RMP[1]	Proposed Action	% of CFO RMP
Wells	10,117[2]	436	4.3
NO_X (tpy)	8885.0[3]	744.1[4]	8.3
CO (tpy)	6072.0[3]	453.5[4]	7.4
VOC (tpy)	35,797.0[3]	763.4[4]	2.1

Notes:
1 Activity and emissions level based on the RFDOTB mitigation scenario
2 ARTSD (URS 2013), Table 1-1 Total Active BLM O&G Wells in RFD Year 20
3 ARTSD (URS 2013), Table 4-11 CFO Project Emissions Alternative RFDOTB
4 See **Table 3.2-6**

Mitigation Measures and Residual Impacts

The ARTSD (URS 2013) inventory used for comparison accounts for "on the books" controls for all proposed future activity. **Table 3.2-13** provides a comparison of the applicant committed environment protection measures (ACEPM) for air quality and new regulations promulgated since the issuance of the ARTSD to the management actions of the existing RMP. Based on this comparison, the combination of the ACEPM and new regulations meet or exceed the "on the books" management actions described in the RMP.

Table 3.2-13 Comparison of Applicant Committed Environmental Protection Measures and New Regulations for Air Quality to "On the Books" Management Actions in the ARTSD for CFO RMP Revision

Source Type	CFO RFDOTB[1]	ACEPM/New Regulations
Goals	Manage oil and gas activities to comply with all local, State, Tribal, and Federal laws, regulations, standards and implementation plans. Manage oil and gas activities to protect air quality and, within the scope of BLM's authority, minimize emissions that cause or contribute to violations of air quality standards or that negatively impact air quality related values (AQRV). Manage oil and gas activities to minimize emissions of GHG.	The proposed action will comply with all local, State, Tribal, and Federal laws, regulations, standards and implementation plans. The proposed action does not cause or contribute to a violation of NAAQS or AQRV. The proposed action reduces the emissions of GHG per well when compared to the ARTSD CFO RMP Revision.
Objectives	Manage oil and gas activities to meet ambient air quality standards.	The proposed action does not cause or contribute to a violation of NAAQS or AQRV.
Level of development	Emission would reflect development of approximately 16,000 oil and gas wells (6,400 BLM and 9,600 non-BLM).	The level of development of the proposed action is within the scope of development analyzed by the ARTSD for CFO RMP Revision.
Drill Rig Engines	Drill rig and frac pump engines would meet New Mexico and EPA requirements.	Drill rig and frac pump engines meet the New Mexico and EPA requirements based on date of engine manufacture or installation.
Well Completion and Testing	Following EPA New Source Performance Standards for the	On June 3, 2016, EPA promulgated changes to the 2012 NSPS and

Table 3.2-13 Comparison of Applicant Committed Environmental Protection Measures and New Regulations for Air Quality to "On the Books" Management Actions in the ARTSD for CFO RMP Revision

Source Type	CFO RFDOTB[1]	ACEPM/New Regulations
	Oil and Gas Industry, beginning January 1, 2015, operators will be required to capture the natural gas associated with hydraulically fractured natural gas well completions, which can accomplished by green completion practices. This would be required unless the need for exemption is documented.	new NSPS for Oil and Gas Production (Subpart OOOOa)[2]. The new rules require reduced emission completions for oil wells in addition to hydraulically fractured gas wells. Therefore, completion controls would be more stringent than the ARTSD for CFO RMP Revision.
Construction Activities and Fugitive Dust Control	No similar action	The proposed action would include the use of watering and best management practices to reduce emissions from surface disturbance and wind erosion.
Tanks	Oil tanks, condensate tanks, and produced water tanks would be required to meet applicable EPA NSPS (2012) emission standards such that new storage tanks with VOC emissions of 6 tons per year or more must reduce VOC emissions by at least 95 percent.	The proposed action would comply with 2012 and 2016 NSPS which require controls of 95% or greater on tanks emitting more than 6 tons per year of VOC.
Compressor Engines	New and modified centrifugal and reciprocating compressors at gas gathering and boosting stations, well sites and gas processing plants will be required to meet EPA NSPS (2012) and New Mexico Environment Department (NMED) requirement and standards.	The proposed action would comply with the 2016 NSPS which requires reciprocating compressors to reduce emissions of VOC and methane from reciprocating compressors by replacing the rod packing every 26,000 hours or route rod packing emissions to a closed vent system. These controls are more stringent than the management actions of the ARTSD for CFO RMP Revision.
Glycol Dehydrators	Glycol dehydrators located at well sites, gathering and boosting stations, gas processing plants, and natural gas transmission stations will required to meet applicable EPA National Emission Standards for Hazardous Air Pollutants (NESHAP) for Oil and Gas Production (2012)	The proposed action would comply with the NESHAP for Oil and Gas as applicable.
Air Monitoring	No similar action	The proposed action does not include provisions for new or enhanced monitoring of air quality.

Table 3.2-13 Comparison of Applicant Committed Environmental Protection Measures and New Regulations for Air Quality to "On the Books" Management Actions in the ARTSD for CFO RMP Revision

Source Type	CFO RFDOTB[1]	ACEPM/New Regulations
Pump and Compressor Electrification	No similar action	The proposed action does not include the electrification of pumps or compressors to reduce emission.
Pneumatic Controllers	Pneumatic controllers at gas gathering and boosting stations, well sites and gas processing plants will be required to meet EPA NSPS (2012) requirements. This would be required unless the need for exemption can be documented.	The proposed action would comply with the 2016 NSPS which requires all pneumatic controllers to be low-bleed and pneumatic diaphragm pumps will be routed to a control device or return vent gas to the process. These provisions are more stringent than the ARTSD for CFO RMP Revision.
Gas Processing Plants	New and modified natural gas sweetening units at gas processing plants will be required to meet EPA (2012) requirements.	The proposed action does not include the construction and operation of natural gas processing plants.
Equipment Leaks	No mitigation for equipment leaks was specified.	The proposed action will be required to the meet the 2016 NSPS which include requirements of Leak Detection and Repair (LDAR) using optical gas imaging or hand-hand analyzer at well sites and compressor stations. This requirement is more stringent than the ARTSD for CFO RMP Revison.

Notes:
1 ARTSD (URS 2013), Table 2-1 for Alternative RFD On-the-Books Controls (RFDOTB)
2 See 81 FR 107 published June 3, 2016

Once operations cease and the area is reclaimed, there would be no continued emissions of air pollution above background levels. No residual impacts to air quality from the proposed action are anticipated since reclamation and revegetation would stablize exposed soil and control fugitive emissions. As vegetation becomes established, particulate levels should return to what is typical for an arid environment. Air quality would revert to its original state.

3.3. Soils

Affected Environment

Soils within the area of analysis were mapped for the soil survey of Eddy County, New Mexico (Soil Conservation Service 1971). As shown on **Figure 3.3-1**, multiple mapped soil units are present, and can be assigned to one of three general categories: loamy, shallow, or gypsum (**Table 3.3-1**; BLM 2014a). These categories represent groups of soils with different physical characteristics as well as different capabilities for producing native plants.

Table 3.3-1 Soil Map Units

Soil Map Unit Abbreviation – Name	Slope (%)	General Category	Water Erosion Hazard	Wind Erosion Hazard	Source of Reclamation Material	Percent of MDP Project Area
CR – Cottonwood-Reeves loams, overflow*	0-3	Gypsum	Slight	Moderate	Poor	1.2%
EC – Ector stony loam	0-9	Shallow	Moderate	Moderately Low	Poor	0.7%
ER – Ector-Reagan association	0-9	Shallow (Ector) (70%) / Loamy (Reagan) (30%)	Moderate	Moderately Low	Poor	8.5%
GC – Gypsum land-Cottonwood complex*	0-3	Gypsum	Severe	High	Poor	8.9%
RA – Reagan loam	0-3	Loamy	Slight	Low	Fair	0.4%
RE – Reagan-Upton association	0-9	Loamy (Reagan) (75%) / Shallow (Upton) (25%)	Slight	Low	Fair	9.6%
RG – Reeves-Gypsum land complex*	0-3	Loamy (Reeves) (60%) / Gypsum (40%)	Slight	Moderate	Poor	29.4%
RM – Reeves-Reagan loams	0-3	Loamy	Slight	Moderate	Poor	41.3%

Notes:

Other soil map units are present within the EA area of analysis but are not within the MDP project area and would not be affected under any alternative and are not included in the description of the affected environment.

Wind erosion hazard based on the following wind erodibility groups (WEGs): WEG 1-2 (high); WEG 3 (moderately high); WEG 4-5 (moderate); WEG 6 (moderately low); WEG 7-8 (low).

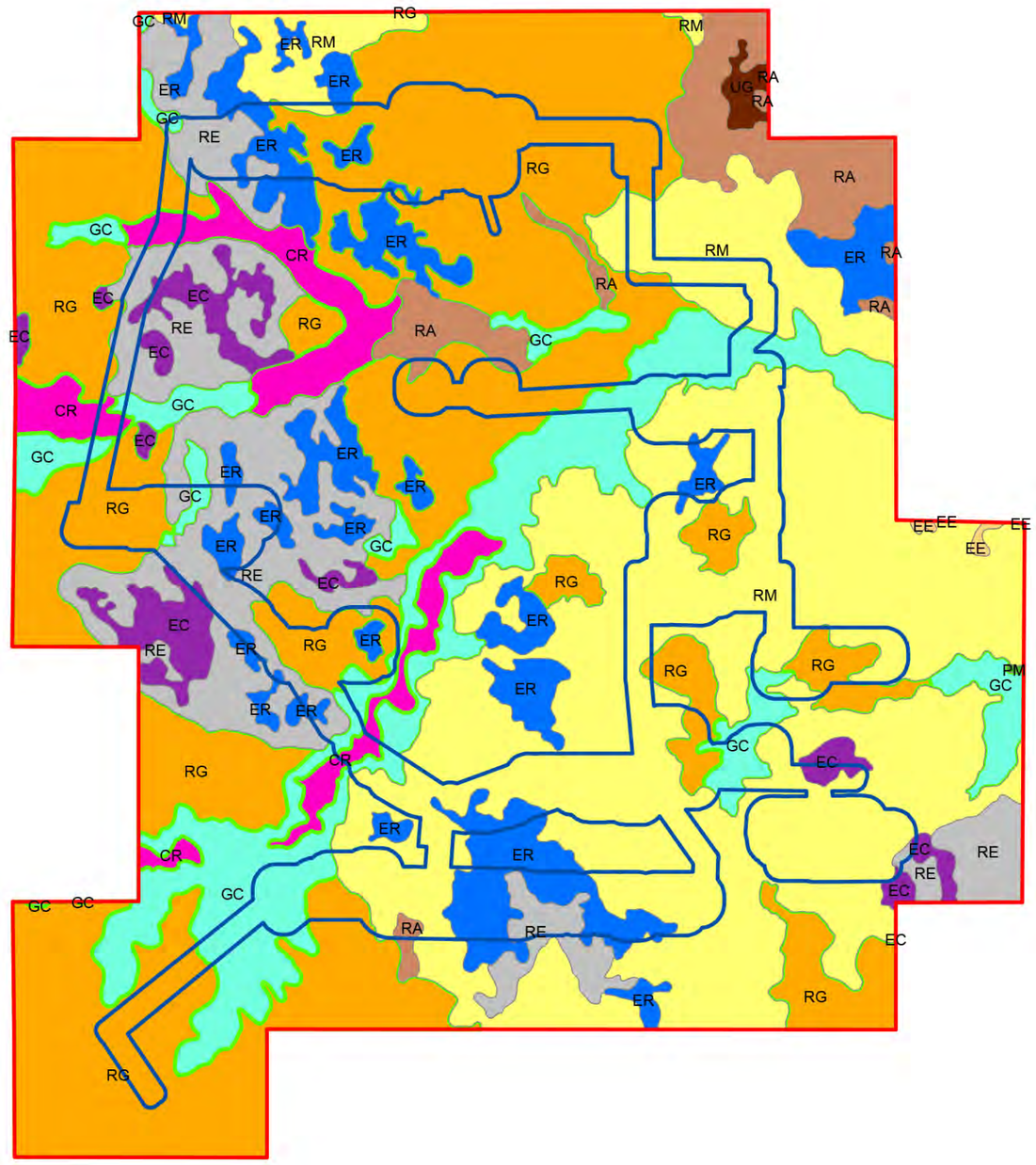
WEG for soil map unit GC is not rated; erosion hazard from BLM (2014a).

* = soil map unit is part of nominated Gypsum Soils Area of Critical Environmental Concern.

Sources: BLM 2014a; Soil Conservation Service 1971; Soil Survey Staff 2015

Water erosion hazards are highest in areas of moderate to steep slopes where vegetation or soil crusts have been removed. Wind erosion hazards are generally highest for disturbed loamy or silty soils. For all soil types, careful management is needed to maintain a cover of desirable forage plants and to control erosion by water and wind. Reestablishing native plant cover could take three to five years due to unpredictable rainfall and high temperatures. Most soils within the project area have low reclamation potential and are poor sources of reclamation material, meaning that revegetation and stabilization are very difficult and costly in most cases (Soil Survey Staff 2015).

Microbiotic soil crusts are found throughout the CFO planning area and are expected to occur within the project area, but have not been documented. These include cyanobacteria and squamulose and gelatinous lichens. While abundant in some areas, microbiotic soil crusts are scattered throughout the project area. These soil crusts are important in binding loose soil particles together to stabilize the soil surface and reduce erosion. They also function in the nutrient cycle by fixing atmospheric nitrogen, contributing to soil organic matter, and maintaining soil moisture. In addition, they can act as a living mulch, which discourages the establishment of annual/invasive weeds. Structurally they form an uneven, rough carpet that reduces raindrop impact and slows surface runoff. Below the surface, lichen and moss rhizines, fungal hyphae, and cyanobacterial filaments act to bind the soil surface particles just below and at the surface. Horizontally, they occur in nutrient-poor areas between plant clumps. Because they lack a waxy epidermis, they tend to leak nutrients into the surrounding soil. Vascular plants such as grasses and forbs can then utilize these nutrients (Belnap et al. 2001).



LEGEND:

- EA Area of Analysis
- MDP Project Area

NRCS Soils

- Ector stony loam (EC)
- Ector extremely rocky loam (EE)
- Ector-Reagan association (ER)
- Pima silt loam (PM)
- Reagan loam (RA)
- Reagan-Upton association (RE)
- Reeves-Reagan loams (RM)
- Upton (UG)

Nominated Gypsum Soils Area of Critical Environmental Concern

- Cottonwood-Reeves loams, overflow (CR)
- Gypsum land-Cottonwood complex (GC)
- Reeves-Gypsum land association (RG)

Notes:
-USDA Natural Resources Conservation Service Soil layer for Eddy County, NM obtained from BLM
-CR, GC, and RG soil map units are part of nominated Gypsum Soils Area of Critical Environmental Concern

Projection:
WGS 1984

NORTH

0 6,800 13,600 Feet

CHEVRON HAYHURST MDP EA

FIGURE 3.3-1
Soil Resources

ANALYSIS AREA: Eddy County, New Mexico

Date: 7/5/2016 | Prepared By: BW

DIV/GROUP: ENV/MDV DB: webb LD: PIC: PM: TM:
PROJECT: PATH: Z:\GISPROJECTS\ ENV\Chevron_Hayhurst\GIS\MXD\Environmental_Assessment\Final\Figure3.3-1_SoilResources.mxd DATE: 6/6/2016 10:02:11 PM

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Shallow

These soils are shallow to very shallow, well-drained, calcareous, stony and rocky loams over limestone and caliche. Topography ranges from nearly level ridgetops to side slopes to cliffs and escarpments. Permeability is moderate, water-holding capacity is very low to low, and runoff is rapid after soils become saturated. Shallow soils are subject to water erosion, but the stones and rock outcrops help to stabilize the soils on nearly level to gently sloping areas. These soils typically have scattered populations of squamulose lichens and a few crustose lichens, while gelatinous lichens and cyanobacteria are occasionally present primarily in the pockets of deeper soils.

Gypsum

Gypsum type soils have a loamy surface layer, with gypsiferous materials starting at a depth of 1 to 10 inches. They are found on gently undulating uplands, with steep, broken gypsum outcrops occurring in places. Permeability varies from very low to moderate, water-holding capacity is very low to low, and runoff rapid to very rapid. Soil fertility and the rooting zone are limited by the underlying gypsiferous material. These soils are subject to severe erosion once the vegetative cover is lost. These areas have good populations of squamulose lichens, a few crustose and gelatinous lichens, and cyanobacteria, which are present throughout the top 2 millimeters of the soil.

Soil map units CR, GC, and RG constitute the nominated Gypsum Soils Area of Critical Environmental Concern (ACEC) due to the presence of fragile microbiotic soil crust, high erosion potential when the crust is disturbed, and poor revegetation potential. These soils tend to be located along the banks and sidewalls of draws and in drainage bottoms. The BLM CFO has identified the Southern Gypsum Soil Area. This 62,800-acre area is characterized by gypsum soils with low organic matter content, sparse vegetation, rapid to very rapid runoff, very low to low water-holding capacity, and high salinity that limits plant rooting. These soils are also subject to severe erosion if the vegetative cover is lost (BLM 2014a). Within this area, some off-road travel activities are restricted, but no specific management designations have been prescribed (BLM 1988). The nominated Gypsum Soils ACEC and Southern Gypsum Soil Area are shown on Figure 3.3-1.

Loamy

Generally, loamy type soils are deep, well-drained, moderately dark colored, and calcareous. These soils typically occur on gently undulating plains and in the broader valleys of the hills and mountains. Permeability is moderate, water-holding capacity is moderate to high, and runoff is likely after prolonged or heavy rains. Careful management is needed to maintain a cover of desirable forage plants and to control erosion. Reestablishing native plant cover could take three to five years due to unpredictable rainfall and high temperatures. There is a potential for wind and water erosion due to the erosive nature of these soils once the cover is lost. These soils generally have cyanobacteria throughout the area, while squamulose, crustose, and gelatinous lichens are occasionally present.

Impacts from the Proposed Action

Direct and Indirect Impacts

Construction-related impacts to soil resources may include compaction and degradation of factors necessary to support vegetation. There is a potential for wind and water erosion due to the erosive nature of some project area soils once the cover is lost, particularly within gypsum type soils. Based on the layout of project components presented in the MDP and APDs, approximately 530 acres of short-term impacts are expected in soils within the Nominated Gypsum Soils ACEC, particularly the Reeves-Gypsum land complex. Approximately 63 acres of short-term disturbance would be in soils with a severe water erosion hazard (i.e., Gypsum land-Cottonwood complex). Long-term impacts due to soil erosion could occur in areas where reclamation is difficult and where establishment of vegetation takes longer than expected.

Microbiotic soil crusts are expected to occur within the project area and may be impacted by surface disturbances, also contributing to increased potential for erosion. Recovery rates for microbiotic soil crusts

are generally slow, specifically for lichen and moss, which can take 45 to 250 years, respectively (Belnap and Gillette 1997). Long-term effects would occur from surface disturbances in areas of microbiotic soil crusts. There is potential for soil contamination due to spills or leaks. Soil contamination from spills or leaks can result in decreased soil fertility, less vegetative cover, and increased soil erosion.

Impacts to soil resources are reduced by standard practices such as utilizing existing surface disturbance, minimizing surface disturbances, minimizing vehicular use, placing parking and staging areas on caliche surfaced areas, reclaiming the areas not necessary for production, and quickly establishing vegetation on the reclaimed areas.

With implementation of design features and reclamation, short-term impacts to soil resources would be moderate and long-term impacts would be minor. These features include caliche surfacing, interim reclamation, reclamation monitoring, topsoil stockpiling, segregation, and erosion prevention through the use of soil retention blankets in areas of high wind or water erosion.

Cumulative Impacts

The CIA for soils is the same as described in Section 3.1 (Figure 3.1-1). Soil types within the CIA have similar overall soil properties to those within the EA analysis area. These general properties include high gypsum concentrations in some components, poor suitability as reclamation material, slight water erosion hazards (but severe in gypsum soils), and moderate wind erosion hazards.

Project construction would result in the temporary disturbance of approximately 1,808 acres of soils. This represents approximately 22 percent of the total estimated disturbance from past, present, and reasonably foreseeable future activities within the CIA. Based on the total amount of disturbance within the CIA, minor to moderate cumulative impacts to soil resources are expected. When considering the low reclamation suitability of soils within the CIA, reclamation and reestablishment of vegetation for all past, present, and reasonably foreseeable future activities are likely to be only partially successful. Minor adverse cumulative impacts to soil resources are expected under the proposed action.

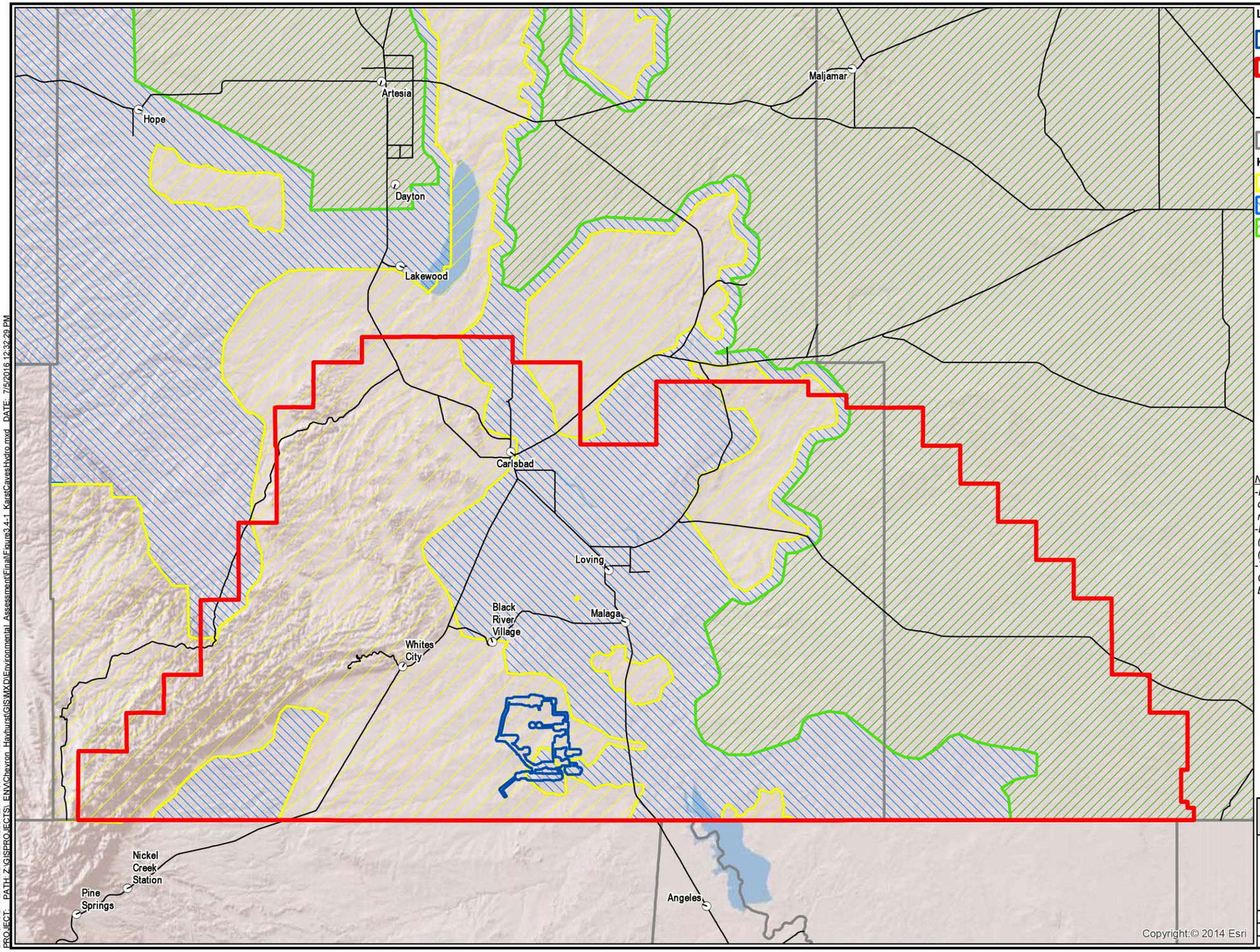
Mitigation Measures and Residual Impacts

Anticipated impacts to soil resources would be less than significant; therefore, no mitigation measures are required for the MDP or 12 submitted APDs. Additional mitigation may be required on an individual APD or ROW basis as determined by the BLM. For example, where roads are proposed in gypsum soil areas, the CFO may require the use of dust abatement measures to mitigate potential impacts to gypsum soils. The CFO has analyzed impacts from the use of dust abatement in a separate programmatic EA (DOI-BLM-NM-P020-2015-0231-EA). The need for dust abatement to mitigate impacts would be determined in future ROW applications that are submitted for gypsum soil areas. Other examples of potential additional mitigation include the potential identification of large expanses of microbiotic soil crusts during onsite reviews that may require additional avoidance measures. Impacts to microbiotic soil crusts, including increased erosion rates and loss of other soil functions, would be reduced through interim and final reclamation; however, damaged soil crusts would take up to 250 years to recover and would represent a residual impact. Overall residual impacts to soil resources with implementation of design features and mitigation that may be required for individual APDs or ROWs are expected to be less than significant.

3.4. Caves and Karst

Affected Environment

The area of analysis for cave and karst resources is the Carlsbad Underground Water Basin, as defined by the New Mexico Office of the State Engineer (NMOSE) (**Figure 3.4-1**). The project area is located in gypsum karst terrain, a landform that is characterized by underground drainage through solutionally enlarged conduits. Gypsum karst terrain may contain sinkholes, sinking streams, caves, and springs. Sinkholes leading to underground drainages and voids are common. These karst features, as well as occasional fissures and discontinuities in the bedrock, provide the primary sources for rapid recharge of the groundwater aquifers of the region.



LEGEND:

- MDP Project
- Area of Analysis for Caves, Karst, and Subsurface Hydrology
- Cities
- Major Highways
- County Boundary

Karst Occurence Potential

- High Potential Karst
- Medium Potential Karst
- Low Potential Karst

Notes:

-Impact analysis for some resources utilizes a different Area of Analysis as illustrated on resource-specific figures

-Data sources: Karts occurrence potential (BLM 2014a); Carlsbad Underground Water Basin (Office of the State Engineer, 2007).

-The cave and karst area of analysis is the Carlsbad Underground Water Basin, as designated by the NM Office of the State Engineer.

Projection:
WGS 1984

NORTH

0 9 18 Miles

CHEVRON HAYHURST MDP EA

FIGURE 3.4-1
Caves, Karst, and Subsurface Hydrology

ANALYSIS AREA: Eddy County, New Mexico

Date: 7/5/2016 | Prepared By: BW

DIV/GROUP: ENV/IMDV DB: webb LD: PIC: PM: TM:
PROJECT: PATH: Z:\GISPROJECTS_ENV\Chevron_Hayhurst\GIS\MXD\Environmental_Assessment\Final\Figure3.4-1_KarstCavesHydro.mxd DATE: 7/5/2016 12:32:29 PM

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The BLM categorizes all areas within the CFO as having either low, medium, high, or critical cave potential based on geology, occurrence of known caves, density of karst features, and potential impacts to freshwater aquifers. The southern portion of the project area occurs within a medium karst zone and all other portions are within a high karst zone. A medium karst zone is defined as an area in known soluble rock types but may have a shallow insoluble overburden. These areas may contain isolated karst features such as caves and sinkholes. Groundwater recharge may not be wholly dependent on karst features but the karst features still provide the most rapid aquifer recharge in response to surface runoff. A high karst zone is defined as an area in known soluble rock types and contains a high frequency of significant caves and karst features such as sinkholes, bedrock fractures that provide rapid recharge of karst aquifers, and springs that provide riparian habitat.

Field notes from baseline surveys (Arcadis 2016) and onsite inspections indicate that cave and karst features are present within or near the project area. Locations of these features are illustrated on **Figure 3.4-2**. Karst features were identified within approximately 100 meters of the proposed APD Group 1 well pad access road and pipeline alignment during the onsite inspection (**Figure 2.1-3**). The majority of features identified during baseline surveys were closed depressions or fissures that may represent surface expressions of underground features. These features may represent preferential flow pathways by which surface waters could reach groundwater and are areas where surface openings may develop in the future. Collapsed sinkholes and similar features (e.g., mammal burrows that collapsed due to water intake) with observed surface openings were also identified.

Sinkholes and cave entrances collect water and can accumulate rich organic materials and soils. This, in conjunction with the stable microclimate near cave entrances, supports a greater diversity and density of plant life, which provides habitat for a greater diversity and density of wildlife such as raptors, rodents, mammals, and reptiles.

The interior of the caves support a large variety of troglobitic, or cave environment-dependent species. The troglobitic species have adapted specifically to the cave environment due to constant temperatures, constant high humidity, and total darkness. Many of the caves in this area contain fragile cave formations known as speleothems.

Impacts from the Proposed Action

Direct and Indirect Impacts

Cave and karst features provide direct conduits leading to groundwater. These conduits can quickly transport surface and subsurface contaminants directly into underground water systems and freshwater aquifers without filtration or biodegradation. In addition, contaminants spilled or leaked into or onto cave/karst zone surfaces and subsurfaces may lead directly to the disruption, displacement, or extermination of cave species and critical biological processes. In extreme or rare cases, a buildup of hydrocarbons in cave systems due to surface leaks or spills could potentially cause underground ignitions or asphyxiation of wildlife or humans within the cave.

In cave and karst terrains, rainfall and surface runoff is directly channeled into natural underground water systems and aquifers. Changes in geologic formation integrity, runoff quantity/quality, drainage course, rainfall percolation factors, vegetation, surface contour, and other surface factors can negatively impact cave ecosystems and aquifer recharge processes. Blasting, heavy vibrations, and focusing of surface drainages can lead to slow subsidence, sudden collapse of subsurface voids, and/or cave ecosystem damage. A more complete discussion of the impacts of oil and gas drilling is provided in the Dark Canyon Environmental Impact Statement (BLM 1992).

The BLM maintains up-to-date locations and surveys of known cave and karst features, and multiple cave and karst features were identified during baseline surveys (Arcadis 2016a). Project activities will be located away from these features whenever possible. Drilling pads, roads, utilities, pipelines, and flowlines will be routed around cave and karst features at an adequate distance to mitigate adverse impacts. Wellbore engineering plans will incorporate required cave and aquifer protection protocols.

Highly sensitive cave and karst areas with critical freshwater aquifer recharge concerns may have a number of special surface and subsurface planning and construction requirements based upon the risk of adverse impacts created by a specific location or process. Due to the presence of identified karst features within the Project Area, the proposed action is subject to mitigation measures designed to adequately protect known and potential cave/karst resources.

Construction Impact Analysis

The construction of roads, pipelines, well pads, and utilities can impact bedrock integrity and reroute, impede, focus, or erode natural surface drainage systems. Increased silting and sedimentation from construction can plug downstream sinkholes, caves, springs, and other components of aquifer recharge systems and result in adverse impacts to aquifer quality and cave environments. Any contaminants released into the environment during or after construction can impact aquifers and cave systems.

A possibility exists for slow subsidence or sudden surface collapse of a sinkhole, cave passage, or void during road, well pad, pipeline, ancillary facility, powerline, and other construction operations. This would cause associated safety hazards to operators of equipment, and the potential for increased negative environmental impact. Opening a new entrance into a cave system can change air flow patterns, temperatures, insurgencies, mineral development, and biological community and may cause other undetermined effects on the cave ecosystem. These subsidence processes can be triggered or enhanced by intense vibrations and rerouting or refocusing of surface drainages.

Roads and road drainage turnouts can direct or funnel runoff water into cave entrances or sinkholes. Contaminants from spills and general road runoff (such as oil and other petroleum products, salt water, and other debris) can be transported directly into the cave systems, causing negative effects on the cave environment and ecosystem. Because cave ecosystems are extremely fragile and easily disturbed, the negative effects to the cave's biological components may include disruption of some of its species. Because karst terrains and cave systems are directly and integrally linked to groundwater recharge, contaminants spilled on roads or leaking pipelines in these areas may lead directly to groundwater contamination.

Buildup of toxic or combustible fumes in caves and cave entrances from spills on roadways may harm wildlife and cave visitors and, in extreme cases, lead to asphyxiation or rapid ignition in the rare event that the fumes are ignited by visitors.

Encountering a void would also have adverse impacts on the stability of a power pole and may result in the subsequent failure of that pole. Slow subsidence or sudden collapse of sinkholes may also leave pipelines hanging and increase their possibility of leaking or failure.

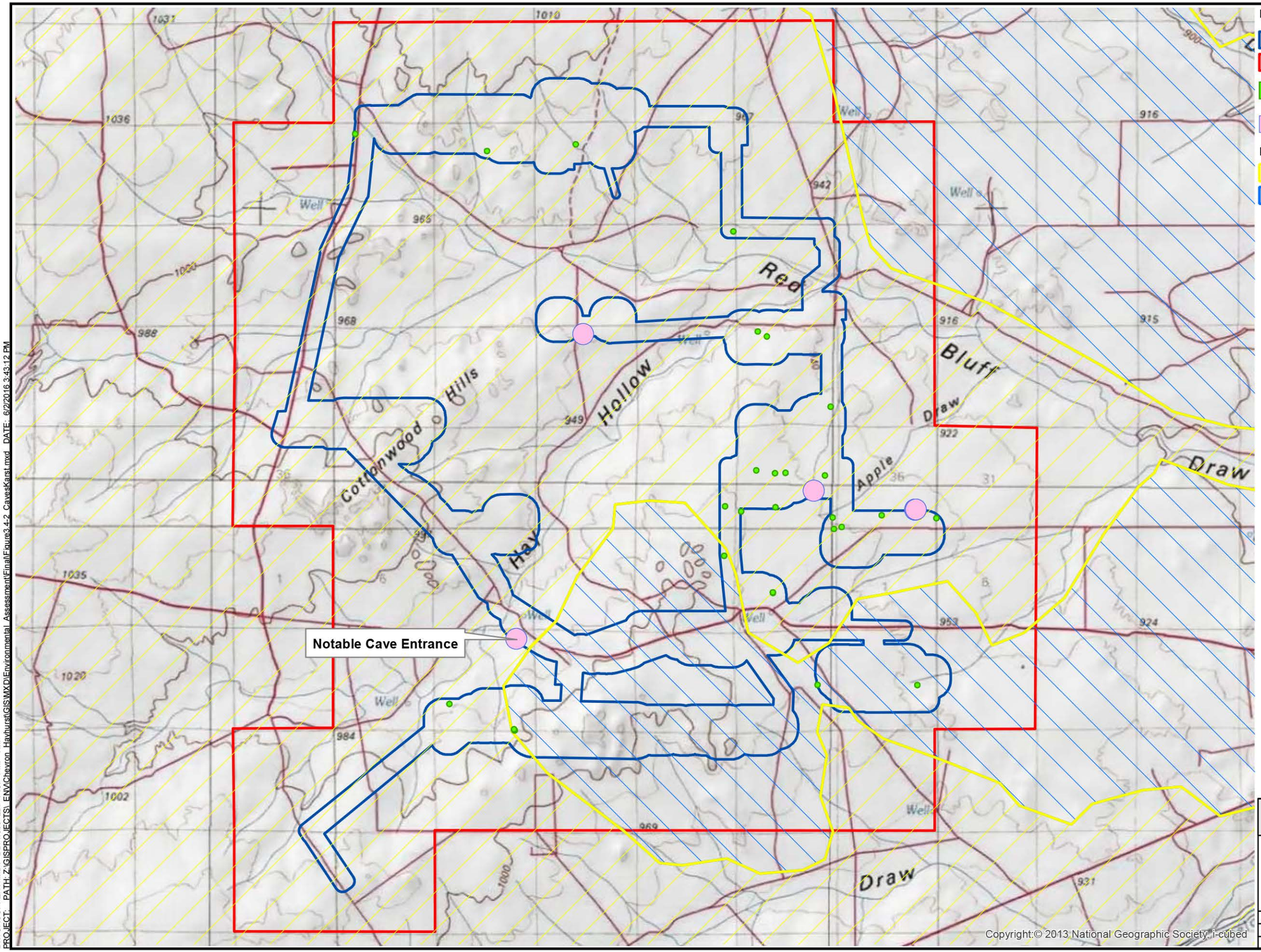
Blasting will not be used as a construction method.

Drilling Impact Analysis

During drilling, previously unknown cave and karst features could be encountered. If a void is encountered while drilling and a loss of circulation occurs, lost drilling fluids can directly contaminate groundwater recharge areas, aquifers, and groundwater quality. Drilling operations can also lead to sudden collapse of underground voids. Cementing operations may plug or alter groundwater flow, potentially reducing the water quantity at springs and water wells. Inadequate subsurface cementing, casing, and cave/aquifer protection measures can lead to the migration of oil, gas, drilling fluids, and produced saltwater into cave systems and freshwater aquifers.

Production Impact Analysis

Production facilities such as tank batteries, pump-jacks, compressors, transfer stations, and piping may fail and allow contaminants to enter caves and freshwater systems. Downhole casing and cementing failures can allow migration of fluids and/or gas between formations and aquifers. Facilities may also be subject to slow subsidence or sudden collapse of the underlying bedrock.



LEGEND:

- MDP Project Area
- Area of Analysis
- Features without Surface Openings (50 meter buffer)
- Features with Surface Openings (200 meter buffer)

Karst Occurence Potential

- High Potential Karst
- Medium Potential Karst

Projection:
WGS 1984

NORTH

0 6,000 12,000 Feet

CHEVRON HAYHURST

FIGURE 3.4-2
CAVE AND KARST FEATURES

ANALYSIS AREA: Eddy County, New Mexico
Date: 6/6/2016 | Prepared By: BW

DIV/GROUP: ENV/IMDV DB: webb LD: PIC: PM: TM:
PROJECT: PATH: Z:\GISPROJECTS_ENV\Chevron_Hayhurst\GIS\MXD\Environmental_Assessment\Final\Figure3.4-2_CavesKarst.mxd DATE: 6/2/2016 3:43:12 PM

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Plugging and Abandonment Impact Analysis

Failure of a plugged and abandoned well can lead to migration of contaminants to karst resources and freshwater aquifers. While this action does not specifically approve plugging and abandonment procedures, the operator should be made aware that additional or special Conditions of Approval may apply at that time.

Cumulative Impacts

The CIA for subsurface hydrology is the Carlsbad Underground Water Basin (**Figure 3.4-1**) as well as the portions of the Red Bluff Draw watershed and Gyp Draw-Delaware River subwatershed that extend into Texas. High to moderate potential for cave and karst resources is present throughout the majority of the CIA, similar to that described for the EA area of analysis (Stafford et al. 2008).

The types impacts of past, present, and reasonably foreseeable future actions would be similar to those described for the proposed action and include potential groundwater contamination and hydrocarbon releases into cave atmospheres, leading to dangerous conditions. Containment ponds associated with some older wells are a risk of contaminant leakage, as are the multiple pipelines, tank batteries, and related facilities present within the CIA.

Dye trace studies conducted by BLM within the CIA have shown connectivity between karst aquifers and lost circulation zones encountered during oil and gas well drilling. These results indicate that past oil and gas operations have likely introduced an unknown quantity of multiple potential contaminants to karst aquifers within the CIA. The extent to which karst aquifer water quality and associated riparian and cave biological communities have been affected has not been determined.

Most ongoing and future oil and gas operations within the CFO are or will be required to incorporate design features, mitigation measures, or conditions of approval to conduct operations within karst areas. These provisions would not apply to oil and gas leases on private or state lands. Past, present, and reasonably foreseeable future actions are likely to contribute to adverse cumulative impacts on cave and karst resources, including groundwater quality and associated ecosystems.

Mitigation Measures and Residual Impacts

Any industrial activities that take place upon or within karst terrains or freshwater aquifer zones have the potential to create both short-term and long-term negative impacts to freshwater aquifers and cave systems. While a number of mitigation measures can be implemented to mitigate many impacts, it is still possible for impacts to occur from containment failures, well blowouts, accidents, spills, and structural collapses. Many of these impacts would likely have long-term, residual effects to resource conditions such as groundwater quality and cave ecosystem functionality. It is therefore necessary to implement long-term monitoring studies to determine if current mitigations measures are sufficient enough to prevent long-term or cumulative impacts.

To mitigate or lessen the probability of impacts associated with the drilling and production of oil and gas wells in karst areas, the guidelines listed in Appendix 3, Practices for Oil and Gas Drilling and Production in Cave and Karst Areas, as approved in the Carlsbad Resource Management Plan Amendment of 1997, page AP3-4 through AP 3-7 will be followed. Many of the mitigation measures provided in the 1997 RMP Amendment have been incorporated into the proposed action as design features and are not considered mitigation measures. Avoidance of known cave and karst features would be prioritized during APD and ROW review. Implementation of mitigation measures is expected to reduce short-term, long-term, and residual impacts to cave and karst resources to less than significant levels.

Additional mitigation is required for the karst features identified closer than 200 meters from the proposed APD Group 1 access road and flowlines. Prior to surface disturbances for construction of the access road, pipeline, flowline, or utility line, straw wattles would be placed along the north side of the area to be disturbed, within and a minimum of 50 feet on either side of the drainage that leads to the karst features.

Road Construction

Roads will be routed around sinkholes and other karst features to avoid or lessen the possibility of encountering near surface voids and to minimize changes to runoff or possible leaks and spills from entering karst systems. Turnout ditches and drainage leadoffs will not be constructed in such a manner as to increase or decrease the natural flow of water into or out of cave or karst features. The CFO will be informed immediately if any subsurface drainage channels, cave passages, or voids are penetrated during construction and no further construction will be done until clearance has been issued by the Authorized Officer. Special restoration stipulations or realignment may be required.

Pipeline Construction

To avoid or lessen the potential of subsidence or collapse of karst features, toxic or combustible gas buildup, or other possible impacts to cave and karst resources from buried pipelines, alignments may be rerouted to avoid karst features. The CFO will be informed immediately if any subsurface drainage channels, passages, or voids are intersected by trenching, and no pipe will be laid in the trench at that point until clearance has been issued by the Authorized Officer. Special restoration stipulations or realignment may be required at such intersections, if any. Leak detection systems, back flow eliminators, and differential pressure shut-off valves may be required to minimize the impacts of leaking or ruptured pipelines. To eliminate these extreme possibilities, good record keeping is needed to quickly identify leaks for their immediate and proper treatment.

Powerline Construction

Smaller powerlines will be routed around sinkholes and other karst features to avoid or lessen the possibility of encountering near surface voids and to minimize changes to runoff or possible leaks and spills from entering karst systems. Larger powerlines will adjust their pole spacing to avoid cave and karst features. The CFO will be informed immediately if any subsurface drainage channels, cave passages, or voids are penetrated during construction and no further construction will be done until clearance has been issued by the Authorized Officer. Special restoration stipulations or realignment may be required.

Drilling Mitigation

Federal regulations and standard Conditions of Approval applied to all APDs require that adequate measures are taken to prevent contamination to the environment. Due to the extreme sensitivity of the cave and karst resources in the Project Area, additional drilling, casing, and cementing procedures to protect cave zones and freshwater aquifers may be required for APDs covered under the MDP on a case-by-case basis.

Production Mitigation

In addition to the leak detection programs for surface facilities and containment ponds provided under the Proposed Action, additional leak detection Conditions of Approval may be applied on a case-by-case basis for production activities covered under the MDP.

Plugging and Abandonment Mitigation

Upon well abandonment in high cave karst areas additional plugging conditions of approval may be required. The BLM will assess the situation and work with the operator to ensure proper plugging of the wellbore.

3.5. Watershed

Affected Environment

Surface Hydrology

The surface hydrology area of analysis is characterized by relatively flat to gently sloping terrain dissected by ephemeral tributaries to the Pecos River (**Figure 3.5-1**). Somewhat steeper, hilly terrain is present in

the western portion of the Project Area in the Cottonwood Hills, where relief is up to about 200 feet. The main drainage within the Project Area is Red Bluff Draw, which collects runoff from North and South Hackberry Draws, Cottonwood Draw, Apple Draw, Hay Hollow Draw, and other unnamed drainages prior to its confluence with the Pecos River. Minor, unnamed drainages in the southern portion of the Project Area flow southward to Owl Draw, which is tributary to the Delaware River. The confluences of Red Bluff Draw and the Delaware River with the Pecos River are both east of State Highway 285, approximately 4 and 6 miles east of the Project Area, respectively.

Water quality and quantity is influenced by physical, chemical, and biological reactions that occur as water moves over and through the land surface toward streams and into aquifers. The rate at which water moves through the watershed strongly affects these reactions. The area is located in the semi-arid southwest on the northern edge of the Chihuahuan Desert, where annual precipitation averages 10.5 inches with the greatest rainfall occurring as monsoonal storms in late summer (July through September). About half of the annual precipitation is received during this period via brief, intense storms that can cause large amounts of runoff and potential flooding (Pecos Valley Water Users Organization [Pecos Valley WUO] 2001). Temporary ponded water may be present in drainages after heavy rains. An impoundment present in the Hay Hollow drainage in T28S, R27E, Section 28 SESE typically contains water throughout the year and is likely seep- or spring-fed. No other seeps, springs, or playas were identified during baseline surveys of the Project Area (Arcadis 2016a).

The reach of the Pecos River which Project Area drainages are tributary is impaired for two designated uses. The warm water aquatic life designated use is impaired by elevated levels of polychlorinated biphenyls (PCBs) in fish tissue and low dissolved oxygen levels. The source of PCBs is unknown and low dissolved oxygen levels are tentatively linked to discharge of groundwater with low oxygen. The irrigation designated use is impaired by elevated levels of dissolved boron, which may be linked to brine springs upstream of the Project Area near Malaga Bend (NMED 2014b).

Subsurface Hydrology

The area of analysis for subsurface hydrology is the same as for cave and karst resources (**Figure 3.4-1**). The Project Area is located in the Carlsbad Groundwater Basin, which encompasses approximately 2,347 square miles of southeastern New Mexico. No EPA-designated sole source aquifers are present within the area of analysis (U.S. Department of Agriculture [USDA] 2016). Groundwater uses within the basin include agriculture; public water supply for Carlsbad, Loving, and other towns; and industrial uses. Groundwater supplies within the basin are obtained from aquifers within underlying sedimentary units including the Dockum Group, Rustler Formation, Castile Formation, Carlsbad and Capitan Limestones, and Delaware Mountain Group. Shallow groundwater is also present in some alluvium and terrace deposits.

The Project Area is underlain by bedrock of the Permian Rustler, Salado, and Castile Formations. Formations comprising the Capitan Reef aquifer are absent. In general, the uppermost bedrock consists of the Rustler Formation in the northern and eastern portions of the Project Area; the Salado Formation in the northwestern, western, central, and southern portions; and the Castile Formation in the southwest. Within the Project Area, none of these formations has sufficient porosity and permeability to yield productive water supply wells, except where karst features are present. Water is withdrawn from the Castile Formation north of the Project Area, where it may be in hydrologic contact with alluvial aquifers (Barroll et al. 2004). Groundwater recharge is from local precipitation entering through playas, sinkholes, and swallets (disappearing streams). Precipitation in the vicinity of the project area primarily falls as rainfall during the summer and fall monsoon (Western Regional Climate Center 2016).

The Carlsbad Groundwater Basin is estimated to contain approximately 12.6 million acre-feet of groundwater within the top 100 feet of all combined aquifers (Pecos Valley WUO 2001). Sustainable groundwater yields for the basin are estimated to be at least 25,000 acre-feet per year, with potential to sustain up to approximately 93,000 acre-feet for short periods (Pecos Valley 2001).

Basin-wide recharge estimates are not established; however, recharge for some individual aquifers within the basin are estimated as follows. Annual recharge is estimated to be 10,000 to 20,000 acre-feet for the

Capitan Reef aquifer and an average of 8,000 acre-feet for the Pecos Valley alluvial aquifer. Irrigation seepage is also estimated to recharge approximately 36,000 acre-feet to the Pecos Valley alluvial aquifer each year. Leakage of water from Lake Avalon is estimated to recharge approximately 15,000 acre-feet each year to the Capitan Reef and Pecos Valley aquifers (NMOSE 2016). Alluvial aquifers and the Capitan Reef aquifer within the basin exhibit short-term fluctuations in water level due to precipitation and withdrawal rates. The Capitan Reef aquifer has shown a slight historical decline. Long-term trends in alluvial water levels are inconsistent. Both aquifers appear to recover quickly during periods of normal precipitation (Pecos River WUO 2001).

Basin-wide estimates of allocated withdrawals in 1996 indicate that approximately 93,500 acre-feet of water rights are recorded or permitted in the basin (Pecos Valley WUO 2001). Of that total, about one-half were supplemental to surface water rights (i.e., only to be used during drought conditions when surface water resources are limited). More recent estimates of water withdrawals for the region have been conducted on a county basis and are not distinguished by groundwater basin. County-wide withdrawals are expected to be much higher than for the Carlsbad Groundwater Basin alone, but provide a picture of distribution of water use by category. For water year 2010 in Eddy County, agriculture (109,738 acre-feet), public water supply (15,465 acre feet), and mining/oil and gas (9,303 acre-feet) comprised approximately 97 percent of all groundwater withdrawals (NMOSE 2016).

Several relatively shallow water wells have been drilled in or near the Project Area that are used primarily to support stock watering. Well yields in the Project Area and vicinity are low (typically less than 5 gallons per minute). Well depths range up to 351 feet, but most are less than 100 feet deep (Arcadis 2016a). Groundwater quality data for the area are limited. However, high sulfur and saline conditions are expected to be present based on regional water quality data and the presence of halite and gypsum/anhydrite in local bedrock (Pecos Valley WUO 2001).

Impacts from the Proposed Action

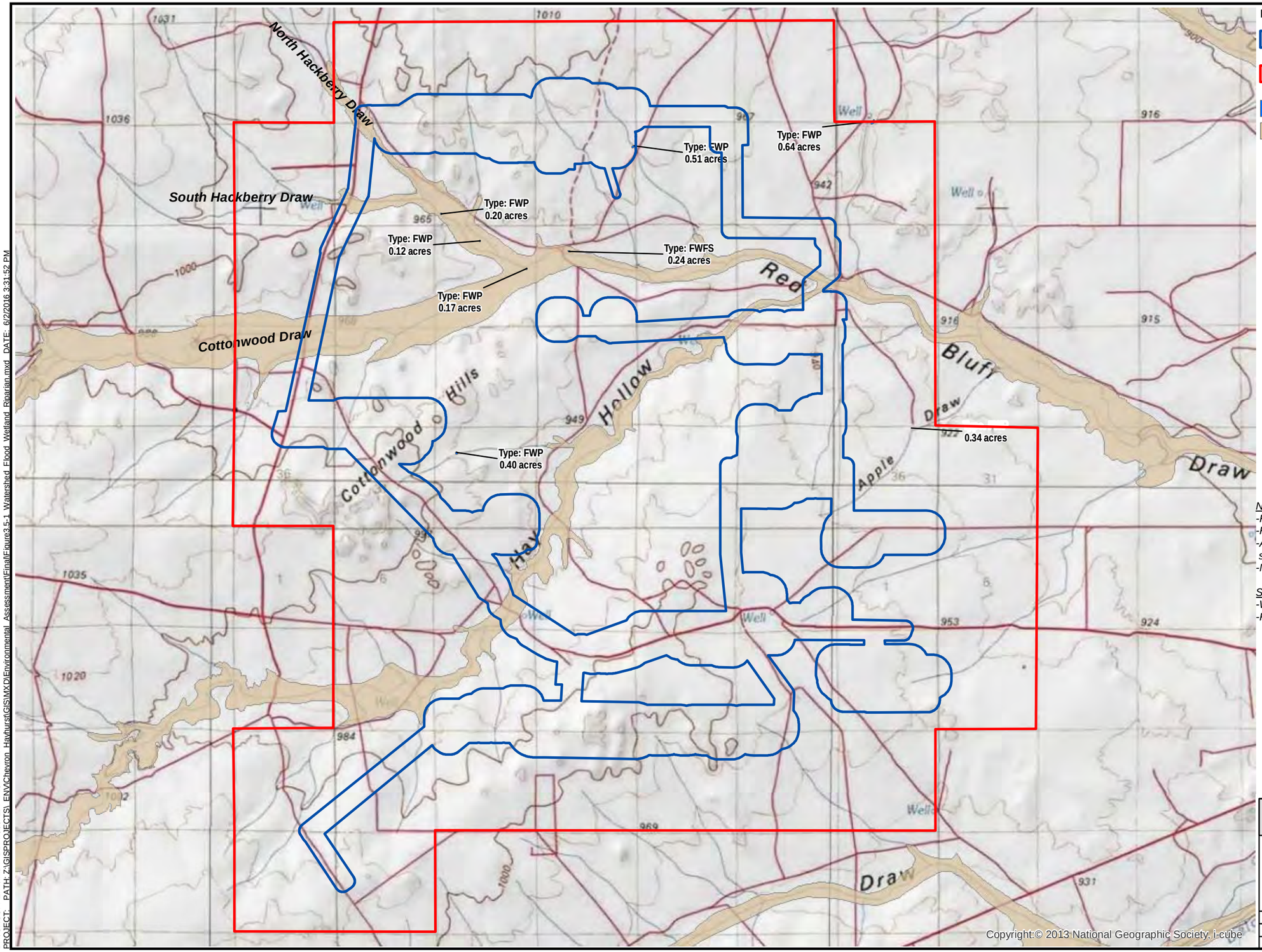
Direct and Indirect Effects

Surface Hydrology

Ephemeral surface water from local rain events will wash down-slope through the area of the proposed action. Localized decreases in vegetative surface cover combined with the caliche covering well pads, roads, and other surface facilities could result in decreased infiltration rates and increased runoff volume and velocity. This causes increased erosion, topsoil loss, and sedimentation. Water diversions (e.g., lead-off ditches, water bars), use of BMPs (e.g., straw wattles) at outlets, low water crossings, and culverts as needed would decrease the potential for erosion and sediment transport along roads. Potential sedimentation in local ephemeral drainages may occur but is not expected to contribute to downstream conditions that have caused impaired designated uses of the Pecos River. Proposed project activities would occur at least 1.25 miles from the seep- or spring-fed impoundment in the Hay Hollow drainage and are not expected to impact discharge or water quality.

Water quality can be adversely affected following the occurrence of an undesirable event such as a leak or spill. Due to typically high concentrations of dissolved solids, spills of produced water or recycled water can have adverse impacts on watershed resources.

Standard practices and design features provided in the MDP and MDP SUPO are expected to reduce potential impacts to surface hydrology. These features include utilizing a closed loop system with no reserve pits, berming, or other secondary containment production facilities; utilizing leak detection systems; utilizing existing surface disturbance; minimizing total surface disturbance; minimizing vehicular use; surfacing parking and staging areas with caliche; and reclaiming areas not necessary for production and quickly reestablishing vegetation on the reclaimed areas. Overall impacts to surface hydrology would be minor.



LEGEND:

- MDP Project
- Area of Analysis for Watershed, Floodplains, Wetlands, and Riparian Areas
- National Wetland Inventory Wetlands
- FEMA 100-Year Floodplain

Notes:
-FWP = Freshwater Pond wetland
-FWFS = Freshwater Forested/Shrub wetland
-Area of analysis for these resources is the same as the Project Area
-No riparian areas identified within area of analysis

Source data:
-Wetlands - USFWS 2016
-Floodplains - FEMA 2010

Projection:
WGS 1984

NORTH

0 6,000 12,000 Feet

FIGURE 3.5-1
WATERSHED, FLOODPLAINS, WETLANDS, AND RIPARIAN AREAS

ANALYSIS AREA: Eddy County, New Mexico
Date: 6/2/2016 | Prepared By: BW

DIV/GROUP: ENV/IMDV DB: webb LD: PIC: PM: TM:
PROJECT: PATH: Z:\GISPROJECTS_ENV\Chevron_Hayhurst\GIS\MXD\Environmental_Assessment\Final\Figure3.5-1_Watershed_Flood_Wetland_Riparian.mxd DATE: 6/2/2016 3:31:52 PM

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Subsurface Hydrology

As described in Section 3.4, cave and karst features provide direct conduits leading to groundwater and can transport contaminants into underground water systems and freshwater aquifers. Potential impacts to subsurface hydrology and groundwater associated with caves and karst are also described in Section 3.4.

Implementation of the proposed water recycling system would reduce the overall water demand compared to similar projects that would rely solely on groundwater resources for completion and other activities. Withdrawal of groundwater for use in project construction, drilling, completion, and reclamation would affect local groundwater aquifers. A total of approximately 3,770,000 bbl of freshwater would be required for construction, dust control, and hydrostatic testing over the life of the project, with an additional maximum of approximately 3,050,000 bbl required for drilling in karst zones. Over the life of the project, the maximum total withdrawal of fresh groundwater for these purposes would be approximately 6,820,000 bbl of water, or 880 acre-feet. Assuming withdrawal of the 880 acre-feet is equally distributed over the 17-year drilling phase of the project (i.e., through 2033), approximately 400,000 bbl (or approximately 52 acre-feet) would be withdrawn from local aquifers each year. This withdrawal rate is considered conservative (high), as some freshwater use for dust control and reclamation would occur after drilling operations have completed. Annual withdrawal of 52 acre-feet of groundwater from the Carlsbad Groundwater Basin would represent approximately one-twentieth of one percent of all permitted or recorded water rights in the basin and approximately one-tenth of one percent of non-supplemental water rights (Pecos Valley WUO 2001).

All freshwater utilized for the proposed action would be obtained from existing, permitted water sources, and no new water wells would be installed. NMOSE is responsible for reviewing and adjudicating all groundwater withdrawals within the subsurface hydrology area of analysis. Adjudications must, in general, ensure that other groundwater users are not impaired and that no additional depletions will occur on fully appropriated streams or streams with flows needed to fulfill interstate compact obligations, including the Pecos River. Therefore, obtaining freshwater from permitted sources is expected to have minor impacts on the availability of groundwater.

Required volumes of non-freshwater would be obtained from the proposed water recycling system, or from local vendors for the initial SWD well. Once completed, the proposed recycling system is expected to provide sufficient water for all project activities that do not require freshwater. As described above for freshwater, all groundwater sources in New Mexico must be permitted and adjudicated by NMOSE. Water sources in Texas are not similarly adjudicated, however. Compared to the volume of declared groundwater within CFO planning area water basins (BLM 2014a; Pecos Valley WUO 2001), project-related water withdrawal is expected to contribute to minor impacts on groundwater availability from the Capitan Reef and Rustler aquifers and minor impacts to discharge and associated streamflow.

Cumulative Impacts

The CIA for surface hydrology is shown on **Figure 3.1-1**. The CIA for subsurface hydrology is the same as described for cave and karst resources and consists of the Carlsbad Underground Water Basin (**Figure 3.4-1**) as well as the portions of the Red Bluff Draw watershed and Gyp Draw-Delaware River subwatershed that extend into Texas.

The types of impacts to surface and subsurface hydrology from past, present, and reasonably foreseeable future actions would be similar to those described for the proposed action.

Surface Hydrology

The proposed action is expected to contribute to minor cumulative impacts on surface hydrology within the CIA. Impaired designated beneficial uses within the Pecos River are either attributed to groundwater discharge with low oxygen or high dissolved boron concentrations or to unknown PCB sources. PCBs may be found associated with natural gas pipeline leaks or effluent from the discharge of condensate (Oregon Department of Environmental Quality 2003). However, the use and discharge of PCBs are highly regulated. As a result, reasonably foreseeable future actions are not expected to cumulatively contribute

to increased PCB concentrations in the Pecos River or to other impairments. Past, present, and reasonably foreseeable future actions are expected to contribute to minor amounts of sedimentation within the CIA, at levels consistent with current conditions. Overall cumulative impacts to surface hydrology are expected to be minor.

Subsurface Hydrology

The proposed action is expected to contribute to minor to moderate cumulative impacts to local freshwater aquifers and minor impacts within the Capitan Reef and Rustler aquifers. No EPA-designated sole source aquifers are present within the CIA of analysis (USDA 2016).

Total water consumption for reasonably foreseeable future actions is estimated as follows. As presented in T**able 3.1-1**, 638 oil and gas wells are projected to be drilled within the CIA through 2034. NMOCD data for well completion operations in Eddy and Lea counties during 2013 indicate that a mean of 28,930 bbl of water was used per well for completion operations (BLM 2014b). (This average value is higher than for the proposed action because the proposed action would utilize recycled water for the majority of well completions.) Based on this average, completion of 638 wells, including the proposed action wells, would require approximately 18.5 million bbl (2,380 acre-feet) of water, all of which is assumed to be withdrawn from local aquifers.

Similarly, if the proposed action use of 380,000 bbl of water per well for drilling operations is applied to all 638 reasonably foreseeable wells, an estimated total of approximately 242 million bbl (31,248 acre-feet) of water would be required for well drilling. Together with the above water requirements for completion activities, approximately 33,628 acre-feet of water are conservatively estimated to be required for reasonably foreseeable drilling and completion activities through 2034 within the CIA. Over the course of 19 years (2016-2034), this total withdrawal would average approximately 1,769 acre-feet per year. Additional water would be utilized for construction of related infrastructure, dust control, revegetation, and other purposes that are not quantified here.

Estimated withdrawal of 1,769 acre-feet of water per year would represent less than one-one hundredth of one percent of all stored groundwater within the Carlsbad Groundwater Basin. These withdrawals would represent approximately two percent of all permitted or recorded water rights in the basin and approximately four percent of non-supplemental water rights (Pecos Valley WUO 2001). The estimated withdrawal rate is also much less than known recharge rates for aquifers in the Carlsbad Groundwater Basin (NMOSE 2016).

Future recharge rates to Carlsbad Groundwater Basin aquifers may be affected by climate change. Climate models generally project decreased precipitation, along with increased temperatures, for the American Southwest, including the CIA (Maloney et al. 2014). However, specific precipitation projections for the region do not correspond well with historical regional observations and are not considered to be reliable precipitation forecasts (Kirtman et al. 2013). The lack of consistency among models is partly due to low precipitation totals and significant year-to-year variation in the region (Kennedy 2013). Therefore, although regional decreases in precipitation, along with increased temperatures and evaporation rates, may occur (e.g., Bureau of Reclamation 2013), quantification of climate impacts on recharge rates and groundwater availability within the CIA is not included in this analysis.

Water withdrawals for reasonably foreseeable future actions within the New Mexico portion of the CIA would be overseen by the NMOSE as described for the proposed action. Withdrawals within the Texas portion of the CIA would be at the discretion of the landowner and are not overseen by the state or a county conservation district. As such, there is higher potential for cumulative impacts due to water withdrawals in the Texas portion of the CIA. However, the only major bedrock aquifer present within the Texas portion of the CIA is the Rustler aquifer, which is limited to outcrops in the northeastern corner of Culberson County (Texas Water Development Board 2011). The Rustler aquifer in southeastern New Mexico contributes to Pecos River streamflow via upward discharge through alluvium and is similarly expected to contribute to flow within the Delaware and Pecos Rivers of Texas (Texas Department of

Water Resources 1978). However, due to the limited extent of the Rustler aquifer within the CIA, withdrawals are expected to be minimal.

Based on current water regulations, projected cumulative water withdrawals from Carlsbad Groundwater Basin aquifers, overall storage, estimated recharge rates (where available), and existing water rights, cumulative water withdrawals for past, present, and reasonably foreseeable future actions are expected to have negligible to minor impacts on water availability within the basin. Cumulative withdrawals would be minor in comparison to withdrawals for irrigation expected to continue to occur in other parts of the basin (NMOSE 2016). Negligible impacts to discharge from the Rustler aquifer to the Pecos River are expected, largely due to the limited extent of the Rustler aquifer within the CIA.

Mitigation Measures and Residual Impacts

With implementation of design features provided in the MDP, MDP SUPO, and APDs, anticipated impacts to watershed resources would be less than significant. Any water erosion that may occur due to the construction of well pads, access roads, or other project components during the life of the project would be quickly corrected and proper measures would be taken to prevent future erosion. Additional mitigation may be required on an individual APD or ROW basis as determined by the BLM. No residual impacts to watershed resources are anticipated.

3.6. Floodplains, Wetlands, and Riparian Areas

Affected Environment

Floodplains

Within the area of analysis, floodplains are ephemeral and are up to approximately 0.5 miles wide. Floodplains provide important water sources for animals and plants in the Chihuahuan Desert. For administrative purposes, the Federal Emergency Management Agency (FEMA)-designated 100-year floodplain serves as the basis for floodplain management within the Project Area. As shown on **Figure 3.5-1**, designated floodplains within the Project Area are located along the following drainages: North and South Hackberry Draw, Cottonwood Draw, Red Bluff Draw, and Hay Hollow (FEMA 2010).

Wetlands and Riparian Areas

Within the area of analysis, the USFWS National Wetlands Inventory (USFWS 2016a) identifies 3.4 acres of wetlands. Most of these (2.9 acres) are in the form of freshwater pond wetlands, with lesser amounts (0.5 acres) of freshwater forested/shrub wetland. One freshwater pond wetland is located within the Project Area boundary in T25S, R27E, Section 16 and was confirmed by baseline surveys (Arcadis 2016a) to represent an ephemeral dirt-bermed pond created to support grazing. All other National Wetlands Inventory-recorded wetlands within the area of analysis occur in bottomland drainages and are 0.5 miles or more downgradient from the Project Area. Baseline surveys by Arcadis (2016) did not identify any additional wetlands or riparian areas within the Project Area.

Impacts from the Proposed Action

Direct and Indirect Effects

No permanent aboveground facilities would be constructed within FEMA-designated 100-year floodplains. Temporary direct impacts to floodplains would occur during construction of access roads, flowlines, and pipelines. No direct impacts to wetlands or riparian areas would occur under the proposed action. Indirect effects such as sedimentation due to runoff from project roads or facilities could occur but are expected to be negligible as a result of implementation of project design features and the downstream distances from project features to wetlands and riparian areas.

Standard practices or design features of the proposed project that minimize impacts to the watershed and water quality include utilizing a closed loop system with no reserve pits, berming production facilities,

utilizing existing surface disturbance, minimizing total surface disturbance, minimizing vehicular use, surfacing parking and staging areas with caliche, and reclaiming the areas not necessary for production and quickly reestablishing vegetation on the reclaimed areas.

Cumulative Impacts

The CIA for floodplains, wetlands, and riparian areas is the same as described in Section 3.1 (**Figure 3.1-1**). Riverine wetlands and riparian areas are prevalent along the Delaware River; otherwise, the majority of the CIA is similar to the EA area of analysis, with isolated wetland and riparian areas occurring in some drainages or associated with springs.

The types of impacts from past, present, and reasonably foreseeable future actions would be similar to those described for the proposed action. Overall, it is expected that negligible, short-term impacts to floodplains, wetlands, and riparian areas would occur within the CIA. The proposed action is expected to contribute to negligible cumulative impacts, primarily in the short-term during construction activities prior to reclamation.

Mitigation Measures and Residual Impacts

With implementation of design features provided in the MDP, MDP SUPO, and APDs, anticipated impacts to floodplains, wetlands, and riparian area resources would be less than significant. Additional mitigation may be required on an individual APD or ROW basis as determined by the BLM. No residual impacts to floodplains, wetlands, or riparian areas are anticipated.

3.7. Vegetation

Affected Environment

The area of analysis is located within the Chihuahuan Basins and Playas Level IV ecoregion. The Chihuahuan Basins and Playas ecoregion has deep depressions filled with sediment that form flat to rolling basins surrounding major rivers. Streams are ephemeral in this area, and annual precipitation ranges from 9 to 13 inches annually. The temperature/moisture regimes are characterized as thermic/aridic, ustic aridic. The dominant land cover type in the ecoregion is shrub/scrub. Vegetation communities within the area of analysis vary based on soil properties. Plant community information was developed using the data available from the Soil Survey of Eddy County, New Mexico and the associated ecological site descriptions (Soil Conservation Service 1971; Natural Resource Conservation Service 2006). The BLM uses the ecological site descriptions and other site-specific information to classify the geographical regions into one of the three vegetative communities described below. A species list developed from baseline environmental surveys (Arcadis 2016a) is included as **Appendix E**. Special status vegetation species (e.g., federal- or state-listed threatened and endangered species) are discussed in Section 3.10.

Loamy Soil Type Plant Communities

Loamy soil types typically are dominated by grasslands made up of warm season, mid- and short-grasses. There is a fair scattering of shrubs and half-shrubs throughout the landscape. Forb production fluctuates greatly from season to season and year to year. Gramas (*Bouteloua spp.*), tridens (*Erioneuron pilosum*), threeawns (*Aristida spp.*), muhlys (*Muhlenbergi*a spp.) dropseeds (*Sporobolus spp.*), tobosa (*Pleuraphis mutica*), and burrograss (*Scleropogon brevifolius*) are the dominant grasses. The most common shrubs in the area are tarbush (*Flourensia cernua)*, creosote (*Larrea tridentata)*, mesquite (*Prosopis glandulosa*), cactus (*Opuntia spp.*), and yucca (*Yucca spp.*). Forbs include filaree (*Erodium spp*.), croton (*Croton spp.)*, bladderpod (*Lesquerella spp.*), and globemallow (*Sphaeralcea spp.*).

Shallow Soil Type Plant Communities

Shallow soil types are typically dominated in the understory by warm season, mid- and short-grasses. Typical grasses include gramas, tridens, dropseeds, threeawn (*Aristida spp.*), and green sprangletop

(*Leptochloa dubia*). The shrub overstory consists primarily of cactus, catclaw (*Mimosa aculeaticarpa var. biuncifera)*, yucca, sumac (*Rhus spp.*), juniper (*Juniperus spp.*) and broom snakeweed (*Gutierrezia sarothrae)*. A large variety of forbs, including croton, bladderpod, buckwheat (*Eriogonum spp.*), and globemallow, can be found, with large fluctuations from season to season based on rainfall. Curlyleaf muhly (*Muhlenbergia setifolia*), wolftail (*Lycurus setosus*), sotol (*Dasylirion wheeleri*), agaves (*Agave lechuguilla*), sacahuista, and piñon (*Pinus spp.*) may be present in limited areas, but are typically confined to limestone hills.

Gypsum Soil Type Plant Communities

Common grasses found in gypsum soil types include gramas, gyp dropseed (*Sporobolus nealleyi*), and alkali sacaton (*Sporobolus airoides*). The shrub component is made up of four-wing saltbush (*Atriplex canescens)*, mormon tea (*Ephedra spp.*), spiny althorn (*Koeberlinia spinosa*), javelin bush (*Condalia ericoides*), and sumac. Forbs include gyp weed (*Datura stramonium*), scarlet guara (*Oenothera suffretescens*), globemallow, and croton. Shrubs and forbs are a minor component of the plant community.

Impacts from the Proposed Action

Direct and Indirect Impacts

Construction of the proposed action would remove approximately 1,808 acres of vegetation: 1,394 acres of loamy soil type plant communities, 156 acres of shallow soil type plant communities, and 258 acres of gypsum soil type plant communities. These impacts would last as long as the well is productive. However, interim reclamation would be conducted within six months of well completion and would reduce the long-term impacts. Once a well is plugged and abandoned, the well pad would be reclaimed and revegetated. It is expected that revegetation would be complete within three to five years, depending on rainfall. The use of proper seed mix (Seed Mixture #1/Loamy Sites; Seed Mixture #3 Shallow Soil Types; and/or Seed Mixture #4 Gypsum Sites), good seed bed preparation, and proper seeding techniques should reduce impacts to vegetation. It is expected that impacts to vegetation would be short term (approximately three to five growing seasons).

In addition to the removal of vegetation for project infrastructure, vegetation could also be indirectly affected by dust caused by construction and operation of the proposed action. Near roads and construction sites, dust can coat surrounding vegetation and disrupt photosynthesis, respiration, and transpiration of plants, ultimately leading to decreased vegetation productivity (Coffin 2007; Trombulak and Frissell 2000). In turn, this can decrease vegetation quality and viability beyond the actual footprint of direct disturbance.

Impacts to vegetation could also occur from unintentional releases of hazardous wastes or other liquid wastes associated with hydraulic fracturing. If such release occurred, nearby vegetation could be killed. Mitigation and regulations associated with containment of hazardous waste and spill prevention measures is discussed in Section 3.16.

Impacts to vegetation would be reduced by standard practices such as utilizing existing surface disturbance, minimizing surface disturbance from well pad and access roads, utilizing steel tanks instead of reserve pits, minimizing vehicular use, placing parking and staging areas on caliche surfaced areas, and reclaiming the areas not necessary for production and quickly establishing vegetation on the reclaimed areas.

Cumulative Impacts

The CIA for vegetation is the same as that generally described for all resources in Section 3.1. The vegetation communities found within the Project Area are typical of those found within the CIA.

The proposed action will impact approximately 1,808 acres of vegetation, which represents a small percentage of the total vegetation within the CIA, approximately 1 percent. The types of primary direct and indirect impacts within the CIA are similar to those described for the proposed action, as oil and gas projects comprise the majority of past, current, and future activities in the CIA. Vegetative disturbance due to past and present oil and gas activities within the CIA is approximately 4,863 acres, and reasonable foreseeable future activities are anticipated to disturb approximately 3,479 acres. The proposed project would result in an additional 22 percent of vegetative disturbance within the CIA. Most vegetative disturbance would be reclaimed within six months following the completion of the last well on any given pad. In addition, a number of described standards would limit impacts to vegetation. Therefore, the proposed action is expected to contribute to negligible to minor impacts on vegetation in the CIA. Impacts are expected to be short-term, primarily occurring during construction, drilling, and maintenance activities throughout the CIA.

Mitigation Measures and Residual Impacts

With implementation of design features provided in the MDP, MDP SUPO, and APDs, anticipated impacts to vegetation would be less than significant. Additional mitigation may be required on an individual APD or ROW basis as determined by the BLM. While design features would reduce impacts, residual impacts could occur from potential erosion, dust, trampling, or ineffective reestablishment.

3.8. Noxious Weeds and Invasive Plants

Affected Environment

New Mexico's Noxious Weed Act of 1963 (76-7-23 to 76-7-30 NMSA 1978), Noxious Weed Control Act (76-7-1 to 76-7-22 NMSA 1978), and Noxious Weed Management Act (76-7D-1 to 76-7D-6 NMSA 1978) provide direction to the New Mexico Department of Agriculture (NMDA) to develop the noxious weed list for the state, identify methods of control, and educate the public about noxious weeds. The NMDA also coordinates weed management between landowners. The BLM currently identifies four plant species within the CFO on the New Mexico Noxious Weed List, Noxious Weed Management Act of 1998. These species are African rue (*Peganum harmala)*, Malta starthistle *(Centaurea melitensis)*, Russian olive *(Elaeagnus angustifolia)*, and salt cedar *(Tamarix spp.)*. African rue and Malta starthistle populations have been identified throughout the CFO and mainly occur along the shoulders of highway, state and county roads, lease roads, and well pads (especially abandoned well pads). The CFO has an active noxious weed monitoring and treatment program, and partners with county, state, and federal agencies and industry to treat infested areas with chemical and monitor the counties for new infestations.

Populations of African rue were identified along existing roads and ROWs within the Project Area during baseline surveys (Arcadis 2016a). In addition, non-native salt cedar was identified along some draws and drainages.

Impacts from the Proposed Action

Direct and Indirect Effects

Any surface disturbance could increase the possibility of establishment of new populations of invasive, non-native species. The construction of the proposed action may contribute to the establishment and spread of African rue and Malta starthistle. The main mechanism for seed dispersion would be by equipment and vehicles that were previously used and/or driven across noxious weed infested areas. Noxious weed seed could be carried to and from the HDA by construction equipment and transport vehicles. Noxious weed introductions could indirectly impact vegetation by reducing habitat quality or changing the trophic structure. The potential for noxious weeds to spread would be highest in newly disturbed areas. Once established, weeds could displace native plant species and change the structure of the habitat (Evangelista et al. 2011, DiTomaso 2000). Noxious weeds could also indirectly affect ecosystem function by changing species composition and the physical environment by altering burn cycles and erosion rates (Evangelista et al. 2011, DiTomaso 2000).

Cumulative Impacts

The CIA for noxious weeds and invasive plants is the same as that generally described for all resources in Section 3.1.

The primary direct and indirect impacts in the CIA would be similar to those described for the proposed action, as oil and gas projects comprise the majority of past, current, and future activities in the CIA. Past and present oil and gas activities make up approximately 4,863 acres of disturbance in the CIA, and reasonable foreseeable future activities, including the proposed action, are anticipated to disturb approximately 3,479 acres.

Noxious weed populations would likely increase to some degree in the short term, as additional well, linear corridor, and facility sites are disturbed. A number of described standards would limit and potentially decrease to manageable levels noxious weed populations in the proposed disturbed areas over the long-term. The use of these measures would likely result in improved weed management. Therefore, the proposed action is expected to contribute to negligible to minor impacts on short-term impacts to noxious weed and invasive plant communities in the CIA. These minor impacts are expected to occur during construction, drilling, and maintenance activities throughout the CIA. However, long-term positive minor impacts may occur due to the implementation of the noxious weed and invasive plant mitigation measures. Therefore, the activities associated with the project would not contribute to the long-term increase in noxious weed populations in the region and no increase in cumulative impacts would be expected.

Mitigation Measures and Residual Impacts

Chevron would be held responsible if noxious weeds become established within the areas of operations. Weed control will be required on the disturbed land where noxious weeds exist both prior to construction and throughout construction, operation, and restoration. These areas include the roads, pads, associated pipeline corridor, and adjacent lands that may be affected by the establishment of weeds due to the proposed action. Chevron would consult with the Authorized Officer for acceptable weed control methods, which include following EPA and BLM requirements and policies. Chevron, in coordination with the BLM, may develop a noxious weed plan to include recommendations and guidelines for noxious weed and invasive species management throughout the Project Area and to minimize the spread of weeds to adjacent areas.

With implementation of these mitigation measures and design features provided in the MDP, MDP SUPO, and APDs, anticipated impacts from noxious weed propagation would be less than significant. Additional mitigation may be required on an individual APD or ROW basis as determined by the BLM. With the implementation of mitigation measures and design features, residual impacts from noxious weeds are not anticipated.

3.9. Wildlife

Affected Environment

The analysis area occurs in the Chihuahuan Deserts Level III Ecoregion. This desert ecoregion extends from the Madrean Archipelago in southeast Arizona to the Edwards Plateau in south-central Texas. It is the northern portion of the southernmost desert in North America that extends more than 500 miles south into Mexico. Outside major river drainages, such as the Rio Grande and Pecos River, the landscape is largely internally drained (Griffith et al. 2006). As described in Section 3.3, vegetation types in the analysis area vary based on soil properties and chemical makeup.

The aforementioned landscape and vegetation characteristics of the analysis area provide habitats for a variety of wildlife including large mammals, small mammals, birds, and herpetofauna (amphibians and reptiles). Mammal species or signs thereof observed in the Project Area during baseline surveys (Arcadis 2016a) along with species with potential to occur in the analysis area are presented in **Table 3.9-1**.

Table 3.9-1 Wildlife Species with Potential or Known to Occur in the Analysis Area[1]

Common Name	Scientific Name
Mule deer	*Odocoileus hemionus*
Pronghorn antelope	*Antilocapra americana*
Coyote	*Canis latrans*
Common gray fox	*Urocyon cinereoargenteus*
Red fox	*Vulpes vulpes*
Northern raccoon	*Procyon lotor*
American badger	*Taxidea taxus*
Mexican ground squirrel	*Spermophilus mexicanus*
Yellow-faced pocket gopher	*Cratogeomys castanops*
Kangaroo rat species	*Dipodomys sp.* (*D. merriami, D. ordii, and D. spectabilis* are possible)
Hispid cotton rat	*Sigmodon hispidus*
Woodrat species	*Neotoma sp.* (*N. Leucodon* and *N. micropus* are possible)
Long-tailed weasel	*Mustela frenata*
Desert cottontail	*Sylvilagus auduboni*
Black-tailed jackrabbit	*Lepus californicus*
Western spotted skunk	*Spilogale gracilis*
Striped skunk	*Mephitis mephitis*
Feral pig	*Sus scrofa*
Collared peccary	*Pecari tajacu*
Mexican free-tailed bat	*Tadarida brasiliensis mexicana*
Pallid bat	*Antrozous pallidus*
Western pipistrelle	*Pipistrellus hesperus*
Big brown bat	*Eptesicus fuscus*
Hoary bat	*Lasiurus cinereus*
Pocketed free-tailed bat	*Nyctinomops femorosaccus*
Eastern red bat	*Lasiurus borealis*
Western small-footed myotis	*Myotis ciliolabrum melanorhinus*
California myotis	*Myotis californicus*
Yuma myotis	*Myotis yumanensis yumanensis*

Notes:
1 Several ground squirrel, mouse, rat, and shrew species have potential to occur in the analysis area (BLM 2014a).
Sources: BLM 2014a, Arcadis 2016a, DesertUSA 2016

The greater CFO contains a large concentration of limestone caves, many of which serve as important roosting and nursery habitat for bats (BLM 2014a). One cave and a number of other karst features (including one large collapsed sinkhole, two small and collapsed sinkholes, three collapsed mammal holes, and a number of closed depressions and fissures) have been identified within the Project Area ROW (Arcadis 2016a). No roosts or hibernacula were identified in the Project Area during baseline surveys (Arcadis 2016a); however, there is potential for bats to roost in the aforementioned cave. Further, there are likely other karst features within the analysis area that provide suitable roosting habitat. Carlsbad Caverns, located approximately 8 to 20 miles west of the analysis area, supports a maternity roost of approximately one million Mexican free-tailed bats and provides habitat for several other species including the BLM sensitive cave myotis and fringed myotis (U.S. Geological Survey 2016). Roosting bats at Carlsbad Caverns may forage within the analysis area as they have been documented foraging more than 56 kilometers (35 miles) from Carlsbad Caverns (Best and Geluso 2003). Further, these bats may migrate through and forage in the analysis area on their way to and from wintering grounds in Mexico.

A variety of avian species have potential to pass through, nest in, and/or winter in the analysis area. Avian species with potential to occur in the analysis area are presented in **Table 3.9-2**.

Table 3.9-2 Avian Species with Potential or Known to Occur in the Analysis Area

Common Name	Scientific Name
Raptors	
Swainson's hawk	*Buteo swainsoni*
Ferruginous hawk	*Buteo regalis*
Red-tailed hawk	*Buteo jamaicensis*
Harris' hawk	*Parabuteo unicinctus*
Rough-legged hawk	*Buteo lagopus*
Cooper's hawk	*Accipiter cooperii*
Northern harrier	*Circus cyaneus*
American kestrel	*Falco sparverius*
Prairie falcon	*Falco mexicanus*
Peregrine falcon	*Falco peregrinus*
Bald eagle	*Haliaeetus leucocephalus*
Golden eagle	*Aquila chrysaetos*
Great-horned owl	*Bubo virginianus*
Burrowing owl	*Athene cunicularia*
Barn owl	*Tyto alba*
Western screech owl	*Otus kennicotti*
Turkey vulture	*Cathartes aura*
Other Migratory Birds	
Rock wren	*Salpinctes obsoletus*
Cactus wren	*Campylorhynchus brunneicapillus*
Loggerhead shrike	*Lanius ludovicianus*
Scaled quail	*Callipepla squamata*
Greater roadrunner	*Geococcyx californianus*
Brewer's sparrow	*Spizella breweri*
Common nighthawk	*Chordeiles minor*

Sources: Arcadis 2016a, USFWS 2016b, Garber and Young 2005

Field baseline survey data indicate that there are a number of raptor nests (including 12 hawk nests and 18 burrowing owl burrows) within the Project Area (Arcadis 2016a). Trees within the Project Area are limited; therefore, raptor nests (other than burrows, which seem to be more concentrated along the northern ROW buffers) are limited in location to these trees or large brush and yucca plants (Arcadis 2016a). This is expected to be the case for the analysis area as a whole. A number of outcroppings have been identified within the Project Area, which could provide suitable nesting habitat for falcons; however, no falcon nests have been confirmed in the area (Arcadis 2016a). Field baseline surveys also indicate the presence of several non-raptor bird nests along the proposed project footprint (Arcadis 2016a).

Herpetofauna known to occur in the analysis area include ornate box turtle (*Terrapene ornata*), Texas horned lizard (*Phrynosoma comutum*), round-tailed horned lizard (*Phrynosoma modestum*), little striped whiptail (*Cnemidophorus inornatus*), gophersnake (*Pituophis catenifer*), and western diamondback rattlesnake (*Crotalus atrox*) (Arcadis 2016a). Herpetofauna often depend on water sources for breeding and survivorship. Permanent water sources are limited in the analysis area, but numerous human-made water sources (e.g., wells and troughs) have been installed within the boundaries of the BLM CFO. These are important to all wildlife in the desert ecosystem as they provide readily available water and areas of sanctuary. No designated wildlife water sources are located within the analysis area; however, one Wildlife Habitat Project Avoidance is located in the analysis area and minimally intersects the buffer area for the ROW in Sections 3 to 4 of Township 26 South, Range 27 East.

Impacts from the Proposed Action

Direct and Indirect Effects

At the programmatic level, direct impacts of the proposed action to wildlife may include, but are not limited to, possible mortality, habitat degradation and fragmentation, and exposure to chemicals. The primary indirect impacts to wildlife could include avoidance of the analysis area and behavioral/physiological changes as a result of habitat loss/fragmentation, noise, and human presence. These direct and indirect impacts are described further below and would also be applicable at the site-specific level (i.e., the 12 APDs submitted with the MDP [APD Group 1 and APD Group 2]), albeit on a smaller scale.

Wildlife could be susceptible to mortality from collision with or trampling by vehicles and equipment, particularly during construction. At the programmatic level, Chevron would use existing county and lease roads as well as new resource roads during construction, drilling, and completion operations. Vehicle collisions with wildlife may occur along proposed access roads and may be more likely to occur in the short-term, during construction, when traffic would be highest (telemetry and SCADA equipment would be used to remotely monitor oil and gas wells during operations to reduce traffic to and from well locations). Posted speed limits would be followed and minimize collision impacts with wildlife (30 to 40 mph is adequate in most cases [Wyoming Game and Fish Department 2010]). To the greatest extent practical, traffic would also be limited during high wildlife use hours (within three hours of sunrise and sunset).

Birds, including raptors, and their nests may be at risk of morality or degradation during construction. Birds may also abandon nests or alter breeding behavior in the vicinity of construction and operations activities. To mitigate for these impacts, ground-breaking activities will be timed to occur outside the avian nesting season (March to late June), if possible. Note that the BLM CFO generally requires a 50-meter buffer during the non-nesting season (September 1 to February 28) for inactive raptor nests. Should construction activities need to occur during the nesting season, Chevron will perform a pre-construction wildlife survey to identify new nests and verify the status of previously identified nests. No surface disturbance will be allowed within 200 meters of active bird (raptor and non-raptor) nests, or construction activity will be delayed up to 90 days (or a combination of both). Chevron will only consider construction within 200 meters of a nest if it is confirmed to be inactive, the proposed construction activity is of short duration (e.g., fence or pipeline installation), and construction will not result in continuing activity in proximity to the nest.

Birds may also be susceptible to collision and electrocution with the proposed 12.47 kV powerlines at the programmatic and site-specific levels (although on a much smaller scale at the site-specific level). Powerlines would be located within the same ROWs as roads and pipelines so as to not contribute to additional habitat loss/fragmentation. The powerlines would be constructed to APLIC standards to minimize collisions and electrocutions (e.g., installing bird flight diverters on the top grounding wire, separating conductors by more than the wingspan or height of a landing or perching bird, and grounding hardware or equipment cases and locating them in proximity to energized conductors). Smaller wildlife, including birds and bats, may also be at risk of mortality by getting trapped (or exposed to chemicals) in open-topped tanks or open-vent exhaust stacks. To mitigate for these types of impacts, Chevron will net, screen, or cover all open-topped tanks until they are removed or no longer contain harmful substances. Further, Chevron would construct, modify, equip, and maintain all open-vent exhaust stacks on production equipment to prevent birds and bats from entering and to discourage perching, roosting, and nesting.

Oil and gas extraction activities under the proposed action could expose wildlife to hazardous chemicals. Hydraulic fracturing fluids could contain chemicals such as acids, salts, surfactants, biocides, and corrosion inhibitors. These or other chemicals may seep from leaks in boreholes, spill from tanks and trucks, or be placed into containment ponds along with other fluids. Impacts of exposure of contaminants to wildlife under the proposed action are expected to be reduced through implementation of a variety of design features as described in Section 2.1.

Under the proposed action, approximately 1,808 acres of wildlife habitat would be removed in the short term, and 782 acres would be removed in the long term. At the site-specific level, 106 acres of wildlife habitat would be removed over the short term and 63 acres would be removed over the long term. Loss of habitat and fragmentation associated with roads and infrastructure under the proposed action may influence wildlife to avoid the area in and around the HDA MDP, and to a lesser extent, the 12 APDs submitted with the MDP. When wildlife are displaced due to habitat loss and fragmentation, they can move into areas of lower habitat value or quality, and/or areas that are already occupied at their carrying capacity. Habitat fragmentation by roads can also increase accidental roads kill (Jankowitz and Gruber 2007). Most habitat disturbance and associated impacts would be short term and would be reclaimed in the interim. Chevron would complete interim reclamation within six months following the completion of the last well on any given pad. Chevron would meet with the BLM to devise an appropriate seed mix, free of noxious weeds, and reclamation plan to best restore the land to preexisting conditions. Final reclamation for long-term habitat disturbance would occur when a well pad is no longer producing. At that point, habitat-related impacts on wildlife are expected to cease.

Wildlife may avoid new noises and human activity associated with the proposed action at both the programmatic and site-specific level. Sawyer et al. (2009) found that during the first five years of natural gas development on the Pinedale Anticline in Wyoming, the amount of predicted winter mule deer avoidance generally increased with a decreased distance to well pads (the researchers predicted that deer use would be half the normal deer use within an average distance of 1.2 miles from well pads). Results of a five-year study of pronghorn antelope in the same region indicate reduced usage and abandonment of small habitat parcels, and avoidance of areas of highly concentrated oil field development (Blickley and Patricelli 2010). Schaub et al. (2008) monitored noise impacts on foraging bats and found that foraging areas near highways and other sources of intense, broadband sound degraded their suitability as bat foraging areas. Impacts of noise associated with the proposed action could also include masking and behavioral disruptions, particularly for nesting birds. Masking may occur when the perception of a sound is affected by the presence of background noise. Many animals use acoustic signals to attract and retain mates, settle territorial disputes, promote social bonding, and alert other individuals to predators (Blickley and Patricelli 2010). Presence of noise could also work to the advantage of some wildlife. For example, one study found that birds nesting near noisy natural gas pads had higher nesting success, likely due to the reduced presence of the most common nest predator, the western scrub jay (Quinn et al. 2006). Wildlife exposure to noise could also result in chronic effects, including elevated stress levels and associated physiological responses (Blickley and Patricelli 2010). To minimize impacts to wildlife associated with noise, Chevron would not use blasting during construction and would install exhaust mufflers on fixed equipment so as to not exceed 75 decibels measured at 30 feet from the source of the noise.

Artificial night lighting associated with the proposed action could affect nocturnal species, such as birds and bats, by triggering unnatural periods of attraction or repulsion that could lead to impacts on foraging and reproductive behavior, biological clocks, predator-prey interactions, movement and dispersal patterns, community structure, and interactions among and within species (The Nature Conservancy 2016). Birds have been shown to alter the timing of morning choruses and reproductive patterns in response to artificial lighting (Miller 2005; Kempenaers et al. 2010). Some bat species also appear to be sensitive to artificial lighting and avoid lighted areas by changing flight routes and habitat use (Kuijper et al. 2008; Patriarca and Debernardi 2010). To minimize impacts of artificial lighting on nocturnal wildlife, Chevron would use direct lighting on fixed equipment. The lighting would be installed in a way that minimizes light pollution and protects visual resources, while ensuring adequate light for safe and reliable production operations.

Water-dependent wildlife such as fish and some herpetofauna are not expected to be impacted under the proposed action as there would be minor direct impacts on surface waters, specifically wetlands and streams (Section 3.5). The BLM also requires that activities within 200 meters from an artificial wildlife water source be limited and short term in nature; therefore, the proposed action is not expected to disrupt wildlife use or activities of these water sources. In summary, the analysis area (at both the programmatic and site-specific level) is not known to include any state or federal wildlife management areas, refuges, parks or recreation areas, BLM areas of critical environmental concern, major bird or mammal migration

corridors, or critically important habitats such as playas, extensive wetlands or riparian areas, and critical winter and breeding areas. For these reasons, previously described impacts under the proposed action are expected to be limited to individual or small groups of wildlife. Through implementation of described design features and mitigation measures, the proposed action is expected to have a negligible to minor impact on wildlife, with most impacts being short term until interim reclamation and some impacts being long term until final reclamation.

Cumulative Impacts

The CIA for wildlife is the same as described in Section 3.1 (**Figure 3.1-1**). The CIA is applicable to this discussion as it is expected to encompass the daily movements of wildlife (aforementioned large and small mammals, birds, and herpetofauna) that could occur in the analysis area and be affected by the proposed action. Oil and gas industry-related actions are the most prevalent activities within the CIA; therefore, the following discussion focuses on associated impacts.

As described previously, the proposed action may result in negligible to minor direct impacts on wildlife including mortality/collision, habitat degradation/fragmentation, and exposure to chemicals. The primary indirect impacts could include avoidance of the proposed action and behavioral/physiological changes as a result of habitat loss/fragmentation, noise, and human presence. Past, present, and future activities within the CIA are generally the same or similar as those described for the proposed action; therefore, impacts to wildlife within the CIA as a whole are expected to be similar. Past and present oil and gas activities make up approximately 4,863 acres of disturbance in the CIA, and reasonable foreseeable future activities, including the proposed action, are anticipated to disturb approximately 3,479 acres.

Within the CIA, previous, current, and future oil and gas exploration, road construction, and utility line construction have or will result in habitat loss and wildlife displacement, to which the proposed action could contribute. The proposed action would contribute to a minor, short-term loss of wildlife habitat (approximately 1,808 acres). Most habitat disturbance from linear features would be reclaimed immediately and well pads would be reclaimed in the interim, within six months following the completion of the last well on any given pad. Some wildlife habitat, for instance raptor nest habitat, would be avoided altogether; therefore, the proposed action would contribute to negligible impacts in the CIA in these cases.

Noise and human disturbances within the CIA are likely to be temporary and negligible, present only during construction, drilling, and maintenance activities. Past, current, and proposed actions in the CIA are less concentrated west of the proposed action; therefore, wildlife may more readily displaced to habitats in this area (if not outside the CIA). As noted previously, displacement of wildlife can result in competition for available resources, but this competition is expected to be short term, lasting until disturbed areas are reclaimed.

Road and utility lines are present or will be constructed in the CIA. The proposed action, through reduced travel speeds during construction, remote monitoring during operations, and implementation of APLIC standards, is expected to contribute to negligible wildlife mortality and collisions in the CIA. Such is true for potential exposure to chemicals as all open tanks and ponds with hazardous materials would be covered, fenced, or otherwise mitigated to negate use by wildlife.

Overall, it is expected that wildlife may be susceptible to minor, short-term impacts of habitat removal/fragmentation, mortality/collision, avoidance, and exposure to chemicals in the CIA. The proposed action is expected to contribute to negligible to minor impacts on wildlife, primarily in the short term during construction, drilling, and maintenance activities.

Mitigation Measures and Residual Impacts

With implementation of design features provided in the MDP, MDP SUPO, and APDs, anticipated impacts to wildlife would be less than significant. These design features conform to BLM CFO management standards and generally follow New Mexico Department of Game and Fish (NMDGF) Oil and Gas

Development Guidelines (Jankowitz and Gruber 2007). Additional mitigation may be required on an individual APD or ROW basis as determined by the BLM. Residual impacts could still occur after implementation of the design features and may include loss of habitat from ineffective reestablishment of vegetation and displacement.

3.10. Special Status Species, including Threatened and Endangered Species

Affected Environment

Federally Listed Species

Under the Endangered Species Act (ESA), the BLM is mandated to conserve and protect federally listed threatened, endangered, candidate, and proposed species (federal threatened and endangered [T&E] species) and designated critical habitat on public land. There are 11 federal T&E wildlife species listed for Eddy County. Some species are also designated as sensitive by the BLM State Director and require special management consideration to promote their conservation and reduce the need for future listing under the ESA. All federal candidate species, proposed species, and species delisted for five years or less are considered BLM sensitive species (BLM 2014a). **Table 3.10-1** lists USFWS T&E and BLM sensitive species along with their potential to occur in the analysis area. Those species listed for Eddy County or the CFO but not expected to occur within the analysis area are summarized in **Table 1.7-1** and not discussed further in this EA.

Table 3.10-1 USFWS T&E and BLM Sensitive Species Listed for Eddy County[1] and CFO

Species	Listing Status[2]	Habitat	Occurrence in Analysis Area[3]
Mammals			
Cave myotis (*Myotis velifer incautus*)	NMSO	This is a desert and lower elevation grassland species, but it has been collected from juniper-pinyon woodlands; roosts in caves (BISON-M 2016); roosting bats not observed in Project Area (Arcadis 2016a); bats may forage in the area.	May occur
Fringed myotis (*Myotis thysanodes thysanodes*)	NMSO	Commonly roosts in caves and abandoned mines; forages in a variety of habitats ranging from mountain pine to desert scrub, but seems to prefer grassland areas at intermediate elevations (BISON-M 2016); roosting bats not observed in Project Area (Arcadis 2016a); bats may forage in the area.	May occur
Long-legged myotis (*Myotis volans interior*)	NMSO	Summers in New Mexico; has an ecoregion association of Chihuahuan desert tarbush creosote and a life zone association of lower Sonoran mesquite creosote (BISON-M 2016) roosting bats not observed in Project Area during baseline surveys (Arcadis 2016a); bats may forage in analysis area.	May occur
Guadalupe pocket gopher (*Thomomys bottae guadalupensis*)	NMSO	Found in the Upper Pecos and Upper Pecos Black River basins; lives in underground burrows in nearly every habitat within New Mexico so long as sufficient tuberous roots and plant material are available and soil is suitable for digging tunnels; in desert habitats, occurs in close association with clumps of lechuguilla, yucca, sotol, catclaw, and cacti (BISON-M 2016); suitable habitat is present in the analysis area.	May occur
Pale Townsend's big-eared bat (*Corynorhinus townsendi pallescens*)	NMSO	Found in Upper Pecos and Upper Pecos Black River basins; found during day mostly in caves or mine tunnels, but at night they rest in abandoned buildings; in summer, occur widely in New Mexico and can be found in a variety of habitats (BISON-M 2016); may forage in analysis area,	May occur

Table 3.10-1 USFWS T&E and BLM Sensitive Species Listed for Eddy County[1] and CFO

Species	Listing Status[2]	Habitat	Occurrence in Analysis Area[3]
		no roosting bats observed during baseline surveys (Arcadis 2016a).	
Spotted bat (*Euderma maculatum*)	NMSO	Can be found in the Upper Pecos and Upper Pecos Black River basins; dwells in cliffs and diurnally roosts in cracks and crevices of canyons and cliffs; rocky cliffs are necessary to provide suitable roosting habitats (BISON-M 2016); no bats observed roosting in Project Area (Arcadis 2016a); bats may forage in the analysis area.	May occur
Western small-footed bat (*Myotis ciliolabrum melanorhinus*)	NMSO	This species shows little geographic variability in New Mexico, and the center of distribution seems to be in the ponderosa pine zone, although they can occur as low as desert and as high as the spruce-fir zone (BISON-M 2016); also utilizes a variety of riparian habitats (BISON-M 2016); may forage in analysis area.	May occur
Yuma myotis bat (*Myotis yumanensis yumanensis*)	NMSO	Found in Upper Pecos and Black River basins; known to occur at Carlsbad Caverns; roosts in caves and buildings; forages in a variety of habitats including those associated with Chihuahuan desert communities (BISON-M 2016); roosting bats not observed in Project Area during baseline surveys (Arcadis 2016a), but may forage in the analysis area.	May occur
Birds			
Baird's sparrow (*Ammodramus bairdii*)	NMSO	Migrants or vagrants; use shortgrass prairies, including desert grasslands; habitat available in analysis area.	May occur
Burrowing owl (*Athene cunicularia hypugaea*)	NMSO	Nest within burrows (typically) built by smaller mammals; burrows are often associated with prairie dog colonies (BISON-M 2016); active burrows have been documented in analysis area (Arcadis 2016a).	Known to occur
Sprague's pipit (*Anthus spragueii*)	C	A wintering population occurs in southern New Mexico; prefers dry, open grasslands (NMPIF 2016b); may use grassland habitat in analysis area.	May occur

Notes:
1 Sources: USFWS 2016b; NMRPTC 1999a,b,c,d
2 C = Candidate for Federal Listing; NMSO = BLM CFO Sensitive Species. Note, some species are also listed as T&E by the state of New Mexico. These species are discussed in subsequent sections.
3 Known to occur, may occur, or not expected. *Species that are not expected to occur in the analysis area are identified in **Table 1.7-1** and are not discussed further.

Additional information on the listing status, life history, and current distribution information for USFWS T&E and BLM sensitive species that may occur in the analysis area is provided below.

In addition, information on the listing status, life history, and current distribution information for federal T&E species that may occur in the Project Area is provided below.

BLM Sensitive Bats

BLM sensitive bats include the following: Big Free-Tailed Bat (*Nyctinomops macrotis*), Cave Myotis (*Myotis velifer incautus*), Fringed Myotis (*Myotis thysanodes thysanodes*), Long-Legged Myotis (*Myotis volans interior*), Pale Townsend's Big-Eared Bat (*Corynorhinus towndendii pallescens*), Spotted Bat (*Euderma maculatum*), Western Small-Footed Myotis (*Myotis ciliolabrum melanorhinus*), and Yuma Myotis (*Myotis yumanensis yumanensis*).

All bat species listed in **Table 3.9-1** are listed as BLM sensitive species; none are USFWS T&E species. Distributions of these species range over a large geographic area and a variety of habitats, but all species have been documented in or are suspected to occur in the CFO (BLM 2014a). The greater CFO contains

a large concentration of limestone caves, many of which serve as important roosting and nursery habitat for bats (e.g., Carlsbad Caverns), including the BLM sensitive species listed above (BLM 2014a). In the analysis area, one cave has been identified as well as some closed sinkholes, closed mammal holes, and a number of depressions and fissures. No bats or roosting activities have been identified using karst features in the analysis area. BLM sensitive bat species known to roost elsewhere in the CFO (e.g., Carlsbad Caverns) may forage within the analysis area. Further, sensitive bat species may stop over within the analysis area during migration to and from wintering grounds in Mexico.

BLM Sensitive Birds

BLM sensitive birds include Baird's Sparrow (*Ammodramus bairdii*) and Burrowing Owl (*Athene cunicularia hypugaea*).

Baird's sparrows were historically noted as common or abundant within limited breeding range on the northern Great Plains. Despite their abundance on breeding grounds, there are relatively few historical records of the sparrow on migratory routes in the central and southern Great Plains, and their winter range is poorly delineated (Wiggins 2006). In New Mexico, Baird's sparrows migrate in the eastern and extreme southern areas of the state and are considered rare to uncommon. They use a variety of habitats, including desert grasslands, and tend to arrive the first week of August and leave by November (BISON-M 2016). Suitable habitat is predominantly present throughout desert grassland in the analysis area, although the species has not been observed in the analysis area (Arcadis 2016a). If present, the bird is only expected to temporarily stop over within the analysis area to forage or rest during migration.

Burrowing owls breed in North America and spend their nonbreeding time primarily south of the United States; they can winter south to Guatemala and El Salvador. In New Mexico, they are uncommon to fairly common in open grassland areas, particularly adjacent to prairie dog towns (BISON-M 2016). Burrowing owls utilize small dens in the ground as their nesting sites, typically abandoned by small burrowing mammals such as prairie dogs, coyotes, foxes, ground squirrels, and badgers (BLM 2014a). Suitable habitat and active burrowing owl burrows were identified throughout the Project Area during baseline surveys (Arcadis 2016a [Figure 10]).

USFWS T&E Bird - Sprague's Pipit (*Anthus spragueii*)

Sprague's pipit is recognized as a candidate for federal listing under the ESA. An endemic grassland species of the northern Great Plains, Sprague's pipit breeds in southern portions of Alberta, Saskatchewan, and Manitoba, eastern Montana, and North Dakota. It winters from southeast Arizona east across most of Texas to Louisiana and Mississippi, and south in Mexico. In New Mexico, Sprague's pipit winters sporadically in southern desert grasslands, primarily in the lower Pecos River Valley, Otero Mesa, and the Animas Valley (NMPIF 2016b). They are generally present in southern New Mexico from October to early April (NMPIF 2016b).

Sprague's pipit prefer dry, open grasslands. Native grass species are preferred over prairie exotics. Wintering habitat may consist of taller grass than in areas typically used for breeding (i.e., intermediate grass height). Wintering areas may have grasses taller than 1 foot and greater than 60 percent grass canopy cover (Jones 2010; NMPIF 2016b). Shrub cover has been known to have a strong negative influence on pipit abundance (Panjabi et al. 2010).

Sprague's pipits were not observed within the Project Area during field surveys (Arcadis 2016a). Grass height in the area (documented as short- to mid-height [Arcadis 2016a]) may not be suitable for use by wintering Sprague's pipits. Further, shrubs are a major component of some grass communities in the Project Area (Arcadis 2016a); therefore, the analysis area may not offer optimum wintering habitat for Sprague's pipits but may be used opportunistically as foraging/stopover habitat.

State-Listed Species

The NMDGF is directed under the New Mexico Wildlife Conservation Act (WCA) to develop recovery plans for species listed by the state of New Mexico as threatened or endangered. The current list of state

threatened and endangered wildlife includes 37 mammal, bird, herpetofauna, and fish species for Eddy County (BISON-M 2016). These species, along with their state listing status, habitat, and occurrence within the analysis area, are presented in **Table 3.10-2**. Those species listed for Eddy County but not expected to occur within the HDA are not discussed further in this EA.

Table 3.10-2 State T&E Species Listed for Eddy County, New Mexico[1, 2]

Species	NM WCA Listing Status[3]	Habitat[4]	Occurrence in Analysis Area[5]
Mammals			
Spotted bat (*Euderma maculatum*)	ST (also NMSO)	See information in **Table 3.10-1**.	May occur
Birds			
Baird's sparrow (*Ammodramus bairdii*)	ST (also NMSO)	See information in **Table 3.10-1**.	May occur
Common ground-dove (*Columbina passerina*)	SE	Rare visitor to southern New Mexico; uses open stands of creosote bush and large succulents; suitable habitat present in analysis area.	May occur
Gray vireo (*Vireo vicinior*)	ST	Most often found in juniper woodlands and foothills/mesas with oaks and well-developed grasses; rare breeder in the state; grasslands with some juniper found in the analysis area.	May occur
Peregrine falcon (*Falco peregrinus*)	ST	Found in a variety of habitats, typically forested, and nest on cliff escarpments; may nest on karst associated rock walls/cliffs in analysis area.	May occur
Varied bunting (*Passerina versicolor*)	ST	Summers in small numbers in Eddy County; prefers dense stands of mesquite and associated growth in canyon bottoms; may use mesquite stands in analysis area.	May occur
Amphibians and Reptiles			
Gray-banded kingsnake (*Lampropeltis alterna*)	SE	Only specimen collected in New Mexico is from Carlsbad Caverns National Park; species uses Chihuahuan deserts with abundant limestone outcroppings; suitable habitat present in analysis area.	May occur
Mottled rock rattlesnake (*Crotalus lepidus lepidus*)	ST	Pine-oak forests, mesquite-grasslands, and deserts; suitable habitat present in analysis area.	May occur

Notes:
1 Source: Biota Information System of New Mexico Report County Federal/State Species Status for Eddy County (BISON-M 2016).
2 Source: NMAC. Title 19. Chapter 21. Part 2. 8. List of New Mexico State Endangered Plant Species.
3 NMSO = BLM CFO Sensitive Species; SE = State Endangered; ST = State Threatened
4 Habitat information obtained from Biota Information System of New Mexico website (BISON-M 2016).
5 Known to occur, may occur, or not expected. *Species that are not expected to occur in the analysis area are identified in **Table 1.7-1** and not discussed further in this section.

Additional information on the listing status, life history, and current distribution information for state-listed species that may occur in the analysis area (spotted bat, birds [Baird's sparrow, common ground-dove, gray vireo, peregrine falcon, and varied bunting], and herpetofauna [gray-banded kingsnake and mottle rock rattlesnake]) is provided below.

State T&E Mammals – Spotted Bat (*Euderma maculatum*)

The spotted bat is listed as a state threatened mammal by the NMDGF and is also a BLM CFO sensitive species. Only a patchy distribution is known for this species, which has been deduced from about 100 scattered specimens. From late spring to early fall, spotted bats have been captured as far north as British Columbia and through most of the western states, including New Mexico. They are known to range south along the Sierra Madre in central Mexico (NMDGF 2007).

The rarity of this bat and the diverse habitats in which it has been seen have caused confusion about its preferences. In New Mexico, spotted bats are known only from about 20 locations in western and southern portions of the state. At almost all of these sites, bats were captured in mist nets over water, so

information about their roosts is speculative. However, since most capture sites had rock cliffs within 1 mile, and there are almost no records of spotted bats roosting in caves, it is assumed that cracks and crevices in cliffs and canyons are their refuges (NMDGF 2007).

Due to the rarity of spotted bats documented in New Mexico, and the uncertainty about/variety in habitat use, the potential for this species to occur in the analysis area is only speculative and based on their known occurrence in Eddy County and potential to roost in cracks and cliffs (which are limited, but associated with karst features, including one cave, in the analysis area [Arcadis 2016a]). No roosts or individual spotted bats were observed in the Project Area during baseline field surveys (Arcadis 2016a). The species could opportunistically forage in or stop over in the analysis area during migration.

State T&E Birds

State T&E birds include Baird's Sparrow (*Ammodramus bairdii*), Common Ground-Dove (*Columbina passerina*), Gray Vireo (*Vireo vicinior*), Northern Aplomado Falcon (*Falco femoralis septentrionalis*), Peregrine Falcon (*Falco peregrinus*), and Varied Bunting (*Passerina versicolor*).

Information on the Baird's Sparrow (state threatened and BLM CFO sensitive species) is presented above under the federally listed T&E section.

The common ground-dove occurs from southeastern California to southern Texas and southward into Latin America. In New Mexico, the dove is a very local, mainly warm season (April to September) visitor to the southernmost part of the state, including presently at San Simon Cienaga and sparingly in the lowermost Rio Grande and Pecos valleys. The dove is typically found in agricultural and developed areas, although it may use open stands of creosote bush and large succulents in Chihuahuan deserts. Suitable habitat is present, although the species has not been observed in the analysis area (Arcadis 2016a). If present, the bird is only expected to rarely and temporarily stop over within the area to forage or rest during migration.

Gray vireos summer from southern California to western Oklahoma, and southward locally to northern Baja California, southern Arizona, southern New Mexico, western Texas, and northern Coahuila. In New Mexico, the bird occurs rarely during the summer in arid juniper woodlands on foothills and mesas, often associated with oaks with a well-developed grass component. Gray vireos are medium-sized passerines (BISON-M 2016). There is a well-developed grass component with some scattered juniper in the analysis area that this species may utilize; however, no gray vireos have were observed during baseline surveys (Arcadis 2016a).

Peregrine falcons breed throughout much of North America and spend their winters primarily south of the Mexico border. In New Mexico, they occur in upper montane areas, lower montane areas, grassland areas, and desert scrubs (dominated by mesquite, yucca, and cactus). They are found in various forest types, but in the Chihuahuan deserts, they can use open stands of creosote bush and large succulents. This species also nests on cliff walls (BISON-M 2016). No peregrine falcons or cliff nests on karst features were observed in the area during baseline field surveys (Arcadis 2016a). They may, however, transiently migrate through the analysis area.

Varied buntings range from the southwestern United States southward to Guatemala, summering in the United States from southern Arizona to southern Texas. In New Mexico, the species summers in two widely separated areas: Carlsbad Caverns National Park area and in Guadalupe Canyon and vicinity. Vagrants have been reported elsewhere in the south, including Eddy County (BISON-M 2016). Varied buntings are found in Chihuahuan desert scrub habitat and seem to prefer dense stands of mesquite and associated growth in canyon bottoms. Canyons are absent within the analysis area, but varied buntings could potentially utilize mesquite shrubs in the area, especially near karst features. No varied buntings were documented during baseline surveys (Arcadis 2016a).

State T&E Amphibians and Reptiles

State-listed T&E herpetofauna with potential to occur in the Project Area include gray-banded kingsnake (state endangered) and mottled rock rattlesnake (state threatened).

Gray-banded kingsnakes could be expected to occur throughout limestone broken rock-Lozier associated with Otero, Eddy, and southwestern Chaves counties in New Mexico. Habitat requirements include typical Chihuahuan desert habitat with abundant limestone outcroppings (BISON-M 2016). Karst features and associated outcroppings within the analysis area may provide suitable habitat for the gray-banded kingsnake; however, no individuals have been observed (Arcadis 2016a).

Mottled rock rattlesnakes occur from southeastern Arizona and southern New Mexico southward in the highlands to Jalisco and San Luis Potosi. The species is known only from the southern Guadalupe Mountains in Eddy and possibly Otero counties. Key habitats include Walnut and Gunsight canyons and Carlsbad Caverns National Park (BISON-M 2016). The snake uses a variety of habitats, including pine-oak forests, mesquite-grasslands, and deserts. No mottled rock rattlesnakes have been observed in the analysis area (Arcadis 2016a). However, suitable habitat is present in the form of mesquite grasslands and deserts.

Impacts from the Proposed Action

Direct and Indirect Impacts

Federally Listed Species

As summarized in **Table 3.9-1**, there are several BLM sensitive species (all birds or bats) and one USFWS T&E species (Sprague's pipit [Candidate]) that has potential to occur in the analysis area based on their known occurrences in the CFO and/or Eddy County. Potential impacts to these species from the proposed action are described below.

BLM Sensitive Bats - Big Free-Tailed Bat (Nyctinomops macrotis), Cave Myotis (Myotis velifer incautus), Fringed Myotis (Myotis thysanodes thysanodes), Long-Legged Myotis (Myotis volans interior), Pale Townsend's Big-Eared Bat (Corynorhinus towndendii pallescens), Spotted Bat (Euderma maculatum), Western Small-Footed Myotis (Myotis ciliolabrum melanorhinus), and Yuma Myotis (Myotis yumanensis yumanensis)

Baseline surveys for the project indicate that roosting habitats for bats (caves, mines, tree cavities, etc.) are limited in the analysis area (Arcadis 2016a). The proposed action would proactively avoid surface disturbance within 200 meters of caves, sinkholes, and mammal holes and 50 meters of depressions and fissures. Therefore, no direct disturbance to potential bat roosting habitat is expected. Therefore, any effects of the proposed action on bats are expected to be limited to foraging or migrating individuals, rather than larger roosting populations like those that occur elsewhere in the CFO (e.g., Carlsbad Caverns [BLM 2014a]). Impacts to bats, at both a programmatic and site-specific level, would be the same as those described for wildlife/bats in Section 3.9. In summary, foraging and/or migrating bats may be susceptible to direct impacts such as collision with vehicles and infrastructure and exposure to chemicals. Chevron plans to reduce these impacts by following posted speed limits, minimizing traffic during evening to early morning hours when bat activity would be highest, constructing open-vent exhaust stacks on production equipment, and installing effective exclosure systems on all secondary containment systems to prevent wildlife (including bat) exposure to contaminants (e.g., fencing, netting, expanded metal mesh, lids, and grate covers [maximum mesh size of 1.5 inches]).

Bats may also be subject to indirect impacts associated with new noise and artificial lighting under the proposed action. Schaub et al. (2008) monitored noise impacts on foraging bats and found that foraging areas near highways and other sources of intense, broadband sound degraded their suitability as foraging areas. Some bat species also appear to be sensitive to artificial lighting and avoid lighted areas by changing flight routes and habitat use (Kuijper et al. 2008; Patriarca and Debernardi 2010). To reduce noise and artificial lighting impacts, Chevron would not blast during construction, would install exhaust

mufflers on fixed equipment, and would use directional lighting on fixed equipment to minimize light pollution. Anticipating that these mitigation measures would be implemented, the proposed action, at both the programmatic and site-specific level, may have minor impacts on foraging and/or migrating bats.

BLM Sensitive Birds - Baird's Sparrow (Ammodramus bairdii) and Burrowing Owl (Athene cunicularia hypugaea)

The Baird's sparrow, if present, is only expected to temporarily stop over within the analysis area to forage or rest during migration. Therefore, impacts of the proposed action on this species are expected to be limited to such individuals (the bird is not known to breed in New Mexico [BISON-M 2016]). At the programmatic level, the proposed action would result in the short-term loss of 1,808 acres of suitable stopover desert grassland habitat and the long-term loss of 782 acres. At the site-specific level, short-term habitat loss would be 106 acres and long-term loss would be 63 acres.

The burrowing owl is known to nest in the analysis area (Arcadis 2016a [Figure 10]). While the project has been designed to avoid direct impacts to known burrows, the proposed action, at the programmatic level, would result in the short-term loss of 1,808 acres of usable grassland habitat and the long-term loss of 782 acres. At the site-specific level, short-term habitat loss would be 106 acres and long-term loss would be 63 acres.

Direct and indirect impacts on the Baird's sparrow and burrowing owl would be the same as those described for wildlife/birds in Section 3.9. In summary, the birds may be susceptible to the following direct impacts under the proposed action: collision with or trampling by vehicles and equipment, collision with or electrocution by aboveground powerlines, exposure to chemicals, and loss of habitat and degradation to nests or burrows.

To reduce these impacts, Chevron would implement design features described in Section 2.1.

Potential indirect impacts on birds include displacement as a result of habitat loss/fragmentation, noise, and artificial lighting. Noise impacts could also include masking and behavioral disruptions, particularly for nesting birds (Blickley and Patricelli 2010). Presence of noise could also work to the advantage of birds. For example, one study found that birds nesting near noisy natural gas pads had higher nesting success, likely due to the reduced presence of common nest predators (Quinn et al. 2006). Wildlife exposure to noise could also result in chronic effects, including elevated stress levels and associated physiological responses (Blickley and Patricelli 2010). To minimize impacts to birds and other wildlife associated with noise, Chevron would not blast during construction and would install exhaust mufflers on fixed equipment so as to not exceed 75 decibels measured at 30 feet from the source of the noise.

Artificial night lighting associated with the proposed action could affect nocturnally active birds by triggering unnatural periods of attraction or repulsion (The Nature Conservancy 2016). Birds have been shown to alter the timing of morning choruses and reproductive patterns in response to artificial lighting (Miller 2005; Kempenaers et al. 2010). To minimize impacts of artificial lighting on nocturnal wildlife, Chevron would use directional lighting on fixed equipment. The lighting would be installed in a way that minimizes light pollution and protects visual resources, while ensuring adequate light for safe and reliable production operations.

Overall, through implementation of previously described design features, proposed action impacts on Baird's sparrow and burrowing owl are expected to be minor, and primarily short term during construction (although some impacts, such as some habitat loss and fragmentation, would occur over the long term).

USFWS T&E Bird - Sprague's Pipit (Anthus spragueii)

Should the Sprague's pipit occur in the analysis area (the species has not been confirmed in the area to date and habitat quality within the analysis area is marginal), impacts of the proposed action, at both the programmatic and site-specific level, would be limited to wintering individuals using tall grass in desert grassland habitat. At the programmatic level, 1,808 acres of potential foraging habitat would be lost in the

short term and 782 acres in the long term. At the site-specific level for APD Group 1 and Group 2, 106 acres of potential foraging habitat would be lost in the short term and 63 acres over the long term. Direct and indirect impacts on the Sprague's pipit would be the same as those described above for the Baird's sparrow. With implementation of previously discussed design features, the proposed action is expected to have minor impacts, if any, on the Sprague's pipit.

State-Listed Species

As mentioned in the affected environment section (**Table 3.9-2**), some bats, birds, and herpetofauna listed by the State of New Mexico as T&E species may occur in the analysis area. Potential impacts to all of these species would be the same as those previously described for federally listed species and general wildlife (in Section 3.9). Overall, impacts on these species are expected to range from negligible to minor (due to a variety of design features that would be implemented to protect wildlife and habitats) and most impacts would occur in the short term during construction.

Cumulative Impacts

The CIA for special status species is the same as described in Section 3.1 (**Figure 3.1-1**). The CIA is applicable to this discussion as it is expected to encompass the daily movements of special status species that could occur in or near the analysis area and be affected by the proposed action. As described previously, BLM sensitive bats, BLM sensitive birds, USFWS T&E species (Sprague's pipit, and a number of state-listed wildlife species have potential to occur in or near the analysis area and therefore the CIA.

The types of primary direct and indirect impacts in the CIA would be similar to those described for the proposed action, as oil and gas projects comprise the majority of past, current, and future activities in the CIA. Past and present oil and gas activities make up approximately 4,863 acres of disturbance in the CIA, and reasonably foreseeable future activities, including the proposed action, are anticipated to disturb approximately 3,479 acres.

For BLM sensitive bats, past, present, and foreseeable actions outside the analysis area are expected to contribute to impacts on foraging, migrating, and roosting bats (particularly where activities occur closer to Carlsbad Caverns, other areas with caves and abandoned mines, and treed areas near water sources). The proposed action is anticipated to contribute to negligible impacts on bats. This is because baseline surveys for the project indicate a lack of roosting habitat in the analysis area. Therefore, any impacts from the proposed action are expected to be limited to foraging bats and their habitats. A number of previously described design features would facilitate negligible impacts on bats in the CIA.

The proposed action is also expected to contribute to negligible impacts on sensitive BLM birds (Baird's sparrow and burrowing owl) and the USFWS T&E bird (Sprague's pipit) in the CIA. This is because a number of design features will be implemented to reduce or avoid impacts to these birds and their habitats (e.g., burrowing owl nests would be avoided through implementation of non-disturbance buffers, APLIC standards would be implemented to reduce collisions and electrocutions, directional lighting would be installed, etc.). Birds may avoid the proposed action in the short term and move to other habitats within the CIA. Past, present, and future activities in the CIA would contribute to reduced habitat/fragmentation, which could result in increased competition for resources among displaced and resident birds. These impacts are expected to be short term in the CIA, occurring primarily during construction, maintenance, and drilling activities (until successful reclamation).

The Texas hornshell, although not expected to occur in the analysis area, is known to occur in the Black River within the CIA, located approximately 2.9 miles northwest of the proposed action. The proposed action is not expected to contribute to impacts on this species as tributaries in the analysis area primarily drain south/southeast to Red Bluff Draw, which flows east to the Pecos River. Therefore, the Black River is not expected to be impacted by the proposed action.

As mentioned in the affected environment section (**Table 3.10-2**), there are a number of state-listed wildlife species that may occur in the analysis area and therefore the CIA. A number of previously described design features would limit impacts to state-listed wildlife. Therefore, the proposed action is expected to contribute to negligible to minor impacts on state-listed wildlife and their habitats in the CIA. Impacts are expected to be short term, primarily occurring during construction, drilling, and maintenance activities throughout the CIA.

Mitigation Measures

With implementation of design features provided in the MDP, MDP SUPO, and APDs, anticipated impacts to special status species would be less than significant. The following mitigation measures will be implemented to minimize impacts on non-raptor avian special status species and their nests. These measures conform to BLM CFO management standards and generally follow NMDGF Oil and Gas Development Guidelines (Jankowitz and Gruber 2007). Additional mitigation may be required on an individual APD or ROW basis as determined by the BLM. Residual impacts could still occur after implementation of the design features and may include loss of habitat from ineffective reestablishment of vegetation and displacement.

3.11. Range

Affected Environment

The Project Area is located in a rural area with a mixture of open rangeland used for livestock grazing, grasslands, and extensive oil and gas development. Livestock grazing within the analysis area includes grazing of domestic cattle and horses. The most common livestock operations in the Project Area are cattle and calf operations.

The BLM is responsible for managing livestock grazing on BLM-managed lands in the CFO Resource Management Planning Area. The CFO manages livestock grazing on 1,947,890 federal acres within the planning area (BLM 2014a). Within the BLM-administered livestock grazing allotments in the analysis area, BLM manages 105,307 acres for the grazing of domestic cattle and horses.

The boundaries of the grazing allotments, range improvements, and range study plots are depicted on **Figure 3.11-1** and listed in **Table 3.11-1**. There are eight grazing allotments and five range study plots within the Project Area. All eight allotments are yearlong cow-calf rotation operations and two allotments also include horses.

The amount of forage required by one animal unit (cow with calf pair) for one month is referred to as an Animal Unit Month (AUM). Based on the total acreage of the allotments and total number of AUMs within the Project Area as listed in **Table 3.11-1**, the rangeland within the Project Area averages 14 acres per AUM.

The number of livestock permitted for each grazing allotment is determined by quantitative measurements of the amount of forage present and to provide for plant recovery to enhance rangeland health. When rangelands are not meeting standards or resource objectives, changes in grazing management are implemented to improve rangeland health, such as adjusting permitted livestock numbers (AUMs), adding additional waters and fences, or providing rest in certain pastures during the growing season. Drought conditions and rangeland wildfires are also a threat to rangeland health (BLM 2014a).

Table 3.11-1 Grazing Allotments, Range Improvements, and Range Study Plots within Analysis Area

Allotment Name	Allotment Number	Total Acres	AUMs		Range Improvements		Range Study Plots within the Analysis Area
			Cattle	Horse	Windmills/ Water Supply	Fences, Troughs, and Corrals	
Big Hackberry	78087	20,652	1,676		Water wells and storages Water pipelines	Barbed wire fences Troughs and corrals	Hackberry – 2
Cottonwood Hills	78104	10,318	1,549		Water wells and storages Water pipelines	Retention dam Barbed wire fences	East Hay Hollow – 1 East Hay Hollow – 2 West Hay Hollow – 3 West Hay Hollow – 4
China Draw	78094	22,838	564		Water wells and storages Water pipelines	Barbed wire fences Troughs and corrals	None identified
Lower Reed Well	78102	4,463	673	21	Water wells and storages Windmill Water pipelines	Barbed wire fences Troughs and corrals	Big – 1 Big – 2 Big – 3
Red Bluff Draw	78101	7,332	72		Water well and storage	Barbed wire fences Troughs	None identified
Delaware River West	78142	19,846	504		Water wells and storages	Barbed wire fences Troughs	None identified
Tecolote Peak	78103	9,574	1,056	48	Water wells and storages Water pipelines	Barbed wire fences Troughs	North – 1
Hay Hollow	78107	10,284	1,200		None identified	Hay hollow interior Fence	Big – 1
Total Acreage		**105,307**	**7,294**	**69**			

Source: BLM 2014a
Total acres for each allotment calculated from GIS files.

Range improvements in the Project Area include water wells, water delivery systems (pipelines, windmills, storage tanks, and water troughs), fences, feed troughs, corrals, and retention dams. In addition, there is one windmill located within the Lower Reed Well Allotment. Noxious weeds, which can affect range quality, are described in Section 3.8, Noxious Weeds and Invasive Plants.

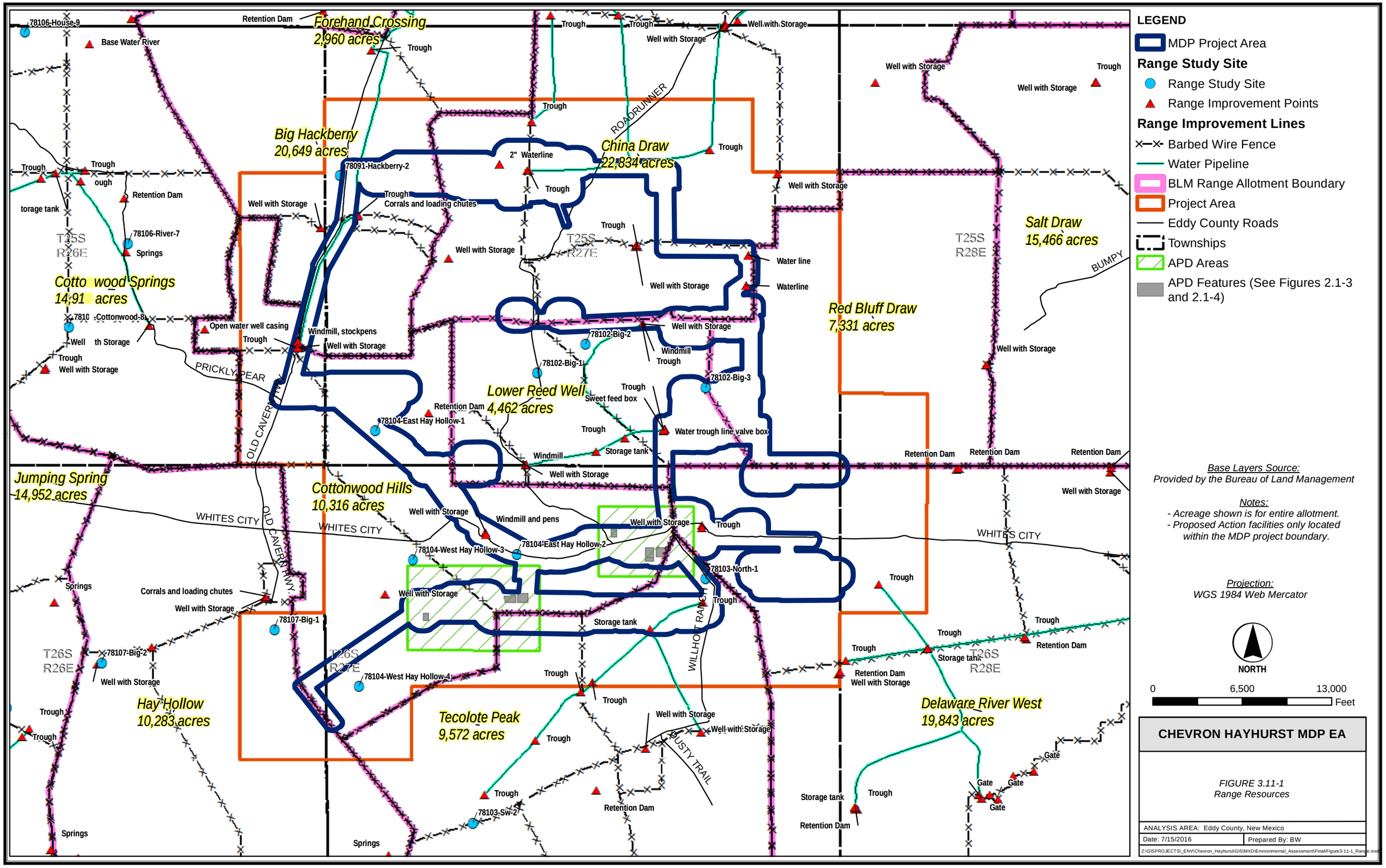
There are four range study plots located within the Cottonwood Hills Allotment and one range study plot in the Tecolote Peak Allotment as shown on **Figure 3.11-1**. There are no range study plots within the other five grazing allotments.

Impacts from the Proposed Action

Direct and Indirect Impacts

The loss of 1,808 acres of vegetation would not substantially affect the AUMs authorized for livestock use in this area. There could be occasional livestock injuries or deaths due to accidents such as collisions with vehicles, falling into excavations, and ingesting plastic or other materials present at the work site. If further development occurs, the resulting loss of vegetation could reduce the AUMs authorized for livestock use in this area.

Under the proposed action, a total of 1,808 acres of short-term surface disturbance would occur within the eight grazing allotments shown on **Figure 3.11-1**. The proposed action as shown on **Figure 2.1-1**, **Figure 2.1-2**, **Figure 2.1-3**, and **Figure 2.1-4** is not likely to impact the range study plots. Following interim reclamation, approximately 782 acres would be disturbed for the life of the project. Under the proposed action, long-term loss of potential forage would represent a reduction of about 1.7 percent of the total acreage of the grazing allotments within the Project Area (105,307 acres) and a 1.8 percent reduction in the AUMs authorized for livestock use in these grazing allotments.



CHEVRON HAYHURST MDP EA

FIGURE 3.11-1
Range Resources

ANALYSIS AREA: Eddy County, New Mexico

Date: 7/15/2016 | Prepared By: BW

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The disturbance associated with the proposed pipelines and roads would expand existing road improvements. Some of these areas may be difficult to reclaim. If reclamation succeeded in these areas, grasses and forbs could begin to provide vegetative cover and forage, possibly as soon as three years after reclamation, if reclamation was protected from livestock grazing.

In addition to the loss of forage, there may be occasional livestock injuries or deaths due to accidents such as collisions with vehicles, falling into excavations, and ingestion of plastic or other materials present at the work site. An increase in vehicle traffic and other human activity could disturb cattle and cause them to move away from productive allotment areas. The proposed action includes several measures to reduce vehicular traffic, which would also reduce impacts to range management.

Impacts to vegetation could also occur from unintentional releases of hazardous wastes or other liquid wastes associated with hydraulic fracturing. If such release occurred, livestock could potentially ingest contaminated vegetation and result in livestock death. Mitigation and regulations associated with containment of hazardous waste and spill prevention measures is discussed in Section 3.16.

In accordance with the BLM CFO Standard COAs, the proposed action would avoid damage to range improvements if practicable. If range improvements are damaged, they would be repaired immediately. These measures would reduce potential impacts to range resources.

Livestock Water Pipelines

Since some of the proposed access roads may travel within 20 feet of buried livestock water pipelines, the pipelines could be damaged during the life of the access roads. The pipelines may be compressed or punctured during construction or heavy vehicle traffic, which would decrease the water flow to water troughs in the area that provide water for livestock.

If a freshwater pipeline or drinking trough is damaged, livestock could run out of water, resulting in stress or death. For the 12 APDs submitted with the MDP (**Figure 2.1-3** and **Figure 2.1-4**), no water pipelines are anticipated to be crossed and no troughs, storages, or water wells impacted by the proposed facilities. Potential impacts to livestock water resources for MPD features would be analyzed during an APD or ROW submittal.

Disturbances to structures that provide water to livestock, such as windmills, pipelines, drinking troughs, and earthen reservoirs would be avoided to the extent possible. Prior to crossing any livestock water pipelines, the private surface landowner or the grazing allotment holder would be notified. Freshwater pipelines, troughs, and windmills would be safeguarded and maintained at all times.

Fence Crossings

The operator would notify the landowner or grazing allotment holder prior to crossing any fences. To reduce impacts to range resources, including livestock and vegetation, Chevron would implement design features including bracing and tying off on both sides of the passageway with H-braces prior to cutting the fence, installing and maintaining appropriately sized cattle guards, and installing wire gates in the fence opening during infrastructure installation to prevent livestock from crossing the fence. The gate would be in place during construction inactivity. Once the work is completed and roads are abandoned, the fences would be restored to its prior condition, or better.

For the 12 APDs submitted with the MDP (**Figure 2.1-3** and **Figure 2.1-4**), one pasture fence and five allotment fences may be crossed by proposed facilities. If a range improvement, such as a fence, is damaged and not immediately repaired and the BLM or grazing allottee is not immediately notified, livestock could move from one pasture/allotment to the next. Impacts to livestock and grazing operations would include added cost in time and money to gather and move the livestock.

Boundary fences and cross fences would be safeguarded and maintained at all times. Fences would not be cut without prior approval of the Authorized Officer. Prior to crossing any fences, the private surface landowner or the grazing allotment holder would be notified. Upon completion of operations, fences would

be restored to their original condition or better. Fences and other existing infrastructure would also be returned to their pre-construction condition as approved by landowners and/or land management agencies.

Cumulative Impacts

The CIA for range resources is the CIA as defined in Section 3.1. Past, present, and reasonably foreseeable future actions in the CIA include oil and gas exploration and development, utility construction, mineral (non-hydrocarbon) exploration and extraction, livestock grazing, recreation, and off-road travel. Oil and gas exploration and development is the most prevalent activity within the CIA and is expected to continue to be over the life of the proposed action. When added to the disturbance associated with the proposed action, the total cumulative surface disturbance is estimated to be 8,342 acres, some of which is on BLM-administered grazing allotments, within the 165,927-acre CIA. The proposed roads, well pads, and other long-term facilities associated with the proposed action would displace forage available for livestock for the life of the project (up to 45 years). The cumulative loss of rangeland would represent approximately 5 percent of the rangeland in the CIA.

Cumulative impacts to range resources would fluctuate with the gradual abandonment and reclamation of wells. It is likely that reclamation activities would occur throughout the CIA during the life of the project; therefore, there would be little or no net increase in the visibility of oil and gas-related components and activities despite an increase in total surface disturbance within the CIA. As new wells are drilled, other wells would be abandoned and reclaimed, reducing impacts to range resources in terms of total cumulative acres disturbed at any given point in time. As the oil field plays out, the cumulative impacts would be reduced as more areas are reclaimed and fewer areas are developed.

Projected vehicle traffic would increase the risk for livestock collisions, wildland fire, and the spread of noxious weeds and invasive species. Reclamation of disturbed areas and the use of BMPs for erosion control would reduce impacts to overall rangeland health. Revegetation efforts would restore the amount of available forage available for livestock grazing in the majority of the CIA. Impacts to vegetation from reclamation efforts resulting from road and well pad construction would include short-term alterations to native plant composition but would ultimately contribute to stable plant communities comparable to pre-disturbance plant densities through time.

Cumulative impacts to livestock and grazing operations would include increased disturbances to range improvements, potentially including damage to fences (allotment boundary and cross fences), windmills, water pipelines, drinking troughs, earthen reservoirs and water wells used by livestock. Fence damages would result in added cost in time and money. Disturbances to structures that provide water to livestock would increase the risk of livestock health issues.

With implementation of design features provided in the MDP, MDP SUPO, and APDs, impacts to range resources would be minor under the proposed action. When considering past, present, and reasonably foreseeable future actions, and the probability for successful reclamation and reestablishment of vegetation, cumulative impacts to range resources are expected to be minor.

Mitigation Measures and Residual Impacts

With implementation of design features provided in the MDP, MDP SUPO, and APDs, anticipated impacts to range resources would be less than significant. The following additional mitigation requirements would be implemented to further reduce potential impacts to range resources. Additional mitigation may be required on an individual APD or ROW basis as determined by the BLM

Removal or alteration of existing range improvements (e.g., fences, cattle guards) would not be allowed without prior approval of the Authorized Officer.

Temporary Fence Crossing Requirement

All gates would remain in place during construction inactivity. Once the work is completed, the fence would be restored to its prior condition or better. The operator shall notify the private surface landowner or the grazing allotment holder prior to crossing any fences.

Livestock Watering Requirement

Structures that provide water to livestock, such as windmills, pipelines, drinking troughs, and earthen reservoirs, would be avoided by moving the proposed action or paying to relocate the structure. The operator must contact the allotment holder prior to construction to identify the locations of water pipelines. The operator must take measures to protect water pipelines from compression or other damages. If a pipeline is damaged or compromised in any way near the proposed project as a result of oil and gas activity, the operator is responsible for repairing the pipeline immediately. The operator must notify the BLM office (575-234-5972) and the private surface landowner or the grazing allotment holder if any damage occurs to structures that provide water to livestock.

Following implementation of the design features and mitigation, residual impacts may remain and include the permanent reduction (1.8 percent) in the AUMs authorized for livestock use in grazing allotments and possible ineffective reclamation, resulting in a loss of forage.

3.12. Cultural and Historical Resources

Affected Environment

The HDA falls within the Southeastern New Mexico Archaeological Region. Aboriginal cultural traditions represented in this region include (Railey, J.A. 2012): Paleoindian (ca.11,500 through 7,000 B.C.), Archaic (ca. 6,000 B.C. through A.D. 500), Ceramic (ca A.D. 500 through 1400), and Post-Formative Native American (ca. A.D. 1400 to Present). Sustained historic Euroamerican presence in the area began in approximately A.D. 1865. The Spanish had passed through the region beginning in the mid-1500s, but did not establish any permanent settlements. Beginning in around A.D. 1865, cattle ranches developed in the region, and cattle drives to move cattle to railheads or mining districts also passed through the region. Beginning in the 1920s, oil and gas exploration and development also expanded into the region. Sites representing all of these periods are known to occur in the region. A more complete discussion of the cultural context of the MDP area is presented in the baseline cultural resource inventory (Boggess et al. 2016).

Lone Mountain Archaeology (Boggess et al. 2016) completed a cultural resources survey and based the survey area on the design and layout of the proposed action, as envisioned before the cultural resource inventory. They then added a survey buffer of 1,000 feet around pad and other facility locations and 200 feet to each side of 120-foot-wide linear ROWs. The irregular and overlapping block areas were squared off into rectangular survey blocks. As a result, Lone Mountain Archaeology surveyed 11 block areas and 35 miles of 520-foot-wide corridor outside these blocks for a total of approximately 7,649 acres. This cultural resource survey area is approximately 21 percent of the total EA analysis area for cultural and historical resources. Records searches of the cultural resource survey area and a 0.25-mile buffer through the State of New Mexico Archaeological Records Management Section and the BLM Carlsbad Field Office conducted before the field survey identified 45 previously recorded sites (Boggess et al. 2016). Sixteen of these previously recorded sites were located with the cultural resource survey area.

The baseline cultural resources inventory (Boggess et al. 2016) identified 37 cultural resource sites in the cultural resource survey area. The 37 sites comprised 16 previously recorded sites that were updated and 21 new sites. Subsequently, McCormack et al. (2016) conducted cultural resource inventory of an additional 424 acres. This additional inventory identified three new sites and updated documentation on seven previously recorded sites. A total of 19 sites in the combined survey area are recommended eligible for the NRHP, and four sites are unevaluated. Sites that are eligible for the NRHP or potentially eligible (e.g., status undetermined) are considered historic properties.

The historic properties in the cultural resource survey area include 22 aboriginal sites of unknown affiliation and one historic Euroamerican feature. The aboriginal sites are considered eligible under National Register Eligibility Criterion D for their potential to yield information important in prehistory or history. The historic Euroamerican feature is unevaluated for eligibility.

Native American Religious Concerns

The BLM consults with Native American tribes regarding traditional cultural properties (TCPs), sacred sites, and traditional use areas that may be affected by land-use planning or federal undertakings. During the oil and gas leasing process, Native American consultation is conducted to identify TCPs, sacred sites, and traditional use areas whose continued use may be incompatible with oil and gas or other land-use authorizations. Knowledge of sacred sites and traditional use areas is culturally sensitive and may not be disclosed to the BLM until there is an adverse effect or tangible threat to those traditional concerns. In addition, these culturally sensitive sites may not be apparent to archaeologists or other cultural resource specialists performing surveys in advance of proposed projects.

Impacts from the Proposed Action

Direct and Indirect Effects

Twenty-three historic properties have been identified within the APE of the proposed project. The project would avoid or mitigate all impacts to historic properties. There would be no adverse impact to historic properties. An avoidance and mitigation plan would be prepared before any ground-disturbing activity. Avoidance measures may include exclusionary fencing for historic properties near project activities or monitoring of project activities near sensitive areas. The avoidance and mitigation plan will also include procedures for the treatment of unanticipated discoveries. If any skeletal remains that might be human or any associated funerary objects are discovered by any project activities, all project activities in the area of the discovery will be stopped, and the BLM will be notified promptly. If any historic properties cannot be avoided, a treatment plan for mitigation of adverse effects would be prepared.

Impacts to cultural resources could also occur from unintentional releases of hazardous wastes or other liquid wastes associated with hydraulic fracturing. If such release occurred, nearby cultural resources could be impacted. Mitigation and regulations associated with containment of hazardous waste and spill prevention measures is discussed in Section 3.16.

Cumulative Impacts

The CIA for cultural resources is the same as described in Section 3.1 (**Figure 3.1-1**).The proponent would avoid or mitigate all historic properties. If there are no unanticipated discoveries of cultural resources during the undertaking, the project would have no adverse effect to historic properties. Any historic properties that cannot be avoided and any unanticipated discoveries would be mitigated under a mitigation plan approved by the BLM. Given the avoidance of known historic properties and the implementation of mitigation and design measures for unanticipated discoveries, the proposed action would not contribute to cumulative impacts to historic properties.

Mitigation Measures and Residual Impacts

Chevron shall be responsible to avoid or mitigate all known NRHP eligible and potentially eligible cultural resources within the areas of operations. These areas of operation include the roads, pads, associated pipeline corridor, and adjacent land affected due to this action. Chevron shall cease activities and notify the BLM within 24 hours of any unanticipated discoveries including but not limited to possible human remains. With implementation of these mitigation measures and design features provided in the MDP, MDP SUPO, and APDs, anticipated impacts to cultural resources would be less than significant. Additional mitigation may be required on an individual APD or ROW basis as determined by the BLM. No residual impacts are anticipated following the implementation of design features and mitigation.

3.13. Paleontology

Affected Environment

Paleontological resources are any fossilized remains, traces, or imprints of organisms, preserved in or on the earth's crust, that are of paleontological interest and that provide information about the history of life on earth. Fossil remains may include bones, teeth, tracks, shells, leaves, imprints, and wood. Paleontological resources include not only the actual fossils but also the geological deposits that contain them and are recognized as non-renewable scientific resources protected by federal statutes and policies.

The primary federal legislation for the protection and conservation of paleontological resources occurring on federally administered lands are the Paleontological Resources Preservation Act of 2009, the Federal Land Policy and Management Act of 1976, and the National Environmental Policy Act of 1970 (NEPA). The BLM has also developed policy guidelines for addressing potential impacts to paleontological resources (BLM 1998, 2008b, 2009). In addition, paleontological resources on state trust lands are protected by state policy from unauthorized appropriation, damage, removal, or use.

The Potential Fossil Yield Classification (PFYC) is a tool the BLM uses to predict the likelihood of a geologic unit to contain paleontological resources. The PFYC is based on a numeric system of 1 through 5, with PFYC 1 carrying little likelihood of containing paleontological resources, whereas a PFYC 5 value is a geologic unit that is known to contain abundant scientifically significant paleontological resources.

All Project Area bedrock is Permian in age (about 299 to 251 million years old) and considered PFYC Class 2 geologic units, with the exception of the lower Rustler Formation (e.g., Culebra Member), which is Class 3 (BLM 2013). Previous geologic mapping and field observations indicate that bedrock consists of the upper Castile Formation, Salado Formation, and lower Rustler Formation (King 1949; New Mexico Bureau of Geology and Mineral Resources [NMBGMR] 2003). The Castile and Salado Formations are generally composed of evaporates, such as anhydrite and halite, which are typically devoid of fossils (NMBGMR 2003). The lowermost Rustler Formation is composed of about 120 feet of siltstone, gypsum, and very fine-grained sandstone. These deposits are in turn overlain by approximately 30 feet of dolomite and 115 feet of gypsum (Vine 1963). No fossils are known from the Rustler Formation of New Mexico, but mollusk fossils (e.g., brachiopods, pelecypods, gastropods) have been identified in the lower Rustler Formation in Culberson County, Texas within dolomite, siltstone, and limestone units (Walter 1953). The lower Rustler Formation may be exposed in isolated, topographically high parts of the area of analysis. Quaternary alluvial deposits are likely Holocene or upper Pleistocene (NMBGMR 2003) and are also considered PFYC 2 deposits. Occurrences of Ice Age mammals have been recovered from Pleistocene and younger deposits, including deposits associated with the Black River (Morgan and Lucas 2005).

Paleontological surveys of the Project Area have not been required or conducted; no paleontological resources were opportunistically observed during other baseline surveys (Arcadis 2016a).

Impacts from the Proposed Action

Direct and Indirect Effects

Direct impacts would result in the immediate physical loss of scientifically significant fossils and their contextual data. Impacts indirectly associated with ground disturbance could subject fossils to damage or destruction from erosion, as well as creating improved access to the public and increased visibility, potentially resulting in unauthorized collection or vandalism. However, not all impacts of construction are detrimental to paleontology. Ground disturbance can reveal significant fossils that would otherwise remain buried and unavailable for scientific study. In this manner, ground disturbance can result in beneficial impacts. Such fossils can be collected properly and curated into the museum collection of a qualified repository, making them available for scientific study and education.

The Project Area contains PFYC 2 (low potential) bedrock deposits, isolated PFYC 3 (moderate potential), and PFYC 2 Quaternary deposits. A pedestrian survey for paleontological resources was not considered necessary. Because of the low potential for scientifically significant paleontological resources to be present within the Project Area, impacts to paleontological resources are expected to be negligible.

Cumulative Impacts

The CIA for paleontology is the same as described in Section 3.1 (**Figure 3.1-1**). Geologic units present at the surface within the CIA are generally the same as within the EA analysis area. Outcrops of the Rustler Formation are more prevalent, but still uncommon in the CIA. The Bell Canyon Formation, which marks the top of the Delaware Mountain Group, is present in the western portion of the CIA. The Bell Canyon Formation is considered a PFYC Class 2 geologic unit based on isolated occurrences of vertebrate fossils (Hunt et al. 2006).

Proposed Action

Due to the low potential for scientifically significant paleontological resources to be present within the dominant surficial geologic units of the CIA, cumulative impacts of past, present, and reasonably foreseeable future actions are expected to be negligible.

Mitigation Measures and Residual Impacts

If fossils are found, the operator shall cease activities in the immediate area of the discovery and notify the BLM within 24 hours. Because discovery often occurs during construction with heavy equipment, damage to paleontological resources may occur prior to implementation of mitigation. Any impacts to paleontological resources would be permanent, and hence residual; however, because of the low potential for these resources to be present, less than significant residual impacts to paleontological resources are anticipated.

3.14. Visual Resource Management

Affected Environment

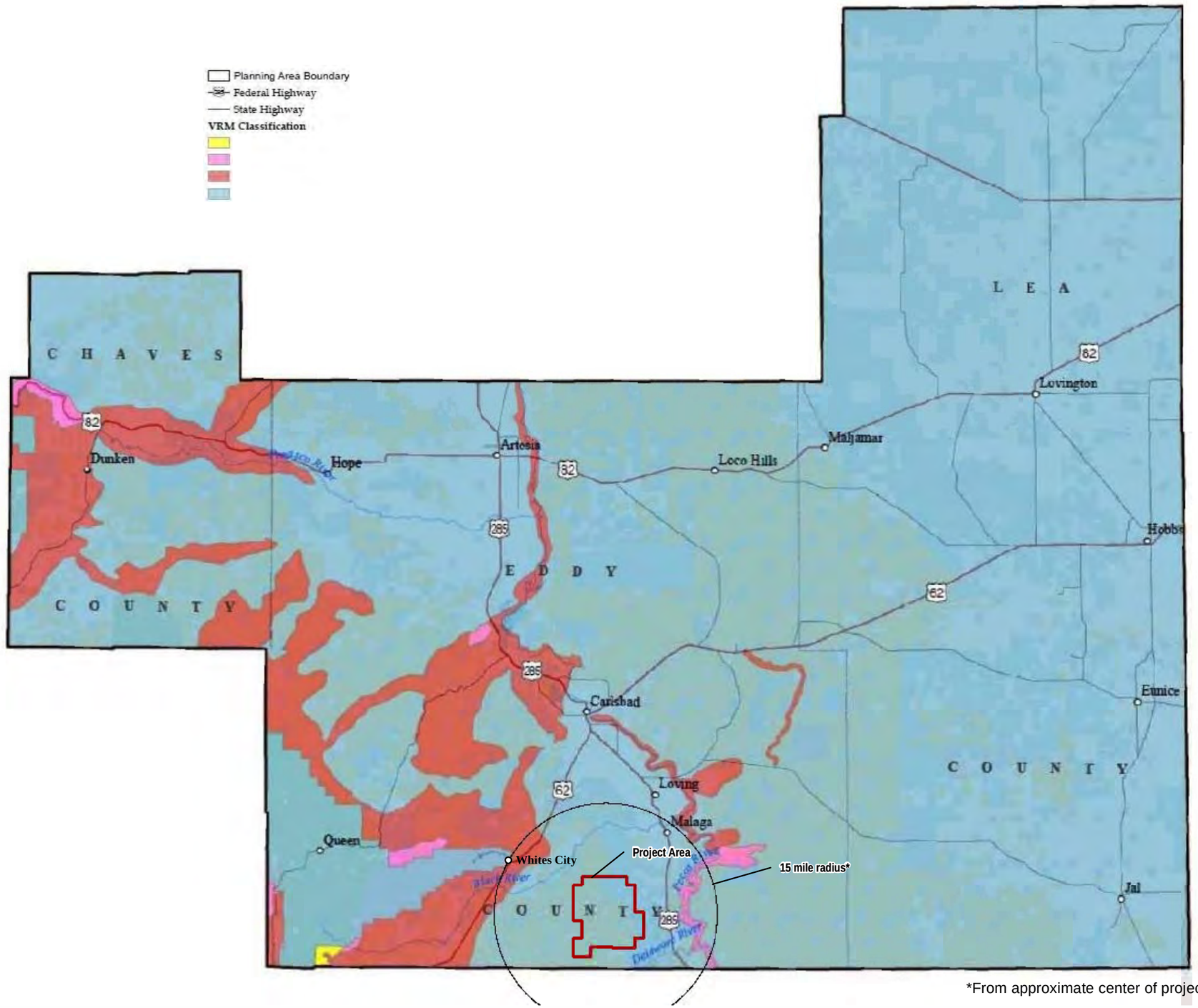
The CFO is responsible for protection of scenic landscapes to consider scenic values before allowing uses that may have negative visual impacts. Scenic resources are typically evaluated using the BLM Visual Resource Management (VRM) system, along with a qualitative assessment of dark sky considerations as discussed in the following subsections.

BLM Visual Resource Management System

The BLM uses the VRM system to identify and classify visual resources on BLM-administered as described in BLM Manual 8400 (BLM 1984). The VRM system classifies land based on visual appeal, public concern for scenic quality, and visibility from travel routes or observation points. Factors typically considered when measuring public concern for visual resources include type of users, amount of public use, public interest, adjacent land uses, and viewing distance. The system is based on the premise that public lands have a variety of visual values, and these values mandate different levels of management and provide a means to evaluate proposed projects to ensure that visual management objectives are met.

Management of visual resources is guided by the approved 1988 BLM CFO RMP (BLM 1988), as amended by the 1997 Carlsbad Approved Resource Management Plan Amendment (BLM 1997). The RMP established objectives for managing visual or scenic values within the CFO Resource Management Planning Area by designating the Planning Area as one of the following four VRM classes as shown on **Figure 3.14-1**.

- Class I: The level of change to the characteristic landscape should be very low and must not attract attention. Class I provides for natural ecological changes; however, it does not preclude very limited management activity.



*From approximate center of project area

LEGEND

Project Area

I
II
III
IV

Source:
BLM 2014
Analysis of the Management Situation
for the Bureau of Land Management
Carlsbad Field Office
September 2014

NORTH

10 5 0 10 Miles

CHEVRON HAYHURST MDP EA

FIGURE 3.14-1
Visual Resource Management Classes

ANALYSIS AREA: Eddy County, New Mexico

Date: 6/2/2016 | Prepared By: BW

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- Class II: The level of change to the characteristic landscape should be low. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the landscape.
- Class III: The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer.
- Class IV: The level of change to the characteristic landscape can be high. Management activities may dominate the view and be a major focus of the viewer's attention. However, every attempt should be made to minimize the impact of these activities through careful location; minimal disturbance; and repeating basic elements of form, line, color, and texture found in the predominant natural features of the landscape.

The degree of visual modification allowed is specific for each VRM class. However, the goal of the VRM system is to minimize the visual impacts of all surface-disturbing activities regardless of the class in which they occur.

The Project Area is located within a BLM-designated VRM Class IV area as shown on **Figure 3.14-1**. Within the CFO Resource Management Planning Area, approximately 1,853,780 acres of BLM-managed land parcels are designated as VRM Class IV (BLM 2014a).

The objective for VRM Class IV areas is to provide for management activities which require major modifications of the existing character of the landscape; therefore, the level of change to the characteristic landscape resulting can be high. Within a VRM Class IV area, management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location; minimal disturbance; and repeating the basic landscape elements of color, form, line and texture.

The Project Area is relatively flat and largely undeveloped. Areas identified in the vicinity of the Project Area that may have views of the Project Area include the existing roads, primarily Whites City Road, Old Cavern Highway, Roadrunner Road, and Willhoit Ranch Road. The existing vegetation within the Project Area is primarily grasses and sagebrush shrubland with a variety of grasses, shrubs, forbs, and cacti in various shades of yellow, brown, and green. The land form topography is rolling to flat terrain with scattered hilltops visible in the distance.

The existing landscape character reflects influences of human activities. Current modifications to the landscape character have resulted from existing roads, fences, well pads, pipelines, powerlines, tank batteries, frac ponds, salt water disposal (SWD) wells, and large oil storage facilities within the Project Area.

Vertical elements in the surrounding landscape include cylindrical water storage tanks and troughs; windmills; along with pumpjacks and aboveground oil storage tanks associated with the existing oil and gas production facilities in various colors of shale green, tan, and black. Linear features are present in the form of oil and gas access roads, overhead powerlines, and fences. Colors are tans and browns from the sandy soils and light and medium greens from the vegetation.

The BLM Manual 8410-1, Visual Resource Inventory, defines distance zones for the visibility of visual resources, typically during daylight hours, as follows:

- Foreground/Middleground: 0 to 5 miles
- Background: >5 to 15 miles
- Seldom Seen Area: Beyond 15 miles

The Special Land Designations within a 15-mile radius from the approximate center of the Project Area (within the background distance zone) are shown on **Figure 3.15-1**. The Nominated Gypsum Soils and Chihuahuan Desert Rivers Areas of Critical Environmental Concern (ACECs) is located within the Project Area. Scenic values identified for the nominated ACECs include portions of the Pecos, Black, and

Delaware Rivers, which provide unique scenic values that are enhanced by topographic and riparian diversity not commonly found in the CFO planning area. In addition, the Guadalupe Escarpment provides a dramatic background with sheer, rugged peaks that extend 2,000 feet above the desert floor. The Pecos, Black, and Delaware Rivers and the Guadalupe Escarpment are not located in the vicinity of the Project Area.

There are no other ACECs, BLM-designated Scenic Area Special Management Areas (SMAs), Wild and Scenic Rivers (eligible, suitable, or designated), Wild or Scenic River Corridors, or Scenic Byways in the vicinity of the Project Area (BLM 2014a). Scenic areas within a 15-mile radius from the approximate center of the Project Area include the Dark Canyon Scenic Area SMA, located 19 miles to the west; the Guadalupe Escarpment Scenic Area Zone 2 SMA, approximately 9 miles to the west; and the Pecos River Corridor 14 miles to the northwest. Portions of the Project Area, primarily artificial lighting of existing facilities, may be visible in the background distance zone from some of these scenic areas. The VRM system includes effects of artificial lighting on night skies as described in the following subsection.

Dark Skies

The dark night skies of many parts of the western United States are valued by residents and visitors to the region and are a tourist amenity in some areas. Low light pollution conditions, or dark skies, is one of the most important properties for viewing stars, constellations, and other astronomical features, such as comets.

Carlsbad Caverns National Park, Guadalupe Mountains National Park, and the Living Desert Zoo and Gardens State Park share boundaries with the CFO. The Carlsbad Caverns National Park is located approximately 9 miles west-northwest of the Project Area on the other side of the Guadalupe Escarpment Scenic Area Zone 2.The McDonald Observatory in Texas is located 90 aerial miles south of the CFO Planning Area. All of these facilities advertise the pristine beauty of night skies and hold special viewing events.

Air quality studies conducted at Carlsbad Caverns National Park show visibility from the park to be up to 170 miles on a clear day. This radius would encompass the entire CFO Planning Area and the McDonald Observatory. The National Park Service has retrofitted its lighting to help protect the night sky and has scientists monitoring light pollution levels at several parks across the country.

Existing sources of artificial night time light in the vicinity of the Project Area include traffic along existing roads (White City Road, Old Cavern Highway, Roadrunner Road, Willhoit Ranch Road, and U.S. Highway 62/180); rural residences; and the communities of Carlsbad, Loving, Malaga and White City as shown on **Figure 3.14-1**.

The Project Area is remote, rural, and isolated from major communities, and there are very few existing stationary light sources in the vicinity. Thus, the ambient light level in the Project Area is low during the night, and the sky is considered to be very dark. The very low ambient light level allows visibility of astronomical features.

Impacts from the Proposed Action

Direct and Indirect Impacts

Implementation of the proposed action would cause some short-term and long-term visual impacts to the natural landscape. Short-term impacts would occur during construction and operations and prior to interim reclamation. Impacts to visual resources due to fugitive dust and other project-related emissions are described in Section 3.2 – Air Resources.

During the construction period, the removal of vegetation, grading, and project-related activities would detract from the visual quality of the landscape in the immediate vicinity of the proposed facilities. Impacts to visual quality would result from the presence of workers, construction equipment (drill rigs and other

heavy equipment), vehicle traffic, vehicle lights, and the bustle of activities and associated dust. Although slopes and vegetative screening would likely obscure direct views of some project-related activities and facilities, vehicle lights and dust raised by vehicle movements may be visible many miles away.

Some project-related facilities and activities would be visible to casual observers traveling (by vehicle) on White City Road and other roads in the Project Area. The potential viewers (casual observers) of the Project Area would be local residents and ranchers, visitors, and motorists traveling through in the Project Area. Direct views of the project facilities would typically be limited to areas in the immediate vicinity of the facilities and activities and short-term during the time it took to drive past the facilities.

Interim reclamation, conducted within 6 months after well completion, would reduce the area of ground disturbance by recontouring and revegetating. The areas planned for interim reclamation would be recontoured to the original contour if feasible, or if not feasible, to an interim contour that blends with the surrounding topography as much as possible. Following interim reclamation, total long-term disturbance is estimated to be 782 acres for the life of the project, primarily resulting from the proposed facilities displacing existing vegetation.

Long-term impacts would be visible to the casual observer throughout the life of the wells. These include the introduction of storage tanks, piping, pumpjacks, pads, and roads, which would result in visible contrasts to form, line, color, and texture relative to the existing surrounding landscape. Removal of vegetation during construction would expose bare soils lighter in color and smoother in texture than the existing surrounding vegetation. The surfacing of these areas with caliche materials would cause further contrasts, which would be visible to local residents and visitors to the area.

BLM Visual Resource Management System

The BLM's Visual Contrast Rating System, as described in the BLM Manual H-8431 (BLM 1986), was used to describe and analyze the effects of the proposed action on visual resources. As part of the analysis process, the visual impacts of a typical well were analyzed. The basic elements (form, line, color, and texture) of a typical well were then compared to those of the existing surrounding landscape to quantify the degree of contrast of the proposed action components relative to the existing and surrounding landscape and to assess whether the contrasts would meet BLM management objectives for VRM Class IV areas.

Based on the expected degree of contrast under the proposed action, the project-related activities are anticipated to dominate the view in some localized areas; however, every attempt would be made to coordinate with the BLM to minimize the impacts of these activities through careful selection of infrastructure locations; minimizing ground disturbances; and repeating the basic landscape elements of color, form, line, and texture.

Given that the Project Area is located in an area designated as VRM Class IV by the BLM, where major modification of the existing landscape may occur and existing oil and gas facilities are present, the introduction of additional oil and gas facilities under the proposed action would be consistent with the BLM management objectives for VRM Class IV areas.

Recontouring for final reclamation would consist of returning the pads, material storage piles, cut- and fill-slopes, and storm water control features to natural contours that blend with adjacent undisturbed areas, as specified in the final reclamation plan or final reclamation plat approved by the BLM. Requirements for seedbed preparation, soil amendments, seed, seeding procedures, mulching, erosion control fencing, security, and monitoring would be as specified for interim reclamation.

Some areas may be difficult to reclaim. If reclamation succeeded in these areas, grasses and forbs could begin to provide vegetative cover, which would reduce visual impacts, possibly as soon as 3 years after reclamation. Upon successful revegetation, visual impacts would be minimal.

Short- and long-term impacts would be minimized by best management practices such as color selection, reducing cut and fill, screening facilities with natural features and vegetation, interim reclamation, and contouring roads along natural changes in elevation.

Dark Skies

During night hours, the proposed action would have a substantially different type of impact on visual resources relative to the visual effects during day hours. Most of the form, line, color, and texture elements of the proposed facilities and activities would not be visible from publically accessible areas during the night. However, lights would be used on project equipment and vehicles during night time activities, and stationary lights would be positioned at various locations within the Project Area.

Drilling operations would require night lighting on a 24-hour basis. Night lighting typically consists of low-pressure sodium vapor fixtures arranged around the site so equipment can be safely operated during darkness. Permanent lighting may be installed for safety and security. Flaring would only occur during emergencies.

Night time lighting generally results in two forms of visual impacts:

- Sky glow (also known as artificial sky glow, light domes, or fugitive light) which is the brightening of the night sky from light scattered in the atmosphere)
- Glare resulting from the direct shining of light.

Both of these forms can impact the natural landscape and limit the visibility of faint dark sky features in the night. In most areas, project-related lights are anticipated to seem quite dim to the casual observer; however, visual impacts could be perceived as sky glow at long distances. Sky glow may be visible in some remote areas many miles from the Project Area.

The Project Area includes dark sky areas that are optimal for viewing stars and constellations because there are few existing light sources in the area, and the ambient light level is low. Under the proposed action, illumination of the night sky would be increased in some areas, and the number of visible astral and stellar features may be reduced. The effects of project-related lights may adversely affect the visual character of some dark sky areas.

Local residents and visitors may experience bright glares from the lighting used during oil and gas operations while driving down roadways within the Project Area. Bright glares could represent a safety hazard to motorists. These effects would typically be limited to areas in the immediate vicinity of the project facilities and short-term, occurring only during the time it took to drive past the facilities.

Cumulative Impacts

The CIA for visual resources is the CIA as defined in Section 3.1. Past, present, and reasonably foreseeable future actions in the CIA include oil and gas exploration and development, utility construction, mineral (non-hydrocarbon) exploration and extraction, livestock grazing, recreation, and off-road travel. Oil and gas exploration and development is the most prevalent activity within the CIA and is expected to continue to be over the life of the proposed action. When added to the disturbance associated with the proposed action, the total cumulative surface disturbance is estimated to be 8,342 acres within the 165,927-acre CIA. Cumulative effects to visual resources would occur as a result of additional industrial components and activities and an increase in the areal extent of oil and gas infrastructure within the CIA. The proposed action long-term facilities (such as roads and well pads) would constitute a visual intrusion for the life of the project (up to 45 years); however, the individual footprints for the project facilities would be relatively small.

The introduction of roads and well pads, along with the visual effects associated with the cumulative disturbances and removal of vegetation, would represent noticeable contrasts in form, line, color, and texture relative to native vegetation and topography within the CIA. Reclamation of disturbed areas in the

CIA would reduce the visual contrast in the disturbed areas with adjacent vegetation. Any newly reclaimed or unreclaimed linear features would continue to represent a visual contrast with the adjacent vegetation, but would not be as obvious a visual impact as the proposed oil and gas-related activities themselves. In time, the reclaimed and seeded areas would be less visible. BMPs, such as requiring that oil and gas infrastructure be painted with colors to blend with the overall landscape, would minimize some of these contrasts.

The proposed action is anticipated to have cumulative impacts on the night sky during operation because lighting would occur in some relatively remote locations within the CIA. Implementation of BMPs for light fixtures would minimize the potential for sky glow and glare. Past, present, and reasonably foreseeable future oil and gas-related projects within the CIA would be expected to require numbers and types of light sources for operation similar to those required for the proposed action. Lights associated with the proposed action are anticipated to be widely separated from the other activities within the CIA, such that the intensity or concentration of light sources in any given area would not increase to a level producing regional light pollution. Upon completion of reclamation, light sources associated with the proposed project would be permanently removed from the Project Area and the CIA.

The cumulative effects of the proposed action on the visual resources of the CIA would be long-term; however, the degree of contrast of the proposed project activities would comply with the objectives of BLM VRM Class IV. With implementation of design features provided in the MDP, MDP SUPO, and APDs, impacts to visual resources would be minor under the proposed action. When considering past, present, and reasonably foreseeable future actions, and the probability for successful reclamation and reestablishment of vegetation, cumulative impacts to visual resources are expected to be minimal.

Mitigation Measures and Residual Impacts

With implementation of design features provided in the MDP, MDP SUPO, and APDs, anticipated impacts to visual resources, including night skies, would be minor. Additional mitigation for visual resources includes the following:

- Chevron would use minimal light necessary for site safety, security, and operations.
- Light should be directed downward or only where needed.
- Low-pressure sodium lamps, such as yellow LED lighting or equivalent, would be used to reduce sky glow and wildlife impacts.
- Properly shielded and mounted light fixtures would be used to reduce sky glow from upward pointing light, as well as trespass from light falling outside of desired area of illumination.

An exception to this mitigation is during the use of temporary light plants during construction, as lighting during this phase is necessary for safety.

Other paint colors may be require by the BLM if onsite inspections determine that shale green is not the appropriate color. Additional mitigation may be required on an individual APD or ROW basis as determined by the BLM. Residual impacts following the implementation of design features, and mitigation may include long-term impacts from the visibility to the casual observer throughout the life of the wells and associated infrastructure and glare during the evening drilling operations.

3.15. Special Land Designations

Affected Environment

Public lands with Special Land Designations within a 15-mile radius from the approximate center of the Project Area are shown on **Figure 3.15-1**. Land management in the CFO Planning Area is guided by the

approved 1988 BLM CFO RMP (BLM 1988), as amended by the 1997 Carlsbad Approved RMP Amendment (BLM 1997).The Planning Area for the RMP revision encompasses 6,257,412 acres, not all of which are public lands (BLM 1997). This acreage includes all of Eddy and Lea Counties and a portion of Chaves County.

Special Land Designations are designed to protect watersheds, scenic and natural values, wildlife habitat, streams, and other natural values. A variety of management activities may be used to implement the management prescriptions for areas with Special Land Designations. These generally include posting boundaries, installing information signs, conducting inventory and monitoring of resources and their uses, acquiring access where appropriate, acquiring additional lands from willing parties as necessary to meet management objectives, and resolving unauthorized uses.

An ACEC is defined as an area within public lands where special management attention is required to protect and prevent irreparable damage to important historical, cultural, and scenic values; fish and wildlife and other natural systems or processes; and life and safety from natural hazards. ACEC designation indicates that significant value or resources exist that must be accommodated for future management actions and land use proposals. ACEC nominations that meet the relevance and importance criteria are incorporated in appropriate RMP alternatives. Two ACECs have been nominated for designation within the Project Area (Gypsum Soils ACEC and Carlsbad Chihuahuan Desert Rivers ACEC) as shown on **Figure 3.15-1**. Both Nominated ACECs meet relevance and importance criteria for the following resources: historic, cultural, scenic, fish, wildlife, and natural systems or processes (including karst, paleontological, riparian, soils, and special status plants), and natural hazards.

SMAs are considered land use authorization avoidance areas because they contain resource values that pose special constraints for, and can result in denial of, applications for land uses that cannot be designed to be compatible with management objectives and prescriptions. The Project Area is within SMA 25, Southern Gypsum Soil Area. This SMA is addressed in Section 3.3, Soils. There are no other SMAs in the vicinity of the Project Area.

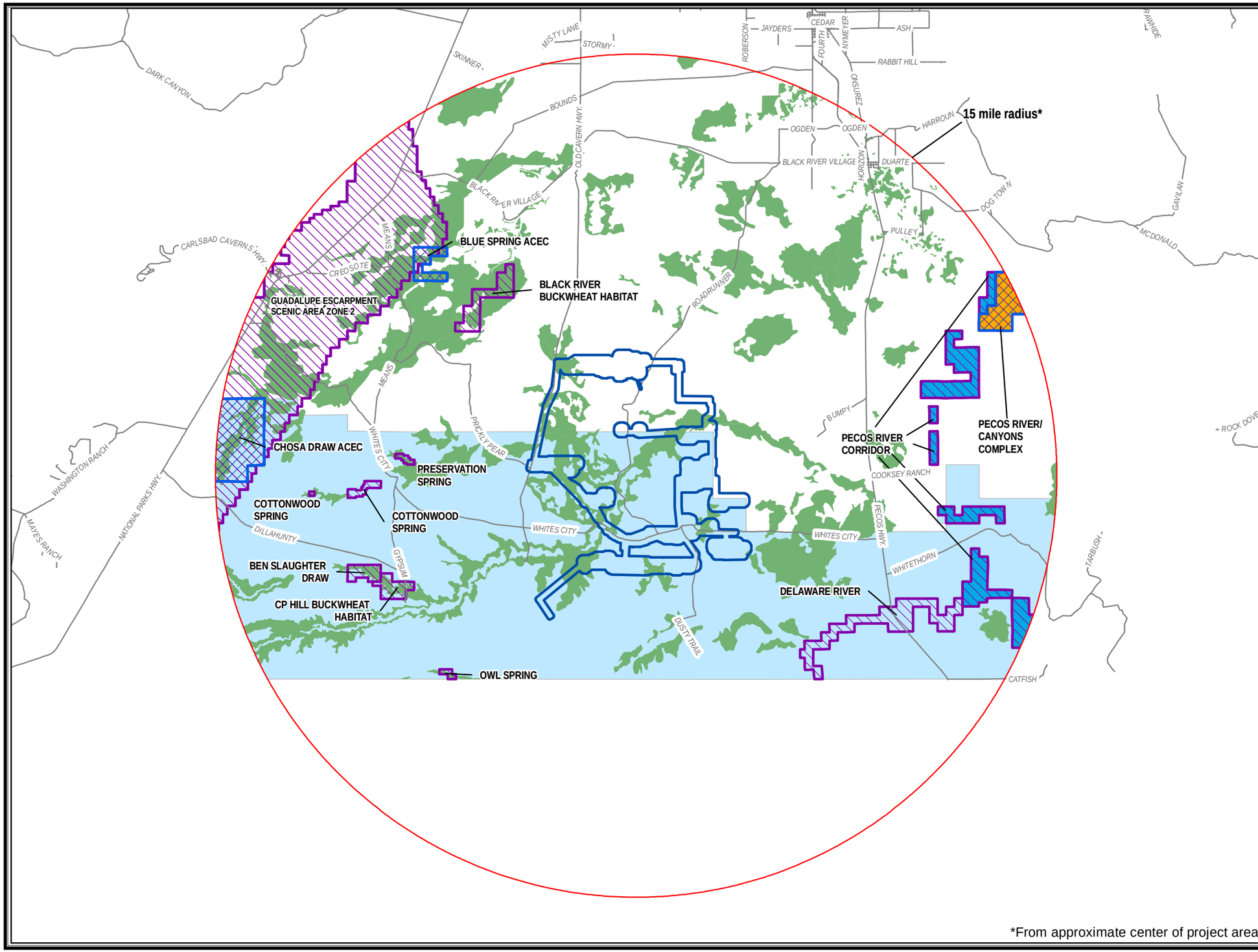
There are two Special Recreation Management Areas and two Off Road Vehicle Recreation Areas within the CFO Planning Area, neither of which are in the vicinity of the Project Area. There are no Outstanding Natural Areas, Research Natural Areas, or Scenic or Backcountry Byways in the vicinity of the Project Area.

Impacts from the Proposed Action

Direct and Indirect Impacts

Impacts resulting from proposed project activities would occur within the boundaries of the Nominated Gypsum Soils and Carlsbad Chihuahuan Desert Rivers ACECs. Relevant and important values for both Nominated ACECs could be affected. Impacts to each of the potentially affected values are described elsewhere within this EA. In summary, with the implementation of proposed design features and BLM-required mitigation measures for each resource, impacts to these resources would be less than significant and would not affect values, resources, systems, processes, or hazards to the point where the Nominated ACECs would no longer be eligible for nomination.

There are no other BLM-designated special land designation areas within the Project Area; therefore, the proposed action would have no direct impacts to other ACEC, SMAs, or other special land designation areas. Indirect effects may include noise, visual effects from the removal of vegetation and night lighting associated with construction activities and facility lights, and short-term traffic delays on some of the roads in the vicinity of the Project Area. Night lighting of project facilities may be visible in the background distance zone from some of the ACECs, scenic areas, or other special land designation areas many miles away from the project. Impacts to visual resources are analyzed in Section 3.14.



*From approximate center of project area

LEGEND

- Special Land Designation Area of Analysis
- MDP Project
- Areas of Critical Environmental Concern
- Special Management Area
- Nominated Gypsum Soils
- Special Recreation Management Area
- Research Natural Area
- Nominated Carlsbad Chihuahuan Desert Rivers ACEC
- County Roads

Notes:

1. *Only the Special Land Designations located within 15-mile radius from approximate center of project area are shown.*
2. *There are no Wilderness Areas, Wilderness Study Areas, Scenic Area Special Management Areas, Special Recreation Management Areas, Off Highway Vehicle Recreation Areas, Research Natural Areas or Outstanding Natural Areas within the EA Area of Analysis.*

Source:
BLM 2014
Analysis of the Management Situation
for the Bureau of Land Management
Carlsbad Field Office
September 2014

NORTH

3.5 1.75 0 3.5 Miles

CHEVRON HAYHURST MDP EA

FIGURE 3.15-1
Special Land Designations

ANALYSIS AREA: Eddy County, New Mexico

Date: 6/2/2016 | Prepared By: BW

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Cumulative Impacts

The CIA for special land designation areas is the CIA defined in Section 3.1. Relevant and important values for the Nominated Gypsum Soils and Carlsbad Chihuahuan Desert Rivers ACECs are expected to sustain some level of cumulative impacts over time. Cumulative impacts would fluctuate with the gradual abandonment and reclamation of wells. As new wells are drilled, other wells would be abandoned and reclaimed, reducing impacts to the Nominated ACECs in terms of total cumulative acres disturbed at any given point in time. As the oil field plays out, the cumulative impacts would be reduced as more areas are reclaimed and fewer areas are developed.

With implementation of design features provided in the MDP, MDP SUPO, and APDs, impacts to the Nominated ACECs would be minor under the proposed action. When considering past, present, and reasonably foreseeable future actions, and the probability for successful reclamation and reestablishment of vegetation, cumulative impacts to special land designation areas are expected to be minor.

Mitigation Measures and Residual Impacts

With implementation of design features provided in the MDP, MDP SUPO, and APDs, anticipated impacts to special land designations or Nominated ACEC designations would be less than significant. Therefore, no additional mitigation measures are required for approval of the MDP. Additional mitigation may be required on an individual APD or ROW basis as determined by the BLM. Potential residual impacts to values associated with the Nominated ACECs are described in other resources sections (cultural and historic resources, wildlife, and visual resources management).

3.16. Wastes – Hazardous and Solid

Affected Environment

The affected environment for hazardous materials includes air, water, soil, and biological resources that could be affected by an accidental release of hazardous materials during transportation to and from the Project Area, storage, and use in construction and operations. Sensitive areas for hazardous materials releases include, but are not limited to, areas adjacent to water bodies; locations above or that drain to aquifers; and areas where humans or wildlife would be directly impacted such as parks, recreation sites, cave/karst terrain, and T&E and sensitive species habitat.

The BLM requires that all NEPA documents list and describe any hazardous and/or extremely hazardous materials that would be produced, used, stored, transported, or disposed of as a result of a proposed project. Many industry practices for use of materials commonly used for oil and gas projects are mandated by various federal and state laws and regulations, as well as the BLM standard lease terms and stipulations that would accompany any authorization resulting from this analysis. Pertinent federal laws dealing with hazardous material contamination are as follows:

- The Oil Pollution Act (Public Law 101-380), August 18, 199) prohibits discharge of pollutants into waters of the U.S., which by definition includes any perennial stream or any tributary stream, including any ephemeral drainage that conveys water to a perennial stream.
- CERCLA provides for liability, compensation, cleanup, and emergency response for hazardous substances released into the environment. It also provides national, regional, and local contingency plans. Petroleum, including crude oil, natural gas, natural gas liquids, liquefied natural gas and synthetic gas, is exempt from CERCLA regulations.
- RCRA regulates the use of hazardous substances and the disposal of hazardous wastes from the time they are produced until their disposal. On January 6, 1988, EPA determined that most oil and gas exploration, development, and production wastes would not be regulated as hazardous wastes under RCRA.
- Hazardous Materials Transportation Uniform Safety Act of 1990 provides for safe transport of hazardous material in intrastate, interstate, and foreign commerce.

- 49 U.S. Code Chapter 51 Transportation of Hazardous Material regulates the transportation, including security, of hazardous material in intrastate, interstate, and foreign commerce.
- 49 CFR parts 171 through 180: Hazardous Material Transportation Regulations provides procedures and policies, material designations, and packaging requirements and operational rules for hazardous material transportation.
- 49 CFR 171.8 Hazardous material provides the definition of hazardous material, “a substance or material that the Secretary of Transportation has determined is capable of posing an unreasonable risk to health, safety, and property when transported in commerce, and has designated as hazardous under section 5103 of Federal hazardous materials transportation law (49 U.S.C. 5103).”
- 43 CFR 3162.1 General Requirements state the operating rights owner or operator, as appropriate, shall comply with applicable laws and regulations; with the lease terms, Onshore Oil and Gas Orders, Notice to Lessee; and with other orders and instructions of the authorized officer. These include, but are not limited to, conducting all operations in a manner which ensures the proper handling, measurement, disposition, and site security of leasehold production; which protects other natural resources and environmental quality; which protects life and property; and which results in maximum ultimate economic recovery of oil and gas with minimum waste and with minimum adverse effect on ultimate recovery of other mineral resources.
- 43 CFR 3162.5-1 Environmental Obligations requires that the operator conduct operations in a manner which protects the mineral resources, other natural resources, and environmental quality. It also requires the operator to exercise due care and diligence to assure that leasehold operations do not result in undue damage to surface or subsurface resources or surface improvements. All produced water must be disposed of by injection into the subsurface, by approved pits, or by other methods which have been approved by the authorized officer. Upon the conclusion of operations, the operator shall reclaim the disturbed surface in a manner approved or reasonably prescribed by the authorized officer. All spills or leakages of oil, gas, produced water, toxic liquids, or waste materials, blowouts, fires, personal injuries, and fatalities shall be reported by the operator in accordance with these regulations and as prescribed in applicable order or notices. The operator shall exercise due diligence in taking necessary measures, subject to approval by the authorized officer, to control and remove pollutants and to extinguish fires. An operator's compliance with the requirements of the regulations in this part shall not relieve the operator of the obligation to comply with other applicable laws and regulations.
- Onshore Order #6 Hydrogen Sulfide Operations protects public health and safety and those personnel essential to maintaining control of the well. This Order identifies the BLM’s national requirements and minimum standards of performance expected from operators when conducting operations involving oil or gas that is known or could reasonably be expected to contain hydrogen sulfide (H_2S) or which results in the emission of sulfur dioxide (SO_2) as a result of flaring H_2S. This Order also identifies the gravity of violations, probable corrective action(s), and normal abatement periods.

Use and/or production of hazardous materials connected to the project could be related to drilling materials, cementing and plugging materials, hydraulic fracturing materials, production products (natural gas, condensates, produced water), fuels and lubricants, pipeline materials, combustion emissions, and miscellaneous materials.

Illegal dumping of oil and gas wastes (fluid and solid waste) has been documented in the BLM CFO Planning Area, particularly the Black River region (BLM 2016b). Documented industrial waste dumps in the Black River watershed contained: high salinity produced water; waste oil; produced oil (including gasoline and diesel range components); drilling fluids/cuttings/pit liners; BTEX (benzene, toluene, xylene); H2S gas (entrained in dumped fluids), frac sand; hydraulic fracturing fluids; waste water (predominantly contaminated rinsate from tanker truck); truck fluids (hydraulic fluids and motor oil); and miscellaneous leaks and spills from transported chemical containers. Illegal dumping of oil and gas wastes is creating

surface disturbances, public roadway hazards, environmental degradation, and natural and cultural resource damage across the region. There are a number of oil and gas industry state and federal regulatory mandates for proper waste stream containment and disposal from “cradle to grave;” some of these regulations are listed above. Oil and gas operators are responsible for the actions and activities of company personnel as well as contractors and contract personnel.

Hydraulic Fracturing

Chemicals serve many functions in hydraulic fracturing, from limiting the growth of bacteria to preventing corrosion of the well casing. Chemicals are needed to ensure that the hydraulic fracturing job is effective and efficient. Typically, fracturing fluid consists of about 99 percent water and sand, with about 1 percent chemical additives. The number of chemical additives used in a typical fracture treatment varies depending on the conditions of the specific well to be fractured. The predominant solutions currently in use for fracture treatments are water-bearing fracturing fluids mixed with friction-reducing additives (Groundwater Protection Council 2009). The chemicals used in hydraulic fracturing operations are typically transported in concentrated bulk and diluted at the project site. A typical fracture treatment uses very low concentrations of three to dozens of additive chemicals, depending on the characteristics of the water and the formation being fractured. Each component serves a specific, engineered purpose (see https://fracfocus.org/chemical-use/what-chemicals-are-used for examples of the more commonly used additives).

Impacts from the Proposed Action

Direct and Indirect Effects

Potentially harmful substances used in well construction, drilling, completion, production, and other operations would be trucked to and from the Project Area as required and kept onsite in limited quantities, stored under appropriate conditions (e.g., stored out of direct sunlight). No hazardous substance, as defined by 40 CFR 355 would be used, produced, stored, transported, or disposed of in amounts above threshold quantities. Waste generated by construction activities would not be exempt from hazardous waste regulations under the oil and gas exploration and production exemption of RCRA. Wastes exempt from hazardous waste classification under RCRA include those associated with well production and transmission of oil and natural gas through the gathering lines and the hydrocarbons themselves. These wastes may also be subject to state hazardous or non-hazardous waste regulations or other federal regulations such as hazardous materials transportation regulations and the National Pollutant Discharge Elimination System. Some wastes exempt from hazardous waste classification under RCRA can still be harmful to human health and the environment if not properly managed. Chevron would comply with all appropriate federal, state, and local regulatory requirements to minimize impacts to the environment or human health and safety. Chevron’s methods for handling waste is described in **Appendix B** (Surface Use Plan).

Chevron would comply with the reporting requirements under Title III of the Superfund Amendments and Reauthorization Act for materials used in quantities of 10,000 pounds or more such as produced hydrocarbons, ethylene glycol (antifreeze), lubricants, and amine compounds. No chemicals used in construction meet the criteria to be considered an acutely hazardous material/substance or would be present in quantities that would exceed criteria. In addition, no extremely hazardous substance, as defined in 40 CFR 355, would be produced, used, stored, transported, or disposed of during construction or operation of the facilities in amounts above threshold permissible quantities.

H_2S is a naturally occurring byproduct of oil and gas development in the vicinity of the Project Area. H_2S is both an irritant and a chemical asphyxiant with effects on both oxygen utilization and the central nervous system. In 1993, EPA found that there is a potential for human and environmental exposure from routine emission of H_2S from oil and gas wells; however, there was insufficient evidence to suggest that these exposures were a significant threat. While there are no national ambient air quality stands for H_2S, the state of New Mexico has set standards for H_2S (BLM 2016a). Chevron is not anticipating to encounter

H_2S, but would be required to meet any NMED H_2S air permit requirements. Chevron has also developed an H_2S Contingency Plant in the event that H_2S is encountered.

Waste, including fluid and solid, produced during drilling and completion operations would be collected in a container and disposed of properly at a state approved disposal facility. Following drilling and completion operations, solid waste, chemicals, salts, frac sand, and other waste material would also be removed and disposed of properly at a state approved disposal facility. Potential unplanned releases could have serious effects on human health and environment. Many common industrial processes use chemicals that would be hazardous in large enough quantities or if not handled properly. Similarly, drilling and hydraulic fracturing chemical additives are safe when properly handled, but could otherwise be hazardous.

Because numerous chemicals could be present on a well site, the potential exists for spills and leaks. The BLM regulations require prevention of spills and leaks (to the extent possible), reporting of undesirable events (via Notice to Lessees 3-A), emergency response to stop the release at the source, clean up measures to state and federal standards, and surface reclamation of impacted areas. Causes and sources of undesirable events are multiple and variable. Small spills may happen at faulty pipe connections; large spills might occur as the result of a major well failure. Spills may result from human error (e.g., vehicle collisions, improper handling or equipment operation/installation), while others could stem from equipment failure (e.g., broken pipe, damaged pit liner, leaking tank) or acts of nature (Fletcher 2012). Equipment failure and corrosion tend to be common causes of spills (Wenzel 2012). Regular inspection and maintenance by the operator can mitigate the potential for adverse events and impacts.

The cause of an undesirable event, the extent of the event, the hazard rating of the involved material(s), response and cleanup times, and cleanup effectiveness play critical roles in determining the overall impacts. Spill volumes and types vary, and small spills occur with greater frequency. Secondary containment and recovery of small spills minimizes potential impacts.

With the use and production of solid and hazardous wastes, potential exists for accidental contamination of surface water or groundwater. An accident could occur that would result in a release of such materials directly or indirectly into surface waters or in a way that posed a potential threat for transport to groundwater. For example, improper casing and cementing could result in contamination of groundwater resources (see Environmental Consequences – Hydrology). Hazardous substances could also contaminate soil and damage or kill nearby vegetation or wildlife, as well as react with other chemicals and/or naturally occurring elements; ignite or explode; result in air pollution; cause evacuation of personnel and/or nearby residences, and become a major public health hazard.

Public concerns have been raised nationwide regarding the human health impacts of the chemicals used during well development, particularly during hydraulic fracturing. Chemicals used in hydraulic fracturing have been found to affect the skin, eyes, and other sensory organs; the respiratory and gastrointestinal systems; as well as brain/nervous system; immune and cardiovascular system; kidneys; endocrine system; and also cause cancer and mutations (Colborn et al. 2011). These chemicals could be released through an accidental spill and result in impacts to the environment and human health. The New Mexico Department of Health and the EPA are responsible for assessing and authorizing chemical use. Individuals most susceptible to any potential impacts from chemicals are those directly involved with handling them. Worker chemical exposure risks are mitigated by compliance with chemical safety and OSHA regulations as well as safe operating procedures implemented operators, third-party contractors, and by the Occupational Health and Safety Administration. Because active oil and gas development activities (e.g., drilling through completion phases) are closed to the public, public health and safety risk is generally limited to exposure to air, water, and other emissions that could migrate outside the Project Area. These impacts have been described in their respective sections of this analysis.

Cumulative Impacts

Implementation of the proposed action, in combination with past, present, and reasonably foreseeable future actions (including ongoing oil and gas development), would continue to increase the quantities of hazardous substances used, the potential for spills or accidents, and the amounts of wastes generated. With continued compliance with regulatory requirements, and implementation of similar design features for other projects within the CFO, cumulative impacts would be less than significant.

Mitigation Measures and Residual Impacts

With implementation of design features provided in the MDP, MDP SUPO, and APDs, anticipated impacts due to the accidental release of hazardous and non-hazardous substances are expected to be less than significant. If successfully implemented, the proposed water treatment and recycling system could be used to recycle water from other operators and reduce the volume of produced water to be disposed of through injection within the CIA.

Safety measures and precautions are included in the proposed action as design features to ensure hazardous wastes are not released into the environment. For example, Chevron would install and maintain an impervious secondary containment system for any tank or barrel containing hazardous, poisonous, flammable, or toxic substances sufficient to contain the contents of the tank or barrel and any drips, leaks, and anticipated precipitation. Additionally, the proposed action would be subject to compliance with any applicable federal, state, county, municipal, and local permits, including all necessary environmental clearances and permits.

In the event of any reportable release of a hazardous substance to the environment, EPA regulations require the responsible party to implement an SPCC Plan (and/or a Federal Response Plan) and take responsibility for cleanup and damages. Should the operator fail to comply with spill obligations, a third-party emergency cleanup contractor could be activated by the BLM and paid for by the operator. Compliance with hazardous waste laws and regulations, standard lease stipulations, contingency plans, and emergency response resources would be expected to adequately mitigate any potential hazardous or solid waste issues associated with the proposed action.

Oil and gas operators, including third-party contractors, are required to adhere to all federal, state, and local regulations regarding the proper handling, storage, and disposal of all hazardous and non-hazardous wastes. Once a waste is taken to a disposal facility, facility operators are also required to comply with all federal and state regulations regarding proper handling and disposal of the waste. Analysis of the potential for contamination at these sites is beyond the scope of this analysis, and regulation of such facilities is overseen by state agencies. In New Mexico, injection operations related to oil and natural gas production are regulated under the provisions of the Oil and Gas Act, NMSA 1978, Sections 70-2-1 et seq. and the Water Quality Act, NMSA 1978, Sections 74-6-1 et seq.

Additional mitigation measures may be identified for individual APDs based on the results of onsite inspections. Residual impacts from the accidental release of hazardous and non-hazardous substances are expected to be less than significant.

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4. SUPPORTING INFORMATION

4.1. Consultation/Coordination

Prior to the onsite meetings for APD Group 1 and Group 2, submitted with the MDP, letters were sent to the allotment permittees providing notification of the onsite and inviting the permittees to attend the onsite. No response was received, and no permittees attended the onsite. Prior to any future onsite meetings, notification letters will be sent to allotment permittees.

Identification and evaluation of historic properties and land assessments and resolution of adverse effect was determined through consultation between the BLM and New Mexico SHPO pursuant to the regulations (36 CFR 800 et seq.) implementing Section 106 of the NHPA of 1966 as amended (54 U.S.C. 306108 et seq.), the NAGPRA (U.S. Code 25, §3001, et seq.).

4.2. List of Preparers and Reviewers

This EA was prepared by the BLM Carlsbad Field Office. Technical assistance for the preparation of the EA was provided by Arcadis U.S., Inc. The following individuals were responsible either for the preparation or review of the EA.

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APPENDIX A

APPLICATIONS FOR PERMIT TO DRILL

APD Group 1 (Pad 2)

APD – HH SO 8 P2 5H Application
APD – HH SO 8 P2 6H Application
APD – HH SO 8 P2 13H Application
APD – HH SO 8 P2 14H Application
APD – HH SO 8 P2 21H Application
APD – HH SO 8 P2 22H Application
Frac Water FL_Perm_SUP cert 7June2016
Frac Water FL_Term_SUP cert 7June2016
Gas Lift FL_SUP cert 7June2016
SWD Water FL_SUP cert 7June2016
Utility 1_SUP cert 7June2016
Utility 2 and 3_SUP cert 7June2016
WFMP FL-SUP cert 7June2016

Form 3160-3
(June 2015)

FORM APPROVED
OMB No. 1004-0137
Expires: January 31, 2018

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

5. Lease Serial No.
NMNM118108

6. If Indian, Allotee or Tribe Name

1a. Type of work: ☑ DRILL ☐ REENTER

1b. Type of Well: ☑ Oil Well ☐ Gas Well ☐ Other

1c. Type of Completion: ☐ Hydraulic Fracturing ☑ Single Zone ☐ Multiple Zone

7. If Unit or CA Agreement, Name and No.

8. Lease Name and Well No.
HH SO 8 P2

2. Name of Operator
CHEVRON USA INC

9. API Well No.
5H

3a. Address
1616 W. BENDER BLVD HOBBS, NM 88240

3b. Phone No. *(include area code)*
575-263-0431

10. Field and Pool, or Exploratory
WILDCAT; WOLFCAMP

4. Location of Well *(Report location clearly and in accordance with any State requirements.*)*
At surface 255' FNL & 960' FWL
At proposed prod. zone 180' FNL & 330' FWL

11. Sec., T. R. M. or Blk. and Survey or Area
SEC17, T26S, R27E, UL D (SHL)

14. Distance in miles and direction from nearest town or post office*
12.8 MILES FROM MALAGA, NEW MEXICO

12. County or Parish
EDDY

13. State
NM

15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drlg. unit line, if any) 255' FSL

16. No of acres in lease
1920 ACRES

17. Spacing Unit dedicated to this well
320 ACRES

18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft. 4300 FT SKEEN 2 SW

19. Proposed Depth
TD 9563' MD 20,126'

20. BLM/BIA Bond No. in file
CA 0329

21. Elevations (Show whether DF, KDB, RT, GL, etc.)
3245' GL

22. Approximate date work will start*
OCTOBER 2016

23. Estimated duration
30 DAYS

24. Attachments

The following, completed in accordance with the requirements of Onshore Oil and Gas Order No. 1, and the Hydraulic Fracturing rule per 43 CFR 3162.3-3 (as applicable)

1. Well plat certified by a registered surveyor.
2. A Drilling Plan.
3. A Surface Use Plan (if the location is on National Forest System Lands, the SUPO must be filed with the appropriate Forest Service Office).
4. Bond to cover the operations unless covered by an existing bond on file (see Item 20 above).
5. Operator certification.
6. Such other site specific information and/or plans as may be requested by the BLM.

25. Signature: Cindy Herrera-Murillo
Name *(Printed/Typed)*: CINDY HERRERA-MURILLO
Date: 02/12/2016

Title: PERMITTING SPECIALIST

Approved by *(Signature)*
Name *(Printed/Typed)*
Date

Title: PERMITTING SPECIALIST
Office

Application approval does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.
Conditions of approval, if any, are attached.

Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212, make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

(Continued on page 2)

*(Instructions on page 2)

CERTIFICATION

I hereby certify that I, or someone under my direct supervision, have inspected the drill site and access route proposed herein; that I am familiar with the conditions which currently exist; that I have full knowledge of state and federal laws applicable to this operation; that the statements made in this APD package are, to the best of my knowledge, true and correct; and, that the work associated with the operations proposed will be performed in conformity with this APD package and the terms and conditions under which it is approved. I also certify that I, or the company I represent, am responsible for the operations conducted under this application. These statements are subject to the provisions of 18 U.S.C. 1001 for the filing of a false statement.

Executed this 19th day of JANUARY, 2016

Name: _____

Sean Cheben-Project Manager

Address: 1400 Smith Street

Houston, TX 77002

Room 40125

Office: 713-372-9382

Email: Sean.Cheben@CHEVRON.COM

Cindy Herrera-Murillo
Permitting Specialist
Midcontinent BU

Chevron North America
Exploration and Production Company
(A Chevron U.S.A. Inc. Division)
1616 W. Bender Blvd
Hobbs FMT, Hobbs, NM 88240
Tel 575-263-0431
Cherreramurillo@chevron.com

February 10, 2016

BLM-Carlsbad Field Office
620 E. Greene Street
Carlsbad, New Mexico 88220

Re: Applications to Drill
For Hayhurst Development Area in NM
MDP- 2016-1

Dear Sirs,

Chevron U.S.A. Inc. respectfully submits 12 Applications to Drill (APD's) with the Hayhurst Development Area's Master Development Plan (MDP-2016-1).

There will be 2 pads and 6 wells on each pad. The first well pad includes the following APD's:

HH SO 10 P3 #7H; HH SO 10 P3 #8H; HH SO 10 P3 #15H; HH SO 10 P3 #16H; HH SO 10 P3 #23H; HH SO 10 P3 #24H.

The second well pad includes the following APD's:

HH SO 8 P2 #5H; HH SO 8 P2 #6H; HH SO 8 P2 #13H; HH SO 8 P2 # 14H; HH SO 8 P2 #21H; HH SO 8 P2 #22H.

Your prompt consideration and approval of these applications will be greatly appreciated. If additional information is required, you may contact me at 575-263-0431, or by email at Cherreramurillo@chevron.com.

Sincerely,

Cindy Herrera-Murillo

Cindy Herrera-Murillo
Permitting Specialist
Enclosures

District I
1625 N. French Dr., Hobbs, NM 88240
Phone: (575) 393-6161 Fax: (575) 393-0720
District II
811 S. First St., Artesia, NM 88210
Phone: (575) 748-1283 Fax: (575) 748-9720
District III
1000 Rio Brazos Road, Aztec, NM 87410
Phone: (505) 334-6178 Fax: (505) 334-6170
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505
Phone: (505) 476-3460 Fax: (505) 476-3462

State of New Mexico
Energy, Minerals & Natural Resources Department
OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-102
Revised August 1, 2011
Submit one copy to appropriate District Office

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

[1] API Number	[2] Pool Code	[3] Pool Name
		Wildcat; Wolfcamp

[4] Property Code	[5] Property Name	[6] Well Number
	HH SO 8 P2	5H

[7] OGRID No	[8] Operator Name	[9] Elevation
4323	CHEVRON U.S.A. INC.	3245'

[10] Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
D	17	26 SOUTH	27 EAST, N.M.P.M.		255'	NORTH	960'	WEST	EDDY

[11] Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
D	5	26 SOUTH	27 EAST, N.M.P.M.		180'	NORTH	330'	WEST	EDDY

[12] Dedicated Acres	[13] Joint or Infill	[14] Consolidation Code	[15] Order No
320			

No allowable will be assigned to this completion until all interests have been consolidated or a non-standard unit has been approved by the division.

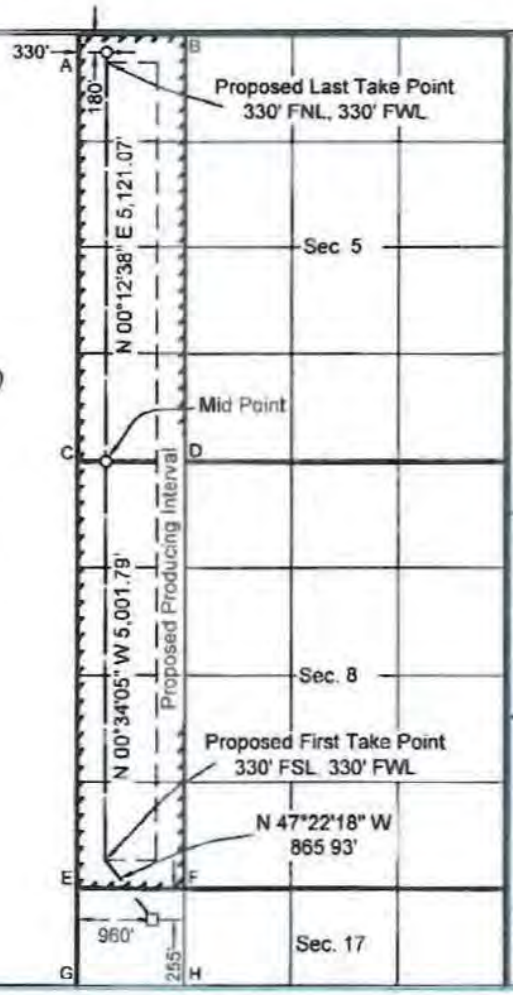
PROPOSED BOTTOM HOLE LOCATION		
X=	535,284	NAD 27
Y=	392,263	
LAT	32.078395	
LONG.	104.219414	
X=	576,468	NAD83
Y=	392,320	
LAT	32.078516	
LONG.	104.219909	

CORNER COORDINATES TABLE (NAD 27)

A - Y=392442.33, X=534954.83
B - Y=392444.24, X=536280.85
C - Y=387143.09, X=534935.36
D - Y=387137.83, X=536254.75
E - Y=381810.94, X=534988.20
F - Y=381808.02, X=536317.14
G - Y=380478.27, X=535007.69
H - Y=380475.74, X=536334.89

Mid Point
Y=387141.77, X=535265.35

HH SO 8 P2 5H WELL		
X=	535,952	NAD 27
Y=	381,554	
LAT.	32.048953	
LONG.	104.217295	
X=	577,136	NAD83
Y=	381,611	
LAT	32.049075	
LONG.	104.217789	
ELEVATION +3245' NAVD 88		



[17] OPERATOR CERTIFICATION

I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.

Cindy Herrera-Murillo 01/18/16
Signature Date

Cindy Herrera-Murillo
Printed Name

Cherreramurillo@chevron.com
E-mail Address

[18] SURVEYOR CERTIFICATION

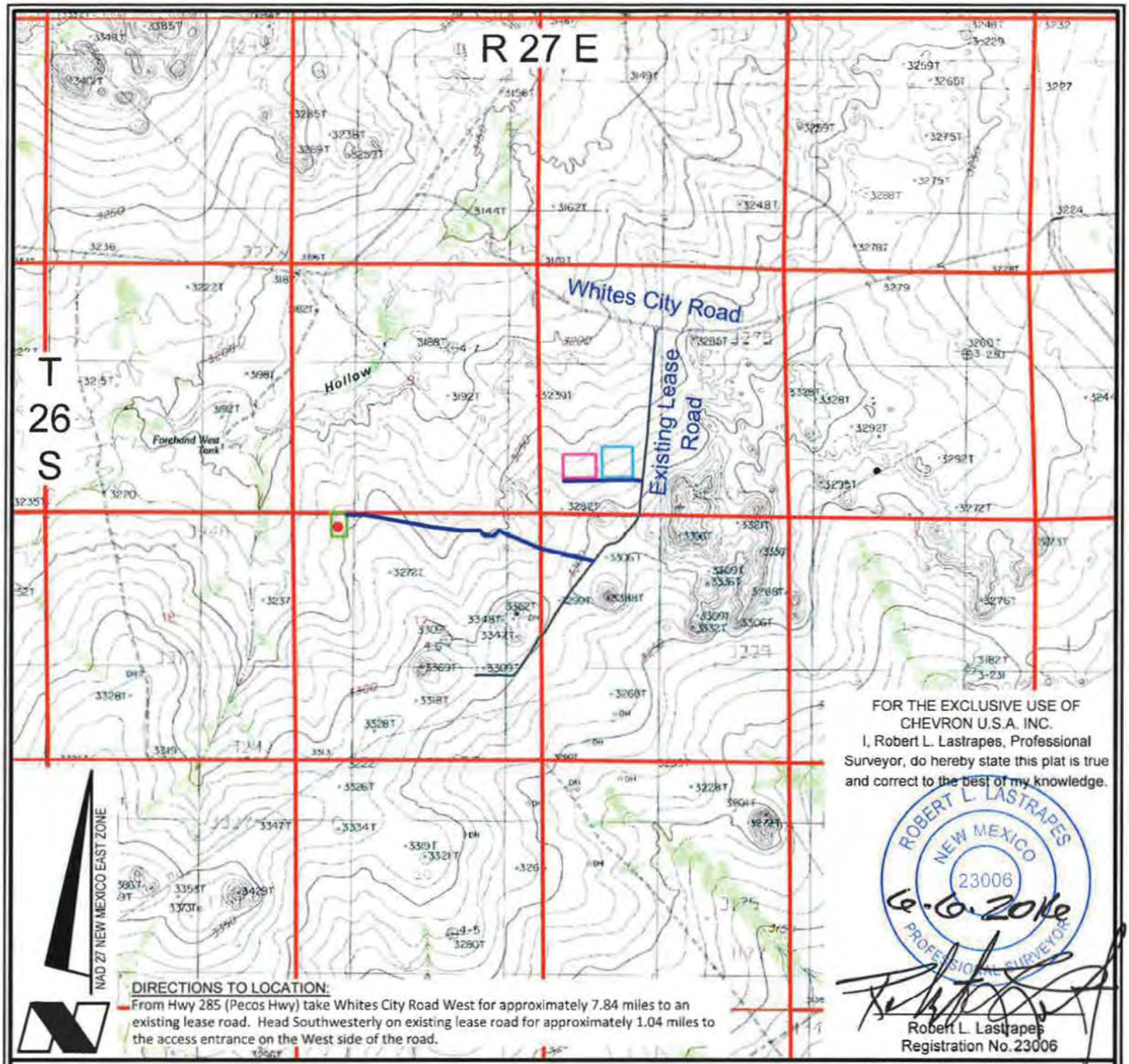
I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.

JAN. 5, 2016
Date of Survey

Signature and Seal of Professional Surveyor

ROBERT L. LASTRAPES
NEW MEXICO
23006
PROFESSIONAL SURVEYOR
1-8-2016

23006
Certificate Number



FOR THE EXCLUSIVE USE OF CHEVRON U.S.A. INC.
I, Robert L. Lastrapes, Professional Surveyor, do hereby state this plat is true and correct to the best of my knowledge.

ROBERT L. LASTRAPES
NEW MEXICO
23006
6-6-2016
PROFESSIONAL SURVEYOR

Robert L. Lastrapes
Registration No. 23006

DIRECTIONS TO LOCATION:
From Hwy 285 (Pecos Hwy) take Whites City Road West for approximately 7.84 miles to an existing lease road. Head Southwesterly on existing lease road for approximately 1.04 miles to the access entrance on the West side of the road.

VICINITY MAP

SCALE: 1" = 3000'
3000' 0 1500' 3000'

LEGEND
- Proposed Well
- Proposed Access Road
- Proposed Drillsite
- Existing Road
- Section Line
- Proposed Frac Pond
- Proposed Facility

CHEVRON U.S.A. INC.
HH SO 8 P2 NO. 5H WELL
LOCATED 255' FNL AND 960' FWL
SECTION 17, T26S-R27E
EDDY COUNTY, NEW MEXICO

FENSTERMAKER
C.H. Fenstermaker & Associates, L.L.C.
135 Regency Sq. Lafayette, LA 70508
Ph. 337-237-2200 Fax. 337-232-3299
www.fenstermaker.com

DRAWN BY: MBD	REVISIONS		
PROJ. MGR.: GDG	No. 1	DATE: 05/27/2016	REVISED BY: BOR
DATE: 01/07/2016	No.	DATE:	REVISED BY:
FILENAME: T:\2015\2153438\DWG\HH SO 8 P2 5H_APD.dwg			

FOR THE EXCLUSIVE USE OF
CHEVRON U.S.A. INC.
I, Robert L. Lastrapes, Professional Surveyor, do hereby state this plat is true and correct to the best of my knowledge.

ROBERT L. LASTRAPES
NEW MEXICO
23006
PROFESSIONAL SURVEYOR

6-6-2016

Robert L. Lastrapes
Registration No. 23006

R 27 E

T 26 S

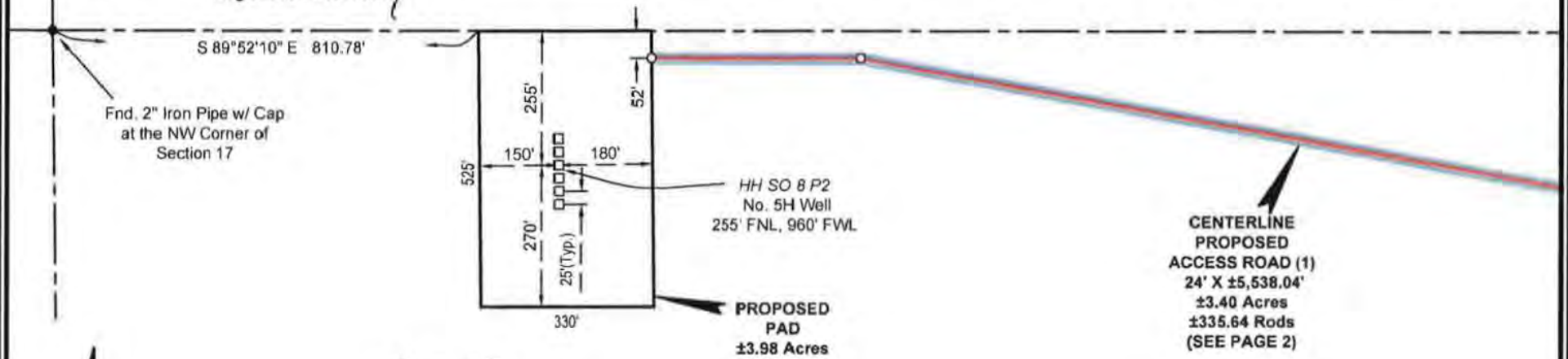
NW PAD CORNER	NE PAD CORNER	HH SO 8 P2 NO. 5H WELL
X= 535,799 NAD 27	X= 536,129 NAD 27	X= 535,952 NAD 27
Y= 381,809	Y= 381,808	Y= 381,554
ELEVATION +3241' NAVD 88	ELEVATION +3247' NAVD 88	LAT. 32.048953
SW PAD CORNER	SE PAD CORNER	LONG. 104.217295
X= 535,805 NAD 27	X= 536,135 NAD 27	X= 577,136 NAD83
Y= 381,284	Y= 381,284	Y= 381,611
ELEVATION +3244' NAVD 88	ELEVATION +3256' NAVD 88	LAT. 32.049075
		LONG. 104.217789
		ELEVATION +3245' NAVD 88

LEGEND

- Section Line
- Access Centerline
- ● Found Monument

Sec. 8

Bureau of Land Management



Sec. 17

Bureau of Land Management

(Access Road 1) ± 4383.54', ±2.42 Acres, ±265.67 Rods

NAD 27 NEW MEXICO EAST ZONE

Scale: 1" = 300'

300' 0 150' 300'

FENSTERMAKER

C. H. Fenstermaker & Associates, L.L.C.
135 Regency Sq. Lafayette, LA 70508
Ph. 337-237-2200 Fax. 337-232-3299
www.fenstermaker.com

SURFACE USE PLAT

CHEVRON U.S.A. INC.

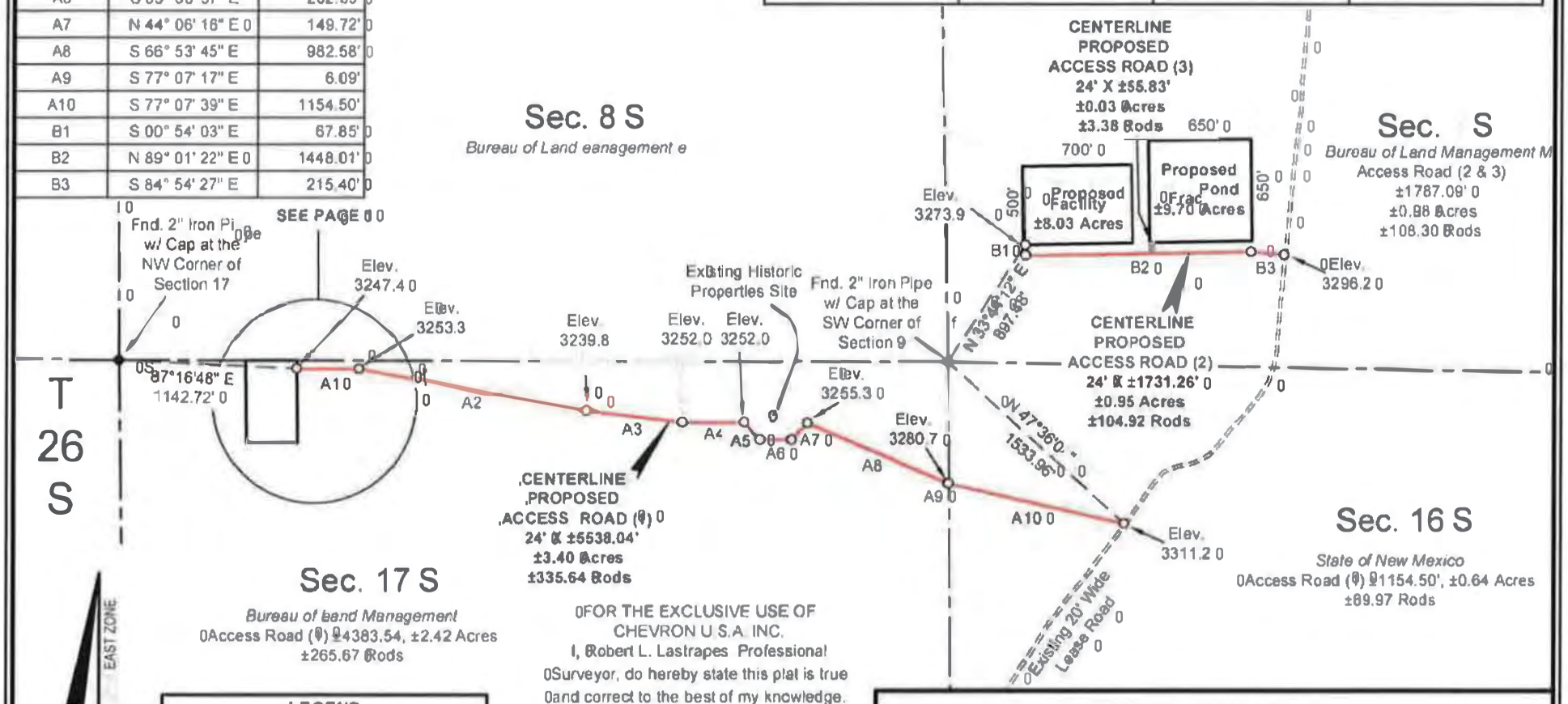
PROPOSED PADS, FRAC POND & ACCESS ROADS
HH SO 8 P2 NO. 5H WELL
SECTIONS 9, 16 & 17, T26S-R27E
EDDY COUNTY, NEW MEXICO

PAGE 1 OF 3

DRAWN BY: LJG	REVISIONS		
PROJ. MGR.: GDG	No. 2	DATE: 01/19/2016	REVISED BY: GDG
DATE: 12/22/2015	No. 3	DATE: 05/27/2016	REVISED BY: BOR
FILENAME: T:\2015\2153438\DWG\HH SO 8 P2 5H_SUP.dwg			

CENTERLINE PROPOSED ACCESS ROADS		
COURSE	BEARING	DISTANCE
A1	S 89° 49' 39" E	398.61'
A2	S 79° 37' 12" E	1478.11'
A3	S 82° 59' 20" E	620.58'
A4	S 89° 50' 47" E	394.88'
A5	S 42° 37' 55" E	150.58'
A6	S 89° 58' 57" E	202.39'
A7	N 44° 06' 16" E	149.72'
A8	S 66° 53' 45" E	982.58'
A9	S 77° 07' 17" E	6.09'
A10	S 77° 07' 39" E	1154.50'
B1	S 00° 54' 03" E	67.85'
B2	N 89° 01' 22" E	1448.01'
B3	S 84° 54' 27" E	215.40'

NW FRAC POND CORNER	NE FRAC POND CORNER	NW FACILITY CORNER	NE FACILITY CORNER
X= 541,594 NAD 27	X= 542,244 NAD 27	X= 540,782 NAD 27	X= 541,482 NAD 27
Y= 383,209	Y= 383,220	Y= 383,045	Y= 383,057
ELEVATION +3264' NAVD 88	ELEVATION +3270' NAVD 88	ELEVATION +3263' NAVD 88	ELEVATION +3265' NAVD 88
SW FRAC POND CORNER	**SE FRAC POND CORNER**	**SW FACILITY CORNER**	**SE FACILITY CORNER**
X= 541,605 NAD 27	X= 542,255 NAD 27	X= 540,790 NAD 27	X= 541,490 NAD 27
Y= 382,559	Y= 382,570	Y= 382,545	Y= 382,557
ELEVATION +3278' NAVD 88	ELEVATION +3289' NAVD 88	ELEVATION +3274' NAVD 88	ELEVATION +3276' NAVD 88



FOR THE EXCLUSIVE USE OF CHEVRON U.S.A. INC.
I, Robert L. Lastrapes Professional Surveyor, do hereby state this plat is true and correct to the best of my knowledge.

ROBERT L. LASTRAPES
NEW MEXICO
23006
PROFESSIONAL SURVEYOR
02.2016

Robert L. Lastrapes
Registration No. 23006

SURFACE USE PLAT

CHEVRON U.S.A. INC. N

PROPOSED PADS, FRAC POND & ACCESS ROADS
HH SO 8 P2 NO. 5H WELL
SECTIONS 9, 16 & 17, T26S-R27E
EDDY COUNTY, NEW MEXICO

PAGE 2 OF 3

FENSTERMAKER
C. H. Fenstermaker & Associates, L.L.C.
135 Regency Sq. Lafayette, LA 70508
Ph. 337-237-2200 Fax 337-232-3299
www.fenstermaker.com

DRAWN BY: JCS	REVISIONS		
PROJ. MGR.: GDG	No. 2	DATE: 01/19/2016	REVISED BY: GDG
DATE: 12/22/2015	No. 3	DATE: 09/27/2016	REVISED BY: BOR

FILENAME: T:\2015\2153438\DWG\HH SO 8 P2 5H_SUP.dwg

DISCLAIMER: At this time, C. H. Fenstermaker & Associates, L.L.C. has not performed nor was asked to perform any type of engineering, hydrological modeling, flood plain, or "No Rise" certification analyses, including but not limited to determining whether the project will impact flood hazards in connection with federal/FEMA, state, and/or local laws, ordinances and regulations. Accordingly, Fenstermaker makes no warranty or representation of any kind as to the foregoing issues, and persons or entities using this information shall do so at their own risk.

NOTE:
Please be advised, that while reasonable efforts are made to locate and verify pipelines and anomalies using our standard pipeline locating equipment, it is impossible to be 100 % effective. As such, we advise using caution when performing work as there is a possibility that pipelines and other hazards, such as fiber optic cables, PVC pipelines, etc. may exist undetected on site.

NOTE:
Many states maintain information centers that establish links between those who dig (excavators) and those who own and operate underground facilities (operators). It is advisable and in most states, law, for the contractor to contact the center for assistance in locating and marking underground utilities. For guidance, New Mexico One Call. www.nmonecall.org

FOR THE EXCLUSIVE USE OF
CHEVRON U.S.A. INC.
I, Robert L. Lastrapes, Professional Surveyor, do hereby state this plat is true and correct to the best of my knowledge.

ROBERT L. LASTRAPES
NEW MEXICO
23006
6-2-2016
PROFESSIONAL SURVEYOR

Robert L. Lastrapes
Registration No. 23006

FENSTERMAKER
C. H. Fenstermaker & Associates, L.L.C.
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SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED PADS, FRAC POND & ACCESS ROADS
HH SO 8 P2 NO. 5H WELL
SECTIONS 9, 16 & 17, T26S-R27E
EDDY COUNTY, NEW MEXICO

DRAWN BY: LJG	REVISIONS		
PROJ. MGR.: GDG	No. 2	DATE: 01/19/2016	REVISED BY: GDG
DATE: 12/22/2015	No. 3	DATE: 05/27/2016	REVISED BY: BOR
FILENAME: T:\2015\2153438\DWG\HH SO 8 P2 5H_SUP.dwg			

Form 3160-3
(June 2015)

FORM APPROVED
OMB No. 1004-0137
Expires: January 31, 2018

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

5. Lease Serial No.
NMNM118108

6. If Indian, Allotee or Tribe Name

1a. Type of work: [✓] DRILL [ ] REENTER

1b. Type of Well: [✓] Oil Well [ ] Gas Well [ ] Other

1c. Type of Completion: [ ] Hydraulic Fracturing [✓] Single Zone [ ] Multiple Zone

7. If Unit or CA Agreement, Name and No.

8. Lease Name and Well No.
HH SO 8 P2

2. Name of Operator
CHEVRON USA INC

9. API Well No.
6H

3a. Address
1616 W. BENDER BLVD HOBBS, NM 88240

3b. Phone No. *(include area code)*
575-263-0431

10. Field and Pool, or Exploratory
WILDCAT; WOLFCAMP

4. Location of Well *(Report location clearly and in accordance with any State requirements.*)*
At surface 280' FNL & 960' FWL
At proposed prod. zone 180' FSL & 996' FWL

11. Sec., T. R. M. or Blk. and Survey or Area
SEC17, T26S, R27E, UL D (SHL)

14. Distance in miles and direction from nearest town or post office*
12.8 MILES FROM MALAGA, NEW MEXICO

12. County or Parish
EDDY

13. State
NM

15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drlg. unit line, if any) 280' FSL

16. No of acres in lease
1920 ACRES

17. Spacing Unit dedicated to this well
320 ACRES

18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft. 4300 FT SKEEN 2 SW

19. Proposed Depth
TD 9628' MD 20,154

20. BLM/BIA Bond No. in file
CA 0329

21. Elevations (Show whether DF, KDB, RT, GL, etc.)
3245' GL

22. Approximate date work will start*
OCTOBER 2016

23. Estimated duration
30 DAYS

24. Attachments

The following, completed in accordance with the requirements of Onshore Oil and Gas Order No. 1, and the Hydraulic Fracturing rule per 43 CFR 3162.3-3 (as applicable)

1. Well plat certified by a registered surveyor.
2. A Drilling Plan.
3. A Surface Use Plan (if the location is on National Forest System Lands, the SUPO must be filed with the appropriate Forest Service Office).
4. Bond to cover the operations unless covered by an existing bond on file (see Item 20 above).
5. Operator certification.
6. Such other site specific information and/or plans as may be requested by the BLM.

25. Signature: Cindy Herrera-Murillo
Name *(Printed/Typed)*: CINDY HERRERA-MURILLO
Date: 02/11/2016

Title: PERMITTING SPECIALIST

Approved by *(Signature)*
Name *(Printed/Typed)*
Date

Title: PERMITTING SPECIALIST
Office

Application approval does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.
Conditions of approval, if any, are attached.

Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212, make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

(Continued on page 2)

*(Instructions on page 2)

CERTIFICATION

I hereby certify that I, or someone under my direct supervision, have inspected the drill site and access route proposed herein; that I am familiar with the conditions which currently exist; that I have full knowledge of state and federal laws applicable to this operation; that the statements made in this APD package are, to the best of my knowledge, true and correct; and, that the work associated with the operations proposed will be performed in conformity with this APD package and the terms and conditions under which it is approved. I also certify that I, or the company I represent, am responsible for the operations conducted under this application. These statements are subject to the provisions of 18 U.S.C. 1001 for the filing of a false statement.

Executed this 19th day of JANUARY, 2016

Name: _____

Sean Cheben-Project Manager

Address: 1400 Smith Street

Houston, TX 77002

Room 40125

Office: 713-372-9382

Email: Sean.Cheben@CHEVRON.COM

Cindy Herrera-Murillo
Permitting Specialist
Midcontinent BU

Chevron North America
Exploration and Production Company
(A Chevron U.S.A. Inc. Division)
1616 W. Bender Blvd
Hobbs FMT, Hobbs, NM 88240
Tel 575-263-0431
Cherreramurillo@chevron.com

February 10, 2016

BLM-Carlsbad Field Office
620 E. Greene Street
Carlsbad, New Mexico 88220

Re: Applications to Drill
For Hayhurst Development Area in NM
MDP- 2016-1

Dear Sirs,

Chevron U.S.A. Inc. respectfully submits 12 Applications to Drill (APD's) with the Hayhurst Development Area's Master Development Plan (MDP-2016-1).

There will be 2 pads and 6 wells on each pad. The first well pad includes the following APD's:

HH SO 10 P3 #7H; HH SO 10 P3 #8H; HH SO 10 P3 #15H; HH SO 10 P3 #16H; HH SO 10 P3 #23H; HH SO 10 P3 #24H.

The second well pad includes the following APD's:

HH SO 8 P2 #5H; HH SO 8 P2 #6H; HH SO 8 P2 #13H; HH SO 8 P2 # 14H; HH SO 8 P2 #21H; HH SO 8 P2 #22H.

Your prompt consideration and approval of these applications will be greatly appreciated. If additional information is required, you may contact me at 575-263-0431, or by email at Cherreramurillo@chevron.com.

Sincerely,

Cindy Herrera-Murillo

Cindy Herrera-Murillo
Permitting Specialist
Enclosures

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Phone: (575) 393-6161 Fax: (575) 393-0720
District II
811 S. First St., Artesia, NM 88210
Phone: (575) 748-1283 Fax: (575) 748-9720
District III
1000 Rio Brazos Road, Aztec, NM 87410
Phone: (505) 334-6178 Fax: (505) 334-6170
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505
Phone: (505) 476-3460 Fax: (505) 476-3462

State of New Mexico
Energy, Minerals & Natural Resources Department
OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-102
Revised August 1, 2011
Submit one copy to appropriate District Office

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

[1] API Number	[2] Pool Code	[3] Pool Name
		Wildcat;Wolfcamp

[4] Property Code	[5] Property Name	[6] Well Number
	HH SO 8 P2	6H

[7] OGRID No.	[8] Operator Name	[9] Elevation
4323	CHEVRON U.S.A. INC.	3245'

[10] Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
D	17	26 SOUTH	27 EAST, N.M.P.M.		280'	NORTH	960'	WEST	EDDY

[11] Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
D	5	26 SOUTH	27 EAST, N.M.P.M.		180'	NORTH	996'	WEST	EDDY

[12] Dedicated Acres	[13] Joint or Infill	[14] Consolidation Code	[15] Order No.
320			

No allowable will be assigned to this completion until all interests have been consolidated or a non-standard unit has been approved by the division.

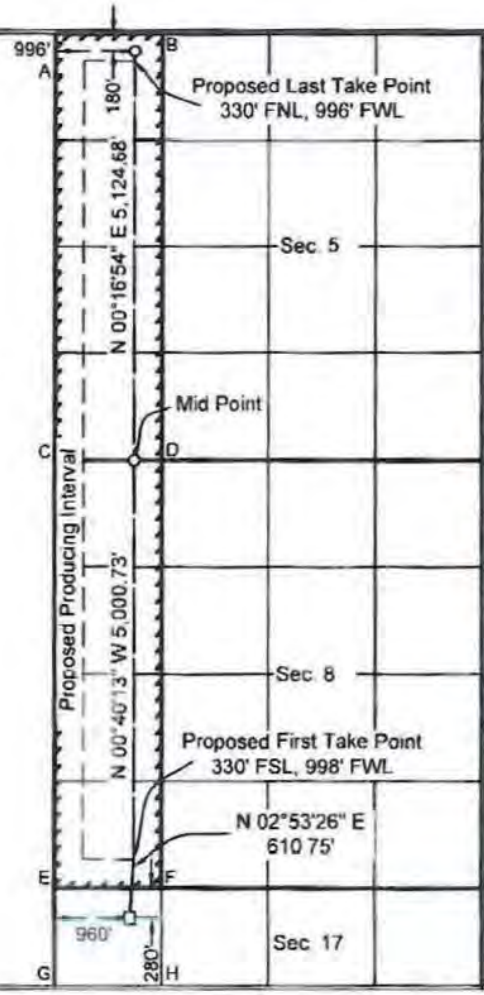
PROPOSED BOTTOM HOLE LOCATION		
X=	535,950	NAD 27
Y=	392,264	
LAT.	32.078396	
LONG.	104.217265	
X=	577,133	NAD83
Y=	392,321	
LAT.	32.078517	
LONG.	104.217760	

CORNER COORDINATES TABLE (NAD 27)

A - Y=392442.33, X=534954.83
B - Y=392444.24, X=536280.85
C - Y=387143.09, X=534935.36
D - Y=387137.83, X=536254.75
E - Y=381810.94, X=534988.20
F - Y=381808.02, X=536317.14
G - Y=380478.27, X=535007.69
H - Y=380475.74, X=536334.89

Mid Point
Y=387139.14, X=535924.76

HH SO 8 P2 6H WELL		
X=	535,952	NAD 27
Y=	381,529	
LAT.	32.048884	
LONG.	104.217294	
X=	557,136	NAD83
Y=	381,586	
LAT.	32.049006	
LONG.	104.217788	
ELEVATION +3245' NAVD 88		



[17] OPERATOR CERTIFICATION

I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.

Cindy Herrera-Murillo 02/04/16
Signature Date

Cindy Herrera-Murillo
Printed Name

Cherreramurillo@chevron.com
E-mail Address

[18] SURVEYOR CERTIFICATION

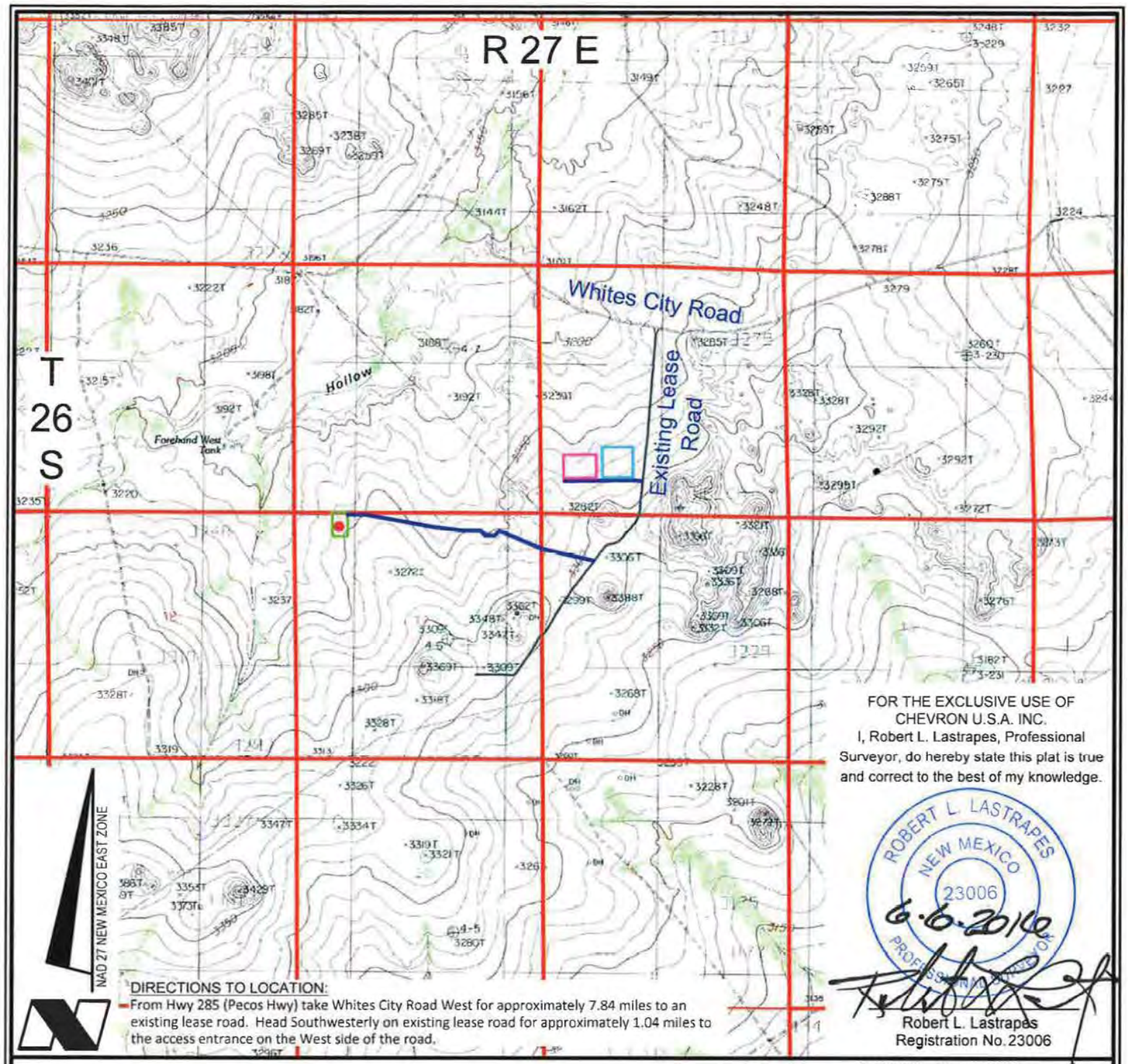
I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.

Jan 5, 2016
Date of Survey

1-8-2016
Signature and Seal of Professional Surveyor

ROBERT L. LASTRAPES
NEW MEXICO
23006
PROFESSIONAL SURVEYOR

23006
Certificate Number



FOR THE EXCLUSIVE USE OF CHEVRON U.S.A. INC.
I, Robert L. Lastrapes, Professional Surveyor, do hereby state this plat is true and correct to the best of my knowledge.

ROBERT L. LASTRAPES
NEW MEXICO
23006
6-6-2016
PROFESSIONAL SURVEYOR

Robert L. Lastrapes
Registration No. 23006

DIRECTIONS TO LOCATION:

From Hwy 285 (Pecos Hwy) take Whites City Road West for approximately 7.84 miles to an existing lease road. Head Southwesterly on existing lease road for approximately 1.04 miles to the access entrance on the West side of the road.

VICINITY MAP

SCALE: 1" = 3000'

3000' 0 1500' 3000'

LEGEND

- Proposed Well
- Proposed Access Road
- Proposed Drillsite
- Existing Road
- Section Line
- Proposed Frac Pond
- Proposed Facility

CHEVRON U.S.A. INC.

HH SO 8 P2 NO. 6H WELL
LOCATED 280' FNL AND 960' FWL
SECTION 17, T26S-R27E
EDDY COUNTY, NEW MEXICO

FENSTERMAKER
C.H. Fenstermaker & Associates, L.L.C.
135 Regency Sq. Lafayette, LA 70508
Ph. 337-237-2200 Fax. 337-232-3299
www.fenstermaker.com

DRAWN BY: MBD	REVISIONS		
PROJ. MGR.: GDG	No. 1	DATE: 05/26/2016	REVISED BY: BOR
DATE: 01/07/2016	No.	DATE:	REVISED BY:
FILENAME: T:\2015\2153439\DWG\HH SO 8 P2 6H_APD.dwg			

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I, Robert L. Lastrapes, Professional Surveyor, do hereby state this plat is true and correct to the best of my knowledge.

ROBERT L. LASTRAPES
NEW MEXICO
23006
PROFESSIONAL SURVEYOR

6-6-2016

Robert L. Lastrapes
Registration No. 23006

R 27 E

T 26 S

NW PAD CORNER	NE PAD CORNER	HH SO 8 P2 NO. 6H WELL
X= 535,799 NAD 27	X= 536,129 NAD 27	X= 535,952 NAD 27
Y= 381,809	Y= 381,808	Y= 381,529
ELEVATION +3241' NAVD 88	ELEVATION +3247' NAVD 88	LAT. 32.048884
SW PAD CORNER	SE PAD CORNER	LONG. 104.217294
X= 535,805 NAD 27	X= 536,135 NAD 27	X= 577,136 NAD83
Y= 381,284	Y= 381,284	Y= 381,586
ELEVATION +3244' NAVD 88	ELEVATION +3256' NAVD 88	LAT. 32.049006
		LONG. 104.217788
		ELEVATION +3245' NAVD 88

LEGEND

- Section Line
- Access Centerline
- Found Monument

Sec. 8

Bureau of Land Management

S 89°52'10" E 810.78'

Fnd. 2" Iron Pipe w/ Cap at the NW Corner of Section 17

280'
25'(Typ.)
52'
525'
150'
180'
245'
330'

HH SO 8 P2
No. 6H Well
280' FNL, 960' FWL

PROPOSED PAD
±3.98 Acres

CENTERLINE PROPOSED ACCESS ROAD (1)
24' X ±5,538.04'
±3.40 Acres
±335.64 Rods
(SEE PAGE 2)

Sec. 17

Bureau of Land Management

(Access Road 1) ± 4383.54', ±2.42 Acres, ±265.67 Rods

NAD 27 NEW MEXICO EAST ZONE

Scale: 1" = 300'

300' 0 150' 300'

FENSTERMAKER

C. H. Fenstermaker & Associates, L.L.C.
135 Regency Sq. Lafayette, LA 70508
Ph. 337-237-2200 Fax 337-232-3299
www.fenstermaker.com

SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED PADS, FRAC POND & ACCESS ROADS
HH SO 8 P2 NO. 6H WELL
SECTIONS 9, 16 & 17, T26S-R27E
EDDY COUNTY, NEW MEXICO

DRAWN BY: LJG	REVISIONS		
PROJ. MGR.: GDG	No. 2	DATE: 01/19/2016	REVISED BY: GDG
DATE: 12/22/2015	No. 3	DATE: 05/26/2016	REVISED BY: BOR

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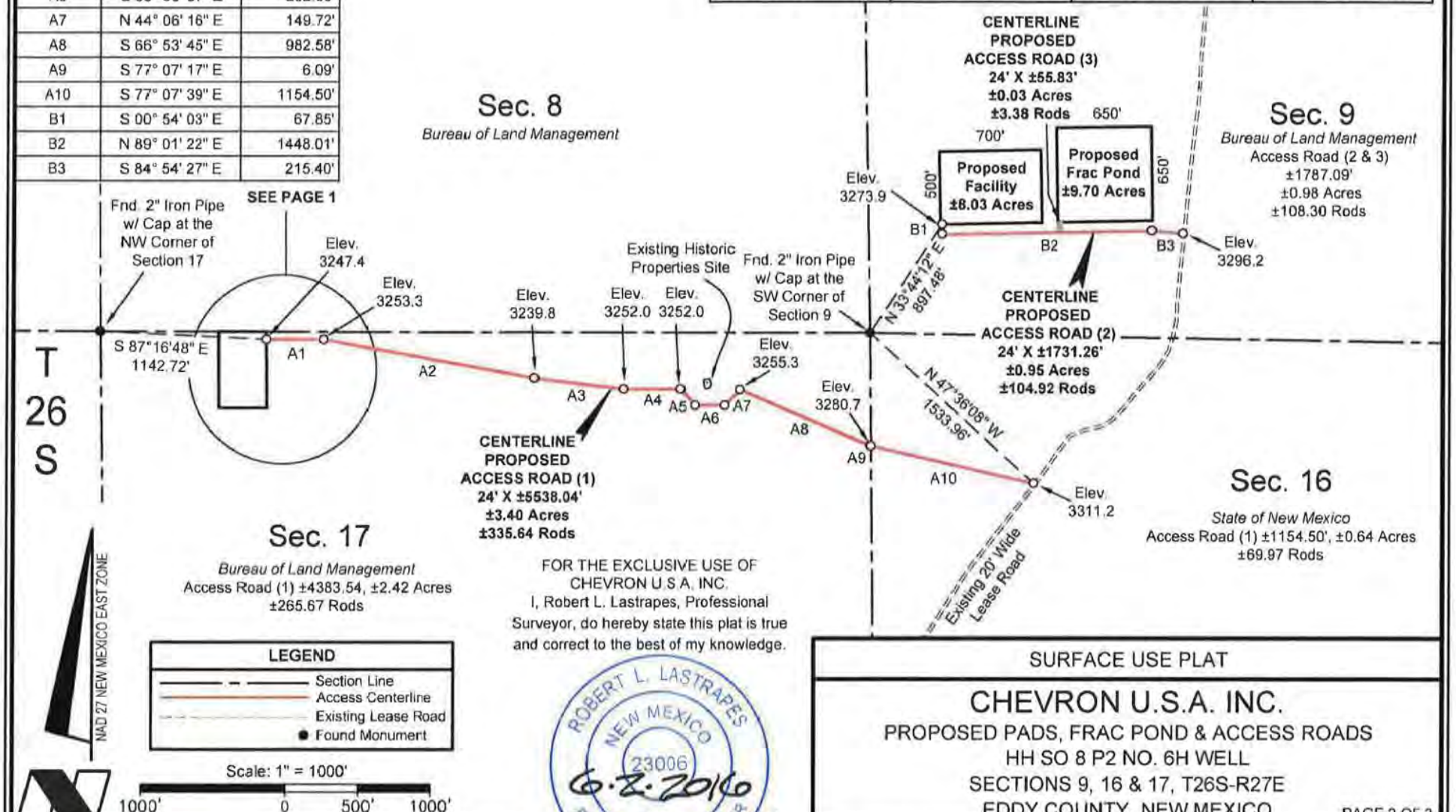
CENTERLINE PROPOSED ACCESS ROADS		
COURSE	BEARING	DISTANCE
A1	S 89° 49' 39" E	398.61'
A2	S 79° 37' 12" E	1478.11'
A3	S 82° 59' 20" E	620.58'
A4	S 89° 50' 47" E	394.88'
A5	S 42° 37' 55" E	150.58'
A6	S 89° 58' 57" E	202.39'
A7	N 44° 06' 16" E	149.72'
A8	S 66° 53' 45" E	982.58'
A9	S 77° 07' 17" E	6.09'
A10	S 77° 07' 39" E	1154.50'
B1	S 00° 54' 03" E	67.85'
B2	N 89° 01' 22" E	1448.01'
B3	S 84° 54' 27" E	215.40'

R 27 E

NW FRAC POND CORNER	NE FRAC POND CORNER	NW FACILITY CORNER	NE FACILITY CORNER
X= 541,594 NAD 27 Y= 383,209	X= 542,244 NAD 27 Y= 383,220	X= 540,782 NAD 27 Y= 383,045	X= 541,482 NAD 27 Y= 383,057
ELEVATION +3264' NAVD 88	ELEVATION +3270' NAVD 88	ELEVATION +3263' NAVD 88	ELEVATION +3265' NAVD 88
SW FRAC POND CORNER	SE FRAC POND CORNER	SW FACILITY CORNER	SE FACILITY CORNER
X= 541,605 NAD 27 Y= 382,559	X= 542,255 NAD 27 Y= 382,570	X= 540,790 NAD 27 Y= 382,545	X= 541,490 NAD 27 Y= 382,557
ELEVATION +3278' NAVD 88	ELEVATION +3289' NAVD 88	ELEVATION +3274' NAVD 88	ELEVATION +3276' NAVD 88



FOR THE EXCLUSIVE USE OF CHEVRON U.S.A. INC.
I, Robert L. Lastrapes, Professional Surveyor, do hereby state this plat is true and correct to the best of my knowledge.

ROBERT L. LASTRAPES NEW MEXICO 23006 PROFESSIONAL SURVEYOR
6-2-2016

Robert L. Lastrapes
Registration No. 23006

FENSTERMAKER

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SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED PADS, FRAC POND & ACCESS ROADS
HH SO 8 P2 NO. 6H WELL
SECTIONS 9, 16 & 17, T26S-R27E
EDDY COUNTY, NEW MEXICO

DRAWN BY: LJG	REVISIONS		
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FILENAME: T:\2015\2153439\DWG\HH SO 8 P2 6H_SUP.dwg

DISCLAIMER: At this time, C. H. Fenstermaker & Associates, L.L.C. has not performed nor was asked to perform any type of engineering, hydrological modeling, flood plain, or "No Rise" certification analyses, including but not limited to determining whether the project will impact flood hazards in connection with federal/FEMA, state, and/or local laws, ordinances and regulations. Accordingly, Fenstermaker makes no warranty or representation of any kind as to the foregoing issues, and persons or entities using this information shall do so at their own risk.

NOTE:
Please be advised, that while reasonable efforts are made to locate and verify pipelines and anomalies using our standard pipeline locating equipment, it is impossible to be 100 % effective. As such, we advise using caution when performing work as there is a possibility that pipelines and other hazards, such as fiber optic cables, PVC pipelines, etc. may exist undetected on site.

NOTE:
Many states maintain information centers that establish links between those who dig (excavators) and those who own and operate underground facilities (operators). It is advisable and in most states, law, for the contractor to contact the center for assistance in locating and marking underground utilities. For guidance, New Mexico One Call. www.nmonecall.org

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6-2-2016

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Form 3160-3
(June 2015)

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OMB No. 1004-0137
Expires: January 31, 2018

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1c. Type of Completion: ☐ Hydraulic Fracturing ☑ Single Zone ☐ Multiple Zone

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At proposed prod. zone 180' FNL & 330' FWL

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SEC17, T26S, R27E, UL D (SHL)

14. Distance in miles and direction from nearest town or post office*
12.8 MILES FROM MALAGA, NEW MEXICO

12. County or Parish
EDDY

13. State
NM

15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drlg. unit line, if any) 305' FNL

16. No of acres in lease
1920 ACRES

17. Spacing Unit dedicated to this well
320 ACRES

18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft. 4300 FT SKEEN 2 SW

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TD 9904' MD 20,551'

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CA 0329

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OCTOBER 2016

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30 DAYS

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25. Signature Cindy Herrera-Murillo

Name *(Printed/Typed)*
CINDY HERRERA-MURILLO

Date
02/11/2016

Title
PERMITTING SPECIALIST

Approved by *(Signature)*

Name *(Printed/Typed)*

Date

Title
PERMITTING SPECIALIST

Office

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(Continued on page 2)

*(Instructions on page 2)

CERTIFICATION

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Executed this 19th day of JANUARY, 2016

Name: _____

Sean Cheben-Project Manager

Address: 1400 Smith Street

Houston, TX 77002

Room 40125

Office: 713-372-9382

Email: Sean.Cheben@CHEVRON.COM

Cindy Herrera-Murillo
Permitting Specialist
Midcontinent BU

Chevron North America
Exploration and Production Company
(A Chevron U.S.A. Inc. Division)
1616 W. Bender Blvd
Hobbs FMT, Hobbs, NM 88240
Tel 575-263-0431
Cherreramurillo@chevron.com

February 10, 2016

BLM-Carlsbad Field Office
620 E. Greene Street
Carlsbad, New Mexico 88220

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For Hayhurst Development Area in NM
MDP- 2016-1

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HH SO 10 P3 #7H; HH SO 10 P3 #8H; HH SO 10 P3 #15H; HH SO 10 P3 #16H; HH SO 10 P3 #23H; HH SO 10 P3 #24H.

The second well pad includes the following APD's:

HH SO 8 P2 #5H; HH SO 8 P2 #6H; HH SO 8 P2 #13H; HH SO 8 P2 # 14H; HH SO 8 P2 #21H; HH SO 8 P2 #22H.

Your prompt consideration and approval of these applications will be greatly appreciated. If additional information is required, you may contact me at 575-263-0431, or by email at Cherreramurillo@chevron.com.

Sincerely,

Cindy Herrera-Murillo

Cindy Herrera-Murillo
Permitting Specialist
Enclosures

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811 S. First St., Artesia, NM 88210
Phone: (575) 748-1283 Fax: (575) 748-9720
District III
1000 Rio Brazos Road, Aztec, NM 87410
Phone: (505) 334-6178 Fax: (505) 334-6170
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505
Phone: (505) 476-3460 Fax: (505) 476-3462

State of New Mexico
Energy, Minerals & Natural Resources Department
OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-102
Revised August 1, 2011
Submit one copy to appropriate District Office

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

[1] API Number	[2] Pool Code	[3] Pool Name
		Wildcat;Wolfcamp

[4] Property Code	[5] Property Name	[6] Well Number
	HH SO 8 P2	13H

[7] OGRID No.	[8] Operator Name	[9] Elevation
4323	CHEVRON U.S.A. INC.	3246'

[10] Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
D	17	26 SOUTH	27 EAST, N.M.P.M.		305'	NORTH	960'	WEST	EDDY

[11] Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
D	5	26 SOUTH	27 EAST, N.M.P.M.		180'	NORTH	330'	WEST	EDDY

[12] Dedicated Acres	[13] Joint or Infill	[14] Consolidation Code	[15] Order No.
320			

No allowable will be assigned to this completion until all interests have been consolidated or a non-standard unit has been approved by the division.

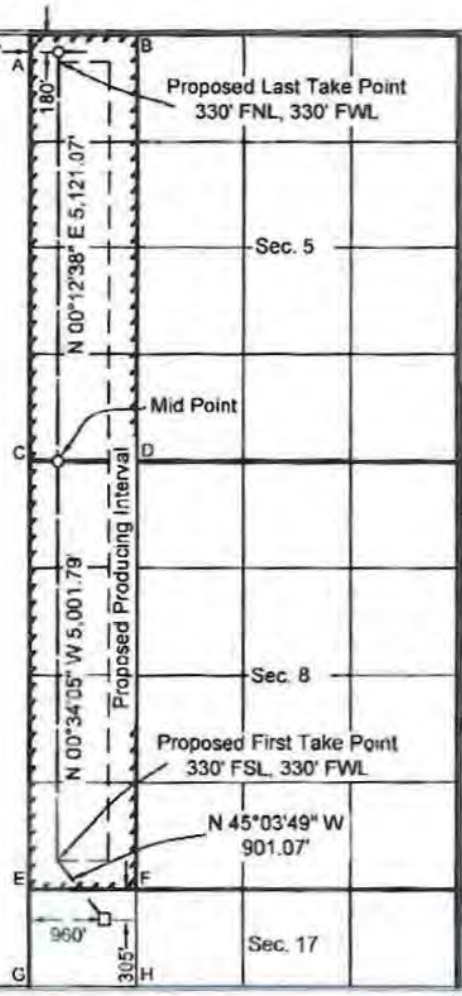
PROPOSED BOTTOM HOLE LOCATION		
X=	535,284	NAD 27
Y=	392,263	
LAT.	32.078395	
LONG.	104.219414	
X=	576,468	NAD83
Y=	392,320	
LAT.	32.078516	
LONG.	104.219909	

CORNER COORDINATES TABLE (NAD 27)

A - Y=392442.33, X=534954.83
B - Y=392444.24, X=536280.85
C - Y=387143.09, X=534935.36
D - Y=387137.83, X=536254.75
E - Y=381810.94, X=534988.20
F - Y=381808.02, X=536317.14
G - Y=380478.27, X=535007.69
H - Y=380475.74, X=536334.89

Mid Point
Y=387141.77, X=535265.35

HH SO 8 P2 13H WELL		
X=	535,953	NAD 27
Y=	381,504	
LAT.	32.048816	
LONG.	104.217293	
X=	577,136	NAD83
Y=	381,561	
LAT.	32.048937	
LONG.	104.217787	
ELEVATION +3246' NAVD 88		



[17] OPERATOR CERTIFICATION

I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.

Cindy Herrera-Murillo 2-4-16
Signature Date

Cindy Herrera-Murillo
Printed Name

Ciherreramurillo@chevron.com
E-mail Address

[18] SURVEYOR CERTIFICATION

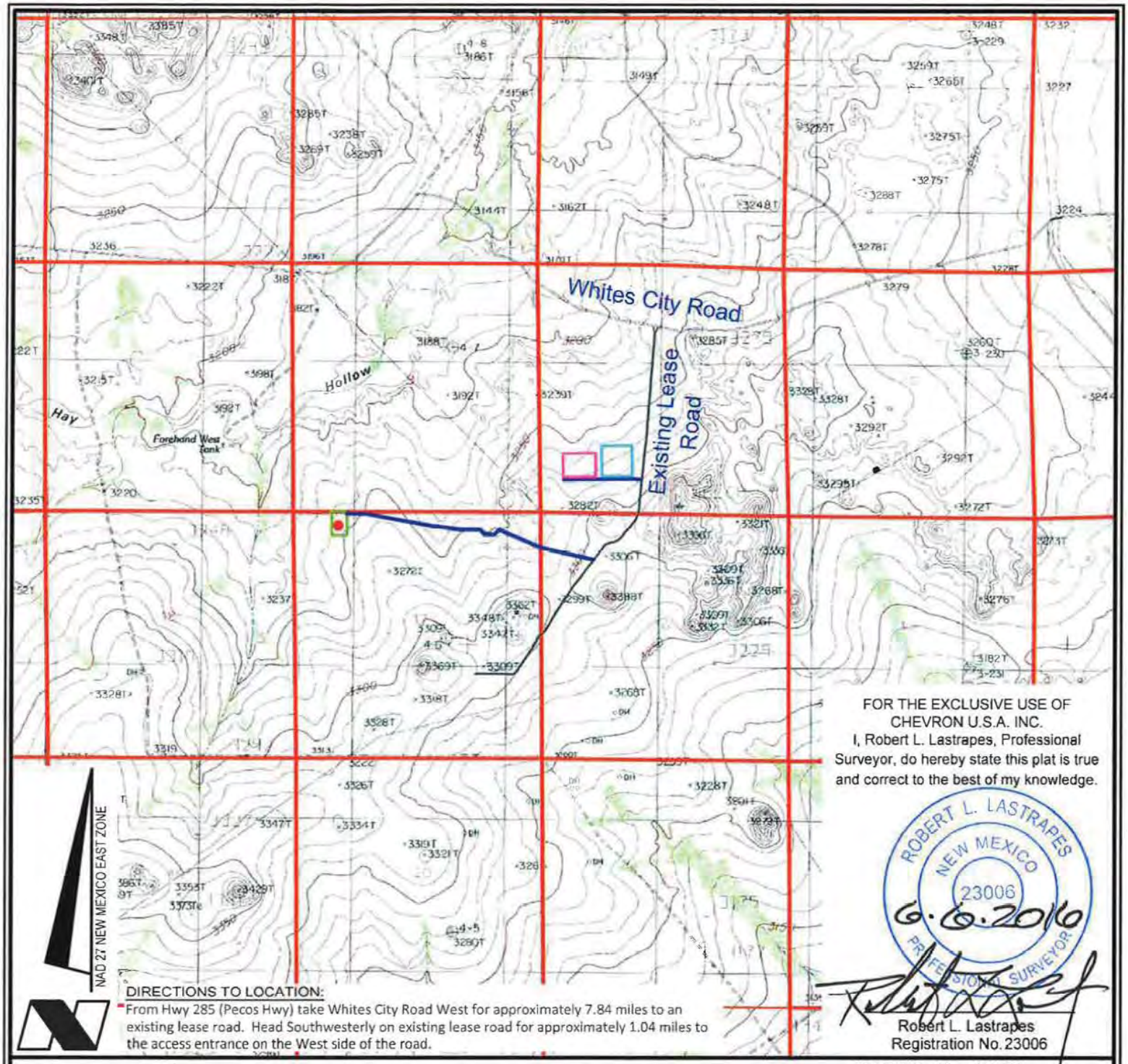
I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.

JAN 5, 2016
Date of Survey

Signature and Seal of Professional Surveyor

ROBERT L. LASTRAPES
NEW MEXICO
23006
PROFESSIONAL SURVEYOR

23006
Certificate Number



FOR THE EXCLUSIVE USE OF
CHEVRON U.S.A. INC.
I, Robert L. Lastrapes, Professional Surveyor, do hereby state this plat is true and correct to the best of my knowledge.

ROBERT L. LASTRAPES
NEW MEXICO
23006
6.6.2016
PROFESSIONAL SURVEYOR

Robert L. Lastrapes
Registration No. 23006

DIRECTIONS TO LOCATION:

From Hwy 285 (Pecos Hwy) take Whites City Road West for approximately 7.84 miles to an existing lease road. Head Southwesterly on existing lease road for approximately 1.04 miles to the access entrance on the West side of the road.

VICINITY MAP

SCALE: 1" = 3000'

3000' 0 1500' 3000'

LEGEND

- Proposed Well
- Proposed Access Road
- Proposed Drillsite
- Existing Road
- Section Line
- Proposed Frac Pond
- Proposed Facility

CHEVRON U.S.A. INC.

HH SO 8 P2 NO. 13H WELL
LOCATED 305' FNL AND 960' FWL
SECTION 17, T26S-R27E
EDDY COUNTY, NEW MEXICO

FENSTERMAKER
C.H. Fenstermaker & Associates, L.L.C.
135 Regency Sq. Lafayette, LA 70508
Ph. 337-237-2200 Fax. 337-232-3299
www.fenstermaker.com

DRAWN BY: VHV	REVISIONS		
PROJ. MGR.: GDG	No. 1	DATE: 05/26/2016	REVISED BY: BOR
DATE: 12/23/2015	No.	DATE:	REVISED BY:
FILENAME: T:\2015\2153440\DWG\HH SO 8 P2 13H_APD.dwg			

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I, Robert L. Lastrapes, Professional Surveyor, do hereby state this plat is true and correct to the best of my knowledge.

ROBERT L. LASTRAPES
NEW MEXICO
23006
PROFESSIONAL SURVEYOR

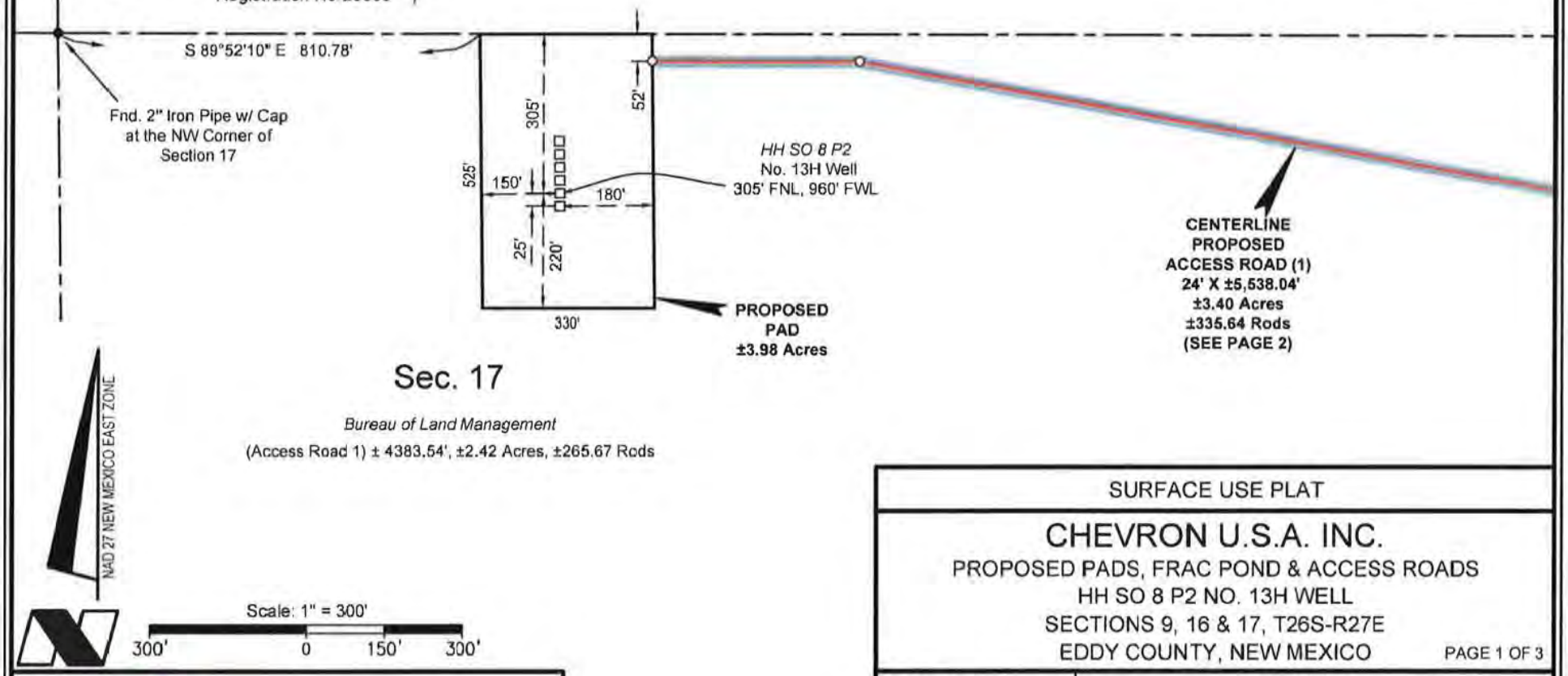
6-6-2016

Robert L. Lastrapes
Registration No. 23006

NW PAD CORNER	NE PAD CORNER	HH SO 8 P2 NO. 13H WELL
X= 535,799 NAD 27	X= 536,129 NAD 27	X= 535,953 NAD 27
Y= 381,809	Y= 381,808	Y= 381,504
ELEVATION +3241' NAVD 88	ELEVATION +3247' NAVD 88	LAT. 32.048816
		LONG. 104.217293
SW PAD CORNER	SE PAD CORNER	X= 577,136 NAD83
X= 535,805 NAD 27	X= 536,135 NAD 27	Y= 381,561
Y= 381,284	Y= 381,284	LAT. 32.048937
ELEVATION +3244' NAVD 88	ELEVATION +3256' NAVD 88	LONG. 104.217787
		ELEVATION +3246' NAVD 88

LEGEND

- Section Line
- Access Centerline
- Found Monument



SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED PADS, FRAC POND & ACCESS ROADS
HH SO 8 P2 NO. 13H WELL
SECTIONS 9, 16 & 17, T26S-R27E
EDDY COUNTY, NEW MEXICO

PAGE 1 OF 3

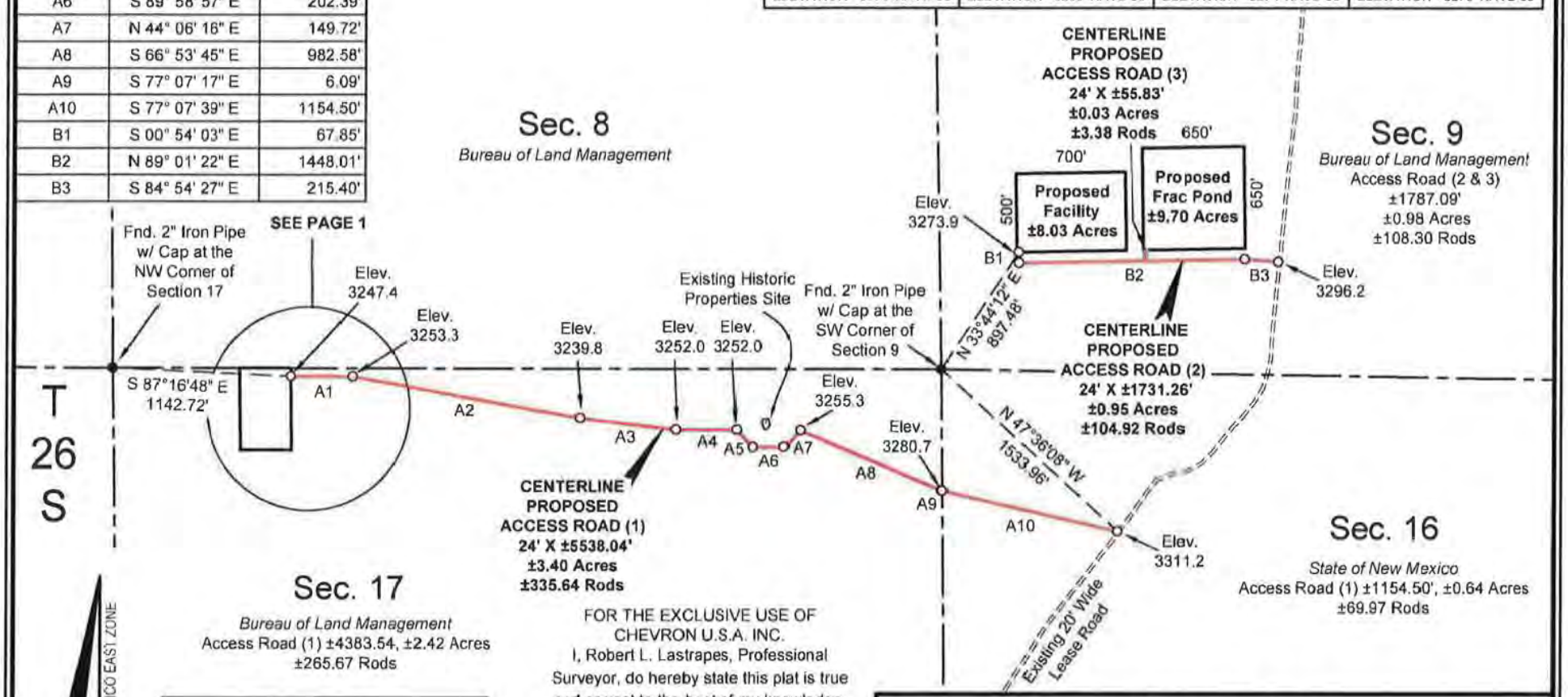
DRAWN BY: LJG	REVISIONS		
PROJ. MGR.: GDG	No. 2	DATE: 01/19/2016	REVISED BY: GDG
DATE: 12/22/2015	No. 3	DATE: 05/26/2016	REVISED BY: BOR
FILENAME: T:\2015\2153440\DWG\HH SO 8 P2 13H_SUP.dwg			

FENSTERMAKER
C. H. Fenstermaker & Associates, L.L.C.
135 Regency Sq. Lafayette, LA 70508
Ph. 337-237-2200 Fax. 337-232-3299
www.fenstermaker.com

CENTERLINE PROPOSED ACCESS ROADS		
COURSE	BEARING	DISTANCE
A1	S 89° 49' 39" E	398.61'
A2	S 79° 37' 12" E	1478.11'
A3	S 82° 59' 20" E	620.58'
A4	S 89° 50' 47" E	394.88'
A5	S 42° 37' 55" E	150.58'
A6	S 89° 58' 57" E	202.39'
A7	N 44° 06' 16" E	149.72'
A8	S 66° 53' 45" E	982.58'
A9	S 77° 07' 17" E	6.09'
A10	S 77° 07' 39" E	1154.50'
B1	S 00° 54' 03" E	67.85'
B2	N 89° 01' 22" E	1448.01'
B3	S 84° 54' 27" E	215.40'

R 27 E

NW FRAC POND CORNER	NE FRAC POND CORNER	NW FACILITY CORNER	NE FACILITY CORNER
X= 541,594 NAD 27 Y= 383,209	X= 542,244 NAD 27 Y= 383,220	X= 540,782 NAD 27 Y= 383,045	X= 541,482 NAD 27 Y= 383,057
ELEVATION +3264' NAVD 88	ELEVATION +3270' NAVD 88	ELEVATION +3263' NAVD 88	ELEVATION +3265' NAVD 88
SW FRAC POND CORNER	SE FRAC POND CORNER	SW FACILITY CORNER	SE FACILITY CORNER
X= 541,605 NAD 27 Y= 382,559	X= 542,255 NAD 27 Y= 382,570	X= 540,790 NAD 27 Y= 382,545	X= 541,490 NAD 27 Y= 382,557
ELEVATION +3278' NAVD 88	ELEVATION +3289' NAVD 88	ELEVATION +3274' NAVD 88	ELEVATION +3276' NAVD 88



FOR THE EXCLUSIVE USE OF CHEVRON U.S.A. INC.
I, Robert L. Lastrapes, Professional Surveyor, do hereby state this plat is true and correct to the best of my knowledge.

ROBERT L. LASTRAPES NEW MEXICO 23006 PROFESSIONAL SURVEYOR
6-2-2016

Robert L. Lastrapes
Registration No. 23006

FENSTERMAKER

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135 Regency Sq. Lafayette, LA 70508
Ph. 337-237-2200 Fax 337-232-3299
www.fenstermaker.com

SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED PADS, FRAC POND & ACCESS ROADS
HH SO 8 P2 NO. 13H WELL
SECTIONS 9, 16 & 17, T26S-R27E
EDDY COUNTY, NEW MEXICO

DRAWN BY: LJG	REVISIONS		
PROJ. MGR.: GDG	No. 2	DATE: 01/19/2016	REVISED BY: GDG
DATE: 12/22/2015	No. 3	DATE: 05/26/2016	REVISED BY: BOR

FILENAME: T:\2015\2153440\DWG\HH SO 8 P2 13H_SUP.dwg

DISCLAIMER: At this time, C. H. Fenstermaker & Associates, L.L.C. has not performed nor was asked to perform any type of engineering, hydrological modeling, flood plain, or "No Rise" certification analyses, including but not limited to determining whether the project will impact flood hazards in connection with federal/FEMA, state, and/or local laws, ordinances and regulations. Accordingly, Fenstermaker makes no warranty or representation of any kind as to the foregoing issues, and persons or entities using this information shall do so at their own risk.

NOTE:
Please be advised, that while reasonable efforts are made to locate and verify pipelines and anomalies using our standard pipeline locating equipment, it is impossible to be 100 % effective. As such, we advise using caution when performing work as there is a possibility that pipelines and other hazards, such as fiber optic cables, PVC pipelines, etc. may exist undetected on site.

NOTE:
Many states maintain information centers that establish links between those who dig (excavators) and those who own and operate underground facilities (operators). It is advisable and in most states, law, for the contractor to contact the center for assistance in locating and marking underground utilities. For guidance, New Mexico One Call. www.nmonecall.org

FOR THE EXCLUSIVE USE OF
CHEVRON U.S.A. INC.
I, Robert L. Lastrapes, Professional Surveyor, do hereby state this plat is true and correct to the best of my knowledge.

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23006
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6-2-2016

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SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED PADS, FRAC POND & ACCESS ROADS
HH SO 8 P2 NO. 13H WELL
SECTIONS 9, 16 & 17, T26S-R27E
EDDY COUNTY, NEW MEXICO

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FILENAME: T:\2015\2153440\DWG\HH SO 8 P2 13H_SUP.dwg			

Form 3160-3
(June 2015)

FORM APPROVED
OMB No. 1004-0137
Expires: January 31, 2018

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

5. Lease Serial No.
NMNM118108

6. If Indian, Allotee or Tribe Name

1a. Type of work: ☑ DRILL ☐ REENTER

1b. Type of Well: ☑ Oil Well ☐ Gas Well ☐ Other

1c. Type of Completion: ☐ Hydraulic Fracturing ☑ Single Zone ☐ Multiple Zone

7. If Unit or CA Agreement, Name and No.

8. Lease Name and Well No.
HH SO 8 P2

2. Name of Operator
CHEVRON USA INC

9. API Well No.
14H

3a. Address
1616 W. BENDER BLVD HOBBS, NM 88240

3b. Phone No. *(include area code)*
575-263-0431

10. Field and Pool, or Exploratory
WILDCAT; WOLFCAMP

4. Location of Well *(Report location clearly and in accordance with any State requirements.*)*
At surface 330' FNL & 960' FWL
At proposed prod. zone 180' FNL & 996' FWL

11. Sec., T. R. M. or Blk. and Survey or Area
SEC17, T26S, R27E, UL D (SHL)

14. Distance in miles and direction from nearest town or post office*
12.8 MILES FROM MALAGA, NEW MEXICO

12. County or Parish
EDDY

13. State
NM

15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drlg. unit line, if any) 330' FNL

16. No of acres in lease
1920 ACRES

17. Spacing Unit dedicated to this well
320 ACRES

18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft. 4300 FT SKEEN 2 SW

19. Proposed Depth
TD 9904' MD 20,551'

20. BLM/BIA Bond No. in file
CA 0329

21. Elevations (Show whether DF, KDB, RT, GL, etc.)
3247' GL

22. Approximate date work will start*
OCTOBER 2016

23. Estimated duration
30 DAYS

24. Attachments

The following, completed in accordance with the requirements of Onshore Oil and Gas Order No. 1, and the Hydraulic Fracturing rule per 43 CFR 3162.3-3 (as applicable)

1. Well plat certified by a registered surveyor.
2. A Drilling Plan.
3. A Surface Use Plan (if the location is on National Forest System Lands, the SUPO must be filed with the appropriate Forest Service Office).
4. Bond to cover the operations unless covered by an existing bond on file (see Item 20 above).
5. Operator certification.
6. Such other site specific information and/or plans as may be requested by the BLM.

25. Signature: Cindy Herrera-Murillo
Name *(Printed/Typed)*: CINDY HERRERA-MURILLO
Date: 02/11/2016

Title: PERMITTING SPECIALIST

Approved by *(Signature)*
Name *(Printed/Typed)*
Date

Title: PERMITTING SPECIALIST
Office

Application approval does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.
Conditions of approval, if any, are attached.

Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212, make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

(Continued on page 2)

*(Instructions on page 2)

CERTIFICATION

I hereby certify that I, or someone under my direct supervision, have inspected the drill site and access route proposed herein; that I am familiar with the conditions which currently exist; that I have full knowledge of state and federal laws applicable to this operation; that the statements made in this APD package are, to the best of my knowledge, true and correct; and, that the work associated with the operations proposed will be performed in conformity with this APD package and the terms and conditions under which it is approved. I also certify that I, or the company I represent, am responsible for the operations conducted under this application. These statements are subject to the provisions of 18 U.S.C. 1001 for the filing of a false statement.

Executed this 19th day of JANUARY, 2016

Name: _____

Sean Cheben-Project Manager

Address: 1400 Smith Street

Houston, TX 77002

Room 40125

Office: 713-372-9382

Email: Sean.Cheben@CHEVRON.COM

Cindy Herrera-Murillo
Permitting Specialist
Midcontinent BU

Chevron North America
Exploration and Production Company
(A Chevron U.S.A. Inc. Division)
1616 W. Bender Blvd
Hobbs FMT, Hobbs, NM 88240
Tel 575-263-0431
Cherreramurillo@chevron.com

February 10, 2016

BLM-Carlsbad Field Office
620 E. Greene Street
Carlsbad, New Mexico 88220

Re: Applications to Drill
For Hayhurst Development Area in NM
MDP- 2016-1

Dear Sirs,

Chevron U.S.A. Inc. respectfully submits 12 Applications to Drill (APD's) with the Hayhurst Development Area's Master Development Plan (MDP-2016-1).

There will be 2 pads and 6 wells on each pad. The first well pad includes the following APD's:

HH SO 10 P3 #7H; HH SO 10 P3 #8H; HH SO 10 P3 #15H; HH SO 10 P3 #16H; HH SO 10 P3 #23H; HH SO 10 P3 #24H.

The second well pad includes the following APD's:

HH SO 8 P2 #5H; HH SO 8 P2 #6H; HH SO 8 P2 #13H; HH SO 8 P2 # 14H; HH SO 8 P2 #21H; HH SO 8 P2 #22H.

Your prompt consideration and approval of these applications will be greatly appreciated. If additional information is required, you may contact me at 575-263-0431, or by email at Cherreramurillo@chevron.com.

Sincerely,

Cindy Herrera-Murillo

Cindy Herrera-Murillo
Permitting Specialist
Enclosures

District I
1625 N French Dr., Hobbs, NM 88240
Phone: (575) 393-6161 Fax: (575) 393-0720
District II
811 S First St., Artesia, NM 88210
Phone: (575) 748-1283 Fax: (575) 748-9720
District III
1000 Rio Brazos Road, Aztec, NM 87410
Phone: (505) 334-6178 Fax: (505) 334-6170
District IV
1220 S St Francis Dr., Santa Fe, NM 87505
Phone: (505) 476-3460 Fax: (505) 476-3462

State of New Mexico
Energy, Minerals & Natural Resources Department
OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-102
Revised August 1, 2011
Submit one copy to appropriate District Office

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

[1] API Number	[2] Pool Code	[3] Pool Name
		Wildcat: Wolfcamp

[4] Property Code	[5] Property Name	[6] Well Number
	HH SO 8 P2	14H

[7] OGRID No.	[8] Operator Name	[9] Elevation
4323	CHEVRON U.S.A. INC.	3247'

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[11] Bottom Hole Location If Different From Surface

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[12] Dedicated Acres	[13] Joint or Infill	[14] Consolidation Code	[15] Order No.
320			

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[16]

PROPOSED BOTTOM HOLE LOCATION		
X=	535,950	NAD 27
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LONG	104.217265	
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Y=	392,321	
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LONG	104.217760	

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Mid Point
Y=387139.14, X=535924.76

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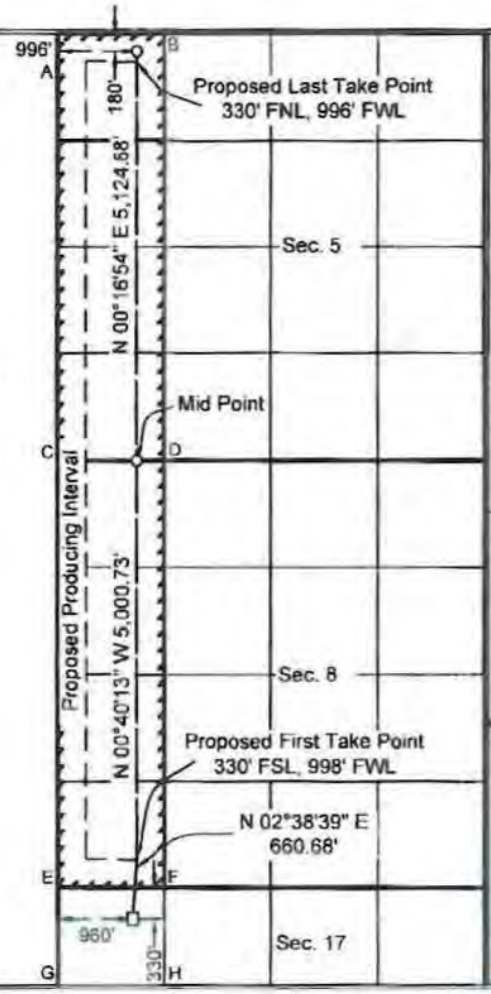
Y=	381,536	
LAT	32.048869	
LONG	104.217787	
ELEVATION =3247' NAVD 88		



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Cindy Herrera-Murillo 2-4-16
Signature Date

Cindy Herrera-Murillo
Printed Name

Cherreramurillo @chevron.com
E-mail Address

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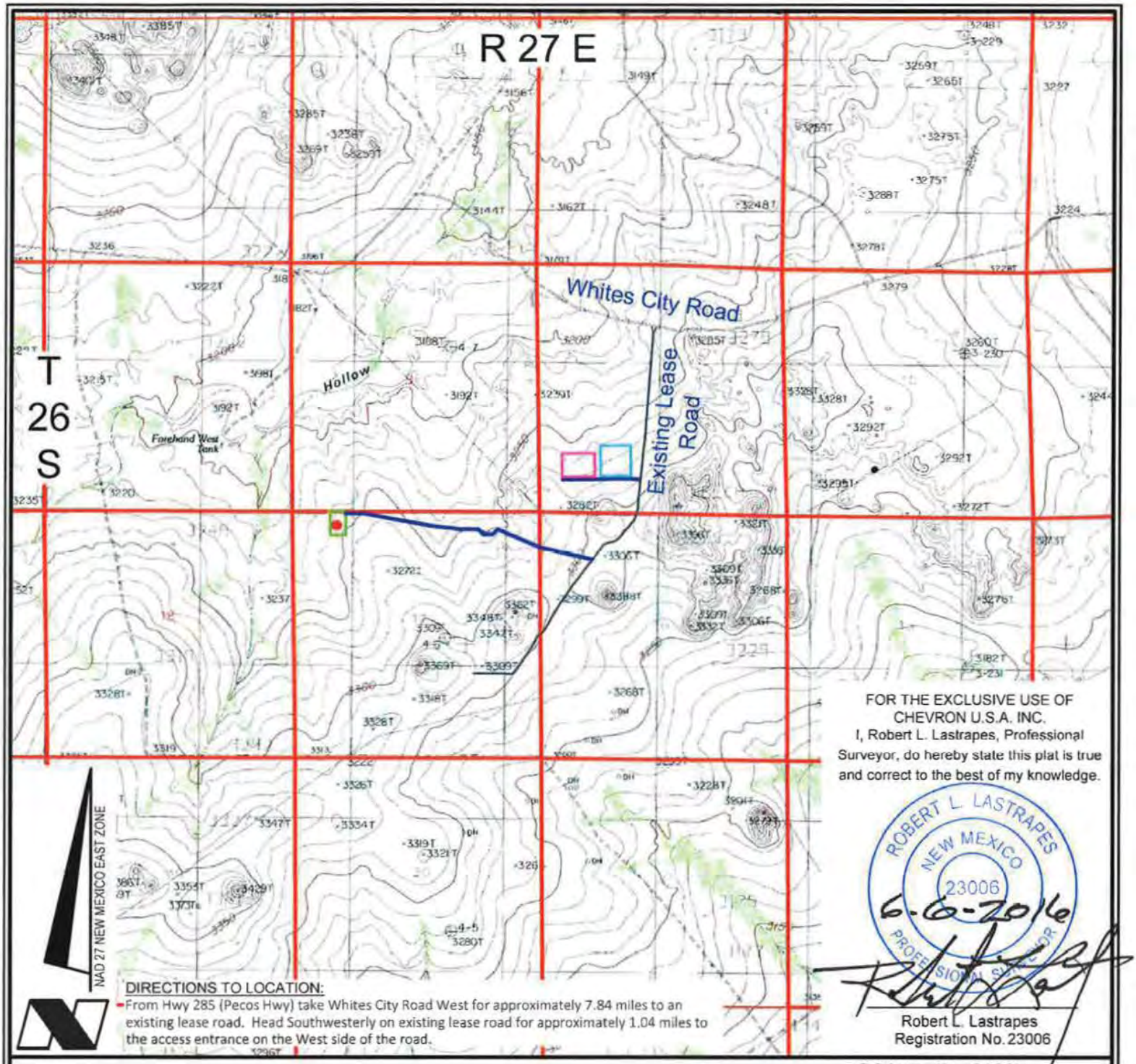
JAN 5, 2016
Date of Survey

Signature and Seal of Professional Surveyor

ROBERT L. LASTRAPES
NEW MEXICO
2-8-2016
23006
PROFESSIONAL SURVEYOR

23006
Certificate Number



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FOR THE EXCLUSIVE USE OF CHEVRON U.S.A. INC.
I, Robert L. Lastrapes, Professional Surveyor, do hereby state this plat is true and correct to the best of my knowledge.

ROBERT L. LASTRAPES
NEW MEXICO
23006
6-6-2016
PROFESSIONAL SURVEYOR

Robert L. Lastrapes
Registration No. 23006

VICINITY MAP

SCALE: 1" = 3000'

3000' 0 1500' 3000'

LEGEND

- Proposed Well
- Proposed Access Road
- Proposed Drillsite
- Existing Road
- Section Line
- Proposed Frac Pond
- Proposed Facility

CHEVRON U.S.A. INC.

HH SO 8 P2 NO. 14H WELL
LOCATED 330' FNL AND 960' FWL
SECTION 17, T26S-R27E
EDDY COUNTY, NEW MEXICO

FENSTERMAKER

C.H. Fenstermaker & Associates, L.L.C.
135 Regency Sq. Lafayette, LA 70508
Ph. 337-237-2200 Fax. 337-232-3299
www.fenstermaker.com

DRAWN BY: MBD	REVISIONS		
PROJ. MGR.: GDG	No. 1	DATE: 05/26/2016	REVISED BY: BOR
DATE: 01/07/2016	No.	DATE:	REVISED BY:
FILENAME: T:\2015\2153441\DWG\HH SO 8 P2 14H_APD.dwg			

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PROFESSIONAL SURVEYOR

6-6-2016

Robert L. Lastrapes
Registration No. 23006

R 27 E

NW PAD CORNER	NE PAD CORNER	HH SO 8 P2 NO. 14H WELL
X= 535,799 NAD 27	X= 536,129 NAD 27	X= 535,953 NAD 27
Y= 381,809	Y= 381,808	Y= 381,479
ELEVATION +3241' NAVD 88	ELEVATION +3247' NAVD 88	LAT. 32.048747
		LONG. 104.217293
SW PAD CORNER	SE PAD CORNER	X= 577,136 NAD83
X= 535,805 NAD 27	X= 536,135 NAD 27	Y= 381,536
Y= 381,284	Y= 381,284	LAT. 32.048869
ELEVATION +3244' NAVD 88	ELEVATION +3256' NAVD 88	LONG. 104.217787
		ELEVATION +3247' NAVD 88

LEGEND

- Section Line
- Access Centerline
- Found Monument

T 26 S

Sec. 8

Bureau of Land Management

S 89°52'10" E 810.78'

Fnd. 2" Iron Pipe w/ Cap at the NW Corner of Section 17

330'
25'(Typ.)
52'
525'
150'
180'
195'
330'

HH SO 8 P2
No. 14H Well
330' FNL, 960' FWL

PROPOSED PAD ±3.98 Acres

CENTERLINE PROPOSED ACCESS ROAD (1) 24' X ±5,538.04' ±3.40 Acres ±335.64 Rods (SEE PAGE 2)

Sec. 17

Bureau of Land Management

(Access Road 1) ± 4383.54', ±2.42 Acres, ±265.67 Rods

NAD 27 NEW MEXICO EAST ZONE

Scale: 1" = 300'

300' 0 150' 300'

FENSTERMAKER

C. H. Fenstermaker & Associates, L.L.C.
135 Regency Sq. Lafayette, LA 70508
Ph. 337-237-2200 Fax. 337-232-3299
www.fenstermaker.com

SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED PADS, FRAC POND & ACCESS ROADS
HH SO 8 P2 NO. 14H WELL
SECTIONS 9, 16 & 17, T26S-R27E
EDDY COUNTY, NEW MEXICO

PAGE 1 OF 3

DRAWN BY: LJG	REVISIONS		
PROJ. MGR.: GDG	No. 2	DATE: 01/19/2016	REVISED BY: GDG
DATE: 12/22/2015	No. 3	DATE: 05/26/2016	REVISED BY: BOR
FILENAME: T:\2015\2153441\DWG\HH SO 8 P2 14H_SUP.dwg			

CENTERLINE PROPOSED ACCESS ROADS		
COURSE	BEARING	DISTANCE
A1	S 89° 49' 39" E	398.61'
A2	S 79° 37' 12" E	1478.11'
A3	S 82° 59' 20" E	620.58'
A4	S 89° 50' 47" E	394.88'
A5	S 42° 37' 55" E	150.58'
A6	S 89° 58' 57" E	202.39'
A7	N 44° 06' 16" E	149.72'
A8	S 66° 53' 45" E	982.58'
A9	S 77° 07' 17" E	6.09'
A10	S 77° 07' 39" E	1154.50'
B1	S 00° 54' 03" E	67.85'
B2	N 89° 01' 22" E	1448.01'
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NW FRAC POND CORNER	NE FRAC POND CORNER	NW FACILITY CORNER	NE FACILITY CORNER
X= 541,594 NAD 27 Y= 383,209	X= 542,244 NAD 27 Y= 383,220	X= 540,782 NAD 27 Y= 383,045	X= 541,482 NAD 27 Y= 383,057
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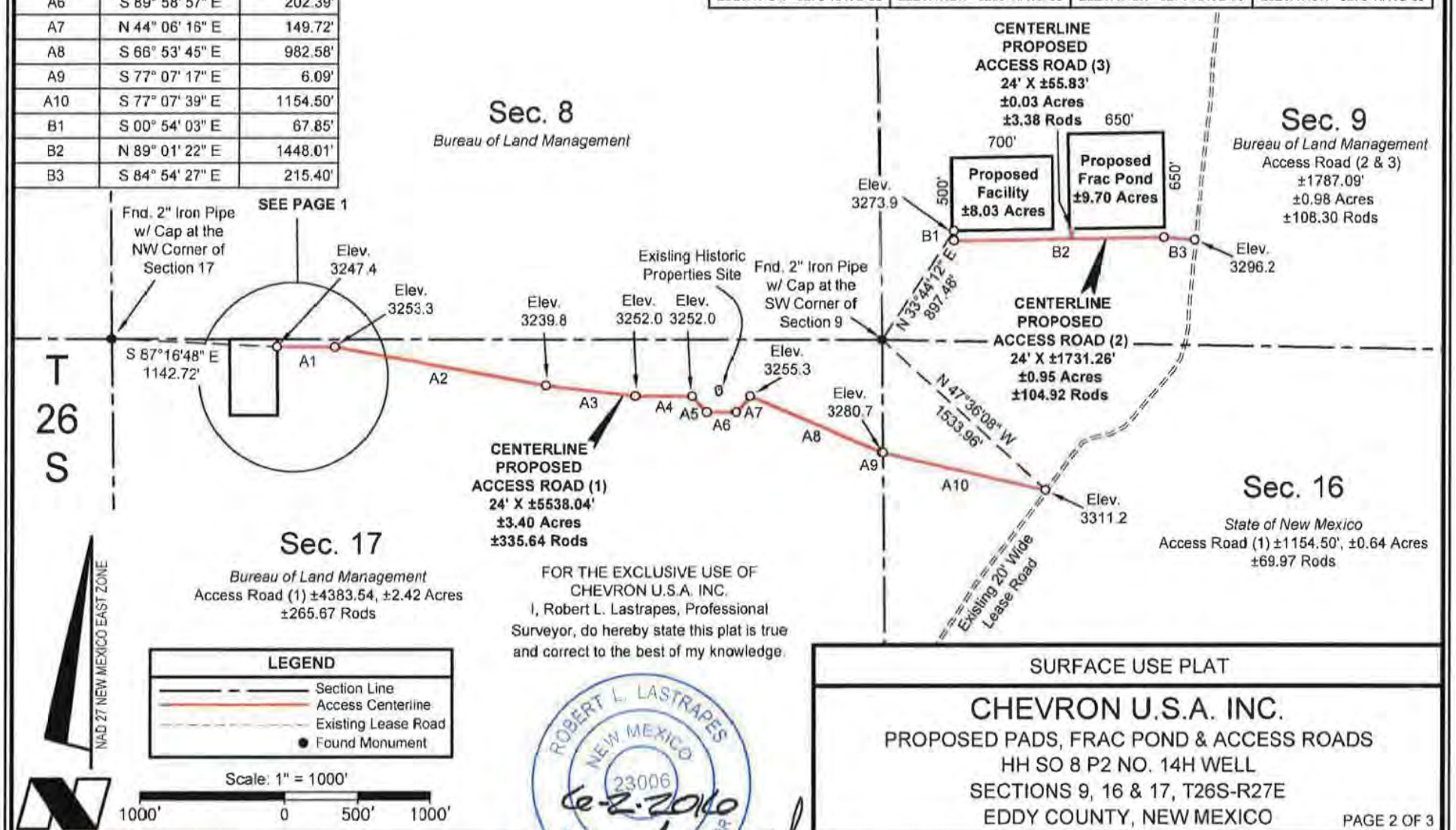

FOR THE EXCLUSIVE USE OF CHEVRON U.S.A. INC.
I, Robert L. Lastrapes, Professional Surveyor, do hereby state this plat is true and correct to the best of my knowledge.

ROBERT L. LASTRAPES NEW MEXICO 23006 6-2-2016

Robert L. Lastrapes
Registration No. 23006

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HH SO 8 P2 NO. 14H WELL
SECTIONS 9, 16 & 17, T26S-R27E
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Form 3160-3
(June 2015)

FORM APPROVED
OMB No. 1004-0137
Expires: January 31, 2018

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

5. Lease Serial No.
NMNM118108

6. If Indian, Allotee or Tribe Name

1a. Type of work: ☑ DRILL ☐ REENTER

1b. Type of Well: ☑ Oil Well ☐ Gas Well ☐ Other

1c. Type of Completion: ☐ Hydraulic Fracturing ☑ Single Zone ☐ Multiple Zone

7. If Unit or CA Agreement, Name and No.

8. Lease Name and Well No.
HH SO 8 P2

2. Name of Operator
CHEVRON USA INC

9. API Well No.
21H

3a. Address
1616 W. BENDER BLVD HOBBS, NM 88240

3b. Phone No. *(include area code)*
575-263-0431

10. Field and Pool, or Exploratory
WILDCAT; WOLFCAMP

4. Location of Well *(Report location clearly and in accordance with any State requirements.*)*
At surface 205' FNL & 960' FWL
At proposed prod. zone 180' FNL & 330' FWL

11. Sec., T. R. M. or Blk. and Survey or Area
SEC17, T26S, R27E, UL D (SHL)

14. Distance in miles and direction from nearest town or post office*
12.8 MILES FROM MALAGA, NEW MEXICO

12. County or Parish
EDDY

13. State
NM

15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drlg. unit line, if any) 205' FNL

16. No of acres in lease
1920 ACRES

17. Spacing Unit dedicated to this well
320 ACRES

18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft. 4300 FT SKEEN 2 SW

19. Proposed Depth
TD 8,918' MD 19,401'

20. BLM/BIA Bond No. in file
CA 0329

21. Elevations (Show whether DF, KDB, RT, GL, etc.)
3245' GL

22. Approximate date work will start*
OCTOBER 2016

23. Estimated duration
30 DAYS

24. Attachments

The following, completed in accordance with the requirements of Onshore Oil and Gas Order No. 1, and the Hydraulic Fracturing rule per 43 CFR 3162.3-3 (as applicable)

1. Well plat certified by a registered surveyor.
2. A Drilling Plan.
3. A Surface Use Plan (if the location is on National Forest System Lands, the SUPO must be filed with the appropriate Forest Service Office).
4. Bond to cover the operations unless covered by an existing bond on file (see Item 20 above).
5. Operator certification.
6. Such other site specific information and/or plans as may be requested by the BLM.

25. Signature: Cindy Herrera-Murillo
Name *(Printed/Typed)* CINDY HERRERA-MURILLO
Date 02/11/2016

Title
PERMITTING SPECIALIST

Approved by *(Signature)*
Name *(Printed/Typed)*
Date

Title
PERMITTING SPECIALIST
Office

Application approval does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.
Conditions of approval, if any, are attached.

Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212, make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

(Continued on page 2)

*(Instructions on page 2)

CERTIFICATION

I hereby certify that I, or someone under my direct supervision, have inspected the drill site and access route proposed herein; that I am familiar with the conditions which currently exist; that I have full knowledge of state and federal laws applicable to this operation; that the statements made in this APD package are, to the best of my knowledge, true and correct; and, that the work associated with the operations proposed will be performed in conformity with this APD package and the terms and conditions under which it is approved. I also certify that I, or the company I represent, am responsible for the operations conducted under this application. These statements are subject to the provisions of 18 U.S.C. 1001 for the filing of a false statement.

Executed this 19th day of JANUARY, 2016

Name: _____

Sean Cheben-Project Manager

Address: 1400 Smith Street

Houston, TX 77002

Room 40125

Office: 713-372-9382

Email: Sean.Cheben@CHEVRON.COM

Cindy Herrera-Murillo
Permitting Specialist
Midcontinent BU

Chevron North America
Exploration and Production Company
(A Chevron U.S.A. Inc. Division)
1616 W. Bender Blvd
Hobbs FMT, Hobbs, NM 88240
Tel 575-263-0431
Cherreramurillo@chevron.com

February 10, 2016

BLM-Carlsbad Field Office
620 E. Greene Street
Carlsbad, New Mexico 88220

Re: Applications to Drill
For Hayhurst Development Area in NM
MDP- 2016-1

Dear Sirs,

Chevron U.S.A. Inc. respectfully submits 12 Applications to Drill (APD's) with the Hayhurst Development Area's Master Development Plan (MDP-2016-1).

There will be 2 pads and 6 wells on each pad. The first well pad includes the following APD's:

HH SO 10 P3 #7H; HH SO 10 P3 #8H; HH SO 10 P3 #15H; HH SO 10 P3 #16H; HH SO 10 P3 #23H; HH SO 10 P3 #24H.

The second well pad includes the following APD's:

HH SO 8 P2 #5H; HH SO 8 P2 #6H; HH SO 8 P2 #13H; HH SO 8 P2 # 14H; HH SO 8 P2 #21H; HH SO 8 P2 #22H.

Your prompt consideration and approval of these applications will be greatly appreciated. If additional information is required, you may contact me at 575-263-0431, or by email at Cherreramurillo@chevron.com.

Sincerely,

Cindy Herrera-Murillo

Cindy Herrera-Murillo
Permitting Specialist
Enclosures

District I
1625 N. French Dr., Hobbs, NM 88240
Phone: (575) 393-6161 Fax: (575) 393-0720
District II
811 S. First St., Artesia, NM 88210
Phone: (575) 748-1283 Fax: (575) 748-9720
District III
1000 Rio Brazos Road, Aztec, NM 87410
Phone: (505) 334-6178 Fax: (505) 334-6170
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505
Phone: (505) 476-3460 Fax: (505) 476-3462

State of New Mexico
Energy, Minerals & Natural Resources Department
OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-102
Revised August 1, 2011
Submit one copy to appropriate District Office

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

[1] API Number	[2] Pool Code	[3] Pool Name
		Wildcat; Wolfcamp

[4] Property Code	[5] Property Name	[6] Well Number
	HH SO 8 P2	21H

[7] OGRID No.	[8] Operator Name	[9] Elevation
4323	CHEVRON U.S.A. INC.	3245'

[10] Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
D	17	26 SOUTH	27 EAST, N.M.P.M.		205'	NORTH	960'	WEST	EDDY

[11] Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
D	5	26 SOUTH	27 EAST, N.M.P.M.		180'	NORTH	330'	WEST	EDDY

[12] Dedicated Acres	[13] Joint or Infill	[14] Consolidation Code	[15] Order No.
320			

No allowable will be assigned to this completion until all interests have been consolidated or a non-standard unit has been approved by the division.

[16]

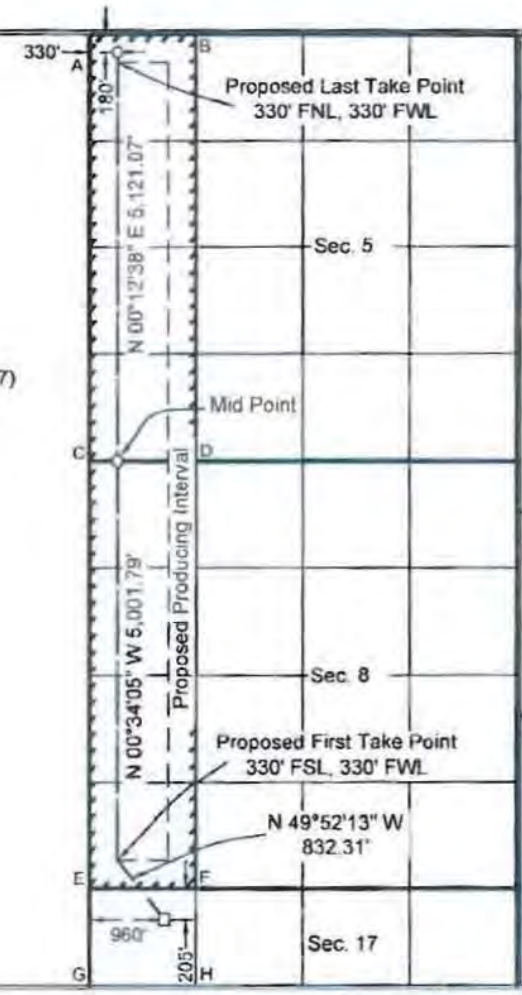
PROPOSED BOTTOM HOLE LOCATION		
X=	535,284	NAD 27
Y=	392,263	
LAT	32.078395	
LONG.	104.219414	
X=	576,468	NAD83
Y=	392,320	
LAT	32.078516	
LONG	104.219909	

CORNER COORDINATES TABLE (NAD 27)

A - Y=392442.33, X=534954.83
B - Y=392444.24, X=536280.85
C - Y=387143.09, X=534935.36
D - Y=387137.83, X=536254.75
E - Y=381810.94, X=534988.20
F - Y=381808.02, X=536317.14
G - Y=380478.27, X=535007.69
H - Y=380475.74, X=536334.89

Mid Point
Y=387141.77, X=535265.35

HH SO 8 P2 21H WELL		
X=	535,951	NAD 27
Y=	381,604	
LAT	32.049091	
LONG	104.217297	
X=	577,135	NAD83
Y=	381,661	
LAT	32.049212	
LONG	104.217791	
ELEVATION ~3245' NAVD 88		



[17] OPERATOR CERTIFICATION

I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.

Cindy Herrera-Murillo 2-4-16
Signature Date

Cindy Herrera-Murillo
Printed Name

Cherreramurillo@chevron.com
E-mail Address

[18] SURVEYOR CERTIFICATION

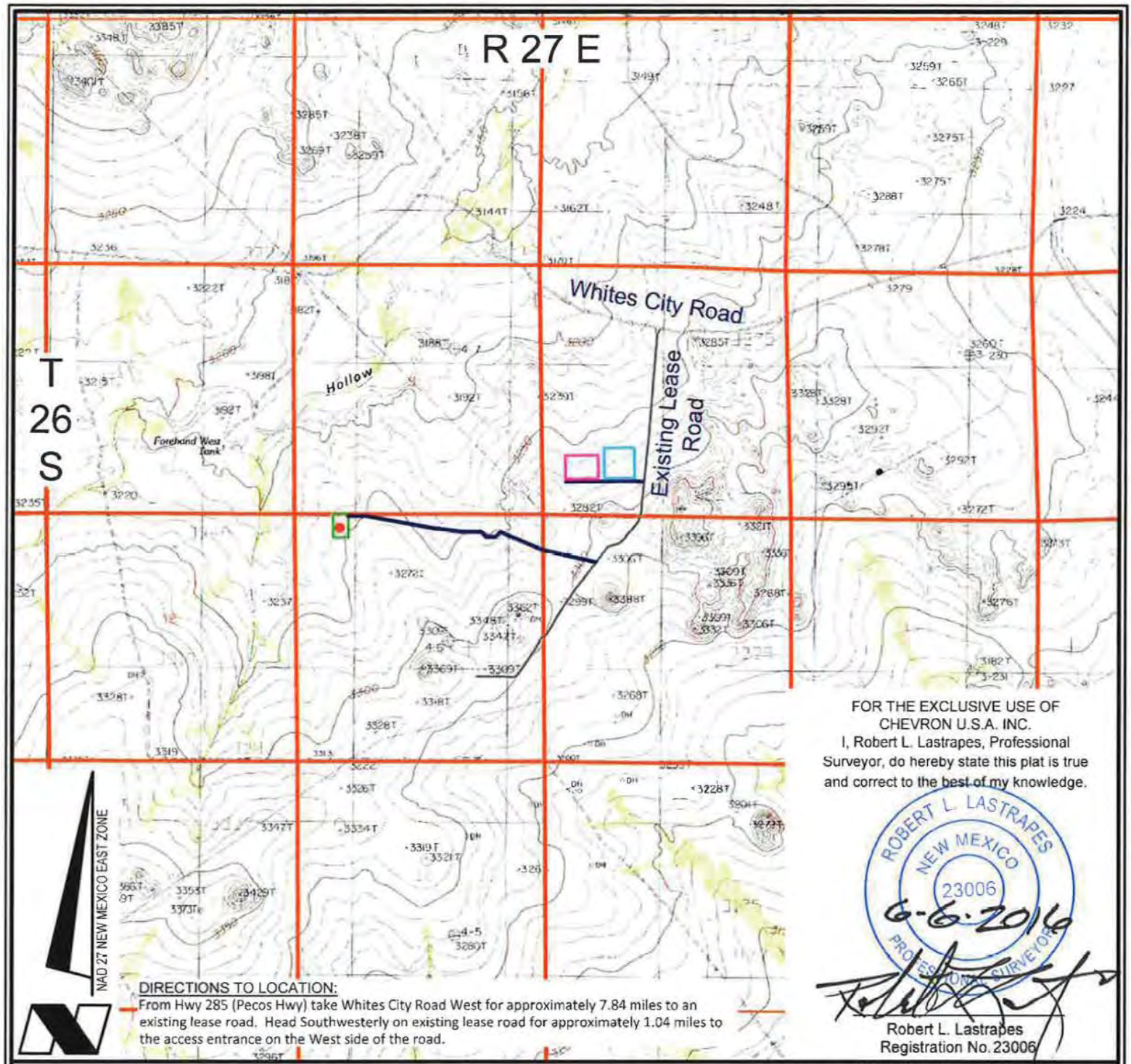
I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.

JAN 5, 2016
Date of Survey

Signature and Seal of Professional Surveyor

ROBERT L. LASTRAPES
NEW MEXICO
23006
PROFESSIONAL SURVEYOR
FEB-2016

23006
Certificate Number



DIRECTIONS TO LOCATION:
From Hwy 285 (Pecos Hwy) take Whites City Road West for approximately 7.84 miles to an existing lease road. Head Southwesterly on existing lease road for approximately 1.04 miles to the access entrance on the West side of the road.

FOR THE EXCLUSIVE USE OF
CHEVRON U.S.A. INC.
I, Robert L. Lastrapes, Professional Surveyor, do hereby state this plat is true and correct to the best of my knowledge.

ROBERT L. LASTRAPES
NEW MEXICO
23006
6-6-2016
PROFESSIONAL SURVEYOR

Robert L. Lastrapes
Registration No. 23006

VICINITY MAP

SCALE: 1" = 3000'
3000' 0 1500' 3000'

LEGEND
- Proposed Well
- Proposed Access Road
- Proposed Drillsite
- Existing Road
- Section Line
- Proposed Frac Pond
- Proposed Facility

CHEVRON U.S.A. INC.

HH SO 8 P2 NO. 21H WELL
LOCATED 205' FNL AND 960' FWL
SECTION 17, T26S-R27E
EDDY COUNTY, NEW MEXICO

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DRAWN BY: MBD	REVISIONS		
PROJ. MGR.: GDG	No. 1	DATE: 05/27/2016	REVISED BY: BOR
DATE: 01/07/2016	No.	DATE:	REVISED BY:
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6-6-2016

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R 27 E

T 26 S

Sec. 8

Bureau of Land Management

NW PAD CORNER	NE PAD CORNER	HH SO 8 P2 NO. 21H WELL
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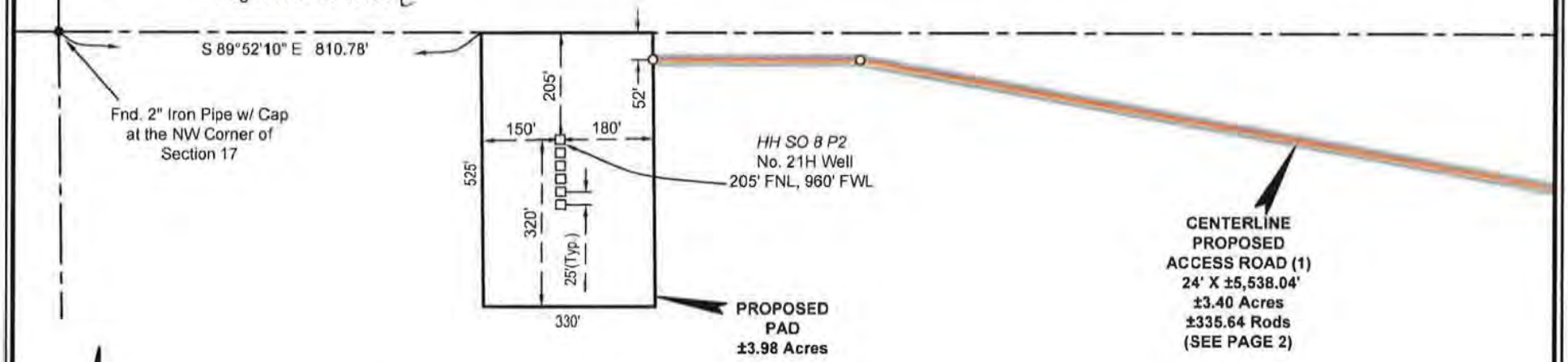

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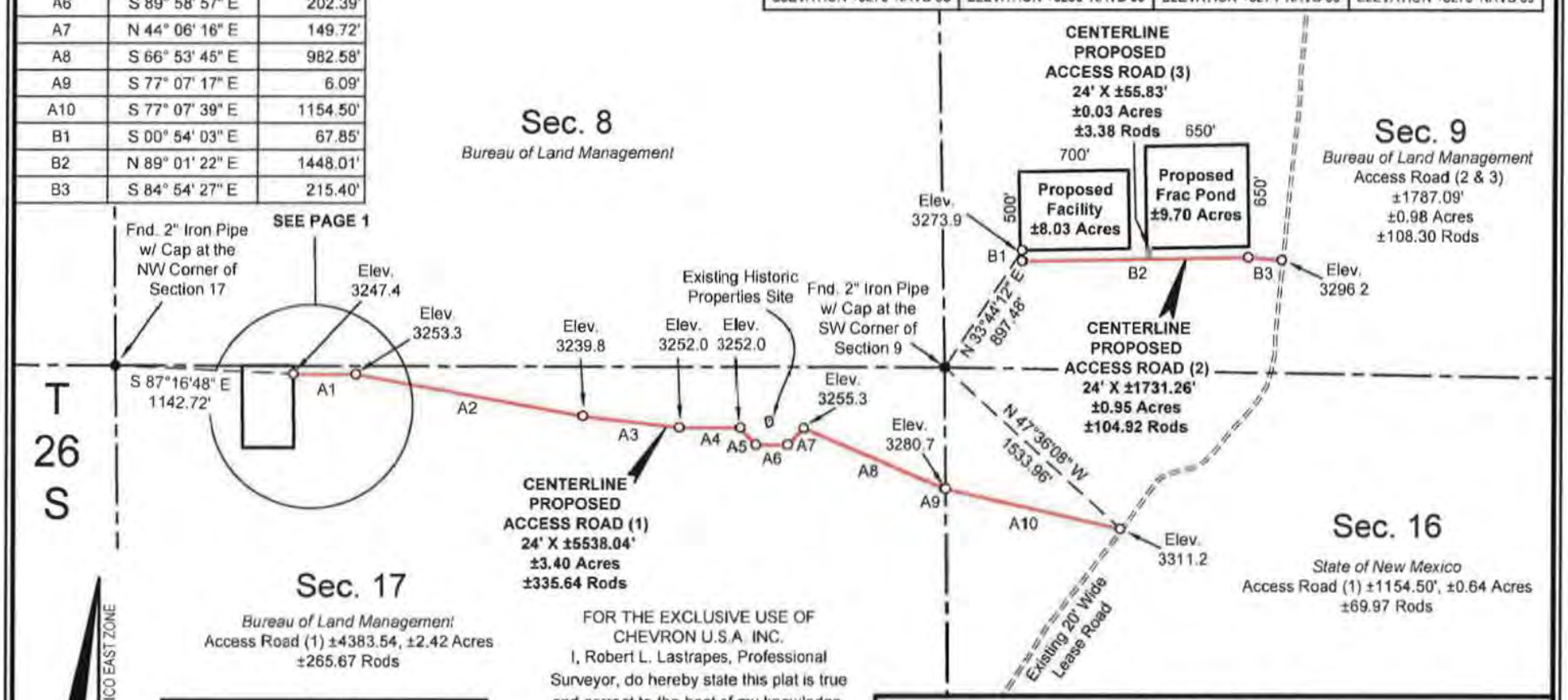

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ROBERT L. LASTRAPES NEW MEXICO 23006 PROFESSIONAL SURVEYOR
6-2-2016

Robert L. Lastrapes
Registration No. 23006

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Ph. 337-237-2200 Fax. 337-232-3299
www.fenstermaker.com

SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED PADS, FRAC POND & ACCESS ROADS
HH SO 8 P2 NO. 21H WELL
SECTIONS 9, 16 & 17, T26S-R27E
EDDY COUNTY, NEW MEXICO

DRAWN BY: LJG	REVISIONS		
PROJ. MGR.: GDG	No. 2	DATE: 09/19/2016	REVISED BY: GDG
DATE: 12/22/2015	No. 3	DATE: 05/27/2016	REVISED BY: BOR
FILENAME: T:\2015\2153436\DWG\HH SO 8 P2 21H_SUP.dwg			

Form 3160-3
(June 2015)

FORM APPROVED
OMB No. 1004-0137
Expires: January 31, 2018

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

5. Lease Serial No.
NMNM118108

6. If Indian, Allotee or Tribe Name

1a. Type of work: ☑ DRILL ☐ REENTER

1b. Type of Well: ☑ Oil Well ☐ Gas Well ☐ Other

1c. Type of Completion: ☐ Hydraulic Fracturing ☑ Single Zone ☐ Multiple Zone

7. If Unit or CA Agreement, Name and No.

8. Lease Name and Well No.
HH SO 8 P2

2. Name of Operator
CHEVRON USA INC

9. API Well No.
22H

3a. Address
1616 W. BENDER BLVD HOBBS, NM 88240

3b. Phone No. *(include area code)*
575-263-0431

10. Field and Pool, or Exploratory
WILDCAT; WOLFCAMP

4. Location of Well *(Report location clearly and in accordance with any State requirements.*)*
At surface 230' FNL & 960' FWL
At proposed prod. zone 180' FNL & 996' FWL

11. Sec., T. R. M. or Blk. and Survey or Area
SEC17, T26S, R27E, UL D (SHL)

14. Distance in miles and direction from nearest town or post office*
12.8 MILES FROM MALAGA, NEW MEXICO

12. County or Parish
EDDY

13. State
NM

15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drlg. unit line, if any) 230' FNL

16. No of acres in lease
1920 ACRES

17. Spacing Unit dedicated to this well
320 ACRES

18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft. 4300 FT SKEEN 2 SW

19. Proposed Depth
TD 9,068' MD 19,510'

20. BLM/BIA Bond No. in file
CA 0329

21. Elevations (Show whether DF, KDB, RT, GL, etc.)
3245' GL

22. Approximate date work will start*
OCTOBER 2016

23. Estimated duration
30 DAYS

24. Attachments

The following, completed in accordance with the requirements of Onshore Oil and Gas Order No. 1, and the Hydraulic Fracturing rule per 43 CFR 3162.3-3 (as applicable)

1. Well plat certified by a registered surveyor.
2. A Drilling Plan.
3. A Surface Use Plan (if the location is on National Forest System Lands, the SUPO must be filed with the appropriate Forest Service Office).
4. Bond to cover the operations unless covered by an existing bond on file (see Item 20 above).
5. Operator certification.
6. Such other site specific information and/or plans as may be requested by the BLM.

25. Signature: Cindy Herrera-Murillo
Name *(Printed/Typed)*: CINDY HERRERA-MURILLO
Date: 02/11/2016

Title: PERMITTING SPECIALIST

Approved by *(Signature)*
Name *(Printed/Typed)*
Date

Title: PERMITTING SPECIALIST
Office

Application approval does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.
Conditions of approval, if any, are attached.

Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212, make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

(Continued on page 2)

*(Instructions on page 2)

CERTIFICATION

I hereby certify that I, or someone under my direct supervision, have inspected the drill site and access route proposed herein; that I am familiar with the conditions which currently exist; that I have full knowledge of state and federal laws applicable to this operation; that the statements made in this APD package are, to the best of my knowledge, true and correct; and, that the work associated with the operations proposed will be performed in conformity with this APD package and the terms and conditions under which it is approved. I also certify that I, or the company I represent, am responsible for the operations conducted under this application. These statements are subject to the provisions of 18 U.S.C. 1001 for the filing of a false statement.

Executed this 19th day of JANUARY, 2016

Name: _____

Sean Cheben-Project Manager

Address: 1400 Smith Street

Houston, TX 77002

Room 40125

Office: 713-372-9382

Email: Sean.Cheben@CHEVRON.COM

Cindy Herrera-Murillo
Permitting Specialist
Midcontinent BU

Chevron North America
Exploration and Production Company
(A Chevron U.S.A. Inc. Division)
1616 W. Bender Blvd
Hobbs FMT, Hobbs, NM 88240
Tel 575-263-0431
Cherreramurillo@chevron.com

February 10, 2016

BLM-Carlsbad Field Office
620 E. Greene Street
Carlsbad, New Mexico 88220

Re: Applications to Drill
For Hayhurst Development Area in NM
MDP- 2016-1

Dear Sirs,

Chevron U.S.A. Inc. respectfully submits 12 Applications to Drill (APD's) with the Hayhurst Development Area's Master Development Plan (MDP-2016-1).

There will be 2 pads and 6 wells on each pad. The first well pad includes the following APD's:

HH SO 10 P3 #7H; HH SO 10 P3 #8H; HH SO 10 P3 #15H; HH SO 10 P3 #16H; HH SO 10 P3 #23H; HH SO 10 P3 #24H.

The second well pad includes the following APD's:

HH SO 8 P2 #5H; HH SO 8 P2 #6H; HH SO 8 P2 #13H; HH SO 8 P2 # 14H; HH SO 8 P2 #21H; HH SO 8 P2 #22H.

Your prompt consideration and approval of these applications will be greatly appreciated. If additional information is required, you may contact me at 575-263-0431, or by email at Cherreramurillo@chevron.com.

Sincerely,

Cindy Herrera-Murillo

Cindy Herrera-Murillo
Permitting Specialist
Enclosures

District I
1625 N. French Dr., Hobbs, NM 88240
Phone: (575) 393-6161 Fax: (575) 393-0720
District II
811 S. First St., Artesia, NM 88210
Phone: (575) 748-1283 Fax: (575) 748-9720
District III
1000 Rio Brazos Road, Aztec, NM 87410
Phone: (505) 334-6178 Fax: (505) 334-6170
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505
Phone: (505) 476-3460 Fax: (505) 476-3462

State of New Mexico
Energy, Minerals & Natural Resources Department
OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-102
Revised August 1, 2011
Submit one copy to appropriate District Office

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

[1] API Number	[2] Pool Code	[3] Pool Name
		Wildcat;Wolfcamp

[4] Property Code	[5] Property Name	[6] Well Number
	HH SO 8 P2	22H
[7] OGRID No	**[8] Operator Name**	**[9] Elevation**
4323	CHEVRON U.S.A. INC.	3245'

[10] Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
D	17	26 SOUTH	27 EAST, N.M.P.M.		230'	NORTH	960'	WEST	EDDY

[11] Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
D	5	26 SOUTH	27 EAST, N.M.P.M.		180'	NORTH	996'	WEST	EDDY

[12] Dedicated Acres	[13] Joint or Infill	[14] Consolidation Code	[15] Order No
320			

No allowable will be assigned to this completion until all interests have been consolidated or a non-standard unit has been approved by the division.

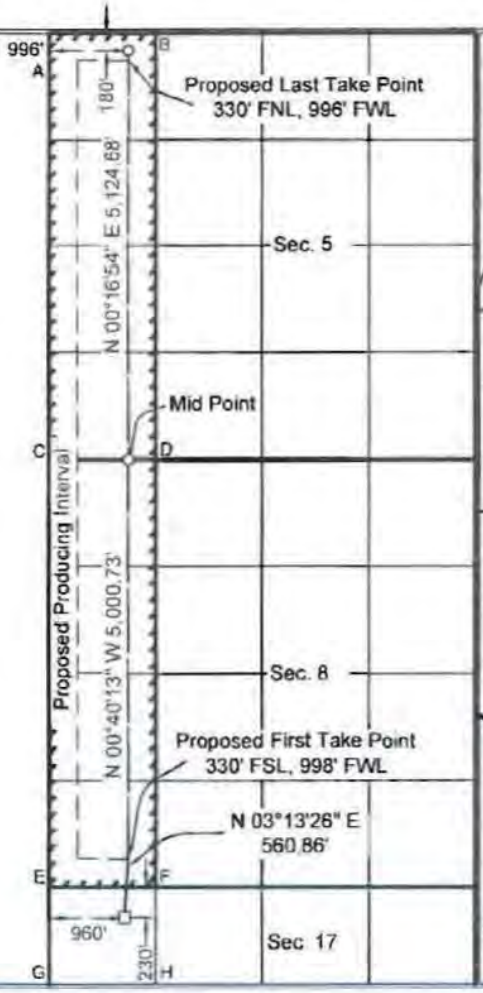
PROPOSED BOTTOM HOLE LOCATION		
X=	535.950	NAD 27
Y=	392,264	
LAT	32.078396	
LONG.	104.217265	
X=	577.133	NAD83
Y=	392,321	
LAT.	32.078517	
LONG	104.217760	

CORNER COORDINATES TABLE (NAD 27)

A - Y=392442.33, X=534954.83
B - Y=392444.24, X=536280.85
C - Y=387143.09, X=534935.36
D - Y=387137.83, X=536254.75
E - Y=381810.94, X=534988.20
F - Y=381808.02, X=536317.14
G - Y=380478.27, X=535007.69
H - Y=380475.74, X=536334.89

Mid Point
Y=387139.14, X=535924.76

HH SO 8 P2 22H WELL		
X=	535.952	NAD 27
Y=	381,579	
LAT	32.049022	
LONG	104.217296	
X=	557,135	NAD83
Y=	381,636	
LAT.	32.049144	
LONG	104.217790	
ELEVATION +3245' NAVD 88		



[17] OPERATOR CERTIFICATION

I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.

Cindy Herrera-Murillo 2-4-16
Signature Date

Cindy Herrera-Murillo
Printed Name

Cherreramurillo@chevron.com
E-mail Address

[18] SURVEYOR CERTIFICATION

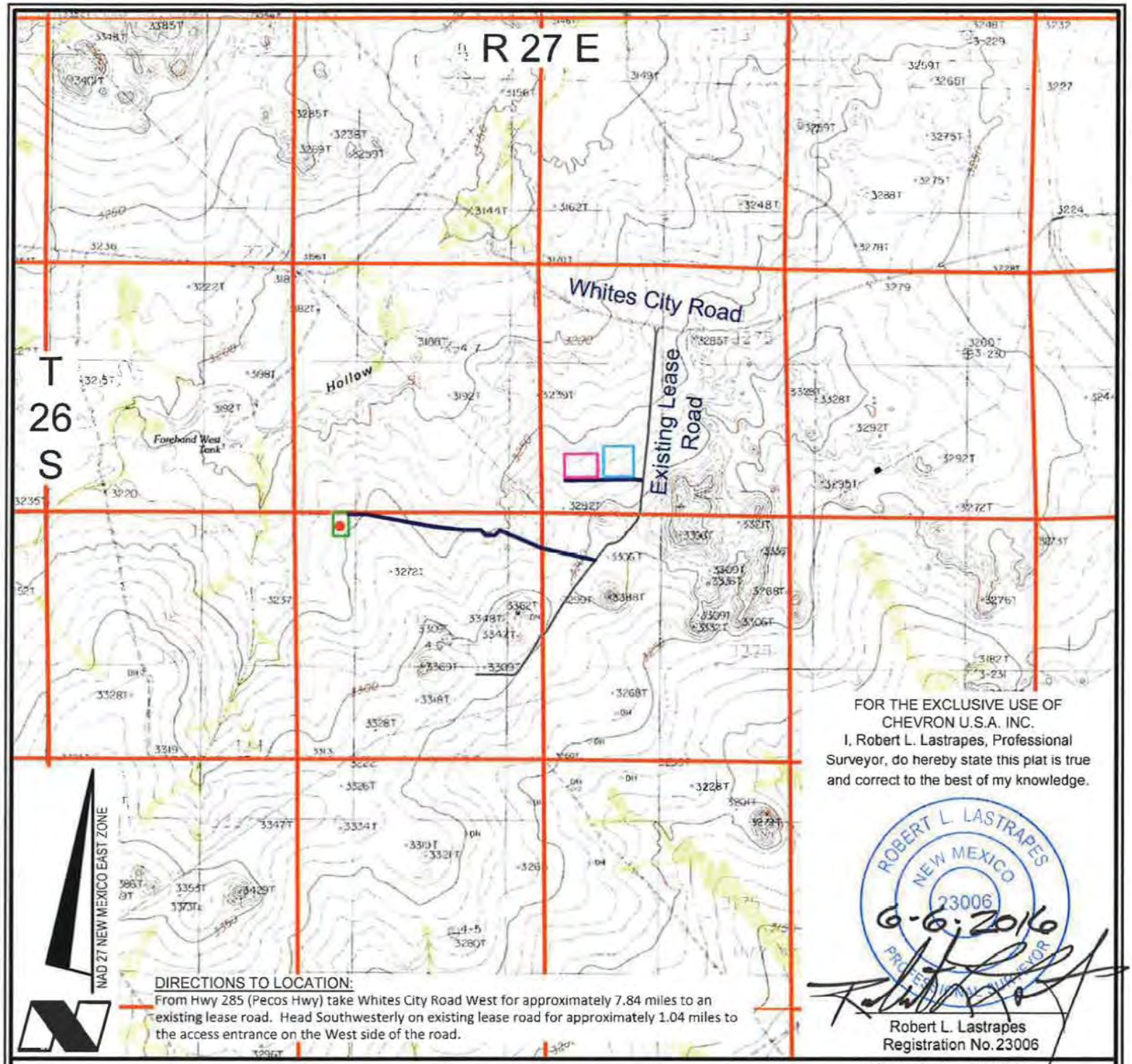
I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.

Jan 5, 2016
Date of Survey

Signature and Seal of Professional Surveyor

ROBERT L. LASTRAPES
NEW MEXICO
23006
PROFESSIONAL SURVEYOR
1-8-2016

23006
Certificate Number



DIRECTIONS TO LOCATION:
From Hwy 285 (Pecos Hwy) take Whites City Road West for approximately 7.84 miles to an existing lease road. Head Southwesterly on existing lease road for approximately 1.04 miles to the access entrance on the West side of the road.

FOR THE EXCLUSIVE USE OF
CHEVRON U.S.A. INC.
I, Robert L. Lastrapes, Professional Surveyor, do hereby state this plat is true and correct to the best of my knowledge.

ROBERT L. LASTRAPES
NEW MEXICO
23006
6-6-2016
PROFESSIONAL SURVEYOR

Robert L. Lastrapes
Registration No. 23006

VICINITY MAP

SCALE: 1" = 3000'
3000' 0 1500' 3000'

LEGEND

- Proposed Well
- Proposed Access Road
- Proposed Drillsite
- Existing Road
- Section Line
- Proposed Frac Pond
- Proposed Facility

CHEVRON U.S.A. INC.

HH SO 8 P2 NO. 22H WELL
LOCATED 230' FNL AND 960' FWL
SECTION 17, T26S-R27E
EDDY COUNTY, NEW MEXICO

FENSTERMAKER
C.H. Fenstermaker & Associates, L.L.C.
135 Regency Sq. Lafayette, LA 70508
Ph. 337-237-2200 Fax. 337-232-3299
www.fenstermaker.com

DRAWN BY: MBD	REVISIONS		
PROJ. MGR.: GDG	No. 1	DATE: 05/27/2016	REVISED BY: BOR
DATE: 01/07/2016	No.	DATE:	REVISED BY:
FILENAME: T:\2015\2153437\DWG\HH SO 8 P2 22H_APD.dwg			

FOR THE EXCLUSIVE USE OF
CHEVRON U.S.A. INC.
I, Robert L. Lastrapes, Professional Surveyor, do hereby state this plat is true and correct to the best of my knowledge.

ROBERT L. LASTRAPES
NEW MEXICO
23006
PROFESSIONAL SURVEYOR

6-6-2016

Robert L. Lastrapes
Registration No. 23006

R 27 E

T 26 S

NW PAD CORNER	NE PAD CORNER	HH SO 8 P2 NO. 22H WELL
X= 535,799 NAD 27 Y= 381,809	X= 536,129 NAD 27 Y= 381,808	X= 535,952 NAD 27 Y= 381,579
ELEVATION +3241' NAVD 88	ELEVATION +3247' NAVD 88	LAT. 32.049022 LONG. 104.217296
SW PAD CORNER	SE PAD CORNER	X= 577,135 NAD83
X= 535,805 NAD 27 Y= 381,284	X= 536,135 NAD 27 Y= 381,284	Y= 381,636 LAT. 32.049144
ELEVATION +3244' NAVD 88	ELEVATION +3256' NAVD 88	LONG. 104.217790
		ELEVATION +3245' NAVD 88

LEGEND

- Section Line
- Access Centerline
- Found Monument

Sec. 8

Bureau of Land Management

S 89°52'10" E 810.78'

Fnd. 2" Iron Pipe w/ Cap at the NW Corner of Section 17

230'
52'
150'
180'
525'
295'
25'(Typ.)
330'

HH SO 8 P2
No. 22H Well
230' FNL, 960' FWL

PROPOSED PAD
±3.98 Acres

CENTERLINE PROPOSED ACCESS ROAD (1)
24' X ±5,538.04'
±3.40 Acres
±335.64 Rods
(SEE PAGE 2)

Sec. 17

Bureau of Land Management

(Access Road 1) ± 4383.54', ±2.42 Acres, ±265.67 Rods

NAD 27 NEW MEXICO EAST ZONE

Scale: 1" = 300'

300' 0 150' 300'

FENSTERMAKER

C. H. Fenstermaker & Associates, L.L.C.
135 Regency Sq. Lafayette, LA 70508
Ph. 337-237-2200 Fax. 337-232-3299
www.fenstermaker.com

SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED PADS, FRAC POND & ACCESS ROADS
HH SO 8 P2 NO. 22H WELL
SECTIONS 9, 16 & 17, T26S-R27E
EDDY COUNTY, NEW MEXICO

PAGE 1 OF 3

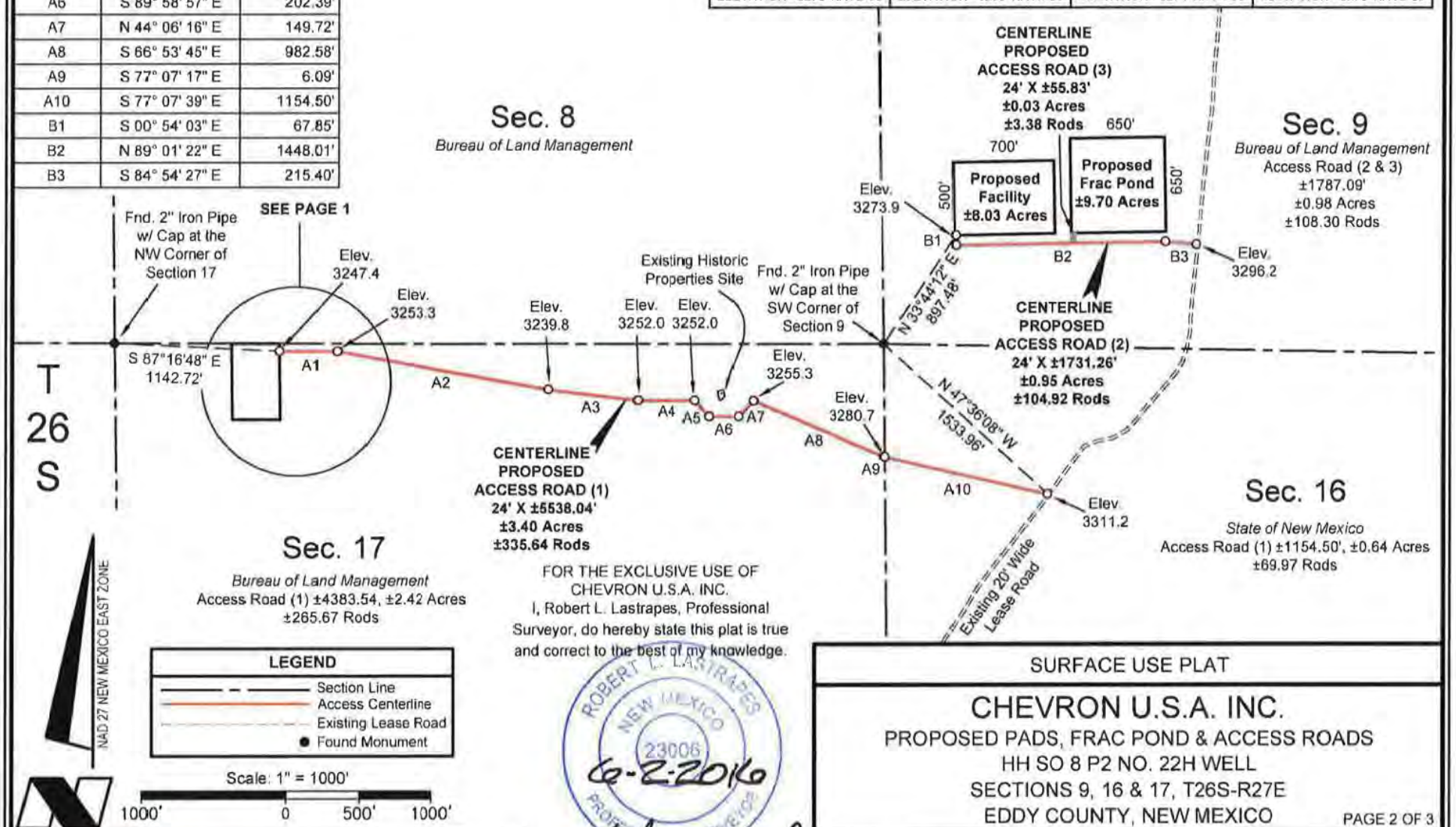
DRAWN BY: LJG	REVISIONS		
PROJ. MGR.: GDG	No. 2	DATE: 01/19/2016	REVISED BY: GDG
DATE: 12/22/2015	No. 3	DATE: 05/27/2016	REVISED BY: BOR

FILENAME: T:\2015\2153437\DWG\HH SO 8 P2 22H_SUP.dwg

CENTERLINE PROPOSED ACCESS ROADS		
COURSE	BEARING	DISTANCE
A1	S 89° 49' 39" E	398.61'
A2	S 79° 37' 12" E	1478.11'
A3	S 82° 59' 20" E	620.58'
A4	S 89° 50' 47" E	394.88'
A5	S 42° 37' 55" E	150.58'
A6	S 89° 58' 57" E	202.39'
A7	N 44° 06' 16" E	149.72'
A8	S 66° 53' 45" E	982.58'
A9	S 77° 07' 17" E	6.09'
A10	S 77° 07' 39" E	1154.50'
B1	S 00° 54' 03" E	67.85'
B2	N 89° 01' 22" E	1448.01'
B3	S 84° 54' 27" E	215.40'

R 27 E

NW FRAC POND CORNER	NE FRAC POND CORNER	NW FACILITY CORNER	NE FACILITY CORNER
X= 541,594 NAD 27 Y= 383,209	X= 542,244 NAD 27 Y= 383,220	X= 540,782 NAD 27 Y= 383,045	X= 541,482 NAD 27 Y= 383,057
ELEVATION +3264' NAVD 88	ELEVATION +3270' NAVD 88	ELEVATION +3263' NAVD 88	ELEVATION +3265' NAVD 88
SW FRAC POND CORNER	SE FRAC POND CORNER	SW FACILITY CORNER	SE FACILITY CORNER
X= 541,605 NAD 27 Y= 382,559	X= 542,255 NAD 27 Y= 382,570	X= 540,790 NAD 27 Y= 382,545	X= 541,490 NAD 27 Y= 382,557
ELEVATION +3278' NAVD 88	ELEVATION +3289' NAVD 88	ELEVATION +3274' NAVD 88	ELEVATION +3276' NAVD 88



FOR THE EXCLUSIVE USE OF CHEVRON U.S.A. INC.
I, Robert L. Lastrapes, Professional Surveyor, do hereby state this plat is true and correct to the best of my knowledge.

ROBERT L. LASTRAPES NEW MEXICO 23006 PROFESSIONAL SURVEYOR
6-2-2016

Robert L. Lastrapes
Registration No. 23006

FENSTERMAKER

C. H. Fenstermaker & Associates, L.L.C.
135 Regency Sq. Lafayette, LA 70508
Ph. 337-237-2200 Fax 337-232-3299
www.fenstermaker.com

SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED PADS, FRAC POND & ACCESS ROADS
HH SO 8 P2 NO. 22H WELL
SECTIONS 9, 16 & 17, T26S-R27E
EDDY COUNTY, NEW MEXICO

DRAWN BY: LJG	REVISIONS		
PROJ. MGR.: GDG	No. 2	DATE: 01/19/2016	REVISED BY: GDG
DATE: 12/22/2015	No. 3	DATE: 05/27/2016	REVISED BY: BOR

FILENAME: T:\2015\2153437\DWG\HH SO 8 P2 22H_SUP.dwg

DISCLAIMER: At this time, C. H. Fenstermaker & Associates, L.L.C. has not performed nor was asked to perform any type of engineering, hydrological modeling, flood plain, or "No Rise" certification analyses, including but not limited to determining whether the project will impact flood hazards in connection with federal/FEMA, state, and/or local laws, ordinances and regulations. Accordingly, Fenstermaker makes no warranty or representation of any kind as to the foregoing issues, and persons or entities using this information shall do so at their own risk.

NOTE:
Please be advised, that while reasonable efforts are made to locate and verify pipelines and anomalies using our standard pipeline locating equipment, it is impossible to be 100 % effective. As such, we advise using caution when performing work as there is a possibility that pipelines and other hazards, such as fiber optic cables, PVC pipelines, etc. may exist undetected on site.

NOTE:
Many states maintain information centers that establish links between those who dig (excavators) and those who own and operate underground facilities (operators). It is advisable and in most states, law, for the contractor to contact the center for assistance in locating and marking underground utilities. For guidance, New Mexico One Call www.nmonecall.org

FOR THE EXCLUSIVE USE OF
CHEVRON U.S.A. INC.
I, Robert L. Lastrapes, Professional Surveyor, do hereby state this plat is true and correct to the best of my knowledge.

ROBERT L. LASTRAPES
NEW MEXICO
23006
6-2-2016

Robert L. Lastrapes
Registration No. 23006

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C. H. Fenstermaker & Associates, L.L.C.
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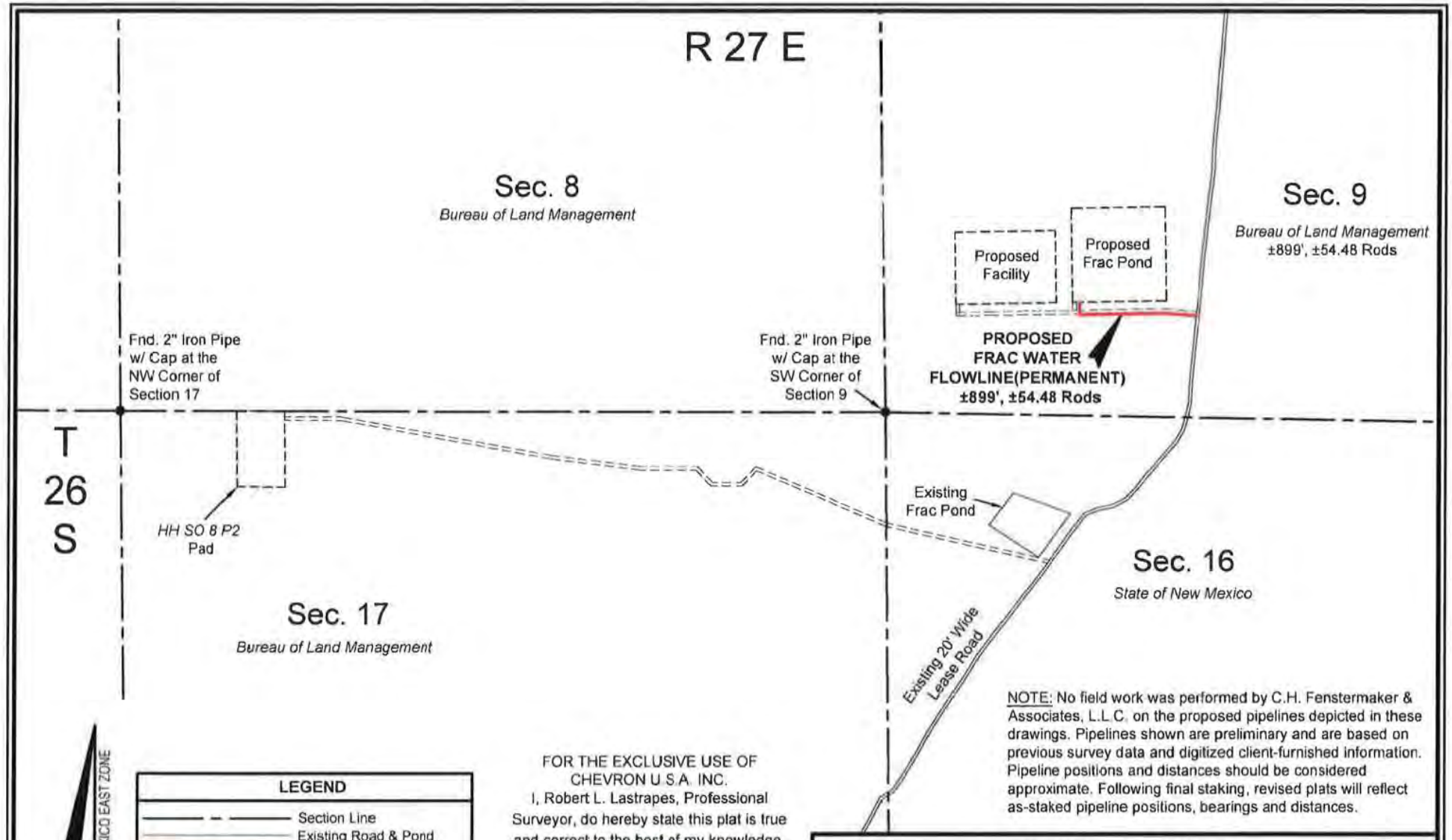
SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED PADS, FRAC POND & ACCESS ROADS
HH SO 8 P2 NO. 22H WELL
SECTIONS 9, 16 & 17, T26S-R27E
EDDY COUNTY, NEW MEXICO

DRAWN BY: LJG	REVISIONS		
PROJ. MGR.: GDG	No. 2	DATE: 01/19/2016	REVISED BY: GDG
DATE: 12/22/2015	No. 3	DATE: 05/27/2016	REVISED BY: BOR
FILENAME: T:\2015\2153437\DWG\HH SO 8 P2 22H_SUP.dwg			



NOTE: No field work was performed by C.H. Fenstermaker & Associates, L.L.C. on the proposed pipelines depicted in these drawings. Pipelines shown are preliminary and are based on previous survey data and digitized client-furnished information. Pipeline positions and distances should be considered approximate. Following final staking, revised plats will reflect as-staked pipeline positions, bearings and distances.

NAD 27 NEW MEXICO EAST ZONE

LEGEND

- Section Line
- Existing Road & Pond
- Proposed Frac Water Flowline(Permanent)
- Proposed Access Road, Frac Pump, Tank Battery, Compressor Station & Pad
- Found Occupation

Scale: 1" = 1000'

1000' 0 500' 1000'

FOR THE EXCLUSIVE USE OF CHEVRON U.S.A. INC.

I, Robert L. Lastrapes, Professional Surveyor, do hereby state this plat is true and correct to the best of my knowledge.

ROBERT L. LASTRAPES NEW MEXICO 23006 PROFESSIONAL SURVEYOR

6-7-2016

Robert L. Lastrapes
Registration No. 23006

FENSTERMAKER
C. H. Fenstermaker & Associates, L.L.C.
135 Regency Sq. Lafayette, LA 70508
Ph. 337-237-2200 Fax. 337-232-3299
www.fenstermaker.com

SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED FRAC WATER FLOWLINE(PERMANENT)
HH SO 8 P2 NO. 13H WELL
SECTION 9, T26S-R27E
EDDY COUNTY, NEW MEXICO

DRAWN BY: BOR	REVISIONS			
PROJ. MGR.: GDG	No. 1	DATE: 06/07/2016	REVISED BY: GDG	
DATE: 02/11/2016	No.	DATE:	REVISED BY:	
FILENAME: T:\2015\2153440\DWG\Frac Water FL_Perm_SUP.dwg				

DISCLAIMER: At this time, C.H. Fenstermaker & Associates, L.L.C. has not performed nor was asked to perform any type of engineering, hydrological modeling, flood plain, or "No Rise" certification analyses, including but not limited to determining whether the project will impact flood hazards in connection with federal/FEMA, state, and/or local laws, ordinances and regulations. Accordingly, Fenstermaker makes no warranty or representation of any kind as to the foregoing issues, and persons or entities using this information shall do so at their own risk.

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3. No field work was performed by C.H. Fenstermaker & Associates, L.L.C. on the proposed pipelines depicted in these drawings. Pipelines shown are preliminary and are based on previous survey data and digitized client-furnished information. Pipeline positions and distances should be considered approximate. Following final staking, revised plats will reflect as-staked pipeline positions, bearings and distances.

FOR THE EXCLUSIVE USE OF
CHEVRON U.S.A. INC.
I, Robert L. Lastrapes, Registered Professional Surveyor, do hereby state this plat is true and correct to the best of my knowledge.

ROBERT L. LASTRAPES
NEW MEXICO
23006
6-7-2016

Robert L. Lastrapes
Registration No. 23006

FENSTERMAKER
C. H. Fenstermaker & Associates, L.L.C.
135 Regency Sq. Lafayette, LA 70508
Ph. 337-237-2200 Fax. 337-232-3299
www.fenstermaker.com

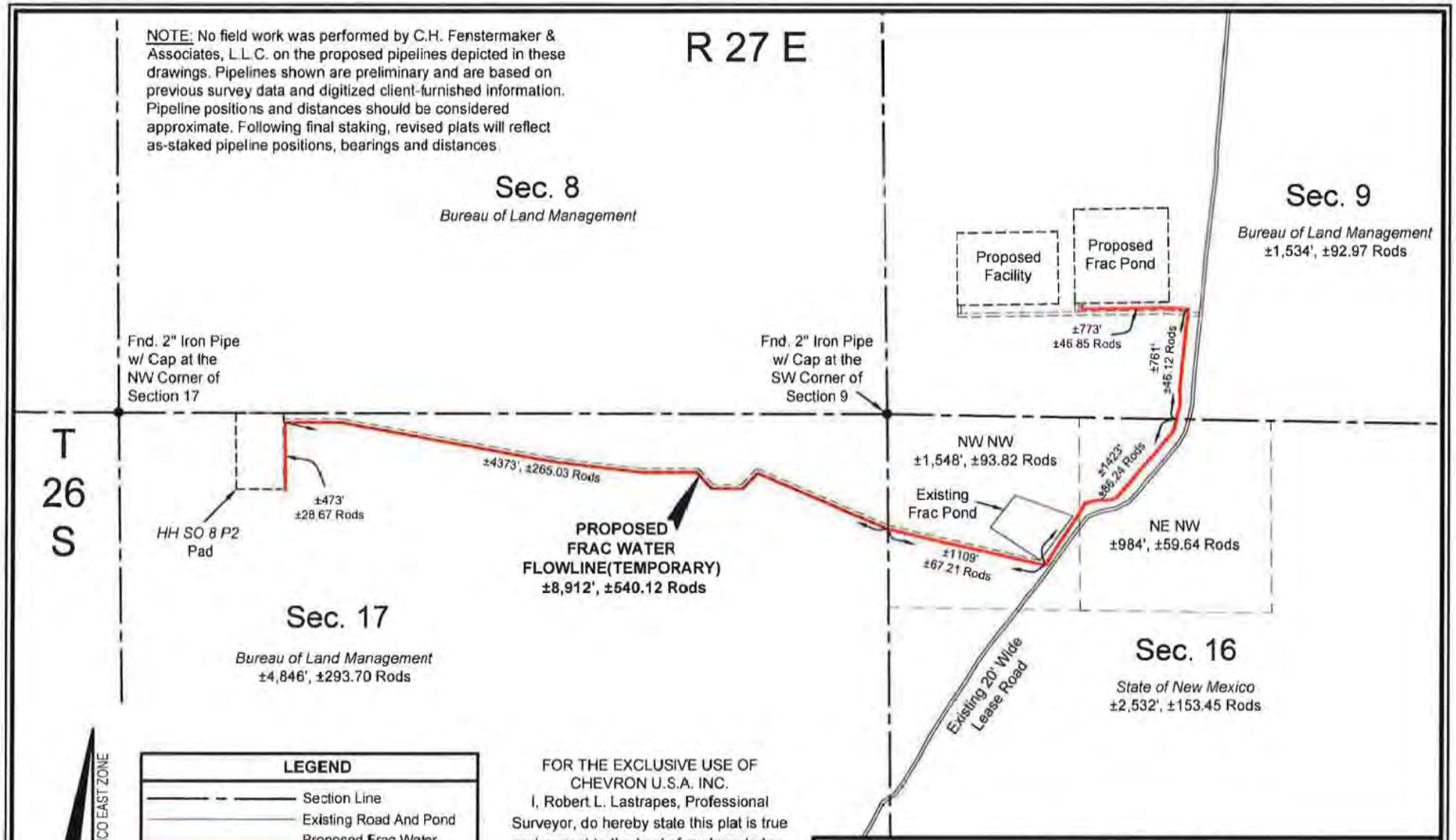
SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED FRAC WATER FLOWLINE(PERMANENT)
HH SO 8 P2 NO. 13H WELL
SECTION 9, T26S-R27E
EDDY COUNTY, NEW MEXICO

DRAWN BY: BOR	REVISIONS		
PROJ. MGR.: GDG	No. 1	DATE: 06/07/2016	REVISED BY: GDG
DATE: 02/11/2016	No.	DATE:	REVISED BY:
FILENAME: T:\2015\2153440\DWG\Frac Water FL_Perm_SUP.dwg			

NOTE: No field work was performed by C.H. Fenstermaker & Associates, L.L.C. on the proposed pipelines depicted in these drawings. Pipelines shown are preliminary and are based on previous survey data and digitized client-furnished information. Pipeline positions and distances should be considered approximate. Following final staking, revised plats will reflect as-staked pipeline positions, bearings and distances.



NAD 27 NEW MEXICO EAST ZONE

LEGEND

- Section Line
- Existing Road And Pond
- Proposed Frac Water Flowline(Temporary)
- Proposed Access Road, Frac Pump, Tank Battery, Compressor Station & Pad
- Found Occupation

Scale: 1" = 1000'

1000' 0 500' 1000'

FOR THE EXCLUSIVE USE OF CHEVRON U.S.A. INC.
I, Robert L. Lastrapes, Professional Surveyor, do hereby state this plat is true and correct to the best of my knowledge.

ROBERT L. LASTRAPES NEW MEXICO 23006 PROFESSIONAL SURVEYOR

6-7-2016

Robert L. Lastrapes, Registration No. 23006

SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED FRAC WATER FLOWLINE(TEMPORARY)
HH SO 8 P2 NO. 13H WELL
SECTIONS 9, 16 & 17, T26S-R27E
EDDY COUNTY, NEW MEXICO

FENSTERMAKER
C. H. Fenstermaker & Associates, L.L.C.
135 Regency Sq. Lafayette, LA 70508
Ph. 337-237-2200 Fax 337-232-3299
www.fenstermaker.com

DRAWN BY: BOR	REVISIONS		
PROJ. MGR.: GDG	No. 1	DATE: 06/07/2016	REVISED BY: GDG
DATE: 02/11/2016	No.	DATE:	REVISED BY:

FILENAME: T:\2015\2153440\DWG\Frac Water FL_Temp_SUP.dwg

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FOR THE EXCLUSIVE USE OF
CHEVRON U.S.A. INC.
I, Robert L. Lastrapes, Registered Professional Surveyor, do hereby state this plat is true and correct to the best of my knowledge.

ROBERT L. LASTRAPES
NEW MEXICO
23006
6-7-2016
PROFESSIONAL SURVEYOR

Robert L. Lastrapes
Registration No. 23006

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SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED FRAC WATER FLOWLINE(TEMPORARY)
HH SO 8 P2 NO. 13H WELL
SECTIONS 9, 16 & 17, T26S-R27E
EDDY COUNTY, NEW MEXICO

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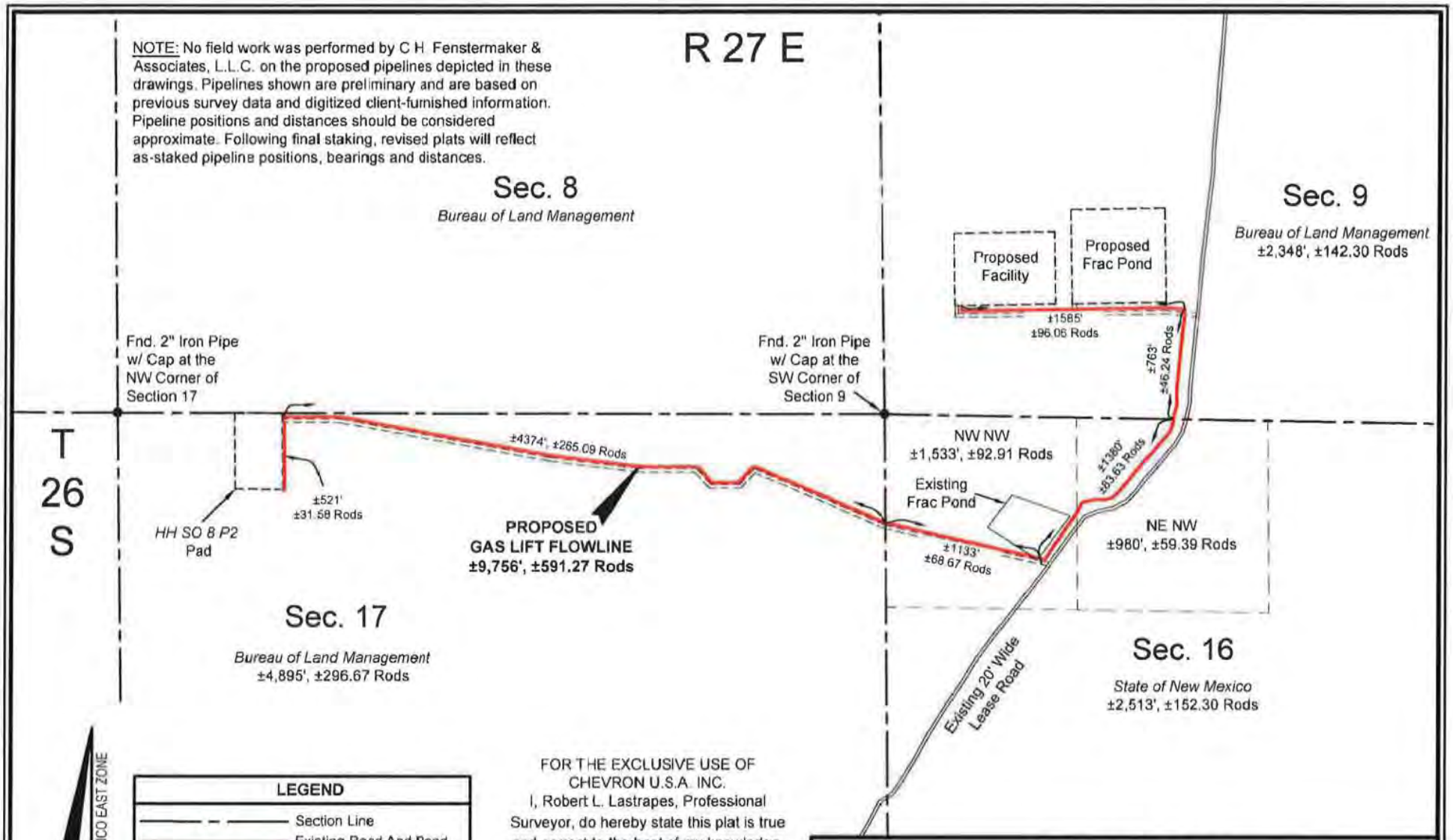

NAD 27 NEW MEXICO EAST ZONE

LEGEND

- Section Line
- Existing Road And Pond
- Proposed Gas Lift Flowline
- Proposed Access Road, Frac Pump, Tank Battery, Compressor Station & Pad
- Found Occupation

Scale: 1" = 1000'

1000' 0 500' 1000'

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SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED GAS LIFT FLOWLINE
HH SO 8 P2 NO. 13H WELL
SECTIONS 9, 16 & 17, T26S-R27E
EDDY COUNTY, NEW MEXICO

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SECTIONS 9, 16 & 17, T26S-R27E
EDDY COUNTY, NEW MEXICO

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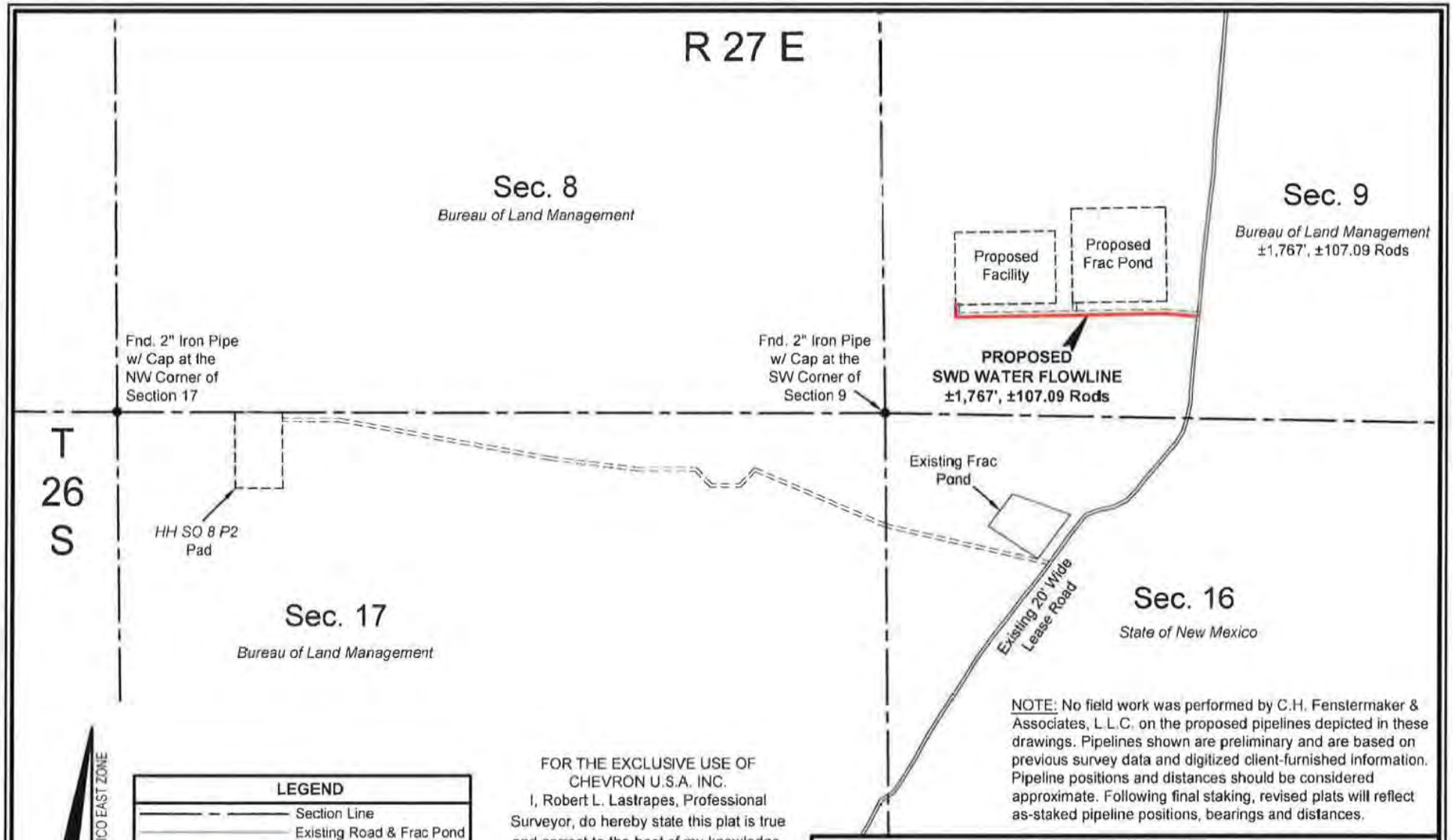

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NAD 27 NEW MEXICO EAST ZONE

LEGEND

- Section Line
- Existing Road & Frac Pond
- Proposed SWD Water Flowline
- Proposed Access Road, Frac Pump, Tank Battery, Compressor Station & Pad
- Found Occupation

Scale: 1" = 1000'

1000' 0 500' 1000'

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SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED SWD WATER FLOWLINE
HH SO 8 P2 NO. 13H WELL
SECTION 9, T26S-R27E
EDDY COUNTY, NEW MEXICO

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SECTION 9, T26S-R27E
EDDY COUNTY, NEW MEXICO

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R 27 E

T 26 S

Sec. 8
Bureau of Land Management

Sec. 9
Bureau of Land Management

Proposed Facility

Proposed Frac Pond

Fnd. 2" Iron Pipe w/ Cap at the NW Corner of Section 17

Fnd. 2" Iron Pipe w/ Cap at the SW Corner of Section 9

±4385', ±265.75 Rods

Existing Frac Pond

NW NW

HH SO 8 P2 Pad

PROPOSED UTILITY LINE(1) ±5,550', ±336.36 Rods

±1165' ±70.61 Rods

Sec. 17
Bureau of Land Management
±4,385', ±265.75 Rods

Existing 20' Wide Lease Road

Sec. 16
State of New Mexico
±1,165', ±70.61 Rods

NAD 27 NEW MEXICO EAST ZONE

LEGEND

- Section Line
- Section Break
- Existing Road & Pond
- Proposed Utility Line(1)
- Proposed Access Road, Frac Pump, Tank Battery, Compressor Station & Pad
- Found Occupation

Scale: 1" = 1000'

1000' 0 500' 1000'

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SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED UTILITY LINE(1)
HH SO 8 P2 NO. 13H WELL
SECTIONS 16 & 17, T26S-R27E
EDDY COUNTY, NEW MEXICO

PAGE 1 OF 2

FENSTERMAKER
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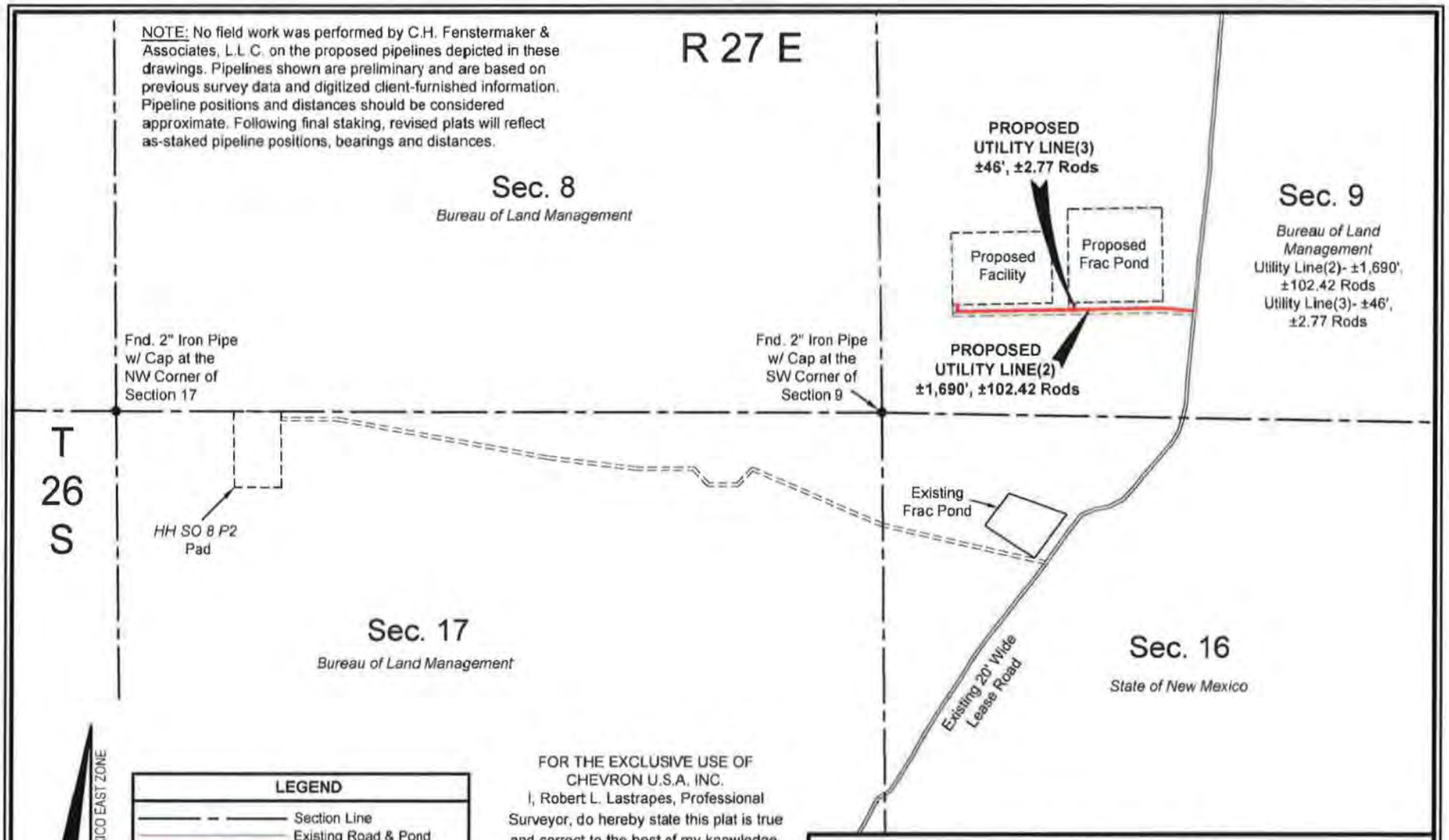

NAD 27 NEW MEXICO EAST ZONE

LEGEND

- Section Line
- Existing Road & Pond
- Proposed Utility Line(2 & 3)
- Proposed Access Road, Frac Pump, Tank Battery, Compressor Station & Pad
- Found Occupation

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PROPOSED UTILITY LINE(2 & 3)
HH SO 8 P2 NO. 13H WELL
SECTION 9, T26S-R27E
EDDY COUNTY, NEW MEXICO

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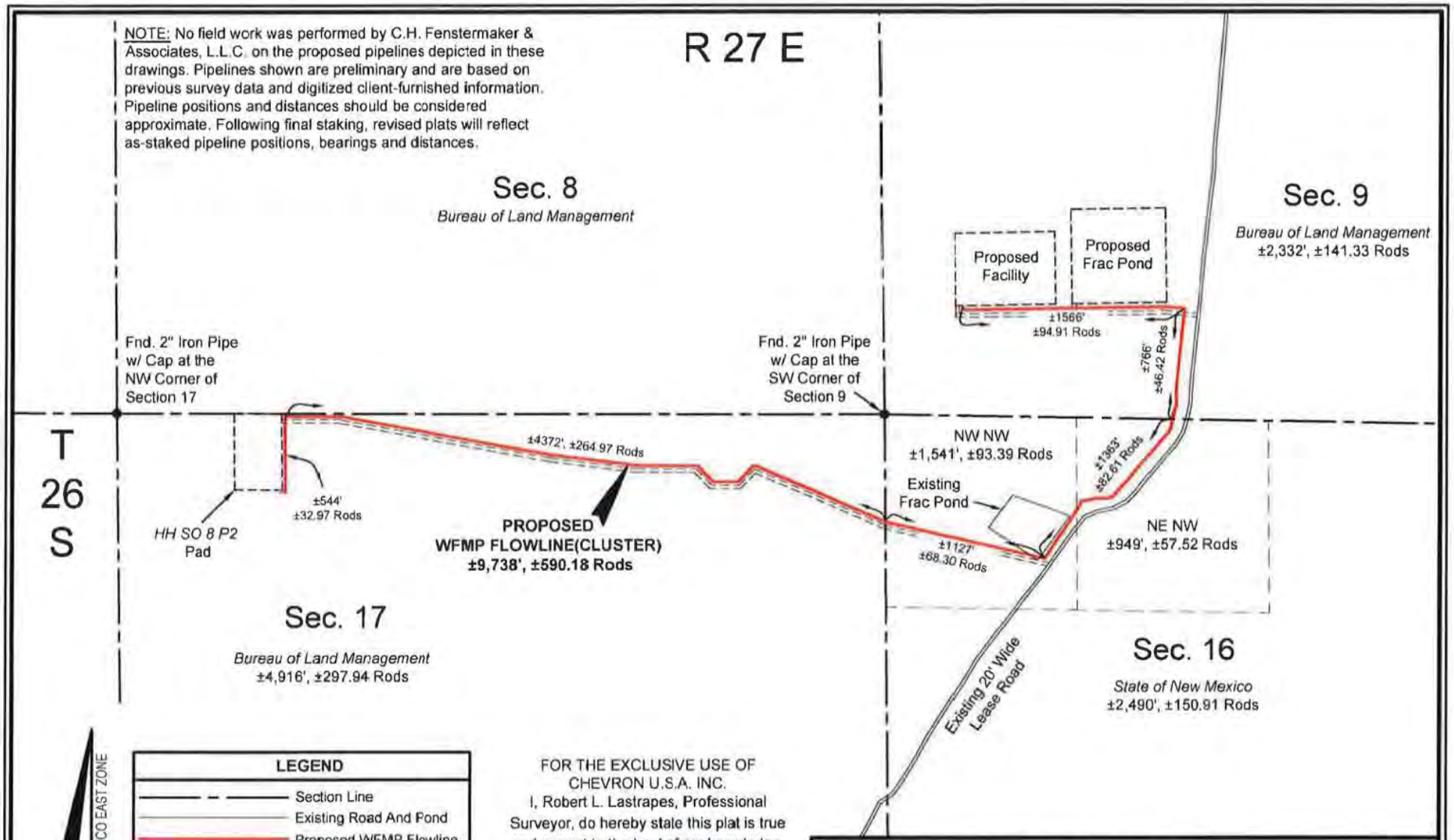

NAD 27 NEW MEXICO EAST ZONE

LEGEND

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PROPOSED WFMP FLOWLINE(CLUSTER)
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EDDY COUNTY, NEW MEXICO

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APD Group 2 (Pad 3)

APD – HH SO 10 P3 7H Application
APD – HH SO 10 P3 8H Application
APD – HH SO 10 P3 15H Application
APD – HH SO 10 P3 16H Application
APD – HH SO 10 P3 23H Application
APD – HH SO 10 P3 24H Application

Form 3160-3
(June 2015)

FORM APPROVED
OMB No. 1004-0137
Expires: January 31, 2018

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

5. Lease Serial No.
NMNM121473

6. If Indian, Allotee or Tribe Name

1a. Type of work: ☑ DRILL ☐ REENTER

1b. Type of Well: ☑ Oil Well ☐ Gas Well ☐ Other

1c. Type of Completion: ☐ Hydraulic Fracturing ☑ Single Zone ☐ Multiple Zone

7. If Unit or CA Agreement, Name and No.

8. Lease Name and Well No.
HH SO 10 P3

2. Name of Operator
CHEVRON USA INC

9. API Well No.
7H

3a. Address
1616 W. BENDER BLVD HOBBS, NM 88240

3b. Phone No. *(include area code)*
575-263-0431

10. Field and Pool, or Exploratory
WILDCAT; WOLFCAMP

4. Location of Well *(Report location clearly and in accordance with any State requirements.*)*
At surface 578' FSL & 2060' FWL
At proposed prod. zone 180' FSL & 1652' FWL

11. Sec., T. R. M. or Blk. and Survey or Area
SEC 3, T26S, R27E, UL N (SHL)

14. Distance in miles and direction from nearest town or post office*
12.8 MILES FROM MALAGA, NEW MEXICO

12. County or Parish
EDDY

13. State
NM

15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drlg. unit line, if any) 578' FSL

16. No of acres in lease
1920 ACRES

17. Spacing Unit dedicated to this well
320 ACRES

18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft. 4300 FT SKEEN 2 SW

19. Proposed Depth
TD 9852' MD 20605"

20. BLM/BIA Bond No. in file
CA 0329

21. Elevations (Show whether DF, KDB, RT, GL, etc.)
3279' GL

22. Approximate date work will start*
OCTOBER 2016

23. Estimated duration
30 DAYS

24. Attachments

The following, completed in accordance with the requirements of Onshore Oil and Gas Order No. 1, and the Hydraulic Fracturing rule per 43 CFR 3162.3-3 (as applicable)

1. Well plat certified by a registered surveyor.
2. A Drilling Plan.
3. A Surface Use Plan (if the location is on National Forest System Lands, the SUPO must be filed with the appropriate Forest Service Office).
4. Bond to cover the operations unless covered by an existing bond on file (see Item 20 above).
5. Operator certification.
6. Such other site specific information and/or plans as may be requested by the BLM.

25. Signature Cindy Herrera-Murillo
Name *(Printed/Typed)* CINDY HERRERA-MURILLO
Date 01/18/2016

Title
REGULATORY SPECIALIST

Approved by *(Signature)*
Name *(Printed/Typed)*
Date

Title
REGULATORY SPECIALIST
Office

Application approval does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.
Conditions of approval, if any, are attached.

Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212, make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

(Continued on page 2)

*(Instructions on page 2)

CERTIFICATION

I hereby certify that I, or someone under my direct supervision, have inspected the drill site and access route proposed herein; that I am familiar with the conditions which currently exist; that I have full knowledge of state and federal laws applicable to this operation; that the statements made in this APD package are, to the best of my knowledge, true and correct; and, that the work associated with the operations proposed will be performed in conformity with this APD package and the terms and conditions under which it is approved. I also certify that I, or the company I represent, am responsible for the operations conducted under this application. These statements are subject to the provisions of 18 U.S.C. 1001 for the filing of a false statement.

Executed this 19th day of JANUARY, 2016

Name: _____

Sean Cheben-Project Manager

Address: 1400 Smith Street

Houston, TX 77002

Room 40125

Office: 713-372-9382

Email: Sean.Cheben@CHEVRON.COM

Cindy Herrera-Murillo
Permitting Specialist
Midcontinent BU

Chevron North America
Exploration and Production Company
(A Chevron U.S.A. Inc. Division)
1616 W. Bender Blvd
Hobbs FMT, Hobbs, NM 88240
Tel 575-263-0431
Cherreramurillo@chevron.com

February 10, 2016

BLM-Carlsbad Field Office
620 E. Greene Street
Carlsbad, New Mexico 88220

Re: Applications to Drill
For Hayhurst Development Area in NM
MDP- 2016-1

Dear Sirs,

Chevron U.S.A. Inc. respectfully submits 12 Applications to Drill (APD's) with the Hayhurst Development Area's Master Development Plan (MDP-2016-1).

There will be 2 pads and 6 wells on each pad. The first well pad includes the following APD's:

HH SO 10 P3 #7H; HH SO 10 P3 #8H; HH SO 10 P3 #15H; HH SO 10 P3 #16H; HH SO 10 P3 #23H; HH SO 10 P3 #24H.

The second well pad includes the following APD's:

HH SO 8 P2 #5H; HH SO 8 P2 #6H; HH SO 8 P2 #13H; HH SO 8 P2 # 14H; HH SO 8 P2 #21H; HH SO 8 P2 #22H.

Your prompt consideration and approval of these applications will be greatly appreciated. If additional information is required, you may contact me at 575-263-0431, or by email at Cherreramurillo@chevron.com.

Sincerely,

Cindy Herrera-Murillo

Cindy Herrera-Murillo
Permitting Specialist
Enclosures

District I
1625 N. French Dr., Hobbs, NM 88240
Phone: (575) 393-6161 Fax: (575) 393-0720
District II
811 S. First St., Artesia, NM 88210
Phone: (575) 748-1283 Fax: (575) 748-9720
District III
1000 Rio Brazos Road, Aztec, NM 87410
Phone: (505) 334-6178 Fax: (505) 334-6170
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505
Phone: (505) 476-3460 Fax: (505) 476-3462

State of New Mexico
Energy, Minerals & Natural Resources Department
OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-102
Revised August 1, 2011
Submit one copy to appropriate District Office

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

[1] API Number	[2] Pool Code	[3] Pool Name
		Wildcat; Wolfcamp

[4] Property Code	[5] Property Name	[6] Well Number
	HH SO 10 P3	7H

[7] OGRID No.	[8] Operator Name	[9] Elevation
4323	CHEVRON U.S.A. INC.	3279'

[10] Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
N	3	26 SOUTH	27 EAST, N.M.P.M.		578'	SOUTH	2066'	WEST	EDDY

[11] Bottom Hole Location If Different From Surface

UL or lot no	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
N	15	26 SOUTH	27 EAST, N.M.P.M.		180'	SOUTH	1652'	WEST	EDDY

[12] Dedicated Acres	[13] Joint or Infill	[14] Consolidation Code	[15] Order No.
320			

No allowable will be assigned to this completion until all interests have been consolidated or a non-standard unit has been approved by the division.

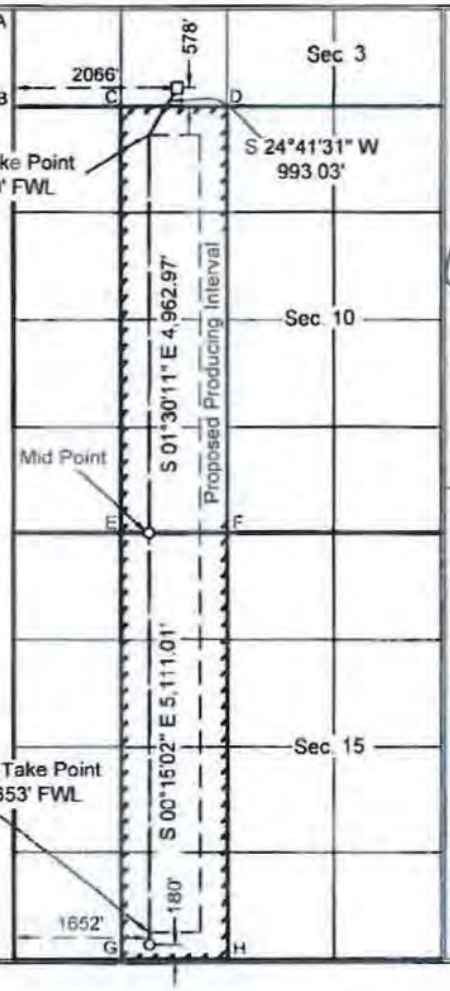
HH SO 10 P3 7H WELL		
X=	547,567	NAD 27
Y=	387,559	
LAT.	32.065422	
LONG.	104.179779	
X=	588,751	NAD83
Y=	387,616	
LAT.	32.065544	
LONG.	104.180272	
ELEVATION +3279' NAVD 88		

CORNER COORDINATES TABLE (NAD 27)

A - Y=392447.75, X=545573.63
B - Y=387009.20, X=545492.91
C - Y=386991.36, X=546813.37
D - Y=386973.51, X=548133.83
E - Y=381698.68, X=546952.45
F - Y=381685.77, X=548282.84
G - Y=376406.42, X=546975.58
H - Y=376398.76, X=548297.64

Mid Point
Y=381695.48, X=547282.47

PROPOSED BOTTOM HOLE LOCATION		
X=	547,305	NAD 27
Y=	376,585	
LAT.	32.035254	
LONG.	104.180676	
X=	588,489	NAD83
Y=	376,641	
LAT.	32.035376	
LONG.	104.181168	



[17] OPERATOR CERTIFICATION

I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.

Cindy Herrera-Murillo 01/18/16
Signature Date

Cindy Herrera-Murillo
Printed Name

Cherreramurillo@chevron.com
E-mail Address

[18] SURVEYOR CERTIFICATION

I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.

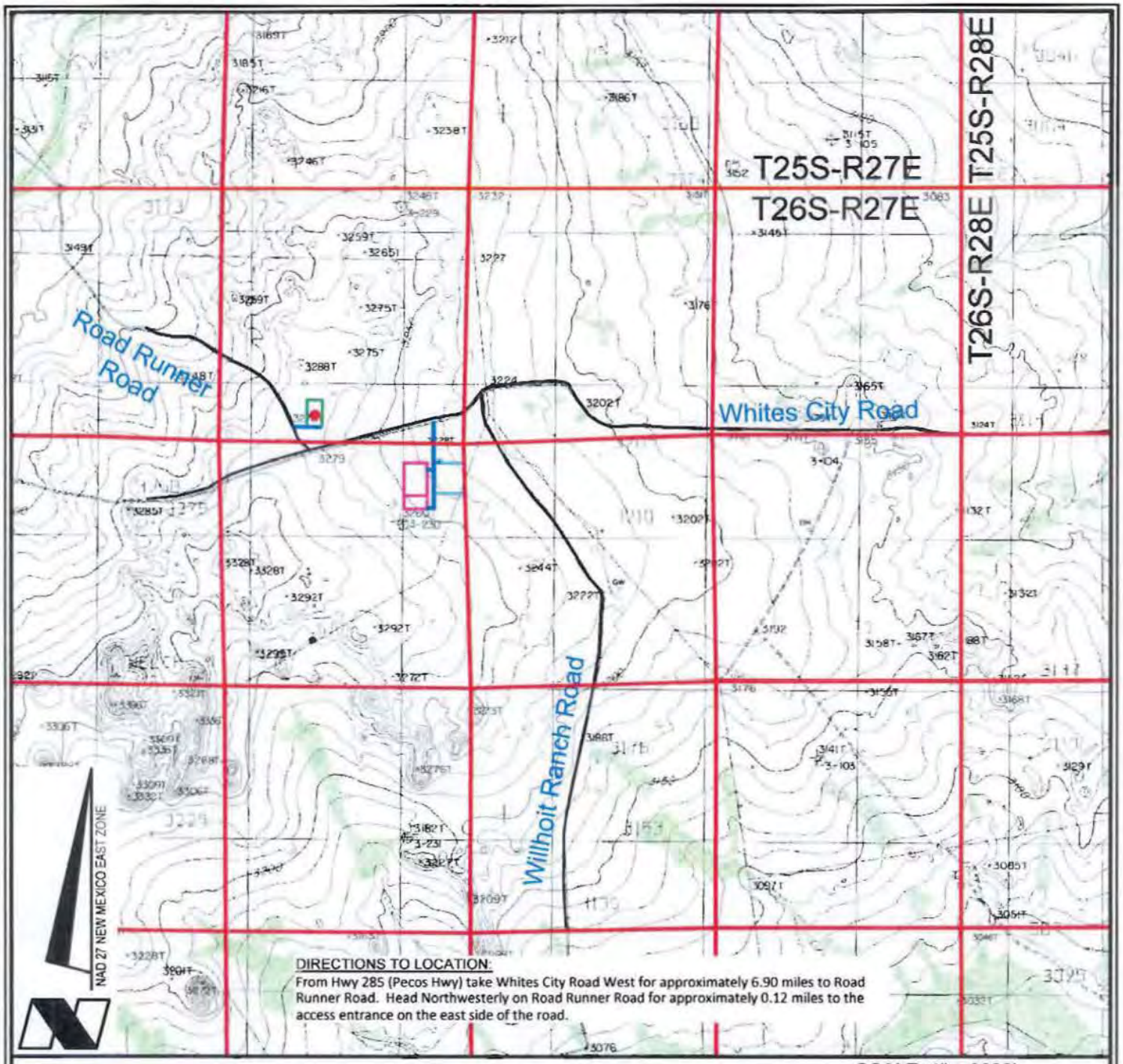
12-8-2015
Date of Survey

Signature and Seal of Professional Surveyor

ROBERT A. ECHOLS JR. NEW MEXICO 23006 PROFESSIONAL SURVEYOR 12-22-2015

23006
Certificate Number

EXHIBIT 1



DIRECTIONS TO LOCATION:
From Hwy 285 (Pecos Hwy) take Whites City Road West for approximately 6.90 miles to Road Runner Road. Head Northwesterly on Road Runner Road for approximately 0.12 miles to the access entrance on the east side of the road.

VICINITY MAP

SCALE: 1" = 3000'

3000' 0 1500' 3000'

LEGEND

- Proposed Well
- Proposed Access Road
- Proposed Drillsite
- Existing Road
- Section Line
- Proposed Frac Pond
- Proposed Facility

CHEVRON U.S.A. INC.

HH SO 10 P3 NO. 7H WELL
LOCATED 578' FSL AND 2066' FWL
SECTION 3, T26S-R27E
EDDY COUNTY, NEW MEXICO

FENSTERMAKER
C.H. Fenstermaker & Associates, L.L.C.
135 Regency Sq. Lafayette, LA 70508
Ph. 337-237-2200 Fax. 337-232-3299
www.fenstermaker.com

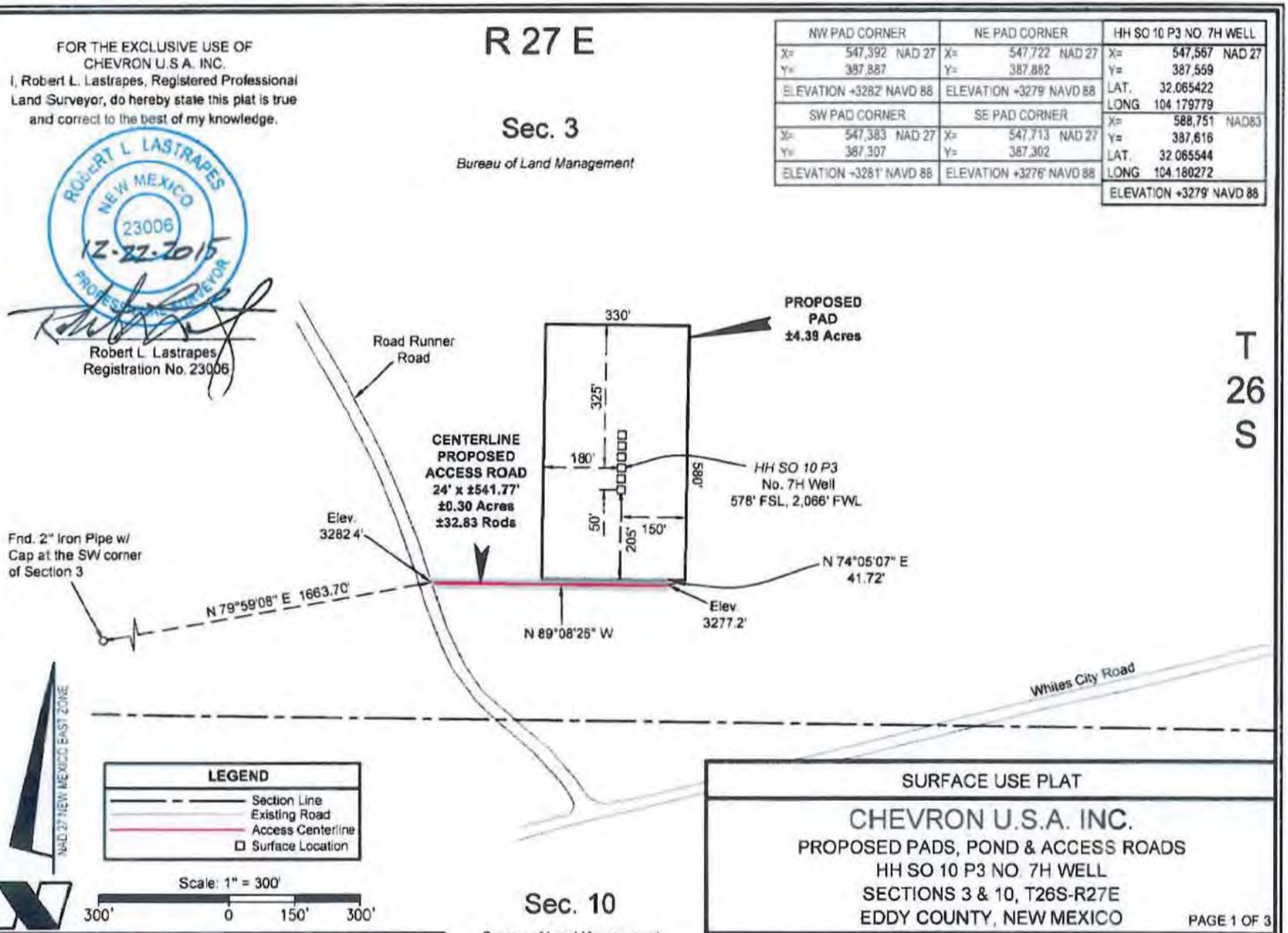
DRAWN BY: LJG	REVISIONS			
PROJ. MGR.: GDG	No.	DATE:	REVISED BY:	
DATE: 12/16/2015	No.	DATE:	REVISED BY:	
FILENAME: T:\2015\2153368\DWG\HH SO 10 P3 7H_APD.dwg				

FOR THE EXCLUSIVE USE OF
CHEVRON U.S.A. INC.
I, Robert L. Lastrapes, Registered Professional Land Surveyor, do hereby state this plat is true and correct to the best of my knowledge.

ROBERT L. LASTRAPES
NEW MEXICO
23006
12-22-2015
PROFESSIONAL SURVEYOR

Robert L. Lastrapes
Registration No. 23006

NW PAD CORNER	NE PAD CORNER	HH SO 10 P3 NO. 7H WELL
X= 547,392 NAD 27	X= 547,722 NAD 27	X= 547,567 NAD 27
Y= 387,887	Y= 387,882	Y= 387,559
ELEVATION +3282' NAVD 88	ELEVATION +3279' NAVD 88	LAT. 32.065422
SW PAD CORNER	SE PAD CORNER	LONG. 104.179779
X= 547,383 NAD 27	X= 547,713 NAD 27	X= 588,751 NAD83
Y= 387,307	Y= 387,302	Y= 387,616
ELEVATION +3281' NAVD 88	ELEVATION +3276' NAVD 88	LAT. 32.065544
		LONG. 104.180272
		ELEVATION +3279' NAVD 88



FENSTERMAKER
C. H. Fenstermaker & Associates, L.L.C.
135 Regency Sq. Lafayette, LA 70508
Ph. 337-237-2200 Fax 337-232-3299
www.fenstermaker.com

SURFACE USE PLAT

CHEVRON U.S.A. INC.
PROPOSED PADS, POND & ACCESS ROADS
HH SO 10 P3 NO. 7H WELL
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

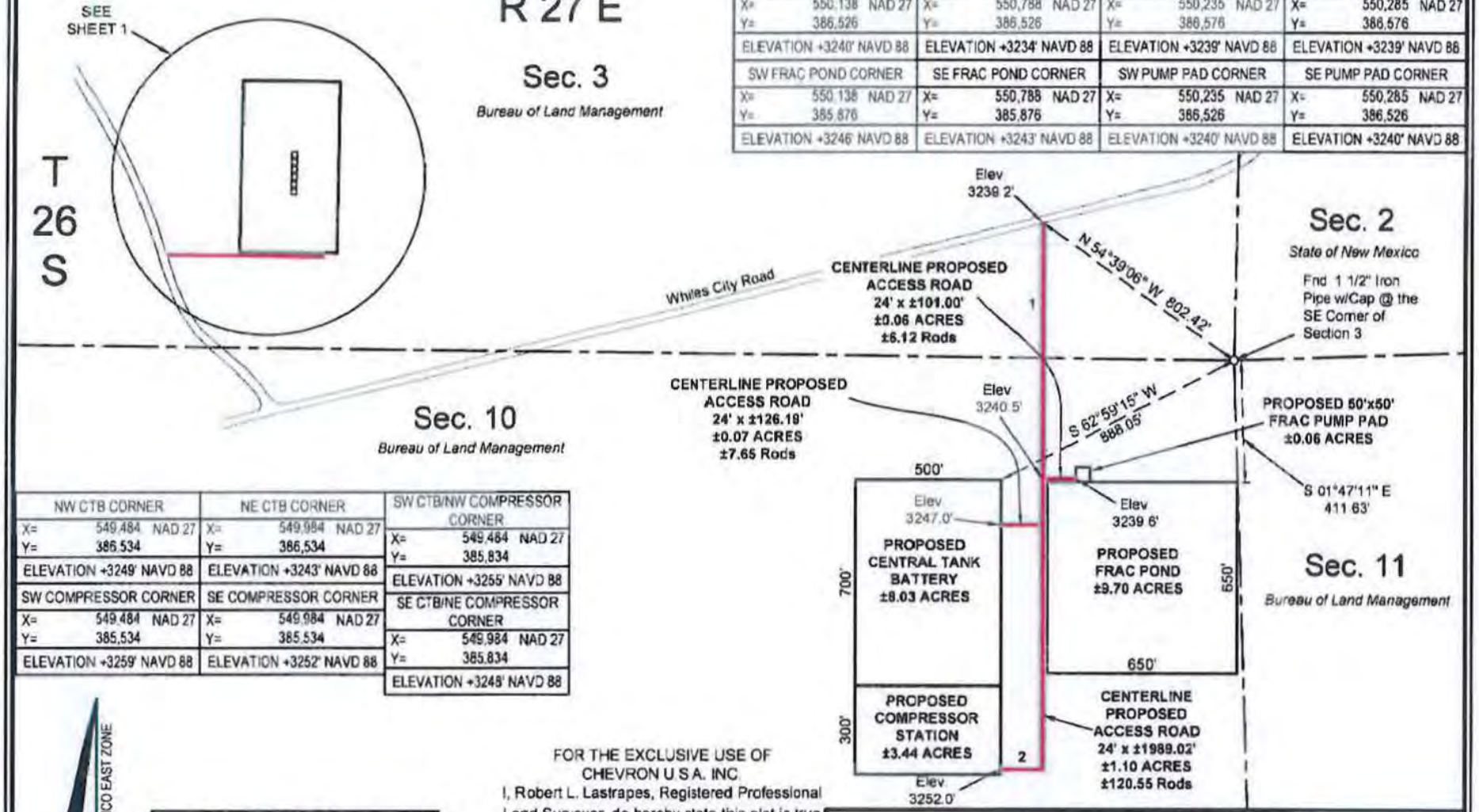
PAGE 1 OF 3

DRAWN BY: LJG	REVISIONS		
PROJ. MGR.: GDG	No.	DATE:	REVISED BY:
DATE: 12/16/2015	No.	DATE:	REVISED BY:

FILENAME: T:\2015\2153368\DWG\HH SO 10 P3 7H_SUP.dwg

EXHIBITS 2&5

NW FRAC POND CORNER	NE FRAC POND CORNER	NW PUMP PAD CORNER	NE PUMP PAD CORNER
X= 550,138 NAD 27 Y= 386,526	X= 550,788 NAD 27 Y= 386,526	X= 550,235 NAD 27 Y= 386,576	X= 550,285 NAD 27 Y= 386,576
ELEVATION +3240' NAVD 88	ELEVATION +3234' NAVD 88	ELEVATION +3239' NAVD 88	ELEVATION +3239' NAVD 88
SW FRAC POND CORNER	**SE FRAC POND CORNER**	**SW PUMP PAD CORNER**	**SE PUMP PAD CORNER**
X= 550,138 NAD 27 Y= 385,876	X= 550,788 NAD 27 Y= 385,876	X= 550,235 NAD 27 Y= 386,526	X= 550,285 NAD 27 Y= 386,526
ELEVATION +3246' NAVD 88	ELEVATION +3243' NAVD 88	ELEVATION +3240' NAVD 88	ELEVATION +3240' NAVD 88



NW CTB CORNER	NE CTB CORNER	SW CTB/NW COMPRESSOR CORNER
X= 549,484 NAD 27 Y= 386,534	X= 549,984 NAD 27 Y= 386,534	X= 549,484 NAD 27 Y= 385,834
ELEVATION +3249' NAVD 88	ELEVATION +3243' NAVD 88	ELEVATION +3255' NAVD 88
SW COMPRESSOR CORNER	**SE COMPRESSOR CORNER**	**SE CTB/NE COMPRESSOR CORNER**
X= 549,484 NAD 27 Y= 385,534	X= 549,984 NAD 27 Y= 385,534	X= 549,984 NAD 27 Y= 385,834
ELEVATION +3259' NAVD 88	ELEVATION +3252' NAVD 88	ELEVATION +3248' NAVD 88

NAD 27 NEW MEXICO EAST ZONE

LEGEND

- Section Line
- Existing Road
- Access Centerline
- Surface Location

Scale: 1" = 500'

500' 0 250' 500'

FOR THE EXCLUSIVE USE OF
CHEVRON U.S.A. INC.
I, Robert L. Lastrapes, Registered Professional Land Surveyor, do hereby state this plat is true and correct to the best of my knowledge

ROBERT L. LASTRAPES NEW MEXICO 23006 12-22-2015 PROFESSIONAL SURVEYOR

Robert L. Lastrapes
Registration No. 23006

FENSTERMAKER

C. H. Fenstermaker & Associates, L.L.C.
135 Regency Sq. Lafayette, LA 70508
Ph. 337-237-2200 Fax 337-232-3299
www.fenstermaker.com

SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED PADS, POND & ACCESS ROADS
HH SO 10 P3 NO. 7H WELL
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

PAGE 2 OF 3

DRAWN BY: LJG	REVISIONS		
PROJ. MGR.: GDG	No.	DATE:	REVISED BY:
DATE: 12/16/2015	No.	DATE:	REVISED BY:
FILENAME: T:\2015\2153368\DWG\HH SO 10 P3 7H_SUP.dwg			

DISCLAIMER: At this time, C.H. Fenstermaker & Associates, L.L.C. has not performed nor was asked to perform any type of engineering, hydrological modeling, flood plain, or "No Rise" certification analyses, including but not limited to determining whether the project will impact flood hazards in connection with federal/FEMA, state, and/or local laws, ordinances and regulations. Accordingly, Fenstermaker makes no warranty or representation of any kind as to the foregoing issues, and persons or entities using this information shall do so at their own risk.

NOTE:
Please be advised, that while reasonable efforts are made to locate and verify pipelines and anomalies using our standard pipeline locating equipment, it is impossible to be 100 % effective. As such, we advise using caution when performing work as there is a possibility that pipelines and other hazards, such as fiber optic cables, PVC pipelines, etc. may exist undetected on site.

NOTE:
Many states maintain information centers that establish links between those who dig (excavators) and those who own and operate underground facilities (operators). It is advisable and in most states, law, for the contractor to contact the center for assistance in locating and marking underground utilities. For guidance, New Mexico One Call www.nmonecall.org

CENTERLINE PROPOSED ACCESS ROAD		
COURSE	BEARING	DISTANCE
1	S 00° 05' 06" E	1849.60'
2	S 89° 54' 54" W	139.42'

FOR THE EXCLUSIVE USE OF
CHEVRON U.S.A. INC.
I, Robert L. Lastrapes, Registered Professional Land Surveyor, do hereby state this plat is true and correct to the best of my knowledge.

ROBERT L. LASTRAPES
NEW MEXICO
23006
12-22-2015
PROFESSIONAL SURVEYOR

Robert L. Lastrapes
Registration No. 23006

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SURFACE USE PLAT

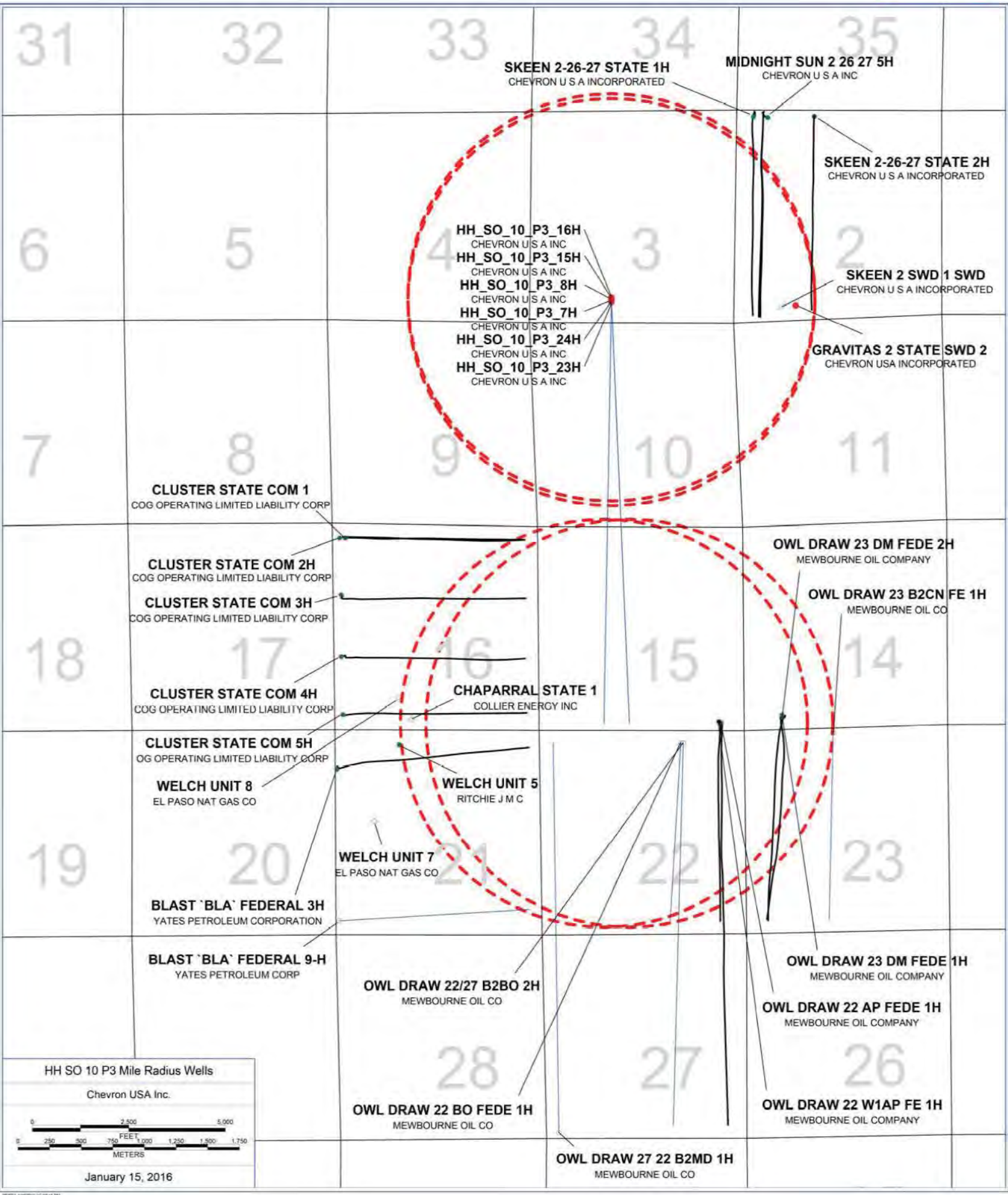
CHEVRON U.S.A. INC.

PROPOSED PADS, POND & ACCESS ROADS
HH SO 10 P3 NO. 7H WELL
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

DRAWN BY: LJG	REVISIONS		
PROJ. MGR.: GDG	No.	DATE:	REVISED BY:
DATE: 12/16/2015	No.	DATE:	REVISED BY:

FILENAME: T:\2015\2153368\DWG\HH SO 10 P3 7H_SUP.dwg

EXHIBIT 3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SKEEN 2-26-27 STATE 1H
CHEVRON U S A INCORPORATED
MIDNIGHT SUN 2 26 27 5H
CHEVRON U S A INC
SKEEN 2-26-27 STATE 2H
CHEVRON U S A INCORPORATED
HH_SO_10_P3_16H
CHEVRON U S A INC
HH_SO_10_P3_15H
CHEVRON U S A INC
HH_SO_10_P3_8H
CHEVRON U S A INC
HH_SO_10_P3_7H
CHEVRON U S A INC
HH_SO_10_P3_24H
CHEVRON U S A INC
HH_SO_10_P3_23H
CHEVRON U S A INC
SKEEN 2 SWD 1 SWD
CHEVRON U S A INCORPORATED
GRAVITAS 2 STATE SWD 2
CHEVRON USA INCORPORATED
CLUSTER STATE COM 1
COG OPERATING LIMITED LIABILITY CORP
CLUSTER STATE COM 2H
COG OPERATING LIMITED LIABILITY CORP
CLUSTER STATE COM 3H
COG OPERATING LIMITED LIABILITY CORP
CLUSTER STATE COM 4H
COG OPERATING LIMITED LIABILITY CORP
CLUSTER STATE COM 5H
OG OPERATING LIMITED LIABILITY CORP
WELCH UNIT 8
EL PASO NAT GAS CO
CHAPARRAL STATE 1
COLLIER ENERGY INC
WELCH UNIT 5
RITCHIE J M C
WELCH UNIT 7
EL PASO NAT GAS CO
BLAST `BLA` FEDERAL 3H
YATES PETROLEUM CORPORATION
BLAST `BLA` FEDERAL 9-H
YATES PETROLEUM CORP
OWL DRAW 23 DM FEDE 2H
MEWBOURNE OIL COMPANY
OWL DRAW 23 B2CN FE 1H
MEWBOURNE OIL CO
OWL DRAW 23 DM FEDE 1H
MEWBOURNE OIL COMPANY
OWL DRAW 22/27 B2BO 2H
MEWBOURNE OIL CO
OWL DRAW 22 AP FEDE 1H
MEWBOURNE OIL COMPANY
OWL DRAW 22 BO FEDE 1H
MEWBOURNE OIL CO
OWL DRAW 22 W1AP FE 1H
MEWBOURNE OIL COMPANY
OWL DRAW 27 22 B2MD 1H
MEWBOURNE OIL CO
HH SO 10 P3 Mile Radius Wells
Chevron USA Inc.
0
2,500
5,000
FEET
0
250
500
750
1,000
1,250
1,500
1,750
METERS
January 15, 2016

1. FORMATION TOPS

The estimated tops of important geologic markers are as follows:

FORMATION	SUB-SEA TVD	KBTVD	MD
Castille		505	
Lamar		2395	
Bell		2310	
Cherry		3208	
Brushy		4450	
Bone Spring/Avalon		6299	
First Bone Spring Sand		6888	
First Bone Spring Shale		6914	
Second Bone Spring Sand		7621	
Harkey Sand		8123	
Third Bone Spring Sand		8617	
Wolfcamp A		9342	
Wolfcamp C		9852	
Lateral TVD Wolfcamp C		9852	20605.69'

2. ESTIMATED DEPTH OF WATER, OIL, GAS & OTHER MINERAL BEARING FORMATIONS

The estimated depths at which the top and bottom of the anticipated water, oil, gas, or other mineral bearing formations are expected to be encountered are as follows:

Substance	Formation	Depth
Deepest Expected Base of Fresh Water		450
Water	Castille	505
Water	Cherry Canyon	3208
Oil/Gas	Brushy Canyon	4450
Oil/Gas	Bone Spring Limestone	6888
Oil/Gas	First Bone Spring Shale	6914
Oil/Gas	Second Bone Spring Sand	7621
Oil/Gas	Harkey Sand	8123
Oil/Gas	Wolfcamp A	9342
Oil/Gas	Wolfcamp C	9852

All shows of fresh water and minerals will be reported and protected.

3. BOP EQUIPMENT

PLEASE REFERENCE MDP

4. **CASING PROGRAM**

Purpose	From	To	Hole Size	Csg Size	Weight	Grade	Thread	Condition
Surface	0'	450'	17-1/2"	13-3/8"	54.5 #	K-55	STC	New
Intermediate	0'	9,015'	12-1/4"	9-5/8"	40.0 #	L-80	TXP	New
Production	0'	20,606'	8-1/2"	5-1/2"	20.0 #	P-110	TXP	New

SF Calculations based on the following "Worst Case" casing design:

Surface Casing: 450'
Intermediate Casing: 9015'
Production Casing: 20605.69' MD/9,852' TVD (10,000' VS @ 90.3 deg inc)

Casing String	Min SF Burst	Min SF Collapse	Min SF Tension	Min SF Tri-Axial
Surface	1.82	5.11	3.97	2.31
Intermediate	1.45	1.32	1.78	1.84
Production	1.26	1.5	2.43	1.35

Min SF is the smallest of a group of safety factors that include the following considerations:

	Surf	Int	Prod
Burst Design			
Pressure Test- Surface, Int, Prod Csg P external: Water P internal: Test psi + next section heaviest mud in csg	X	X	X
Displace to Gas- Surf Csg P external: Water P internal: Dry Gas from Next Csg Point	X		
Frac at Shoe, Gas to Surf- Int Csg P external: Water P internal: Dry Gas, 15 ppg Frac Gradient		X	
Stimulation (Frac) Pressures- Prod Csg P external: Water P internal: Max inj pressure w/ heaviest injected fluid			X
Tubing leak- Prod Csg (packer at KOP) P external: Water P internal: Leak just below surf, 8.7 ppg packer fluid			X
Collapse Design			
Full Evacuation P external: Water gradient in cement, mud above TOC P internal: none	X	X	X
Cementing- Surf, Int, Prod Csg P external: Wet cement P internal: water	X	X	X
Tension Design			
100k lb overpull	X	X	X

5. **CEMENTING PROGRAM**

Slurry	Type	Cement Top	Cement Bottom	Weight	Yield	%Excess	Sacks	Water
Surface				(ppg)	(sx/cu ft)	Open Hole		gal/sk
Tail	Class C	0'	450'	14.8	1.33	50	356	6.37
Intermediate								
Stage 2 Lead	50:50 Poz: Class C + Antifoam, Extender, Salt, Retarder	0'	1,100'	11.9	2.43	50	213	14.21
Stage 2 Tail	Class C + Antifoam, Retarder, Viscosifier	1,100'	2,100'	14.8	1.33	0	235	6.37
DV TOOL		2,100'						
Stage 1 Lead	50:50 Poz: Class H + Extender, Antifoam, Retarder, Salt, Viscosifier	2,100'	8,015'	11.9	2.43	100	1524	13.76
Stage 1 Tail	Class H + Retarder, Extender, Dispersant	8,015'	9,015'	15.6	1.21	50	389	5.54
Production								
Lead	50:50 Poz: Class H + Extender, Antifoam, Dispersant, , Retarder	7,015'	8,015'	14.5	1.21	100	430	5.54
Tail	Class H + Viscosifier, Antifoam, Dispersant, Fluid Loss, Retarder, Expanding Agent	8,015'	20,606'	15.6	1.2	50	3603	5.30

6. **MUD PROGRAM**

From	To	Type	Weight	F. Vis	Filtrate
0'	450'	Spud Mud	8.3 - 8.7	32 - 34	NC - NC
450'	9015'	OBM	9.0 - 9.5	50 -70	5.0 - 10
9015'	20,606'	OBM	10.0 - 13.5	50 -70	5.0 - 10

7. **TESTING, LOGGING, AND CORING**

TYPE	Logs	Interval	Timing	Vendor
Mudlogs	2 man mudlog	Int Csg to TD	Drillout of Int Csg	TBD
LWD	MWD Gamma	Int. and Prod. Hole	While Drilling	TBD

8. **ABNORMAL PRESSURES AND HYDROGEN SULFIDE**

PLEASE REFERENCE MDP

Schlumberger

#7H - Rev0

Chevron

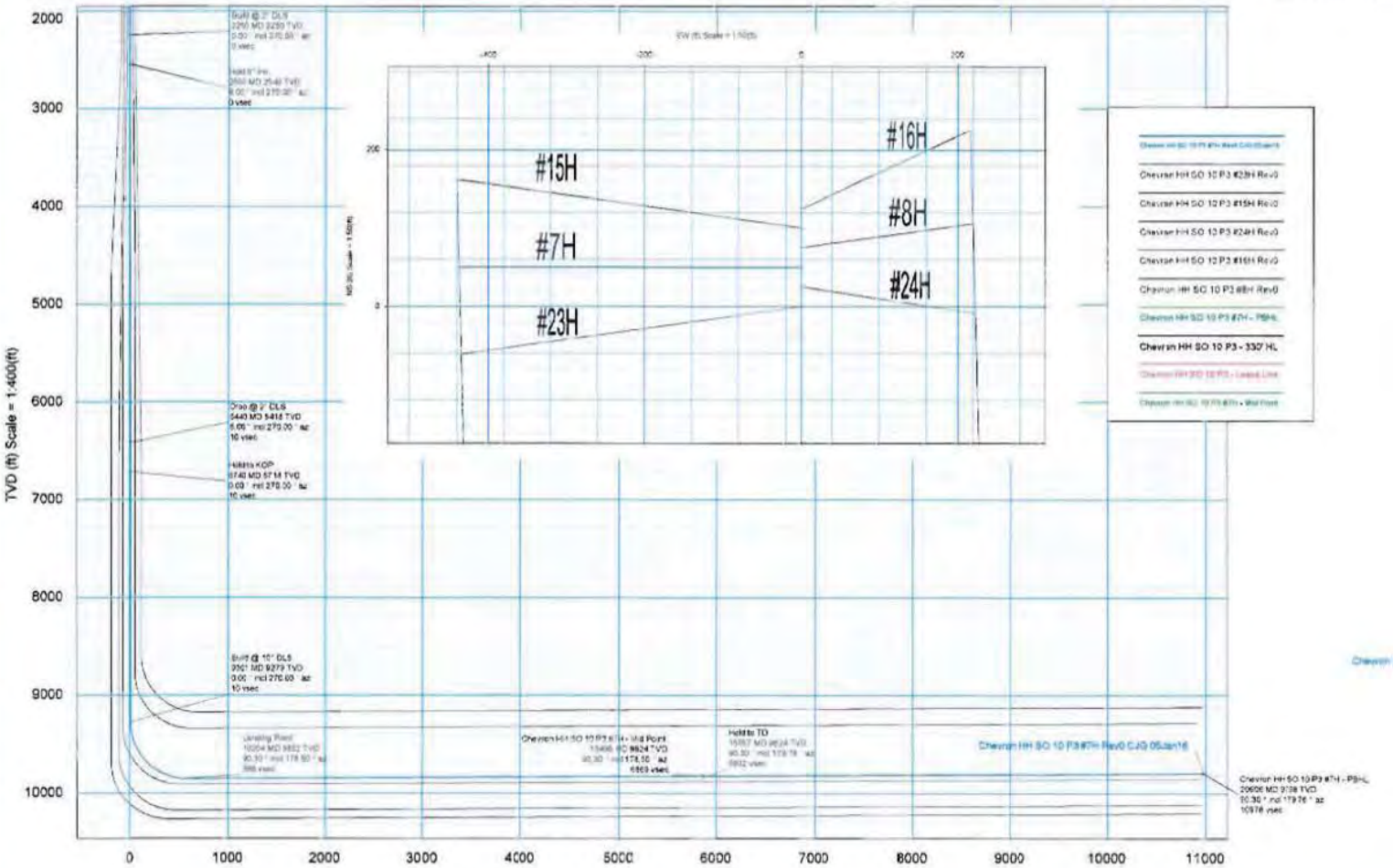
Borehole:	Well:	Field:	Structure:
Original Borehole	HH SO 10 P3 #7H	NM Eddy County (NAD 27)	Chevron HH SO 10 P3 Pad

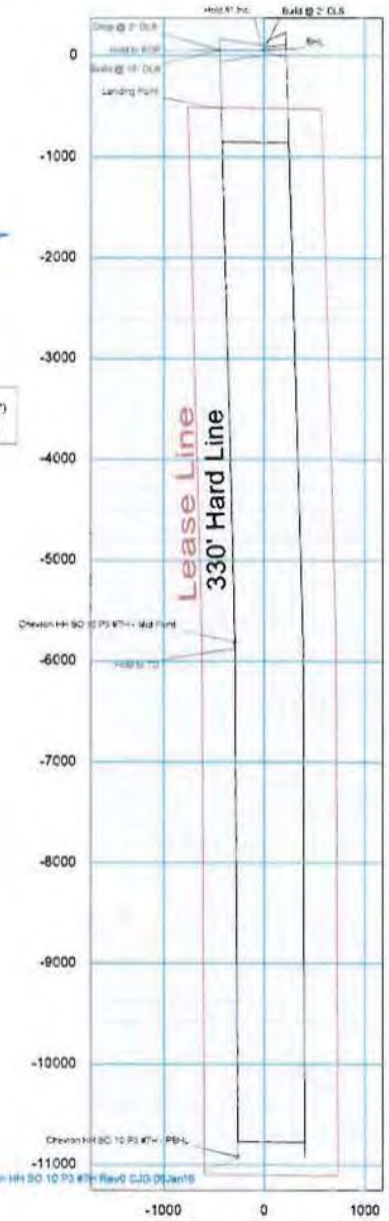
Gravity & Magnetic Parameters				Surface Location (NAD27 New Mexico State Plane, Eastern Zone, US Feet)					Miscellaneous		
Model:	HDGM 2016	Dip:	59.818°	Date:	06-Jan-2016	Lat:	N 32 1 55.82	Northing:	387549ftUS	Grid Conv:	0.0818°
MagDec:	7.517°	FS:	48187.937nT	Gravity FS:	998.428mgn (9.80665 Based)	Lon:	W 104 16 47.21	Easting:	547567ftUS	Scale Fact:	0.99991163

Slot: HH SO 10 P3 #7H TVD Ref: RKB(3312ft above MSL)
Plan: Chevron HH SO 10 P3 #7H Rev0 CJG 06Jan16

Critical Points

Critical Point	MD	INCL	AZIM	TVD	VSEC	N(+)/S(-)	E(+)/W(-)	DLS
SHL	0.00	0.00	270.00	0.00	0.00	50.00	1.00	
Build @ 2° DLS	2250.00	0.00	270.00	2250.00	0.00	50.00	1.00	0.00
Hold 6° Inc.	2550.00	6.00	270.00	2549.45	0.37	50.00	-14.69	2.00
Drop @ 2° DLS	6440.00	6.00	270.00	6418.14	10.08	50.00	-421.31	0.00
Hold to KOP	6740.00	0.00	270.00	6717.59	10.45	50.00	-437.00	2.00
Build @ 10° DLS	9301.46	0.00	270.00	9279.05	10.45	50.00	-437.00	0.00
Landing Point	10204.45	90.30	178.50	9852.00	585.69	-525.75	-421.93	10.00
Chevron HH SO 10 P3 #7H - Mid Point	15494.63	90.30	178.50	9824.32	5869.17	-5814.05	-283.56	0.00
Hold to TD	15557.26	90.30	179.76	9823.99	5931.76	-5876.67	-282.60	2.00
Chevron HH SO 10 P3 #7H - PBHL	20605.69	90.30	179.76	9797.59	10978.12	-10924.99	-261.02	0.00





CONTROLLED

1	Originator	Colby Gannon
2	GEO Sign Off	
3	QC Sign Off	
4	Client	Chevron

Schlumberger

Chevron

Chevron HH SO 10 P3 #7H Rev0 CJG 06Jan16 Proposal Geodetic Report

(Non-Def Plan)

Report Date:	January 13, 2016 - 04:03 PM	**Survey / DLS Computation:**	Minimum Curvature / Lubinski
Client:	Chevron	**Vertical Section Azimuth:**	181.368 ° (Grid North)
Field:	NM Eddy County (NAD 27)	**Vertical Section Origin:**	50.005 ft, 1.000 ft
Structure / Slot:	Chevron HH SO 10 P3 Pad / HH SO 10 P3 #7H	**TVD Reference Datum:**	RKB
Well:	HH SO 10 P3 #7H	**TVD Reference Elevation:**	3312.000 ft above MSL
Borehole:	Original Borehole	**Seabed / Ground Elevation:**	3279.000 ft above MSL
UWI / API#:	Unknown / Unknown	**Magnetic Declination:**	7.517 °
Survey Name:	Chevron HH SO 10 P3 #7H Rev0 CJG 06Jan16	**Total Gravity Field Strength:**	998.4279mgn (9.80665 Based)
Survey Date:	December 30, 2015	**Gravity Model:**	GARM
Tort / AHD / DDI / ERD Ratio:	103.555 ° / 11415.056 ft / 6.393 / 1.159	**Total Magnetic Field Strength:**	48167.937 nT
Coordinate Reference System:	NAD27 New Mexico State Plane, Eastern Zone, US Feet	**Magnetic Dip Angle:**	59.816 °
Location Lat / Long:	N 32° 3' 55.51923", W 104° 10' 47.20699"	**Declination Date:**	January 05, 2016
Location Grid N/E Y/X:	N 387559.000 ftUS, E 547567.000 ftUS	**Magnetic Declination Model:**	HDGM 2015
CRS Grid Convergence Angle:	0.0815 °	**North Reference:**	Grid North
Grid Scale Factor:	0.99991188	**Grid Convergence Used:**	0.0815 °
Version / Patch:	2.8.572.0	**Total Corr Mag North->Grid North:**	7.4359 °
		Local Coord Referenced To:	Structure Reference Point

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
SHL	0.00	0.00	270.00	0.00	0.00	50.00	1.00	N/A	387559.00	547567.00	N 32 3 55.52	W 104 10 47.21
	100.00	0.00	270.00	100.00	0.00	50.00	1.00	0.00	387559.00	547567.00	N 32 3 55.52	W 104 10 47.21
	200.00	0.00	270.00	200.00	0.00	50.00	1.00	0.00	387559.00	547567.00	N 32 3 55.52	W 104 10 47.21
	300.00	0.00	270.00	300.00	0.00	50.00	1.00	0.00	387559.00	547567.00	N 32 3 55.52	W 104 10 47.21
	400.00	0.00	270.00	400.00	0.00	50.00	1.00	0.00	387559.00	547567.00	N 32 3 55.52	W 104 10 47.21
	500.00	0.00	270.00	500.00	0.00	50.00	1.00	0.00	387559.00	547567.00	N 32 3 55.52	W 104 10 47.21
	600.00	0.00	270.00	600.00	0.00	50.00	1.00	0.00	387559.00	547567.00	N 32 3 55.52	W 104 10 47.21
	700.00	0.00	270.00	700.00	0.00	50.00	1.00	0.00	387559.00	547567.00	N 32 3 55.52	W 104 10 47.21
	800.00	0.00	270.00	800.00	0.00	50.00	1.00	0.00	387559.00	547567.00	N 32 3 55.52	W 104 10 47.21
	900.00	0.00	270.00	900.00	0.00	50.00	1.00	0.00	387559.00	547567.00	N 32 3 55.52	W 104 10 47.21
	1000.00	0.00	270.00	1000.00	0.00	50.00	1.00	0.00	387559.00	547567.00	N 32 3 55.52	W 104 10 47.21
	1100.00	0.00	270.00	1100.00	0.00	50.00	1.00	0.00	387559.00	547567.00	N 32 3 55.52	W 104 10 47.21
	1200.00	0.00	270.00	1200.00	0.00	50.00	1.00	0.00	387559.00	547567.00	N 32 3 55.52	W 104 10 47.21
	1300.00	0.00	270.00	1300.00	0.00	50.00	1.00	0.00	387559.00	547567.00	N 32 3 55.52	W 104 10 47.21
	1400.00	0.00	270.00	1400.00	0.00	50.00	1.00	0.00	387559.00	547567.00	N 32 3 55.52	W 104 10 47.21
	1500.00	0.00	270.00	1500.00	0.00	50.00	1.00	0.00	387559.00	547567.00	N 32 3 55.52	W 104 10 47.21
	1600.00	0.00	270.00	1600.00	0.00	50.00	1.00	0.00	387559.00	547567.00	N 32 3 55.52	W 104 10 47.21
	1700.00	0.00	270.00	1700.00	0.00	50.00	1.00	0.00	387559.00	547567.00	N 32 3 55.52	W 104 10 47.21
	1800.00	0.00	270.00	1800.00	0.00	50.00	1.00	0.00	387559.00	547567.00	N 32 3 55.52	W 104 10 47.21
	1900.00	0.00	270.00	1900.00	0.00	50.00	1.00	0.00	387559.00	547567.00	N 32 3 55.52	W 104 10 47.21
	2000.00	0.00	270.00	2000.00	0.00	50.00	1.00	0.00	387559.00	547567.00	N 32 3 55.52	W 104 10 47.21
	2100.00	0.00	270.00	2100.00	0.00	50.00	1.00	0.00	387559.00	547567.00	N 32 3 55.52	W 104 10 47.21
	2200.00	0.00	270.00	2200.00	0.00	50.00	1.00	0.00	387559.00	547567.00	N 32 3 55.52	W 104 10 47.21
Build @ 2° DLS	2250.00	0.00	270.00	2250.00	0.00	50.00	1.00	0.00	387559.00	547567.00	N 32 3 55.52	W 104 10 47.21
	2300.00	1.00	270.00	2300.00	0.01	50.00	0.56	2.00	387559.00	547566.56	N 32 3 55.52	W 104 10 47.21
	2400.00	3.00	270.00	2399.93	0.09	50.00	-2.93	2.00	387559.00	547563.07	N 32 3 55.52	W 104 10 47.25
	2500.00	5.00	270.00	2499.68	0.26	50.00	-9.90	2.00	387559.00	547556.10	N 32 3 55.52	W 104 10 47.33
Hold 6° Inc.	2550.00	6.00	270.00	2549.45	0.37	50.00	-14.69	2.00	387559.00	547551.31	N 32 3 55.52	W 104 10 47.39
	2600.00	6.00	270.00	2599.15	0.50	50.00	-19.92	0.00	387559.00	547546.08	N 32 3 55.52	W 104 10 47.45
	2700.00	6.00	270.00	2698.63	0.75	50.00	-30.37	0.00	387559.00	547535.63	N 32 3 55.52	W 104 10 47.57
	2800.00	6.00	270.00	2798.08	1.00	50.00	-40.83	0.00	387559.00	547525.18	N 32 3 55.52	W 104 10 47.69
	2900.00	6.00	270.00	2897.53	1.25	50.00	-51.28	0.00	387559.00	547514.73	N 32 3 55.52	W 104 10 47.81
	3000.00	6.00	270.00	2996.99	1.50	50.00	-61.73	0.00	387559.00	547504.27	N 32 3 55.52	W 104 10 47.94
	3100.00	6.00	270.00	3096.44	1.75	50.00	-72.18	0.00	387559.00	547493.82	N 32 3 55.52	W 104 10 48.06
	3200.00	6.00	270.00	3195.89	2.00	50.00	-82.64	0.00	387559.00	547483.37	N 32 3 55.52	W 104 10 48.18
	3300.00	6.00	270.00	3295.34	2.25	50.00	-93.09	0.00	387559.00	547472.92	N 32 3 55.52	W 104 10 48.30
	3400.00	6.00	270.00	3394.80	2.50	50.00	-103.54	0.00	387559.00	547462.47	N 32 3 55.52	W 104 10 48.42
	3500.00	6.00	270.00	3494.25	2.74	50.00	-114.00	0.00	387559.00	547452.01	N 32 3 55.52	W 104 10 48.54
	3600.00	6.00	270.00	3593.70	2.99	50.00	-124.45	0.00	387559.00	547441.56	N 32 3 55.52	W 104 10 48.66
	3700.00	6.00	270.00	3693.15	3.24	50.00	-134.90	0.00	387559.00	547431.11	N 32 3 55.52	W 104 10 48.79
	3800.00	6.00	270.00	3792.60	3.49	50.00	-145.35	0.00	387559.00	547420.66	N 32 3 55.52	W 104 10 48.91
	3900.00	6.00	270.00	3892.06	3.74	50.00	-155.81	0.00	387559.00	547410.21	N 32 3 55.52	W 104 10 49.03
	4000.00	6.00	270.00	3991.51	3.99	50.00	-166.26	0.00	387559.00	547399.76	N 32 3 55.52	W 104 10 49.15
	4100.00	6.00	270.00	4090.96	4.24	50.00	-176.71	0.00	387559.00	547389.30	N 32 3 55.52	W 104 10 49.27
	4200.00	6.00	270.00	4190.41	4.49	50.00	-187.17	0.00	387559.00	547378.85	N 32 3 55.52	W 104 10 49.39
	4300.00	6.00	270.00	4289.87	4.74	50.00	-197.62	0.00	387559.00	547368.40	N 32 3 55.52	W 104 10 49.51
	4400.00	6.00	270.00	4389.32	4.99	50.00	-208.07	0.00	387559.00	547357.95	N 32 3 55.52	W 104 10 49.64
	4500.00	6.00	270.00	4488.77	5.24	50.00	-218.52	0.00	387559.00	547347.50	N 32 3 55.52	W 104 10 49.76
	4600.00	6.00	270.00	4588.22	5.49	50.00	-228.98	0.00	387559.00	547337.04	N 32 3 55.52	W 104 10 49.88
	4700.00	6.00	270.00	4687.67	5.74	50.00	-239.43	0.00	387559.00	547326.59	N 32 3 55.52	W 104 10 50.00
	4800.00	6.00	270.00	4787.13	5.99	50.00	-249.88	0.00	387559.00	547316.14	N 32 3 55.52	W 104 10 50.12
	4900.00	6.00	270.00	4886.58	6.24	50.00	-260.34	0.00	387559.00	547305.69	N 32 3 55.52	W 104 10 50.24
	5000.00	6.00	270.00	4986.03	6.49	50.00	-270.79	0.00	387559.00	547295.24	N 32 3 55.52	W 104 10 50.37
	5100.00	6.00	270.00	5085.48	6.74	50.00	-281.24	0.00	387559.00	547284.78	N 32 3 55.52	W 104 10 50.49
	5200.00	6.00	270.00	5184.94	6.99	50.00	-291.69	0.00	387559.00	547274.33	N 32 3 55.52	W 104 10 50.61
	5300.00	6.00	270.00	5284.39	7.24	50.00	-302.15	0.00	387559.00	547263.88	N 32 3 55.52	W 104 10 50.73
	5400.00	6.00	270.00	5383.84	7.48	50.00	-312.60	0.00	387559.00	547253.43	N 32 3 55.52	W 104 10 50.85
	5500.00	6.00	270.00	5483.29	7.73	50.00	-323.05	0.00	387559.00	547242.98	N 32 3 55.52	W 104 10 50.97
	5600.00	6.00	270.00	5582.74	7.98	50.00	-333.51	0.00	387559.00	547232.52	N 32 3 55.52	W 104 10 51.09
	5700.00	6.00	270.00	5682.20	8.23	50.00	-343.96	0.00	387559.00	547222.07	N 32 3 55.52	W 104 10 51.22
	5800.00	6.00	270.00	5781.65	8.48	50.00	-354.41	0.00	387559.00	547211.62	N 32 3 55.52	W 104 10 51.34
	5900.00	6.00	270.00	5881.10	8.73	50.00	-364.86	0.00	387559.00	547201.17	N 32 3 55.52	W 104 10 51.46
	6000.00	6.00	270.00	5980.55	8.98	50.00	-375.32	0.00	387559.00	547190.72	N 32 3 55.52	W 104 10 51.58
	6100.00	6.00	270.00	6080.00	9.23	50.00	-385.77	0.00	387559.00	547180.27	N 32 3 55.52	W 104 10 51.70
	6200.00	6.00	270.00	6179.46	9.48	50.00	-396.22	0.00	387559.00	547169.81	N 32 3 55.52	W 104 10 51.82

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
	6300.00	6.00	270.00	6278.91	9.73	50.00	-406.68	0.00	387559.00	547159.36	N 32 3 55.52	W 104 10 51.94
	6400.00	6.00	270.00	6378.36	9.98	50.00	-417.13	0.00	387559.00	547148.91	N 32 3 55.53	W 104 10 52.07
Drop @ 2° DLS	6440.00	6.00	270.00	6418.14	10.08	50.00	-421.31	0.00	387559.00	547144.73	N 32 3 55.53	W 104 10 52.11
	6500.00	4.80	270.00	6477.87	10.21	50.00	-426.96	2.00	387559.00	547139.08	N 32 3 55.53	W 104 10 52.18
	6600.00	2.80	270.00	6577.65	10.37	50.00	-433.58	2.00	387559.00	547132.46	N 32 3 55.53	W 104 10 52.26
	6700.00	0.80	270.00	6677.60	10.45	50.00	-436.72	2.00	387559.00	547129.32	N 32 3 55.53	W 104 10 52.29
Hold to KOP	6740.00	0.00	270.00	6717.59	10.45	50.00	-437.00	2.00	387559.00	547129.04	N 32 3 55.53	W 104 10 52.30
	6800.00	0.00	270.00	6777.59	10.45	50.00	-437.00	0.00	387559.00	547129.04	N 32 3 55.53	W 104 10 52.30
	6900.00	0.00	270.00	6877.59	10.45	50.00	-437.00	0.00	387559.00	547129.04	N 32 3 55.53	W 104 10 52.30
	7000.00	0.00	270.00	6977.59	10.45	50.00	-437.00	0.00	387559.00	547129.04	N 32 3 55.53	W 104 10 52.30
	7100.00	0.00	270.00	7077.59	10.45	50.00	-437.00	0.00	387559.00	547129.04	N 32 3 55.53	W 104 10 52.30
	7200.00	0.00	270.00	7177.59	10.45	50.00	-437.00	0.00	387559.00	547129.04	N 32 3 55.53	W 104 10 52.30
	7300.00	0.00	270.00	7277.59	10.45	50.00	-437.00	0.00	387559.00	547129.04	N 32 3 55.53	W 104 10 52.30
	7400.00	0.00	270.00	7377.59	10.45	50.00	-437.00	0.00	387559.00	547129.04	N 32 3 55.53	W 104 10 52.30
	7500.00	0.00	270.00	7477.59	10.45	50.00	-437.00	0.00	387559.00	547129.04	N 32 3 55.53	W 104 10 52.30
	7600.00	0.00	270.00	7577.59	10.45	50.00	-437.00	0.00	387559.00	547129.04	N 32 3 55.53	W 104 10 52.30
	7700.00	0.00	270.00	7677.59	10.45	50.00	-437.00	0.00	387559.00	547129.04	N 32 3 55.53	W 104 10 52.30
	7800.00	0.00	270.00	7777.59	10.45	50.00	-437.00	0.00	387559.00	547129.04	N 32 3 55.53	W 104 10 52.30
	7900.00	0.00	270.00	7877.59	10.45	50.00	-437.00	0.00	387559.00	547129.04	N 32 3 55.53	W 104 10 52.30
	8000.00	0.00	270.00	7977.59	10.45	50.00	-437.00	0.00	387559.00	547129.04	N 32 3 55.53	W 104 10 52.30
	8100.00	0.00	270.00	8077.59	10.45	50.00	-437.00	0.00	387559.00	547129.04	N 32 3 55.53	W 104 10 52.30
	8200.00	0.00	270.00	8177.59	10.45	50.00	-437.00	0.00	387559.00	547129.04	N 32 3 55.53	W 104 10 52.30
	8300.00	0.00	270.00	8277.59	10.45	50.00	-437.00	0.00	387559.00	547129.04	N 32 3 55.53	W 104 10 52.30
	8400.00	0.00	270.00	8377.59	10.45	50.00	-437.00	0.00	387559.00	547129.04	N 32 3 55.53	W 104 10 52.30
	8500.00	0.00	270.00	8477.59	10.45	50.00	-437.00	0.00	387559.00	547129.04	N 32 3 55.53	W 104 10 52.30
	8600.00	0.00	270.00	8577.59	10.45	50.00	-437.00	0.00	387559.00	547129.04	N 32 3 55.53	W 104 10 52.30
	8700.00	0.00	270.00	8677.59	10.45	50.00	-437.00	0.00	387559.00	547129.04	N 32 3 55.53	W 104 10 52.30
	8800.00	0.00	270.00	8777.59	10.45	50.00	-437.00	0.00	387559.00	547129.04	N 32 3 55.53	W 104 10 52.30
	8900.00	0.00	270.00	8877.59	10.45	50.00	-437.00	0.00	387559.00	547129.04	N 32 3 55.53	W 104 10 52.30
	9000.00	0.00	270.00	8977.59	10.45	50.00	-437.00	0.00	387559.00	547129.04	N 32 3 55.53	W 104 10 52.30
	9100.00	0.00	270.00	9077.59	10.45	50.00	-437.00	0.00	387559.00	547129.04	N 32 3 55.53	W 104 10 52.30
	9200.00	0.00	270.00	9177.59	10.45	50.00	-437.00	0.00	387559.00	547129.04	N 32 3 55.53	W 104 10 52.30
	9300.00	0.00	270.00	9277.59	10.45	50.00	-437.00	0.00	387559.00	547129.04	N 32 3 55.53	W 104 10 52.30
Build @ 10° DLS	9301.46	0.00	270.00	9279.05	10.45	50.00	-437.00	0.00	387559.00	547129.04	N 32 3 55.53	W 104 10 52.30
	9400.00	9.85	178.50	9377.11	18.90	41.55	-436.78	10.00	387550.55	547129.26	N 32 3 55.44	W 104 10 52.29
	9500.00	19.85	178.50	9473.64	44.47	15.96	-436.11	10.00	387524.96	547129.93	N 32 3 55.19	W 104 10 52.29
	9600.00	29.85	178.50	9564.27	86.39	-26.00	-435.01	10.00	387483.00	547131.03	N 32 3 54.77	W 104 10 52.27
	9700.00	39.85	178.50	9646.22	143.40	-83.06	-433.52	10.00	387425.95	547132.52	N 32 3 54.21	W 104 10 52.26
	9800.00	49.85	178.50	9717.02	213.75	-153.48	-431.67	10.00	387355.53	547134.36	N 32 3 53.51	W 104 10 52.24
	9900.00	59.85	178.50	9774.52	295.32	-235.12	-429.54	10.00	387273.90	547136.50	N 32 3 52.70	W 104 10 52.21
	10000.00	69.85	178.50	9816.95	385.61	-325.49	-427.17	10.00	387183.54	547138.87	N 32 3 51.81	W 104 10 52.19
	10100.00	79.85	178.50	9843.05	481.89	-421.87	-424.65	10.00	387087.17	547141.39	N 32 3 50.86	W 104 10 52.16
	10200.00	89.85	178.50	9852.01	581.24	-521.30	-422.04	10.00	386967.75	547144.00	N 32 3 49.87	W 104 10 52.13
Landing Point	10204.45	90.30	178.50	9852.00	585.69	-525.75	-421.93	10.00	386983.29	547144.11	N 32 3 49.83	W 104 10 52.13
	10300.00	90.30	178.50	9851.50	681.11	-621.27	-419.43	0.00	386887.79	547146.61	N 32 3 48.88	W 104 10 52.10
	10400.00	90.30	178.50	9850.98	780.99	-721.23	-416.81	0.00	386787.83	547149.23	N 32 3 47.89	W 104 10 52.07
	10500.00	90.30	178.50	9850.45	880.86	-821.19	-414.19	0.00	386687.88	547151.85	N 32 3 46.90	W 104 10 52.05
	10600.00	90.30	178.50	9849.93	980.73	-921.16	-411.57	0.00	386587.92	547154.46	N 32 3 45.91	W 104 10 52.02
	10700.00	90.30	178.50	9849.41	1080.61	-1021.12	-408.96	0.00	386487.97	547157.08	N 32 3 44.93	W 104 10 51.99
	10800.00	90.30	178.50	9848.88	1180.48	-1121.09	-406.34	0.00	386388.01	547159.70	N 32 3 43.94	W 104 10 51.96
	10900.00	90.30	178.50	9848.36	1280.35	-1221.05	-403.72	0.00	386288.06	547162.32	N 32 3 42.95	W 104 10 51.93
	11000.00	90.30	178.50	9847.84	1380.23	-1321.02	-401.10	0.00	386188.10	547164.93	N 32 3 41.96	W 104 10 51.90
	11100.00	90.30	178.50	9847.31	1480.10	-1420.98	-398.49	0.00	386088.15	547167.55	N 32 3 40.97	W 104 10 51.87
	11200.00	90.30	178.50	9846.79	1579.97	-1520.95	-395.87	0.00	385988.19	547170.17	N 32 3 39.98	W 104 10 51.84
	11300.00	90.30	178.50	9846.27	1679.85	-1620.91	-393.25	0.00	385888.24	547172.78	N 32 3 38.99	W 104 10 51.82
	11400.00	90.30	178.50	9845.74	1779.72	-1720.87	-390.64	0.00	385788.28	547175.40	N 32 3 38.00	W 104 10 51.79
	11500.00	90.30	178.50	9845.22	1879.60	-1820.84	-388.02	0.00	385688.33	547178.02	N 32 3 37.01	W 104 10 51.76
	11600.00	90.30	178.50	9844.70	1979.47	-1920.80	-385.40	0.00	385588.37	547180.63	N 32 3 36.02	W 104 10 51.73
	11700.00	90.30	178.50	9844.17	2079.34	-2020.77	-382.79	0.00	385488.42	547183.25	N 32 3 35.03	W 104 10 51.70
	11800.00	90.30	178.50	9843.65	2179.22	-2120.73	-380.17	0.00	385388.46	547185.86	N 32 3 34.04	W 104 10 51.67
	11900.00	90.30	178.50	9843.13	2279.09	-2220.70	-377.55	0.00	385288.50	547188.48	N 32 3 33.05	W 104 10 51.64
	12000.00	90.30	178.50	9842.61	2378.96	-2320.66	-374.94	0.00	385188.55	547191.10	N 32 3 32.07	W 104 10 51.61
	12100.00	90.30	178.50	9842.08	2478.84	-2420.62	-372.32	0.00	385088.59	547193.71	N 32 3 31.08	W 104 10 51.59
	12200.00	90.30	178.50	9841.56	2578.71	-2520.59	-369.70	0.00	384988.64	547196.33	N 32 3 30.09	W 104 10 51.56
	12300.00	90.30	178.50	9841.04	2678.58	-2620.55	-367.09	0.00	384888.68	547198.94	N 32 3 29.10	W 104 10 51.53
	12400.00	90.30	178.50	9840.51	2778.46	-2720.52	-364.47	0.00	384788.73	547201.56	N 32 3 28.11	W 104 10 51.50
	12500.00	90.30	178.50	9839.99	2878.33	-2820.48	-361.86	0.00	384688.77	547204.18	N 32 3 27.12	W 104 10 51.47
	12600.00	90.30	178.50	9839.47	2978.20	-2920.45	-359.24	0.00	384588.82	547206.79	N 32 3 26.13	W 104 10 51.44
	12700.00	90.30	178.50	9838.94	3078.08	-3020.41	-356.63	0.00	384488.86	547209.41	N 32 3 25.14	W 104 10 51.41
	12800.00	90.30	178.50	9838.42	3177.95	-3120.38	-354.01	0.00	384388.91	547212.02	N 32 3 24.15	W 104 10 51.38
	12900.00	90.30	178.50	9837.90	3277.82	-3220.34	-351.39	0.00	384288.95	547214.64	N 32 3 23.16	W 104 10 51.36
	13000.00	90.30	178.50	9837.37	3377.70	-3320.30	-348.78	0.00	384189.00	547217.25	N 32 3 22.17	W 104 10 51.33
	13100.00	90.30	178.50	9836.85	3477.57	-3420.27	-346.16	0.00	384089.04	547219.87	N 32 3 21.18	W 104 10 51.30
	13200.00	90.30	178.50	9836.33	3577.44	-3520.23	-343.55	0.00	383989.08	547222.48	N 32 3 20.19	W 104 10 51.27
	13300.00	90.30	178.50	9835.80	3677.32	-3620.20	-340.93	0.00	383889.13	547225.10	N 32 3 19.20	W 104 10 51.24
	13400.00	90.30	178.50	9835.28	3777.19	-3720.16	-338.32	0.00	383789.17	547227.71	N 32 3 18.22	W 104 10 51.21
	13500.00	90.30	178.50	9834.76	3877.07	-3820.13	-335.70	0.00	383689.22	547230.33	N 32 3 17.23	W 104 10 51.18
	13600.00	90.30	178.50	9834.23	3976.94	-3920.09	-333.09	0.00	383589.26	547232.94	N 32 3 16.24	W 104 10 51.15
	13700.00	90.30	178.50	9833.71	4076.81	-4020.06	-330.47	0.00	383489.31	547235.56	N 32 3 15.25	W 104 10 51.13
	13800.00	90.30	178.50	9833.19	4176.69	-4120.02	-327.86	0.00	383389.35	547238.17	N 32 3 14.26	W 104 10 51.10
	13900.00	90.30	178.50	9832.66	4276.56	-4219.98	-325.24	0.00	383289.40	547240.79	N 32 3 13.27	W 104 10 51.07
	14000.00	90.30	178.50	9832.14	4376.43	-4319.95	-322.63	0.00	383189.44	547243.40	N 32 3 12.28	W 104 10 51.04
	14100.00	90.30	178.50	9831.62	4476.31	-4419.91	-320.01	0.00	383089.49	547246.02	N 32 3 11.29	W 104 10 51.01
	14200.00	90.30	178.50	9831.09	4576.18	-4519.88	-317.40	0.00	382989.53	547248.63	N 32 3 10.30	W 104 10 50.98
	14300.00	90.30	178.50	9830.57	4676.05	-4619.84	-314.78	0.00	382889.57	547251.24	N 32 3 9.31	W 104 10 50.95
	14400.00	90.30	178.50	9830.05	4775.93	-4719.81	-312.17	0.00	382789.62	547253.86	N 32 3 8.32	W 104 10 50.92
	14500.00	90.30	178.50	9829.52	4875.80	-4819.77	-309.55	0.00	382689.66	547256.47	N 32 3 7.33	W 104 10 50.90
	14600.00	90.30	178.50	9829.00	4975.67	-4919.74	-306.94	0.00	382589.71	547259.09	N 32 3 6.34	W 104 10 50.87

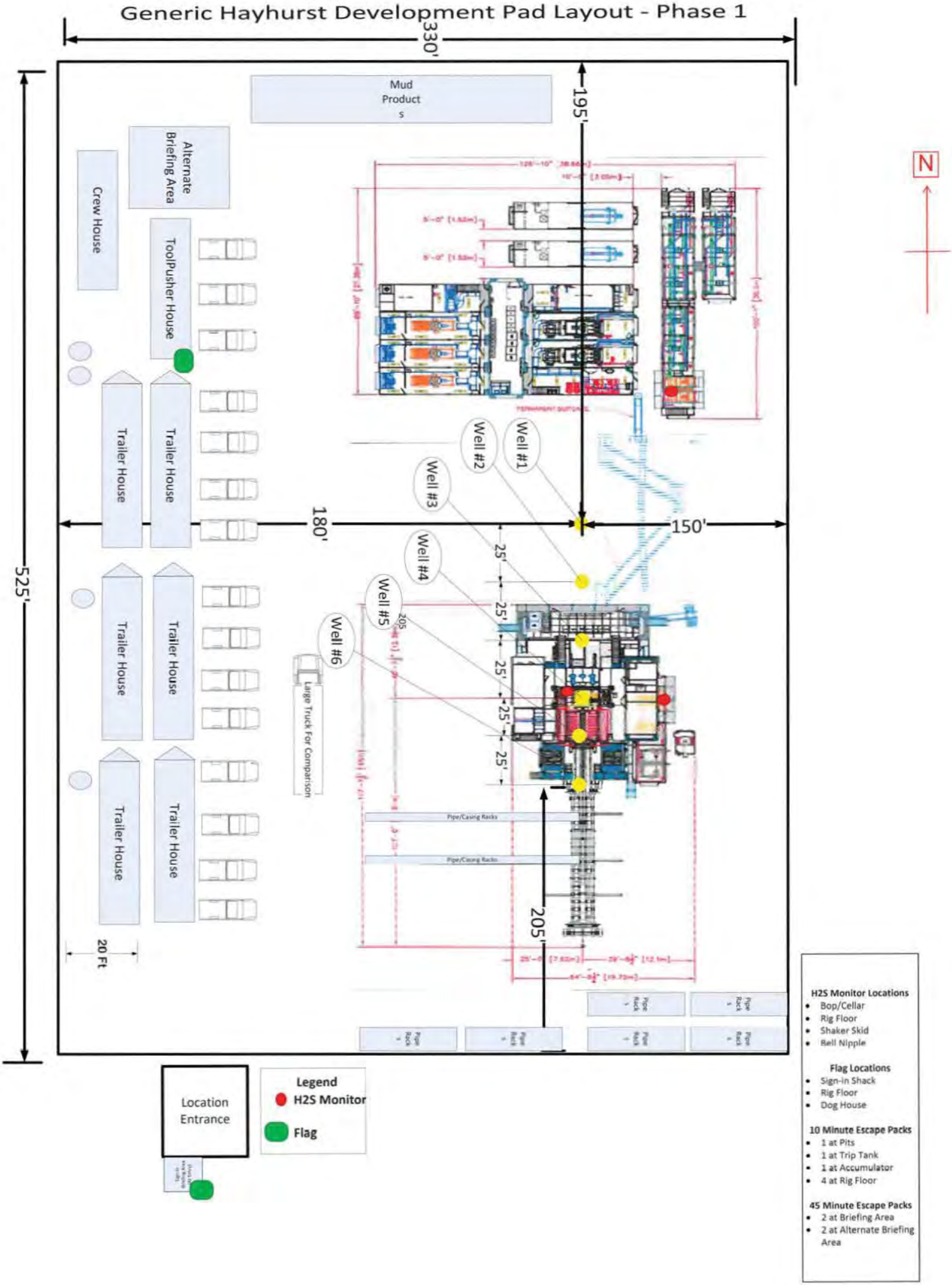
Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
	14700.00	90.30	178.50	9828.48	5075.55	-5019.70	-304.33	0.00	382489.75	547261.70	N 32 3 5.36	W 104 10 50.84
	14800.00	90.30	178.50	9827.95	5175.42	-5119.66	-301.71	0.00	382389.80	547264.32	N 32 3 4.37	W 104 10 50.81
	14900.00	90.30	178.50	9827.43	5275.29	-5219.63	-299.10	0.00	382289.84	547266.93	N 32 3 3.38	W 104 10 50.78
	15000.00	90.30	178.50	9826.91	5375.17	-5319.59	-296.48	0.00	382189.89	547269.54	N 32 3 2.39	W 104 10 50.75
	15100.00	90.30	178.50	9826.38	5475.04	-5419.56	-293.87	0.00	382089.93	547272.16	N 32 3 1.40	W 104 10 50.72
	15200.00	90.30	178.50	9825.86	5574.92	-5519.52	-291.26	0.00	381989.98	547274.77	N 32 3 0.41	W 104 10 50.69
	15300.00	90.30	178.50	9825.34	5674.79	-5619.49	-288.64	0.00	381890.02	547277.38	N 32 2 59.42	W 104 10 50.67
	15400.00	90.30	178.50	9824.82	5774.66	-5719.45	-286.03	0.00	381790.07	547280.00	N 32 2 58.43	W 104 10 50.64
Chevron HH SO 10 P3 #7H - Mid Point	15494.63	90.30	178.50	9824.32	5869.17	-5814.05	-283.56	0.00	381695.48	547282.47	N 32 2 57.49	W 104 10 50.61
	15500.00	90.30	178.61	9824.29	5874.54	-5819.42	-283.42	2.00	381690.11	547282.61	N 32 2 57.44	W 104 10 50.61
Hold to TD	15557.28	90.30	179.76	9823.99	5931.76	-5876.67	-282.60	2.00	381632.86	547283.42	N 32 2 56.87	W 104 10 50.60
	15600.00	90.30	179.76	9823.77	5974.48	-5919.41	-282.42	0.00	381590.13	547283.61	N 32 2 56.45	W 104 10 50.60
	15700.00	90.30	179.76	9823.25	6074.43	-6019.41	-281.99	0.00	381490.14	547284.03	N 32 2 55.46	W 104 10 50.60
	15800.00	90.30	179.76	9822.72	6174.39	-6119.40	-281.57	0.00	381390.15	547284.46	N 32 2 54.47	W 104 10 50.59
	15900.00	90.30	179.76	9822.20	6274.35	-6219.40	-281.14	0.00	381290.16	547284.89	N 32 2 53.48	W 104 10 50.59
	16000.00	90.30	179.76	9821.68	6374.31	-6319.40	-280.71	0.00	381190.17	547285.31	N 32 2 52.49	W 104 10 50.59
	16100.00	90.30	179.76	9821.15	6474.27	-6419.40	-280.28	0.00	381090.18	547285.74	N 32 2 51.50	W 104 10 50.58
	16200.00	90.30	179.76	9820.63	6574.23	-6519.39	-279.86	0.00	380990.20	547286.17	N 32 2 50.51	W 104 10 50.58
	16300.00	90.30	179.76	9820.11	6674.19	-6619.39	-279.43	0.00	380890.21	547286.60	N 32 2 49.52	W 104 10 50.58
	16400.00	90.30	179.76	9819.59	6774.15	-6719.39	-279.00	0.00	380790.22	547287.02	N 32 2 48.54	W 104 10 50.57
	16500.00	90.30	179.76	9819.06	6874.11	-6819.39	-278.57	0.00	380690.23	547287.45	N 32 2 47.55	W 104 10 50.57
	16600.00	90.30	179.76	9818.54	6974.07	-6919.38	-278.15	0.00	380590.24	547287.88	N 32 2 46.56	W 104 10 50.57
	16700.00	90.30	179.76	9818.02	7074.03	-7019.38	-277.72	0.00	380490.25	547288.31	N 32 2 45.57	W 104 10 50.56
	16800.00	90.30	179.76	9817.49	7173.98	-7119.38	-277.29	0.00	380390.26	547288.73	N 32 2 44.58	W 104 10 50.56
	16900.00	90.30	179.76	9816.97	7273.94	-7219.38	-276.86	0.00	380290.27	547289.16	N 32 2 43.59	W 104 10 50.56
	17000.00	90.30	179.76	9816.45	7373.90	-7319.38	-276.44	0.00	380190.29	547289.59	N 32 2 42.60	W 104 10 50.55
	17100.00	90.30	179.76	9815.92	7473.86	-7419.37	-276.01	0.00	380090.30	547290.02	N 32 2 41.61	W 104 10 50.55
	17200.00	90.30	179.76	9815.40	7573.82	-7519.37	-275.58	0.00	379990.31	547290.44	N 32 2 40.62	W 104 10 50.55
	17300.00	90.30	179.76	9814.88	7673.78	-7619.37	-275.15	0.00	379890.32	547290.87	N 32 2 39.63	W 104 10 50.54
	17400.00	90.30	179.76	9814.36	7773.74	-7719.37	-274.73	0.00	379790.33	547291.30	N 32 2 38.64	W 104 10 50.54
	17500.00	90.30	179.76	9813.83	7873.70	-7819.36	-274.30	0.00	379690.34	547291.73	N 32 2 37.65	W 104 10 50.54
	17600.00	90.30	179.76	9813.31	7973.66	-7919.36	-273.87	0.00	379590.35	547292.15	N 32 2 36.66	W 104 10 50.53
	17700.00	90.30	179.76	9812.79	8073.62	-8019.36	-273.44	0.00	379490.36	547292.58	N 32 2 35.67	W 104 10 50.53
	17800.00	90.30	179.76	9812.26	8173.57	-8119.36	-273.02	0.00	379390.38	547293.01	N 32 2 34.68	W 104 10 50.53
	17900.00	90.30	179.76	9811.74	8273.53	-8219.35	-272.59	0.00	379290.39	547293.44	N 32 2 33.69	W 104 10 50.52
	18000.00	90.30	179.76	9811.22	8373.49	-8319.35	-272.16	0.00	379190.40	547293.86	N 32 2 32.70	W 104 10 50.52
	18100.00	90.30	179.76	9810.69	8473.45	-8419.35	-271.73	0.00	379090.41	547294.29	N 32 2 31.71	W 104 10 50.52
	18200.00	90.30	179.76	9810.17	8573.41	-8519.35	-271.31	0.00	378990.42	547294.72	N 32 2 30.72	W 104 10 50.51
	18300.00	90.30	179.76	9809.65	8673.37	-8619.35	-270.88	0.00	378890.43	547295.15	N 32 2 29.73	W 104 10 50.51
	18400.00	90.30	179.76	9809.13	8773.33	-8719.34	-270.45	0.00	378790.44	547295.57	N 32 2 28.74	W 104 10 50.51
	18500.00	90.30	179.76	9808.60	8873.29	-8819.34	-270.02	0.00	378690.46	547296.00	N 32 2 27.75	W 104 10 50.50
	18600.00	90.30	179.76	9808.08	8973.25	-8919.34	-269.60	0.00	378590.47	547296.43	N 32 2 26.76	W 104 10 50.50
	18700.00	90.30	179.76	9807.56	9073.21	-9019.34	-269.17	0.00	378490.48	547296.85	N 32 2 25.78	W 104 10 50.50
	18800.00	90.30	179.76	9807.03	9173.16	-9119.33	-268.74	0.00	378390.49	547297.28	N 32 2 24.79	W 104 10 50.49
	18900.00	90.30	179.76	9806.51	9273.12	-9219.33	-268.31	0.00	378290.50	547297.71	N 32 2 23.80	W 104 10 50.49
	19000.00	90.30	179.76	9805.99	9373.08	-9319.33	-267.89	0.00	378190.51	547298.14	N 32 2 22.81	W 104 10 50.49
	19100.00	90.30	179.76	9805.46	9473.04	-9419.33	-267.46	0.00	378090.52	547298.56	N 32 2 21.82	W 104 10 50.48
	19200.00	90.30	179.76	9804.94	9573.00	-9519.33	-267.03	0.00	377990.53	547298.99	N 32 2 20.83	W 104 10 50.48
	19300.00	90.30	179.76	9804.42	9672.96	-9619.32	-266.60	0.00	377890.55	547299.42	N 32 2 19.84	W 104 10 50.48
	19400.00	90.30	179.76	9803.90	9772.92	-9719.32	-266.18	0.00	377790.56	547299.85	N 32 2 18.85	W 104 10 50.47
	19500.00	90.30	179.76	9803.37	9872.88	-9819.32	-265.75	0.00	377690.57	547300.27	N 32 2 17.86	W 104 10 50.47
	19600.00	90.30	179.76	9802.85	9972.84	-9919.32	-265.32	0.00	377590.58	547300.70	N 32 2 16.87	W 104 10 50.47
	19700.00	90.30	179.76	9802.33	10072.80	-10019.31	-264.89	0.00	377490.59	547301.13	N 32 2 15.88	W 104 10 50.46
	19800.00	90.30	179.76	9801.80	10172.76	-10119.31	-264.47	0.00	377390.60	547301.56	N 32 2 14.89	W 104 10 50.46
	19900.00	90.30	179.76	9801.28	10272.71	-10219.31	-264.04	0.00	377290.61	547301.98	N 32 2 13.90	W 104 10 50.46
	20000.00	90.30	179.76	9800.76	10372.67	-10319.31	-263.61	0.00	377190.63	547302.41	N 32 2 12.91	W 104 10 50.45
	20100.00	90.30	179.76	9800.23	10472.63	-10419.30	-263.19	0.00	377090.64	547302.84	N 32 2 11.92	W 104 10 50.45
	20200.00	90.30	179.76	9799.71	10572.59	-10519.30	-262.76	0.00	376990.65	547303.27	N 32 2 10.93	W 104 10 50.45
	20300.00	90.30	179.76	9799.19	10672.55	-10619.30	-262.33	0.00	376890.66	547303.69	N 32 2 9.94	W 104 10 50.44
	20400.00	90.30	179.76	9798.67	10772.51	-10719.30	-261.90	0.00	376790.67	547304.12	N 32 2 8.95	W 104 10 50.44
	20500.00	90.30	179.76	9798.14	10872.47	-10819.30	-261.48	0.00	376690.68	547304.55	N 32 2 7.96	W 104 10 50.44
	20600.00	90.30	179.76	9797.62	10972.43	-10919.29	-261.05	0.00	376590.69	547304.98	N 32 2 6.97	W 104 10 50.43
Chevron HH SO 10 P3 #7H - PBHL	20605.69	90.30	179.76	9797.59	10978.12	-10924.99	-261.02	0.00	376585.00	547305.00	N 32 2 6.92	W 104 10 50.43

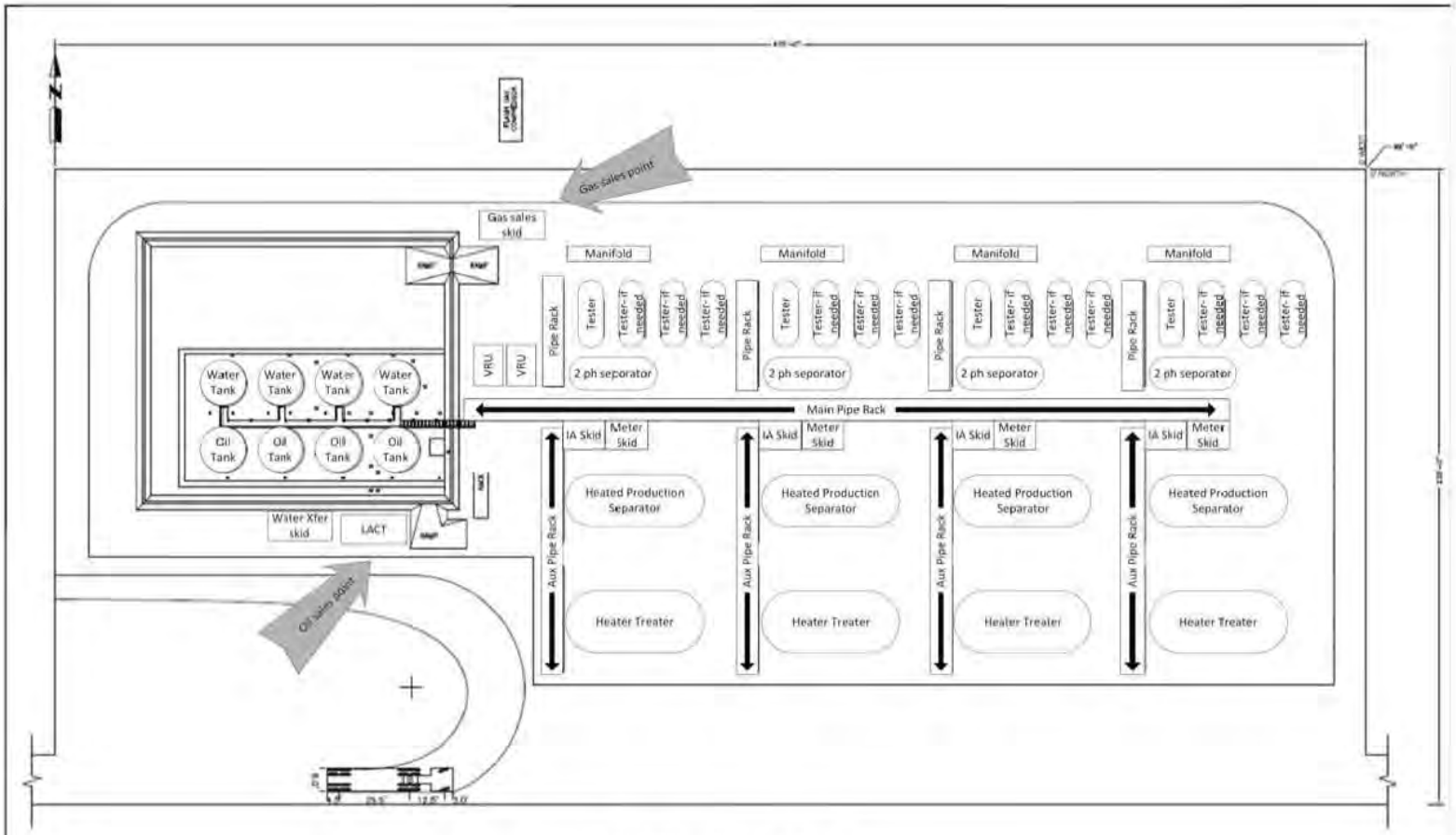
Survey Type: Non-Def Plan

Survey Error Model: ISCWSA Rev 0 *** 3-D 95.000% Confidence 2.7955 sigma
Survey Program:

Description	Part	MD From (ft)	MD To (ft)	EOU Freq (ft)	Hole Size (in)	Casing Diameter (in)	Survey Tool Type	Borehole / Survey
	1	0.000	33.000	1/100.000	30.000	30.000	SLB_MWD-STD-Depth Only	Original Borehole / Chevron HH SO 10 P3 #7H Rev0 CJG 06Jan16
	1	33.000	20605.694	1/100.000	30.000	30.000	SLB_MWD-STD	Original Borehole / Chevron HH SO 10 P3 #7H Rev0 CJG 06Jan16

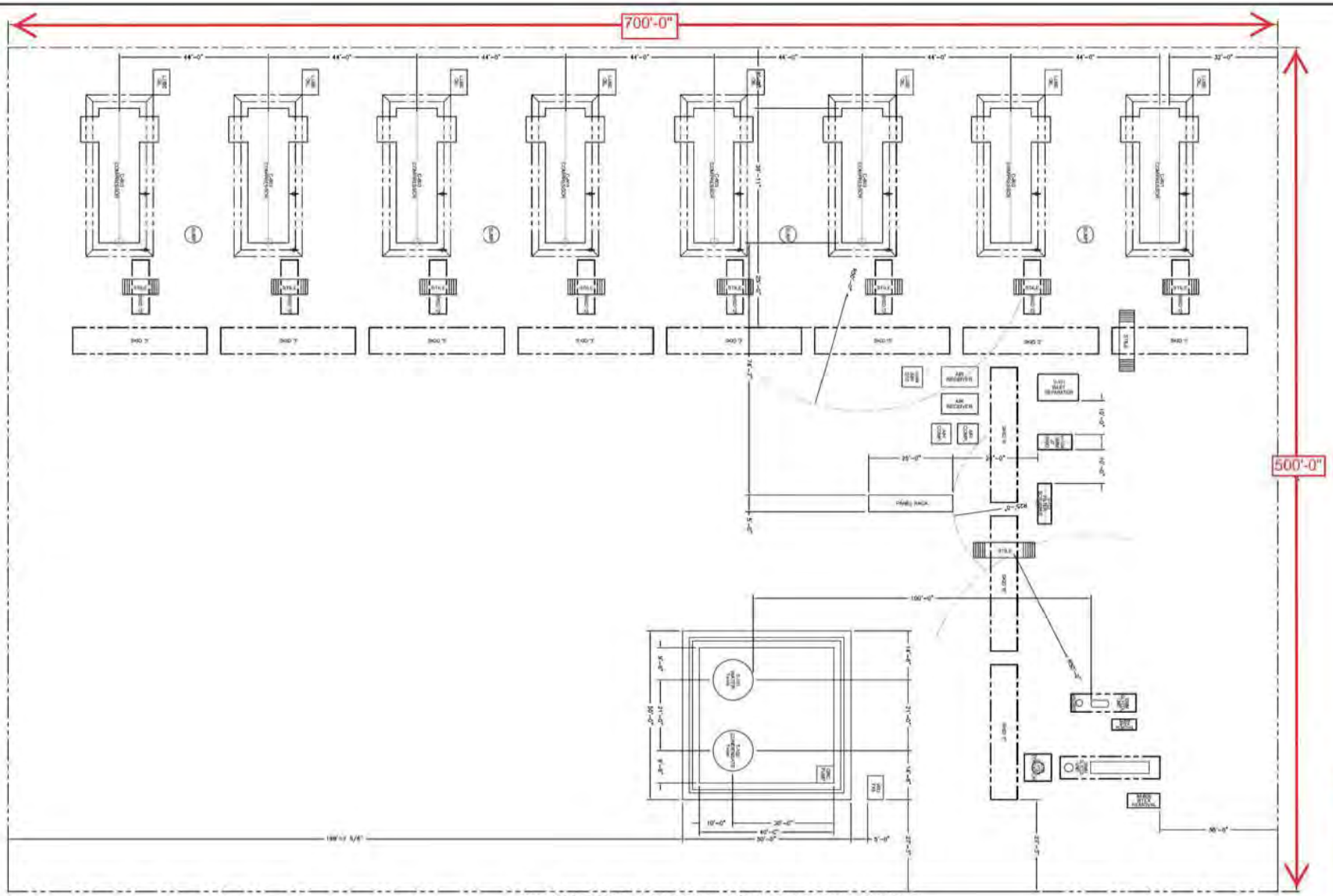
Generic Hayhurst Development Pad Layout - Phase 1





PLOT PLAN - 4 TRAIN / 8 TANK

EXHIBIT 4



COMPRESSOR STATION - 8 COMPRESSOR LAYOUT

SCALE: NONE

REVISIONS			
A ISSUED FOR REVIEW - JMDESIGN 07/14/15	EWM		

FOR REVIEW

Chevron U.S.A. Inc.

STANDARD COMPRESSOR GAS-LIFT STATION

PLOT PLAN - 8 COMPRESSOR LAYOUT

API _____ LEASE _____

COMPRESSOR_PLOTPLAN_8TOTAL

A

PLOT DATE: 07/14/2015 (1:215985)

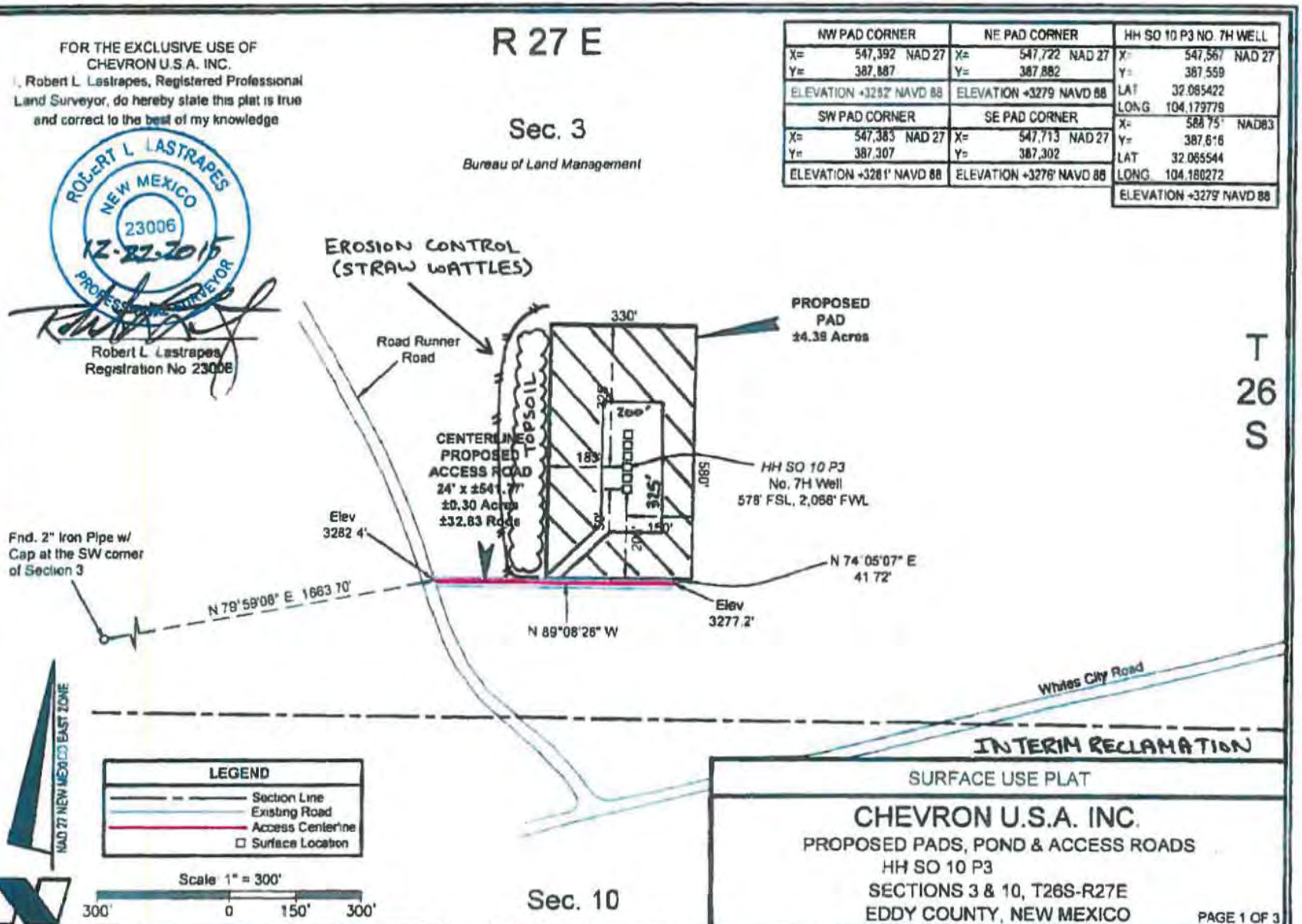
COMPRESSOR PLOTPLAN 8TOTAL.dwg

FOR THE EXCLUSIVE USE OF
CHEVRON U.S.A. INC.
I, Robert L. Lastrapes, Registered Professional Land Surveyor, do hereby state this plat is true and correct to the best of my knowledge

ROBERT L. LASTRAPES
NEW MEXICO
23006
12-22-2015
PROFESSIONAL SURVEYOR

Robert L. Lastrapes
Registration No 23006

NW PAD CORNER	NE PAD CORNER	HH SO 10 P3 NO. 7H WELL
X= 547,392 NAD 27	X= 547,722 NAD 27	X= 547,567 NAD 27
Y= 387,887	Y= 387,882	Y= 387,559
ELEVATION +3282' NAVD 88	ELEVATION +3279' NAVD 88	LAT 32.085422
SW PAD CORNER	SE PAD CORNER	LONG 104.179779
X= 547,383 NAD 27	X= 547,713 NAD 27	X= 588.75' NAD83
Y= 387,307	Y= 387,302	Y= 387,616
ELEVATION +3281' NAVD 88	ELEVATION +3276' NAVD 88	LAT 32.085544
		LONG 104.180272
		ELEVATION +3279' NAVD 88



SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED PADS, POND & ACCESS ROADS
HH SO 10 P3
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

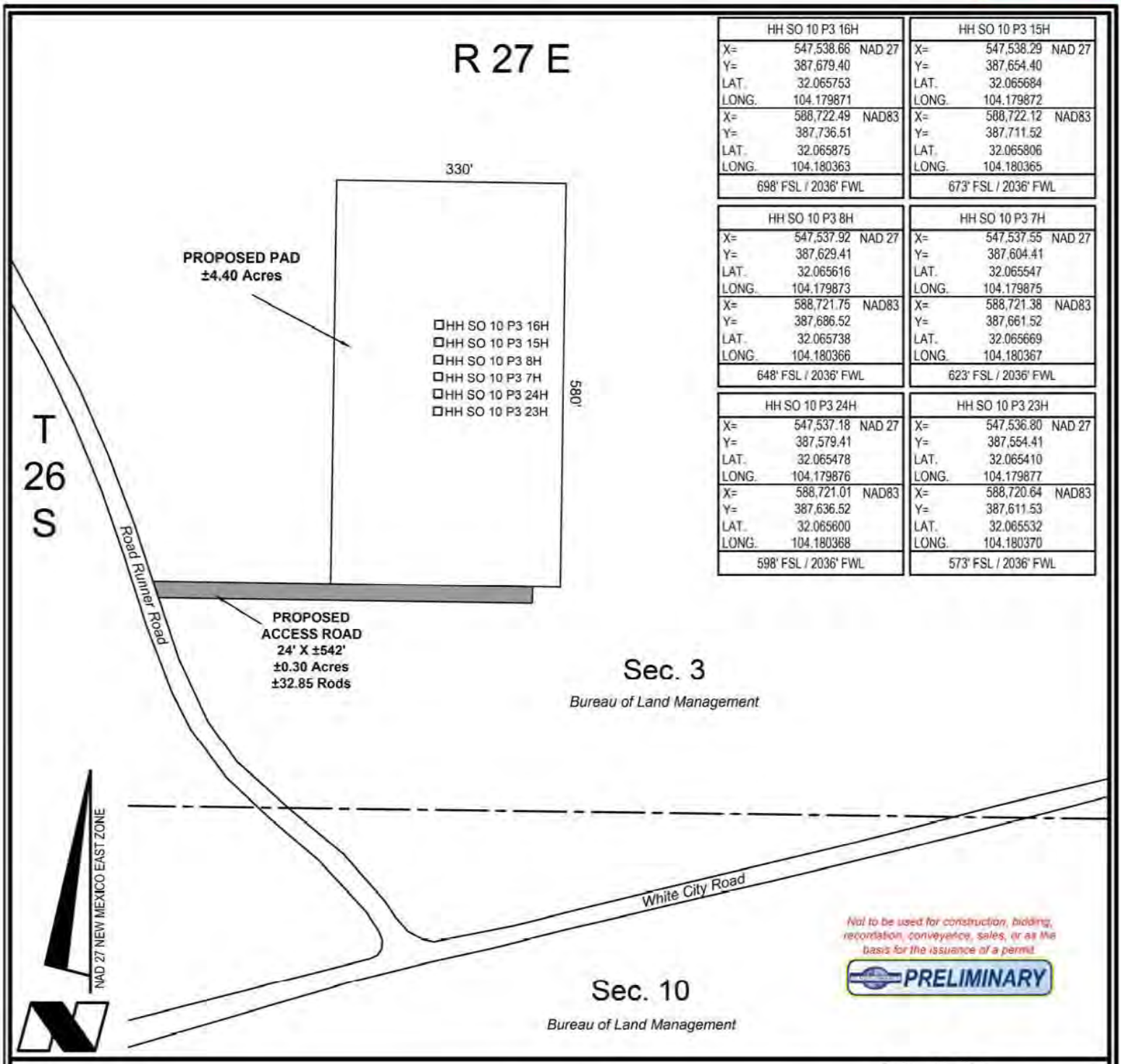
PAGE 1 OF 3

FENSTERMAKER
C. H. Fenstermaker & Associates L.L.C.
135 Regency Sq. Lafayette LA 70508
Ph. 337.237.2200 Fax 337.232.3299
www.fenstermaker.com

DRAWN BY: LJG	REVISIONS		
PROJ. MGR.: CDG	No.	DATE:	REVISED BY:
DATE: 12/16/2015	No.	DATE:	REVISED BY:

FILENAME: T:\2015\2153366\DWG\HH SO 10 P3 7H_SUP.dwg

EXHIBIT 4



HH SO 10 P3 16H		
X=	547,538.66	NAD 27
Y=	387,679.40	
LAT.	32.065753	
LONG.	104.179871	
X=	588,722.49	NAD83
Y=	387,736.51	
LAT.	32.065875	
LONG.	104.180363	
698' FSL / 2036' FWL		

HH SO 10 P3 15H		
X=	547,538.29	NAD 27
Y=	387,654.40	
LAT.	32.065684	
LONG.	104.179872	
X=	588,722.12	NAD83
Y=	387,711.52	
LAT.	32.065806	
LONG.	104.180365	
673' FSL / 2036' FWL		

HH SO 10 P3 8H		
X=	547,537.92	NAD 27
Y=	387,629.41	
LAT.	32.065616	
LONG.	104.179873	
X=	588,721.75	NAD83
Y=	387,686.52	
LAT.	32.065738	
LONG.	104.180366	
648' FSL / 2036' FWL		

HH SO 10 P3 7H		
X=	547,537.55	NAD 27
Y=	387,604.41	
LAT.	32.065547	
LONG.	104.179875	
X=	588,721.38	NAD83
Y=	387,661.52	
LAT.	32.065669	
LONG.	104.180367	
623' FSL / 2036' FWL		

HH SO 10 P3 24H		
X=	547,537.18	NAD 27
Y=	387,579.41	
LAT.	32.065478	
LONG.	104.179876	
X=	588,721.01	NAD83
Y=	387,636.52	
LAT.	32.065600	
LONG.	104.180368	
598' FSL / 2036' FWL		

HH SO 10 P3 23H		
X=	547,536.80	NAD 27
Y=	387,554.41	
LAT.	32.065410	
LONG.	104.179877	
X=	588,720.64	NAD83
Y=	387,611.53	
LAT.	32.065532	
LONG.	104.180370	
573' FSL / 2036' FWL		

DETAIL

Scale: 1" = 200'

200' 0 100' 200'

CHEVRON U.S.A. INC.

PAD AND ACCESS DETAIL FOR THE
HH SO 10 P3 PAD
SECTION 3, T26S-R27E
EDDY COUNTY, NEW MEXICO

FENSTERMAKER
C. H. Fenstermaker & Associates, L.L.C.
135 Regency Sq. Lafayette, LA 70508
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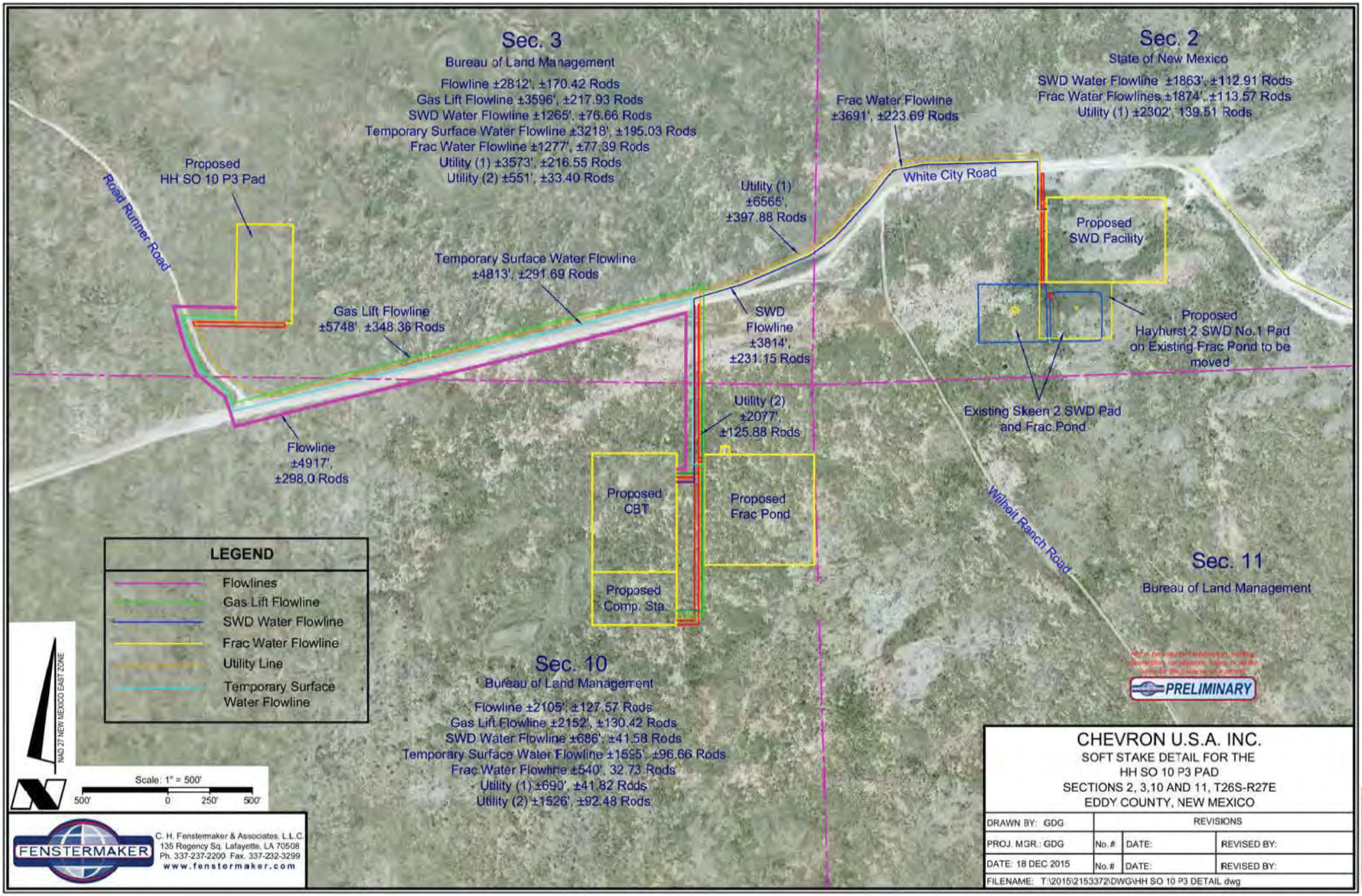
www.fenstermaker.com

DRAWN BY: GDG	REVISIONS		
PROJ. MGR.: GDG	No.#	DATE:	REVISED BY:
DATE: 2 DEC 2015	No.#	DATE:	REVISED BY:
FILENAME: T:\2015\2153367\DWG\HH SO 10 P3 PAD DETAIL.dwg			


Sec. 3
Bureau of Land Management
Flowline ±2812', ±170.42 Rods
Gas Lift Flowline ±3596', ±217.93 Rods
SWD Water Flowline ±1265', ±76.66 Rods
Temporary Surface Water Flowline ±3218', ±195.03 Rods
Frac Water Flowline ±1277', ±77.39 Rods
Utility (1) ±3573', ±216.55 Rods
Utility (2) ±551', ±33.40 Rods
Sec. 2
State of New Mexico
SWD Water Flowline ±1863', ±112.91 Rods
Frac Water Flowlines ±1874', ±113.57 Rods
Utility (1) ±2302', 139.51 Rods
Frac Water Flowline ±3691', ±223.69 Rods
White City Road
Road Runner Road
Proposed HH SO 10 P3 Pad
Utility (1) ±6565', ±397.88 Rods
Proposed SWD Facility
Temporary Surface Water Flowline ±4813', ±291.69 Rods
Gas Lift Flowline ±5748', ±348.36 Rods
SWD Flowline ±3814', ±231.15 Rods
Proposed Hayhurst 2 SWD No.1 Pad on Existing Frac Pond to be moved
Utility (2) ±2077', ±125.88 Rods
Existing Skeen 2 SWD Pad and Frac Pond
Flowline ±4917', ±298.0 Rods
Proposed CBT
Proposed Frac Pond
Wilhoit Ranch Road
Sec. 11
Bureau of Land Management
Proposed Comp. Sta.
LEGEND
Flowlines
Gas Lift Flowline
SWD Water Flowline
Frac Water Flowline
Utility Line
Temporary Surface Water Flowline
NAD 27 NEW MEXICO EAST ZONE
Scale: 1" = 500'
500' 0 250' 500'
Sec. 10
Bureau of Land Management
Flowline ±2105', ±127.57 Rods
Gas Lift Flowline ±2152', ±130.42 Rods
SWD Water Flowline ±686', ±41.58 Rods
Temporary Surface Water Flowline ±1595', ±96.66 Rods
Frac Water Flowline ±540', 32.73 Rods
Utility (1) ±690', ±41.82 Rods
Utility (2) ±1526', ±92.48 Rods
PRELIMINARY
FENSTERMAKER
C. H. Fenstermaker & Associates, L.L.C.
135 Regency Sq. Lafayette, LA 70508
Ph. 337-237-2200 Fax. 337-232-3299
www.fenstermaker.com
CHEVRON U.S.A. INC.
SOFT STAKE DETAIL FOR THE
HH SO 10 P3 PAD
SECTIONS 2, 3,10 AND 11, T26S-R27E
EDDY COUNTY, NEW MEXICO
DRAWN BY: GDG
PROJ. MGR.: GDG
DATE: 18 DEC 2015
REVISIONS
No.# DATE: REVISED BY:
No.# DATE: REVISED BY:
FILENAME: T:\2015\2153372\DWG\HH SO 10 P3 DETAIL.dwg

EXHIBITS 4&5

CHEVRON U.S.A. Inc
HH SO 10 P3 7H
NMNM 121473
SECTION 3, T26S-R27E (Off Lease SHL) SECTION 15, T26S, R27E
SHL 578' FSL & 2066' FWL BHL 180' FSL & 1652' FWL

APD Surface Use Plan of Operations

This Surface Use Plan of Operations has been designed to be reviewed in conjunction with Hayhurst Development Area (HDA) Master Development Plan

HDA Master Development Plan Reference Table
The contents referenced below apply to all HDA APD's

Existing Roads	Exhibit 1, MDP SUPO Page 1
Construction Materials	MDP SUPO Page 6
Methods for Handling Waste	MDP SUPO Page 6
Reclamation Objectives	MDP SUPO Page 6-8
Final Surface Reclamation	MDP SUPO Page 6-8

Driving Directions

- Driving Directions – From Malaga, New Mexico. The location is approximately 11.5 miles from the nearest town, which is Malaga, New Mexico. From Malaga, proceed South on Highway 285 approximately 11.5 miles and turn right (West) onto White City Rd and go approximately 6.8 miles on White City Road until the road reaches an intersection with Roadrunner Rd. Turn right onto this and travel 100 yards, then the access road and well location is on the right.

New or Reconstructed Access Roads – (Exhibit 2, MDP SUPO Pg. 1)

- There will be 2,758' of new road construction for this proposal.
- Ditches: See Exhibit 2 (To be submitted at later date)
- Culverts: See Exhibit 2 (To be submitted at later date)
- Road Cuts: See Exhibit 2 (To be submitted at later date)

Location of Existing Wells (Exhibit 3)

- 1-Mile radius map is attached

Location of Existing and/or Proposed Production Facilities (Exhibit 4, MDP SUP Pg. 2)

- Facilities: Proposed production facilities located in the NE corner of Sec. 10, T26S-R27E where oil and gas sales will take place.
    - The proposed facility and frac pond is in Sec. 10, T26S-R27E
    - Gas purchaser pipeline is in place at the tank battery.
    - Open top tanks or open containments will be netted.
    - Open vent exhaust stacks will be modified to prevent birds or bats from entering, discourage perching, roosting, and nesting.
    - Facilities will have a secondary containment 1.5 times the holding capacity of largest storage tank.
    - All above ground structures will be painted non-reflective shale green for blending with surrounding environment.
    - The permanent water disposal system will be determined prior to construction of any water transfer pipeline. Until permanent water takeaway is available, produced water will be hauled off location in trucks. **Notification will be provided to BLM upon site selection and survey – plats (including SWD well information) will be provided.**
- Pipelines: See Detail – Exhibit 5
    - Pipelines Include:
        - 4,917' of Flowlines carrying production (buried)
        - 5,748' Gas Lift Line carrying pressurized gas (buried)
        - 3,814' SWD Line carrying produced water (buried)
        - 3,691' Permanent Frac water line carrying fresh water (buried)
        - 4,813' Temporary Water line carrying fresh water (surface)
    - A ROW will be applied for through the State and BLM.
    - All construction activity will be confined to the approved ROW.
    - Pipeline will run parallel to the road and will stay within approved ROW.
- Power lines\Utility lines: 8,642' of new power lines

Location and Types of Water Supply (Exhibit 5, MDP SUPO Pg. 5)

- Proposed pond in Section 10, T26S-R27E will be utilized for fresh water.
- Fresh water will be obtained from a private water source.

Construction Materials (MDP SUPO Pg. 6)

- Location-specific caliche sources will be provided in post-application supplement

CHEVRON U.S.A. Inc
HH SO 10 P3 7H
NMNM 121473
SECTION 3, T26S-R27E (Off Lease SHL) SECTION 15, T26S, R27E
SHL 578' FSL & 2066' FWL BHL 180' FSL & 1652' FWL

Well Site Layout (Exhibit 6)

- Surveyor Plat (Exhibit 6a)
  - Exterior well pad dimensions are 580' x 330'
  - Interior well pad dimensions from point of entry (well head) of the well are N-325', S-255', E-150', W-180'. Total disturbance area needed for construction of well pad will be approximately 4.4 acres
  - Topsoil placement is on the west where interim reclamation is planned to be completed upon completion of well and evaluation of best management practices.
  - Cut and fill: will be minimal.
- Rig Layout (Exhibit 6b)

Plans for Surface Reclamation (Exhibit 6, MDP SUPA Pg. 8)

Interim Reclamation Procedures

- Reclaimed pad size: 200' x 325'
- See Exhibit for reclaimed pad layout, topsoil location & erosion control features

Surface Ownership

- BLM Surface
  - Surface Tenant – Phillip Stell
- **Nearest Post Office:** Malaga Post Office; 11.4 Miles north

Other Information

- On-site performed by BLM NRS: Paul Murphy 11/4/2015
- Cultural report attached: **Yes** Participating Agreement attached: N/A

CHEVRON U.S.A. Inc
HH SO 10 P3 7H
NMNM 121473
SECTION 3, T26S-R27E (Off Lease SHL) SECTION 15, T26S, R27E
SHL 578' FSL & 2066' FWL BHL 180' FSL & 1652' FWL

Chevron Representatives

Primary point of contact:
Jennifer Van Curen
Jennifer.VanCuren@arcadis-us.com
M- 432-270-8753

Chevron Functional Contacts

Project Manager Name: Sean Cheben Address: 1400 Smith Street Houston, TX 77002 Phone: (432) 664-6809 Email: Sean.Cheben@chevron.com	**Drilling Engineer** Name: Roderick Milligan Address: 1400 Smith Street Houston, TX 77002 Phone: (281) 413-9794 Email: RoderickMilligan@chevron.com
Surface Land Representative Name: Kevin Dickerson Address: 15 Smith Road Midland Texas 79705 Phone: (432) 687-7104 Email: Kevin.Dickerson@chevron.com	**Facility Lead** Name: Tyler Weaver Address: 1400 Smith Street Houston, TX 77002 Phone: (281) 384-8934 Email: tyler.weaver@chevron.com
Geologist Name: Jeff Fabre Address: 1400 Smith Street Houston, TX 77002 Phone: (713) 372-0523 Email: JeffreyFabre@chevron.com	**Regulatory Specialist** Cindy Herrera-Murillo Address: 1616 W. Bender Blvd, Hobbs, NM 88240 Office: (575) 263-0431 Email: CHerreraMurillo@chevron.com

CHEVRON U.S.A. Inc
HH SO 10 P3 7H
NMNM 121473
SECTION 3, T26S-R27E (Off Lease SHL) SECTION 15, T26S, R27E
SHL 578' FSL & 2066' FWL BHL 180' FSL & 1652' FWL

EXHIBITS:

Exhibit 1 -- Existing Roads

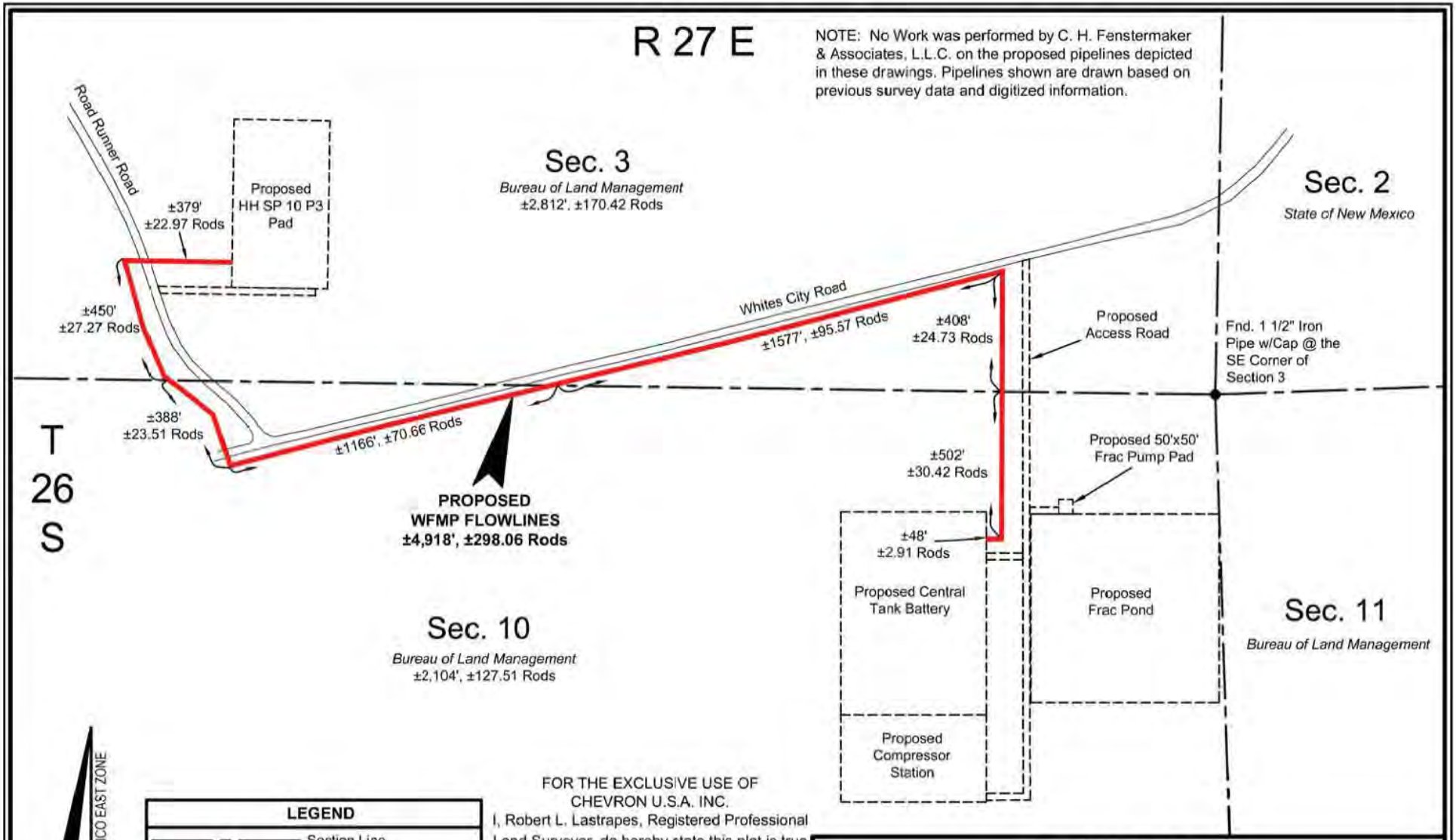
Exhibit 2 -- Survey Plat: New or Reconstructed Roads Map: if road is outside 600' x 600'.

Exhibit 3 -- 1-mile Radius Map

Exhibit 4 -- Location of Existing and/or Proposed Production Facilities (Tank Battery)

Exhibit 5 -- Survey Plat: Infrastructure: roads, pipelines, power lines, frac pond

Exhibit 6 -- Rig Layout: Well Site Layout Map / Diagram



FOR THE EXCLUSIVE USE OF CHEVRON U.S.A. INC.
I, Robert L. Lastrapes, Registered Professional Land Surveyor, do hereby state this plat is true and correct to the best of my knowledge.

Not to be used for construction, bidding, recordation, conveyance, sales, or as the basis for the issuance of a permit.

PRELIMINARY

Robert L. Lastrapes
Registration No. 23006

FENSTERMAKER
C. H. Fenstermaker & Associates, L.L.C.
135 Regency Sq. Lafayette, LA 70508
Ph. 337-237-2200 Fax. 337-232-3299
www.fenstermaker.com

SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED WFMP FLOWLINES
HH SO 10 P3
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

DRAWN BY: BOR	REVISIONS			
PROJ. MGR.: GDG	No.	DATE:	REVISED BY:	
DATE: 02/08/2016	No.	DATE:	REVISED BY:	
FILENAME: T:\2015\2153372\DWG\WFMP Flowlines_SUP.dwg				

EXHIBIT 5

DISCLAIMER: At this time, C.H. Fenstermaker & Associates, L.L.C. has not performed nor was asked to perform any type of engineering, hydrological modeling, flood plain, or "No Rise" certification analyses, including but not limited to determining whether the project will impact flood hazards in connection with federal/FEMA, state, and/or local laws, ordinances and regulations. Accordingly, Fenstermaker makes no warranty or representation of any kind as to the foregoing issues, and persons or entities using this information shall do so at their own risk.

NOTE:

1. Please be advised, that while reasonable efforts are made to locate and verify pipelines and anomalies using our standard pipeline locating equipment, it is impossible to be 100 % effective. As such, we advise using caution when performing work as there is a possibility that pipelines and other hazards, such as fiber optic cables, PVC pipelines, etc. may exist undetected on site.

2. Many states maintain information centers that establish links between those who dig (excavators) and those who own and operate underground facilities (operators). It is advisable and in most states, law, for the contractor to contact the center for assistance in locating and marking underground utilities. For guidance, New Mexico One Call, www.nmonecall.org

3. No Work was performed by C. H. Fenstermaker & Associates, L.L.C. on the proposed pipelines depicted in these drawings. Pipelines shown are drawn based on previous survey data and digitized information.

FOR THE EXCLUSIVE USE OF
CHEVRON U.S.A. INC.
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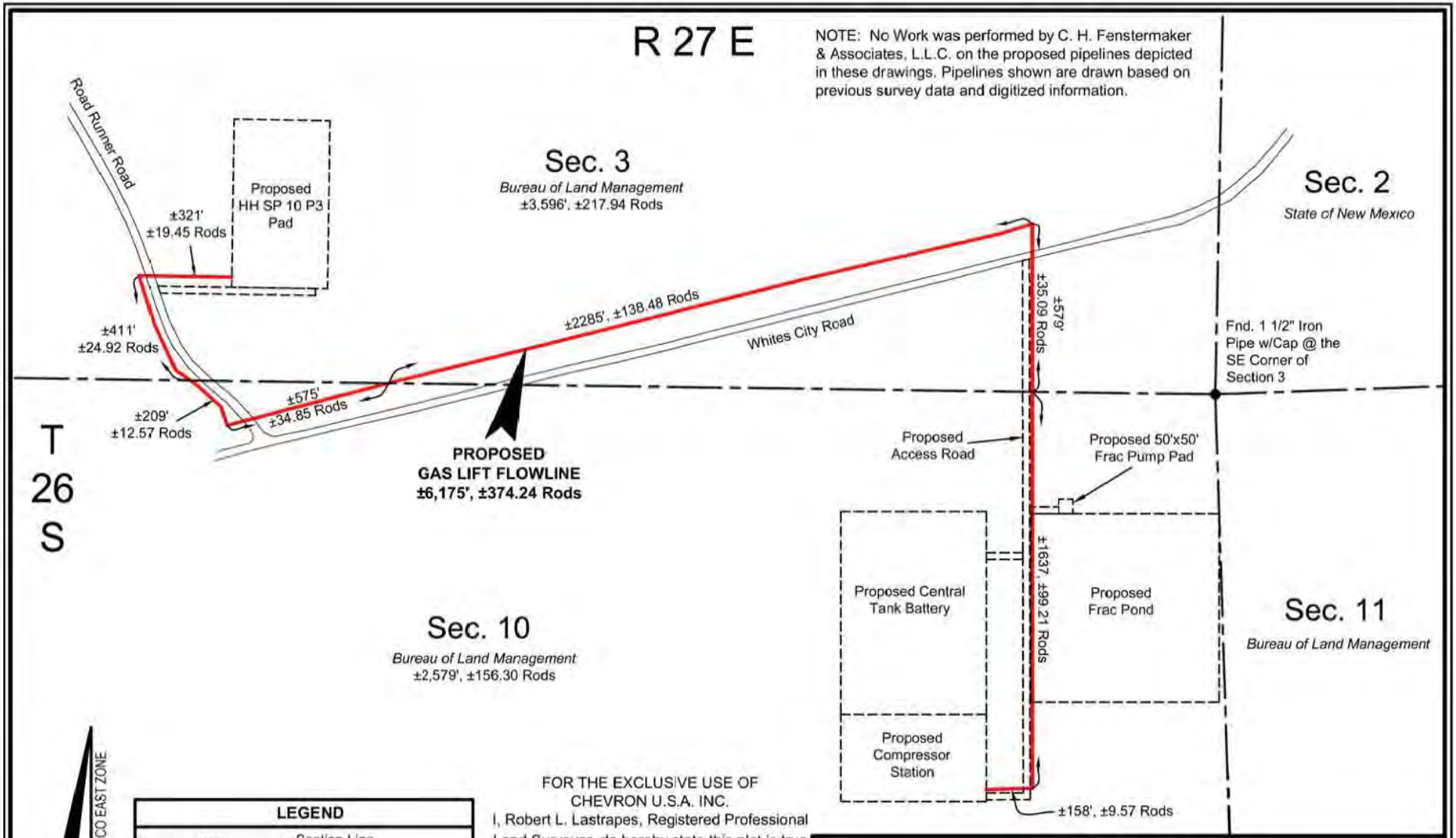
SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED WFMP FLOWLINES
HH SO 10 P3
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

DRAWN BY: BOR	REVISIONS			
PROJ. MGR.: GDG	No.	DATE:		REVISED BY:
DATE: 02/08/2016	No.	DATE:		REVISED BY:
FILENAME: T:\2015\2153372\DWG\Gas Lift Flowline_SUP.dwg				

NOTE: No Work was performed by C. H. Fenstermaker & Associates, L.L.C. on the proposed pipelines depicted in these drawings. Pipelines shown are drawn based on previous survey data and digitized information.



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SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED GAS LIFT FLOWLINE
HH SO 10 P3
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

PAGE 1 OF 2

DRAWN BY: BOR	REVISIONS			
PROJ. MGR.: GDG	No.	DATE:	REVISED BY:	
DATE: 02/08/2016	No.	DATE:	REVISED BY:	
FILENAME: T:\2015\2153372\DWG\Gas Lift Flowline_SUP.dwg				

EXHIBIT 5

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www.fenstermaker.com

SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED GAS LIFT FLOWLINE
HH SO 10 P3
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

DRAWN BY: BOR	REVISIONS			
PROJ. MGR.: GDG	No.	DATE:	REVISED BY:	
DATE: 02/08/2016	No.	DATE:	REVISED BY:	
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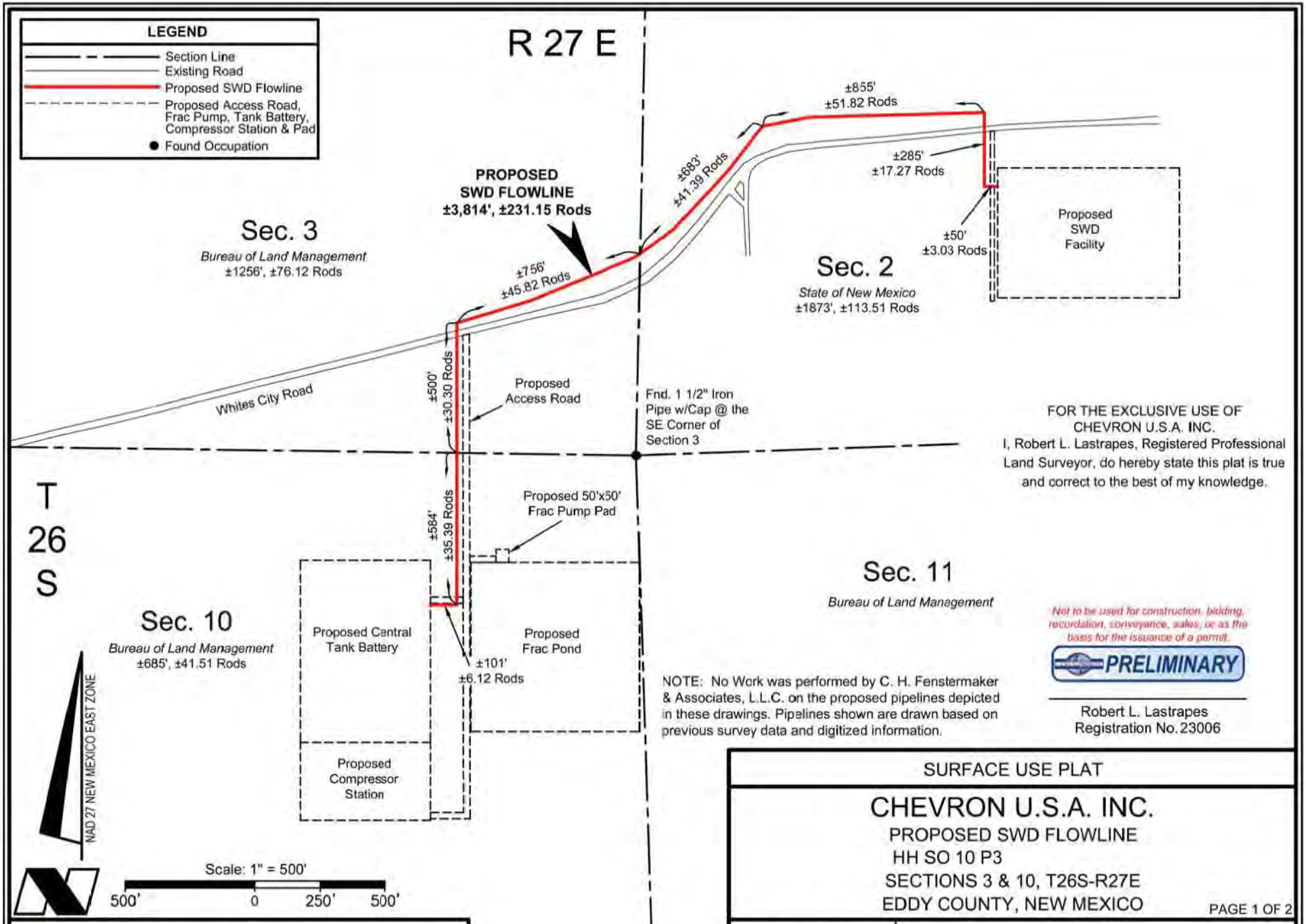

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PRELIMINARY

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Registration No. 23006

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SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED SWD FLOWLINE
HH SO 10 P3
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

PAGE 1 OF 2

DRAWN BY: BOR	REVISIONS		
PROJ. MGR.: GDG	No.	DATE:	REVISED BY:
DATE: 02/10/2016	No.	DATE:	REVISED BY:
FILENAME: T:\2015\2153372\DWG\SWD FL_SUP.dwg			

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www.fenstermaker.com

EXHIBIT 5

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FOR THE EXCLUSIVE USE OF
CHEVRON U.S.A. INC.
I, Robert L. Lastrapes, Registered Professional Land Surveyor, do hereby state this plat is true and correct to the best of my knowledge.

Not to be used for construction, bidding, recordation, conveyance, sales, or as the basis for the issuance of a permit.

PRELIMINARY

Robert L. Lastrapes
Registration No. 23006

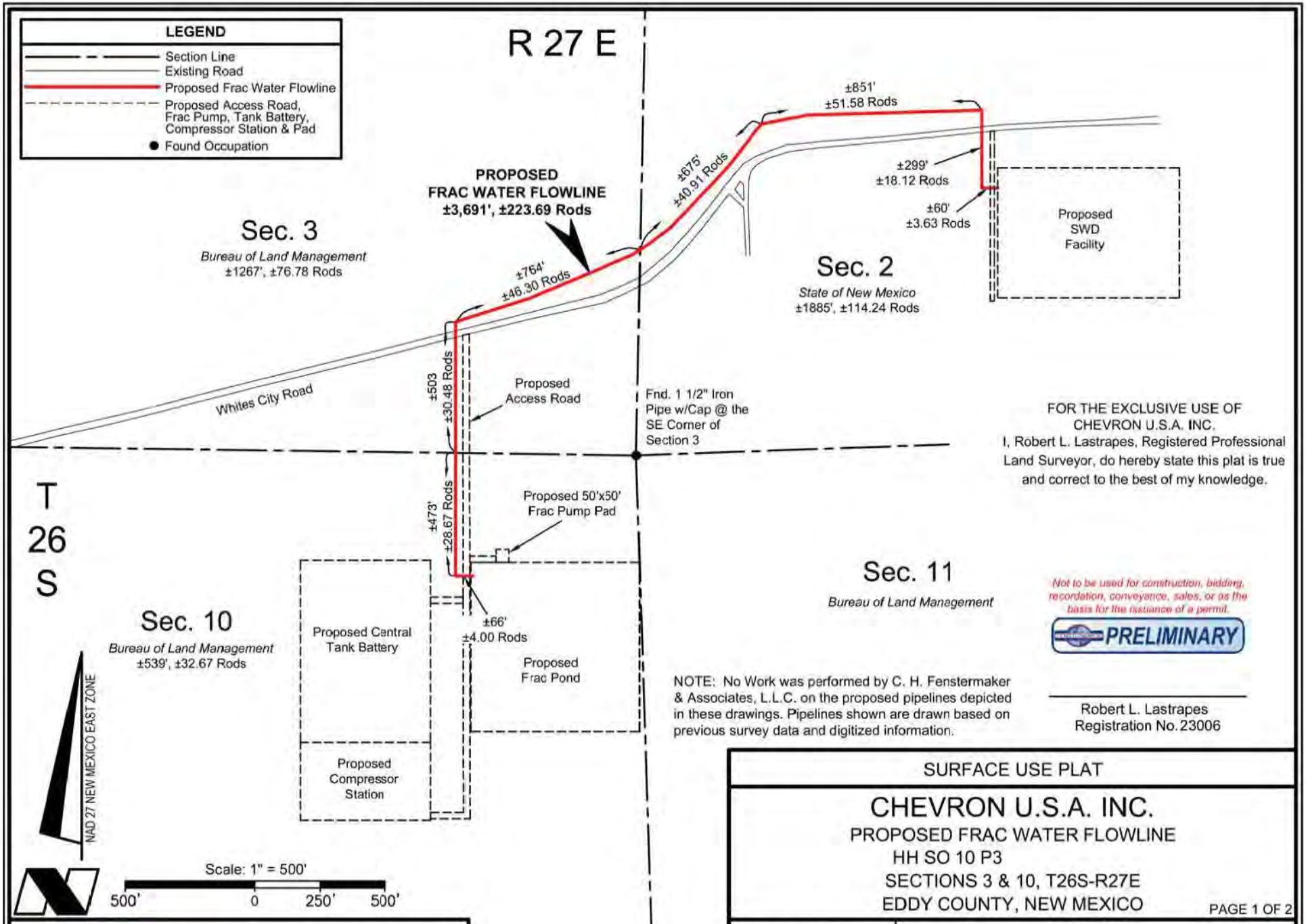
FENSTERMAKER
C. H. Fenstermaker & Associates, L.L.C.
135 Regency Sq. Lafayette, LA 70508
Ph. 337-237-2200 Fax. 337-232-3299
www.fenstermaker.com

SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED SWD FLOWLINE
HH SO 10 P3
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

DRAWN BY: BOR	REVISIONS		
PROJ. MGR.: GDG	No.	DATE:	REVISED BY:
DATE: 02/10/2016	No.	DATE:	REVISED BY:
FILENAME: T:\2015\2153372\DWG\SWD FL_SUP.dwg			



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PROPOSED FRAC WATER FLOWLINE
HH SO 10 P3
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

PAGE 1 OF 2

DRAWN BY: BOR	REVISIONS			
PROJ. MGR.: GDG	No.	DATE:	REVISED BY:	
DATE: 02/10/2016	No.	DATE:	REVISED BY:	
FILENAME: T:\2015\2153372\DWG\Frac Water FL_SUP.dwg				

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EDDY COUNTY, NEW MEXICO

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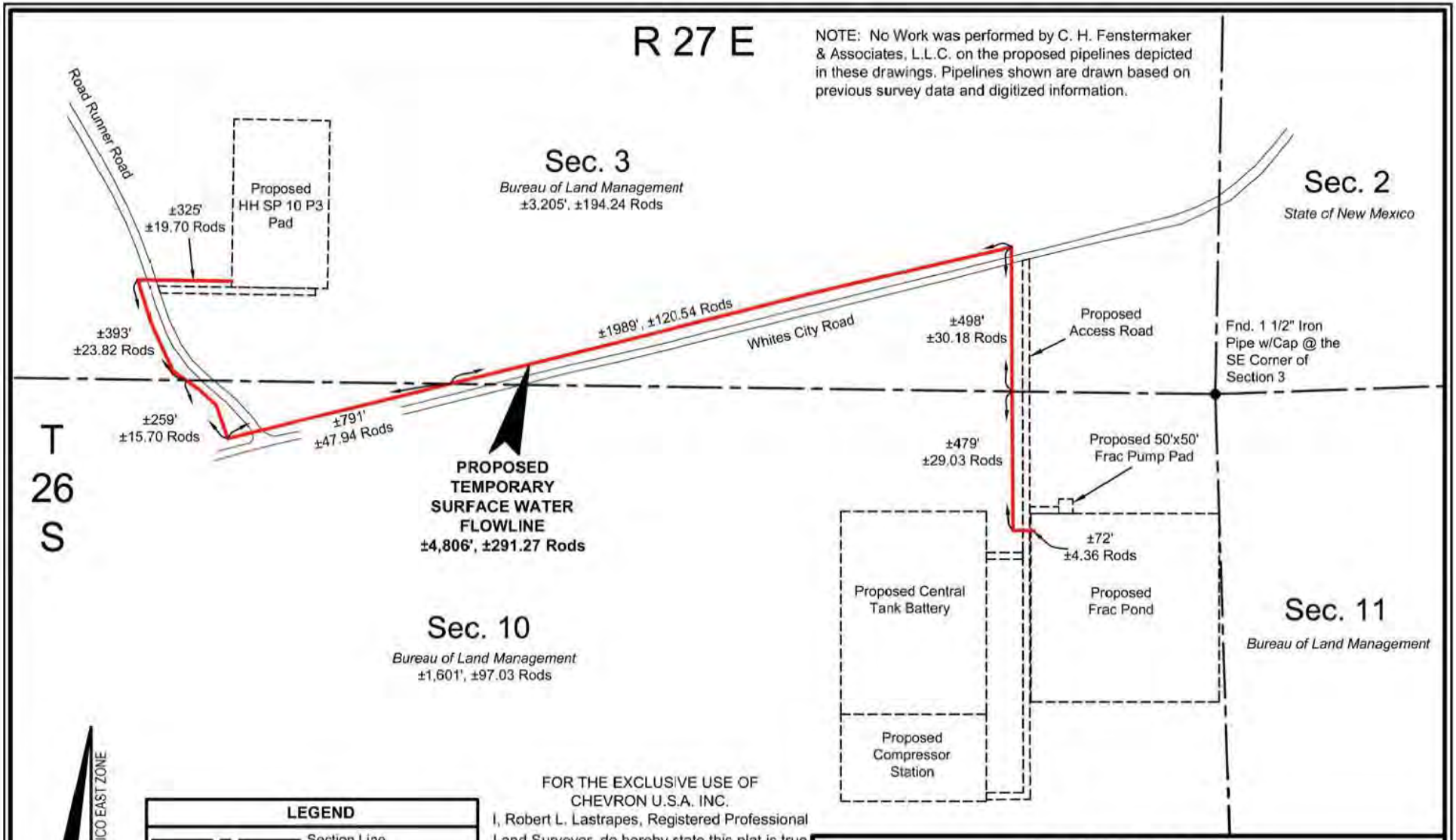

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CHEVRON U.S.A. INC.

PROPOSED TEMPORARY SURFACE WATER FLOWLINE
HH SO 10 P3
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

PAGE 1 OF 2

DRAWN BY: BOR	REVISIONS		
PROJ. MGR.: GDG	No.	DATE:	REVISED BY:
DATE: 02/08/2016	No.	DATE:	REVISED BY:
FILENAME: T:\2015\2153372\DWG\Temporary Surface Water Flowline_SUP.dwg			

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SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

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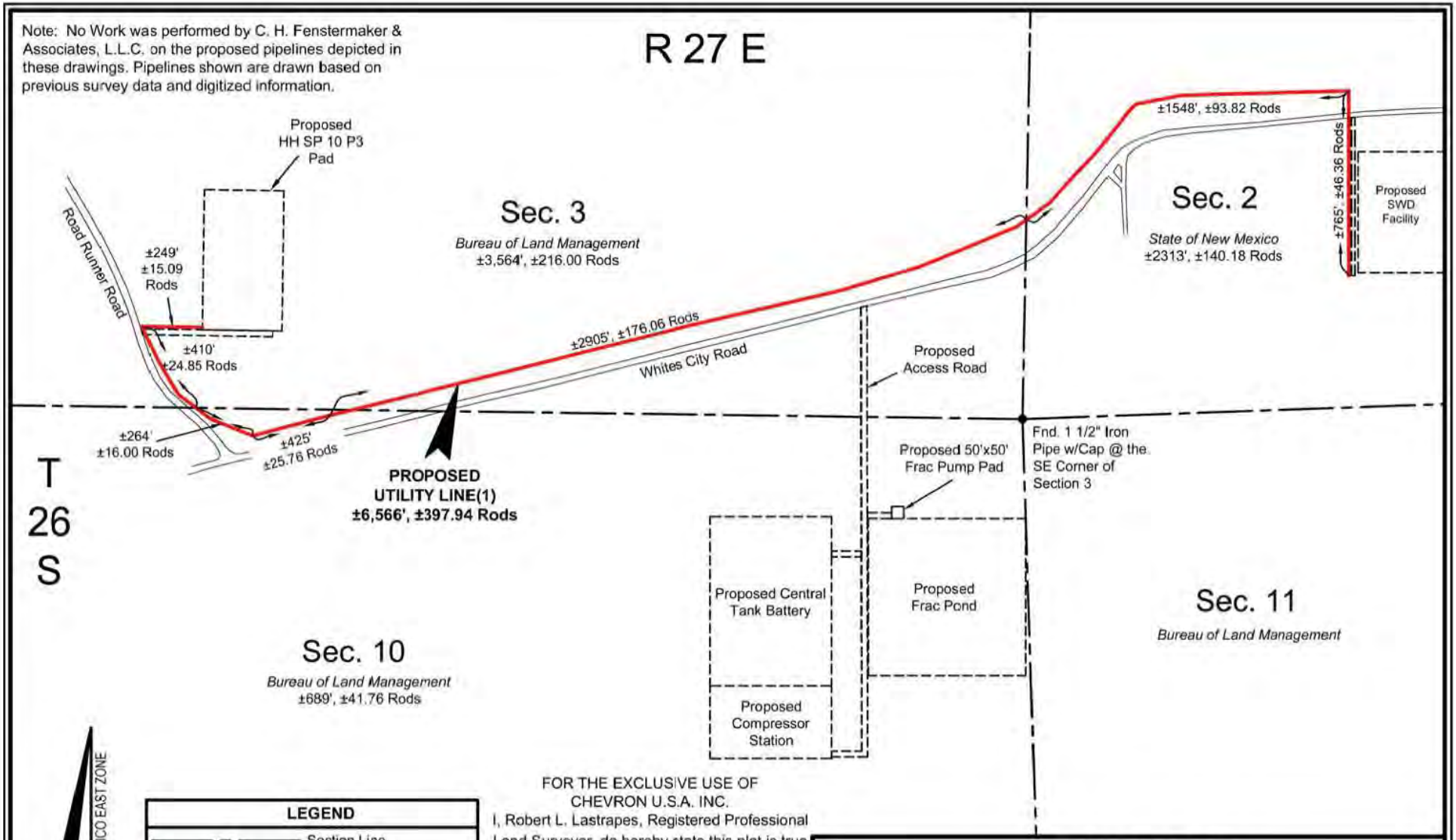

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PROPOSED UTILITY LINE(1)
HH SO 10 P3
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

DRAWN BY: BOR	REVISIONS		
PROJ. MGR.: GDG	No.	DATE:	REVISED BY:
DATE: 02/08/2016	No.	DATE:	REVISED BY:
FILENAME: T:\2015\2153372\DWG\Utility Line 1_SUP.dwg			

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EDDY COUNTY, NEW MEXICO

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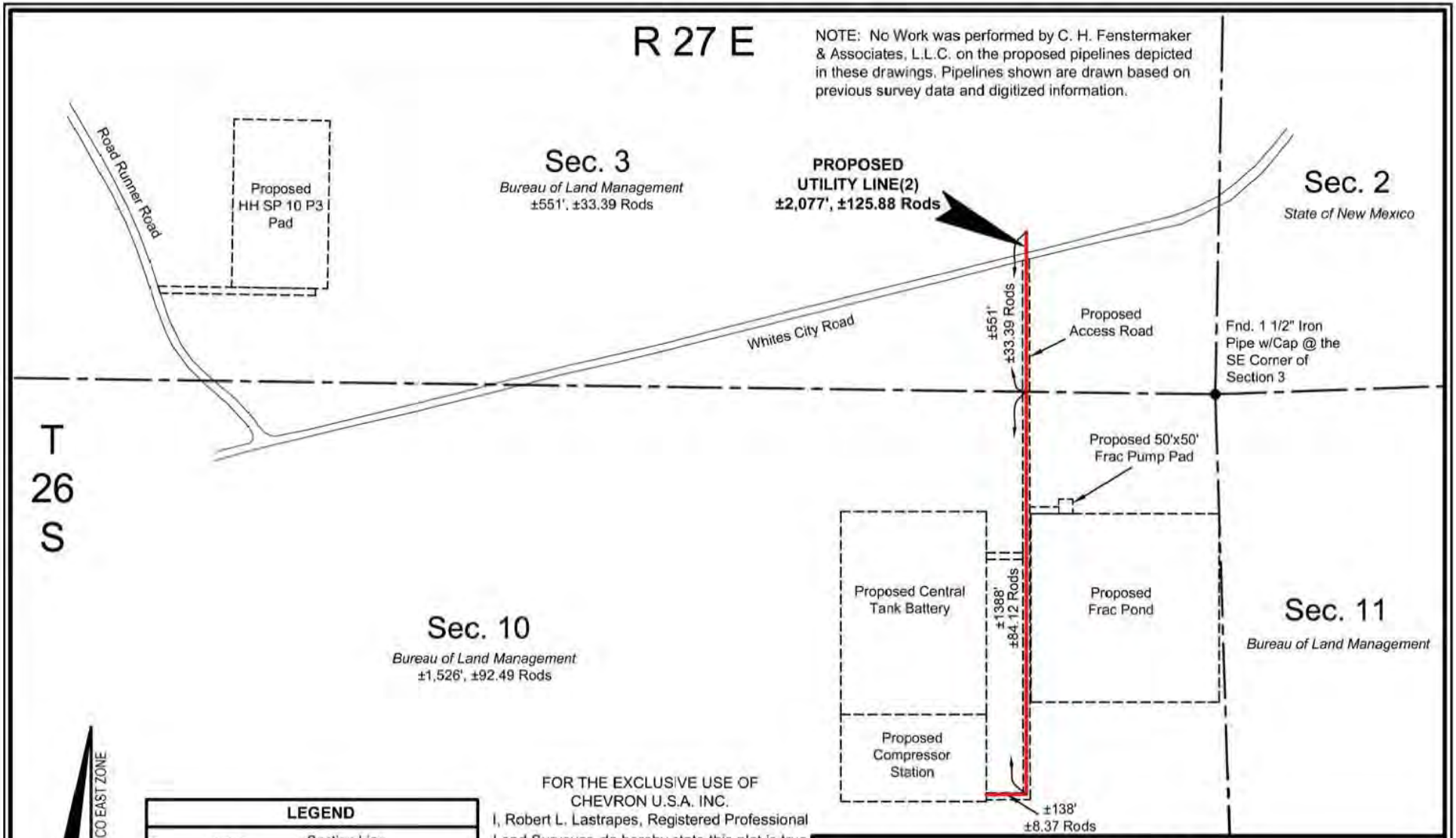

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HH SO 10 P3
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

PAGE 1 OF 2

DRAWN BY: BOR	REVISIONS			
PROJ. MGR.: GDG	No.	DATE:	REVISED BY:	
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CHEVRON U.S.A. INC.

PROPOSED UTILITY LINE(2)
HH SO 10 P3
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

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FILENAME: T:\2015\2153372\DWG\Utility Line 2_SUP.dwg			

Form 3160-3
(June 2015)

FORM APPROVED
OMB No. 1004-0137
Expires: January 31, 2018

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

5. Lease Serial No.
NMNM121473

6. If Indian, Allotee or Tribe Name

1a. Type of work: ☑ DRILL ☐ REENTER

1b. Type of Well: ☑ Oil Well ☐ Gas Well ☐ Other

1c. Type of Completion: ☐ Hydraulic Fracturing ☑ Single Zone ☐ Multiple Zone

7. If Unit or CA Agreement, Name and No.

8. Lease Name and Well No.
HH SO 10 P3

2. Name of Operator
CHEVRON USA INC

9. API Well No.
8H

3a. Address
1616 W. BENDER BLVD HOBBS, NM 88240

3b. Phone No. *(include area code)*
575-263-0431

10. Field and Pool, or Exploratory
WILDCAT; WOLFCAMP

4. Location of Well *(Report location clearly and in accordance with any State requirements.*)*
At surface 603' FSL & 2066' FWL
At proposed prod. zone 180' FSL & 2315" FWL

11. Sec., T. R. M. or Blk. and Survey or Area
SEC 3, T26S, R27E, UL N (SHL)

14. Distance in miles and direction from nearest town or post office*
12.8 MILES FROM MALAGA, NEW MEXICO

12. County or Parish
EDDY

13. State
NM

15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drlg. unit line, if any) 603' FSL

16. No of acres in lease
1920 ACRES

17. Spacing Unit dedicated to this well
320 ACRES

18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft. 4300 FT SKEEN 2 SW

19. Proposed Depth
TD 9,912' MD 20,714"

20. BLM/BIA Bond No. in file
CA 0329

21. Elevations (Show whether DF, KDB, RT, GL, etc.)
3279' GL

22. Approximate date work will start*
OCTOBER 2016

23. Estimated duration
30 DAYS

24. Attachments

The following, completed in accordance with the requirements of Onshore Oil and Gas Order No. 1, and the Hydraulic Fracturing rule per 43 CFR 3162.3-3 (as applicable)

1. Well plat certified by a registered surveyor.
2. A Drilling Plan.
3. A Surface Use Plan (if the location is on National Forest System Lands, the SUPO must be filed with the appropriate Forest Service Office).
4. Bond to cover the operations unless covered by an existing bond on file (see Item 20 above).
5. Operator certification.
6. Such other site specific information and/or plans as may be requested by the BLM.

25. Signature Cindy Herrera-Murillo
Name *(Printed/Typed)* CINDY HERRERA-MURILLO
Date 02/11/2016

Title
PERMITTING SPECIALIST

Approved by *(Signature)*
Name *(Printed/Typed)*
Date

Title
Office

Application approval does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.
Conditions of approval, if any, are attached.

Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212, make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

(Continued on page 2)

*(Instructions on page 2)

CERTIFICATION

I hereby certify that I, or someone under my direct supervision, have inspected the drill site and access route proposed herein; that I am familiar with the conditions which currently exist; that I have full knowledge of state and federal laws applicable to this operation; that the statements made in this APD package are, to the best of my knowledge, true and correct; and, that the work associated with the operations proposed will be performed in conformity with this APD package and the terms and conditions under which it is approved. I also certify that I, or the company I represent, am responsible for the operations conducted under this application. These statements are subject to the provisions of 18 U.S.C. 1001 for the filing of a false statement.

Executed this 19th day of JANUARY, 2016

Name: _____

Sean Cheben-Project Manager

Address: 1400 Smith Street

Houston, TX 77002

Room 40125

Office: 713-372-9382

Email: Sean.Cheben@CHEVRON.COM

Cindy Herrera-Murillo
Permitting Specialist
Midcontinent BU

Chevron North America
Exploration and Production Company
(A Chevron U.S.A. Inc. Division)
1616 W. Bender Blvd
Hobbs FMT, Hobbs, NM 88240
Tel 575-263-0431
Cherreramurillo@chevron.com

February 10, 2016

BLM-Carlsbad Field Office
620 E. Greene Street
Carlsbad, New Mexico 88220

Re: Applications to Drill
For Hayhurst Development Area in NM
MDP- 2016-1

Dear Sirs,

Chevron U.S.A. Inc. respectfully submits 12 Applications to Drill (APD's) with the Hayhurst Development Area's Master Development Plan (MDP-2016-1).

There will be 2 pads and 6 wells on each pad. The first well pad includes the following APD's:

HH SO 10 P3 #7H; HH SO 10 P3 #8H; HH SO 10 P3 #15H; HH SO 10 P3 #16H; HH SO 10 P3 #23H; HH SO 10 P3 #24H.

The second well pad includes the following APD's:

HH SO 8 P2 #5H; HH SO 8 P2 #6H; HH SO 8 P2 #13H; HH SO 8 P2 # 14H; HH SO 8 P2 #21H; HH SO 8 P2 #22H.

Your prompt consideration and approval of these applications will be greatly appreciated. If additional information is required, you may contact me at 575-263-0431, or by email at Cherreramurillo@chevron.com.

Sincerely,

Cindy Herrera-Murillo

Cindy Herrera-Murillo
Permitting Specialist
Enclosures

District I
1625 N. French Dr., Hobbs, NM 88240
Phone: (575) 393-6161 Fax: (575) 393-0720
District II
811 S. First St., Artesia, NM 88210
Phone: (575) 748-1283 Fax: (575) 748-9720
District III
1000 Rio Brazos Road, Aztec, NM 87410
Phone: (505) 334-6178 Fax: (505) 334-6170
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505
Phone: (505) 476-3460 Fax: (505) 476-3462

State of New Mexico
Energy, Minerals & Natural Resources Department
OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-102
Revised August 1, 2011
Submit one copy to appropriate District Office

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

[1] API Number	[2] Pool Code	[3] Pool Name
		Wildcat; Wolfcamp

[4] Property Code	[5] Property Name	[6] Well Number
	HH SO 10 P3	8H

[7] OGRID No.	[8] Operator Name	[9] Elevation
4323	CHEVRON U.S.A. INC.	3279'

[10] Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
N	3	26 SOUTH	27 EAST, N.M.P.M.		603'	SOUTH	2066'	WEST	EDDY

[11] Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
N	15	26 SOUTH	27 EAST, N.M.P.M.		180'	SOUTH	2315'	WEST	EDDY

[12] Dedicated Acres	[13] Joint or Infill	[14] Consolidation Code	[15] Order No.
320			

No allowable will be assigned to this completion until all interests have been consolidated or a non-standard unit has been approved by the division.

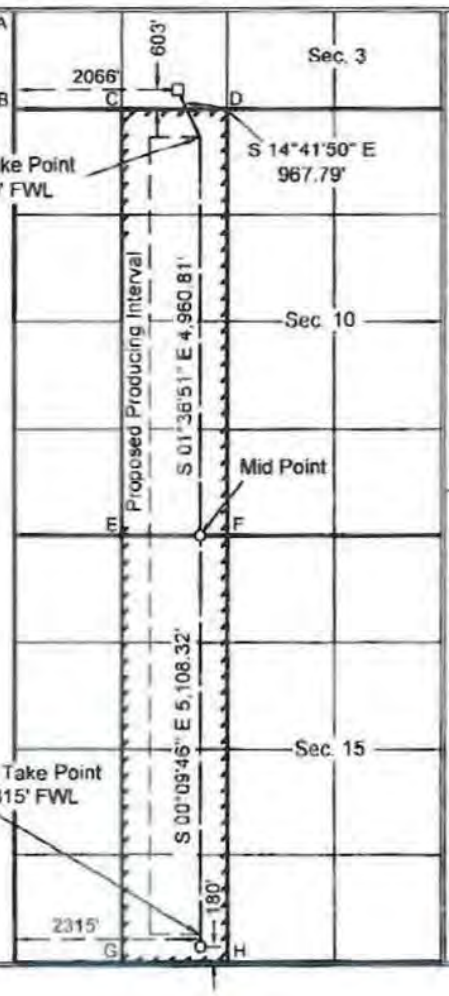
HH SO 10 P3 8H WELL		
X=	547,567	NAD 27
Y=	387,584	
LAT	32.065491	
LONG	104.179778	
X=	588,751	NAD83
Y=	387,641	
LAT.	32.065613	
LONG	104.180271	
ELEVATION +3279' NAVD 88		

CORNER COORDINATES TABLE (NAD 27)

A - Y=392447.75, X=545573.63
B - Y=387009.20, X=545492.91
C - Y=386991.36, X=546813.37
D - Y=386973.51, X=548133.83
E - Y=381698.68, X=546952.45
F - Y=381685.77, X=548282.84
G - Y=376406.42, X=546975.58
H - Y=376398.76, X=548297.64

Mid Point
Y=381688.98, X=547952.62

PROPOSED BOTTOM HOLE LOCATION		
X=	547,967	NAD 27
Y=	376,581	
LAT	32.035240	
LONG	104.178539	
X=	589,151	NAD83
Y=	376,638	
LAT	32.035363	
LONG	104.179031	



[17] OPERATOR CERTIFICATION

I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.

Cindy Herrera-Murillo 2-4-16
Signature Date

Cindy Herrera-Murillo
Printed Name

Cherreramurillo@chevron.com
E-mail Address

[18] SURVEYOR CERTIFICATION

I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.

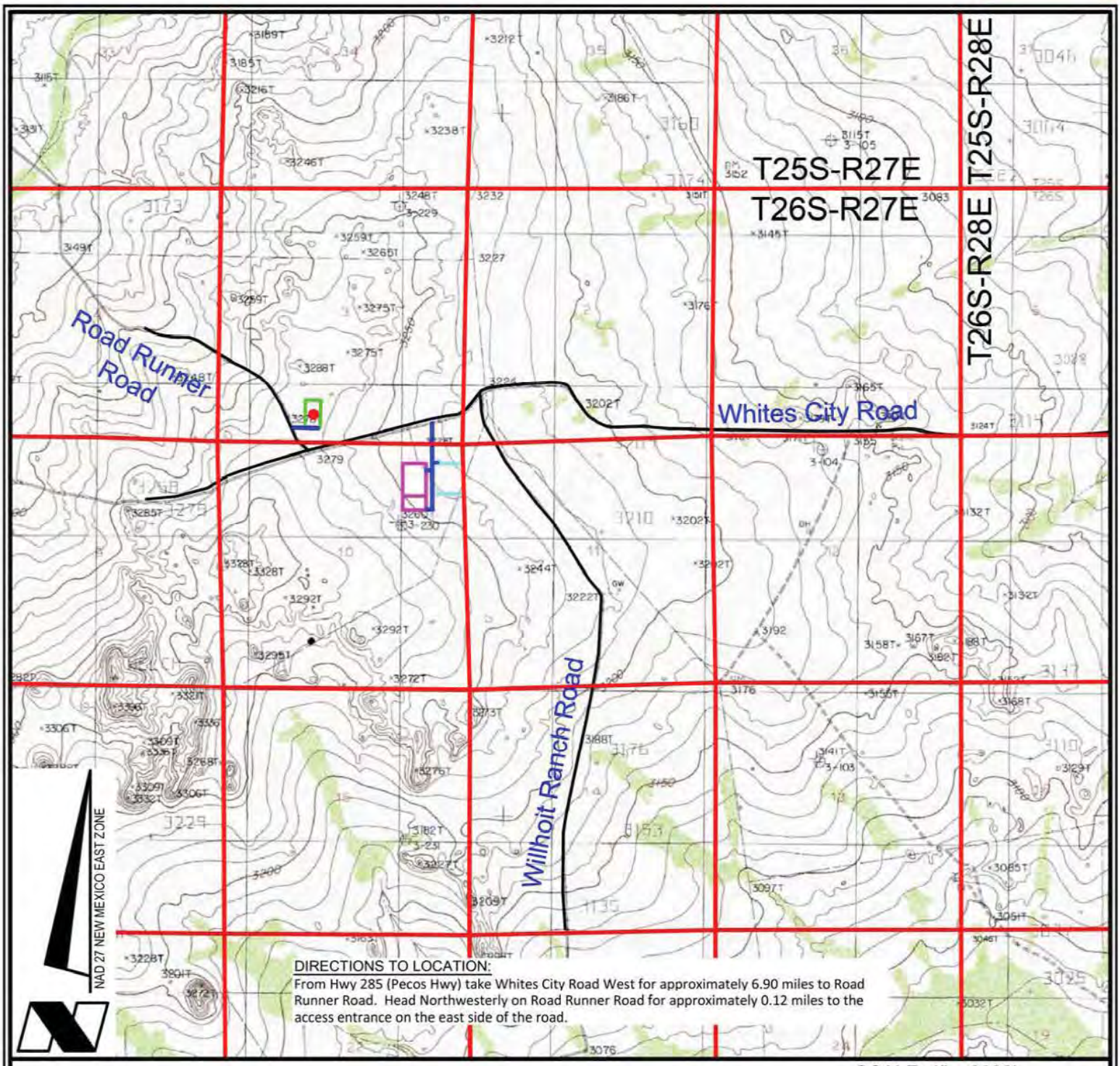
12-8-2015
Date of Survey

Signature and Seal of Professional Surveyor

ROBERT L. LASTRAPES
NEW MEXICO
PROFESSIONAL SURVEYOR
12-22-2015

23006
Certificate Number

EXHIBIT 1



DIRECTIONS TO LOCATION:
From Hwy 285 (Pecos Hwy) take Whites City Road West for approximately 6.90 miles to Road Runner Road. Head Northwesterly on Road Runner Road for approximately 0.12 miles to the access entrance on the east side of the road.

VICINITY MAP

SCALE: 1" = 3000'
3000' 0 1500' 3000'

LEGEND
- Proposed Well
- Proposed Access Road
- Proposed Drillsite
- Existing Road
- Section Line
- Proposed Frac Pond
- Proposed Facility

CHEVRON U.S.A. INC.

HH SO 10 P3 NO. 8H WELL
LOCATED 603' FSL AND 2066' FWL
SECTION 3, T26S-R27E
EDDY COUNTY, NEW MEXICO

FENSTERMAKER
C.H. Fenstermaker & Associates, L.L.C.
135 Regency Sq. Lafayette, LA 70508
Ph. 337-237-2200 Fax. 337-232-3299
www.fenstermaker.com

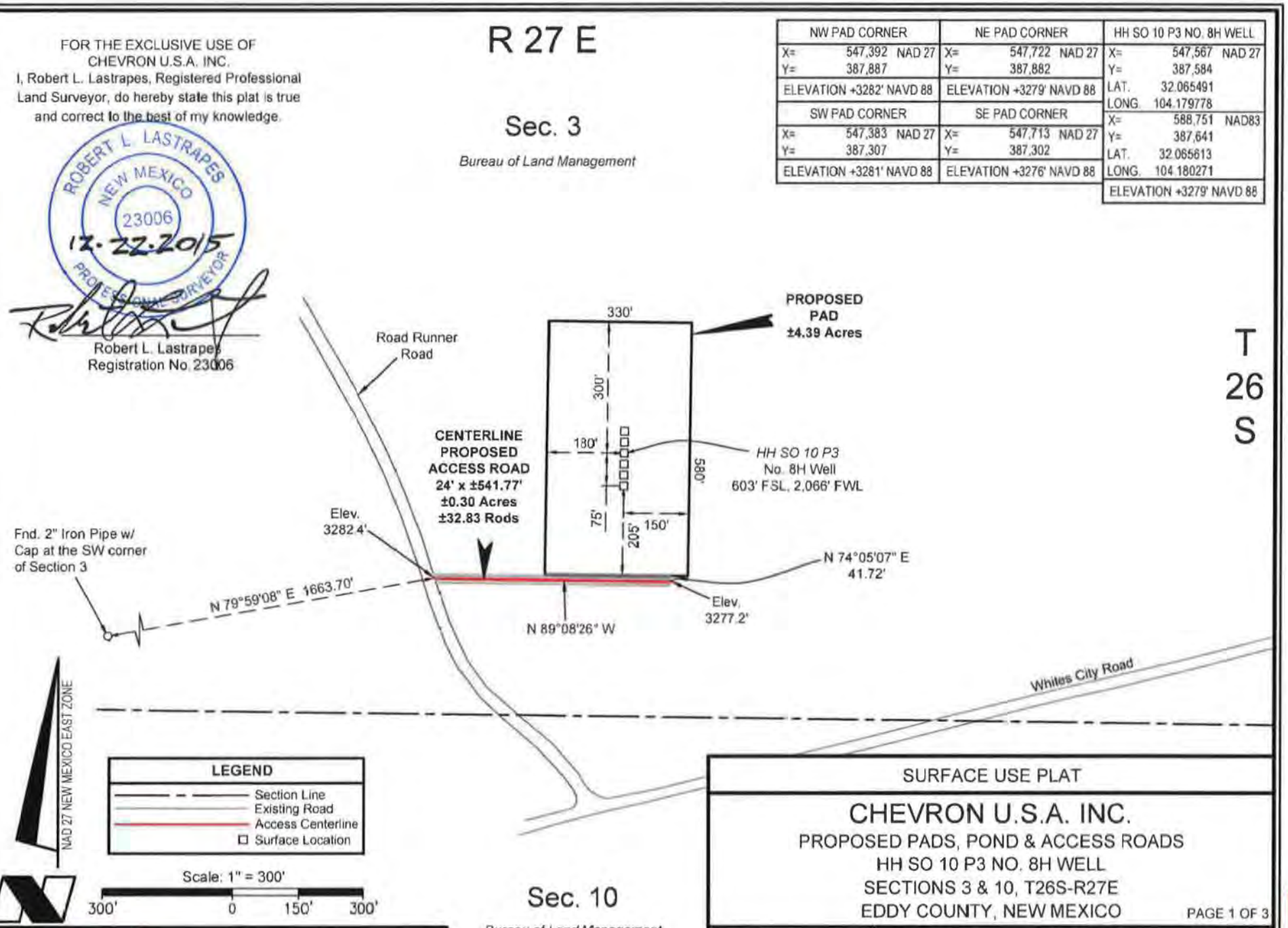
DRAWN BY: LJG	REVISIONS		
PROJ. MGR.: GDG	No.	DATE:	REVISED BY:
DATE: 12/16/2015	No.	DATE:	REVISED BY:
FILENAME: T:\2015\2153370\DWG\HH SO 10 P3 8H_APD.dwg			

FOR THE EXCLUSIVE USE OF
CHEVRON U.S.A. INC.
I, Robert L. Lastrapes, Registered Professional Land Surveyor, do hereby state this plat is true and correct to the best of my knowledge.

ROBERT L. LASTRAPES
NEW MEXICO
23006
12-22-2015
PROFESSIONAL SURVEYOR

Robert L. Lastrapes
Registration No. 23006

NW PAD CORNER	NE PAD CORNER	HH SO 10 P3 NO. 8H WELL
X= 547,392 NAD 27	X= 547,722 NAD 27	X= 547,567 NAD 27
Y= 387,887	Y= 387,882	Y= 387,584
ELEVATION +3282' NAVD 88	ELEVATION +3279' NAVD 88	LAT. 32.065491
		LONG. 104.179778
SW PAD CORNER	SE PAD CORNER	X= 588,751 NAD83
X= 547,383 NAD 27	X= 547,713 NAD 27	Y= 387,641
Y= 387,307	Y= 387,302	LAT. 32.065613
ELEVATION +3281' NAVD 88	ELEVATION +3276' NAVD 88	LONG. 104.180271
		ELEVATION +3279' NAVD 88



SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED PADS, POND & ACCESS ROADS
HH SO 10 P3 NO. 8H WELL
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

PAGE 1 OF 3

FENSTERMAKER
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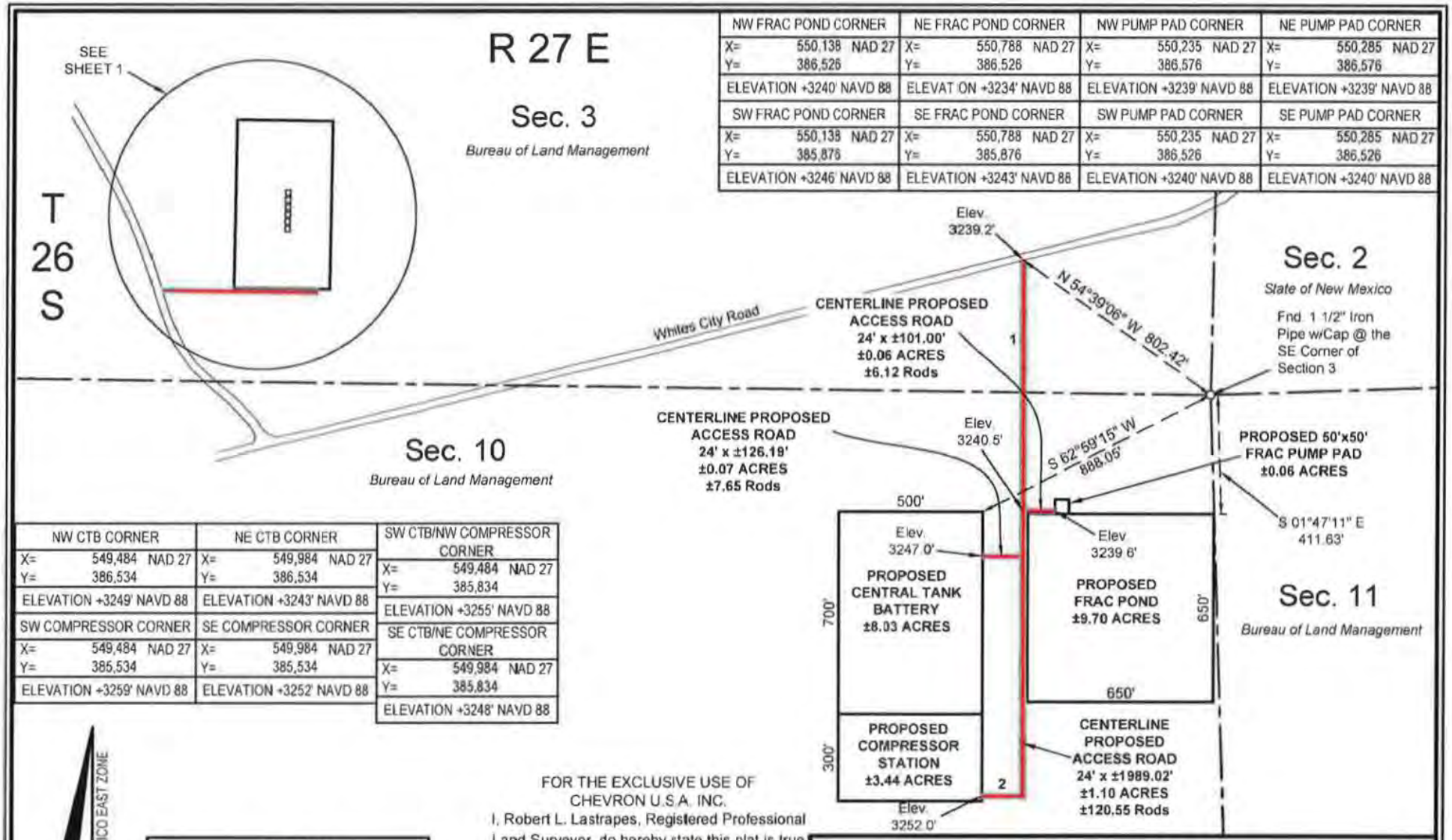
DRAWN BY: LJG	REVISIONS		
PROJ. MGR.: GDG	No.	DATE:	REVISED BY:
DATE: 12/16/2015	No.	DATE:	REVISED BY:
FILENAME: T:\2015\2153370\DWG\HH SO 10 P3 8H_SUP.dwg			

EXHIBITS 2&5

NW FRAC POND CORNER	NE FRAC POND CORNER	NW PUMP PAD CORNER	NE PUMP PAD CORNER
X= 550,138 NAD 27 Y= 386,526	X= 550,788 NAD 27 Y= 386,526	X= 550,235 NAD 27 Y= 386,576	X= 550,285 NAD 27 Y= 386,576
ELEVATION +3240' NAVD 88	ELEVAT ON +3234' NAVD 88	ELEVATION +3239' NAVD 88	ELEVATION +3239' NAVD 88
SW FRAC POND CORNER	**SE FRAC POND CORNER**	**SW PUMP PAD CORNER**	**SE PUMP PAD CORNER**
X= 550,138 NAD 27 Y= 385,876	X= 550,788 NAD 27 Y= 385,876	X= 550,235 NAD 27 Y= 386,526	X= 550,285 NAD 27 Y= 386,526
ELEVATION +3246' NAVD 88	ELEVATION +3243' NAVD 88	ELEVATION +3240' NAVD 88	ELEVATION +3240' NAVD 88



NW CTB CORNER	NE CTB CORNER	SW CTB/NW COMPRESSOR CORNER
X= 549,484 NAD 27 Y= 386,534	X= 549,984 NAD 27 Y= 386,534	X= 549,484 NAD 27 Y= 385,834
ELEVATION +3249' NAVD 88	ELEVATION +3243' NAVD 88	ELEVATION +3255' NAVD 88
SW COMPRESSOR CORNER	**SE COMPRESSOR CORNER**	**SE CTB/NE COMPRESSOR CORNER**
X= 549,484 NAD 27 Y= 385,534	X= 549,984 NAD 27 Y= 385,534	X= 549,984 NAD 27 Y= 385,834
ELEVATION +3259' NAVD 88	ELEVATION +3252' NAVD 88	ELEVATION +3248' NAVD 88

NAD 27 NEW MEXICO EAST ZONE

LEGEND

- Section Line
- Existing Road
- Access Centerline
- Surface Location

Scale: 1" = 500'

500' 0 250' 500'

FOR THE EXCLUSIVE USE OF CHEVRON U.S.A. INC.
I, Robert L. Lastrapes, Registered Professional Land Surveyor, do hereby state this plat is true and correct to the best of my knowledge.

ROBERT L. LASTRAPES NEW MEXICO 23006 PROFESSIONAL SURVEYOR 12-22-2015

Robert L. Lastrapes
Registration No. 23006

FENSTERMAKER

C. H. Fenstermaker & Associates, L.L.C.
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SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED PADS, POND & ACCESS ROADS
HH SO 10 P3 NO. 8H WELL
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

DRAWN BY: LJG	REVISIONS		
PROJ. MGR.: GDG	No.	DATE:	REVISED BY:
DATE: 12/16/2015	No.	DATE:	REVISED BY:

FILENAME: T:\2015\2153370\DWG\HH SO 10 P3 8H_SUP.dwg

DISCLAIMER: At this time, C.H. Fenstermaker & Associates, L.L.C. has not performed nor was asked to perform any type of engineering, hydrological modeling, flood plain, or "No Rise" certification analyses, including but not limited to determining whether the project will impact flood hazards in connection with federal/FEMA, state, and/or local laws, ordinances and regulations. Accordingly, Fenstermaker makes no warranty or representation of any kind as to the foregoing issues, and persons or entities using this information shall do so at their own risk.

NOTE:
Please be advised, that while reasonable efforts are made to locate and verify pipelines and anomalies using our standard pipeline locating equipment, it is impossible to be 100 % effective. As such, we advise using caution when performing work as there is a possibility that pipelines and other hazards, such as fiber optic cables, PVC pipelines, etc. may exist undetected on site.

NOTE:
Many states maintain information centers that establish links between those who dig (excavators) and those who own and operate underground facilities (operators). It is advisable and in most states, law, for the contractor to contact the center for assistance in locating and marking underground utilities. For guidance, New Mexico One Call. www.nmonecall.org

CENTERLINE PROPOSED ACCESS ROAD		
COURSE	BEARING	DISTANCE
1	S 00° 05' 06" E	1849.60'
2	S 89° 54' 54" W	139.42'

FOR THE EXCLUSIVE USE OF
CHEVRON U.S.A. INC.
I, Robert L. Lastrapes, Registered Professional Land Surveyor, do hereby state this plat is true and correct to the best of my knowledge.

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NEW MEXICO
23006
12-22-2015
PROFESSIONAL SURVEYOR

Robert L. Lastrapes
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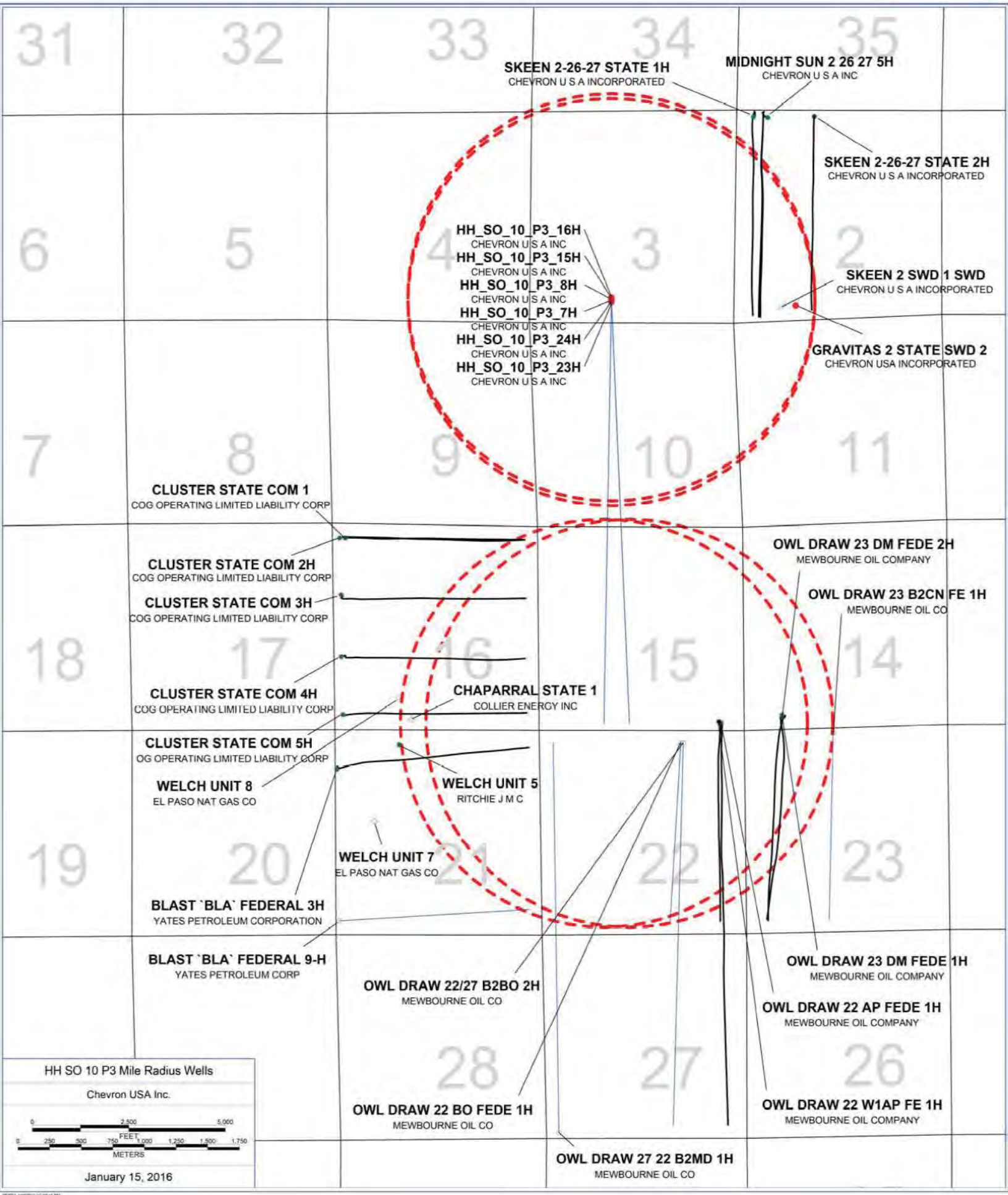
CHEVRON U.S.A. INC.

PROPOSED PADS, POND & ACCESS ROADS
HH SO 10 P3 NO. 8H WELL
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

DRAWN BY: LJG	REVISIONS		
PROJ. MGR.: GDG	No.	DATE:	REVISED BY:
DATE: 12/16/2015	No.	DATE:	REVISED BY:
FILENAME: T:\2015\2153370\DWG\HH SO 10 P3 8H_SUP.dwg			

EXHIBIT 3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SKEEN 2-26-27 STATE 1H
CHEVRON U S A INCORPORATED
MIDNIGHT SUN 2 26 27 5H
CHEVRON U S A INC
SKEEN 2-26-27 STATE 2H
CHEVRON U S A INCORPORATED
HH_SO_10_P3_16H
CHEVRON U S A INC
HH_SO_10_P3_15H
CHEVRON U S A INC
HH_SO_10_P3_8H
CHEVRON U S A INC
HH_SO_10_P3_7H
CHEVRON U S A INC
HH_SO_10_P3_24H
CHEVRON U S A INC
HH_SO_10_P3_23H
CHEVRON U S A INC
SKEEN 2 SWD 1 SWD
CHEVRON U S A INCORPORATED
GRAVITAS 2 STATE SWD 2
CHEVRON USA INCORPORATED
CLUSTER STATE COM 1
COG OPERATING LIMITED LIABILITY CORP
CLUSTER STATE COM 2H
COG OPERATING LIMITED LIABILITY CORP
CLUSTER STATE COM 3H
COG OPERATING LIMITED LIABILITY CORP
CLUSTER STATE COM 4H
COG OPERATING LIMITED LIABILITY CORP
CLUSTER STATE COM 5H
OG OPERATING LIMITED LIABILITY CORP
WELCH UNIT 8
EL PASO NAT GAS CO
CHAPARRAL STATE 1
COLLIER ENERGY INC
WELCH UNIT 5
RITCHIE J M C
WELCH UNIT 7
EL PASO NAT GAS CO
BLAST `BLA` FEDERAL 3H
YATES PETROLEUM CORPORATION
BLAST `BLA` FEDERAL 9-H
YATES PETROLEUM CORP
OWL DRAW 23 DM FEDE 2H
MEWBOURNE OIL COMPANY
OWL DRAW 23 B2CN FE 1H
MEWBOURNE OIL CO
OWL DRAW 23 DM FEDE 1H
MEWBOURNE OIL COMPANY
OWL DRAW 22/27 B2BO 2H
MEWBOURNE OIL CO
OWL DRAW 22 AP FEDE 1H
MEWBOURNE OIL COMPANY
OWL DRAW 22 BO FEDE 1H
MEWBOURNE OIL CO
OWL DRAW 22 W1AP FE 1H
MEWBOURNE OIL COMPANY
OWL DRAW 27 22 B2MD 1H
MEWBOURNE OIL CO
HH SO 10 P3 Mile Radius Wells
Chevron USA Inc.
0
2,500
5,000
FEET
0
250
500
750
1,000
1,250
1,500
1,750
METERS
January 15, 2016

1. FORMATION TOPS

The estimated tops of important geologic markers are as follows:

FORMATION	SUB-SEA TVD	KBTVD	MD
Castille		505	
Lamar		2395	
Bell		2310	
Cherry		3208	
Brushy		4450	
Bone Spring/Avalon		6299	
First Bone Spring Sand		6888	
First Bone Spring Shale		6914	
Second Bone Spring Sand		7621	
Harkey Sand		8123	
Third Bone Spring Sand		8617	
Wolfcamp A		9342	
Wolfcamp C		9912	
Lateral TVD Wolfcamp C		9912	20714.46'

2. ESTIMATED DEPTH OF WATER, OIL, GAS & OTHER MINERAL BEARING FORMATIONS

The estimated depths at which the top and bottom of the anticipated water, oil, gas, or other mineral bearing formations are expected to be encountered are as follows:

Substance	Formation	Depth
Deepest Expected Base of Fresh Water		450
Water	Castille	505
Water	Cherry Canyon	3208
Oil/Gas	Brushy Canyon	4450
Oil/Gas	Bone Spring Limestone	6888
Oil/Gas	First Bone Spring Shale	6914
Oil/Gas	Second Bone Spring Sand	7621
Oil/Gas	Harkey Sand	8123
Oil/Gas	Wolfcamp A	9342
Oil/Gas	Wolfcamp C	9912

All shows of fresh water and minerals will be reported and protected.

3. BOP EQUIPMENT

PLEASE REFERENCE MDP

4. **CASING PROGRAM**

Purpose	From	To	Hole Size	Csg Size	Weight	Grade	Thread	Condition
Surface	0'	450'	17-1/2"	13-3/8"	54.5 #	K-55	STC	New
Intermediate	0'	9,015'	12-1/4"	9-5/8"	40.0 #	L-80	TXP	New
Production	0'	20,714'	8-1/2"	5-1/2"	20.0 #	P-110	TXP	New

SF Calculations based on the following "Worst Case" casing design:

Surface Casing: 450'
Intermediate Casing: 9015'
Production Casing: 20714.46' MD/9,912' TVD (10,000' VS @ 90.3 deg inc)

Casing String	Min SF Burst	Min SF Collapse	Min SF Tension	Min SF Tri-Axial
Surface	1.82	5.11	3.97	2.31
Intermediate	1.45	1.32	1.78	1.84
Production	1.26	1.5	2.43	1.35

Min SF is the smallest of a group of safety factors that include the following considerations:

	Surf	Int	Prod
Burst Design			
Pressure Test- Surface, Int, Prod Csg P external: Water P internal: Test psi + next section heaviest mud in csg	X	X	X
Displace to Gas- Surf Csg P external: Water P internal: Dry Gas from Next Csg Point	X		
Frac at Shoe, Gas to Surf- Int Csg P external: Water P internal: Dry Gas, 15 ppg Frac Gradient		X	
Stimulation (Frac) Pressures- Prod Csg P external: Water P internal: Max inj pressure w/ heaviest injected fluid			X
Tubing leak- Prod Csg (packer at KOP) P external: Water P internal: Leak just below surf, 8.7 ppg packer fluid			X
Collapse Design			
Full Evacuation P external: Water gradient in cement, mud above TOC P internal: none	X	X	X
Cementing- Surf, Int, Prod Csg P external: Wet cement P internal: water	X	X	X
Tension Design			

100k lb overpull	X	X	X

5. **CEMENTING PROGRAM**

Slurry	Type	Cement Top	Cement Bottom	Weight	Yield	%Excess	Sacks	Water
Surface				(ppg)	(sx/cu ft)	Open Hole		gal/sk
Tail	Class C	0'	450'	14.8	1.33	50	356	6.37
Intermediate								
Stage 2 Lead	50:50 Poz: Class C + Antifoam, Extender, Salt, Retarder	0'	1,100'	11.9	2.43	50	213	14.21
Stage 2 Tail	Class C + Antifoam, Retarder, Viscosifier	1,100'	2,100'	14.8	1.33	0	235	6.37
DV TOOL		2,100'						
Stage 1 Lead	50:50 Poz: Class H + Extender, Antifoam, Retarder, Salt, Viscosifier	2,100'	8,015'	11.9	2.43	100	1524	13.76
Stage 1 Tail	Class H + Retarder, Extender, Dispersant	8,015'	9,015'	15.6	1.21	50	389	5.54
Production								
Lead	50:50 Poz: Class H + Extender, Antifoam, Dispersant, , Retarder	7,015'	8,015'	14.5	1.21	100	430	5.54
Tail	Class H + Viscosifier, Antifoam, Dispersant, Fluid Loss, Retarder, Expanding Agent	8,015'	20,714'	15.6	1.2	50	3633	5.30

6. MUD PROGRAM

From	To	Type	Weight	F. Vis	Filtrate
0'	450'	Spud Mud	8.3 - 8.7	32 - 34	NC - NC
450'	9015'	OBM	9.0 - 9.5	50 -70	5.0 - 10
9015'	20,714'	OBM	10.0 - 13.5	50 -70	5.0 - 10

7. TESTING, LOGGING, AND CORING

TYPE	Logs	Interval	Timing	Vendor
Mudlogs	2 man mudlog	Int Csg to TD	Drillout of Int Csg	TBD
LWD	MWD Gamma	Int. and Prod. Hole	While Drilling	TBD

8. ABNORMAL PRESSURES AND HYDROGEN SULFIDE

PLEASE REFERENCE MDP

Schlumberger

#8H - Rev0

Chevron

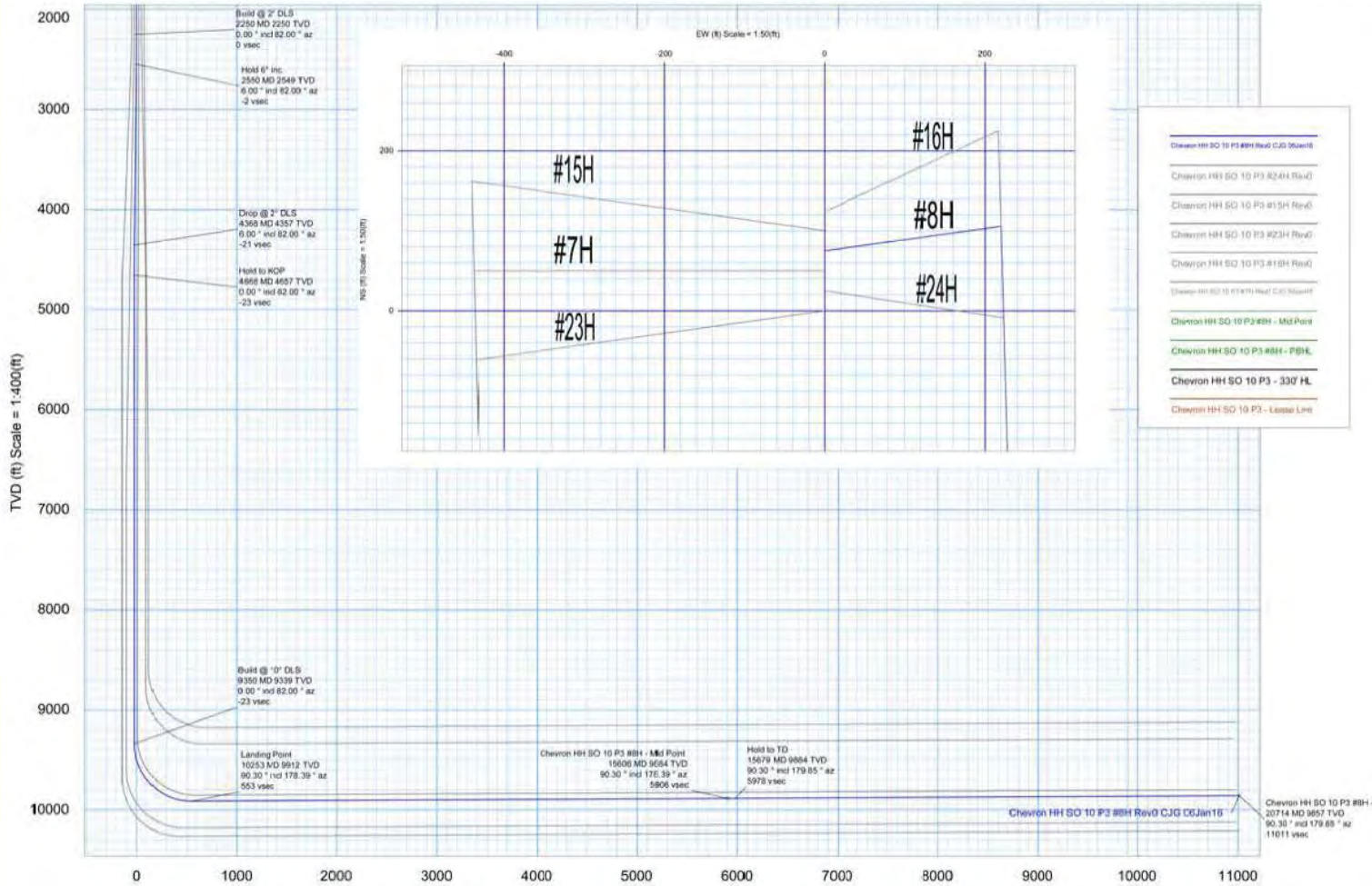
Borehole:	Well:	Field:	Structure:
Original Borehole	HH SO 10 P3 #8H	NM Eddy County (NAD 27)	Chevron HH SO 10 P3 Pad

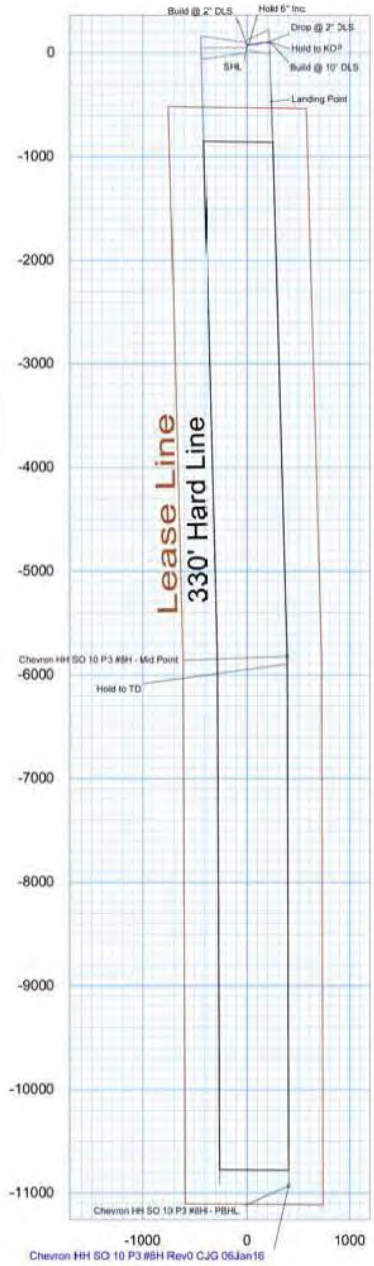
Gravity & Magnetic Parameters						Surface Location	NAD27 New Mexico State Plane, Eastern Zone, US Feet					Miscellaneous			
Model:	HDGM 2015	Dip:	59.816°	Date:	30-Dec-2015	Lat:	N 32 3 35.77	Northing:	387584ftUS	Grid Conv:	0.0815°	Slot:	HH SO 10 P3 #8H	TVD Ref:	RKB(3312ft above MSL)
MagDec:	7.519°	FS:	48169.726nT	Gravity FS:	998.428mgn (9.80665 Based)	Lon:	W 104 10 47.21	Easting:	547567ftUS	Scale Fact:	0.99991166	Plan:	Chevron HH SO 10 P3 #8H Rev0 CJG 06Jan16		

Critical Points

Critical Point	MD	INCL	AZIM	TVD	VSEC	N(+)/S(-)	E(+)/W(-)	DLS
SHL	0.00	0.00	82.00	0.00	0.00	75.01	1.00	
Build @ 2° DLS	2250.00	0.00	82.00	2250.00	0.00	75.01	1.00	0.00
Hold 6° Inc.	2550.00	6.00	82.00	2549.45	-1.62	77.19	16.54	2.00
Drop @ 2° DLS	4368.00	6.00	82.00	4357.49	-21.21	103.64	204.72	0.00
Hold to KOP	4668.00	0.00	82.00	4656.94	-22.83	105.82	220.27	2.00
Build @ 10° DLS	9350.11	0.00	82.00	9339.05	-22.83	105.82	220.27	0.00
Landing Point	10253.10	90.30	178.39	9912.00	553.11	-469.91	238.45	10.00
Chevron HH SO 10 P3 #8H - Mid Point	15605.92	90.30	178.39	9883.98	5905.67	-5820.55	386.65	0.00
Hold to TD	15678.68	90.30	179.85	9883.60	5978.41	-5893.29	387.77	2.00
Chevron HH SO 10 P3 #8H - PBHL	20714.46	90.30	179.85	9857.24	11011.26	-10928.99	401.04	0.00

Grid North
Tot Corr (M->G 7.437°)
Mag Dec (7.519°)
Grid Conv (0.082°)





CONTROLLED

1	Originator	Colby Gannon
2	DEC Sign Off	
3	CC Sign Off	
4	Client	Chevron

Schlumberger

Chevron

Chevron HH SO 10 P3 #8H Rev0 CJG 06Jan16 Proposal Geodetic Report

(Non-Def Plan)

Report Date:	January 13, 2016 - 04:16 PM	**Survey / DLS Computation:**	Minimum Curvature / Lubinski
Client:	Chevron	**Vertical Section Azimuth:**	177.918 ° (Grid North)
Field:	NM Eddy County (NAD 27)	**Vertical Section Origin:**	75.007 ft, 1.000 ft
Structure / Slot:	Chevron HH SO 10 P3 Pad / HH SO 10 P3 #8H	**TVD Reference Datum:**	RKB
Well:	HH SO 10 P3 #8H	**TVD Reference Elevation:**	3312.000 ft above MSL
Borehole:	Original Borehole	**Seabed / Ground Elevation:**	3279.000 ft above MSL
UWI / API#:	Unknown / Unknown	**Magnetic Declination:**	7.519 °
Survey Name:	Chevron HH SO 10 P3 #8H Rev0 CJG 06Jan16	**Total Gravity Field Strength:**	998.4279mgn (9.80665 Based)
Survey Date:	December 30, 2015	**Gravity Model:**	GARM
Tort / AHD / DDI / ERD Ratio:	103.759 ° / 11258.593 ft / 6.388 / 1.136	**Total Magnetic Field Strength:**	48169.725 nT
Coordinate Reference System:	NAD27 New Mexico State Plane, Eastern Zone, US Feet	**Magnetic Dip Angle:**	59.816 °
Location Lat / Long:	N 32° 3' 55.76665", W 104° 10' 47.20658"	**Declination Date:**	December 30, 2015
Location Grid N/E Y/X:	N 387584.000 ftUS, E 547567.000 ftUS	**Magnetic Declination Model:**	HDGM 2015
CRS Grid Convergence Angle:	0.0815 °	**North Reference:**	Grid North
Grid Scale Factor:	0.99991168	**Grid Convergence Used:**	0.0815 °
Version / Patch:	2.8.572.0	**Total Corr Mag North->Grid North:**	7.4376 °
		Local Coord Referenced To:	Structure Reference Point

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
SHL	0.00	0.00	82.00	0.00	0.00	75.01	1.00	N/A	387584.00	547567.00	N 32 3 55.77	W 104 10 47.21
	100.00	0.00	82.00	100.00	0.00	75.01	1.00	0.00	387584.00	547567.00	N 32 3 55.77	W 104 10 47.21
	200.00	0.00	82.00	200.00	0.00	75.01	1.00	0.00	387584.00	547567.00	N 32 3 55.77	W 104 10 47.21
	300.00	0.00	82.00	300.00	0.00	75.01	1.00	0.00	387584.00	547567.00	N 32 3 55.77	W 104 10 47.21
	400.00	0.00	82.00	400.00	0.00	75.01	1.00	0.00	387584.00	547567.00	N 32 3 55.77	W 104 10 47.21
	500.00	0.00	82.00	500.00	0.00	75.01	1.00	0.00	387584.00	547567.00	N 32 3 55.77	W 104 10 47.21
	600.00	0.00	82.00	600.00	0.00	75.01	1.00	0.00	387584.00	547567.00	N 32 3 55.77	W 104 10 47.21
	700.00	0.00	82.00	700.00	0.00	75.01	1.00	0.00	387584.00	547567.00	N 32 3 55.77	W 104 10 47.21
	800.00	0.00	82.00	800.00	0.00	75.01	1.00	0.00	387584.00	547567.00	N 32 3 55.77	W 104 10 47.21
	900.00	0.00	82.00	900.00	0.00	75.01	1.00	0.00	387584.00	547567.00	N 32 3 55.77	W 104 10 47.21
	1000.00	0.00	82.00	1000.00	0.00	75.01	1.00	0.00	387584.00	547567.00	N 32 3 55.77	W 104 10 47.21
	1100.00	0.00	82.00	1100.00	0.00	75.01	1.00	0.00	387584.00	547567.00	N 32 3 55.77	W 104 10 47.21
	1200.00	0.00	82.00	1200.00	0.00	75.01	1.00	0.00	387584.00	547567.00	N 32 3 55.77	W 104 10 47.21
	1300.00	0.00	82.00	1300.00	0.00	75.01	1.00	0.00	387584.00	547567.00	N 32 3 55.77	W 104 10 47.21
	1400.00	0.00	82.00	1400.00	0.00	75.01	1.00	0.00	387584.00	547567.00	N 32 3 55.77	W 104 10 47.21
	1500.00	0.00	82.00	1500.00	0.00	75.01	1.00	0.00	387584.00	547567.00	N 32 3 55.77	W 104 10 47.21
	1600.00	0.00	82.00	1600.00	0.00	75.01	1.00	0.00	387584.00	547567.00	N 32 3 55.77	W 104 10 47.21
	1700.00	0.00	82.00	1700.00	0.00	75.01	1.00	0.00	387584.00	547567.00	N 32 3 55.77	W 104 10 47.21
	1800.00	0.00	82.00	1800.00	0.00	75.01	1.00	0.00	387584.00	547567.00	N 32 3 55.77	W 104 10 47.21
	1900.00	0.00	82.00	1900.00	0.00	75.01	1.00	0.00	387584.00	547567.00	N 32 3 55.77	W 104 10 47.21
	2000.00	0.00	82.00	2000.00	0.00	75.01	1.00	0.00	387584.00	547567.00	N 32 3 55.77	W 104 10 47.21
	2100.00	0.00	82.00	2100.00	0.00	75.01	1.00	0.00	387584.00	547567.00	N 32 3 55.77	W 104 10 47.21
	2200.00	0.00	82.00	2200.00	0.00	75.01	1.00	0.00	387584.00	547567.00	N 32 3 55.77	W 104 10 47.21
Build @ 2° DLS	2250.00	0.00	82.00	2250.00	0.00	75.01	1.00	0.00	387584.00	547567.00	N 32 3 55.77	W 104 10 47.21
	2300.00	1.00	82.00	2300.00	-0.04	75.07	1.43	2.00	387584.06	547567.43	N 32 3 55.77	W 104 10 47.20
	2400.00	3.00	82.00	2399.93	-0.40	75.55	4.89	2.00	387584.55	547570.89	N 32 3 55.77	W 104 10 47.16
	2500.00	5.00	82.00	2499.68	-1.12	76.52	11.80	2.00	387585.52	547577.79	N 32 3 55.78	W 104 10 47.06
Hold 6° Inc	2550.00	6.00	82.00	2549.45	-1.62	77.19	16.54	2.00	387586.18	547582.54	N 32 3 55.79	W 104 10 47.03
	2600.00	6.00	82.00	2599.16	-2.16	77.92	21.72	0.00	387586.91	547587.71	N 32 3 55.80	W 104 10 46.97
	2700.00	6.00	82.00	2698.63	-3.23	79.37	32.07	0.00	387588.37	547598.06	N 32 3 55.81	W 104 10 46.85
	2800.00	6.00	82.00	2798.08	-4.31	80.83	42.42	0.00	387589.82	547608.41	N 32 3 55.82	W 104 10 46.73
	2900.00	6.00	82.00	2897.53	-5.39	82.28	52.77	0.00	387591.28	547618.77	N 32 3 55.84	W 104 10 46.60
	3000.00	6.00	82.00	2996.99	-6.47	83.74	63.12	0.00	387592.73	547629.12	N 32 3 55.85	W 104 10 46.48
	3100.00	6.00	82.00	3096.44	-7.55	85.19	73.47	0.00	387594.18	547639.47	N 32 3 55.87	W 104 10 46.36
	3200.00	6.00	82.00	3195.89	-8.62	86.65	83.82	0.00	387595.64	547649.82	N 32 3 55.88	W 104 10 46.24
	3300.00	6.00	82.00	3295.34	-9.70	88.10	94.17	0.00	387597.09	547660.17	N 32 3 55.89	W 104 10 46.12
	3400.00	6.00	82.00	3394.80	-10.78	89.56	104.53	0.00	387598.55	547670.52	N 32 3 55.91	W 104 10 46.00
	3500.00	6.00	82.00	3494.25	-11.86	91.01	114.88	0.00	387600.00	547680.87	N 32 3 55.92	W 104 10 45.88
	3600.00	6.00	82.00	3593.70	-12.93	92.47	125.23	0.00	387601.46	547691.22	N 32 3 55.94	W 104 10 45.76
	3700.00	6.00	82.00	3693.15	-14.01	93.92	135.58	0.00	387602.91	547701.57	N 32 3 55.95	W 104 10 45.64
	3800.00	6.00	82.00	3792.60	-15.09	95.38	145.93	0.00	387604.37	547711.92	N 32 3 55.97	W 104 10 45.52
	3900.00	6.00	82.00	3892.06	-16.17	96.83	156.28	0.00	387605.82	547722.27	N 32 3 55.98	W 104 10 45.40
	4000.00	6.00	82.00	3991.51	-17.25	98.28	166.63	0.00	387607.28	547732.62	N 32 3 55.99	W 104 10 45.28
	4100.00	6.00	82.00	4090.96	-18.32	99.74	176.98	0.00	387608.73	547742.97	N 32 3 56.01	W 104 10 45.16
	4200.00	6.00	82.00	4190.41	-19.40	101.19	187.33	0.00	387610.19	547753.32	N 32 3 56.02	W 104 10 45.04
	4300.00	6.00	82.00	4289.87	-20.48	102.65	197.69	0.00	387611.64	547763.67	N 32 3 56.04	W 104 10 44.92
Drop @ 2° DLS	4368.00	6.00	82.00	4357.49	-21.21	103.64	204.72	0.00	387612.63	547770.71	N 32 3 56.05	W 104 10 44.84
	4400.00	5.36	82.00	4389.34	-21.54	104.08	207.86	2.00	387613.07	547773.84	N 32 3 56.05	W 104 10 44.80
	4500.00	3.36	82.00	4489.04	-22.32	105.14	215.39	2.00	387614.13	547781.37	N 32 3 56.06	W 104 10 44.71
	4600.00	1.36	82.00	4588.95	-22.75	105.71	219.47	2.00	387614.70	547785.45	N 32 3 56.07	W 104 10 44.67
Hold to KOP	4668.00	0.00	82.00	4656.94	-22.83	105.82	220.27	2.00	387614.81	547786.25	N 32 3 56.07	W 104 10 44.66
	4700.00	0.00	82.00	4688.94	-22.83	105.82	220.27	0.00	387614.81	547786.25	N 32 3 56.07	W 104 10 44.66
	4800.00	0.00	82.00	4788.94	-22.83	105.82	220.27	0.00	387614.81	547786.25	N 32 3 56.07	W 104 10 44.66
	4900.00	0.00	82.00	4888.94	-22.83	105.82	220.27	0.00	387614.81	547786.25	N 32 3 56.07	W 104 10 44.66
	5000.00	0.00	82.00	4988.94	-22.83	105.82	220.27	0.00	387614.81	547786.25	N 32 3 56.07	W 104 10 44.66
	5100.00	0.00	82.00	5088.94	-22.83	105.82	220.27	0.00	387614.81	547786.25	N 32 3 56.07	W 104 10 44.66
	5200.00	0.00	82.00	5188.94	-22.83	105.82	220.27	0.00	387614.81	547786.25	N 32 3 56.07	W 104 10 44.66
	5300.00	0.00	82.00	5288.94	-22.83	105.82	220.27	0.00	387614.81	547786.25	N 32 3 56.07	W 104 10 44.66
	5400.00	0.00	82.00	5388.94	-22.83	105.82	220.27	0.00	387614.81	547786.25	N 32 3 56.07	W 104 10 44.66
	5500.00	0.00	82.00	5488.94	-22.83	105.82	220.27	0.00	387614.81	547786.25	N 32 3 56.07	W 104 10 44.66
	5600.00	0.00	82.00	5588.94	-22.83	105.82	220.27	0.00	387614.81	547786.25	N 32 3 56.07	W 104 10 44.66
	5700.00	0.00	82.00	5688.94	-22.83	105.82	220.27	0.00	387614.81	547786.25	N 32 3 56.07	W 104 10 44.66
	5800.00	0.00	82.00	5788.94	-22.83	105.82	220.27	0.00	387614.81	547786.25	N 32 3 56.07	W 104 10 44.66
	5900.00	0.00	82.00	5888.94	-22.83	105.82	220.27	0.00	387614.81	547786.25	N 32 3 56.07	W 104 10 44.66
	6000.00	0.00	82.00	5988.94	-22.83	105.82	220.27	0.00	387614.81	547786.25	N 32 3 56.07	W 104 10 44.66

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
	6100.00	0.00	82.00	6088.94	-22.83	105.82	220.27	0.00	387614.81	547786.25	N 32 3 56.07	W 104 10 44.66
	6200.00	0.00	82.00	6188.94	-22.83	105.82	220.27	0.00	387614.81	547786.25	N 32 3 56.07	W 104 10 44.66
	6300.00	0.00	82.00	6288.94	-22.83	105.82	220.27	0.00	387614.81	547786.25	N 32 3 56.07	W 104 10 44.66
	6400.00	0.00	82.00	6388.94	-22.83	105.82	220.27	0.00	387614.81	547786.25	N 32 3 56.07	W 104 10 44.66
	6500.00	0.00	82.00	6488.94	-22.83	105.82	220.27	0.00	387614.81	547786.25	N 32 3 56.07	W 104 10 44.66
	6600.00	0.00	82.00	6588.94	-22.83	105.82	220.27	0.00	387614.81	547786.25	N 32 3 56.07	W 104 10 44.66
	6700.00	0.00	82.00	6688.94	-22.83	105.82	220.27	0.00	387614.81	547786.25	N 32 3 56.07	W 104 10 44.66
	6800.00	0.00	82.00	6788.94	-22.83	105.82	220.27	0.00	387614.81	547786.25	N 32 3 56.07	W 104 10 44.66
	6900.00	0.00	82.00	6888.94	-22.83	105.82	220.27	0.00	387614.81	547786.25	N 32 3 56.07	W 104 10 44.66
	7000.00	0.00	82.00	6988.94	-22.83	105.82	220.27	0.00	387614.81	547786.25	N 32 3 56.07	W 104 10 44.66
	7100.00	0.00	82.00	7088.94	-22.83	105.82	220.27	0.00	387614.81	547786.25	N 32 3 56.07	W 104 10 44.66
	7200.00	0.00	82.00	7188.94	-22.83	105.82	220.27	0.00	387614.81	547786.25	N 32 3 56.07	W 104 10 44.66
	7300.00	0.00	82.00	7288.94	-22.83	105.82	220.27	0.00	387614.81	547786.25	N 32 3 56.07	W 104 10 44.66
	7400.00	0.00	82.00	7388.94	-22.83	105.82	220.27	0.00	387614.81	547786.25	N 32 3 56.07	W 104 10 44.66
	7500.00	0.00	82.00	7488.94	-22.83	105.82	220.27	0.00	387614.81	547786.25	N 32 3 56.07	W 104 10 44.66
	7600.00	0.00	82.00	7588.94	-22.83	105.82	220.27	0.00	387614.81	547786.25	N 32 3 56.07	W 104 10 44.66
	7700.00	0.00	82.00	7688.94	-22.83	105.82	220.27	0.00	387614.81	547786.25	N 32 3 56.07	W 104 10 44.66
	7800.00	0.00	82.00	7788.94	-22.83	105.82	220.27	0.00	387614.81	547786.25	N 32 3 56.07	W 104 10 44.66
	7900.00	0.00	82.00	7888.94	-22.83	105.82	220.27	0.00	387614.81	547786.25	N 32 3 56.07	W 104 10 44.66
	8000.00	0.00	82.00	7988.94	-22.83	105.82	220.27	0.00	387614.81	547786.25	N 32 3 56.07	W 104 10 44.66
	8100.00	0.00	82.00	8088.94	-22.83	105.82	220.27	0.00	387614.81	547786.25	N 32 3 56.07	W 104 10 44.66
	8200.00	0.00	82.00	8188.94	-22.83	105.82	220.27	0.00	387614.81	547786.25	N 32 3 56.07	W 104 10 44.66
	8300.00	0.00	82.00	8288.94	-22.83	105.82	220.27	0.00	387614.81	547786.25	N 32 3 56.07	W 104 10 44.66
	8400.00	0.00	82.00	8388.94	-22.83	105.82	220.27	0.00	387614.81	547786.25	N 32 3 56.07	W 104 10 44.66
	8500.00	0.00	82.00	8488.94	-22.83	105.82	220.27	0.00	387614.81	547786.25	N 32 3 56.07	W 104 10 44.66
	8600.00	0.00	82.00	8588.94	-22.83	105.82	220.27	0.00	387614.81	547786.25	N 32 3 56.07	W 104 10 44.66
	8700.00	0.00	82.00	8688.94	-22.83	105.82	220.27	0.00	387614.81	547786.25	N 32 3 56.07	W 104 10 44.66
	8800.00	0.00	82.00	8788.94	-22.83	105.82	220.27	0.00	387614.81	547786.25	N 32 3 56.07	W 104 10 44.66
	8900.00	0.00	82.00	8888.94	-22.83	105.82	220.27	0.00	387614.81	547786.25	N 32 3 56.07	W 104 10 44.66
	9000.00	0.00	82.00	8988.94	-22.83	105.82	220.27	0.00	387614.81	547786.25	N 32 3 56.07	W 104 10 44.66
	9100.00	0.00	82.00	9088.94	-22.83	105.82	220.27	0.00	387614.81	547786.25	N 32 3 56.07	W 104 10 44.66
	9200.00	0.00	82.00	9188.94	-22.83	105.82	220.27	0.00	387614.81	547786.25	N 32 3 56.07	W 104 10 44.66
	9300.00	0.00	82.00	9288.94	-22.83	105.82	220.27	0.00	387614.81	547786.25	N 32 3 56.07	W 104 10 44.66
Build @ 10° DLS	9350.11	0.00	82.00	9339.05	-22.83	105.82	220.27	0.00	387614.81	547786.25	N 32 3 56.07	W 104 10 44.66
	9400.00	4.99	178.39	9388.88	-20.66	103.65	220.33	10.00	387612.64	547786.31	N 32 3 56.05	W 104 10 44.66
	9500.00	14.99	178.39	9487.24	-3.33	86.33	220.81	10.00	387595.33	547786.79	N 32 3 55.88	W 104 10 44.65
	9600.00	24.99	178.39	9581.10	30.81	52.21	221.77	10.00	387561.20	547787.75	N 32 3 55.54	W 104 10 44.64
	9700.00	34.99	178.39	9667.60	80.72	2.31	223.17	10.00	387511.31	547789.15	N 32 3 55.04	W 104 10 44.63
	9800.00	44.99	178.39	9744.12	144.91	-61.85	224.98	10.00	387447.15	547790.96	N 32 3 54.41	W 104 10 44.61
	9900.00	54.99	178.39	9808.33	221.40	-138.32	227.13	10.00	387370.69	547793.11	N 32 3 53.65	W 104 10 44.58
	10000.00	64.99	178.39	9858.28	307.88	-224.77	229.56	10.00	387284.25	547795.54	N 32 3 52.80	W 104 10 44.56
	10100.00	74.99	178.39	9892.46	401.72	-318.57	232.19	10.00	387190.46	547798.17	N 32 3 51.87	W 104 10 44.53
	10200.00	84.99	178.39	9909.82	500.07	-416.89	234.96	10.00	387092.15	547800.94	N 32 3 50.90	W 104 10 44.50
Landing Point	10253.10	90.30	178.39	9912.00	553.11	-469.91	236.45	10.00	387039.14	547802.43	N 32 3 50.37	W 104 10 44.48
	10300.00	90.30	178.39	9911.75	600.00	-516.78	237.76	0.00	386992.26	547803.74	N 32 3 49.91	W 104 10 44.47
	10400.00	90.30	178.39	9911.23	700.00	-616.74	240.57	0.00	386892.31	547806.55	N 32 3 48.92	W 104 10 44.43
	10500.00	90.30	178.39	9910.71	799.99	-716.70	243.38	0.00	386792.36	547809.36	N 32 3 47.93	W 104 10 44.40
	10600.00	90.30	178.39	9910.18	899.99	-816.66	246.19	0.00	386692.41	547812.17	N 32 3 46.94	W 104 10 44.37
	10700.00	90.30	178.39	9909.66	999.98	-916.62	249.00	0.00	386592.46	547814.98	N 32 3 45.95	W 104 10 44.34
	10800.00	90.30	178.39	9909.14	1099.98	-1016.58	251.81	0.00	386492.51	547817.79	N 32 3 44.96	W 104 10 44.31
	10900.00	90.30	178.39	9908.61	1199.97	-1116.54	254.62	0.00	386392.56	547820.60	N 32 3 43.97	W 104 10 44.28
	11000.00	90.30	178.39	9908.09	1299.97	-1216.50	257.43	0.00	386292.61	547823.41	N 32 3 42.98	W 104 10 44.25
	11100.00	90.30	178.39	9907.57	1399.96	-1316.46	260.24	0.00	386192.66	547826.21	N 32 3 41.99	W 104 10 44.22
	11200.00	90.30	178.39	9907.04	1499.96	-1416.42	263.05	0.00	386092.71	547829.02	N 32 3 41.00	W 104 10 44.19
	11300.00	90.30	178.39	9906.52	1599.95	-1516.38	265.85	0.00	385992.76	547831.83	N 32 3 40.02	W 104 10 44.16
	11400.00	90.30	178.39	9906.00	1699.95	-1616.33	268.66	0.00	385892.81	547834.64	N 32 3 39.03	W 104 10 44.12
	11500.00	90.30	178.39	9905.47	1799.94	-1716.29	271.47	0.00	385792.86	547837.45	N 32 3 38.04	W 104 10 44.09
	11600.00	90.30	178.39	9904.95	1899.94	-1816.25	274.28	0.00	385692.91	547840.25	N 32 3 37.05	W 104 10 44.06
	11700.00	90.30	178.39	9904.43	1999.93	-1916.21	277.09	0.00	385592.96	547843.06	N 32 3 36.06	W 104 10 44.03
	11800.00	90.30	178.39	9903.90	2099.93	-2016.17	279.89	0.00	385493.01	547845.87	N 32 3 35.07	W 104 10 44.00
	11900.00	90.30	178.39	9903.38	2199.92	-2116.13	282.70	0.00	385393.06	547848.68	N 32 3 34.08	W 104 10 43.97
	12000.00	90.30	178.39	9902.86	2299.92	-2216.09	285.51	0.00	385293.11	547851.48	N 32 3 33.09	W 104 10 43.94
	12100.00	90.30	178.39	9902.33	2399.92	-2316.05	288.32	0.00	385193.16	547854.29	N 32 3 32.10	W 104 10 43.91
	12200.00	90.30	178.39	9901.81	2499.91	-2416.01	291.12	0.00	385093.21	547857.10	N 32 3 31.11	W 104 10 43.88
	12300.00	90.30	178.39	9901.29	2599.91	-2515.97	293.93	0.00	384993.26	547859.90	N 32 3 30.12	W 104 10 43.85
	12400.00	90.30	178.39	9900.76	2699.90	-2615.93	296.74	0.00	384893.31	547862.71	N 32 3 29.13	W 104 10 43.81
	12500.00	90.30	178.39	9900.24	2799.90	-2715.89	299.54	0.00	384793.36	547865.52	N 32 3 28.14	W 104 10 43.78
	12600.00	90.30	178.39	9899.71	2899.89	-2815.85	302.35	0.00	384693.41	547868.32	N 32 3 27.16	W 104 10 43.75
	12700.00	90.30	178.39	9899.19	2999.89	-2915.80	305.16	0.00	384593.46	547871.13	N 32 3 26.17	W 104 10 43.72
	12800.00	90.30	178.39	9898.67	3099.88	-3015.76	307.96	0.00	384493.51	547873.93	N 32 3 25.18	W 104 10 43.69
	12900.00	90.30	178.39	9898.14	3199.88	-3115.72	310.77	0.00	384393.56	547876.74	N 32 3 24.19	W 104 10 43.66
	13000.00	90.30	178.39	9897.62	3299.87	-3215.68	313.57	0.00	384293.61	547879.55	N 32 3 23.20	W 104 10 43.63
	13100.00	90.30	178.39	9897.10	3399.87	-3315.64	316.38	0.00	384193.66	547882.35	N 32 3 22.21	W 104 10 43.60
	13200.00	90.30	178.39	9896.57	3499.86	-3415.60	319.19	0.00	384093.71	547885.16	N 32 3 21.22	W 104 10 43.57
	13300.00	90.30	178.39	9896.05	3599.86	-3515.56	321.99	0.00	383993.76	547887.96	N 32 3 20.23	W 104 10 43.54
	13400.00	90.30	178.39	9895.53	3699.85	-3615.52	324.80	0.00	383893.81	547890.77	N 32 3 19.24	W 104 10 43.51
	13500.00	90.30	178.39	9895.00	3799.85	-3715.48	327.60	0.00	383793.86	547893.57	N 32 3 18.25	W 104 10 43.47
	13600.00	90.30	178.39	9894.48	3899.84	-3815.44	330.41	0.00	383693.91	547896.38	N 32 3 17.26	W 104 10 43.44
	13700.00	90.30	178.39	9893.96	3999.84	-3915.40	333.21	0.00	383593.96	547899.18	N 32 3 16.27	W 104 10 43.41
	13800.00	90.30	178.39	9893.43	4099.83	-4015.36	336.02	0.00	383494.01	547901.99	N 32 3 15.28	W 104 10 43.38
	13900.00	90.30	178.39	9892.91	4199.83	-4115.32	338.82	0.00	383394.06	547904.79	N 32 3 14.30	W 104 10 43.35
	14000.00	90.30	178.39	9892.39	4299.82	-4215.27	341.63	0.00	383294.11	547907.60	N 32 3 13.31	W 104 10 43.32
	14100.00	90.30	178.39	9891.86	4399.82	-4315.23	344.43	0.00	383194.16	547910.40	N 32 3 12.32	W 104 10 43.29
	14200.00	90.30	178.39	9891.34	4499.81	-4415.19	347.24	0.00	383094.21	547913.21	N 32 3 11.33	W 104 10 43.26
	14300.00	90.30	178.39	9890.82	4599.81	-4515.15	350.04	0.00	382994.26	547916.01	N 32 3 10.34	W 104 10 43.23
	14400.00	90.30	178.39	9890.29	4699.81	-4615.11	352.85	0.00	382894.30	547918.82	N 32 3 9.35	W 104 10 43.20
	14500.00	90.30	178.39	9889.77	4799.80	-4715.07	355.65	0.00	382794.35	547921.62	N 32 3 8.36	W 104 10 43.17
	14600.00	90.30	178.39	9889.25	4899.80	-4815.03	358.46	0.00	382694.40	547924.42	N 32 3 7.37	W 104 10 43.13

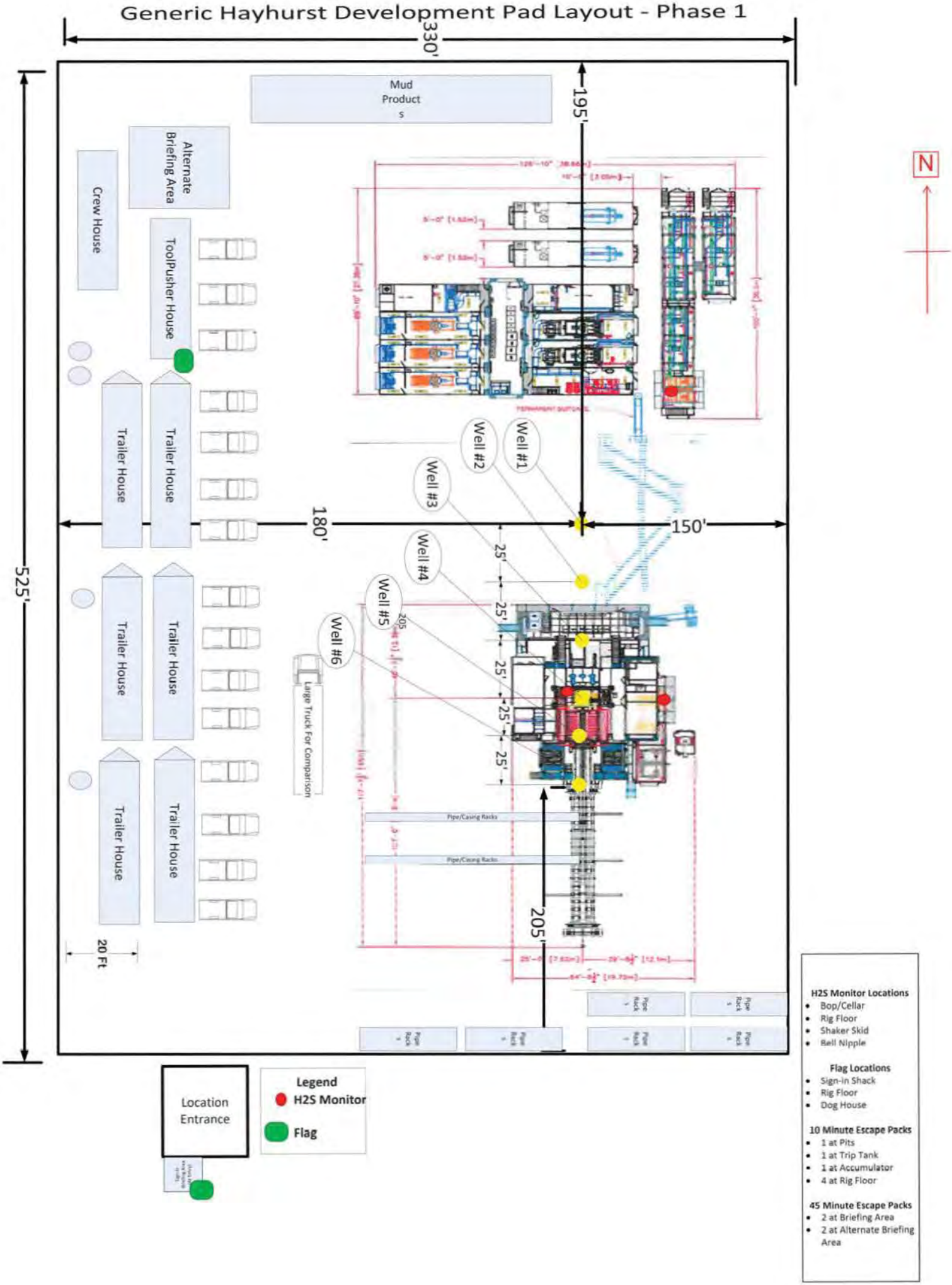
Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
	14700.00	90.30	178.39	9888.72	4999.79	-4914.99	361.26	0.00	382594.45	547927.23	N 32 3 6.38	W 104 10 43.10
	14800.00	90.30	178.39	9888.20	5099.79	-5014.95	364.06	0.00	382494.50	547930.03	N 32 3 5.39	W 104 10 43.07
	14900.00	90.30	178.39	9887.68	5199.78	-5114.91	366.87	0.00	382394.55	547932.83	N 32 3 4.40	W 104 10 43.04
	15000.00	90.30	178.39	9887.15	5299.78	-5214.87	369.67	0.00	382294.60	547935.64	N 32 3 3.41	W 104 10 43.01
	15100.00	90.30	178.39	9886.63	5399.77	-5314.83	372.47	0.00	382194.65	547938.44	N 32 3 2.43	W 104 10 42.98
	15200.00	90.30	178.39	9886.10	5499.77	-5414.79	375.28	0.00	382094.70	547941.24	N 32 3 1.44	W 104 10 42.95
	15300.00	90.30	178.39	9885.58	5599.76	-5514.75	378.08	0.00	381994.75	547944.05	N 32 3 0.45	W 104 10 42.92
	15400.00	90.30	178.39	9885.06	5699.76	-5614.71	380.88	0.00	381894.80	547946.85	N 32 2 59.46	W 104 10 42.89
	15500.00	90.30	178.39	9884.53	5799.75	-5714.66	383.69	0.00	381794.85	547949.65	N 32 2 58.47	W 104 10 42.86
	15600.00	90.30	178.39	9884.01	5899.75	-5814.62	386.49	0.00	381694.90	547952.45	N 32 2 57.48	W 104 10 42.83
Chevron HH SO 10 P3 #8H - Mid Point	15605.92	90.30	178.39	9883.98	5905.67	-5820.55	386.65	0.00	381688.98	547952.62	N 32 2 57.42	W 104 10 42.82
Hold to TD	15678.68	90.30	179.85	9883.60	5978.41	-5893.29	387.77	2.00	381616.24	547953.74	N 32 2 56.70	W 104 10 42.81
	15700.00	90.30	179.85	9883.49	5999.72	-5914.61	387.83	0.00	381594.92	547953.79	N 32 2 56.49	W 104 10 42.81
	15800.00	90.30	179.85	9882.96	6099.66	-6014.61	388.09	0.00	381494.94	547954.05	N 32 2 55.50	W 104 10 42.81
	15900.00	90.30	179.85	9882.44	6199.60	-6114.61	388.35	0.00	381394.95	547954.32	N 32 2 54.51	W 104 10 42.81
	16000.00	90.30	179.85	9881.92	6299.54	-6214.60	388.62	0.00	381294.96	547954.58	N 32 2 53.52	W 104 10 42.81
	16100.00	90.30	179.85	9881.39	6399.48	-6314.60	388.88	0.00	381194.97	547954.85	N 32 2 52.53	W 104 10 42.81
	16200.00	90.30	179.85	9880.87	6499.42	-6414.60	389.14	0.00	381094.98	547955.11	N 32 2 51.54	W 104 10 42.80
	16300.00	90.30	179.85	9880.35	6599.37	-6514.60	389.41	0.00	380994.99	547955.37	N 32 2 50.55	W 104 10 42.80
	16400.00	90.30	179.85	9879.82	6699.31	-6614.60	389.67	0.00	380895.00	547955.64	N 32 2 49.56	W 104 10 42.80
	16500.00	90.30	179.85	9879.30	6799.25	-6714.60	389.93	0.00	380795.01	547955.90	N 32 2 48.57	W 104 10 42.80
	16600.00	90.30	179.85	9878.78	6899.19	-6814.59	390.20	0.00	380695.02	547956.16	N 32 2 47.58	W 104 10 42.80
	16700.00	90.30	179.85	9878.25	6999.13	-6914.59	390.46	0.00	380595.03	547956.43	N 32 2 46.59	W 104 10 42.80
	16800.00	90.30	179.85	9877.73	7099.08	-7014.59	390.72	0.00	380495.04	547956.69	N 32 2 45.60	W 104 10 42.80
	16900.00	90.30	179.85	9877.21	7199.02	-7114.59	390.99	0.00	380395.05	547956.95	N 32 2 44.61	W 104 10 42.79
	17000.00	90.30	179.85	9876.68	7298.96	-7214.59	391.25	0.00	380295.06	547957.22	N 32 2 43.63	W 104 10 42.79
	17100.00	90.30	179.85	9876.16	7398.90	-7314.59	391.51	0.00	380195.08	547957.48	N 32 2 42.64	W 104 10 42.79
	17200.00	90.30	179.85	9875.64	7498.84	-7414.58	391.78	0.00	380095.09	547957.74	N 32 2 41.65	W 104 10 42.79
	17300.00	90.30	179.85	9875.11	7598.79	-7514.58	392.04	0.00	379995.10	547958.01	N 32 2 40.66	W 104 10 42.79
	17400.00	90.30	179.85	9874.59	7698.73	-7614.58	392.30	0.00	379895.11	547958.27	N 32 2 39.67	W 104 10 42.79
	17500.00	90.30	179.85	9874.07	7798.67	-7714.58	392.57	0.00	379795.12	547958.53	N 32 2 38.68	W 104 10 42.79
	17600.00	90.30	179.85	9873.54	7898.61	-7814.58	392.83	0.00	379695.13	547958.80	N 32 2 37.69	W 104 10 42.78
	17700.00	90.30	179.85	9873.02	7998.55	-7914.58	393.10	0.00	379595.14	547959.06	N 32 2 36.70	W 104 10 42.78
	17800.00	90.30	179.85	9872.50	8098.49	-8014.57	393.36	0.00	379495.15	547959.32	N 32 2 35.71	W 104 10 42.78
	17900.00	90.30	179.85	9871.97	8198.44	-8114.57	393.62	0.00	379395.16	547959.59	N 32 2 34.72	W 104 10 42.78
	18000.00	90.30	179.85	9871.45	8298.38	-8214.57	393.89	0.00	379295.17	547959.85	N 32 2 33.73	W 104 10 42.78
	18100.00	90.30	179.85	9870.93	8398.32	-8314.57	394.15	0.00	379195.18	547960.11	N 32 2 32.74	W 104 10 42.78
	18200.00	90.30	179.85	9870.40	8498.26	-8414.57	394.41	0.00	379095.19	547960.38	N 32 2 31.75	W 104 10 42.78
	18300.00	90.30	179.85	9869.88	8598.20	-8514.56	394.68	0.00	378995.20	547960.64	N 32 2 30.76	W 104 10 42.78
	18400.00	90.30	179.85	9869.35	8698.15	-8614.56	394.94	0.00	378895.21	547960.90	N 32 2 29.77	W 104 10 42.77
	18500.00	90.30	179.85	9868.83	8798.09	-8714.56	395.20	0.00	378795.23	547961.17	N 32 2 28.78	W 104 10 42.77
	18600.00	90.30	179.85	9868.31	8898.03	-8814.56	395.47	0.00	378695.24	547961.43	N 32 2 27.79	W 104 10 42.77
	18700.00	90.30	179.85	9867.78	8997.97	-8914.56	395.73	0.00	378595.25	547961.69	N 32 2 26.80	W 104 10 42.77
	18800.00	90.30	179.85	9867.26	9097.91	-9014.56	395.99	0.00	378495.26	547961.96	N 32 2 25.81	W 104 10 42.77
	18900.00	90.30	179.85	9866.74	9197.85	-9114.55	396.26	0.00	378395.27	547962.22	N 32 2 24.82	W 104 10 42.77
	19000.00	90.30	179.85	9866.21	9297.80	-9214.55	396.52	0.00	378295.28	547962.48	N 32 2 23.83	W 104 10 42.77
	19100.00	90.30	179.85	9865.69	9397.74	-9314.55	396.78	0.00	378195.29	547962.75	N 32 2 22.84	W 104 10 42.76
	19200.00	90.30	179.85	9865.17	9497.68	-9414.55	397.05	0.00	378095.30	547963.01	N 32 2 21.86	W 104 10 42.76
	19300.00	90.30	179.85	9864.64	9597.62	-9514.55	397.31	0.00	377995.31	547963.27	N 32 2 20.87	W 104 10 42.76
	19400.00	90.30	179.85	9864.12	9697.56	-9614.55	397.57	0.00	377895.32	547963.54	N 32 2 19.88	W 104 10 42.76
	19500.00	90.30	179.85	9863.60	9797.51	-9714.54	397.84	0.00	377795.33	547963.80	N 32 2 18.89	W 104 10 42.76
	19600.00	90.30	179.85	9863.07	9897.45	-9814.54	398.10	0.00	377695.34	547964.06	N 32 2 17.90	W 104 10 42.76
	19700.00	90.30	179.85	9862.55	9997.39	-9914.54	398.36	0.00	377595.35	547964.33	N 32 2 16.91	W 104 10 42.76
	19800.00	90.30	179.85	9862.03	10097.33	-10014.54	398.63	0.00	377495.37	547964.59	N 32 2 15.92	W 104 10 42.75
	19900.00	90.30	179.85	9861.50	10197.27	-10114.54	398.89	0.00	377395.38	547964.85	N 32 2 14.93	W 104 10 42.75
	20000.00	90.30	179.85	9860.98	10297.21	-10214.54	399.15	0.00	377295.39	547965.12	N 32 2 13.94	W 104 10 42.75
	20100.00	90.30	179.85	9860.46	10397.16	-10314.53	399.42	0.00	377195.40	547965.38	N 32 2 12.95	W 104 10 42.75
	20200.00	90.30	179.85	9859.93	10497.10	-10414.53	399.68	0.00	377095.41	547965.64	N 32 2 11.96	W 104 10 42.75
	20300.00	90.30	179.85	9859.41	10597.04	-10514.53	399.94	0.00	376995.42	547965.91	N 32 2 10.97	W 104 10 42.75
	20400.00	90.30	179.85	9858.89	10696.98	-10614.53	400.21	0.00	376895.43	547966.17	N 32 2 9.98	W 104 10 42.75
	20500.00	90.30	179.85	9858.36	10796.92	-10714.53	400.47	0.00	376795.44	547966.44	N 32 2 8.99	W 104 10 42.74
	20600.00	90.30	179.85	9857.84	10896.87	-10814.53	400.73	0.00	376695.45	547966.70	N 32 2 8.00	W 104 10 42.74
	20700.00	90.30	179.85	9857.32	10996.81	-10914.52	401.00	0.00	376595.46	547966.96	N 32 2 7.01	W 104 10 42.74
Chevron HH SO 10 P3 #8H - PBHL	20714.46	90.30	179.85	9857.24	11011.26	-10928.99	401.04	0.00	376581.00	547967.00	N 32 2 6.87	W 104 10 42.74

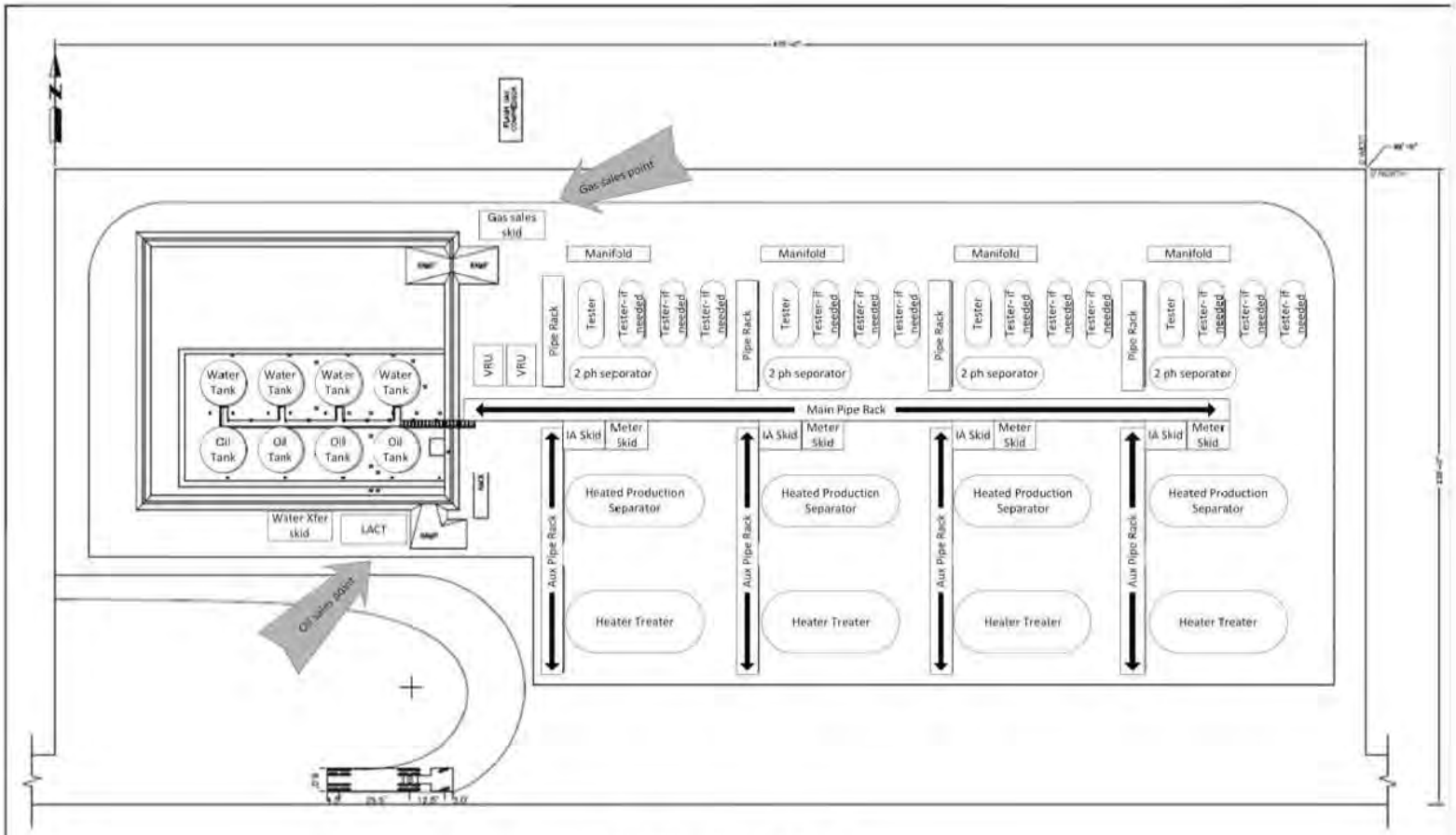
Survey Type: Non-Def Plan

Survey Error Model: ISCWSA Rev 0 *** 3-D 95.000% Confidence 2.7955 sigma
Survey Program:

Description	Part	MD From (ft)	MD To (ft)	EOU Freq (ft)	Hole Size (in)	Casing Diameter (in)	Survey Tool Type	Borehole / Survey
	1	0.000	33.000	1/100.000	30.000	30.000	SLB_MWD-STD-Depth Only	Original Borehole / Chevron HH SO 10 P3 #8H Rev0 CJG 06Jan16
	1	33.000	20714.464	1/100.000	30.000	30.000	SLB_MWD-STD	Original Borehole / Chevron HH SO 10 P3 #8H Rev0 CJG 06Jan16

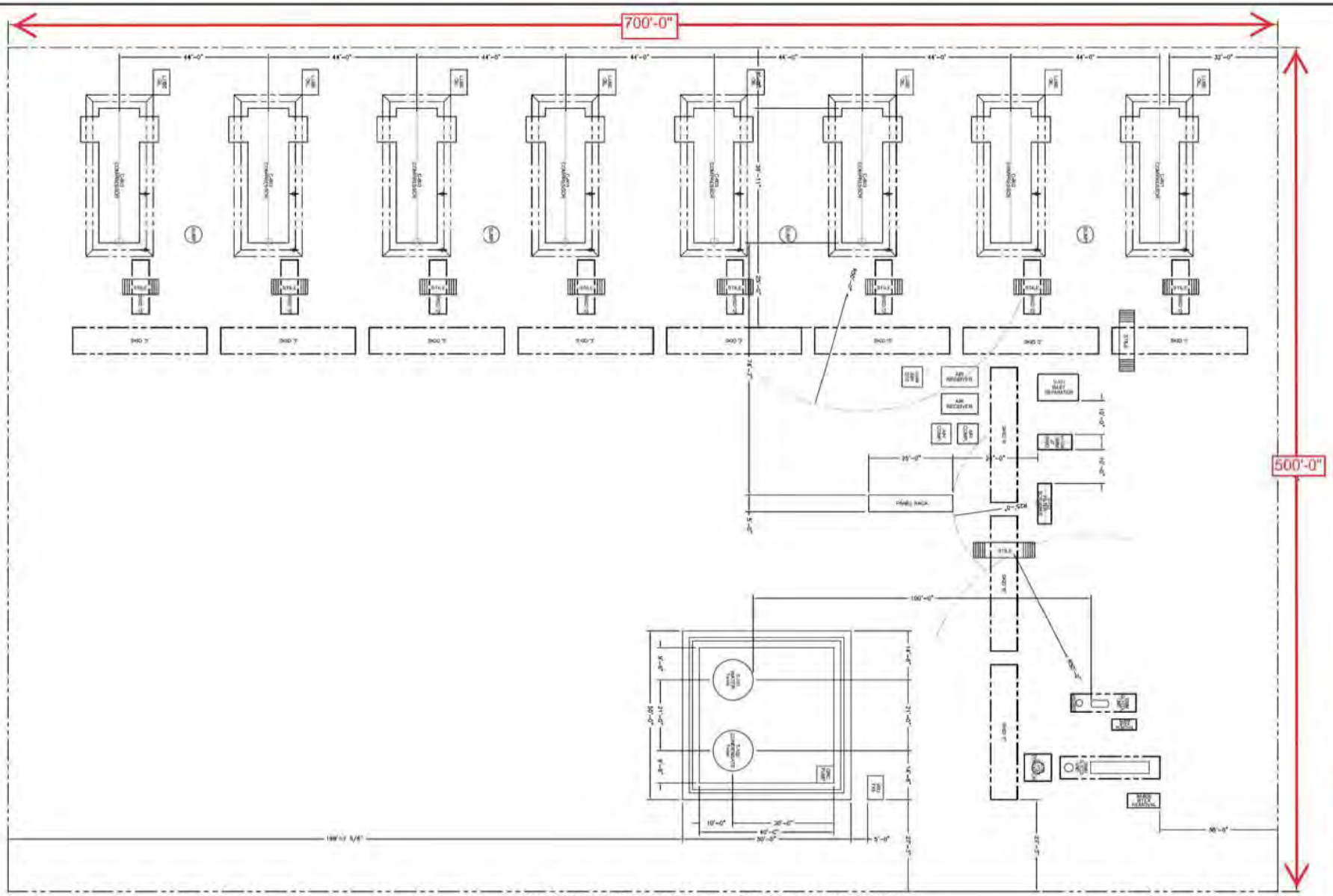
Generic Hayhurst Development Pad Layout - Phase 1





PLOT PLAN - 4 TRAIN / 8 TANK

EXHIBIT 4



COMPRESSOR STATION - 8 COMPRESSOR LAYOUT

SCALE: NONE

REVISIONS			
A ISSUED FOR REVIEW - JMDESIGN 07/14/15	EWM		

FOR REVIEW

Chevron U.S.A. Inc.

STANDARD COMPRESSOR GAS-LIFT STATION

PLOT PLAN - 8 COMPRESSOR LAYOUT

API _____ LEASE _____

COMPRESSOR_PLOTPLAN_8TOTAL

A

PLOT DATE: 07/14/2015 (1:215985)

COMPRESSOR PLOTPLAN 8TOTAL.dwg

FOR THE EXCLUSIVE USE OF
CHEVRON U.S.A. INC.
I, Robert L. Lastrapes, Registered Professional Land Surveyor, do hereby state this plat is true and correct to the best of my knowledge

ROBERT L. LASTRAPES
NEW MEXICO
23006
12-22-2015
PROFESSIONAL SURVEYOR

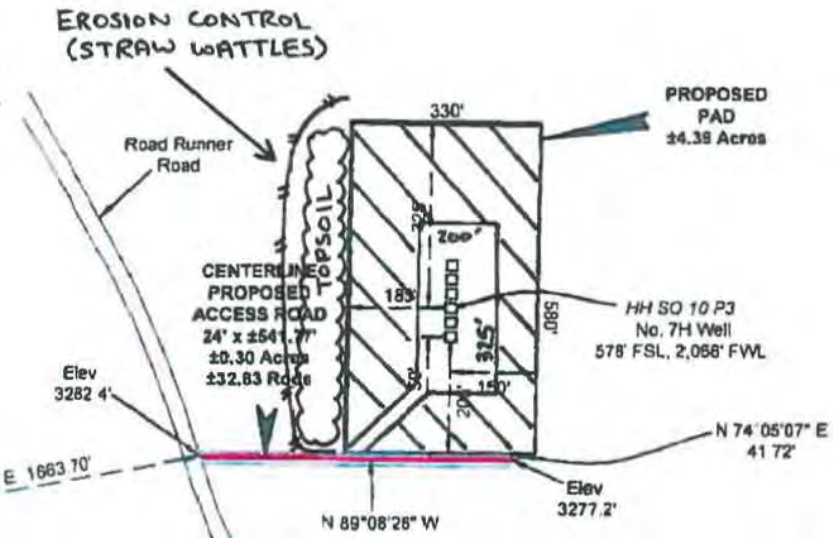
Robert L. Lastrapes
Registration No 23006

R 27 E

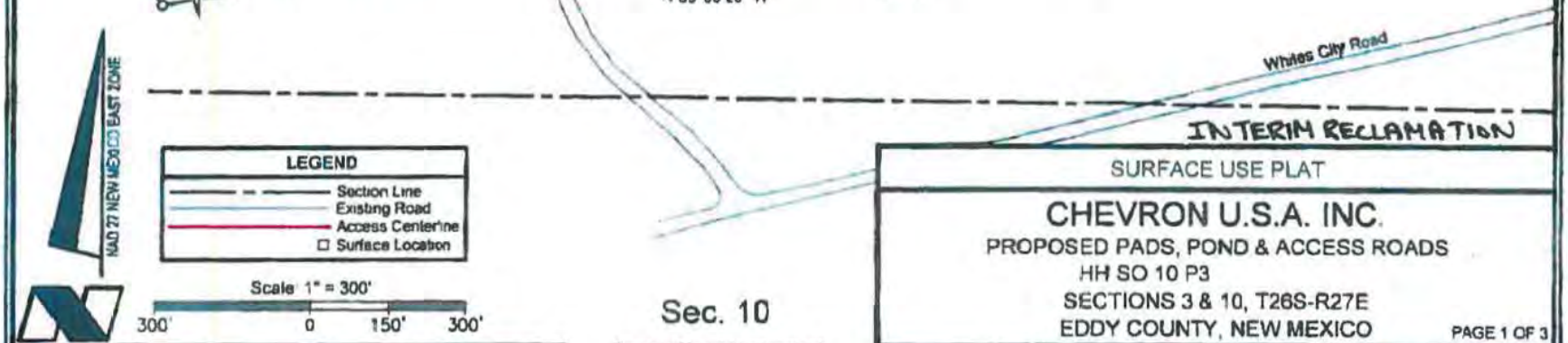
Sec. 3

Bureau of Land Management

NW PAD CORNER	NE PAD CORNER	HH SO 10 P3 NO. 7H WELL
X= 547,392 NAD 27	X= 547,722 NAD 27	X= 547,567 NAD 27
Y= 387,887	Y= 387,882	Y= 387,559
ELEVATION +3282' NAVD 88	ELEVATION +3279 NAVD 88	LAT 32.085422
SW PAD CORNER	SE PAD CORNER	LONG 104.179779
X= 547,383 NAD 27	X= 547,713 NAD 27	X= 588.75' NAD83
Y= 387,307	Y= 387,302	Y= 387,616
ELEVATION +3281' NAVD 88	ELEVATION +3276' NAVD 88	LAT 32.085544
		LONG 104.180272
		ELEVATION +3279' NAVD 88



T
26
S



Sec. 10

Bureau of Land Management

FENSTERMAKER

C H Fenstermaker & Associates L.L.C.
135 Regency Sq Lafayette LA 70508
Ph 337.237.2200 Fax 337.232.3299
www.fenstermaker.com

SURFACE USE PLAT

CHEVRON U.S.A. INC.

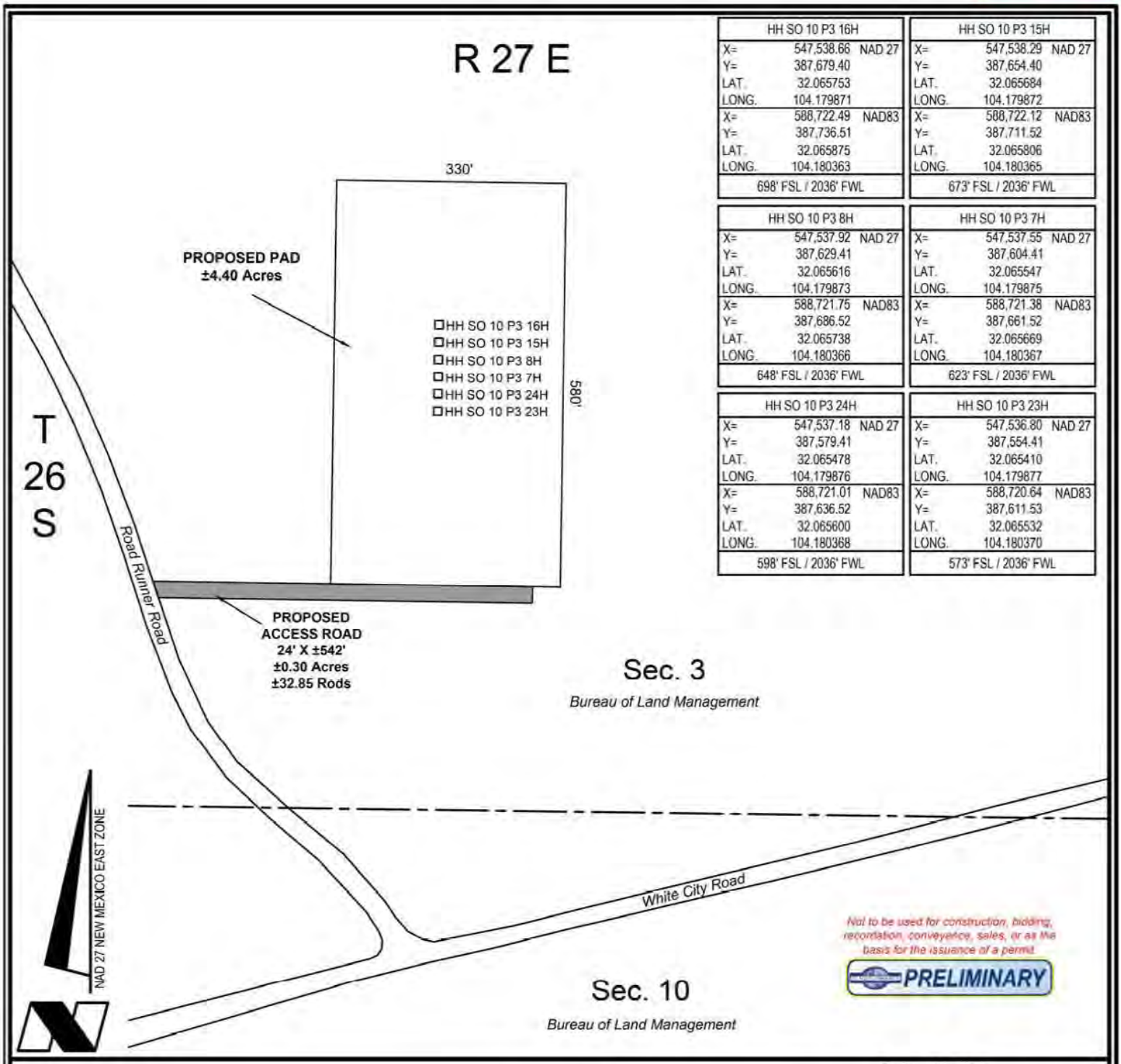
PROPOSED PADS, POND & ACCESS ROADS
HH SO 10 P3
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

PAGE 1 OF 3

DRAWN BY: LJG	REVISIONS		
PROJ. MGR.: CDG	No.	DATE:	REVISED BY:
DATE 12/16/2015	No.	DATE:	REVISED BY

FILENAME: T:\2015\2153366\DWG\HH SO 10 P3 7H_SUP.dwg

EXHIBIT 4



HH SO 10 P3 16H		
X=	547,538.66	NAD 27
Y=	387,679.40	
LAT.	32.065753	
LONG.	104.179871	
X=	588,722.49	NAD83
Y=	387,736.51	
LAT.	32.065875	
LONG.	104.180363	
698' FSL / 2036' FWL		

HH SO 10 P3 15H		
X=	547,538.29	NAD 27
Y=	387,654.40	
LAT.	32.065684	
LONG.	104.179872	
X=	588,722.12	NAD83
Y=	387,711.52	
LAT.	32.065806	
LONG.	104.180365	
673' FSL / 2036' FWL		

HH SO 10 P3 8H		
X=	547,537.92	NAD 27
Y=	387,629.41	
LAT.	32.065616	
LONG.	104.179873	
X=	588,721.75	NAD83
Y=	387,686.52	
LAT.	32.065738	
LONG.	104.180366	
648' FSL / 2036' FWL		

HH SO 10 P3 7H		
X=	547,537.55	NAD 27
Y=	387,604.41	
LAT.	32.065547	
LONG.	104.179875	
X=	588,721.38	NAD83
Y=	387,661.52	
LAT.	32.065669	
LONG.	104.180367	
623' FSL / 2036' FWL		

HH SO 10 P3 24H		
X=	547,537.18	NAD 27
Y=	387,579.41	
LAT.	32.065478	
LONG.	104.179876	
X=	588,721.01	NAD83
Y=	387,636.52	
LAT.	32.065600	
LONG.	104.180368	
598' FSL / 2036' FWL		

HH SO 10 P3 23H		
X=	547,536.80	NAD 27
Y=	387,554.41	
LAT.	32.065410	
LONG.	104.179877	
X=	588,720.64	NAD83
Y=	387,611.53	
LAT.	32.065532	
LONG.	104.180370	
573' FSL / 2036' FWL		

DETAIL

Scale: 1" = 200'

200' 0 100' 200'

CHEVRON U.S.A. INC.

PAD AND ACCESS DETAIL FOR THE
HH SO 10 P3 PAD
SECTION 3, T26S-R27E
EDDY COUNTY, NEW MEXICO

FENSTERMAKER
C. H. Fenstermaker & Associates, L.L.C.
135 Regency Sq. Lafayette, LA 70508
Ph. 337-237-2200 Fax. 337-232-3299
www.fenstermaker.com

DRAWN BY: GDG	REVISIONS		
PROJ. MGR.: GDG	No.#	DATE:	REVISED BY:
DATE: 2 DEC 2015	No.#	DATE:	REVISED BY:
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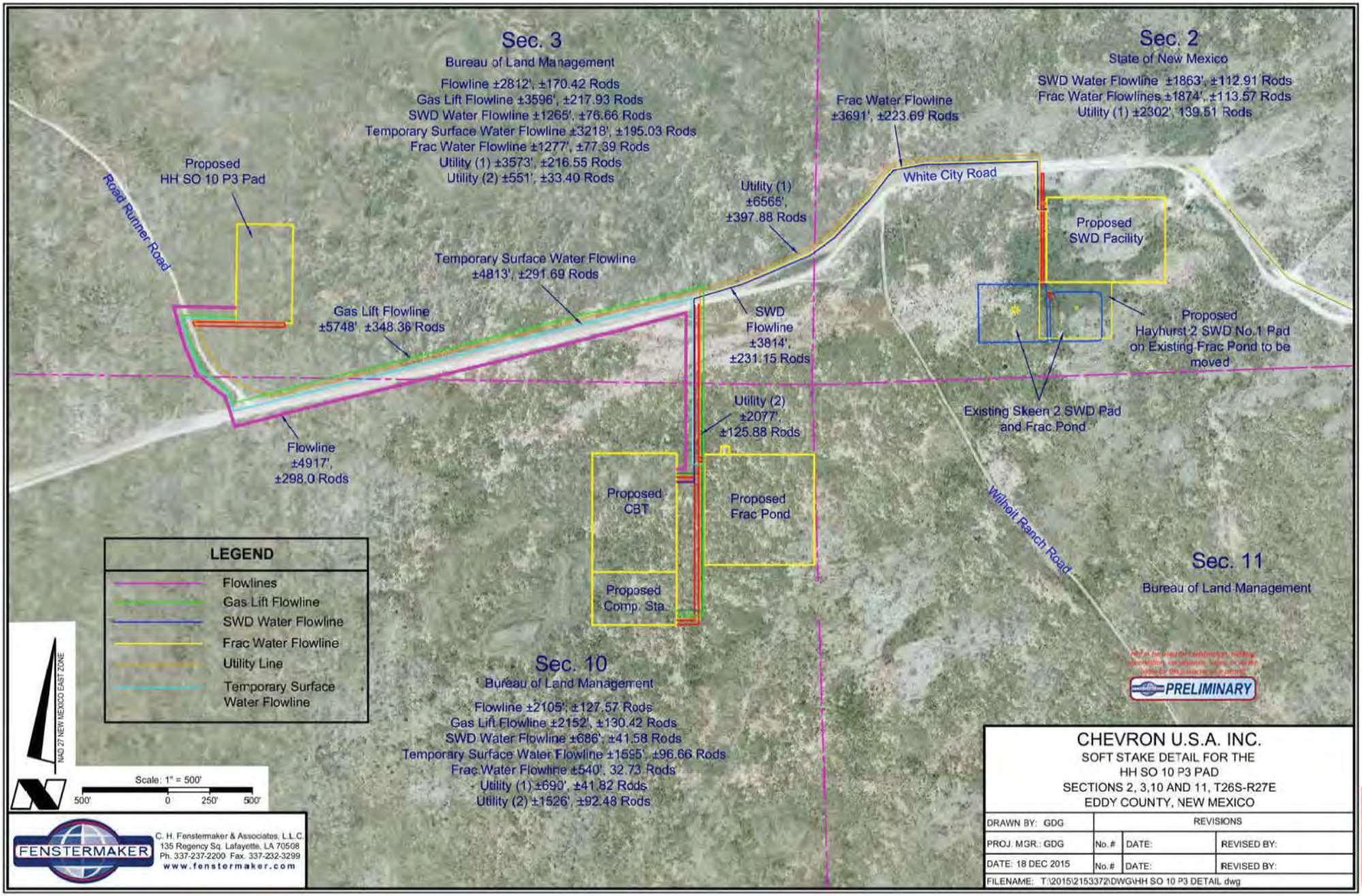
Sec. 3
Bureau of Land Management
Flowline ±2812', ±170.42 Rods
Gas Lift Flowline ±3596', ±217.93 Rods
SWD Water Flowline ±1265', ±76.66 Rods
Temporary Surface Water Flowline ±3218', ±195.03 Rods
Frac Water Flowline ±1277', ±77.39 Rods
Utility (1) ±3573', ±216.55 Rods
Utility (2) ±551', ±33.40 Rods
Sec. 2
State of New Mexico
SWD Water Flowline ±1863', ±112.91 Rods
Frac Water Flowlines ±1874', ±113.57 Rods
Utility (1) ±2302', 139.51 Rods
Frac Water Flowline ±3691', ±223.69 Rods
White City Road
Road Runner Road
Proposed HH SO 10 P3 Pad
Utility (1) ±6565', ±397.88 Rods
Proposed SWD Facility
Temporary Surface Water Flowline ±4813', ±291.69 Rods
Gas Lift Flowline ±5748', ±348.36 Rods
SWD Flowline ±3814', ±231.15 Rods
Proposed Hayhurst 2 SWD No.1 Pad on Existing Frac Pond to be moved
Utility (2) ±2077', ±125.88 Rods
Existing Skeen 2 SWD Pad and Frac Pond
Flowline ±4917', ±298.0 Rods
Proposed CBT
Proposed Frac Pond
Wilhoit Ranch Road
Sec. 11
Bureau of Land Management
Proposed Comp. Sta.
LEGEND
Flowlines
Gas Lift Flowline
SWD Water Flowline
Frac Water Flowline
Utility Line
Temporary Surface Water Flowline
NAD 27 NEW MEXICO EAST ZONE
Scale: 1" = 500'
500' 0 250' 500'
Sec. 10
Bureau of Land Management
Flowline ±2105', ±127.57 Rods
Gas Lift Flowline ±2152', ±130.42 Rods
SWD Water Flowline ±686', ±41.58 Rods
Temporary Surface Water Flowline ±1595', ±96.66 Rods
Frac Water Flowline ±540', 32.73 Rods
Utility (1) ±690', ±41.82 Rods
Utility (2) ±1526', ±92.48 Rods
PRELIMINARY
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CHEVRON U.S.A. INC.
SOFT STAKE DETAIL FOR THE
HH SO 10 P3 PAD
SECTIONS 2, 3,10 AND 11, T26S-R27E
EDDY COUNTY, NEW MEXICO
DRAWN BY: GDG
PROJ. MGR.: GDG
DATE: 18 DEC 2015
REVISIONS
No.# DATE: REVISED BY:
No.# DATE: REVISED BY:
FILENAME: T:\2015\2153372\DWG\HH SO 10 P3 DETAIL.dwg

EXHIBITS 4&5

CHEVRON U.S.A. Inc
HH SO 10 P3 8H
NMNM 121473
SECTION 3, T26S-R27E (Off Lease SHL) SECTION 15, T26S, R27E
SHL 603' FSL & 2066' FWL BHL 180' FSL & 2315' FWL

APD Surface Use Plan of Operations

This Surface Use Plan of Operations has been designed to be reviewed in conjunction with Hayhurst Development Area (HDA) Master Development Plan

HDA Master Development Plan Reference Table
The contents referenced below apply to all HDA APD's

Existing Roads	Exhibit 1, MDP SUPO Page 1
Construction Materials	MDP SUPO Page 6
Methods for Handling Waste	MDP SUPO Page 6
Reclamation Objectives	MDP SUPO Page 6-8
Final Surface Reclamation	MDP SUPO Page 6-8

Driving Directions

- Driving Directions – From Malaga, New Mexico. The location is approximately 11.5 miles from the nearest town, which is Malaga, New Mexico. From Malaga, proceed South on Highway 285 approximately 11.5 miles and turn right (West) onto White City Rd and go approximately 6.8 miles on White City Road until the road reaches an intersection with Roadrunner Rd. Turn right onto this and travel 100 yards, then the access road and well location is on the right.

New or Reconstructed Access Roads – (Exhibit 2, MDP SUPO Pg. 1)

- There will be 2,758' of new road construction for this proposal.
- Ditches: See Exhibit 2 (To be submitted at later date)
- Culverts: See Exhibit 2 (To be submitted at later date)
- Road Cuts: See Exhibit 2 (To be submitted at later date)

Location of Existing Wells (Exhibit 3)

- 1-Mile radius map is attached

Location of Existing and/or Proposed Production Facilities (Exhibit 4, MDP SUP Pg. 2)

- Facilities: Proposed production facilities located in the NE corner of Sec. 10, T26S-R27E where oil and gas sales will take place.
  - The proposed facility and frac pond is in Sec. 10, T26S-R27E
  - Gas purchaser pipeline is in place at the tank battery.
  - Open top tanks or open containments will be netted.
  - Open vent exhaust stacks will be modified to prevent birds or bats from entering, discourage perching, roosting, and nesting.
  - Facilities will have a secondary containment 1.5 times the holding capacity of largest storage tank.
  - All above ground structures will be painted non-reflective shale green for blending with surrounding environment.
  - The permanent water disposal system will be determined prior to construction of any water transfer pipeline. Until permanent water takeaway is available, produced water will be hauled off location in trucks. **Notification will be provided to BLM upon site selection and survey – plats (including SWD well information) will be provided.**
- Pipelines: See Detail – Exhibit 5
  - Pipelines Include:
    - 4,917' of Flowlines carrying production (buried)
    - 5,748' Gas Lift Line carrying pressurized gas (buried)
    - 3,814' SWD Line carrying produced water (buried)
    - 3,691' Permanent Frac water line carrying fresh water (buried)
    - 4,813' Temporary Water line carrying fresh water (surface)
  - A ROW will be applied for through the State and BLM.
  - All construction activity will be confined to the approved ROW.
  - Pipeline will run parallel to the road and will stay within approved ROW.
- Power lines\Utility lines: 8,642' of new power lines

Location and Types of Water Supply (Exhibit 5, MDP SUPO Pg. 5)

- Proposed pond in Section 10, T26S-R27E will be utilized for fresh water.
- Fresh water will be obtained from a private water source.

Construction Materials (MDP SUPO Pg. 6)

- Location-specific caliche sources will be provided in post-application supplement

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SHL 603' FSL & 2066' FWL BHL 180' FSL & 2315' FWL

Well Site Layout (Exhibit 6)

- Surveyor Plat (Exhibit 6a)
  - Exterior well pad dimensions are 580' x 330'
  - Interior well pad dimensions from point of entry (well head) of the well are N-300', S-280', E-150', W-180'. Total disturbance area needed for construction of well pad will be approximately 4.4 acres
  - Topsoil placement is on the west where interim reclamation is planned to be completed upon completion of well and evaluation of best management practices.
  - Cut and fill: will be minimal.
- Rig Layout (Exhibit 6b)

Plans for Surface Reclamation (Exhibit 6, MDP SUPA Pg. 8)

Interim Reclamation Procedures

- Reclaimed pad size: 200' x 325'
- See Exhibit for reclaimed pad layout, topsoil location & erosion control features

Surface Ownership

- BLM Surface
  - Surface Tenant – Phillip Stell
- **Nearest Post Office:** Malaga Post Office; 11.4 Miles north

Other Information

- On-site performed by BLM NRS: Paul Murphy 11/4/2015
- Cultural report attached: **Yes** Participating Agreement attached: N/A

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SECTION 3, T26S-R27E (Off Lease SHL) SECTION 15, T26S, R27E
SHL 603' FSL & 2066' FWL BHL 180' FSL & 2315' FWL

Chevron Representatives

Primary point of contact:
Jennifer Van Curen
Jennifer.VanCuren@arcadis-us.com
M- 432-270-8753

Chevron Functional Contacts

Project Manager Name: Sean Cheben Address: 1400 Smith Street Houston, TX 77002 Phone: (432) 664-6809 Email: Sean.Cheben@chevron.com	**Drilling Engineer** Name: Roderick Milligan Address: 1400 Smith Street Houston, TX 77002 Phone: (281) 413-9794 Email: RoderickMilligan@chevron.com
Surface Land Representative Name: Kevin Dickerson Address: 15 Smith Road Midland Texas 79705 Phone: (432) 687-7104 Email: Kevin.Dickerson@chevron.com	**Facility Lead** Name: Tyler Weaver Address: 1400 Smith Street Houston, TX 77002 Phone: (281) 384-8934 Email: tyler.weaver@chevron.com
Geologist Name: Jeff Fabre Address: 1400 Smith Street Houston, TX 77002 Phone: (713) 372-0523 Email: JeffreyFabre@chevron.com	**Regulatory Specialist** Cindy Herrera-Murillo Address: 1616 W. Bender Blvd, Hobbs, NM 88240 Office: (575) 263-0431 Email: CHerreraMurillo@chevron.com

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EXHIBITS:

Exhibit 1 -- Existing Roads

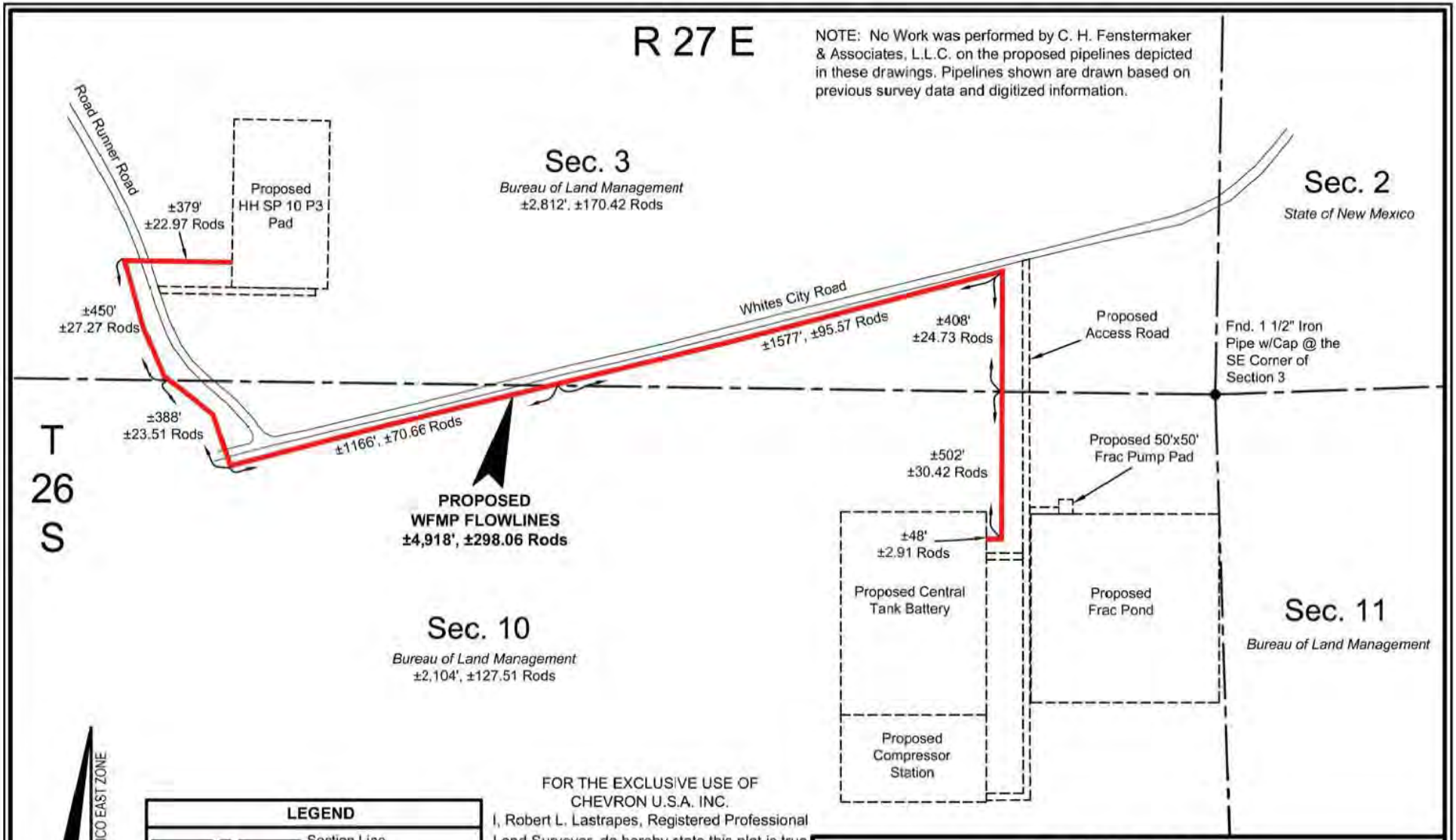
Exhibit 2 -- Survey Plat: New or Reconstructed Roads Map: if road is outside 600' x 600'.

Exhibit 3 -- 1-mile Radius Map

Exhibit 4 -- Location of Existing and/or Proposed Production Facilities (Tank Battery)

Exhibit 5 -- Survey Plat: Infrastructure: roads, pipelines, power lines, frac pond

Exhibit 6 -- Rig Layout: Well Site Layout Map / Diagram



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SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED WFMP FLOWLINES
HH SO 10 P3
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

DRAWN BY: BOR	REVISIONS			
PROJ. MGR.: GDG	No.	DATE:	REVISED BY:	
DATE: 02/08/2016	No.	DATE:	REVISED BY:	
FILENAME: T:\2015\2153372\DWG\WFMP Flowlines_SUP.dwg				

EXHIBIT 5

DISCLAIMER: At this time, C.H. Fenstermaker & Associates, L.L.C. has not performed nor was asked to perform any type of engineering, hydrological modeling, flood plain, or "No Rise" certification analyses, including but not limited to determining whether the project will impact flood hazards in connection with federal/FEMA, state, and/or local laws, ordinances and regulations. Accordingly, Fenstermaker makes no warranty or representation of any kind as to the foregoing issues, and persons or entities using this information shall do so at their own risk.

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SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED WFMP FLOWLINES
HH SO 10 P3
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

DRAWN BY: BOR	REVISIONS			
PROJ. MGR.: GDG	No.	DATE:		REVISED BY:
DATE: 02/08/2016	No.	DATE:		REVISED BY:
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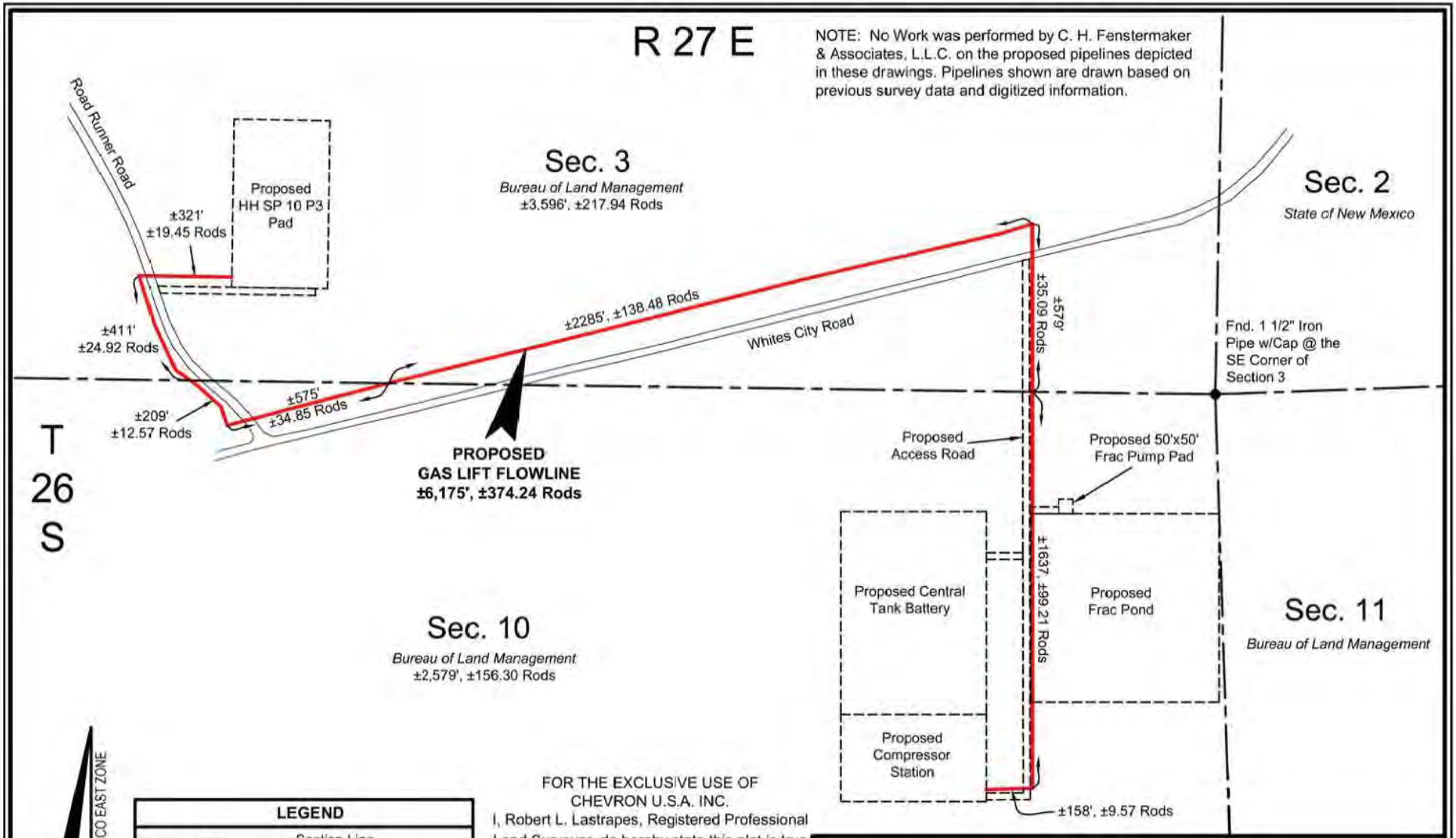

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SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED GAS LIFT FLOWLINE
HH SO 10 P3
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

PAGE 1 OF 2

DRAWN BY: BOR	REVISIONS			
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DATE: 02/08/2016	No.	DATE:	REVISED BY:	
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SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED GAS LIFT FLOWLINE
HH SO 10 P3
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

DRAWN BY: BOR	REVISIONS			
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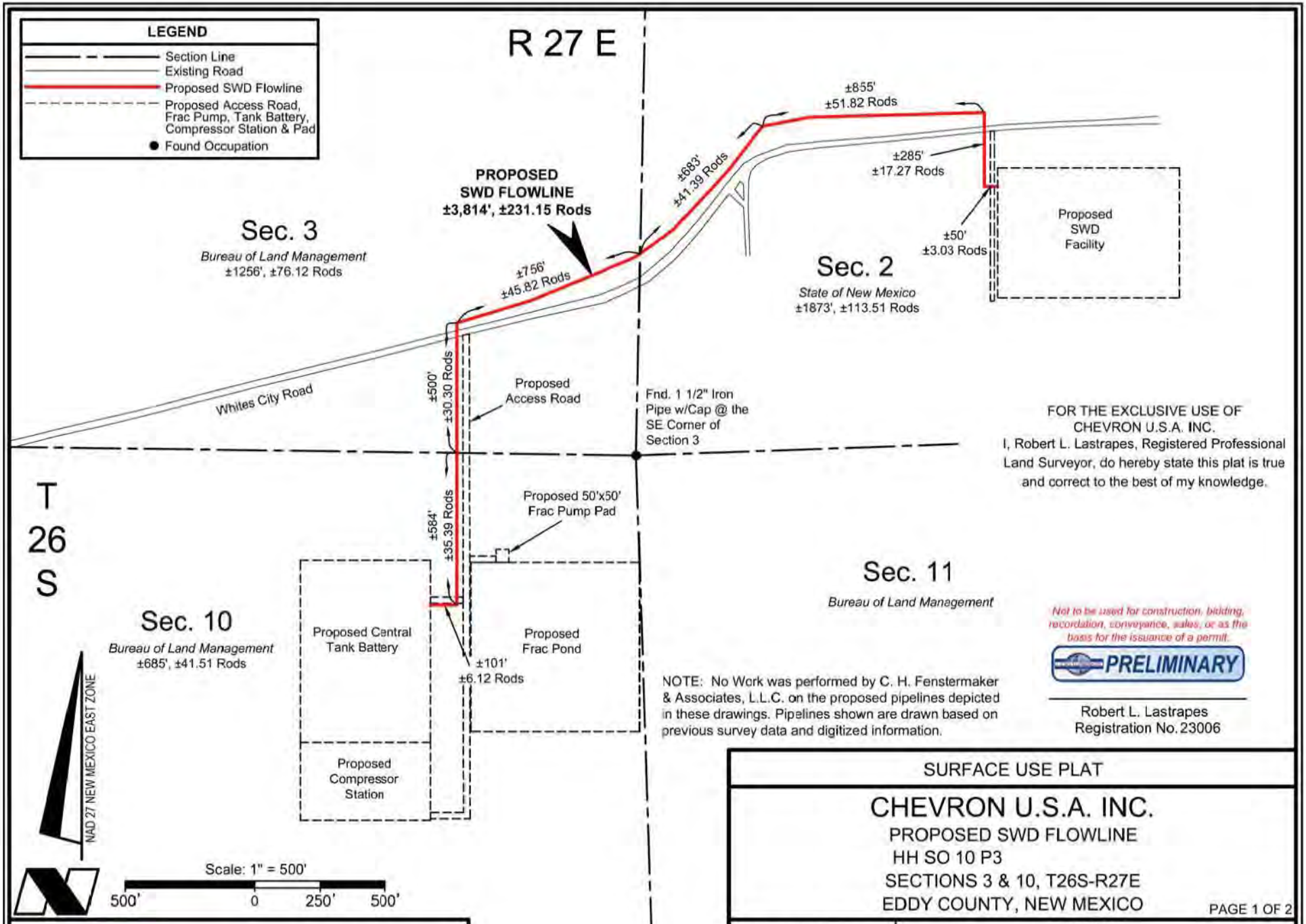

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SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED SWD FLOWLINE
HH SO 10 P3
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

PAGE 1 OF 2

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SURFACE USE PLAT

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PROPOSED SWD FLOWLINE
HH SO 10 P3
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

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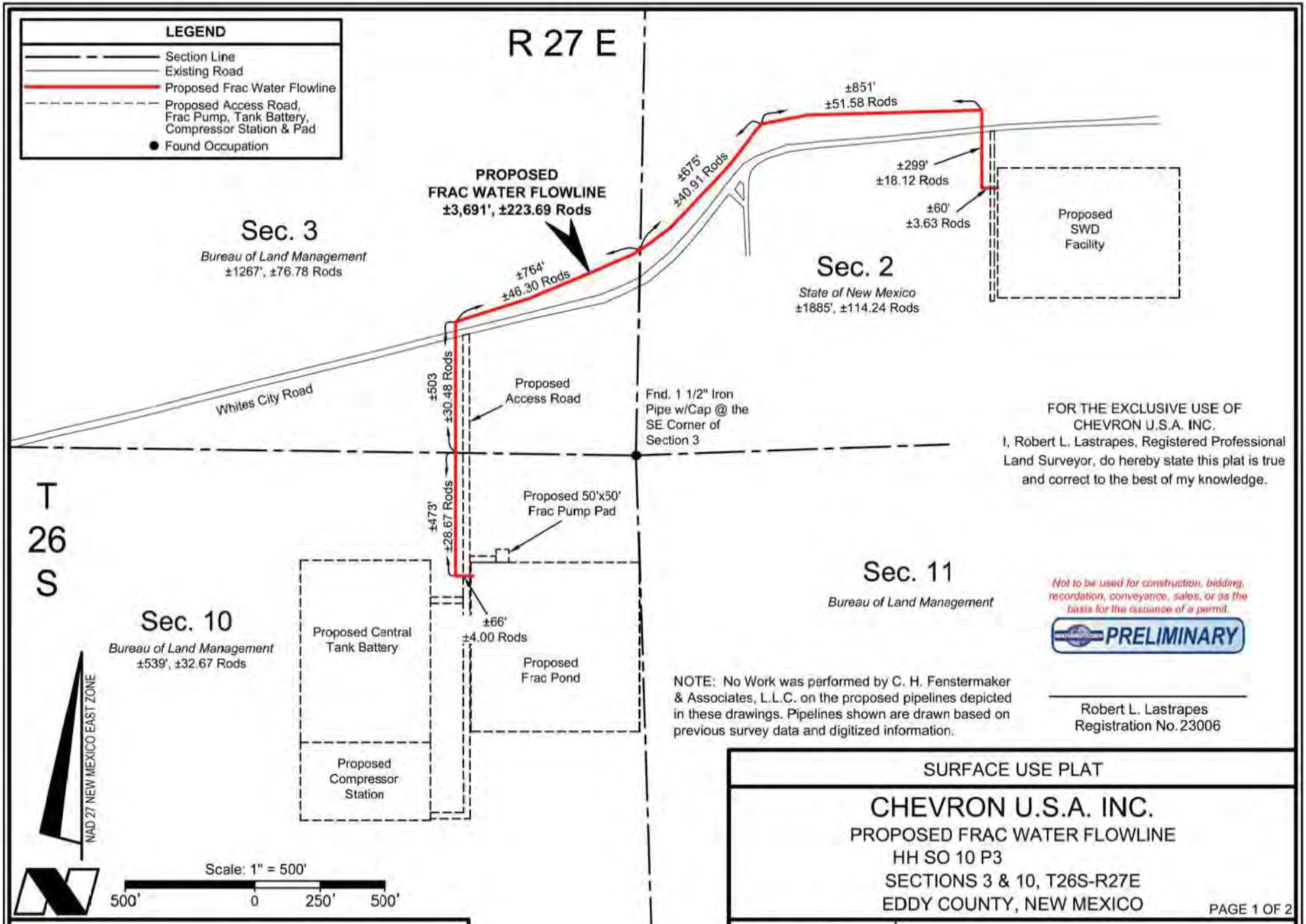

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SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED FRAC WATER FLOWLINE
HH SO 10 P3
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

PAGE 1 OF 2

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PROJ. MGR.: GDG	No.	DATE:	REVISED BY:	
DATE: 02/10/2016	No.	DATE:	REVISED BY:	
FILENAME: T:\2015\2153372\DWG\Frac Water FL_SUP.dwg				

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HH SO 10 P3
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

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PROJ. MGR.: GDG	No.	DATE:		REVISED BY:
DATE: 02/10/2016	No.	DATE:		REVISED BY:
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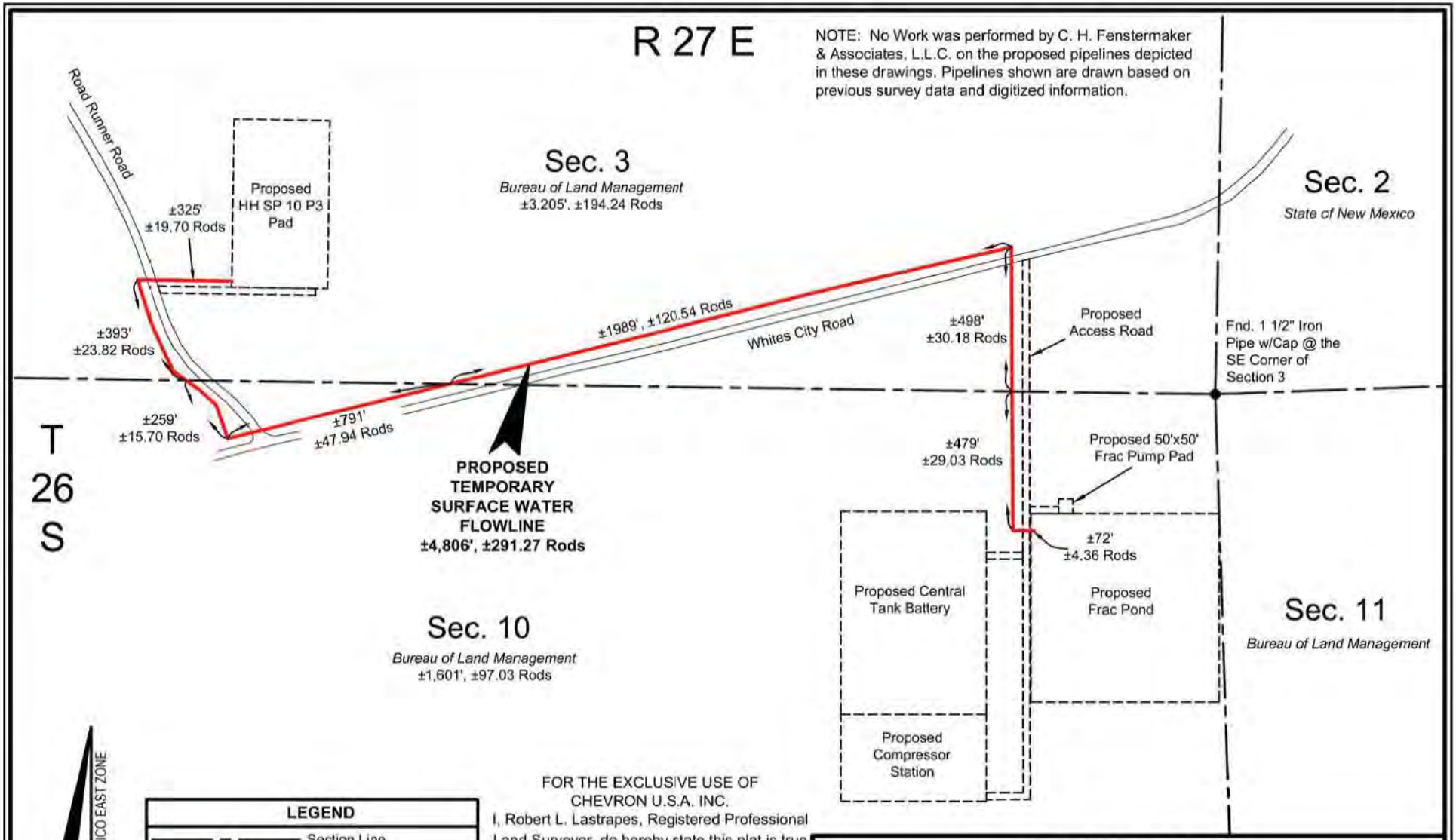

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SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED TEMPORARY SURFACE WATER FLOWLINE
HH SO 10 P3
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

PAGE 1 OF 2

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PROJ. MGR.: GDG	No.	DATE:	REVISED BY:
DATE: 02/08/2016	No.	DATE:	REVISED BY:
FILENAME: T:\2015\2153372\DWG\Temporary Surface Water Flowline_SUP.dwg			

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3. No Work was performed by C. H. Fenstermaker & Associates, L.L.C. on the proposed pipelines depicted in these drawings. Pipelines shown are drawn based on previous survey data and digitized information.

FOR THE EXCLUSIVE USE OF
CHEVRON U.S.A. INC.
I, Robert L. Lastrapes, Registered Professional Land Surveyor, do hereby state this plat is true and correct to the best of my knowledge.

Not to be used for construction, bidding, recordation, conveyance, sales, or as the basis for the issuance of a permit.

PRELIMINARY

Robert L. Lastrapes
Registration No. 23006

FENSTERMAKER
C. H. Fenstermaker & Associates, L.L.C.
135 Regency Sq. Lafayette, LA 70508
Ph. 337-237-2200 Fax. 337-232-3299
www.fenstermaker.com

SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED TEMPORARY SURFACE WATER FLOWLINE
HH SO 10 P3
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

DRAWN BY: BOR	REVISIONS			
PROJ. MGR.: GDG	No.	DATE:	REVISED BY:	
DATE: 02/08/2016	No.	DATE:	REVISED BY:	
FILENAME: T:\2015\2153372\DWG\Temporary Surface Water Flowline_SUP.dwg				

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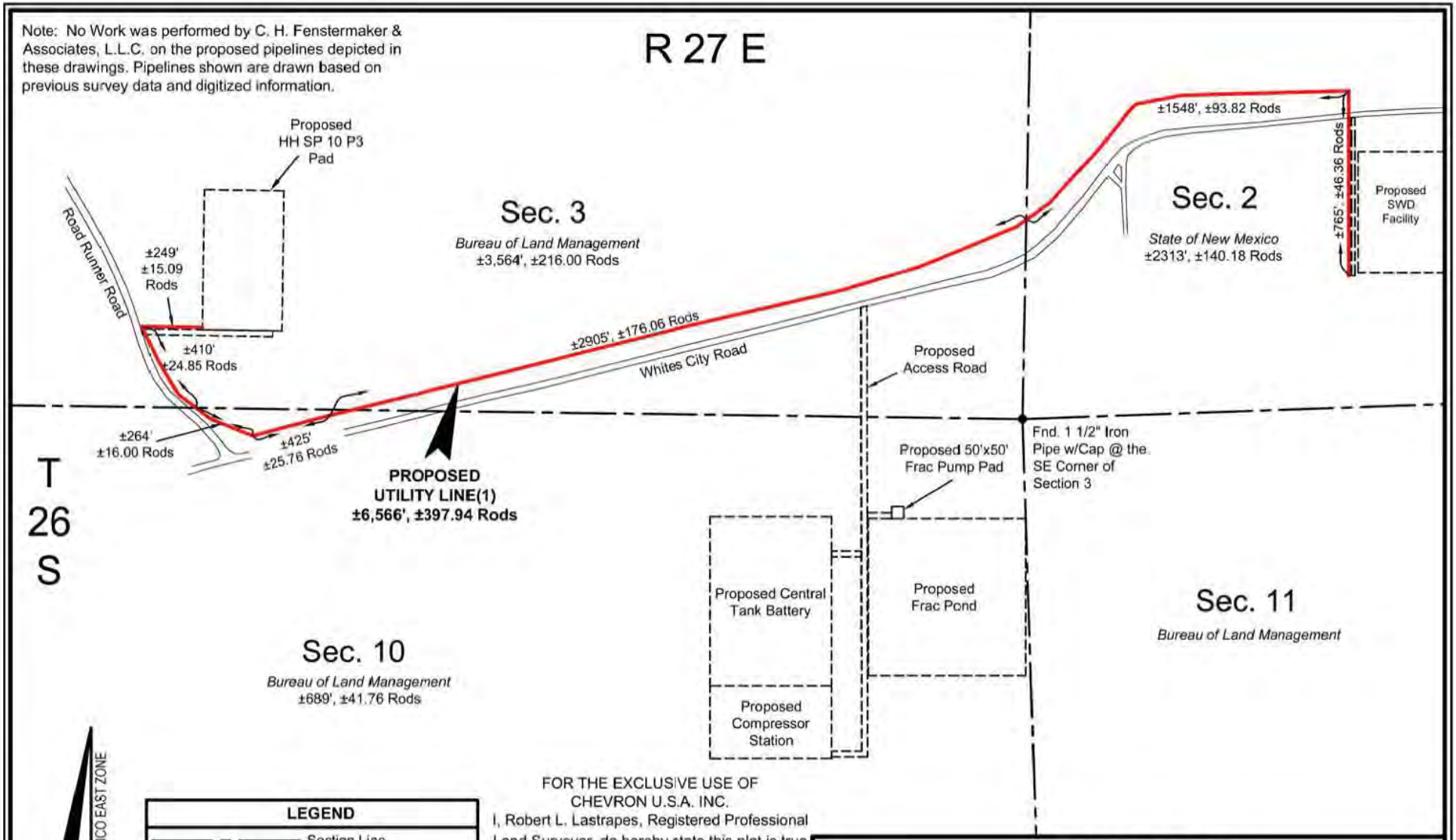

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SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED UTILITY LINE(1)
HH SO 10 P3
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

DRAWN BY: BOR	REVISIONS		
PROJ. MGR.: GDG	No.	DATE:	REVISED BY:
DATE: 02/08/2016	No.	DATE:	REVISED BY:
FILENAME: T:\2015\2153372\DWG\Utility Line 1_SUP.dwg			

EXHIBIT 5

DISCLAIMER: At this time, C.H. Fenstermaker & Associates, L.L.C. has not performed nor was asked to perform any type of engineering, hydrological modeling, flood plain, or "No Rise" certification analyses, including but not limited to determining whether the project will impact flood hazards in connection with federal/FEMA, state, and/or local laws, ordinances and regulations. Accordingly, Fenstermaker makes no warranty or representation of any kind as to the foregoing issues, and persons or entities using this information shall do so at their own risk.

NOTE:

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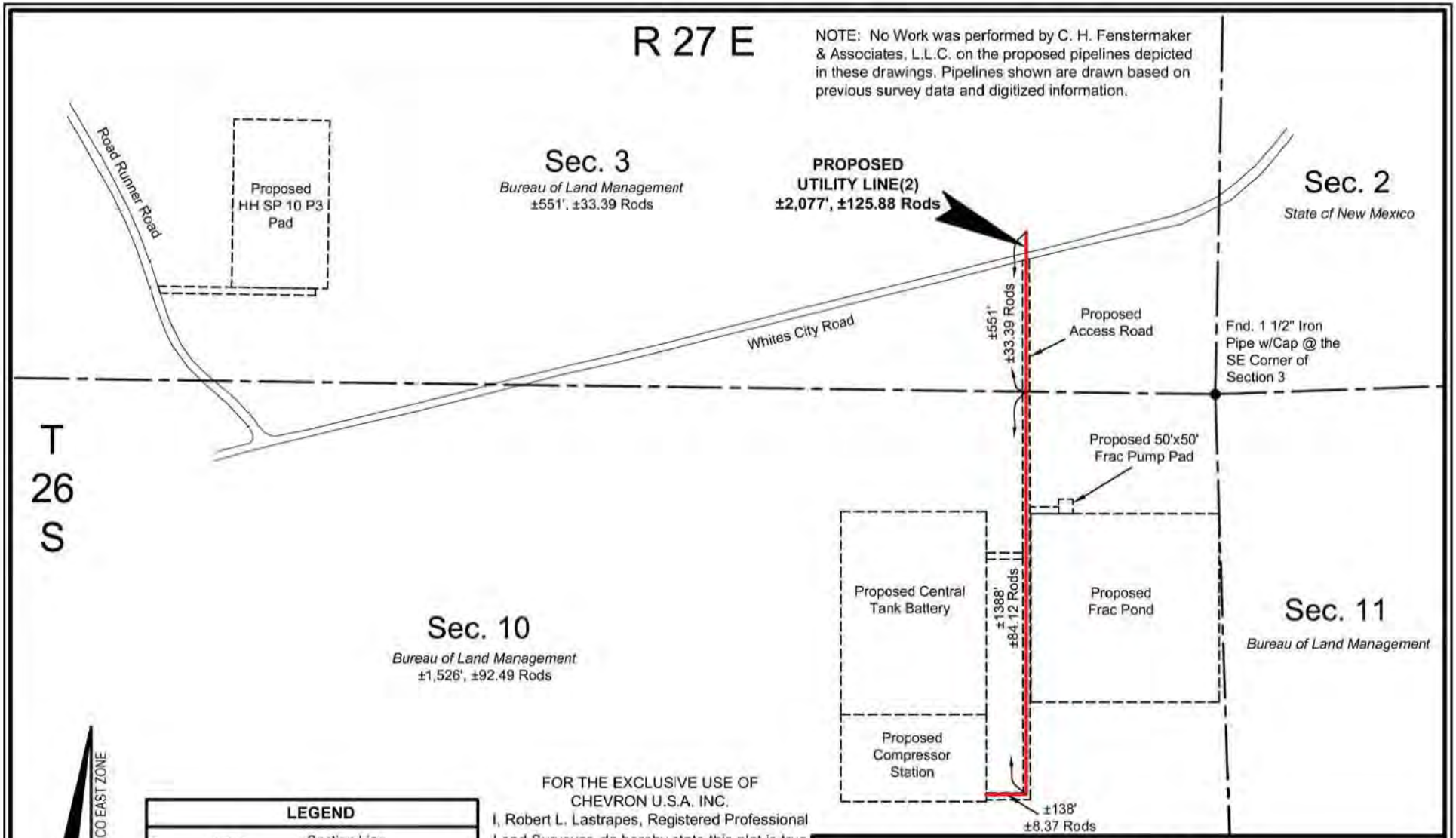
SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED UTILITY LINE(1)
HH SO 10 P3
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

DRAWN BY: BOR	REVISIONS		
PROJ. MGR.: GDG	No.	DATE:	REVISED BY:
DATE: 02/08/2016	No.	DATE:	REVISED BY:
FILENAME: T:\2015\2153372\DWG\Utility Line 1_SUP.dwg			



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SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED UTILITY LINE(2)
HH SO 10 P3
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

PAGE 1 OF 2

DRAWN BY: BOR	REVISIONS			
PROJ. MGR.: GDG	No.	DATE:	REVISED BY:	
DATE: 02/08/2016	No.	DATE:	REVISED BY:	
FILENAME: T:\2015\2153372\DWG\Utility Line 2_SUP.dwg				

EXHIBIT 5

DISCLAIMER: At this time, C.H. Fenstermaker & Associates, L.L.C. has not performed nor was asked to perform any type of engineering, hydrological modeling, flood plain, or "No Rise" certification analyses, including but not limited to determining whether the project will impact flood hazards in connection with federal/FEMA, state, and/or local laws, ordinances and regulations. Accordingly, Fenstermaker makes no warranty or representation of any kind as to the foregoing issues, and persons or entities using this information shall do so at their own risk.

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SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED UTILITY LINE(2)
HH SO 10 P3
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

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DATE: 02/08/2016	No.	DATE:	REVISED BY:
FILENAME: T:\2015\2153372\DWG\Utility Line 2_SUP.dwg			

Form 3160-3
(June 2015)

FORM APPROVED
OMB No. 1004-0137
Expires: January 31, 2018

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

5. Lease Serial No.
NMNM11808

6. If Indian, Allotee or Tribe Name

1a. Type of work: [✓] DRILL [ ] REENTER

1b. Type of Well: [✓] Oil Well [ ] Gas Well [ ] Other

1c. Type of Completion [ ] Hydraulic Fracturing [✓] Single Zone [ ] Multiple Zone

7. If Unit or CA Agreement, Name and No.

8. Lease Name and Well No.
HH SO 10 P3

2. Name of Operator
CHEVRON USA INC

9. API Well No.
15H

3a. Address
1616 W. BENDER BLVD HOBBS, NM 88240

3b. Phone No. *(include area code)*
575-263-0431

10. Field and Pool, or Exploratory
WILDCAT; WOLFCAMP

4. Location of Well *(Report location clearly and in accordance with any State requirements.*)*
At surface 628' FSL & 2066' FWL
At proposed prod. zone 180' FNL & 1652' FWL

11. Sec., T. R. M. or Blk. and Survey or Area
SEC 3, T26S, R27E, UL N (SHL)

14. Distance in miles and direction from nearest town or post office*
12.8 MILES FROM MALAGA, NEW MEXICO

12. County or Parish
EDDY

13. State
NM

15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any) 628 ' FSL

16. No of acres in lease
1120 ACRES

17. Spacing Unit dedicated to this well
320 ACRES

18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft. SKEEN 2 SWD-CHEV

19. Proposed Depth
TD 10,177' MD 21,043"

20. BLM/BIA Bond No. in file
CA 0329

21. Elevations (Show whether DF, KDB, RT, GL, etc.)
3279' GL

22. Approximate date work will start*
OCTOBER 2016

23. Estimated duration
30 DAYS

24. Attachments

The following, completed in accordance with the requirements of Onshore Oil and Gas Order No. 1, and the Hydraulic Fracturing rule per 43 CFR 3162.3-3 (as applicable)

1. Well plat certified by a registered surveyor.
2. A Drilling Plan.
3. A Surface Use Plan (if the location is on National Forest System Lands, the SUPO must be filed with the appropriate Forest Service Office).
4. Bond to cover the operations unless covered by an existing bond on file (see Item 20 above).
5. Operator certification.
6. Such other site specific information and/or plans as may be requested by the BLM.

25. Signature Cindy Herrera-Murillo

Name *(Printed/Typed)*
CINDY HERRERA-MURILLO

Date
02/11/2016

Title
PERMITTING SPECIALIST

Approved by *(Signature)*

Name *(Printed/Typed)*

Date

Title

Office

Application approval does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.
Conditions of approval, if any, are attached.

Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212, make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

(Continued on page 2)

*(Instructions on page 2)

CERTIFICATION

I hereby certify that I, or someone under my direct supervision, have inspected the drill site and access route proposed herein; that I am familiar with the conditions which currently exist; that I have full knowledge of state and federal laws applicable to this operation; that the statements made in this APD package are, to the best of my knowledge, true and correct; and, that the work associated with the operations proposed will be performed in conformity with this APD package and the terms and conditions under which it is approved. I also certify that I, or the company I represent, am responsible for the operations conducted under this application. These statements are subject to the provisions of 18 U.S.C. 1001 for the filing of a false statement.

Executed this 19th day of JANUARY, 2016

Name: _____

Sean Cheben-Project Manager

Address: 1400 Smith Street

Houston, TX 77002

Room 40125

Office: 713-372-9382

Email: Sean.Cheben@CHEVRON.COM

Cindy Herrera-Murillo
Permitting Specialist
Midcontinent BU

Chevron North America
Exploration and Production Company
(A Chevron U.S.A. Inc. Division)
1616 W. Bender Blvd
Hobbs FMT, Hobbs, NM 88240
Tel 575-263-0431
Cherreramurillo@chevron.com

February 10, 2016

BLM-Carlsbad Field Office
620 E. Greene Street
Carlsbad, New Mexico 88220

Re: Applications to Drill
For Hayhurst Development Area in NM
MDP- 2016-1

Dear Sirs,

Chevron U.S.A. Inc. respectfully submits 12 Applications to Drill (APD's) with the Hayhurst Development Area's Master Development Plan (MDP-2016-1).

There will be 2 pads and 6 wells on each pad. The first well pad includes the following APD's:

HH SO 10 P3 #7H; HH SO 10 P3 #8H; HH SO 10 P3 #15H; HH SO 10 P3 #16H; HH SO 10 P3 #23H; HH SO 10 P3 #24H.

The second well pad includes the following APD's:

HH SO 8 P2 #5H; HH SO 8 P2 #6H; HH SO 8 P2 #13H; HH SO 8 P2 # 14H; HH SO 8 P2 #21H; HH SO 8 P2 #22H.

Your prompt consideration and approval of these applications will be greatly appreciated. If additional information is required, you may contact me at 575-263-0431, or by email at Cherreramurillo@chevron.com.

Sincerely,

Cindy Herrera-Murillo

Cindy Herrera-Murillo
Permitting Specialist
Enclosures

District I
1625 N French Dr., Hobbs, NM 88240
Phone: (575) 393-6161 Fax: (575) 393-0720
District II
811 S. First St., Artesia, NM 88210
Phone: (575) 748-1283 Fax: (575) 748-9720
District III
1000 Rio Brazos Road, Aztec, NM 87410
Phone: (505) 334-6178 Fax: (505) 334-6170
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505
Phone: (505) 476-3460 Fax: (505) 476-3462

State of New Mexico
Energy, Minerals & Natural Resources Department
OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-102
Revised August 1, 2011
Submit one copy to appropriate District Office

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

[1] API Number	[2] Pool Code	[3] Pool Name
		Wildcat; Wolfcamp

[4] Property Code	[5] Property Name	[6] Well Number
	HH SO 10 P3	15H

[7] OGRID No.	[8] Operator Name	[9] Elevation
4323	CHEVRON U.S.A. INC.	3279'

[10] Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
N	3	26 SOUTH	27 EAST, N.M.P.M.		628'	SOUTH	2066'	WEST	EDDY

[11] Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
N	15	26 SOUTH	27 EAST, N.M.P.M.		180'	SOUTH	1652'	WEST	EDDY

[12] Dedicated Acres	[13] Joint or Infill	[14] Consolidation Code	[15] Order No.
320			

No allowable will be assigned to this completion until all interests have been consolidated or a non-standard unit has been approved by the division.

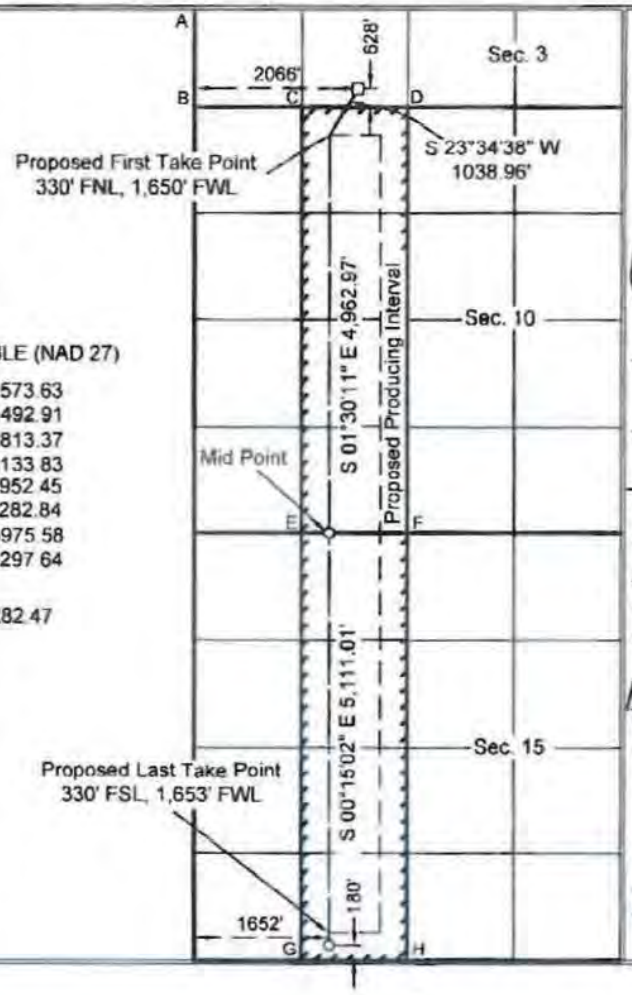
HH SO 10 P3 15H WELL		
X=	547,568	NAD 27
Y=	387,609	
LAT.	32.065559	
LONG.	104.179777	
X=	588,752	NAD83
Y=	387,666	
LAT.	32.065681	
LONG.	104.180269	
ELEVATION +3279' NAVD 88		

CORNER COORDINATES TABLE (NAD 27)

A - Y=392447.75, X=545573.63
B - Y=387009.20, X=545492.91
C - Y=386991.36, X=546813.37
D - Y=386973.51, X=548133.83
E - Y=381698.68, X=546952.45
F - Y=381685.77, X=548282.84
G - Y=376406.42, X=546975.58
H - Y=376398.76, X=548297.64

Mid Point
Y=381695.48, X=547282.47

PROPOSED BOTTOM HOLE LOCATION		
X=	547,305	NAD 27
Y=	376,585	
LAT.	32.035254	
LONG.	104.180676	
X=	588,489	NAD83
Y=	376,641	
LAT.	32.035376	
LONG.	104.181168	



[17] OPERATOR CERTIFICATION

I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.

Cindy Herrera-Murillo 24-16
Signature Date

Cindy Herrera-Murillo
Printed Name

Cherreramurillo@chevron.com
E-mail Address

[18] SURVEYOR CERTIFICATION

I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.

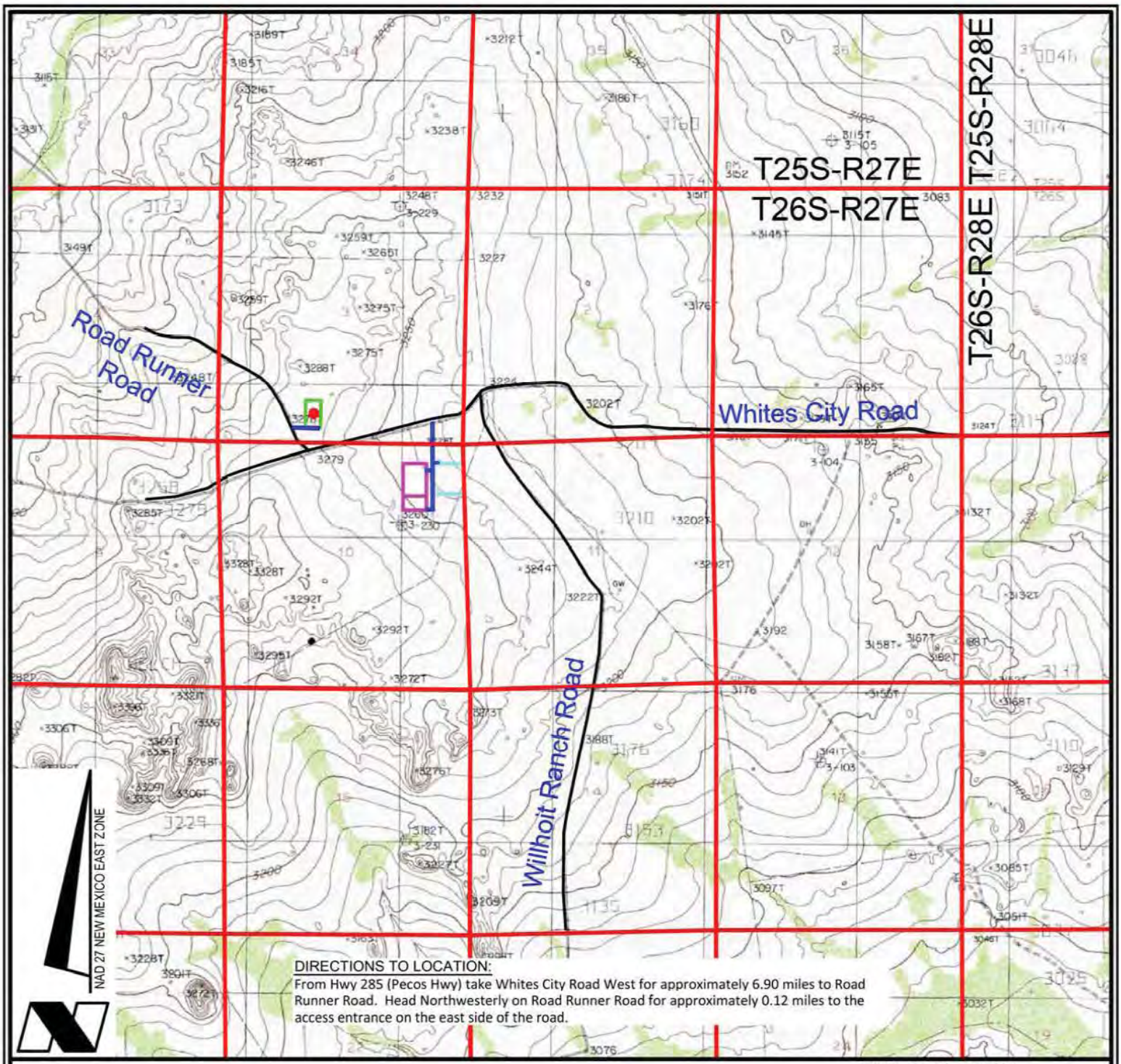
12-8-2015
Date of Survey

Signature and Seal of Professional Surveyor

ROBERT L. LASTRAPES
NEW MEXICO
23006
PROFESSIONAL SURVEYOR
12-22-2015

23006
Certificate Number

EXHIBIT 1



DIRECTIONS TO LOCATION:
From Hwy 285 (Pecos Hwy) take Whites City Road West for approximately 6.90 miles to Road Runner Road. Head Northwesterly on Road Runner Road for approximately 0.12 miles to the access entrance on the east side of the road.

VICINITY MAP

SCALE: 1" = 3000'
3000' 0 1500' 3000'

LEGEND
- Proposed Well
- Proposed Access Road
- Proposed Drillsite
- Existing Road
- Section Line
- Proposed Frac Pond
- Proposed Facility

CHEVRON U.S.A. INC.

HH SO 10 P3 NO. 15H WELL
LOCATED 628' FSL AND 2066' FWL
SECTION 3, T26S-R27E
EDDY COUNTY, NEW MEXICO

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DRAWN BY: LJG	REVISIONS		
PROJ. MGR.: GDG	No.	DATE:	REVISED BY:
DATE: 12/16/2015	No.	DATE:	REVISED BY:
FILENAME: T:\2015\2153371\DWG\HH SO 10 P3 15H_APD.dwg			

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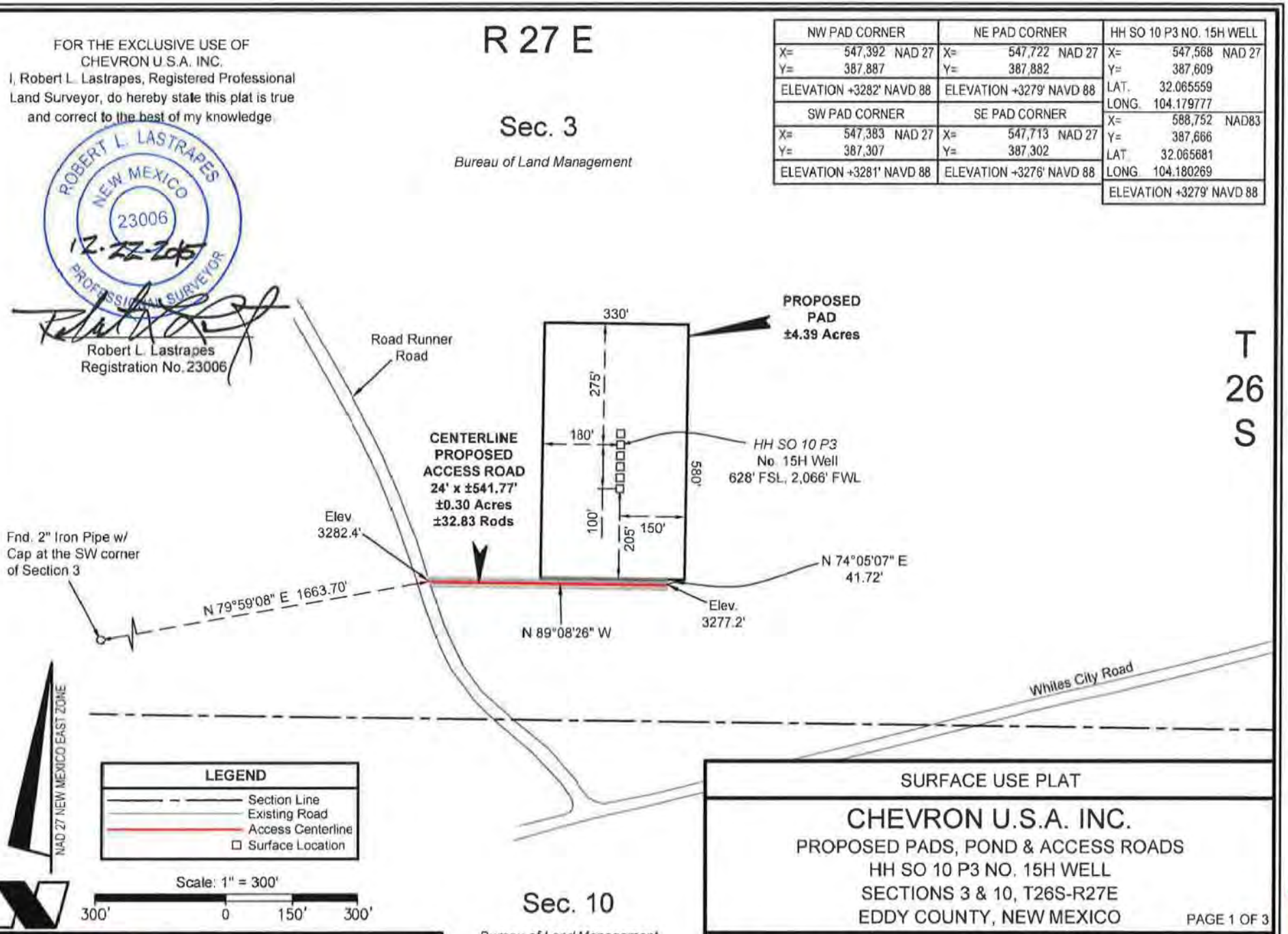
ROBERT L. LASTRAPES
NEW MEXICO
23006
12-22-2015
PROFESSIONAL SURVEYOR

Robert L. Lastrapes
Registration No. 23006

NW PAD CORNER	NE PAD CORNER	HH SO 10 P3 NO. 15H WELL
X= 547,392 NAD 27	X= 547,722 NAD 27	X= 547,568 NAD 27
Y= 387,887	Y= 387,882	Y= 387,609
ELEVATION +3282' NAVD 88	ELEVATION +3279' NAVD 88	LAT. 32.065559
SW PAD CORNER	SE PAD CORNER	LONG. 104.179777
X= 547,383 NAD 27	X= 547,713 NAD 27	X= 588,752 NAD83
Y= 387,307	Y= 387,302	Y= 387,666
ELEVATION +3281' NAVD 88	ELEVATION +3276' NAVD 88	LAT. 32.065681
		LONG. 104.180269
		ELEVATION +3279' NAVD 88



SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED PADS, POND & ACCESS ROADS
HH SO 10 P3 NO. 15H WELL
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

PAGE 1 OF 3

FENSTERMAKER

C. H. Fenstermaker & Associates, L.L.C.
135 Regency Sq. Lafayette, LA 70508
Ph. 337-237-2200 Fax 337-232-3299
www.fenstermaker.com

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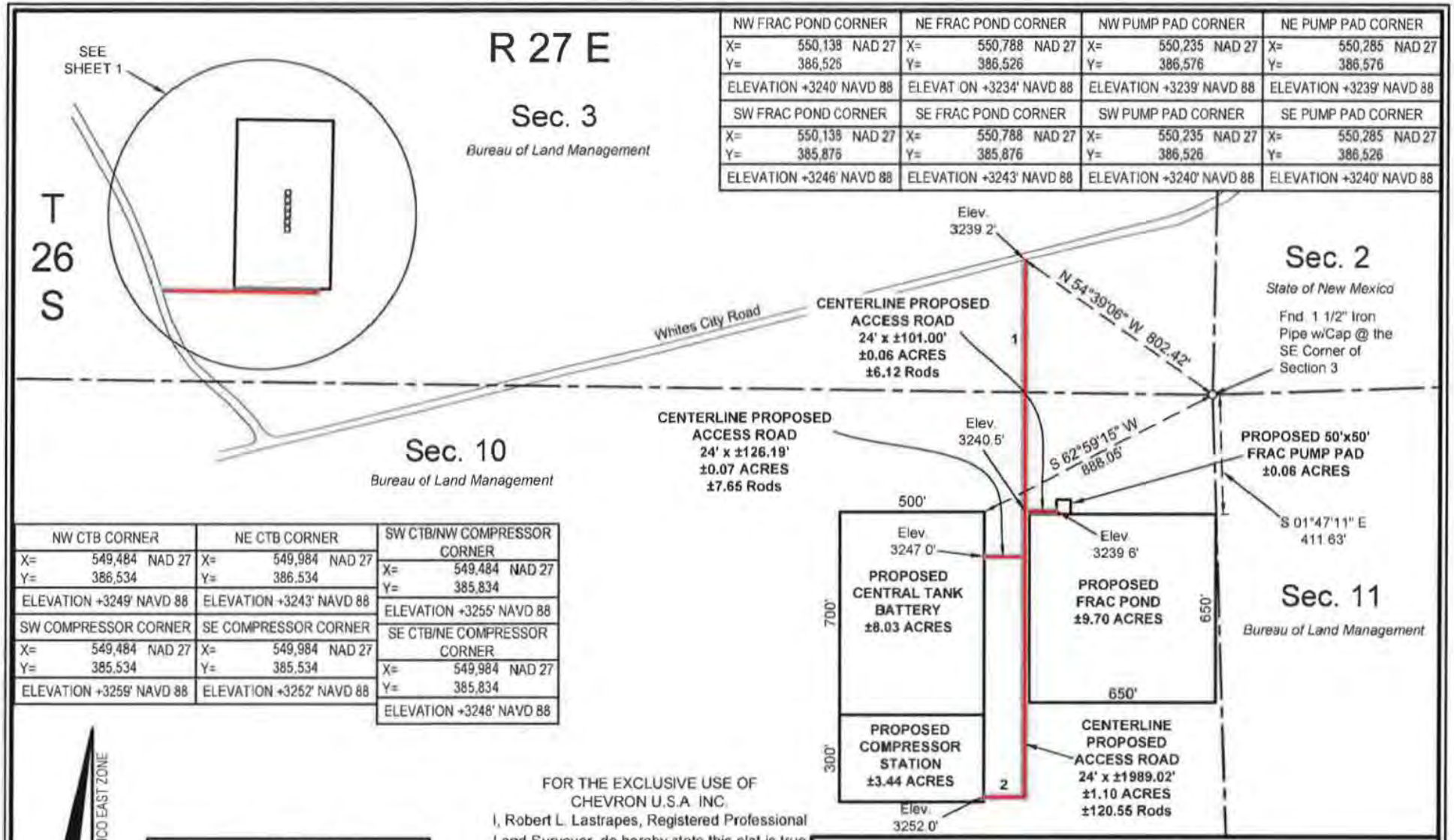
FILENAME: T:\2015\2153371\DWG\HH SO 10 P3 15H_SUP.dwg			

EXHIBITS 2&5

NW FRAC POND CORNER	NE FRAC POND CORNER	NW PUMP PAD CORNER	NE PUMP PAD CORNER
X= 550,138 NAD 27 Y= 386,526	X= 550,788 NAD 27 Y= 386,526	X= 550,235 NAD 27 Y= 386,576	X= 550,285 NAD 27 Y= 386,576
ELEVATION +3240' NAVD 88	ELEVAT ON +3234' NAVD 88	ELEVATION +3239' NAVD 88	ELEVATION +3239' NAVD 88
SW FRAC POND CORNER	**SE FRAC POND CORNER**	**SW PUMP PAD CORNER**	**SE PUMP PAD CORNER**
X= 550,138 NAD 27 Y= 385,876	X= 550,788 NAD 27 Y= 385,876	X= 550,235 NAD 27 Y= 386,526	X= 550,285 NAD 27 Y= 386,526
ELEVATION +3246' NAVD 88	ELEVATION +3243' NAVD 88	ELEVATION +3240' NAVD 88	ELEVATION +3240' NAVD 88



NW CTB CORNER	NE CTB CORNER	SW CTB/NW COMPRESSOR CORNER
X= 549,484 NAD 27 Y= 386,534	X= 549,984 NAD 27 Y= 386,534	X= 549,484 NAD 27 Y= 385,834
ELEVATION +3249' NAVD 88	ELEVATION +3243' NAVD 88	ELEVATION +3255' NAVD 88
SW COMPRESSOR CORNER	**SE COMPRESSOR CORNER**	**SE CTB/NE COMPRESSOR CORNER**
X= 549,484 NAD 27 Y= 385,534	X= 549,984 NAD 27 Y= 385,534	X= 549,984 NAD 27 Y= 385,834
ELEVATION +3259' NAVD 88	ELEVATION +3252' NAVD 88	ELEVATION +3248' NAVD 88

NAD 27 NEW MEXICO EAST ZONE

LEGEND

- Section Line
- Existing Road
- Access Centerline
- Surface Location

Scale: 1" = 500'

500' 0 250' 500'

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I, Robert L. Lastrapes, Registered Professional Land Surveyor, do hereby state this plat is true and correct to the best of my knowledge

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NEW MEXICO
23006
12-22-2015
PROFESSIONAL SURVEYOR

Robert L. Lastrapes
Registration No. 23006

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SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED PADS, POND & ACCESS ROADS
HH SO 10 P3 NO. 15H WELL
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

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DATE: 12/16/2015	No.	DATE:	REVISED BY:

FILENAME: T:\2015\2153371\DWG\HH SO 10 P3 15H_SUP.dwg

DISCLAIMER: At this time, C.H. Fenstermaker & Associates, L.L.C. has not performed nor was asked to perform any type of engineering, hydrological modeling, flood plain, or "No Rise" certification analyses, including but not limited to determining whether the project will impact flood hazards in connection with federal/FEMA, state, and/or local laws, ordinances and regulations. Accordingly, Fenstermaker makes no warranty or representation of any kind as to the foregoing issues, and persons or entities using this information shall do so at their own risk.

NOTE:
Please be advised, that while reasonable efforts are made to locate and verify pipelines and anomalies using our standard pipeline locating equipment, it is impossible to be 100 % effective. As such, we advise using caution when performing work as there is a possibility that pipelines and other hazards, such as fiber optic cables, PVC pipelines, etc. may exist undetected on site.

NOTE:
Many states maintain information centers that establish links between those who dig (excavators) and those who own and operate underground facilities (operators). It is advisable and in most states, law, for the contractor to contact the center for assistance in locating and marking underground utilities. For guidance, New Mexico One Call www.nmonecall.org

CENTERLINE PROPOSED ACCESS ROAD		
COURSE	BEARING	DISTANCE
1	S 00° 05' 06" E	1849.60'
2	S 89° 54' 54" W	139.42'

FOR THE EXCLUSIVE USE OF
CHEVRON U.S.A. INC.
I, Robert L. Lastrapes, Registered Professional Land Surveyor, do hereby state this plat is true and correct to the best of my knowledge.

ROBERT L. LASTRAPES
NEW MEXICO
23006
12-22-2015
PROFESSIONAL SURVEYOR

Robert L. Lastrapes
Registration No. 23006

FENSTERMAKER
C. H. Fenstermaker & Associates, L.L.C.
135 Regency Sq. Lafayette, LA 70508
Ph. 337-237-2200 Fax: 337-232-3299
www.fenstermaker.com

SURFACE USE PLAT

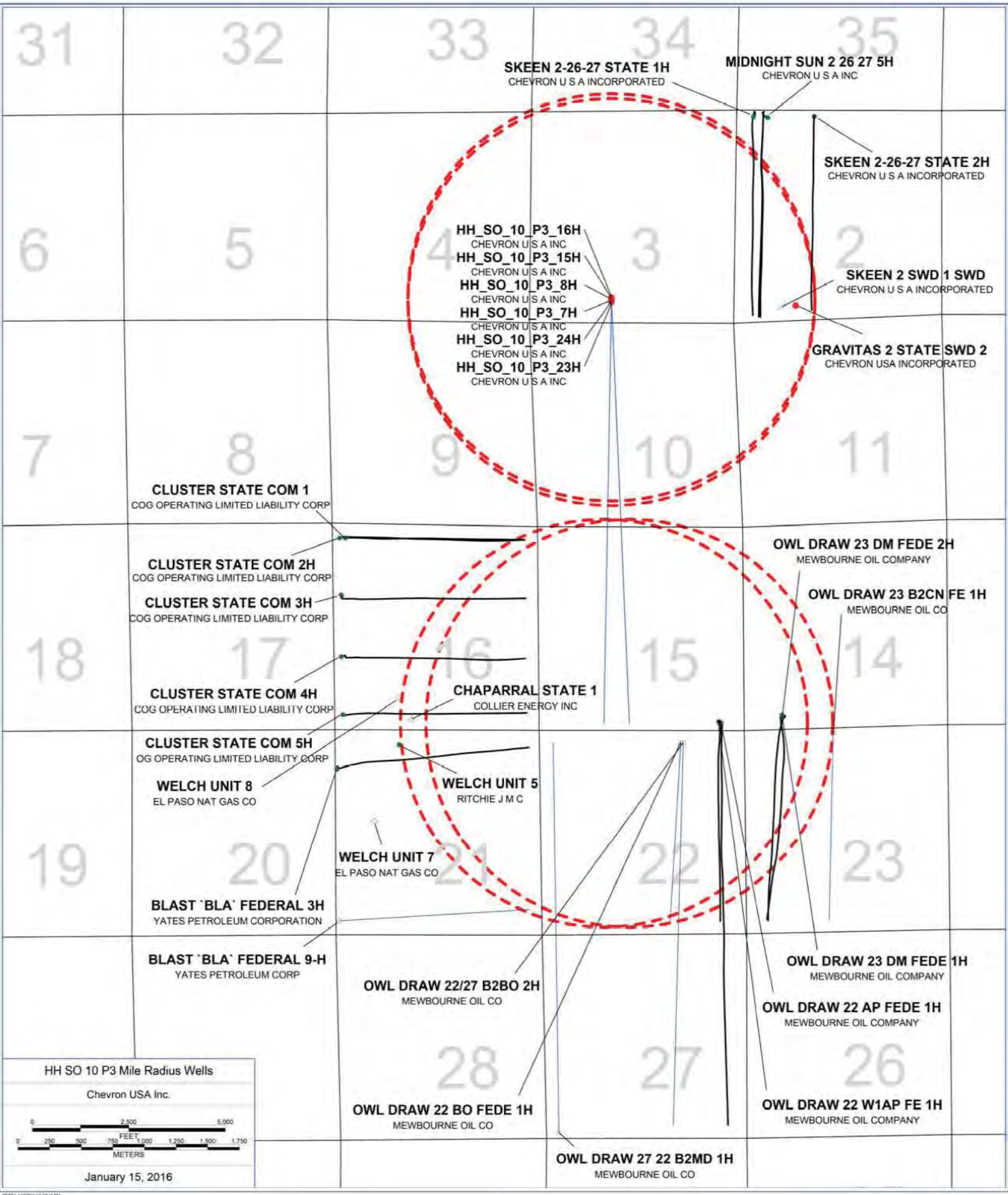
CHEVRON U.S.A. INC.

PROPOSED PADS, POND & ACCESS ROADS
HH SO 10 P3 NO. 15H WELL
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

DRAWN BY: LJG	REVISIONS			
PROJ. MGR.: GDG	No.	DATE:		REVISED BY:
DATE: 12/16/2015	No.	DATE:		REVISED BY:

FILENAME: T:\2015\2153371\DWG\HH SO 10 P3 15H_SUP.dwg

EXHIBIT 3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SKEEN 2-26-27 STATE 1H
CHEVRON U S A INCORPORATED
MIDNIGHT SUN 2 26 27 5H
CHEVRON U S A INC
SKEEN 2-26-27 STATE 2H
CHEVRON U S A INCORPORATED
HH_SO_10_P3_16H
CHEVRON U S A INC
HH_SO_10_P3_15H
CHEVRON U S A INC
HH_SO_10_P3_8H
CHEVRON U S A INC
HH_SO_10_P3_7H
CHEVRON U S A INC
HH_SO_10_P3_24H
CHEVRON U S A INC
HH_SO_10_P3_23H
CHEVRON U S A INC
SKEEN 2 SWD 1 SWD
CHEVRON U S A INCORPORATED
GRAVITAS 2 STATE SWD 2
CHEVRON USA INCORPORATED
CLUSTER STATE COM 1
COG OPERATING LIMITED LIABILITY CORP
CLUSTER STATE COM 2H
COG OPERATING LIMITED LIABILITY CORP
CLUSTER STATE COM 3H
COG OPERATING LIMITED LIABILITY CORP
CLUSTER STATE COM 4H
COG OPERATING LIMITED LIABILITY CORP
CLUSTER STATE COM 5H
OG OPERATING LIMITED LIABILITY CORP
WELCH UNIT 8
EL PASO NAT GAS CO
CHAPARRAL STATE 1
COLLIER ENERGY INC
WELCH UNIT 5
RITCHIE J M C
WELCH UNIT 7
EL PASO NAT GAS CO
BLAST `BLA` FEDERAL 3H
YATES PETROLEUM CORPORATION
BLAST `BLA` FEDERAL 9-H
YATES PETROLEUM CORP
OWL DRAW 23 DM FEDE 2H
MEWBOURNE OIL COMPANY
OWL DRAW 23 B2CN FE 1H
MEWBOURNE OIL CO
OWL DRAW 23 DM FEDE 1H
MEWBOURNE OIL COMPANY
OWL DRAW 22/27 B2BO 2H
MEWBOURNE OIL CO
OWL DRAW 22 AP FEDE 1H
MEWBOURNE OIL COMPANY
OWL DRAW 22 BO FEDE 1H
MEWBOURNE OIL CO
OWL DRAW 22 W1AP FE 1H
MEWBOURNE OIL COMPANY
OWL DRAW 27 22 B2MD 1H
MEWBOURNE OIL CO
HH SO 10 P3 Mile Radius Wells
Chevron USA Inc.
0
2,500
5,000
FEET
0
250
500
750
1,000
1,250
1,500
1,750
METERS
January 15, 2016

1. FORMATION TOPS

The estimated tops of important geologic markers are as follows:

FORMATION	SUB-SEA TVD	KBTVD	MD
Castille		505	
Lamar		2395	
Bell		2310	
Cherry		3208	
Brushy		4450	
Bone Spring/Avalon		6299	
First Bone Spring Sand		6888	
First Bone Spring Shale		6914	
Second Bone Spring Sand		7621	
Harkey Sand		8123	
Third Bone Spring Sand		8617	
Wolfcamp A		9342	
Wolfcamp D		10177	
Lateral TVD Wolfcamp D		10177	21043.30'

2. ESTIMATED DEPTH OF WATER, OIL, GAS & OTHER MINERAL BEARING FORMATIONS

The estimated depths at which the top and bottom of the anticipated water, oil, gas, or other mineral bearing formations are expected to be encountered are as follows:

Substance	Formation	Depth
Deepest Expected Base of Fresh Water		450
Water	Castille	505
Water	Cherry Canyon	3208
Oil/Gas	Brushy Canyon	4450
Oil/Gas	Bone Spring Limestone	6888
Oil/Gas	First Bone Spring Shale	6914
Oil/Gas	Second Bone Spring Sand	7621
Oil/Gas	Harkey Sand	8123
Oil/Gas	Wolfcamp A	9342
Oil/Gas	Wolfcamp D	10177

All shows of fresh water and minerals will be reported and protected.

3. BOP EQUIPMENT

PLEASE REFERENCE MDP

4. **CASING PROGRAM**

Purpose	From	To	Hole Size	Csg Size	Weight	Grade	Thread	Condition
Surface	0'	450'	17-1/2"	13-3/8"	54.5 #	K-55	STC	New
Intermediate	0'	9,015'	12-1/4"	9-5/8"	40.0 #	L-80	TXP	New
Production	0'	21,043'	8-1/2"	0"	20.0 #	P-110	TXP	New

SF Calculations based on the following "Worst Case" casing design:

Surface Casing: 450'
Intermediate Casing: 9015'
Production Casing: 21043.30' MD/10,177' TVD (10,000' VS @ 90.3 deg inc)

Casing String	Min SF Burst	Min SF Collapse	Min SF Tension	Min SF Tri-Axial
Surface	1.82	5.11	3.97	2.31
Intermediate	1.45	1.32	1.78	1.84
Production	1.26	1.5	2.43	1.35

Min SF is the smallest of a group of safety factors that include the following considerations:

	Surf	Int	Prod
Burst Design			
Pressure Test- Surface, Int, Prod Csg P external: Water P internal: Test psi + next section heaviest mud in csg	X	X	X
Displace to Gas- Surf Csg P external: Water P internal: Dry Gas from Next Csg Point	X		
Frac at Shoe, Gas to Surf- Int Csg P external: Water P internal: Dry Gas, 15 ppg Frac Gradient		X	
Stimulation (Frac) Pressures- Prod Csg P external: Water P internal: Max inj pressure w/ heaviest injected fluid			X
Tubing leak- Prod Csg (packer at KOP) P external: Water P internal: Leak just below surf, 8.7 ppg packer fluid			X
Collapse Design			
Full Evacuation P external: Water gradient in cement, mud above TOC P internal: none	X	X	X
Cementing- Surf, Int, Prod Csg P external: Wet cement P internal: water	X	X	X
Tension Design			
100k lb overpull	X	X	X

5. **CEMENTING PROGRAM**

Slurry	Type	Cement Top	Cement Bottom	Weight	Yield	%Excess	Sacks	Water
Surface				(ppg)	(sx/cu ft)	Open Hole		gal/sk
Tail	Class C	0'	450'	14.8	1.33	50	356	6.37
Intermediate								
Stage 2 Lead	50:50 Poz: Class C + Antifoam, Extender, Salt, Retarder	0'	1,100'	11.9	2.43	50	213	14.21
Stage 2 Tail	Class C + Antifoam, Retarder, Viscosifier	1,100'	2,100'	14.8	1.33	0	235	6.37
DV TOOL		2,100'						
Stage 1 Lead	50:50 Poz: Class H + Extender, Antifoam, Retarder, Salt, Viscosifier	2,100'	8,015'	11.9	2.43	100	1524	13.76
Stage 1 Tail	Class H + Retarder, Extender, Dispersant	8,015'	9,015'	15.6	1.21	50	389	5.54
Production								
Lead	50:50 Poz: Class H + Extender, Antifoam, Dispersant, , Retarder	7,015'	8,015'	14.5	1.21	100	430	5.54
Tail	Class H + Viscosifier, Antifoam, Dispersant, Fluid Loss, Retarder, Expanding Agent	8,015'	21,043'	15.6	1.2	50	3728	5.30

6. **MUD PROGRAM**

From	To	Type	Weight	F. Vis	Filtrate
0'	450'	Spud Mud	0	0	0
450'	9015'	OBM	9.0 - 9.5	50 -70	5.0 - 10
9015'	21,043'	OBM	10.0 - 13.5	50 -70	5.0 - 10

7. **TESTING, LOGGING, AND CORING**

TYPE	Logs	Interval	Timing	Vendor
Mudlogs	2 man mudlog	Int Csg to TD	Drillout of Int Csg	TBD
LWD	MWD Gamma	Int. and Prod. Hole	While Drilling	TBD

8. **ABNORMAL PRESSURES AND HYDROGEN SULFIDE**

PLEASE REFERENCE MDP

Schlumberger

#15H - Rev0

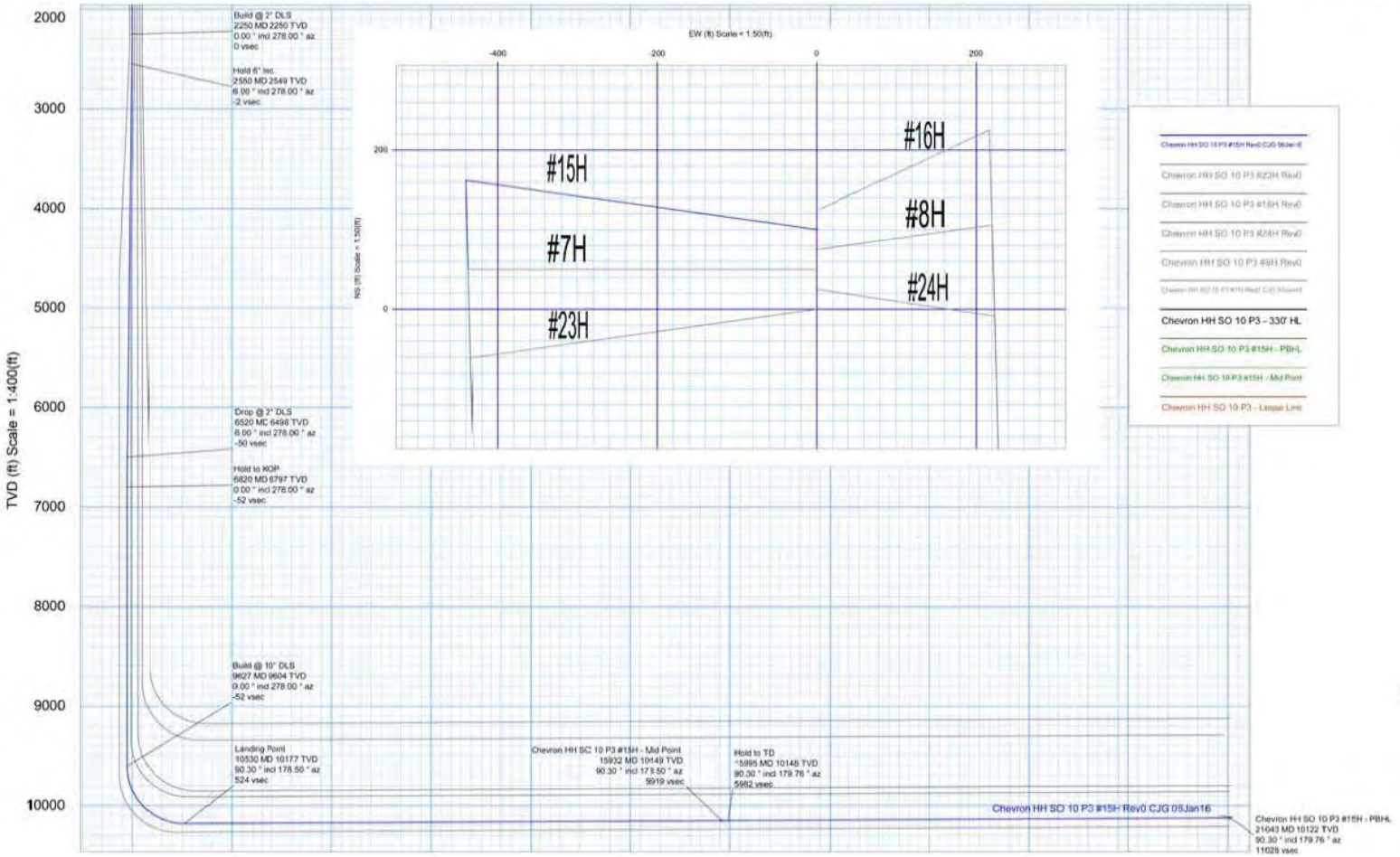
Chevron

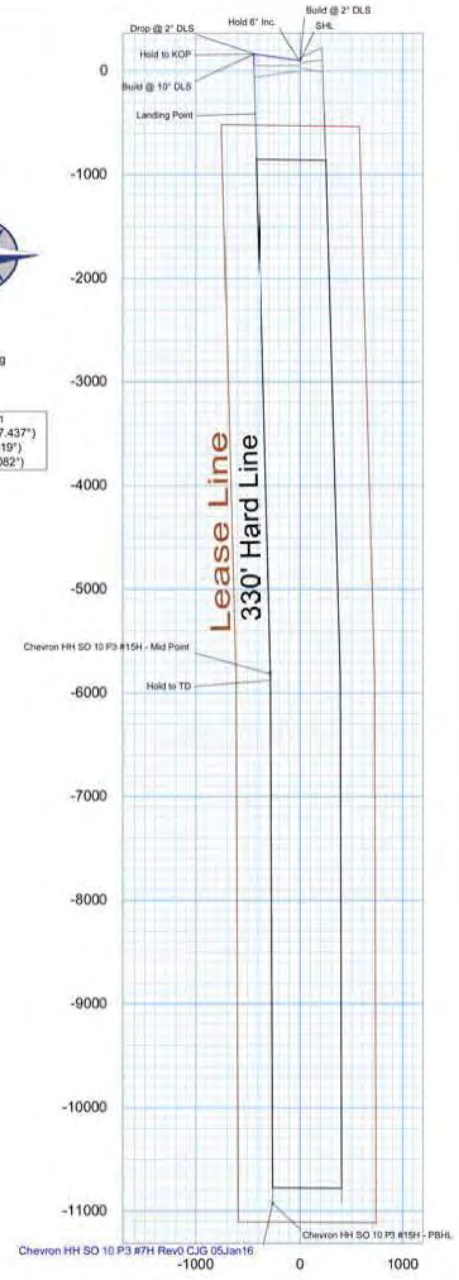
Borehole:	Well:	Field:	Structure:
Original Borehole	HH SO 10 P3 #15H	NM Eddy County (NAD 27)	Chevron HH SO 10 P3 Pad

Gravity & Magnetic Parameters																	
Model:	HDGM 2015	Dip:	59.816°	Date:	30-Dec-2015	Surface Location	NAD27 New Mexico State Plane, Eastern Zone, US Feet							Miscellaneous			
MagDec:	7.519°	FS:	48169.766nT	Gravity FS:	998.428mgn (9.80665 Based)	Lat:	N 32 3 16.01	Northing:	387609ftUS	Grid Conv:	0.0815°	Slot:	HH SO 10 P3 # 15 H	TVD Ref:	RKB(3312ft above MSL)		
						Lon:	W 104 16 47.19	Easting:	547568ftUS	Scale Fact:	0.99991166	Plan:	Chevron HH SO 10 P3 #15H Rev0 CJG 06Jan16				

Critical Points

Critical Point	MD	INCL	AZIM	TVD	VSEC	N(+)/S(-)	E(+)/W(-)	DLS
SHL	0.00	0.00	278.00	0.00	0.00	100.01	2.00	
Build @ 2° DLS	2250.00	0.00	278.00	2250.00	0.00	100.01	2.00	0.00
Hold 6° Inc.	2550.00	6.00	278.00	2549.45	-1.81	102.19	-13.54	2.00
Drop @ 2° DLS	6520.00	6.00	278.00	6497.70	-49.75	159.95	-424.48	0.00
Hold to KOP	6820.00	0.00	278.00	6797.16	-51.56	162.13	-440.02	2.00
Build @ 10° DLS	9626.89	0.00	278.00	9604.05	-51.56	162.13	-440.02	0.00
Landing Point	10529.89	90.30	178.50	10177.00	523.67	-413.63	-424.95	10.00
Chevron HH SO 10 P3 #15H - Mid Point	15932.23	90.30	178.50	10148.73	5919.18	-5814.05	-283.56	0.00
Hold to TD	15994.98	90.30	179.76	10148.40	5981.87	-5876.78	-282.60	2.00
Chevron HH SO 10 P3 #15H - PBHL	21043.30	90.30	179.76	10122.00	11028.13	-10924.99	-261.02	0.00





CONTROLLED

1	Originator	Colby Gannon
2	DEC Sign Off	
3	CC Sign Off	
4	Client	Chevron

Schlumberger

Chevron

Chevron HH SO 10 P3 #15H Rev0 CJG 06Jan16 Proposal Geodetic Report

(Non-Def Plan)

Report Date:	January 13, 2016 - 04:19 PM	**Survey / DLS Computation:**	Minimum Curvature / Lubinski
Client:	Chevron	**Vertical Section Azimuth:**	181.367 ° (Grid North)
Field:	NM Eddy County (NAD 27)	**Vertical Section Origin:**	100.009 ft, 2.000 ft
Structure / Slot:	Chevron HH SO 10 P3 Pad / HH SO 10 P3 #15H	**TVD Reference Datum:**	RKB
Well:	HH SO 10 P3 #15H	**TVD Reference Elevation:**	3312.000 ft above MSL
Borehole:	Original Borehole	**Seabed / Ground Elevation:**	3279.000 ft above MSL
UWI / API#:	Unknown / Unknown	**Magnetic Declination:**	7.519 °
Survey Name:	Chevron HH SO 10 P3 #15H Rev0 CJG 06Jan16	**Total Gravity Field Strength:**	998.4279mgn (9.80665 Based)
Survey Date:	December 30, 2015	**Gravity Model:**	GARM
Tort / AHD / DDI / ERD Ratio:	103.555 ° / 11535.586 ft / 6.393 / 1.133	**Total Magnetic Field Strength:**	48169.766 nT
Coordinate Reference System:	NAD27 New Mexico State Plane, Eastern Zone, US Feet	**Magnetic Dip Angle:**	59.816 °
Location Lat / Long:	N 32° 3' 56.01405", W 104° 10' 47.19454"	**Declination Date:**	December 30, 2015
Location Grid N/E Y/X:	N 387609.000 ftUS, E 547568.000 ftUS	**Magnetic Declination Model:**	HDGM 2015
CRS Grid Convergence Angle:	0.0815 °	**North Reference:**	Grid North
Grid Scale Factor:	0.99991168	**Grid Convergence Used:**	0.0815 °
Version / Patch:	2.8.572.0	**Total Corr Mag North->Grid North:**	7.4377 °
		Local Coord Referenced To:	Structure Reference Point

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
SHL	0.00	0.00	278.00	0.00	0.00	100.01	2.00	N/A	387609.00	547568.00	N 32 3 56.01	W 104 10 47.19
	100.00	0.00	278.00	100.00	0.00	100.01	2.00	0.00	387609.00	547568.00	N 32 3 56.01	W 104 10 47.19
	200.00	0.00	278.00	200.00	0.00	100.01	2.00	0.00	387609.00	547568.00	N 32 3 56.01	W 104 10 47.19
	300.00	0.00	278.00	300.00	0.00	100.01	2.00	0.00	387609.00	547568.00	N 32 3 56.01	W 104 10 47.19
	400.00	0.00	278.00	400.00	0.00	100.01	2.00	0.00	387609.00	547568.00	N 32 3 56.01	W 104 10 47.19
	500.00	0.00	278.00	500.00	0.00	100.01	2.00	0.00	387609.00	547568.00	N 32 3 56.01	W 104 10 47.19
	600.00	0.00	278.00	600.00	0.00	100.01	2.00	0.00	387609.00	547568.00	N 32 3 56.01	W 104 10 47.19
	700.00	0.00	278.00	700.00	0.00	100.01	2.00	0.00	387609.00	547568.00	N 32 3 56.01	W 104 10 47.19
	800.00	0.00	278.00	800.00	0.00	100.01	2.00	0.00	387609.00	547568.00	N 32 3 56.01	W 104 10 47.19
	900.00	0.00	278.00	900.00	0.00	100.01	2.00	0.00	387609.00	547568.00	N 32 3 56.01	W 104 10 47.19
	1000.00	0.00	278.00	1000.00	0.00	100.01	2.00	0.00	387609.00	547568.00	N 32 3 56.01	W 104 10 47.19
	1100.00	0.00	278.00	1100.00	0.00	100.01	2.00	0.00	387609.00	547568.00	N 32 3 56.01	W 104 10 47.19
	1200.00	0.00	278.00	1200.00	0.00	100.01	2.00	0.00	387609.00	547568.00	N 32 3 56.01	W 104 10 47.19
	1300.00	0.00	278.00	1300.00	0.00	100.01	2.00	0.00	387609.00	547568.00	N 32 3 56.01	W 104 10 47.19
	1400.00	0.00	278.00	1400.00	0.00	100.01	2.00	0.00	387609.00	547568.00	N 32 3 56.01	W 104 10 47.19
	1500.00	0.00	278.00	1500.00	0.00	100.01	2.00	0.00	387609.00	547568.00	N 32 3 56.01	W 104 10 47.19
	1600.00	0.00	278.00	1600.00	0.00	100.01	2.00	0.00	387609.00	547568.00	N 32 3 56.01	W 104 10 47.19
	1700.00	0.00	278.00	1700.00	0.00	100.01	2.00	0.00	387609.00	547568.00	N 32 3 56.01	W 104 10 47.19
	1800.00	0.00	278.00	1800.00	0.00	100.01	2.00	0.00	387609.00	547568.00	N 32 3 56.01	W 104 10 47.19
	1900.00	0.00	278.00	1900.00	0.00	100.01	2.00	0.00	387609.00	547568.00	N 32 3 56.01	W 104 10 47.19
	2000.00	0.00	278.00	2000.00	0.00	100.01	2.00	0.00	387609.00	547568.00	N 32 3 56.01	W 104 10 47.19
	2100.00	0.00	278.00	2100.00	0.00	100.01	2.00	0.00	387609.00	547568.00	N 32 3 56.01	W 104 10 47.19
	2200.00	0.00	278.00	2200.00	0.00	100.01	2.00	0.00	387609.00	547568.00	N 32 3 56.01	W 104 10 47.19
Build @ 2° DLS	2250.00	0.00	278.00	2250.00	0.00	100.01	2.00	0.00	387609.00	547568.00	N 32 3 56.01	W 104 10 47.19
	2300.00	1.00	278.00	2300.00	-0.05	100.07	1.57	2.00	387609.06	547567.57	N 32 3 56.01	W 104 10 47.20
	2400.00	3.00	278.00	2399.93	-0.45	100.56	-1.89	2.00	387609.55	547564.11	N 32 3 56.02	W 104 10 47.24
	2500.00	5.00	278.00	2499.68	-1.26	101.53	-8.80	2.00	387610.52	547557.21	N 32 3 56.03	W 104 10 47.32
Hold 6° Inc.	2550.00	6.00	278.00	2549.45	-1.81	102.19	-13.54	2.00	387611.18	547552.46	N 32 3 56.04	W 104 10 47.38
	2600.00	6.00	278.00	2599.18	-2.42	102.92	-18.72	0.00	387611.91	547547.29	N 32 3 56.04	W 104 10 47.44
	2700.00	6.00	278.00	2698.63	-3.62	104.38	-29.07	0.00	387613.37	547536.94	N 32 3 56.06	W 104 10 47.56
	2800.00	6.00	278.00	2798.08	-4.83	105.83	-39.42	0.00	387614.82	547526.59	N 32 3 56.07	W 104 10 47.68
	2900.00	6.00	278.00	2897.53	-6.04	107.28	-49.77	0.00	387616.28	547516.23	N 32 3 56.09	W 104 10 47.80
	3000.00	6.00	278.00	2996.99	-7.25	108.74	-60.12	0.00	387617.73	547505.88	N 32 3 56.10	W 104 10 47.92
	3100.00	6.00	278.00	3096.44	-8.45	110.19	-70.47	0.00	387619.18	547495.53	N 32 3 56.12	W 104 10 48.04
	3200.00	6.00	278.00	3195.89	-9.66	111.65	-80.82	0.00	387620.64	547485.18	N 32 3 56.13	W 104 10 48.16
	3300.00	6.00	278.00	3295.34	-10.87	113.10	-91.17	0.00	387622.09	547474.83	N 32 3 56.14	W 104 10 48.28
	3400.00	6.00	278.00	3394.80	-12.08	114.56	-101.53	0.00	387623.55	547464.48	N 32 3 56.16	W 104 10 48.40
	3500.00	6.00	278.00	3494.25	-13.28	116.01	-111.88	0.00	387625.00	547454.13	N 32 3 56.17	W 104 10 48.52
	3600.00	6.00	278.00	3593.70	-14.49	117.47	-122.23	0.00	387626.46	547443.78	N 32 3 56.19	W 104 10 48.64
	3700.00	6.00	278.00	3693.15	-15.70	118.92	-132.56	0.00	387627.91	547433.43	N 32 3 56.20	W 104 10 48.76
	3800.00	6.00	278.00	3792.60	-16.91	120.38	-142.93	0.00	387629.37	547423.08	N 32 3 56.22	W 104 10 48.88
	3900.00	6.00	278.00	3892.06	-18.11	121.83	-153.28	0.00	387630.82	547412.73	N 32 3 56.23	W 104 10 49.00
	4000.00	6.00	278.00	3991.51	-19.32	123.29	-163.63	0.00	387632.28	547402.38	N 32 3 56.25	W 104 10 49.12
	4100.00	6.00	278.00	4090.96	-20.53	124.74	-173.98	0.00	387633.73	547392.03	N 32 3 56.26	W 104 10 49.24
	4200.00	6.00	278.00	4190.41	-21.74	126.20	-184.33	0.00	387635.19	547381.68	N 32 3 56.28	W 104 10 49.36
	4300.00	6.00	278.00	4289.87	-22.94	127.65	-194.69	0.00	387636.64	547371.33	N 32 3 56.29	W 104 10 49.48
	4400.00	6.00	278.00	4389.32	-24.15	129.11	-205.04	0.00	387638.09	547360.98	N 32 3 56.30	W 104 10 49.60
	4500.00	6.00	278.00	4488.77	-25.36	130.56	-215.39	0.00	387639.55	547350.63	N 32 3 56.32	W 104 10 49.72
	4600.00	6.00	278.00	4588.22	-26.57	132.02	-225.74	0.00	387641.00	547340.28	N 32 3 56.33	W 104 10 49.84
	4700.00	6.00	278.00	4687.67	-27.77	133.47	-236.09	0.00	387642.46	547329.93	N 32 3 56.35	W 104 10 49.96
	4800.00	6.00	278.00	4787.13	-28.98	134.93	-246.44	0.00	387643.91	547319.58	N 32 3 56.36	W 104 10 50.08
	4900.00	6.00	278.00	4886.58	-30.19	136.38	-256.79	0.00	387645.37	547309.23	N 32 3 56.38	W 104 10 50.20
	5000.00	6.00	278.00	4986.03	-31.40	137.83	-267.14	0.00	387646.82	547298.88	N 32 3 56.39	W 104 10 50.32
	5100.00	6.00	278.00	5085.48	-32.60	139.29	-277.49	0.00	387648.28	547288.53	N 32 3 56.41	W 104 10 50.44
	5200.00	6.00	278.00	5184.94	-33.81	140.74	-287.85	0.00	387649.73	547278.18	N 32 3 56.42	W 104 10 50.56
	5300.00	6.00	278.00	5284.39	-35.02	142.20	-298.20	0.00	387651.19	547267.83	N 32 3 56.44	W 104 10 50.68
	5400.00	6.00	278.00	5383.84	-36.23	143.65	-308.55	0.00	387652.64	547257.48	N 32 3 56.45	W 104 10 50.80
	5500.00	6.00	278.00	5483.29	-37.43	145.11	-318.90	0.00	387654.10	547247.13	N 32 3 56.46	W 104 10 50.92
	5600.00	6.00	278.00	5582.74	-38.64	146.56	-329.25	0.00	387655.55	547236.78	N 32 3 56.48	W 104 10 51.04
	5700.00	6.00	278.00	5682.20	-39.85	148.02	-339.60	0.00	387657.00	547226.43	N 32 3 56.49	W 104 10 51.16
	5800.00	6.00	278.00	5781.65	-41.06	149.47	-349.95	0.00	387658.46	547216.08	N 32 3 56.51	W 104 10 51.28
	5900.00	6.00	278.00	5881.10	-42.26	150.93	-360.30	0.00	387659.91	547205.73	N 32 3 56.52	W 104 10 51.40
	6000.00	6.00	278.00	5980.55	-43.47	152.38	-370.65	0.00	387661.37	547195.38	N 32 3 56.54	W 104 10 51.52
	6100.00	6.00	278.00	6080.00	-44.68	153.84	-381.01	0.00	387662.82	547185.03	N 32 3 56.55	W 104 10 51.64
	6200.00	6.00	278.00	6179.46	-45.89	155.29	-391.36	0.00	387664.28	547174.68	N 32 3 56.57	W 104 10 51.76

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
	6300.00	6.00	278.00	6278.91	-47.09	156.75	-401.71	0.00	387665.73	547164.33	N 32 3 56.58	W 104 10 51.88
	6400.00	6.00	278.00	6378.36	-48.30	158.20	-412.06	0.00	387667.19	547153.98	N 32 3 56.60	W 104 10 52.01
	6500.00	6.00	278.00	6477.81	-49.51	159.66	-422.41	0.00	387668.64	547143.63	N 32 3 56.61	W 104 10 52.13
Drop @ 2° DLS	6520.00	6.00	278.00	6497.70	-49.75	159.95	-424.48	0.00	387668.93	547141.56	N 32 3 56.61	W 104 10 52.15
	6600.00	4.40	278.00	6577.37	-50.59	160.96	-431.66	2.00	387669.94	547134.38	N 32 3 56.62	W 104 10 52.23
	6700.00	2.40	278.00	6677.19	-51.27	161.78	-437.53	2.00	387670.77	547128.51	N 32 3 56.63	W 104 10 52.30
	6800.00	0.40	278.00	6777.16	-51.55	162.12	-439.95	2.00	387671.11	547126.09	N 32 3 56.63	W 104 10 52.33
Hold to KOP	6820.00	0.00	278.00	6797.16	-51.56	162.13	-440.02	2.00	387671.12	547126.02	N 32 3 56.63	W 104 10 52.33
	6900.00	0.00	278.00	6877.16	-51.56	162.13	-440.02	0.00	387671.12	547126.02	N 32 3 56.63	W 104 10 52.33
	7000.00	0.00	278.00	6977.16	-51.56	162.13	-440.02	0.00	387671.12	547126.02	N 32 3 56.63	W 104 10 52.33
	7100.00	0.00	278.00	7077.16	-51.56	162.13	-440.02	0.00	387671.12	547126.02	N 32 3 56.63	W 104 10 52.33
	7200.00	0.00	278.00	7177.16	-51.56	162.13	-440.02	0.00	387671.12	547126.02	N 32 3 56.63	W 104 10 52.33
	7300.00	0.00	278.00	7277.16	-51.56	162.13	-440.02	0.00	387671.12	547126.02	N 32 3 56.63	W 104 10 52.33
	7400.00	0.00	278.00	7377.16	-51.56	162.13	-440.02	0.00	387671.12	547126.02	N 32 3 56.63	W 104 10 52.33
	7500.00	0.00	278.00	7477.16	-51.56	162.13	-440.02	0.00	387671.12	547126.02	N 32 3 56.63	W 104 10 52.33
	7600.00	0.00	278.00	7577.16	-51.56	162.13	-440.02	0.00	387671.12	547126.02	N 32 3 56.63	W 104 10 52.33
	7700.00	0.00	278.00	7677.16	-51.56	162.13	-440.02	0.00	387671.12	547126.02	N 32 3 56.63	W 104 10 52.33
	7800.00	0.00	278.00	7777.16	-51.56	162.13	-440.02	0.00	387671.12	547126.02	N 32 3 56.63	W 104 10 52.33
	7900.00	0.00	278.00	7877.16	-51.56	162.13	-440.02	0.00	387671.12	547126.02	N 32 3 56.63	W 104 10 52.33
	8000.00	0.00	278.00	7977.16	-51.56	162.13	-440.02	0.00	387671.12	547126.02	N 32 3 56.63	W 104 10 52.33
	8100.00	0.00	278.00	8077.16	-51.56	162.13	-440.02	0.00	387671.12	547126.02	N 32 3 56.63	W 104 10 52.33
	8200.00	0.00	278.00	8177.16	-51.56	162.13	-440.02	0.00	387671.12	547126.02	N 32 3 56.63	W 104 10 52.33
	8300.00	0.00	278.00	8277.16	-51.56	162.13	-440.02	0.00	387671.12	547126.02	N 32 3 56.63	W 104 10 52.33
	8400.00	0.00	278.00	8377.16	-51.56	162.13	-440.02	0.00	387671.12	547126.02	N 32 3 56.63	W 104 10 52.33
	8500.00	0.00	278.00	8477.16	-51.56	162.13	-440.02	0.00	387671.12	547126.02	N 32 3 56.63	W 104 10 52.33
	8600.00	0.00	278.00	8577.16	-51.56	162.13	-440.02	0.00	387671.12	547126.02	N 32 3 56.63	W 104 10 52.33
	8700.00	0.00	278.00	8677.16	-51.56	162.13	-440.02	0.00	387671.12	547126.02	N 32 3 56.63	W 104 10 52.33
	8800.00	0.00	278.00	8777.16	-51.56	162.13	-440.02	0.00	387671.12	547126.02	N 32 3 56.63	W 104 10 52.33
	8900.00	0.00	278.00	8877.16	-51.56	162.13	-440.02	0.00	387671.12	547126.02	N 32 3 56.63	W 104 10 52.33
	9000.00	0.00	278.00	8977.16	-51.56	162.13	-440.02	0.00	387671.12	547126.02	N 32 3 56.63	W 104 10 52.33
	9100.00	0.00	278.00	9077.16	-51.56	162.13	-440.02	0.00	387671.12	547126.02	N 32 3 56.63	W 104 10 52.33
	9200.00	0.00	278.00	9177.16	-51.56	162.13	-440.02	0.00	387671.12	547126.02	N 32 3 56.63	W 104 10 52.33
	9300.00	0.00	278.00	9277.16	-51.56	162.13	-440.02	0.00	387671.12	547126.02	N 32 3 56.63	W 104 10 52.33
	9400.00	0.00	278.00	9377.16	-51.56	162.13	-440.02	0.00	387671.12	547126.02	N 32 3 56.63	W 104 10 52.33
	9500.00	0.00	278.00	9477.16	-51.56	162.13	-440.02	0.00	387671.12	547126.02	N 32 3 56.63	W 104 10 52.33
	9600.00	0.00	278.00	9577.16	-51.56	162.13	-440.02	0.00	387671.12	547126.02	N 32 3 56.63	W 104 10 52.33
Build @ 10° DLS	9626.89	0.00	278.00	9604.05	-51.56	162.13	-440.02	0.00	387671.12	547126.02	N 32 3 56.63	W 104 10 52.33
	9700.00	7.31	178.50	9676.96	-46.91	157.48	-439.90	10.00	387666.48	547126.14	N 32 3 56.59	W 104 10 52.33
	9800.00	17.31	178.50	9774.53	-25.64	136.19	-439.34	10.00	387645.18	547126.70	N 32 3 56.38	W 104 10 52.32
	9900.00	27.31	178.50	9866.93	12.22	98.29	-438.35	10.00	387607.28	547127.69	N 32 3 56.00	W 104 10 52.31
	10000.00	37.31	178.50	9951.34	65.54	44.92	-436.95	10.00	387553.92	547129.09	N 32 3 55.48	W 104 10 52.30
	10100.00	47.31	178.50	10025.20	132.69	-22.28	-435.19	10.00	387486.72	547130.85	N 32 3 54.81	W 104 10 52.28
	10200.00	57.31	178.50	10086.26	211.62	-101.29	-433.12	10.00	387407.72	547132.91	N 32 3 54.03	W 104 10 52.25
	10300.00	67.31	178.50	10132.67	299.95	-189.70	-430.81	10.00	387319.32	547135.23	N 32 3 53.15	W 104 10 52.23
	10400.00	77.31	178.50	10163.01	394.98	-284.81	-428.32	10.00	387224.21	547137.72	N 32 3 52.21	W 104 10 52.20
	10500.00	87.31	178.50	10176.38	493.83	383.76	-425.73	10.00	387125.28	547140.31	N 32 3 51.23	W 104 10 52.17
Landing Point	10529.89	90.30	178.50	10177.00	523.67	-413.63	-424.95	10.00	387095.41	547141.09	N 32 3 50.94	W 104 10 52.16
	10600.00	90.30	178.50	10176.63	593.69	-483.71	-423.11	0.00	387025.33	547142.93	N 32 3 50.24	W 104 10 52.14
	10700.00	90.30	178.50	10176.11	693.57	-583.67	-420.49	0.00	386925.38	547145.54	N 32 3 49.25	W 104 10 52.12
	10800.00	90.30	178.50	10175.59	793.44	-683.64	-417.88	0.00	386825.42	547148.16	N 32 3 48.27	W 104 10 52.09
	10900.00	90.30	178.50	10175.06	893.31	-783.60	-415.26	0.00	386725.47	547150.78	N 32 3 47.28	W 104 10 52.06
	11000.00	90.30	178.50	10174.54	993.19	-883.57	-412.64	0.00	386625.51	547153.39	N 32 3 46.29	W 104 10 52.03
	11100.00	90.30	178.50	10174.02	1093.06	-983.53	-410.03	0.00	386525.56	547156.01	N 32 3 45.30	W 104 10 52.00
	11200.00	90.30	178.50	10173.49	1192.93	-1083.50	-407.41	0.00	386425.60	547158.63	N 32 3 44.31	W 104 10 51.97
	11300.00	90.30	178.50	10172.97	1292.81	-1183.46	-404.79	0.00	386325.65	547161.25	N 32 3 43.32	W 104 10 51.94
	11400.00	90.30	178.50	10172.45	1392.68	-1283.43	-402.17	0.00	386225.69	547163.86	N 32 3 42.33	W 104 10 51.91
	11500.00	90.30	178.50	10171.92	1492.55	-1383.39	-399.56	0.00	386125.74	547166.48	N 32 3 41.34	W 104 10 51.89
	11600.00	90.30	178.50	10171.40	1592.43	-1483.35	-396.94	0.00	386025.78	547169.10	N 32 3 40.35	W 104 10 51.86
	11700.00	90.30	178.50	10170.88	1692.30	-1583.32	-394.32	0.00	385925.82	547171.71	N 32 3 39.36	W 104 10 51.83
	11800.00	90.30	178.50	10170.35	1792.17	-1683.28	-391.71	0.00	385825.87	547174.33	N 32 3 38.37	W 104 10 51.80
	11900.00	90.30	178.50	10169.83	1892.05	-1783.25	-389.09	0.00	385725.91	547176.95	N 32 3 37.38	W 104 10 51.77
	12000.00	90.30	178.50	10169.31	1991.92	-1883.21	-386.47	0.00	385625.96	547179.56	N 32 3 36.39	W 104 10 51.74
	12100.00	90.30	178.50	10168.78	2091.80	-1983.18	-383.85	0.00	385526.00	547182.18	N 32 3 35.40	W 104 10 51.71
	12200.00	90.30	178.50	10168.26	2191.67	-2083.14	-381.24	0.00	385426.05	547184.80	N 32 3 34.42	W 104 10 51.68
	12300.00	90.30	178.50	10167.74	2291.54	-2183.10	-378.62	0.00	385326.09	547187.42	N 32 3 33.43	W 104 10 51.65
	12400.00	90.30	178.50	10167.21	2391.42	-2283.07	-376.00	0.00	385226.14	547190.03	N 32 3 32.44	W 104 10 51.63
	12500.00	90.30	178.50	10166.69	2491.29	-2383.03	-373.38	0.00	385126.18	547192.65	N 32 3 31.45	W 104 10 51.60
	12600.00	90.30	178.50	10166.17	2591.16	-2483.00	-370.77	0.00	385026.23	547195.27	N 32 3 30.46	W 104 10 51.57
	12700.00	90.30	178.50	10165.64	2691.04	-2582.96	-368.15	0.00	384926.27	547197.88	N 32 3 29.47	W 104 10 51.54
	12800.00	90.30	178.50	10165.12	2790.91	-2682.93	-365.53	0.00	384826.32	547200.50	N 32 3 28.48	W 104 10 51.51
	12900.00	90.30	178.50	10164.60	2890.78	-2782.89	-362.92	0.00	384726.36	547203.12	N 32 3 27.49	W 104 10 51.48
	13000.00	90.30	178.50	10164.07	2990.66	-2882.86	-360.30	0.00	384626.41	547205.73	N 32 3 26.50	W 104 10 51.45
	13100.00	90.30	178.50	10163.55	3090.53	-2982.82	-357.68	0.00	384526.45	547208.35	N 32 3 25.51	W 104 10 51.42
	13200.00	90.30	178.50	10163.03	3190.40	-3082.78	-355.06	0.00	384426.49	547210.97	N 32 3 24.52	W 104 10 51.40
	13300.00	90.30	178.50	10162.50	3290.28	-3182.75	-352.45	0.00	384326.54	547213.58	N 32 3 23.53	W 104 10 51.37
	13400.00	90.30	178.50	10161.98	3390.15	-3282.71	-349.83	0.00	384226.58	547216.20	N 32 3 22.54	W 104 10 51.34
	13500.00	90.30	178.50	10161.46	3490.02	-3382.68	-347.21	0.00	384126.63	547218.82	N 32 3 21.56	W 104 10 51.31
	13600.00	90.30	178.50	10160.93	3589.90	-3482.64	-344.60	0.00	384026.67	547221.44	N 32 3 20.57	W 104 10 51.28
	13700.00	90.30	178.50	10160.41	3689.77	-3582.61	-341.98	0.00	383926.72	547224.05	N 32 3 19.58	W 104 10 51.25
	13800.00	90.30	178.50	10159.89	3789.64	-3682.57	-339.36	0.00	383826.76	547226.67	N 32 3 18.59	W 104 10 51.22
	13900.00	90.30	178.50	10159.36	3889.52	-3782.53	-336.74	0.00	383726.81	547229.29	N 32 3 17.60	W 104 10 51.19
	14000.00	90.30	178.50	10158.84	3989.39	-3882.50	-334.13	0.00	383626.85	547231.90	N 32 3 16.61	W 104 10 51.17
	14100.00	90.30	178.50	10158.32	4089.27	-3982.46	-331.51	0.00	383526.90	547234.52	N 32 3 15.62	W 104 10 51.14
	14200.00	90.30	178.50	10157.79	4189.14	-4082.43	-328.89	0.00	383426.94	547237.14	N 32 3 14.63	W 104 10 51.11
	14300.00	90.30	178.50	10157.27	4289.01	-4182.39	-326.27	0.00	383326.99	547239.75	N 32 3 13.64	W 104 10 51.08
	14400.00	90.30	178.50	10156.75	4388.89	-4282.36	-323.66	0.00	383227.03	547242.37	N 32 3 12.65	W 104 10 51.05
	14500.00	90.30	178.50	10156.22	4488.76	-4382.32	-321.04	0.00	383127.07	547244.99	N 32 3 11.66	W 104 10 51.02
	14600.00	90.30	178.50	10155.70	4588.63	-4482.29	-318.42	0.00	383027.12	547247.61	N 32 3 10.67	W 104 10 50.99

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
	14700.00	90.30	178.50	10155.18	4688.51	-4582.25	-315.81	0.00	382927.16	547250.22	N 32 3 9.68	W 104 10 50.96
	14800.00	90.30	178.50	10154.65	4788.38	-4682.21	-313.19	0.00	382827.21	547252.84	N 32 3 8.69	W 104 10 50.94
	14900.00	90.30	178.50	10154.13	4888.25	-4782.18	-310.57	0.00	382727.25	547255.46	N 32 3 7.71	W 104 10 50.91
	15000.00	90.30	178.50	10153.61	4988.13	-4882.14	-307.95	0.00	382627.30	547258.07	N 32 3 6.72	W 104 10 50.88
	15100.00	90.30	178.50	10153.09	5088.00	-4982.11	-305.34	0.00	382527.34	547260.69	N 32 3 5.73	W 104 10 50.85
	15200.00	90.30	178.50	10152.56	5187.87	-5082.07	-302.72	0.00	382427.39	547263.31	N 32 3 4.74	W 104 10 50.82
	15300.00	90.30	178.50	10152.04	5287.75	-5182.04	-300.10	0.00	382327.43	547265.92	N 32 3 3.75	W 104 10 50.79
	15400.00	90.30	178.50	10151.52	5387.62	-5282.00	-297.49	0.00	382227.48	547268.54	N 32 3 2.76	W 104 10 50.76
	15500.00	90.30	178.50	10150.99	5487.49	-5381.96	-294.87	0.00	382127.52	547271.16	N 32 3 1.77	W 104 10 50.73
	15600.00	90.30	178.50	10150.47	5587.37	-5481.93	-292.25	0.00	382027.57	547273.78	N 32 3 0.78	W 104 10 50.71
	15700.00	90.30	178.50	10149.95	5687.24	-5581.89	-289.63	0.00	381927.61	547276.39	N 32 2 59.79	W 104 10 50.68
	15800.00	90.30	178.50	10149.42	5787.12	-5681.86	-287.02	0.00	381827.66	547279.01	N 32 2 58.80	W 104 10 50.65
	15900.00	90.30	178.50	10148.90	5886.99	-5781.82	-284.40	0.00	381727.70	547281.63	N 32 2 57.81	W 104 10 50.62
Chevron HH SO 10 P3 #15H - Mid Point	15932.23	90.30	178.50	10148.73	5919.18	-5814.05	-283.56	0.00	381695.48	547282.47	N 32 2 57.49	W 104 10 50.61
Hold to TD	15994.98	90.30	179.76	10148.40	5981.87	-5876.78	-282.60	2.00	381632.75	547283.43	N 32 2 56.87	W 104 10 50.60
	16000.00	90.30	179.76	10148.38	5986.90	-5881.80	-282.58	0.00	381627.73	547283.45	N 32 2 56.82	W 104 10 50.60
	16100.00	90.30	179.76	10147.85	6086.86	-5981.80	-282.15	0.00	381527.74	547283.87	N 32 2 55.83	W 104 10 50.60
	16200.00	90.30	179.76	10147.33	6186.81	-6081.80	-281.72	0.00	381427.75	547284.30	N 32 2 54.84	W 104 10 50.59
	16300.00	90.30	179.76	10146.81	6286.77	-6181.79	-281.30	0.00	381327.76	547284.73	N 32 2 53.86	W 104 10 50.59
	16400.00	90.30	179.76	10146.28	6386.73	-6281.79	-280.87	0.00	381227.78	547285.16	N 32 2 52.87	W 104 10 50.59
	16500.00	90.30	179.76	10145.76	6486.69	-6381.79	-280.44	0.00	381127.79	547285.58	N 32 2 51.88	W 104 10 50.58
	16600.00	90.30	179.76	10145.24	6586.65	-6481.79	-280.01	0.00	381027.80	547286.01	N 32 2 50.89	W 104 10 50.58
	16700.00	90.30	179.76	10144.71	6686.61	-6581.79	-279.59	0.00	380927.81	547286.44	N 32 2 49.90	W 104 10 50.58
	16800.00	90.30	179.76	10144.19	6786.57	-6681.78	-279.16	0.00	380827.82	547286.87	N 32 2 48.91	W 104 10 50.57
	16900.00	90.30	179.76	10143.67	6886.53	-6781.78	-278.73	0.00	380727.83	547287.29	N 32 2 47.92	W 104 10 50.57
	17000.00	90.30	179.76	10143.15	6986.49	-6881.78	-278.30	0.00	380627.84	547287.72	N 32 2 46.93	W 104 10 50.57
	17100.00	90.30	179.76	10142.62	7086.45	-6981.78	-277.88	0.00	380527.85	547288.15	N 32 2 45.94	W 104 10 50.56
	17200.00	90.30	179.76	10142.10	7186.40	-7081.77	-277.45	0.00	380427.87	547288.57	N 32 2 44.95	W 104 10 50.56
	17300.00	90.30	179.76	10141.58	7286.36	-7181.77	-277.02	0.00	380327.88	547289.00	N 32 2 43.96	W 104 10 50.56
	17400.00	90.30	179.76	10141.05	7386.32	-7281.77	-276.60	0.00	380227.89	547289.43	N 32 2 42.97	W 104 10 50.55
	17500.00	90.30	179.76	10140.53	7486.28	-7381.77	-276.17	0.00	380127.90	547289.86	N 32 2 41.98	W 104 10 50.55
	17600.00	90.30	179.76	10140.01	7586.24	-7481.76	-275.74	0.00	380027.91	547290.28	N 32 2 40.99	W 104 10 50.55
	17700.00	90.30	179.76	10139.48	7686.20	-7581.76	-275.31	0.00	379927.92	547290.71	N 32 2 40.00	W 104 10 50.54
	17800.00	90.30	179.76	10138.96	7786.16	-7681.76	-274.89	0.00	379827.93	547291.14	N 32 2 39.01	W 104 10 50.54
	17900.00	90.30	179.76	10138.44	7886.12	-7781.76	-274.46	0.00	379727.94	547291.57	N 32 2 38.02	W 104 10 50.54
	18000.00	90.30	179.76	10137.92	7986.08	-7881.76	-274.03	0.00	379627.96	547291.99	N 32 2 37.03	W 104 10 50.53
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	18900.00	90.30	179.76	10133.21	8885.71	-8781.74	-270.18	0.00	378728.06	547295.84	N 32 2 28.13	W 104 10 50.50
	19000.00	90.30	179.76	10132.69	8985.67	-8881.73	-269.76	0.00	378628.07	547296.27	N 32 2 27.14	W 104 10 50.50
	19100.00	90.30	179.76	10132.16	9085.63	-8981.73	-269.33	0.00	378528.08	547296.69	N 32 2 26.15	W 104 10 50.50
	19200.00	90.30	179.76	10131.64	9185.59	-9081.73	-268.90	0.00	378428.09	547297.12	N 32 2 25.16	W 104 10 50.49
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	19400.00	90.30	179.76	10130.59	9385.50	-9281.72	-268.05	0.00	378228.11	547297.98	N 32 2 23.18	W 104 10 50.49
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	20000.00	90.30	179.76	10127.46	9985.26	-9881.71	-265.48	0.00	377628.18	547300.54	N 32 2 17.24	W 104 10 50.47
	20100.00	90.30	179.76	10126.93	10085.22	-9981.71	-265.06	0.00	377528.19	547300.97	N 32 2 16.25	W 104 10 50.46
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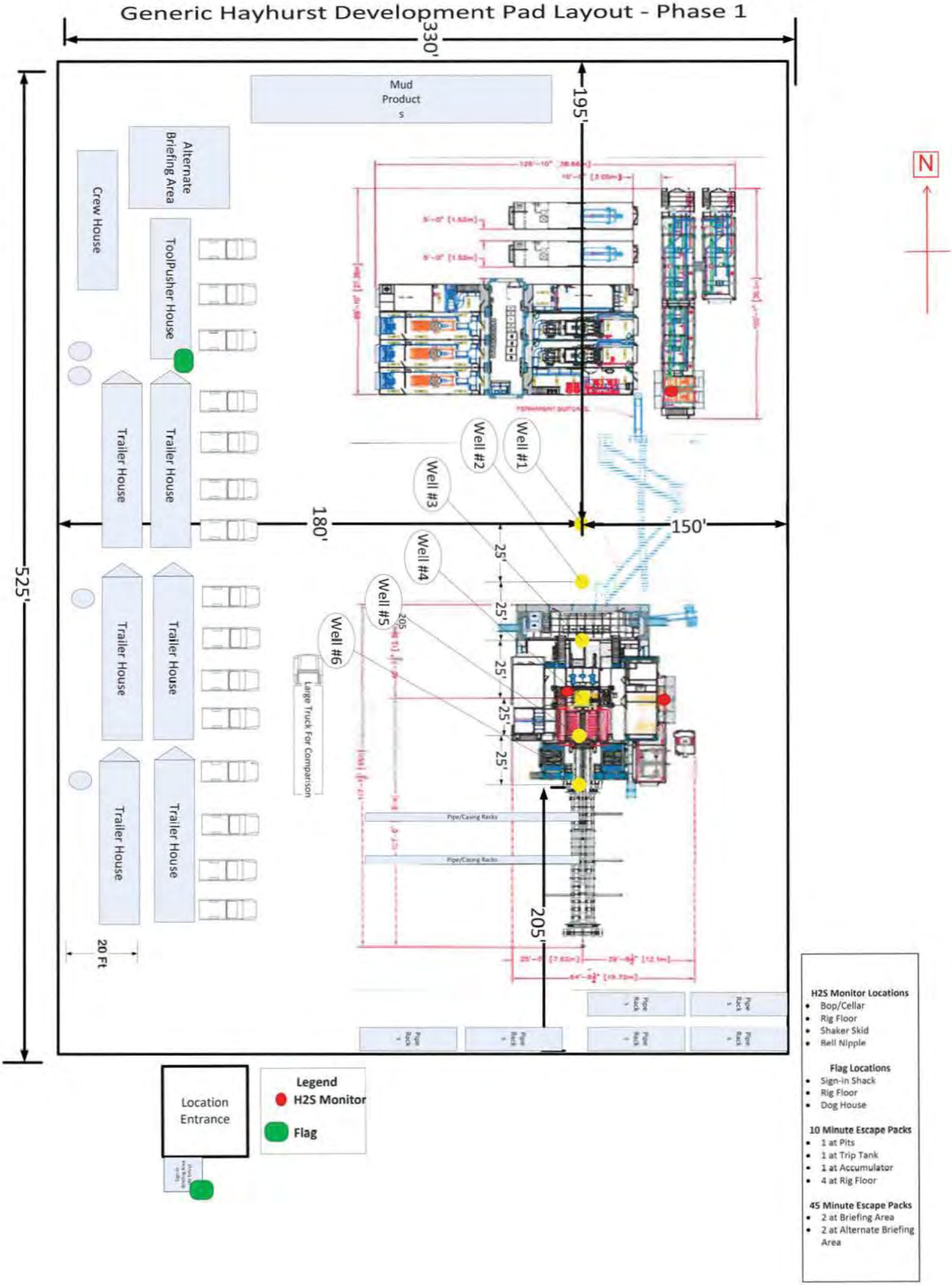
	20400.00	90.30	179.76	10125.36	10385.10	-10281.70	-263.77	0.00	377228.23	547302.25	N 32 2 13.28	W 104 10 50.45
	20500.00	90.30	179.76	10124.84	10485.05	-10381.70	-263.35	0.00	377128.24	547302.68	N 32 2 12.29	W 104 10 50.45
	20600.00	90.30	179.76	10124.32	10585.01	-10481.70	-262.92	0.00	377028.25	547303.11	N 32 2 11.30	W 104 10 50.45
	20700.00	90.30	179.76	10123.80	10684.97	-10581.69	-262.49	0.00	376928.26	547303.53	N 32 2 10.31	W 104 10 50.44
	20800.00	90.30	179.76	10123.27	10784.93	-10681.69	-262.06	0.00	376828.27	547303.96	N 32 2 9.32	W 104 10 50.44
	20900.00	90.30	179.76	10122.75	10884.89	-10781.69	-261.64	0.00	376728.28	547304.39	N 32 2 8.34	W 104 10 50.44
	21000.00	90.30	179.76	10122.23	10984.85	-10881.69	-261.21	0.00	376628.30	547304.81	N 32 2 7.35	W 104 10 50.43
Chevron HH SO 10 P3 #15H - PBHL	21043.30	90.30	179.76	10122.00	11028.13	-10924.99	-261.02	0.00	376585.00	547305.00	N 32 2 6.92	W 104 10 50.43

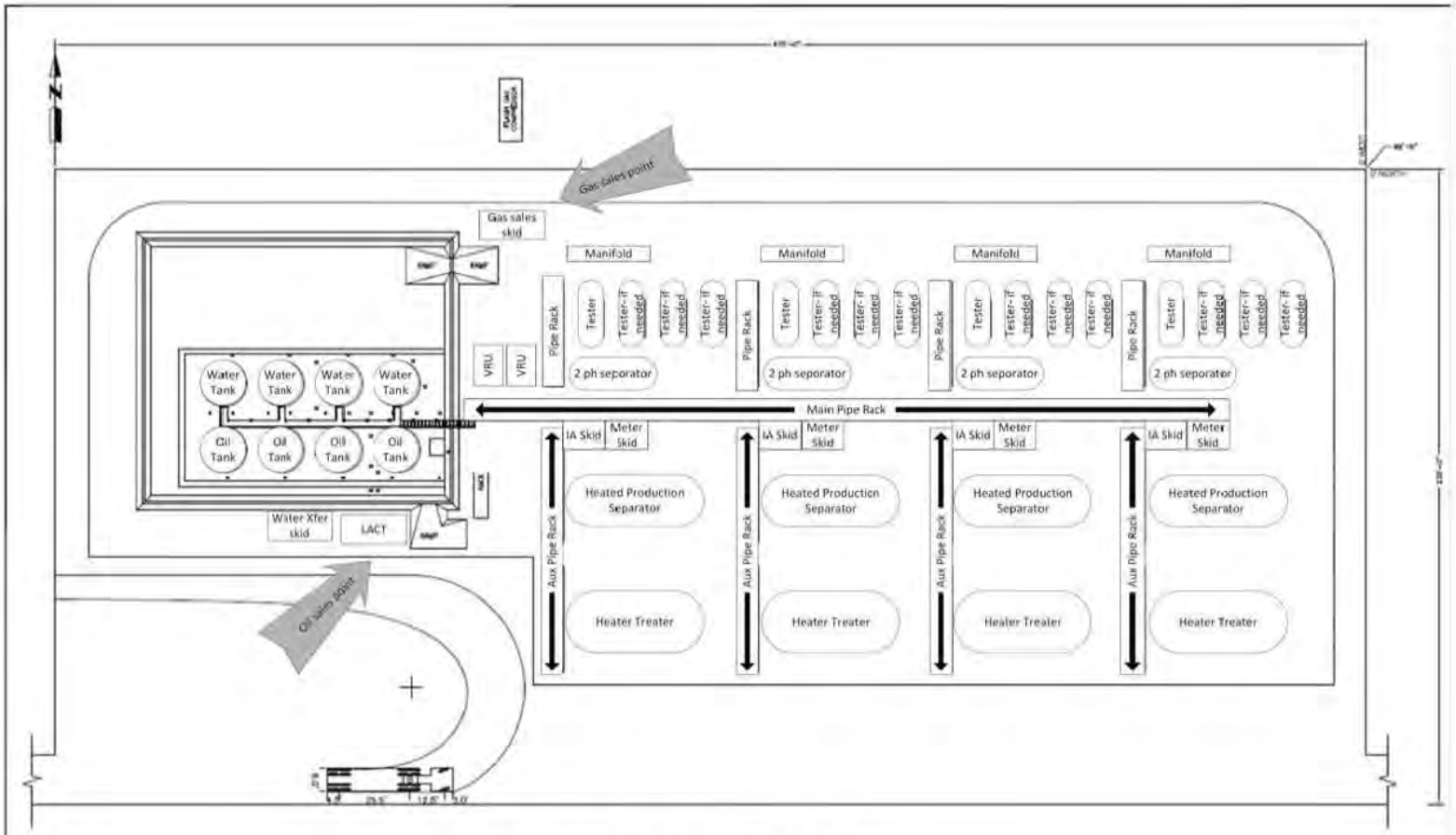
Survey Type: Non-Def Plan

Survey Error Model: ISCWSA Rev 0 *** 3-D 95.000% Confidence 2.7955 sigma
Survey Program:

Description	Part	MD From (ft)	MD To (ft)	EOU Freq (ft)	Hole Size (in)	Casing Diameter (in)	Survey Tool Type	Borehole / Survey
	1	0.000	33.000	1/100.000	30.000	30.000	SLB_MWD-STD-Depth Only	Original Borehole / Chevron HH SO 10 P3 #15H Rev0 CJG
	1	33.000	21043.300	1/100.000	30.000	30.000	SLB_MWD-STD	Original Borehole / Chevron HH SO 10 P3 #15H Rev0 CJG

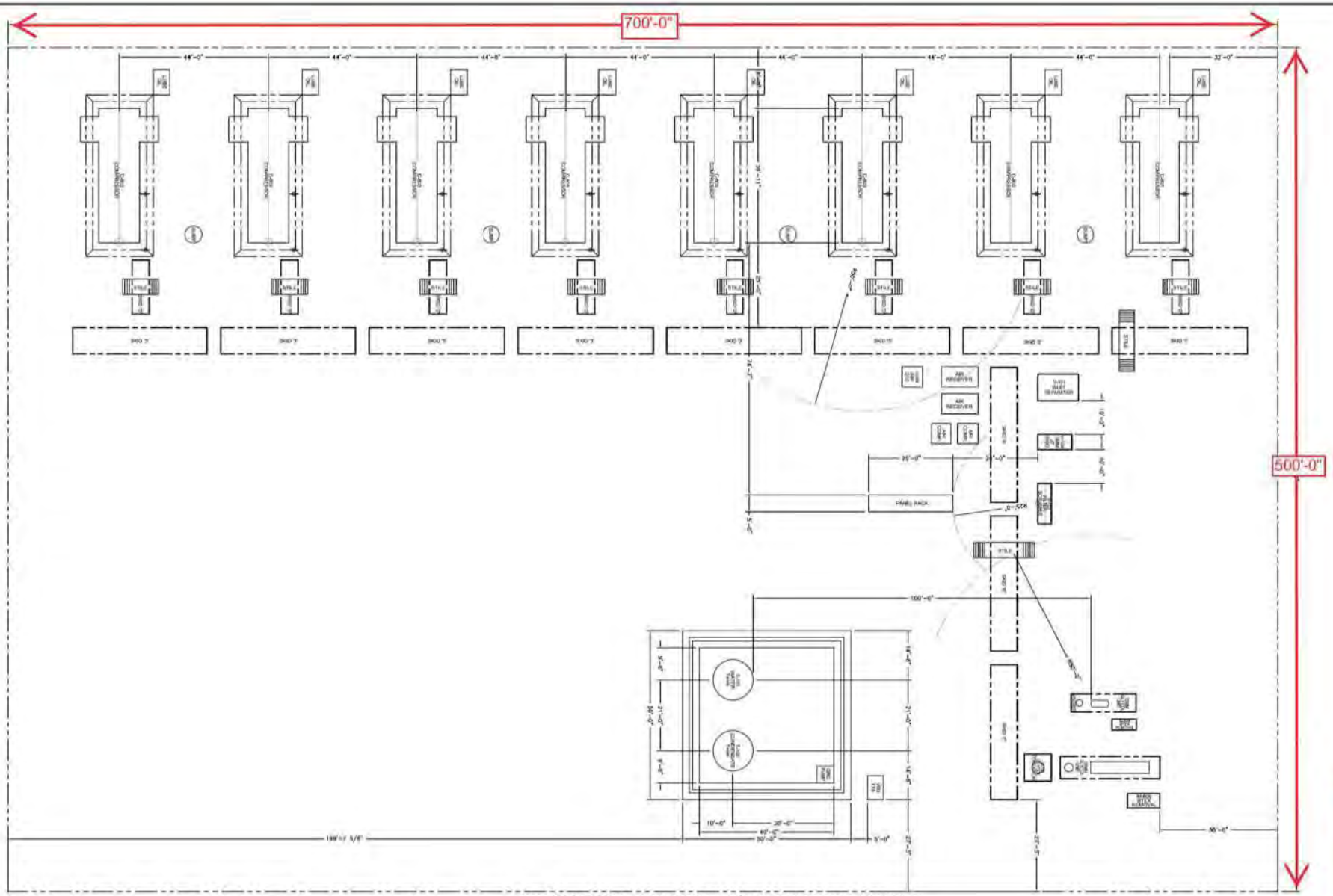
Generic Hayhurst Development Pad Layout - Phase 1





PLOT PLAN - 4 TRAIN / 8 TANK

EXHIBIT 4



COMPRESSOR STATION - 8 COMPRESSOR LAYOUT

SCALE: NONE

REVISIONS			
A ISSUED FOR REVIEW - JMDESIGN 07/14/15	EWM		

FOR REVIEW

Chevron U.S.A. Inc.

STANDARD COMPRESSOR GAS-LIFT STATION

PLOT PLAN - 8 COMPRESSOR LAYOUT

API _____ LEASE _____

COMPRESSOR_PLOTPLAN_8TOTAL

A

PLOT DATE: 07/14/2015 (1:215985)

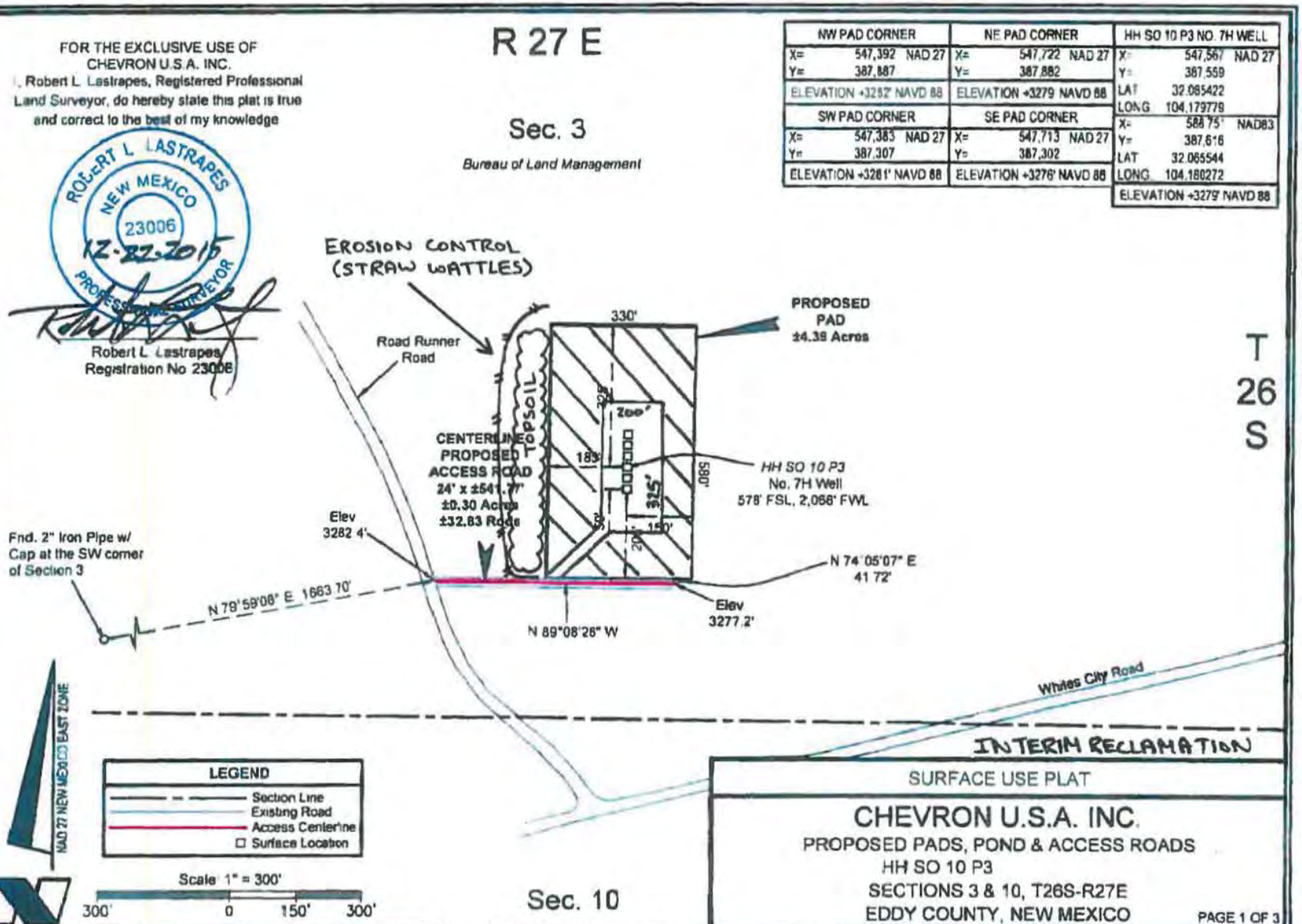
COMPRESSOR PLOTPLAN 8TOTAL.dwg

FOR THE EXCLUSIVE USE OF
CHEVRON U.S.A. INC.
I, Robert L. Lastrapes, Registered Professional Land Surveyor, do hereby state this plat is true and correct to the best of my knowledge

ROBERT L. LASTRAPES
NEW MEXICO
23006
12-22-2015
PROFESSIONAL SURVEYOR

Robert L. Lastrapes
Registration No 23006

NW PAD CORNER	NE PAD CORNER	HH SO 10 P3 NO. 7H WELL
X= 547,392 NAD 27	X= 547,722 NAD 27	X= 547,567 NAD 27
Y= 387,887	Y= 387,882	Y= 387,559
ELEVATION +3282' NAVD 88	ELEVATION +3279' NAVD 88	LAT 32.085422
SW PAD CORNER	SE PAD CORNER	LONG 104.179779
X= 547,383 NAD 27	X= 547,713 NAD 27	X= 588.75' NAD83
Y= 387,307	Y= 387,302	Y= 387,616
ELEVATION +3281' NAVD 88	ELEVATION +3276' NAVD 88	LAT 32.085544
		LONG 104.180272
		ELEVATION +3279' NAVD 88



FENSTERMAKER
C. H. Fenstermaker & Associates L.L.C.
135 Regency Sq. Lafayette LA 70508
Ph. 337.237.2200 Fax 337.232.3299
www.fenstermaker.com

SURFACE USE PLAT

CHEVRON U.S.A. INC.

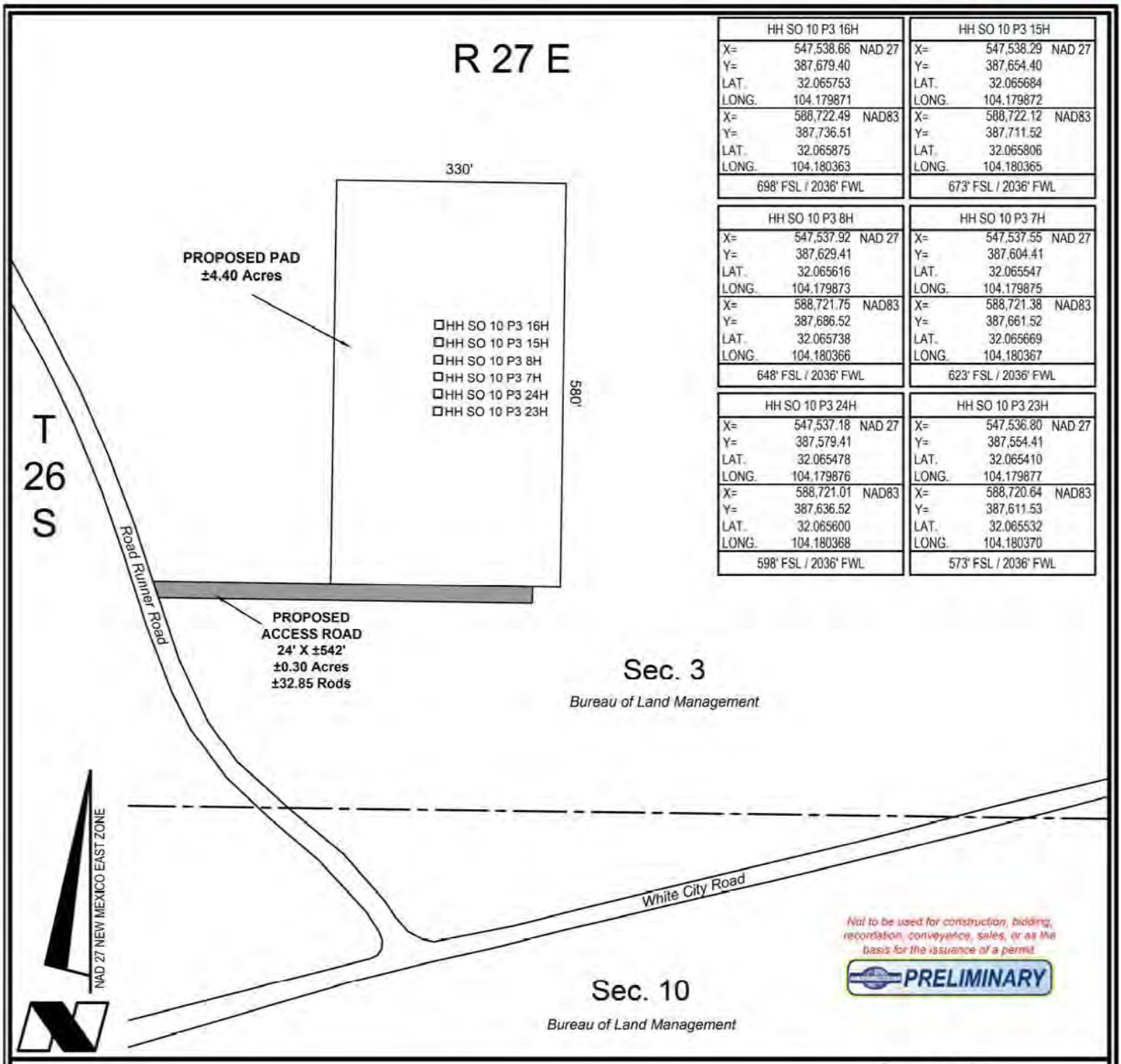
PROPOSED PADS, POND & ACCESS ROADS
HH SO 10 P3
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

PAGE 1 OF 3

DRAWN BY: LJG	REVISIONS		
PROJ. MGR.: CDG	No.	DATE:	REVISED BY:
DATE: 12/16/2015	No.	DATE:	REVISED BY:

FILENAME: T:\2015\2153366\DWG\HH SO 10 P3 7H_SUP.dwg

EXHIBIT 4



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LONG.	104.179871	
X=	588,722.49	NAD83
Y=	387,736.51	
LAT.	32.065875	
LONG.	104.180363	
698' FSL / 2036' FWL		

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Y=	387,654.40	
LAT.	32.065684	
LONG.	104.179872	
X=	588,722.12	NAD83
Y=	387,711.52	
LAT.	32.065806	
LONG.	104.180365	
673' FSL / 2036' FWL		

HH SO 10 P3 8H		
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Y=	387,629.41	
LAT.	32.065616	
LONG.	104.179873	
X=	588,721.75	NAD83
Y=	387,686.52	
LAT.	32.065738	
LONG.	104.180366	
648' FSL / 2036' FWL		

HH SO 10 P3 7H		
X=	547,537.55	NAD 27
Y=	387,604.41	
LAT.	32.065547	
LONG.	104.179875	
X=	588,721.38	NAD83
Y=	387,661.52	
LAT.	32.065669	
LONG.	104.180367	
623' FSL / 2036' FWL		

HH SO 10 P3 24H		
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Y=	387,579.41	
LAT.	32.065478	
LONG.	104.179876	
X=	588,721.01	NAD83
Y=	387,636.52	
LAT.	32.065600	
LONG.	104.180368	
598' FSL / 2036' FWL		

HH SO 10 P3 23H		
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Y=	387,554.41	
LAT.	32.065410	
LONG.	104.179877	
X=	588,720.64	NAD83
Y=	387,611.53	
LAT.	32.065532	
LONG.	104.180370	
573' FSL / 2036' FWL		

DETAIL

Scale: 1" = 200'

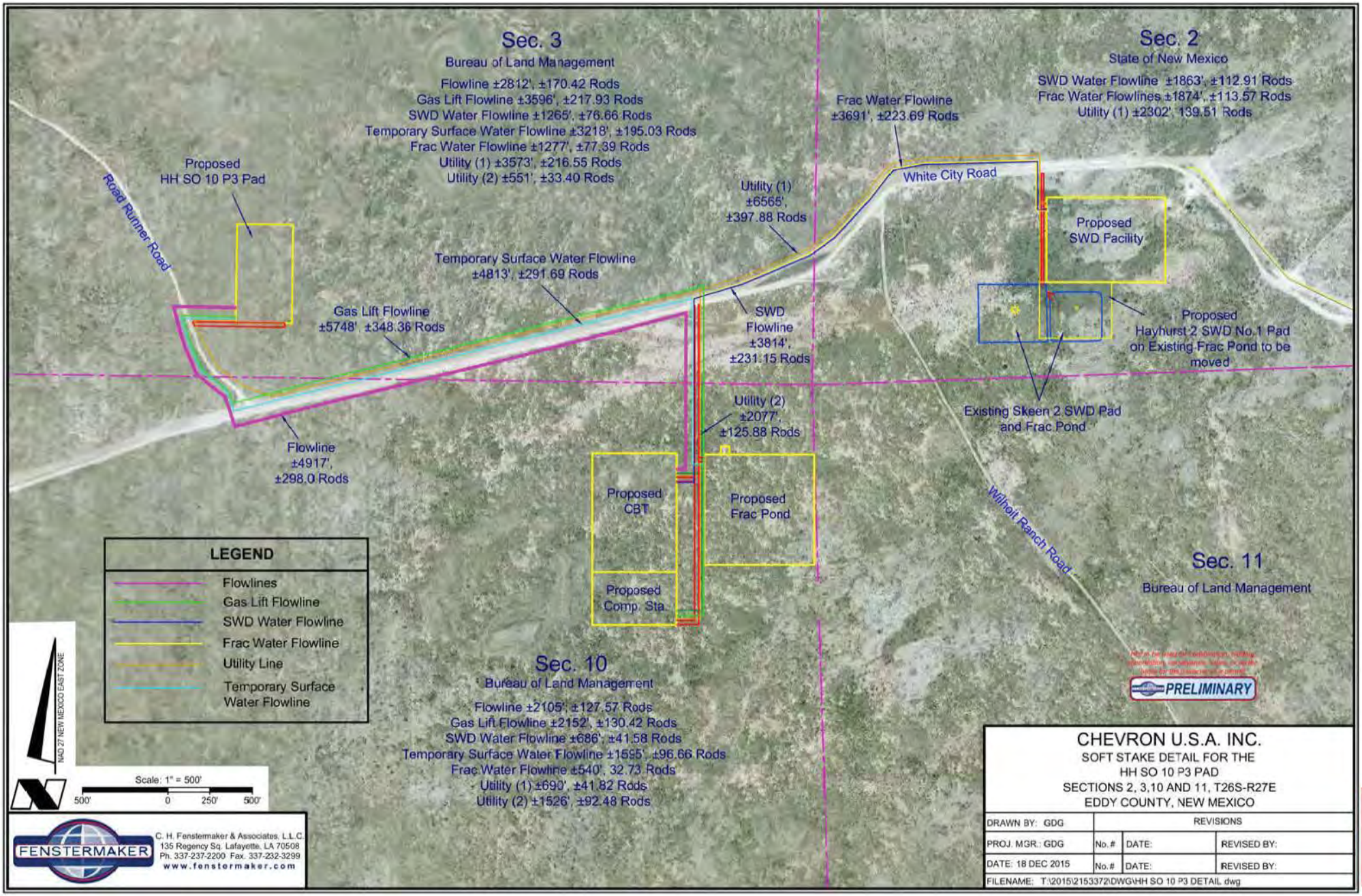
200' 0 100' 200'

CHEVRON U.S.A. INC.

PAD AND ACCESS DETAIL FOR THE
HH SO 10 P3 PAD
SECTION 3, T26S-R27E
EDDY COUNTY, NEW MEXICO

FENSTERMAKER
C. H. Fenstermaker & Associates, L.L.C.
135 Regency Sq. Lafayette, LA 70508
Ph. 337-237-2200 Fax. 337-232-3299
www.fenstermaker.com

DRAWN BY: GDG	REVISIONS		
PROJ. MGR.: GDG	No.#	DATE:	REVISED BY:
DATE: 2 DEC 2015	No.#	DATE:	REVISED BY:
FILENAME: T:\2015\2153367\DWG\HH SO 10 P3 PAD DETAIL.dwg			


Sec. 3
Bureau of Land Management
Flowline ±2812', ±170.42 Rods
Gas Lift Flowline ±3596', ±217.93 Rods
SWD Water Flowline ±1265', ±76.66 Rods
Temporary Surface Water Flowline ±3218', ±195.03 Rods
Frac Water Flowline ±1277', ±77.39 Rods
Utility (1) ±3573', ±216.55 Rods
Utility (2) ±551', ±33.40 Rods
Sec. 2
State of New Mexico
SWD Water Flowline ±1863', ±112.91 Rods
Frac Water Flowlines ±1874', ±113.57 Rods
Utility (1) ±2302', 139.51 Rods
Frac Water Flowline ±3691', ±223.69 Rods
White City Road
Road Runner Road
Proposed HH SO 10 P3 Pad
Utility (1) ±6565', ±397.88 Rods
Proposed SWD Facility
Temporary Surface Water Flowline ±4813', ±291.69 Rods
Gas Lift Flowline ±5748', ±348.36 Rods
SWD Flowline ±3814', ±231.15 Rods
Proposed Hayhurst 2 SWD No.1 Pad on Existing Frac Pond to be moved
Utility (2) ±2077', ±125.88 Rods
Existing Skeen 2 SWD Pad and Frac Pond
Flowline ±4917', ±298.0 Rods
Proposed CBT
Proposed Frac Pond
Wilhoit Ranch Road
Sec. 11
Bureau of Land Management
Proposed Comp. Sta.
LEGEND
Flowlines
Gas Lift Flowline
SWD Water Flowline
Frac Water Flowline
Utility Line
Temporary Surface Water Flowline
NAD 27 NEW MEXICO EAST ZONE
Scale: 1" = 500'
500' 0 250' 500'
Sec. 10
Bureau of Land Management
Flowline ±2105', ±127.57 Rods
Gas Lift Flowline ±2152', ±130.42 Rods
SWD Water Flowline ±686', ±41.58 Rods
Temporary Surface Water Flowline ±1595', ±96.66 Rods
Frac Water Flowline ±540', 32.73 Rods
Utility (1) ±690', ±41.82 Rods
Utility (2) ±1526', ±92.48 Rods
PRELIMINARY
FENSTERMAKER
C. H. Fenstermaker & Associates, L.L.C.
135 Regency Sq. Lafayette, LA 70508
Ph. 337-237-2200 Fax. 337-232-3299
www.fenstermaker.com
CHEVRON U.S.A. INC.
SOFT STAKE DETAIL FOR THE
HH SO 10 P3 PAD
SECTIONS 2, 3,10 AND 11, T26S-R27E
EDDY COUNTY, NEW MEXICO
DRAWN BY: GDG
PROJ. MGR.: GDG
DATE: 18 DEC 2015
REVISIONS
No.# DATE: REVISED BY:
No.# DATE: REVISED BY:
FILENAME: T:\2015\2153372\DWG\HH SO 10 P3 DETAIL.dwg

EXHIBITS 4&5

CHEVRON U.S.A. Inc
HH SO 10 P3 15H
NMNM 121473
SECTION 3, T26S-R27E (Off Lease SHL) SECTION 15, T26S, R27E
SHL 628' FSL & 2066' FWL BHL 180' FSL & 1652' FWL

APD Surface Use Plan of Operations

This Surface Use Plan of Operations has been designed to be reviewed in conjunction with Hayhurst Development Area (HDA) Master Development Plan

HDA Master Development Plan Reference Table
The contents referenced below apply to all HDA APD's

Existing Roads	Exhibit 1, MDP SUPO Page 1
Construction Materials	MDP SUPO Page 6
Methods for Handling Waste	MDP SUPO Page 6
Reclamation Objectives	MDP SUPO Page 6-8
Final Surface Reclamation	MDP SUPO Page 6-8

Driving Directions

- Driving Directions – From Malaga, New Mexico. The location is approximately 11.5 miles from the nearest town, which is Malaga, New Mexico. From Malaga, proceed South on Highway 285 approximately 11.5 miles and turn right (West) onto White City Rd and go approximately 6.8 miles on White City Road until the road reaches an intersection with Roadrunner Rd. Turn right onto this and travel 100 yards, then the access road and well location is on the right.

New or Reconstructed Access Roads – (Exhibit 2, MDP SUPO Pg. 1)

- There will be 2,758' of new road construction for this proposal.
- Ditches: See Exhibit 2 (To be submitted at later date)
- Culverts: See Exhibit 2 (To be submitted at later date)
- Road Cuts: See Exhibit 2 (To be submitted at later date)

Location of Existing Wells (Exhibit 3)

- 1-Mile radius map is attached

Location of Existing and/or Proposed Production Facilities (Exhibit 4, MDP SUP Pg. 2)

- Facilities: Proposed production facilities located in the NE corner of Sec. 10, T26S-R27E where oil and gas sales will take place.
  - The proposed facility and frac pond is in Sec. 10, T26S-R27E
  - Gas purchaser pipeline is in place at the tank battery.
  - Open top tanks or open containments will be netted.
  - Open vent exhaust stacks will be modified to prevent birds or bats from entering, discourage perching, roosting, and nesting.
  - Facilities will have a secondary containment 1.5 times the holding capacity of largest storage tank.
  - All above ground structures will be painted non-reflective shale green for blending with surrounding environment.
  - The permanent water disposal system will be determined prior to construction of any water transfer pipeline. Until permanent water takeaway is available, produced water will be hauled off location in trucks. **Notification will be provided to BLM upon site selection and survey – plats (including SWD well information) will be provided.**
- Pipelines: See Detail – Exhibit 5
  - Pipelines Include:
    - 4,917' of Flowlines carrying production (buried)
    - 5,748' Gas Lift Line carrying pressurized gas (buried)
    - 3,814' SWD Line carrying produced water (buried)
    - 3,691' Permanent Frac water line carrying fresh water (buried)
    - 4,813' Temporary Water line carrying fresh water (surface)
  - A ROW will be applied for through the State and BLM.
  - All construction activity will be confined to the approved ROW.
  - Pipeline will run parallel to the road and will stay within approved ROW.
- Power lines\Utility lines: 8,642' of new power lines

Location and Types of Water Supply (Exhibit 5, MDP SUPO Pg. 5)

- Proposed pond in Section 10, T26S-R27E will be utilized for fresh water.
- Fresh water will be obtained from a private water source.

Construction Materials (MDP SUPO Pg. 6)

- Location-specific caliche sources will be provided in post-application supplement

CHEVRON U.S.A. Inc
HH SO 10 P3 15H
NMNM 121473
SECTION 3, T26S-R27E (Off Lease SHL) SECTION 15, T26S, R27E
SHL 628' FSL & 2066' FWL BHL 180' FSL & 1652' FWL

Well Site Layout (Exhibit 6)

- Surveyor Plat (Exhibit 6a)
  - Exterior well pad dimensions are 580' x 330'
  - Interior well pad dimensions from point of entry (well head) of the well are N-275', S-305', E-150', W-180'. Total disturbance area needed for construction of well pad will be approximately 4.4 acres
  - Topsoil placement is on the west where interim reclamation is planned to be completed upon completion of well and evaluation of best management practices.
  - Cut and fill: will be minimal.
- Rig Layout (Exhibit 6b)

Plans for Surface Reclamation (Exhibit 6, MDP SUPA Pg. 8)

Interim Reclamation Procedures

- Reclaimed pad size: 200' x 325'
- See Exhibit for reclaimed pad layout, topsoil location & erosion control features

Surface Ownership

- BLM Surface
  - Surface Tenant – Phillip Stell
- **Nearest Post Office:** Malaga Post Office; 11.4 Miles north

Other Information

- On-site performed by BLM NRS: Paul Murphy 11/4/2015
- Cultural report attached: **Yes** Participating Agreement attached: N/A

CHEVRON U.S.A. Inc
HH SO 10 P3 15H
NMNM 121473
SECTION 3, T26S-R27E (Off Lease SHL) SECTION 15, T26S, R27E
SHL 628' FSL & 2066' FWL BHL 180' FSL & 1652' FWL

Chevron Representatives

Primary point of contact:
Jennifer Van Curen
Jennifer.VanCuren@arcadis-us.com
M- 432-270-8753

Chevron Functional Contacts

Project Manager Name: Sean Cheben Address: 1400 Smith Street Houston, TX 77002 Phone: (432) 664-6809 Email: Sean.Cheben@chevron.com	**Drilling Engineer** Name: Roderick Milligan Address: 1400 Smith Street Houston, TX 77002 Phone: (281) 413-9794 Email: RoderickMilligan@chevron.com
Surface Land Representative Name: Kevin Dickerson Address: 15 Smith Road Midland Texas 79705 Phone: (432) 687-7104 Email: Kevin.Dickerson@chevron.com	**Facility Lead** Name: Tyler Weaver Address: 1400 Smith Street Houston, TX 77002 Phone: (281) 384-8934 Email: tyler.weaver@chevron.com
Geologist Name: Jeff Fabre Address: 1400 Smith Street Houston, TX 77002 Phone: (713) 372-0523 Email: JeffreyFabre@chevron.com	**Regulatory Specialist** Cindy Herrera-Murillo Address: 1616 W. Bender Blvd, Hobbs, NM 88240 Office: (575) 263-0431 Email: CHerreraMurillo@chevron.com

CHEVRON U.S.A. Inc
HH SO 10 P3 15H
NMNM 121473
SECTION 3, T26S-R27E (Off Lease SHL) SECTION 15, T26S, R27E
SHL 628' FSL & 2066' FWL BHL 180' FSL & 1652' FWL

EXHIBITS:

Exhibit 1 -- Existing Roads

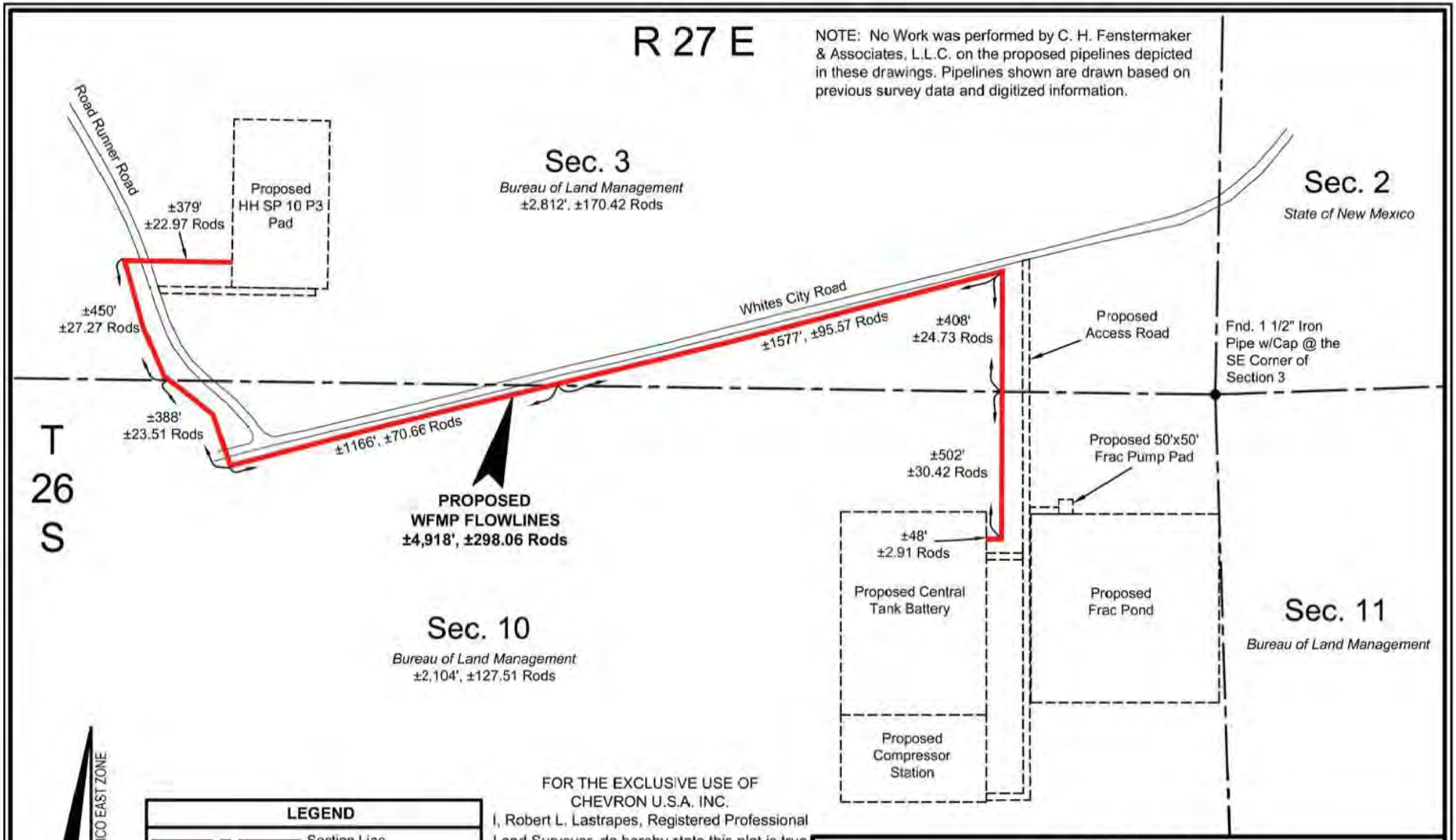
Exhibit 2 -- Survey Plat: New or Reconstructed Roads Map: if road is outside 600' x 600'.

Exhibit 3 -- 1-mile Radius Map

Exhibit 4 -- Location of Existing and/or Proposed Production Facilities (Tank Battery)

Exhibit 5 -- Survey Plat: Infrastructure: roads, pipelines, power lines, frac pond

Exhibit 6 -- Rig Layout: Well Site Layout Map / Diagram



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SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED WFMP FLOWLINES
HH SO 10 P3
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

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EXHIBIT 5

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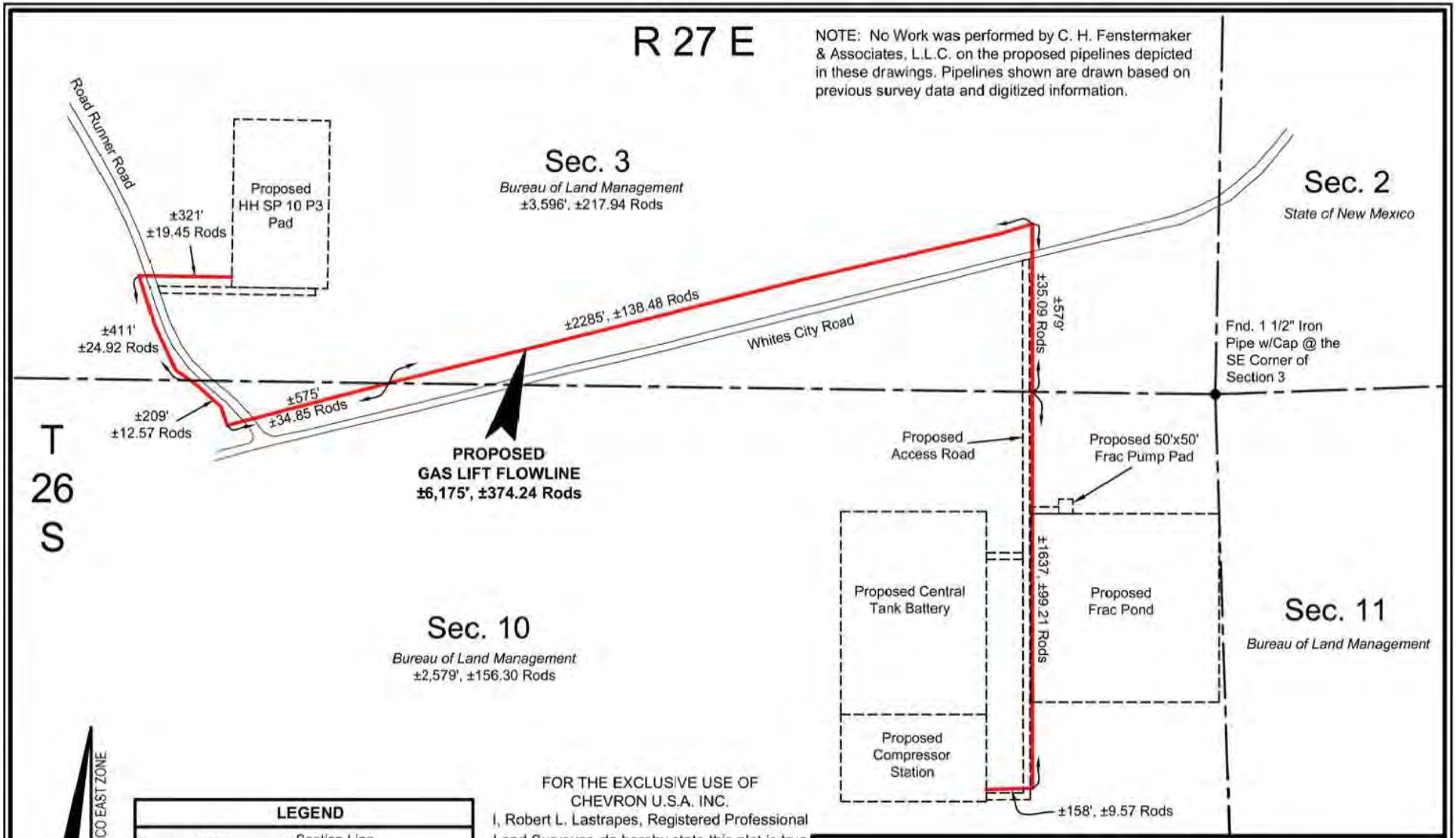

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PROPOSED GAS LIFT FLOWLINE
HH SO 10 P3
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

PAGE 1 OF 2

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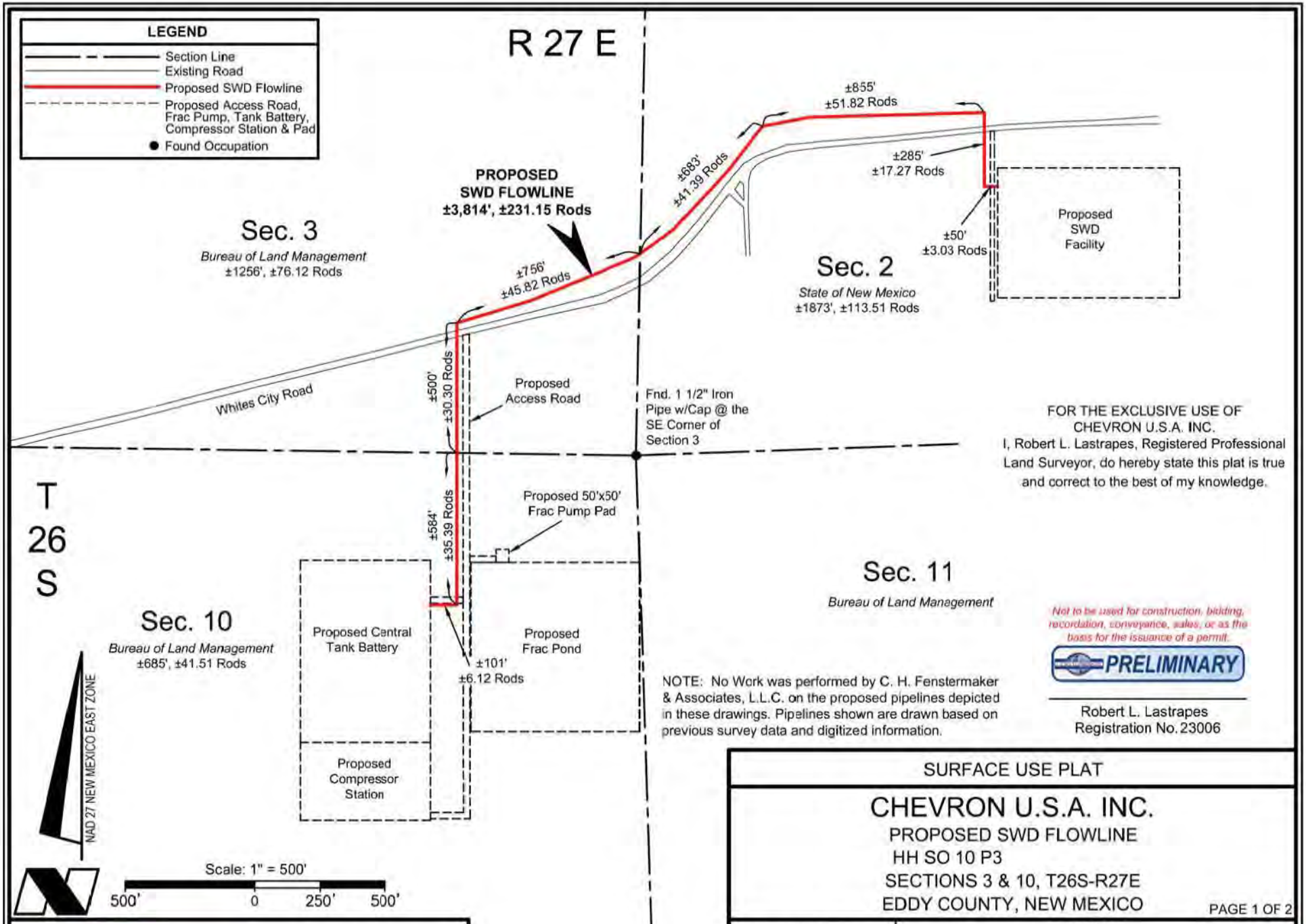

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CHEVRON U.S.A. INC.

PROPOSED SWD FLOWLINE
HH SO 10 P3
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

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PROPOSED SWD FLOWLINE
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EDDY COUNTY, NEW MEXICO

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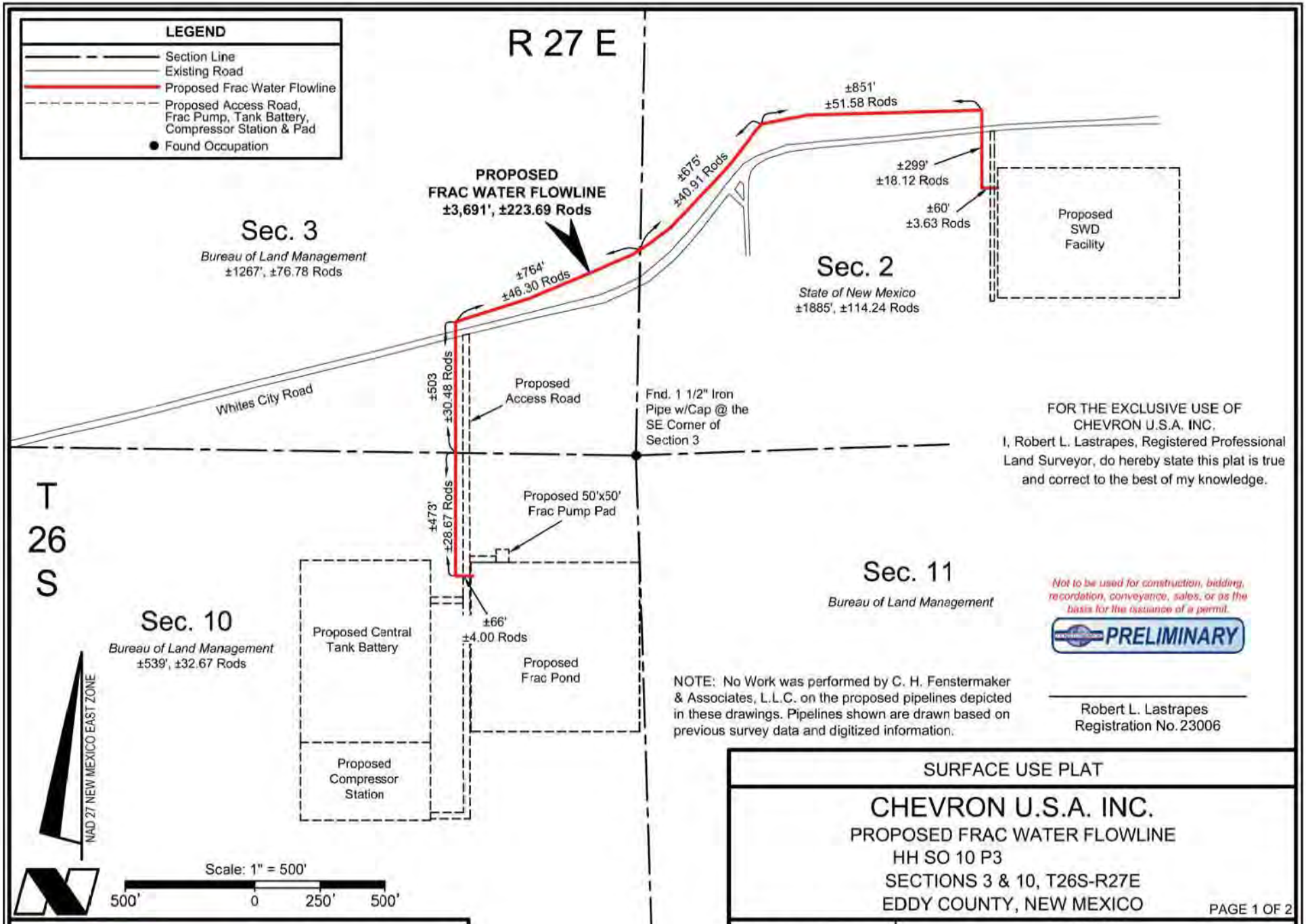

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SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED FRAC WATER FLOWLINE
HH SO 10 P3
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

PAGE 1 OF 2

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EDDY COUNTY, NEW MEXICO

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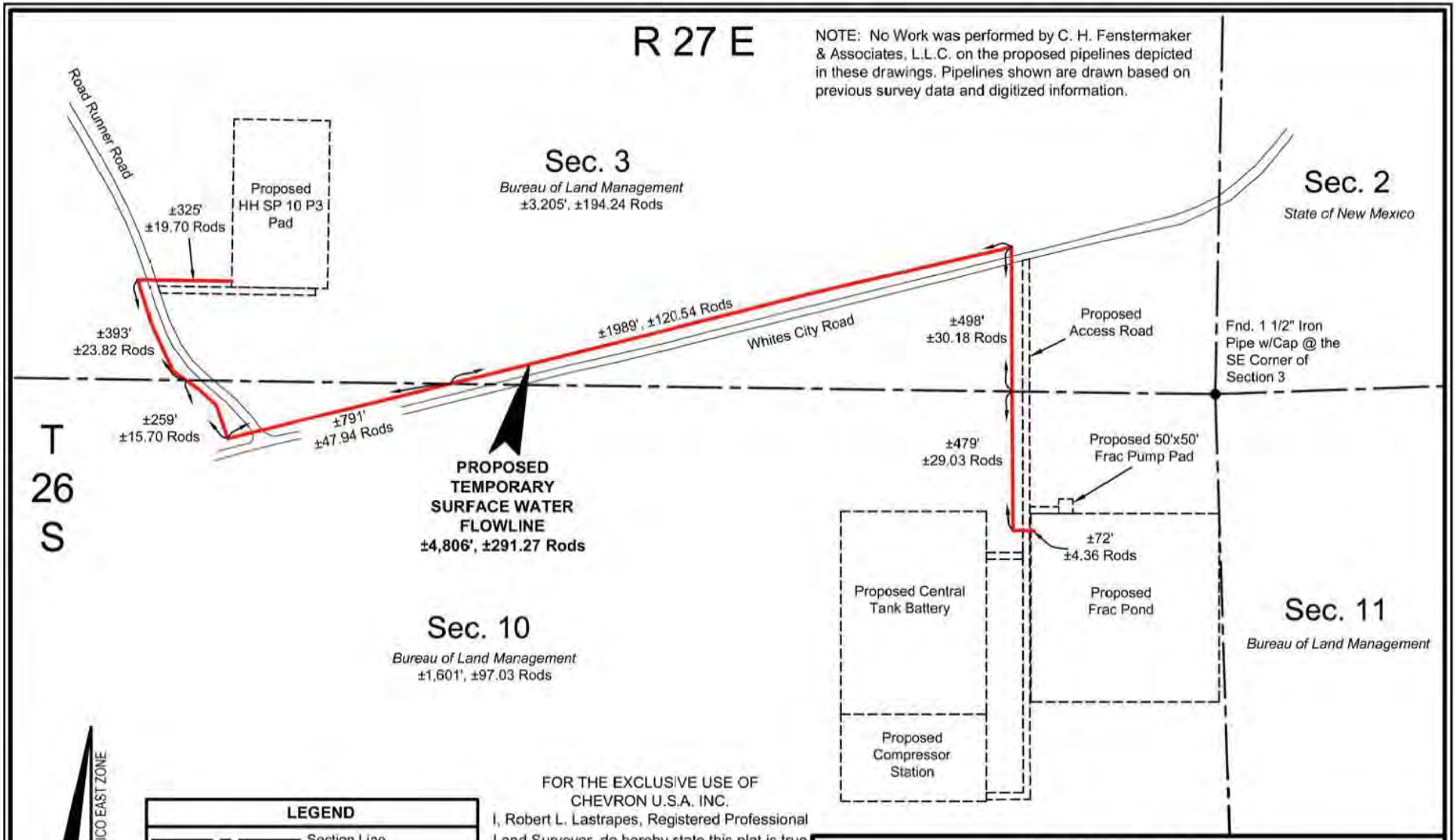

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SURFACE USE PLAT

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PROPOSED TEMPORARY SURFACE WATER FLOWLINE
HH SO 10 P3
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EDDY COUNTY, NEW MEXICO

PAGE 1 OF 2

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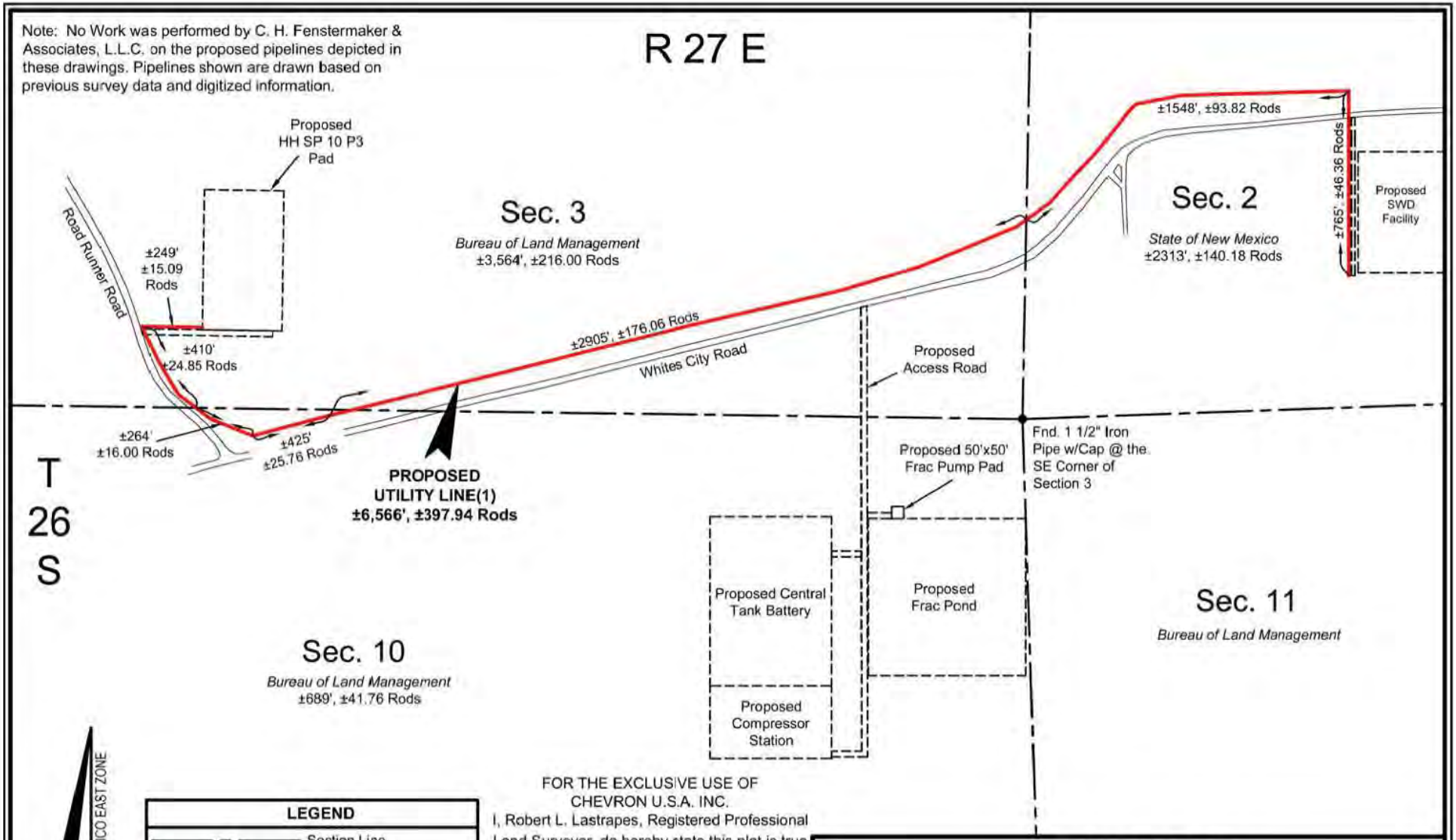

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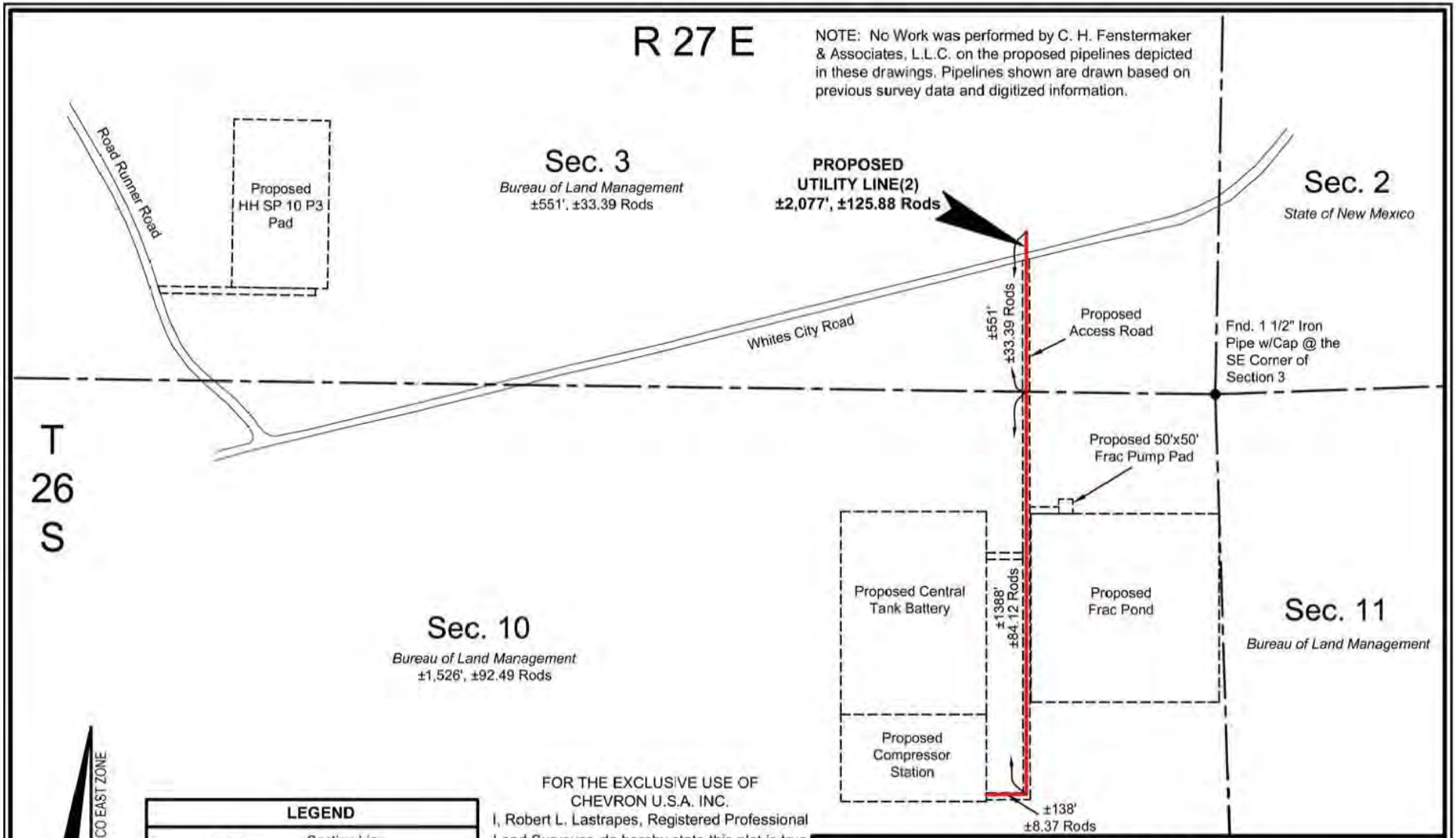

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3. No Work was performed by C. H. Fenstermaker & Associates, L.L.C. on the proposed pipelines depicted in these drawings. Pipelines shown are drawn based on previous survey data and digitized information.

FOR THE EXCLUSIVE USE OF
CHEVRON U.S.A. INC.
I, Robert L. Lastrapes, Registered Professional Land Surveyor, do hereby state this plat is true and correct to the best of my knowledge.

Not to be used for construction, bidding, recordation, conveyance, sales, or as the basis for the issuance of a permit.

PRELIMINARY

Robert L. Lastrapes
Registration No. 23006

FENSTERMAKER
C. H. Fenstermaker & Associates, L.L.C.
135 Regency Sq. Lafayette, LA 70508
Ph. 337-237-2200 Fax. 337-232-3299
www.fenstermaker.com

SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED UTILITY LINE(2)
HH SO 10 P3
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

DRAWN BY: BOR	REVISIONS		
PROJ. MGR.: GDG	No.	DATE:	REVISED BY:
DATE: 02/08/2016	No.	DATE:	REVISED BY:
FILENAME: T:\2015\2153372\DWG\Utility Line 2_SUP.dwg			

Form 3160-3
(June 2015)

FORM APPROVED
OMB No. 1004-0137
Expires: January 31, 2018

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

5. Lease Serial No.
NMNM121473

6. If Indian, Allotee or Tribe Name

1a. Type of work: ☑ DRILL ☐ REENTER

1b. Type of Well: ☑ Oil Well ☐ Gas Well ☐ Other

1c. Type of Completion: ☐ Hydraulic Fracturing ☑ Single Zone ☐ Multiple Zone

7. If Unit or CA Agreement, Name and No.

8. Lease Name and Well No.
HH SO 10 P3

2. Name of Operator
CHEVRON USA INC

9. API Well No.
16H

3a. Address
1616 W. BENDER BLVD HOBBS, NM 88240

3b. Phone No. *(include area code)*
575-263-0431

10. Field and Pool, or Exploratory
WILDCAT; WOLFCAMP

4. Location of Well *(Report location clearly and in accordance with any State requirements.*)*
At surface 653' FSL & 2066' FWL
At proposed prod. zone 180' FSL & 2315" FWL

11. Sec., T. R. M. or Blk. and Survey or Area
SEC 3, T26S, R27E, UL N (SHL)

14. Distance in miles and direction from nearest town or post office*
12.8 MILES FROM MALAGA, NEW MEXICO

12. County or Parish
EDDY

13. State
NM

15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drlg. unit line, if any) 653' FSL

16. No of acres in lease
1920 ACRES

17. Spacing Unit dedicated to this well
320 ACRES

18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft. 4300 FT SKEEN 2 SW

19. Proposed Depth
TD 10,264' MD 21,186"

20. BLM/BIA Bond No. in file
CA 0329

21. Elevations (Show whether DF, KDB, RT, GL, etc.)
3279' GL

22. Approximate date work will start*
OCTOBER 2016

23. Estimated duration
30 DAYS

24. Attachments

The following, completed in accordance with the requirements of Onshore Oil and Gas Order No. 1, and the Hydraulic Fracturing rule per 43 CFR 3162.3-3 (as applicable)

1. Well plat certified by a registered surveyor.
2. A Drilling Plan.
3. A Surface Use Plan (if the location is on National Forest System Lands, the SUPO must be filed with the appropriate Forest Service Office).
4. Bond to cover the operations unless covered by an existing bond on file (see Item 20 above).
5. Operator certification.
6. Such other site specific information and/or plans as may be requested by the BLM.

25. Signature: Cindy Herrera-Murillo

Name *(Printed/Typed)*
CINDY HERRERA-MURILLO

Date
02/11/2016

Title
PERMITTING SPECIALIST

Approved by *(Signature)*

Name *(Printed/Typed)*

Date

Title

Office

Application approval does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.
Conditions of approval, if any, are attached.

Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212, make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

(Continued on page 2)

*(Instructions on page 2)

CERTIFICATION

I hereby certify that I, or someone under my direct supervision, have inspected the drill site and access route proposed herein; that I am familiar with the conditions which currently exist; that I have full knowledge of state and federal laws applicable to this operation; that the statements made in this APD package are, to the best of my knowledge, true and correct; and, that the work associated with the operations proposed will be performed in conformity with this APD package and the terms and conditions under which it is approved. I also certify that I, or the company I represent, am responsible for the operations conducted under this application. These statements are subject to the provisions of 18 U.S.C. 1001 for the filing of a false statement.

Executed this 19th day of JANUARY, 2016

Name: _____

Sean Cheben-Project Manager

Address: 1400 Smith Street

Houston, TX 77002

Room 40125

Office: 713-372-9382

Email: Sean.Cheben@CHEVRON.COM

Cindy Herrera-Murillo
Permitting Specialist
Midcontinent BU

Chevron North America
Exploration and Production Company
(A Chevron U.S.A. Inc. Division)
1616 W. Bender Blvd
Hobbs FMT, Hobbs, NM 88240
Tel 575-263-0431
Cherreramurillo@chevron.com

February 10, 2016

BLM-Carlsbad Field Office
620 E. Greene Street
Carlsbad, New Mexico 88220

Re: Applications to Drill
For Hayhurst Development Area in NM
MDP- 2016-1

Dear Sirs,

Chevron U.S.A. Inc. respectfully submits 12 Applications to Drill (APD's) with the Hayhurst Development Area's Master Development Plan (MDP-2016-1).

There will be 2 pads and 6 wells on each pad. The first well pad includes the following APD's:

HH SO 10 P3 #7H; HH SO 10 P3 #8H; HH SO 10 P3 #15H; HH SO 10 P3 #16H; HH SO 10 P3 #23H; HH SO 10 P3 #24H.

The second well pad includes the following APD's:

HH SO 8 P2 #5H; HH SO 8 P2 #6H; HH SO 8 P2 #13H; HH SO 8 P2 # 14H; HH SO 8 P2 #21H; HH SO 8 P2 #22H.

Your prompt consideration and approval of these applications will be greatly appreciated. If additional information is required, you may contact me at 575-263-0431, or by email at Cherreramurillo@chevron.com.

Sincerely,

Cindy Herrera-Murillo

Cindy Herrera-Murillo
Permitting Specialist
Enclosures

District I
1625 N. French Dr., Hobbs, NM 88240
Phone: (575) 393-6161 Fax: (575) 393-0720
District II
811 S. First St., Artesia, NM 88210
Phone: (575) 748-1283 Fax: (575) 748-9720
District III
1000 Rio Brazos Road, Aztec, NM 87410
Phone: (505) 334-6178 Fax: (505) 334-6170
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505
Phone: (505) 476-3460 Fax: (505) 476-3462

State of New Mexico
Energy, Minerals & Natural Resources Department
OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-102
Revised August 1, 2011
Submit one copy to appropriate District Office

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

[1] API Number	[2] Pool Code	[3] Pool Name
		Wildcat; Wolfcamp

[4] Property Code	[5] Property Name	[6] Well Number
	HH SO 10 P3	16H

[7] OGRID No.	[8] Operator Name	[9] Elevation
4323	CHEVRON U.S.A. INC.	3279'

[10] Surface Location

UL or lot no	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
N	3	26 SOUTH	27 EAST, N.M.P.M.		653'	SOUTH	2066'	WEST	EDDY

[11] Bottom Hole Location If Different From Surface

UL or lot no	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
N	15	26 SOUTH	27 EAST, N.M.P.M.		180'	SOUTH	2315'	WEST	EDDY

[12] Dedicated Acres	[13] Joint or Infill	[14] Consolidation Code	[15] Order No
320			

No allowable will be assigned to this completion until all interests have been consolidated or a non-standard unit has been approved by the division.

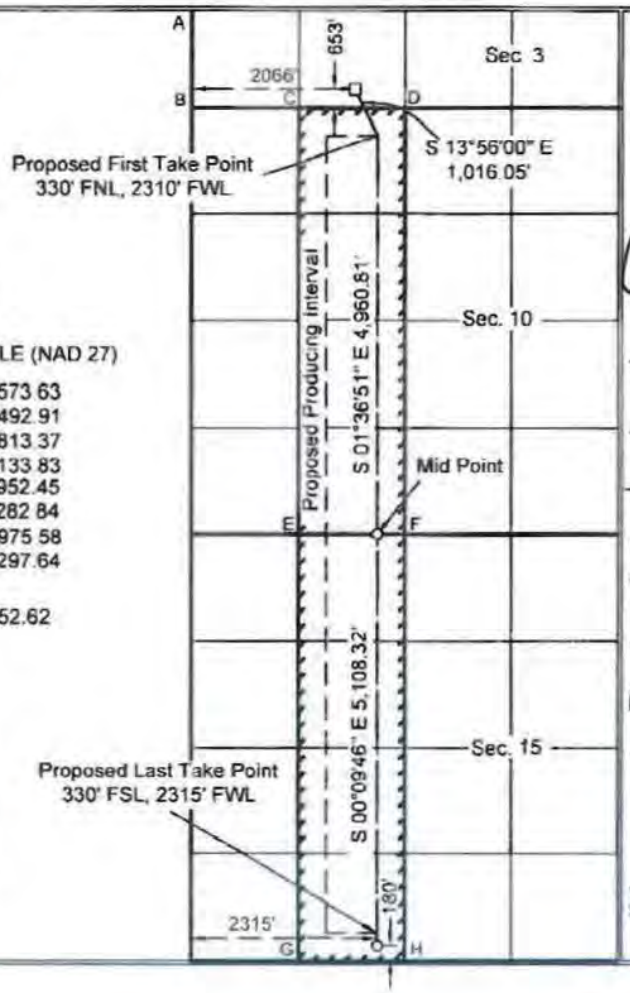
HH SO 10 P3 16H WELL		
X=	547,568	NAD 27
Y=	387,634	
LAT	32.065628	
LONG.	104.179775	
X=	588,752	NAD83
Y=	387,691	
LAT	32.065750	
LONG.	104.180268	
ELEVATION +3279' NAVD 88		

CORNER COORDINATES TABLE (NAD 27)

A - Y=392447.75, X=545573.63
B - Y=387009.20, X=545492.91
C - Y=386991.36, X=546813.37
D - Y=386973.51, X=548133.83
E - Y=381698.68, X=546952.45
F - Y=381685.77, X=548282.84
G - Y=376406.42, X=546975.58
H - Y=376398.76, X=548297.64

Mid Point
Y=381688.98, X=547952.62

PROPOSED BOTTOM HOLE LOCATION		
X=	547,967	NAD 27
Y=	376,581	
LAT	32.035240	
LONG.	104.178539	
X=	589,151	NAD83
Y=	376,638	
LAT	32.035363	
LONG.	104.179031	



[17] OPERATOR CERTIFICATION

I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.

Cindy Herrera-Murillo 2-4-16
Signature Date

Cindy Herrera-Murillo
Printed Name

Cherreramurillo@chevron.com
E-mail Address

[18] SURVEYOR CERTIFICATION

I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.

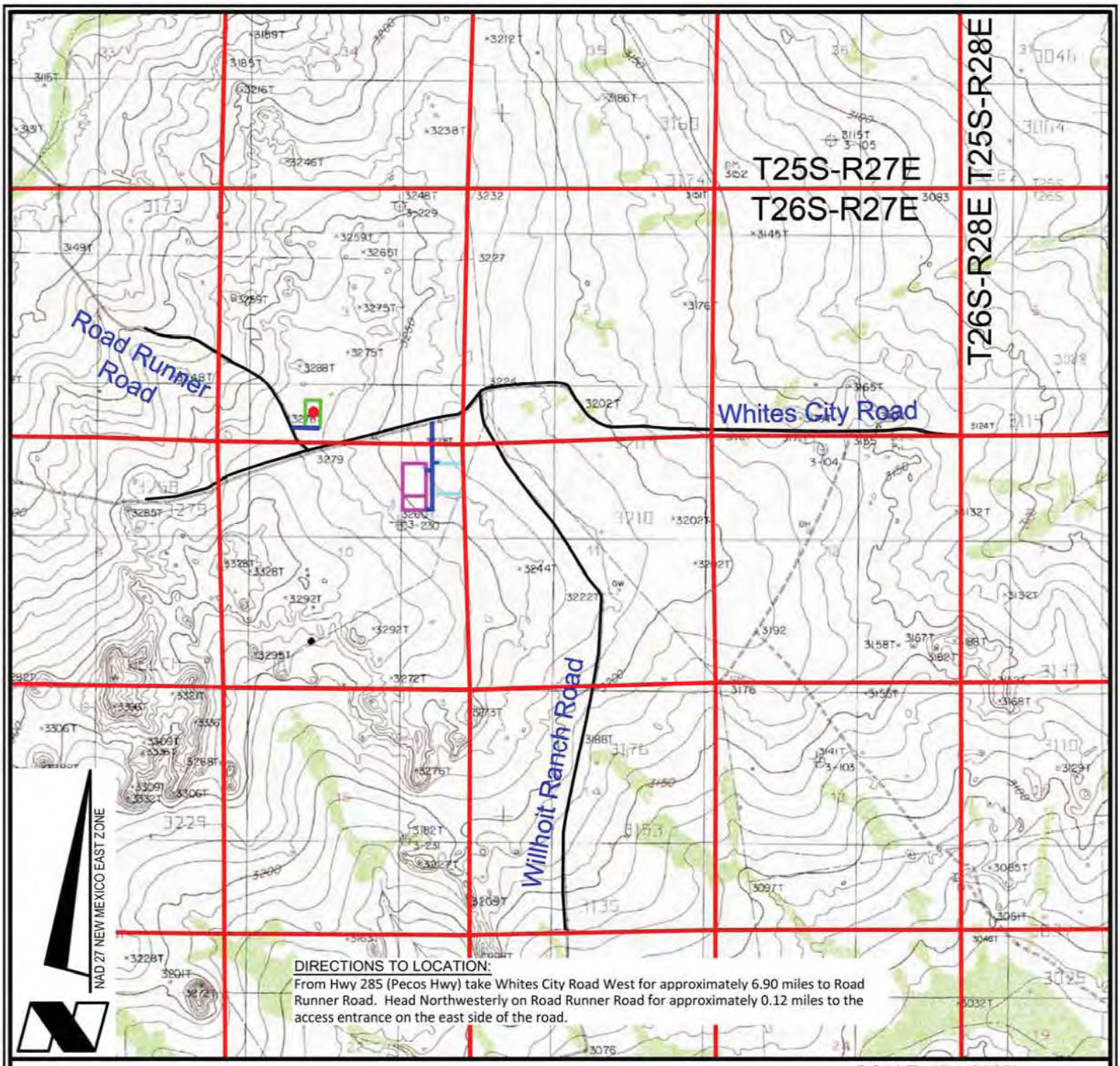
12-8-2015
Date of Survey

Signature and Seal of Professional Surveyor

ROBERT L. LASTRAPES
NEW MEXICO
23006
12-22-2015
PROFESSIONAL SURVEYOR

23006
Certificate Number

EXHIBIT 1



DIRECTIONS TO LOCATION:
From Hwy 285 (Pecos Hwy) take Whites City Road West for approximately 6.90 miles to Road Runner Road. Head Northwesterly on Road Runner Road for approximately 0.12 miles to the access entrance on the east side of the road.

VICINITY MAP

SCALE: 1" = 3000'
3000' 0 1500' 3000'

LEGEND
- Proposed Well
- Proposed Access Road
- Proposed Drillsite
- Existing Road
- Section Line
- Proposed Frac Pond
- Proposed Facility

CHEVRON U.S.A. INC.

HH SO 10 P3 NO. 16H WELL
LOCATED 653' FSL AND 2066' FWL
SECTION 3, T26S-R27E
EDDY COUNTY, NEW MEXICO

FENSTERMAKER
C.H. Fenstermaker & Associates, L.L.C.
135 Regency Sq. Lafayette, LA 70508
Ph. 337-237-2200 Fax. 337-232-3299
www.fenstermaker.com

DRAWN BY: LJG	REVISIONS		
PROJ. MGR.: GDG	No.	DATE:	REVISED BY:
DATE: 12/16/2015	No.	DATE:	REVISED BY:
FILENAME: T:\2015\2153372\DWG\HH SO 10 P3 16H_APD.dwg			

FOR THE EXCLUSIVE USE OF
CHEVRON U.S.A. INC.
I, Robert L. Lastrapes, Registered Professional Land Surveyor, do hereby state this plat is true and correct to the best of my knowledge.

ROBERT L. LASTRAPES
NEW MEXICO
23006
12-22-2015
PROFESSIONAL SURVEYOR

Robert L. Lastrapes
Registration No. 23006

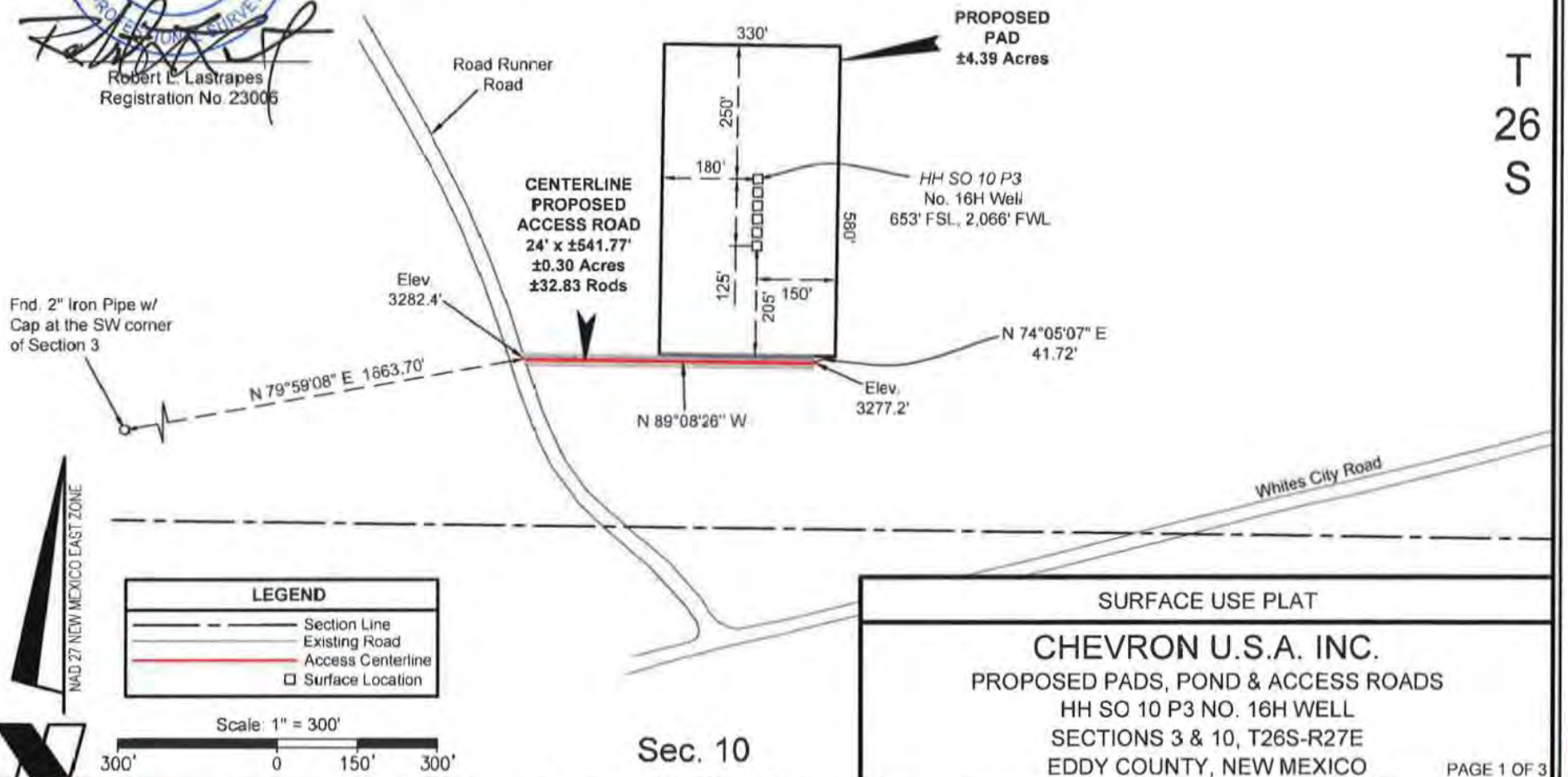
R 27 E

Sec. 3

Bureau of Land Management

NW PAD CORNER	NE PAD CORNER	HH SO 10 P3 NO. 16H WELL
X= 547,392 NAD 27	X= 547,722 NAD 27	X= 547,568 NAD 27
Y= 387,887	Y= 387,882	Y= 387,634
ELEVATION +3282' NAVD 88	ELEVATION +3279' NAVD 88	LAT. 32.065628
		LONG. 104.179775
SW PAD CORNER	SE PAD CORNER	X= 588,752 NAD83
X= 547,383 NAD 27	X= 547,713 NAD 27	Y= 387,691
Y= 387,307	Y= 387,302	LAT. 32.065750
ELEVATION +3281' NAVD 88	ELEVATION +3276' NAVD 88	LONG. 104.180268
		ELEVATION +3279' NAVD 88

T 26 S



Sec. 10

Bureau of Land Management

SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED PADS, POND & ACCESS ROADS
HH SO 10 P3 NO. 16H WELL
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

PAGE 1 OF 3

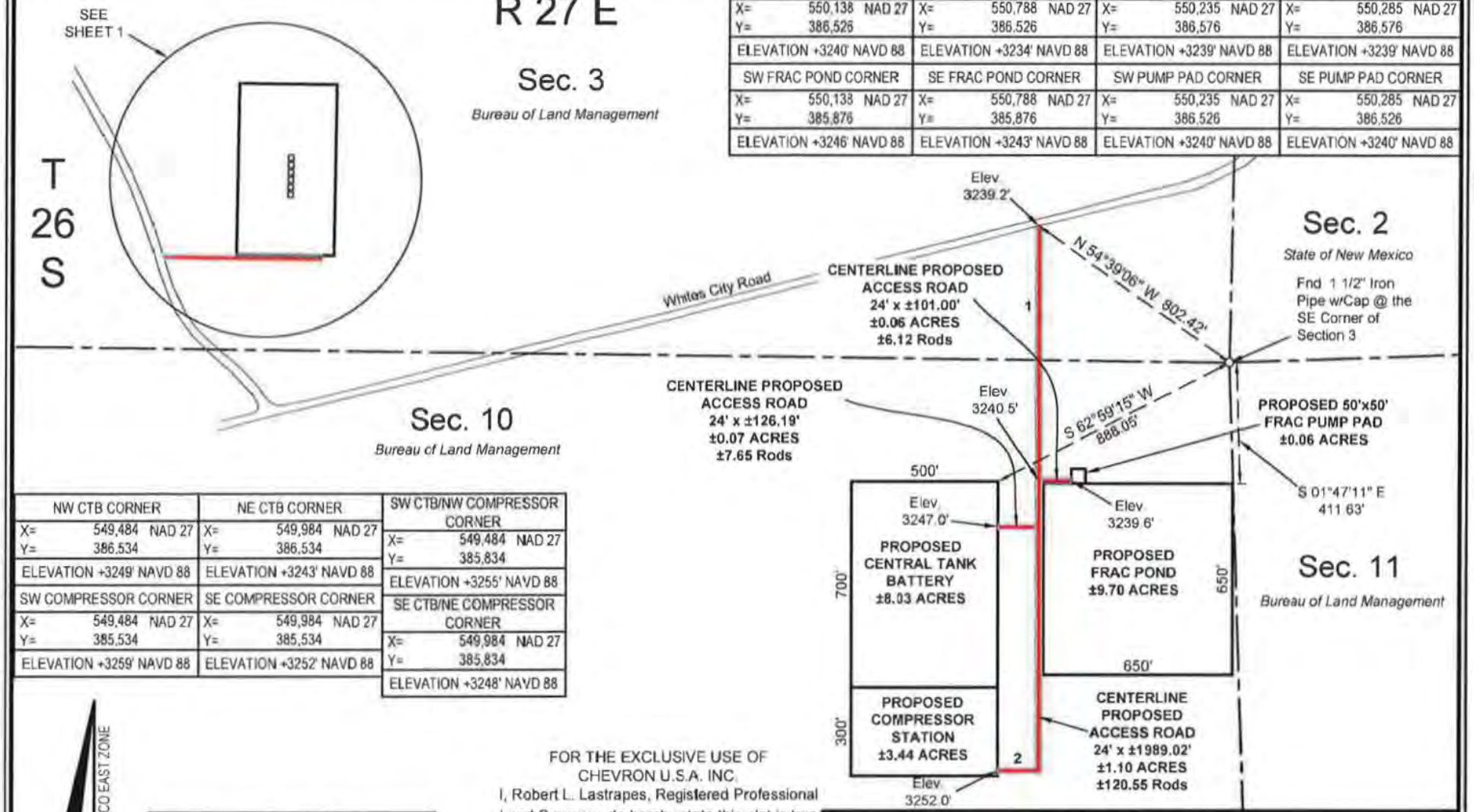
FENSTERMAKER

C. H. Fenstermaker & Associates, L.L.C.
135 Regency Sq. Lafayette, LA 70508
Ph. 337-237-2200 Fax 337-232-3299
www.fenstermaker.com

DRAWN BY: LJG	REVISIONS		
PROJ. MGR.: GDG	No.	DATE:	REVISED BY:
DATE: 12/16/2015	No.	DATE:	REVISED BY:
FILENAME: T:\2015\2153372\DWG\HH SO 10 P3 16H_SUP.dwg			

EXHIBITS 2&5

NW FRAC POND CORNER	NE FRAC POND CORNER	NW PUMP PAD CORNER	NE PUMP PAD CORNER
X= 550,138 NAD 27 Y= 386,526	X= 550,788 NAD 27 Y= 386,526	X= 550,235 NAD 27 Y= 386,576	X= 550,285 NAD 27 Y= 386,576
ELEVATION +3240' NAVD 88	ELEVATION +3234' NAVD 88	ELEVATION +3239' NAVD 88	ELEVATION +3239' NAVD 88
SW FRAC POND CORNER	**SE FRAC POND CORNER**	**SW PUMP PAD CORNER**	**SE PUMP PAD CORNER**
X= 550,138 NAD 27 Y= 385,876	X= 550,788 NAD 27 Y= 385,876	X= 550,235 NAD 27 Y= 386,526	X= 550,285 NAD 27 Y= 386,526
ELEVATION +3246' NAVD 88	ELEVATION +3243' NAVD 88	ELEVATION +3240' NAVD 88	ELEVATION +3240' NAVD 88



NW CTB CORNER	NE CTB CORNER	SW CTB/NW COMPRESSOR CORNER
X= 549,484 NAD 27 Y= 386,534	X= 549,984 NAD 27 Y= 386,534	X= 549,484 NAD 27 Y= 385,834
ELEVATION +3249' NAVD 88	ELEVATION +3243' NAVD 88	ELEVATION +3255' NAVD 88
SW COMPRESSOR CORNER	**SE COMPRESSOR CORNER**	**SE CTB/NE COMPRESSOR CORNER**
X= 549,484 NAD 27 Y= 385,534	X= 549,984 NAD 27 Y= 385,534	X= 549,984 NAD 27 Y= 385,834
ELEVATION +3259' NAVD 88	ELEVATION +3252' NAVD 88	ELEVATION +3248' NAVD 88

NAD 27 NEW MEXICO EAST ZONE

LEGEND

- Section Line
- Existing Road
- Access Centerline
- Surface Location

Scale: 1" = 500'

500' 0 250' 500'

FOR THE EXCLUSIVE USE OF CHEVRON U.S.A. INC.
I, Robert L. Lastrapes, Registered Professional Land Surveyor, do hereby state this plat is true and correct to the best of my knowledge.

ROBERT L. LASTRAPES NEW MEXICO 23006 PROFESSIONAL SURVEYOR
12-22-2015

Robert L. Lastrapes
Registration No. 23006

FENSTERMAKER

C. H. Fenstermaker & Associates, L.L.C.
135 Regency Sq. Lafayette, LA 70508
Ph. 337-237-2200 Fax 337-232-3299
www.fenstermaker.com

SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED PADS, POND & ACCESS ROADS
HH SO 10 P3 NO. 16H WELL
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

DRAWN BY: LJG	REVISIONS		
PROJ. MGR.: GDG	No.	DATE:	REVISED BY:
DATE: 12/16/2015	No.	DATE:	REVISED BY:
FILENAME: T:\2015\2153372\DWG\HH SO 10 P3 16H_SUP.dwg			

DISCLAIMER: At this time, C.H. Fenstermaker & Associates, L.L.C. has not performed nor was asked to perform any type of engineering, hydrological modeling, flood plain, or "No Rise" certification analyses, including but not limited to determining whether the project will impact flood hazards in connection with federal/FEMA, state, and/or local laws, ordinances and regulations. Accordingly, Fenstermaker makes no warranty or representation of any kind as to the foregoing issues, and persons or entities using this information shall do so at their own risk.

NOTE:
Please be advised, that while reasonable efforts are made to locate and verify pipelines and anomalies using our standard pipeline locating equipment, it is impossible to be 100 % effective. As such, we advise using caution when performing work as there is a possibility that pipelines and other hazards, such as fiber optic cables, PVC pipelines, etc. may exist undetected on site.

NOTE:
Many states maintain information centers that establish links between those who dig (excavators) and those who own and operate underground facilities (operators). It is advisable and in most states, law, for the contractor to contact the center for assistance in locating and marking underground utilities. For guidance, New Mexico One Call. www.nmonecall.org

CENTERLINE PROPOSED ACCESS ROAD		
COURSE	BEARING	DISTANCE
1	S 00° 05' 06" E	1849.60'
2	S 89° 54' 54" W	139.42'

FOR THE EXCLUSIVE USE OF
CHEVRON U.S.A. INC.
I, Robert L. Lastrapes, Registered Professional Land Surveyor, do hereby state this plat is true and correct to the best of my knowledge.

ROBERT L. LASTRAPES
NEW MEXICO
23006
12-22-2015
PROFESSIONAL SURVEYOR

Robert L. Lastrapes
Registration No. 23006

FENSTERMAKER
C. H. Fenstermaker & Associates, L.L.C.
135 Regency Sq. Lafayette, LA 70508
Ph. 337-237-2200 Fax. 337-232-3299
www.fenstermaker.com

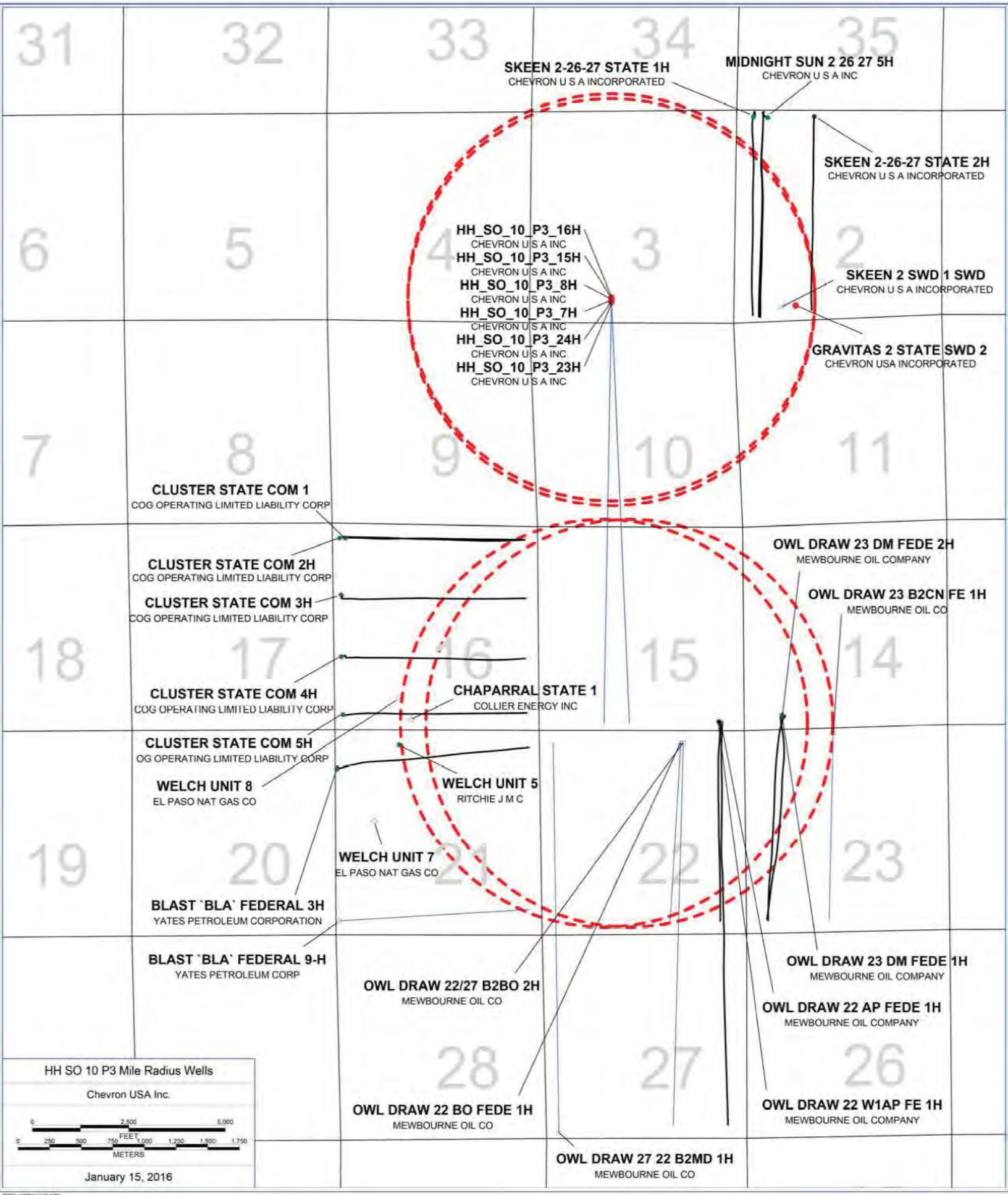
SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED PADS, POND & ACCESS ROADS
HH SO 10 P3 NO. 16H WELL
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

DRAWN BY: LJG	REVISIONS		
PROJ. MGR.: GDG	No.	DATE:	REVISED BY:
DATE: 12/16/2015	No.	DATE:	REVISED BY:
FILENAME: T:\2015\2153372\DWG\HH SO 10 P3 16H_SUP.dwg			

EXHIBIT 3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SKEEN 2-26-27 STATE 1H
CHEVRON U S A INCORPORATED
MIDNIGHT SUN 2 26 27 5H
CHEVRON U S A INC
SKEEN 2-26-27 STATE 2H
CHEVRON U S A INCORPORATED
HH_SO_10_P3_16H
CHEVRON U S A INC
HH_SO_10_P3_15H
CHEVRON U S A INC
HH_SO_10_P3_8H
CHEVRON U S A INC
HH_SO_10_P3_7H
CHEVRON U S A INC
HH_SO_10_P3_24H
CHEVRON U S A INC
HH_SO_10_P3_23H
CHEVRON U S A INC
SKEEN 2 SWD 1 SWD
CHEVRON U S A INCORPORATED
GRAVITAS 2 STATE SWD 2
CHEVRON USA INCORPORATED
CLUSTER STATE COM 1
COG OPERATING LIMITED LIABILITY CORP
CLUSTER STATE COM 2H
COG OPERATING LIMITED LIABILITY CORP
CLUSTER STATE COM 3H
COG OPERATING LIMITED LIABILITY CORP
CLUSTER STATE COM 4H
COG OPERATING LIMITED LIABILITY CORP
CLUSTER STATE COM 5H
OG OPERATING LIMITED LIABILITY CORP
WELCH UNIT 8
EL PASO NAT GAS CO
CHAPARRAL STATE 1
COLLIER ENERGY INC
WELCH UNIT 5
RITCHIE J M C
WELCH UNIT 7
EL PASO NAT GAS CO
BLAST `BLA` FEDERAL 3H
YATES PETROLEUM CORPORATION
BLAST `BLA` FEDERAL 9-H
YATES PETROLEUM CORP
OWL DRAW 23 DM FEDE 2H
MEWBOURNE OIL COMPANY
OWL DRAW 23 B2CN FE 1H
MEWBOURNE OIL CO
OWL DRAW 23 DM FEDE 1H
MEWBOURNE OIL COMPANY
OWL DRAW 22/27 B2BO 2H
MEWBOURNE OIL CO
OWL DRAW 22 AP FEDE 1H
MEWBOURNE OIL COMPANY
OWL DRAW 22 BO FEDE 1H
MEWBOURNE OIL CO
OWL DRAW 22 W1AP FE 1H
MEWBOURNE OIL COMPANY
OWL DRAW 27 22 B2MD 1H
MEWBOURNE OIL CO
HH SO 10 P3 Mile Radius Wells
Chevron USA Inc.
0
2,500
5,000
FEET
0
250
500
750
1,000
1,250
1,500
1,750
METERS
January 15, 2016

1. FORMATION TOPS

The estimated tops of important geologic markers are as follows:

FORMATION	SUB-SEA TVD	KBTVD	MD
Castille		505	
Lamar		2395	
Bell		2310	
Cherry		3208	
Brushy		4450	
Bone Spring/Avalon		6299	
First Bone Spring Sand		6888	
First Bone Spring Shale		6914	
Second Bone Spring Sand		7621	
Harkey Sand		8123	
Third Bone Spring Sand		8617	
Wolfcamp A		9342	
Wolfcamp D		10264	
Lateral TVD Wolfcamp D		10264	21186.59'

2. ESTIMATED DEPTH OF WATER, OIL, GAS & OTHER MINERAL BEARING FORMATIONS

The estimated depths at which the top and bottom of the anticipated water, oil, gas, or other mineral bearing formations are expected to be encountered are as follows:

Substance	Formation	Depth
Deepest Expected Base of Fresh Water		450
Water	Castille	505
Water	Cherry Canyon	3208
Oil/Gas	Brushy Canyon	4450
Oil/Gas	Bone Spring Limestone	6888
Oil/Gas	First Bone Spring Shale	6914
Oil/Gas	Second Bone Spring Sand	7621
Oil/Gas	Harkey Sand	8123
Oil/Gas	Wolfcamp A	9342
Oil/Gas	Wolfcamp D	10264

All shows of fresh water and minerals will be reported and protected.

3. BOP EQUIPMENT

PLEASE REFERENCE MDP

4. **CASING PROGRAM**

Purpose	From	To	Hole Size	Csg Size	Weight	Grade	Thread	Condition
Surface	0'	450'	17-1/2"	13-3/8"	54.5 #	K-55	STC	New
Intermediate	0'	9,015'	12-1/4"	9-5/8"	40.0 #	L-80	TXP	New
Production	0'	21,187'	8-1/2"	5-1/2"	20.0 #	P-110	TXP	New

SF Calculations based on the following "Worst Case" casing design:

Surface Casing: 450'
Intermediate Casing: 9015'
Production Casing: 21186.59' MD/10,264' TVD (10,000' VS @ 90.3 deg inc)

Casing String	Min SF Burst	Min SF Collapse	Min SF Tension	Min SF Tri-Axial
Surface	1.82	5.11	3.97	2.31
Intermediate	1.45	1.32	1.78	1.84
Production	1.26	1.5	2.43	1.35

Min SF is the smallest of a group of safety factors that include the following considerations:

	Surf	Int	Prod
Burst Design			
Pressure Test- Surface, Int, Prod Csg P external: Water P internal: Test psi + next section heaviest mud in csg	X	X	X
Displace to Gas- Surf Csg P external: Water P internal: Dry Gas from Next Csg Point	X		
Frac at Shoe, Gas to Surf- Int Csg P external: Water P internal: Dry Gas, 15 ppg Frac Gradient		X	
Stimulation (Frac) Pressures- Prod Csg P external: Water P internal: Max inj pressure w/ heaviest injected fluid			X
Tubing leak- Prod Csg (packer at KOP) P external: Water P internal: Leak just below surf, 8.7 ppg packer fluid			X
Collapse Design			
Full Evacuation P external: Water gradient in cement, mud above TOC P internal: none	X	X	X
Cementing- Surf, Int, Prod Csg P external: Wet cement P internal: water	X	X	X
Tension Design			

100k lb overpull	X	X	X

5. **CEMENTING PROGRAM**

Slurry	Type	Cement Top	Cement Bottom	Weight	Yield	%Excess	Sacks	Water
Surface				(ppg)	(sx/cu ft)	Open Hole		gal/sk
Tail	Class C	0'	450'	14.8	1.33	50	356	6.37
Intermediate								
Stage 2 Lead	50:50 Poz: Class C + Antifoam, Extender, Salt, Retarder	0'	1,100'	11.9	2.43	50	213	14.21
Stage 2 Tail	Class C + Antifoam, Retarder, Viscosifier	1,100'	2,100'	14.8	1.33	0	235	6.37
DV TOOL		2,100'						
Stage 1 Lead	50:50 Poz: Class H + Extender, Antifoam, Retarder, Salt, Viscosifier	2,100'	8,015'	11.9	2.43	100	1524	13.76
Stage 1 Tail	Class H + Retarder, Extender, Dispersant	8,015'	9,015'	15.6	1.21	50	389	5.54
Production								
Lead	50:50 Poz: Class H + Extender, Antifoam, Dispersant, , Retarder	7,015'	8,015'	14.5	1.21	100	430	5.54
Tail	Class H + Viscosifier, Antifoam, Dispersant, Fluid Loss, Retarder, Expanding Agent	8,015'	21,187'	15.6	1.2	50	3768	5.30
Pilot Hole								
Tail	Class C	9,500'	10,000'	17.2	0.97	50-100	50-100	3.61

6. MUD PROGRAM

From	To	Type	Weight	F. Vis	Filtrate
0'	450'	Spud Mud	0	0	0
450'	9015'	OBM	9.0 - 9.5	50 -70	5.0 - 10
9015'	21,187'	OBM	10.0 - 13.5	50 -70	5.0 - 10

7. TESTING, LOGGING, AND CORING

TYPE	Logs	Interval	Timing	Vendor
Mudlogs	2 man mudlog	Int Csg to TD	Drillout of Int Csg	TBD
LWD	MWD Gamma	Int. and Prod. Hole	While Drilling	TBD
Wireline Logs	Quad Combo w/ Di-Pole Sonic, FMI,	Prod hole	After Intermediate hole	TBD

8. ABNORMAL PRESSURES AND HYDROGEN SULFIDE

PLEASE REFERENCE MDP

Schlumberger

#16H - Rev0

Chevron

Borehole:	Well:	Field:	Structure:
Original Borehole	HH SO 10 P3 #16H	NM Eddy County (NAD 27)	Chevron HH SO 10 P3 Pad

Gravity & Magnetic Parameters
Model: HDGM 2015 Dip: 59.816° Date: 30-Dec-2015
MagDec: 7.519° FS: 48169.806nT Gravity FS: 998.428mgn (9.80665 Based)

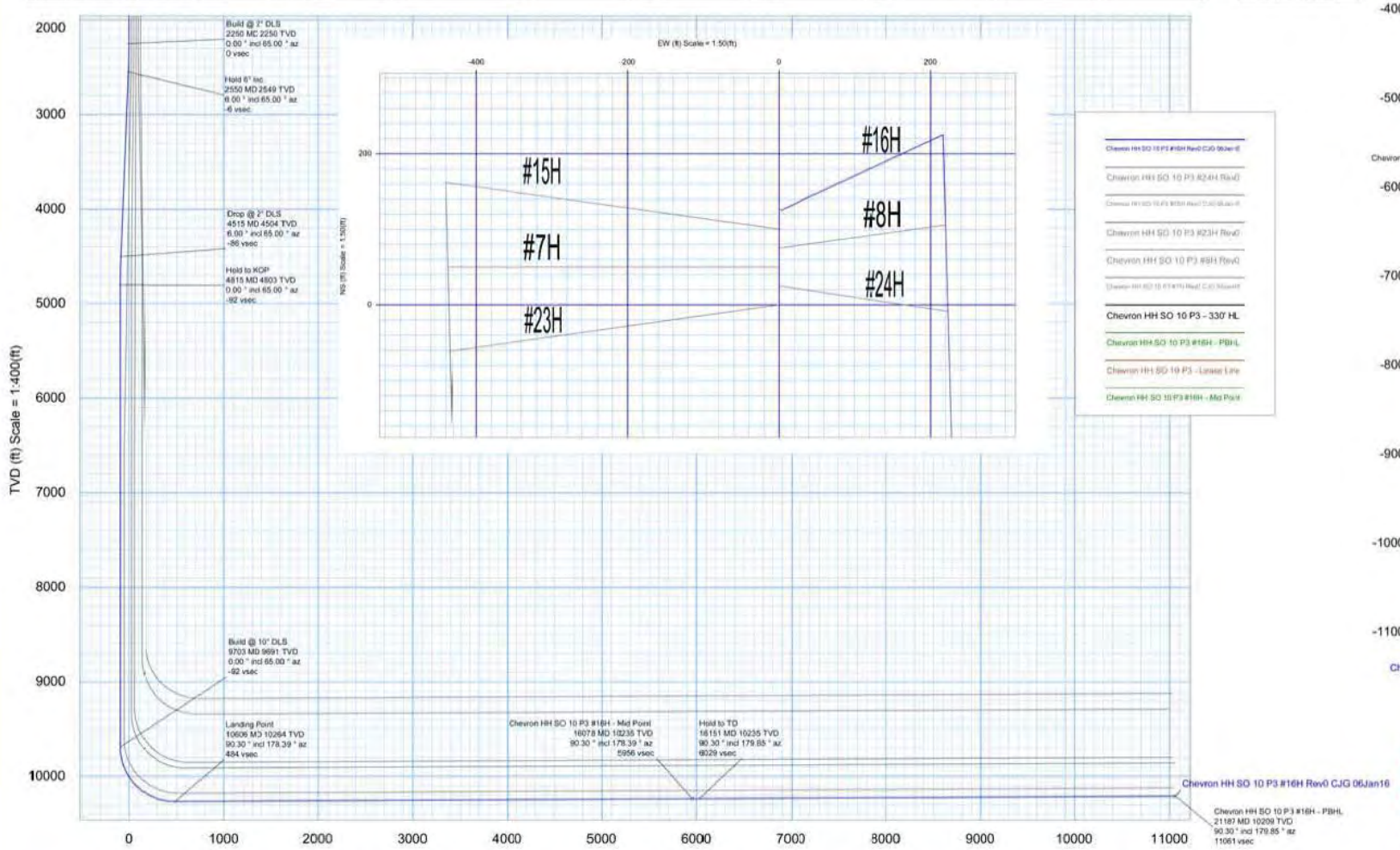
Surface Location NAD27 New Mexico State Plane, Eastern Zone, US Feet
Lat: N 32 3 16.26 Northing: 387634ftUS Grid Conv: 0.0815°
Lon: W 104 1(47.19 Easting: 547568ftUS Scale Fact: 0.99991166

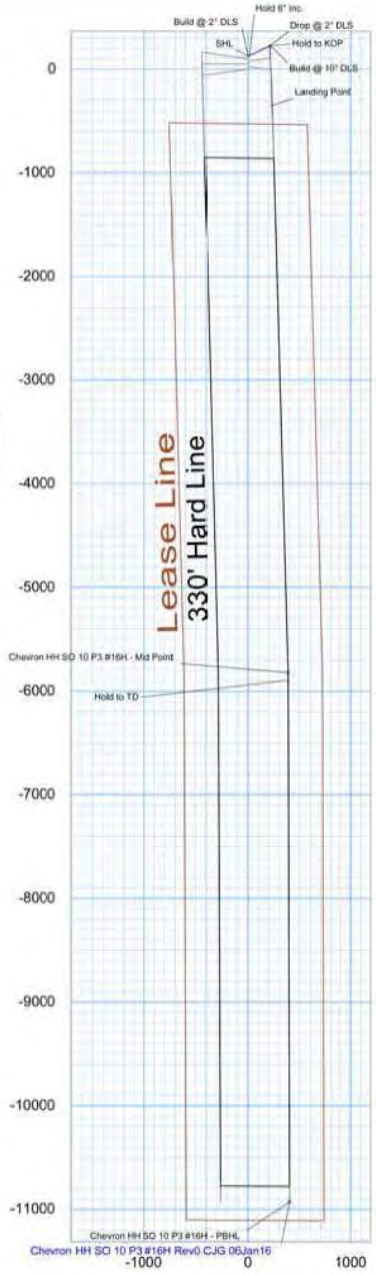
Miscellaneous
Slot: HH SO 10 P3 # 16 H TVD Ref: RKB(3312ft above MSL)
Plan: Chevron HH SO 10 P3 #16H Rev0 CJG 06Jan16

Critical Points

Critical Point	MD	INCL	AZIM	TVD	VSEC	N(+)/S(-)	E(+)/W(-)	DLS
SHL	0.00	0.00	65.00	0.00	0.00	125.01	2.00	
Build @ 2° DLS	2250.00	0.00	65.00	2250.00	0.00	125.01	2.00	0.00
Hold 6° Inc.	2550.00	6.00	65.00	2549.45	-6.11	131.64	16.22	2.00
Drop @ 2° DLS	4515.00	6.00	65.00	4503.69	-86.15	218.45	202.38	0.00
Hold to KOP	4815.00	0.00	65.00	4803.14	-92.26	225.08	216.60	2.00
Build @ 10° DLS	9702.91	0.00	65.00	9691.05	-92.26	225.08	216.60	0.00
Landing Point	10605.91	90.30	178.39	10264.00	483.68	-350.65	232.78	10.00
Chevron HH SO 10 P3 #16H - Mid Point	16078.05	90.30	178.39	10235.33	5955.56	-5820.55	386.65	0.00
Hold to TD	16151.14	90.30	179.85	10234.95	6028.64	-5893.63	387.78	2.00
Chevron HH SO 10 P3 #16H - PBHL	21186.59	90.30	179.85	10208.62	11061.20	-10928.99	401.04	0.00

Grid North
Tot Corr (M->G 7.437°)
Mag Dec (7.519°)
Grid Conv (0.082°)





CONTROLLED

1	Originator	Colby Gannon
2	DEC Sign Off	
3	CC Sign Off	
4	Client	Chevron

Schlumberger

Chevron

Chevron HH SO 10 P3 #16H Rev0 CJG 06Jan16 Proposal Geodetic Report

(Non-Def Plan)

Report Date:	January 13, 2016 - 04:26 PM	**Survey / DLS Computation:**	Minimum Curvature / Lubinski
Client:	Chevron	**Vertical Section Azimuth:**	177.933 ° (Grid North)
Field:	NM Eddy County (NAD 27)	**Vertical Section Origin:**	125.011 ft, 2.000 ft
Structure / Slot:	Chevron HH SO 10 P3 Pad / HH SO 10 P3 #16H	**TVD Reference Datum:**	RKB
Well:	HH SO 10 P3 #16H	**TVD Reference Elevation:**	3312.000 ft above MSL
Borehole:	Original Borehole	**Seabed / Ground Elevation:**	3279.000 ft above MSL
UWI / API#:	Unknown / Unknown	**Magnetic Declination:**	7.519 °
Survey Name:	Chevron HH SO 10 P3 #16H Rev0 CJG 06Jan16	**Total Gravity Field Strength:**	998.4279mgn (9.80665 Based)
Survey Date:	December 30, 2015	**Gravity Model:**	GARM
Tort / AHD / DDI / ERD Ratio:	103.765 ° / 11393.273 ft / 6.387 / 1.110	**Total Magnetic Field Strength:**	48169.806 nT
Coordinate Reference System:	NAD27 New Mexico State Plane, Eastern Zone, US Feet	**Magnetic Dip Angle:**	59.816 °
Location Lat / Long:	N 32° 3' 56.26147", W 104° 10' 47.19413"	**Declination Date:**	December 30, 2015
Location Grid N/E Y/X:	N 387634.000 ftUS, E 547568.000 ftUS	**Magnetic Declination Model:**	HDGM 2015
CRS Grid Convergence Angle:	0.0815 °	**North Reference:**	Grid North
Grid Scale Factor:	0.99991168	**Grid Convergence Used:**	0.0815 °
Version / Patch:	2.8.572.0	**Total Corr Mag North->Grid North:**	7.4377 °
		Local Coord Referenced To:	Structure Reference Point

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
SHL	0.00	0.00	65.00	0.00	0.00	125.01	2.00	N/A	387634.00	547568.00	N 32 3 56.26	W 104 10 47.19
	100.00	0.00	65.00	100.00	0.00	125.01	2.00	0.00	387634.00	547568.00	N 32 3 56.26	W 104 10 47.19
	200.00	0.00	65.00	200.00	0.00	125.01	2.00	0.00	387634.00	547568.00	N 32 3 56.26	W 104 10 47.19
	300.00	0.00	65.00	300.00	0.00	125.01	2.00	0.00	387634.00	547568.00	N 32 3 56.26	W 104 10 47.19
	400.00	0.00	65.00	400.00	0.00	125.01	2.00	0.00	387634.00	547568.00	N 32 3 56.26	W 104 10 47.19
	500.00	0.00	65.00	500.00	0.00	125.01	2.00	0.00	387634.00	547568.00	N 32 3 56.26	W 104 10 47.19
	600.00	0.00	65.00	600.00	0.00	125.01	2.00	0.00	387634.00	547568.00	N 32 3 56.26	W 104 10 47.19
	700.00	0.00	65.00	700.00	0.00	125.01	2.00	0.00	387634.00	547568.00	N 32 3 56.26	W 104 10 47.19
	800.00	0.00	65.00	800.00	0.00	125.01	2.00	0.00	387634.00	547568.00	N 32 3 56.26	W 104 10 47.19
	900.00	0.00	65.00	900.00	0.00	125.01	2.00	0.00	387634.00	547568.00	N 32 3 56.26	W 104 10 47.19
	1000.00	0.00	65.00	1000.00	0.00	125.01	2.00	0.00	387634.00	547568.00	N 32 3 56.26	W 104 10 47.19
	1100.00	0.00	65.00	1100.00	0.00	125.01	2.00	0.00	387634.00	547568.00	N 32 3 56.26	W 104 10 47.19
	1200.00	0.00	65.00	1200.00	0.00	125.01	2.00	0.00	387634.00	547568.00	N 32 3 56.26	W 104 10 47.19
	1300.00	0.00	65.00	1300.00	0.00	125.01	2.00	0.00	387634.00	547568.00	N 32 3 56.26	W 104 10 47.19
	1400.00	0.00	65.00	1400.00	0.00	125.01	2.00	0.00	387634.00	547568.00	N 32 3 56.26	W 104 10 47.19
	1500.00	0.00	65.00	1500.00	0.00	125.01	2.00	0.00	387634.00	547568.00	N 32 3 56.26	W 104 10 47.19
	1600.00	0.00	65.00	1600.00	0.00	125.01	2.00	0.00	387634.00	547568.00	N 32 3 56.26	W 104 10 47.19
	1700.00	0.00	65.00	1700.00	0.00	125.01	2.00	0.00	387634.00	547568.00	N 32 3 56.26	W 104 10 47.19
	1800.00	0.00	65.00	1800.00	0.00	125.01	2.00	0.00	387634.00	547568.00	N 32 3 56.26	W 104 10 47.19
	1900.00	0.00	65.00	1900.00	0.00	125.01	2.00	0.00	387634.00	547568.00	N 32 3 56.26	W 104 10 47.19
	2000.00	0.00	65.00	2000.00	0.00	125.01	2.00	0.00	387634.00	547568.00	N 32 3 56.26	W 104 10 47.19
	2100.00	0.00	65.00	2100.00	0.00	125.01	2.00	0.00	387634.00	547568.00	N 32 3 56.26	W 104 10 47.19
	2200.00	0.00	65.00	2200.00	0.00	125.01	2.00	0.00	387634.00	547568.00	N 32 3 56.26	W 104 10 47.19
Build @ 2° DLS	2250.00	0.00	65.00	2250.00	0.00	125.01	2.00	0.00	387634.00	547568.00	N 32 3 56.26	W 104 10 47.19
	2300.00	1.00	65.00	2300.00	-0.17	125.20	2.40	2.00	387634.18	547568.40	N 32 3 56.26	W 104 10 47.19
	2400.00	3.00	65.00	2399.93	-1.53	126.67	5.56	2.00	387635.66	547571.56	N 32 3 56.28	W 104 10 47.15
	2500.00	5.00	65.00	2499.68	-4.25	129.62	11.88	2.00	387638.61	547577.88	N 32 3 56.31	W 104 10 47.06
Hold 6° Inc	2550.00	6.00	65.00	2549.45	-6.11	131.64	16.22	2.00	387640.63	547582.22	N 32 3 56.33	W 104 10 47.03
	2600.00	6.00	65.00	2599.18	-8.15	133.85	20.96	0.00	387642.84	547586.96	N 32 3 56.35	W 104 10 46.97
	2700.00	6.00	65.00	2698.63	-12.22	138.27	30.43	0.00	387647.26	547596.43	N 32 3 56.39	W 104 10 46.86
	2800.00	6.00	65.00	2798.08	-16.30	142.69	39.91	0.00	387651.67	547605.90	N 32 3 56.44	W 104 10 46.75
	2900.00	6.00	65.00	2897.53	-20.37	147.11	49.38	0.00	387656.09	547615.38	N 32 3 56.48	W 104 10 46.64
	3000.00	6.00	65.00	2996.99	-24.44	151.52	58.86	0.00	387660.51	547624.85	N 32 3 56.52	W 104 10 46.53
	3100.00	6.00	65.00	3096.44	-28.52	155.94	68.33	0.00	387664.93	547634.32	N 32 3 56.57	W 104 10 46.42
	3200.00	6.00	65.00	3195.89	-32.59	160.36	77.80	0.00	387669.34	547643.79	N 32 3 56.61	W 104 10 46.31
	3300.00	6.00	65.00	3295.34	-36.66	164.78	87.27	0.00	387673.76	547653.27	N 32 3 56.65	W 104 10 46.20
	3400.00	6.00	65.00	3394.80	-40.73	169.19	96.75	0.00	387678.18	547662.74	N 32 3 56.70	W 104 10 46.09
	3500.00	6.00	65.00	3494.25	-44.81	173.61	106.22	0.00	387682.59	547672.21	N 32 3 56.74	W 104 10 45.98
	3600.00	6.00	65.00	3593.70	-48.88	178.03	115.70	0.00	387687.01	547681.68	N 32 3 56.78	W 104 10 45.87
	3700.00	6.00	65.00	3693.15	-52.95	182.45	125.17	0.00	387691.43	547691.16	N 32 3 56.83	W 104 10 45.76
	3800.00	6.00	65.00	3792.60	-57.03	186.86	134.64	0.00	387695.85	547700.63	N 32 3 56.87	W 104 10 45.65
	3900.00	6.00	65.00	3892.06	-61.10	191.28	144.12	0.00	387700.26	547710.10	N 32 3 56.92	W 104 10 45.54
	4000.00	6.00	65.00	3991.51	-65.17	195.70	153.59	0.00	387704.68	547719.58	N 32 3 56.96	W 104 10 45.43
	4100.00	6.00	65.00	4090.96	-69.25	200.12	163.06	0.00	387709.10	547729.05	N 32 3 57.00	W 104 10 45.32
	4200.00	6.00	65.00	4190.41	-73.32	204.53	172.54	0.00	387713.52	547738.52	N 32 3 57.05	W 104 10 45.21
	4300.00	6.00	65.00	4289.87	-77.39	208.95	182.01	0.00	387717.93	547747.99	N 32 3 57.09	W 104 10 45.10
	4400.00	6.00	65.00	4389.32	-81.46	213.37	191.48	0.00	387722.35	547757.47	N 32 3 57.13	W 104 10 44.99
	4500.00	6.00	65.00	4488.77	-85.54	217.79	200.96	0.00	387726.77	547766.94	N 32 3 57.18	W 104 10 44.88
Drop @ 2° DLS	4515.00	6.00	65.00	4503.69	-86.15	218.45	202.38	0.00	387727.43	547768.36	N 32 3 57.18	W 104 10 44.86
	4600.00	4.30	65.00	4588.34	-89.12	221.67	209.29	2.00	387730.65	547775.27	N 32 3 57.22	W 104 10 44.78
	4700.00	2.30	65.00	4688.17	-91.38	224.11	214.51	2.00	387733.09	547780.49	N 32 3 57.24	W 104 10 44.72
	4800.00	0.30	65.00	4788.14	-92.25	225.06	216.57	2.00	387734.04	547782.55	N 32 3 57.25	W 104 10 44.70
Hold to KOP	4815.00	0.00	65.00	4803.14	-92.26	225.08	216.60	2.00	387734.06	547782.58	N 32 3 57.25	W 104 10 44.70
	4900.00	0.00	65.00	4888.14	-92.26	225.08	216.60	0.00	387734.06	547782.58	N 32 3 57.25	W 104 10 44.70
	5000.00	0.00	65.00	4988.14	-92.26	225.08	216.60	0.00	387734.06	547782.58	N 32 3 57.25	W 104 10 44.70
	5100.00	0.00	65.00	5088.14	-92.26	225.08	216.60	0.00	387734.06	547782.58	N 32 3 57.25	W 104 10 44.70
	5200.00	0.00	65.00	5188.14	-92.26	225.08	216.60	0.00	387734.06	547782.58	N 32 3 57.25	W 104 10 44.70
	5300.00	0.00	65.00	5288.14	-92.26	225.08	216.60	0.00	387734.06	547782.58	N 32 3 57.25	W 104 10 44.70
	5400.00	0.00	65.00	5388.14	-92.26	225.08	216.60	0.00	387734.06	547782.58	N 32 3 57.25	W 104 10 44.70
	5500.00	0.00	65.00	5488.14	-92.26	225.08	216.60	0.00	387734.06	547782.58	N 32 3 57.25	W 104 10 44.70
	5600.00	0.00	65.00	5588.14	-92.26	225.08	216.60	0.00	387734.06	547782.58	N 32 3 57.25	W 104 10 44.70
	5700.00	0.00	65.00	5688.14	-92.26	225.08	216.60	0.00	387734.06	547782.58	N 32 3 57.25	W 104 10 44.70
	5800.00	0.00	65.00	5788.14	-92.26	225.08	216.60	0.00	387734.06	547782.58	N 32 3 57.25	W 104 10 44.70
	5900.00	0.00	65.00	5888.14	-92.26	225.08	216.60	0.00	387734.06	547782.58	N 32 3 57.25	W 104 10 44.70
	6000.00	0.00	65.00	5988.14	-92.26	225.08	216.60	0.00	387734.06	547782.58	N 32 3 57.25	W 104 10 44.70

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
	6100.00	0.00	65.00	6088.14	-92.26	225.08	216.60	0.00	387734.06	547782.58	N 32 3 57.25	W 104 10 44.70
	6200.00	0.00	65.00	6188.14	-92.26	225.08	216.60	0.00	387734.06	547782.58	N 32 3 57.25	W 104 10 44.70
	6300.00	0.00	65.00	6288.14	-92.26	225.08	216.60	0.00	387734.06	547782.58	N 32 3 57.25	W 104 10 44.70
	6400.00	0.00	65.00	6388.14	-92.26	225.08	216.60	0.00	387734.06	547782.58	N 32 3 57.25	W 104 10 44.70
	6500.00	0.00	65.00	6488.14	-92.26	225.08	216.60	0.00	387734.06	547782.58	N 32 3 57.25	W 104 10 44.70
	6600.00	0.00	65.00	6588.14	-92.26	225.08	216.60	0.00	387734.06	547782.58	N 32 3 57.25	W 104 10 44.70
	6700.00	0.00	65.00	6688.14	-92.26	225.08	216.60	0.00	387734.06	547782.58	N 32 3 57.25	W 104 10 44.70
	6800.00	0.00	65.00	6788.14	-92.26	225.08	216.60	0.00	387734.06	547782.58	N 32 3 57.25	W 104 10 44.70
	6900.00	0.00	65.00	6888.14	-92.26	225.08	216.60	0.00	387734.06	547782.58	N 32 3 57.25	W 104 10 44.70
	7000.00	0.00	65.00	6988.14	-92.26	225.08	216.60	0.00	387734.06	547782.58	N 32 3 57.25	W 104 10 44.70
	7100.00	0.00	65.00	7088.14	-92.26	225.08	216.60	0.00	387734.06	547782.58	N 32 3 57.25	W 104 10 44.70
	7200.00	0.00	65.00	7188.14	-92.26	225.08	216.60	0.00	387734.06	547782.58	N 32 3 57.25	W 104 10 44.70
	7300.00	0.00	65.00	7288.14	-92.26	225.08	216.60	0.00	387734.06	547782.58	N 32 3 57.25	W 104 10 44.70
	7400.00	0.00	65.00	7388.14	-92.26	225.08	216.60	0.00	387734.06	547782.58	N 32 3 57.25	W 104 10 44.70
	7500.00	0.00	65.00	7488.14	-92.26	225.08	216.60	0.00	387734.06	547782.58	N 32 3 57.25	W 104 10 44.70
	7600.00	0.00	65.00	7588.14	-92.26	225.08	216.60	0.00	387734.06	547782.58	N 32 3 57.25	W 104 10 44.70
	7700.00	0.00	65.00	7688.14	-92.26	225.08	216.60	0.00	387734.06	547782.58	N 32 3 57.25	W 104 10 44.70
	7800.00	0.00	65.00	7788.14	-92.26	225.08	216.60	0.00	387734.06	547782.58	N 32 3 57.25	W 104 10 44.70
	7900.00	0.00	65.00	7888.14	-92.26	225.08	216.60	0.00	387734.06	547782.58	N 32 3 57.25	W 104 10 44.70
	8000.00	0.00	65.00	7988.14	-92.26	225.08	216.60	0.00	387734.06	547782.58	N 32 3 57.25	W 104 10 44.70
	8100.00	0.00	65.00	8088.14	-92.26	225.08	216.60	0.00	387734.06	547782.58	N 32 3 57.25	W 104 10 44.70
	8200.00	0.00	65.00	8188.14	-92.26	225.08	216.60	0.00	387734.06	547782.58	N 32 3 57.25	W 104 10 44.70
	8300.00	0.00	65.00	8288.14	-92.26	225.08	216.60	0.00	387734.06	547782.58	N 32 3 57.25	W 104 10 44.70
	8400.00	0.00	65.00	8388.14	-92.26	225.08	216.60	0.00	387734.06	547782.58	N 32 3 57.25	W 104 10 44.70
	8500.00	0.00	65.00	8488.14	-92.26	225.08	216.60	0.00	387734.06	547782.58	N 32 3 57.25	W 104 10 44.70
	8600.00	0.00	65.00	8588.14	-92.26	225.08	216.60	0.00	387734.06	547782.58	N 32 3 57.25	W 104 10 44.70
	8700.00	0.00	65.00	8688.14	-92.26	225.08	216.60	0.00	387734.06	547782.58	N 32 3 57.25	W 104 10 44.70
	8800.00	0.00	65.00	8788.14	-92.26	225.08	216.60	0.00	387734.06	547782.58	N 32 3 57.25	W 104 10 44.70
	8900.00	0.00	65.00	8888.14	-92.26	225.08	216.60	0.00	387734.06	547782.58	N 32 3 57.25	W 104 10 44.70
	9000.00	0.00	65.00	8988.14	-92.26	225.08	216.60	0.00	387734.06	547782.58	N 32 3 57.25	W 104 10 44.70
	9100.00	0.00	65.00	9088.14	-92.26	225.08	216.60	0.00	387734.06	547782.58	N 32 3 57.25	W 104 10 44.70
	9200.00	0.00	65.00	9188.14	-92.26	225.08	216.60	0.00	387734.06	547782.58	N 32 3 57.25	W 104 10 44.70
	9300.00	0.00	65.00	9288.14	-92.26	225.08	216.60	0.00	387734.06	547782.58	N 32 3 57.25	W 104 10 44.70
	9400.00	0.00	65.00	9388.14	-92.26	225.08	216.60	0.00	387734.06	547782.58	N 32 3 57.25	W 104 10 44.70
	9500.00	0.00	65.00	9488.14	-92.26	225.08	216.60	0.00	387734.06	547782.58	N 32 3 57.25	W 104 10 44.70
	9600.00	0.00	65.00	9588.14	-92.26	225.08	216.60	0.00	387734.06	547782.58	N 32 3 57.25	W 104 10 44.70
	9700.00	0.00	65.00	9688.14	-92.26	225.08	216.60	0.00	387734.06	547782.58	N 32 3 57.25	W 104 10 44.70
Build @ 10° DLS	9702.91	0.00	65.00	9691.05	-92.26	225.08	216.60	0.00	387734.06	547782.58	N 32 3 57.25	W 104 10 44.70
	9800.00	9.71	178.39	9787.68	-84.06	216.88	216.63	10.00	387725.86	547782.81	N 32 3 57.17	W 104 10 44.70
	9900.00	19.71	178.39	9884.28	-58.70	191.53	217.54	10.00	387700.51	547783.52	N 32 3 56.92	W 104 10 44.69
	10000.00	29.71	178.39	9975.00	-16.95	149.80	218.72	10.00	387658.78	547784.70	N 32 3 56.50	W 104 10 44.68
	10100.00	39.71	178.39	10057.11	39.91	92.95	220.31	10.00	387601.94	547786.29	N 32 3 55.94	W 104 10 44.66
	10200.00	49.71	178.39	10128.08	110.17	22.72	222.29	10.00	387531.72	547788.27	N 32 3 55.25	W 104 10 44.64
	10300.00	59.71	178.39	10185.78	191.69	-58.77	224.58	10.00	387450.24	547790.56	N 32 3 54.44	W 104 10 44.61
	10400.00	69.71	178.39	10228.45	281.99	-149.03	227.12	10.00	387359.98	547793.10	N 32 3 53.55	W 104 10 44.58
	10500.00	79.71	178.39	10254.79	378.32	245.33	229.82	10.00	387263.60	547795.80	N 32 3 52.59	W 104 10 44.55
	10600.00	89.71	178.39	10264.00	477.77	-344.74	232.62	10.00	387164.29	547798.60	N 32 3 51.61	W 104 10 44.52
Landing Point	10605.91	90.30	178.39	10264.00	483.68	-350.65	232.78	10.00	387158.38	547798.76	N 32 3 51.55	W 104 10 44.52
	10700.00	90.30	178.39	10263.51	577.76	-444.70	235.43	0.00	387064.34	547801.41	N 32 3 50.62	W 104 10 44.49
	10800.00	90.30	178.39	10262.98	677.76	-544.66	238.24	0.00	386964.39	547804.21	N 32 3 49.63	W 104 10 44.46
	10900.00	90.30	178.39	10262.46	777.75	-644.62	241.05	0.00	386864.44	547807.02	N 32 3 48.64	W 104 10 44.43
	11000.00	90.30	178.39	10261.94	877.75	-744.58	243.86	0.00	386764.49	547809.83	N 32 3 47.65	W 104 10 44.40
	11100.00	90.30	178.39	10261.41	977.74	-844.54	246.67	0.00	386664.54	547812.64	N 32 3 46.66	W 104 10 44.37
	11200.00	90.30	178.39	10260.89	1077.74	-944.50	249.48	0.00	386564.59	547815.45	N 32 3 45.67	W 104 10 44.34
	11300.00	90.30	178.39	10260.36	1177.73	-1044.46	252.29	0.00	386464.64	547818.26	N 32 3 44.69	W 104 10 44.31
	11400.00	90.30	178.39	10259.84	1277.73	-1144.41	255.10	0.00	386364.69	547821.07	N 32 3 43.70	W 104 10 44.27
	11500.00	90.30	178.39	10259.32	1377.73	-1244.37	257.91	0.00	386264.74	547823.88	N 32 3 42.71	W 104 10 44.24
	11600.00	90.30	178.39	10258.79	1477.72	-1344.33	260.72	0.00	386164.79	547826.69	N 32 3 41.72	W 104 10 44.21
	11700.00	90.30	178.39	10258.27	1577.72	-1444.29	263.53	0.00	386064.84	547829.50	N 32 3 40.73	W 104 10 44.18
	11800.00	90.30	178.39	10257.75	1677.71	-1544.25	266.34	0.00	385964.89	547832.31	N 32 3 39.74	W 104 10 44.15
	11900.00	90.30	178.39	10257.22	1777.71	-1644.21	269.15	0.00	385864.94	547835.12	N 32 3 38.75	W 104 10 44.12
	12000.00	90.30	178.39	10256.70	1877.70	-1744.17	271.96	0.00	385764.99	547837.93	N 32 3 37.76	W 104 10 44.09
	12100.00	90.30	178.39	10256.17	1977.70	-1844.13	274.77	0.00	385665.04	547840.75	N 32 3 36.77	W 104 10 44.06
	12200.00	90.30	178.39	10255.65	2077.69	-1944.09	277.58	0.00	385565.09	547843.56	N 32 3 35.78	W 104 10 44.03
	12300.00	90.30	178.39	10255.13	2177.69	-2044.05	280.39	0.00	385465.14	547846.37	N 32 3 34.79	W 104 10 44.00
	12400.00	90.30	178.39	10254.60	2277.68	-2144.01	283.20	0.00	385365.19	547849.18	N 32 3 33.80	W 104 10 43.96
	12500.00	90.30	178.39	10254.08	2377.68	-2243.96	286.01	0.00	385265.24	547851.99	N 32 3 32.81	W 104 10 43.93
	12600.00	90.30	178.39	10253.55	2477.68	-2343.92	288.83	0.00	385165.29	547854.80	N 32 3 31.83	W 104 10 43.90
	12700.00	90.30	178.39	10253.03	2577.67	-2443.88	291.64	0.00	385065.34	547857.61	N 32 3 30.84	W 104 10 43.87
	12800.00	90.30	178.39	10252.51	2677.67	-2543.84	294.45	0.00	384965.39	547860.42	N 32 3 29.85	W 104 10 43.84
	12900.00	90.30	178.39	10251.98	2777.66	-2643.80	297.26	0.00	384865.44	547863.23	N 32 3 28.86	W 104 10 43.81
	13000.00	90.30	178.39	10251.46	2877.66	-2743.76	300.07	0.00	384765.49	547866.04	N 32 3 27.87	W 104 10 43.78
	13100.00	90.30	178.39	10250.94	2977.65	-2843.72	302.88	0.00	384665.54	547868.86	N 32 3 26.88	W 104 10 43.75
	13200.00	90.30	178.39	10250.41	3077.65	-2943.68	305.69	0.00	384565.59	547871.67	N 32 3 25.89	W 104 10 43.72
	13300.00	90.30	178.39	10249.89	3177.64	-3043.64	308.51	0.00	384465.64	547874.48	N 32 3 24.90	W 104 10 43.69
	13400.00	90.30	178.39	10249.36	3277.64	-3143.60	311.32	0.00	384365.69	547877.29	N 32 3 23.91	W 104 10 43.65
	13500.00	90.30	178.39	10248.84	3377.63	-3243.56	314.13	0.00	384265.74	547880.10	N 32 3 22.92	W 104 10 43.62
	13600.00	90.30	178.39	10248.32	3477.63	-3343.51	316.94	0.00	384165.79	547882.91	N 32 3 21.93	W 104 10 43.59
	13700.00	90.30	178.39	10247.79	3577.63	-3443.47	319.75	0.00	384065.84	547885.73	N 32 3 20.94	W 104 10 43.56
	13800.00	90.30	178.39	10247.27	3677.62	-3543.43	322.57	0.00	383965.89	547888.54	N 32 3 19.96	W 104 10 43.53
	13900.00	90.30	178.39	10246.74	3777.62	-3643.39	325.38	0.00	383865.94	547891.35	N 32 3 18.97	W 104 10 43.50
	14000.00	90.30	178.39	10246.22	3877.61	-3743.35	328.19	0.00	383765.99	547894.16	N 32 3 17.98	W 104 10 43.47
	14100.00	90.30	178.39	10245.70	3977.61	-3843.31	331.00	0.00	383666.04	547896.97	N 32 3 16.99	W 104 10 43.44
	14200.00	90.30	178.39	10245.17	4077.60	-3943.27	333.82	0.00	383566.09	547899.79	N 32 3 16.00	W 104 10 43.41
	14300.00	90.30	178.39	10244.65	4177.60	-4043.23	336.63	0.00	383466.14	547902.60	N 32 3 15.01	W 104 10 43.38
	14400.00	90.30	178.39	10244.12	4277.59	-4143.19	339.44	0.00	383366.19	547905.41	N 32 3 14.02	W 104 10 43.34
	14500.00	90.30	178.39	10243.60	4377.59	-4243.15	342.26	0.00	383266.24	547908.22	N 32 3 13.03	W 104 10 43.31
	14600.00	90.30	178.39	10243.08	4477.58	-4343.11	345.07	0.00	383166.29	547911.04	N 32 3 12.04	W 104 10 43.28

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
	14700.00	90.30	178.39	10242.55	4577.58	-4443.06	347.88	0.00	383066.34	547913.85	N 32 3 11.05	W 104 10 43.25
	14800.00	90.30	178.39	10242.03	4677.58	-4543.02	350.69	0.00	382966.39	547916.66	N 32 3 10.06	W 104 10 43.22
	14900.00	90.30	178.39	10241.50	4777.57	-4642.98	353.51	0.00	382866.44	547919.48	N 32 3 9.07	W 104 10 43.19
	15000.00	90.30	178.39	10240.98	4877.57	-4742.94	356.32	0.00	382766.49	547922.29	N 32 3 8.08	W 104 10 43.16
	15100.00	90.30	178.39	10240.46	4977.56	-4842.90	359.13	0.00	382666.54	547925.10	N 32 3 7.10	W 104 10 43.13
	15200.00	90.30	178.39	10239.93	5077.56	-4942.86	361.95	0.00	382566.59	547927.92	N 32 3 6.11	W 104 10 43.10
	15300.00	90.30	178.39	10239.41	5177.55	-5042.82	364.76	0.00	382466.64	547930.73	N 32 3 5.12	W 104 10 43.06
	15400.00	90.30	178.39	10238.88	5277.55	-5142.78	367.57	0.00	382366.69	547933.54	N 32 3 4.13	W 104 10 43.03
	15500.00	90.30	178.39	10238.36	5377.54	-5242.74	370.39	0.00	382266.74	547936.36	N 32 3 3.14	W 104 10 43.00
	15600.00	90.30	178.39	10237.84	5477.54	-5342.70	373.20	0.00	382166.79	547939.17	N 32 3 2.15	W 104 10 42.97
	15700.00	90.30	178.39	10237.31	5577.53	-5442.65	376.02	0.00	382066.84	547941.98	N 32 3 1.16	W 104 10 42.94
	15800.00	90.30	178.39	10236.79	5677.53	-5542.61	378.83	0.00	381966.89	547944.80	N 32 3 0.17	W 104 10 42.91
	15900.00	90.30	178.39	10236.26	5777.53	-5642.57	381.64	0.00	381866.94	547947.61	N 32 2 59.18	W 104 10 42.88
	16000.00	90.30	178.39	10235.74	5877.52	-5742.53	384.46	0.00	381766.99	547950.42	N 32 2 58.19	W 104 10 42.85
Chevron HH SO 10 P3 #16H - Mid Point	16078.05	90.30	178.39	10235.33	5955.56	-5820.55	386.65	0.00	381688.98	547952.62	N 32 2 57.42	W 104 10 42.82
	16100.00	90.30	178.83	10235.21	5977.52	-5842.49	387.19	2.00	381667.03	547953.15	N 32 2 57.20	W 104 10 42.82
Hold to TD	16151.14	90.30	179.85	10234.95	6028.64	-5893.63	387.78	2.00	381615.91	547953.74	N 32 2 56.70	W 104 10 42.81
	16200.00	90.30	179.85	10234.69	6077.47	-5942.49	387.91	0.00	381567.05	547953.87	N 32 2 56.21	W 104 10 42.81
	16300.00	90.30	179.85	10234.17	6177.41	-6042.49	388.17	0.00	381467.06	547954.14	N 32 2 55.22	W 104 10 42.81
	16400.00	90.30	179.85	10233.65	6277.36	-6142.48	388.43	0.00	381367.07	547954.40	N 32 2 54.23	W 104 10 42.81
	16500.00	90.30	179.85	10233.12	6377.30	-6242.48	388.70	0.00	381267.08	547954.66	N 32 2 53.25	W 104 10 42.81
	16600.00	90.30	179.85	10232.60	6477.24	-6342.48	388.96	0.00	381167.09	547954.93	N 32 2 52.26	W 104 10 42.81
	16700.00	90.30	179.85	10232.08	6577.18	-6442.48	389.22	0.00	381067.10	547955.19	N 32 2 51.27	W 104 10 42.80
	16800.00	90.30	179.85	10231.55	6677.13	-6542.48	389.49	0.00	380967.11	547955.45	N 32 2 50.28	W 104 10 42.80
	16900.00	90.30	179.85	10231.03	6777.07	-6642.48	389.75	0.00	380867.12	547955.72	N 32 2 49.29	W 104 10 42.80
	17000.00	90.30	179.85	10230.51	6877.01	-6742.47	390.01	0.00	380767.14	547955.98	N 32 2 48.30	W 104 10 42.80
	17100.00	90.30	179.85	10229.99	6976.96	-6842.47	390.28	0.00	380667.15	547956.24	N 32 2 47.31	W 104 10 42.80
	17200.00	90.30	179.85	10229.46	7076.90	-6942.47	390.54	0.00	380567.16	547956.51	N 32 2 46.32	W 104 10 42.80
	17300.00	90.30	179.85	10228.94	7176.84	-7042.47	390.80	0.00	380467.17	547956.77	N 32 2 45.33	W 104 10 42.80
	17400.00	90.30	179.85	10228.42	7276.78	-7142.47	391.07	0.00	380367.18	547957.03	N 32 2 44.34	W 104 10 42.79
	17500.00	90.30	179.85	10227.89	7376.73	-7242.46	391.33	0.00	380267.19	547957.30	N 32 2 43.35	W 104 10 42.79
	17600.00	90.30	179.85	10227.37	7476.67	-7342.46	391.59	0.00	380167.20	547957.56	N 32 2 42.36	W 104 10 42.79
	17700.00	90.30	179.85	10226.85	7576.61	-7442.46	391.86	0.00	380067.21	547957.82	N 32 2 41.37	W 104 10 42.79
	17800.00	90.30	179.85	10226.33	7676.55	-7542.46	392.12	0.00	379967.22	547958.09	N 32 2 40.38	W 104 10 42.79
	17900.00	90.30	179.85	10225.80	7776.50	-7642.46	392.38	0.00	379867.23	547958.35	N 32 2 39.39	W 104 10 42.79
	18000.00	90.30	179.85	10225.28	7876.44	-7742.46	392.65	0.00	379767.24	547958.61	N 32 2 38.40	W 104 10 42.79
	18100.00	90.30	179.85	10224.76	7976.38	-7842.45	392.91	0.00	379667.25	547958.87	N 32 2 37.41	W 104 10 42.78
	18200.00	90.30	179.85	10224.24	8076.32	-7942.45	393.17	0.00	379567.26	547959.14	N 32 2 36.42	W 104 10 42.78
	18300.00	90.30	179.85	10223.71	8176.27	-8042.45	393.44	0.00	379467.28	547959.40	N 32 2 35.43	W 104 10 42.78
	18400.00	90.30	179.85	10223.19	8276.21	-8142.45	393.70	0.00	379367.29	547959.66	N 32 2 34.44	W 104 10 42.78
	18500.00	90.30	179.85	10222.67	8376.15	-8242.45	393.96	0.00	379267.30	547959.93	N 32 2 33.45	W 104 10 42.78
	18600.00	90.30	179.85	10222.14	8476.10	-8342.45	394.23	0.00	379167.31	547960.19	N 32 2 32.46	W 104 10 42.78
	18700.00	90.30	179.85	10221.62	8576.04	-8442.44	394.49	0.00	379067.32	547960.45	N 32 2 31.47	W 104 10 42.78
	18800.00	90.30	179.85	10221.10	8675.98	-8542.44	394.75	0.00	378967.33	547960.72	N 32 2 30.49	W 104 10 42.77
	18900.00	90.30	179.85	10220.58	8775.92	-8642.44	395.02	0.00	378867.34	547960.98	N 32 2 29.50	W 104 10 42.77
	19000.00	90.30	179.85	10220.05	8875.87	-8742.44	395.28	0.00	378767.35	547961.24	N 32 2 28.51	W 104 10 42.77
	19100.00	90.30	179.85	10219.53	8975.81	-8842.44	395.54	0.00	378667.36	547961.51	N 32 2 27.52	W 104 10 42.77
	19200.00	90.30	179.85	10219.01	9075.75	-8942.44	395.81	0.00	378567.37	547961.77	N 32 2 26.53	W 104 10 42.77
	19300.00	90.30	179.85	10218.48	9175.69	-9042.43	396.07	0.00	378467.38	547962.03	N 32 2 25.54	W 104 10 42.77
	19400.00	90.30	179.85	10217.96	9275.64	-9142.43	396.33	0.00	378367.39	547962.30	N 32 2 24.55	W 104 10 42.77
	19500.00	90.30	179.85	10217.44	9375.58	-9242.43	396.60	0.00	378267.40	547962.56	N 32 2 23.56	W 104 10 42.76
	19600.00	90.30	179.85	10216.92	9475.52	-9342.43	396.86	0.00	378167.41	547962.82	N 32 2 22.57	W 104 10 42.76
	19700.00	90.30	179.85	10216.39	9575.47	-9442.43	397.12	0.00	378067.43	547963.09	N 32 2 21.58	W 104 10 42.76
	19800.00	90.30	179.85	10215.87	9675.41	-9542.43	397.39	0.00	377967.44	547963.35	N 32 2 20.59	W 104 10 42.76
	19900.00	90.30	179.85	10215.35	9775.35	-9642.42	397.65	0.00	377867.45	547963.61	N 32 2 19.60	W 104 10 42.76
	20000.00	90.30	179.85	10214.82	9875.29	-9742.42	397.91	0.00	377767.46	547963.88	N 32 2 18.61	W 104 10 42.76
	20100.00	90.30	179.85	10214.30	9975.24	-9842.42	398.18	0.00	377667.47	547964.14	N 32 2 17.62	W 104 10 42.76
	20200.00	90.30	179.85	10213.78	10075.18	-9942.42	398.44	0.00	377567.48	547964.40	N 32 2 16.63	W 104 10 42.76
	20300.00	90.30	179.85	10213.26	10175.12	-10042.42	398.70	0.00	377467.49	547964.67	N 32 2 15.64	W 104 10 42.75
	20400.00	90.30	179.85	10212.73	10275.06	-10142.42	398.97	0.00	377367.50	547964.93	N 32 2 14.65	W 104 10 42.75
	20500.00	90.30	179.85	10212.21	10375.01	-10242.41	399.23	0.00	377267.51	547965.19	N 32 2 13.66	W 104 10 42.75
	20600.00	90.30	179.85	10211.69	10474.95	-10342.41	399.49	0.00	377167.52	547965.46	N 32 2 12.67	W 104 10 42.75
	20700.00	90.30	179.85	10211.16	10574.89	-10442.41	399.76	0.00	377067.53	547965.72	N 32 2 11.68	W 104 10 42.75
	20800.00	90.30	179.85	10210.64	10674.83	-10542.41	400.02	0.00	376967.54	547965.98	N 32 2 10.69	W 104 10 42.75
	20900.00	90.30	179.85	10210.12	10774.78	-10642.41	400.28	0.00	376867.55	547966.25	N 32 2 9.70	W 104 10 42.75
	21000.00	90.30	179.85	10209.60	10874.72	-10742.41	400.55	0.00	376767.57	547966.51	N 32 2 8.71	W 104 10 42.74
	21100.00	90.30	179.85	10209.07	10974.66	-10842.40	400.81	0.00	376667.58	547966.77	N 32 2 7.73	W 104 10 42.74
Chevron HH SO 10 P3 #16H - PBHL	21186.59	90.30	179.85	10208.62	11061.20	-10928.99	401.04	0.00	376581.00	547967.00	N 32 2 6.87	W 104 10 42.74

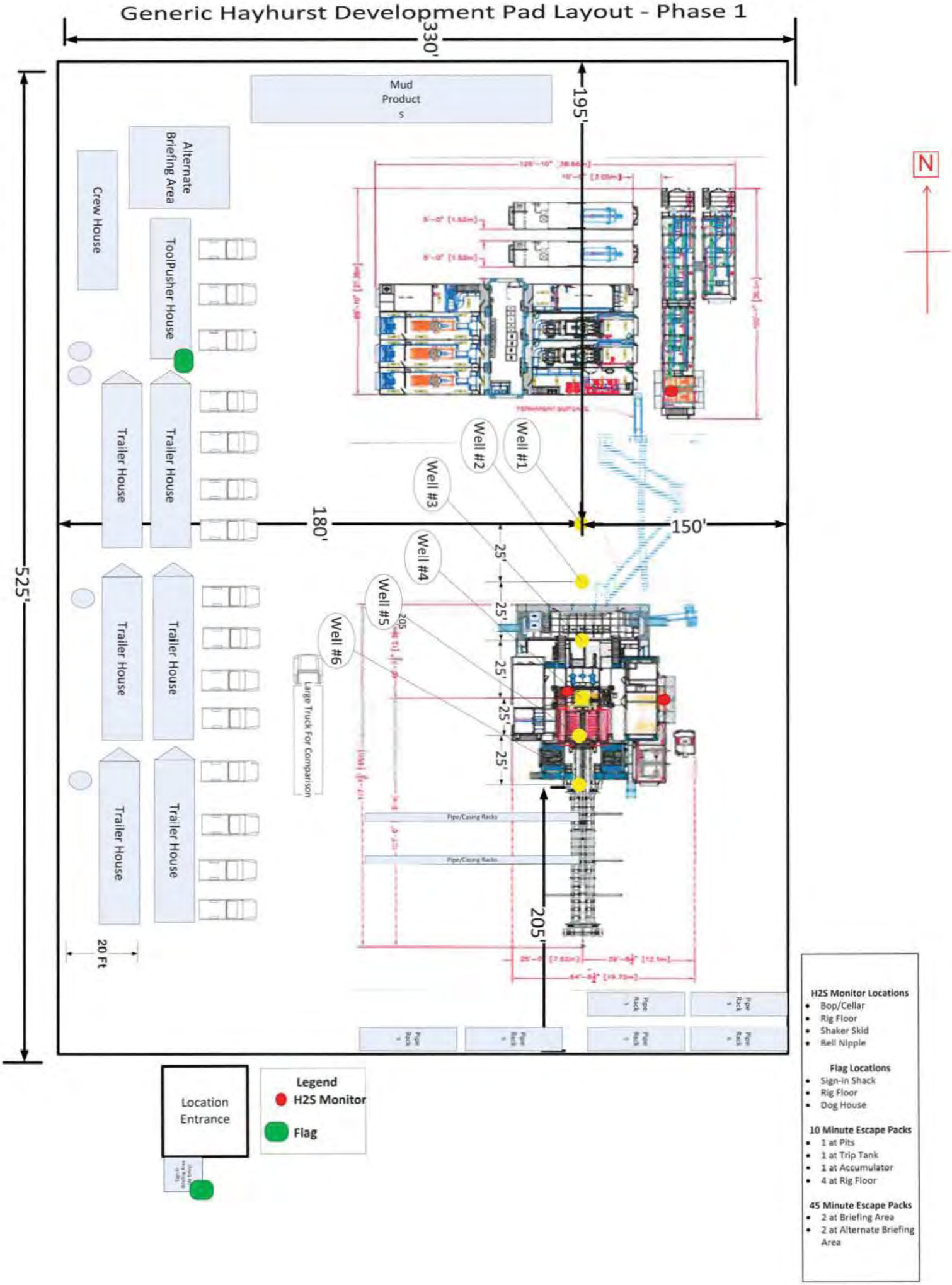
Survey Type: *Non-Def Plan*

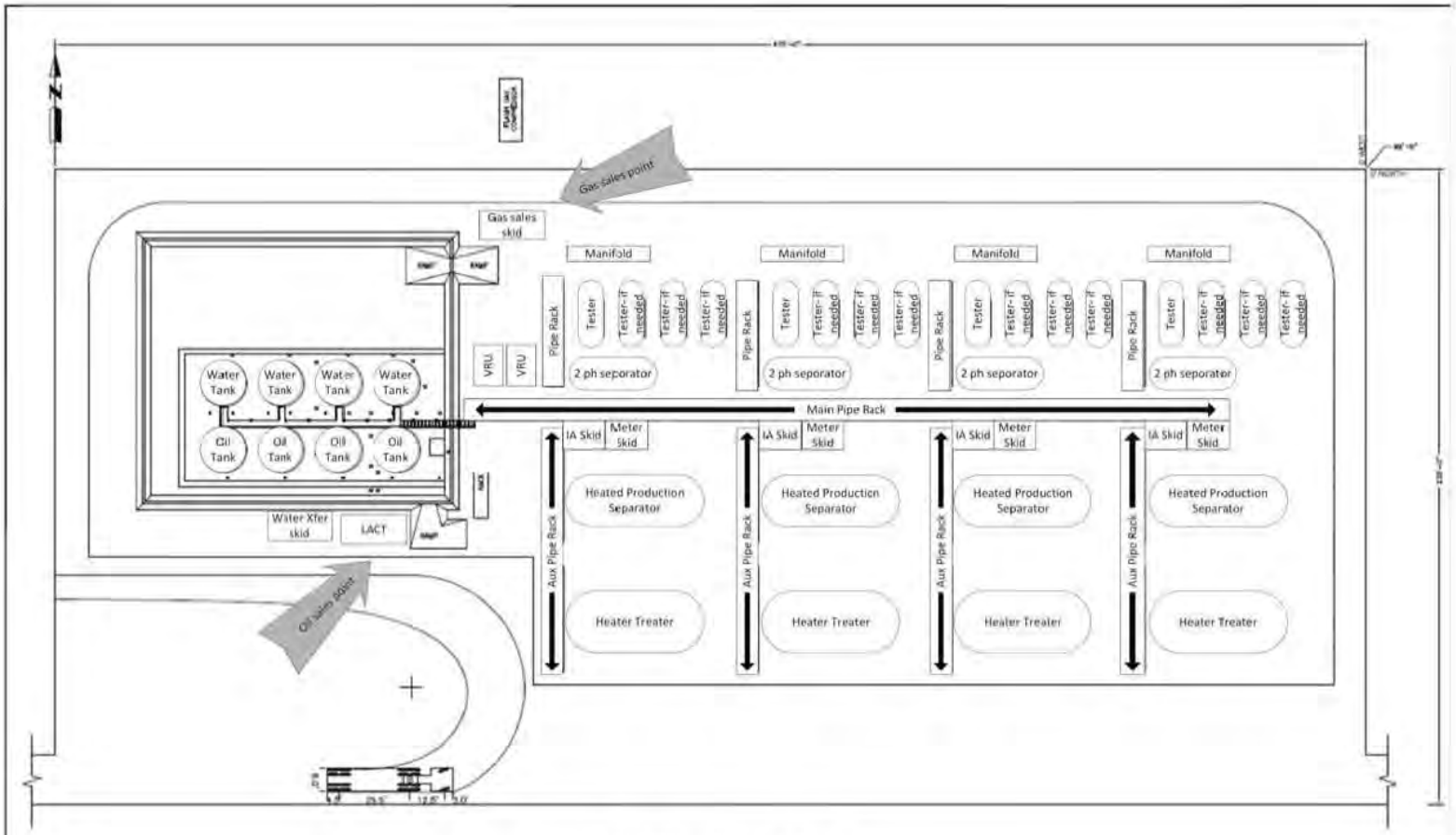
Survey Error Model: ISCWSA Rev 0 *** 3-D 95.000% Confidence 2.7955 sigma

Survey Program:

Description	Part	MD From (ft)	MD To (ft)	EOU Freq (ft)	Hole Size (in)	Casing Diameter (in)	Survey Tool Type	Borehole / Survey
	1	0.000	33.000	1/100.000	30.000	30.000	SLB_MWD-STD-Depth Only	Original Borehole / Chevron HH SO 10 P3 #16H Rev0 CJG
	1	33.000	21186.585	1/100.000	30.000	30.000	SLB_MWD-STD	Original Borehole / Chevron HH SO 10 P3 #16H Rev0 CJG

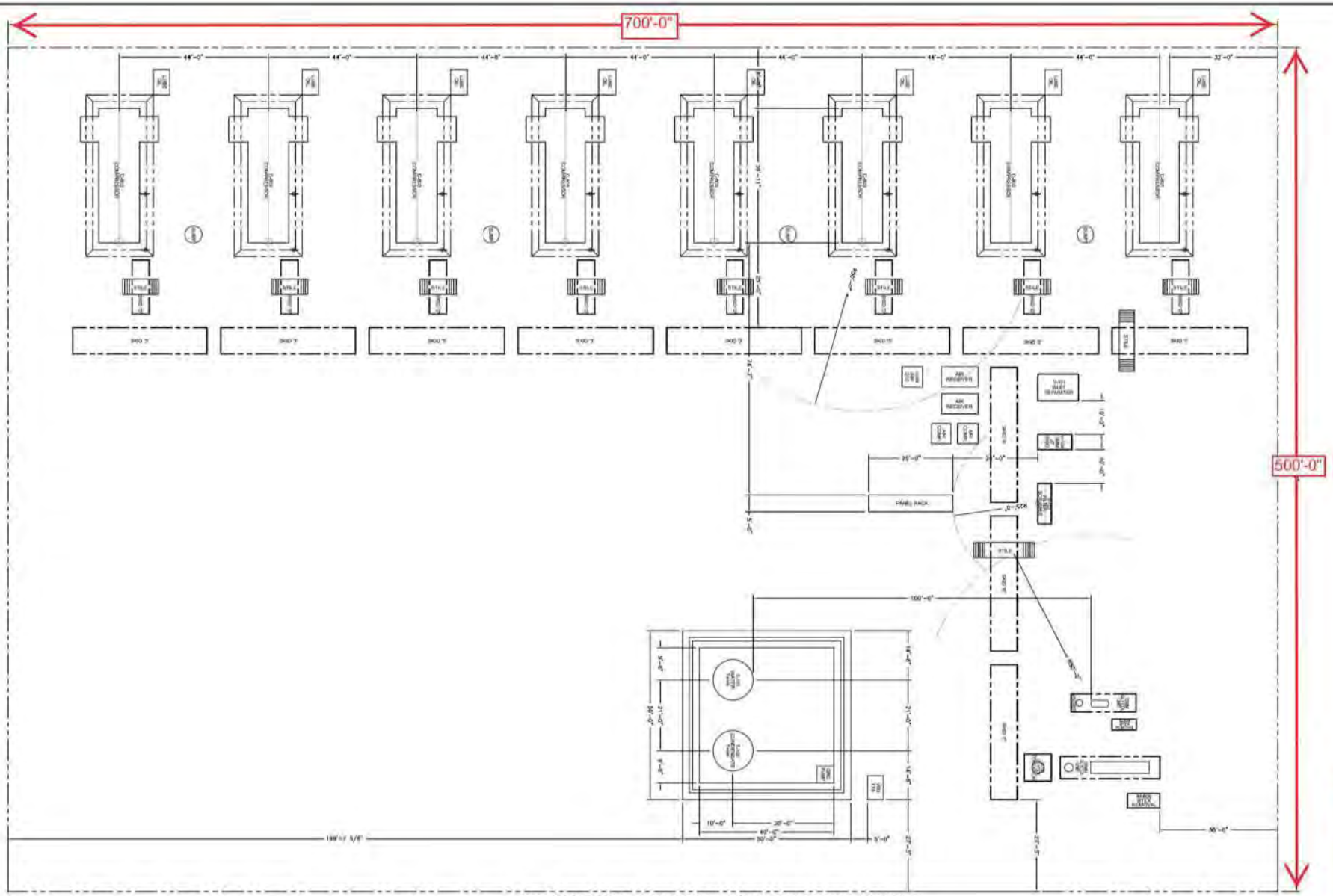
Generic Hayhurst Development Pad Layout - Phase 1





PLOT PLAN - 4 TRAIN / 8 TANK

EXHIBIT 4



COMPRESSOR STATION - 8 COMPRESSOR LAYOUT

SCALE: NONE

REVISIONS			
A ISSUED FOR REVIEW - JMDESIGN 07/14/15	EWM		

FOR REVIEW

Chevron U.S.A. Inc.

STANDARD COMPRESSOR GAS-LIFT STATION

PLOT PLAN - 8 COMPRESSOR LAYOUT

API _____ LEASE _____

COMPRESSOR_PLOTPLAN_8TOTAL

A

PLOT DATE: 07/14/2015 (1:215985)

COMPRESSOR PLOTPLAN 8TOTAL.dwg

FOR THE EXCLUSIVE USE OF
CHEVRON U.S.A. INC.
I, Robert L. Lastrapes, Registered Professional Land Surveyor, do hereby state this plat is true and correct to the best of my knowledge

ROBERT L. LASTRAPES
NEW MEXICO
23006
12-22-2015
PROFESSIONAL SURVEYOR

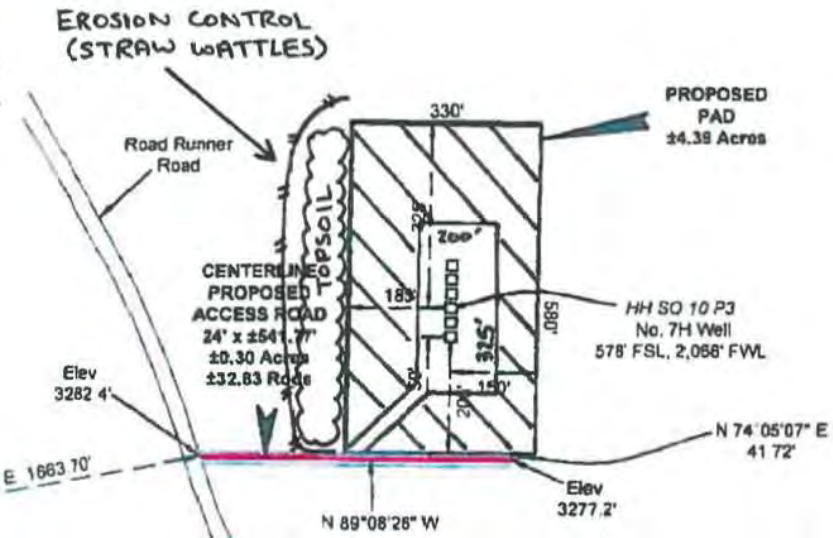
Robert L. Lastrapes
Registration No 23006

R 27 E

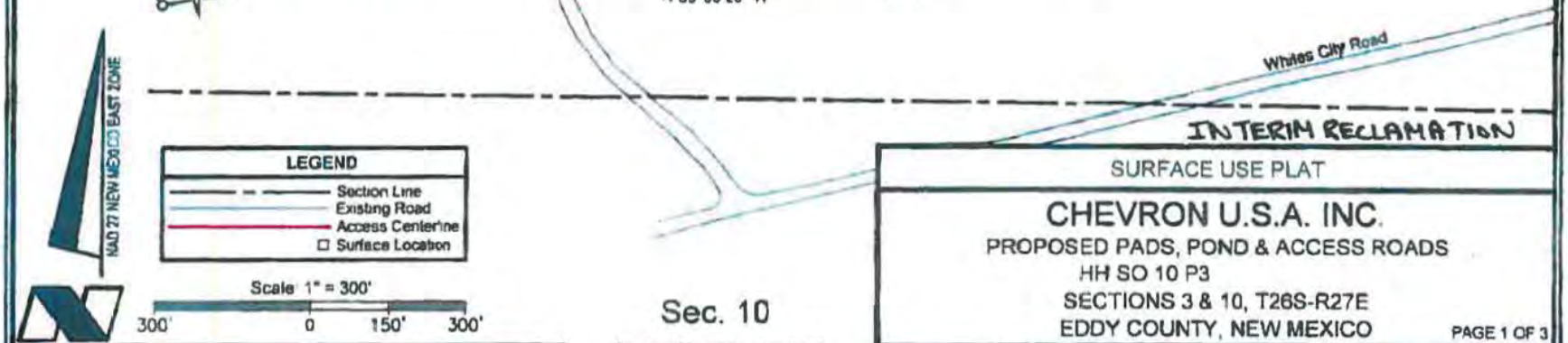
Sec. 3

Bureau of Land Management

NW PAD CORNER	NE PAD CORNER	HH SO 10 P3 NO. 7H WELL
X= 547,392 NAD 27	X= 547,722 NAD 27	X= 547,567 NAD 27
Y= 387,887	Y= 387,882	Y= 387,559
ELEVATION +3282' NAVD 88	ELEVATION +3279' NAVD 88	LAT 32.085422
SW PAD CORNER	SE PAD CORNER	LONG 104.179779
X= 547,383 NAD 27	X= 547,713 NAD 27	X= 588.75' NAD83
Y= 387,307	Y= 387,302	Y= 387,616
ELEVATION +3281' NAVD 88	ELEVATION +3276' NAVD 88	LAT 32.085544
		LONG 104.180272
		ELEVATION +3279' NAVD 88



T
26
S



INTERIM RECLAMATION

Sec. 10

Bureau of Land Management

SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED PADS, POND & ACCESS ROADS
HH SO 10 P3
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

PAGE 1 OF 3

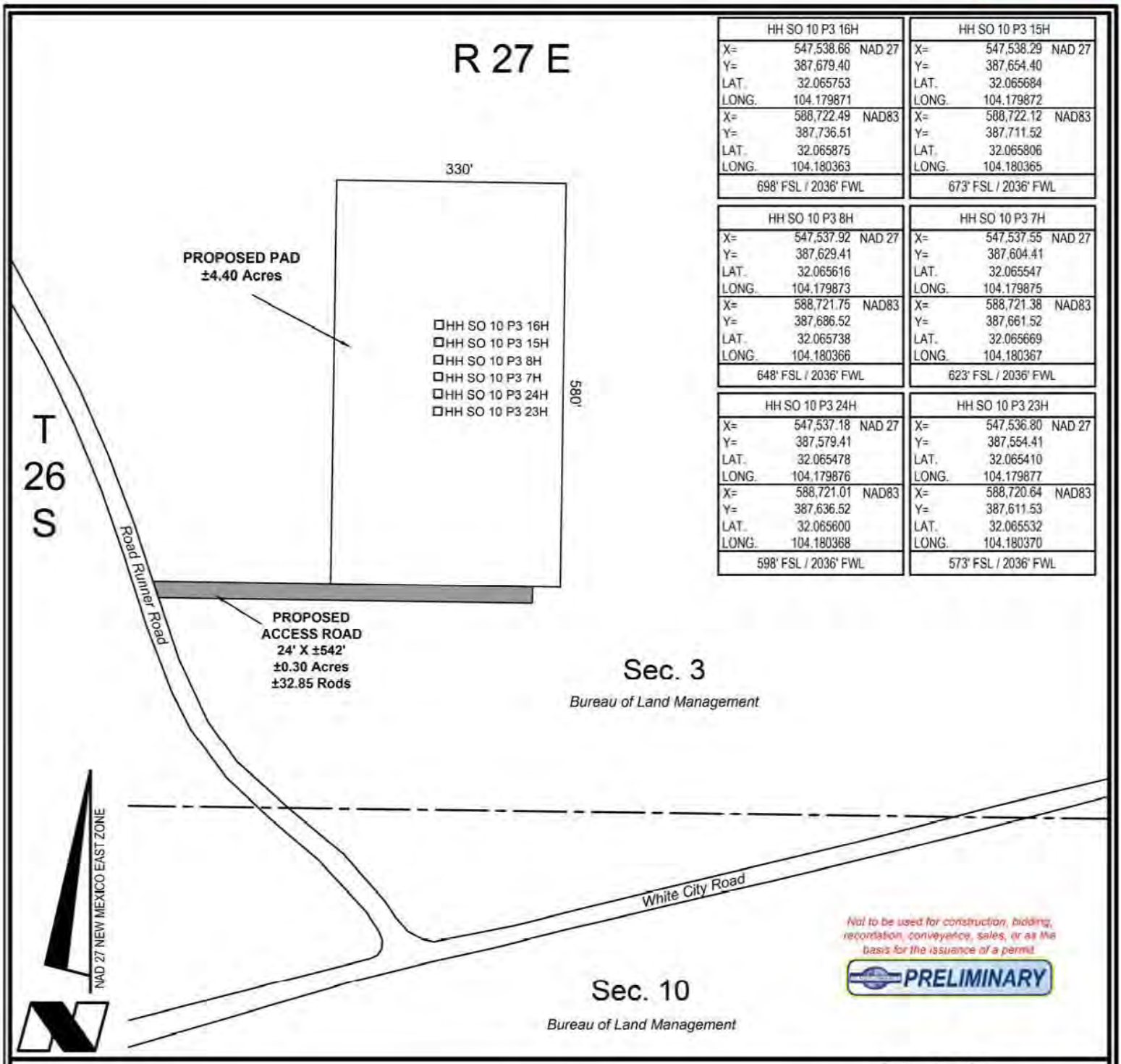
FENSTERMAKER

C H Fenstermaker & Associates L.L.C.
135 Regency Sq Lafayette LA 70508
Ph 337.237.2200 Fax 337.232.3299
www.fenstermaker.com

DRAWN BY: LJG	REVISIONS		
PROJ. MGR.: CDG	No.	DATE:	REVISED BY:
DATE 12/16/2015	No.	DATE:	REVISED BY

FILENAME: T:\2015\2153366\DWG\HH SO 10 P3 7H_SUP.dwg

EXHIBIT 4



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X=	547,538.66	NAD 27
Y=	387,679.40	
LAT.	32.065753	
LONG.	104.179871	
X=	588,722.49	NAD83
Y=	387,736.51	
LAT.	32.065875	
LONG.	104.180363	
698' FSL / 2036' FWL		

HH SO 10 P3 15H		
X=	547,538.29	NAD 27
Y=	387,654.40	
LAT.	32.065684	
LONG.	104.179872	
X=	588,722.12	NAD83
Y=	387,711.52	
LAT.	32.065806	
LONG.	104.180365	
673' FSL / 2036' FWL		

HH SO 10 P3 8H		
X=	547,537.92	NAD 27
Y=	387,629.41	
LAT.	32.065616	
LONG.	104.179873	
X=	588,721.75	NAD83
Y=	387,686.52	
LAT.	32.065738	
LONG.	104.180366	
648' FSL / 2036' FWL		

HH SO 10 P3 7H		
X=	547,537.55	NAD 27
Y=	387,604.41	
LAT.	32.065547	
LONG.	104.179875	
X=	588,721.38	NAD83
Y=	387,661.52	
LAT.	32.065669	
LONG.	104.180367	
623' FSL / 2036' FWL		

HH SO 10 P3 24H		
X=	547,537.18	NAD 27
Y=	387,579.41	
LAT.	32.065478	
LONG.	104.179876	
X=	588,721.01	NAD83
Y=	387,636.52	
LAT.	32.065600	
LONG.	104.180368	
598' FSL / 2036' FWL		

HH SO 10 P3 23H		
X=	547,536.80	NAD 27
Y=	387,554.41	
LAT.	32.065410	
LONG.	104.179877	
X=	588,720.64	NAD83
Y=	387,611.53	
LAT.	32.065532	
LONG.	104.180370	
573' FSL / 2036' FWL		

DETAIL

Scale: 1" = 200'

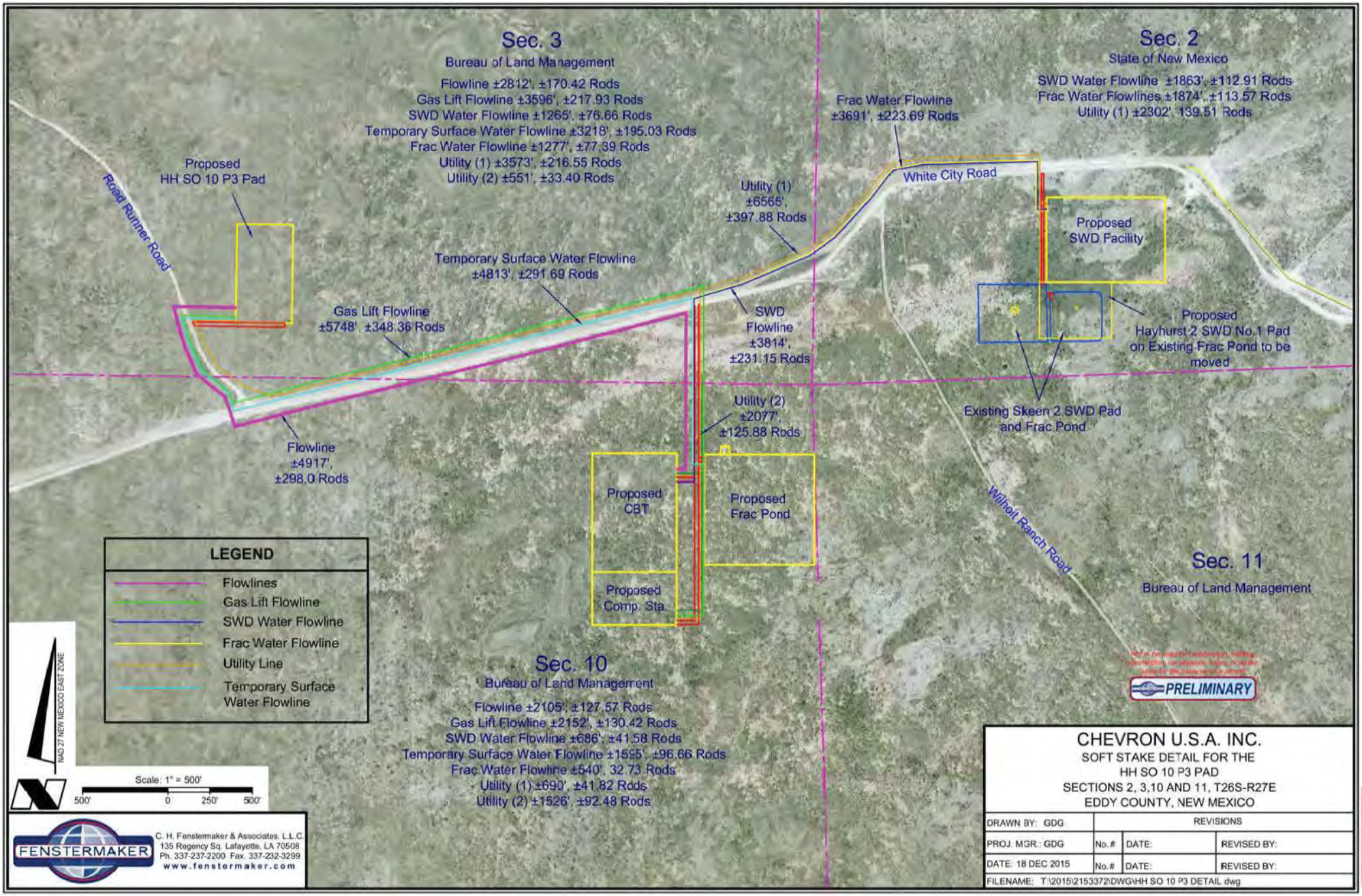
200' 0 100' 200'

CHEVRON U.S.A. INC.

PAD AND ACCESS DETAIL FOR THE
HH SO 10 P3 PAD
SECTION 3, T26S-R27E
EDDY COUNTY, NEW MEXICO

FENSTERMAKER
C. H. Fenstermaker & Associates, L.L.C.
135 Regency Sq. Lafayette, LA 70508
Ph. 337-237-2200 Fax. 337-232-3299
www.fenstermaker.com

DRAWN BY: GDG	REVISIONS		
PROJ. MGR.: GDG	No.#	DATE:	REVISED BY:
DATE: 2 DEC 2015	No.#	DATE:	REVISED BY:
FILENAME: T:\2015\2153367\DWG\HH SO 10 P3 PAD DETAIL.dwg			


Sec. 3
Bureau of Land Management
Flowline ±2812', ±170.42 Rods
Gas Lift Flowline ±3596', ±217.93 Rods
SWD Water Flowline ±1265', ±76.66 Rods
Temporary Surface Water Flowline ±3218', ±195.03 Rods
Frac Water Flowline ±1277', ±77.39 Rods
Utility (1) ±3573', ±216.55 Rods
Utility (2) ±551', ±33.40 Rods
Sec. 2
State of New Mexico
SWD Water Flowline ±1863', ±112.91 Rods
Frac Water Flowlines ±1874', ±113.57 Rods
Utility (1) ±2302', 139.51 Rods
Frac Water Flowline ±3691', ±223.69 Rods
White City Road
Road Runner Road
Proposed HH SO 10 P3 Pad
Utility (1) ±6565', ±397.88 Rods
Proposed SWD Facility
Temporary Surface Water Flowline ±4813', ±291.69 Rods
Gas Lift Flowline ±5748', ±348.36 Rods
SWD Flowline ±3814', ±231.15 Rods
Proposed Hayhurst 2 SWD No.1 Pad on Existing Frac Pond to be moved
Utility (2) ±2077', ±125.88 Rods
Existing Skeen 2 SWD Pad and Frac Pond
Flowline ±4917', ±298.0 Rods
Proposed CBT
Proposed Frac Pond
Wilhoit Ranch Road
Sec. 11
Bureau of Land Management
Proposed Comp. Sta.
LEGEND
Flowlines
Gas Lift Flowline
SWD Water Flowline
Frac Water Flowline
Utility Line
Temporary Surface Water Flowline
NAD 27 NEW MEXICO EAST ZONE
Scale: 1" = 500'
500' 0 250' 500'
Sec. 10
Bureau of Land Management
Flowline ±2105', ±127.57 Rods
Gas Lift Flowline ±2152', ±130.42 Rods
SWD Water Flowline ±686', ±41.58 Rods
Temporary Surface Water Flowline ±1595', ±96.66 Rods
Frac Water Flowline ±540', 32.73 Rods
Utility (1) ±690', ±41.82 Rods
Utility (2) ±1526', ±92.48 Rods
PRELIMINARY
FENSTERMAKER
C. H. Fenstermaker & Associates, L.L.C.
135 Regency Sq. Lafayette, LA 70508
Ph. 337-237-2200 Fax. 337-232-3299
www.fenstermaker.com
CHEVRON U.S.A. INC.
SOFT STAKE DETAIL FOR THE
HH SO 10 P3 PAD
SECTIONS 2, 3,10 AND 11, T26S-R27E
EDDY COUNTY, NEW MEXICO
DRAWN BY: GDG
PROJ. MGR.: GDG
DATE: 18 DEC 2015
REVISIONS
No.# DATE: REVISED BY:
No.# DATE: REVISED BY:
FILENAME: T:\2015\2153372\DWG\HH SO 10 P3 DETAIL.dwg

EXHIBITS 4&5

CHEVRON U.S.A. Inc
HH SO 10 P3 16H
NMNM 121473
SECTION 3, T26S-R27E (Off Lease SHL) SECTION 15, T26S, R27E
SHL 653' FSL & 2066' FWL BHL 180' FSL & 2315' FWL

APD Surface Use Plan of Operations

This Surface Use Plan of Operations has been designed to be reviewed in conjunction with Hayhurst Development Area (HDA) Master Development Plan

HDA Master Development Plan Reference Table
The contents referenced below apply to all HDA APD's

Existing Roads	Exhibit 1, MDP SUPO Page 1
Construction Materials	MDP SUPO Page 6
Methods for Handling Waste	MDP SUPO Page 6
Reclamation Objectives	MDP SUPO Page 6-8
Final Surface Reclamation	MDP SUPO Page 6-8

Driving Directions

- Driving Directions – From Malaga, New Mexico. The location is approximately 11.5 miles from the nearest town, which is Malaga, New Mexico. From Malaga, proceed South on Highway 285 approximately 11.5 miles and turn right (West) onto White City Rd and go approximately 6.8 miles on White City Road until the road reaches an intersection with Roadrunner Rd. Turn right onto this and travel 100 yards, then the access road and well location is on the right.

New or Reconstructed Access Roads – (Exhibit 2, MDP SUPO Pg. 1)

- There will be 2,758' of new road construction for this proposal.
- Ditches: See Exhibit 2 (To be submitted at later date)
- Culverts: See Exhibit 2 (To be submitted at later date)
- Road Cuts: See Exhibit 2 (To be submitted at later date)

Location of Existing Wells (Exhibit 3)

- 1-Mile radius map is attached

Location of Existing and/or Proposed Production Facilities (Exhibit 4, MDP SUP Pg. 2)

- Facilities: Proposed production facilities located in the NE corner of Sec. 10, T26S-R27E where oil and gas sales will take place.
  - The proposed facility and frac pond is in Sec. 10, T26S-R27E
  - Gas purchaser pipeline is in place at the tank battery.
  - Open top tanks or open containments will be netted.
  - Open vent exhaust stacks will be modified to prevent birds or bats from entering, discourage perching, roosting, and nesting.
  - Facilities will have a secondary containment 1.5 times the holding capacity of largest storage tank.
  - All above ground structures will be painted non-reflective shale green for blending with surrounding environment.
  - The permanent water disposal system will be determined prior to construction of any water transfer pipeline. Until permanent water takeaway is available, produced water will be hauled off location in trucks. **Notification will be provided to BLM upon site selection and survey – plats (including SWD well information) will be provided.**
- Pipelines: See Detail – Exhibit 5
  - Pipelines Include:
    - 4,917' of Flowlines carrying production (buried)
    - 5,748' Gas Lift Line carrying pressurized gas (buried)
    - 3,814' SWD Line carrying produced water (buried)
    - 3,691' Permanent Frac water line carrying fresh water (buried)
    - 4,813' Temporary Water line carrying fresh water (surface)
  - A ROW will be applied for through the State and BLM.
  - All construction activity will be confined to the approved ROW.
  - Pipeline will run parallel to the road and will stay within approved ROW.
- Power lines\Utility lines: 8,642' of new power lines

Location and Types of Water Supply (Exhibit 5, MDP SUPO Pg. 5)

- Proposed pond in Section 10, T26S-R27E will be utilized for fresh water.
- Fresh water will be obtained from a private water source.

Construction Materials (MDP SUPO Pg. 6)

- Location-specific caliche sources will be provided in post-application supplement

CHEVRON U.S.A. Inc
HH SO 10 P3 16H
NMNM 121473
SECTION 3, T26S-R27E (Off Lease SHL) SECTION 15, T26S, R27E
SHL 653' FSL & 2066' FWL BHL 180' FSL & 2315' FWL

Well Site Layout (Exhibit 6)

- Surveyor Plat (Exhibit 6a)
  - Exterior well pad dimensions are 580' x 330'
  - Interior well pad dimensions from point of entry (well head) of the well are N-250', S-330', E-150', W-180'. Total disturbance area needed for construction of well pad will be approximately 4.4 acres
  - Topsoil placement is on the west where interim reclamation is planned to be completed upon completion of well and evaluation of best management practices.
  - Cut and fill: will be minimal.
- Rig Layout (Exhibit 6b)

Plans for Surface Reclamation (Exhibit 6, MDP SUPA Pg. 8)

Interim Reclamation Procedures

- Reclaimed pad size: 200' x 325'
- See Exhibit for reclaimed pad layout, topsoil location & erosion control features

Surface Ownership

- BLM Surface
  - Surface Tenant – Phillip Stell
- **Nearest Post Office:** Malaga Post Office; 11.4 Miles north

Other Information

- On-site performed by BLM NRS: Paul Murphy 11/4/2015
- Cultural report attached: **Yes** Participating Agreement attached: N/A

CHEVRON U.S.A. Inc
HH SO 10 P3 16H
NMNM 121473
SECTION 3, T26S-R27E (Off Lease SHL) SECTION 15, T26S, R27E
SHL 653' FSL & 2066' FWL BHL 180' FSL & 2315' FWL

Chevron Representatives

Primary point of contact:
Jennifer Van Curen
Jennifer.VanCuren@arcadis-us.com
M- 432-270-8753

Chevron Functional Contacts

Project Manager Name: Sean Cheben Address: 1400 Smith Street Houston, TX 77002 Phone: (432) 664-6809 Email: Sean.Cheben@chevron.com	**Drilling Engineer** Name: Roderick Milligan Address: 1400 Smith Street Houston, TX 77002 Phone: (281) 413-9794 Email: RoderickMilligan@chevron.com
Surface Land Representative Name: Kevin Dickerson Address: 15 Smith Road Midland Texas 79705 Phone: (432) 687-7104 Email: Kevin.Dickerson@chevron.com	**Facility Lead** Name: Tyler Weaver Address: 1400 Smith Street Houston, TX 77002 Phone: (281) 384-8934 Email: tyler.weaver@chevron.com
Geologist Name: Jeff Fabre Address: 1400 Smith Street Houston, TX 77002 Phone: (713) 372-0523 Email: JeffreyFabre@chevron.com	**Regulatory Specialist** Cindy Herrera-Murillo Address: 1616 W. Bender Blvd, Hobbs, NM 88240 Office: (575) 263-0431 Email: CHerreraMurillo@chevron.com

CHEVRON U.S.A. Inc
HH SO 10 P3 16H
NMNM 121473
SECTION 3, T26S-R27E (Off Lease SHL) SECTION 15, T26S, R27E
SHL 653' FSL & 2066' FWL BHL 180' FSL & 2315' FWL

EXHIBITS:

Exhibit 1 -- Existing Roads

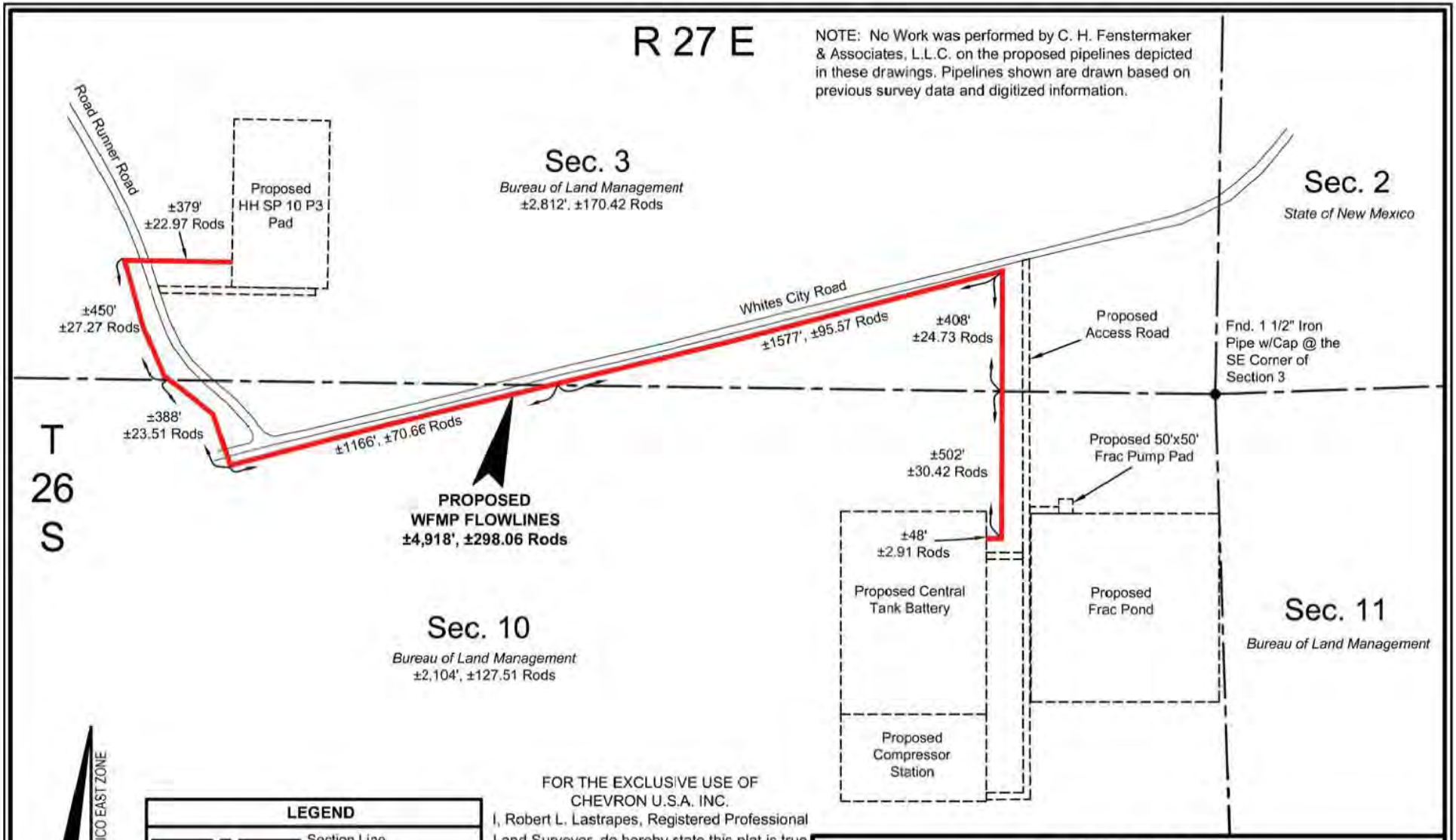
Exhibit 2 -- Survey Plat: New or Reconstructed Roads Map: if road is outside 600' x 600'.

Exhibit 3 -- 1-mile Radius Map

Exhibit 4 -- Location of Existing and/or Proposed Production Facilities (Tank Battery)

Exhibit 5 -- Survey Plat: Infrastructure: roads, pipelines, power lines, frac pond

Exhibit 6 -- Rig Layout: Well Site Layout Map / Diagram



FOR THE EXCLUSIVE USE OF CHEVRON U.S.A. INC.
I, Robert L. Lastrapes, Registered Professional Land Surveyor, do hereby state this plat is true and correct to the best of my knowledge.

SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED WFMP FLOWLINES
HH SO 10 P3 NO. 16H WELL
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

FENSTERMAKER
C. H. Fenstermaker & Associates, L.L.C.
135 Regency Sq. Lafayette, LA 70508
Ph. 337-237-2200 Fax. 337-232-3299
www.fenstermaker.com

Not to be used for construction, bidding, recordation, conveyance, sales, or as the basis for the issuance of a permit.

PRELIMINARY

Robert L. Lastrapes
Registration No. 23006

DRAWN BY: BOR	REVISIONS		
PROJ. MGR.: GDG	No.	DATE:	REVISED BY:
DATE: 02/08/2016	No.	DATE:	REVISED BY:
FILENAME: T:\2015\2153372\DWG\WFMP Flowlines_SUP.dwg			

EXHIBIT 5

DISCLAIMER: At this time, C.H. Fenstermaker & Associates, L.L.C. has not performed nor was asked to perform any type of engineering, hydrological modeling, flood plain, or "No Rise" certification analyses, including but not limited to determining whether the project will impact flood hazards in connection with federal/FEMA, state, and/or local laws, ordinances and regulations. Accordingly, Fenstermaker makes no warranty or representation of any kind as to the foregoing issues, and persons or entities using this information shall do so at their own risk.

NOTE:

1. Please be advised, that while reasonable efforts are made to locate and verify pipelines and anomalies using our standard pipeline locating equipment, it is impossible to be 100 % effective. As such, we advise using caution when performing work as there is a possibility that pipelines and other hazards, such as fiber optic cables, PVC pipelines, etc. may exist undetected on site.

2. Many states maintain information centers that establish links between those who dig (excavators) and those who own and operate underground facilities (operators). It is advisable and in most states, law, for the contractor to contact the center for assistance in locating and marking underground utilities. For guidance, New Mexico One Call, www.nmonecall.org

3. No Work was performed by C. H. Fenstermaker & Associates, L.L.C. on the proposed pipelines depicted in these drawings. Pipelines shown are drawn based on previous survey data and digitized information.

FOR THE EXCLUSIVE USE OF
CHEVRON U.S.A. INC.
I, Robert L. Lastrapes, Registered Professional Land Surveyor, do hereby state this plat is true and correct to the best of my knowledge.

Not to be used for construction, bidding, recordation, conveyance, sales, or as the basis for the issuance of a permit.

PRELIMINARY

Robert L. Lastrapes
Registration No. 23006

FENSTERMAKER
C. H. Fenstermaker & Associates, L.L.C.
135 Regency Sq. Lafayette, LA 70508
Ph. 337-237-2200 Fax. 337-232-3299
www.fenstermaker.com

SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED WFMP FLOWLINES
HH SO 10 P3 NO. 16H WELL
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

DRAWN BY: BOR	REVISIONS			
PROJ. MGR.: GDG	No.	DATE:	REVISED BY:	
DATE: 02/08/2016	No.	DATE:	REVISED BY:	
FILENAME: T:\2015\2153372\DWG\Gas Lift Flowline_SUP.dwg				

R 27 E

NOTE: No Work was performed by C. H. Fenstermaker & Associates, L.L.C. on the proposed pipelines depicted in these drawings. Pipelines shown are drawn based on previous survey data and digitized information.

Road Runner Road

Proposed HH SP 10 P3 Pad

±321' ±19.45 Rods

±411' ±24.92 Rods

±209' ±12.57 Rods

±575' ±34.85 Rods

Sec. 3
Bureau of Land Management
±3,596', ±217.94 Rods

±2285', ±138.48 Rods

Whites City Road

PROPOSED GAS LIFT FLOWLINE ±6,175', ±374.24 Rods

Sec. 2
State of New Mexico

±579' ±35.09 Rods

Fnd. 1 1/2" Iron Pipe w/Cap @ the SE Corner of Section 3

T 26 S

Proposed Access Road

Proposed 50'x50' Frac Pump Pad

Proposed Central Tank Battery

±1637', ±99.21 Rods

Proposed Frac Pond

Sec. 11
Bureau of Land Management

Sec. 10
Bureau of Land Management
±2,579', ±156.30 Rods

Proposed Compressor Station

±158', ±9.57 Rods

NAD 27 NEW MEXICO EAST ZONE

LEGEND

- Section Line
- Existing Road
- Proposed Gas Lift Flowline
- Proposed Access Road, Frac Pump, Tank Battery, Compressor Station & Pad

Scale: 1" = 500'

500' 0 250' 500'

FOR THE EXCLUSIVE USE OF CHEVRON U.S.A. INC.
I, Robert L. Lastrapes, Registered Professional Land Surveyor, do hereby state this plat is true and correct to the best of my knowledge.

Not to be used for construction, bidding, recordation, conveyance, sales, or as the basis for the issuance of a permit.

PRELIMINARY

Robert L. Lastrapes
Registration No. 23006

FENSTERMAKER
C. H. Fenstermaker & Associates, L.L.C.
135 Regency Sq. Lafayette, LA 70508
Ph. 337-237-2200 Fax. 337-232-3299
www.fenstermaker.com

SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED GAS LIFT FLOWLINE
HH SO 10 P3 NO. 16H WELL
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

DRAWN BY: BOR	REVISIONS			
PROJ. MGR.: GDG	No.	DATE:	REVISED BY:	
DATE: 02/08/2016	No.	DATE:	REVISED BY:	
FILENAME: T:\2015\2153372\DWG\Gas Lift Flowline_SUP.dwg				

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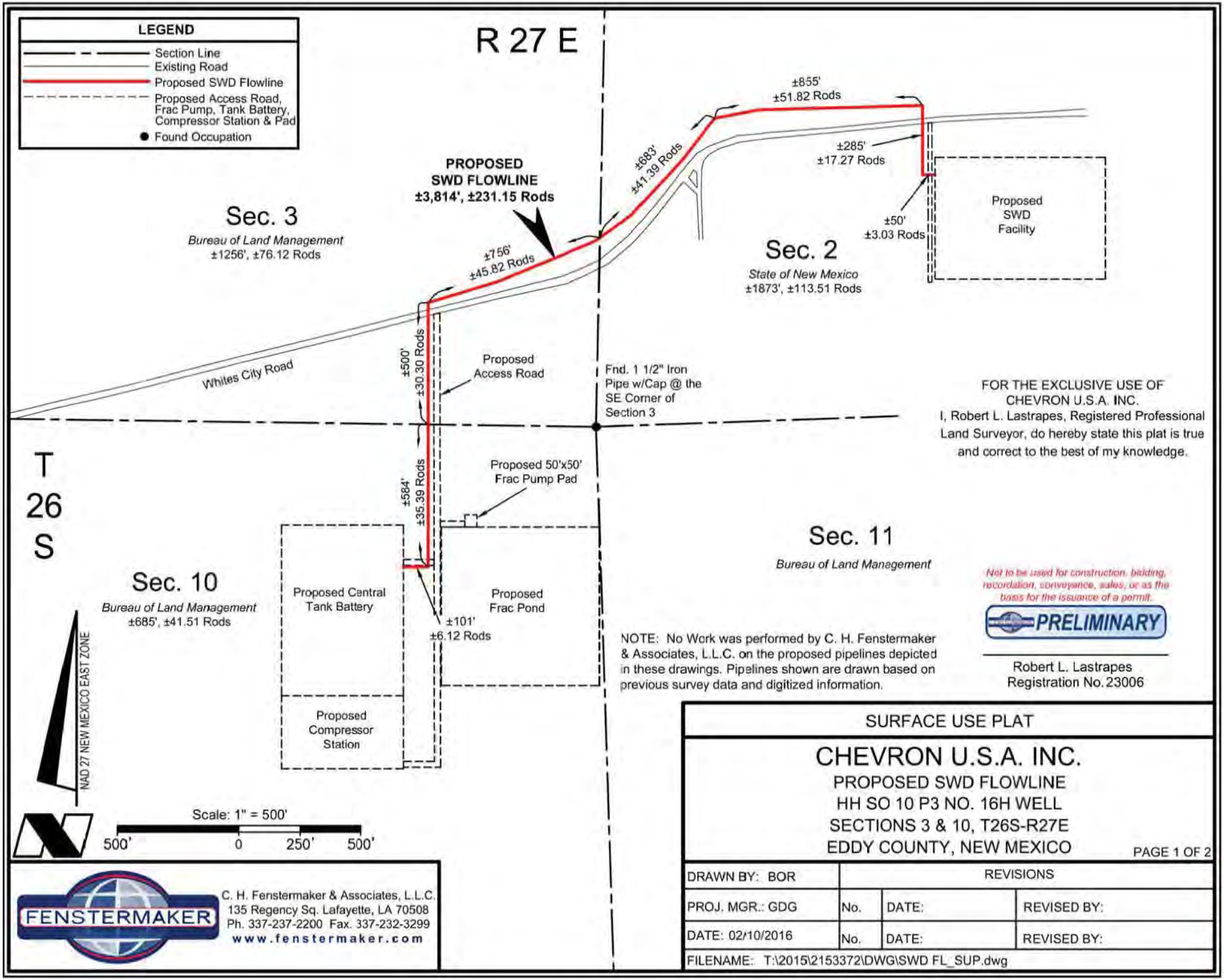
LEGEND
Section Line
Existing Road
Proposed SWD Flowline
Proposed Access Road, Frac Pump, Tank Battery, Compressor Station & Pad
Found Occupation
R 27 E
T 26 S
PROPOSED SWD FLOWLINE ±3,814', ±231.15 Rods
Sec. 3
Bureau of Land Management
±1256', ±76.12 Rods
±756' ±45.82 Rods
±683' ±41.39 Rods
±855' ±51.82 Rods
±285' ±17.27 Rods
±50' ±3.03 Rods
Proposed SWD Facility
Sec. 2
State of New Mexico
±1873', ±113.51 Rods
Whites City Road
±500' ±30.30 Rods
Proposed Access Road
Fnd. 1 1/2" Iron Pipe w/Cap @ the SE Corner of Section 3
Proposed 50'x50' Frac Pump Pad
±584' ±35.39 Rods
Sec. 11
Bureau of Land Management
Sec. 10
Bureau of Land Management
±685', ±41.51 Rods
Proposed Central Tank Battery
Proposed Frac Pond
±101' ±6.12 Rods
Proposed Compressor Station
NAD 27 NEW MEXICO EAST ZONE
Scale: 1" = 500'
500' 0 250' 500'
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SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO
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PROJ. MGR.: GDG
DATE: 02/10/2016
REVISIONS
No. DATE: REVISED BY:
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FILENAME: T:\2015\2153372\DWG\SWD FL_SUP.dwg
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SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

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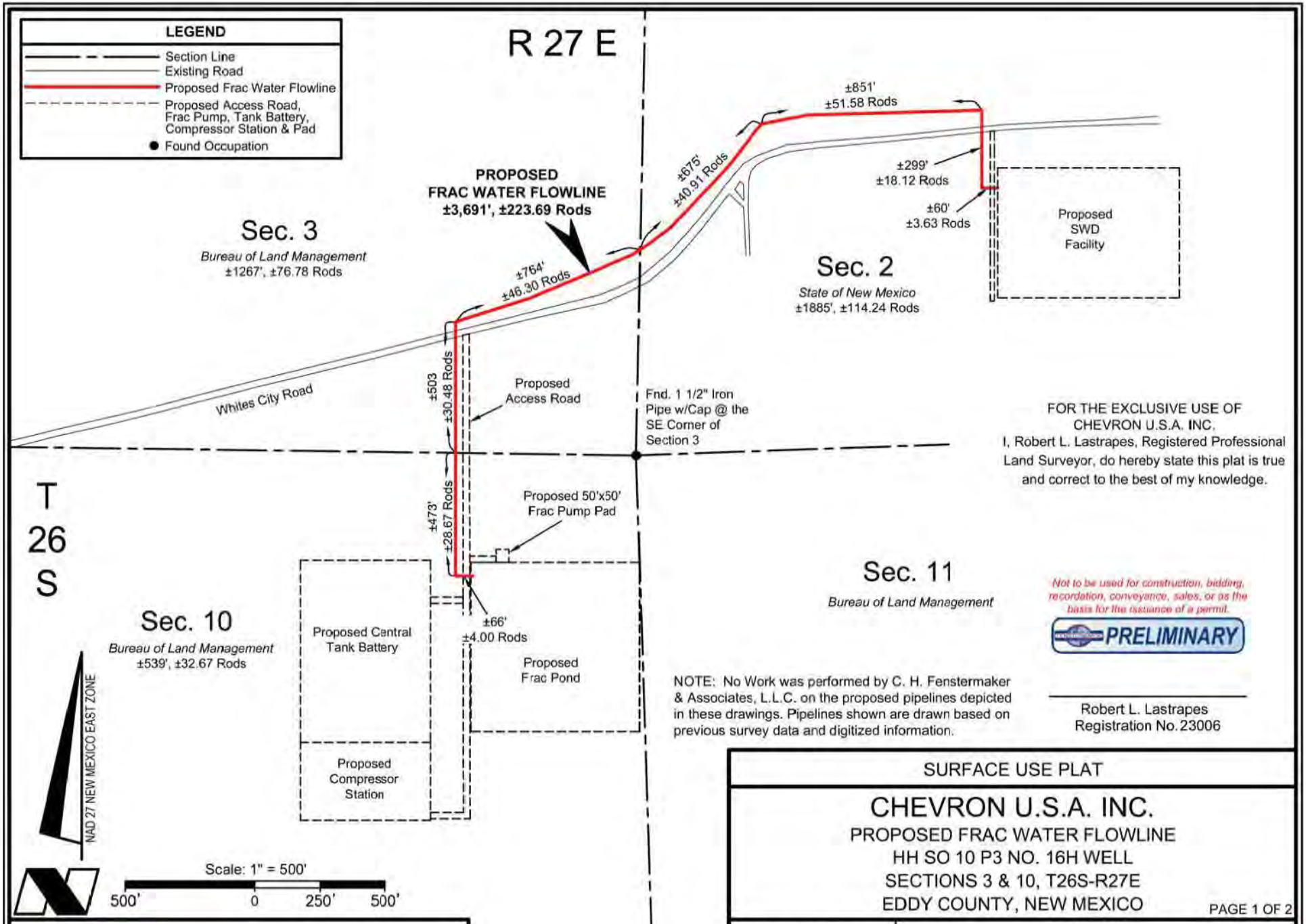

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SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED FRAC WATER FLOWLINE
HH SO 10 P3 NO. 16H WELL
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

PAGE 1 OF 2

DRAWN BY: BOR	REVISIONS		
PROJ. MGR.: GDG	No.	DATE:	REVISED BY:
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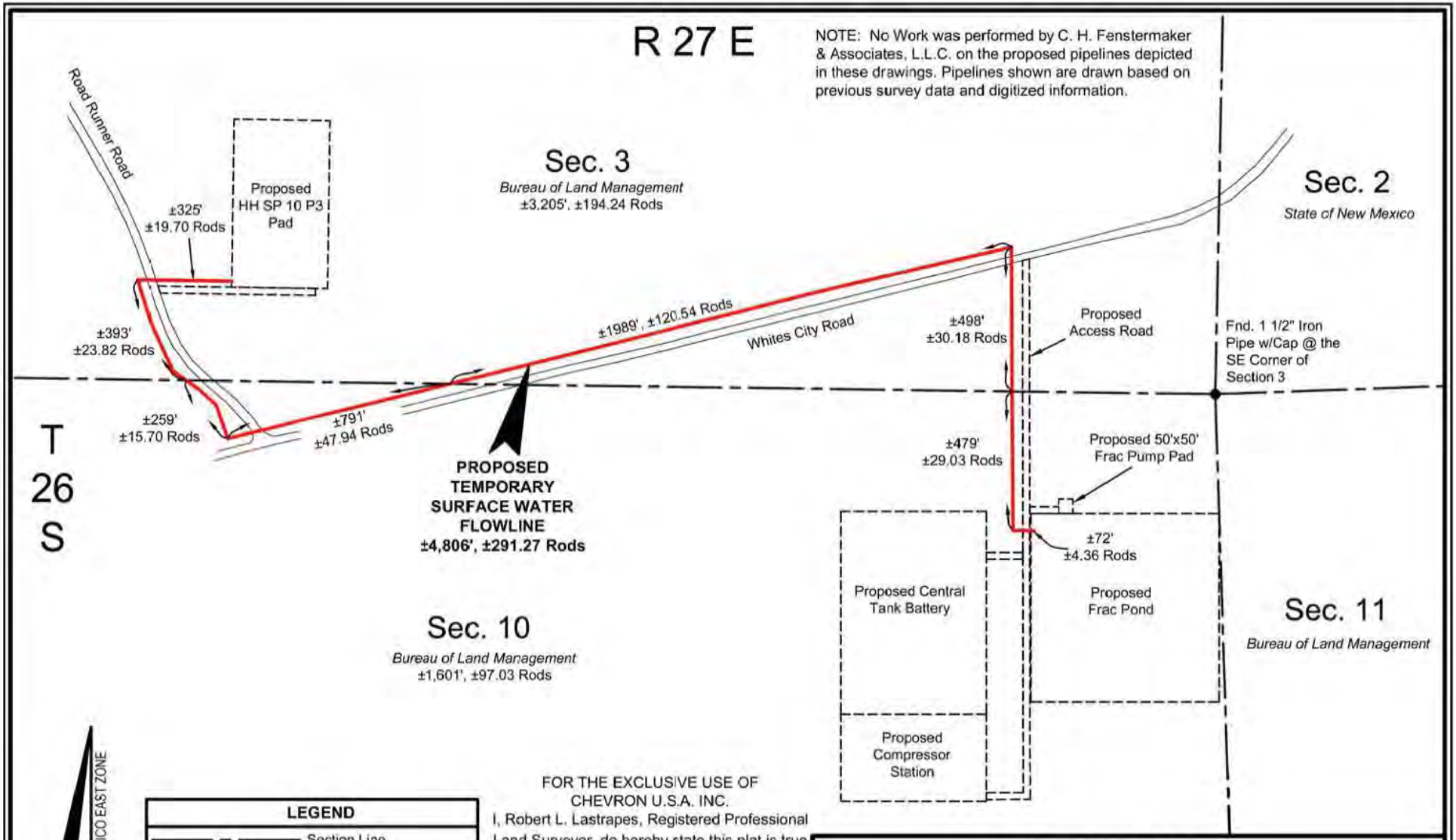

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SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

PAGE 1 OF 2

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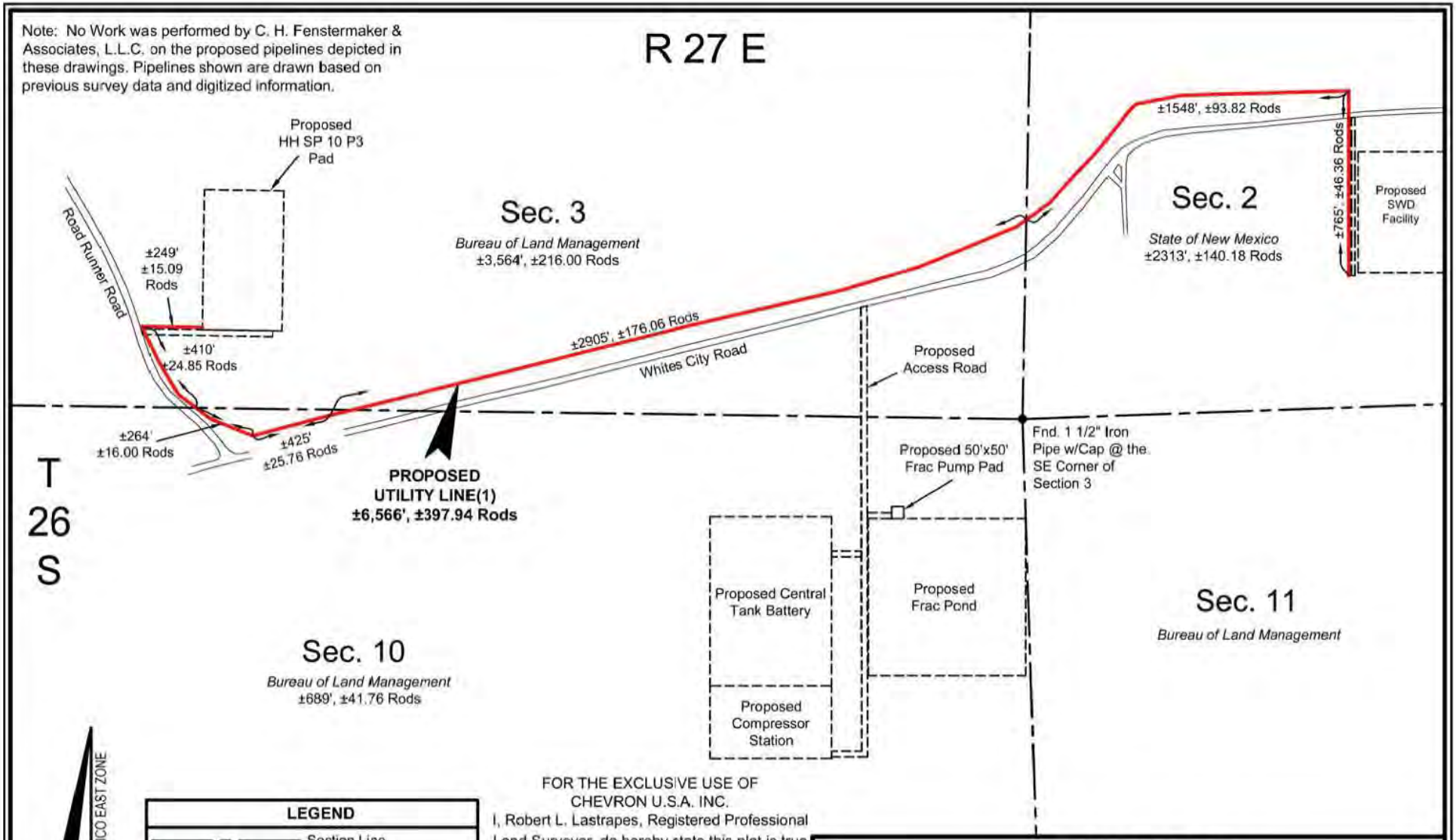

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SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

PAGE 1 OF 2

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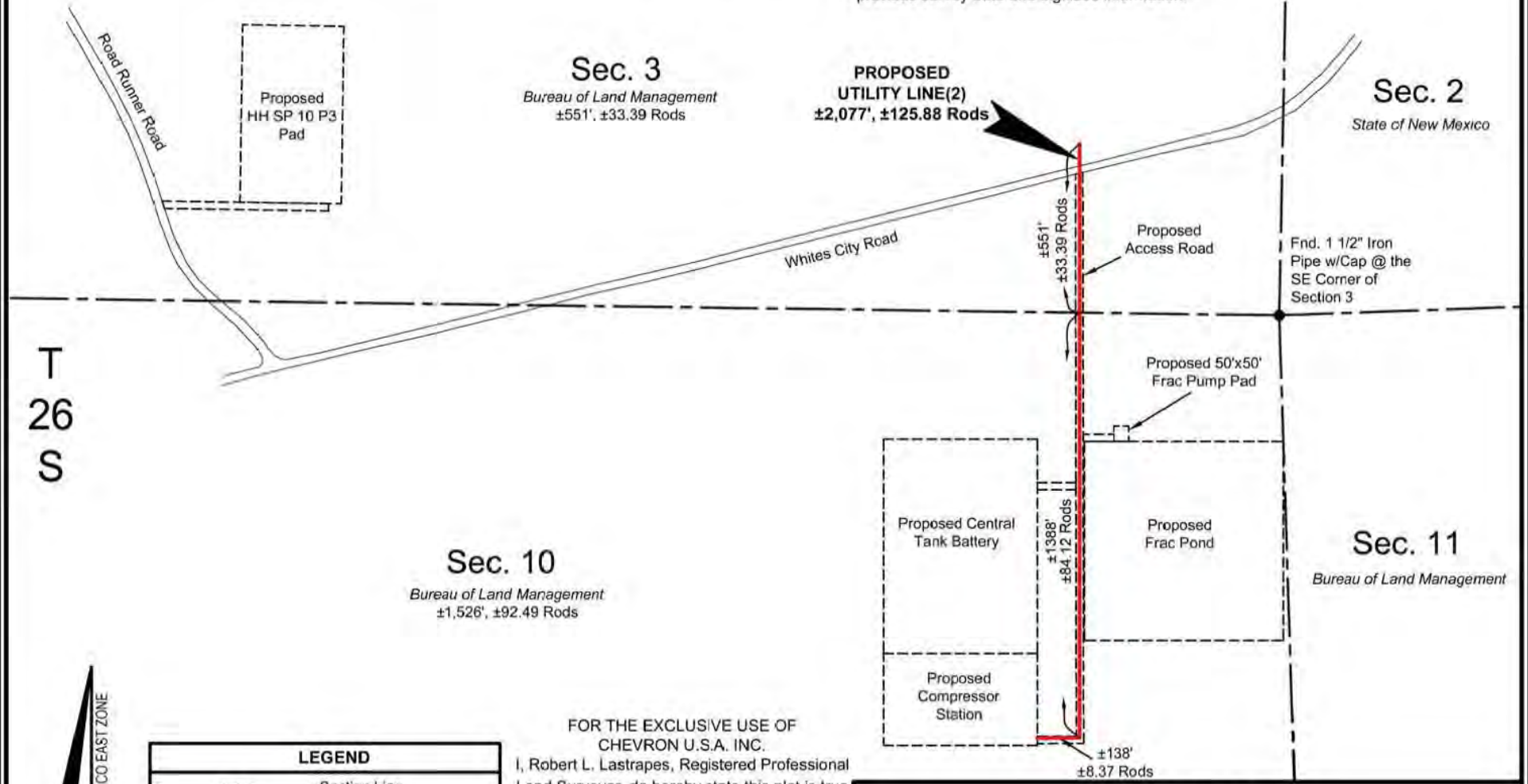

NAD 27 NEW MEXICO EAST ZONE

LEGEND

- Section Line
- Existing Road
- Proposed Utility Line(2)
- Proposed Access Road, Frac Pump, Tank Battery, Compressor Station & Pad

Scale: 1" = 500'

500' 0 250' 500'

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EDDY COUNTY, NEW MEXICO

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Form 3160-3
(June 2015)

FORM APPROVED
OMB No. 1004-0137
Expires: January 31, 2018

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

5. Lease Serial No.
NMNM121473

6. If Indian, Allotee or Tribe Name

1a. Type of work: ☑ DRILL ☐ REENTER

1b. Type of Well: ☑ Oil Well ☐ Gas Well ☐ Other

1c. Type of Completion: ☐ Hydraulic Fracturing ☑ Single Zone ☐ Multiple Zone

7. If Unit or CA Agreement, Name and No.

8. Lease Name and Well No.
HH SO 10 P3

2. Name of Operator
CHEVRON USA INC

9. API Well No.
23H

3a. Address
1616 W. BENDER BLVD HOBBS, NM 88240

3b. Phone No. *(include area code)*
575-263-0431

10. Field and Pool, or Exploratory
WILDCAT; WOLFCAMP

4. Location of Well *(Report location clearly and in accordance with any State requirements.*)*
At surface 528' FSL & 2066' FWL
At proposed prod. zone 180' FSL & 1652" FWL

11. Sec., T. R. M. or Blk. and Survey or Area
SEC 3, T26S, R27E, UL N (SHL)

14. Distance in miles and direction from nearest town or post office*
12.8 MILES FROM MALAGA, NEW MEXICO

12. County or Parish
EDDY

13. State
NM

15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drlg. unit line, if any) 528' FSL

16. No of acres in lease
1920 ACRES

17. Spacing Unit dedicated to this well
320 ACRES

18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft. 4300 FT SKEEN 2 SW

19. Proposed Depth
TD 9,176' MD 19,818"

20. BLM/BIA Bond No. in file
CA 0329

21. Elevations (Show whether DF, KDB, RT, GL, etc.)
3278' GL

22. Approximate date work will start*
OCTOBER 2016

23. Estimated duration
30 DAYS

24. Attachments

The following, completed in accordance with the requirements of Onshore Oil and Gas Order No. 1, and the Hydraulic Fracturing rule per 43 CFR 3162.3-3 (as applicable)

1. Well plat certified by a registered surveyor.
2. A Drilling Plan.
3. A Surface Use Plan (if the location is on National Forest System Lands, the SUPO must be filed with the appropriate Forest Service Office).
4. Bond to cover the operations unless covered by an existing bond on file (see Item 20 above).
5. Operator certification.
6. Such other site specific information and/or plans as may be requested by the BLM.

25. Signature: Cindy Herrera-Murillo

Name *(Printed/Typed)*
CINDY HERRERA-MURILLO

Date
02/11/2016

Title
PERMITTING SPECIALIST

Approved by *(Signature)*

Name *(Printed/Typed)*

Date

Title

Office

Application approval does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.
Conditions of approval, if any, are attached.

Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212, make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

(Continued on page 2)

*(Instructions on page 2)

CERTIFICATION

I hereby certify that I, or someone under my direct supervision, have inspected the drill site and access route proposed herein; that I am familiar with the conditions which currently exist; that I have full knowledge of state and federal laws applicable to this operation; that the statements made in this APD package are, to the best of my knowledge, true and correct; and, that the work associated with the operations proposed will be performed in conformity with this APD package and the terms and conditions under which it is approved. I also certify that I, or the company I represent, am responsible for the operations conducted under this application. These statements are subject to the provisions of 18 U.S.C. 1001 for the filing of a false statement.

Executed this 19th day of JANUARY, 2016

Name: _____

Sean Cheben-Project Manager

Address: 1400 Smith Street

Houston, TX 77002

Room 40125

Office: 713-372-9382

Email: Sean.Cheben@CHEVRON.COM

Cindy Herrera-Murillo
Permitting Specialist
Midcontinent BU

Chevron North America
Exploration and Production Company
(A Chevron U.S.A. Inc. Division)
1616 W. Bender Blvd
Hobbs FMT, Hobbs, NM 88240
Tel 575-263-0431
Cherreramurillo@chevron.com

February 10, 2016

BLM-Carlsbad Field Office
620 E. Greene Street
Carlsbad, New Mexico 88220

Re: Applications to Drill
For Hayhurst Development Area in NM
MDP- 2016-1

Dear Sirs,

Chevron U.S.A. Inc. respectfully submits 12 Applications to Drill (APD's) with the Hayhurst Development Area's Master Development Plan (MDP-2016-1).

There will be 2 pads and 6 wells on each pad. The first well pad includes the following APD's:

HH SO 10 P3 #7H; HH SO 10 P3 #8H; HH SO 10 P3 #15H; HH SO 10 P3 #16H; HH SO 10 P3 #23H; HH SO 10 P3 #24H.

The second well pad includes the following APD's:

HH SO 8 P2 #5H; HH SO 8 P2 #6H; HH SO 8 P2 #13H; HH SO 8 P2 # 14H; HH SO 8 P2 #21H; HH SO 8 P2 #22H.

Your prompt consideration and approval of these applications will be greatly appreciated. If additional information is required, you may contact me at 575-263-0431, or by email at Cherreramurillo@chevron.com.

Sincerely,

Cindy Herrera-Murillo

Cindy Herrera-Murillo
Permitting Specialist
Enclosures

District I
1625 N French Dr., Hobbs, NM 88240
Phone: (575) 393-6161 Fax: (575) 393-0720
District II
811 S First St., Artesia, NM 88210
Phone: (575) 748-1283 Fax: (575) 748-9720
District III
1000 Rio Brazos Road, Aztec, NM 87410
Phone: (505) 334-6178 Fax: (505) 334-6170
District IV
1220 S St Francis Dr., Santa Fe, NM 87505
Phone: (505) 476-3460 Fax: (505) 476-3462

State of New Mexico
Energy, Minerals & Natural Resources Department
OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-102
Revised August 1, 2011
Submit one copy to appropriate District Office

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

[1] API Number	[2] Pool Code	[3] Pool Name
		Wildcat;Wolfcamp

[4] Property Code	[5] Property Name	[6] Well Number
	HH SO 10 P3	23H

[7] OGRID No.	[8] Operator Name	[9] Elevation
4323	CHEVRON U.S.A. INC.	3278'

[10] Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
N	3	26 SOUTH	27 EAST, N.M.P.M.		528'	SOUTH	2066'	WEST	EDDY

[11] Bottom Hole Location If Different From Surface

UL or lot no	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
N	15	26 SOUTH	27 EAST, N.M.P.M.		180'	SOUTH	1652'	WEST	EDDY

[12] Dedicated Acres	[13] Joint or Infill	[14] Consolidation Code	[15] Order No.
320			

No allowable will be assigned to this completion until all interests have been consolidated or a non-standard unit has been approved by the division.

[16]

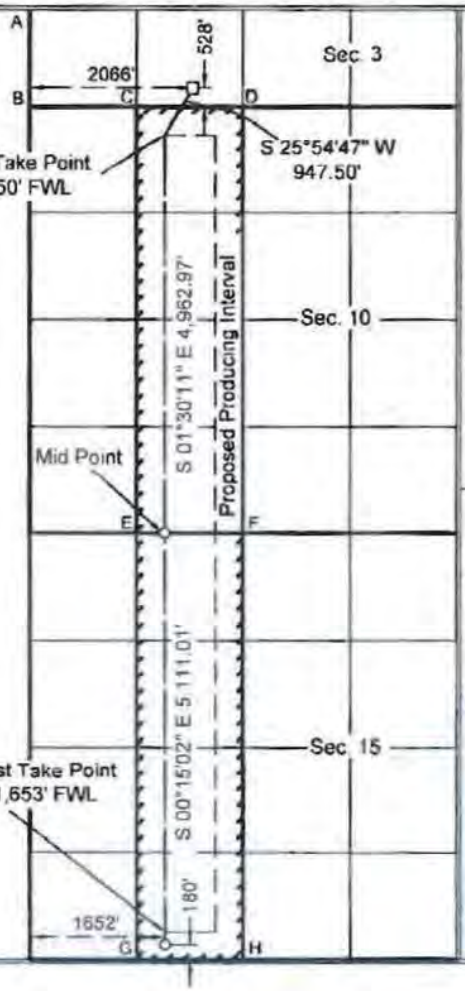
HH SO 10 P3 23H WELL		
X=	547,566	NAD 27
Y=	387,509	
LAT	32.065285	
LONG	104.179782	
X=	588,750	NAD83
Y=	387,566	
LAT.	32.065407	
LONG	104.180275	
ELEVATION +3278' NAVD 88		

CORNER COORDINATES TABLE (NAD 27)

A - Y=392447.75, X=545573.63
B - Y=387009.20, X=545492.91
C - Y=386991.36, X=546813.37
D - Y=386973.51, X=548133.83
E - Y=381698.68, X=546952.45
F - Y=381685.77, X=548282.84
G - Y=376406.42, X=546975.58
H - Y=376398.76, X=548297.64

Mid Point
Y=381695.48, X=547282.47

PROPOSED BOTTOM HOLE LOCATION		
X=	547,305	NAD 27
Y=	376,585	
LAT	32.035254	
LONG	104.180676	
X=	588,489	NAD83
Y=	376,641	
LAT	32.035376	
LONG	104.181168	



[17] OPERATOR CERTIFICATION

I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division

Signature: Cindy Herrera-Murillo 2-4-16
Date

Cindy Herrera-Murillo
Printed Name

Cherreramurillo@chevron.com
E-mail Address

[18] SURVEYOR CERTIFICATION

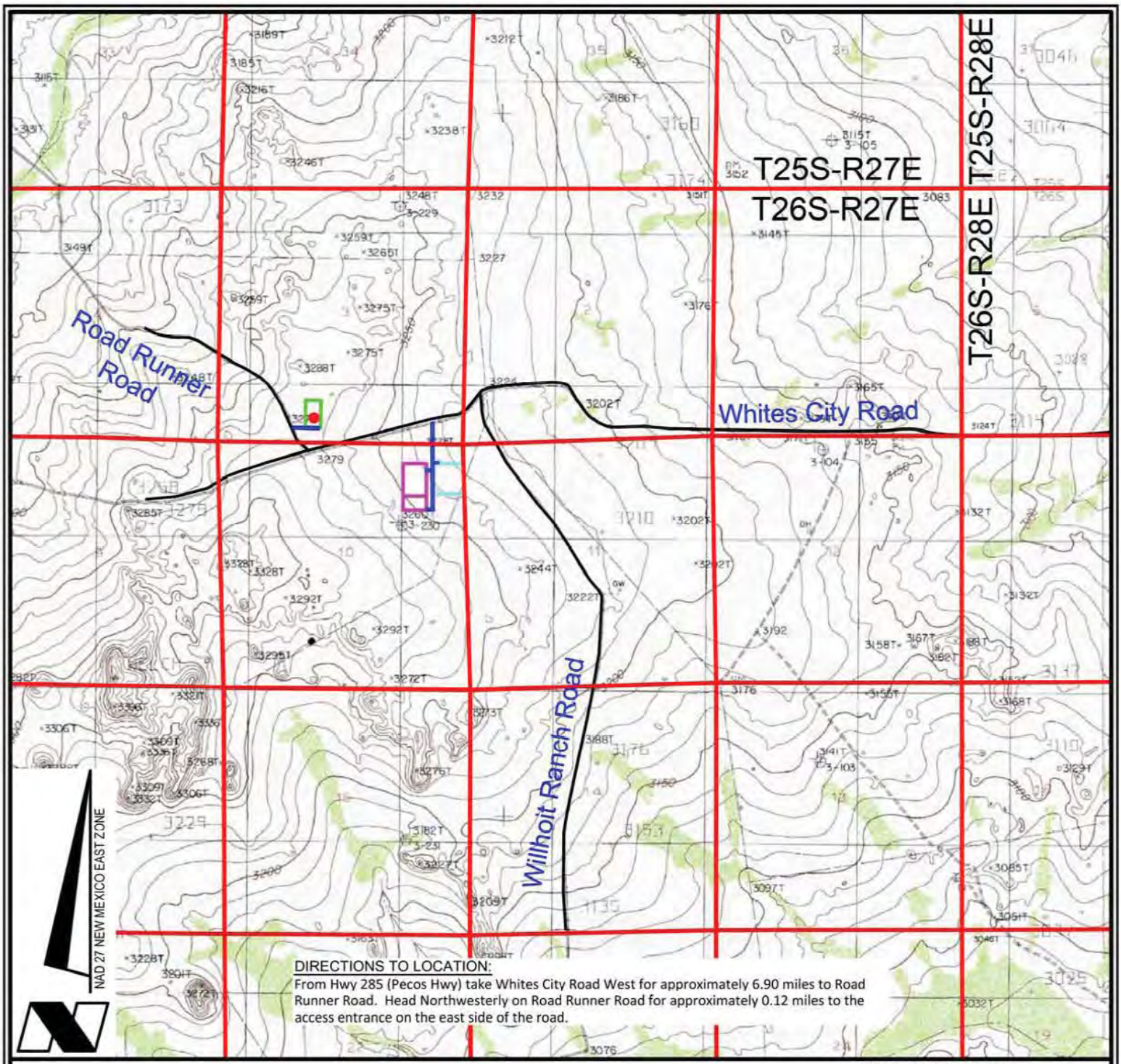
I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief

12-8-2015
Date of Survey

Signature and Seal of Professional Surveyor: 12-22-2015

23006
Certificate Number

EXHIBIT 1



DIRECTIONS TO LOCATION:
From Hwy 285 (Pecos Hwy) take Whites City Road West for approximately 6.90 miles to Road Runner Road. Head Northwesterly on Road Runner Road for approximately 0.12 miles to the access entrance on the east side of the road.

VICINITY MAP

SCALE: 1" = 3000'
3000' 0 1500' 3000'

LEGEND
- Proposed Well
- Proposed Access Road
- Proposed Drillsite
- Existing Road
- Section Line
- Proposed Frac Pond
- Proposed Facility

CHEVRON U.S.A. INC.

HH SO 10 P3 NO. 23H WELL
LOCATED 528' FSL AND 2066' FWL
SECTION 3, T26S-R27E
EDDY COUNTY, NEW MEXICO

FENSTERMAKER
C.H. Fenstermaker & Associates, L.L.C.
135 Regency Sq. Lafayette, LA 70508
Ph. 337-237-2200 Fax. 337-232-3299
www.fenstermaker.com

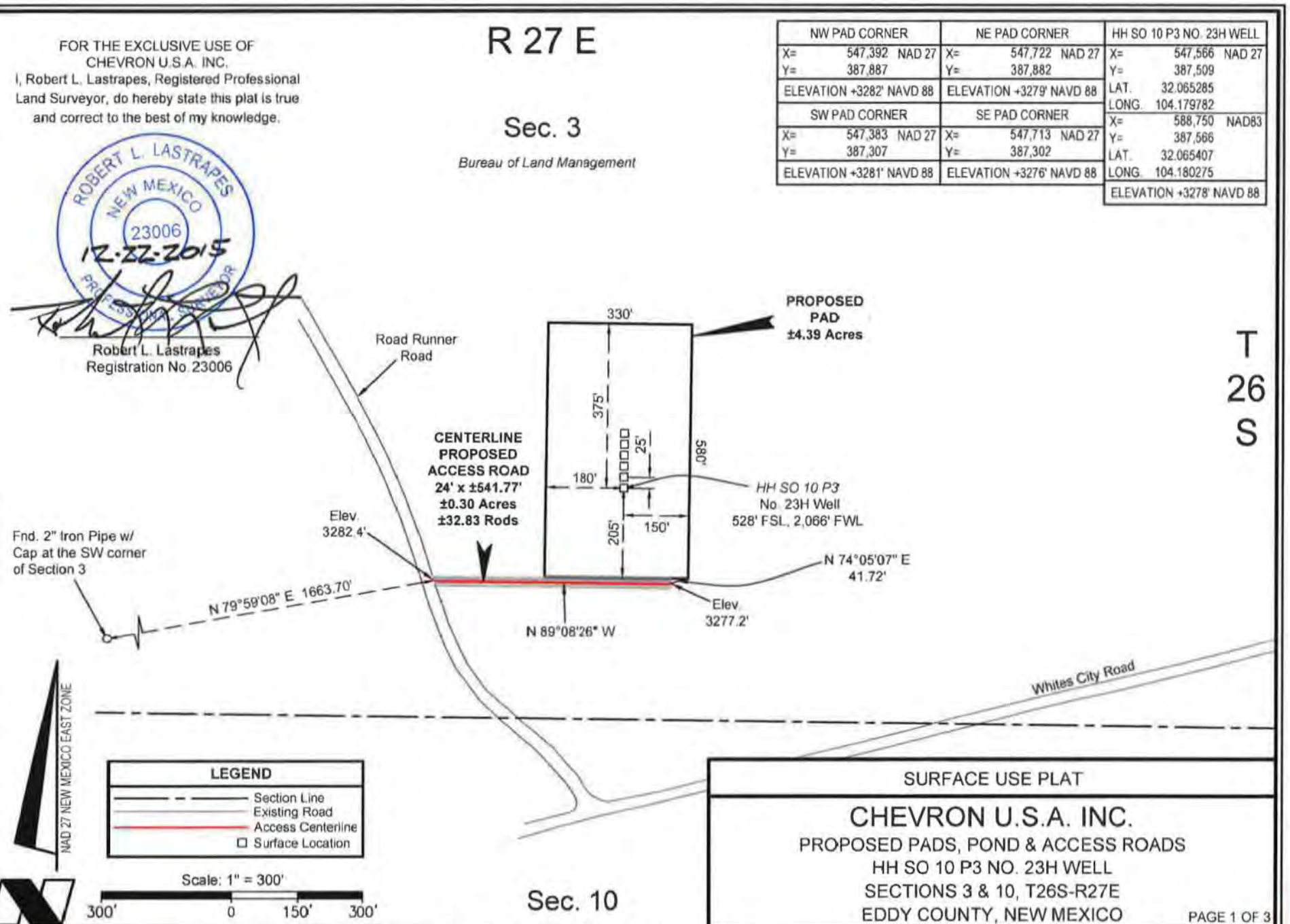
DRAWN BY: VHV	REVISIONS		
PROJ. MGR.: GDG	No.	DATE:	REVISED BY:
DATE: 12/15/2015	No.	DATE:	REVISED BY:
FILENAME: T:\2015\2153364\DWG\HH SO 10 P3 23H_APD.dwg			

FOR THE EXCLUSIVE USE OF
CHEVRON U.S.A. INC.
I, Robert L. Lastrapes, Registered Professional Land Surveyor, do hereby state this plat is true and correct to the best of my knowledge.

ROBERT L. LASTRAPES
NEW MEXICO
23006
12-22-2015
PROFESSIONAL SURVEYOR

Robert L. Lastrapes
Registration No. 23006

NW PAD CORNER	NE PAD CORNER	HH SO 10 P3 NO. 23H WELL
X= 547,392 NAD 27	X= 547,722 NAD 27	X= 547,566 NAD 27
Y= 387,887	Y= 387,882	Y= 387,509
ELEVATION +3282' NAVD 88	ELEVATION +3279' NAVD 88	LAT. 32.065285
SW PAD CORNER	SE PAD CORNER	LONG. 104.179782
X= 547,383 NAD 27	X= 547,713 NAD 27	X= 588,750 NAD83
Y= 387,307	Y= 387,302	Y= 387,566
ELEVATION +3281' NAVD 88	ELEVATION +3276' NAVD 88	LAT. 32.065407
		LONG. 104.180275
		ELEVATION +3278' NAVD 88



SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED PADS, POND & ACCESS ROADS
HH SO 10 P3 NO. 23H WELL
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

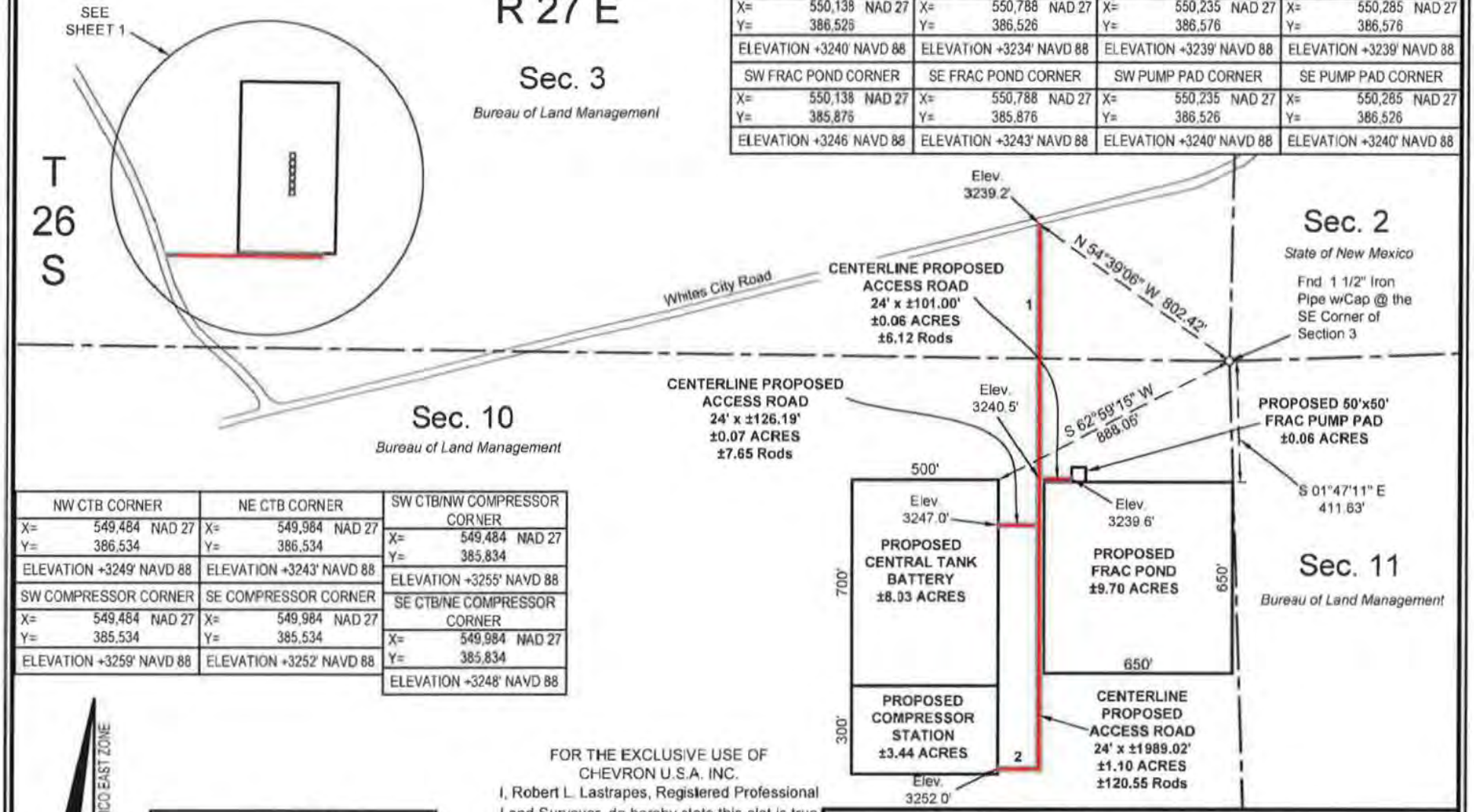
PAGE 1 OF 3

DRAWN BY: VHV	REVISIONS		
PROJ. MGR.: GDG	No.	DATE:	REVISED BY:
DATE: 12/15/2015	No.	DATE:	REVISED BY:
FILENAME: T:\2015\2153364\DWG\HH SO 10 P3 23H_SUP.dwg			

FENSTERMAKER
C. H. Fenstermaker & Associates, L.L.C.
135 Regency Sq. Lafayette, LA 70508
Ph. 337-237-2200 Fax. 337-232-3299
www.fenstermaker.com

EXHIBITS 2&5

NW FRAC POND CORNER	NE FRAC POND CORNER	NW PUMP PAD CORNER	NE PUMP PAD CORNER
X= 550,138 NAD 27 Y= 386,526	X= 550,788 NAD 27 Y= 386,526	X= 550,235 NAD 27 Y= 386,576	X= 550,285 NAD 27 Y= 386,576
ELEVATION +3240' NAVD 88	ELEVATION +3234' NAVD 88	ELEVATION +3239' NAVD 88	ELEVATION +3239' NAVD 88
SW FRAC POND CORNER	SE FRAC POND CORNER	SW PUMP PAD CORNER	SE PUMP PAD CORNER
X= 550,138 NAD 27 Y= 385,876	X= 550,788 NAD 27 Y= 385,876	X= 550,235 NAD 27 Y= 386,526	X= 550,285 NAD 27 Y= 386,526
ELEVATION +3246 NAVD 88	ELEVATION +3243' NAVD 88	ELEVATION +3240' NAVD 88	ELEVATION +3240' NAVD 88



NW CTB CORNER	NE CTB CORNER	SW CTB/NW COMPRESSOR CORNER
X= 549,484 NAD 27 Y= 386,534	X= 549,984 NAD 27 Y= 386,534	X= 549,484 NAD 27 Y= 385,834
ELEVATION +3249' NAVD 88	ELEVATION +3243' NAVD 88	ELEVATION +3255' NAVD 88
SW COMPRESSOR CORNER	SE COMPRESSOR CORNER	SE CTB/NE COMPRESSOR CORNER
X= 549,484 NAD 27 Y= 385,534	X= 549,984 NAD 27 Y= 385,534	X= 549,984 NAD 27 Y= 385,834
ELEVATION +3259' NAVD 88	ELEVATION +3252' NAVD 88	ELEVATION +3248' NAVD 88

NAD 27 NEW MEXICO EAST ZONE

LEGEND

- Section Line
- Existing Road
- Access Centerline
- Surface Location

Scale: 1" = 500'

500' 0 250' 500'

FOR THE EXCLUSIVE USE OF
CHEVRON U.S.A. INC.
I, Robert L. Lastrapes, Registered Professional Land Surveyor, do hereby state this plat is true and correct to the best of my knowledge.

ROBERT L. LASTRAPES
NEW MEXICO
23006
12-22-2015
PROFESSIONAL SURVEYOR

Robert L. Lastrapes
Registration No. 23006

FENSTERMAKER
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135 Regency Sq. Lafayette, LA 70508
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www.fenstermaker.com

SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED PADS, POND & ACCESS ROADS
HH SO 10 P3 NO. 23H WELL
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

DRAWN BY: VHV	REVISIONS		
PROJ. MGR.: GDG	No.	DATE:	REVISED BY:
DATE: 12/15/2015	No.	DATE:	REVISED BY:

FILENAME: T:\2015\2153364\DWG\HH SO 10 P3 23H_SUP.dwg

DISCLAIMER: At this time, C.H. Fenstermaker & Associates, L.L.C. has not performed nor was asked to perform any type of engineering, hydrological modeling, flood plain, or "No Rise" certification analyses, including but not limited to determining whether the project will impact flood hazards in connection with federal/FEMA, state, and/or local laws, ordinances and regulations. Accordingly, Fenstermaker makes no warranty or representation of any kind as to the foregoing issues, and persons or entities using this information shall do so at their own risk.

NOTE:
Please be advised, that while reasonable efforts are made to locate and verify pipelines and anomalies using our standard pipeline locating equipment, it is impossible to be 100 % effective. As such, we advise using caution when performing work as there is a possibility that pipelines and other hazards, such as fiber optic cables, PVC pipelines, etc may exist undetected on site.

NOTE:
Many states maintain information centers that establish links between those who dig (excavators) and those who own and operate underground facilities (operators). It is advisable and in most states, law, for the contractor to contact the center for assistance in locating and marking underground utilities. For guidance, New Mexico One Call www.nmonecall.org

CENTERLINE PROPOSED ACCESS ROAD		
COURSE	BEARING	DISTANCE
1	S 00° 05' 06" E	1849.60'
2	S 89° 54' 54" W	139.42'

FOR THE EXCLUSIVE USE OF
CHEVRON U.S.A. INC.
I, Robert L. Lastrapes, Registered Professional Land Surveyor, do hereby state this plat is true and correct to the best of my knowledge.

ROBERT L. LASTRAPES
NEW MEXICO
23006
12-22-2015
PROFESSIONAL SURVEYOR

Robert L. Lastrapes
Registration No. 23006

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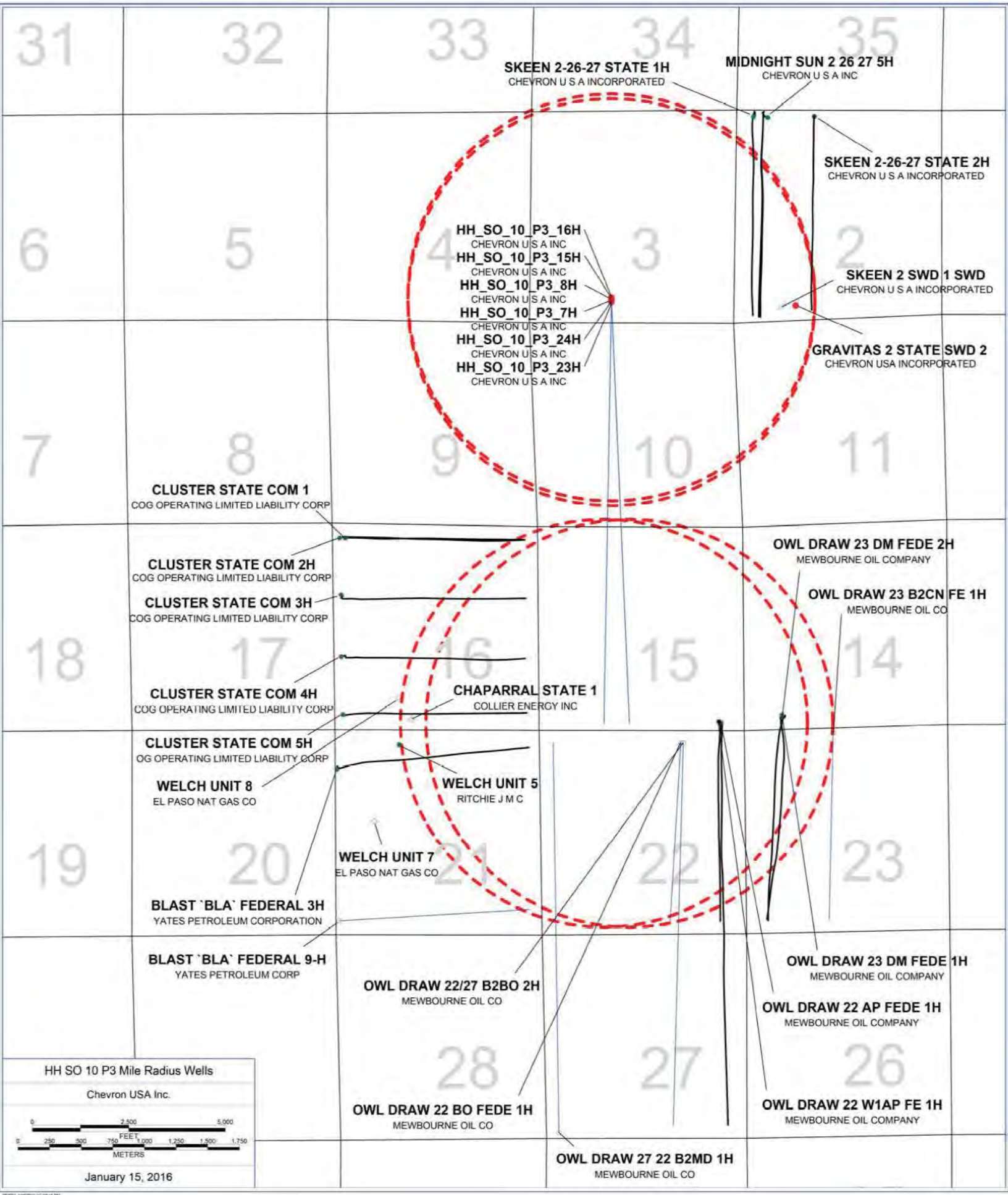
SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED PADS, POND & ACCESS ROADS
HH SO 10 P3 NO. 23H WELL
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

DRAWN BY: VHV	REVISIONS			
PROJ. MGR.: GDG	No.	DATE:	REVISED BY:	
DATE: 12/15/2015	No.	DATE:	REVISED BY:	
FILENAME: T:\2015\2153364\DWG\HH SO 10 P3 23H_SUP.dwg				

EXHIBIT 3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27
26
SKEEN 2-26-27 STATE 1H
CHEVRON U S A INCORPORATED
MIDNIGHT SUN 2 26 27 5H
CHEVRON U S A INC
SKEEN 2-26-27 STATE 2H
CHEVRON U S A INCORPORATED
HH_SO_10_P3_16H
CHEVRON U S A INC
HH_SO_10_P3_15H
CHEVRON U S A INC
HH_SO_10_P3_8H
CHEVRON U S A INC
HH_SO_10_P3_7H
CHEVRON U S A INC
HH_SO_10_P3_24H
CHEVRON U S A INC
HH_SO_10_P3_23H
CHEVRON U S A INC
SKEEN 2 SWD 1 SWD
CHEVRON U S A INCORPORATED
GRAVITAS 2 STATE SWD 2
CHEVRON USA INCORPORATED
CLUSTER STATE COM 1
COG OPERATING LIMITED LIABILITY CORP
CLUSTER STATE COM 2H
COG OPERATING LIMITED LIABILITY CORP
CLUSTER STATE COM 3H
COG OPERATING LIMITED LIABILITY CORP
CLUSTER STATE COM 4H
COG OPERATING LIMITED LIABILITY CORP
CLUSTER STATE COM 5H
OG OPERATING LIMITED LIABILITY CORP
WELCH UNIT 8
EL PASO NAT GAS CO
CHAPARRAL STATE 1
COLLIER ENERGY INC
WELCH UNIT 5
RITCHIE J M C
WELCH UNIT 7
EL PASO NAT GAS CO
BLAST `BLA` FEDERAL 3H
YATES PETROLEUM CORPORATION
BLAST `BLA` FEDERAL 9-H
YATES PETROLEUM CORP
OWL DRAW 23 DM FEDE 2H
MEWBOURNE OIL COMPANY
OWL DRAW 23 B2CN FE 1H
MEWBOURNE OIL CO
OWL DRAW 23 DM FEDE 1H
MEWBOURNE OIL COMPANY
OWL DRAW 22/27 B2BO 2H
MEWBOURNE OIL CO
OWL DRAW 22 AP FEDE 1H
MEWBOURNE OIL COMPANY
OWL DRAW 22 BO FEDE 1H
MEWBOURNE OIL CO
OWL DRAW 22 W1AP FE 1H
MEWBOURNE OIL COMPANY
OWL DRAW 27 22 B2MD 1H
MEWBOURNE OIL CO
HH SO 10 P3 Mile Radius Wells
Chevron USA Inc.
0
2,500
5,000
FEET
0
250
500
750
1,000
1,250
1,500
1,750
METERS
January 15, 2016

1. FORMATION TOPS

The estimated tops of important geologic markers are as follows:

FORMATION	SUB-SEA TVD	KBTVD	MD
Castille		505	
Lamar		2395	
Bell		2310	
Cherry		3208	
Brushy		4450	
Bone Spring/Avalon		6299	
First Bone Spring Sand		6888	
First Bone Spring Shale		6914	
Second Bone Spring Sand		7621	
Harkey Sand		8123	
Third Bone Spring Sand		8617	
Wolfcamp A		9176	
Lateral TVD Wolfcamp A		9176	19818.64'

2. ESTIMATED DEPTH OF WATER, OIL, GAS & OTHER MINERAL BEARING FORMATIONS

The estimated depths at which the top and bottom of the anticipated water, oil, gas, or other mineral bearing formations are expected to be encountered are as follows:

Substance	Formation	Depth
Deepest Expected Base of Fresh Water		450
Water	Castille	505
Water	Cherry Canyon	3208
Oil/Gas	Brushy Canyon	4450
Oil/Gas	Bone Spring Limestone	6888
Oil/Gas	First Bone Spring Shale	6914
Oil/Gas	Second Bone Spring Sand	7621
Oil/Gas	Harkey Sand	8123
Oil/Gas	Wolfcamp A	9176

All shows of fresh water and minerals will be reported and protected.

3. BOP EQUIPMENT

PLEASE REFERENCE MDP

4. **CASING PROGRAM**

Purpose	From	To	Hole Size	Csg Size	Weight	Grade	Thread	Condition
Surface	0'	450'	17-1/2"	13-3/8"	54.5 #	K-55	STC	New
Intermediate	0'	9,015'	12-1/4"	9-5/8"	40.0 #	L-80	TXP	New
Production	0'	19,819'	8-1/2"	5-1/2"	20.0 #	P-110	TXP	New

SF Calculations based on the following "Worst Case" casing design:

Surface Casing: 450'
Intermediate Casing: 9015'
Production Casing: 19818.64' MD/9,176' TVD (10,000' VS @ 90.3 deg inc)

Casing String	Min SF Burst	Min SF Collapse	Min SF Tension	Min SF Tri-Axial
Surface	1.82	5.11	3.97	2.31
Intermediate	2.9	1.34	1.79	2.22
Production	1.26	1.66	2.54	1.31

Min SF is the smallest of a group of safety factors that include the following considerations:

	Surf	Int	Prod
Burst Design			
Pressure Test- Surface, Int, Prod Csg P external: Water P internal: Test psi + next section heaviest mud in csg	X	X	X
Displace to Gas- Surf Csg P external: Water P internal: Dry Gas from Next Csg Point	X		
Frac at Shoe, Gas to Surf- Int Csg P external: Water P internal: Dry Gas, 15 ppg Frac Gradient		X	
Stimulation (Frac) Pressures- Prod Csg P external: Water P internal: Max inj pressure w/ heaviest injected fluid			X
Tubing leak- Prod Csg (packer at KOP) P external: Water P internal: Leak just below surf, 8.7 ppg packer fluid			X
Collapse Design			
Full Evacuation P external: Water gradient in cement, mud above TOC P internal: none	X	X	X
Cementing- Surf, Int, Prod Csg P external: Wet cement P internal: water	X	X	X
Tension Design			
100k lb overpull	X	X	X

5. **CEMENTING PROGRAM**

Slurry	Type	Cement Top	Cement Bottom	Weight	Yield	%Excess	Sacks	Water
Surface				(ppg)	(sx/cu ft)	Open Hole		gal/sk
Tail	Class C	0'	450'	14.8	1.33	50	356	6.37
Intermediate								
Stage 2 Lead	50:50 Poz: Class C + Antifoam, Extender, Salt, Retarder	0'	1,100'	11.9	2.43	50	213	14.21
Stage 2 Tail	Class C + Antifoam, Retarder, Viscosifier	1,100'	2,100'	14.8	1.33	0	235	6.37
DV Tool		2,100'						
Stage 1 Lead	50:50 Poz: Class H + Extender, Antifoam, Retarder, Salt, Viscosifier	2,100'	8,015'	11.9	2.43	100	1524	13.76
Stage 1 Tail	Class H + Retarder, Extender, Dispersant	8,015'	9,015'	15.6	1.21	50	389	5.54
Production								
Lead	50:50 Poz: Class H + Extender, Antifoam, Dispersant, , Retarder	7,015'	8,015'	14.5	1.21	100	430	5.54
Tail	Class H + Viscosifier, Antifoam, Dispersant, Fluid Loss, Retarder, Expanding Agent	8,015'	19,819'	15.6	1.2	50	3377	5.30

6. MUD PROGRAM

From	To	Type	Weight	F. Vis	Filtrate
0'	450'	Spud Mud	8.3 - 8.7	32 - 34	NC - NC
450'	9015'	OBM	9.0 - 9.5	50 -70	5.0 – 10
9015'	19,819'	OBM	10.0 - 13.5	50 -70	5.0 – 10

7. TESTING, LOGGING, AND CORING

TYPE	Logs	Interval	Timing	Vendor
Mudlogs	2 man mudlog	Int Csg to TD	Drillout of Int Csg	TBD
LWD	MWD Gamma	Int. and Prod. Hole	While Drilling	TBD

8. ABNORMAL PRESSURES AND HYDROGEN SULFIDE

PLEASE REFERENCE MDP

Schlumberger

#23H - Rev0

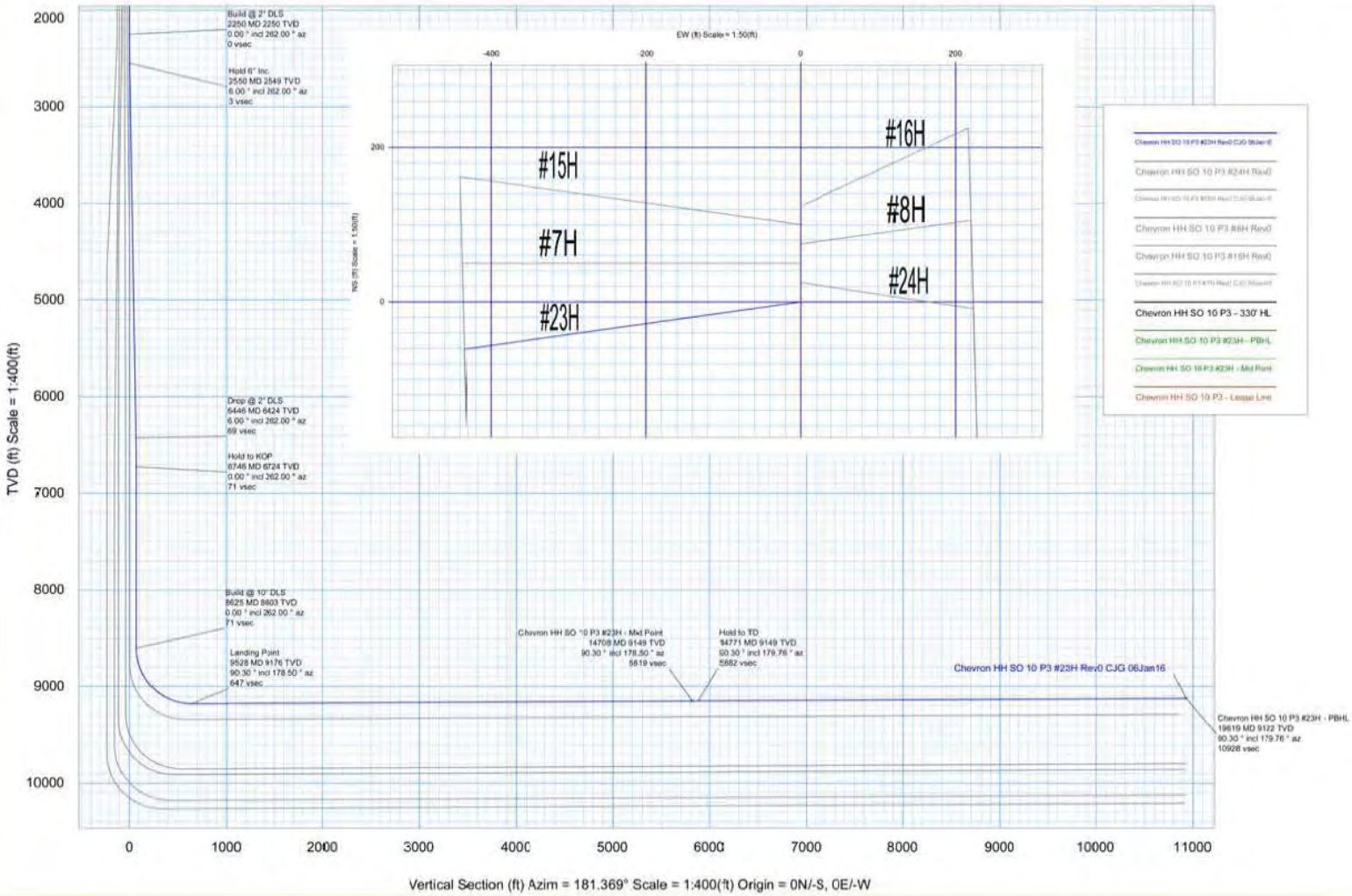
Chevron

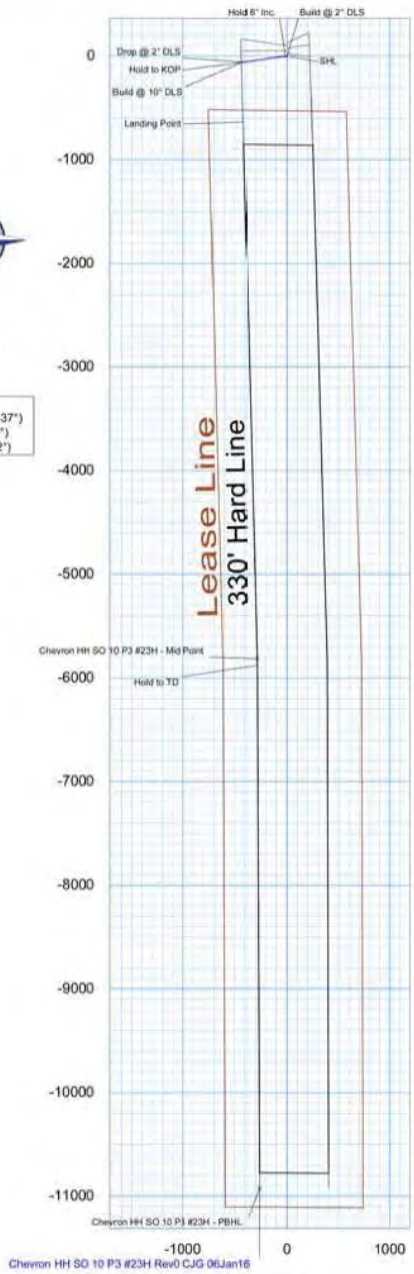
Borehole:	Well:	Field:	Structure:
Original Borehole	HH SO 10 P3 #23H	NM Eddy County (NAD 27)	Chevron HH SO 10 P3 Pad

Gravity & Magnetic Parameters																	
Model:	HDGM 2015	Dip:	59.816°	Date:	30-Dec-2015	Surface Location	NAD27 New Mexico State Plane, Eastern Zone, US Feet					Miscellaneous					
MagDec:	7.519°	FS:	48169.618nT	Gravity FS:	998.428mgn (9.80665 Based)	Lat:	N 32 3 35.02	Northing:	387509ftUS	Grid Conv:	0.0815°	Slot:	HH SO 10 P3 # 23 H	TVD Ref:	RKB(3311ft above MSL)		
						Lon:	W 104 16 47.22	Easting:	547566ftUS	Scale Fact:	0.99991166	Plan:	Chevron HH SO 10 P3 #23H Rev0 CJG 06Jan16				

Critical Points

Critical Point	MD	INCL	AZIM	TVD	VSEC	N(+)/S(-)	E(+)/W(-)	DLS
SHL	0.00	0.00	262.00	0.00	0.00	0.00	0.00	
Build @ 2° DLS	2250.00	0.00	262.00	2250.00	0.00	0.00	0.00	0.00
Hold 6° Inc.	2550.00	6.00	262.00	2549.45	2.55	-2.18	-15.54	2.00
Drop @ 2° DLS	6446.00	6.00	262.00	6424.11	68.85	-58.86	-418.82	0.00
Hold to KOP	6746.00	0.00	262.00	6723.56	71.40	-61.05	-434.36	2.00
Build @ 10° DLS	8625.49	0.00	262.00	8603.05	71.40	-61.05	-434.36	0.00
Landing Point	9528.48	90.30	178.50	9176.00	646.63	-636.80	-419.28	10.00
Chevron HH SO 10 P3 #23H - Mid Point	14707.58	90.30	178.50	9148.92	5819.16	-5814.05	-283.56	0.00
Hold to TD	14770.51	90.30	179.76	9148.59	5882.04	-5876.97	-282.60	2.00
Chevron HH SO 10 P3 #23H - PBHL	19818.64	90.30	179.76	9122.17	10928.10	-10924.99	-261.02	0.00





CONTROLLED

1	Originator	Colby Gannon
2	DEC Sign Off	
3	CC Sign Off	
4	Client	Chevron

Schlumberger

Chevron

Chevron HH SO 10 P3 #23H Rev0 CJG 06Jan16 Proposal Geodetic Report

(Non-Def Plan)

Report Date:	January 13, 2016 - 04:25 PM	**Survey / DLS Computation:**	Minimum Curvature / Lubinski
Client:	Chevron	**Vertical Section Azimuth:**	181.369 ° (Grid North)
Field:	NM Eddy County (NAD 27)	**Vertical Section Origin:**	0.000 ft, 0.000 ft
Structure / Slot:	Chevron HH SO 10 P3 Pad / HH SO 10 P3 #23H	**TVD Reference Datum:**	RKB
Well:	HH SO 10 P3 #23H	**TVD Reference Elevation:**	3311.000 ft above MSL
Borehole:	Original Borehole	**Seabed / Ground Elevation:**	3278.000 ft above MSL
UWI / API#:	Unknown / Unknown	**Magnetic Declination:**	7.519 °
Survey Name:	Chevron HH SO 10 P3 #23H Rev0 CJG 06Jan16	**Total Gravity Field Strength:**	998.4280mgn (9.80665 Based)
Survey Date:	December 30, 2015	**Gravity Model:**	GARM
Tort / AHD / DDI / ERD Ratio:	103.562 ° / 11304.602 ft / 6.403 / 1.232	**Total Magnetic Field Strength:**	48169.615 nT
Coordinate Reference System:	NAD27 New Mexico State Plane, Eastern Zone, US Feet	**Magnetic Dip Angle:**	59.816 °
Location Lat / Long:	N 32° 3' 55.02442", W 104° 10' 47.21944"	**Declination Date:**	December 30, 2015
Location Grid N/E Y/X:	N 387509.000 ftUS, E 547566.000 ftUS	**Magnetic Declination Model:**	HDGM 2015
CRS Grid Convergence Angle:	0.0815 °	**North Reference:**	Grid North
Grid Scale Factor:	0.99991168	**Grid Convergence Used:**	0.0815 °
Version / Patch:	2.8.572.0	**Total Corr Mag North->Grid North:**	7.4376 °
		Local Coord Referenced To:	Structure Reference Point

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
SHL	0.00	0.00	262.00	0.00	0.00	0.00	0.00	N/A	387509.00	547566.00	N 32 3 55.02	W 104 10 47.22
	100.00	0.00	262.00	100.00	0.00	0.00	0.00	0.00	387509.00	547566.00	N 32 3 55.02	W 104 10 47.22
	200.00	0.00	262.00	200.00	0.00	0.00	0.00	0.00	387509.00	547566.00	N 32 3 55.02	W 104 10 47.22
	300.00	0.00	262.00	300.00	0.00	0.00	0.00	0.00	387509.00	547566.00	N 32 3 55.02	W 104 10 47.22
	400.00	0.00	262.00	400.00	0.00	0.00	0.00	0.00	387509.00	547566.00	N 32 3 55.02	W 104 10 47.22
	500.00	0.00	262.00	500.00	0.00	0.00	0.00	0.00	387509.00	547566.00	N 32 3 55.02	W 104 10 47.22
	600.00	0.00	262.00	600.00	0.00	0.00	0.00	0.00	387509.00	547566.00	N 32 3 55.02	W 104 10 47.22
	700.00	0.00	262.00	700.00	0.00	0.00	0.00	0.00	387509.00	547566.00	N 32 3 55.02	W 104 10 47.22
	800.00	0.00	262.00	800.00	0.00	0.00	0.00	0.00	387509.00	547566.00	N 32 3 55.02	W 104 10 47.22
	900.00	0.00	262.00	900.00	0.00	0.00	0.00	0.00	387509.00	547566.00	N 32 3 55.02	W 104 10 47.22
	1000.00	0.00	262.00	1000.00	0.00	0.00	0.00	0.00	387509.00	547566.00	N 32 3 55.02	W 104 10 47.22
	1100.00	0.00	262.00	1100.00	0.00	0.00	0.00	0.00	387509.00	547566.00	N 32 3 55.02	W 104 10 47.22
	1200.00	0.00	262.00	1200.00	0.00	0.00	0.00	0.00	387509.00	547566.00	N 32 3 55.02	W 104 10 47.22
	1300.00	0.00	262.00	1300.00	0.00	0.00	0.00	0.00	387509.00	547566.00	N 32 3 55.02	W 104 10 47.22
	1400.00	0.00	262.00	1400.00	0.00	0.00	0.00	0.00	387509.00	547566.00	N 32 3 55.02	W 104 10 47.22
	1500.00	0.00	262.00	1500.00	0.00	0.00	0.00	0.00	387509.00	547566.00	N 32 3 55.02	W 104 10 47.22
	1600.00	0.00	262.00	1600.00	0.00	0.00	0.00	0.00	387509.00	547566.00	N 32 3 55.02	W 104 10 47.22
	1700.00	0.00	262.00	1700.00	0.00	0.00	0.00	0.00	387509.00	547566.00	N 32 3 55.02	W 104 10 47.22
	1800.00	0.00	262.00	1800.00	0.00	0.00	0.00	0.00	387509.00	547566.00	N 32 3 55.02	W 104 10 47.22
	1900.00	0.00	262.00	1900.00	0.00	0.00	0.00	0.00	387509.00	547566.00	N 32 3 55.02	W 104 10 47.22
	2000.00	0.00	262.00	2000.00	0.00	0.00	0.00	0.00	387509.00	547566.00	N 32 3 55.02	W 104 10 47.22
	2100.00	0.00	262.00	2100.00	0.00	0.00	0.00	0.00	387509.00	547566.00	N 32 3 55.02	W 104 10 47.22
	2200.00	0.00	262.00	2200.00	0.00	0.00	0.00	0.00	387509.00	547566.00	N 32 3 55.02	W 104 10 47.22
Build @ 2° DLS	2250.00	0.00	262.00	2250.00	0.00	0.00	0.00	0.00	387509.00	547566.00	N 32 3 55.02	W 104 10 47.22
	2300.00	1.00	262.00	2300.00	0.07	-0.06	-0.43	2.00	387508.94	547565.57	N 32 3 55.02	W 104 10 47.22
	2400.00	3.00	262.00	2399.93	0.64	-0.55	-3.89	2.00	387508.45	547562.11	N 32 3 55.02	W 104 10 47.26
	2500.00	5.00	262.00	2499.68	1.77	-1.52	-10.80	2.00	387507.48	547555.21	N 32 3 55.01	W 104 10 47.34
Hold 6° Inc	2550.00	6.00	262.00	2549.45	2.55	-2.18	-15.54	2.00	387506.82	547550.46	N 32 3 55.00	W 104 10 47.40
	2600.00	6.00	262.00	2599.18	3.41	-2.91	-20.72	0.00	387506.09	547545.29	N 32 3 55.00	W 104 10 47.46
	2700.00	6.00	262.00	2698.63	5.11	-4.37	-31.07	0.00	387504.63	547534.94	N 32 3 54.98	W 104 10 47.58
	2800.00	6.00	262.00	2798.08	6.81	-5.82	-41.42	0.00	387503.18	547524.59	N 32 3 54.97	W 104 10 47.70
	2900.00	6.00	262.00	2897.53	8.51	-7.28	-51.77	0.00	387501.72	547514.23	N 32 3 54.95	W 104 10 47.82
	3000.00	6.00	262.00	2996.99	10.21	-8.73	-62.12	0.00	387500.27	547503.88	N 32 3 54.94	W 104 10 47.94
	3100.00	6.00	262.00	3096.44	11.91	-10.19	-72.47	0.00	387498.82	547493.53	N 32 3 54.92	W 104 10 48.06
	3200.00	6.00	262.00	3195.89	13.61	-11.64	-82.82	0.00	387497.36	547483.18	N 32 3 54.91	W 104 10 48.18
	3300.00	6.00	262.00	3295.34	15.32	-13.09	-93.17	0.00	387495.91	547472.83	N 32 3 54.90	W 104 10 48.30
	3400.00	6.00	262.00	3394.80	17.02	-14.55	-103.53	0.00	387494.45	547462.48	N 32 3 54.88	W 104 10 48.42
	3500.00	6.00	262.00	3494.25	18.72	-16.00	-113.88	0.00	387493.00	547452.13	N 32 3 54.87	W 104 10 48.54
	3600.00	6.00	262.00	3593.70	20.42	-17.46	-124.23	0.00	387491.54	547441.78	N 32 3 54.85	W 104 10 48.66
	3700.00	6.00	262.00	3693.15	22.12	-18.91	-134.58	0.00	387490.09	547431.43	N 32 3 54.84	W 104 10 48.78
	3800.00	6.00	262.00	3792.60	23.82	-20.37	-144.93	0.00	387488.63	547421.08	N 32 3 54.82	W 104 10 48.90
	3900.00	6.00	262.00	3892.06	25.53	-21.82	-155.28	0.00	387487.18	547410.73	N 32 3 54.81	W 104 10 49.02
	4000.00	6.00	262.00	3991.51	27.23	-23.28	-165.63	0.00	387485.72	547400.38	N 32 3 54.80	W 104 10 49.14
	4100.00	6.00	262.00	4090.96	28.93	-24.73	-175.98	0.00	387484.27	547390.03	N 32 3 54.78	W 104 10 49.26
	4200.00	6.00	262.00	4190.41	30.63	-26.19	-186.33	0.00	387482.81	547379.68	N 32 3 54.77	W 104 10 49.39
	4300.00	6.00	262.00	4289.87	32.33	-27.64	-196.69	0.00	387481.36	547369.33	N 32 3 54.75	W 104 10 49.51
	4400.00	6.00	262.00	4389.32	34.03	-29.10	-207.04	0.00	387479.91	547358.98	N 32 3 54.74	W 104 10 49.63
	4500.00	6.00	262.00	4488.77	35.74	-30.55	-217.39	0.00	387478.45	547348.63	N 32 3 54.73	W 104 10 49.75
	4600.00	6.00	262.00	4588.22	37.44	-32.01	-227.74	0.00	387477.00	547338.28	N 32 3 54.71	W 104 10 49.87
	4700.00	6.00	262.00	4687.67	39.14	-33.46	-238.09	0.00	387475.54	547327.93	N 32 3 54.70	W 104 10 49.99
	4800.00	6.00	262.00	4787.13	40.84	-34.92	-248.44	0.00	387474.09	547317.58	N 32 3 54.68	W 104 10 50.11
	4900.00	6.00	262.00	4886.58	42.54	-36.37	-258.79	0.00	387472.63	547307.23	N 32 3 54.67	W 104 10 50.23
	5000.00	6.00	262.00	4986.03	44.24	-37.83	-269.14	0.00	387471.18	547296.88	N 32 3 54.65	W 104 10 50.35
	5100.00	6.00	262.00	5085.48	45.95	-39.28	-279.49	0.00	387469.72	547286.53	N 32 3 54.64	W 104 10 50.47
	5200.00	6.00	262.00	5184.94	47.65	-40.74	-289.85	0.00	387468.27	547276.18	N 32 3 54.63	W 104 10 50.59
	5300.00	6.00	262.00	5284.39	49.35	-42.19	-300.20	0.00	387466.81	547265.83	N 32 3 54.61	W 104 10 50.71
	5400.00	6.00	262.00	5383.84	51.05	-43.64	-310.55	0.00	387465.36	547255.48	N 32 3 54.60	W 104 10 50.83
	5500.00	6.00	262.00	5483.29	52.75	-45.10	-320.90	0.00	387463.90	547245.13	N 32 3 54.58	W 104 10 50.95
	5600.00	6.00	262.00	5582.74	54.45	-46.55	-331.25	0.00	387462.45	547234.78	N 32 3 54.57	W 104 10 51.07
	5700.00	6.00	262.00	5682.20	56.15	-48.01	-341.60	0.00	387461.00	547224.43	N 32 3 54.55	W 104 10 51.19
	5800.00	6.00	262.00	5781.65	57.86	-49.46	-351.95	0.00	387459.54	547214.08	N 32 3 54.54	W 104 10 51.31
	5900.00	6.00	262.00	5881.10	59.56	-50.92	-362.30	0.00	387458.09	547203.73	N 32 3 54.53	W 104 10 51.43
	6000.00	6.00	262.00	5980.55	61.26	-52.37	-372.65	0.00	387456.63	547193.38	N 32 3 54.51	W 104 10 51.55
	6100.00	6.00	262.00	6080.00	62.96	-53.83	-383.01	0.00	387455.18	547183.03	N 32 3 54.50	W 104 10 51.67
	6200.00	6.00	262.00	6179.46	64.66	-55.28	-393.36	0.00	387453.72	547172.68	N 32 3 54.48	W 104 10 51.79

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
	6300.00	6.00	262.00	6278.91	66.36	-56.74	-403.71	0.00	387452.27	547162.33	N 32 3 54.47	W 104 10 51.91
	6400.00	6.00	262.00	6378.36	68.07	-58.19	-414.06	0.00	387450.81	547151.98	N 32 3 54.45	W 104 10 52.03
Drop @ 2° DLS	6446.00	6.00	262.00	6424.11	68.85	-58.86	-418.82	0.00	387450.14	547147.22	N 32 3 54.45	W 104 10 52.09
	6500.00	4.92	262.00	6477.86	69.68	-59.58	-423.91	2.00	387449.43	547142.13	N 32 3 54.44	W 104 10 52.15
	6600.00	2.92	262.00	6577.62	70.80	-60.53	-430.68	2.00	387448.48	547135.36	N 32 3 54.43	W 104 10 52.23
	6700.00	0.92	262.00	6677.56	71.34	-60.99	-434.00	2.00	387448.01	547132.04	N 32 3 54.43	W 104 10 52.26
Hold to KOP	6746.00	0.00	262.00	6723.56	71.40	-61.05	-434.36	2.00	387447.96	547131.68	N 32 3 54.43	W 104 10 52.27
	6800.00	0.00	262.00	6777.56	71.40	-61.05	-434.36	0.00	387447.96	547131.68	N 32 3 54.43	W 104 10 52.27
	6900.00	0.00	262.00	6877.56	71.40	-61.05	-434.36	0.00	387447.96	547131.68	N 32 3 54.43	W 104 10 52.27
	7000.00	0.00	262.00	6977.56	71.40	-61.05	-434.36	0.00	387447.96	547131.68	N 32 3 54.43	W 104 10 52.27
	7100.00	0.00	262.00	7077.56	71.40	-61.05	-434.36	0.00	387447.96	547131.68	N 32 3 54.43	W 104 10 52.27
	7200.00	0.00	262.00	7177.56	71.40	-61.05	-434.36	0.00	387447.96	547131.68	N 32 3 54.43	W 104 10 52.27
	7300.00	0.00	262.00	7277.56	71.40	-61.05	-434.36	0.00	387447.96	547131.68	N 32 3 54.43	W 104 10 52.27
	7400.00	0.00	262.00	7377.56	71.40	-61.05	-434.36	0.00	387447.96	547131.68	N 32 3 54.43	W 104 10 52.27
	7500.00	0.00	262.00	7477.56	71.40	-61.05	-434.36	0.00	387447.96	547131.68	N 32 3 54.43	W 104 10 52.27
	7600.00	0.00	262.00	7577.56	71.40	-61.05	-434.36	0.00	387447.96	547131.68	N 32 3 54.43	W 104 10 52.27
	7700.00	0.00	262.00	7677.56	71.40	-61.05	-434.36	0.00	387447.96	547131.68	N 32 3 54.43	W 104 10 52.27
	7800.00	0.00	262.00	7777.56	71.40	-61.05	-434.36	0.00	387447.96	547131.68	N 32 3 54.43	W 104 10 52.27
	7900.00	0.00	262.00	7877.56	71.40	-61.05	-434.36	0.00	387447.96	547131.68	N 32 3 54.43	W 104 10 52.27
	8000.00	0.00	262.00	7977.56	71.40	-61.05	-434.36	0.00	387447.96	547131.68	N 32 3 54.43	W 104 10 52.27
	8100.00	0.00	262.00	8077.56	71.40	-61.05	-434.36	0.00	387447.96	547131.68	N 32 3 54.43	W 104 10 52.27
	8200.00	0.00	262.00	8177.56	71.40	-61.05	-434.36	0.00	387447.96	547131.68	N 32 3 54.43	W 104 10 52.27
	8300.00	0.00	262.00	8277.56	71.40	-61.05	-434.36	0.00	387447.96	547131.68	N 32 3 54.43	W 104 10 52.27
	8400.00	0.00	262.00	8377.56	71.40	-61.05	-434.36	0.00	387447.96	547131.68	N 32 3 54.43	W 104 10 52.27
	8500.00	0.00	262.00	8477.56	71.40	-61.05	-434.36	0.00	387447.96	547131.68	N 32 3 54.43	W 104 10 52.27
	8600.00	0.00	262.00	8577.56	71.40	-61.05	-434.36	0.00	387447.96	547131.68	N 32 3 54.43	W 104 10 52.27
Build @ 10° DLS	8625.49	0.00	262.00	8603.05	71.40	-61.05	-434.36	0.00	387447.96	547131.68	N 32 3 54.43	W 104 10 52.27
	8700.00	7.45	178.50	8677.35	76.24	-65.88	-434.23	10.00	387443.12	547131.80	N 32 3 54.38	W 104 10 52.27
	8800.00	17.45	178.50	8774.88	97.74	-87.41	-433.67	10.00	387421.60	547132.37	N 32 3 54.17	W 104 10 52.26
	8900.00	27.45	178.50	8867.18	135.83	-125.54	-432.67	10.00	387383.48	547133.37	N 32 3 53.79	W 104 10 52.25
	9000.00	37.45	178.50	8951.46	189.98	-179.11	-431.27	10.00	387329.91	547134.77	N 32 3 53.26	W 104 10 52.23
	9100.00	47.45	178.50	9025.15	258.88	-246.49	-429.51	10.00	387262.53	547136.53	N 32 3 52.59	W 104 10 52.21
	9200.00	57.45	178.50	9086.01	335.77	-325.65	-427.43	10.00	387183.38	547138.61	N 32 3 51.81	W 104 10 52.19
	9300.00	67.45	178.50	9132.21	424.21	-414.17	-425.11	10.00	387094.87	547140.92	N 32 3 50.93	W 104 10 52.17
	9400.00	77.45	178.50	9162.32	519.31	-509.36	-422.62	10.00	386999.68	547143.42	N 32 3 49.99	W 104 10 52.14
	9500.00	87.45	178.50	9175.44	618.19	-608.34	-420.03	10.00	386900.72	547146.01	N 32 3 49.01	W 104 10 52.11
Landing Point	9528.48	90.30	178.50	9176.00	646.63	-636.80	-419.26	10.00	386872.26	547146.75	N 32 3 48.73	W 104 10 52.10
	9600.00	90.30	178.50	9175.63	718.08	-708.29	-417.41	0.00	386800.77	547148.63	N 32 3 48.02	W 104 10 52.08
	9700.00	90.30	178.50	9175.10	817.93	-808.26	-414.79	0.00	386700.82	547151.24	N 32 3 47.03	W 104 10 52.05
	9800.00	90.30	178.50	9174.58	917.81	-908.22	-412.18	0.00	386600.86	547153.86	N 32 3 46.04	W 104 10 52.02
	9900.00	90.30	178.50	9174.06	1017.68	-1008.18	-409.56	0.00	386500.91	547156.48	N 32 3 45.05	W 104 10 52.00
	10000.00	90.30	178.50	9173.53	1117.55	-1108.15	-406.94	0.00	386400.95	547159.10	N 32 3 44.06	W 104 10 51.97
	10100.00	90.30	178.50	9173.01	1217.43	-1208.11	-404.32	0.00	386301.00	547161.71	N 32 3 43.07	W 104 10 51.94
	10200.00	90.30	178.50	9172.49	1317.30	-1308.08	-401.70	0.00	386201.04	547164.33	N 32 3 42.09	W 104 10 51.91
	10300.00	90.30	178.50	9171.97	1417.17	-1408.04	-399.09	0.00	386101.08	547166.95	N 32 3 41.10	W 104 10 51.88
	10400.00	90.30	178.50	9171.44	1517.05	-1508.01	-396.47	0.00	386001.13	547169.57	N 32 3 40.11	W 104 10 51.85
	10500.00	90.30	178.50	9170.92	1616.92	-1607.97	-393.85	0.00	385901.17	547172.19	N 32 3 39.12	W 104 10 51.82
	10600.00	90.30	178.50	9170.40	1716.79	-1707.94	-391.23	0.00	385801.22	547174.81	N 32 3 38.13	W 104 10 51.79
	10700.00	90.30	178.50	9169.87	1816.67	-1807.90	-388.61	0.00	385701.26	547177.42	N 32 3 37.14	W 104 10 51.76
	10800.00	90.30	178.50	9169.35	1916.54	-1907.86	-385.99	0.00	385601.31	547180.04	N 32 3 36.15	W 104 10 51.74
	10900.00	90.30	178.50	9168.83	2016.41	-2007.83	-383.37	0.00	385501.35	547182.66	N 32 3 35.16	W 104 10 51.71
	11000.00	90.30	178.50	9168.31	2116.29	-2107.79	-380.75	0.00	385401.40	547185.28	N 32 3 34.17	W 104 10 51.68
	11100.00	90.30	178.50	9167.78	2216.16	-2207.76	-378.13	0.00	385301.44	547187.90	N 32 3 33.18	W 104 10 51.65
	11200.00	90.30	178.50	9167.26	2316.03	-2307.72	-375.51	0.00	385201.49	547190.52	N 32 3 32.19	W 104 10 51.62
	11300.00	90.30	178.50	9166.74	2415.91	-2407.69	-372.89	0.00	385101.53	547193.14	N 32 3 31.20	W 104 10 51.59
	11400.00	90.30	178.50	9166.21	2515.78	-2507.65	-370.27	0.00	385001.58	547195.76	N 32 3 30.21	W 104 10 51.56
	11500.00	90.30	178.50	9165.69	2615.65	-2607.61	-367.65	0.00	384901.62	547198.38	N 32 3 29.23	W 104 10 51.53
	11600.00	90.30	178.50	9165.17	2715.52	-2707.58	-365.03	0.00	384801.67	547201.00	N 32 3 28.24	W 104 10 51.51
	11700.00	90.30	178.50	9164.65	2815.40	-2807.54	-362.41	0.00	384701.71	547203.62	N 32 3 27.25	W 104 10 51.48
	11800.00	90.30	178.50	9164.12	2915.27	-2907.51	-359.79	0.00	384601.76	547206.24	N 32 3 26.26	W 104 10 51.45
	11900.00	90.30	178.50	9163.60	3015.14	-3007.47	-357.17	0.00	384501.80	547208.86	N 32 3 25.27	W 104 10 51.42
	12000.00	90.30	178.50	9163.08	3115.02	-3107.44	-354.55	0.00	384401.85	547211.48	N 32 3 24.28	W 104 10 51.39
	12100.00	90.30	178.50	9162.55	3214.89	-3207.40	-351.93	0.00	384301.89	547214.10	N 32 3 23.29	W 104 10 51.36
	12200.00	90.30	178.50	9162.03	3314.76	-3307.36	-349.31	0.00	384201.93	547216.72	N 32 3 22.30	W 104 10 51.33
	12300.00	90.30	178.50	9161.51	3414.64	-3407.33	-346.69	0.00	384101.98	547219.34	N 32 3 21.31	W 104 10 51.30
	12400.00	90.30	178.50	9160.99	3514.51	-3507.29	-344.07	0.00	384002.02	547221.96	N 32 3 20.32	W 104 10 51.28
	12500.00	90.30	178.50	9160.46	3614.38	-3607.26	-341.45	0.00	383902.07	547224.58	N 32 3 19.33	W 104 10 51.25
	12600.00	90.30	178.50	9159.94	3714.26	-3707.22	-338.83	0.00	383802.11	547227.20	N 32 3 18.34	W 104 10 51.22
	12700.00	90.30	178.50	9159.42	3814.13	-3807.19	-336.21	0.00	383702.16	547229.82	N 32 3 17.35	W 104 10 51.19
	12800.00	90.30	178.50	9158.89	3914.00	-3907.15	-333.58	0.00	383602.20	547232.45	N 32 3 16.37	W 104 10 51.16
	12900.00	90.30	178.50	9158.37	4013.88	-4007.11	-330.96	0.00	383502.25	547235.07	N 32 3 15.38	W 104 10 51.13
	13000.00	90.30	178.50	9157.85	4113.75	-4107.08	-328.34	0.00	383402.29	547237.69	N 32 3 14.39	W 104 10 51.10
	13100.00	90.30	178.50	9157.33	4213.62	-4207.04	-325.72	0.00	383302.34	547240.31	N 32 3 13.40	W 104 10 51.07
	13200.00	90.30	178.50	9156.80	4313.50	-4307.01	-323.10	0.00	383202.38	547242.93	N 32 3 12.41	W 104 10 51.04
	13300.00	90.30	178.50	9156.28	4413.37	-4406.97	-320.48	0.00	383102.43	547245.55	N 32 3 11.42	W 104 10 51.02
	13400.00	90.30	178.50	9155.76	4513.24	-4506.94	-317.85	0.00	383002.47	547248.18	N 32 3 10.43	W 104 10 50.99
	13500.00	90.30	178.50	9155.23	4613.11	-4606.90	-315.23	0.00	382902.52	547250.80	N 32 3 9.44	W 104 10 50.96
	13600.00	90.30	178.50	9154.71	4712.99	-4706.86	-312.61	0.00	382802.56	547253.42	N 32 3 8.45	W 104 10 50.93
	13700.00	90.30	178.50	9154.19	4812.86	-4806.83	-309.99	0.00	382702.61	547256.04	N 32 3 7.46	W 104 10 50.90
	13800.00	90.30	178.50	9153.67	4912.73	-4906.79	-307.36	0.00	382602.65	547258.66	N 32 3 6.47	W 104 10 50.87
	13900.00	90.30	178.50	9153.14	5012.61	-5006.76	-304.74	0.00	382502.70	547261.29	N 32 3 5.48	W 104 10 50.84
	14000.00	90.30	178.50	9152.62	5112.48	-5106.72	-302.12	0.00	382402.74	547263.91	N 32 3 4.49	W 104 10 50.81
	14100.00	90.30	178.50	9152.10	5212.35	-5206.68	-299.49	0.00	382302.79	547266.53	N 32 3 3.50	W 104 10 50.79
	14200.00	90.30	178.50	9151.57	5312.23	-5306.65	-296.87	0.00	382202.83	547269.16	N 32 3 2.52	W 104 10 50.76
	14300.00	90.30	178.50	9151.05	5412.10	-5406.61	-294.25	0.00	382102.87	547271.78	N 32 3 1.53	W 104 10 50.73
	14400.00	90.30	178.50	9150.53	5511.97	-5506.58	-291.63	0.00	382002.92	547274.40	N 32 3 0.54	W 104 10 50.70
	14500.00	90.30	178.50	9150.01	5611.85	-5606.54	-289.00	0.00	381902.96	547277.02	N 32 2 59.55	W 104 10 50.67
	14600.00	90.30	178.50	9149.48	5711.72	-5706.51	-286.38	0.00	381803.01	547279.65	N 32 2 58.56	W 104 10 50.64

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
	14700.00	90.30	178.50	9148.96	5811.59	-5806.47	-283.75	0.00	381703.05	547282.27	N 32 2 57.57	W 104 10 50.61
Chevron HH SO 10 P3 #23H - Mid Point	14707.58	90.30	178.50	9148.92	5819.16	-5814.05	-283.56	0.00	381695.48	547282.47	N 32 2 57.49	W 104 10 50.61
Hold to TD	14770.52	90.30	179.76	9148.59	5882.05	-5876.98	-282.60	2.00	381632.55	547283.43	N 32 2 56.87	W 104 10 50.60
	14800.00	90.30	179.75	9148.44	5911.52	-5906.46	-282.47	0.00	381603.08	547283.56	N 32 2 56.58	W 104 10 50.60
	14900.00	90.30	179.75	9147.91	6011.48	-6006.46	-282.04	0.00	381503.09	547283.98	N 32 2 55.59	W 104 10 50.60
	15000.00	90.30	179.75	9147.39	6111.44	-6106.45	-281.61	0.00	381403.10	547284.41	N 32 2 54.60	W 104 10 50.59
	15100.00	90.30	179.75	9146.87	6211.40	-6206.45	-281.19	0.00	381303.11	547284.84	N 32 2 53.61	W 104 10 50.59
	15200.00	90.30	179.75	9146.34	6311.36	-6306.45	-280.76	0.00	381203.12	547285.27	N 32 2 52.62	W 104 10 50.59
	15300.00	90.30	179.75	9145.82	6411.31	-6406.45	-280.33	0.00	381103.13	547285.69	N 32 2 51.63	W 104 10 50.58
	15400.00	90.30	179.75	9145.30	6511.27	-6506.44	-279.91	0.00	381003.14	547286.12	N 32 2 50.64	W 104 10 50.58
	15500.00	90.30	179.75	9144.77	6611.23	-6606.44	-279.48	0.00	380903.16	547286.55	N 32 2 49.65	W 104 10 50.58
	15600.00	90.30	179.75	9144.25	6711.19	-6706.44	-279.05	0.00	380803.17	547286.97	N 32 2 48.66	W 104 10 50.57
	15700.00	90.30	179.75	9143.73	6811.15	-6806.44	-278.62	0.00	380703.18	547287.40	N 32 2 47.67	W 104 10 50.57
	15800.00	90.30	179.75	9143.20	6911.11	-6906.43	-278.20	0.00	380603.19	547287.83	N 32 2 46.68	W 104 10 50.57
	15900.00	90.30	179.75	9142.68	7011.07	-7006.43	-277.77	0.00	380503.20	547288.26	N 32 2 45.69	W 104 10 50.56
	16000.00	90.30	179.75	9142.16	7111.03	-7106.43	-277.34	0.00	380403.21	547288.68	N 32 2 44.71	W 104 10 50.56
	16100.00	90.30	179.75	9141.63	7210.99	-7206.43	-276.91	0.00	380303.22	547289.11	N 32 2 43.72	W 104 10 50.56
	16200.00	90.30	179.75	9141.11	7310.94	-7306.43	-276.49	0.00	380203.23	547289.54	N 32 2 42.73	W 104 10 50.55
	16300.00	90.30	179.75	9140.59	7410.90	-7406.42	-276.06	0.00	380103.25	547289.97	N 32 2 41.74	W 104 10 50.55
	16400.00	90.30	179.75	9140.06	7510.86	-7506.42	-275.63	0.00	380003.26	547290.39	N 32 2 40.75	W 104 10 50.55
	16500.00	90.30	179.75	9139.54	7610.82	-7606.42	-275.20	0.00	379903.27	547290.82	N 32 2 39.76	W 104 10 50.54
	16600.00	90.30	179.75	9139.02	7710.78	-7706.42	-274.78	0.00	379803.28	547291.25	N 32 2 38.77	W 104 10 50.54
	16700.00	90.30	179.75	9138.49	7810.74	-7806.41	-274.35	0.00	379703.29	547291.67	N 32 2 37.78	W 104 10 50.54
	16800.00	90.30	179.75	9137.97	7910.70	-7906.41	-273.92	0.00	379603.30	547292.10	N 32 2 36.79	W 104 10 50.53
	16900.00	90.30	179.75	9137.45	8010.66	-8006.41	-273.50	0.00	379503.31	547292.53	N 32 2 35.80	W 104 10 50.53
	17000.00	90.30	179.75	9136.92	8110.62	-8106.41	-273.07	0.00	379403.32	547292.96	N 32 2 34.81	W 104 10 50.53
	17100.00	90.30	179.75	9136.40	8210.58	-8206.40	-272.64	0.00	379303.34	547293.38	N 32 2 33.82	W 104 10 50.52
	17200.00	90.30	179.75	9135.88	8310.53	-8306.40	-272.21	0.00	379203.35	547293.81	N 32 2 32.83	W 104 10 50.52
	17300.00	90.30	179.75	9135.35	8410.49	-8406.40	-271.79	0.00	379103.36	547294.24	N 32 2 31.84	W 104 10 50.52
	17400.00	90.30	179.75	9134.83	8510.45	-8506.40	-271.36	0.00	379003.37	547294.67	N 32 2 30.85	W 104 10 50.51
	17500.00	90.30	179.75	9134.31	8610.41	-8606.40	-270.93	0.00	378903.38	547295.09	N 32 2 29.86	W 104 10 50.51
	17600.00	90.30	179.75	9133.78	8710.37	-8706.39	-270.50	0.00	378803.39	547295.52	N 32 2 28.87	W 104 10 50.51
	17700.00	90.30	179.75	9133.26	8810.33	-8806.39	-270.08	0.00	378703.40	547295.95	N 32 2 27.88	W 104 10 50.50
	17800.00	90.30	179.75	9132.74	8910.29	-8906.39	-269.65	0.00	378603.42	547296.37	N 32 2 26.89	W 104 10 50.50
	17900.00	90.30	179.75	9132.21	9010.25	-9006.39	-269.22	0.00	378503.43	547296.80	N 32 2 25.90	W 104 10 50.50
	18000.00	90.30	179.75	9131.69	9110.21	-9106.38	-268.80	0.00	378403.44	547297.23	N 32 2 24.91	W 104 10 50.49
	18100.00	90.30	179.75	9131.16	9210.17	-9206.38	-268.37	0.00	378303.45	547297.66	N 32 2 23.92	W 104 10 50.49
	18200.00	90.30	179.75	9130.64	9310.12	-9306.38	-267.94	0.00	378203.46	547298.08	N 32 2 22.93	W 104 10 50.49
	18300.00	90.30	179.75	9130.12	9410.08	-9406.38	-267.51	0.00	378103.47	547298.51	N 32 2 21.95	W 104 10 50.48
	18400.00	90.30	179.75	9129.59	9510.04	-9506.38	-267.09	0.00	378003.48	547298.94	N 32 2 20.96	W 104 10 50.48
	18500.00	90.30	179.75	9129.07	9610.00	-9606.37	-266.66	0.00	377903.49	547299.37	N 32 2 19.97	W 104 10 50.48
	18600.00	90.30	179.75	9128.55	9709.96	-9706.37	-266.23	0.00	377803.51	547299.79	N 32 2 18.98	W 104 10 50.47
	18700.00	90.30	179.75	9128.02	9809.92	-9806.37	-265.80	0.00	377703.52	547300.22	N 32 2 17.99	W 104 10 50.47
	18800.00	90.30	179.75	9127.50	9909.88	-9906.37	-265.38	0.00	377603.53	547300.65	N 32 2 17.00	W 104 10 50.47
	18900.00	90.30	179.75	9126.98	10009.84	-10006.36	-264.95	0.00	377503.54	547301.07	N 32 2 16.01	W 104 10 50.46
	19000.00	90.30	179.75	9126.45	10109.80	-10106.36	-264.52	0.00	377403.55	547301.50	N 32 2 15.02	W 104 10 50.46
	19100.00	90.30	179.75	9125.93	10209.76	-10206.36	-264.09	0.00	377303.56	547301.93	N 32 2 14.03	W 104 10 50.46
	19200.00	90.30	179.75	9125.41	10309.71	-10306.36	-263.67	0.00	377203.57	547302.36	N 32 2 13.04	W 104 10 50.45
	19300.00	90.30	179.75	9124.88	10409.67	-10406.35	-263.24	0.00	377103.59	547302.78	N 32 2 12.05	W 104 10 50.45
	19400.00	90.30	179.75	9124.36	10509.63	-10506.35	-262.81	0.00	377003.60	547303.21	N 32 2 11.06	W 104 10 50.45
	19500.00	90.30	179.75	9123.84	10609.59	-10606.35	-262.39	0.00	376903.61	547303.64	N 32 2 10.07	W 104 10 50.44
	19600.00	90.30	179.75	9123.31	10709.55	-10706.35	-261.96	0.00	376803.62	547304.07	N 32 2 9.08	W 104 10 50.44
	19700.00	90.30	179.75	9122.79	10809.51	-10806.35	-261.53	0.00	376703.63	547304.49	N 32 2 8.09	W 104 10 50.44
	19800.00	90.30	179.75	9122.27	10909.47	-10906.34	-261.10	0.00	376603.64	547304.92	N 32 2 7.10	W 104 10 50.43
Chevron HH SO 10 P3 #23H - PBHL	19818.64	90.30	179.75	9122.17	10928.10	-10924.99	-261.02	0.00	376585.00	547305.00	N 32 2 6.92	W 104 10 50.43

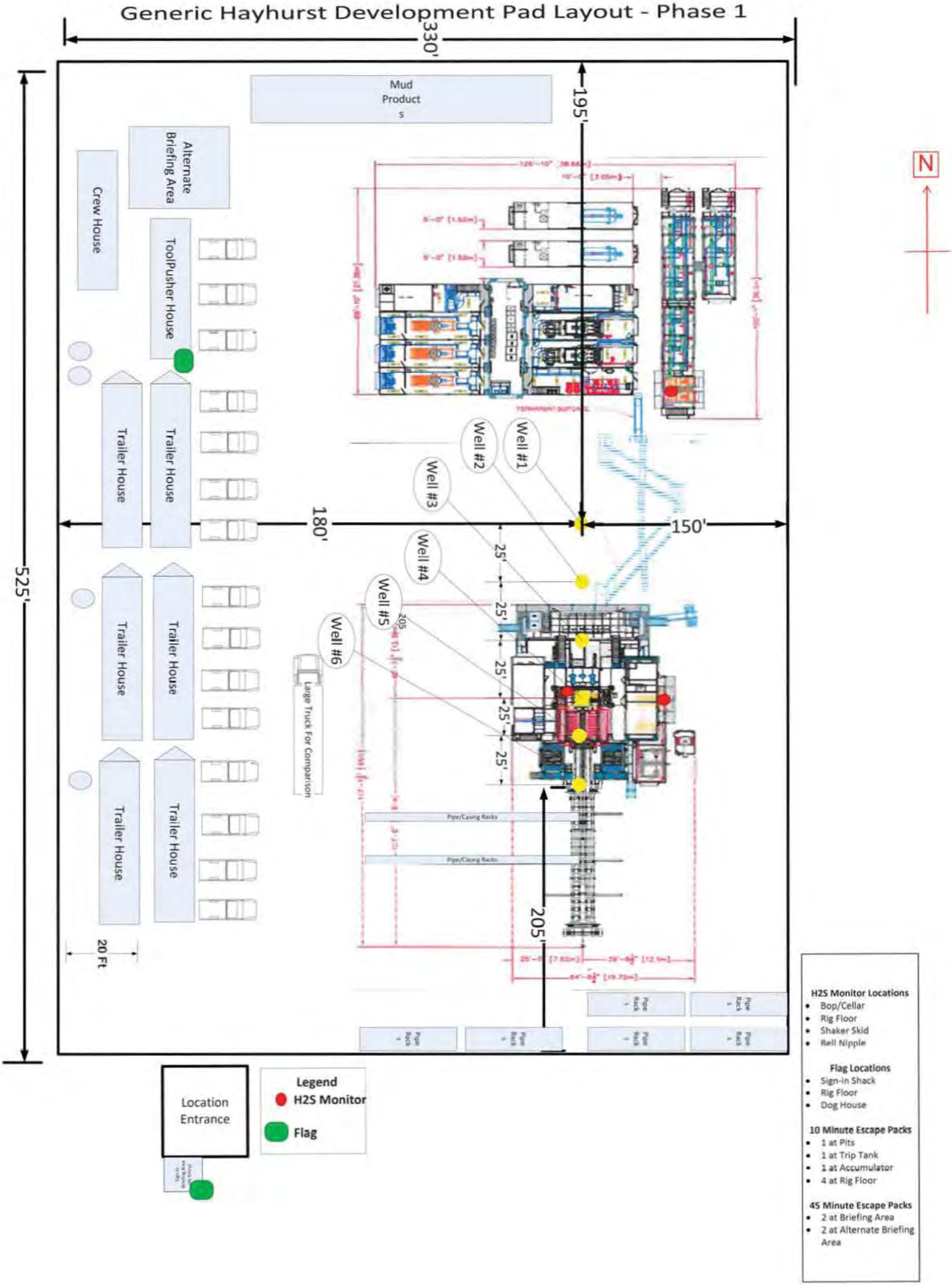
Survey Type: Non-Def Plan

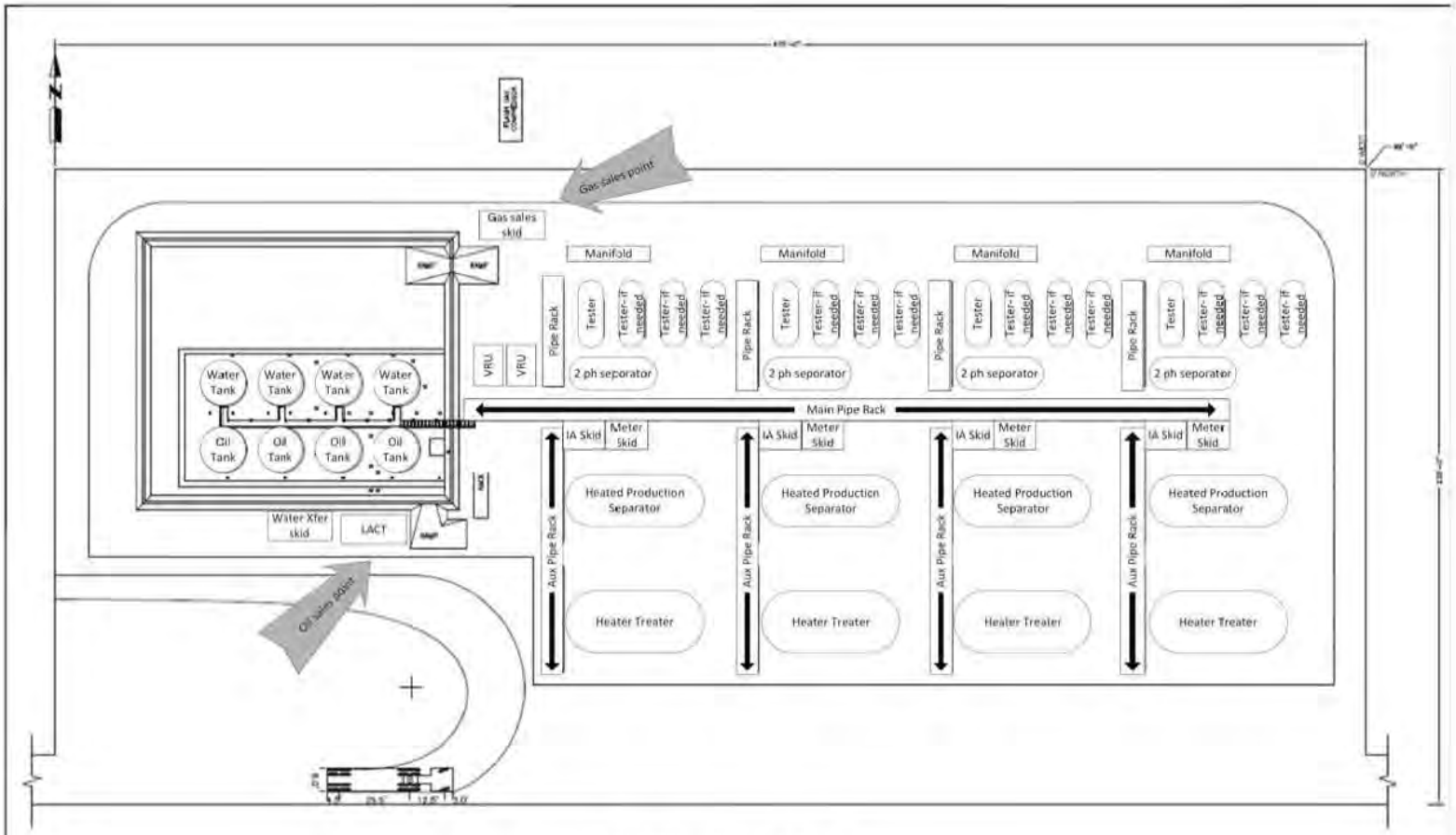
Survey Error Model: ISCWSA Rev 0 *** 3-D 95.000% Confidence 2.7955 sigma

Survey Program:

Description	Part	MD From (ft)	MD To (ft)	EOU Freq (ft)	Hole Size (in)	Casing Diameter (in)	Survey Tool Type	Borehole / Survey
	1	0.000	33.000	1/100.000	30.000	30.000	SLB_MWD-STD-Depth Only	Original Borehole / Chevron HH SO 10 P3 #23H Rev0 CJG
	1	33.000	19818.644	1/100.000	30.000	30.000	SLB_MWD-STD	Original Borehole / Chevron HH SO 10 P3 #23H Rev0 CJG

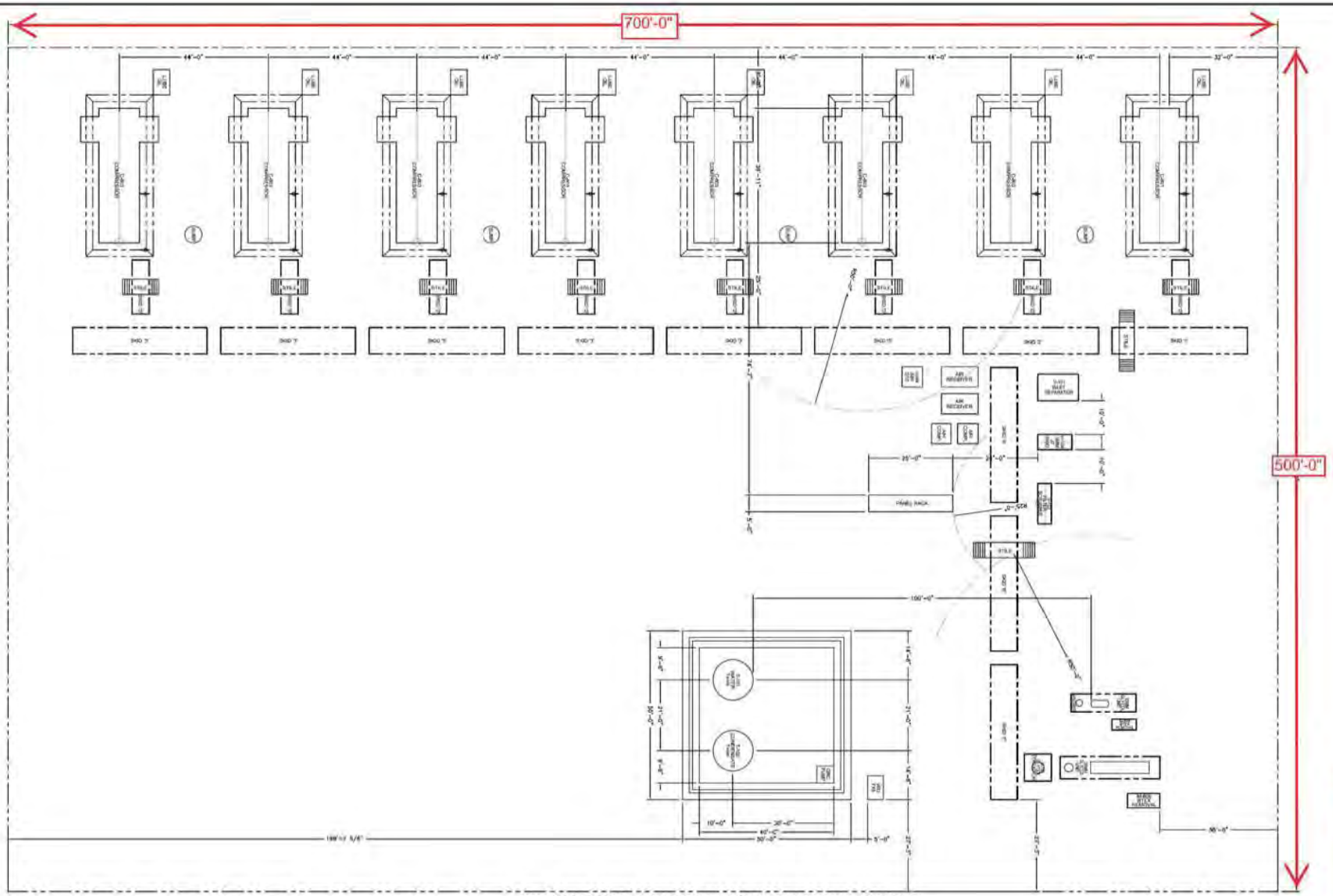
Generic Hayhurst Development Pad Layout - Phase 1





PLOT PLAN - 4 TRAIN / 8 TANK

EXHIBIT 4



COMPRESSOR STATION - 8 COMPRESSOR LAYOUT

SCALE: NONE

REVISIONS			
A ISSUED FOR REVIEW - JMDESIGN 07/14/15	EWM		

FOR REVIEW

Chevron U.S.A. Inc.

STANDARD COMPRESSOR GAS-LIFT STATION

PLOT PLAN - 8 COMPRESSOR LAYOUT

API _____ LEASE _____

COMPRESSOR_PLOTPLAN_8TOTAL

A

PLOT DATE: 07/14/2015 (1:215985)

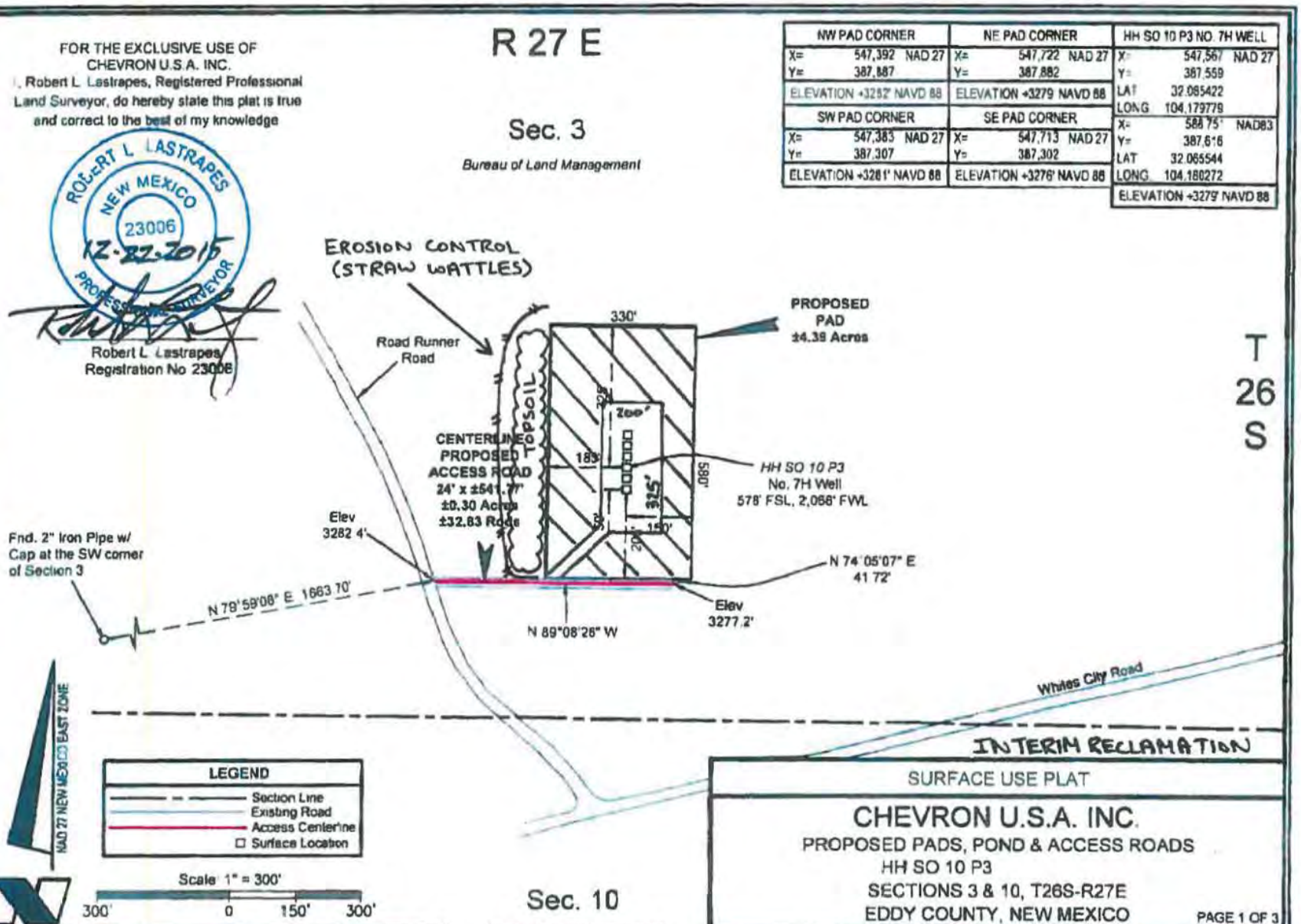
COMPRESSOR PLOTPLAN 8TOTAL.dwg

FOR THE EXCLUSIVE USE OF
CHEVRON U.S.A. INC.
I, Robert L. Lastrapes, Registered Professional Land Surveyor, do hereby state this plat is true and correct to the best of my knowledge

ROBERT L. LASTRAPES
NEW MEXICO
23006
12-22-2015
PROFESSIONAL SURVEYOR

Robert L. Lastrapes
Registration No 23006

NW PAD CORNER	NE PAD CORNER	HH SO 10 P3 NO. 7H WELL
X= 547,392 NAD 27	X= 547,722 NAD 27	X= 547,567 NAD 27
Y= 387,887	Y= 387,882	Y= 387,559
ELEVATION +3282' NAVD 88	ELEVATION +3279' NAVD 88	LAT 32.085422
SW PAD CORNER	SE PAD CORNER	LONG 104.179779
X= 547,383 NAD 27	X= 547,713 NAD 27	X= 588.75' NAD83
Y= 387,307	Y= 387,302	Y= 387,616
ELEVATION +3281' NAVD 88	ELEVATION +3276' NAVD 88	LAT 32.085544
		LONG 104.180272
		ELEVATION +3279' NAVD 88



FENSTERMAKER
C. H. Fenstermaker & Associates L.L.C.
135 Regency Sq. Lafayette LA 70508
Ph. 337.237.2200 Fax 337.232.3299
www.fenstermaker.com

SURFACE USE PLAT

CHEVRON U.S.A. INC.

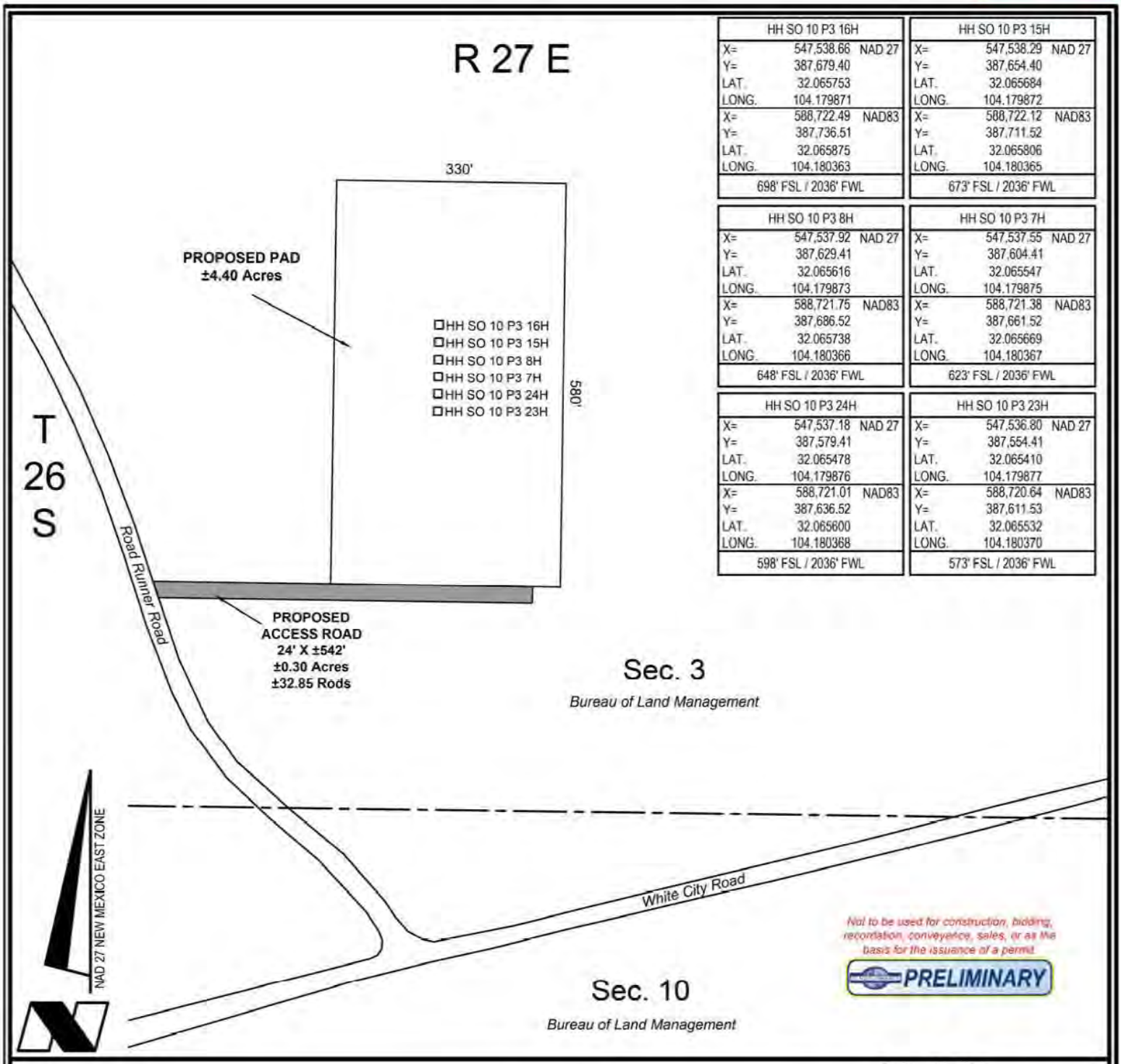
PROPOSED PADS, POND & ACCESS ROADS
HH SO 10 P3
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

PAGE 1 OF 3

DRAWN BY: LJG	REVISIONS		
PROJ. MGR.: CDG	No.	DATE:	REVISED BY:
DATE: 12/16/2015	No.	DATE:	REVISED BY:

FILENAME: T:\2015\2153366\DWG\HH SO 10 P3 7H_SUP.dwg

EXHIBIT 4



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X=	547,538.66	NAD 27
Y=	387,679.40	
LAT.	32.065753	
LONG.	104.179871	
X=	588,722.49	NAD83
Y=	387,736.51	
LAT.	32.065875	
LONG.	104.180363	
698' FSL / 2036' FWL		

HH SO 10 P3 15H		
X=	547,538.29	NAD 27
Y=	387,654.40	
LAT.	32.065684	
LONG.	104.179872	
X=	588,722.12	NAD83
Y=	387,711.52	
LAT.	32.065806	
LONG.	104.180365	
673' FSL / 2036' FWL		

HH SO 10 P3 8H		
X=	547,537.92	NAD 27
Y=	387,629.41	
LAT.	32.065616	
LONG.	104.179873	
X=	588,721.75	NAD83
Y=	387,686.52	
LAT.	32.065738	
LONG.	104.180366	
648' FSL / 2036' FWL		

HH SO 10 P3 7H		
X=	547,537.55	NAD 27
Y=	387,604.41	
LAT.	32.065547	
LONG.	104.179875	
X=	588,721.38	NAD83
Y=	387,661.52	
LAT.	32.065669	
LONG.	104.180367	
623' FSL / 2036' FWL		

HH SO 10 P3 24H		
X=	547,537.18	NAD 27
Y=	387,579.41	
LAT.	32.065478	
LONG.	104.179876	
X=	588,721.01	NAD83
Y=	387,636.52	
LAT.	32.065600	
LONG.	104.180368	
598' FSL / 2036' FWL		

HH SO 10 P3 23H		
X=	547,536.80	NAD 27
Y=	387,554.41	
LAT.	32.065410	
LONG.	104.179877	
X=	588,720.64	NAD83
Y=	387,611.53	
LAT.	32.065532	
LONG.	104.180370	
573' FSL / 2036' FWL		

DETAIL

Scale: 1" = 200'

200' 0 100' 200'

CHEVRON U.S.A. INC.

PAD AND ACCESS DETAIL FOR THE
HH SO 10 P3 PAD
SECTION 3, T26S-R27E
EDDY COUNTY, NEW MEXICO

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DRAWN BY: GDG	REVISIONS		
PROJ. MGR.: GDG	No.#	DATE:	REVISED BY:
DATE: 2 DEC 2015	No.#	DATE:	REVISED BY:
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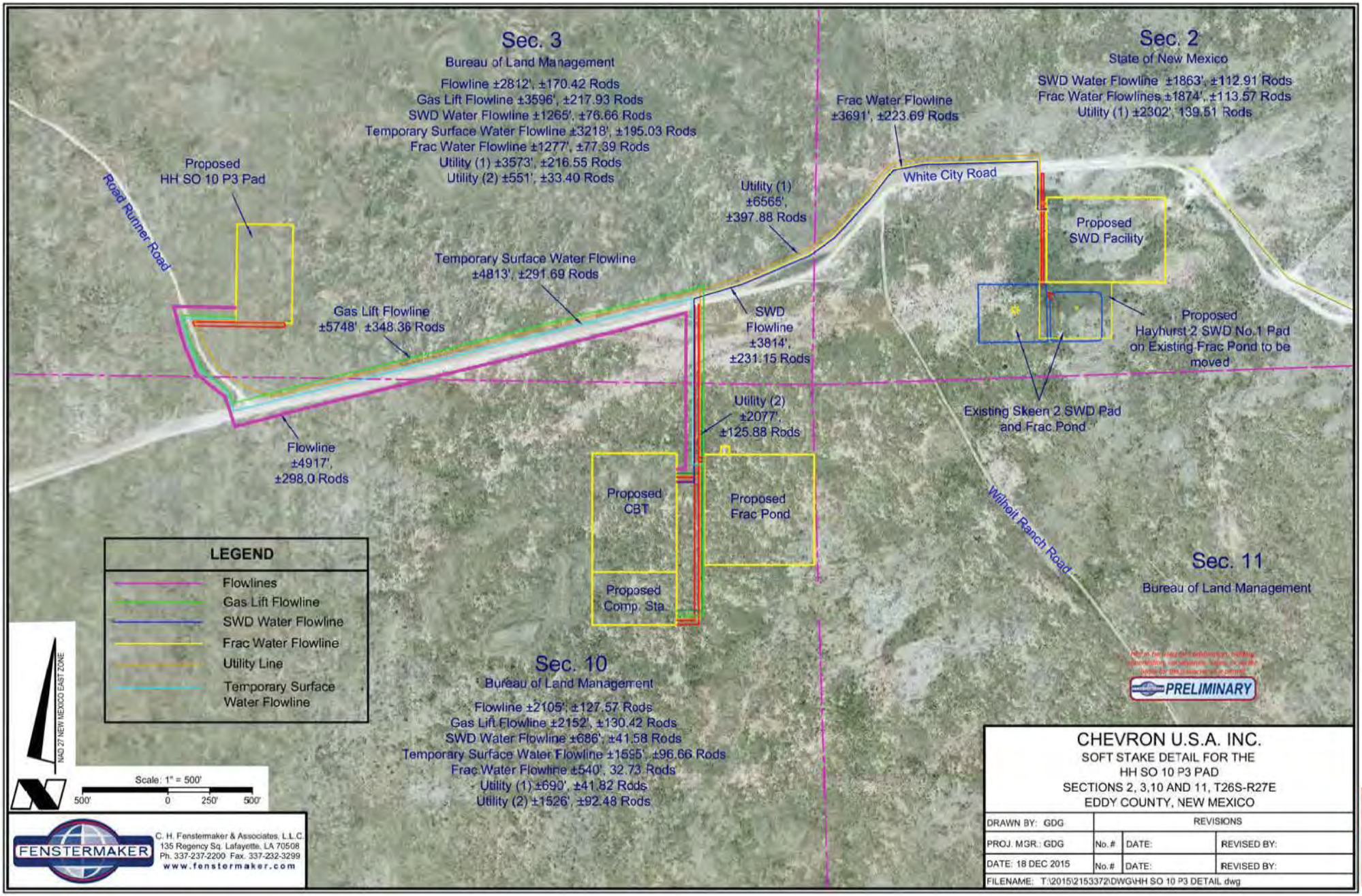
Sec. 3
Bureau of Land Management
Flowline ±2812', ±170.42 Rods
Gas Lift Flowline ±3596', ±217.93 Rods
SWD Water Flowline ±1265', ±76.66 Rods
Temporary Surface Water Flowline ±3218', ±195.03 Rods
Frac Water Flowline ±1277', ±77.39 Rods
Utility (1) ±3573', ±216.55 Rods
Utility (2) ±551', ±33.40 Rods
Sec. 2
State of New Mexico
SWD Water Flowline ±1863', ±112.91 Rods
Frac Water Flowlines ±1874', ±113.57 Rods
Utility (1) ±2302', 139.51 Rods
Frac Water Flowline ±3691', ±223.69 Rods
White City Road
Road Runner Road
Proposed HH SO 10 P3 Pad
Utility (1) ±6565', ±397.88 Rods
Proposed SWD Facility
Temporary Surface Water Flowline ±4813', ±291.69 Rods
Gas Lift Flowline ±5748', ±348.36 Rods
SWD Flowline ±3814', ±231.15 Rods
Proposed Hayhurst 2 SWD No.1 Pad on Existing Frac Pond to be moved
Utility (2) ±2077', ±125.88 Rods
Existing Skeen 2 SWD Pad and Frac Pond
Flowline ±4917', ±298.0 Rods
Proposed CBT
Proposed Frac Pond
Wilhoit Ranch Road
Sec. 11
Bureau of Land Management
Proposed Comp. Sta.
LEGEND
Flowlines
Gas Lift Flowline
SWD Water Flowline
Frac Water Flowline
Utility Line
Temporary Surface Water Flowline
NAD 27 NEW MEXICO EAST ZONE
Scale: 1" = 500'
500' 0 250' 500'
Sec. 10
Bureau of Land Management
Flowline ±2105', ±127.57 Rods
Gas Lift Flowline ±2152', ±130.42 Rods
SWD Water Flowline ±686', ±41.58 Rods
Temporary Surface Water Flowline ±1595', ±96.66 Rods
Frac Water Flowline ±540', 32.73 Rods
Utility (1) ±690', ±41.82 Rods
Utility (2) ±1526', ±92.48 Rods
PRELIMINARY
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www.fenstermaker.com
CHEVRON U.S.A. INC.
SOFT STAKE DETAIL FOR THE
HH SO 10 P3 PAD
SECTIONS 2, 3,10 AND 11, T26S-R27E
EDDY COUNTY, NEW MEXICO
DRAWN BY: GDG
PROJ. MGR.: GDG
DATE: 18 DEC 2015
REVISIONS
No.# DATE: REVISED BY:
No.# DATE: REVISED BY:
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EXHIBITS 4&5

CHEVRON U.S.A. Inc
HH SO 10 P3 23H
NMNM 121473
SECTION 3, T26S-R27E (Off Lease SHL) SECTION 15, T26S, R27E
SHL 528' FSL & 2066' FWL BHL 180' FSL & 1652' FWL

APD Surface Use Plan of Operations

This Surface Use Plan of Operations has been designed to be reviewed in conjunction with Hayhurst Development Area (HDA) Master Development Plan

HDA Master Development Plan Reference Table
The contents referenced below apply to all HDA APD's

Existing Roads	Exhibit 1, MDP SUPO Page 1
Construction Materials	MDP SUPO Page 6
Methods for Handling Waste	MDP SUPO Page 6
Reclamation Objectives	MDP SUPO Page 6-8
Final Surface Reclamation	MDP SUPO Page 6-8

Driving Directions

- Driving Directions – From Malaga, New Mexico. The location is approximately 11.5 miles from the nearest town, which is Malaga, New Mexico. From Malaga, proceed South on Highway 285 approximately 11.5 miles and turn right (West) onto White City Rd and go approximately 6.8 miles on White City Road until the road reaches an intersection with Roadrunner Rd. Turn right onto this and travel 100 yards, then the access road and well location is on the right.

New or Reconstructed Access Roads – (Exhibit 2, MDP SUPO Pg. 1)

- There will be 2,758' of new road construction for this proposal.
- Ditches: See Exhibit 2 (To be submitted at later date)
- Culverts: See Exhibit 2 (To be submitted at later date)
- Road Cuts: See Exhibit 2 (To be submitted at later date)

Location of Existing Wells (Exhibit 3)

- 1-Mile radius map is attached

Location of Existing and/or Proposed Production Facilities (Exhibit 4, MDP SUP Pg. 2)

- Facilities: Proposed production facilities located in the NE corner of Sec. 10, T26S-R27E where oil and gas sales will take place.
    - The proposed facility and frac pond is in Sec. 10, T26S-R27E
    - Gas purchaser pipeline is in place at the tank battery.
    - Open top tanks or open containments will be netted.
    - Open vent exhaust stacks will be modified to prevent birds or bats from entering, discourage perching, roosting, and nesting.
    - Facilities will have a secondary containment 1.5 times the holding capacity of largest storage tank.
    - All above ground structures will be painted non-reflective shale green for blending with surrounding environment.
    - The permanent water disposal system will be determined prior to construction of any water transfer pipeline. Until permanent water takeaway is available, produced water will be hauled off location in trucks. **Notification will be provided to BLM upon site selection and survey – plats (including SWD well information) will be provided.**
- Pipelines: See Detail – Exhibit 5
    - Pipelines Include:
        - 4,917' of Flowlines carrying production (buried)
        - 5,748' Gas Lift Line carrying pressurized gas (buried)
        - 3,814' SWD Line carrying produced water (buried)
        - 3,691' Permanent Frac water line carrying fresh water (buried)
        - 4,813' Temporary Water line carrying fresh water (surface)
    - A ROW will be applied for through the State and BLM.
    - All construction activity will be confined to the approved ROW.
    - Pipeline will run parallel to the road and will stay within approved ROW.
- Power lines\Utility lines: 8,642' of new power lines

Location and Types of Water Supply (Exhibit 5, MDP SUPO Pg. 5)

- Proposed pond in Section 10, T26S-R27E will be utilized for fresh water.
- Fresh water will be obtained from a private water source.

Construction Materials (MDP SUPO Pg. 6)

- Location-specific caliche sources will be provided in post-application supplement

CHEVRON U.S.A. Inc
HH SO 10 P3 23H
NMNM 121473
SECTION 3, T26S-R27E (Off Lease SHL) SECTION 15, T26S, R27E
SHL 528' FSL & 2066' FWL BHL 180' FSL & 1652' FWL

Well Site Layout (Exhibit 6)

- Surveyor Plat (Exhibit 6a)
  - Exterior well pad dimensions are 580' x 330'
  - Interior well pad dimensions from point of entry (well head) of the well are N-375', S-205', E-150', W-180'. Total disturbance area needed for construction of well pad will be approximately 4.4 acres
  - Topsoil placement is on the west where interim reclamation is planned to be completed upon completion of well and evaluation of best management practices.
  - Cut and fill: will be minimal.
- Rig Layout (Exhibit 6b)

Plans for Surface Reclamation (Exhibit 6, MDP SUPA Pg. 8)

Interim Reclamation Procedures

- Reclaimed pad size: 200' x 325'
- See Exhibit for reclaimed pad layout, topsoil location & erosion control features

Surface Ownership

- BLM Surface
  - Surface Tenant – Phillip Stell
- **Nearest Post Office:** Malaga Post Office; 11.4 Miles north

Other Information

- On-site performed by BLM NRS: Paul Murphy 11/4/2015
- Cultural report attached: **Yes** Participating Agreement attached: N/A

CHEVRON U.S.A. Inc
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NMNM 121473
SECTION 3, T26S-R27E (Off Lease SHL) SECTION 15, T26S, R27E
SHL 528' FSL & 2066' FWL BHL 180' FSL & 1652' FWL

Chevron Representatives

Primary point of contact:
Jennifer Van Curen
Jennifer.VanCuren@arcadis-us.com
M- 432-270-8753

Chevron Functional Contacts

Project Manager Name: Sean Cheben Address: 1400 Smith Street Houston, TX 77002 Phone: (432) 664-6809 Email: Sean.Cheben@chevron.com	**Drilling Engineer** Name: Roderick Milligan Address: 1400 Smith Street Houston, TX 77002 Phone: (281) 413-9794 Email: RoderickMilligan@chevron.com
Surface Land Representative Name: Kevin Dickerson Address: 15 Smith Road Midland Texas 79705 Phone: (432) 687-7104 Email: Kevin.Dickerson@chevron.com	**Facility Lead** Name: Tyler Weaver Address: 1400 Smith Street Houston, TX 77002 Phone: (281) 384-8934 Email: tyler.weaver@chevron.com
Geologist Name: Jeff Fabre Address: 1400 Smith Street Houston, TX 77002 Phone: (713) 372-0523 Email: JeffreyFabre@chevron.com	**Regulatory Specialist** Cindy Herrera-Murillo Address: 1616 W. Bender Blvd, Hobbs, NM 88240 Office: (575) 263-0431 Email: CHerreraMurillo@chevron.com

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NMNM 121473
SECTION 3, T26S-R27E (Off Lease SHL) SECTION 15, T26S, R27E
SHL 528' FSL & 2066' FWL BHL 180' FSL & 1652' FWL

EXHIBITS:

Exhibit 1 -- Existing Roads

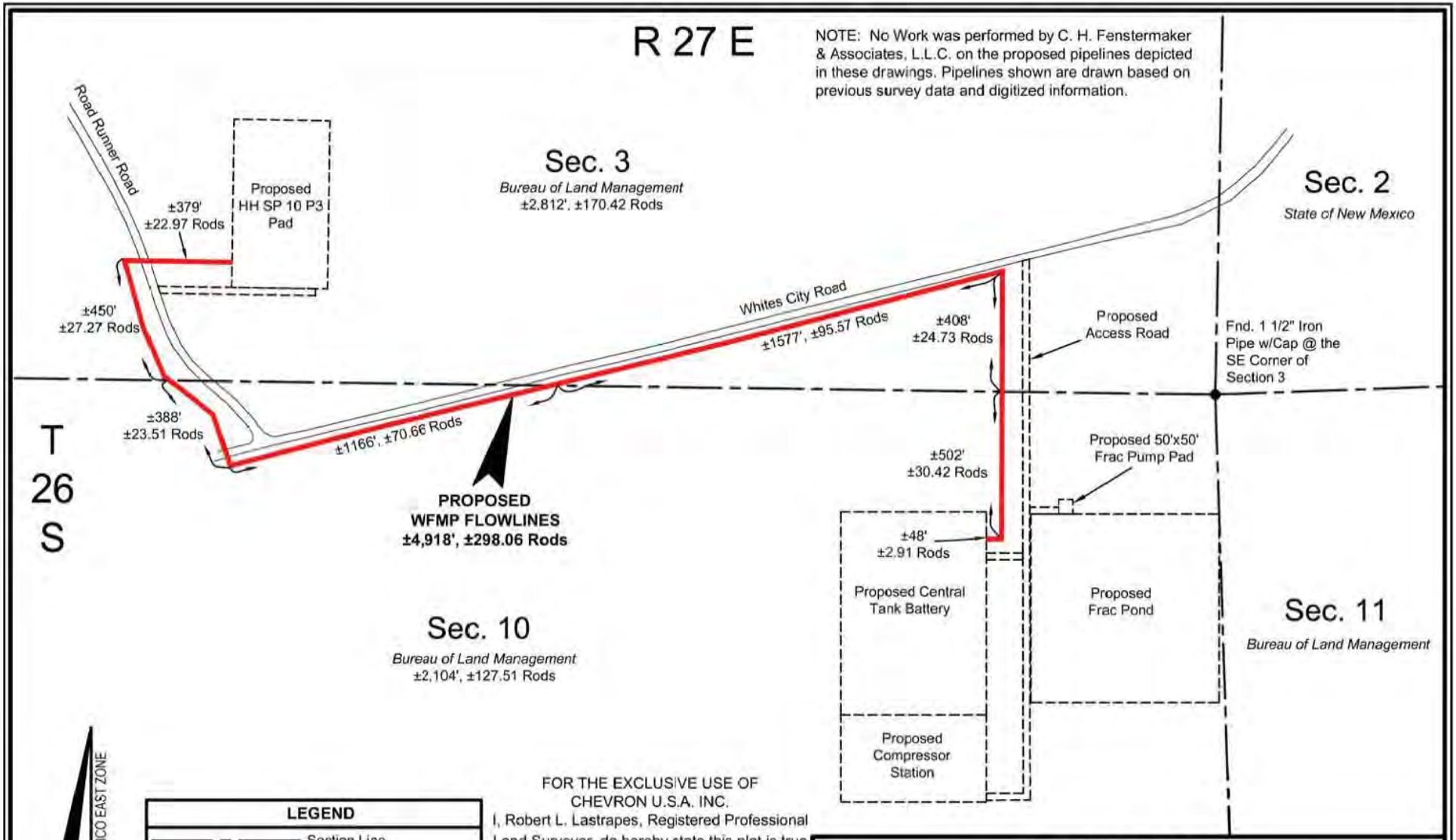
Exhibit 2 -- Survey Plat: New or Reconstructed Roads Map: if road is outside 600' x 600'.

Exhibit 3 -- 1-mile Radius Map

Exhibit 4 -- Location of Existing and/or Proposed Production Facilities (Tank Battery)

Exhibit 5 -- Survey Plat: Infrastructure: roads, pipelines, power lines, frac pond

Exhibit 6 -- Rig Layout: Well Site Layout Map / Diagram



FOR THE EXCLUSIVE USE OF CHEVRON U.S.A. INC.
I, Robert L. Lastrapes, Registered Professional Land Surveyor, do hereby state this plat is true and correct to the best of my knowledge.

Not to be used for construction, bidding, recordation, conveyance, sales, or as the basis for the issuance of a permit.

PRELIMINARY

Robert L. Lastrapes
Registration No. 23006

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www.fenstermaker.com

SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED WFMP FLOWLINES
HH SO 10 P3
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

DRAWN BY: BOR	REVISIONS			
PROJ. MGR.: GDG	No.	DATE:	REVISED BY:	
DATE: 02/08/2016	No.	DATE:	REVISED BY:	
FILENAME: T:\2015\2153372\DWG\WFMP Flowlines_SUP.dwg				

EXHIBIT 5

DISCLAIMER: At this time, C.H. Fenstermaker & Associates, L.L.C. has not performed nor was asked to perform any type of engineering, hydrological modeling, flood plain, or "No Rise" certification analyses, including but not limited to determining whether the project will impact flood hazards in connection with federal/FEMA, state, and/or local laws, ordinances and regulations. Accordingly, Fenstermaker makes no warranty or representation of any kind as to the foregoing issues, and persons or entities using this information shall do so at their own risk.

NOTE:

1. Please be advised, that while reasonable efforts are made to locate and verify pipelines and anomalies using our standard pipeline locating equipment, it is impossible to be 100 % effective. As such, we advise using caution when performing work as there is a possibility that pipelines and other hazards, such as fiber optic cables, PVC pipelines, etc. may exist undetected on site.

2. Many states maintain information centers that establish links between those who dig (excavators) and those who own and operate underground facilities (operators). It is advisable and in most states, law, for the contractor to contact the center for assistance in locating and marking underground utilities. For guidance, New Mexico One Call, www.nmonecall.org

3. No Work was performed by C. H. Fenstermaker & Associates, L.L.C. on the proposed pipelines depicted in these drawings. Pipelines shown are drawn based on previous survey data and digitized information.

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SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED WFMP FLOWLINES
HH SO 10 P3
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

DRAWN BY: BOR	REVISIONS			
PROJ. MGR.: GDG	No.	DATE:		REVISED BY:
DATE: 02/08/2016	No.	DATE:		REVISED BY:
FILENAME: T:\2015\2153372\DWG\Gas Lift Flowline_SUP.dwg				

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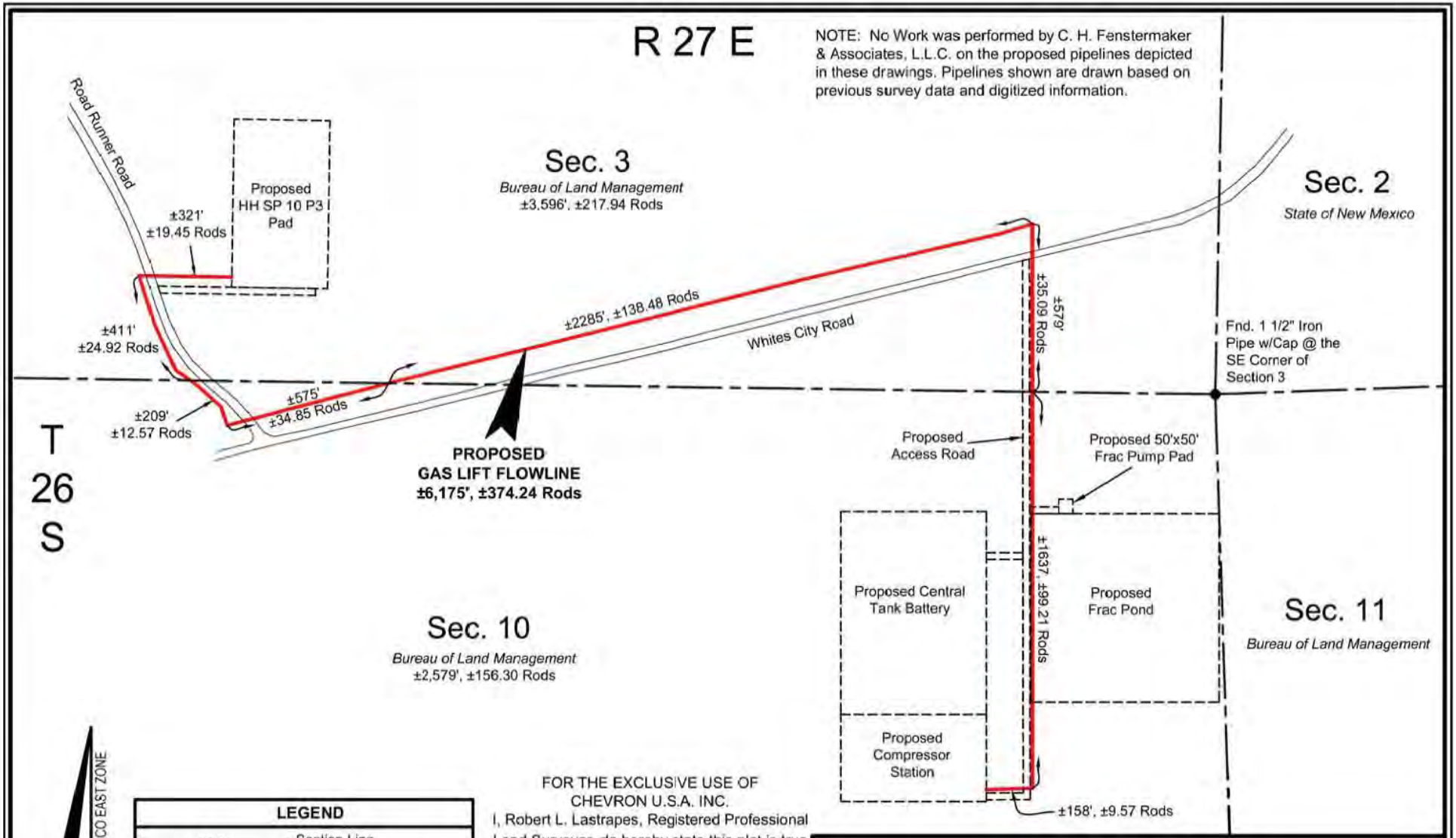

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SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED GAS LIFT FLOWLINE
HH SO 10 P3
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

PAGE 1 OF 2

DRAWN BY: BOR	REVISIONS			
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DATE: 02/08/2016	No.	DATE:	REVISED BY:	
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SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED GAS LIFT FLOWLINE
HH SO 10 P3
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

DRAWN BY: BOR	REVISIONS			
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DATE: 02/08/2016	No.	DATE:	REVISED BY:	
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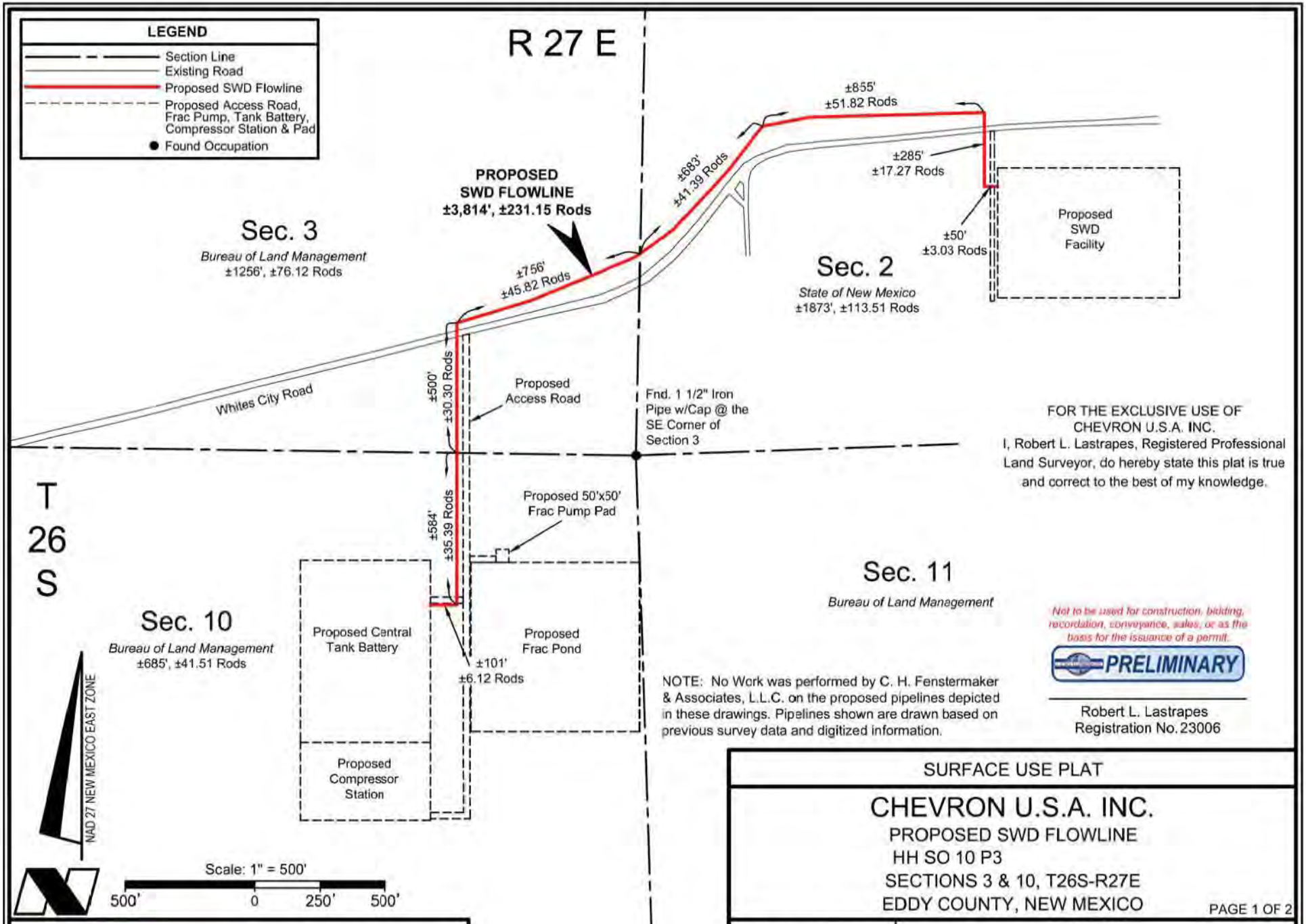

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PRELIMINARY

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SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED SWD FLOWLINE
HH SO 10 P3
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

PAGE 1 OF 2

DRAWN BY: BOR	REVISIONS		
PROJ. MGR.: GDG	No.	DATE:	REVISED BY:
DATE: 02/10/2016	No.	DATE:	REVISED BY:
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SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED SWD FLOWLINE
HH SO 10 P3
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

DRAWN BY: BOR	REVISIONS		
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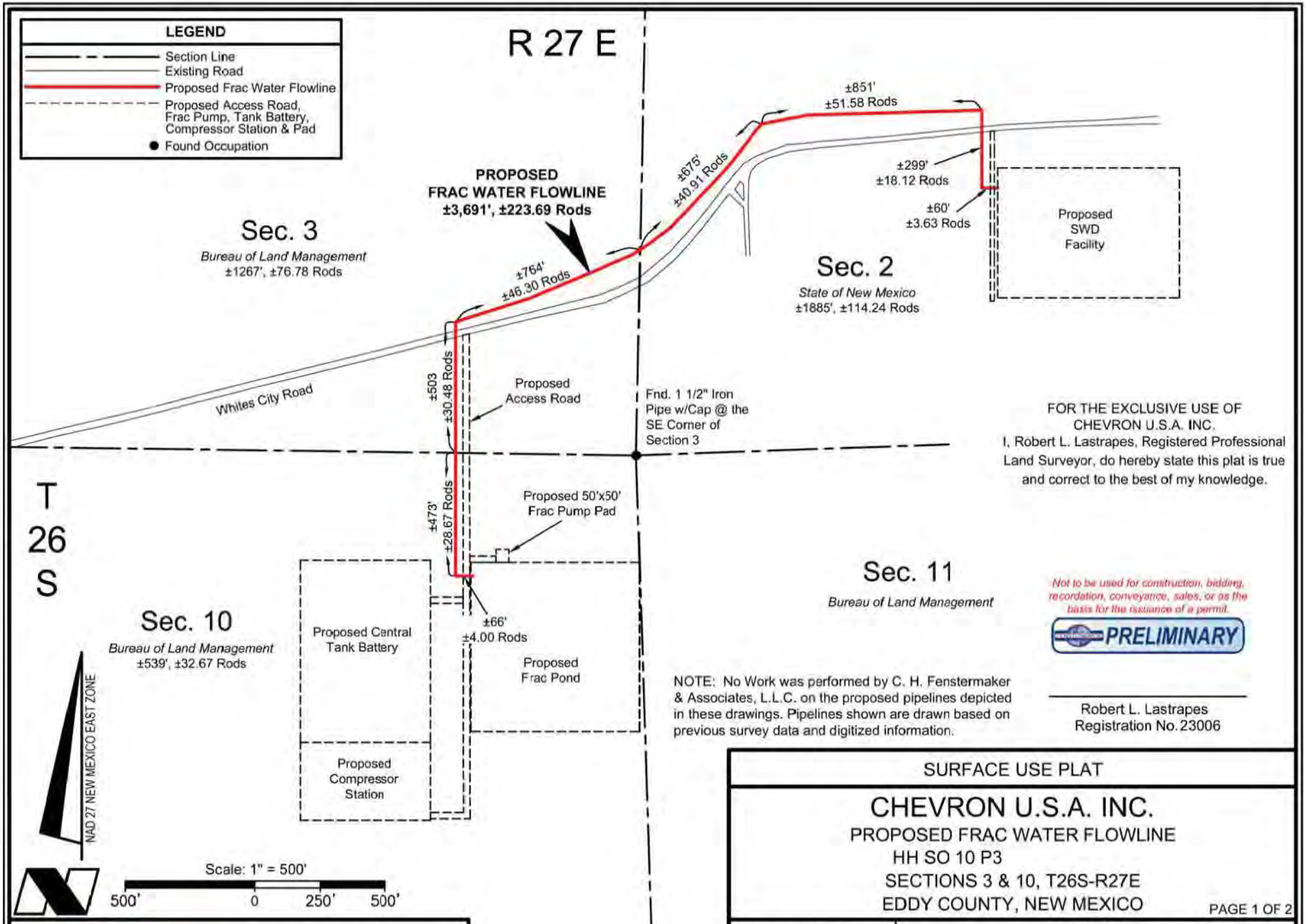

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Robert L. Lastrapes
Registration No. 23006

SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED FRAC WATER FLOWLINE
HH SO 10 P3
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

PAGE 1 OF 2

DRAWN BY: BOR	REVISIONS			
PROJ. MGR.: GDG	No.	DATE:	REVISED BY:	
DATE: 02/10/2016	No.	DATE:	REVISED BY:	
FILENAME: T:\2015\2153372\DWG\Frac Water FL_SUP.dwg				

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FOR THE EXCLUSIVE USE OF
CHEVRON U.S.A. INC.
I, Robert L. Lastrapes, Registered Professional Land Surveyor, do hereby state this plat is true and correct to the best of my knowledge.

Not to be used for construction, bidding, recordation, conveyance, sales, or as the basis for the issuance of a permit.

PRELIMINARY

Robert L. Lastrapes
Registration No. 23006

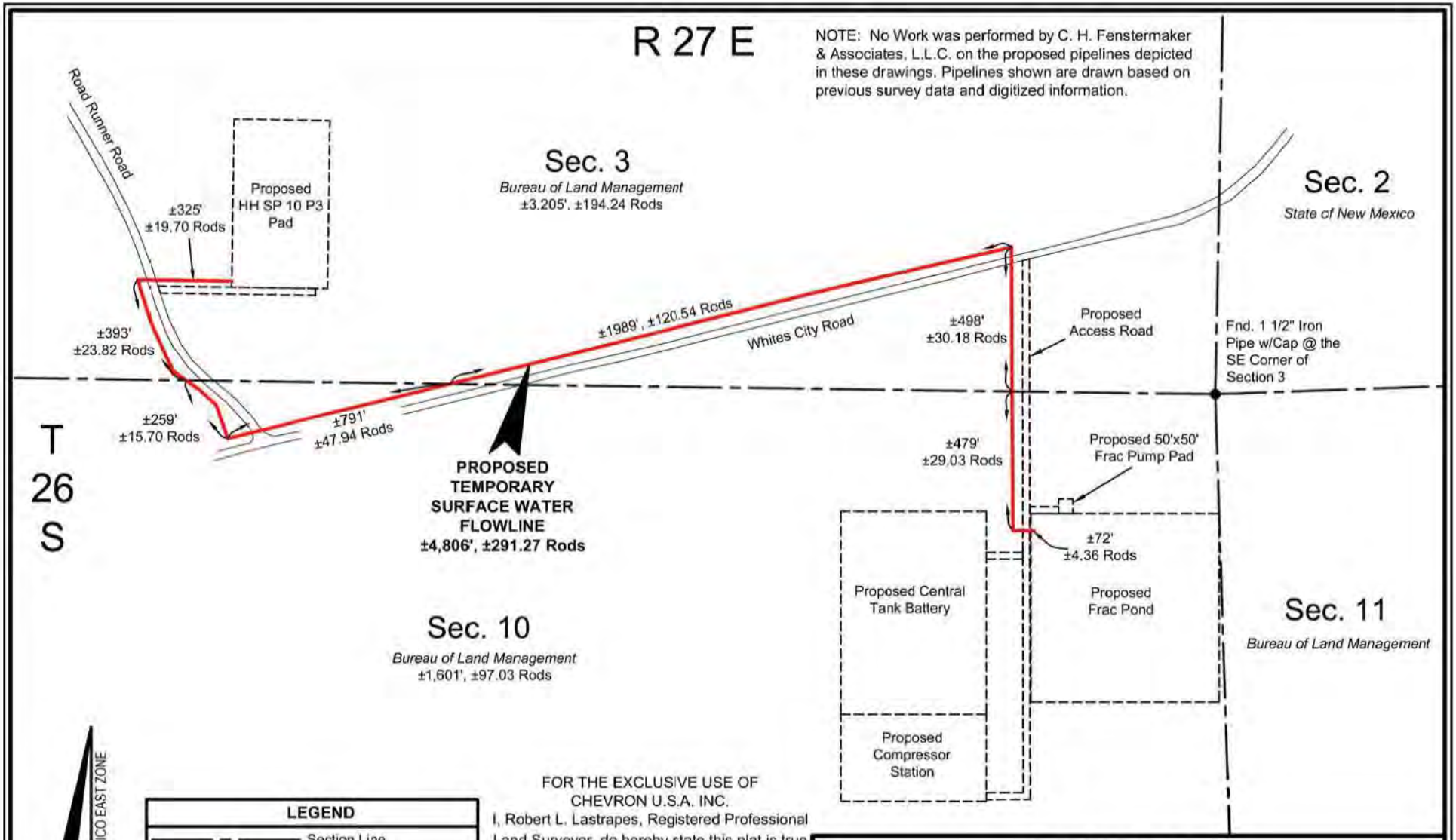
FENSTERMAKER
C. H. Fenstermaker & Associates, L.L.C.
135 Regency Sq. Lafayette, LA 70508
Ph. 337-237-2200 Fax. 337-232-3299
www.fenstermaker.com

SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED FRAC WATER FLOWLINE
HH SO 10 P3
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

DRAWN BY: BOR	REVISIONS			
PROJ. MGR.: GDG	No.	DATE:		REVISED BY:
DATE: 02/10/2016	No.	DATE:		REVISED BY:
FILENAME: T:\2015\2153372\DWG\Frac Water FL_SUP.dwg				



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PROPOSED TEMPORARY SURFACE WATER FLOWLINE
HH SO 10 P3
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

PAGE 1 OF 2

DRAWN BY: BOR	REVISIONS		
PROJ. MGR.: GDG	No.	DATE:	REVISED BY:
DATE: 02/08/2016	No.	DATE:	REVISED BY:
FILENAME: T:\2015\2153372\DWG\Temporary Surface Water Flowline_SUP.dwg			

EXHIBIT 5

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CHEVRON U.S.A. INC.

PROPOSED TEMPORARY SURFACE WATER FLOWLINE
HH SO 10 P3
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

DRAWN BY: BOR	REVISIONS			
PROJ. MGR.: GDG	No.	DATE:	REVISED BY:	
DATE: 02/08/2016	No.	DATE:	REVISED BY:	
FILENAME: T:\2015\2153372\DWG\Temporary Surface Water Flowline_SUP.dwg				

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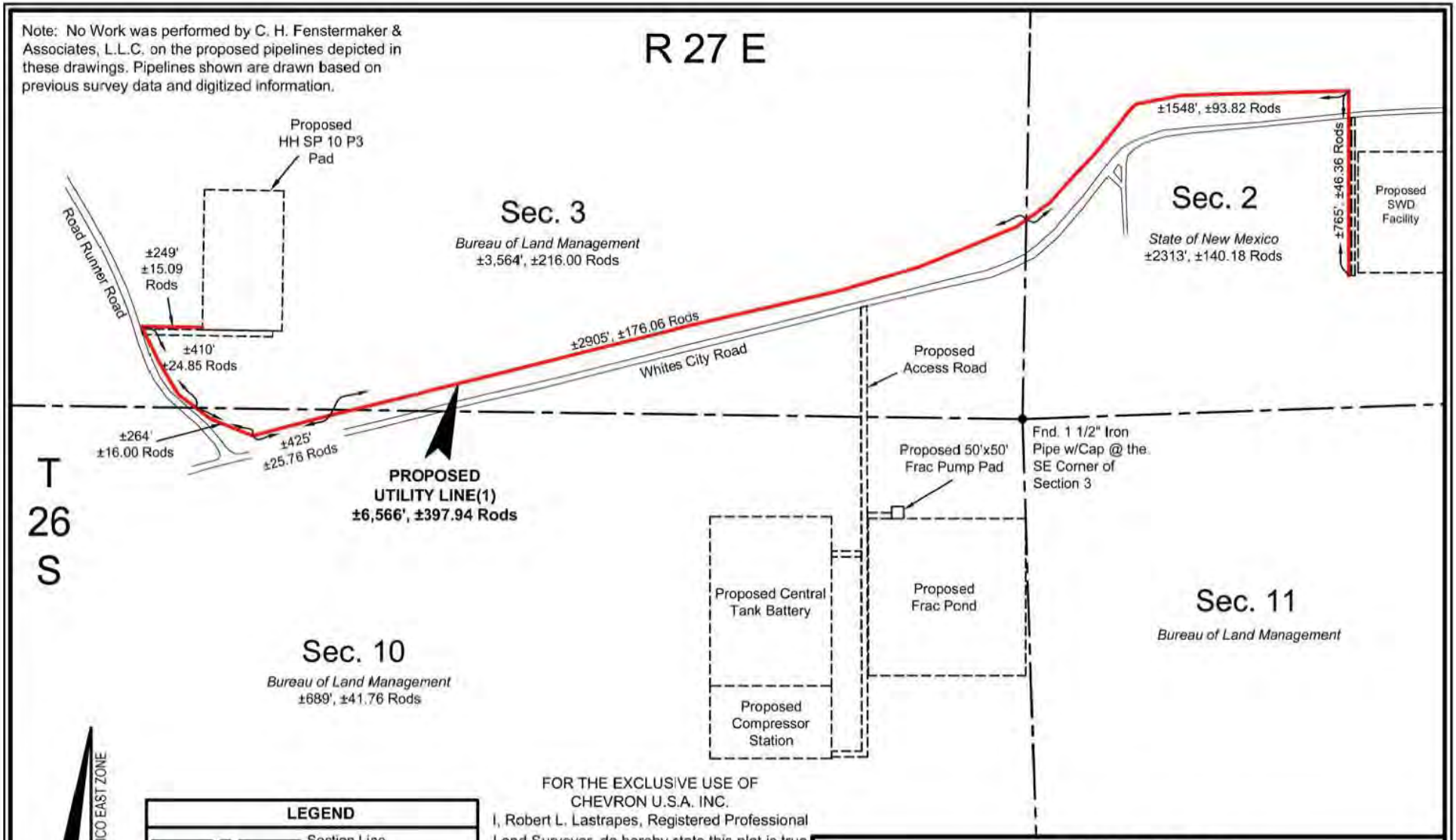

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SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED UTILITY LINE(1)
HH SO 10 P3
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

DRAWN BY: BOR	REVISIONS		
PROJ. MGR.: GDG	No.	DATE:	REVISED BY:
DATE: 02/08/2016	No.	DATE:	REVISED BY:
FILENAME: T:\2015\2153372\DWG\Utility Line 1_SUP.dwg			

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EDDY COUNTY, NEW MEXICO

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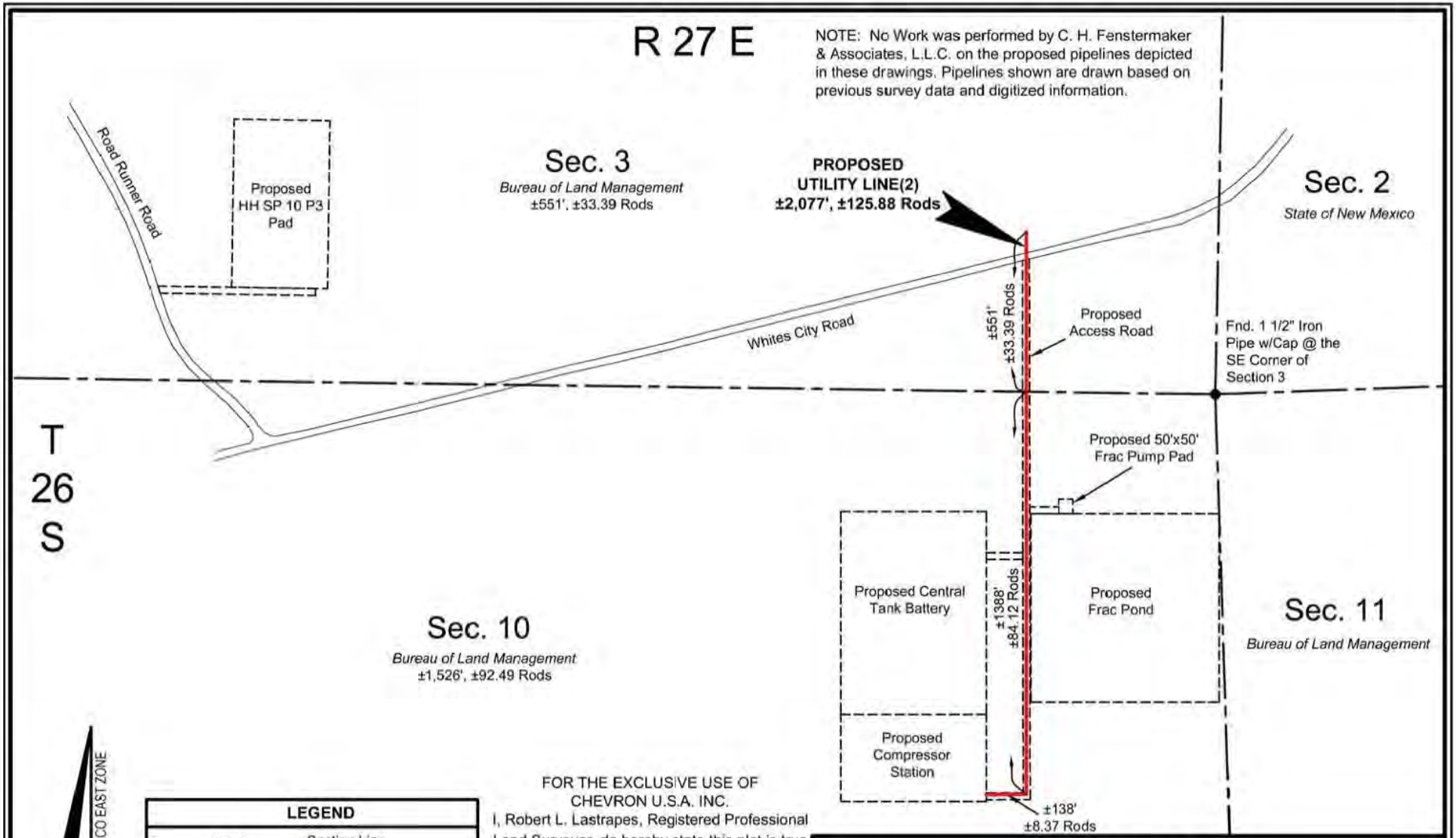

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SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED UTILITY LINE(2)
HH SO 10 P3
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

PAGE 1 OF 2

DRAWN BY: BOR	REVISIONS			
PROJ. MGR.: GDG	No.	DATE:	REVISED BY:	
DATE: 02/08/2016	No.	DATE:	REVISED BY:	
FILENAME: T:\2015\2153372\DWG\Utility Line 2_SUP.dwg				

EXHIBIT 5

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PROPOSED UTILITY LINE(2)
HH SO 10 P3
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

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DATE: 02/08/2016	No.	DATE:	REVISED BY:
FILENAME: T:\2015\2153372\DWG\Utility Line 2_SUP.dwg			

Form 3160-3
(June 2015)

FORM APPROVED
OMB No. 1004-0137
Expires: January 31, 2018

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

5. Lease Serial No.
NMNM121473

6. If Indian, Allotee or Tribe Name

1a. Type of work: [✓] DRILL [ ] REENTER

1b. Type of Well: [✓] Oil Well [ ] Gas Well [ ] Other

1c. Type of Completion: [ ] Hydraulic Fracturing [✓] Single Zone [ ] Multiple Zone

7. If Unit or CA Agreement, Name and No.

8. Lease Name and Well No.
HH SO 10 P3

2. Name of Operator
CHEVRON USA INC

9. API Well No.
24H

3a. Address
1616 W. BENDER BLVD HOBBS, NM 88240

3b. Phone No. *(include area code)*
575-263-0431

10. Field and Pool, or Exploratory
WILDCAT; WOLFCAMP

4. Location of Well *(Report location clearly and in accordance with any State requirements.*)*
At surface 553' FSL & 2066' FWL
At proposed prod. zone 180' FSL & 2315" FWL

11. Sec., T. R. M. or Blk. and Survey or Area
SEC 3, T26S, R27E, UL N (SHL)

14. Distance in miles and direction from nearest town or post office*
12.8 MILES FROM MALAGA, NEW MEXICO

12. County or Parish
EDDY

13. State
NM

15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drlg. unit line, if any) 553' FSL

16. No of acres in lease
1920 ACRES

17. Spacing Unit dedicated to this well
320 ACRES

18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft. 4300 FT SKEEN 2 SW

19. Proposed Depth
TD 9,342' MD 19,973"

20. BLM/BIA Bond No. in file
CA 0329

21. Elevations (Show whether DF, KDB, RT, GL, etc.)
3279' GL

22. Approximate date work will start*
OCTOBER 2016

23. Estimated duration
30 DAYS

24. Attachments

The following, completed in accordance with the requirements of Onshore Oil and Gas Order No. 1, and the Hydraulic Fracturing rule per 43 CFR 3162.3-3 (as applicable)

1. Well plat certified by a registered surveyor.
2. A Drilling Plan
3. A Surface Use Plan (if the location is on National Forest System Lands, the SUPO must be filed with the appropriate Forest Service Office).
4. Bond to cover the operations unless covered by an existing bond on file (see Item 20 above).
5. Operator certification.
6. Such other site specific information and/or plans as may be requested by the BLM.

25. Signature: Cindy Herrera-Murillo

Name *(Printed/Typed)*
CINDY HERRERA-MURILLO

Date
02/11/2016

Title
PERMITTING SPECIALIST

Approved by *(Signature)*

Name *(Printed/Typed)*

Date

Title

Office

Application approval does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.
Conditions of approval, if any, are attached.

Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212, make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

(Continued on page 2)

*(Instructions on page 2)

CERTIFICATION

I hereby certify that I, or someone under my direct supervision, have inspected the drill site and access route proposed herein; that I am familiar with the conditions which currently exist; that I have full knowledge of state and federal laws applicable to this operation; that the statements made in this APD package are, to the best of my knowledge, true and correct; and, that the work associated with the operations proposed will be performed in conformity with this APD package and the terms and conditions under which it is approved. I also certify that I, or the company I represent, am responsible for the operations conducted under this application. These statements are subject to the provisions of 18 U.S.C. 1001 for the filing of a false statement.

Executed this 19th day of JANUARY, 2016

Name: _____

Sean Cheben-Project Manager

Address: 1400 Smith Street

Houston, TX 77002

Room 40125

Office: 713-372-9382

Email: Sean.Cheben@CHEVRON.COM

Cindy Herrera-Murillo
Permitting Specialist
Midcontinent BU

Chevron North America
Exploration and Production Company
(A Chevron U.S.A. Inc. Division)
1616 W. Bender Blvd
Hobbs FMT, Hobbs, NM 88240
Tel 575-263-0431
Cherreramurillo@chevron.com

February 10, 2016

BLM-Carlsbad Field Office
620 E. Greene Street
Carlsbad, New Mexico 88220

Re: Applications to Drill
For Hayhurst Development Area in NM
MDP- 2016-1

Dear Sirs,

Chevron U.S.A. Inc. respectfully submits 12 Applications to Drill (APD's) with the Hayhurst Development Area's Master Development Plan (MDP-2016-1).

There will be 2 pads and 6 wells on each pad. The first well pad includes the following APD's:

HH SO 10 P3 #7H; HH SO 10 P3 #8H; HH SO 10 P3 #15H; HH SO 10 P3 #16H; HH SO 10 P3 #23H; HH SO 10 P3 #24H.

The second well pad includes the following APD's:

HH SO 8 P2 #5H; HH SO 8 P2 #6H; HH SO 8 P2 #13H; HH SO 8 P2 # 14H; HH SO 8 P2 #21H; HH SO 8 P2 #22H.

Your prompt consideration and approval of these applications will be greatly appreciated. If additional information is required, you may contact me at 575-263-0431, or by email at Cherreramurillo@chevron.com.

Sincerely,

Cindy Herrera-Murillo

Cindy Herrera-Murillo
Permitting Specialist
Enclosures

District I
1625 N. French Dr., Hobbs, NM 88240
Phone: (575) 393-6161 Fax: (575) 393-0720
District II
811 S. First St., Artesia, NM 88210
Phone: (575) 748-1283 Fax: (575) 748-9720
District III
1000 Rio Brazos Road, Aztec, NM 87410
Phone: (505) 334-6178 Fax: (505) 334-6170
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505
Phone: (505) 476-3460 Fax: (505) 476-3462

State of New Mexico
Energy, Minerals & Natural Resources Department
OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-102
Revised August 1, 2011
Submit one copy to appropriate District Office

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

[1] API Number	[2] Pool Code	[3] Pool Name
		Wildcat;Wolfcamp

[4] Property Code	[5] Property Name	[6] Well Number
	HH SO 10 P3	24H

[7] OGRID No.	[8] Operator Name	[9] Elevation
4323	CHEVRON U.S.A. INC.	3279'

[10] Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
N	3	26 SOUTH	27 EAST, N.M.P.M.		553'	SOUTH	2066'	WEST	EDDY

[11] Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
N	15	26 SOUTH	27 EAST, N.M.P.M.		180'	SOUTH	2315'	WEST	EDDY

[12] Dedicated Acres	[13] Joint or Infill	[14] Consolidation Code	[15] Order No.
320			

No allowable will be assigned to this completion until all interests have been consolidated or a non-standard unit has been approved by the division.

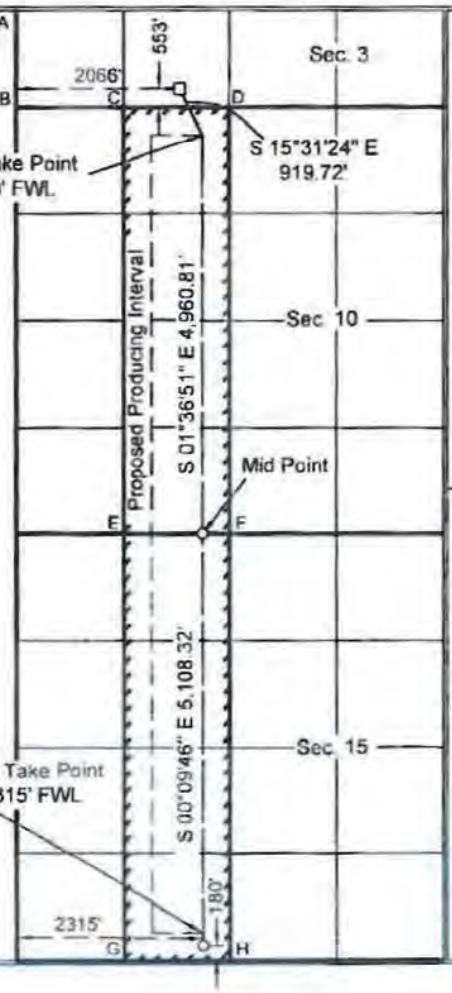
HH SO 10 P3 24H WELL		
X=	547,567	NAD 27
Y=	387 534	
LAT.	32.065353	
LONG	104 179781	
X=	588,751	NAD83
Y=	387,591	
LAT.	32.065475	
LONG	104 180273	
ELEVATION +3279' NAVD 88		

CORNER COORDINATES TABLE (NAD 27)

A - Y=392447 75, X=545573 63
B - Y=387009 20, X=545492 91
C - Y=386991.36, X=546813.37
D - Y=386973.51, X=548133.83
E - Y=381698.68, X=546952.45
F - Y=381685.77, X=548282.84
G - Y=376406.42, X=546975.58
H - Y=376398 76, X=548297 64

Mid Point
Y=381688 98, X=547952.62

PROPOSED BOTTOM HOLE LOCATION		
X=	547,967	NAD 27
Y=	376,581	
LAT	32 035240	
LONG	104 178539	
X=	589,151	NAD83
Y=	376,638	
LAT	32.035363	
LONG	104 179031	



[17] OPERATOR CERTIFICATION

I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division

Cindy Herrera-Murillo 2-4-16
Signature Date

Cindy Herrera-Murillo
Printed Name

Cherreramurillo@chevron.com
E-mail Address

[18] SURVEYOR CERTIFICATION

I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.

12-8-2015
Date of Survey

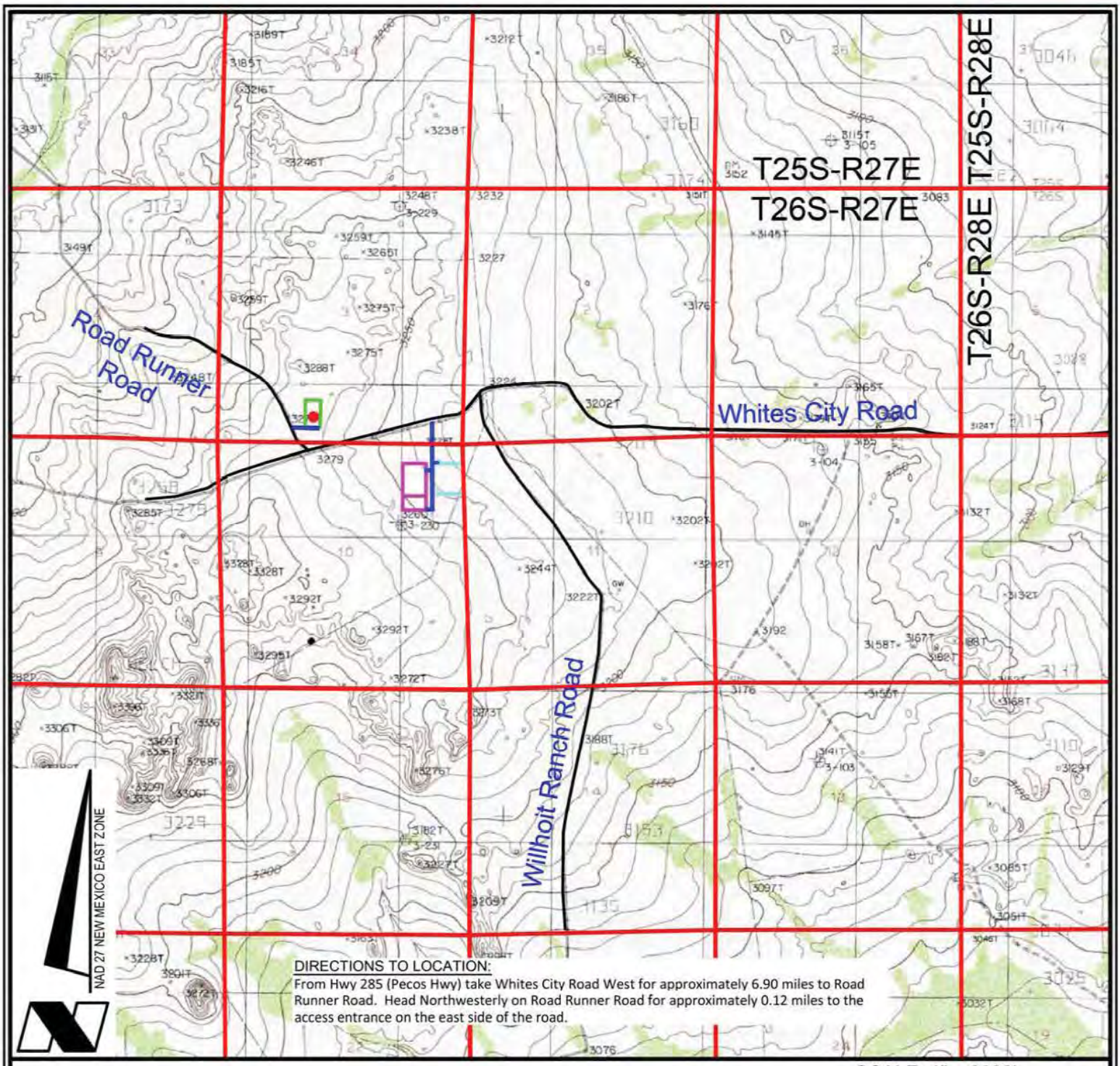
Signature and Seal of Professional Surveyor

ROBERT L. HARGRAVES NEW MEXICO PROFESSIONAL SURVEYOR 23006

12-22-2015

23006
Certificate Number

EXHIBIT 1



DIRECTIONS TO LOCATION:
From Hwy 285 (Pecos Hwy) take Whites City Road West for approximately 6.90 miles to Road Runner Road. Head Northwesterly on Road Runner Road for approximately 0.12 miles to the access entrance on the east side of the road.

VICINITY MAP

SCALE: 1" = 3000'

3000' 0 1500' 3000'

LEGEND

- Proposed Well
- Proposed Access Road
- Proposed Drillsite
- Existing Road
- Section Line
- Proposed Frac Pond
- Proposed Facility

CHEVRON U.S.A. INC.

HH SO 10 P3 NO. 24H WELL
LOCATED 553' FSL AND 2066' FWL
SECTION 3, T26S-R27E
EDDY COUNTY, NEW MEXICO

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135 Regency Sq. Lafayette, LA 70508
Ph. 337-237-2200 Fax. 337-232-3299
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DRAWN BY: LJG	REVISIONS		
PROJ. MGR.: GDG	No.	DATE:	REVISED BY:
DATE: 12/16/2015	No.	DATE:	REVISED BY:
FILENAME: T:\2015\2153367\DWG\HH SO 10 P3 24H_APD.dwg			

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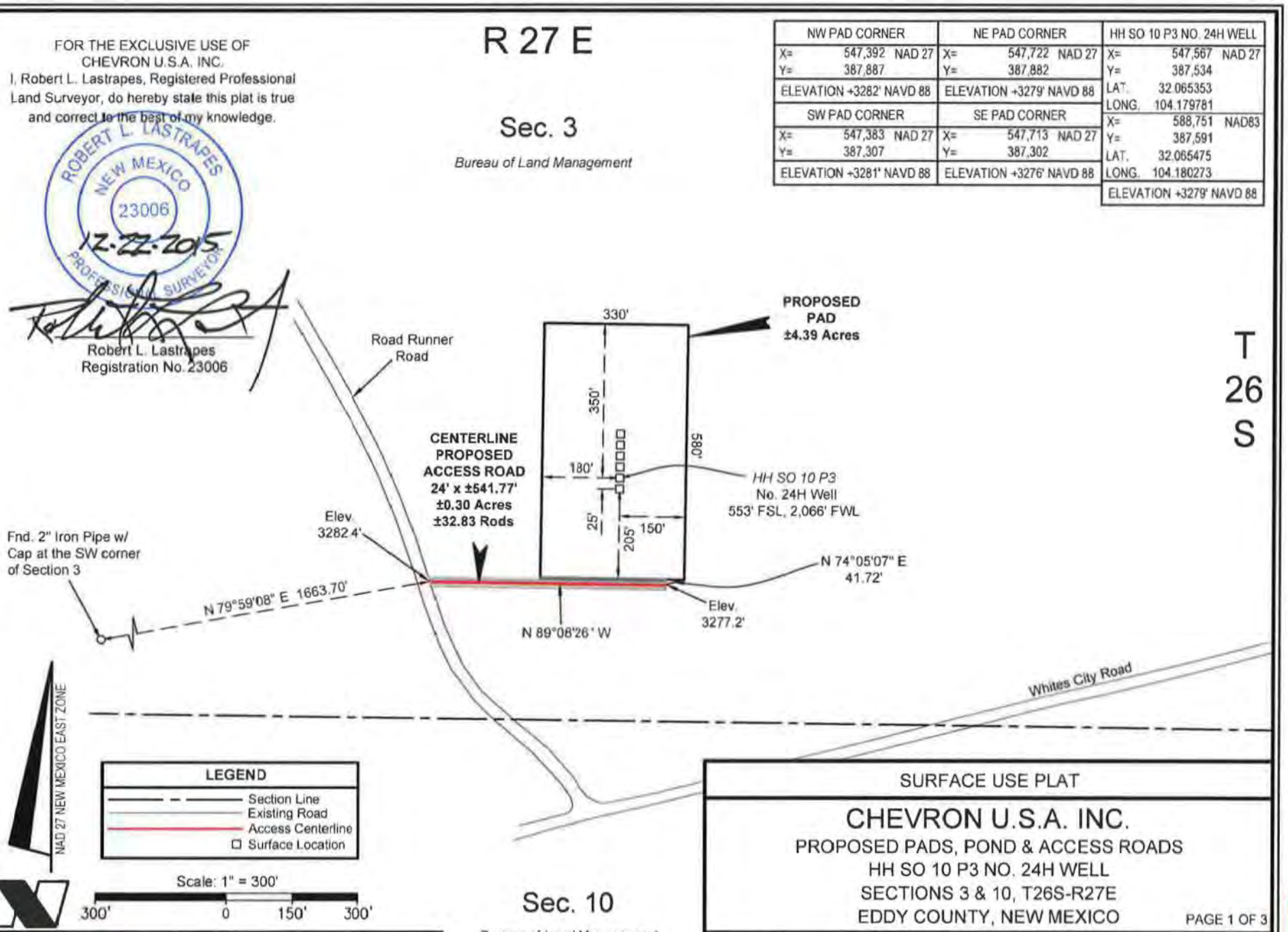
ROBERT L. LASTRAPES
NEW MEXICO
23006
12-22-2015
PROFESSIONAL SURVEYOR

Robert L. Lastrapes
Registration No. 23006

NW PAD CORNER	NE PAD CORNER	HH SO 10 P3 NO. 24H WELL
X= 547,392 NAD 27	X= 547,722 NAD 27	X= 547,567 NAD 27
Y= 387,887	Y= 387,882	Y= 387,534
ELEVATION +3282' NAVD 88	ELEVATION +3279' NAVD 88	LAT. 32.065353
SW PAD CORNER	SE PAD CORNER	LONG. 104.179781
X= 547,383 NAD 27	X= 547,713 NAD 27	X= 588,751 NAD83
Y= 387,307	Y= 387,302	Y= 387,591
ELEVATION +3281' NAVD 88	ELEVATION +3276' NAVD 88	LAT. 32.065475
		LONG. 104.180273
		ELEVATION +3279' NAVD 88



SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED PADS, POND & ACCESS ROADS
HH SO 10 P3 NO. 24H WELL
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

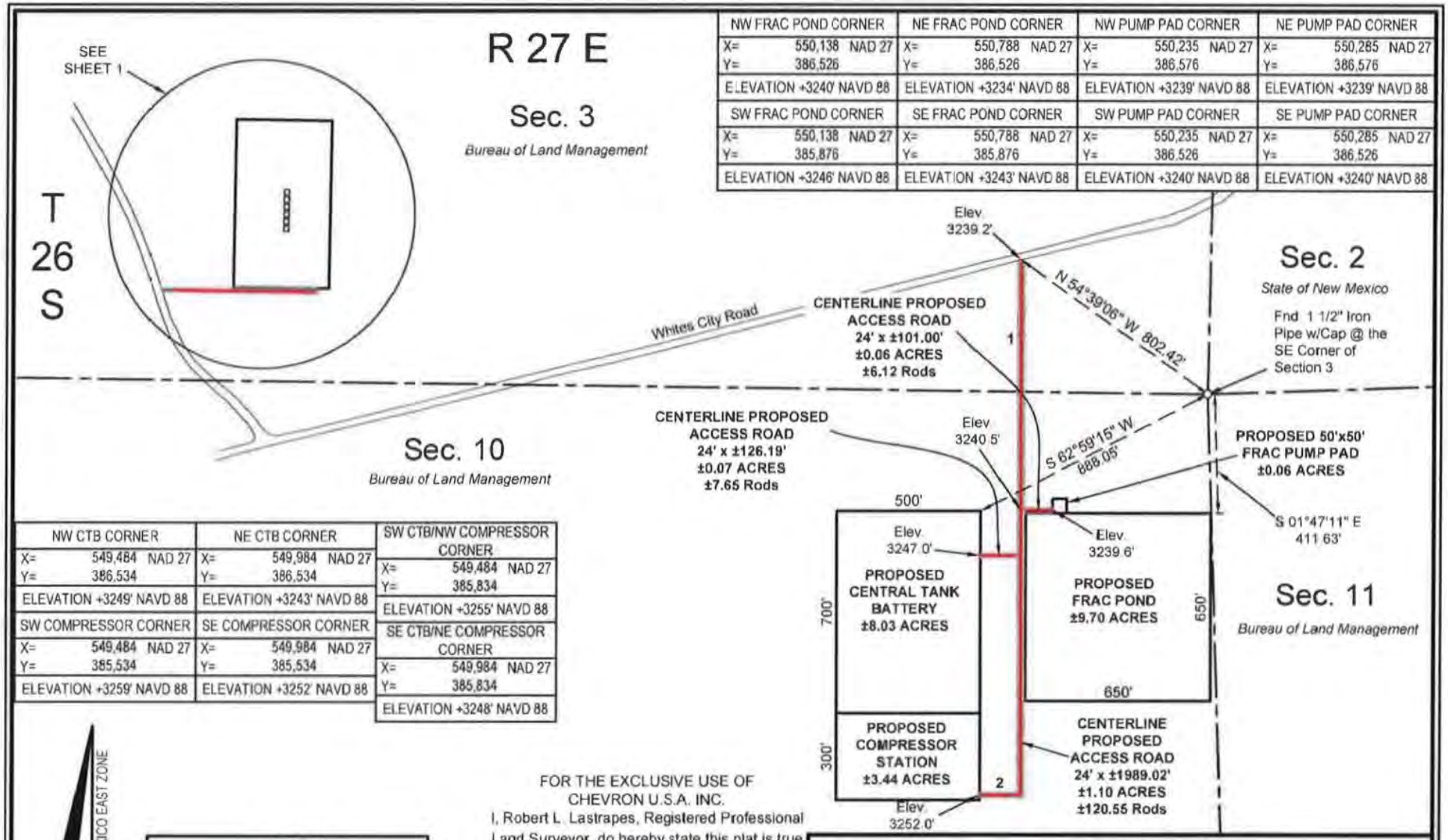
PAGE 1 OF 3

FENSTERMAKER
C. H. Fenstermaker & Associates, L.L.C.
135 Regency Sq. Lafayette, LA 70508
Ph. 337-237-2200 Fax 337-232-3299
www.fenstermaker.com

DRAWN BY: LJG	REVISIONS		
PROJ. MGR.: GDG	No.	DATE:	REVISED BY:
DATE: 12/16/2015	No.	DATE:	REVISED BY:
FILENAME: T:\2015\2153367\DWG\HH SO 10 P3 24H_SUP.dwg			

EXHIBITS 2&5

NW FRAC POND CORNER	NE FRAC POND CORNER	NW PUMP PAD CORNER	NE PUMP PAD CORNER
X= 550,138 NAD 27 Y= 386,526	X= 550,788 NAD 27 Y= 386,526	X= 550,235 NAD 27 Y= 386,576	X= 550,285 NAD 27 Y= 386,576
ELEVATION +3240' NAVD 88	ELEVATION +3234' NAVD 88	ELEVATION +3239' NAVD 88	ELEVATION +3239' NAVD 88
SW FRAC POND CORNER	SE FRAC POND CORNER	SW PUMP PAD CORNER	SE PUMP PAD CORNER
X= 550,138 NAD 27 Y= 385,876	X= 550,788 NAD 27 Y= 385,876	X= 550,235 NAD 27 Y= 386,526	X= 550,285 NAD 27 Y= 386,526
ELEVATION +3246' NAVD 88	ELEVATION +3243' NAVD 88	ELEVATION +3240' NAVD 88	ELEVATION +3240' NAVD 88



NW CTB CORNER	NE CTB CORNER	SW CTB/NW COMPRESSOR CORNER
X= 549,484 NAD 27 Y= 386,534	X= 549,984 NAD 27 Y= 386,534	X= 549,484 NAD 27 Y= 385,834
ELEVATION +3249' NAVD 88	ELEVATION +3243' NAVD 88	ELEVATION +3255' NAVD 88
SW COMPRESSOR CORNER	SE COMPRESSOR CORNER	SE CTB/NE COMPRESSOR CORNER
X= 549,484 NAD 27 Y= 385,534	X= 549,984 NAD 27 Y= 385,534	X= 549,984 NAD 27 Y= 385,834
ELEVATION +3259' NAVD 88	ELEVATION +3252' NAVD 88	ELEVATION +3248' NAVD 88

NAD 27 NEW MEXICO EAST ZONE

LEGEND

- Section Line
- Existing Road
- Access Centerline
- Surface Location

Scale: 1" = 500'

500' 0 250' 500'

FOR THE EXCLUSIVE USE OF CHEVRON U.S.A. INC.
I, Robert L. Lastrapes, Registered Professional Land Surveyor, do hereby state this plat is true and correct to the best of my knowledge.

ROBERT L. LASTRAPES NEW MEXICO 23006 PROFESSIONAL SURVEYOR
12-22-2015

Robert L. Lastrapes
Registration No. 23006

SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED PADS, POND & ACCESS ROADS
HH SO 10 P3 NO. 24H WELL
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

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FILENAME: T:\2015\2153367\DWG\HH SO 10 P3 24H_SUP.dwg

DISCLAIMER: At this time, C.H. Fenstermaker & Associates, L.L.C. has not performed nor was asked to perform any type of engineering, hydrological modeling, flood plain, or "No Rise" certification analyses, including but not limited to determining whether the project will impact flood hazards in connection with federal/FEMA, state, and/or local laws, ordinances and regulations. Accordingly, Fenstermaker makes no warranty or representation of any kind as to the foregoing issues, and persons or entities using this information shall do so at their own risk.

NOTE:
Please be advised, that while reasonable efforts are made to locate and verify pipelines and anomalies using our standard pipeline locating equipment, it is impossible to be 100 % effective. As such, we advise using caution when performing work as there is a possibility that pipelines and other hazards, such as fiber optic cables, PVC pipelines, etc. may exist undetected on site.

NOTE:
Many states maintain information centers that establish links between those who dig (excavators) and those who own and operate underground facilities (operators). It is advisable and in most states, law, for the contractor to contact the center for assistance in locating and marking underground utilities. For guidance, New Mexico One Call. www.nmonecall.org

CENTERLINE PROPOSED ACCESS ROAD		
COURSE	BEARING	DISTANCE
1	S 00° 05' 06" E	1849.60'
2	S 89° 54' 54" W	139.42'

FOR THE EXCLUSIVE USE OF
CHEVRON U.S.A. INC.
I, Robert L. Lastrapes, Registered Professional Land Surveyor, do hereby state this plat is true and correct to the best of my knowledge.

ROBERT L. LASTRAPES
NEW MEXICO
23006
12-22-2015
PROFESSIONAL SURVEYOR

Robert L. Lastrapes
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SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED PADS, POND & ACCESS ROADS
HH SO 10 P3 NO. 24H WELL
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

DRAWN BY: LJG	REVISIONS		
PROJ. MGR.: GDG	No.	DATE:	REVISED BY:
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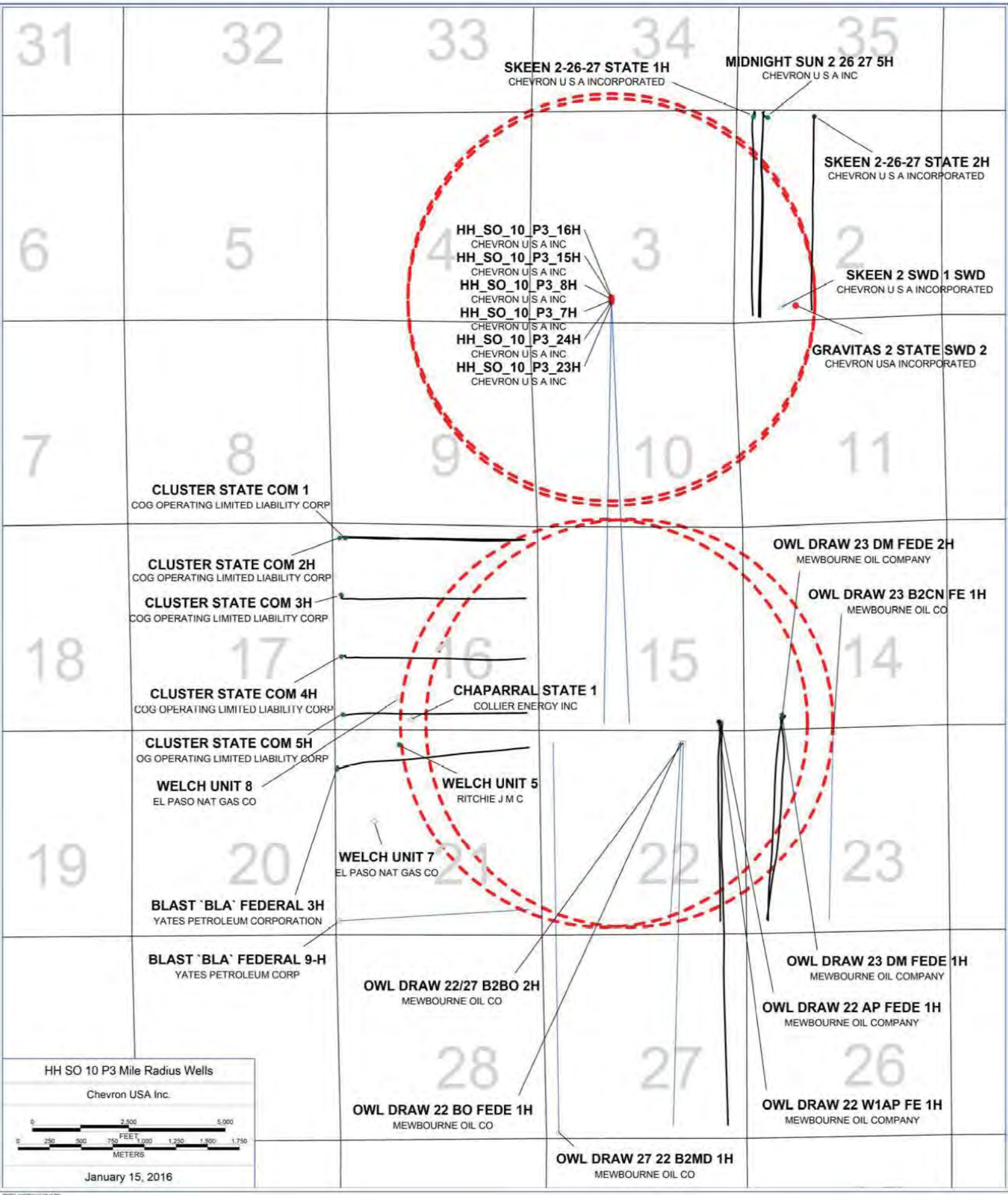
EXHIBIT 3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SKEEN 2-26-27 STATE 1H
CHEVRON U S A INCORPORATED
MIDNIGHT SUN 2 26 27 5H
CHEVRON U S A INC
SKEEN 2-26-27 STATE 2H
CHEVRON U S A INCORPORATED
HH_SO_10_P3_16H
CHEVRON U S A INC
HH_SO_10_P3_15H
CHEVRON U S A INC
HH_SO_10_P3_8H
CHEVRON U S A INC
HH_SO_10_P3_7H
CHEVRON U S A INC
HH_SO_10_P3_24H
CHEVRON U S A INC
HH_SO_10_P3_23H
CHEVRON U S A INC
SKEEN 2 SWD 1 SWD
CHEVRON U S A INCORPORATED
GRAVITAS 2 STATE SWD 2
CHEVRON USA INCORPORATED
CLUSTER STATE COM 1
COG OPERATING LIMITED LIABILITY CORP
CLUSTER STATE COM 2H
COG OPERATING LIMITED LIABILITY CORP
CLUSTER STATE COM 3H
COG OPERATING LIMITED LIABILITY CORP
CLUSTER STATE COM 4H
COG OPERATING LIMITED LIABILITY CORP
CLUSTER STATE COM 5H
OG OPERATING LIMITED LIABILITY CORP
WELCH UNIT 8
EL PASO NAT GAS CO
CHAPARRAL STATE 1
COLLIER ENERGY INC
WELCH UNIT 5
RITCHIE J M C
WELCH UNIT 7
EL PASO NAT GAS CO
BLAST `BLA` FEDERAL 3H
YATES PETROLEUM CORPORATION
BLAST `BLA` FEDERAL 9-H
YATES PETROLEUM CORP
OWL DRAW 23 DM FEDE 2H
MEWBOURNE OIL COMPANY
OWL DRAW 23 B2CN FE 1H
MEWBOURNE OIL CO
OWL DRAW 23 DM FEDE 1H
MEWBOURNE OIL COMPANY
OWL DRAW 22/27 B2BO 2H
MEWBOURNE OIL CO
OWL DRAW 22 AP FEDE 1H
MEWBOURNE OIL COMPANY
OWL DRAW 22 BO FEDE 1H
MEWBOURNE OIL CO
OWL DRAW 22 W1AP FE 1H
MEWBOURNE OIL COMPANY
OWL DRAW 27 22 B2MD 1H
MEWBOURNE OIL CO
HH SO 10 P3 Mile Radius Wells
Chevron USA Inc.
0
2,500
5,000
FEET
0
250
500
750
1,000
1,250
1,500
1,750
METERS
January 15, 2016

1. FORMATION TOPS

The estimated tops of important geologic markers are as follows:

FORMATION	SUB-SEA TVD	KBTVD	MD
Castille		505	
Lamar		2395	
Bell		2310	
Cherry		3208	
Brushy		4450	
Bone Spring/Avalon		6299	
First Bone Spring Sand		6888	
First Bone Spring Shale		6914	
Second Bone Spring Sand		7621	
Harkey Sand		8123	
Third Bone Spring Sand		8617	
Wolfcamp A		9342	
Lateral TVD Wolfcamp A		9342	19973.09'

2. ESTIMATED DEPTH OF WATER, OIL, GAS & OTHER MINERAL BEARING FORMATIONS

The estimated depths at which the top and bottom of the anticipated water, oil, gas, or other mineral bearing formations are expected to be encountered are as follows:

Substance	Formation	Depth
Deepest Expected Base of Fresh Water		450
Water	Castille	505
Water	Cherry Canyon	3208
Oil/Gas	Brushy Canyon	4450
Oil/Gas	Bone Spring Limestone	6888
Oil/Gas	First Bone Spring Shale	6914
Oil/Gas	Second Bone Spring Sand	7621
Oil/Gas	Harkey Sand	8123
Oil/Gas	Wolfcamp A	9342

All shows of fresh water and minerals will be reported and protected.

3. BOP EQUIPMENT

PLEASE REFERENCE MDP

4. **CASING PROGRAM**

Purpose	From	To	Hole Size	Csg Size	Weight	Grade	Thread	Condition
Surface	0'	450'	17-1/2"	13-3/8"	54.5 #	K-55	STC	New
Intermediate	0'	9,015'	12-1/4"	9-5/8"	40.0 #	L-80	TXP	New
Production	0'	19,973'	8-1/2"	5-1/2"	20.0 #	P-110	TXP	New

SF Calculations based on the following "Worst Case" casing design:

Surface Casing: 450'
Intermediate Casing: 9015'
Production Casing: 19973.09' MD/9,342' TVD (10,000' VS @ 90.3 deg inc)

Casing String	Min SF Burst	Min SF Collapse	Min SF Tension	Min SF Tri-Axial
Surface	1.82	5.11	3.97	2.31
Intermediate	2.9	1.34	1.79	2.22
Production	1.26	1.66	2.54	1.31

Min SF is the smallest of a group of safety factors that include the following considerations:

	Surf	Int	Prod
Burst Design			
Pressure Test- Surface, Int, Prod Csg P external: Water P internal: Test psi + next section heaviest mud in csg	X	X	X
Displace to Gas- Surf Csg P external: Water P internal: Dry Gas from Next Csg Point	X		
Frac at Shoe, Gas to Surf- Int Csg P external: Water P internal: Dry Gas, 15 ppg Frac Gradient		X	
Stimulation (Frac) Pressures- Prod Csg P external: Water P internal: Max inj pressure w/ heaviest injected fluid			X
Tubing leak- Prod Csg (packer at KOP) P external: Water P internal: Leak just below surf, 8.7 ppg packer fluid			X
Collapse Design			
Full Evacuation P external: Water gradient in cement, mud above TOC P internal: none	X	X	X
Cementing- Surf, Int, Prod Csg P external: Wet cement P internal: water	X	X	X
Tension Design			
100k lb overpull	X	X	X

5. **CEMENTING PROGRAM**

Slurry	Type	Cement Top	Cement Bottom	Weight	Yield	%Excess	Sacks	Water
Surface				(ppg)	(sx/cu ft)	Open Hole		gal/sk
Tail	Class C	0'	450'	14.8	1.33	50	356	6.37
Intermediate								
Stage 2 Lead	50:50 Poz: Class C + Antifoam, Extender, Salt, Retarder	0'	1,100'	11.9	2.43	50	213	14.21
Stage 2 Tail	Class C + Antifoam, Retarder, Viscosifier	1,100'	2,100'	14.8	1.33	0	235	6.37
DV TOOL		2,100'						
Stage 1 Lead	50:50 Poz: Class H + Extender, Antifoam, Retarder, Salt, Viscosifier	2,100'	8,015'	11.9	2.43	100	1524	13.76
Stage 1 Tail	Class H + Retarder, Extender, Dispersant	8,015'	9,015'	15.6	1.21	50	389	5.54
Production								
Lead	50:50 Poz: Class H + Extender, Antifoam, Dispersant, , Retarder	7,015'	8,015'	14.5	1.21	100	430	5.54
Tail	Class H + Viscosifier, Antifoam, Dispersant, Fluid Loss, Retarder, Expanding Agent	8,015'	19,973'	15.6	1.2	50	3422	5.30

6. MUD PROGRAM

From	To	Type	Weight	F. Vis	Filtrate
0'	450'	Spud Mud	8.3 - 8.7	32 - 34	NC - NC
450'	9015'	OBM	9.0 - 9.5	50 -70	5.0 - 10
9015'	19,973'	OBM	10.0 - 13.5	50 -70	5.0 - 10

7. TESTING, LOGGING, AND CORING

TYPE	Logs	Interval	Timing	Vendor
Mudlogs	2 man mudlog	Int Csg to TD	Drillout of Int Csg	TBD
LWD	MWD Gamma	Int. and Prod. Hole	While Drilling	TBD

8. ABNORMAL PRESSURES AND HYDROGEN SULFIDE

PLEASE REFERENCE MDP

Schlumberger

#24H - Rev0

Chevron

Borehole:	Well:	Field:	Structure:
Original Borehole	HH SO 10 P3 #24H	NM Eddy County (NAD 27)	Chevron HH SO 10 P3 Pad

Gravity & Magnetic Parameters
Model: HDGM 2015 Dip: 59.816° Date: 30-Dec-2015
MagDec: 7.519° FS: 48169.646nT Gravity FS: 998.428mgn (9.80665 Based)

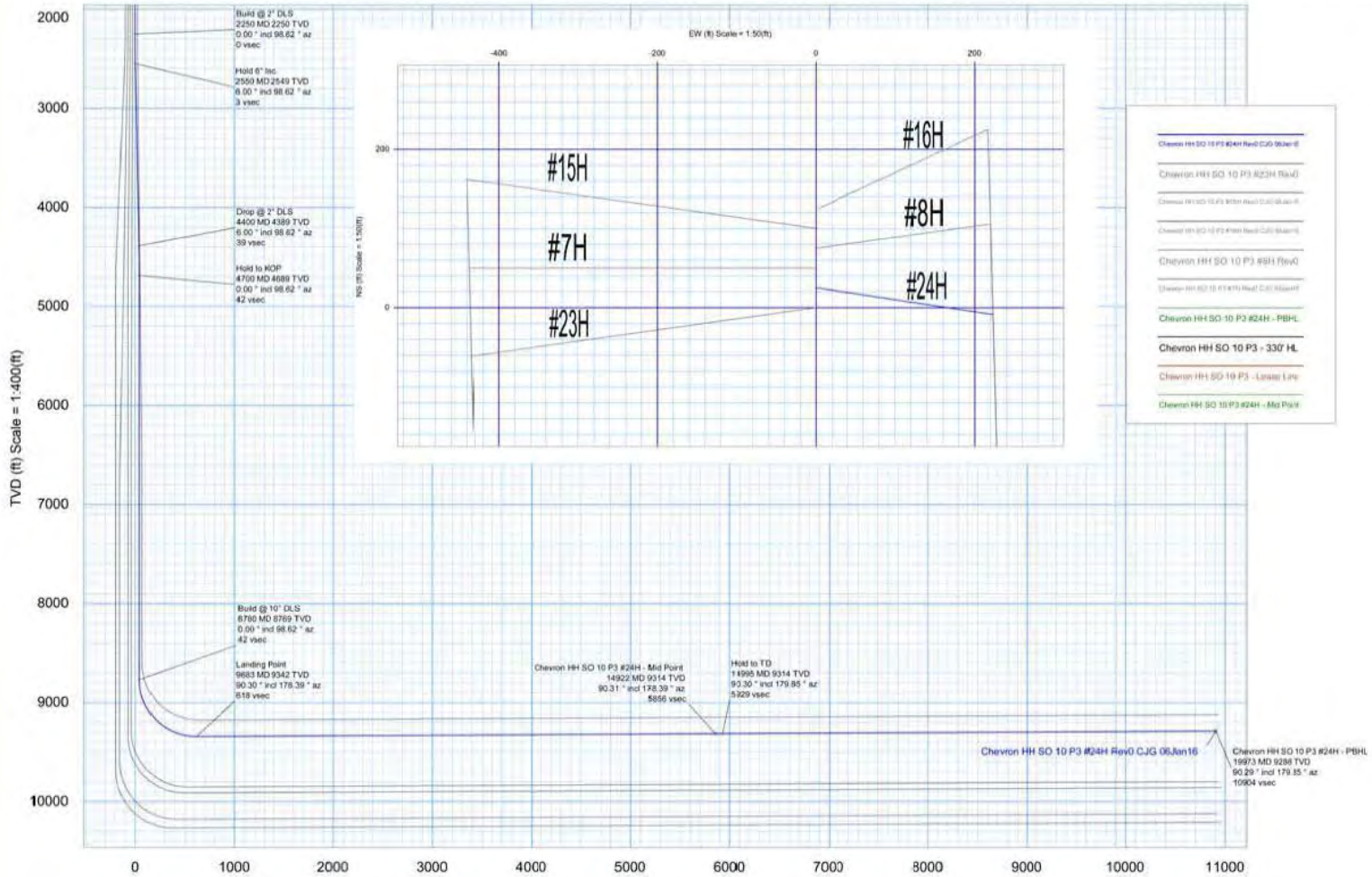
Surface Location NAD27 New Mexico State Plane, Eastern Zone, US Feet
Lat: N 32 3 35.27 Northing: 387534ftUS Grid Conv: 0.0815°
Lon: W 104 16 47.21 Easting: 547567ftUS Scale Fact: 0.99991166

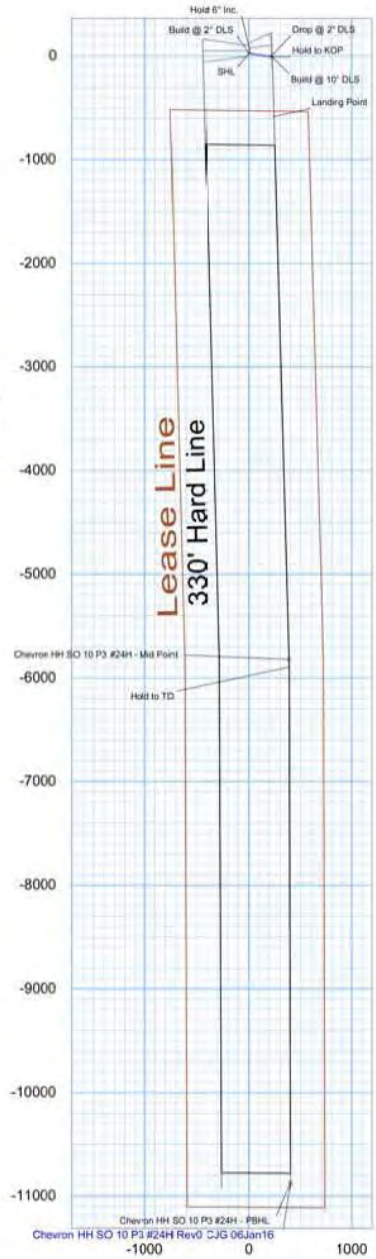
Miscellaneous
Slot: HH SO 10 P3 #24H TVD Ref: RKB(3312ft above MSL)
Plan: Chevron HH SO 10 P3 #24H Rev0 CJG 06Jan16

Critical Points

Critical Point	MD	INCL	AZIM	TVD	VSEC	N(+)/S(-)	E(+)/W(-)	DLS
SHL	0.00	0.00	98.62	0.00	0.00	25.00	1.00	
Build @ 2° DLS	2250.00	0.00	98.62	2250.00	0.00	25.00	1.00	0.00
Hold 6° Inc.	2550.00	6.00	98.62	2549.45	2.92	22.65	16.52	2.00
Drop @ 2° DLS	4400.00	6.00	98.62	4389.32	38.90	-6.33	207.71	0.00
Hold to KOP	4700.00	0.00	98.62	4688.77	41.82	-8.69	223.23	2.00
Build @ 10° DLS	8780.28	0.00	98.62	8769.05	41.82	-8.69	223.23	0.00
Landing Point	9683.28	90.30	178.39	9342.00	617.75	-584.42	239.42	10.00
Chevron HH SO 10 P3 #24H - Mid Point	14921.55	90.31	178.39	9314.34	5855.76	-5820.55	385.65	0.00
Hold to TD	14994.54	90.30	179.85	9313.95	5928.73	-5893.52	387.78	2.00
Chevron HH SO 10 P3 #24H - PBHL	19973.09	90.29	179.85	9288.14	10904.32	-10871.98	401.04	0.00

Grid North
Tot Corr (M->G 7.437°)
Mag Dec (7.519°)
Grid Conv (0.082°)





CONTROLLED

1	Originator	Colby Gannon
2	DEC Sign Off	
3	CC Sign Off	
4	Client	Chevron

Schlumberger

Chevron

Chevron HH SO 10 P3 #24H Rev0 CJG 06Jan16 Proposal Geodetic Report

(Non-Def Plan)

Report Date:	January 13, 2016 - 04:29 PM	**Survey / DLS Computation:**	Minimum Curvature / Lubinski
Client:	Chevron	**Vertical Section Azimuth:**	177.898 ° (Grid North)
Field:	NM Eddy County (NAD 27)	**Vertical Section Origin:**	25.002 ft, 1.000 ft
Structure / Slot:	Chevron HH SO 10 P3 Pad / HH SO 10 P3 #24H	**TVD Reference Datum:**	RKB
Well:	HH SO 10 P3 #24H	**TVD Reference Elevation:**	3312.000 ft above MSL
Borehole:	Original Borehole	**Seabed / Ground Elevation:**	3279.000 ft above MSL
UWI / API#:	Unknown / Unknown	**Magnetic Declination:**	7.519 °
Survey Name:	Chevron HH SO 10 P3 #24H Rev0 CJG 06Jan16	**Total Gravity Field Strength:**	998.4279mgn (9.80665 Based)
Survey Date:	December 30, 2015	**Gravity Model:**	GARM
Tort / AHD / DDI / ERD Ratio:	103.772 ° / 11090.387 ft / 6.391 / 1.187	**Total Magnetic Field Strength:**	48169.646 nT
Coordinate Reference System:	NAD27 New Mexico State Plane, Eastern Zone, US Feet	**Magnetic Dip Angle:**	59.816 °
Location Lat / Long:	N 32° 3' 55.27182", W 104° 10' 47.20740"	**Declination Date:**	December 30, 2015
Location Grid N/E Y/X:	N 387534.000 ftUS, E 547567.000 ftUS	**Magnetic Declination Model:**	HDGM 2015
CRS Grid Convergence Angle:	0.0815 °	**North Reference:**	Grid North
Grid Scale Factor:	0.99991168	**Grid Convergence Used:**	0.0815 °
Version / Patch:	2.8.572.0	**Total Corr Mag North->Grid North:**	7.4376 °
		Local Coord Referenced To:	Structure Reference Point

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
SHL	0.00	0.00	98.62	0.00	0.00	25.00	1.00	N/A	387534.00	547567.00	N 32 3 55.27	W 104 10 47.21
	100.00	0.00	98.62	100.00	0.00	25.00	1.00	0.00	387534.00	547567.00	N 32 3 55.27	W 104 10 47.21
	200.00	0.00	98.62	200.00	0.00	25.00	1.00	0.00	387534.00	547567.00	N 32 3 55.27	W 104 10 47.21
	300.00	0.00	98.62	300.00	0.00	25.00	1.00	0.00	387534.00	547567.00	N 32 3 55.27	W 104 10 47.21
	400.00	0.00	98.62	400.00	0.00	25.00	1.00	0.00	387534.00	547567.00	N 32 3 55.27	W 104 10 47.21
	500.00	0.00	98.62	500.00	0.00	25.00	1.00	0.00	387534.00	547567.00	N 32 3 55.27	W 104 10 47.21
	600.00	0.00	98.62	600.00	0.00	25.00	1.00	0.00	387534.00	547567.00	N 32 3 55.27	W 104 10 47.21
	700.00	0.00	98.62	700.00	0.00	25.00	1.00	0.00	387534.00	547567.00	N 32 3 55.27	W 104 10 47.21
	800.00	0.00	98.62	800.00	0.00	25.00	1.00	0.00	387534.00	547567.00	N 32 3 55.27	W 104 10 47.21
	900.00	0.00	98.62	900.00	0.00	25.00	1.00	0.00	387534.00	547567.00	N 32 3 55.27	W 104 10 47.21
	1000.00	0.00	98.62	1000.00	0.00	25.00	1.00	0.00	387534.00	547567.00	N 32 3 55.27	W 104 10 47.21
	1100.00	0.00	98.62	1100.00	0.00	25.00	1.00	0.00	387534.00	547567.00	N 32 3 55.27	W 104 10 47.21
	1200.00	0.00	98.62	1200.00	0.00	25.00	1.00	0.00	387534.00	547567.00	N 32 3 55.27	W 104 10 47.21
	1300.00	0.00	98.62	1300.00	0.00	25.00	1.00	0.00	387534.00	547567.00	N 32 3 55.27	W 104 10 47.21
	1400.00	0.00	98.62	1400.00	0.00	25.00	1.00	0.00	387534.00	547567.00	N 32 3 55.27	W 104 10 47.21
	1500.00	0.00	98.62	1500.00	0.00	25.00	1.00	0.00	387534.00	547567.00	N 32 3 55.27	W 104 10 47.21
	1600.00	0.00	98.62	1600.00	0.00	25.00	1.00	0.00	387534.00	547567.00	N 32 3 55.27	W 104 10 47.21
	1700.00	0.00	98.62	1700.00	0.00	25.00	1.00	0.00	387534.00	547567.00	N 32 3 55.27	W 104 10 47.21
	1800.00	0.00	98.62	1800.00	0.00	25.00	1.00	0.00	387534.00	547567.00	N 32 3 55.27	W 104 10 47.21
	1900.00	0.00	98.62	1900.00	0.00	25.00	1.00	0.00	387534.00	547567.00	N 32 3 55.27	W 104 10 47.21
	2000.00	0.00	98.62	2000.00	0.00	25.00	1.00	0.00	387534.00	547567.00	N 32 3 55.27	W 104 10 47.21
	2100.00	0.00	98.62	2100.00	0.00	25.00	1.00	0.00	387534.00	547567.00	N 32 3 55.27	W 104 10 47.21
	2200.00	0.00	98.62	2200.00	0.00	25.00	1.00	0.00	387534.00	547567.00	N 32 3 55.27	W 104 10 47.21
Build @ 2° DLS	2250.00	0.00	98.62	2250.00	0.00	25.00	1.00	0.00	387534.00	547567.00	N 32 3 55.27	W 104 10 47.21
	2300.00	1.00	98.62	2300.00	0.08	24.94	1.43	2.00	387533.93	547567.43	N 32 3 55.27	W 104 10 47.20
	2400.00	3.00	98.62	2399.93	0.73	24.41	4.88	2.00	387533.41	547570.88	N 32 3 55.27	W 104 10 47.16
	2500.00	5.00	98.62	2499.68	2.03	23.37	11.78	2.00	387532.37	547577.78	N 32 3 55.26	W 104 10 47.06
Hold 6° Inc.	2550.00	6.00	98.62	2549.45	2.92	22.65	16.52	2.00	387531.65	547582.51	N 32 3 55.25	W 104 10 47.03
	2600.00	6.00	98.62	2599.18	3.89	21.87	21.66	0.00	387530.86	547587.66	N 32 3 55.24	W 104 10 46.97
	2700.00	6.00	98.62	2698.63	5.84	20.30	32.02	0.00	387529.30	547598.02	N 32 3 55.22	W 104 10 46.85
	2800.00	6.00	98.62	2798.08	7.78	18.73	42.35	0.00	387527.73	547608.35	N 32 3 55.21	W 104 10 46.73
	2900.00	6.00	98.62	2897.53	9.73	17.17	52.69	0.00	387526.17	547618.68	N 32 3 55.19	W 104 10 46.61
	3000.00	6.00	98.62	2996.99	11.67	15.60	63.02	0.00	387524.60	547629.02	N 32 3 55.18	W 104 10 46.49
	3100.00	6.00	98.62	3096.44	13.62	14.03	73.36	0.00	387523.03	547639.35	N 32 3 55.16	W 104 10 46.37
	3200.00	6.00	98.62	3195.89	15.56	12.47	83.69	0.00	387521.47	547649.68	N 32 3 55.15	W 104 10 46.25
	3300.00	6.00	98.62	3295.34	17.51	10.90	94.03	0.00	387519.90	547660.02	N 32 3 55.13	W 104 10 46.13
	3400.00	6.00	98.62	3394.80	19.45	9.33	104.36	0.00	387518.33	547670.35	N 32 3 55.12	W 104 10 46.01
	3500.00	6.00	98.62	3494.25	21.40	7.77	114.70	0.00	387516.77	547680.69	N 32 3 55.10	W 104 10 45.89
	3600.00	6.00	98.62	3593.70	23.34	6.20	125.03	0.00	387515.20	547691.02	N 32 3 55.08	W 104 10 45.77
	3700.00	6.00	98.62	3693.15	25.28	4.63	135.37	0.00	387513.63	547701.35	N 32 3 55.07	W 104 10 45.65
	3800.00	6.00	98.62	3792.60	27.23	3.07	145.70	0.00	387512.07	547711.69	N 32 3 55.05	W 104 10 45.53
	3900.00	6.00	98.62	3892.06	29.17	1.50	156.04	0.00	387510.50	547722.02	N 32 3 55.04	W 104 10 45.41
	4000.00	6.00	98.62	3991.51	31.12	-0.07	166.37	0.00	387508.93	547732.36	N 32 3 55.02	W 104 10 45.29
	4100.00	6.00	98.62	4090.96	33.06	-1.63	176.71	0.00	387507.37	547742.69	N 32 3 55.01	W 104 10 45.17
	4200.00	6.00	98.62	4190.41	35.01	-3.20	187.04	0.00	387505.80	547753.02	N 32 3 54.99	W 104 10 45.05
	4300.00	6.00	98.62	4289.87	36.95	-4.77	197.37	0.00	387504.23	547763.36	N 32 3 54.97	W 104 10 44.93
Drop @ 2° DLS	4400.00	6.00	98.62	4389.32	38.90	-6.33	207.71	0.00	387502.67	547773.69	N 32 3 54.96	W 104 10 44.81
	4500.00	4.00	98.62	4488.93	40.52	-7.64	216.33	2.00	387501.36	547782.31	N 32 3 54.95	W 104 10 44.71
	4600.00	2.00	98.62	4588.79	41.49	-8.42	221.50	2.00	387500.58	547787.48	N 32 3 54.94	W 104 10 44.65
Hold to KOP	4700.00	0.00	98.62	4688.77	41.82	-8.69	223.23	2.00	387500.32	547789.21	N 32 3 54.94	W 104 10 44.63
	4800.00	0.00	98.62	4788.77	41.82	-8.69	223.23	0.00	387500.32	547789.21	N 32 3 54.94	W 104 10 44.63
	4900.00	0.00	98.62	4888.77	41.82	-8.69	223.23	0.00	387500.32	547789.21	N 32 3 54.94	W 104 10 44.63
	5000.00	0.00	98.62	4988.77	41.82	-8.69	223.23	0.00	387500.32	547789.21	N 32 3 54.94	W 104 10 44.63
	5100.00	0.00	98.62	5088.77	41.82	-8.69	223.23	0.00	387500.32	547789.21	N 32 3 54.94	W 104 10 44.63
	5200.00	0.00	98.62	5188.77	41.82	-8.69	223.23	0.00	387500.32	547789.21	N 32 3 54.94	W 104 10 44.63
	5300.00	0.00	98.62	5288.77	41.82	-8.69	223.23	0.00	387500.32	547789.21	N 32 3 54.94	W 104 10 44.63
	5400.00	0.00	98.62	5388.77	41.82	-8.69	223.23	0.00	387500.32	547789.21	N 32 3 54.94	W 104 10 44.63
	5500.00	0.00	98.62	5488.77	41.82	-8.69	223.23	0.00	387500.32	547789.21	N 32 3 54.94	W 104 10 44.63
	5600.00	0.00	98.62	5588.77	41.82	-8.69	223.23	0.00	387500.32	547789.21	N 32 3 54.94	W 104 10 44.63
	5700.00	0.00	98.62	5688.77	41.82	-8.69	223.23	0.00	387500.32	547789.21	N 32 3 54.94	W 104 10 44.63
	5800.00	0.00	98.62	5788.77	41.82	-8.69	223.23	0.00	387500.32	547789.21	N 32 3 54.94	W 104 10 44.63
	5900.00	0.00	98.62	5888.77	41.82	-8.69	223.23	0.00	387500.32	547789.21	N 32 3 54.94	W 104 10 44.63
	6000.00	0.00	98.62	5988.77	41.82	-8.69	223.23	0.00	387500.32	547789.21	N 32 3 54.94	W 104 10 44.63
	6100.00	0.00	98.62	6088.77	41.82	-8.69	223.23	0.00	387500.32	547789.21	N 32 3 54.94	W 104 10 44.63
	6200.00	0.00	98.62	6188.77	41.82	-8.69	223.23	0.00	387500.32	547789.21	N 32 3 54.94	W 104 10 44.63

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
	6300.00	0.00	98.62	6288.77	41.82	-8.69	223.23	0.00	387500.32	547789.21	N 32 3 54.94	W 104 10 44.63
	6400.00	0.00	98.62	6388.77	41.82	-8.69	223.23	0.00	387500.32	547789.21	N 32 3 54.94	W 104 10 44.63
	6500.00	0.00	98.62	6488.77	41.82	-8.69	223.23	0.00	387500.32	547789.21	N 32 3 54.94	W 104 10 44.63
	6600.00	0.00	98.62	6588.77	41.82	-8.69	223.23	0.00	387500.32	547789.21	N 32 3 54.94	W 104 10 44.63
	6700.00	0.00	98.62	6688.77	41.82	-8.69	223.23	0.00	387500.32	547789.21	N 32 3 54.94	W 104 10 44.63
	6800.00	0.00	98.62	6788.77	41.82	-8.69	223.23	0.00	387500.32	547789.21	N 32 3 54.94	W 104 10 44.63
	6900.00	0.00	98.62	6888.77	41.82	-8.69	223.23	0.00	387500.32	547789.21	N 32 3 54.94	W 104 10 44.63
	7000.00	0.00	98.62	6988.77	41.82	-8.69	223.23	0.00	387500.32	547789.21	N 32 3 54.94	W 104 10 44.63
	7100.00	0.00	98.62	7088.77	41.82	-8.69	223.23	0.00	387500.32	547789.21	N 32 3 54.94	W 104 10 44.63
	7200.00	0.00	98.62	7188.77	41.82	-8.69	223.23	0.00	387500.32	547789.21	N 32 3 54.94	W 104 10 44.63
	7300.00	0.00	98.62	7288.77	41.82	-8.69	223.23	0.00	387500.32	547789.21	N 32 3 54.94	W 104 10 44.63
	7400.00	0.00	98.62	7388.77	41.82	-8.69	223.23	0.00	387500.32	547789.21	N 32 3 54.94	W 104 10 44.63
	7500.00	0.00	98.62	7488.77	41.82	-8.69	223.23	0.00	387500.32	547789.21	N 32 3 54.94	W 104 10 44.63
	7600.00	0.00	98.62	7588.77	41.82	-8.69	223.23	0.00	387500.32	547789.21	N 32 3 54.94	W 104 10 44.63
	7700.00	0.00	98.62	7688.77	41.82	-8.69	223.23	0.00	387500.32	547789.21	N 32 3 54.94	W 104 10 44.63
	7800.00	0.00	98.62	7788.77	41.82	-8.69	223.23	0.00	387500.32	547789.21	N 32 3 54.94	W 104 10 44.63
	7900.00	0.00	98.62	7888.77	41.82	-8.69	223.23	0.00	387500.32	547789.21	N 32 3 54.94	W 104 10 44.63
	8000.00	0.00	98.62	7988.77	41.82	-8.69	223.23	0.00	387500.32	547789.21	N 32 3 54.94	W 104 10 44.63
	8100.00	0.00	98.62	8088.77	41.82	-8.69	223.23	0.00	387500.32	547789.21	N 32 3 54.94	W 104 10 44.63
	8200.00	0.00	98.62	8188.77	41.82	-8.69	223.23	0.00	387500.32	547789.21	N 32 3 54.94	W 104 10 44.63
	8300.00	0.00	98.62	8288.77	41.82	-8.69	223.23	0.00	387500.32	547789.21	N 32 3 54.94	W 104 10 44.63
	8400.00	0.00	98.62	8388.77	41.82	-8.69	223.23	0.00	387500.32	547789.21	N 32 3 54.94	W 104 10 44.63
	8500.00	0.00	98.62	8488.77	41.82	-8.69	223.23	0.00	387500.32	547789.21	N 32 3 54.94	W 104 10 44.63
	8600.00	0.00	98.62	8588.77	41.82	-8.69	223.23	0.00	387500.32	547789.21	N 32 3 54.94	W 104 10 44.63
	8700.00	0.00	98.62	8688.77	41.82	-8.69	223.23	0.00	387500.32	547789.21	N 32 3 54.94	W 104 10 44.63
Build @ 10° DLS	8780.28	0.00	98.62	8769.05	41.82	-8.69	223.23	0.00	387500.32	547789.21	N 32 3 54.94	W 104 10 44.63
	8800.00	1.97	178.39	8788.77	42.16	-9.02	223.24	10.00	387499.98	547789.22	N 32 3 54.93	W 104 10 44.63
	8900.00	11.97	178.39	8887.90	54.28	-21.14	223.58	10.00	387487.86	547789.56	N 32 3 54.81	W 104 10 44.62
	9000.00	21.97	178.39	8983.42	83.43	-50.28	224.40	10.00	387458.72	547790.38	N 32 3 54.52	W 104 10 44.61
	9100.00	31.97	178.39	9072.43	128.73	-95.56	225.67	10.00	387413.44	547791.65	N 32 3 54.08	W 104 10 44.60
	9200.00	41.97	178.39	9152.23	188.79	-155.61	227.36	10.00	387353.41	547793.34	N 32 3 53.48	W 104 10 44.58
	9300.00	51.97	178.39	9220.37	261.80	-228.59	229.41	10.00	387280.43	547795.39	N 32 3 52.76	W 104 10 44.56
	9400.00	61.97	178.39	9274.81	345.53	-312.29	231.76	10.00	387196.74	547797.74	N 32 3 51.93	W 104 10 44.53
	9500.00	71.97	178.39	9313.88	437.44	-404.17	234.35	10.00	387104.87	547800.33	N 32 3 51.02	W 104 10 44.50
	9600.00	81.97	178.39	9336.39	534.74	-501.43	237.08	10.00	387007.61	547803.06	N 32 3 50.06	W 104 10 44.47
Landing Point	9683.28	90.30	178.39	9342.00	617.75	-584.42	239.42	10.00	386924.64	547805.39	N 32 3 49.24	W 104 10 44.45
	9700.00	90.30	178.39	9341.91	634.47	-601.13	239.89	0.00	386907.93	547805.86	N 32 3 49.07	W 104 10 44.44
	9800.00	90.30	178.39	9341.39	734.47	-701.09	242.70	0.00	386807.98	547808.67	N 32 3 48.08	W 104 10 44.41
	9900.00	90.30	178.39	9340.86	834.48	-801.05	245.51	0.00	386708.03	547811.48	N 32 3 47.09	W 104 10 44.38
	10000.00	90.30	178.39	9340.34	934.48	-901.01	248.32	0.00	386608.08	547814.30	N 32 3 46.10	W 104 10 44.35
	10100.00	90.30	178.39	9339.82	1034.45	-1000.96	251.13	0.00	386508.13	547817.11	N 32 3 45.12	W 104 10 44.32
	10200.00	90.30	178.39	9339.29	1134.45	-1100.92	253.94	0.00	386408.18	547819.92	N 32 3 44.13	W 104 10 44.29
	10300.00	90.30	178.39	9338.77	1234.44	-1200.88	256.75	0.00	386308.23	547822.73	N 32 3 43.14	W 104 10 44.26
	10400.00	90.30	178.39	9338.24	1334.44	-1300.84	259.56	0.00	386208.28	547825.54	N 32 3 42.15	W 104 10 44.22
	10500.00	90.30	178.39	9337.72	1434.43	-1400.80	262.37	0.00	386108.33	547828.35	N 32 3 41.16	W 104 10 44.19
	10600.00	90.30	178.39	9337.19	1534.43	-1500.76	265.18	0.00	386008.38	547831.16	N 32 3 40.17	W 104 10 44.16
	10700.00	90.30	178.39	9336.67	1634.42	-1600.72	267.99	0.00	385908.42	547833.97	N 32 3 39.18	W 104 10 44.13
	10800.00	90.30	178.39	9336.14	1734.42	-1700.68	270.80	0.00	385808.47	547836.78	N 32 3 38.19	W 104 10 44.10
	10900.00	90.30	178.39	9335.62	1834.41	-1800.64	273.62	0.00	385708.52	547839.59	N 32 3 37.20	W 104 10 44.07
	11000.00	90.30	178.39	9335.09	1934.41	-1900.60	276.43	0.00	385608.57	547842.40	N 32 3 36.21	W 104 10 44.04
	11100.00	90.30	178.39	9334.57	2034.40	-2000.56	279.24	0.00	385508.62	547845.21	N 32 3 35.22	W 104 10 44.01
	11200.00	90.30	178.39	9334.04	2134.40	-2100.52	282.05	0.00	385408.67	547848.02	N 32 3 34.23	W 104 10 43.98
	11300.00	90.30	178.39	9333.51	2234.39	-2200.47	284.86	0.00	385308.72	547850.83	N 32 3 33.25	W 104 10 43.95
	11400.00	90.30	178.39	9332.99	2334.39	-2300.43	287.67	0.00	385208.77	547853.64	N 32 3 32.26	W 104 10 43.91
	11500.00	90.30	178.39	9332.46	2434.38	-2400.39	290.48	0.00	385108.82	547856.45	N 32 3 31.27	W 104 10 43.88
	11600.00	90.30	178.39	9331.93	2534.38	-2500.35	293.29	0.00	385008.87	547859.26	N 32 3 30.28	W 104 10 43.85
	11700.00	90.30	178.39	9331.41	2634.37	-2600.31	296.10	0.00	384908.92	547862.08	N 32 3 29.29	W 104 10 43.82
	11800.00	90.30	178.39	9330.88	2734.37	-2700.27	298.91	0.00	384808.97	547864.89	N 32 3 28.30	W 104 10 43.79
	11900.00	90.30	178.39	9330.35	2834.36	-2800.23	301.72	0.00	384709.02	547867.70	N 32 3 27.31	W 104 10 43.76
	12000.00	90.30	178.39	9329.82	2934.36	-2900.19	304.53	0.00	384609.07	547870.51	N 32 3 26.32	W 104 10 43.73
	12100.00	90.30	178.39	9329.30	3034.35	-3000.15	307.35	0.00	384509.12	547873.32	N 32 3 25.33	W 104 10 43.70
	12200.00	90.30	178.39	9328.77	3134.35	-3100.11	310.16	0.00	384409.17	547876.13	N 32 3 24.34	W 104 10 43.67
	12300.00	90.30	178.39	9328.24	3234.34	-3200.07	312.97	0.00	384309.22	547878.94	N 32 3 23.35	W 104 10 43.64
	12400.00	90.30	178.39	9327.71	3334.34	-3300.02	315.78	0.00	384209.27	547881.75	N 32 3 22.36	W 104 10 43.60
	12500.00	90.30	178.39	9327.18	3434.33	-3399.98	318.59	0.00	384109.32	547884.56	N 32 3 21.37	W 104 10 43.57
	12600.00	90.30	178.39	9326.66	3534.33	-3499.94	321.40	0.00	384009.37	547887.37	N 32 3 20.39	W 104 10 43.54
	12700.00	90.30	178.39	9326.13	3634.32	-3599.90	324.21	0.00	383909.42	547890.18	N 32 3 19.40	W 104 10 43.51
	12800.00	90.30	178.39	9325.60	3734.32	-3699.86	327.02	0.00	383809.47	547892.99	N 32 3 18.41	W 104 10 43.48
	12900.00	90.30	178.39	9325.07	3834.31	-3799.82	329.83	0.00	383709.52	547895.80	N 32 3 17.42	W 104 10 43.45
	13000.00	90.30	178.39	9324.54	3934.31	-3899.78	332.64	0.00	383609.57	547898.61	N 32 3 16.43	W 104 10 43.42
	13100.00	90.30	178.39	9324.01	4034.30	-3999.74	335.45	0.00	383509.62	547901.42	N 32 3 15.44	W 104 10 43.39
	13200.00	90.30	178.39	9323.48	4134.30	-4099.70	338.26	0.00	383409.67	547904.23	N 32 3 14.45	W 104 10 43.36
	13300.00	90.30	178.39	9322.95	4234.29	-4199.66	341.08	0.00	383309.72	547907.04	N 32 3 13.46	W 104 10 43.33
	13400.00	90.30	178.39	9322.42	4334.29	-4299.62	343.89	0.00	383209.77	547909.86	N 32 3 12.47	W 104 10 43.29
	13500.00	90.30	178.39	9321.89	4434.28	-4399.57	346.70	0.00	383108.82	547912.67	N 32 3 11.48	W 104 10 43.26
	13600.00	90.30	178.39	9321.36	4534.28	-4499.53	349.51	0.00	383009.87	547915.48	N 32 3 10.49	W 104 10 43.23
	13700.00	90.30	178.39	9320.83	4634.27	-4599.49	352.32	0.00	382909.92	547918.29	N 32 3 9.50	W 104 10 43.20
	13800.00	90.30	178.39	9320.30	4734.27	-4699.45	355.13	0.00	382809.97	547921.10	N 32 3 8.51	W 104 10 43.17
	13900.00	90.30	178.39	9319.77	4834.26	-4799.41	357.94	0.00	382710.02	547923.91	N 32 3 7.53	W 104 10 43.14
	14000.00	90.30	178.39	9319.24	4934.25	-4899.37	360.75	0.00	382610.07	547926.72	N 32 3 6.54	W 104 10 43.11
	14100.00	90.30	178.39	9318.71	5034.25	-4999.33	363.56	0.00	382510.12	547929.53	N 32 3 5.55	W 104 10 43.08
	14200.00	90.30	178.39	9318.18	5134.24	-5099.29	366.37	0.00	382410.17	547932.34	N 32 3 4.56	W 104 10 43.05
	14300.00	90.30	178.39	9317.65	5234.24	-5199.25	369.18	0.00	382310.22	547935.15	N 32 3 3.57	W 104 10 43.02
	14400.00	90.30	178.39	9317.11	5334.23	-5299.21	371.99	0.00	382210.27	547937.96	N 32 3 2.58	W 104 10 42.99
	14500.00	90.30	178.39	9316.58	5434.23	-5399.17	374.81	0.00	382110.32	547940.77	N 32 3 1.59	W 104 10 42.95
	14600.00	90.30	178.39	9316.05	5534.22	-5499.12	377.62	0.00	382010.37	547943.58	N 32 3 0.60	W 104 10 42.92
	14700.00	90.30	178.39	9315.52	5634.22	-5599.08	380.43	0.00	381910.42	547946.39	N 32 2 59.61	W 104 10 42.89
	14800.00	90.30	178.39	9314.99	5734.21	-5699.04	383.24	0.00	381810.47	547949.20	N 32 2 58.62	W 104 10 42.86

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
	14900.00	90.31	178.39	9314.45	5834.21	-5799.00	386.05	0.00	381710.52	547952.01	N 32 2 57.63	W 104 10 42.83
Chevron HH SO 10 P3 #24H - Mid Point	14921.55	90.31	178.39	9314.34	5855.76	-5820.55	386.65	0.00	381688.98	547952.62	N 32 2 57.42	W 104 10 42.82
Hold to TD	14994.54	90.30	179.85	9313.95	5928.73	-5893.52	387.78	2.00	381616.01	547953.74	N 32 2 56.70	W 104 10 42.81
	15000.00	90.30	179.85	9313.93	5934.19	-5898.98	387.79	0.00	381610.55	547953.76	N 32 2 56.64	W 104 10 42.81
	15100.00	90.30	179.85	9313.40	6034.13	-5998.98	388.05	0.00	381510.56	547954.02	N 32 2 55.65	W 104 10 42.81
	15200.00	90.30	179.85	9312.88	6134.07	-6098.98	388.32	0.00	381410.57	547954.28	N 32 2 54.67	W 104 10 42.81
	15300.00	90.30	179.85	9312.36	6234.01	-6198.98	388.58	0.00	381310.58	547954.55	N 32 2 53.68	W 104 10 42.81
	15400.00	90.30	179.85	9311.83	6333.95	-6298.97	388.85	0.00	381210.59	547954.81	N 32 2 52.69	W 104 10 42.81
	15500.00	90.30	179.85	9311.31	6433.89	-6398.97	389.11	0.00	381110.61	547955.07	N 32 2 51.70	W 104 10 42.80
	15600.00	90.30	179.85	9310.79	6533.83	-6498.97	389.37	0.00	381010.62	547955.34	N 32 2 50.71	W 104 10 42.80
	15700.00	90.30	179.85	9310.27	6633.77	-6598.97	389.64	0.00	380910.63	547955.60	N 32 2 49.72	W 104 10 42.80
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	16000.00	90.30	179.85	9308.70	6933.59	-6898.96	390.43	0.00	380610.66	547956.40	N 32 2 46.75	W 104 10 42.80
	16100.00	90.30	179.85	9308.18	7033.53	-6998.96	390.70	0.00	380510.67	547956.66	N 32 2 45.76	W 104 10 42.80
	16200.00	90.30	179.85	9307.66	7133.47	-7098.96	390.96	0.00	380410.68	547956.93	N 32 2 44.77	W 104 10 42.79
	16300.00	90.30	179.85	9307.14	7233.41	-7198.96	391.23	0.00	380310.69	547957.19	N 32 2 43.78	W 104 10 42.79
	16400.00	90.30	179.85	9306.62	7333.35	-7298.96	391.49	0.00	380210.70	547957.46	N 32 2 42.79	W 104 10 42.79
	16500.00	90.30	179.85	9306.10	7433.30	-7398.96	391.76	0.00	380110.71	547957.72	N 32 2 41.80	W 104 10 42.79
	16600.00	90.30	179.85	9305.57	7533.24	-7498.95	392.02	0.00	380010.72	547957.99	N 32 2 40.81	W 104 10 42.79
	16700.00	90.30	179.85	9305.05	7633.18	-7598.95	392.29	0.00	379910.73	547958.25	N 32 2 39.82	W 104 10 42.79
	16800.00	90.30	179.85	9304.53	7733.12	-7698.95	392.55	0.00	379810.75	547958.52	N 32 2 38.83	W 104 10 42.79
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	17000.00	90.30	179.85	9303.50	7933.00	-7898.95	393.08	0.00	379610.77	547959.05	N 32 2 36.85	W 104 10 42.78
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	17200.00	90.30	179.85	9302.46	8132.88	-8098.94	393.62	0.00	379410.79	547959.58	N 32 2 34.87	W 104 10 42.78
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	17600.00	90.30	179.85	9300.38	8532.64	-8498.94	394.68	0.00	379010.83	547960.64	N 32 2 30.92	W 104 10 42.77
	17700.00	90.30	179.85	9299.86	8632.58	-8598.93	394.95	0.00	378910.84	547960.91	N 32 2 29.93	W 104 10 42.77
	17800.00	90.30	179.85	9299.35	8732.52	-8698.93	395.21	0.00	378810.85	547961.18	N 32 2 28.94	W 104 10 42.77
	17900.00	90.30	179.85	9298.83	8832.47	-8798.93	395.48	0.00	378710.86	547961.44	N 32 2 27.95	W 104 10 42.77
	18000.00	90.30	179.85	9298.31	8932.41	-8898.93	395.75	0.00	378610.87	547961.71	N 32 2 26.96	W 104 10 42.77
	18100.00	90.30	179.85	9297.79	9032.35	-8998.93	396.01	0.00	378510.88	547961.98	N 32 2 25.97	W 104 10 42.77
	18200.00	90.30	179.85	9297.28	9132.29	-9098.93	396.28	0.00	378410.90	547962.25	N 32 2 24.98	W 104 10 42.77
	18300.00	90.30	179.85	9296.76	9232.23	-9198.92	396.55	0.00	378310.91	547962.51	N 32 2 23.99	W 104 10 42.76
	18400.00	90.30	179.85	9296.24	9332.17	-9298.92	396.82	0.00	378210.92	547962.78	N 32 2 23.00	W 104 10 42.76
	18500.00	90.30	179.85	9295.73	9432.11	-9398.92	397.08	0.00	378110.93	547963.05	N 32 2 22.01	W 104 10 42.76
	18600.00	90.30	179.85	9295.21	9532.05	-9498.92	397.35	0.00	378010.94	547963.31	N 32 2 21.02	W 104 10 42.76
	18700.00	90.30	179.85	9294.69	9631.99	-9598.92	397.62	0.00	377910.95	547963.58	N 32 2 20.03	W 104 10 42.76
	18800.00	90.30	179.85	9294.18	9731.93	-9698.92	397.89	0.00	377810.96	547963.85	N 32 2 19.04	W 104 10 42.76
	18900.00	90.30	179.85	9293.66	9831.87	-9798.91	398.15	0.00	377710.97	547964.12	N 32 2 18.05	W 104 10 42.76
	19000.00	90.30	179.85	9293.15	9931.81	-9898.91	398.42	0.00	377610.98	547964.39	N 32 2 17.06	W 104 10 42.75
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	19200.00	90.30	179.85	9292.12	10131.70	-10098.91	398.96	0.00	377411.00	547964.92	N 32 2 15.08	W 104 10 42.75
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	19500.00	90.29	179.85	9290.57	10431.52	-10398.90	399.76	0.00	377111.03	547965.73	N 32 2 12.11	W 104 10 42.75
	19600.00	90.29	179.85	9290.06	10531.46	-10498.90	400.03	0.00	377011.05	547966.00	N 32 2 11.12	W 104 10 42.75
	19700.00	90.29	179.85	9289.54	10631.40	-10598.90	400.30	0.00	376911.06	547966.27	N 32 2 10.13	W 104 10 42.74
	19800.00	90.29	179.85	9289.03	10731.34	-10698.90	400.57	0.00	376811.07	547966.53	N 32 2 9.15	W 104 10 42.74
	19900.00	90.29	179.85	9288.52	10831.28	-10798.90	400.84	0.00	376711.08	547966.80	N 32 2 8.16	W 104 10 42.74
Chevron HH SO 10 P3 #24H - PBHL	19973.09	90.29	179.85	9288.14	10904.32	-10871.98	401.04	0.00	376638.00	547967.00	N 32 2 7.43	W 104 10 42.74

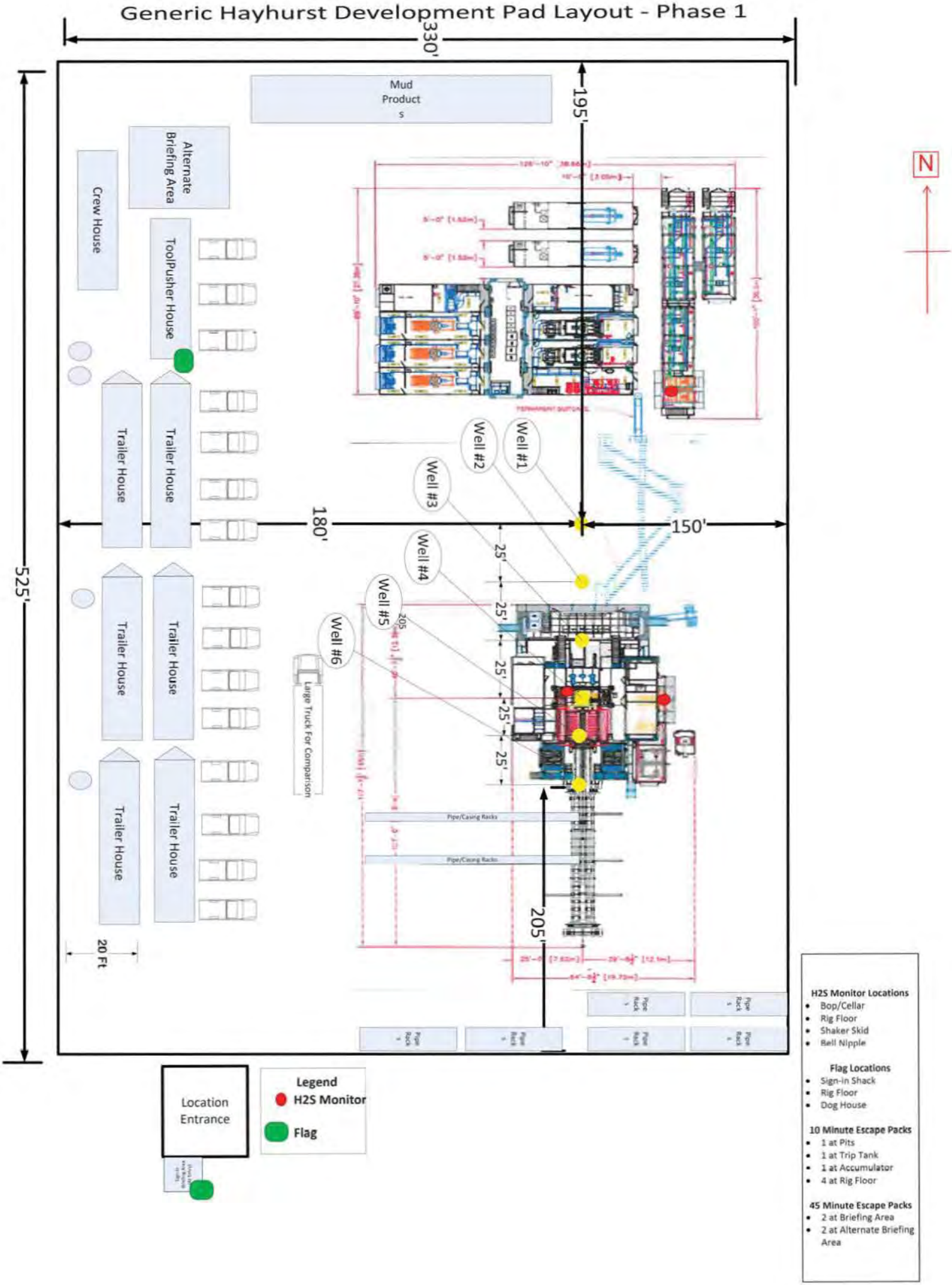
Survey Type: Non-Def Plan

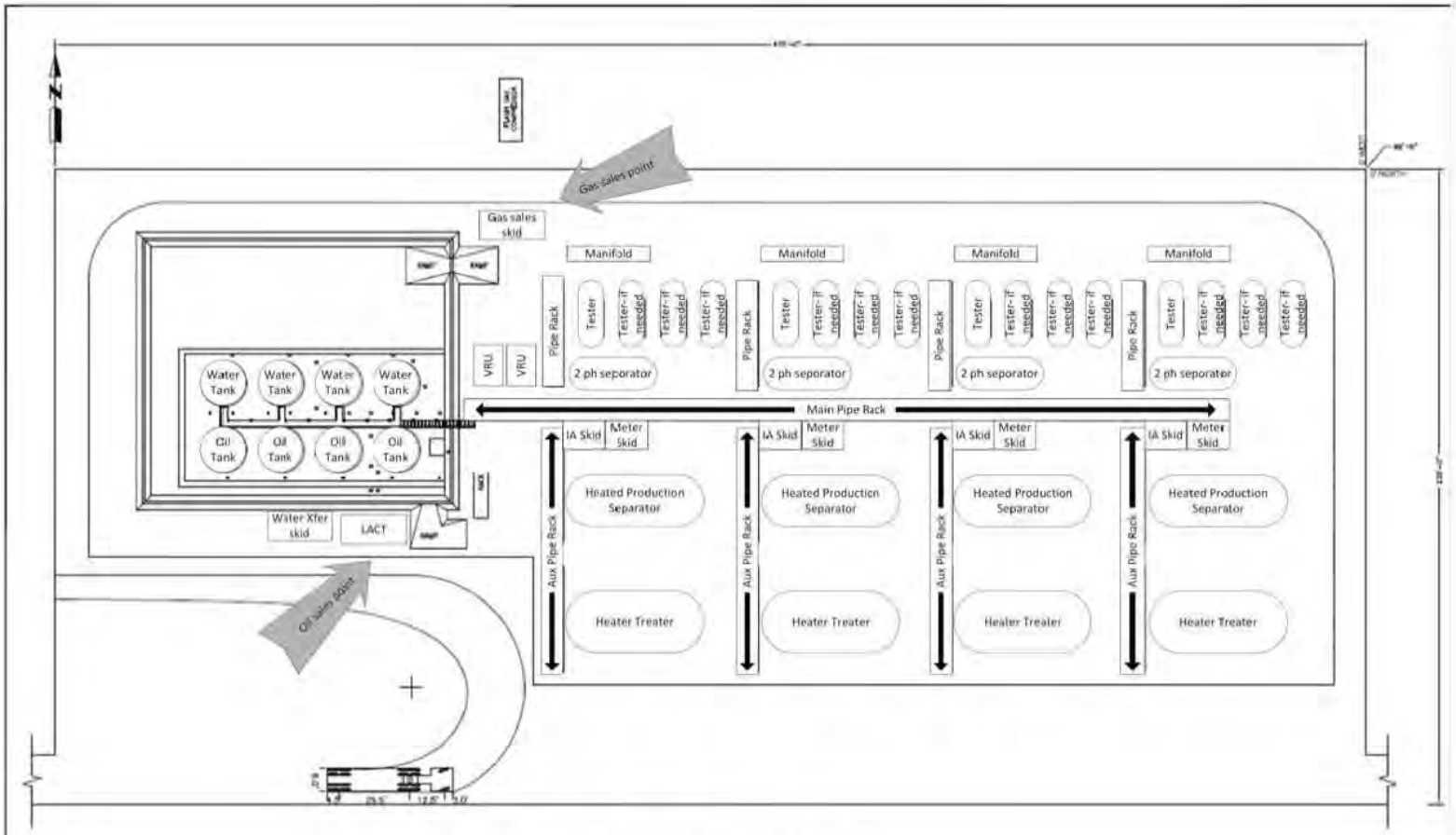
Survey Error Model: ISCWSA Rev 0 *** 3-D 95.000% Confidence 2.7955 sigma

Survey Program:

Description	Part	MD From (ft)	MD To (ft)	EOU Freq (ft)	Hole Size (in)	Casing Diameter (in)	Survey Tool Type	Borehole / Survey
	1	0.000	33.000	1/100.000	30.000	30.000	SLB_MWD-STD-Depth Only	Original Borehole / Chevron HH SO 10 P3 #24H Rev0 CJG
	1	33.000	19973.088	1/100.000	30.000	30.000	SLB_MWD-STD	Original Borehole / Chevron HH SO 10 P3 #24H Rev0 CJG

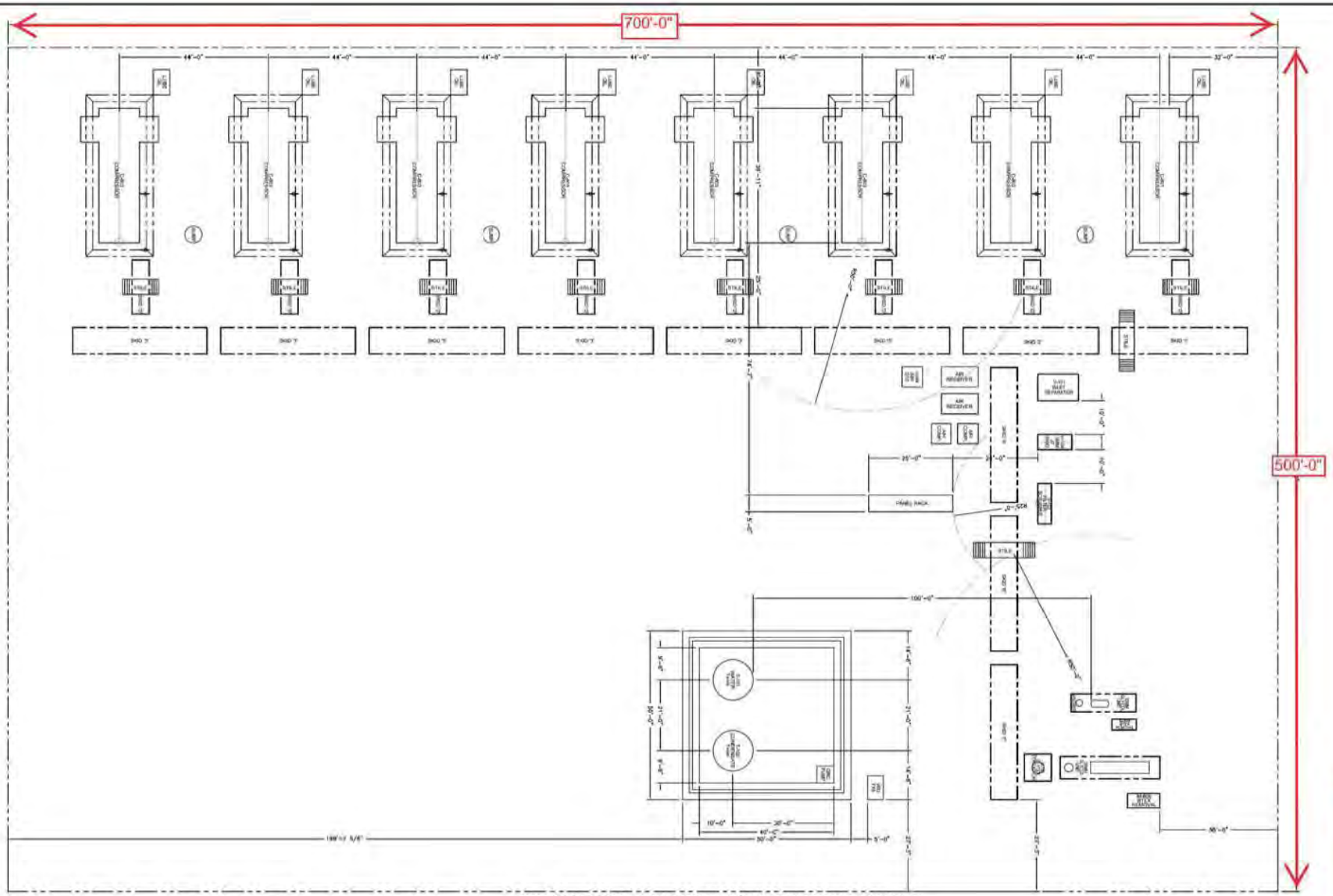
Generic Hayhurst Development Pad Layout - Phase 1





PLOT PLAN - 4 TRAIN / 8 TANK

EXHIBIT 4



COMPRESSOR STATION - 8 COMPRESSOR LAYOUT

SCALE: NONE

REVISIONS			
A ISSUED FOR REVIEW - JMDESIGN 07/14/15	EWM		

FOR REVIEW

Chevron U.S.A. Inc.

STANDARD COMPRESSOR GAS-LIFT STATION

PLOT PLAN - 8 COMPRESSOR LAYOUT

API _____ LEASE _____

COMPRESSOR_PLOTPLAN_8TOTAL

A

PLOT DATE: 07/14/2015 (1:215985)

COMPRESSOR PLOTPLAN 8TOTAL.dwg

FOR THE EXCLUSIVE USE OF
CHEVRON U.S.A. INC.
I, Robert L. Lastrapes, Registered Professional Land Surveyor, do hereby state this plat is true and correct to the best of my knowledge

ROBERT L. LASTRAPES
NEW MEXICO
23006
12-22-2015
PROFESSIONAL SURVEYOR

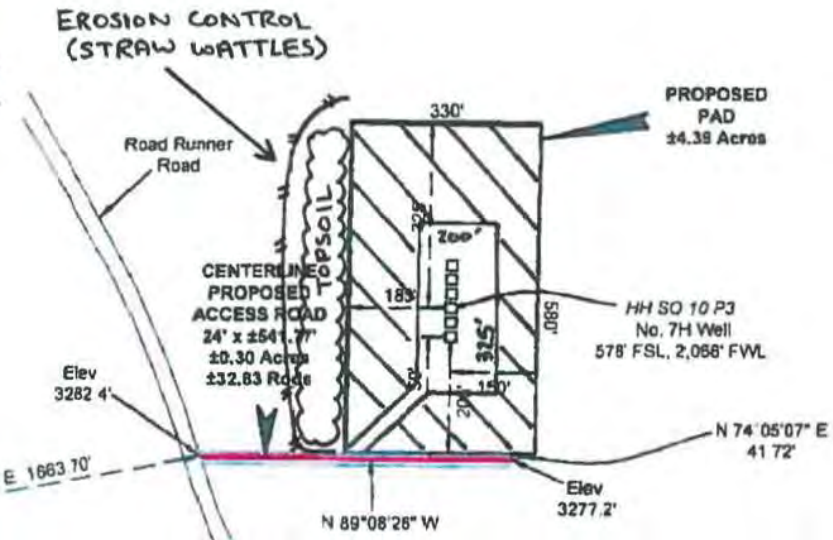
Robert L. Lastrapes
Registration No 23006

R 27 E

Sec. 3

Bureau of Land Management

NW PAD CORNER	NE PAD CORNER	HH SO 10 P3 NO. 7H WELL
X= 547,392 NAD 27	X= 547,722 NAD 27	X= 547,567 NAD 27
Y= 387,887	Y= 387,882	Y= 387,559
ELEVATION +3282' NAVD 88	ELEVATION +3279 NAVD 88	LAT 32.085422
SW PAD CORNER	SE PAD CORNER	LONG 104.179779
X= 547,383 NAD 27	X= 547,713 NAD 27	X= 588.75' NAD83
Y= 387,307	Y= 387,302	Y= 387,616
ELEVATION +3281' NAVD 88	ELEVATION +3276' NAVD 88	LAT 32.085544
		LONG 104.180272
		ELEVATION +3279' NAVD 88



T
26
S

LEGEND
Section Line
Existing Road
Access Centerline
Surface Location

Scale: 1" = 300'
300' 0 150' 300'

Sec. 10

Bureau of Land Management

Whites City Road

INTERIM RECLAMATION

SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED PADS, POND & ACCESS ROADS
HH SO 10 P3
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

PAGE 1 OF 3

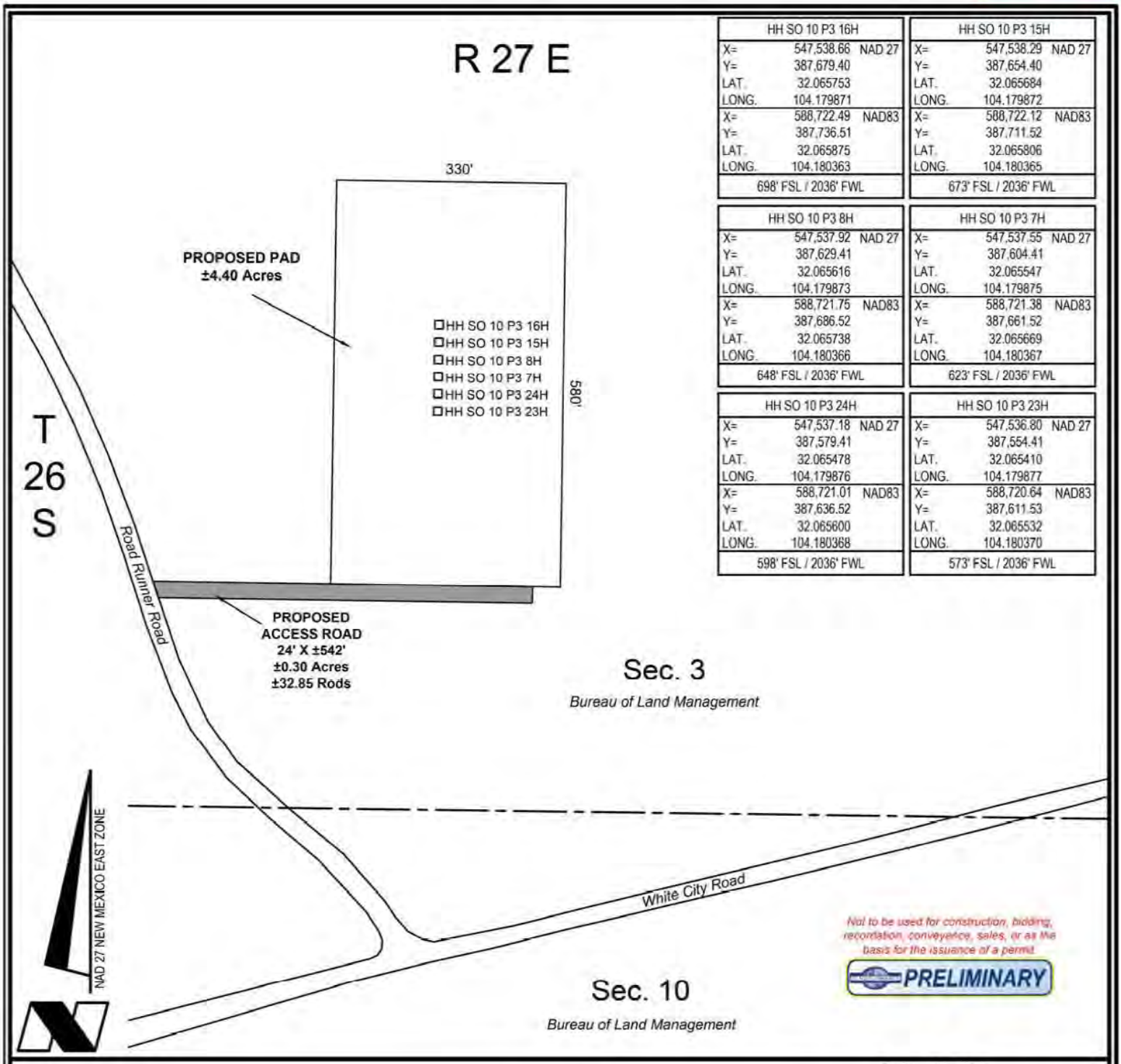
FENSTERMAKER

C. H. Fenstermaker & Associates L.L.C.
135 Regency Sq. Lafayette LA 70508
Ph. 337.237.2200 Fax 337-232.3299
www.fenstermaker.com

DRAWN BY: LJG	REVISIONS		
PROJ. MGR.: CDG	No.	DATE:	REVISED BY:
DATE: 12/16/2015	No.	DATE:	REVISED BY:

FILENAME: T:\2015\2153366\DWG\HH SO 10 P3 7H_SUP.dwg

EXHIBIT 4



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Y=	387,679.40	
LAT.	32.065753	
LONG.	104.179871	
X=	588,722.49	NAD83
Y=	387,736.51	
LAT.	32.065875	
LONG.	104.180363	
698' FSL / 2036' FWL		

HH SO 10 P3 15H		
X=	547,538.29	NAD 27
Y=	387,654.40	
LAT.	32.065684	
LONG.	104.179872	
X=	588,722.12	NAD83
Y=	387,711.52	
LAT.	32.065806	
LONG.	104.180365	
673' FSL / 2036' FWL		

HH SO 10 P3 8H		
X=	547,537.92	NAD 27
Y=	387,629.41	
LAT.	32.065616	
LONG.	104.179873	
X=	588,721.75	NAD83
Y=	387,686.52	
LAT.	32.065738	
LONG.	104.180366	
648' FSL / 2036' FWL		

HH SO 10 P3 7H		
X=	547,537.55	NAD 27
Y=	387,604.41	
LAT.	32.065547	
LONG.	104.179875	
X=	588,721.38	NAD83
Y=	387,661.52	
LAT.	32.065669	
LONG.	104.180367	
623' FSL / 2036' FWL		

HH SO 10 P3 24H		
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Y=	387,579.41	
LAT.	32.065478	
LONG.	104.179876	
X=	588,721.01	NAD83
Y=	387,636.52	
LAT.	32.065600	
LONG.	104.180368	
598' FSL / 2036' FWL		

HH SO 10 P3 23H		
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Y=	387,554.41	
LAT.	32.065410	
LONG.	104.179877	
X=	588,720.64	NAD83
Y=	387,611.53	
LAT.	32.065532	
LONG.	104.180370	
573' FSL / 2036' FWL		

DETAIL

Scale: 1" = 200'

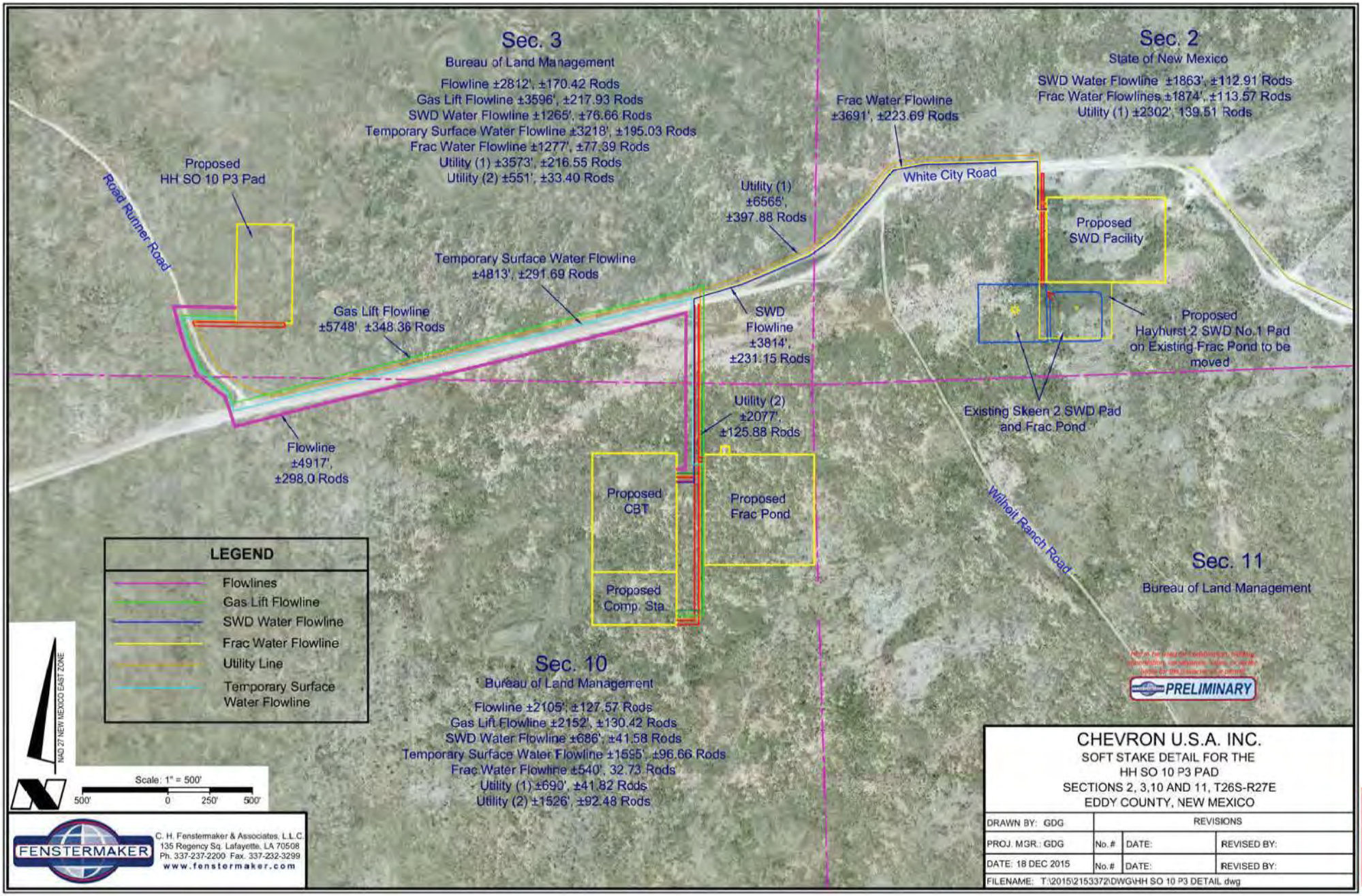
200' 0 100' 200'

CHEVRON U.S.A. INC.

PAD AND ACCESS DETAIL FOR THE
HH SO 10 P3 PAD
SECTION 3, T26S-R27E
EDDY COUNTY, NEW MEXICO

FENSTERMAKER
C. H. Fenstermaker & Associates, L.L.C.
135 Regency Sq. Lafayette, LA 70508
Ph. 337-237-2200 Fax. 337-232-3299
www.fenstermaker.com

DRAWN BY: GDG	REVISIONS		
PROJ. MGR.: GDG	No.#	DATE:	REVISED BY:
DATE: 2 DEC 2015	No.#	DATE:	REVISED BY:
FILENAME: T:\2015\2153367\DWG\HH SO 10 P3 PAD DETAIL.dwg			


Sec. 3
Bureau of Land Management
Flowline ±2812', ±170.42 Rods
Gas Lift Flowline ±3596', ±217.93 Rods
SWD Water Flowline ±1265', ±76.66 Rods
Temporary Surface Water Flowline ±3218', ±195.03 Rods
Frac Water Flowline ±1277', ±77.39 Rods
Utility (1) ±3573', ±216.55 Rods
Utility (2) ±551', ±33.40 Rods
Sec. 2
State of New Mexico
SWD Water Flowline ±1863', ±112.91 Rods
Frac Water Flowlines ±1874', ±113.57 Rods
Utility (1) ±2302', 139.51 Rods
Frac Water Flowline ±3691', ±223.69 Rods
White City Road
Road Runner Road
Proposed HH SO 10 P3 Pad
Utility (1) ±6565', ±397.88 Rods
Proposed SWD Facility
Temporary Surface Water Flowline ±4813', ±291.69 Rods
Gas Lift Flowline ±5748', ±348.36 Rods
SWD Flowline ±3814', ±231.15 Rods
Proposed Hayhurst 2 SWD No.1 Pad on Existing Frac Pond to be moved
Utility (2) ±2077', ±125.88 Rods
Existing Skeen 2 SWD Pad and Frac Pond
Flowline ±4917', ±298.0 Rods
Proposed CBT
Proposed Frac Pond
Wilhoit Ranch Road
Sec. 11
Bureau of Land Management
Proposed Comp. Sta.
LEGEND
Flowlines
Gas Lift Flowline
SWD Water Flowline
Frac Water Flowline
Utility Line
Temporary Surface Water Flowline
NAD 27 NEW MEXICO EAST ZONE
Scale: 1" = 500'
500' 0 250' 500'
Sec. 10
Bureau of Land Management
Flowline ±2105', ±127.57 Rods
Gas Lift Flowline ±2152', ±130.42 Rods
SWD Water Flowline ±686', ±41.58 Rods
Temporary Surface Water Flowline ±1595', ±96.66 Rods
Frac Water Flowline ±540', 32.73 Rods
Utility (1) ±690', ±41.82 Rods
Utility (2) ±1526', ±92.48 Rods
PRELIMINARY
FENSTERMAKER
C. H. Fenstermaker & Associates, L.L.C.
135 Regency Sq. Lafayette, LA 70508
Ph. 337-237-2200 Fax. 337-232-3299
www.fenstermaker.com
CHEVRON U.S.A. INC.
SOFT STAKE DETAIL FOR THE
HH SO 10 P3 PAD
SECTIONS 2, 3,10 AND 11, T26S-R27E
EDDY COUNTY, NEW MEXICO
DRAWN BY: GDG
PROJ. MGR.: GDG
DATE: 18 DEC 2015
REVISIONS
No.# DATE: REVISED BY:
No.# DATE: REVISED BY:
FILENAME: T:\2015\2153372\DWG\HH SO 10 P3 DETAIL.dwg

EXHIBITS 4&5

CHEVRON U.S.A. Inc
HH SO 10 P3 24H
NMNM 121473
SECTION 3, T26S-R27E (Off Lease SHL) SECTION 15, T26S, R27E
SHL 553' FSL & 2066' FWL BHL 180' FSL & 2315' FWL

APD Surface Use Plan of Operations

This Surface Use Plan of Operations has been designed to be reviewed in conjunction with Hayhurst Development Area (HDA) Master Development Plan

HDA Master Development Plan Reference Table
The contents referenced below apply to all HDA APD's

Existing Roads	Exhibit 1, MDP SUPO Page 1
Construction Materials	MDP SUPO Page 6
Methods for Handling Waste	MDP SUPO Page 6
Reclamation Objectives	MDP SUPO Page 6-8
Final Surface Reclamation	MDP SUPO Page 6-8

Driving Directions

- Driving Directions – From Malaga, New Mexico. The location is approximately 11.5 miles from the nearest town, which is Malaga, New Mexico. From Malaga, proceed South on Highway 285 approximately 11.5 miles and turn right (West) onto White City Rd and go approximately 6.8 miles on White City Road until the road reaches an intersection with Roadrunner Rd. Turn right onto this and travel 100 yards, then the access road and well location is on the right.

New or Reconstructed Access Roads – (Exhibit 2, MDP SUPO Pg. 1)

- There will be 2,758' of new road construction for this proposal.
- Ditches: See Exhibit 2 (To be submitted at later date)
- Culverts: See Exhibit 2 (To be submitted at later date)
- Road Cuts: See Exhibit 2 (To be submitted at later date)

Location of Existing Wells (Exhibit 3)

- 1-Mile radius map is attached

Location of Existing and/or Proposed Production Facilities (Exhibit 4, MDP SUP Pg. 2)

- Facilities: Proposed production facilities located in the NE corner of Sec. 10, T26S-R27E where oil and gas sales will take place.
  - The proposed facility and frac pond is in Sec. 10, T26S-R27E
  - Gas purchaser pipeline is in place at the tank battery.
  - Open top tanks or open containments will be netted.
  - Open vent exhaust stacks will be modified to prevent birds or bats from entering, discourage perching, roosting, and nesting.
  - Facilities will have a secondary containment 1.5 times the holding capacity of largest storage tank.
  - All above ground structures will be painted non-reflective shale green for blending with surrounding environment.
  - The permanent water disposal system will be determined prior to construction of any water transfer pipeline. Until permanent water takeaway is available, produced water will be hauled off location in trucks. **Notification will be provided to BLM upon site selection and survey – plats (including SWD well information) will be provided.**
- Pipelines: See Detail – Exhibit 5
  - Pipelines Include:
    - 4,917' of Flowlines carrying production (buried)
    - 5,748' Gas Lift Line carrying pressurized gas (buried)
    - 3,814' SWD Line carrying produced water (buried)
    - 3,691' Permanent Frac water line carrying fresh water (buried)
    - 4,813' Temporary Water line carrying fresh water (surface)
  - A ROW will be applied for through the State and BLM.
  - All construction activity will be confined to the approved ROW.
  - Pipeline will run parallel to the road and will stay within approved ROW.
- Power lines\Utility lines: 8,642' of new power lines

Location and Types of Water Supply (Exhibit 5, MDP SUPO Pg. 5)

- Proposed pond in Section 10, T26S-R27E will be utilized for fresh water.
- Fresh water will be obtained from a private water source.

Construction Materials (MDP SUPO Pg. 6)

- Location-specific caliche sources will be provided in post-application supplement

CHEVRON U.S.A. Inc
HH SO 10 P3 24H
NMNM 121473
SECTION 3, T26S-R27E (Off Lease SHL) SECTION 15, T26S, R27E
SHL 553' FSL & 2066' FWL BHL 180' FSL & 2315' FWL

Well Site Layout (Exhibit 6)

- Surveyor Plat (Exhibit 6a)
  - Exterior well pad dimensions are 580' x 330'
  - Interior well pad dimensions from point of entry (well head) of the well are N-350', S-230', E-150', W-180'. Total disturbance area needed for construction of well pad will be approximately 4.4 acres
  - Topsoil placement is on the west where interim reclamation is planned to be completed upon completion of well and evaluation of best management practices.
  - Cut and fill: will be minimal.
- Rig Layout (Exhibit 6b)

Plans for Surface Reclamation (Exhibit 6, MDP SUPA Pg. 8)

Interim Reclamation Procedures

- Reclaimed pad size: 200' x 325'
- See Exhibit for reclaimed pad layout, topsoil location & erosion control features

Surface Ownership

- BLM Surface
  - Surface Tenant – Phillip Stell
- **Nearest Post Office:** Malaga Post Office; 11.4 Miles north

Other Information

- On-site performed by BLM NRS: Paul Murphy 11/4/2015
- Cultural report attached: **Yes** Participating Agreement attached: N/A

CHEVRON U.S.A. Inc
HH SO 10 P3 24H
NMNM 121473
SECTION 3, T26S-R27E (Off Lease SHL) SECTION 15, T26S, R27E
SHL 553' FSL & 2066' FWL BHL 180' FSL & 2315' FWL

Chevron Representatives

Primary point of contact:
Jennifer Van Curen
Jennifer.VanCuren@arcadis-us.com
M- 432-270-8753

Chevron Functional Contacts

Project Manager Name: Sean Cheben Address: 1400 Smith Street Houston, TX 77002 Phone: (432) 664-6809 Email: Sean.Cheben@chevron.com	**Drilling Engineer** Name: Roderick Milligan Address: 1400 Smith Street Houston, TX 77002 Phone: (281) 413-9794 Email: RoderickMilligan@chevron.com
Surface Land Representative Name: Kevin Dickerson Address: 15 Smith Road Midland Texas 79705 Phone: (432) 687-7104 Email: Kevin.Dickerson@chevron.com	**Facility Lead** Name: Tyler Weaver Address: 1400 Smith Street Houston, TX 77002 Phone: (281) 384-8934 Email: tyler.weaver@chevron.com
Geologist Name: Jeff Fabre Address: 1400 Smith Street Houston, TX 77002 Phone: (713) 372-0523 Email: JeffreyFabre@chevron.com	**Regulatory Specialist** Cindy Herrera-Murillo Address: 1616 W. Bender Blvd, Hobbs, NM 88240 Office: (575) 263-0431 Email: CHerreraMurillo@chevron.com

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EXHIBITS:

Exhibit 1 -- Existing Roads

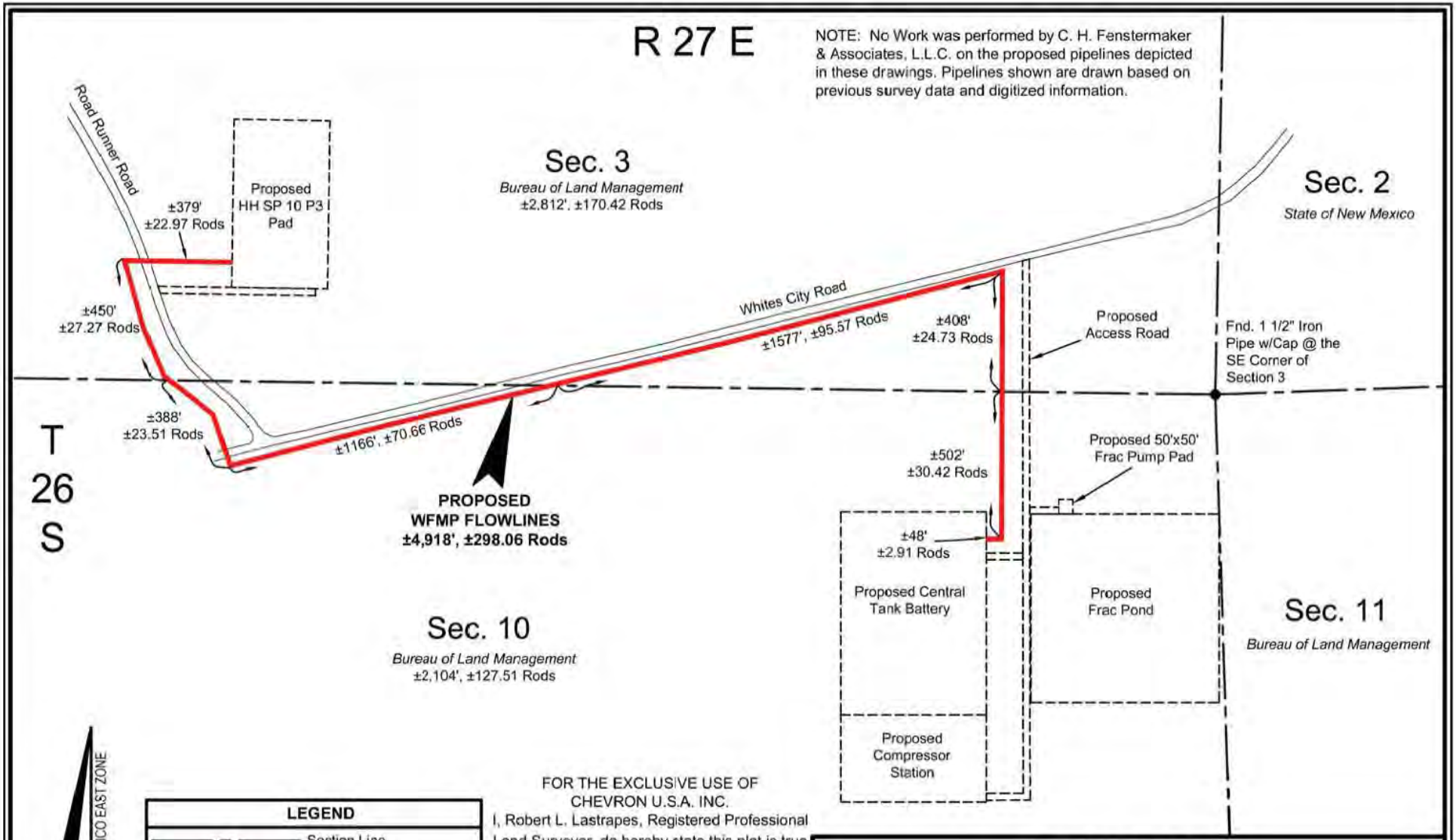
Exhibit 2 -- Survey Plat: New or Reconstructed Roads Map: if road is outside 600' x 600'.

Exhibit 3 -- 1-mile Radius Map

Exhibit 4 -- Location of Existing and/or Proposed Production Facilities (Tank Battery)

Exhibit 5 -- Survey Plat: Infrastructure: roads, pipelines, power lines, frac pond

Exhibit 6 -- Rig Layout: Well Site Layout Map / Diagram



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SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED WFMP FLOWLINES
HH SO 10 P3
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

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EXHIBIT 5

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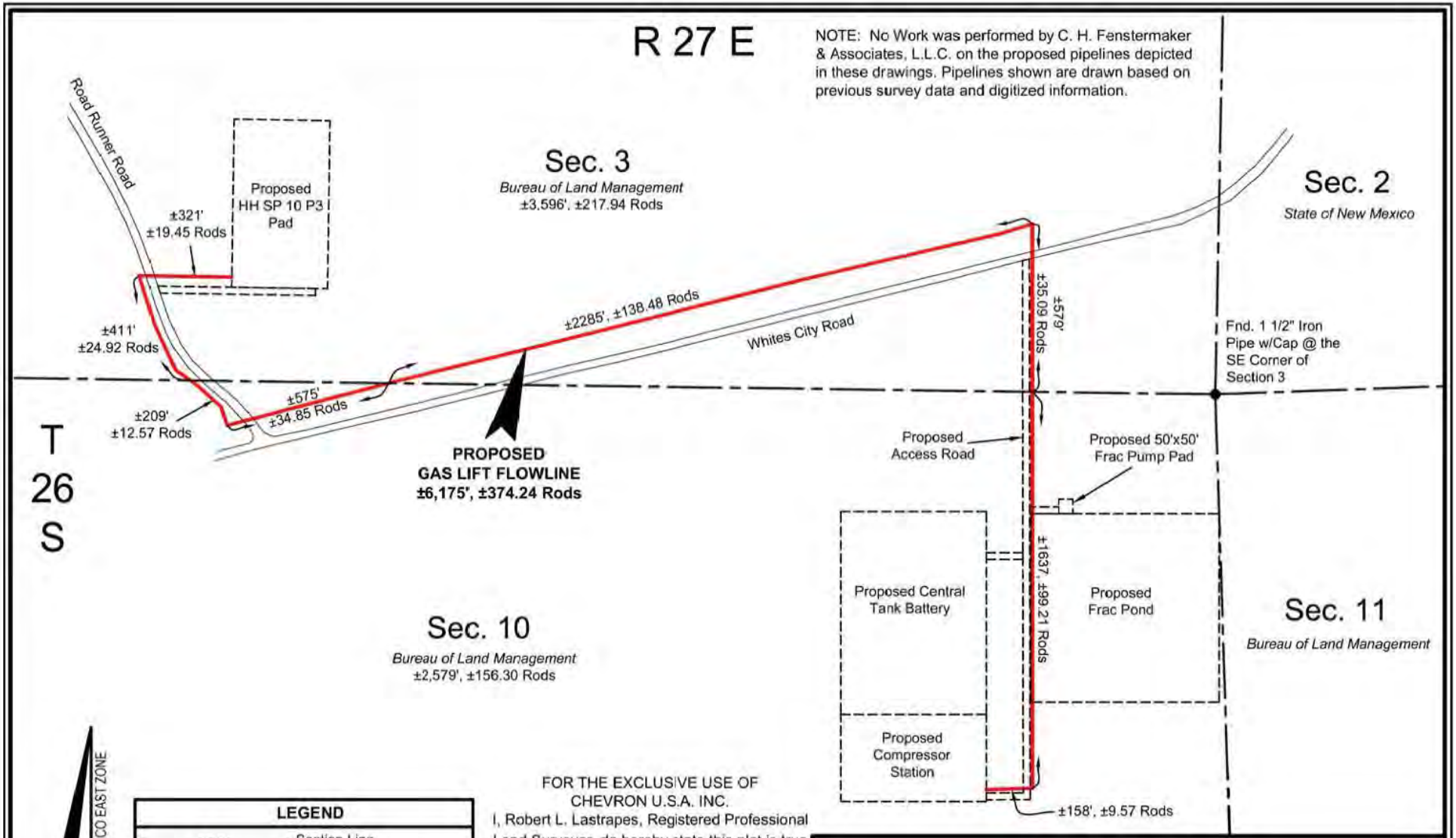

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PROPOSED GAS LIFT FLOWLINE
HH SO 10 P3
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

PAGE 1 OF 2

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EDDY COUNTY, NEW MEXICO

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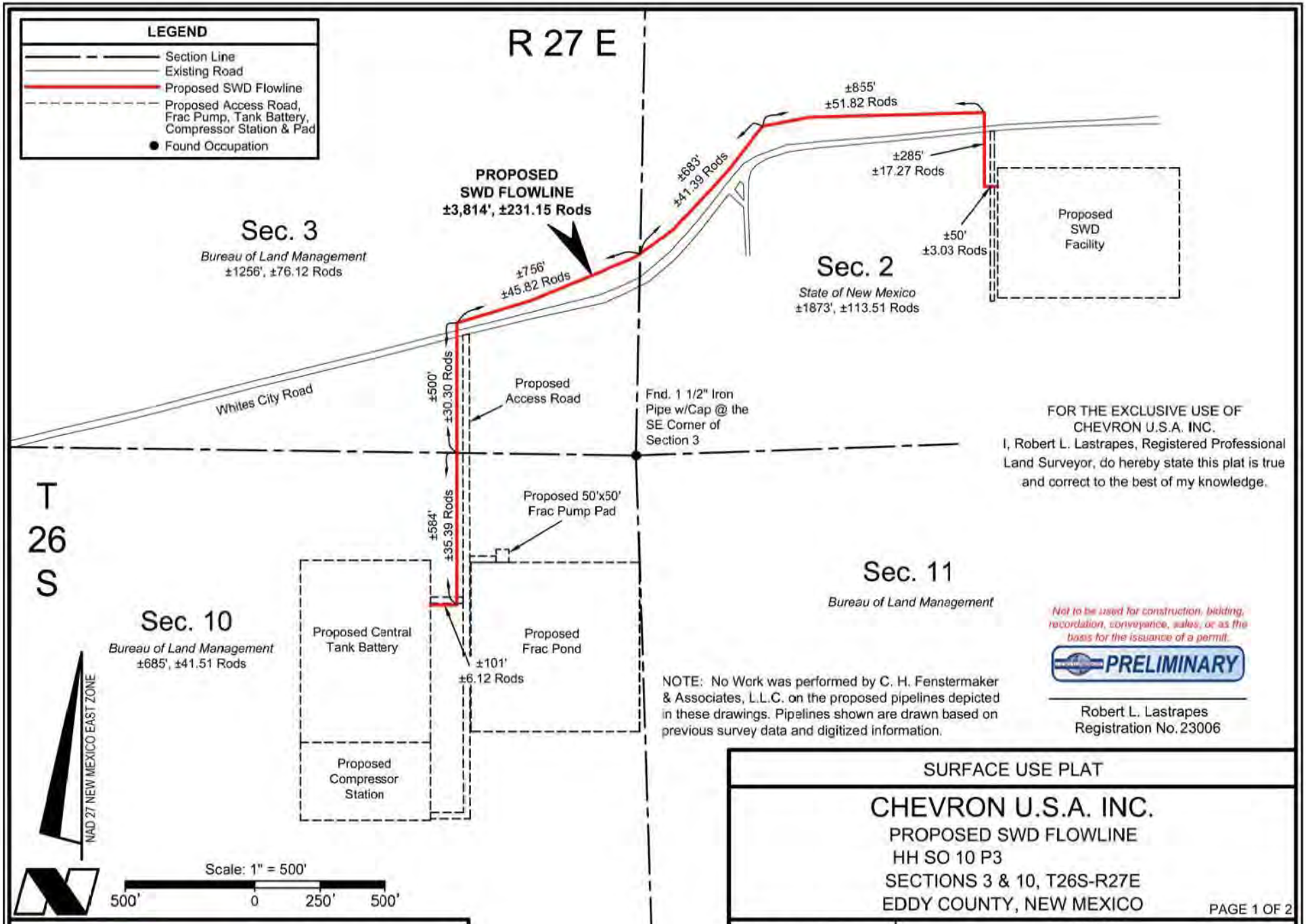

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CHEVRON U.S.A. INC.

PROPOSED SWD FLOWLINE
HH SO 10 P3
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EDDY COUNTY, NEW MEXICO

PAGE 1 OF 2

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SURFACE USE PLAT

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PROPOSED SWD FLOWLINE
HH SO 10 P3
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

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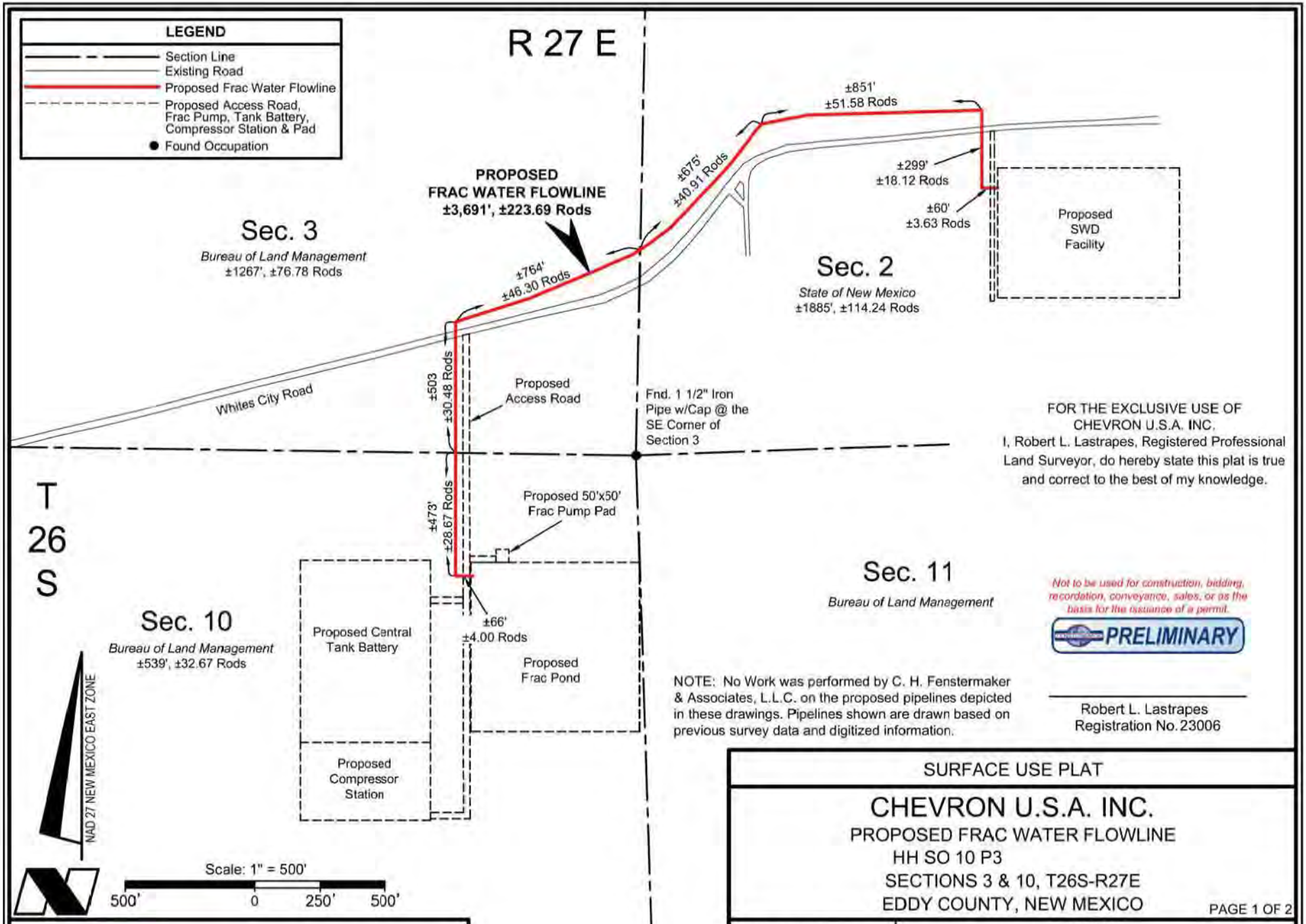

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SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED FRAC WATER FLOWLINE
HH SO 10 P3
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

PAGE 1 OF 2

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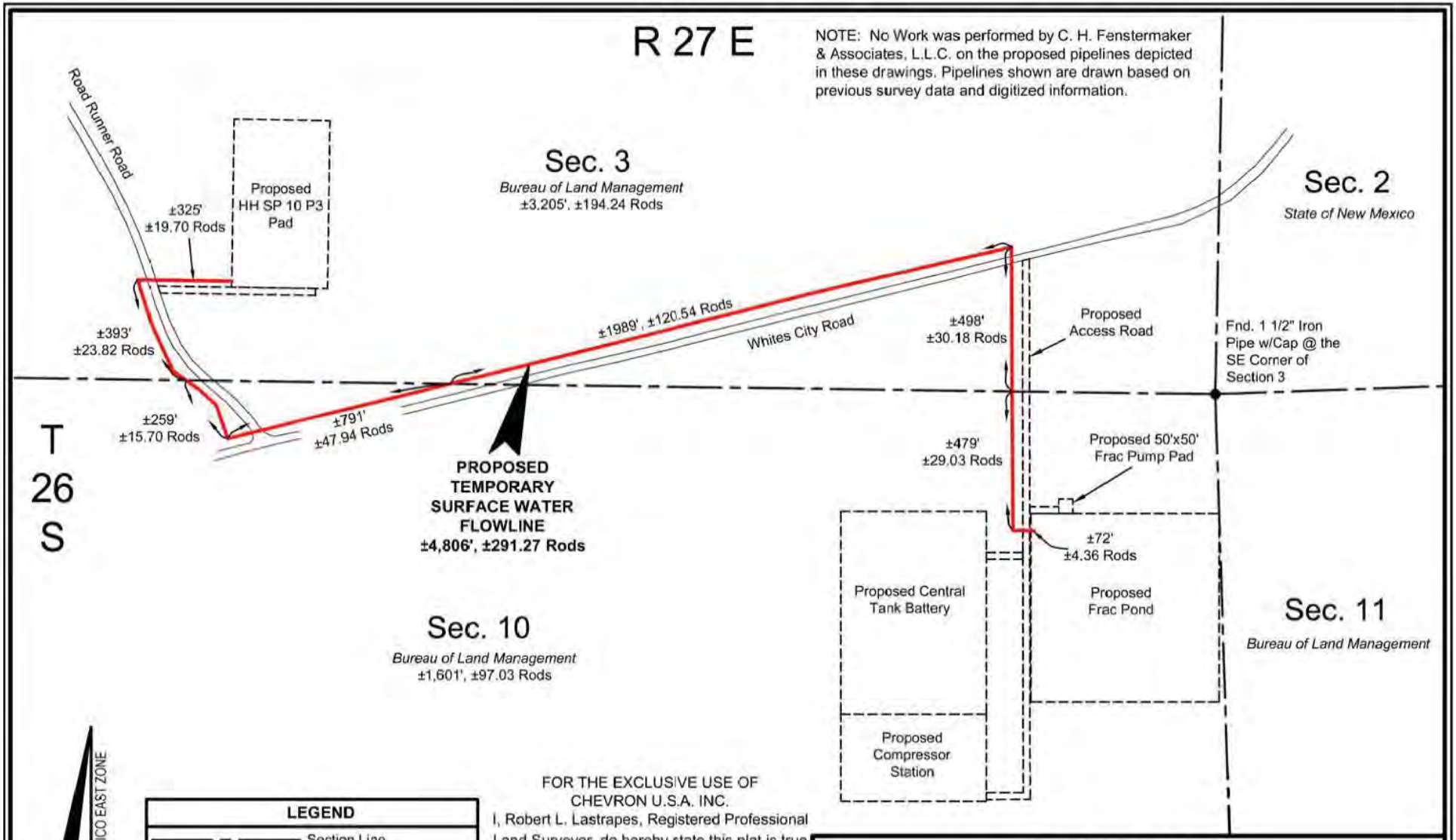

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PROPOSED TEMPORARY SURFACE WATER FLOWLINE
HH SO 10 P3
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

PAGE 1 OF 2

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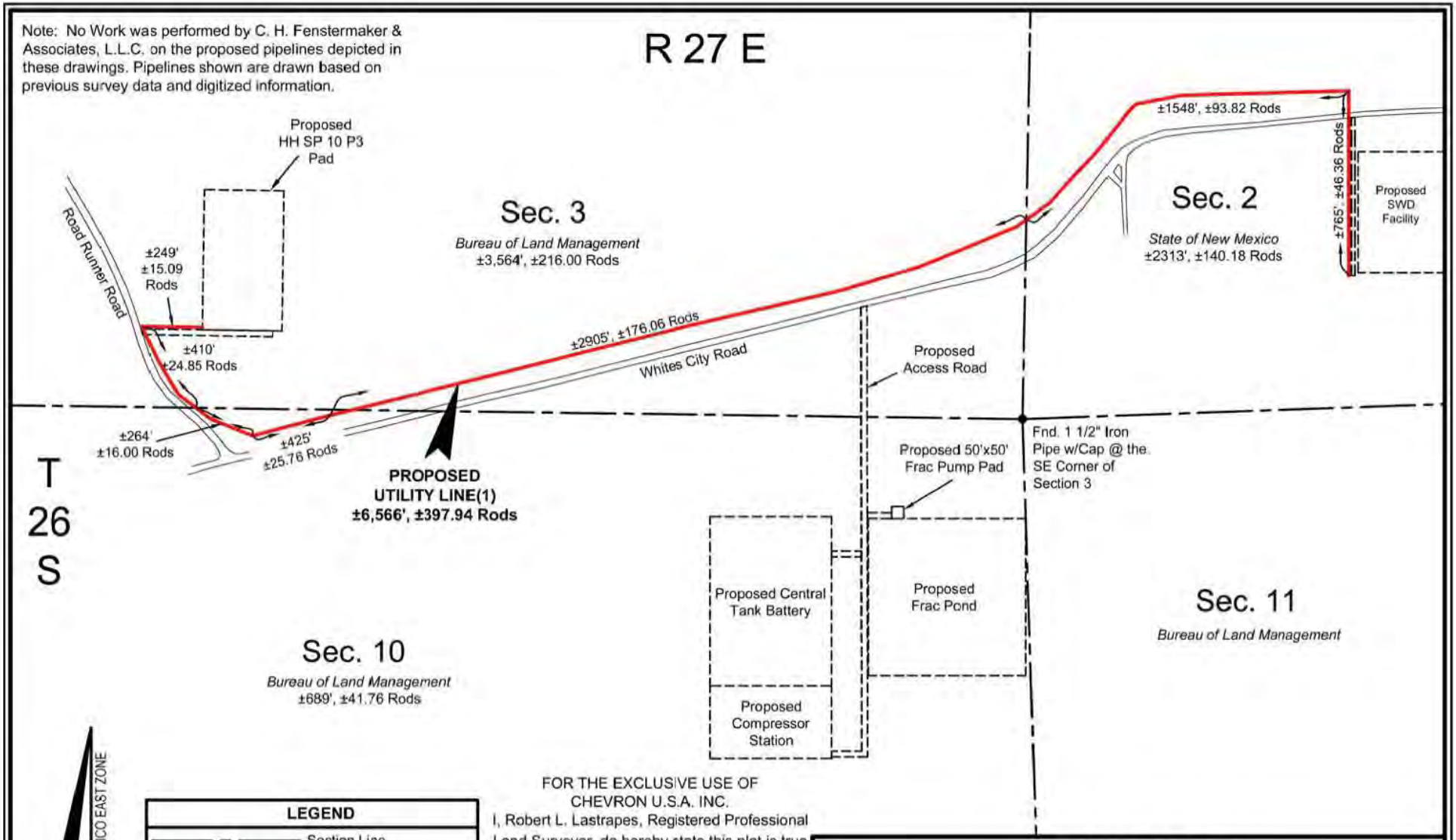

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PROPOSED UTILITY LINE(1)
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EDDY COUNTY, NEW MEXICO

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EDDY COUNTY, NEW MEXICO

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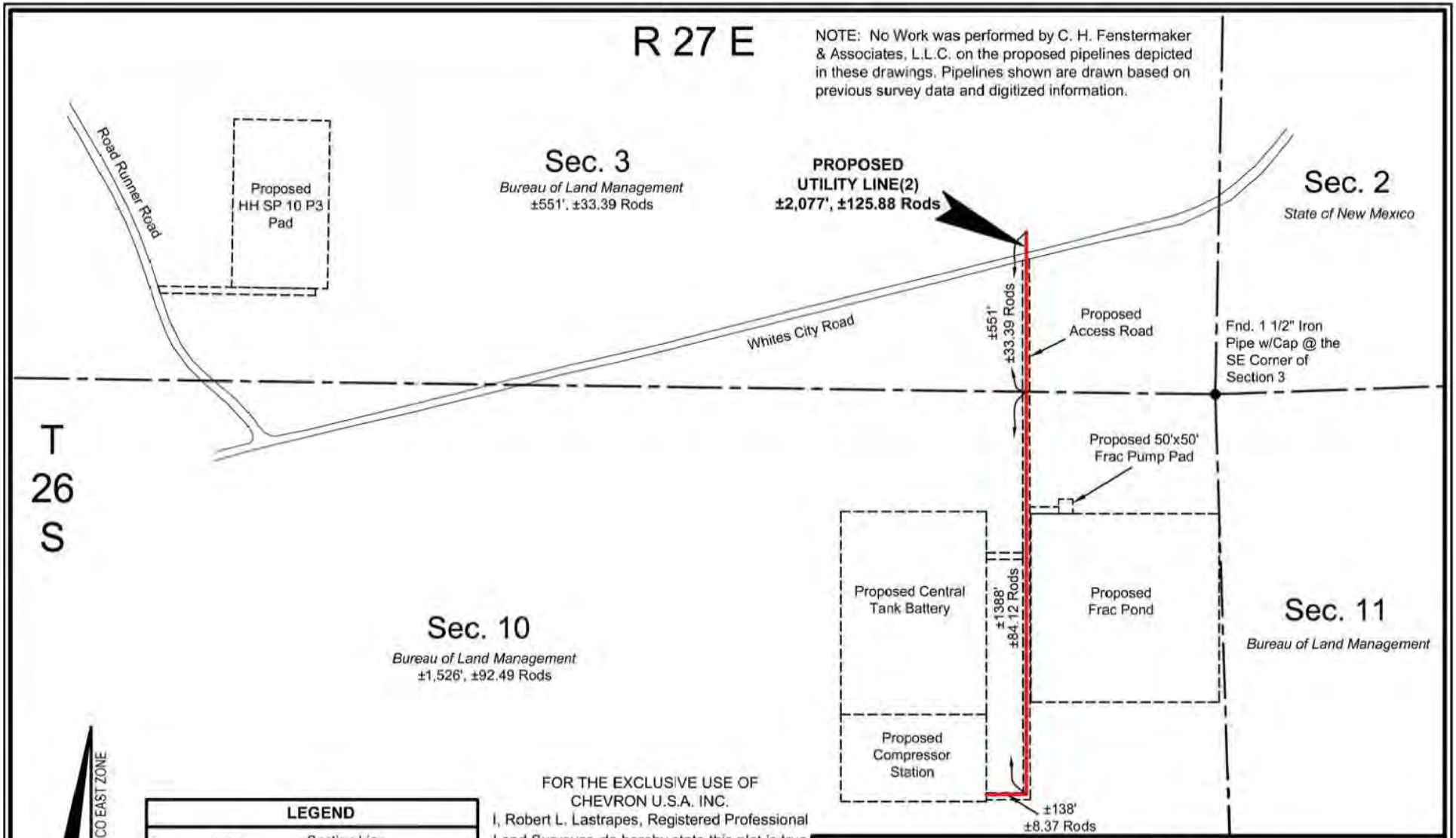

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EXHIBIT 5

DISCLAIMER: At this time, C.H. Fenstermaker & Associates, L.L.C. has not performed nor was asked to perform any type of engineering, hydrological modeling, flood plain, or "No Rise" certification analyses, including but not limited to determining whether the project will impact flood hazards in connection with federal/FEMA, state, and/or local laws, ordinances and regulations. Accordingly, Fenstermaker makes no warranty or representation of any kind as to the foregoing issues, and persons or entities using this information shall do so at their own risk.

NOTE:

1. Please be advised, that while reasonable efforts are made to locate and verify pipelines and anomalies using our standard pipeline locating equipment, it is impossible to be 100 % effective. As such, we advise using caution when performing work as there is a possibility that pipelines and other hazards, such as fiber optic cables, PVC pipelines, etc. may exist undetected on site.

2. Many states maintain information centers that establish links between those who dig (excavators) and those who own and operate underground facilities (operators). It is advisable and in most states, law, for the contractor to contact the center for assistance in locating and marking underground utilities. For guidance, New Mexico One Call, www.nmonecall.org

3. No Work was performed by C. H. Fenstermaker & Associates, L.L.C. on the proposed pipelines depicted in these drawings. Pipelines shown are drawn based on previous survey data and digitized information.

FOR THE EXCLUSIVE USE OF
CHEVRON U.S.A. INC.
I, Robert L. Lastrapes, Registered Professional Land Surveyor, do hereby state this plat is true and correct to the best of my knowledge.

Not to be used for construction, bidding, recordation, conveyance, sales, or as the basis for the issuance of a permit.

PRELIMINARY

Robert L. Lastrapes
Registration No. 23006

FENSTERMAKER
C. H. Fenstermaker & Associates, L.L.C.
135 Regency Sq. Lafayette, LA 70508
Ph. 337-237-2200 Fax. 337-232-3299
www.fenstermaker.com

SURFACE USE PLAT

CHEVRON U.S.A. INC.

PROPOSED UTILITY LINE(2)
HH SO 10 P3
SECTIONS 3 & 10, T26S-R27E
EDDY COUNTY, NEW MEXICO

DRAWN BY: BOR	REVISIONS		
PROJ. MGR.: GDG	No.	DATE:	REVISED BY:
DATE: 02/08/2016	No.	DATE:	REVISED BY:
FILENAME: T:\2015\2153372\DWG\Utility Line 2_SUP.dwg			

APPENDIX B

MASTER DEVELOPMENT PLAN (SURFACE USE PLAN OF OPERATION, DRILLING PLAN)

Drilling Use Plan of Operations

1. Introduction and Overview
2. Drilling Use Plans
    a. First Bone Spring through Third Bone Spring
    b. Wolfcamp A
    c. Wolfcamp C and D
    d. Saltwater Disposal – Devonian
3. Structure Maps
4. Blowout Preventer (BOP), Choke, and Flexhose Schematics
5. Wellhead Schematics
6. H_2S Contingency Plan

Notes

1. The Drilling Use Plans (DUP) include the following:
    - Formation tops
    - Depth of water, oil, gas, and other mineral bearing formations
    - Casing Program
    - Cementing Program
    - Mud Program
    - Testing, logging, and coring
    - Potential hazards
2. Each DUP is intended to cover horizontal wells with 5,000; 7,000; and 10,000 ft laterals

1 – Introduction and Overview

Up to 436 horizontal oil and gas wells and five vertical water disposal wells would be drilled under this proposed action. Fewer wells could be drilled than are proposed due to geologic conditions, market uncertainties, or other considerations. Chevron's drilling operations would be conducted in compliance with all Federal Onshore Oil and Gas Orders, as well as with all other applicable laws, rules, and regulations. The seven potential target zones for the 436 total wells are detailed in Table 1 along with the target zone for the five water disposal wells. As geology is more fully developed, Chevron may increase or decrease the number of target zones as it deems advisable.

Table 1: Potential Target Zones in HDA

Target Zone	Approximate Depth (ft.)		Approximate Thickness (ft.)	
	Shallow	Deep	Thin	Thick
First Bone Spring	6,513	6,888	130	190
Second Bone Spring Sand	7,492	7,621	1,080	1,250
Harkey Sand	7,771	8,123	55	115
Third Bone Spring Sand	8,050	8,617	810	850
Wolfcamp A	8,400	9,014	130	190
Wolfcamp C	9,459	9,870	130	145
Wolfcamp D	9,570	9,992	270	300
Disposal Zone (Devonian)	14,100	15,300	1,000	1,200

Drilling Plan. Surface casing would be run to a minimum depth of 100 feet below freshwater aquifers. The surface hole would be cased with steel casing and cemented in place entirely from ground level to the depth specified in each well's APD. Prior to drilling below the surface casing, a Blowout Preventer (BOP) would be installed on the surface casing and both the BOP and the surface casing would be tested for pressure integrity. The BOP and related equipment would meet the requirements of Federal Onshore Oil and Gas Order No. 2 and the BLM would be notified in advance of all pressure tests.

Specific directional plans for each well would be included with a well's APD. Downhole operations would be done with tools to facilitate proper direction and path of the well bore. Some wells may require a pilot hole to facilitate drilling the horizontal section of the well; these will be specified in a well's APD.

After drilling each hole section to its final depth, logging tools would be run into the well to evaluate the potential hydrocarbon resource. Once the evaluation is complete, steel production casing would be run and cemented into place in accordance with the well design as approved by the BLM. The proposed casing and cementing program would be designed to protect and/or isolate all usable water zones, potentially productive zones, lost circulation zones, abnormally pressured zones and any prospectively valuable deposits of minerals. BLM approval is required prior to the use of any isolating medium other than cement. Upon cementing production casing in place, the drilling rig would be removed and replaced by a completion rig. Well completion primarily consists of hydraulic fracturing operations to

stimulate a well's lateral section. Completion operations will be conducted according to "green completion" guidelines per 40 CFR part 60, subpart OOOOa.

Up to four (4) drilling rigs may be simultaneously deployed in the HDA. Drilling rigs with onsite diesel generators shall maintain 4,500 foot spacing from other drilling rigs with onsite diesel generators to minimize the impact on air quality.

Waste Management. Chevron would use a closed-loop drilling system to capture drill cuttings and recycle drilling mud. Drill cuttings, drilling fluids, and produced oil and water would be stored safely in steel tanks, trucked to an NMOCD-approved disposal site (listed in Table 2), and disposed of properly. Chevron may elect to include additional disposal sites in subsequent APDs.

Table 2: Approved Drilling Waste Disposal Sites

Nearest City	Disposal Facility	Address	Phone Number
Carlsbad	R360 - Halfway	6601 Hobbs Hwy, Carlsbad, NM	(575) 393-1079
Eunice	Sundance Services	5 miles east of Eunice on Hwy 18 and Wallach Ln	(575) 390-0342
Seminole, TX	Permian Disposal	587 US Hwy 385 S	(432) 955-0322

Garbage and trash produced during drilling and completion operations will be collected in a trash container and disposed of properly at a state approved disposal facility. All trash on and around the well site will be collected for disposal. Human waste and grey water will be properly contained and disposed of properly at a state approved disposal facility. After drilling and completion operations, trash, chemicals, salts, frac sand and other waste material will be removed and disposed of properly at a state approved disposal facility.

Water Supply and Management. A well is anticipated to require between 24 - 60 days to drill and an additional 34 - 47 days to complete, depending on the targeted reservoir. Between 90,000 - 330,000 barrels of water would be required for drilling and completion of each well. That water would be transported to each location by temporary surface-laid pipelines installed on the edge of the access roads. Additionally, Chevron estimates that 2,000,000 barrels of water will be required to construct all pads and roads in the HDA, 1,700,000 barrels of water will be required for dust control, and 70,000 barrels of water will be required to hydrotest all pipelines and flowlines. Chevron expects that a variety of water sources would need to be utilized over the life of the development plan.

During the drilling and completions process, a temporary 10" expanding pipe water transfer line will run along established disturbance corridors, such as along access roads or on top of flowline or pipeline ROWs. Chevron does not expect that this water line, which will run parallel to and stay within 10' of the access road, will require a separate ROW.

2A – DUP for First Bone Spring through Third Bone Spring

Eddy County, NM

1. **FORMATION TOPS**

The estimated tops of important geologic markers are as follows:

FORMATION	SUB-SEA TVD	KBTVD	MD
Castille		505	
Lamar		2395	
Bell		2310	
Cherry		3208	
Brushy		4450	
Bone Spring/Avalon		6299	
First Bone Spring Sand		6888	
First Bone Spring Shale		6914	
Second Bone Spring Sand		7621	
Harkey Sand		8123	
Third Bone Spring Sand		8617	
Third Bone Spring Sand		8617	12,617'-20,000'

2. **ESTIMATED DEPTH OF WATER, OIL, GAS & OTHER MINERAL BEARING FORMATIONS**

The estimated depths at which the top and bottom of the anticipated water, oil, gas, or other mineral bearing formations are expected to be encountered are as follows:

Substance	Formation	Depth
Deepest Expected Base of Fresh Water		450
Water	Castille	505
Water	Cherry Canyon	3208
Oil/Gas	Brushy Canyon	4450
Oil/Gas	Bone Spring Limestone	6888
Oil/Gas	First Bone Spring Shale	6914
Oil/Gas	Second Bone Spring Sand	7621
Oil/Gas	Harkey Sand	8123
Oil/Gas	Third Bone Spring Sand	8617

All shows of fresh water and minerals will be reported and protected.

3. **BOP EQUIPMENT**

Will have a minimum of a 5000 psi rig stack (see proposed schematic) for drill out below surface casing. Stack will be tested as specified in the attached testing requirements. Chevron requests a variance to use a CoFlex hose with a metal protective covering that will be utilized between the BOP and Choke manifold. Please refer to the testing and specification documents.

Chevron requests a variance to use a FMC Technologies UH-2 Multibowl wellhead, which will be run through the rig foor on surface casing. BOPE will be nippled up and tested after cementing surface casing. Subsequent tests will be performed as needed, not to exceed 30 days. The field report from FMC Technologies and BOP test information will be provided in a subsequent report at the end of the well. Please see the attached wellhead schematic. An installation manual has been placed on file with the BLM office and remains unchanged from previous submittal.

4. **CASING PROGRAM**

a. The proposed casing program will be as follows: The ranges of the production casing will range from 5000' -10,000' laterals. The targeted formations will be the First and Second Bonespring Sand, Harkey Sand, and the Third Bonespring Sand. The casing loads were based on the worst case senerio (Third Bone Spring Sand formation)

Purpose	From	To	Hole Size	Csg Size	Weight	Grade	Thread	Condition
Surface	0'	450'	17-1/2"	13-3/8"	54.5 #	K-55	STC	New
Intermediate	0'	2,100'	12-1/4"	9-5/8"	40.0 #	L-80	LTC	New
Production	0'	12,617'-20,000'	8-3/4"	5-1/2"	20.0 #	L-80	TXP	New

b. Casing design subject to revision based on geologic conditions encountered.

c. *****A "Worst Case" casing design for wells in a particular area is used below to calculate the Casing Safety Factors. If for any reason the casing design for a particular well requires setting casing deeper than the following "worst case" design, then the Casing Safety Factors will be recalcuated & sent to the BLM prior to drilling.**

d. **Chevron will fill casing at a minimum of every 20 jts (840') while running for intermediate and production casing in order to maintain collapse SF.**

SF Calculations based on the following "Worst Case" casing design:

Surface Casing: 450'
Intermediate Casing: 2100'
Production Casing: 12,617'-20,000' MD/6,914'-8,617' TVD (5,000'-10,000' VS @ 90 deg inc)

Casing String	Min SF Burst	Min SF Collapse	Min SF Tension	Min SF Tri-Axial
Surface	2.29	8.77	5.2	2.9
Intermediate	2.62	2.92	3.23	3.32
Production	1.26	2.12	1.84	1.45

Min SF is the smallest of a group of safety factors that include the following considerations:

	Surf	Int	Prod
Burst Design			
Pressure Test- Surface, Int, Prod Csg P external: Water P internal: Test psi + next section heaviest mud in csg	X	X	X
Displace to Gas- Surf Csg P external: Water P internal: Dry Gas from Next Csg Point	X		
Frac at Shoe, Gas to Surf- Int Csg P external: Water P internal: Dry Gas, 15 ppg Frac Gradient		X	
Stimulation (Frac) Pressures- Prod Csg P external: Water P internal: Max inj pressure w/ heaviest injected fluid			X
Tubing leak- Prod Csg (packer at KOP) P external: Water P internal: Leak just below surf, 8.7 ppg packer fluid			X
Collapse Design			
Full Evacuation P external: Water gradient in cement, mud above TOC P internal: none	X	X	X
Cementing- Surf, Int, Prod Csg P external: Wet cement P internal: water	X	X	X
Tension Design			
100k lb overpull	X	X	X

5. **CEMENTING PROGRAM**

Slurry	Type	Cement Top	Cement Bottom	Weight	Yield	%Excess	Sacks	Water
Single Slurry				(ppg)	(sx/cu ft)	Open Hole		gal/sk
Tail	Class C	0'	425'	14.8	1.33	50-100	350-450	6.37
Single Slurry								
2nd Stage Lead	Class C + Extender, Antifoam, Retarder	0'	1,100'	13.7	1.62	50-100	150-250	8.49
2nd Stage	Class C + Retarder	1,100'	2,100'	14.8	1.33	50-100	250-350	6.37
Production								
Tail	50:50 Poz: Class H + Extender, Antifoam, Dispersant, Viscosifier, Retarder	0'	2,100'	11.5	2.52	50-100	250-500	14.83
Lead	TXI + Extender, Antifoam, Dispersant, Fluid Loss, Retarder, Viscosifier	2,100'	7,617'	12.5	1.59	50-100	600-850	8.54
Single Slurry	Class H	7,123'	TD	15	2.18	50-100	2000-3000	9.547

1. Final cement volumes will be determined by caliper. Also, due to the surface location not being staked, the cement volumes will be submitted with the APD. The production string will vary with respect to the lateral length drilled.
2. Surface casing shall have at least one centralizer installed on each of the bottom three joints starting with the shoe joint.
3. Production casing will have one horizontal type centralizer on every joint for the first 1000' from TD, then every other joint to EOB, and then every third joint to KOP. Bowspring type centralizers will be run from KOP to intermediate casing.

6. **MUD PROGRAM**

From	To	Type	Weight	F. Vis	Filtrate
0'	450'	Spud Mud	8.3 - 8.7	32 - 34	NC - NC
450'	2,100'	WBM	9.5-10.0	30-40	NC -NC
2,100'	TD	WBM/OBM	9.0 - 9.5	50 -70	5.0 - 10

* The mud type is contingent on the lateral length drilled. The 5,000'-7500' laterals will consist of a WBM system. The 10,000' laterals will consist of a OBM system.
The mud weights may reflect wellbore stability and not the pore pressure of the well.
A closed system will by utilized consisting of above ground steel tanks. All wastes accumulated during drilling operations will be contained in a portable trash cage and removed from location and deposited in an approved sanitary landfill. Sanitary wastes will be contained in a chemical porta-toilet and then hauled to an approved sanitary landfill.

All fluids and cuttings will be disposed of in accordance with New Mexico Oil Conservation Division rules and regulations.

A mud test shall be performed every 24 hours after mudding up to determine, as applicable: density, viscosity, gel strength, filtration, and pH.

Visual mud monitoring equipment shall be in place to detect volume changes indicating loss or gain of circulating fluid volume. When abnormal pressures are anticipated -- a pit volume totalizer (PVT), stroke counter, and flow sensor will be used to detect volume changes indicating loss or gain of circulating fluid volume.

A weighting agent and lost circulating material (LCM) will be onsite to mitigate pressure or lost circulation as hole conditions dictate.

7. **TESTING, LOGGING, AND CORING**

The anticipated type and amount of testing, logging, and coring are as follows:

a. Drill stem tests are not planned.
b. The logging program will be as follows:

TYPE	Logs	Interval	Timing	Vendor
Mudlogs	2 man mudlog	Int Csg to TD	Drillout of Int Csg	TBD
LWD	MWD Gamma	Int. and Prod. Hole	While Drilling	TBD

c. Conventional whole core samples are not planned.
d. A Directional Survey will be run.

8. **ABNORMAL PRESSURES AND HYDROGEN SULFIDE**

a. There is a pressure ramp that will be seen in the Thirdbone Spring formation expected. Estimated BHP is: **4032 psi**
b. Hydrogen sulfide gas is not anticipated. An H2S Contingency plan will be attached with this MPD in the event that H2S is encountered

2B – DUP for Wolfcamp A

Eddy County, NM

1. **FORMATION TOPS**

The estimated tops of important geologic markers are as follows:
The formation tops are just an overview of the area TVD and are subjected to change.

FORMATION	SUB-SEA TVD	KBTVD	MD
Castille		505	
Lamar		2395	
Bell		2310	
Cherry		3208	
Brushy		4450	
Bone Spring/Avalon		6299	
First Bone Spring Sand		6888	
First Bone Spring Shale		6914	
Second Bone Spring Sand		7621	
Harkey Sand		8123	
Third Bone Spring Sand		8617	
Wolfcamp A		9014	
Lateral TVD Wolfcamp A		9014	14,014'-22,000'

2. **ESTIMATED DEPTH OF WATER, OIL, GAS & OTHER MINERAL BEARING FORMATIONS**

The estimated depths at which the top and bottom of the anticipated water, oil, gas, or other mineral bearing formations are expected to be encountered are as follows:

Substance	Formation	Depth
Deepest Expected Base of Fresh Water		450
Water	Castille	505
Water	Cherry Canyon	3208
Oil/Gas	Brushy Canyon	4450
Oil/Gas	Bone Spring Limestone	6888
Oil/Gas	First Bone Spring Shale	6914
Oil/Gas	Second Bone Spring Sand	7621
Oil/Gas	Harkey Sand	8123
Oil/Gas	Wolfcamp A	9014

All shows of fresh water and minerals will be reported and protected.

3. **BOP EQUIPMENT**

Will have a minimum of a 5000 psi rig stack (see proposed schematic) for drill out below surface casing. Stack will be tested as specified in the attached testing requirements. Chevron requests a variance to use a CoFlex hose with a metal protective covering that will be utilized between the BOP and Choke manifold. Please refer to the testing and specification documents.

Chevron requests a variance to use a FMC Technologies UH-2 Multibowl wellhead, which will be run through the rig foor on surface casing. BOPE will be nippled up and tested after cementing surface casing. Subsequent tests will be performed as needed, not to exceed 30 days. The field report from FMC Technologies and BOP test information will be provided in a subsequent report at the end of the well. Please see the attached wellhead schematic. An installation manual has been placed on file with the BLM office and remains unchanged from previous submittal.

4. **CASING PROGRAM**

a. The proposed casing program will be as follows:The proposed casing program will be as follows: The ranges of the production casing will range from 5000' -10,000' laterals. The targeted formations will be the Wolfcamp A. The casing loads were based on the worst case senerio (10,000' lateral)

Purpose	From	To	Hole Size	Csg Size	Weight	Grade	Thread	Condition
Surface	0'	450'	17-1/2"	13-3/8"	54.5 #	K-55	STC	New
Intermediate	0'	9,015'	12-1/4"	9-5/8"	40.0 #	L-80	TXP	New
Production	0'	14,014'-22,000'	8-1/2"	5-1/2"	20.0 #	P-110	TXP	New

b. Casing design subject to revision based on geologic conditions encountered.

c. *****A "Worst Case" casing design for wells in a particular area is used below to calculate the Casing Safety Factors. If for any reason the casing design for a particular well requires setting casing deeper than the following "worst case" design, then the Casing Safety Factors will be recalcuated & sent to the BLM prior to drilling.**

d. **Chevron will fill casing at a minimum of every 20 jts (840') while running for intermediate and production casing in order to maintain collapse SF.**

SF Calculations based on the following "Worst Case" casing design:

Surface Casing: 450'
Intermediate Casing: 9015'
Production Casing: 14,014'-22,000' MD/9,014' TVD (5,000'-10,000' VS @ 90 deg inc)

Casing String	Min SF Burst	Min SF Collapse	Min SF Tension	Min SF Tri-Axial
Surface	1.82	5.11	3.97	2.31
Intermediate	2.9	1.34	1.79	2.22
Production	1.26	1.66	2.54	1.31

Min SF is the smallest of a group of safety factors that include the following considerations:

Burst Design	Surf	Int	Prod
Pressure Test- Surface, Int, Prod Csg P external: Water P internal: Test psi + next section heaviest mud in csg	X	X	X
Displace to Gas- Surf Csg P external: Water P internal: Dry Gas from Next Csg Point	X		
Frac at Shoe, Gas to Surf- Int Csg P external: Water P internal: Dry Gas, 15 ppg Frac Gradient		X	
Stimulation (Frac) Pressures- Prod Csg P external: Water P internal: Max inj pressure w/ heaviest injected fluid			X
Tubing leak- Prod Csg (packer at KOP) P external: Water P internal: Leak just below surf, 8.7 ppg packer fluid			X
Collapse Design			
Full Evacuation P external: Water gradient in cement, mud above TOC P internal: none	X	X	X
Cementing- Surf, Int, Prod Csg P external: Wet cement P internal: water	X	X	X
Tension Design			
100k lb overpull	X	X	X

5. **CEMENTING PROGRAM**

Slurry	Type	Cement Top	Cement Bottom	Weight	Yield	%Excess	Sacks	Water
Surface				(ppg)	(sx/cu ft)	Open Hole		gal/sk
Tail	Class C	0'	450'	14.8	1.33	50-100		6.37
Intermediate								
Stage 2 Lead	50:50 Poz: Class C + Antifoam, Extender, Salt, Retarder	0'	1,100'	11.9	2.43	50-100	150-250	14.21
Stage 2 Tail	Class C + Antifoam, Retarder, Viscosifier	1,100'	2,100'	14.8	1.33	50-100	250-350	6.37
DV Tool		Tool Depth: 2,100'						
Stage 1 Lead	50:50 Poz: Class H + Extender, Antifoam, Retarder, Salt, Viscosifier	2,100'	8,015'	11.9	2.43	50-100	600-850	13.76
Stage 1 Tail	Class H + Retarder, Extender, Dispersant	8,015'	9,015'	15.6	1.21	50-100	250-450	5.54
Production								
Lead	50:50 Poz: Class H + Extender, Antifoam, Dispersant, , Retarder	7,015'	8,015'	14.5	1.21	50-100	150-250	5.54
Tail	Class H + Viscosifier, Antifoam, Dispersant, Fluid Loss, Retarder, Expanding Agent	8,015'	TD	15.6	1.2	50-100	2000-3000	5.30

1. Final cement volumes will be determined by caliper. Also, due to the surface location not being staked, the cement
2. Surface casing shall have at least one centralizer installed on each of the bottom three joints starting with the shoe joint.

3. Production casing will have one horizontal type centralizer on every joint for the first 1000' from TD, then every other joint to EOB, and then every third joint to KOP. Bowspring type centralizers will be run from KOP to intermediate casing.

6. **MUD PROGRAM**

From	To	Type	Weight	F. Vis	Filtrate
0'	450'	Spud Mud	8.3 - 8.7	32 - 34	NC - NC
450'	9015'	OBM	9.0 - 9.5	50 -70	5.0 - 10
9015'	TD	OBM	10.0 - 13.5	50 -70	5.0 - 10

* The mud weights will range depending on the targeted formation. The Wolfcamp A pore pressure will not exceed 9.5 ppg, but due to wellbore stability, the mud program will exceed the pore pressure.
A closed system will by utilized consisting of above ground steel tanks. All wastes accumulated during drilling operations will be contained in a portable trash cage and removed from location and deposited in an approved sanitary landfill. Sanitary wastes will be contained in a chemical porta-toilet and then hauled to an approved sanitary landfill.

All fluids and cuttings will be disposed of in accordance with New Mexico Oil Conservation Division rules and regulations.

A mud test shall be performed every 24 hours after mudding up to determine, as applicable: density, viscosity, gel strength, filtration, and pH.

Visual mud monitoring equipment shall be in place to detect volume changes indicating loss or gain of circulating fluid volume. When abnormal pressures are anticipated -- a pit volume totalizer (PVT), stroke counter, and flow sensor will be used to detect volume changes indicating loss or gain of circulating fluid volume.

A weighting agent and lost circulating material (LCM) will be onsite to mitigate pressure or lost circulation as hole conditions

7. **TESTING, LOGGING, AND CORING**

The anticipated type and amount of testing, logging, and coring are as follows:

a. Drill stem tests are not planned.
b. The logging program will be as follows:

TYPE	Logs	Interval	Timing	Vendor
Mudlogs	2 man mudlog	Int Csg to TD	Drillout of Int Csg	TBD
LWD	MWD Gamma	Int. and Prod. Hole	While Drilling	TBD

c. Conventional whole core samples are not planned.
d. A Directional Survey will be run.

8. **ABNORMAL PRESSURES AND HYDROGEN SULFIDE**

a. There is a pressure ramp that will be seen in the Wolfcamp A formation expected. Estimated BHP is: **4218 psi**
b. Hydrogen sulfide gas is not anticipated. An H2S Contingency plan will be attached with this MPD in the event that H2S is encountered

2C – DUP for Wolfcamp C and D

Eddy County, NM

1. **FORMATION TOPS**

The estimated tops of important geologic markers are as follows:
The formation tops are just an overview of the area TVD and are subjected to change.

FORMATION	SUB-SEA TVD	KBTVD	MD
Castille		505	
Lamar		2395	
Bell		2310	
Cherry		3208	
Brushy		4450	
Bone Spring/Avalon		6299	
First Bone Spring Sand		6888	
First Bone Spring Shale		6914	
Second Bone Spring Sand		7621	
Harkey Sand		8123	
Third Bone Spring Sand		8617	
Wolfcamp A		9014	
Wolfcamp C		9870	
Wolfcamp D		9992	
Lateral TVD Wolfcamp D		9992	14,992'-22,500'

2. **ESTIMATED DEPTH OF WATER, OIL, GAS & OTHER MINERAL BEARING FORMATIONS**

The estimated depths at which the top and bottom of the anticipated water, oil, gas, or other mineral bearing formations are expected to be encountered are as follows:

Substance	Formation	Depth
Deepest Expected Base of Fresh Water		450
Water	Castille	505
Water	Cherry Canyon	3208
Oil/Gas	Brushy Canyon	4450
Oil/Gas	Bone Spring Limestone	6888
Oil/Gas	First Bone Spring Shale	6914
Oil/Gas	Second Bone Spring Sand	7621
Oil/Gas	Harkey Sand	8123
Oil/Gas	Wolfcamp A	9014
Oil/Gas	Wolfcamp C	9870
Oil/Gas	Wolfcamp D	9992

All shows of fresh water and minerals will be reported and protected.

3. **BOP EQUIPMENT**

Will have a minimum of a 10,000 psi rig stack (see proposed schematic) for drill out below surface casing. Stack will be tested as specified in the attached testing requirements. Chevron requests a variance to use a CoFlex hose with a metal protective covering that will be utilized between the BOP and Choke manifold. Please refer to the testing and specification documents.

Chevron requests a variance to use a FMC Technologies UH-2 Multibowl wellhead, which will be run through the rig foor on surface casing. BOPE will be nippled up and tested after cementing surface casing. Subsequent tests will be performed as needed, not to exceed 30 days. The field report from FMC Technologies and BOP test information will be provided in a subsequent report at the end of the well. Please see the attached wellhead schematic. An installation manual has been placed on file with the BLM office and remains unchanged from previous submittal.

4. **CASING PROGRAM**

a. The proposed casing program will be as follows: The ranges of the production casing will range from 5000' -10,000' laterals. The targeted formations will be the Wolfcamp C & D. The casing loads were based on the worst case senerio (Wolfcamp D formation).

Purpose	From	To	Hole Size	Csg Size	Weight	Grade	Thread	Condition
Surface	0'	450'	17-1/2"	13-3/8"	54.5 #	K-55	STC	New
Intermediate	0'	9,015'	12-1/4"	9-5/8"	40.0 #	L-80	TXP	New
Production	0'	14,992'-22,500'	8-1/2"	5-1/2"	20.0 #	P-110	TXP	New

b. Casing design subject to revision based on geologic conditions encountered.

c. *****A "Worst Case" casing design for wells in a particular area is used below to calculate the Casing Safety Factors. If for any reason the casing design for a particular well requires setting casing deeper than the following "worst case" design, then the Casing Safety Factors will be recalcuated & sent to the BLM prior to drilling.**

d. **Chevron will fill casing at a minimum of every 20 jts (840') while running for intermediate and production casing in order to maintain collapse SF.**

SF Calculations based on the following "Worst Case" casing design:

Surface Casing: 450'
Intermediate Casing: 9015'
Production Casing: 14,992'-22,500' MD/9,992' TVD (5,000'-10,000' VS @ 90 deg inc)

Casing String	Min SF Burst	Min SF Collapse	Min SF Tension	Min SF Tri-Axial
Surface	1.82	5.11	3.97	2.31
Intermediate	1.45	1.32	1.78	1.84
Production	1.26	1.50	2.43	1.35

Min SF is the smallest of a group of safety factors that include the following considerations:

	Surf	Int	Prod
Burst Design			
Pressure Test- Surface, Int, Prod Csg P extern Water P interna Test psi + next section heaviest mud in csg	X	X	X
Displace to Gas- Surf Csg P extern Water P interna Dry Gas from Next Csg Point	X		
Frac at Shoe, Gas to Surf- Int Csg P extern Water P interna Dry Gas, 15 ppg Frac Gradient		X	
Stimulation (Frac) Pressures- Prod Csg P extern Water P interna Max inj pressure w/ heaviest injected fluid			X
Tubing leak- Prod Csg (packer at KOP) P extern Water P interna Leak just below surf, 8.7 ppg packer fluid			X
Collapse Design			
Full Evacuation P extern Water gradient in cement, mud above TOC P interna none	X	X	X
Cementing- Surf, Int, Prod Csg P extern Wet cement P interna water	X	X	X
Tension Design			
100k lb overpull	X	X	X

5. **CEMENTING PROGRAM**

Slurry	Type	Cement Top	Cement Bottom	Weight	Yield	%Excess	Sacks	Water
Surface				(ppg)	(sx/cu ft)	Open Hole		gal/sk
Tail	Class C	0'	450'	14.8	1.33	50-100	350-450	6.37
Intermediate								
Stage 2 Lead	50:50 Poz: Class C + Antifoam, Extender, Salt, Retarder	0'	1,100'	11.9	2.43	50-100	150-250	14.21
Stage 2 Tail	Class C + Antifoam, Retarder, Viscosifier	1,100'	2,100'	14.8	1.33	50-100	250-350	6.37
DV Tool		Tool Depth: 2,100'						
Stage 1 Lead	50:50 Poz: Class H + Extender, Antifoam, Retarder, Salt, Viscosifier	2,100'	8,015'	11.9	2.43	50-100	600-850	13.76
Stage 1 Tail	Class H + Retarder, Extender, Dispersant	8,015'	9,015'	15.6	1.21	50-100	250-450	5.54
Production								
Lead	50:50 Poz: Class H + Extender, Antifoam, Dispersant, , Retarder	7,015'	8,015'	14.5	1.21	50-100	150-250	5.54
Tail	Class H + Viscosifier, Antifoam, Dispersant, Fluid Loss, Retarder, Expanding Agent	8,015'	TD	15.6	1.2	50-100	2000-3000	5.30
Pilot Hole								
Tail	Class C	Kick off point	TVD	17.2	0.97	50-100	50-100	3.61

1. Final cement volumes will be determined by caliper. Also, due to the surface location not being staked, the
2. Surface casing shall have at least one centralizer installed on each of the bottom three joints starting with the shoe joint.

3. Production casing will have one horizontal type centralizer on every joint for the first 1000' from TD, then every other joint to EOB, and then every third joint to KOP. Bowspring type centralizers will be run from KOP to

6. **MUD PROGRAM**

From	To	Type	Weight	F. Vis	Filtrate
0'	450'	Spud Mud	8.3 - 8.7	32 - 34	NC - NC
450'	9,015'	OBM	9.0 - 9.5	50 -70	5.0 - 10
9,015'	TD	OBM	10.0-13.5	50 -70	5.0 - 10

* The mud weights will range depending on the targeted formation. The Wolfcamp D will be the upper limit of the The mud weight may exceed the expected pore pressure, due to wellbore stability.
A closed system will by utilized consisting of above ground steel tanks. All wastes accumulated during drilling operations will be contained in a portable trash cage and removed from location and deposited in an approved sanitary landfill. Sanitary wastes will be contained in a chemical porta-toilet and then hauled to an approved sanitary landfill.

All fluids and cuttings will be disposed of in accordance with New Mexico Oil Conservation Division rules and regulations.

A mud test shall be performed every 24 hours after mudding up to determine, as applicable: density, viscosity, gel strength, filtration, and pH.

Visual mud monitoring equipment shall be in place to detect volume changes indicating loss or gain of circulating fluid volume. When abnormal pressures are anticipated -- a pit volume totalizer (PVT), stroke counter, and flow sensor will be used to detect volume changes indicating loss or gain of circulating fluid volume.

A weighting agent and lost circulating material (LCM) will be onsite to mitigate pressure or lost circulation as hole

7. **TESTING, LOGGING, AND CORING**

The anticipated type and amount of testing, logging, and coring are as follows:

a. Drill stem tests are not planned.
b. The logging program will be as follows:

TYPE	Logs	Interval	Timing	Vendor
Mudlogs	2 man mudlog	Int Csg to TD	Drillout of Int Csg	TBD
LWD	MWD Gamma	Int. and Prod. Hole	While Drilling	TBD
Wireline Logs	Quad Combo w/ Di-Pole Sonic, FMI,	Prod hole	After Intermediate hole	TBD

c. Conventional whole core samples are not planned for every well, the coring and wireline logs will only be taken on
d. A Directional Survey will be run.

8. **ABNORMAL PRESSURES AND HYDROGEN SULFIDE**

a.There is a pressure ramp that will be seen in the Wolfcamp D formation expected. Estimated BHP is: **5195-7015 psi**
b. Hydrogen sulfide gas is not anticipated. An H2S Contingency plan will be attached with this MPD in the event that H2S is encountered

9. **Pilot hole**

The pilot hole will be drilled on the Wolfcamp D wells, or the first well on the section drilled. The pilot hole will collect data from the Wolfcamp A to the Wolfcamp D formations using logging technics identified in section 7 of the MPD. The pilot hole will be cemented and a whipstock will be set to initiate the curve section of the targeted formation.

2D – DUP for Saltwater Disposal wells in the Devonian/Silurian

1. **FORMATION TOPS**

The estimated tops of important geologic markers are as follows:

FORMATION	SUB-SEA TVD	KBTVD	MD
Castille		505	
Lamar		2395	
Bell		2310	
Cherry		3208	
Brushy		4450	
Bone Spring/Avalon		6299	
Wolfcamp A		9014	
Wolfcamp C		9870	
Wolfcamp D		9992	
Penn / Cisco / Canyon		11340	
Strawn		11635	
Atoka		11860	
Morrow		12370	
Barnett		12780	
Mississippi Lime		13710	
Woodford		14000	
Devonian / Silurian		14100	
Fusselman		14700	
Lateral TVD Fusselman		15300	15300

2. **ESTIMATED DEPTH OF WATER, OIL, GAS & OTHER MINERAL BEARING FORMATIONS**

The estimated depths at which the top and bottom of the anticipated water, oil, gas, or other mineral bearing formations are expected to be encountered are as follows:

Substance	Formation	Depth
Deepest Expected Base of Fresh Water		450
Water	Castille	505
Water	Cherry Canyon	3208
Oil/Gas	Brushy Canyon	4450
Oil/Gas	Bone Spring Limestone	6299
Oil/Gas	Wolfcamp C	9014
Oil/Gas	Wolfcamp D	9870
Oil/Gas	Penn / Cisco / Canyon	9992
Oil/Gas	Strawn	11340
Oil/Gas	Atoka	11635
Oil/Gas	Morrow	11860
Oil/Gas	Barnett	12370
Oil/Gas	Mississippi Lime	12780
Oil/Gas	Woodford	13710

All shows of fresh water and minerals will be reported and protected.

3. **BOP EQUIPMENT**

Will have a minimum of a 5000 psi rig stack (see proposed schematic) for drill out below surface casing. In the intermediate liner string section, we will move to a 10,000 psi BOP stack. Stack will be tested as specified in the attached testing requirements.

Chevron requests a variance to use a FMC Technologies conventional wellhead, which will be run through the rig foor on surface casing. BOPE will be nippled up and tested after cementing surface casing. Subsequent tests will be performed as needed, not to exceed 30 days. The field report from FMC Technologies and BOP test information will be provided in a subsequent report at the end of the well. Please see the attached wellhead schematic. An installation manual has been placed on file with the BLM office and remains unchanged from previous submittal.

4. **CASING PROGRAM**

a. The proposed casing program will be as follows: The hole sizes will be opened using an underreamer the effective hole sizes are listed below. The following sections will utilize a under reamer: Intermediate liner section- (12-1/4" x 14-1/2"), Production liner section - (6.75" x 8.5"). Cementing modeling was performed to ensure we would have a good cement job that will isolate the zones for interest.

Purpose	From	To	Hole Size	Csg Size	Weight	Grade	Thread	Condition
Surface	0'	450'	24"	18-5/8"	87.5 #	H-40	BTC	New
Intermediate	0'	7,600'	16"	13-3/8"	72.0 #	P-110S	BLUE	New
Intermediate Liner	7,300'	9,200'	14-1/2"	11-3/4"	60.0 #	P-110	T-521	New
Production	0'	12,810'	10-5/8"	8-5/8"	44.0 #	TN-110HC	T-521	New
Production Liner	12,500'	14,000'	8-1/2"	6-5/8"	32.0 #	P-110IC	T-521	New
Open Hole	14,000'	15,300'	5-1/2"	-	-	-	-	New

b. Casing design subject to revision based on geologic conditions encountered.

c. *****A "Worst Case" casing design for wells in a particular area is used below to calculate the Casing Safety Factors. If for any reason the casing design for a particular well requires setting casing deeper than the following "worst case" design, then the Casing Safety Factors will be recalcuated & sent to the BLM prior to drilling.**

d. **Chevron will fill casing at a minimum of every 20 jts (840') while running for intermediate and production casing in order to maintain collapse SF.**

SF Calculations based on the following "Worst Case" casing design:

Surface Casing:	450'
Intermediate Casing:	7,600'
Intermediate Liner Casing:	9,200'
Production Casing:	12,810'
Production Liner Casing:	15,300'

Casing String	Min SF Burst	Min SF Collapse	Min SF Tension	Min SF Tri-Axial
Surface	2.15	3.20	4.20	2.71
Intermediate	1.53	1.15	3.41	1.91
Intermediate Liner	1.37	1.06	7.42	1.84
Production	1.96	1.04	1.68	1.27
Production Liner	2.40	1.15	3.03	1.27

Min SF is the smallest of a group of safety factors that include the following considerations:

Burst Design	Surf	Int	Prod
Pressure Test- Surface, Int, Prod Csg P externa Water P internal Test psi + next section heaviest mud in csg	X	X	X
Displace to Gas- Surf Csg P externa Water P internal Dry Gas from Next Csg Point	X		
Frac at Shoe, Gas to Surf- Int Csg P externa Water P internal Dry Gas, 15 ppg Frac Gradient		X	
Stimulation (Frac) Pressures- Prod Csg P externa Water P internal Max inj pressure w/ heaviest injected fluid			X
Tubing leak- Prod Csg (packer at KOP) P externa Water P internal Leak just below surf, 8.7 ppg packer fluid			X
Collapse Design			
Full Evacuation P externa Water gradient in cement, mud above TOC P internal none	X	X	X
Cementing- Surf, Int, Prod Csg P externa Wet cement P internal water	X	X	X
Tension Design			
100k lb overpull	X	X	X

5. **CEMENTING PROGRAM**

Slurry	Type	Cement Top	Cement Bottom	Weight	Yield	%Excess	Sacks	Water
Surface				(ppg)	(sx/cu ft)	Open Hole		gal/sk
Tail	Class C	0'	450'	14.8	1.33	50-100	300-400	6.37
Intermediate								
Stage 2 Lead	50:50 Poz: Class C + Antifoam, Extender, Salt, Retarder	0'	1,100'	11.9	2.43	50-100	150-250	14.21
Stage 2 Tail	Class C + Antifoam, Retarder, Viscosifier	1,100'	2,100'	14.8	1.33	50-100	250-350	6.37
DV TOOL		2,100'						
Stage 1 Lead	50:50 Poz: Class H + Extender, Antifoam, Retarder, Salt, Viscosifier	2,100'	6,600'	11.9	2.43	50-100	750-850	13.76
Stage 1 Tail	Class H + Retarder, Extender, Dispersant	6,600'	7,600'	15.6	1.21	50-100	300-400	5.54
Intermediate Liner								
Lead	50:50 Poz: Class H + Extender, Antifoam, Dispersant, , Retarder	7,300'	8,200'	14.5	1.21	50-100	250-350	5.54
Tail	Class H + Viscosifier, Antifoam, Dispersant, Fluid Loss, Retarder, Expanding Agent	8,200'	9,200'	15.6	1.2	50-100	250-350	5.30
Production								
Lead	50:50 Poz: Class H + Extender, Antifoam, Dispersant, , Retarder	8,900'	11,810'	14.5	1.21	50-100	450-550	5.54
Tail	Class H + Viscosifier, Antifoam, Dispersant, Fluid Loss, Retarder, Expanding Agent	11,810'	12,810'	15.6	1.2	50-100	150-200	5.30
Production Liner								
Tail	Class H	12,500'	14,000'	11.7	2.45	50-100	25-100	14.21

1. Final cement volumes will be determined by caliper. Also, due to the surface location not being staked, the cement volumes will be submitted with the APD. The production string will vary with respect to the lateral length drilled.
2. Surface casing shall have at least one centralizer installed on each of the bottom three joints starting with the shoe joint.
3. Production casing will have one horizontal type centralizer on every joint for the first 1000' from TD, then every other joint to EOB, and then every third joint to KOP. Bowspring type centralizers will be run from KOP to intermediate casing.

6. **MUD PROGRAM**

From	To	Type	Weight	F. Vis	Filtrate
0'	450'	Spud Mud	8.3 - 8.7	32 - 34	NC - NC
450'	9,200'	OBM	9.0 - 9.5	50 -70	5.0 - 10
9,200'	12,810'	WBM	10.0-15	50 -70	5.0 - 10
12,810'	TD	WBM	8.6-9	32-34	5.0 - 10

* The mud weights will range depending on the targeted formation. The Barnett Shale will be the upper limit of the mud program and it is reflected in the ranges given.
The mud weight may exceed the expected pore pressure, due to wellbore stability.
A closed system will by utilized consisting of above ground steel tanks. All wastes accumulated during drilling operations will be contained in a portable trash cage and removed from location and deposited in an approved sanitary landfill. Sanitary wastes will be contained in a chemical porta-toilet and then hauled to an approved sanitary landfill.

All fluids and cuttings will be disposed of in accordance with New Mexico Oil Conservation Division rules and regulations.

A mud test shall be performed every 24 hours after mudding up to determine, as applicable: density, viscosity, gel strength, filtration, and pH.

Visual mud monitoring equipment shall be in place to detect volume changes indicating loss or gain of circulating fluid volume. When abnormal pressures are anticipated -- a pit volume totalizer (PVT), stroke counter, and flow sensor will be used to detect volume changes indicating loss or gain of circulating fluid volume.

A weighting agent and lost circulating material (LCM) will be onsite to mitigate pressure or lost circulation as hole conditions dictate.

7. **TESTING, LOGGING, AND CORING**

The anticipated type and amount of testing, logging, and coring are as follows:

a. Drill stem tests are not planned.
b. The logging program will be as follows:

TYPE	Logs	Interval	Timing	Vendor
Mudlogs	2 man mudlog	Int Csg to TD	Drillout of Int Csg	TBD
LWD	MWD Gamma	Int. and Prod. Hole	While Drilling	TBD
Gas Analysis	XRD/XRF cuttings and gas analysis	Int. and Prod. Hole	While Drilling	TBD
Wireline Logs	Quad Combo w/ Di-Pole Sonic, FMI, Lithoscanner	Prod hole	After Intermediate hole	TBD

c. Conventional whole core samples are not planned.
d. A Directional Survey will be run.

8. **ABNORMAL PRESSURES AND HYDROGEN SULFIDE**

a. There is a pressure ramp that will be seen in the Wolfcamp B formation expected. Estimated BHP is: **7654 psi**
b. Hydrogen sulfide gas is not anticipated. An H2S Contingency plan will be attached with this APD in the event that H2S is encountered

3 – Structure Maps

The following structure maps correspond to the potential casing setting depths for at least one of the well plans including in the HDA Drilling Use Plan. The maps indicate the formation tops with depths in feet presented in measured depth (MD).

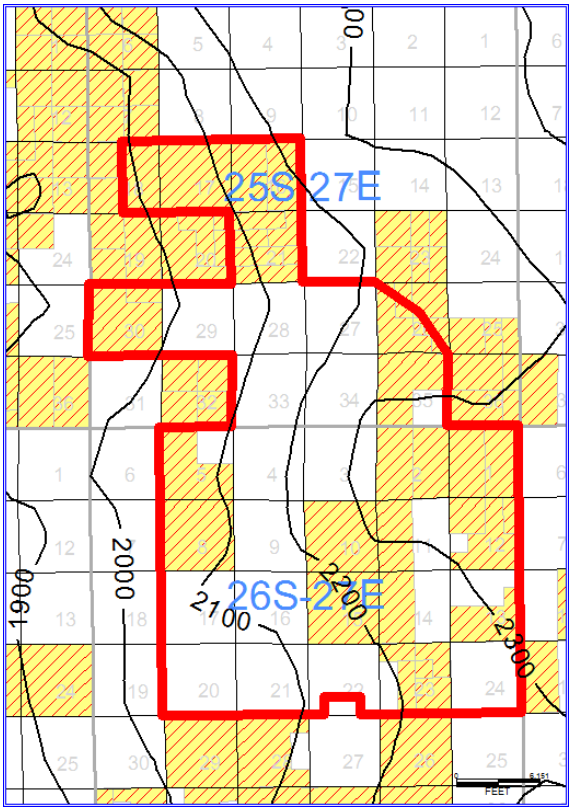


Figure 1: Structure Map of the Lamar

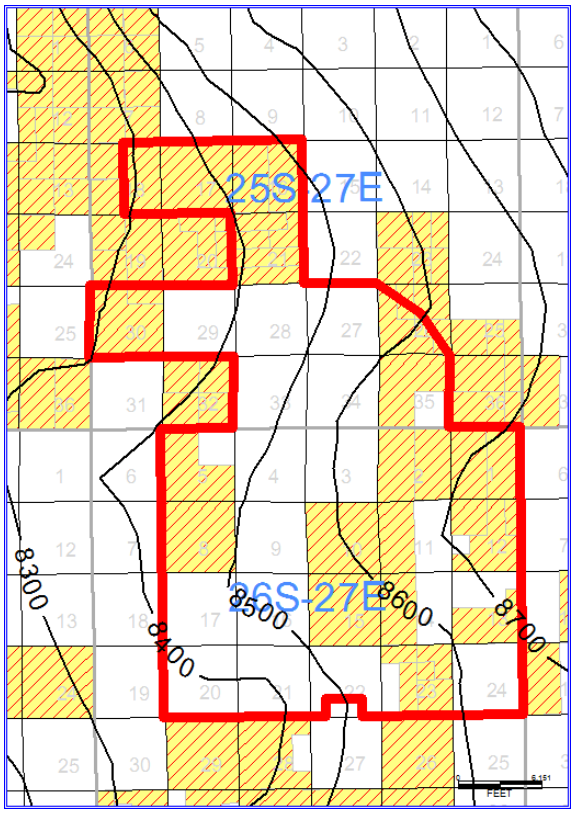


Figure 2: Structure Map of the Third Bone Spring

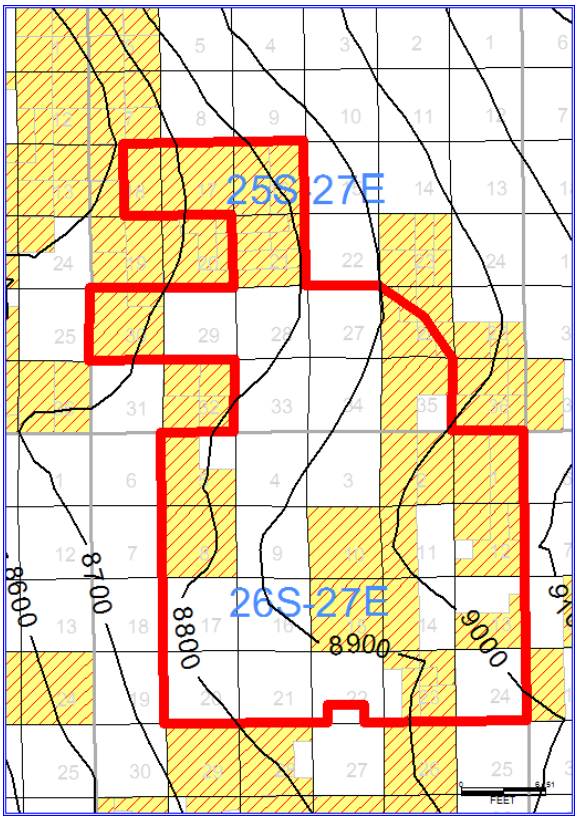


Figure 3: Structure Map of the Wolfcamp A

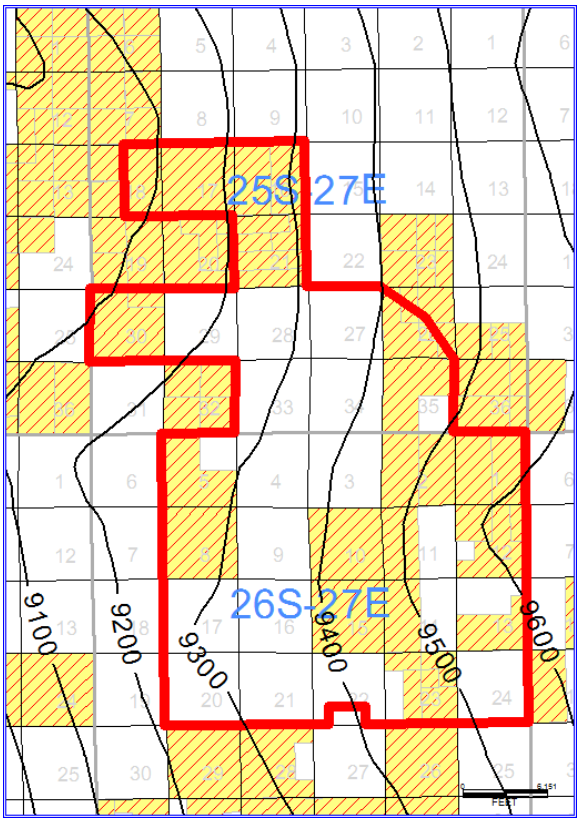


Figure 4: Structure Map of the Wolfcamp B

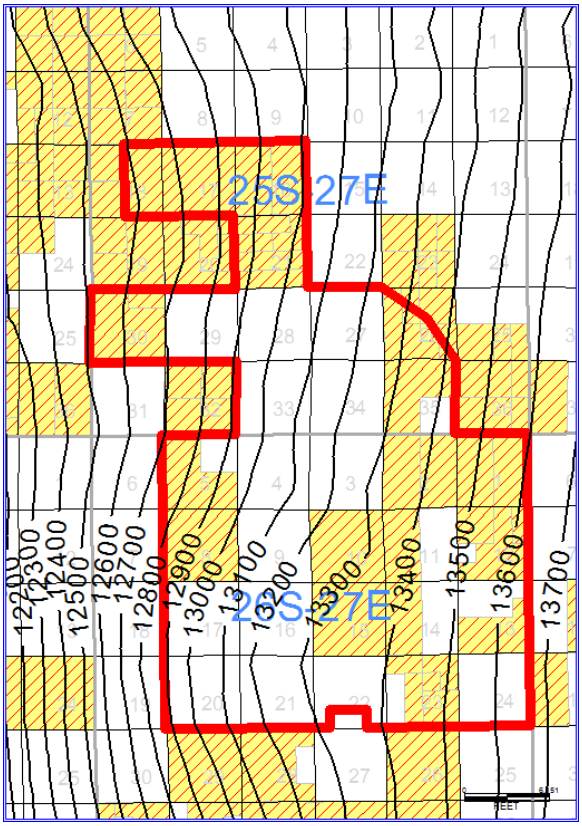


Figure 5: Structure Map of the Mississippi Lime

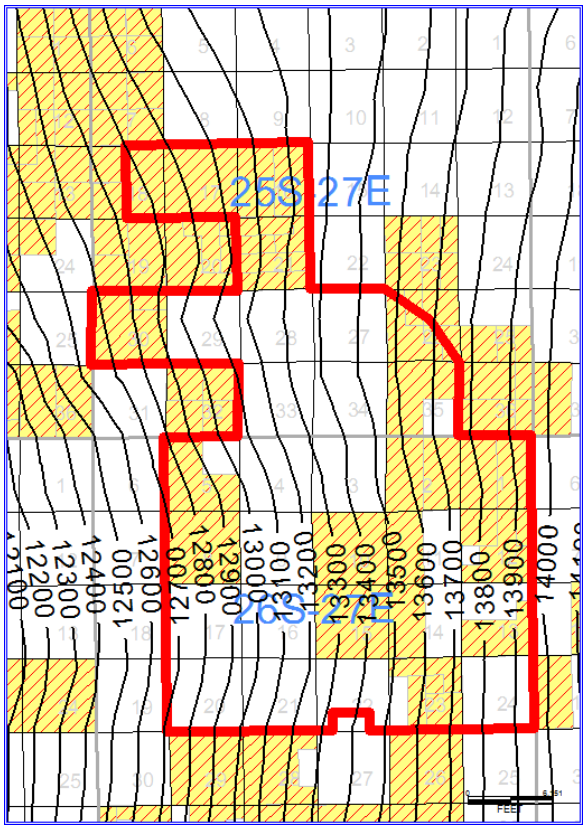


Figure 6: Structure Map of the Silurian

4 – BOP, Choke, and Flexhose Schematics

BLOWOUT PREVENTOR SCHEMATIC

Minimum Requirements

OPERATION : Bone Spring wells/ Intermediate section SWD

Minimum System Pressure Rating : **5,000 psi**

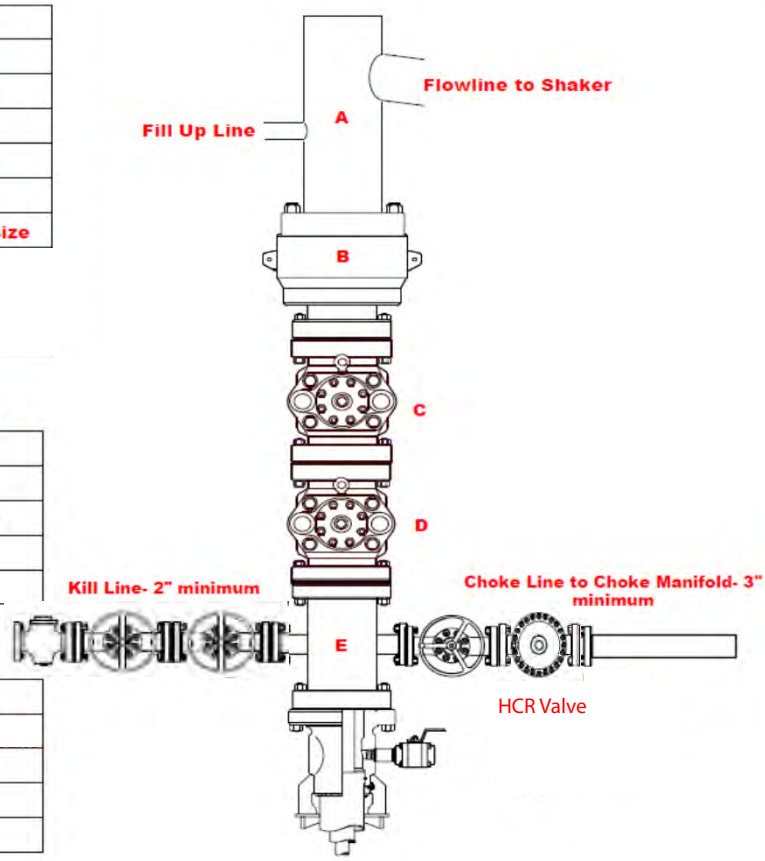
	SIZE	PRESSURE	DESCRIPTION
A		N/A	Bell Nipple
B	13 5/8"	5,000 psi	Annular
C	13 5/8"	5,000 psi	Pipe Ram
D	13 5/8"	5,000 psi	Blind Ram
E	13 5/8"	5,000 psi	Mud Cross
F			
DSA		As required for each hole size	

Kill Line

SIZE	PRESSURE	DESCRIPTION
2"	5,000 psi	Gate Valve
2"	5,000 psi	Gate Valve
2"	5,000 psi	Check Valve

Choke Line

SIZE	PRESSURE	DESCRIPTION
3"	5,000 psi	Gate Valve
3"	5,000 psi	HCR Valve



Installation Checklist

The following item must be verified and checked off prior to pressure testing of BOP equipment.

- ☐ **The installed BOP equipment meets at least the minimum requirements (rating, type, size, configuration) as shown on this schematic. Components may be substituted for equivalent equipment rated to higher pressures. Additional components may be put into place as long as they meet or exceed the minimum pressure rating of the system.**
- ☐ **All valves on the kill line and choke line will be full opening and will allow straight though flow.**
- ☐ **The kill line and choke line will be straight unless turns use tee blocks or are targeted with running tess, and will be anchored to prevent whip and reduce vibration.**
- ☐ **Manual (hand wheels) or automatic locking devices will be installed on all ram preventers. Hand wheels will also be installed on all manual valves on the choke line and kill line.**
- ☐ **A valve will be installed in the closing line as close as possible to the annular preventer to act as a locking device. This valve will remain open unless accumulator is inoperative.**
- ☐ **Upper kelly cock valve with handle will be available on rig floor along with safety valve and subs to fit all drill string connections in use.**

After Installation Checklist is complete, fill out the information below and email to Superintendent and Drilling Engineer

Wellname: _____

Representative: _____

Date: _____

Diagram A

CHOKE MANIFOLD SCHEMATIC

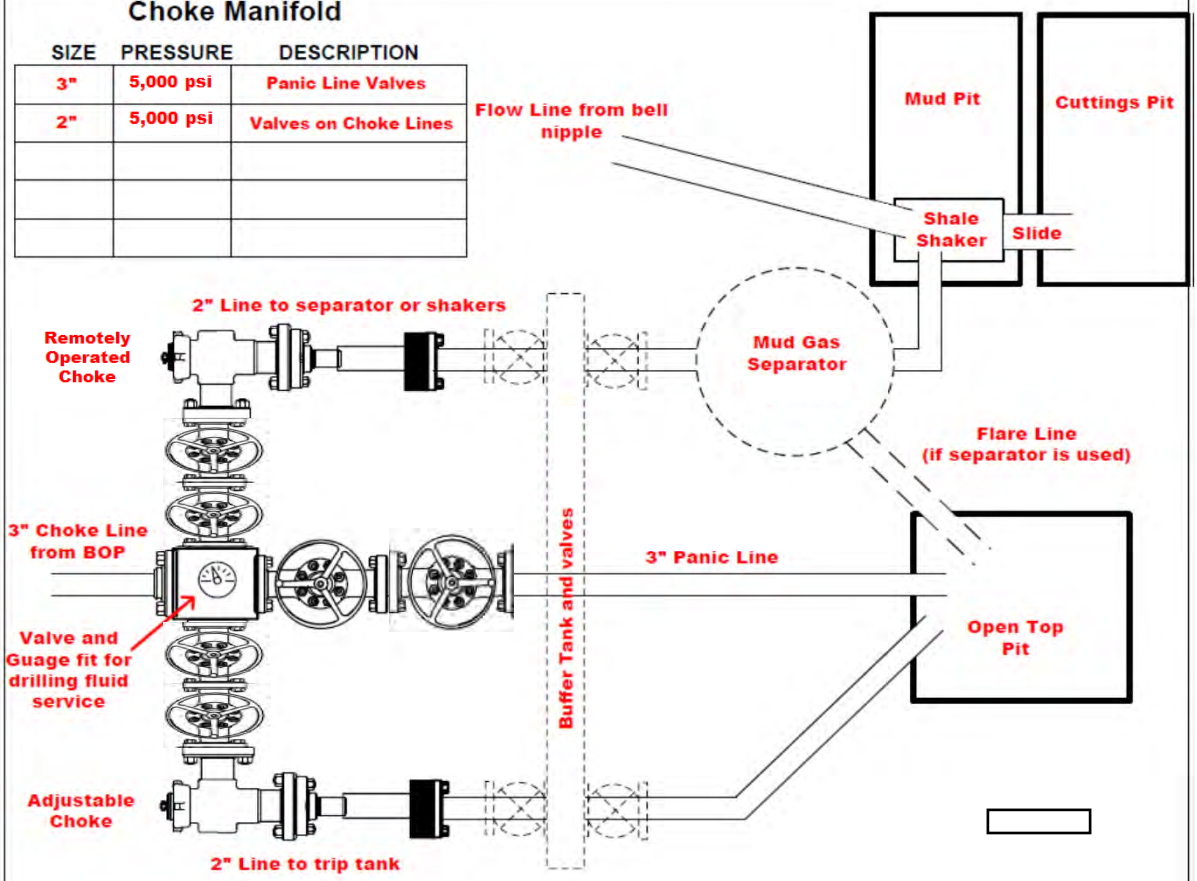
Minimum Requirements

OPERATION : Bone Spring wells/ Intermediate section SWD

Minimum System Pressure Rating : **5,000 psi**

Choke Manifold

SIZE	PRESSURE	DESCRIPTION
3"	5,000 psi	Panic Line Valves
2"	5,000 psi	Valves on Choke Lines



Installation Checklist

The following item must be verified and checked off prior to pressure testing of BOP equipment.

- ☐ The installed BOP equipment meets at least the minimum requirements (rating, type, size, configuration) as shown on this schematic. Components may be substituted for equivalent equipment rated to higher pressures. Additional components may be put into place as long as they meet or exceed the minimum pressure rating of the system.
- ☐ Adjustable Chokes may be Remotely Operated but will have backup hand pump for hydraulic actuation in case of loss of rig air pressure or power.
- ☐ Flare and Panic lines will terminate a minimum of 150' from the wellhead. These lines will terminate at a location as per approved APD.
- ☐ The choke line, kill line, and choke manifold lines will be straight unless turns use tee blocks or are targeted with running tess, and will be anchored to prevent whip and reduce vibration. This excludes the line between mud gas separator and shale shaker.
- ☐ All valves (except chokes) on choke line, kill line, and choke manifold will be full opening and will allow straight through flow. This excludes any valves between mud gas separator and shale shakers.
- ☐ All manual valves will have hand wheels installed.
- ☐ If used, flare system will have effective method for ignition
- ☐ All connections will be flanged, welded, or clamped (no threaded connections like hammer unions)
- ☐ If buffer tank is used, a valve will be used on all lines at any entry or exit point to or from the buffer tank.

After Installation Checklist is complete, fill out the information below and email to Superintendent and Drilling Engineer

Wellname: _____

Representative: _____

Date: _____

Diagram B

10M BLOWOUT PREVENTER SCHEMATIC

Minimum Requirements

OPERATION: Wolfcamp wells andProduction and Open Hole Sections for SWD

Minimum System Pressure Rating: **10,000 PSI**

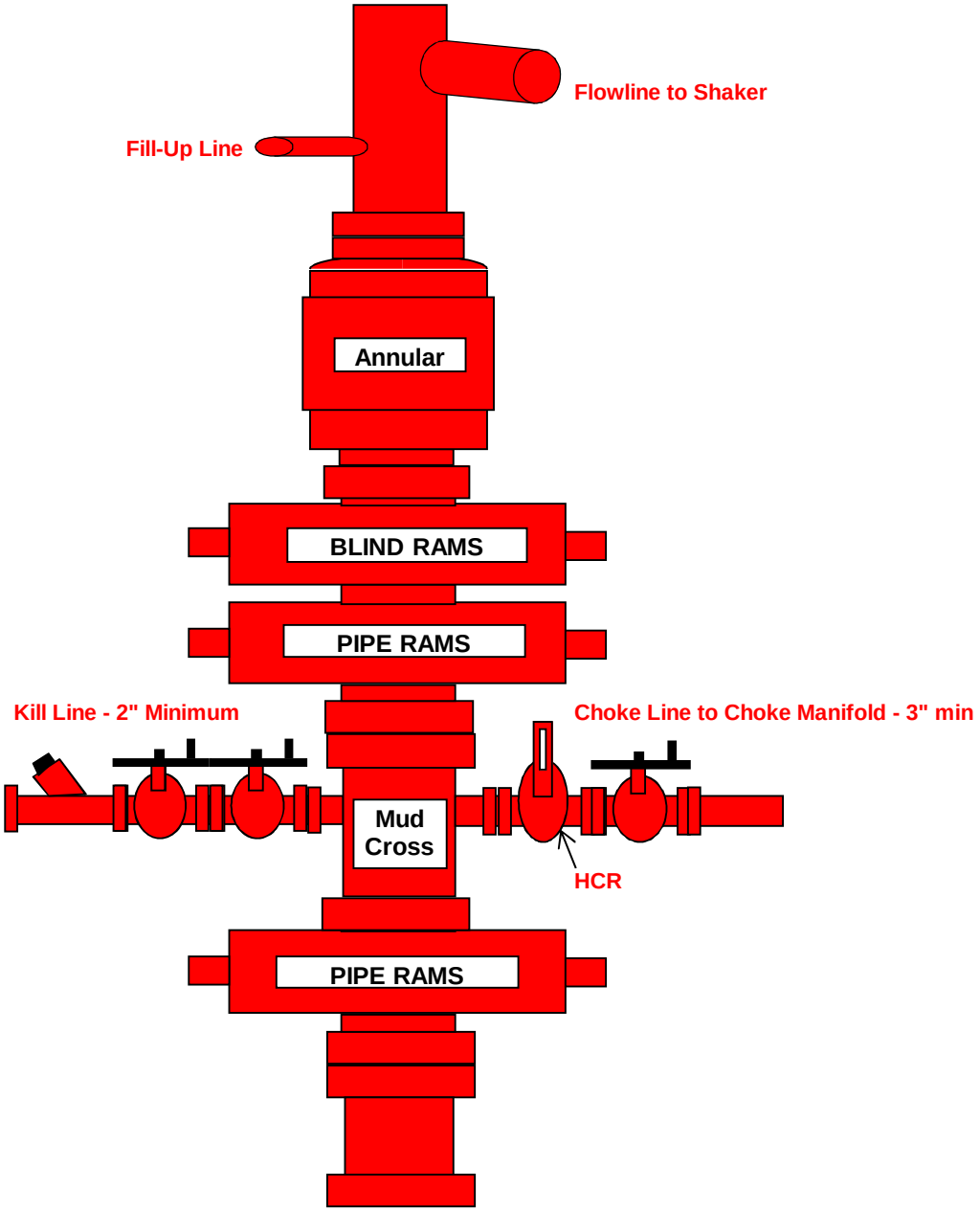


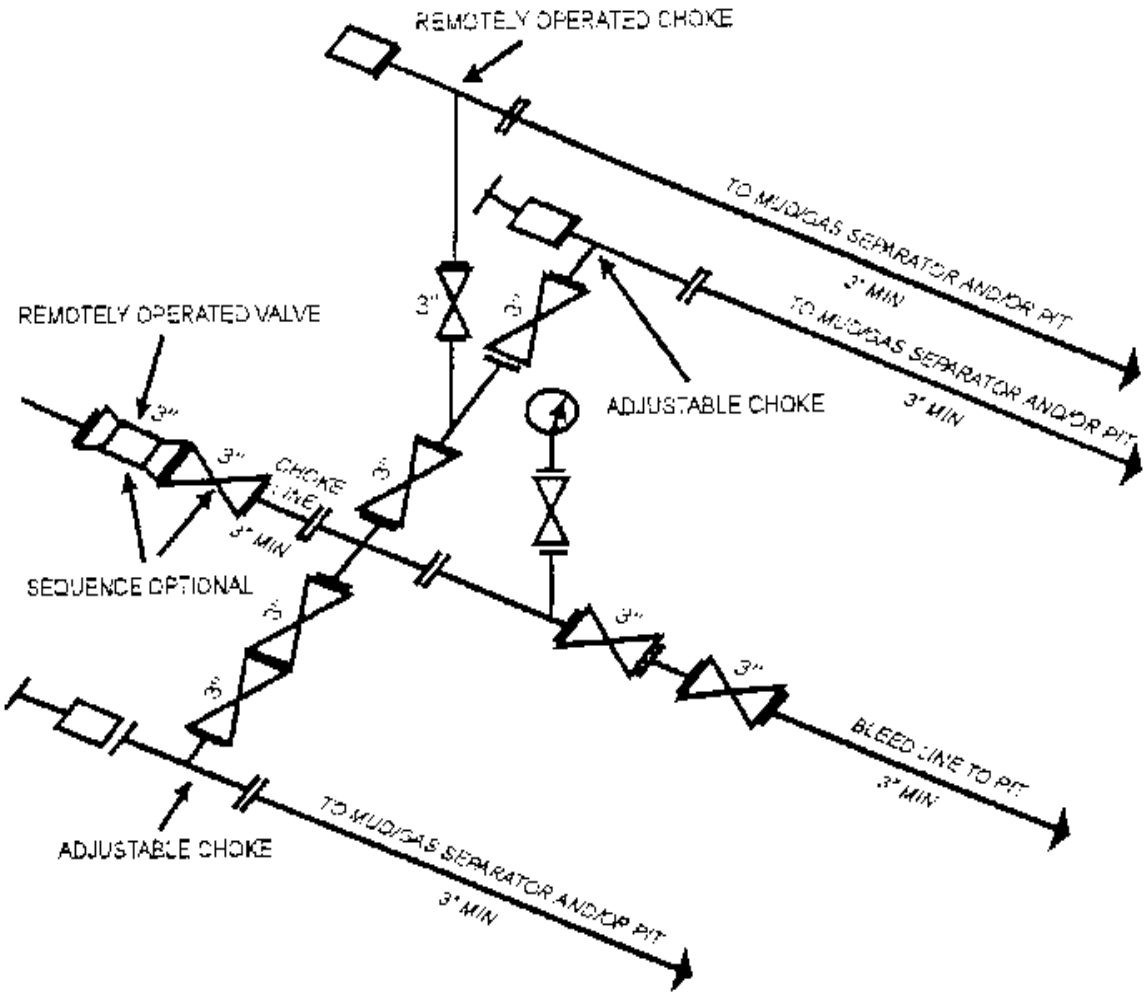
Diagram C

10M Choke Manifold SCHEMATIC

Minimum Requirements

OPERATION: Production and Open Hole Sections

Minimum System Pressure Rating: **10,000 PSI**



10M AND 15M CHOKE MANIFOLD EQUIPMENT - CONFIGURATION OF CHOKES MAY VARY

[53 FR 49661, Dec. 9, 1988 and 54 FR 39528, Sept. 27, 1989]

Diagram D

Delaware Basin

CHEVRON CONTACT:

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1400 SMITH ST.
HOUSTON, TX 77002

DESK: HOU140/43-130
CELL: 281-413-9794
EMAIL: RODERICK.MILLIGAN@CHEVRON.COM

Summary of Changes to MPD Submission

BOP Equipment – CoFlex Hose (Section 3 of 9 Point Drilling Plan in MPD)

BOP Equipment – CoFlex Hose

Summary: Variance to use a CoFlex hose between BOP and choke manifold not requested in original submittal.

As Defined in MPD:	As Planned on Well:
Variance to use CoFlex hose not requested.	Chevron requests a variance to use a CoFlex hose with a metal protective covering that will be utilized between the BOP and Choke manifold. Please refer to the attached testing and specification documents.

Continental

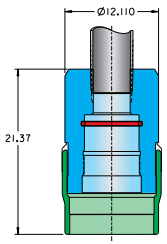
ContiTech

Hose Data Sheet

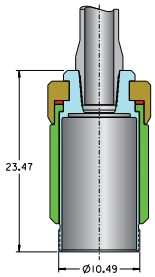
CRI Order No.	538332
Customer	ContiTech Oil & Marine Corp.
Customer Order No	4500412631 CBC544771, CBC544769, CBC544767, CBC544763, CBC544768, CBC544745, CBC544744, CBC544746
Item No.	1
Hose Type	Flexible Hose
Standard	**API SPEC 16 C**
Inside dia in inches	3
Length	45 ft
Type of coupling one end	FLANGE 4.1/16" 10KPSI API SPEC 17D SV SWIVEL FLANGE SOURC/W BX155 ST/ST INLAID R.GR.
Type of coupling other end	FLANGE 4.1/16" 10KPSI API SPEC 17D SV SWIVEL FLANGE SOUR C/W BX155 ST/ST INLAID R.GR.
H2S service NACE MR0175	Yes
Working Pressure	10 000 psi
Design Pressure	10 000 psi
Test Pressure	15 000 psi
Safety Factor	2,25
Marking	USUAL PHOENIX
Cover	NOT FIRE RESISTANT
Outside protection	St.steel outer wrap
Internal stripwound tube	No
Lining	OIL + GAS RESISTANT SOUR
Safety clamp	Yes
Lifting collar	Yes
Element C	Yes
Safety chain	Yes
Safety wire rope	No
Max.design temperature [°C]	100
Min.design temperature [°C]	-20
Min. Bend Radius operating [m]	0,90
Min. Bend Radius storage [m]	0,90
Electrical continuity	The Hose is electrically continuous
Type of packing	WOODEN CRATE ISPM-15

5 – Wellhead Schematic

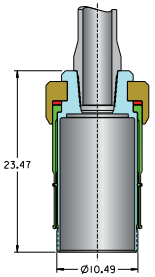
FMC Technologies



CASING HANGER R&R TOOL
9.750-4NA-2G-LH (M) BTM X 9.625 LC
P1000157568



PACKOFF INSTALLATION TOOL,
F/ 13 5/8 UH-2 PACKOFF
P1000154374



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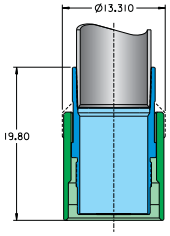
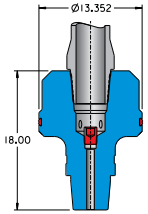
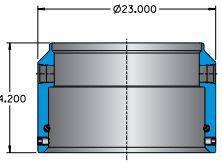
P1000154374



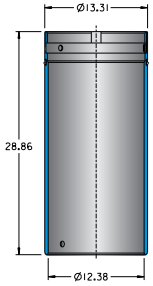
CASING HANGER R&R TOOL
P1000115382



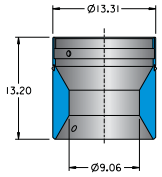
BOP TEST PLUG
P4000029902



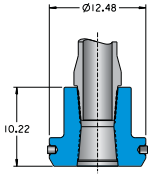
RISER ASSY, DIVERTER, 20 SO BTM
P172075



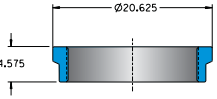
WEAR BUSHING (BOWL PROTECTOR)
P1000153633



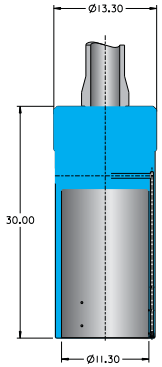
SHORT BOWL PROTECTOR
P1000153630



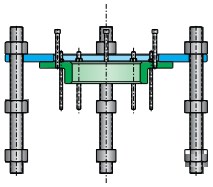
BOWL PROTECTOR R&R TOOL
48-291-312



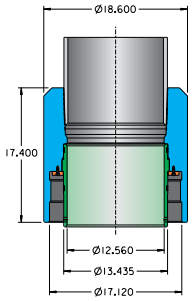
SWIVEL/ROTATING HUB
P1000101641



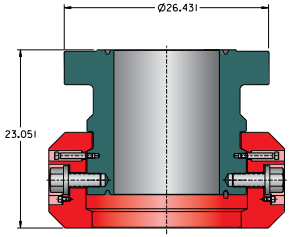
WASH TOOL
13.387 X 4 1/2 IF
P1000115671



INSTALLATION / REMOVAL TOOL ASSY,
PUSHER PLATE AND T-MANDREL
P1000136034



CASING HEAD RUNNING TOOL ASSY
P1000118117

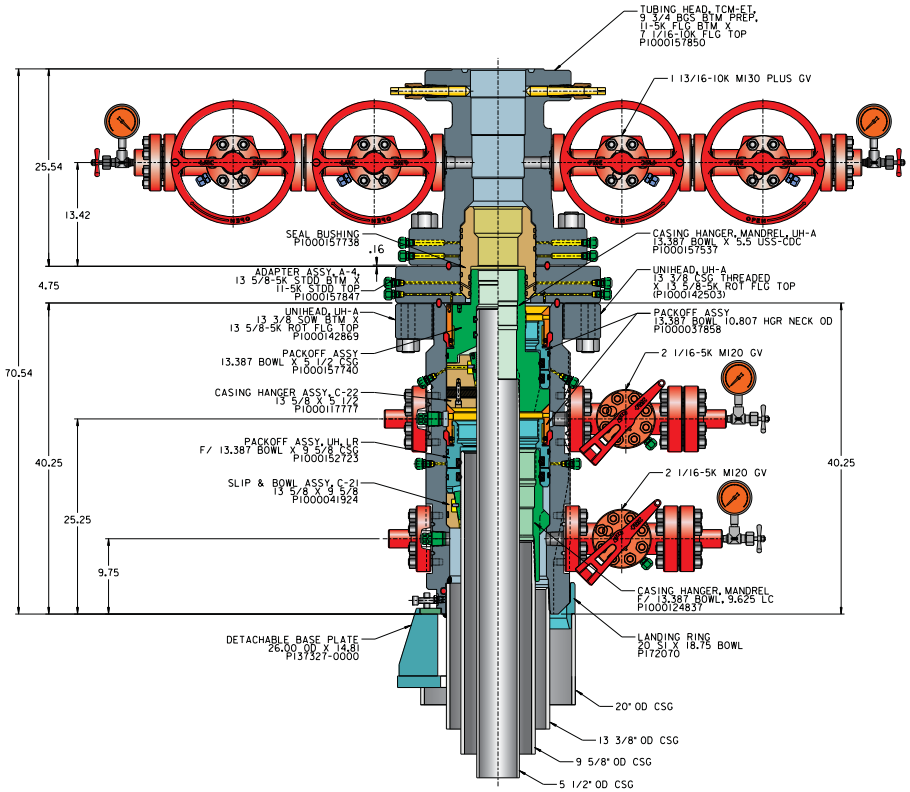


SPEEDLOC II
P117126-0000

BPV RUNNING TOOL
P178648

BPV REMOVAL TOOL
P410275

BPV, TYPE H
P126944-0000



CHEVRON
ODESSA
20 X 13 3/8 X 9 5/8 X 5 1/2

QUOTE LAYOUT
F19942
REF: DMI00147640-2
DMI00146407-2
DMI00213533

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REVISIONS		DESCRIPTION
A	06-18-15	

SURFACE WELLHEAD LAYOUT, UNIHEAD,
UH-2, STC THREAD, CHEVRON, ODESSA

DRAWN BY	O. BUI	06-18-15
DRAFTING REVIEW	Z. MARQUEZ	06-18-15
DESIGN REVIEW	L. MELO	06-18-15
APPROVED BY	K. TAHA	06-18-15

FMC Technologies

DRAWING NUMBER
DMI00220685

6 – H2S Contingency Plan

- Hayhurst Eddy County, New Mexico

Training

MCBU Drilling and Completions H_2S training requirements are intended to define the minimum level of training required for employees, contractors and visitors to enter or perform work at MCBU Drilling and Completions locations that have known concentrations of H_2S.

Awareness Level

Employees and visitors to MCBU Drilling and Completions locations that have known concentrations of H_2S, who are not required to perform work in H_2S areas, will be provided with an awareness level of H_2S training prior to entering any H_2S areas. At a minimum, awareness level training will include:

1. Physical and chemical properties of H_2S
2. Health hazards of H_2S
3. Personal protective equipment
4. Information regarding potential sources of H_2S
5. Alarms and emergency evacuation procedures

Awareness level training will be developed and conducted by personnel who are qualified either by specific training, educational experience and/or work-related background.

Advanced Level H_2S Training

Employees and contractors required to work in areas that may contain H_2S will be provided with Advanced Level H_2S training prior to initial assignment. In addition to the Awareness Level requirements, Advanced Level H_2S training will include:

1. H_2S safe work practice procedures;
2. Emergency contingency plan procedures;
3. Methods to detect the presence or release of H_2S (e.g., alarms, monitoring equipment), including hands-on training with direct reading and personal monitoring H_2S equipment.
4. Basic overview of respiratory protective equipment suitable for use in H_2S environments. Note: Employees who work at sites that participate in the Chevron Respirator User program will require separate respirator training as required by the MCBU Respiratory Protection Program;
5. Basic overview of emergency rescue techniques, first aid, CPR and medical evaluation procedures. Employees who may be required to perform “standby” duties are required to receive additional first aid and CPR training, which is not covered in the Advanced Level H_2S training;
6. Proficiency examination covering all course material.

Advanced H_2S training courses will be instructed by personnel who have successfully completed an appropriate H_2S train-the-trainer development course (ANSI/ASSE Z390.1-2006) or who possess significant past experience through educational or work-related background.

H_2S Training Certification

All employees and visitors will be issued an H_2S training certification card (or certificate) upon successful completion of the appropriate H_2S training course. Personnel working in an H_2S environment will carry a current H_2S training certification card as proof of having received the proper training on their person at all times.

Briefing Area

A minimum of two briefing areas will be established in locations that at least one area will be up-wind from the well at all times. Upon recognition of an emergency situation, all personnel should assemble at the designated upwind briefing areas for instructions.

H_2S Equipment

Respiratory Protection

a) Six 30 minute SCBAs – 2 at each briefing area and 2 in the Safety Trailer.

b) Eight 5 minute EBAs – 5 in the dog house at the rig floor, 1 at the accumulator, 1 at the shale shakers and 1 at the mud pits.

Visual Warning System

a) One color code sign, displaying all possible conditions, will be placed at the entrance to the location with a flag displaying the current condition.

b) Two windsocks will be on location, one on the dog house and one on the Drill Site Manager's Trailer.

H_2S Detection and Monitoring System

a) H_2S monitoring system (sensor head, warning light and siren) placed throughout rig.

- Drilling Rig Locations: at a minimum, in the area of the Shale shaker, rig floor, and bell nipple.
- Workover Rig Locations: at a minimum, in the area of the Cellar, rig floor and circulating tanks or shale shaker.

Well Control Equipment

a) Flare Line 150' from wellhead with igniter.

b) Choke manifold with a remotely operated choke.

c) Mud / gas separator

Mud Program

In the event of drilling, completions, workover and well servicing operations involving a hydrogen sulfide concentration of 100 ppm or greater the following shall be considered:

1. Use of a degasser
2. Use of a zinc based mud treatment
3. Increasing mud weight

Public Safety - Emergency Assistance

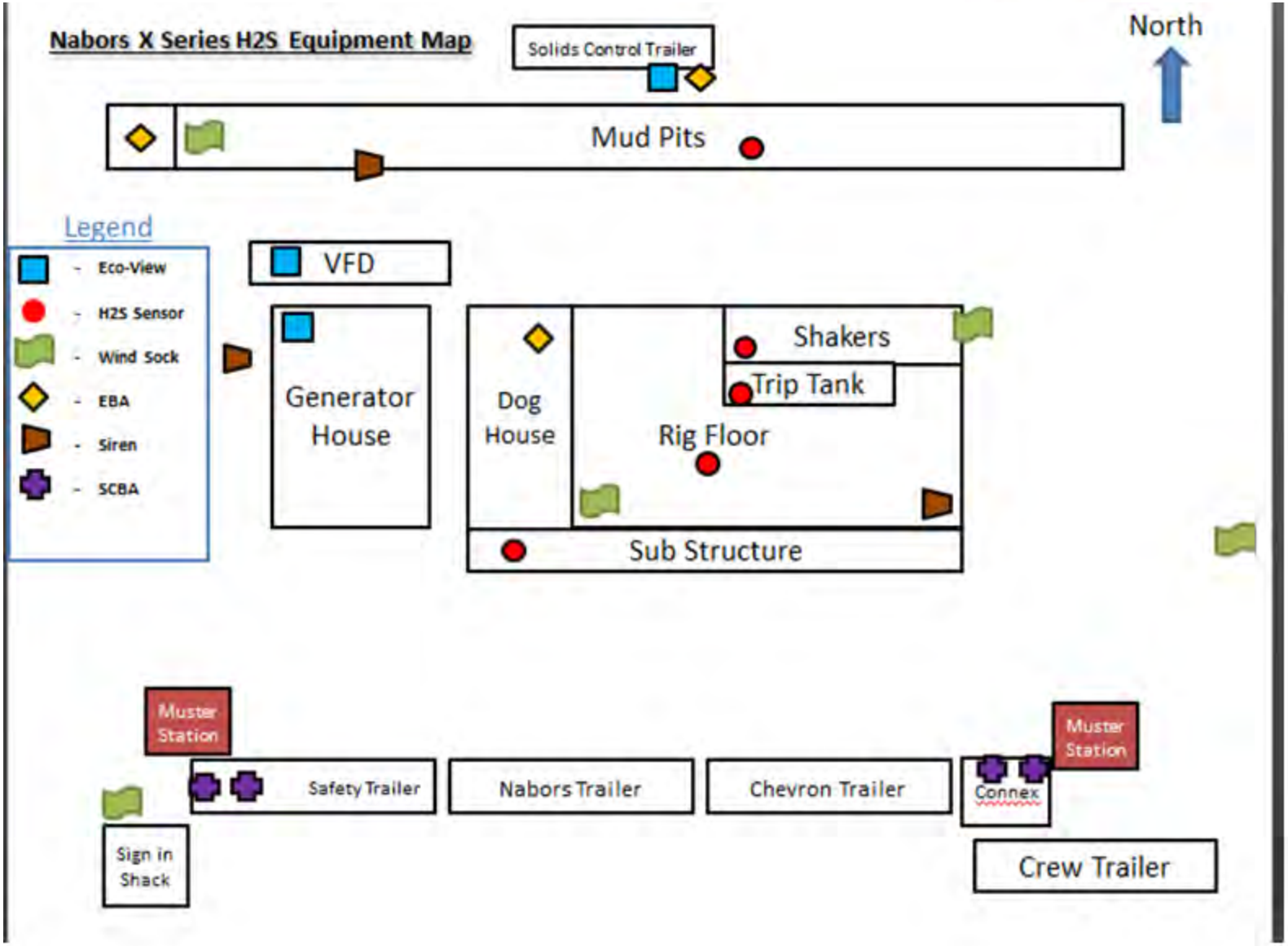
Agency	Telephone Number
Eddy County Sheriff's Department	575-887-7551
Fire Department:	
Carlsbad	575-885-3125
Artesia	575-746-5050
Carlsbad Medical Center	575-887-4100
Eddy County Emergency Management	575-628-5450
Poison Control Center	800-222-1222

Chevron MCBU D&C Emergency Notifications

Below are lists of contacts to be used in emergency situations.

	Name	Title	Office Number	Cell Phone
1.	Roderick Milligan	Drilling Engineer	(713) 372-2011	(281) 413-9794
2.	Josh Kirk	Superintendent	(713) 372-2505	(832) 374-7883
5.	Ike Chukwumaeze	Drilling Manager	(713) 372-7591	(281) 615-0701
6.	Scott Nash	Operations Manager	(713) 372-5747	(281) 814-9713
7.	Belle Davis	D&C HES	(432)687-7477	(432)234-8713

H_2S Preparedness and Contingency Plan Summary



Master Development Plan

Hayhurst Development Area

MDP-2016-1

February 15, 2016

Description of Chevron U.S.A. Inc Proposed Action for the Master Development Plan in the Hayhurst Development Area

Background

In 2013, Chevron U.S.A. Inc. (Chevron) initiated a program to drill horizontal oil and gas wells in the Hayhurst Development Area (HDA), located in T26S-R27E and T25S-R27E in Eddy County, New Mexico, to assess and retain existing oil and gas leases of federal, private, and New Mexico state minerals. Figure 1 shows the general location of the HDA. Chevron has drilled a total of 14 such wells in the HDA. Two of these wells produce federal minerals only, three produce both federal minerals and either state or private minerals, and the other nine wells produce state and/or private minerals. While classified as oil wells by the New Mexico Oil Conservation Division (NMOCD), all 14 wells produce both oil and gas.

[FIGURE 1 – TBD]

Introduction

The proposed action consists of constructing, drilling, completing, operating, and plugging and abandoning up to 436 horizontal oil and gas wells and five water disposal wells. The oil and gas wells would be drilled on a maximum of 109 new well pads (see Appendix A). As described in detail below, this proposal also includes the construction and operation of production, storage, and compression facilities; water disposal and recycling facilities; gathering pipelines for oil, gas, and produced water; pipelines for fresh, brackish, or recycled water to support hydraulic fracturing operations; and upgraded and new access roads to support drilling, completion, operation, and plugging and abandonment of the proposed wells. In order to facilitate early planning, orderly development, and environmental analysis, Chevron is submitting the Master Development Plan (MDP) described in this proposal which would apply to all 436 wells.

Under this proposed action, Chevron would exercise the right to develop oil and gas resources under its existing federal leases and any newly acquired federal leases within the HDA. Twelve (12) Applications for Permit to Drill (APD) will be submitted contemporaneously with the Master Development Plan (MDP) described in this proposal. These APDs will be for the following oil and gas wells: HH SO 10 Fed -8H, -9H, -16H, -17H, -24H, and -25H; HH SO 08 Fed -6H, -7H, -14H, -15H, -22H, and -23H. The remaining 424 oil and gas wells will each require an APD, and Chevron will submit these APDs in batches corresponding to pad groupings.

One hundred (100) of the well pads would be located on BLM-owned surface lands, and wells drilled from these pads would produce federal minerals for which Chevron has existing leases. Nine (9) well pads would be located on surface lands owned by the State of New Mexico (state lands) and would partially produce both federal and state minerals. Note that the pad numbers discussed in this paragraph assume development on four-well pads. As technology improves, it is understood that Chevron may increase the number of wells per pad. With fewer pads, the total disturbance will likewise decrease while drilling the same number of wells. Chevron submits this proposed action with the reasonable expectation that it will have flexibility to increase the number of wells per pad without the

necessity of revising the MDP. In the event that more than four wells per pad are implemented, surface disturbances would not increase beyond the approved project totals; however, configuration and size of pads and facilities may change to accommodate more wells per pad. Maps of the proposed activity are provided in Appendix F.

Table 1 provides a summary of the applicable lease stipulations in the HDA. A full list of the lease stipulations is provided in Appendix B.

Table 1: Summary of Applicable Lease Stipulations in the HDA

Lease	Section	Township	Range	Lease Stipulations			
				Cultural Resource	Cave/ Karst	Fragile Slopes	Streams/ Floodplains
NMNM 107368	19, 30	25S	27E				X
NMNM 107369	21, 26, 35	25S	27E				X
NMNM 109756	19, 30	25S	27E			X	X
NMNM 111530	18	25S	27E		X		X
NMNM 113954	17	25S	27E	X	X	X	X
NMNM 114968	35	25S	27E	X		X	
NMNM 116028	1, 12	26S	27E	X	X	X	
NMNM 118108	5, 8	26S	27E	X	X	X	X
NMNM 120350	1, 12, 13	26S	27E	X	X	X	X
NMNM 121473	10, 11, 14, 15	26S	27E	X	X	X	
NMNM 130854	20	25S	27E	X	X	X	X
NMNM 130855	20	25S	27E	X	X	X	X

Surface Disturbance by Wellfield Component

Table 2 provides estimates of short-term (less than 18 months) and long-term disturbance for each wellfield component. The estimates of disturbance in Table 2 include proposed components on BLM-owned surface lands and on state-owned surface lands. Chevron estimates that approximately 80 percent of proposed disturbances would occur on BLM-owned surface and 20 percent would occur on state-owned surface. Approximately 6 acres of disturbance will occur on private surface in S5-26S-27E.

Table 2: Estimated Short- and Long-Term Surface Disturbance

Project Component	Length (miles)	Quantity (#)	Buried or Surface-Laid	Short-term Disturbance (acres)	Long-term Disturbance (acres)
New Well Pads	---	109	---	429	142
New Flowlines	229	---	Buried	333	0[1]
New Tank Battery Pads	---	16	---	129	129
New Roads	42	---	---	122	122
New Power Lines	40	---	Surface	116	6[2]
New Gas Pipelines	98	---	Buried	72	4[2]
New Compressor Station Pads	---	7	---	56	56
New Salt Water Disposal Pads[3]	---	5	---	53	44
New Recycle Containment Ponds	---	4	---	46	46
New Water Pipelines	43	---	Buried	21	2[2]
New Water Storage Facility	---	2	---	16	16
New Oil Gathering Pipelines	25	---	Buried	12	1[2]
New Electrical Substation	---	1	---	8	8
New Central Housing Facility	---	2	---	2	2
			TOTAL	**1186**	**473**

1: Flowline construction disturbance would be 100% reclaimed immediately following installation.
2: Pipeline and powerline disturbance would be 95% reclaimed immediately following installation.
3: Includes both the Salt Water Disposal (SWD) facility and the SWD well pad

Construction

Chevron would obtain and comply with all appropriate federal, state, county, municipal, and local permits, including all necessary environmental clearances and permits before commencing any work.

Well Pads. Chevron is proposing to construct 109 production well pads and five water disposal well pads. The schedule of constructing these well pads has yet to be determined, but Chevron expects to construct between three and seven pads annually. The working surface (drilling and completion operations area) of the newly constructed well pads would average 475 feet by 330 feet (3.6 acres) and would be surfaced with caliche. With cut-and-fill slopes and topsoil storage, average surface disturbance per pad would be approximately 3.9 acres. Construction of the 109 well pads would result in an estimated 429 acres of new short-term surface disturbance. Following interim reclamation (reduction of the pad size as areas unnecessary for long-term production are reshaped and revegetated) a working area of about 1.3 acres per pad would remain disturbed throughout the long-term production phase of the wells. Total long-term disturbance for well pads is estimated at 162 acres, following interim reclamation. Typical drawings of the proposed well pads during drilling and production are shown in Appendix C.

Each proposed production well pad would accommodate at least four wells, and would be constructed from native soil and rock materials present at the site or mined from approved caliche pits, using equipment that is appropriate for the scope and scale of the required work. Pads would be constructed by clearing vegetation, salvaging and storing topsoil and leveling the drilling area using cut-and-fill techniques where appropriate. Topsoil placement is on the western edge of the pad where interim

reclamation is planned to be completed upon completion of well and evaluation of best management practices. Chevron would conduct interim reclamation within six months after completion of the last well planned for the well pad. Chevron submits this proposed action with the reasonable expectation that it will have flexibility to increase the number of wells per pad without the necessity of revising the MDP.

Proposed Existing Access Roads. Chevron proposes to use approximately 4.9 miles of existing county roads and 11.8 miles of existing lease roads for access within the HDA during construction and drilling and completion operations. Road maintenance and upgrades on BLM-owned surface would comply with Surface Operating Standards and Guidelines for Oil and Gas Development, also known as the Gold Book. All roads would be surfaced with caliche or river rock during construction.

Chevron will improve or maintain existing roads in a condition the same as or better than before operations begin. All existing roads will be used in their present condition with the exception of minor blading as needed. All existing structures on the entire access route such as cattle guards, other range improvement projects, culverts, etc. will be properly repaired or replaced if they are damaged or have deteriorated beyond practical use due to Chevron's activities. Chevron will abate and, where reasonably possible, prevent fugitive dust as needed, whether created by vehicular traffic, equipment operations, or wind events. BLM written approval will be acquired before application of surfactants, binding agents, or other dust suppression chemicals on roadways.

Proposed New Access Roads. Chevron proposes that approximately 20 miles of new resource roads will be required for full-field development. New resource roads up to 24 feet wide would be constructed at the same time as the well pads and facilities they are intended to serve. Road construction, maintenance, and upgrades on BLM-owned surface would comply with Surface Operating Standards and Guidelines for Oil and Gas Development, also known as the Gold Book. All roads would be surfaced with caliche or river rock during construction. Chevron estimates a short- and long-term disturbance of 57 acres for new roads.

New access roads will be constructed as crowned and ditched roads and will be graveled as needed for drilling. If requested by the surface tenant, upgrading of this portion of the road will be kept to a minimum. In accordance with BLM standards, drainage control would be ensured over the entire road through the use of drainage dips, in-slipping and ditches, natural rolling topography, ditch turnouts, armored crossings or culverts. Site-specific road design would consider grades, soils and local hydrology. Culverts, low water crossings, and cattle guards will be installed as needed. Where culverts or drainage crossings are required, they would be designed for a 100-year storm event without development of a static head at the pipe inlet.

The following design specifications will be observed while constructing all access roads:

- No additional construction easement will be required outside of the total right-of-way (ROW) (see "Proposed Gathering Pipelines" below).
- No turnouts will be constructed due to 24-foot road width.
- Road gradient will not exceed 8%.

- A cross slope of 2% will be used to allow water to drain from the crown.
- Major cuts-and-fills will use a 2:1 slope initially, and will be modified to a 3:1 slope during interim reclamation.
- 6" rock under road, leadoff ditching, low water crossings, culverts, and water bars will be installed where needed to control erosion.

Topsoil will be wind-rowed, segregated and stored along the road for later spreading across the disturbed corridor. Topsoil will be promptly seeded to control erosion, prevent weed establishment and maintain soil microbial activity. In areas of high wind or water erosion, staked soil retention blankets will be used in combination with seeding to prevent topsoil erosion. Retention blankets will be a straw/coconut blend (or similar) and will be covered on the top and bottom with 100% fiber netting to reduce entanglement of small animals. All disturbed areas will be seeded by Broadcast or Drill-and-Crimp during interim reclamation. Ground conditions will determine the seeding method used.

Chevron would restrict activities to permitted roads, facilities, and sites. Speed limits would be posted and followed.

Proposed Gathering Pipelines and Powerlines. Proposed pipelines will be constructed immediately adjacent to roads. Approximately 16.7 miles of new pipelines would be installed adjacent to existing improved roads (no upgrading needed) or adjacent to existing roads planned for upgrading. The remaining 7.8 miles of new pipelines would be constructed adjacent to new roads. Topsoil would be salvaged and windrowed separately from the underlying subsoil and stored along the road until the trench was backfilled. All pipelines would be buried to a minimum depth of two feet from surface to top of pipe. The pipeline trench would be excavated mechanically; pipe segments would then be welded together and tested, lowered into the trench and covered with excavated material.

The pipelines would be installed in separated trenches for each service. Table 3 shows the configuration of services in each trench, and Table 4 provides detailed information about each pipeline required for drilling, completions, and production operations. Chevron estimates a short-term disturbance of 105 acres for pipelines, and a long-term disturbance of 7 acres. A total of 30 miles of new ROW will be required.

Table 3: Right-of-Way Configuration and Services in Each Trench

Trench	ROW Component	Trench Service	ROW Width
1	Gas Lift P/L	Lift-gas distribution pipeline	4 feet
N/A	Safety Offset	Safety offset between trenches 1 and 2	10 feet
2	HP Gas P/L	Gas gathering pipeline, dual lines in some cases	8 feet
N/A	Power Lines	Above-ground distribution power lines operating at 12.47 kV	20 feet
N/A	Road	Two-lane access roads designed per BLM Gold Book	24 feet
3	Water P/L	Distribution pipelines for hydraulic fracturing water and gathering pipelines for produced water	8 feet
N/A	Safety Offset	Safety offset between trenches 3 and 4	10 feet
4	LP Gas P/L	Gas gathering at 50-150 psig	4 feet
N/A	Safety Offset	Safety offset between trenches 4 and 5	10 feet
5	Oil P/L	3rd party oil gathering pipeline	4 feet
TOTAL			102 feet

Table 4: Pipeline Detailed Information

Pipeline Service	Nominal Size (inches)	Length (miles)	Pressure (psig)	Material of Construction	ROW Width (ft)
Gas Lift	4	26.2	1100	Flexpipe	4
HP Gas Gathering[1]	12	14.7	1400	Steel	8
HF Water[2]	12	14.3	200	HDPE	8
Produced Water	12	17.8	150	HDPE	4
LP Gas Gathering	24	22.9	150	Steel	4
Oil Gathering[3]	12	22.9	150	Steel	4

1: HP gas gathering ROW will include some third-party pipelines

2: HF water includes all water to be used for hydraulic fracturing, which may be fresh, brackish or recycled

3: Oil gathering pipeline will be managed by a third party

Prior to construction, a ROW will be applied for through the BLM and all construction activity will be confined to the ROW as approved. Chevron will run all ROWs parallel to existing disturbances wherever possible. All permanent pipelines will be buried (none are surface laid).

Each pipeline would be pressure tested with fresh water to ensure integrity. All hydrostatic test (hydrotest) water will be purchased from local owners of water rights or sourced by Chevron and would be transported to the testing location by truck. After testing, the water will be disposed of in a produced-water injection facility, where it would either be injected into a disposal well or recycled for hydraulic fracturing operations.

All powerlines will be overhead (none are buried) and will be constructed to APLIC standards. The electrical distribution system will operate at 12.47 kV with an average span of 250 between poles. 788 power poles will be required for a total run of 37.3 miles of power line. Chevron estimates a short-term disturbance of 116 acres for power line construction, and a long-term disturbance of 6 acres.

Drilling and Completion

Up to 436 horizontal oil and gas wells and five vertical water disposal wells would be drilled under this proposed action. Fewer wells could be drilled than are proposed due to geologic conditions, market uncertainties, or other considerations. Chevron's drilling operations would be conducted in compliance with all Federal Onshore Oil and Gas Orders, as well as with all other applicable laws, rules, and regulations. The seven potential target zones for the 436 total wells are detailed in Table 5 along with the target zone for the five water disposal wells. As geology is more fully developed, Chevron may increase or decrease the number of target zones as it deems advisable.

Table 5: Potential Target Zones in HDA

Target Zone	Approximate Depth (ft.)		Approximate Thickness (ft.)	
	Shallow	Deep	Thin	Thick
First Bone Spring	6,513	6,888	130	190
Second Bone Spring Sand	7,492	7,621	1,080	1,250
Harkey Sand	7,771	8,123	55	115
Third Bone Spring Sand	8,050	8,617	810	850
Wolfcamp A	8,400	9,014	130	190
Wolfcamp C	9,459	9,870	130	145
Wolfcamp D	9,570	9,992	270	300
Disposal Zone (Devonian)	14,100	15,300	1,000	1,200

Drilling Plan. Surface casing would be run to a minimum depth of 100 feet below freshwater aquifers. The surface hole would be cased with steel casing and cemented in place entirely from ground level to the depth specified in each well's APD. Prior to drilling below the surface casing, a Blowout Preventer (BOP) would be installed on the surface casing and both the BOP and the surface casing would be tested for pressure integrity. The BOP and related equipment would meet the requirements of Federal Onshore Oil and Gas Order No. 2 and the BLM would be notified in advance of all pressure tests.

Specific directional plans for each well would be included with a well's APD. Downhole operations would be done with tools to facilitate proper direction and path of the well bore. Some wells may require a pilot hole to facilitate drilling the horizontal section of the well; these will be specified in a well's APD.

After drilling each hole section to its final depth, logging tools would be run into the well to evaluate the potential hydrocarbon resource. Once the evaluation is complete, steel production casing would be run and cemented into place in accordance with the well design as approved by the BLM. The proposed casing and cementing program would be designed to protect and/or isolate all usable water zones, potentially productive zones, lost circulation zones, abnormally pressured zones and any prospectively valuable deposits of minerals. BLM approval is required prior to the use of any isolating medium other than cement. Upon cementing production casing in place, the drilling rig would be removed and replaced by a completion rig. Well completion primarily consists of hydraulic fracturing operations to stimulate a well's lateral section. Completion operations will be conducted according to "green completion" guidelines per 40 CFR part 60, subpart OOOOa.

Up to four (4) drilling rigs may be simultaneously deployed in the HDA. Drilling rigs with onsite diesel generators shall maintain 4,500 foot spacing from other drilling rigs with onsite diesel generators to minimize the impact on air quality.

Waste Management. Chevron would use a closed-loop drilling system to capture drill cuttings and recycle drilling mud. Drill cuttings, drilling fluids, and produced oil and water would be stored safely in steel tanks, trucked to an NMOCD-approved disposal site (listed in Table 6), and disposed of properly. Chevron may elect to include additional disposal sites in subsequent APDs.

Table 6: Approved Drilling Waste Disposal Sites

Nearest City	Disposal Facility	Address	Phone Number
Carlsbad	R360 - Halfway	6601 Hobbs Hwy, Carlsbad, NM	(575) 393-1079
Eunice	Sundance Services	5 miles east of Eunice on Hwy 18 and Wallach Ln	(575) 390-0342
Seminole, TX	Permian Disposal	587 US Hwy 385 S	(432) 955-0322

Garbage and trash produced during drilling and completion operations will be collected in a trash container and disposed of properly at a state approved disposal facility. All trash on and around the well site will be collected for disposal. Human waste and grey water will be properly contained and disposed of properly at a state approved disposal facility. After drilling and completion operations, trash, chemicals, salts, frac sand and other waste material will be removed and disposed of properly at a state approved disposal facility.

Water Supply and Management. A well is anticipated to require between 24 - 60 days to drill and an additional 34 - 47 days to complete, depending on the targeted reservoir. Between 90,000 - 330,000 barrels of water would be required for drilling and completion of each well. That water would be transported to each location by temporary surface-laid pipelines installed on the edge of the access roads. Additionally, Chevron estimates that 2,000,000 barrels of water will be required to construct all pads and roads in the HDA, 1,700,000 barrels of water will be required for dust control, and 70,000 barrels of water will be required to hydrotest all pipelines and flowlines. Chevron expects that a variety of water sources would need to be utilized over the life of the development plan, and a number of potential water sources are outlined in Tables 7 and 8. Chevron may elect to include additional water sources in subsequent APDs.

Table 7: Water Sources for Drilling and Completion

Source	Location[1]	Quality (mg/L TDS)	Transport Method
Local ground water	Within 15 miles of HDA	0-5,000	Pipeline or Truck
Capitan Reef	Near Jal, NM	25,000-40,000	Pipeline
Rustler Aquifer	Near Orla, TX	25,000-40,000	Pipeline
Recycled Produced	Within HDA	150,000-210,000	Pipeline

1: Location of potential water wells to be used by the HDA can be found in Appendix D.

Table 8: Vendors Potentially Supplying Local Ground Water

Vendor	Address
Gregory Rockhouse Ranch, Inc	1108 W Pierce St, Carlsbad NM 88220
MMX Excavating, Inc	2373 Pecos Hwy, Carlsbad NM 88220
Wolfcamp Water Partners	4800 Bryant Irvin Ct, Fort Worth TX 76107
XRI Blue	415 W Wall St #130, Midland TX 79701

During the drilling and completions process, a temporary 10" expanding pipe water transfer line will run along established disturbance corridors, such as along access roads or on top of flowline or pipeline ROWs. Chevron does not expect that this water line, which will run parallel to and stay within 10' of the access road, will require a separate ROW.

Production – Operation and Maintenance

Existing Facility Locations. Within the boundary of the HDA, Chevron currently operates two oil and gas facilities on BLM-owned surface lands and two facilities on state-owned surface lands. These facilities would not be used as part of the proposed action as they are not designed for the scale of production envisioned in this proposal. Chevron would decommission these existing facilities as new facilities become operational, pending the approval of commingling agreements. The surface disturbance from the existing facilities would then be remediated or re-purposed.

Proposed Surface Facilities. Chevron expects all wells drilled in the HDA to produce oil, water, and gas. Production would flow via buried flowlines from the wells to one of sixteen (16) centralized tank battery (CTB) facilities, where oil, water, and gas are separated and treated to meet sales specifications. Table 9 details the location of each CTB, which will have adequate oil and water tankage to minimize the risk of spills and to provide adequate time for field personnel to respond to production upsets or other impactful circumstances. All tanks located at a CTB will have a capacity of 750 barrels and would be installed inside lined berms in accordance with SPCC guidelines. Vapor recovery units (VRU) will be installed to capture flash gases produced from tanks storing both oil and water, and Chevron shall install appropriate redundancy in VRU capacity to ensure 99% recovery of vapors. Leak detection and repair (LDAR) programs will be implemented at the facilities to minimize the quantity of fugitive emissions from valves and flanges. Secondary containment would be sized to contain a minimum of 150 percent of the storage capacity of the largest tank within the berm. All production equipment with a chimney, vent or stack would be fitted with a device that would prevent birds from entering the chimney, such as an excluder cone or equivalent.

Table 9: Proposed Central Tank Battery Locations and Associated Leases

ID	Township	Range	Section	Unit Letter[1]	Lease of Primary Production
1	26S	27E	10	A	NMNM 121473
2	25S	27E	9	O	VB 1865 (CTB located off-lease)
3	26S	27E	8	P	NMNM 118108
4	25S	27E	35	L	NMNM 107369
5	25S	27E	17	H	NMNM 113954
6	26S	27E	12	E	NMNM 116028
7	25S	27E	35	L	NMNM 107369
8	25S	27E	31	B	NMNM 109756 (CTB located off-lease)
9	26S	27E	12	E	NMNM 116028
10	26S	27E	10	B	NMNM 121473
11	26S	27E	12	G	NMNM 116028
12	26S	27E	10	P	NMNM 121473
13	26S	27E	8	O	NMNM 118108
14	25S	27E	35	K	NMNM 107369
15	25S	27E	16	E	NMNM 113954 (CTB located off-lease)
16	25S	27E	31	B	NMNM 109756 (CTB located off-lease)

1: Chevron submits this proposed action with the reasonable expectation that it will have the flexibility relocate facilities within the NEPA "drill island" corridors without the necessity of revising the MDP.

Open top tanks or open containments will be netted. Until the permanent water disposal and recycling system is available within the HDA, produced water will be hauled off location in trucks. Chevron may elect to construct a water storage facility if produced water volumes meet or exceed forecasts. The facility would utilize site-fabricated tanks larger than 3000 barrels and would minimize the number of 750 barrel water tanks that would need to be installed at each CTB.

Oil would be sold via Lease Automated Custody Transfer (LACT) to a third-party oil pipeline system, though oil may be trucked during upset conditions or periods of pipeline curtailment. Produced water would be pumped via pipeline to centralized salt-water disposal (SWD) and treating facilities, where it would either be injected into a disposal well via electric pumps or treated to remove oil, solids, and some dissolved metals for re-use in hydraulic fracturing operations. Table 10 details the location of each SWD facility. Once treated, this water would be stored in permanent recycling containments, each sized to hold approximately 770,000 barrels of water. Table 11 details the location of each containment.

Table 10: Proposed Salt Water Disposal Locations

ID	Township	Range	Section	Unit Letter[1]
1	26S	27E	2	N
2	25S	27E	16	F
3	25S	27E	26	P
4	26S	27E	12	L
5	26S	27E	2	P

1: Chevron submits this proposed action with the reasonable expectation that it will have the flexibility relocate facilities within the NEPA "drill island" corridors without the necessity of revising the MDP.

Table 11: Proposed Permanent Recycling Containment Locations

Pond ID	Section	Township	Range	Unit Letter[1]	Capacity (MBBL)
1	10	26S	27E	A	770
2	8	26S	27E	P	770
3	18	25S	27E	A	770
4	26	25S	27E	P	770

1: Chevron submits this proposed action with the reasonable expectation that it will have the flexibility relocate facilities within the NEPA "drill island" corridors without the necessity of revising the MDP.

The ponds will be designed as "multiwell fluid management pits" in compliance with New Mexico Administrative Code section 19.15.34 and will include the following design features:

- Berms: Berms shall be sloped at 3:1 both internally and externally. Berm top will have at least 12 feet of working area and be capable of supporting light vehicle traffic. Berm height, thickness, and depth will be determined based on site-specific information and included in each APD and SF-299.
- Liners: Ponds shall be double-lined and have a method of leak detection, typically trenched High Density Polyethylene (HDPE) pipe between liners. An 8 oz. geotextile fabric shall be used to line the soil prior to installation of a secondary (bottom) liner. Primary liner of 60-mil smooth HDPE and secondary liner of 60-mil smooth HDPE shall be installed. Minimum 200-mil geonet shall be installed between primary and secondary liner to maintain an interstitial space.
- Fencing: Ponds shall have eight-foot game fencing installed around the perimeter, outside of bottom berm. The fence bottom shall be keyed-in around the perimeter of the pond site and include the use of two-foot silt fencing to prevent access of smaller animals.
- Wildlife Protection: Typical bird deterrent options include molded decoy owls and noise-making streamers. Wildlife protection measures, including those for migratory birds, shall be monitored at least monthly to ensure deterrents are effective.

Gas would be piped to one of seven compressor stations, where it would be compressed to 1200 psig, dehydrated to meet sales specifications and to reduce the risk of methane hydrate formation, and sold into a third-party gas pipeline system. Table 10 details the location of each compressor station. If gas-driven engines are used for compression, all engines will be designed to meet Tier 4 emissions standards. Chevron may in some cases elect to use electrically-driven compression rather than gas-driven compression, so the surface disturbance for an electrical substation (which involves slightly higher surface impact) has been included in the proposal. Prior to sales, some of the gas will be diverted for use in artificial lift operations at each wellhead. Lift gas will be metered in accordance with the Federal Onshore Oil and Gas Order No. 5 prior to injection into each well's production tubing to ensure accurate production royalty accounting.

Table 10: Proposed Gas Compressor Station Locations

ID	Township	Range	Section	Unit Letter[1]
1	26S	27E	10	H
2	25S	27E	16	F
3	26S	27E	8	A
4	25S	27E	35	J
5	25S	27E	17	G
6	26S	27E	12	G
7	25S	27E	31	B

1: Chevron submits this proposed action with the reasonable expectation that it will have the flexibility relocate facilities within the NEPA "drill island" corridors without the necessity of revising the MDP.

Table 11 shows the expected pad size for each of the proposed surface facility types. Chevron estimates that the total full-field surface disturbance associated with surface facilities is 310 acres. Flowlines will result in an additional short-term disturbance of 229 acres, but all flowline disturbances will be reclaimed upon installation.

Table 11: Proposed Pad Size for Proposed Surface Facilities

Facility Type	Total Number	Pad Dimensions (ft. x ft.)	Pad Size (acres)
Centralized Tank Battery	16	500 x 700	8
Compressor Station	7	500 x 700	8
Salt Water Disposal Facility	5	500 x 700	8
Recycling Containment	4	710 x 710	12
Water Storage	2	500 x 700	8
Electrical Substation	1	500 x 650	7

1: Chevron submits this proposed action with the reasonable expectation that it will have the flexibility relocate facilities within the NEPA "drill island" corridors without the necessity of revising the MDP.

Surface facilities at each well pad location would consist of wellheads, gas lift metering units, and chemical injection equipment. Temporary equipment, such as sand separators and pressure let-down skids, may be installed during the first six to twelve months of production. No other equipment, including gas handling equipment, will be permanently installed on a well pad after drilling and completion operations have finished. Telemetry and SCADA equipment would be used to remotely monitor oil and gas wells and would reduce traffic to and from the well locations in order to minimize impacts on sensitive soils, wildlife, and plants. A pumper truck would periodically visit the pads based upon information gathered from telemetry equipment.

All permanent surface facilities or other above-ground structures located on BLM-owned surface lands would be painted a BLM Standard Environmental Color, such as Shale Green.

All production facilities with the potential to leak or spill oil produced water, glycol, or other fluids which might be a hazard to public health or safety would be placed within secondary containment structures in accordance with SPCC guidelines. Secondary containment structured would consist of earthen containment berms. Secondary containment would be sized to contain a minimum of 150 percent of the storage capacity of the largest tank within the berm. All loading lines would be placed inside the

containment berm. Chemical containers would be clearly labeled, maintained in good condition, and placed within secondary containment.

Work-overs or Recompletions. Periodically, the work-over or recompletion of a well might be required to ensure that efficient production is maintained. Work-overs can include repairs to wellbore equipment (casing, tubing, valves, rods or pump), a wellhead or production facilities. Repairs would usually be completed during daylight. The frequency of this work cannot be accurately predicted because the need for work-overs varies from well to well.

Water Supply and Use. Chevron would procure water for drilling and completions, dust control, and hydrostatic testing from a variety of water sources, shown in Tables 7 and 8. Between 90,000 - 330,000 barrels of water would be required for drilling and completion of each well, and that water would be transported to location by temporary surface-laid pipelines installed on the edge of the access roads. During the construction of pipelines and flowlines, fresh water will be required for hydrostatic testing of pipelines. Once all wells are on production, the only fresh-water use would be for dust control.

Waste Handling. Wastes associated with the proposed action may include produced water, garbage, sewage, drill cuttings, water recycling wastes, and other waste materials associated with drilling and completion. The following measures are proposed regarding handling waste, including those for hazardous materials management:

- Produced water would be transported via pipeline to SWD facilities, where it would either be injected into a disposal well or treated to remove oil, solids, and some dissolved metals for re-use in hydraulic fracturing operations.
- Garbage, trash, and other waste materials would be collected in portable, self-contained and fully-enclosed trash cages during drilling and completion. Upon completion of operations, or as needed, the accumulated trash would be disposed of at a state approved disposal facility. No trash would be burned on location.
- Self-contained chemical toilets would be provided for human waste. Upon completion of operations, or as needed, the toilet holding tanks would be pumped and the contents thereof disposed of in the nearest approved sewage disposal facility.
- Drill cuttings would be removed from the closed-loop drilling system and trucked to an approved drilling waste disposal site. Approved sites are listed in Table 6.
- Immediately after the removal of the drilling rig, all debris and other waste materials not contained in the trash cage would be cleaned up and removed from the well location.
- Hazardous materials would be handled in the following manner:
    - Project-related activities involving hazardous materials would be conducted in a manner that minimizes environmental impacts. A file would be maintained containing current Material Safety Data Sheets (MSDS) for all chemicals, compounds, and/or substances that are used in the course of construction, drilling, completion, production, and reclamation.
    - Spills of any potentially hazardous substance would be reported immediately to the BLM and other responsible parties. Spills would be mitigated immediately. Appropriate measures for cleanup would be implemented, and spilled material removed to an approved

disposal site according to the SPCC plan. Any release of toxic substance (leaks, spills, etc.) in excess of the reportable quantity established by 40 CFR, Part 117 would be reported per the Comprehensive Environmental Response Compensation and Liability Act of 1980, Section 102b (CERCLA). Copies of any report to any Federal agency or State government as a result of a reportable release/spill of any toxic substances would be furnished to the BLM, concurrent with the filing of the repots to any Federal agency or State government.

Schedule

The schedule of construction for the proposed action has yet to be determined. However, activity is expected to begin within 6 months of obtaining all BLM and other federal, state, and local approvals. Chevron expects to construct between three and seven pads annually and to drill and complete between twelve and twenty-eight wells annually. Chevron reserves the right to delay activity and control the pace of its operations.

Workforce

Chevron estimates that 18 workers (9 per shift) would be required per drilling rig, which would drill 24 hours per day and 7 days per week. Chevron also estimates that a peak of 70 workers (35 per shift) would be required per pad during completion operations, which would occur 24 hours per day and 7 days per week. Additional personnel would be required for facility construction, pipeline construction, commissioning, and operations. Table 12 provides an estimate of peak construction and operations workforces. Personnel may be housed at temporary, centralized housing facilities. Drill rig personnel may be housed at the drilling location (see example layout in Appendix C). Other personnel may commute from Carlsbad, Jal, or other nearby towns.

Table 12: Estimated Peak Construction and Operations Workforces

Workforce Category	Number of Workers at Peak
Construction	
Well pad construction	4
Well drilling	72[1]
Well completion	70[2]
Reclamation (interim)	2
Road/pipeline/facility construction	20
Total	**168**
Operations	
Commissioning	6
Production Operations and Maintenance	8
Compression Operations and Maintenance	10
Total	**24**

1: Assumes a maximum of four rigs
2: Assumes one completions spread, may temporarily increase to two spreads if required by logistics

Surface Ownership, Access, and Traffic

Surface Ownership. Most of the surface in the HDA is owned by the BLM. Table 13 details those surface tracts that are owned by the State of New Mexico or by a private landowner. Table 14 details the surface tenants whose allotments overlap the HDA (refer to Appendix E for a map of the allotments).

Table 13: Surface Ownership for non-BLM Tracts

Land Status	Township	Range	Section	Unit Letters
State Owned	25S	27E	16	All
Private	25S	27E	20	B, C, G, H, I, and J
State Owned	25S	27E	21	A, G, H, M, N, O, and P
Private	25S	27E	21	E and F
State Owned	25S	27E	26	C, F, I, J, and P
State Owned	26S	27E	2	All
Private	26S	27E	5	I, N, O, and P
State Owned	26S	27E	12	L

Table 14: Tenants with BLM Surface Allotments within the HDA

Tenant Name	Allotment	Address
Forest A Connally	78094	126 S. Donaldson Farm Rd. Loving, NM 88256
Ogden Farm & Cattle Co.	78087	159 W. Ogden, Loving, NM 88256
Joy E. Cooksey	78101	P.O. Box 45, Carlsbad, NM 88221
Forehand Ranches, Inc.	78104	P.O. Box 5373, Carlsbad, NM 88221
Johnny Laxson	78102	224 W. Ogden, Loving, NM 88256
Martha Skeen	78142	P.O. Box 696, Loving, NM 88256
Owen Carleton	78107	P.O. Box 14, Malaga, NM 88263
Philip & Kendra Stell	78103	1305 Janway, Carlsbad NM 88220

Access. All access into the HDA will be via White City Road (CR 724). This county road can be accessed from Pecos Hwy (NM 285) either from Carlsbad in the north or Pecos, TX in the south.

Traffic. Substantial traffic is not expected as part of the proposed action. Light vehicles for construction and operations will travel to and from the HDA regularly from Carlsbad, Eunice, and Pecos, TX. Heavy vehicles – such as drilling rigs, hydraulic fracturing spreads, cranes, and facility equipment delivery trucks – will travel to and from the HDA sporadically during mobilization and demobilization. Heavy vehicle traffic will be routed away from the Village of Loving, NM so as to avoid the school zone near the Loving Municipal Schools campus on Pecos Hwy (NM 285).

Plugging, Abandonment, and Reclamation

Well Plugging and Abandonment. New non-producing wells would be plugged, abandoned, and reclaimed within 90 days of well completion, weather permitting. Upon abandonment, each borehole would be plugged, capped, and its related surface equipment removed. Subsurface pipelines would be purged and plugged at specific intervals. A Sundry Notice would be submitted by Chevron to the BLM

proposing the engineering, technical, and/or environmental aspects of final plugging and abandonment. This notice would include final reclamation procedures and mitigation measures, and BLM standards for plugging would be followed.

Interim Reclamation. The objectives of interim reclamation, which re-establishes vegetation, ecological function, and other natural resource values during the productive life of a well pad, are to restore vegetative cover and a portion of the landform sufficient to maintain healthy, biologically active topsoil, to control erosion and sediment transport, and to minimize loss of habitat, forage, and visual resources throughout the project life. Chevron would complete interim reclamation of a well pad within six months following the completion of the last well on the pad. Prior to interim reclamation, Chevron would meet with the BLM to inspect the disturbed area, to review the existing reclamation plan (including the appropriate seed mixture to be used), and agree upon any revisions to the plan. The following best practices will be followed during interim reclamation:

- Within 6 months, Chevron will contact BLM Surface Management Specialists to devise the best strategies to reduce the size of the location.
- Within 30 days of completion of the last well on a pad, the well location and surrounding areas will be cleared of, and maintained free of, all materials, trash, and equipment not required for production. A plan will be submitted showing where interim reclamation will be completed in order to allow for safe operations, protection of the environment outside of drilled well, and following best management practices found in the BLM Gold Book.
- In areas planned for interim reclamation, all the surfacing material will be removed and returned to the original mineral pit or recycled to repair or build roads and well pads.
- The areas planned for interim reclamation will then be recontoured to the original contour if feasible, or if not feasible, to an interim contour that blends with the surrounding topography as much as possible. Where applicable, the fill material of the well pad will be backfilled into the cut to bring the area back to the original contour. The interim cut and fill slopes prior to re-seeding will not be steeper than a 3:1 ratio, unless the adjacent native topography is steeper. Note: Constructed slopes may be much steeper during drilling, but will be recontoured to the above ratios during interim reclamation.
- Topsoil will be evenly respread and revegetated over the entire disturbed area not needed for all-weather operations including cuts & fills. To seed the area, an approved BLM seed mixture, free of noxious weeds, will be used.
- Proper erosion control methods will be used on the area to control erosion, runoff and siltation of the surrounding area.
- The interim reclamation will be monitored periodically to ensure that vegetation has reestablished

Final Reclamation. The long-term objective of final reclamation is to return the land, following authorized use, to a condition approximating that which existed prior to disturbance. This includes

restoration of the landform, natural vegetative community, hydrologic systems, visual resources, and wildlife habitats.

A well pad that no longer has a producing well would undergo final reclamation within no more than one year following plugging and abandonment of the final well on that pad. Buried pipelines will be abandoned in place and not removed, and any remaining surface disturbance associated with pipelines would be reclaimed to final reclamation standards at the time of installation.

Prior to final reclamation of the well pad, Chevron would meet with the BLM to inspect the disturbed area, review the existing reclamation plan (including the appropriate seed mixture to be used), and agree to any revisions to the plan.

Prior to re-contouring and reseeding the well pad, Chevron would complete the following:

- All equipment, facilities, and trash would be removed from the location.
- All surfacing material will be removed and returned to the original mineral pit or recycled to repair or build roads and well pads.
- Each borehole would be plugged, capped, and its related surface equipment removed.
- Subsurface pipelines would be purged and plugged at specific intervals.
- Dry hole markers would be installed subsurface, to prevent their use as perching sites by raptors.

Re-contouring for final reclamation would consist of returning the pad, material storage piles, cut-and-fill slopes, and storm water control features to natural contours that blend with adjacent undisturbed areas, as specified in the final reclamation plan or final reclamation plat approved by the BLM. Requirements for seedbed preparation, soil amendments, seed, seeding procedures, mulching, erosion control fencing, security and monitoring would be as specified for interim reclamation.

Design Features

Chevron shall adhere to the following design features per this proposed action within the HDA. If deviation from these design features is necessary, Chevron will include a request for deviation as part of the APD associated with the deviation.

Archeological, Paleontological, and Historical Sites. Chevron shall immediately report any cultural and/or paleontological resource discovered by Chevron or by any person working on Chevron's behalf to the Authorized Officer. After such notification, Chevron shall suspend all operations in the immediate area of the discovery until written authorization to proceed is issued by the Authorized Officer.

Chemical and Fuel Secondary Containment and Exclosure Screening. Chevron shall install and maintain an impervious secondary containment system for any tank or barrel containing hazardous, poisonous, flammable, or toxic substances sufficient to contain the contents of the tank or barrel and any drips, leaks and anticipated precipitation. Chevron will dispose of fluids within the containment system in accordance with state law, and will not drain the fluids to soil or ground. Chevron will design, construct, and maintain all secondary containment systems to prevent wildlife and livestock exposure to harmful substances by installing effective exclosure systems such as fencing, netting, expanded metal mesh, lids, and grate covers (using a maximum netting mesh size of 1½" inches).

Communitization Agreement. Communitization agreements will be required for some wells. When required, Chevron shall submit the communitization agreement to the Carlsbad Field Office when the Application for Permit to Drill is submitted. The well sign will include the surface hole lease number, bottom hole lease number, and communitization agreement number.

Construction Notification. Chevron shall notify the Carlsbad Field Office at least three days prior to commencing construction of an access road or pad, and shall have the approved MDP, APD, and Conditions of Approval on site and shall make them available upon request by the Authorized Officer.

Dark Skies. Chevron will install lighting on fixed equipment and surface facilities in a way that minimizes light pollution and protects visual resources while ensuring adequate light for safe and reliable production operations.

Enclosure Fencing. Chevron shall install and maintain enclosure fencing for all open well cellars before and after drilling operations until the pit is free of fluids and backfilling has been initiated.

Federal Mineral Materials Pit. Chevron shall make payment to the BLM prior to removing any federal mineral materials.

Flaring. Chevron will not flare produced or recycled gas except for instances where flaring is necessary to protect operating personnel or to ensure the safe operation of surface facilities.

Karst. In order to mitigate the impacts from construction activities on cave and karst resources, Chevron shall do the following:

- During construction, Chevron will halt all activities and immediately notify the BLM in the event that any underground voids are encountered.
- During construction, Chevron will not use blasting as a construction method.
- During construction, Chevron will berm all pads to minimize the effects of any spilled contaminant.
- While drilling, Chevron will use a closed mud system using steel tanks with all fluids and cuttings hauled off.
- While drilling, Chevron will use fresh water where cave or karst features are expected to prevent contamination of freshwater aquifers.
- While drilling, Chevron will only directional drill after at least 100 feet below the cave occurrence zone.
- While drilling, Chevron will log and report all lost circulation zones in the drilling report.
- While drilling, Chevron will add nontoxic fluorescent dyes to the drilling fluid when the hole is spudded, and will circulate this fluid to the bottom of the karst layers.
- During production operations, Chevron will install automatic shutdown systems, check valves, or similar systems on pipelines and tanks to minimize the effects of line failures.
- During production operations, Chevron will perform annual pressure monitoring on well casing and will undertake remedial action if any casing failures are identified.

Netting of Open Topped Tanks. Chevron shall net, screen, or cover open-topped tanks until the tanks are removed from location or until the tanks no longer contain the substances that could be harmful to wildlife or livestock. If netting is used, Chevron will cover and secure the open portion of the tank to prevent wildlife entry. A maximum netting size of 1 ½" will be used, and the netting will not be in contact with fluids and will not have holes or gaps.

Noise Control. Chevron will install exhaust mufflers on fixed equipment so as not to exceed 75 db measured at 30 feet from the source of the noise.

Noxious Weeds. Chevron shall use appropriate weed control methods (per the Authorized Officer) on disturbed land where noxious weeds exist, including roads, pads, associated pipeline corridors, and adjacent lands affected by the establishment of weeds due to Chevron's action.

Open-Vent Exhaust Stack Exclosures. Chevron will construct, modify, equip, and maintain all open-vent exhaust stacks on production equipment to prevent birds and bats from entering, and to discourage perching, roosting, and nesting. Exclosure systems will be in the shape of a cone.

Painting Requirement. Chevron will paint all above-ground structures that are not subject to safety requirements a flat non-reflective paint color, Shale Green from the BLM Standard Environmental Color Chart (CC-001: June 2008).

Range Features. Chevron will avoid or pay to relocate structures that provide water to livestock, such as windmills, pipelines, drinking troughs, and earthen reservoirs.

Range Fences and Cattle guards. Where entry is granted across a fence line, Chevron will brace the fence and tie-off on both sides of the passageway with H-braces prior to cutting. A wire gate or appropriately sized cattle guard will be installed in the fence opening during infrastructure installation to prevent livestock from crossing the fence and will remain in place during construction inactivity. Chevron shall repair or replace new or existing cattle guards on the route if they are damaged or have deteriorated beyond practical use. Once the work is completed or the road is abandoned, Chevron will restore the fence to its prior condition, or better. Chevron shall notify the private surface landowner or the grazing allotment holder prior to crossing any fences.

Topsoil. Chevron shall strip the top portion of the soil (root zone – typically six inches in depth) from the entire right-of-way, road, or pad area and stockpile the topsoil along the edge of the right-of-way, road, or pad as depicted in the MDP. Other subsoil shall be completely segregated from the topsoil stockpile. Stockpiled topsoil will be redistributed over the interim reclamation areas. Topsoil shall not be used for berming the pad or facilities. For final reclamation, topsoil shall be spread over the entire pad area for seeding preparation. Large rocks or subsoil clods shall be buried within the approved area for interim reclamation.

Watershed. Chevron shall berm the entire well pad to prevent oil, salt, and other chemical contaminants from leaving the well pad. No water flow from the uphill side of the pad shall be allowed to enter the well pad.

Well Pad Surfacing. Chevron will surface roads and well pads with caliche or crushed gravel, which will be removed at the time of reclamation. Well pads will be constructed in a manner that creates the smallest possible surface disturbance, consistent with safety and operational needs.

Wildlife. Chevron will protect raptor nests on special, natural habitat features – such as trees, large brush, cliff faces and escarpments – by not allowing surface disturbance within up to 200 meters of active nests or by delaying activity for up to 90 days, or a combination of both. Prior to initiating construction activities, Chevron shall perform a wildlife survey to identify raptor nests in the proximity and to determine if the raptor nests are active. Chevron will contact a BLM Wildlife Biologist if any raptor nests within 200 meters of the construction site are active. Chevron will only consider construction within 200 meters of a raptor nest if the nest is inactive, the proposed activity is of short duration (e.g. habitat enhancement projects, fences, pipelines), and if construction will not result in continuing activity in proximity to the nest.

Appendix A: Well List

Leases		Proposed Pad[1]	Proposed Well	Section	Township	Range	SHL[1, 4]	First Take Point	BHL
APDs Submitted with MDP									
NMNM 121473	---	HH SO 10 P03	HH SO 10 Fed 7H	10	26S	27E	S03 N	S10 330 FNL 1650 FWL	S15 330 FSL 1650 FWL
NMNM 121473	---	HH SO 10 P03	HH SO 10 Fed 8H	10	26S	27E	S03 N	S10 330 FNL 2310 FWL	S15 330 FSL 2310 FWL
NMNM 121473	---	HH SO 10 P03	HH SO 10 Fed 15H	10	26S	27E	S03 N	S10 330 FNL 1650 FWL	S15 330 FSL 1650 FWL
NMNM 121473	---	HH SO 10 P03	HH SO 10 Fed 16H	10	26S	27E	S03 N	S10 330 FNL 2310 FWL	S15 330 FSL 2310 FWL
NMNM 121473	---	HH SO 10 P03	HH SO 10 Fed 23H	10	26S	27E	S03 N	S10 330 FNL 1650 FWL	S15 330 FSL 1650 FWL
NMNM 121473	---	HH SO 10 P03	HH SO 10 Fed 24H	10	26S	27E	S03 N	S10 330 FNL 2310 FWL	S15 330 FSL 2310 FWL
NMNM 118108	---	HH SO 08 P02	HH SO 8 Fed 5H	8	26S	27E	S17 D	S8 330 FSL 330 FWL	S5 330 FNL 330 FWL
NMNM 118108	---	HH SO 08 P02	HH SO 8 Fed 6H	8	26S	27E	S17 D	S8 330 FSL 990 FWL	S5 330 FNL 990 FWL
NMNM 118108	---	HH SO 08 P02	HH SO 8 Fed 13H	8	26S	27E	S17 D	S8 330 FSL 330 FWL	S5 330 FNL 330 FWL
NMNM 118108	---	HH SO 08 P02	HH SO 8 Fed 14H	8	26S	27E	S17 D	S8 330 FSL 990 FWL	S5 330 FNL 990 FWL
NMNM 118108	---	HH SO 08 P02	HH SO 8 Fed 21H	8	26S	27E	S17 D	S8 330 FSL 330 FWL	S5 330 FNL 330 FWL
NMNM 118108	---	HH SO 08 P02	HH SO 8 Fed 22H	8	26S	27E	S17 D	S8 330 FSL 990 FWL	S5 330 FNL 990 FWL
APDs to be Submitted Following MDP Approval									
NMNM 121473	---	HH SO 10 P01	HH SO 10 Fed 1H	10	26S	27E	S10 N	S10 330 FSL 660 FWL	S10 330 FNL 660 FWL
NMNM 121473	---	HH SO 10 P01	HH SO 10 Fed 2H	10	26S	27E	S10 N	S10 330 FSL 1980 FWL	S10 330 FNL 1980 FWL
NMNM 121473	---	HH SO 10 P01	HH SO 10 Fed 3H	10	26S	27E	S10 N	S10 330 FSL 1980 FEL	S10 330 FNL 1980 FEL
NMNM 121473	---	HH SO 10 P01	HH SO 10 Fed 4H	10	26S	27E	S10 N	S10 330 FSL 660 FEL	S10 330 FNL 660 FEL
NMNM 121473	---	HH SO 10 P02	HH SO 10 Fed 5H	10	26S	27E	S10 D	S10 330 FNL 330 FWL	S15 330 FSL 330 FWL
NMNM 121473	---	HH SO 10 P02	HH SO 10 Fed 6H	10	26S	27E	S10 D	S10 330 FNL 990 FWL	S15 330 FSL 990 FWL
NMNM 121473	---	HH SO 10 P04	HH SO 10 Fed 9H	10	26S	27E	S10 B	S10 330 FNL 2310 FEL	S15 330 FSL 2310 FEL
NMNM 121473	---	HH SO 10 P04	HH SO 10 Fed 10H	10	26S	27E	S10 B	S10 330 FNL 1650 FEL	S15 330 FSL 1650 FEL
NMNM 121473	---	HH SO 10 P05	HH SO 10 Fed 11H	10	26S	27E	S03 P	S10 330 FNL 990 FEL	S15 330 FSL 990 FEL
NMNM 121473	---	HH SO 10 P05	HH SO 10 Fed 12H	10	26S	27E	S03 P	S10 330 FNL 330 FEL	S15 330 FSL 330 FEL
NMNM 121473	---	HH SO 10 P02	HH SO 10 Fed 13H	10	26S	27E	S10 D	S10 330 FNL 330 FWL	S15 330 FSL 330 FWL
NMNM 121473	---	HH SO 10 P02	HH SO 10 Fed 14H	10	26S	27E	S10 D	S10 330 FNL 990 FWL	S15 330 FSL 990 FWL
NMNM 121473	---	HH SO 10 P04	HH SO 10 Fed 17H	10	26S	27E	S10 B	S10 330 FNL 2310 FEL	S15 330 FSL 2310 FEL
NMNM 121473	---	HH SO 10 P04	HH SO 10 Fed 18H	10	26S	27E	S10 B	S10 330 FNL 1650 FEL	S15 330 FSL 1650 FEL
NMNM 121473	---	HH SO 10 P05	HH SO 10 Fed 19H	10	26S	27E	S03 P	S10 330 FNL 990 FEL	S15 330 FSL 990 FEL
NMNM 121473	---	HH SO 10 P05	HH SO 10 Fed 20H	10	26S	27E	S03 P	S10 330 FNL 330 FEL	S15 330 FSL 330 FEL
NMNM 121473	---	HH SO 10 P06	HH SO 10 Fed 21H	10	26S	27E	S10 C	S10 330 FNL 330 FWL	S15 330 FSL 330 FWL
NMNM 121473	---	HH SO 10 P06	HH SO 10 Fed 22H	10	26S	27E	S10 C	S10 330 FNL 990 FWL	S15 330 FSL 990 FWL
NMNM 121473	---	HH SO 10 P07	HH SO 10 Fed 25H	10	26S	27E	S10 A	S10 330 FNL 2310 FEL	S15 330 FSL 2310 FEL
NMNM 121473	---	HH SO 10 P07	HH SO 10 Fed 26H	10	26S	27E	S10 A	S10 330 FNL 1650 FEL	S15 330 FSL 1650 FEL
NMNM 121473	---	HH SO 10 P07	HH SO 10 Fed 27H	10	26S	27E	S10 A	S10 330 FNL 990 FEL	S15 330 FSL 990 FEL
NMNM 121473	---	HH SO 10 P07	HH SO 10 Fed 28H	10	26S	27E	S10 A	S10 330 FNL 330 FEL	S15 330 FSL 330 FEL
NMNM 121473	---	HH SO 10 P08	HH SO 10 Fed 29H	10	26S	27E	S10 N	S10 330 FSL 660 FWL	S10 330 FNL 660 FWL
NMNM 121473	---	HH SO 10 P08	HH SO 10 Fed 30H	10	26S	27E	S10 N	S10 330 FSL 1980 FWL	S10 330 FNL 1980 FWL
NMNM 121473	---	HH SO 10 P08	HH SO 10 Fed 31H	10	26S	27E	S10 N	S10 330 FSL 1980 FEL	S10 330 FNL 1980 FEL

Leases		Proposed Pad[1]	Proposed Well	Section	Township	Range	SHL[1, 4]	First Take Point	BHL
NMNM 121473	---	HH SO 10 P08	HH SO 10 Fed 32H	10	26S	27E	S10 N	S10 330 FSL 660 FEL	S10 330 FNL 660 FEL
NMNM 121473	---	HH SO 10 P09	HH SO 10 Fed 33H	10	26S	27E	S10 O	S10 330 FSL 660 FWL	S10 330 FNL 660 FWL
NMNM 121473	---	HH SO 10 P09	HH SO 10 Fed 34H	10	26S	27E	S10 O	S10 330 FSL 1980 FWL	S10 330 FNL 1980 FWL
NMNM 121473	---	HH SO 10 P09	HH SO 10 Fed 35H	10	26S	27E	S10 O	S10 330 FSL 1980 FEL	S10 330 FNL 1980 FEL
NMNM 121473	---	HH SO 10 P09	HH SO 10 Fed 36H	10	26S	27E	S10 O	S10 330 FSL 660 FEL	S10 330 FNL 660 FEL
NMNM 121473	---	HH SO 10 P10	HH SO 10 Fed 37H	10	26S	27E	S10 O	S10 330 FSL 660 FWL	S10 330 FNL 660 FWL
NMNM 121473	---	HH SO 10 P10	HH SO 10 Fed 38H	10	26S	27E	S10 O	S10 330 FSL 1980 FWL	S10 330 FNL 1980 FWL
NMNM 121473	---	HH SO 10 P10	HH SO 10 Fed 39H	10	26S	27E	S10 O	S10 330 FSL 1980 FEL	S10 330 FNL 1980 FEL
NMNM 121473	---	HH SO 10 P10	HH SO 10 Fed 40H	10	26S	27E	S10 O	S10 330 FSL 660 FEL	S10 330 FNL 660 FEL
NMNM 121473	---	HH SO 11 P01	HH SO 11 Fed 1H	11	26S	27E	S11 M	S11 330 FSL 660 FWL	S11 330 FNL 660 FWL
NMNM 121473	---	HH SO 11 P01	HH SO 11 Fed 2H	11	26S	27E	S11 M	S11 330 FSL 1980 FWL	S11 330 FNL 1980 FWL
NMNM 121473	---	HH SO 11 P02	HH SO 11 Fed 5H	11	26S	27E	S11 D	S11 330 FNL 330 FWL	S14 330 FSL 330 FWL
NMNM 121473	---	HH SO 11 P02	HH SO 11 Fed 6H	11	26S	27E	S11 D	S11 330 FNL 990 FWL	S14 330 FSL 990 FWL
NMNM 121473	---	HH SO 11 P03	HH SO 11 Fed 7H	11	26S	27E	S11 C	S11 330 FNL 1650 FWL	S14 330 FSL 1650 FWL
NMNM 121473	---	HH SO 11 P03	HH SO 11 Fed 8H	11	26S	27E	S11 C	S11 330 FNL 2310 FWL	S14 330 FSL 2310 FWL
NMNM 121473	---	HH SO 11 P02	HH SO 11 Fed 13H	11	26S	27E	S11 D	S11 330 FNL 330 FWL	S14 330 FSL 330 FWL
NMNM 121473	---	HH SO 11 P02	HH SO 11 Fed 14H	11	26S	27E	S11 D	S11 330 FNL 990 FWL	S14 330 FSL 990 FWL
NMNM 121473	---	HH SO 11 P03	HH SO 11 Fed 15H	11	26S	27E	S11 C	S11 330 FNL 1650 FWL	S14 330 FSL 1650 FWL
NMNM 121473	---	HH SO 11 P03	HH SO 11 Fed 16H	11	26S	27E	S11 C	S11 330 FNL 2310 FWL	S14 330 FSL 2310 FWL
NMNM 121473	---	HH SO 11 P06	HH SO 11 Fed 21H	11	26S	27E	S11 D	S11 330 FNL 330 FWL	S14 330 FSL 330 FWL
NMNM 121473	---	HH SO 11 P06	HH SO 11 Fed 22H	11	26S	27E	S11 D	S11 330 FNL 990 FWL	S14 330 FSL 990 FWL
NMNM 121473	---	HH SO 11 P06	HH SO 11 Fed 23H	11	26S	27E	S11 D	S11 330 FNL 1650 FWL	S14 330 FSL 1650 FWL
NMNM 121473	---	HH SO 11 P06	HH SO 11 Fed 24H	11	26S	27E	S11 D	S11 330 FNL 2310 FWL	S14 330 FSL 2310 FWL
NMNM 121473	---	HH SO 11 P08	HH SO 11 Fed 29H	11	26S	27E	S11 N	S11 330 FSL 660 FWL	S10 330 FNL 660 FWL
NMNM 121473	---	HH SO 11 P08	HH SO 11 Fed 30H	11	26S	27E	S11 N	S11 330 FSL 1980 FWL	S10 330 FNL 1980 FWL
NMNM 121473	---	HH SO 11 P09	HH SO 11 Fed 33H	11	26S	27E	S14 D	S11 330 FSL 660 FWL	S11 330 FNL 660 FWL
NMNM 121473	---	HH SO 11 P09	HH SO 11 Fed 34H	11	26S	27E	S14 D	S11 330 FSL 1980 FWL	S11 330 FNL 1980 FWL
NMNM 121473	---	HH SO 11 P10	HH SO 11 Fed 37H	11	26S	27E	S14 C	S11 330 FSL 660 FWL	S11 330 FNL 660 FWL
NMNM 121473	---	HH SO 11 P10	HH SO 11 Fed 38H	11	26S	27E	S14 C	S11 330 FSL 1980 FWL	S11 330 FNL 1980 FWL
NMNM 121473	---	HH SO 15 P01	HH SO 15 Fed 1H	15	26S	27E	S15 C	S15 330 FNL 660 FWL	S15 330 FSL 660 FWL
NMNM 121473	---	HH SO 15 P01	HH SO 15 Fed 2H	15	26S	27E	S15 C	S15 330 FNL 1980 FWL	S15 330 FSL 1980 FWL
NMNM 121473	---	HH SO 15 P01	HH SO 15 Fed 3H	15	26S	27E	S15 C	S15 330 FNL 1980 FEL	S15 330 FSL 1980 FEL
NMNM 121473	---	HH SO 15 P01	HH SO 15 Fed 4H	15	26S	27E	S15 C	S15 330 FNL 660 FEL	S15 330 FSL 660 FEL
NMNM 121473	---	HH SO 15 P08	HH SO 15 Fed 29H	15	26S	27E	S15 C	S15 330 FNL 660 FWL	S15 330 FSL 660 FWL
NMNM 121473	---	HH SO 15 P08	HH SO 15 Fed 30H	15	26S	27E	S15 C	S15 330 FNL 1980 FWL	S15 330 FSL 1980 FWL
NMNM 121473	---	HH SO 15 P08	HH SO 15 Fed 31H	15	26S	27E	S15 C	S15 330 FNL 1980 FEL	S15 330 FSL 1980 FEL
NMNM 121473	---	HH SO 15 P08	HH SO 15 Fed 32H	15	26S	27E	S15 C	S15 330 FNL 660 FEL	S15 330 FSL 660 FEL
NMNM 121473	---	HH SO 15 P09	HH SO 15 Fed 33H	15	26S	27E	S15 B	S15 330 FNL 660 FWL	S15 330 FSL 660 FWL
NMNM 121473	---	HH SO 15 P09	HH SO 15 Fed 34H	15	26S	27E	S15 B	S15 330 FNL 1980 FWL	S15 330 FSL 1980 FWL
NMNM 121473	---	HH SO 15 P09	HH SO 15 Fed 35H	15	26S	27E	S15 B	S15 330 FNL 1980 FEL	S15 330 FSL 1980 FEL

Leases		Proposed Pad[1]	Proposed Well	Section	Township	Range	SHL[1, 4]	First Take Point	BHL
NMNM 121473	---	HH SO 15 P09	HH SO 15 Fed 36H	15	26S	27E	S15 B	S15 330 FNL 660 FEL	S15 330 FSL 660 FEL
NMNM 121473	---	HH SO 15 P10	HH SO 15 Fed 37H	15	26S	27E	S15 B	S15 330 FNL 660 FWL	S15 330 FSL 660 FWL
NMNM 121473	---	HH SO 15 P10	HH SO 15 Fed 38H	15	26S	27E	S15 B	S15 330 FNL 1980 FWL	S15 330 FSL 1980 FWL
NMNM 121473	---	HH SO 15 P10	HH SO 15 Fed 39H	15	26S	27E	S15 B	S15 330 FNL 1980 FEL	S15 330 FSL 1980 FEL
NMNM 121473	---	HH SO 15 P10	HH SO 15 Fed 40H	15	26S	27E	S15 B	S15 330 FNL 660 FEL	S15 330 FSL 660 FEL
NMNM 121473	---	HH SO 11 P01	HH SO 14 Fed 1H	14	26S	27E	S11 N	S15 330 FNL 660 FWL	S15 330 FSL 660 FWL
NMNM 121473	---	HH SO 11 P01	HH SO 14 Fed 2H	14	26S	27E	S11 N	S15 330 FNL 1980 FWL	S15 330 FSL 1980 FWL
NMNM 121473	---	HH SO 11 P08	HH SO 14 Fed 29H	14	26S	27E	S14 D	S15 330 FNL 660 FWL	S15 330 FSL 660 FWL
NMNM 121473	---	HH SO 11 P08	HH SO 14 Fed 30H	14	26S	27E	S14 D	S15 330 FNL 1980 FWL	S15 330 FSL 1980 FWL
NMNM 121473	---	HH SO 11 P09	HH SO 14 Fed 33H	14	26S	27E	S14 C	S15 330 FNL 660 FWL	S15 330 FSL 660 FWL
NMNM 121473	---	HH SO 11 P09	HH SO 14 Fed 34H	14	26S	27E	S14 C	S15 330 FNL 1980 FWL	S15 330 FSL 1980 FWL
NMNM 121473	---	HH SO 11 P10	HH SO 14 Fed 37H	14	26S	27E	S11 N	S15 330 FNL 660 FWL	S15 330 FSL 660 FWL
NMNM 121473	---	HH SO 11 P10	HH SO 14 Fed 38H	14	26S	27E	S11 N	S15 330 FNL 1980 FWL	S15 330 FSL 1980 FWL
NMNM 121473	---	HH SO 08 P01	HH SO 8 Fed 1H	8	26S	27E	S08 C	S8 330 FSL 660 FWL	S8 330 FNL 660 FWL
NMNM 118108	---	HH SO 08 P01	HH SO 8 Fed 2H	8	26S	27E	S08 C	S8 330 FSL 1980 FWL	S8 330 FNL 1980 FWL
NMNM 118108	---	HH SO 08 P01	HH SO 8 Fed 3H	8	26S	27E	S08 C	S8 330 FSL 1980 FEL	S8 330 FNL 1980 FEL
NMNM 118108	---	HH SO 08 P01	HH SO 8 Fed 4H	8	26S	27E	S08 C	S8 330 FSL 660 FEL	S8 330 FNL 660 FEL
NMNM 118108	---	HH SO 08 P03	HH SO 8 Fed 7H	8	26S	27E	S08 C	S8 330 FSL 1650 FWL	S5 330 FNL 1650 FWL
NMNM 118108	---	HH SO 08 P03	HH SO 8 Fed 8H	8	26S	27E	S08 C	S8 330 FSL 2310 FWL	S5 330 FNL 2310 FWL
NMNM 118108	NMNM 113399	HH SO 08 P04	HH SO 8 Fed Com 9H	8	26S	27E	S08 B	S8 330 FSL 2310 FEL	S5 330 FNL 2310 FEL
NMNM 118108	NMNM 113399	HH SO 08 P04	HH SO 8 Fed Com 10H	8	26S	27E	S08 B	S8 330 FSL 1650 FEL	S5 330 FNL 1650 FEL
NMNM 118108	NMNM 113399	HH SO 08 P05	HH SO 8 Fed Com 11H	8	26S	27E	S08 A	S8 330 FSL 990 FEL	S5 330 FNL 990 FEL
NMNM 118108	NMNM 113399	HH SO 08 P05	HH SO 8 Fed Com 12H	8	26S	27E	S08 A	S8 330 FSL 330 FEL	S5 330 FNL 330 FEL
NMNM 118108	---	HH SO 08 P03	HH SO 8 Fed 15H	8	26S	27E	S08 C	S8 330 FSL 1650 FWL	S5 330 FNL 1650 FWL
NMNM 118108	---	HH SO 08 P03	HH SO 8 Fed 16H	8	26S	27E	S08 C	S8 330 FSL 2310 FWL	S5 330 FNL 2310 FWL
NMNM 118108	NMNM 113399	HH SO 08 P04	HH SO 8 Fed Com 17H	8	26S	27E	S08 B	S8 330 FSL 2310 FEL	S5 330 FNL 2310 FEL
NMNM 118108	NMNM 113399	HH SO 08 P04	HH SO 8 Fed Com 18H	8	26S	27E	S08 B	S8 330 FSL 1650 FEL	S5 330 FNL 1650 FEL
NMNM 118108	NMNM 113399	HH SO 08 P05	HH SO 8 Fed Com 19H	8	26S	27E	S08 A	S8 330 FSL 990 FEL	S5 330 FNL 990 FEL
NMNM 118108	NMNM 113399	HH SO 08 P05	HH SO 8 Fed Com 20H	8	26S	27E	S08 A	S8 330 FSL 330 FEL	S5 330 FNL 330 FEL
NMNM 118108	---	HH SO 08 P06	HH SO 8 Fed 23H	8	26S	27E	S08 C	S8 330 FSL 1650 FWL	S5 330 FNL 1650 FWL
NMNM 118108	---	HH SO 08 P06	HH SO 8 Fed 24H	8	26S	27E	S08 C	S8 330 FSL 2310 FWL	S5 330 FNL 2310 FWL
NMNM 118108	NMNM 113399	HH SO 08 P07	HH SO 8 Fed Com 25H	8	26S	27E	S08 B	S8 330 FSL 2310 FEL	S5 330 FNL 2310 FEL
NMNM 118108	NMNM 113399	HH SO 08 P07	HH SO 8 Fed Com 26H	8	26S	27E	S08 B	S8 330 FSL 1650 FEL	S5 330 FNL 1650 FEL
NMNM 118108	NMNM 113399	HH SO 08 P07	HH SO 8 Fed Com 27H	8	26S	27E	S08 B	S8 330 FSL 990 FEL	S5 330 FNL 990 FEL
NMNM 118108	NNNM 113399	HH SO 08 P07	HH SO 8 Fed Com 28H	8	26S	27E	S08 B	S8 330 FSL 330 FEL	S5 330 FNL 330 FEL
NMNM 118108	---	HH SO 08 P08	HH SO 8 Fed 29H	8	26S	27E	S08 C	S8 330 FSL 660 FWL	S8 330 FNL 660 FWL
NMNM 118108	---	HH SO 08 P08	HH SO 8 Fed 30H	8	26S	27E	S08 C	S8 330 FSL 1980 FWL	S8 330 FNL 1980 FWL

Leases		Proposed Pad[1]	Proposed Well	Section	Township	Range	SHL[1, 4]	First Take Point	BHL
NMNM 118108	---	HH SO 08 P08	HH SO 8 Fed 31H	8	26S	27E	S08 C	S8 330 FSL 1980 FEL	S8 330 FNL 1980 FEL
NMNM 118108	---	HH SO 08 P08	HH SO 8 Fed 32H	8	26S	27E	S08 C	S8 330 FSL 660 FEL	S8 330 FNL 660 FEL
NMNM 118108	---	HH SO 08 P09	HH SO 8 Fed 33H	8	26S	27E	S08 B	S8 330 FSL 660 FWL	S8 330 FNL 660 FWL
NMNM 118108	---	HH SO 08 P09	HH SO 8 Fed 34H	8	26S	27E	S08 B	S8 330 FSL 1980 FWL	S8 330 FNL 1980 FWL
NMNM 118108	---	HH SO 08 P09	HH SO 8 Fed 35H	8	26S	27E	S08 B	S8 330 FSL 1980 FEL	S8 330 FNL 1980 FEL
NMNM 118108	---	HH SO 08 P09	HH SO 8 Fed 36H	8	26S	27E	S08 B	S8 330 FSL 660 FEL	S8 330 FNL 660 FEL
NMNM 118108	---	HH SO 08 P10	HH SO 8 Fed 37H	8	26S	27E	S08 B	S8 330 FSL 660 FWL	S8 330 FNL 660 FWL
NMNM 118108	---	HH SO 08 P10	HH SO 8 Fed 38H	8	26S	27E	S08 B	S8 330 FSL 1980 FWL	S8 330 FNL 1980 FWL
NMNM 118108	---	HH SO 08 P10	HH SO 8 Fed 39H	8	26S	27E	S08 B	S8 330 FSL 1980 FEL	S8 330 FNL 1980 FEL
NMNM 118108	---	HH SO 08 P10	HH SO 8 Fed 40H	8	26S	27E	S08 B	S8 330 FSL 660 FEL	S8 330 FNL 660 FEL
NMNM 121473	---	HH SO 05 P01	HH SO 5 Fed 1H	5	26S	27E	S05 C	S5 330 FNL 660 FWL	S5 330 FSL 660 FWL
NMNM 118108	---	HH SO 05 P01	HH SO 5 Fed 2H	5	26S	27E	S05 C	S5 330 FNL 1980 FWL	S5 330 FSL 1980 FWL
NMNM 118108	NNNM 113399	HH SO 05 P01	HH SO 5 Fed Com 3H	5	26S	27E	S05 C	S5 330 FNL 1980 FEL	S5 330 FSL 1980 FEL
NMNM 118108	NNNM 113399	HH SO 05 P01	HH SO 5 Fed Com 4H	5	26S	27E	S05 C	S5 330 FNL 660 FEL	S5 330 FSL 660 FEL
NMNM 118108	---	HH SO 05 P08	HH SO 5 Fed 29H	5	26S	27E	S05 B	S5 330 FNL 660 FWL	S5 330 FSL 660 FWL
NMNM 118108	---	HH SO 05 P08	HH SO 5 Fed 30H	5	26S	27E	S05 B	S5 330 FNL 1980 FWL	S5 330 FSL 1980 FWL
NMNM 118108	NNNM 113399	HH SO 05 P08	HH SO 5 Fed Com 31H	5	26S	27E	S05 B	S5 330 FNL 1980 FEL	S5 330 FSL 1980 FEL
NMNM 118108	NNNM 113399	HH SO 05 P08	HH SO 5 Fed Com 32H	5	26S	27E	S05 B	S5 330 FNL 660 FEL	S5 330 FSL 660 FEL
NMNM 118108	---	HH SO 05 P09	HH SO 5 Fed 33H	5	26S	27E	S05 B	S5 330 FNL 660 FWL	S5 330 FSL 660 FWL
NMNM 118108	---	HH SO 05 P09	HH SO 5 Fed 34H	5	26S	27E	S05 B	S5 330 FNL 1980 FWL	S5 330 FSL 1980 FWL
NMNM 118108	NNNM 113399	HH SO 05 P09	HH SO 5 Fed Com 35H	5	26S	27E	S05 B	S5 330 FNL 1980 FEL	S5 330 FSL 1980 FEL
NMNM 118108	NNNM 113399	HH SO 05 P09	HH SO 5 Fed Com 36H	5	26S	27E	S05 B	S5 330 FNL 660 FEL	S5 330 FSL 660 FEL
NMNM 118108	---	HH SO 05 P10	HH SO 5 Fed 37H	5	26S	27E	S05 B	S5 330 FNL 660 FWL	S5 330 FSL 660 FWL
NMNM 118108	---	HH SO 05 P10	HH SO 5 Fed 38H	5	26S	27E	S05 B	S5 330 FNL 1980 FWL	S5 330 FSL 1980 FWL
NMNM 118108	NNNM 113399	HH SO 05 P10	HH SO 5 Fed Com 39H	5	26S	27E	S05 B	S5 330 FNL 1980 FEL	S5 330 FSL 1980 FEL
NMNM 118108	NNNM 113399	HH SO 05 P10	HH SO 5 Fed Com 40H	5	26S	27E	S05 B	S5 330 FNL 660 FEL	S5 330 FSL 660 FEL
NMNM 107369	VB 1805	HH CE 35 P01	HH SO 2 Fed Com 5H	2	26S	27E	S35 E	S35 2590 FSL 330 FWL	S2 330 FSL 330 FWL
NMNM 107369	VB 1805	HH CE 35 P02	HH SO 2 Fed Com 6H	2	26S	27E	S35 E	S35 2590 FSL 990 FWL	S2 330 FSL 990 FWL
NMNM 107369	VB 1805	HH CE 35 P03	HH SO 2 Fed Com 7H	2	26S	27E	S35 F	S35 2590 FSL 1650 FWL	S2 330 FSL 1650 FWL
NMNM 107369	VB 1805	HH CE 35 P04	HH SO 2 Fed Com 8H	2	26S	27E	S35 F	S35 2590 FSL 2310 FWL	S2 330 FSL 2310 FWL
NNNM 114968	VB 1796	HH CE 35 P05	HH SO 2 Fed Com 9H	2	26S	27E	S35 G	S35 2590 FSL 2310 FEL	S2 330 FSL 2310 FEL
NNNM 114968	VB 1796	HH CE 35 P06	HH SO 2 Fed Com 10H	2	26S	27E	S35 G	S35 2590 FSL 1650 FEL	S2 330 FSL 1650 FEL
NNNM 114968	VB 1796	HH CE 35 P07	HH SO 2 Fed Com 11H	2	26S	27E	S35 H	S35 2590 FSL 990 FEL	S2 330 FSL 990 FEL
NNNM 114968	VB 1796	HH CE 35 P08	HH SO 2 Fed Com 12H	2	26S	27E	S35 H	S35 2590 FSL 330 FEL	S2 330 FSL 330 FEL
NMNM 107369	VB 1805	HH CE 35 P01	HH SO 2 Fed Com 13H	2	26S	27E	S35 E	S35 2590 FSL 330 FWL	S2 330 FSL 330 FWL
NMNM 107369	VB 1805	HH CE 35 P02	HH SO 2 Fed Com 14H	2	26S	27E	S35 E	S35 2590 FSL 990 FWL	S2 330 FSL 990 FWL
NMNM 107369	VB 1805	HH CE 35 P03	HH SO 2 Fed Com 15H	2	26S	27E	S35 F	S35 2590 FSL 1650 FWL	S2 330 FSL 1650 FWL
NMNM 107369	VB 1805	HH CE 35 P04	HH SO 2 Fed Com 16H	2	26S	27E	S35 F	S35 2590 FSL 2310 FWL	S2 330 FSL 2310 FWL
NNNM 114968	VB 1796	HH CE 35 P05	HH SO 2 Fed Com 17H	2	26S	27E	S35 G	S35 2590 FSL 2310 FEL	S2 330 FSL 2310 FEL
NNNM 114968	VB 1796	HH CE 35 P06	HH SO 2 Fed Com 18H	2	26S	27E	S35 G	S35 2590 FSL 1650 FEL	S2 330 FSL 1650 FEL

Leases		Proposed Pad[1]	Proposed Well	Section	Township	Range	SHL[1, 4]	First Take Point	BHL
NNNM 114968	VB 1796	HH CE 35 P07	HH SO 2 Fed Com 19H	2	26S	27E	S35 H	S35 2590 FSL 990 FEL	S2 330 FSL 990 FEL
NNNM 114968	VB 1796	HH CE 35 P08	HH SO 2 Fed Com 20H	2	26S	27E	S35 H	S35 2590 FSL 330 FEL	S2 330 FSL 330 FEL
NMNM 107369	VB 1805	HH CE 35 P09	HH SO 2 Fed Com 21H	2	26S	27E	S35 E	S35 2590 FSL 330 FWL	S2 330 FSL 330 FWL
NMNM 107369	VB 1805	HH CE 35 P09	HH SO 2 Fed Com 22H	2	26S	27E	S35 E	S35 2590 FSL 990 FWL	S2 330 FSL 990 FWL
NMNM 107369	VB 1805	HH CE 35 P10	HH SO 2 Fed Com 23H	2	26S	27E	S35 F	S35 2590 FSL 1650 FWL	S2 330 FSL 1650 FWL
NMNM 107369	VB 1805	HH CE 35 P10	HH SO 2 Fed Com 24H	2	26S	27E	S35 F	S35 2590 FSL 2310 FWL	S2 330 FSL 2310 FWL
NNNM 114968	VB 1796	HH CE 35 P11	HH SO 2 Fed Com 25H	2	26S	27E	S35 G	S35 2590 FSL 2310 FEL	S2 330 FSL 2310 FEL
NNNM 114968	VB 1796	HH CE 35 P11	HH SO 2 Fed Com 26H	2	26S	27E	S35 G	S35 2590 FSL 1650 FEL	S2 330 FSL 1650 FEL
NNNM 114968	VB 1796	HH CE 35 P12	HH SO 2 Fed Com 27H	2	26S	27E	S35 H	S35 2590 FSL 990 FEL	S2 330 FSL 990 FEL
NNNM 114968	VB 1796	HH CE 35 P12	HH SO 2 Fed Com 28H	2	26S	27E	S35 H	S35 2590 FSL 330 FEL	S2 330 FSL 330 FEL
NMNM 107369	VB 1805	HH CE 35 P13	HH SO 2 Fed Com 29H	2	26S	27E	S35 F	S35 2590 FSL 660 FWL	S2 330 FSL 660 FWL
NMNM 107369	VB 1805	HH CE 35 P13	HH SO 2 Fed Com 30H	2	26S	27E	S35 F	S35 2590 FSL 1980 FWL	S2 330 FSL 1980 FWL
NNNM 114968	VB 1796	HH CE 35 P14	HH SO 2 Fed Com 31H	2	26S	27E	S35 G	S35 2590 FSL 1980 FEL	S2 330 FSL 1980 FEL
NNNM 114968	VB 1796	HH CE 35 P14	HH SO 2 Fed Com 32H	2	26S	27E	S35 G	S35 2590 FSL 660 FEL	S2 330 FSL 660 FEL
NMNM 107369	VB 1805	HH CE 35 P15	HH SO 2 Fed Com 34H	2	26S	27E	S35 F	S35 2590 FSL 1980 FWL	S2 330 FSL 1980 FWL
NNNM 114968	VB 1796	HH CE 35 P16	HH SO 2 Fed Com 35H	2	26S	27E	S35 G	S35 2590 FSL 1980 FEL	S2 330 FSL 1980 FEL
NNNM 114968	VB 1796	HH CE 35 P16	HH SO 2 Fed Com 36H	2	26S	27E	S35 G	S35 2590 FSL 660 FEL	S2 330 FSL 660 FEL
NMNM 107369	VB 1805	HH CE 35 P17	HH SO 2 Fed Com 37H	2	26S	27E	S35 F	S35 2590 FSL 660 FWL	S2 330 FSL 660 FWL
NMNM 107369	VB 1805	HH CE 35 P17	HH SO 2 Fed Com 38H	2	26S	27E	S35 F	S35 2590 FSL 1980 FWL	S2 330 FSL 1980 FWL
NNNM 114968	VB 1796	HH CE 35 P18	HH SO 2 Fed Com 39H	2	26S	27E	S35 G	S35 2590 FSL 1980 FEL	S2 330 FSL 1980 FEL
NNNM 114968	VB 1796	HH CE 35 P18	HH SO 2 Fed Com 40H	2	26S	27E	S35 G	S35 2590 FSL 660 FEL	S2 330 FSL 660 FEL
NMNM 107369	---	HH CE 26 P01	HH CE 26 Fed 1H	26	25S	27E	S35 C	S26 330 FSL 660 FWL	S26 330 FNL 660 FWL
NMNM 107369	VB 0734	HH CE 26 P01	HH CE 26 Fed Com 2H	26	25S	27E	S35 C	S26 330 FSL 1980 FWL	S26 330 FNL 1980 FWL
NMNM 107369	VB 0734	HH CE 26 P02	HH CE 26 Fed Com 3H	26	25S	27E	S35 B	S26 330 FSL 1980 FEL	S26 330 FNL 1980 FEL
NMNM 107369	VB 0734	HH CE 26 P02	HH CE 26 Fed Com 4H	26	25S	27E	S35 B	S26 330 FSL 660 FEL	S26 330 FNL 660 FEL
NMNM 107369	---	HH CE 35 P01	HH CE 26 Fed 5H	26	25S	27E	S35 E	S35 2590 FNL 2590 FWL	S26 330 FNL 330 FWL
NMNM 107369	---	HH CE 35 P02	HH CE 26 Fed 6H	26	25S	27E	S35 E	S35 2590 FNL 990 FWL	S26 330 FNL 990 FWL
NMNM 107369	VB 0734	HH CE 35 P03	HH CE 26 Fed Com 7H	26	25S	27E	S35 F	S35 2590 FNL 1650 FWL	S26 330 FNL 1650 FWL
NMNM 107369	VB 0734	HH CE 35 P04	HH CE 26 Fed Com 8H	26	25S	27E	S35 F	S35 2590 FNL 2310 FWL	S26 330 FNL 2310 FWL
NMNM 107369	VB 0734	HH CE 35 P05	HH CE 26 Fed Com 9H	26	25S	27E	S35 G	S35 2590 FNL 2310 FEL	S26 330 FNL 2310 FEL
NMNM 107369	VB 0734	HH CE 35 P06	HH CE 26 Fed Com 10H	26	25S	27E	S35 G	S35 2590 FNL 1650 FEL	S26 330 FNL 1650 FEL
NMNM 107369	VB 0734	HH CE 35 P07	HH CE 26 Fed Com 11H	26	25S	27E	S35 H	S35 2590 FNL 990 FEL	S26 330 FNL 990 FEL
NMNM 107369	VB 0734	HH CE 35 P08	HH CE 26 Fed Com 12H	26	25S	27E	S35 H	S35 2590 FNL 2590 FEL	S26 330 FNL 330 FEL
NMNM 107369	---	HH CE 35 P01	HH CE 26 Fed 13H	26	25S	27E	S35 E	S35 2590 FNL 2590 FWL	S26 330 FNL 330 FWL
NMNM 107369	---	HH CE 35 P02	HH CE 26 Fed 14H	26	25S	27E	S35 E	S35 2590 FNL 990 FWL	S26 330 FNL 990 FWL
NMNM 107369	VB 0734	HH CE 35 P03	HH CE 26 Fed Com 15H	26	25S	27E	S35 F	S35 2590 FNL 1650 FWL	S26 330 FNL 1650 FWL
NMNM 107369	VB 0734	HH CE 35 P04	HH CE 26 Fed Com 16H	26	25S	27E	S35 F	S35 2590 FNL 2310 FWL	S26 330 FNL 2310 FWL
NMNM 107369	VB 0734	HH CE 35 P05	HH CE 26 Fed Com 17H	26	25S	27E	S35 G	S35 2590 FNL 2310 FEL	S26 330 FNL 2310 FEL
NMNM 107369	VB 0734	HH CE 35 P06	HH CE 26 Fed Com 18H	26	25S	27E	S35 G	S35 2590 FNL 1650 FEL	S26 330 FNL 1650 FEL

Leases		Proposed Pad[1]	Proposed Well	Section	Township	Range	SHL[1, 4]	First Take Point	BHL
NMNM 107369	VB 0734	HH CE 35 P07	HH CE 26 Fed Com 19H	26	25S	27E	S35 H	S35 2590 FNL 990 FEL	S26 330 FNL 990 FEL
NMNM 107369	VB 0734	HH CE 35 P08	HH CE 26 Fed Com 20H	26	25S	27E	S35 H	S35 2590 FNL 2590 FEL	S26 330 FNL 330 FEL
NMNM 107369	---	HH CE 35 P09	HH CE 26 Fed 21H	26	25S	27E	S35 E	S35 2590 FNL 2590 FWL	S26 330 FNL 330 FWL
NMNM 107369	---	HH CE 35 P09	HH CE 26 Fed 22H	26	25S	27E	S35 E	S35 2590 FNL 990 FWL	S26 330 FNL 990 FWL
NMNM 107369	VB 0734	HH CE 35 P10	HH CE 26 Fed Com 23H	26	25S	27E	S35 F	S35 2590 FNL 1650 FWL	S26 330 FNL 1650 FWL
NMNM 107369	VB 0734	HH CE 35 P10	HH CE 26 Fed Com 24H	26	25S	27E	S35 F	S35 2590 FNL 2310 FWL	S26 330 FNL 2310 FWL
NMNM 107369	VB 0734	HH CE 35 P11	HH CE 26 Fed Com 25H	26	25S	27E	S35 G	S35 2590 FNL 2310 FEL	S26 330 FNL 2310 FEL
NMNM 107369	VB 0734	HH CE 35 P11	HH CE 26 Fed Com 26H	26	25S	27E	S35 G	S35 2590 FNL 1650 FEL	S26 330 FNL 1650 FEL
NMNM 107369	VB 0734	HH CE 35 P12	HH CE 26 Fed Com 27H	26	25S	27E	S35 H	S35 2590 FNL 990 FEL	S26 330 FNL 990 FEL
NMNM 107369	VB 0734	HH CE 35 P12	HH CE 26 Fed Com 28H	26	25S	27E	S35 H	S35 2590 FNL 2590 FEL	S26 330 FNL 330 FEL
NMNM 107369	---	HH CE 35 P13	HH CE 26 Fed 29H	26	25S	27E	S35 F	S35 2590 FNL 660 FWL	S26 330 FNL 660 FWL
NMNM 107369	VB 0734	HH CE 35 P13	HH CE 26 Fed Com 30H	26	25S	27E	S35 F	S35 2590 FNL 1980 FWL	S26 330 FNL 1980 FWL
NMNM 107369	VB 0734	HH CE 35 P14	HH CE 26 Fed Com 31H	26	25S	27E	S35 G	S35 2590 FNL 1980 FEL	S26 330 FNL 1980 FEL
NMNM 107369	VB 0734	HH CE 35 P14	HH CE 26 Fed Com 32H	26	25S	27E	S35 G	S35 2590 FNL 660 FEL	S26 330 FNL 660 FEL
NMNM 107369	---	HH CE 26 P03	HH CE 26 Fed 33H	26	25S	27E	S35 D	S26 330 FSL 660 FWL	S26 330 FNL 660 FWL
NMNM 107369	VB 0734	HH CE 35 P15	HH CE 26 Fed Com 34H	26	25S	27E	S35 F	S35 2590 FNL 1980 FWL	S26 330 FNL 1980 FWL
NMNM 107369	VB 0734	HH CE 35 P16	HH CE 26 Fed Com 35H	26	25S	27E	S35 G	S35 2590 FNL 1980 FEL	S26 330 FNL 1980 FEL
NMNM 107369	VB 0734	HH CE 35 P16	HH CE 26 Fed Com 36H	26	25S	27E	S35 G	S35 2590 FNL 660 FEL	S26 330 FNL 660 FEL
NMNM 107369	VB 0734	HH CE 35 P17	HH CE 26 Fed Com 37H	26	25S	27E	S35 F	S35 2590 FNL 660 FWL	S26 330 FNL 660 FWL
NMNM 107369	---	HH CE 35 P17	HH CE 26 Fed 38H	26	25S	27E	S35 F	S35 2590 FNL 1980 FWL	S26 330 FNL 1980 FWL
NMNM 107369	VB 0734	HH CE 35 P18	HH CE 26 Fed Com 39H	26	25S	27E	S35 G	S35 2590 FNL 1980 FEL	S26 330 FNL 1980 FEL
NMNM 107369	VB 0734	HH CE 35 P18	HH CE 26 Fed Com 40H	26	25S	27E	S35 G	S35 2590 FNL 660 FEL	S26 330 FNL 660 FEL
NMNM 107369	VB 0734	HH CE 26 P01	HH CE 35 Fed 1H	35	25S	27E	S35 C	S35 330 FNL 660 FWL	S35 330 FSL 660 FWL
NMNM 107369	---	HH CE 26 P01	HH CE 35 Fed 2H	35	25S	27E	S35 C	S35 330 FNL 1980 FWL	S35 330 FSL 1980 FWL
NMNM 107369	---	HH CE 26 P02	HH CE 35 Fed Com 3H	35	25S	27E	S35 B	S35 330 FNL 1980 FEL	S35 330 FSL 1980 FEL
NMNM 107369	NNNM 114968	HH CE 26 P02	HH CE 35 Fed Com 4H	35	25S	27E	S35 B	S35 330 FNL 660 FEL	S35 330 FSL 660 FEL
NMNM 107369	NNNM 114968	HH CE 26 P03	HH CE 35 Fed 33H	35	25S	27E	S35 D	S35 330 FNL 660 FWL	S35 330 FSL 660 FWL
NMNM 109756	---	HH CE 30 P01	HH CE 30 Fed 1H	30	25S	27E	S30 N	S30 330 FSL 660 FWL	S30 330 FNL 660 FWL
NMNM 109756	---	HH CE 30 P01	HH CE 30 Fed 2H	30	25S	27E	S30 N	S30 330 FSL 1980 FWL	S30 330 FNL 1980 FWL
NMNM 109756	NMNM 107368	HH CE 30 P01	HH CE 30 Fed Com 3H	30	25S	27E	S30 N	S30 330 FSL 1980 FEL	S19 2310 FSL 1980 FEL
NMNM 109756	NMNM 107368	HH CE 30 P01	HH CE 30 Fed Com 4H	30	25S	27E	S30 N	S30 330 FSL 660 FEL	S19 2310 FSL 660 FEL
NMNM 109756	---	HH CE 30 P02	HH CE 30 Fed Com 5H	30	25S	27E	S30 M	S30 330 FSL 330 FWL	S19 330 FNL 330 FWL
NMNM 109756	---	HH CE 30 P02	HH CE 30 Fed Com 6H	30	25S	27E	S30 M	S30 330 FSL 990 FWL	S19 330 FNL 990 FWL
NMNM 109756	---	HH CE 30 P03	HH CE 30 Fed Com 7H	30	25S	27E	S30 N	S30 330 FSL 1650 FWL	S19 330 FNL 1650 FWL
NMNM 109756	---	HH CE 30 P03	HH CE 30 Fed Com 8H	30	25S	27E	S30 N	S30 330 FSL 2310 FWL	S19 330 FNL 2310 FWL
NMNM 109756	NMNM 107368	HH CE 30 P04	HH CE 30 Fed Com 9H	30	25S	27E	S30 O	S30 330 FSL 2310 FEL	S19 2310 FSL 2310 FEL
NMNM 109756	NMNM 107368	HH CE 30 P04	HH CE 30 Fed Com 10H	30	25S	27E	S30 O	S30 330 FSL 1650 FEL	S19 2310 FSL 1650 FEL
NMNM 109756	NMNM 107368	HH CE 30 P05	HH CE 30 Fed Com 11H	30	25S	27E	S30 P	S30 330 FSL 990 FEL	S19 2310 FSL 990 FEL
NMNM 109756	NMNM 107368	HH CE 30 P05	HH CE 30 Fed Com 12H	30	25S	27E	S30 P	S30 330 FSL 330 FEL	S19 2310 FSL 330 FEL

Leases		Proposed Pad[1]	Proposed Well	Section	Township	Range	SHL[1, 4]	First Take Point	BHL
NMNM 109756	---	HH CE 30 P02	HH CE 30 Fed Com 13H	30	25S	27E	S30 M	S30 330 FSL 330 FWL	S19 330 FNL 330 FWL
NMNM 109756	---	HH CE 30 P02	HH CE 30 Fed Com 14H	30	25S	27E	S30 M	S30 330 FSL 990 FWL	S19 330 FNL 990 FWL
NMNM 109756	---	HH CE 30 P03	HH CE 30 Fed Com 15H	30	25S	27E	S30 N	S30 330 FSL 1650 FWL	S19 330 FNL 1650 FWL
NMNM 109756	---	HH CE 30 P03	HH CE 30 Fed Com 16H	30	25S	27E	S30 N	S30 330 FSL 2310 FWL	S19 330 FNL 2310 FWL
NMNM 109756	NMNM 107368	HH CE 30 P04	HH CE 30 Fed Com 17H	30	25S	27E	S30 O	S30 330 FSL 2310 FEL	S30 2310 FSL 2310 FEL
NMNM 109756	NMNM 107368	HH CE 30 P04	HH CE 30 Fed Com 18H	30	25S	27E	S30 O	S30 330 FSL 1650 FEL	S30 2310 FSL 1650 FEL
NMNM 109756	NMNM 107368	HH CE 30 P05	HH CE 30 Fed Com 19H	30	25S	27E	S30 P	S30 330 FSL 990 FEL	S30 2310 FSL 990 FEL
NMNM 109756	NMNM 107368	HH CE 30 P05	HH CE 30 Fed Com 20H	30	25S	27E	S30 P	S30 330 FSL 330 FEL	S30 2310 FSL 330 FEL
NMNM 109756	---	HH CE 30 P06	HH CE 30 Fed Com 21H	30	25S	27E	S30 N	S30 330 FSL 330 FWL	S19 330 FNL 330 FWL
NMNM 109756	---	HH CE 30 P06	HH CE 30 Fed Com 22H	30	25S	27E	S30 N	S30 330 FSL 990 FWL	S19 330 FNL 990 FWL
NMNM 109756	---	HH CE 30 P06	HH CE 30 Fed Com 23H	30	25S	27E	S30 N	S30 330 FSL 1650 FWL	S19 330 FNL 1650 FWL
NMNM 109756	---	HH CE 30 P06	HH CE 30 Fed Com 24H	30	25S	27E	S30 N	S30 330 FSL 2310 FWL	S19 330 FNL 2310 FWL
NMNM 109756	NMNM 107368	HH CE 30 P07	HH CE 30 Fed Com 25H	30	25S	27E	S30 O	S30 330 FSL 2310 FEL	S30 2310 FSL 2310 FEL
NMNM 109756	NMNM 107368	HH CE 30 P07	HH CE 30 Fed Com 26H	30	25S	27E	S30 O	S30 330 FSL 1650 FEL	S30 2310 FSL 1650 FEL
NMNM 109756	NMNM 107368	HH CE 30 P07	HH CE 30 Fed Com 27H	30	25S	27E	S30 O	S30 330 FSL 990 FEL	S30 2310 FSL 990 FEL
NMNM 109756	NMNM 107368	HH CE 30 P07	HH CE 30 Fed Com 28H	30	25S	27E	S30 O	S30 330 FSL 330 FEL	S30 2310 FSL 330 FEL
NMNM 109756	---	HH CE 30 P08	HH CE 30 Fed 29H	30	25S	27E	S30 N	S30 330 FSL 660 FWL	S30 330 FNL 660 FWL
NMNM 109756	---	HH CE 30 P08	HH CE 30 Fed 30H	30	25S	27E	S30 N	S30 330 FSL 1980 FWL	S30 330 FNL 1980 FWL
NMNM 109756	NMNM 107368	HH CE 30 P08	HH CE 30 Fed Com 31H	30	25S	27E	S30 N	S30 330 FSL 1980 FEL	S19 2310 FSL 1980 FEL
NMNM 109756	NMNM 107368	HH CE 30 P08	HH CE 30 Fed Com 32H	30	25S	27E	S30 N	S30 330 FSL 660 FEL	S19 2310 FSL 660 FEL
NMNM 109756	---	HH CE 30 P09	HH CE 30 Fed 33H	30	25S	27E	S30 O	S30 330 FSL 660 FWL	S30 330 FNL 660 FWL
NMNM 109756	---	HH CE 30 P09	HH CE 30 Fed 34H	30	25S	27E	S30 O	S30 330 FSL 1980 FWL	S30 330 FNL 1980 FWL
NMNM 109756	NMNM 107368	HH CE 30 P09	HH CE 30 Fed Com 35H	30	25S	27E	S30 O	S30 330 FSL 1980 FEL	S19 2310 FSL 1980 FEL
NMNM 109756	NMNM 107368	HH CE 30 P09	HH CE 30 Fed Com 36H	30	25S	27E	S30 O	S30 330 FSL 660 FEL	S19 2310 FSL 660 FEL
NMNM 109756	---	HH CE 30 P10	HH CE 30 Fed 37H	30	25S	27E	S30 O	S30 330 FSL 660 FWL	S30 330 FNL 660 FWL
NMNM 109756	---	HH CE 30 P10	HH CE 30 Fed 38H	30	25S	27E	S30 O	S30 330 FSL 1980 FWL	S30 330 FNL 1980 FWL
NMNM 109756	NMNM 107368	HH CE 30 P10	HH CE 30 Fed Com 39H	30	25S	27E	S30 O	S30 330 FSL 1980 FEL	S19 2310 FSL 1980 FEL
NMNM 109756	NMNM 107368	HH CE 30 P10	HH CE 30 Fed Com 40H	30	25S	27E	S30 O	S30 330 FSL 660 FEL	S19 2310 FSL 660 FEL
NMNM 113954	---	HH CE 17 P01	HH CE 17 Fed 2H	17	25S	27E	S17 C	S17 330 FNL 1980 FWL	S17 330 FSL 1980 FWL
NMNM 113954	---	HH CE 17 P01	HH CE 17 Fed 3H	17	25S	27E	S17 C	S17 330 FNL 1980 FEL	S17 330 FSL 1980 FEL
NMNM 113954	---	HH CE 17 P01	HH CE 17 Fed 4H	17	25S	27E	S17 C	S17 330 FNL 660 FEL	S17 330 FSL 660 FEL
NMNM 113954	NMNM 130854/5, Fee[2]	HH CE 17 P02	HH CE 17 Fed Com 5H	17	25S	27E	S17 D	S17 330 FNL 330 FWL	S20 330 FSL 330 FWL
NMNM 113954	NMNM 130854/5, Fee[2]	HH CE 17 P02	HH CE 17 Fed Com 6H	17	25S	27E	S17 D	S17 330 FNL 990 FWL	S20 330 FSL 990 FWL
NMNM 113954	NMNM 130854/5	HH CE 17 P03	HH CE 17 Fed Com 7H	17	25S	27E	S17 C	S17 330 FNL 1650 FWL	S20 330 FSL 1650 FWL
NMNM 113954	NMNM 130854/5	HH CE 17 P03	HH CE 17 Fed Com 8H	17	25S	27E	S17 C	S17 330 FNL 2310 FWL	S20 330 FSL 2310 FWL
NMNM 113954	NMNM 130854/5, Fee[2]	HH CE 17 P04	HH CE 17 Fed Com 9H	17	25S	27E	S17 B	S17 330 FNL 2310 FEL	S20 330 FSL 2310 FEL
NMNM 113954	NMNM 130854/5, Fee[2]	HH CE 17 P04	HH CE 17 Fed Com 10H	17	25S	27E	S17 B	S17 330 FNL 1650 FEL	S20 330 FSL 1650 FEL
NMNM 113954	NMNM 130854/5, Fee[2]	HH CE 17 P05	HH CE 17 Fed Com 11H	17	25S	27E	S17 A	S17 330 FNL 990 FEL	S20 330 FSL 990 FEL
NMNM 113954	NMNM 130854/5, Fee[2]	HH CE 17 P05	HH CE 17 Fed Com 12H	17	25S	27E	S17 A	S17 330 FNL 330 FEL	S20 330 FSL 330 FEL

Leases		Proposed Pad[1]	Proposed Well	Section	Township	Range	SHL[1, 4]	First Take Point	BHL
NMNM 113954	NMNM 130854/5, Fee[2]	HH CE 17 P02	HH CE 17 Fed Com 13H	17	25S	27E	S17 D	S17 330 FNL 330 FWL	S20 330 FSL 330 FWL
NMNM 113954	NMNM 130854/5, Fee[2]	HH CE 17 P02	HH CE 17 Fed Com 14H	17	25S	27E	S17 D	S17 330 FNL 990 FWL	S20 330 FSL 990 FWL
NMNM 113954	NMNM 130854/5	HH CE 17 P03	HH CE 17 Fed Com 15H	17	25S	27E	S17 C	S17 330 FNL 1650 FWL	S20 330 FSL 1650 FWL
NMNM 113954	NMNM 130854/5	HH CE 17 P03	HH CE 17 Fed Com 16H	17	25S	27E	S17 C	S17 330 FNL 2310 FWL	S20 330 FSL 2310 FWL
NMNM 113954	NMNM 130854/5, Fee[2]	HH CE 17 P04	HH CE 17 Fed Com 17H	17	25S	27E	S17 B	S17 330 FNL 2310 FEL	S20 330 FSL 2310 FEL
NMNM 113954	NMNM 130854/5, Fee[2]	HH CE 17 P04	HH CE 17 Fed Com 18H	17	25S	27E	S17 B	S17 330 FNL 1650 FEL	S20 330 FSL 1650 FEL
NMNM 113954	NMNM 130854/5, Fee[2]	HH CE 17 P05	HH CE 17 Fed Com 19H	17	25S	27E	S17 A	S17 330 FNL 990 FEL	S20 330 FSL 990 FEL
NMNM 113954	NMNM 130854/5, Fee[2]	HH CE 17 P05	HH CE 17 Fed Com 20H	17	25S	27E	S17 A	S17 330 FNL 330 FEL	S20 330 FSL 330 FEL
NMNM 113954	NMNM 130854/5	HH CE 17 P06	HH CE 17 Fed Com 21H	17	25S	27E	S17 C	S17 330 FNL 330 FWL	S20 330 FSL 330 FWL
NMNM 113954	NMNM 130854/5	HH CE 17 P06	HH CE 17 Fed Com 22H	17	25S	27E	S17 C	S17 330 FNL 990 FWL	S20 330 FSL 990 FWL
NMNM 113954	NMNM 130854/5, Fee[2]	HH CE 17 P06	HH CE 17 Fed Com 23H	17	25S	27E	S17 C	S17 330 FNL 1650 FWL	S20 330 FSL 1650 FWL
NMNM 113954	NMNM 130854/5, Fee[2]	HH CE 17 P06	HH CE 17 Fed Com 24H	17	25S	27E	S17 C	S17 330 FNL 2310 FWL	S20 330 FSL 2310 FWL
NMNM 113954	NMNM 130854/5, Fee[2]	HH CE 17 P07	HH CE 17 Fed Com 25H	17	25S	27E	S17 B	S17 330 FNL 2310 FEL	S20 330 FSL 2310 FEL
NMNM 113954	NMNM 130854/5, Fee[2]	HH CE 17 P07	HH CE 17 Fed Com 26H	17	25S	27E	S17 B	S17 330 FNL 1650 FEL	S20 330 FSL 1650 FEL
NMNM 113954	NMNM 130854/5, Fee[2]	HH CE 17 P07	HH CE 17 Fed Com 27H	17	25S	27E	S17 B	S17 330 FNL 990 FEL	S20 330 FSL 990 FEL
NMNM 113954	NMNM 130854/5, Fee[2]	HH CE 17 P07	HH CE 17 Fed Com 28H	17	25S	27E	S17 B	S17 330 FNL 330 FEL	S20 330 FSL 330 FEL
NMNM 113954	---	HH CE 17 P08	HH CE 17 Fed 29H	17	25S	27E	S17 C	S17 330 FNL 660 FWL	S17 330 FSL 660 FWL
NMNM 113954	---	HH CE 17 P08	HH CE 17 Fed 30H	17	25S	27E	S17 C	S17 330 FNL 1980 FWL	S17 330 FSL 1980 FWL
NMNM 113954	---	HH CE 17 P08	HH CE 17 Fed 31H	17	25S	27E	S17 C	S17 330 FNL 1980 FEL	S17 330 FSL 1980 FEL
NMNM 113954	---	HH CE 17 P08	HH CE 17 Fed 32H	17	25S	27E	S17 C	S17 330 FNL 660 FEL	S17 330 FSL 660 FEL
NMNM 113954	---	HH CE 17 P09	HH CE 17 Fed 33H	17	25S	27E	S17 B	S17 330 FNL 660 FWL	S17 330 FSL 660 FWL
NMNM 113954	---	HH CE 17 P09	HH CE 17 Fed 34H	17	25S	27E	S17 B	S17 330 FNL 1980 FWL	S17 330 FSL 1980 FWL
NMNM 113954	---	HH CE 17 P09	HH CE 17 Fed 35H	17	25S	27E	S17 B	S17 330 FNL 1980 FEL	S17 330 FSL 1980 FEL
NMNM 113954	---	HH CE 17 P09	HH CE 17 Fed 36H	17	25S	27E	S17 B	S17 330 FNL 660 FEL	S17 330 FSL 660 FEL
NMNM 113954	---	HH CE 17 P10	HH CE 17 Fed 37H	17	25S	27E	S17 B	S17 330 FNL 660 FWL	S17 330 FSL 660 FWL
NMNM 113954	---	HH CE 17 P10	HH CE 17 Fed 38H	17	25S	27E	S17 B	S17 330 FNL 1980 FWL	S17 330 FSL 1980 FWL
NMNM 113954	---	HH CE 17 P10	HH CE 17 Fed 39H	17	25S	27E	S17 B	S17 330 FNL 1980 FEL	S17 330 FSL 1980 FEL
NMNM 113954	---	HH CE 17 P10	HH CE 17 Fed 40H	17	25S	27E	S17 B	S17 330 FNL 660 FEL	S17 330 FSL 660 FEL
NMNM 111530	---	HH CE 18 P01	HH CE 18 Fed 3H	18	25S	27E	S18 B	S18 330 FNL 1980 FEL	S18 330 FSL 1980 FEL
NMNM 111530	NMNM 107368	HH CE 18 P04	HH CE 18 Fed Com 9H	18	25S	27E	S07 O	S18 330 FNL 2310 FEL	S19 2310 FNL 2310 FEL
NMNM 111530	NMNM 107368	HH CE 18 P04	HH CE 18 Fed Com 10H	18	25S	27E	S07 O	S18 330 FNL 1650 FEL	S19 2310 FNL 1650 FEL
NMNM 111530	NMNM 107368	HH CE 18 P05	HH CE 18 Fed Com 11H	18	25S	27E	S07 P	S18 330 FNL 990 FEL	S19 2310 FNL 990 FEL
NMNM 111530	NMNM 107368	HH CE 18 P05	HH CE 18 Fed Com 12H	18	25S	27E	S07 P	S18 330 FNL 330 FEL	S19 2310 FNL 330 FEL
NMNM 111530	NMNM 107368	HH CE 18 P04	HH CE 18 Fed Com 17H	18	25S	27E	S07 O	S18 330 FNL 2310 FEL	S19 2310 FNL 2310 FEL
NMNM 111530	NMNM 107368	HH CE 18 P04	HH CE 18 Fed Com 18H	18	25S	27E	S07 O	S18 330 FNL 1650 FEL	S19 2310 FNL 1650 FEL
NMNM 111530	NMNM 107368	HH CE 18 P05	HH CE 18 Fed Com 19H	18	25S	27E	S07 P	S18 330 FNL 990 FEL	S19 2310 FNL 990 FEL
NMNM 111530	NMNM 107368	HH CE 18 P05	HH CE 18 Fed Com 20H	18	25S	27E	S07 P	S18 330 FNL 330 FEL	S19 2310 FNL 330 FEL
NMNM 111530	NMNM 107368	HH CE 18 P07	HH CE 18 Fed Com 25H	18	25S	27E	S07 O	S18 330 FNL 2310 FEL	S19 2310 FNL 2310 FEL

Leases		Proposed Pad[1]	Proposed Well	Section	Township	Range	SHL[1, 4]	First Take Point	BHL
NMNM 111530	NMNM 107368	HH CE 18 P07	HH CE 18 Fed Com 26H	18	25S	27E	S07 O	S18 330 FNL 1650 FEL	S19 2310 FNL 1650 FEL
NMNM 111530	NMNM 107368	HH CE 18 P07	HH CE 18 Fed Com 27H	18	25S	27E	S07 O	S18 330 FNL 990 FEL	S19 2310 FNL 990 FEL
NMNM 111530	NMNM 107368	HH CE 18 P07	HH CE 18 Fed Com 28H	18	25S	27E	S07 O	S18 330 FNL 330 FEL	S19 2310 FNL 330 FEL
NMNM 111530	---	HH CE 18 P01	HH CE 18 Fed 31H	18	25S	27E	S18 B	S18 330 FNL 1980 FEL	S18 330 FSL 1980 FEL
NMNM 111530	---	HH CE 18 P01	HH CE 18 Fed 32H	18	25S	27E	S18 B	S18 330 FNL 660 FEL	S18 330 FSL 660 FEL
NMNM 111530	---	HH CE 18 P08	HH CE 18 Fed 35H	18	25S	27E	S18 A	S18 330 FNL 1980 FEL	S18 330 FSL 1980 FEL
NMNM 111530	---	HH CE 18 P08	HH CE 18 Fed 36H	18	25S	27E	S18 A	S18 330 FNL 660 FEL	S18 330 FSL 660 FEL
NMNM 111530	---	HH CE 18 P08	HH CE 18 Fed 39H	18	25S	27E	S18 A	S18 330 FNL 1980 FEL	S18 330 FSL 1980 FEL
NMNM 111530	---	HH CE 18 P08	HH CE 18 Fed 40H	18	25S	27E	S18 A	S18 330 FNL 660 FEL	S18 330 FSL 660 FEL
NMNM 107369	VB 0673, Fee[2]	HH CE 16 P02	HH CE 16 Fed Com 5H	16	25S	27E	S09 M	S16 330 FNL 330 FWL	S21 330 FSL 330 FWL
NMNM 107369	VB 0673, Fee[2]	HH CE 16 P02	HH CE 16 Fed Com 6H	16	25S	27E	S09 M	S16 330 FNL 990 FWL	S21 330 FSL 990 FWL
NMNM 107369	VB 0673, Fee[2]	HH CE 16 P03	HH CE 16 Fed Com 7H	16	25S	27E	S09 N	S16 330 FNL 1650 FWL	S21 330 FSL 1650 FWL
NMNM 107369	VB 0673, Fee[2]	HH CE 16 P03	HH CE 16 Fed Com 8H	16	25S	27E	S09 N	S16 330 FNL 2310 FWL	S21 330 FSL 2310 FWL
NMNM 107369	VB 0673, Fee[2]	HH CE 16 P04	HH CE 16 Fed Com 9H	16	25S	27E	S09 O	S16 330 FNL 2310 FEL	S21 330 FSL 2310 FEL
NMNM 107369	VB 0673, Fee[2]	HH CE 16 P04	HH CE 16 Fed Com 10H	16	25S	27E	S09 O	S16 330 FNL 1650 FEL	S21 330 FSL 1650 FEL
NMNM 107369	VB 0673, Fee[2]	HH CE 16 P05	HH CE 16 Fed Com 11H	16	25S	27E	S09 P	S16 330 FNL 990 FEL	S21 330 FSL 990 FEL
NMNM 107369	VB 0673, Fee[2]	HH CE 16 P05	HH CE 16 Fed Com 12H	16	25S	27E	S09 P	S16 330 FNL 330 FEL	S21 330 FSL 330 FEL
NMNM 107369	VB 0673, Fee[2]	HH CE 16 P02	HH CE 16 Fed Com 13H	16	25S	27E	S09 M	S16 330 FNL 330 FWL	S21 330 FSL 330 FWL
NMNM 107369	VB 0673, Fee[2]	HH CE 16 P02	HH CE 16 Fed Com 14H	16	25S	27E	S09 M	S16 330 FNL 990 FWL	S21 330 FSL 990 FWL
NMNM 107369	VB 0673, Fee[2]	HH CE 16 P03	HH CE 16 Fed Com 15H	16	25S	27E	S09 N	S16 330 FNL 1650 FWL	S21 330 FSL 1650 FWL
NMNM 107369	VB 0673, Fee[2]	HH CE 16 P03	HH CE 16 Fed Com 16H	16	25S	27E	S09 N	S16 330 FNL 2310 FWL	S21 330 FSL 2310 FWL
NMNM 107369	VB 0673, Fee[2]	HH CE 16 P04	HH CE 16 Fed Com 17H	16	25S	27E	S09 O	S16 330 FNL 2310 FEL	S21 330 FSL 2310 FEL
NMNM 107369	VB 0673, Fee[2]	HH CE 16 P04	HH CE 16 Fed Com 18H	16	25S	27E	S09 O	S16 330 FNL 1650 FEL	S21 330 FSL 1650 FEL
NMNM 107369	VB 0673, Fee[2]	HH CE 16 P05	HH CE 16 Fed Com 19H	16	25S	27E	S09 P	S16 330 FNL 990 FEL	S21 330 FSL 990 FEL
NMNM 107369	VB 0673, Fee[2]	HH CE 16 P05	HH CE 16 Fed Com 20H	16	25S	27E	S09 P	S16 330 FNL 330 FEL	S21 330 FSL 330 FEL
NMNM 107369	VB 0673, Fee[2]	HH CE 16 P06	HH CE 16 Fed Com 21H	16	25S	27E	S09 M	S16 330 FNL 330 FWL	S21 330 FSL 330 FWL
NMNM 107369	VB 0673, Fee[2]	HH CE 16 P06	HH CE 16 Fed Com 22H	16	25S	27E	S09 M	S16 330 FNL 990 FWL	S21 330 FSL 990 FWL
NMNM 107369	VB 0673, Fee[2]	HH CE 16 P06	HH CE 16 Fed Com 23H	16	25S	27E	S09 M	S16 330 FNL 1650 FWL	S21 330 FSL 1650 FWL
NMNM 107369	VB 0673, Fee[2]	HH CE 16 P06	HH CE 16 Fed Com 24H	16	25S	27E	S09 M	S16 330 FNL 2310 FWL	S21 330 FSL 2310 FWL
NMNM 107369	VB 0673, Fee[2]	HH CE 16 P07	HH CE 16 Fed Com 25H	16	25S	27E	S09 P	S16 330 FNL 2310 FEL	S21 330 FSL 2310 FEL
NMNM 107369	VB 0673, Fee[2]	HH CE 16 P07	HH CE 16 Fed Com 26H	16	25S	27E	S09 P	S16 330 FNL 1650 FEL	S21 330 FSL 1650 FEL
NMNM 107369	VB 0673, Fee[2]	HH CE 16 P07	HH CE 16 Fed Com 27H	16	25S	27E	S09 P	S16 330 FNL 990 FEL	S21 330 FSL 990 FEL
NMNM 107369	VB 0673, Fee[2]	HH CE 16 P07	HH CE 16 Fed Com 28H	16	25S	27E	S09 P	S16 330 FNL 330 FEL	S21 330 FSL 330 FEL
NMNM 107369	VB 0673, Fee[2]	HH CE 16 P08	HH CE 16 Fed Com 29H	16	25S	27E	S16 C	S16 330 FNL 660 FWL	S21 330 FSL 660 FWL
NMNM 107369	VB 0673, Fee[2]	HH CE 16 P08	HH CE 16 Fed Com 30H	16	25S	27E	S16 C	S16 330 FNL 1980 FWL	S21 330 FSL 1980 FWL
NMNM 107369	VB 0673, Fee[2]	HH CE 16 P08	HH CE 16 Fed Com 31H	16	25S	27E	S16 C	S16 330 FNL 1980 FEL	S21 330 FSL 1980 FEL
NMNM 107369	VB 0673, Fee[2]	HH CE 16 P08	HH CE 16 Fed Com 32H	16	25S	27E	S16 C	S16 330 FNL 660 FEL	S21 330 FSL 660 FEL
NMNM 107369	VB 0673, Fee[2]	HH CE 16 P09	HH CE 16 Fed Com 33H	16	25S	27E	S16 C	S16 330 FNL 660 FWL	S21 330 FSL 660 FWL
NMNM 107369	VB 0673, Fee[2]	HH CE 16 P09	HH CE 16 Fed Com 34H	16	25S	27E	S16 C	S16 330 FNL 1980 FWL	S21 330 FSL 1980 FWL
NMNM 107369	VB 0673, Fee[2]	HH CE 16 P09	HH CE 16 Fed Com 35H	16	25S	27E	S16 C	S16 330 FNL 1980 FEL	S21 330 FSL 1980 FEL

Leases		Proposed Pad[1]	Proposed Well	Section	Township	Range	SHL[1, 4]	First Take Point	BHL
NMNM 107369	VB 0673, Fee[2]	HH CE 16 P09	HH CE 16 Fed Com 36H	16	25S	27E	S16 C	S16 330 FNL 660 FEL	S21 330 FSL 660 FEL
NMNM 107369	VB 0673, Fee[2]	HH CE 16 P10	HH CE 16 Fed Com 37H	16	25S	27E	S16 B	S16 330 FNL 660 FWL	S21 330 FSL 660 FWL
NMNM 107369	VB 0673, Fee[2]	HH CE 16 P10	HH CE 16 Fed Com 38H	16	25S	27E	S16 B	S16 330 FNL 1980 FWL	S21 330 FSL 1980 FWL
NMNM 107369	VB 0673, Fee[2]	HH CE 16 P10	HH CE 16 Fed Com 39H	16	25S	27E	S16 B	S16 330 FNL 1980 FEL	S21 330 FSL 1980 FEL
NMNM 107369	VB 0673, Fee[2]	HH CE 16 P10	HH CE 16 Fed Com 40H	16	25S	27E	S16 B	S16 330 FNL 660 FEL	S21 330 FSL 660 FEL
NMNM 120350	---	HH SO 12 P01	HH SO 1 Fed 1H	1	26S	27E	S12 F	S12 2590 FNL 660 FWL	S1 330 FNL 660 FWL
NMNM 120350	---	HH SO 12 P01	HH SO 1 Fed 2H	1	26S	27E	S12 F	S12 2590 FNL 1980 FWL	S1 330 FNL 1980 FWL
NMNM 116028	---	HH SO 12 P02	HH SO 1 Fed 3H	1	26S	27E	S12 K	S12 2590 FNL 1980 FEL	S1 330 FNL 1980 FEL
NMNM 116028	NMNM 120350	HH SO 12 P02	HH SO 1 Fed Com 4H	1	26S	27E	S12 K	S12 2590 FNL 660 FEL	S1 330 FNL 660 FEL
NMNM 120350	---	HH SO 12 P03	HH SO 1 Fed 5H	1	26S	27E	S12 E	S12 2590 FNL 2590 FWL	S1 330 FNL 330 FWL
NMNM 120350	---	HH SO 12 P04	HH SO 1 Fed 6H	1	26S	27E	S12 L	S12 2590 FNL 990 FWL	S1 330 FNL 990 FWL
NMNM 120350	---	HH SO 12 P05	HH SO 1 Fed 7H	1	26S	27E	S12 F	S12 2590 FNL 1650 FWL	S1 330 FNL 1650 FWL
NMNM 120350	---	HH SO 12 P06	HH SO 1 Fed 8H	1	26S	27E	S12 K	S12 2590 FNL 2310 FWL	S1 330 FNL 2310 FWL
NMNM 116028	---	HH SO 12 P07	HH SO 1 Fed 9H	1	26S	27E	S12 G	S12 2590 FNL 2310 FEL	S1 330 FNL 2310 FEL
NMNM 116028	---	HH SO 12 P08	HH SO 1 Fed 10H	1	26S	27E	S12 J	S12 2590 FNL 1650 FEL	S1 330 FNL 1650 FEL
NMNM 116028	NMNM 120350	HH SO 12 P09	HH SO 1 Fed Com 11H	1	26S	27E	S12 H	S12 2590 FNL 990 FEL	S1 330 FNL 990 FEL
NMNM 116028	NMNM 120350	HH SO 12 P10	HH SO 1 Fed Com 12H	1	26S	27E	S12 I	S12 2590 FNL 2590 FEL	S1 330 FNL 330 FEL
NMNM 120350	---	HH SO 12 P03	HH SO 1 Fed 13H	1	26S	27E	S12 E	S12 2590 FNL 2590 FWL	S1 330 FNL 330 FWL
NMNM 120350	---	HH SO 12 P04	HH SO 1 Fed 14H	1	26S	27E	S12 L	S12 2590 FNL 990 FWL	S1 330 FNL 990 FWL
NMNM 120350	---	HH SO 12 P05	HH SO 1 Fed 15H	1	26S	27E	S12 F	S12 2590 FNL 1650 FWL	S1 330 FNL 1650 FWL
NMNM 120350	---	HH SO 12 P06	HH SO 1 Fed 16H	1	26S	27E	S12 K	S12 2590 FNL 2310 FWL	S1 330 FNL 2310 FWL
NMNM 116028	---	HH SO 12 P07	HH SO 1 Fed 17H	1	26S	27E	S12 G	S12 2590 FNL 2310 FEL	S1 330 FNL 2310 FEL
NMNM 116028	---	HH SO 12 P08	HH SO 1 Fed 18H	1	26S	27E	S12 J	S12 2590 FNL 1650 FEL	S1 330 FNL 1650 FEL
NMNM 116028	NMNM 120350	HH SO 12 P09	HH SO 1 Fed Com 19H	1	26S	27E	S12 H	S12 2590 FNL 990 FEL	S1 330 FNL 990 FEL
NMNM 116028	NMNM 120350	HH SO 12 P10	HH SO 1 Fed Com 20H	1	26S	27E	S12 I	S12 2590 FNL 2590 FEL	S1 330 FNL 330 FEL
NMNM 120350	---	HH SO 12 P11	HH SO 1 Fed 21H	1	26S	27E	S12 E	S12 2590 FNL 2590 FWL	S1 330 FNL 330 FWL
NMNM 120350	---	HH SO 12 P11	HH SO 1 Fed 22H	1	26S	27E	S12 E	S12 2590 FNL 990 FWL	S1 330 FNL 990 FWL
NMNM 120350	---	HH SO 12 P12	HH SO 1 Fed 23H	1	26S	27E	S12 K	S12 2590 FNL 1650 FWL	S1 330 FNL 1650 FWL
NMNM 120350	---	HH SO 12 P12	HH SO 1 Fed 24H	1	26S	27E	S12 K	S12 2590 FNL 2310 FWL	S1 330 FNL 2310 FWL
NMNM 116028	---	HH SO 12 P13	HH SO 1 Fed 25H	1	26S	27E	S12 H	S12 2590 FNL 2310 FEL	S1 330 FNL 2310 FEL
NMNM 116028	---	HH SO 12 P13	HH SO 1 Fed 26H	1	26S	27E	S12 H	S12 2590 FNL 1650 FEL	S1 330 FNL 1650 FEL
NMNM 116028	NMNM 120350	HH SO 12 P14	HH SO 1 Fed Com 27H	1	26S	27E	S12 I	S12 2590 FNL 990 FEL	S1 330 FNL 990 FEL
NMNM 116028	NMNM 120350	HH SO 12 P14	HH SO 1 Fed Com 28H	1	26S	27E	S12 I	S12 2590 FNL 2590 FEL	S1 330 FNL 330 FEL
NMNM 120350	---	HH SO 12 P15	HH SO 1 Fed 29H	1	26S	27E	S12 G	S12 2590 FNL 660 FWL	S1 330 FNL 660 FWL
NMNM 120350	---	HH SO 12 P15	HH SO 1 Fed 30H	1	26S	27E	S12 G	S12 2590 FNL 1980 FWL	S1 330 FNL 1980 FWL
NMNM 116028	---	HH SO 12 P16	HH SO 1 Fed 31H	1	26S	27E	S12 J	S12 2590 FNL 1980 FEL	S1 330 FNL 1980 FEL
NMNM 116028	NMNM 120350	HH SO 12 P16	HH SO 1 Fed Com 32H	1	26S	27E	S12 J	S12 2590 FNL 660 FEL	S1 330 FNL 660 FEL
NMNM 120350	---	HH SO 12 P17	HH SO 1 Fed 33H	1	26S	27E	S12 G	S12 330 FSL 660 FWL	S1 330 FNL 660 FWL
NMNM 120350	---	HH SO 12 P17	HH SO 1 Fed 34H	1	26S	27E	S12 G	S12 2590 FNL 1980 FWL	S1 330 FNL 1980 FWL

Leases		Proposed Pad[1]	Proposed Well	Section	Township	Range	SHL[1, 4]	First Take Point	BHL
NMNM 116028	---	HH SO 12 P18	HH SO 1 Fed 35H	1	26S	27E	S12 J	S12 2590 FNL 1980 FEL	S1 330 FNL 1980 FEL
NMNM 116028	NMNM 120350	HH SO 12 P18	HH SO 1 Fed Com 36H	1	26S	27E	S12 J	S12 2590 FNL 660 FEL	S1 330 FNL 660 FEL
NMNM 120350	---	HH SO 12 P19	HH SO 1 Fed 37H	1	26S	27E	S12 G	S12 2590 FNL 660 FWL	S1 330 FNL 660 FWL
NMNM 120350	---	HH SO 12 P19	HH SO 1 Fed 38H	1	26S	27E	S12 G	S12 2590 FNL 1980 FWL	S1 330 FNL 1980 FWL
NMNM 116028	---	HH SO 12 P20	HH SO 1 Fed 39H	1	26S	27E	S12 J	S12 2590 FNL 1980 FEL	S1 330 FNL 1980 FEL
NMNM 116028	NMNM 120350[3]	HH SO 12 P20	HH SO 1 Fed Com 40H	1	26S	27E	S12 J	S12 2590 FNL 660 FEL	S1 330 FNL 660 FEL
NMNM 116028	NMNM 120350	HH SO 12 P01	HH SO 13 Fed Com 1H	13	26S	27E	S12 F	S12 2590 FSL 660 FWL	S13 330 FSL 660 FWL
NMNM 116028	NMNM 120350	HH SO 12 P01	HH SO 13 Fed Com 2H	13	26S	27E	S12 F	S12 2590 FSL 1980 FWL	S13 330 FSL 1980 FWL
NMNM 116028	NMNM 120350	HH SO 12 P02	HH SO 13 Fed Com 3H	13	26S	27E	S12 K	S12 2590 FSL 1980 FEL	S13 330 FSL 1980 FEL
NMNM 116028	NMNM 120350	HH SO 12 P02	HH SO 13 Fed Com 4H	13	26S	27E	S12 K	S12 2590 FSL 660 FEL	S13 330 FSL 660 FEL
NMNM 116028	NMNM 120350	HH SO 12 P03	HH SO 13 Fed Com 5H	13	26S	27E	S12 E	S12 2590 FSL 2590 FWL	S13 330 FSL 330 FWL
NMNM 116028	NMNM 120350	HH SO 12 P04	HH SO 13 Fed Com 6H	13	26S	27E	S12 L	S12 2590 FSL 990 FWL	S13 330 FSL 990 FWL
NMNM 116028	NMNM 120350	HH SO 12 P05	HH SO 13 Fed Com 7H	13	26S	27E	S12 F	S12 2590 FSL 1650 FWL	S13 330 FSL 1650 FWL
NMNM 116028	NMNM 120350	HH SO 12 P06	HH SO 13 Fed Com 8H	13	26S	27E	S12 K	S12 2590 FSL 2310 FWL	S13 330 FSL 2310 FWL
NMNM 116028	NMNM 120350	HH SO 12 P07	HH SO 13 Fed Com 9H	13	26S	27E	S12 G	S12 2590 FSL 2310 FEL	S13 330 FSL 2310 FEL
NMNM 116028	NMNM 120350	HH SO 12 P08	HH SO 13 Fed Com 10H	13	26S	27E	S12 J	S12 2590 FSL 1650 FEL	S13 330 FSL 1650 FEL
NMNM 116028	NMNM 120350	HH SO 12 P09	HH SO 13 Fed Com 11H	13	26S	27E	S12 H	S12 2590 FSL 990 FEL	S13 330 FSL 990 FEL
NMNM 116028	NMNM 120350	HH SO 12 P10	HH SO 13 Fed Com 12H	13	26S	27E	S12 I	S12 2590 FSL 2590 FEL	S13 330 FSL 330 FEL
NMNM 116028	NMNM 120350	HH SO 12 P03	HH SO 13 Fed Com 13H	13	26S	27E	S12 E	S12 2590 FSL 2590 FWL	S13 330 FSL 330 FWL
NMNM 116028	NMNM 120350	HH SO 12 P04	HH SO 13 Fed Com 14H	13	26S	27E	S12 L	S12 2590 FSL 990 FWL	S13 330 FSL 990 FWL
NMNM 116028	NMNM 120350	HH SO 12 P05	HH SO 13 Fed Com 15H	13	26S	27E	S12 F	S12 2590 FSL 1650 FWL	S13 330 FSL 1650 FWL
NMNM 116028	NMNM 120350	HH SO 12 P06	HH SO 13 Fed Com 16H	13	26S	27E	S12 K	S12 2590 FSL 2310 FWL	S13 330 FSL 2310 FWL
NMNM 116028	NMNM 120350	HH SO 12 P07	HH SO 13 Fed Com 17H	13	26S	27E	S12 G	S12 2590 FSL 2310 FEL	S13 330 FSL 2310 FEL
NMNM 116028	NMNM 120350	HH SO 12 P08	HH SO 13 Fed Com 18H	13	26S	27E	S12 J	S12 2590 FSL 1650 FEL	S13 330 FSL 1650 FEL
NMNM 116028	NMNM 120350	HH SO 12 P09	HH SO 13 Fed Com 19H	13	26S	27E	S12 H	S12 2590 FSL 990 FEL	S13 330 FSL 990 FEL
NMNM 116028	NMNM 120350	HH SO 12 P10	HH SO 13 Fed Com 20H	13	26S	27E	S12 I	S12 2590 FSL 2590 FEL	S13 330 FSL 330 FEL
NMNM 116028	NMNM 120350	HH SO 12 P11	HH SO 13 Fed Com 21H	13	26S	27E	S12 E	S12 2590 FSL 2590 FWL	S13 330 FSL 330 FWL
NMNM 116028	NMNM 120350	HH SO 12 P11	HH SO 13 Fed Com 22H	13	26S	27E	S12 E	S12 2590 FSL 990 FWL	S13 330 FSL 990 FWL
NMNM 116028	NMNM 120350	HH SO 12 P12	HH SO 13 Fed Com 23H	13	26S	27E	S12 K	S12 2590 FSL 1650 FWL	S13 330 FSL 1650 FWL
NMNM 116028	NMNM 120350	HH SO 12 P12	HH SO 13 Fed Com 24H	13	26S	27E	S12 K	S12 2590 FSL 2310 FWL	S13 330 FSL 2310 FWL
NMNM 116028	NMNM 120350	HH SO 12 P13	HH SO 13 Fed Com 25H	13	26S	27E	S12 H	S12 2590 FSL 2310 FEL	S13 330 FSL 2310 FEL
NMNM 116028	NMNM 120350	HH SO 12 P13	HH SO 13 Fed Com 26H	13	26S	27E	S12 H	S12 2590 FSL 1650 FEL	S13 330 FSL 1650 FEL
NMNM 116028	NMNM 120350	HH SO 12 P14	HH SO 13 Fed Com 27H	13	26S	27E	S12 I	S12 2590 FSL 990 FEL	S13 330 FSL 990 FEL
NMNM 116028	NMNM 120350	HH SO 12 P14	HH SO 13 Fed Com 28H	13	26S	27E	S12 I	S12 2590 FSL 2590 FEL	S13 330 FSL 330 FEL
NMNM 116028	NMNM 120350	HH SO 12 P15	HH SO 13 Fed Com 29H	13	26S	27E	S12 G	S12 2590 FSL 660 FWL	S13 330 FSL 660 FWL
NMNM 116028	NMNM 120350	HH SO 12 P15	HH SO 13 Fed Com 30H	13	26S	27E	S12 G	S12 2590 FSL 1980 FWL	S13 330 FSL 1980 FWL
NMNM 116028	NMNM 120350	HH SO 12 P16	HH SO 13 Fed Com 31H	13	26S	27E	S12 J	S12 2590 FSL 1980 FEL	S13 330 FSL 1980 FEL
NMNM 116028	NMNM 120350	HH SO 12 P16	HH SO 13 Fed Com 32H	13	26S	27E	S12 J	S12 2590 FSL 660 FEL	S13 330 FSL 660 FEL

Leases		Proposed Pad[1]	Proposed Well	Section	Township	Range	SHL[1, 4]	First Take Point	BHL
NMNM 116028	NMNM 120350	HH SO 12 P17	HH SO 13 Fed Com 33H	13	26S	27E	S12 G	S12 330 FSL 660 FWL	S13 330 FSL 660 FWL
NMNM 116028	NMNM 120350	HH SO 12 P17	HH SO 13 Fed Com 34H	13	26S	27E	S12 G	S12 2590 FSL 1980 FWL	S13 330 FSL 1980 FWL
NMNM 116028	NMNM 120350	HH SO 12 P18	HH SO 13 Fed Com 35H	13	26S	27E	S12 J	S12 2590 FSL 1980 FEL	S13 330 FSL 1980 FEL
NMNM 116028	NMNM 120350	HH SO 12 P18	HH SO 13 Fed Com 36H	13	26S	27E	S12 J	S12 2590 FSL 660 FEL	S13 330 FSL 660 FEL
NMNM 116028	NMNM 120350	HH SO 12 P19	HH SO 13 Fed Com 37H	13	26S	27E	S12 G	S12 2590 FSL 660 FWL	S13 330 FSL 660 FWL
NMNM 116028	NMNM 120350	HH SO 12 P19	HH SO 13 Fed Com 38H	13	26S	27E	S12 G	S12 2590 FSL 1980 FWL	S13 330 FSL 1980 FWL
NMNM 116028	NMNM 120350	HH SO 12 P20	HH SO 13 Fed Com 39H	13	26S	27E	S12 J	S12 2590 FSL 1980 FEL	S13 330 FSL 1980 FEL
NMNM 116028	NMNM 120350	HH SO 12 P20	HH SO 13 Fed Com 40H	13	26S	27E	S12 J	S12 2590 FSL 660 FEL	S13 330 FSL 660 FEL
VB 1805	---	N/A	HH SO 02 NM SWD 1H[4]	2	26S	27E	S02 N	N/A	N/A
VB 7320	---	N/A	HH CE 16 NM SWD 1H[4]	16	25S	27E	S16 F	N/A	N/A
VB 0734	---	N/A	HH CE 26 NM SWD 1H[4]	26	25S	27E	S26 P	N/A	N/A
VB XXXX	---	N/A	HH SO 12 NM SWD 1H[4]	12	26S	27E	S12 L	N/A	N/A
VB 1805	---	N/A	HH SO 02 NM SWD 2H[4]	2	26S	27E	S02 P	N/A	N/A

Notes:

1: The proposed pads and SHLs included in this well list are for illustrative purposes only; Chevron submits this proposed action with the reasonable expectation that it will have the flexibility relocate well pads within the NEPA “drill island” corridors without the necessity of revising the MDP.

2: A number of leases are included under each “Fee” designation, the details of which have not been included in the Master Development Plan.

3. All wells proposed in S13-T26S-R27E depend on a future lease auction of the NW/4, N/2 of NE/4, and NE/4 of NE/4 of S13.

4: All of the proposed wells listed are horizontal oil wells with the exception of the salt water disposal wells, which are vertical disposal wells

Appendix B: Lease Stipulation Table

SECTION	LEASE NAME	ROYALTY RATE	Special Cultural Resource Lease	Potential Cave or Karst Occurrence Area	Slopes or Fragile Soils	Streams, Rivers, and Floodplains	Caves and Karst	Raptor Nests and Heronries	Playas and Alkali Lakes	Springs, Seeps, and Tanks	Plan of Development Stipulation	Reclamation
25S-27E												
17	NMNM 113954	0.125	X	X	X	X	X					
18	NMNM 111530	0.125		X		X						
20	NMNM 130854	0.125	X	X	Note 1	Note 2	Note 3	X		Note 4	X	The following well to be plugged and reclaimed: Cottonwood Draw U #1
20	NMNM 130855	0.125	X	X	Note 1	Note 2	Note 3	X		Note 4	X	
21, 26, 35	NMNM 107369	0.125				SW/4NW/4NW/4, NW/4NW/4SW/4						
19, 30	NMNM 107368	0.125				N/2NE/4 -Sec 30; S/2SE/4 -Sec 19						
19, 30	NMNM 109756	0.125			Note 1	Lot 4- Sec 19, Note 2						
35	NMNM 114968	0.125	X		Note 1							
26S-27E												
1, 12	NMNM 116028	0.125	X	X	Note 1			X	X			
1, 12, 13	NMNM 120350	0.125	X	X	Note 1	Note 2						
5, 8	NMNM 118108	0.125	X	X	Note 1	Note 2	Note 3					
10, 11, 14, 15	NMNM 121473	0.125	X	X	Note 1		Note 3			Note 4	X	X

Notes:

1. No surface disturbance on slopes >30%
2. No surface disturbance w/in up to 200m of the outer edge of 100-year floodplains, exceptions exist
3. No surface disturbance w/in up to 200m of known cave entrances
4. No surface disturbance w/in up to 200m of the source of a spring or seep, or w/in downstream riparian areas created by flows from the source of resulting from riparian area mgmt.; or earthen tanks or the adjacent riparian areas created as a result of the presence of the tanks

Figure D1 Well pad schematic with rig layout cannot be made Section 508 compliant. For help with its data or information, please contact the BLM Idaho State Office Webmaster at 208-373-4000. No warranty is made by the Bureau of Land Management. The accuracy, reliability, or completeness of this data for individual use or aggregate use with other data is not guaranteed.

Appendix C: Well Pad Schematics

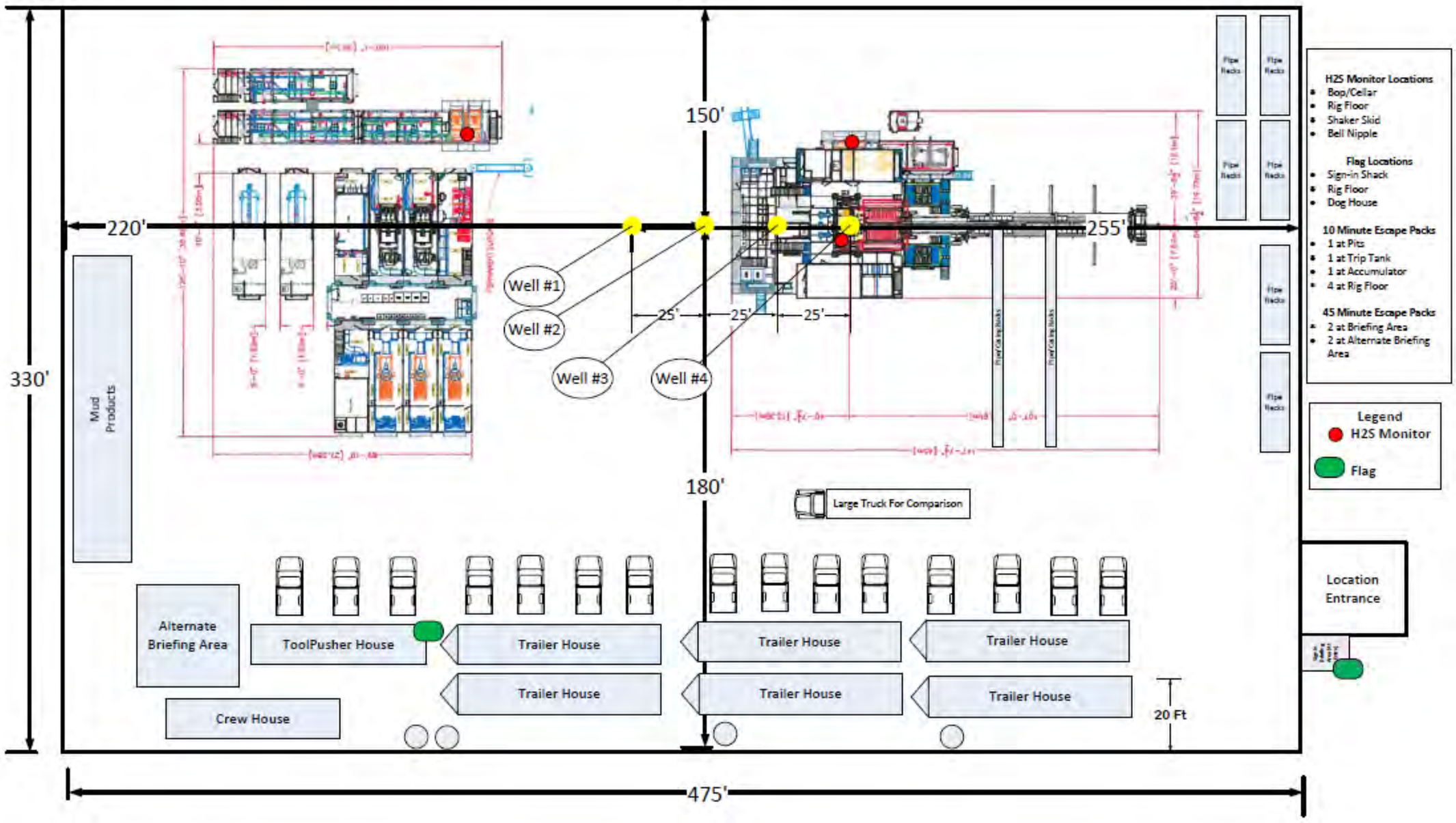


Figure D.1: Well pad schematic with rig layout

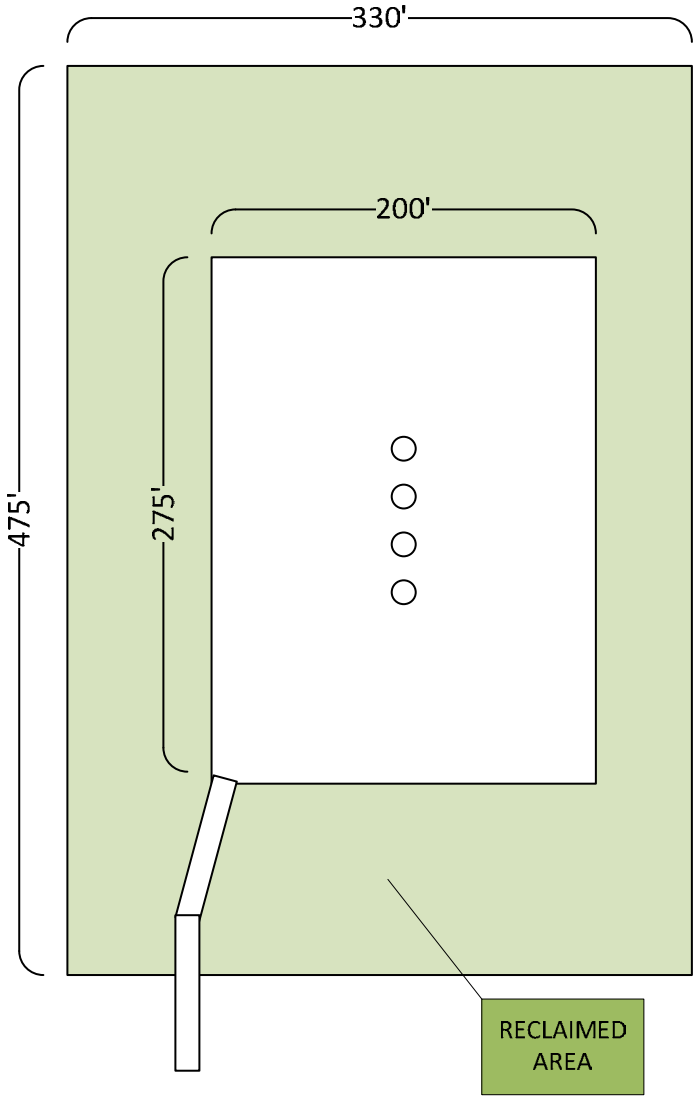


Figure C.2: Interim reclamation schematic of well pad

Figure C2 Interim reclamation schematic of well pad cannot be made Section 508 compliant. For help with its data or information, please contact the BLM Idaho State Office Webmaster at 208-373-4000. No warranty is made by the Bureau of Land Management. The accuracy, reliability, or completeness of this data for individual use or aggregate use with other data is not guaranteed.

APPENDIX D: Source Water Well Detailed Information

Table E1: Source Water Well Detailed Information

Source	Vendor	Latitude	Longitude	Data Quality
Ground Water	Gregory Rockhouse Ranch, Inc	32° 12’ 6.92” N	104° 15’ 15.54” W	Exact
Ground Water	Gregory Rockhouse Ranch, Inc	32° 10’ 17.39” N	104° 16’ 35.76” W	Exact
Ground Water	Gregory Rockhouse Ranch, Inc	32° 12’ 13.95” N	104° 14’ 49.47” W	Exact
Ground Water	Gregory Rockhouse Ranch, Inc	32° 10’ 52.89” N	104° 17’ 38.43” W	Exact
Ground Water	MMX Excavating, Inc	TBD	TBD	TBD
Capitan Reef	Chevron U.S.A. Inc	31° 58’ 23.81” N	103° 12’ 52.12” W	Approximate

Figure E1 Map of Surface Tenants cannot be made Section 508 compliant. For help with its data or information, please contact the BLM Idaho State Office Webmaster at 208-373-4000. No warranty is made by the Bureau of Land Management. The accuracy, reliability, or completeness of this data for individual use or aggregate use with other data is not guaranteed.

APPENDIX E: Map of Surface Tenants with Allotments Overlapping the HDA

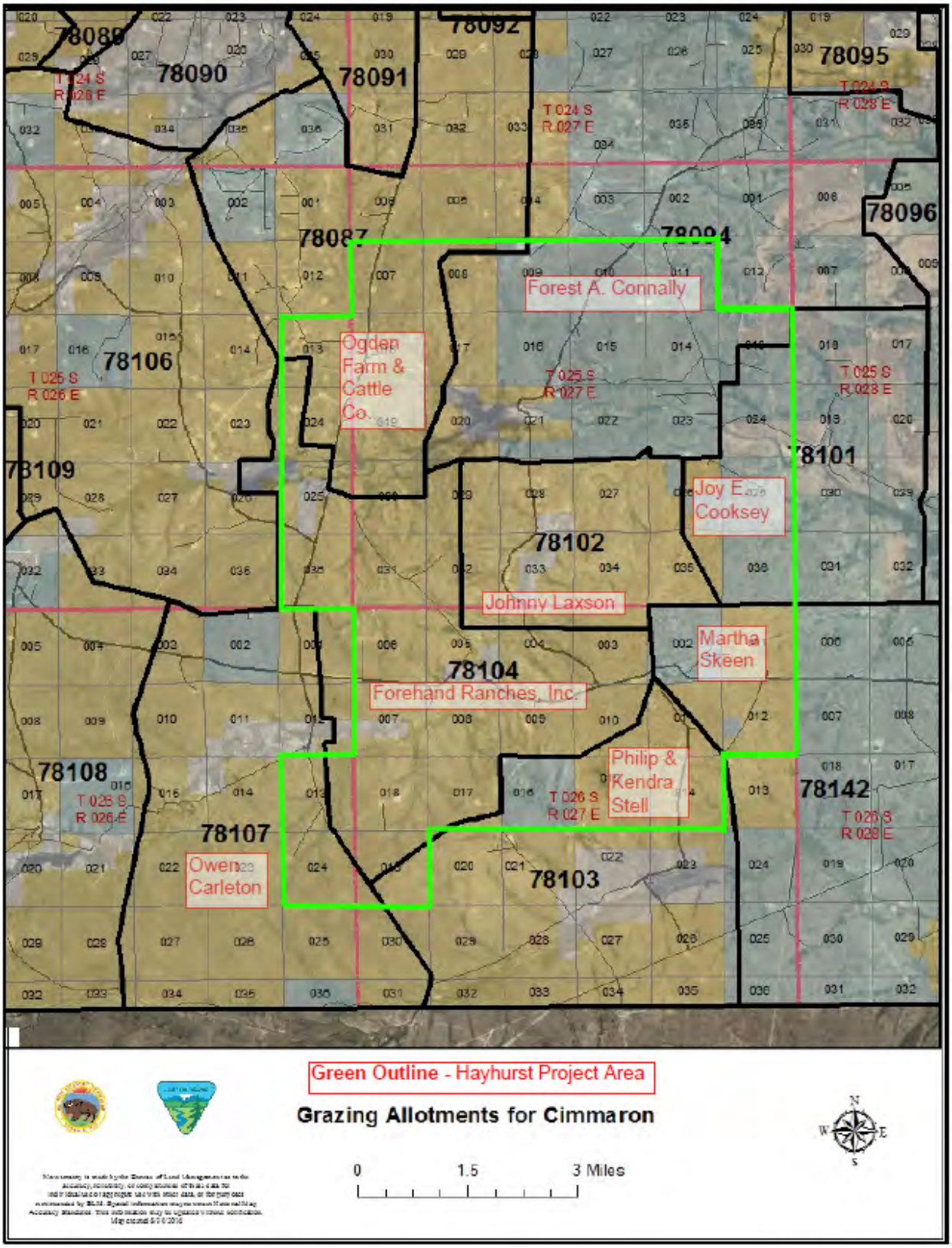
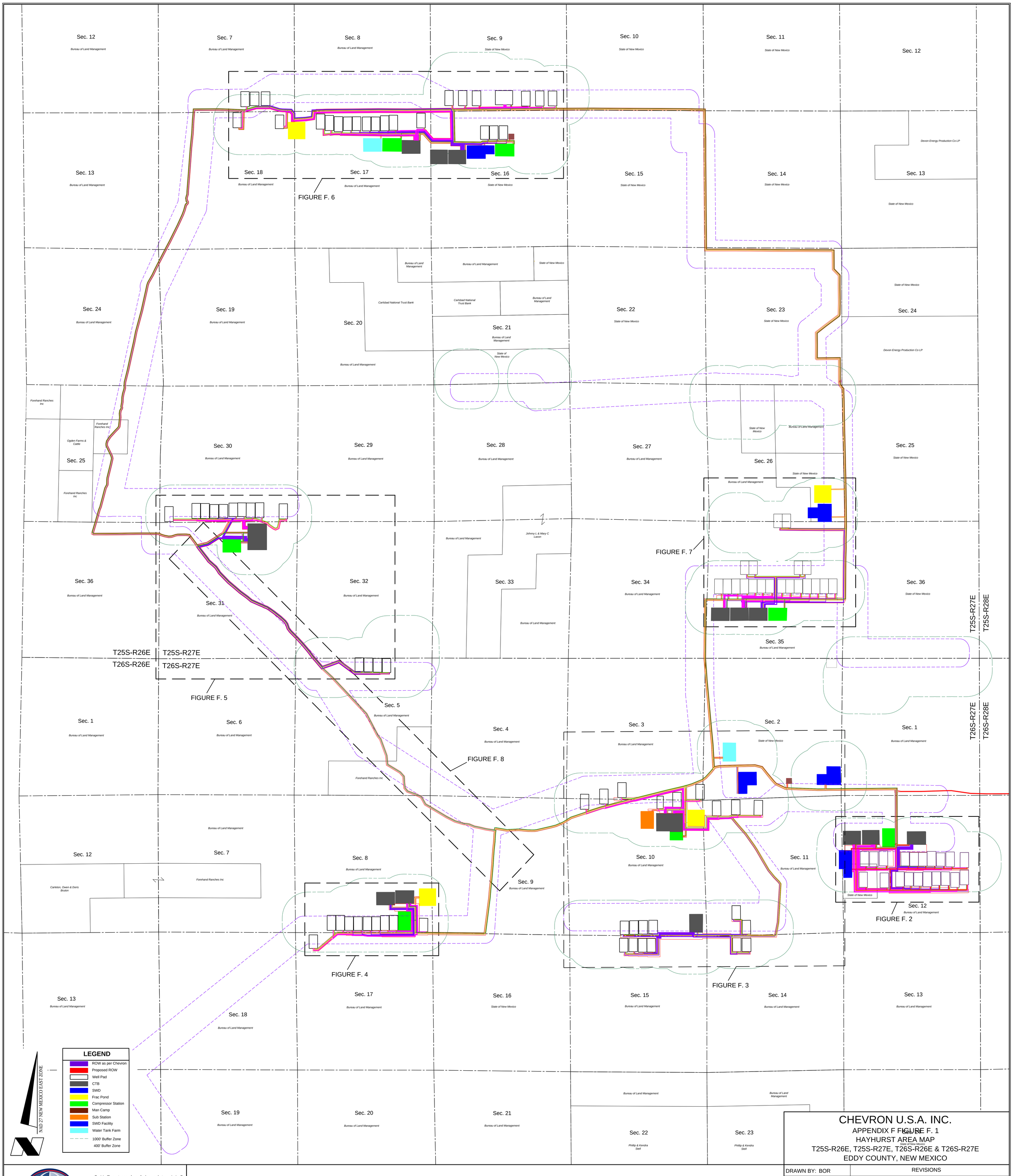


Figure E.1: Map of Surface Tenants

APPENDIX F: Maps

INDEX:

- Figure F.1: HDA Overview Map
- Figure F.2: HDA Sub-Area AA Detail Map
- Figure F.3: HDA Sub-Area BB Detail Map
- Figure F.4: HDA Sub-Area CC Detail Map
- Figure F.5: HDA Sub-Area DD Detail Map
- Figure F.6: HDA Sub-Area EE Detail Map
- Figure F.7: HDA Sub-Area FF Detail Map
- Figure F.8: HDA Sub-Area GG Detail Map
- Figure F.9: Map of New and Existing Roads
- Figure F.10: Map of Water Supply/Disposal System
- Figure F.11: Map of Existing Roads and Facilities



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APPENDIX F FIGURE F. 1
HAYHURST AREA MAP
T25S-R26E, T25S-R27E, T26S-R26E & T26S-R27E
EDDY COUNTY, NEW MEXICO

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PROJ. MGR.:GDG	No.1	DATE:12/16/2015	REVISED BY:TBD
DATE:11/03/2015	No. 2	DATE:01/19/2016	REVISED BY:VHV
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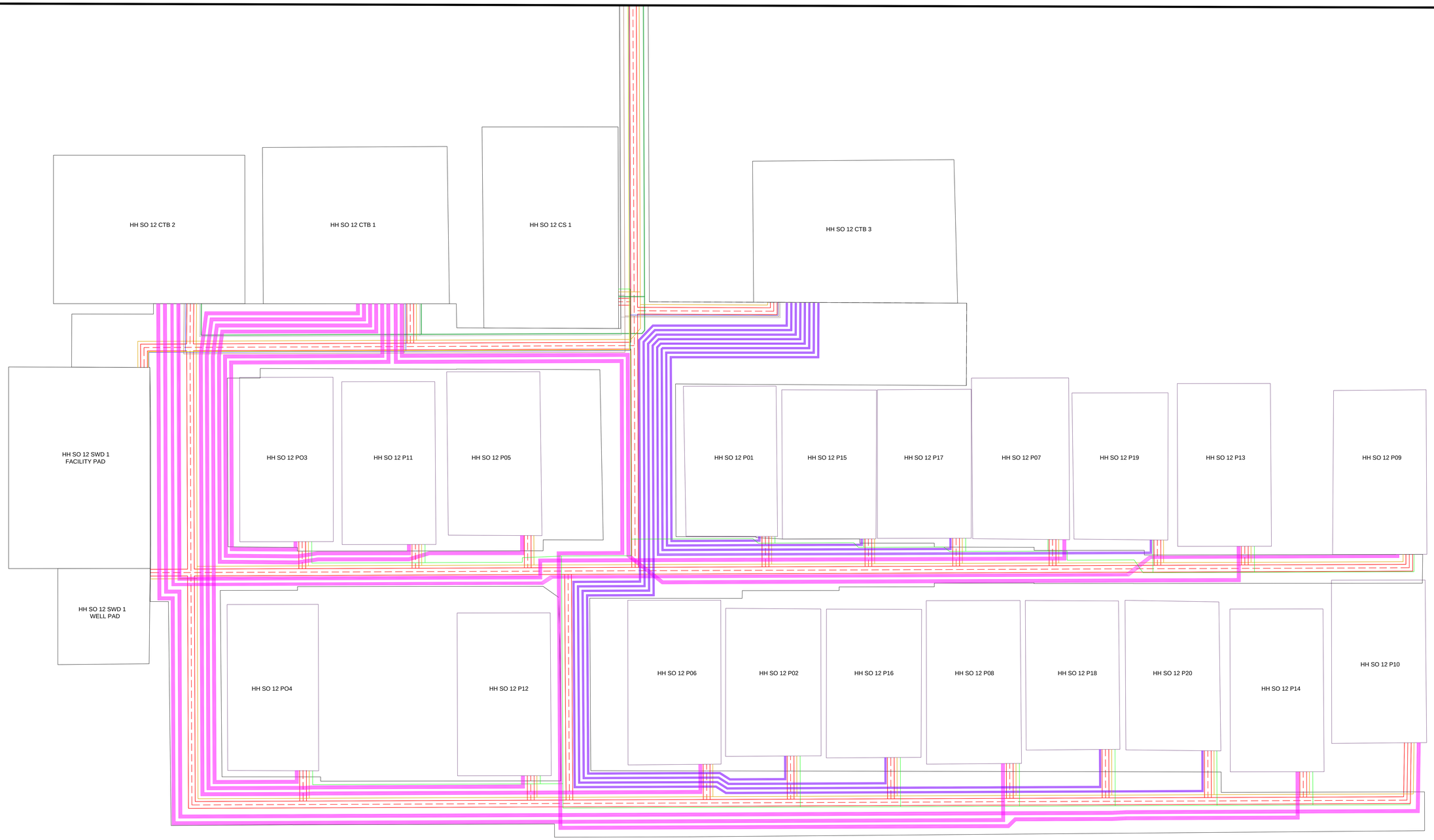

LEGEND

- WFMP (Wolfcamp) Flowlines
- Proposed Roads
- Gas Lift Flowlines
- Oil Take Away Flowlines
- SWD Water Flowlines
- Frac Water Flowlines
- SBSG Flowlines
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Scale: 1" = 100'

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Init.	Date	Init.	Date
GDG	5/12/2016		
GDG	5/14/2016		

Map Projection: LM2LASFT
Geodetic Datum: NAD 27
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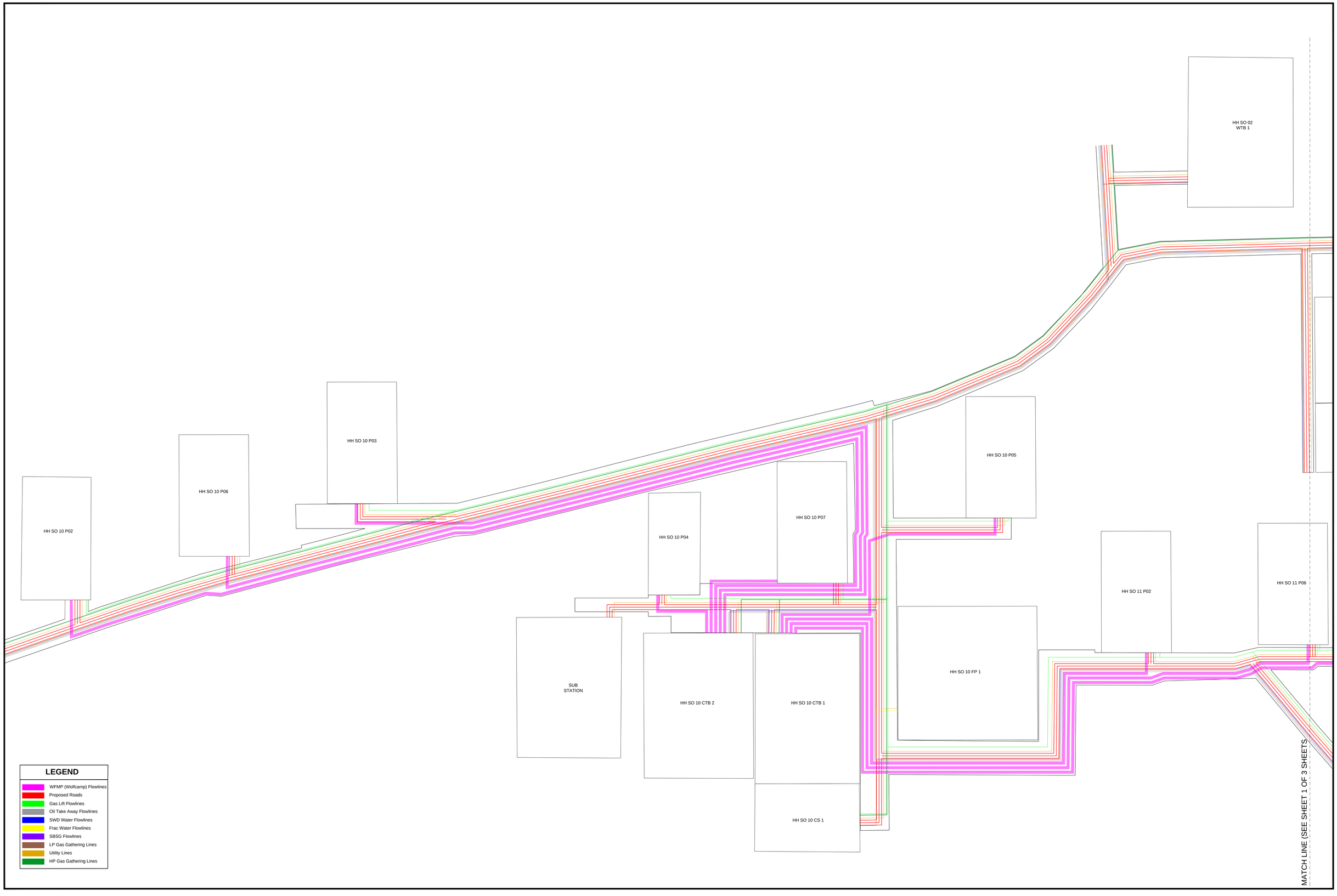
APPENDIX F
Figure F.2: DETAIL MAP OF HDA SUB-AREA AA
SECTION 12, T26S-R27E
EDDY COUNTY, NEW MEXICO

DRAWN BY: GDG
PROJ. MGR.: GDG
DATE: NOVEMBER 30, 2015
SCALE: 1"= 100'



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Init.	Date	Init.	Date	APPENDIX F	DRAWN BY: TBD
GDG	3/15/2016			Figure F.3: DETAIL MAP OF HDA SUB-AREA BB (1 OF 3)	PROJ. MGR.: GDG
GDG	7/14/2016			SECTION 12, T26S-R27E	DATE: DECEMBER 10, 2015
				EDDY COUNTY, NEW MEXICO	SCALE: 1"= 1000'
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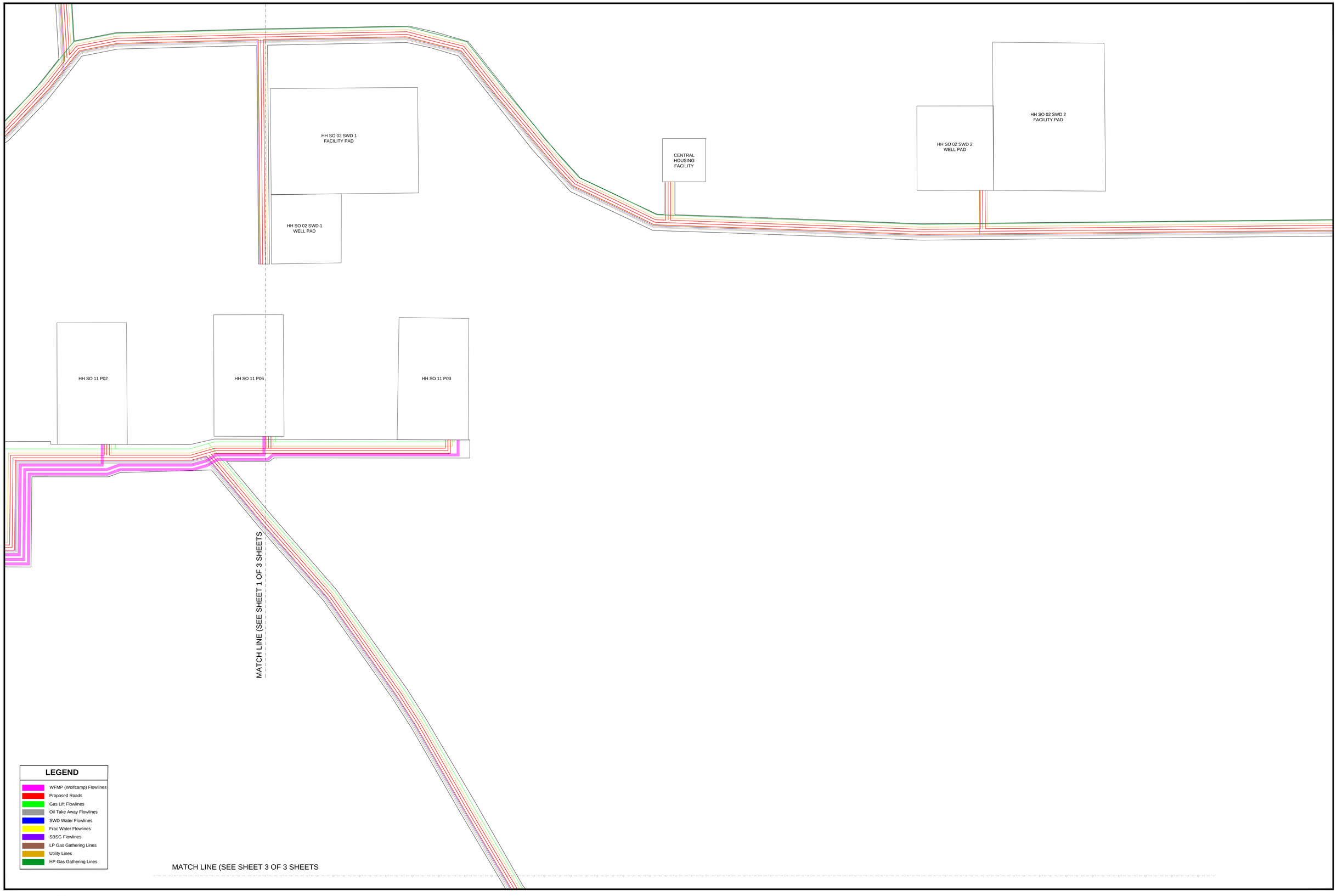

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GDG	3/12/2018		
GDG	7/14/2018		

APPENDIX F
Figure F.3: DETAIL MAP OF HDA SUB-AREA BB (2 OF 3)
SECTION 12, T26S-R27E
EDDY COUNTY, NEW MEXICO

Map Projection: LM2LASFT
Geodetic Datum: NAD 27

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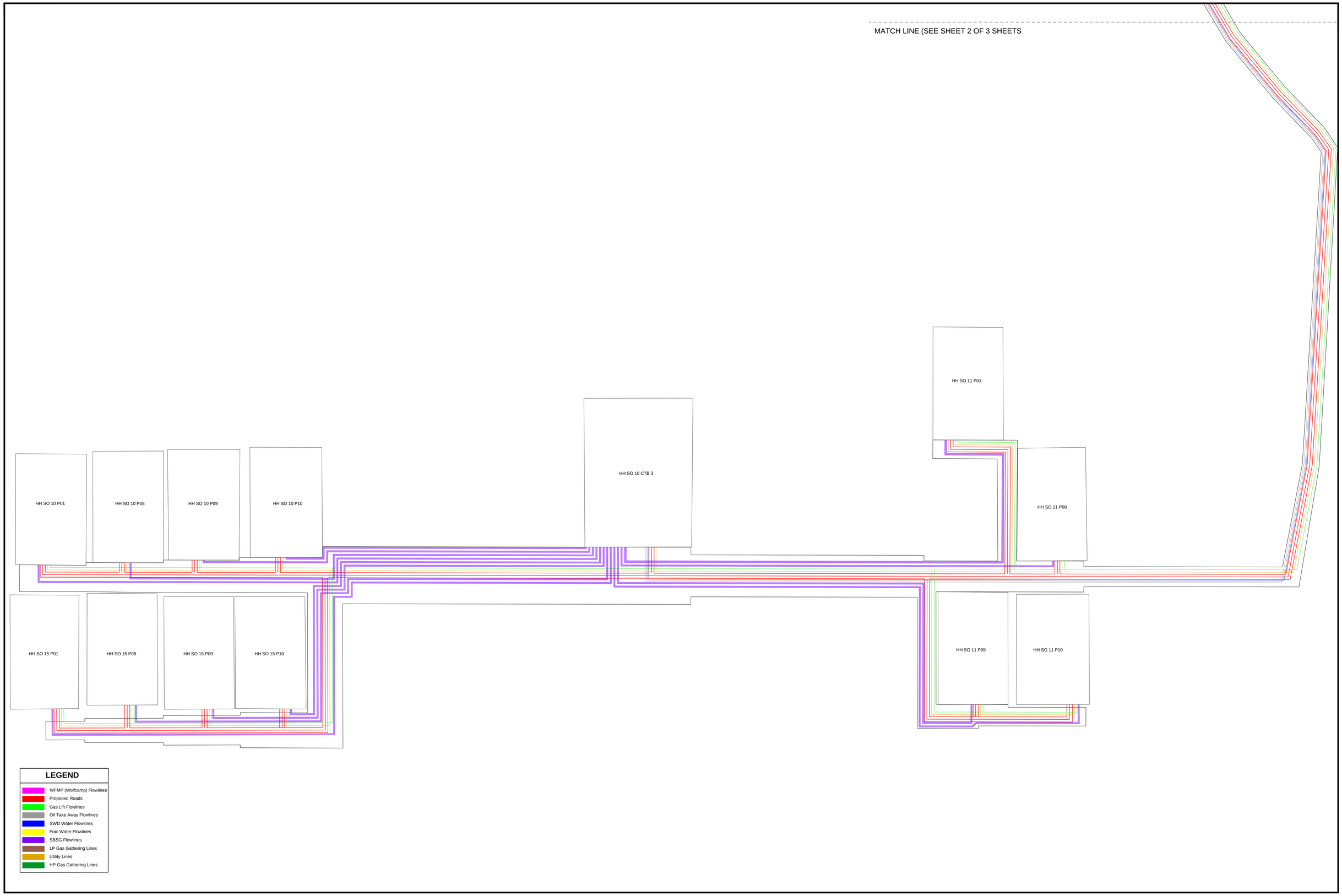

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GDG	1/12/2016		
GDG	1/14/2016		

APPENDIX F
Figure F.3: DETAIL MAP OF HOA SUB-AREA BB (3 OF 3)
SECTION 12, T26S-R27E
EDDY COUNTY, NEW MEXICO

Map Projection: LM2LASFT
Geodetic Datum: NAD 27

DRAWN BY: TBD
PROJ. MGR.: GDG
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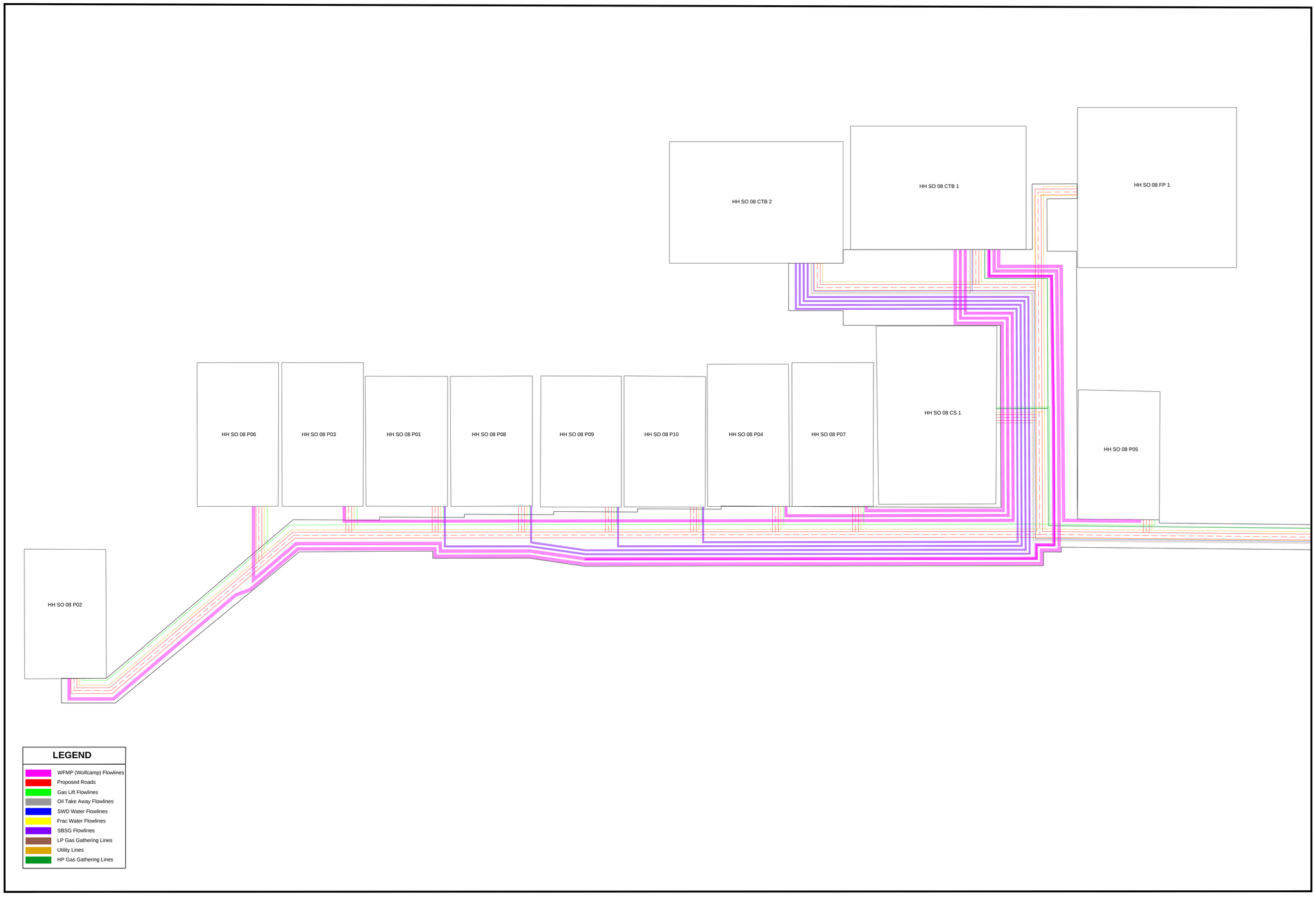

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Init.	Date	Init.	Date
GDG	1/15/2016		
GDG	6/14/2016		

Map Projection: LMI_ASFT
Geodetic Datum: NAD 27

APPENDIX F
Figure F.4: DETAIL MAP OF HDA SUB-AREA CC
SECTIONS 8 & 17, T26S-R27E
EDDY COUNTY, NEW MEXICO

DRAWN BY: TBD
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DATE: DECEMBER 16, 2015
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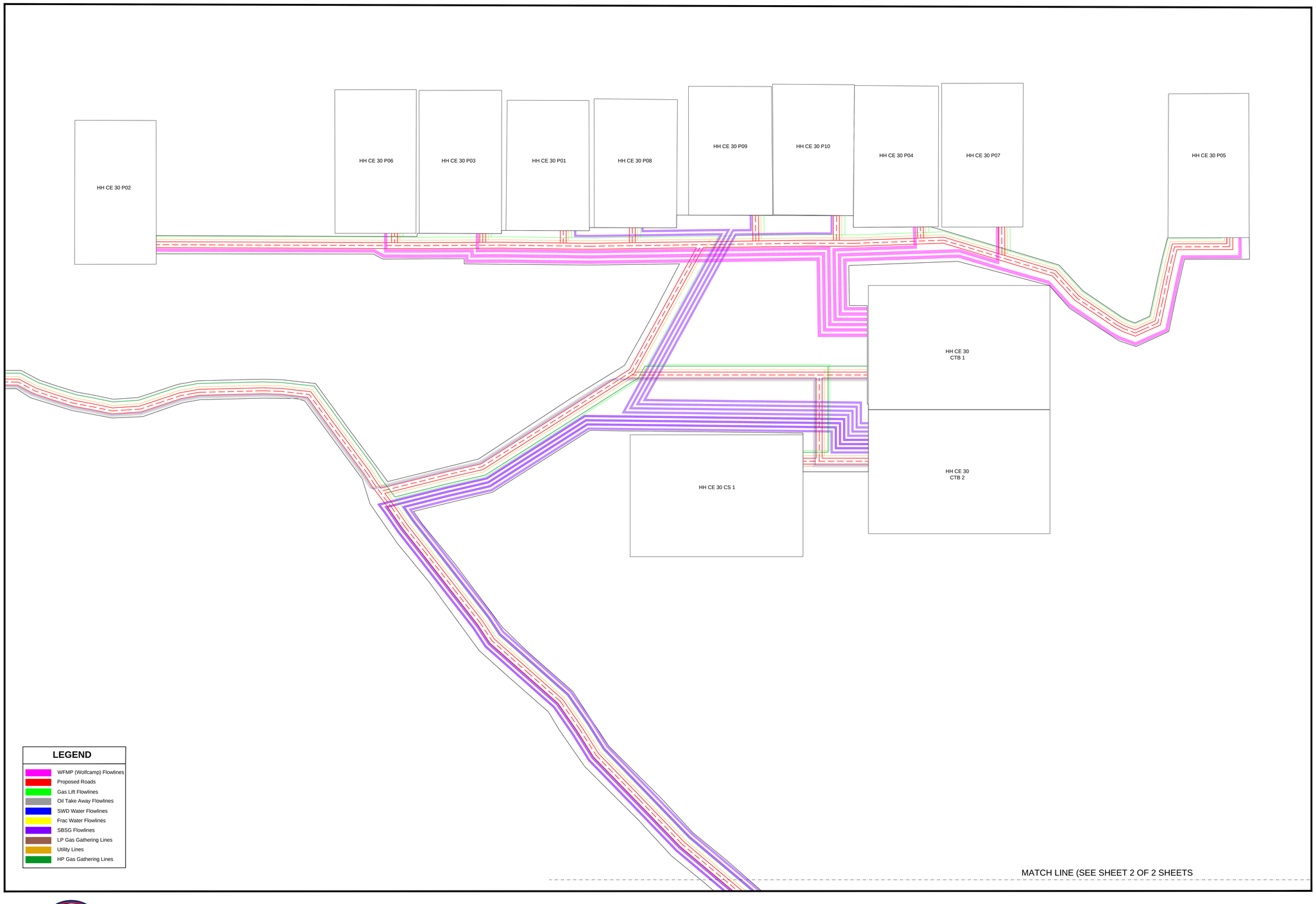

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Int.	Date	Int.	Date
GDG	1/13/2016		

Map Projection: LM1LASFT
Geodetic Datum: NAD 27

APPENDIX F
Figure F.5: DETAIL MAP OF HDA SUB-AREA DD (1 OF 2)
SECTIONS 30, 31 & 32, T25S-R27E & SECTION 5, T26S-R27E
EDDY COUNTY, NEW MEXICO

DRAWN BY: TBD
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DATE: DECEMBER 29, 2015
SCALE: 1"= 100'

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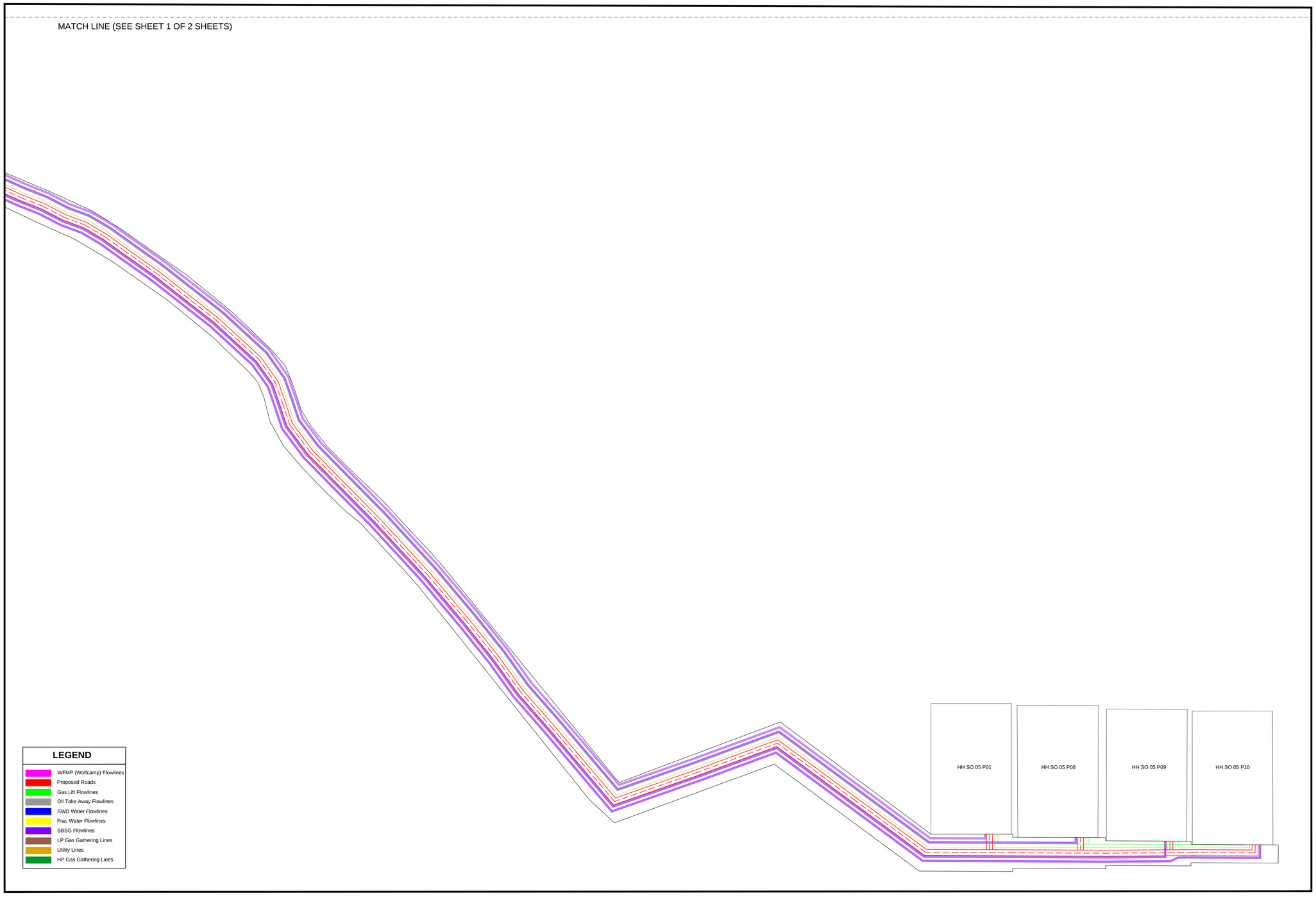

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Init.	Date	Init.	Date
GDG	1/13/2016		

Map Projection: LM21ASFT
Geodetic Datum: NAD 27

APPENDIX F
Figure F.5: DETAIL MAP OF HDA SUB-AREA DD (2 OF 2)
SECTIONS 30, 31 & 32, T25S-R27E & SECTION 5, T26S-R27E
EDDY COUNTY, NEW MEXICO

DRAWN BY: TBD
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DATE: DECEMBER 9, 2015
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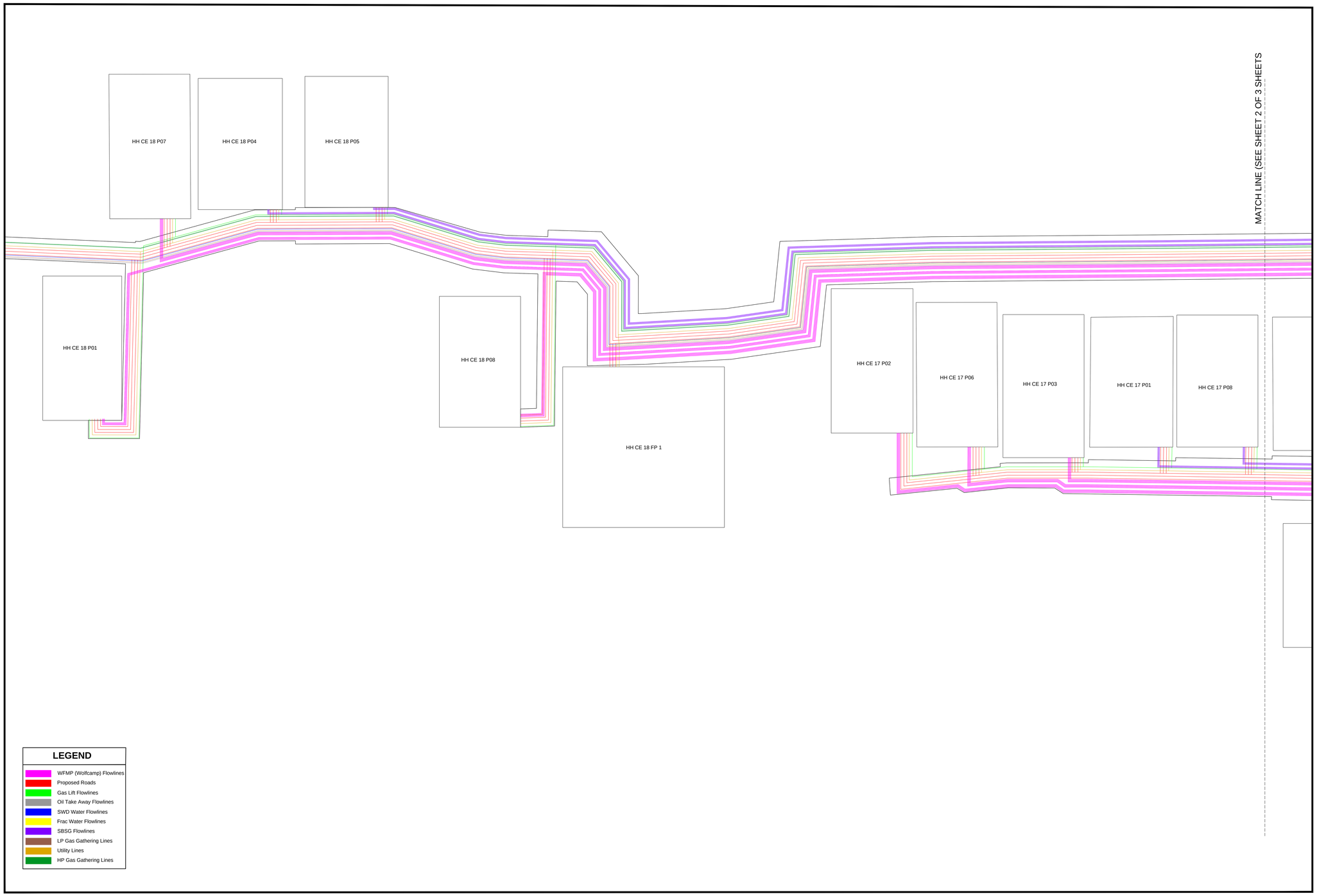

LEGEND

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SHEET 1 OF 3 SHEETS

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REVISIONS			
Int.	Date	Int.	Date

Map Projection: LM1,ASF1
Geodetic Datum: NAD 27

APPENDIX F
Figure F.6: DETAIL MAP OF HDA SUB-AREA EE (1 OF 3)
SECTIONS 7,8,9,16,17 & 18, T25S-R27E
EDDY COUNTY, NEW MEXICO

DRAWN BY: TBD
PROJ. MGR.: GDG
DATE: DECEMBER 29, 2015
SCALE: 1"= 100'

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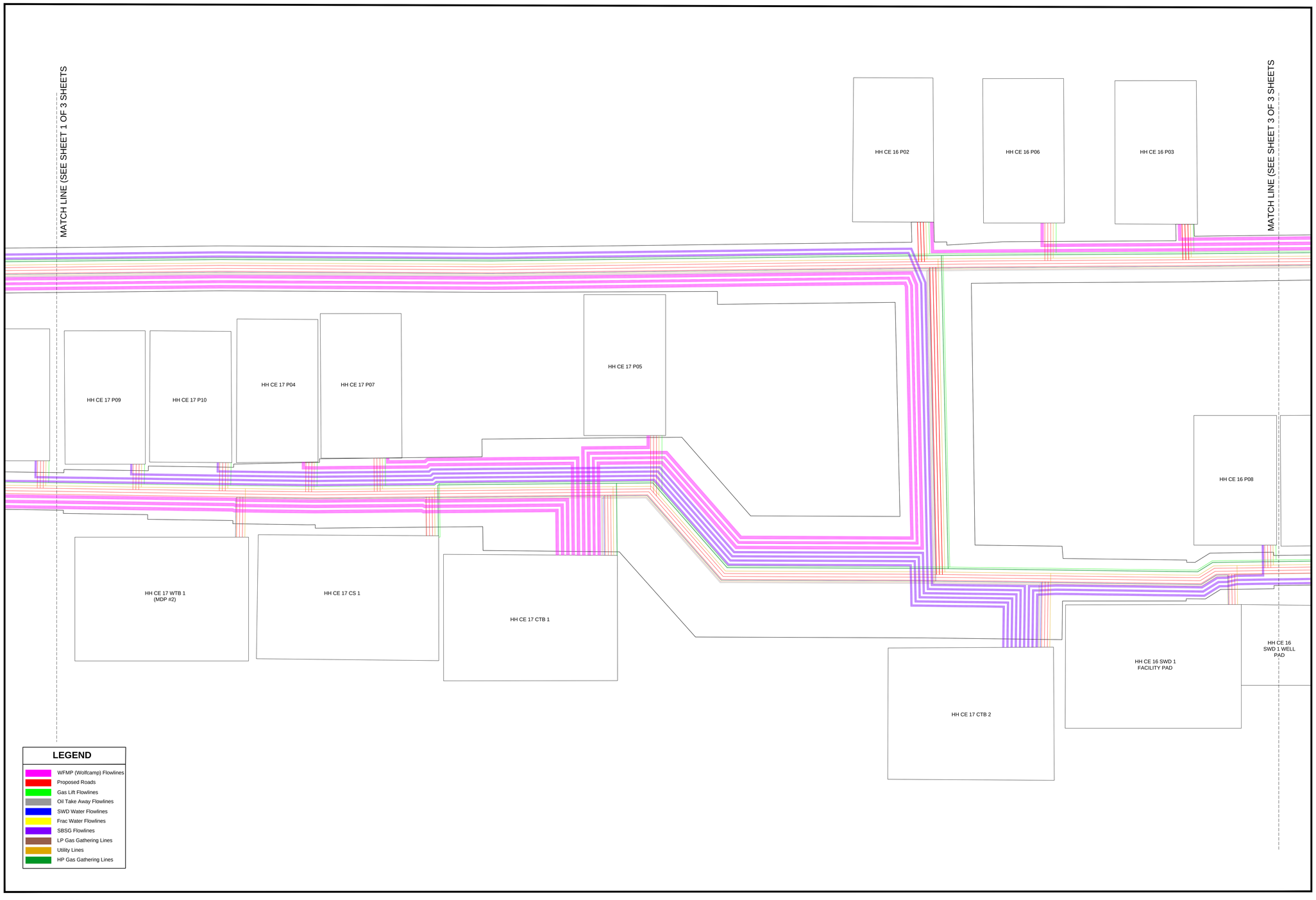

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Scale: 1" = 100'

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SHEET 2 OF 3 SHEETS

CHEVRON U.S.A. INC.

REVISIONS			
Int.	Date	Int.	Date

APPENDIX F
Figure F.6: DETAIL MAP OF HDA SUB-AREA EE (2 OF 3)
SECTIONS 7,8,9,16,17 & 18, T25S-R27E
EDDY COUNTY, NEW MEXICO

Map Projection: LMSLASFT
Geodetic Datum: NAD 27

DRAWN BY: TBD
PROJ. MGR.: GDG
DATE: DECEMBER 29, 2015
SCALE: 1"= 100'

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Scale: 1" = 100'

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SHEET 3 OF 3 SHEETS

CHEVRON U.S.A. INC.

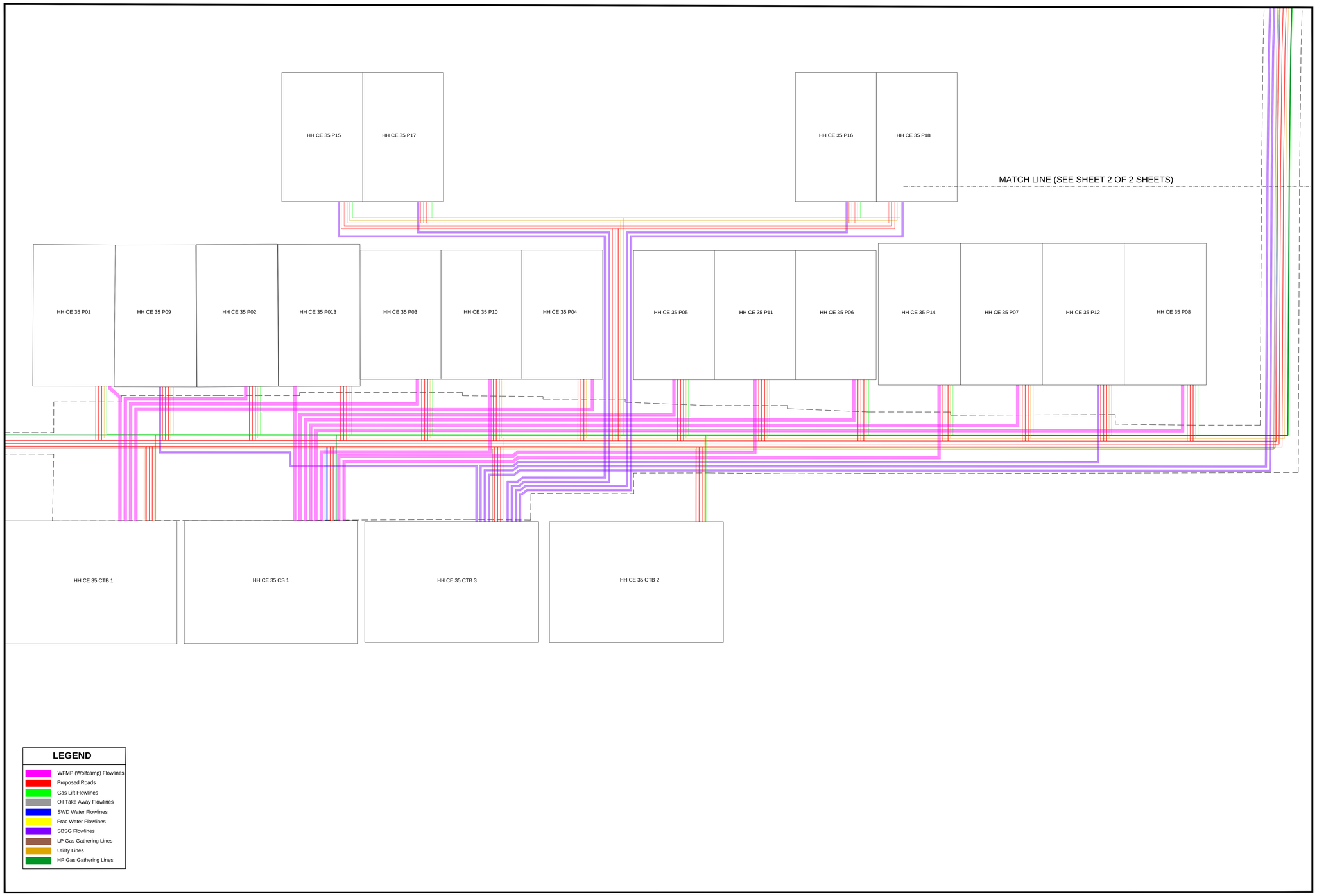
REVISIONS			
Int.	Date	Int.	Date

Map Projection: LM1,ASF,T
Geodetic Datum: NAD 27

APPENDIX F
Figure F.6: DETAIL MAP OF HDA SUB-AREA EE (3 OF 3)
SECTIONS 7,8,9,16,17 &18 T25S-R27E
EDDY COUNTY, NEW MEXICO

DRAWN BY: TBD
PROJ. MGR.: GDG
DATE: DECEMBER 29, 2015
SCALE: 1"= 100'

FILENAME: T201512153297\DWG\FF DETAIL WITH LINES BASE MAP.dwg



LEGEND

- WFMP (Wolfcamp) Flowlines
- Proposed Roads
- Gas Lift Flowlines
- Oil Take Away Flowlines
- SWD Water Flowlines
- Frac Water Flowlines
- SBSG Flowlines
- LP Gas Gathering Lines
- Utility Lines
- HP Gas Gathering Lines

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Scale: 1" = 100'

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CHEVRON U.S.A. INC.

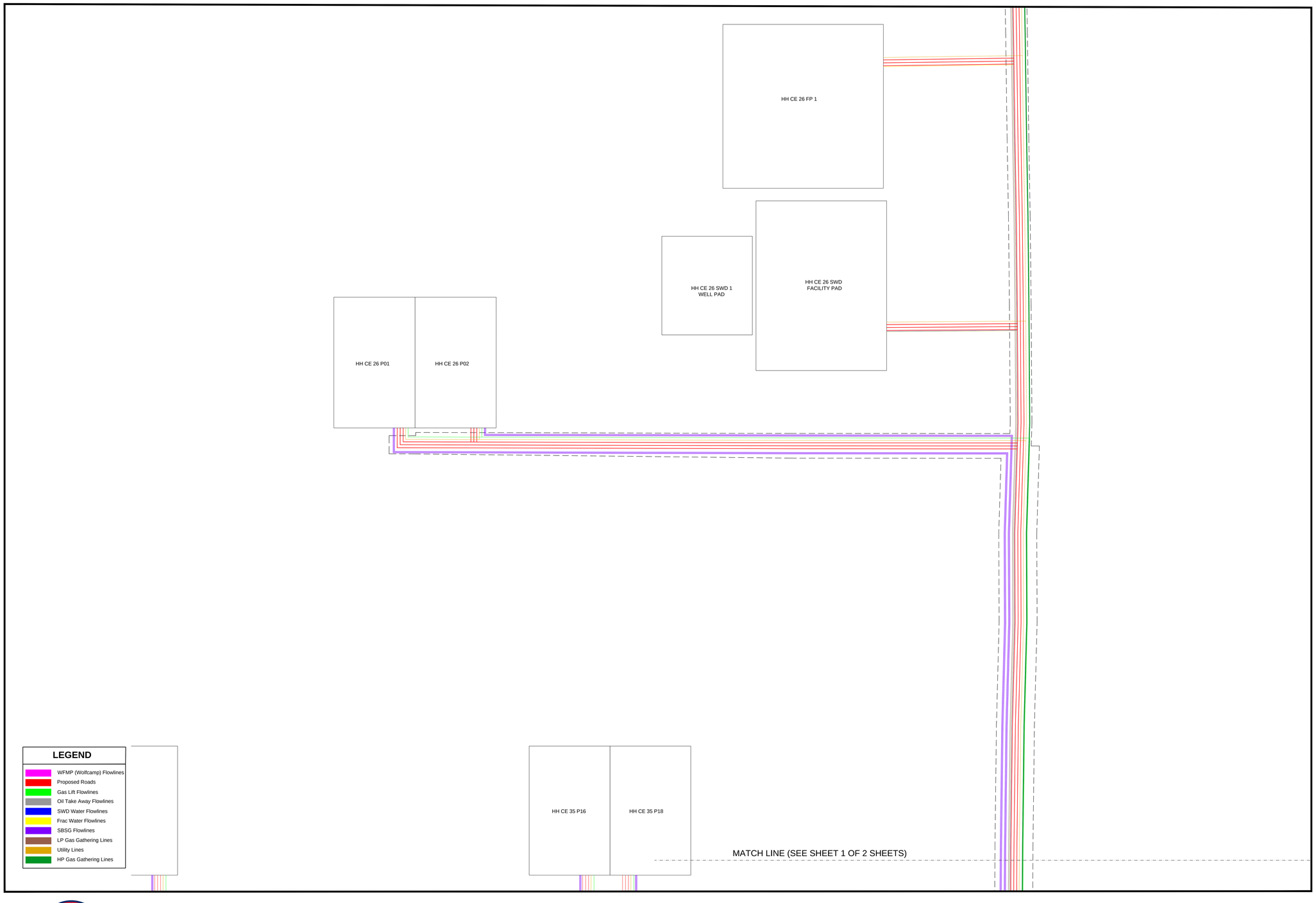
REVISIONS			
Int.	Date	Int.	Date

Map Projection: LM1ASF
Geodetic Datum: NAD 27

APPENDIX F
Figure F.7: DETAIL MAP OF HDA SUB-AREA FF (1 of 2)
SECTIONS 26 & 32, T25S-R27E
EDDY COUNTY, NEW MEXICO

DRAWN BY: TBD
PROJ. MGR.: GDG
DATE: DECEMBER 28, 2015
SCALE: 1"= 100'

FILENAME: T:\2015\215329\7-DWG\FF DETAIL WITH LINES BASE MAP.dwg



LEGEND

- WFMP (Wolfcamp) Flowlines
- Proposed Roads
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- Oil Take Away Flowlines
- SWD Water Flowlines
- Frac Water Flowlines
- SBSG Flowlines
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Scale: 1" = 100'

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CHEVRON U.S.A. INC.

REVISIONS			
Int.	Date	Int.	Date

Map Projection: LMSLASFT
Geodetic Datum: NAD 27

APPENDIX F
Figure F.7: DETAIL MAP OF HDA SUB-AREA FF (2 of 2)
SECTIONS 26 & 35, T25S-R27E
EDDY COUNTY, NEW MEXICO

DRAWN BY: TBD
PROJ. MGR: GDG
DATE: DECEMBER 28, 2015
SCALE: 1"= 100'

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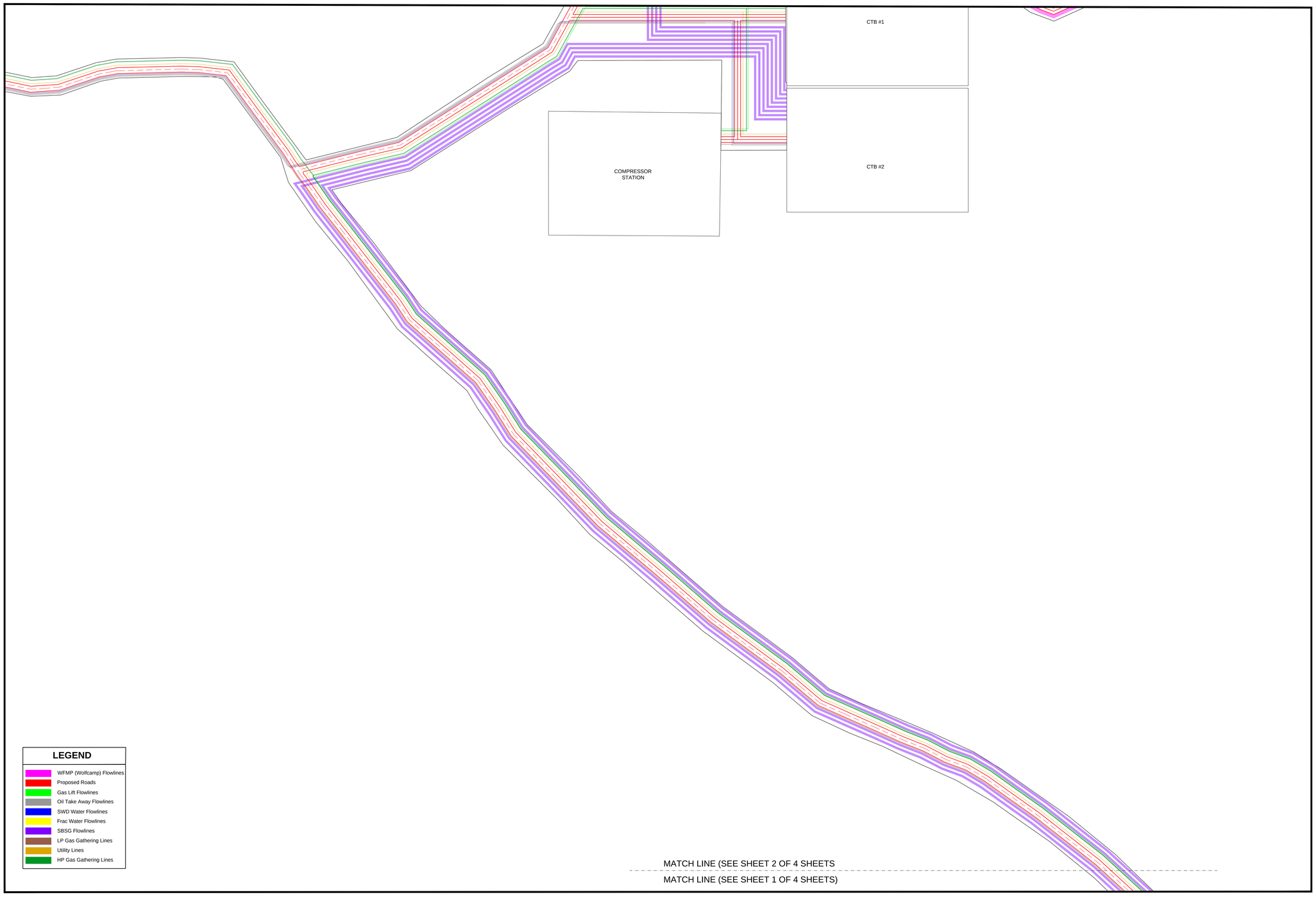

LEGEND

- WFMP (Wolfcamp) Flowlines
- Proposed Roads
- Gas Lift Flowlines
- Oil Take Away Flowlines
- SWD Water Flowlines
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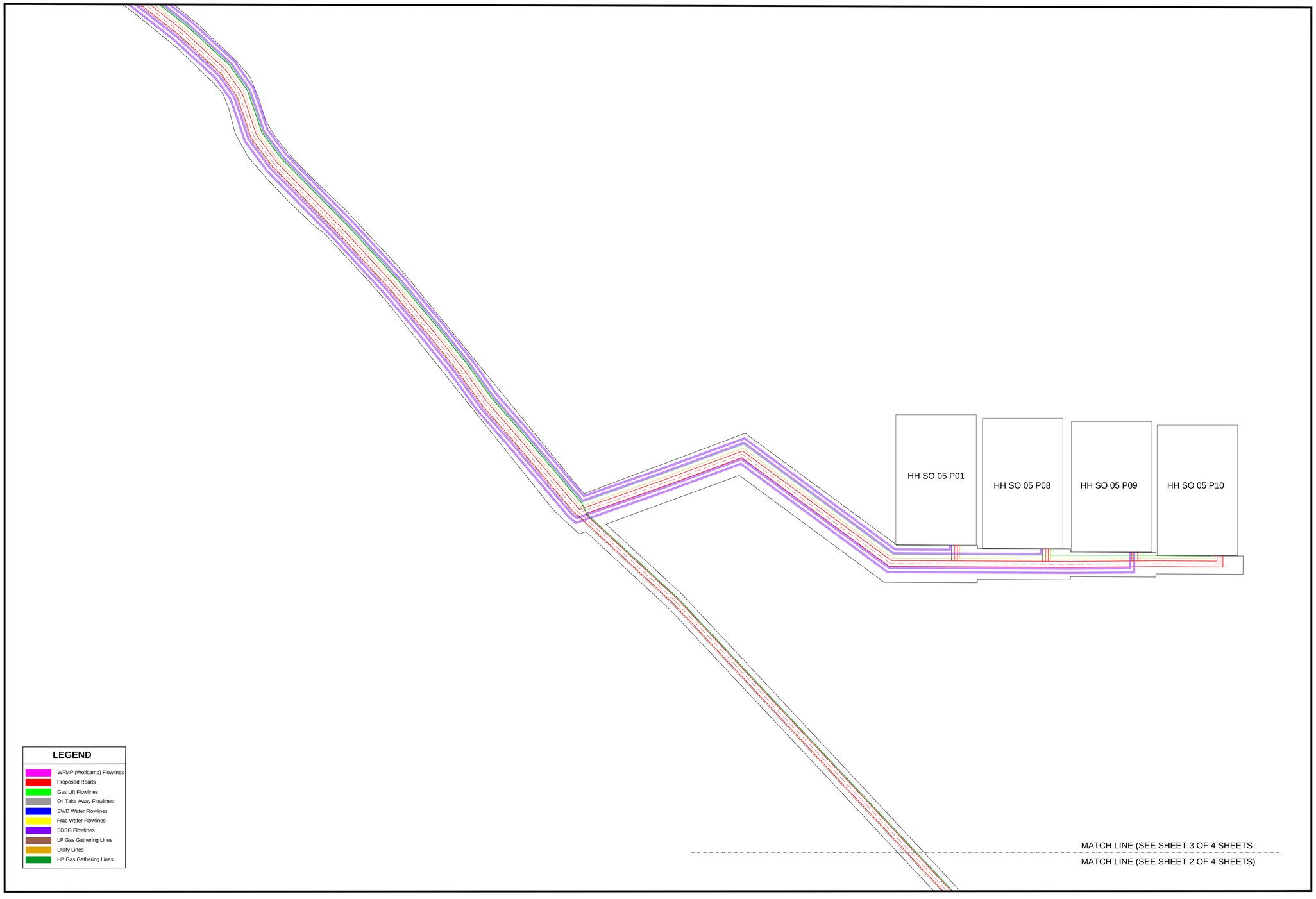
SHEET 1 OF 4 SHEETS

CHEVRON U.S.A. INC.

REVISIONS				APPENDIX F	DRAWN BY: GDG
Int.	Date	Int.	Date	Figure F.8: DETAIL MAP OF HDA SUB-AREA GG (1 of 4)	PROJ. MGR.: GDG
				SECTIONS 31 & 32, T25S-R27E & SECTIONS 5, 8 & 9, T26S-R27E	DATE: JANUARY 8, 2016
				EDDY COUNTY, NEW MEXICO	SCALE: 1"= 100'
Map Projection: LM1LASFT					
Geodetic Datum: NAD 27					
FILENAME: T:\2015\215329\7\DWG\GG DETAIL WITH LINES BASE MAP.dwg					



LEGEND

- WFMP (Wolfcamp) Flowlines
- Proposed Roads
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- Oil Take Away Flowlines
- SWD Water Flowlines
- Frac Water Flowlines
- SBSG Flowlines
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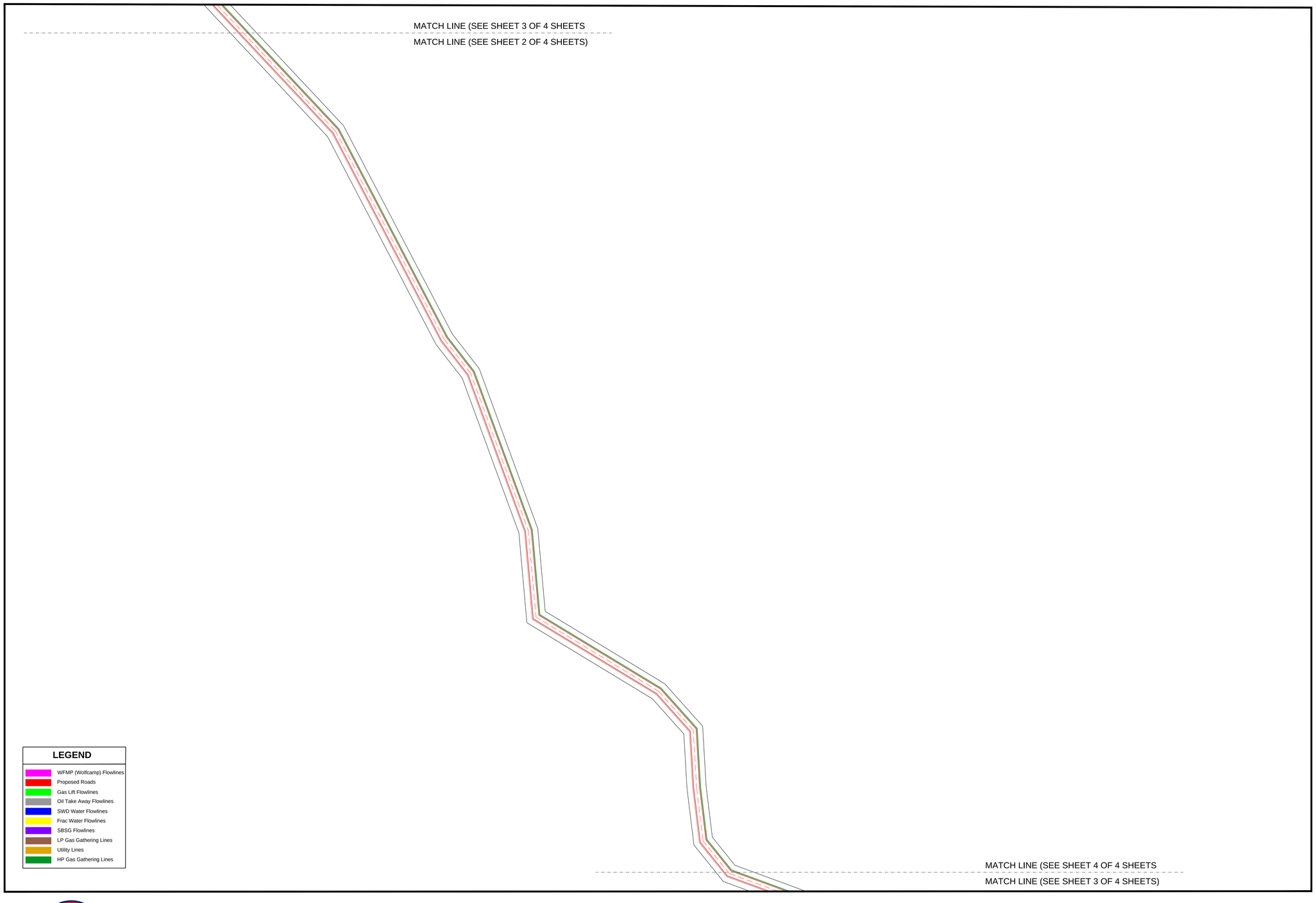
SHEET 2 OF 4 SHEETS

CHEVRON U.S.A. INC.

REVISIONS				APPENDIX F	DRAWN BY: GDG
Int.	Date	Int.	Date	Figure F.8: DETAIL MAP OF HDA SUB-AREA GG (2 of 4)	PROJ. MGR.: GDG
				SECTIONS 31 & 32, T25S-R27E & SECTIONS 5, 8 & 9, T26S-R27E	DATE: JANUARY 8, 2016
				EDDY COUNTY, NEW MEXICO	SCALE: 1"= 100'
Map Projection: LMS,ASF,T					
Geodetic Datum: NAD 27					
FILENAME: T:\2015\215329\DWG\GG DETAIL WITH LINES BASE MAP.dwg					



LEGEND

- WFMP (Wolfcamp) Flowlines
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Scale: 1" = 100'

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SHEET 3 OF 4 SHEETS

CHEVRON U.S.A. INC.

REVISIONS				
Int.	Date	Int.	Date	
Map Projection: LMSLASFT				
Geodetic Datum: NAD 27				

APPENDIX F
Figure F.8: DETAIL MAP OF HDA SUB-AREA GG (3 of 4)
SECTIONS 31 & 32, T25S-R27E & SECTIONS 5, 8 & 9, T26S-R27E
EDDY COUNTY, NEW MEXICO

DRAWN BY: GDG
PROJ. MGR.: GDG
DATE: JANUARY 8, 2016
SCALE: 1"= 100'

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LEGEND

- WFMP (Wolfcamp) Flowlines
- Proposed Roads
- Gas Lift Flowlines
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SHEET 4 OF 4 SHEETS

CHEVRON U.S.A. INC.

REVISIONS			
Int.	Date	Int.	Date

Map Projection: LM1,ASF1
Geodetic Datum: NAD 27

APPENDIX F
Figure F.8: DETAIL MAP OF HDA SUB-AREA GG (4 of 4)
SECTIONS 31 & 32, T25S-R27E & SECTIONS 5, 8 & 9, T26S-R27E
EDDY COUNTY, NEW MEXICO

DRAWN BY: GDG
PROJ. MGR.: GDG
DATE: JANUARY 8, 2016
SCALE: 1"= 100'

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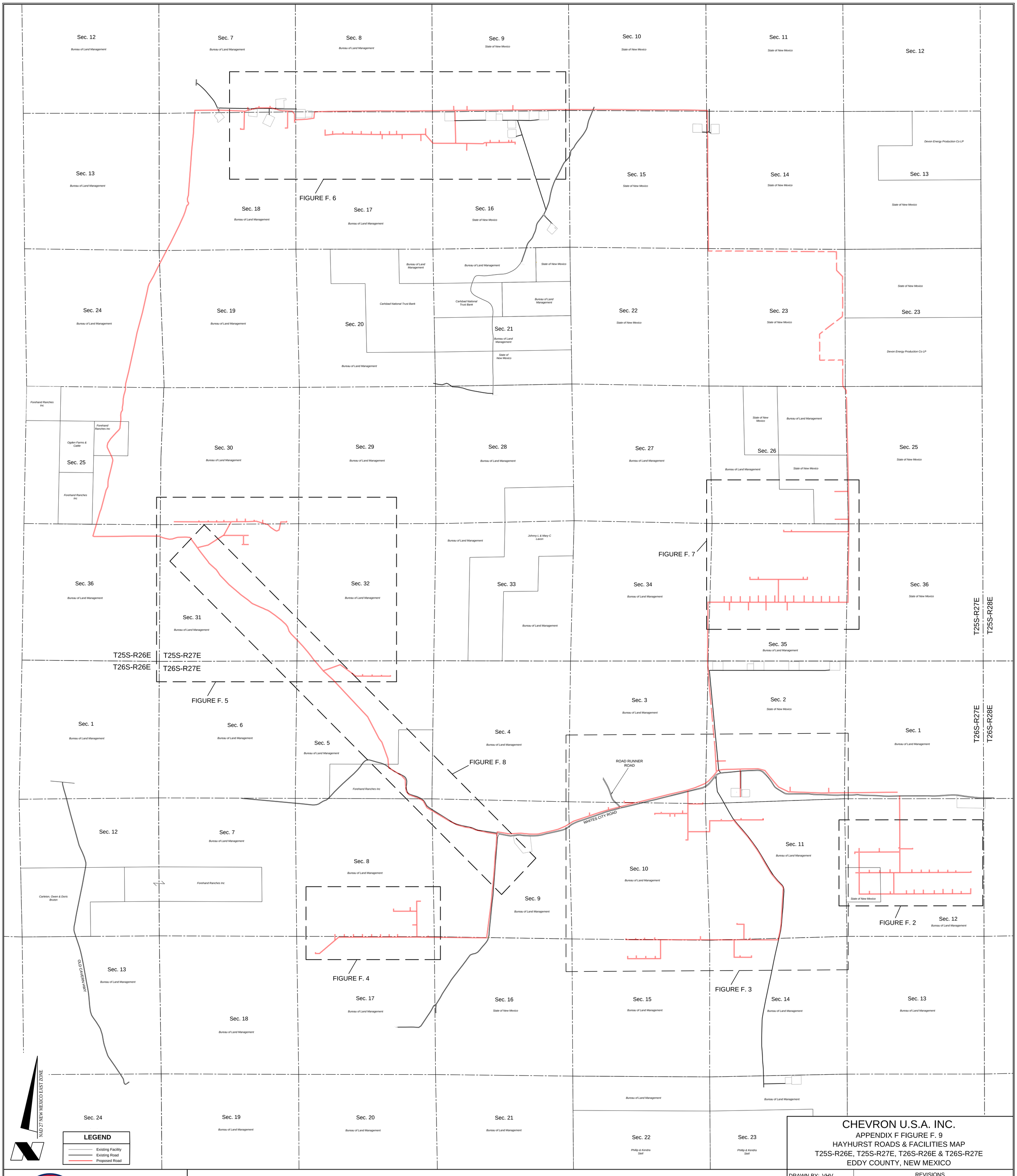

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APPENDIX F FIGURE F. 9
HAYHURST ROADS & FACILITIES MAP
T25S-R26E, T25S-R27E, T26S-R26E & T26S-R27E
EDDY COUNTY, NEW MEXICO

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1000' 0 500' 1000'
Scale: 1" = 1000'

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PROJ. MGR.:GDG	No.	DATE:	REVISED BY:
DATE: 01/19/2016	No.	DATE:	REVISED BY:
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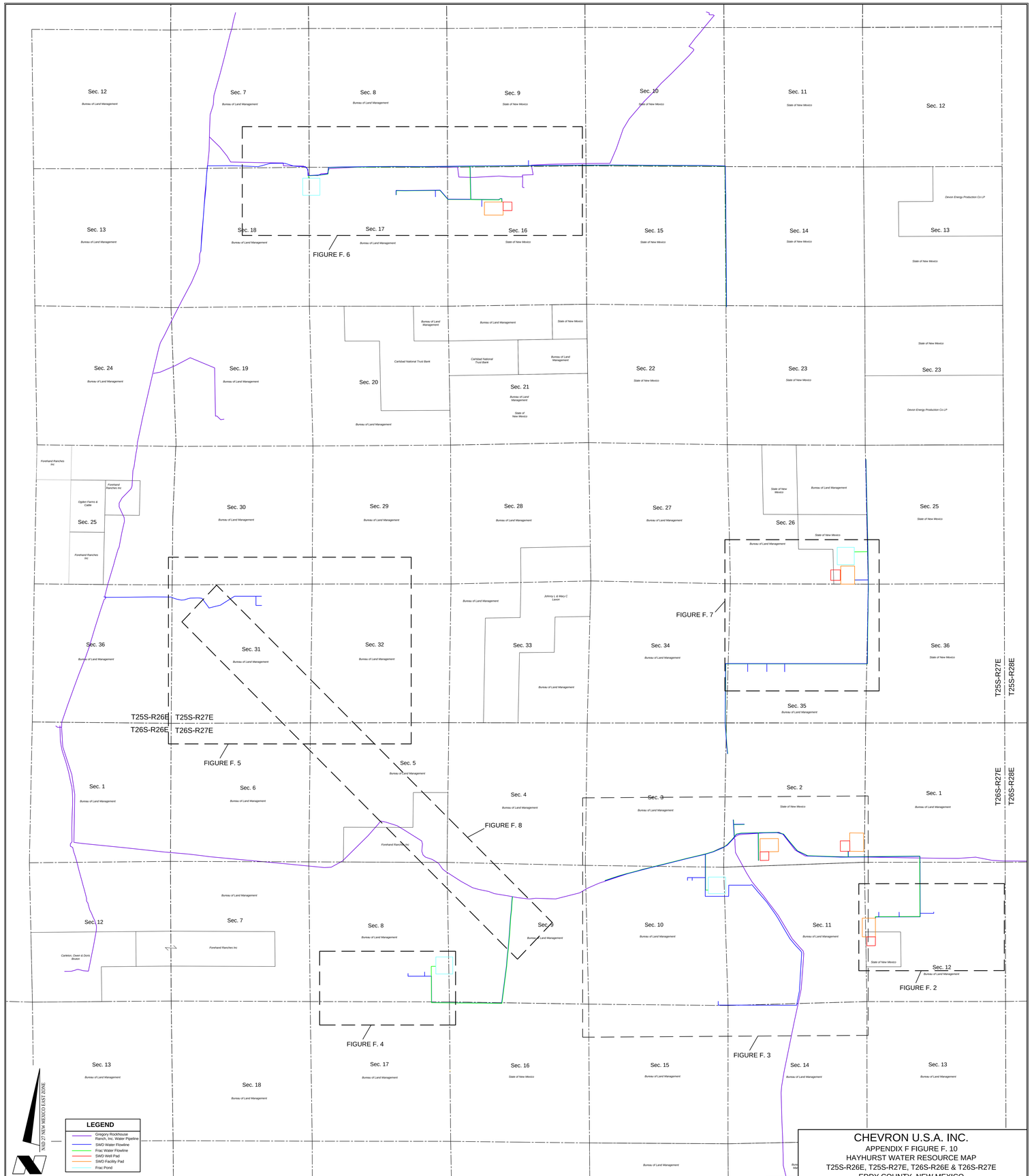

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1000' 0 500' 1000'
Scale: 1" = 1000'

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APPENDIX F FIGURE F. 10
HAYHURST WATER RESOURCE MAP
T25S-R26E, T25S-R27E, T26S-R26E & T26S-R27E
EDDY COUNTY, NEW MEXICO

DRAWN BY: GDG	REVISIONS		
PROJ. MGR.:GDG	No.	DATE:	REVISED BY:
DATE: 1/19/2016	No.	DATE:	REVISED BY:
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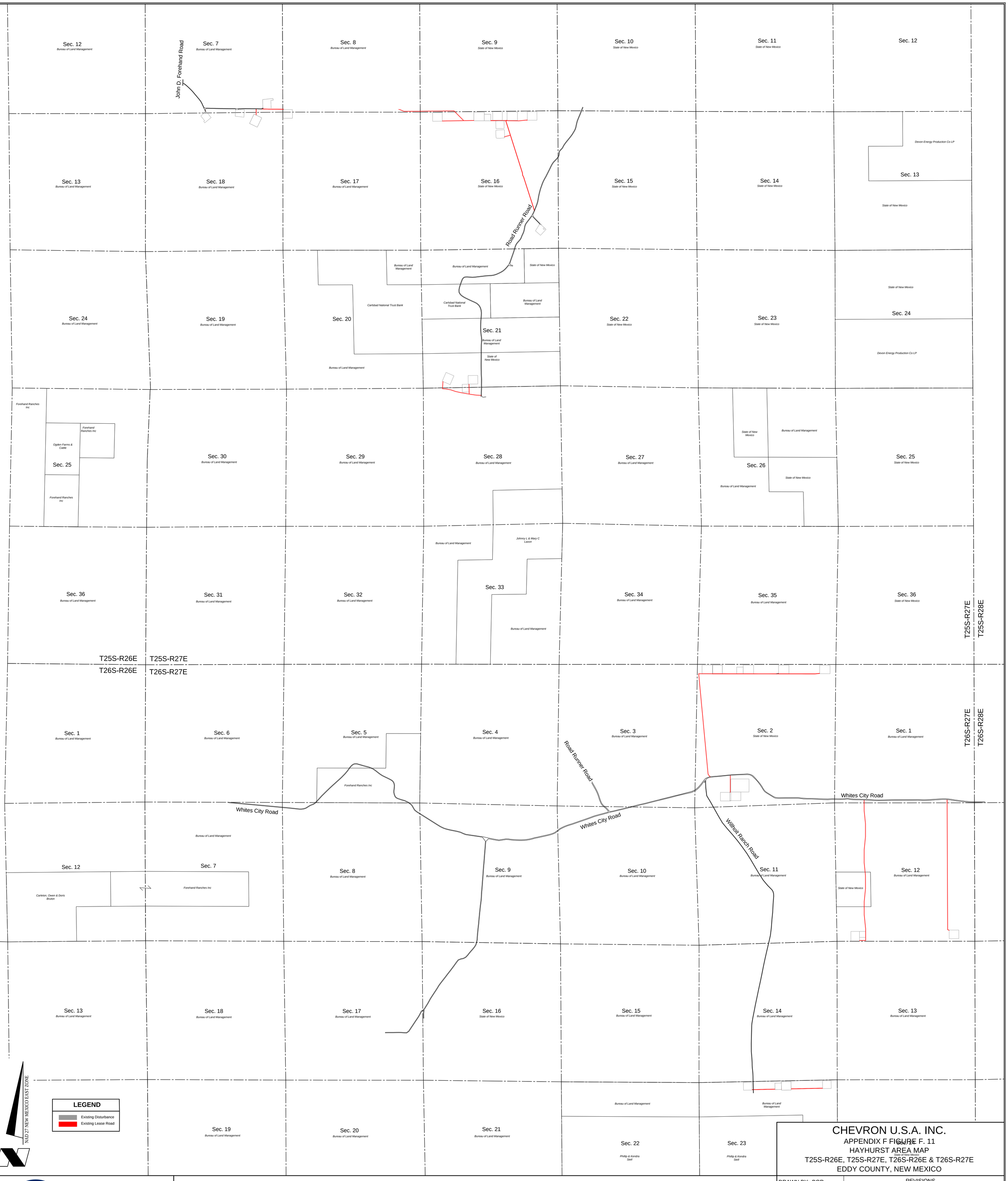

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1000' 0 500' 1000'
Scale: 1" = 1000'

CHEVRON U.S.A. INC.

APPENDIX F FIGURE F. 11
HAYHURST AREA MAP
T25S-R26E, T25S-R27E, T26S-R26E & T26S-R27E
EDDY COUNTY, NEW MEXICO

DRAWN BY: BOR	REVISIONS		
PROJ. MGR.:GDG	No.	DATE:	REVISED BY:
DATE: 02/08/2016	No.	DATE:	REVISED BY:
FILENAME: T:\2015\2153297\DWG\Hayhurst Basemap Figure F 11.dwg			

Surface Use Plan of Operations

Existing Roads (Exhibit 1 – see Proposed Action Appendix F, Figure F.9)

- Chevron U.S.A. Inc (Chevron) will improve or maintain existing roads in a condition the same as or better than before operations begin. Chevron will repair pot holes, clear ditches, repair the crown, etc. All existing structures on the entire access route such as cattle guards, other range improvement projects, culverts, etc. will be properly repaired or replaced if they are damaged or have deteriorated beyond practical use. Chevron will prevent and abate fugitive dust as needed, whether created by vehicular traffic, equipment operations, or wind events. BLM written approval will be acquired before application of surfactants, binding agents, or other dust suppression chemicals on roadways. Existing lease roads operated by Chevron will be maintained as needed or upon request (based on historical weather data, Chevron expects that maintenance will likely occur four to five times annually). Existing lease roads used by multiple operators will be maintained through road maintenance agreements with all parties.
- Driving Directions – From Carlsbad, NM. The location is approximately 35 miles from Carlsbad, NM. From Carlsbad, proceed south on Highway 285 (Pecos Hwy) for approximately 29 miles and turn right (west) onto Whites City Rd (CR 724). Travel west on Whites City Road for roughly 6 miles.

New or Reconstructed Access Roads – Representative Map (Exhibit 2 – see Proposed Action Appendix F, Figure F.10)

- There will be approximately 20 miles of new access road to be constructed.
- New access road will be upgraded to a crowned and ditched road and will be graveled as needed for drilling. If requested by the surface tenant, upgrading of this portion of the road will be kept to a minimum.
- All new roads (previously improved) will be used “as is” with the exception of minor blading as needed.
- Surfacing material (road base derived from caliche or river rock) will be placed on the access road during construction. All surface disturbing activities will be discussed with and agreed to with the surface tenant.
- Surface disturbance and vehicular travel will be limited to the approved access route. Any additional area will be approved in advance.
- Road width: 24 feet traveling surface
- Construction Easement: no additional construction easement will be required for new roads as they will be constructed within right-of-way corridors
- Maximum Grade: Road gradient less than 8%

- Turnouts: none required due to 24 feet travelling surface
- Ditch design: Drainage, ditch diversions and outlets shall be placed in roadway and angled away from road at approximately 45 degrees. At each diversion, straw waddles or equivalent will be utilized perpendicular flow.
- Crown design: 2%
- Erosion control: 6" rock under road; roadway water diversions (identified on each APD as applicable), low water crossings, culverts, and water bars where needed; straw waddles will be used on the downslope side of new roads where undisturbed grades away from the roadway are 5% or greater.
- Proposed culverts: Culverts and low water crossings will be installed where applicable; culvert sizing details will be included in each APD's SUP and shown on exhibit.
- Major Cuts and Fills: 2:1 slope until completed, reduce to 3:1 slope during interim reclamation
- Cattle guard(s) will be installed as needed and shown in each APD's SUP and exhibit.
- Storage Placement of Topsoil:
    - Topsoil will be stored on the upslope edge of each disturbance (unless otherwise directed by BLM) no higher than 3 feet, and will be promptly seeded to control erosion, prevent weed establishment and maintain soil microbial activity.
    - Along pipelines and roads, topsoil will be wind-rowed, segregated and stored for later spreading across the disturbed corridor. Topsoil will be promptly seeded to control erosion, prevent weed establishment and maintain soil microbial activity.
    - In areas of high wind or water erosion, staked soil retention blankets will be used in combination with seeding to prevent topsoil erosion. Retention blankets will be a straw/coconut blend (or similar) and will be covered on the top and bottom with 100% fiber netting to reduce entanglement of small animals.
- Chevron will prevent and abate fugitive dust using water trucks as necessary (typically twice each week during drilling, completion, and construction operations and once monthly during operations), whether dust is created by vehicular traffic, equipment operations, or wind events.

Location of Existing Wells (Exhibit 3)

- 1-Mile radius map covering all wells in the HDA is attached
- A localized map will be included with each APD

Location of Existing and/or Proposed Production Facilities (Exhibit 4 – see Proposed Action Appendix F, Figures F.1 through F.8)

- Existing Facilities: No existing facilities will be used for the Proposed Action. The existing Chevron-operated facilities within the HDA are:
    - Cotton Hills 23 CTB: B-S23-T26S-R27E
    - Hayhurst 16 CTB: C-S16-T25S-R27E
    - Hayhurst 17 CTB: D-S17-T25S-R27E

- Skeen 2 CTB: C-S02-T26S-R27E

- Chevron submits this plan with the reasonable expectation that it will have the flexibility to change the locations and dimensions of any facility, pipeline, or disturbance, so long as the total disturbance remains within the boundary of the HDA EA and the total acreage of disturbance remains equal to or less than that proposed in the HDA Master Development Plan, without the necessity of revising the MDP. Any change in location from those outlined in the HDA MDP will require BLM approval through the APD or Sundry process.
- Proposed Facilities: 16 proposed CTB facilities are located across the HDA:

	Township	Range	Section	Unit Letter[1]	Lease
1	26S	27E	10	A	NMNM 121473
2	25S	27E	9	O	VB 1865 (off-lease)
3	26S	27E	8	P	NMNM 118108
4	25S	27E	35	L	NMNM 107369
5	25S	27E	17	H	NMNM 113954
6	26S	27E	12	E	NMNM 116028
7	25S	27E	35	L	NMNM 107369
8	25S	27E	31	B	NMNM 109756 (off-lease)
9	26S	27E	12	E	NMNM 116028
10	26S	27E	10	B	NMNM 121473
11	26S	27E	12	G	NMNM 116028
12	26S	27E	10	P	NMNM 121473
13	26S	27E	8	O	NMNM 118108
14	25S	27E	35	K	NMNM 107369
15	25S	27E	16	E	NMNM 113954
16	25S	27E	31	B	NMNM 109756 (off-lease)

1: Chevron submits this proposed action with the reasonable expectation that it will have the flexibility relocate facilities within the NEPA "drill island" corridors without the necessity of revising the MDP.

- Open top tanks or open containments will be netted.
- Open vent exhaust stacks will be modified to prevent birds or bats from entering, discourage perching, roosting, and nesting.
- Facilities will have a secondary containment 1.5 times the holding capacity of largest storage tank.
- All above ground structures will be painted non-reflective shale green for blending with surrounding environment.
- The permanent water disposal system will be determined prior to construction of any water transfer pipeline. Until permanent water takeaway is available, produced water will be hauled off location in trucks.

- Proposed Facilities: 7 proposed compression facilities are located across the HDA:

ID	Township	Range	Section	Unit Letter[1]
1	26S	27E	10	H
2	25S	27E	16	F
3	26S	27E	8	A
4	25S	27E	35	J
5	25S	27E	17	G
6	26S	27E	12	G
7	25S	27E	31	B

1: Chevron submits this proposed action with the reasonable expectation that it will have the flexibility relocate facilities within the NEPA "drill island" corridors without the necessity of revising the MDP.

- Proposed Facilities: 5 proposed SWD facilities are located across the HDA:

ID	Township	Range	Section	Unit Letter[1]
1	26S	27E	2	M
2	25S	27E	16	F
3	25S	27E	26	P
4	26S	27E	12	L
5	26S	27E	2	P

1: Chevron submits this proposed action with the reasonable expectation that it will have the flexibility relocate facilities within the NEPA "drill island" corridors without the necessity of revising the MDP.

- Pipelines: A number of pipelines will be required throughout the HDA:

Pipeline Service	Size (inches)	Length (miles)	Pressure (psig)	Material of Construction	ROW Width (ft)[1]
Gas lift	4	26.2	1100	Flexpipe	4
HP gas gathering[2]	12	14.7	1400	Steel	8
HF water[3]	12	14.3	200	HDPE	8
Produced water	12	17.8	150	HDPE	4
LP gas gathering	24	22.9	150	Steel	4
Oil gathering[4]	12	22.9	150	Steel	4
Temp Frac water[5]	10	TBD[5]	200	Polyurethane	N/A

1: All ROW also require an additional 10' construction corridor per Table 3 in the Proposed Action
2: HP gas gathering ROW will include some third-party pipelines
3: HF water includes all water to be used for hydraulic fracturing, which may be fresh, brackish or recycled
4: Oil gathering pipeline will be managed by a third party
5: See next section "Location and Types of Water Supply"

  - ROWs will be applied for through the BLM.
  - All construction activity will be confined to the approved ROW.
  - All permanent pipelines will be buried (none are surface-laid).
  - Temporary water lines will be surface laid for a period no longer than one year or time allotted by BLM Realty.
  - Pipeline will run parallel to existing disturbances wherever possible and will stay within approved ROW.

- Power lines: 37.3 total miles of power lines will be required across the HDA. All powerlines will be overhead (none are buried). The average span between power poles will be 250 feet and a total of 788 poles will be required. All distribution lines will operate at 12.47 kV and are designed to APLIC standards.

Location and Types of Water Supply (Exhibit 5 – see Proposed Action Appendix F, Figure F.11)

- Four ponds, designed as permanent recycling containments per NMAC 19.15.34, will be required across the HDA:

Pond ID	Section	Township	Range	Unit Letter[1]	Capacity (MBBL)
1	10	26S	27E	A	770
2	8	26S	27E	P	770
3	18	25S	27E	A	770
4	26	25S	27E	P	770

1: Chevron submits this proposed action with the reasonable expectation that it will have the flexibility relocate facilities within the NEPA "drill island" corridors without the necessity of revising the MDP.

- Water will be obtained from a variety of sources:

Source	Location	Quality	Transport Method
Local ground water	Within 15 miles of HDA	Fresh (0-5,000 TDS)	Pipeline or Truck
Capitan Reef	Near Jal, NM	Brackish (25-40,000 TDS)	Pipeline
Rustler Aquifer	Near Orla, TX	Brackish (25-40,000 TDS)	Pipeline
Recycled Produced	Within HDA	Saline (150-210,000 TDS)	Pipeline

- Local ground water will be sourced from the following vendors:

Vendor	Address
Gregory Rockhouse Ranch, Inc	1108 W Pierce St, Carlsbad NM 88220
MMX Excavating, Inc	2373 Pecos Hwy, Carlsbad NM 88220
Wolfcamp Water Partners	4800 Bryant Irvin Ct, Fort Worth TX 76107
XRI Blue	415 W Wall St #130, Midland TX 79701

- Water well locations are as follows:

Source	Vendor	Latitude	Longitude	Data Quality
Ground Water	Gregory Rockhouse Ranch, Inc	32° 12' 6.92" N	104° 15' 15.54" W	Exact
Ground Water	Gregory Rockhouse Ranch, Inc	32° 10' 17.39" N	104° 16' 35.76" W	Exact
Ground Water	Gregory Rockhouse Ranch, Inc	32° 12' 13.95" N	104° 14' 49.47" W	Exact
Ground Water	Gregory Rockhouse Ranch, Inc	32° 10' 52.89" N	104° 17' 38.43" W	Exact
Ground Water	MMX Excavating, Inc	TBD	TBD	TBD
Capitan Reef	Chevron U.S.A. Inc	31° 58' 23.81" N	103° 12' 52.12" W	Approx

- A temporary 10" expanding pipe surface transfer line will run along established disturbance corridors, such as along access roads or on top of flowline or pipeline rights-of-way.
    - Water line will run parallel to road and will stay within 10' of access road.
    - Temporary BLM ROWs will be applied for as needed for the water transfer lines.

Construction Material

- Caliche will be used to construct well pad and roads. Caliche will be purchased from the nearest federal, state, or private permitted pit
- Caliche will be used as surface material or fill for roads and pads, or to construct containment berms or low water crossings.
- The specific source of construction material will be specified in each APD's SUP
- The proposed source of construction material will be located and purchased by construction contractor.
    - Payment shall be made by contractor prior to any removal of federal minerals material by contacting agent at (575) 234-5972.
    - Notification shall be given to BLM at (575) 234-5909 at least 3 working days prior to commencing construction of access road and/or well pad.

Methods for Handling Waste

- Drilling fluids and produced oil and water from the well during drilling and completion operations will be stored safely and disposed of properly in an NMOCD approved disposal facility.

- Garbage and trash produced during drilling and completion operations will be collected in a trash container and disposed of properly at a state approved disposal facility. All trash on and around the well site will be collected for disposal.
- Human waste and grey water will be properly contained and disposed of properly at a state approved disposal facility.
- After drilling and completion operations, trash, chemicals, salts, frac sand and other waste material will be removed and disposed of properly at a state approved disposal facility.
- The well will be drilled utilizing a closed loop system (no reserve pits will be constructed). Drill cutting will be properly disposed of into steel tanks and taken to an NMOCD approved disposal facility.
- Chevron plans to utilize the following waste disposal sites:

Nearest City	Disposal Facility	Address	Phone Number
Carlsbad		6601 Hobbs Hwy, Carlsbad, NM	(575) 393-1079
Eunice	Sundance Services	5 miles east of Eunice on Hwy 18 and Wallach Ln	(575) 390-0342
Seminole, TX	Permian Disposal	587 US Hwy 385 S	(432) 955-0322

- Proposed Facilities: 5 proposed SWD facilities are located across the HDA:

ID	Township	Range	Section	Unit Letter[1]
1	26S	27E	2	M
2	25S	27E	16	F
3	25S	27E	26	P
4	26S	27E	12	L
5	26S	27E	2	P

1: Chevron submits this proposed action with the reasonable expectation that it will have the flexibility relocate facilities within the NEPA "drill island" corridors without the necessity of revising the MDP.

Ancillary Facilities

- Three ancillary facilities are envisioned for the HDA – a water tank facility, an electrical substation, and a central housing facility. Detailed proposals for these facilities will be included in the APD submitted prior to their construction.

Well Site Layout (Exhibit 6)

- Rig Layout (Exhibit 6)
  - Exterior well pad dimensions are 475' x 330'
  - Interior well pad dimensions from point of entry (well head) of the westernmost well are N-150', S-`80', E-255', W-220'. The length to the east includes 25' spacing for next well on multi-well pad (four wells).Total disturbance area needed for construction of well pad will be 3.60 acres
  - Topsoil placement is on the upslope edge of each pad (unless otherwise directed by BLM – final placement to be included in APD's SUP) no higher than 3 feet where interim reclamation is planned to be completed upon completion of well and evaluation of best management practices.
  - Construction methods: Pads would be constructed by clearing vegetation, salvaging and storing topsoil and leveling the drilling area using cut-and-fill techniques where appropriate.

Plans for Surface Reclamation

Reclamation Objectives

- The objective of interim reclamation is to restore vegetative cover and a portion of the landform sufficient to maintain healthy, biologically active topsoil; control erosion; and minimize habitat and forage loss, visual impact, and weed infestation, during the life of the well or facilities.
- The long-term objective of final reclamation is to return the land to a condition similar to what existed prior to disturbance. This includes restoration of the landform and natural vegetative community, hydrologic systems, visual resources, and wildlife habitats. To ensure that the long-term objective will be reached through human and natural processes,
  actions will be taken to ensure standards are met for site stability, visual quality, hydrological functioning, and vegetative productivity.
- The BLM will be notified at least 3 days prior to commencement of any reclamation procedures.
- If circumstances allow, interim reclamation and/or final reclamation actions will be completed no later than 6 months from when the final well on the location has been completed or plugged. We will gain written permission from the BLM if more time is needed.
- Reclamation will be performed by using the following procedures:

Interim Reclamation Procedures

- Within 6 months, Chevron will contact BLM Surface Management Specialists to devise the best strategies to reduce the size of the location.
- Within 30 days of well completion, the well location and surrounding areas will be cleared of, and maintained free of, all materials, trash, and equipment not required for production. A plan will be submitted showing where interim reclamation will be

completed in order to allow for safe operations, protection of the environment outside of drilled well, and following best management practices found in the BLM "Gold Book".

- In areas planned for interim reclamation, all the surfacing material will be removed and returned to the original mineral pit or recycled to repair or build roads and well pads.
- The areas planned for interim reclamation will then be recontoured to the original contour if feasible, or if not feasible, to an interim contour that blends with the surrounding topography as much as possible. Where applicable, the fill material of the well pad will be backfilled into the cut to bring the area back to the original contour. The interim cut and fill slopes prior to re-seeding will not be steeper than a 3:1 ratio, unless the adjacent native topography is steeper. Note: Constructed slopes may be much steeper during drilling, but will be recontoured to the above ratios during interim reclamation.
- Topsoil will be evenly respread and aggressively revegetated over the entire disturbed area not needed for all-weather operations including cuts & fills. To seed the area, the proper BLM seed mixture, free of noxious weeds, will be used.
- Before commencing construction activities, proper erosion control methods will be determined for use on the area including and outside area of topsoil placement to control erosion, runoff and siltation of the surrounding area.
- The interim reclamation will be monitored periodically to ensure that vegetation has reestablished

Final Reclamation (well pad, buried pipelines, and power lines, etc.)

- Prior to final reclamation procedures, the well pad, road, and surrounding area will be cleared of material, trash, and equipment.
- All surfacing material will be removed and returned to the original mineral pit or recycled to repair or build roads and well pads.
- All disturbed areas, including roads, pipelines, pads, production facilities, and interim reclaimed areas will be recontoured to the contour existing prior to initial construction or a contour that blends in distinguishably with the surrounding landscape. Topsoil that was spread over the interim reclamation areas will be stockpiled prior to recontouring. The topsoil will be redistributed evenly over the entire disturbed site to ensure successful revegetation.
- After all the disturbed areas have been properly prepared; the areas will be seeded with the proper BLM seed mixture, free of noxious weeds.
- Proper erosion control methods will be used on the entire area to control erosion, runoff and siltation of the surrounding area.

Surface Ownership (Exhibit 7 – see Proposed Action Appendix E)

- All surface is owned by BLM with the exception of the following:

Land Status	Township	Range	Section	Unit Letters
State Owned	25S	27E	16	All
Private	25S	27E	20	B, C, G, H, I, and J
State Owned	25S	27E	21	A, G, H, M, N, O, and P
Private	25S	27E	21	E and F
State Owned	25S	27E	26	C, F, I, J, and P
State Owned	26S	27E	2	All
Private	26S	27E	5	I, N, O, and P
State Owned	26S	27E	12	L

- BLM Surface – a number of surface tenants occupy the surface in the HDA:

Tenant Name	Allotment	Address
Forest A Connally	78094	126 S. Donaldson Farm Rd. Loving, NM 88256
Ogden Farm & Cattle Co.	78087	159 W. Ogden, Loving, NM 88256
Joy E. Cooksey	78101	P.O. Box 45, Carlsbad, NM 88221
Forehand Ranches, Inc.	78104	P.O. Box 5373, Carlsbad, NM 88221
Johnny Laxson	78102	224 W. Ogden, Loving, NM 88256
Martha Skeen	78142	P.O. Box 696, Loving, NM 88256
Owen Carleton	78107	P.O. Box 14, Malaga, NM 88263
Philip & Kendra Stell	78103	1305 Janway, Carlsbad NM 88220

- **Nearest Post Office:** Malaga Post Office; 15.4 Miles north

Other Information

- Recycle Containment Pond Design Features:
  - Four permanent recycle containment ponds will be required across the HDA. The ponds will be centralized and used across multiple leases (see Exhibit 5).
  - Permanent buried pipelines will be installed to transport water between the four ponds (see Exhibit 4). Temporary surface pipelines will be installed between the ponds and the site of hydraulic fracturing operations.
  - All wells covered by the HDA MDP will require hydraulic fracturing
  - The ponds will be designed as "multiwell fluid management pits" in compliance with NMAC 19.15.34 and will include the following design features:
    - Berms
      - Berms shall be sloped at 3:1 both internally and externally
      - Berm top will have at least 12 feet of working area and be capable of supporting light vehicle traffic
      - Berm height, thickness, and depth will be determined based on site-specific information and included in each APD and SF-299.

- Liners
    - Ponds shall be double-lined and have a method of leak detection, typically trenched HDPE pipe between liners
    - An 8 oz geotextile fabric shall be used to line the soil prior to installation of a secondary (bottom) liner
    - Primary liner should be 60-mil smooth HDPE; secondary liner should be 40-mil smooth HDPE
    - Minimum 200-mil geonet shall be installed between primary and secondary liner to maintain an interstitial space
- Fencing
    - Ponds shall have eight-foot game fencing installed around the perimeter, outside of bottom berm.
    - The fence bottom shall be keyed-in around the perimeter of the pond site and include the use of two-foot silt fencing to prevent access of smaller animals.
- Wildlife Protection
    - Typical bird deterrent options include molded decoy owls and noise-making streamers.
    - Wildlife protection measures, including those for migratory birds, shall be monitored at least monthly to ensure deterrents are effective.

Chevron Representatives

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EXHIBITS:

Exhibit 1 -- Existing Roads

Exhibit 2 -- New Roads

Exhibit 3 -- 1-mile Radius Map

Exhibit 4 -- Location of Existing and/or Proposed Production Facilities and Infrastructure (roads, pipelines, power lines)

Exhibit 5 -- Location of Existing and/or Proposed Water Infrastructure (pipelines, frac ponds)

Exhibit 6 -- Rig Layout: Well Site Layout Map / Diagram and Interim Reclamation Diagram

Exhibit 7 -- Surface Tenant Allotment Map

Exhibit 1 – Existing Roads

See Figure F.9 in the HDA Master Development Plan Proposed Action Appendix F

Exhibit 2 – New Roads

See Figure F.10 in the HDA Master Development Plan Proposed Action Appendix F

Exhibit 3 – 1-mile Radius Map

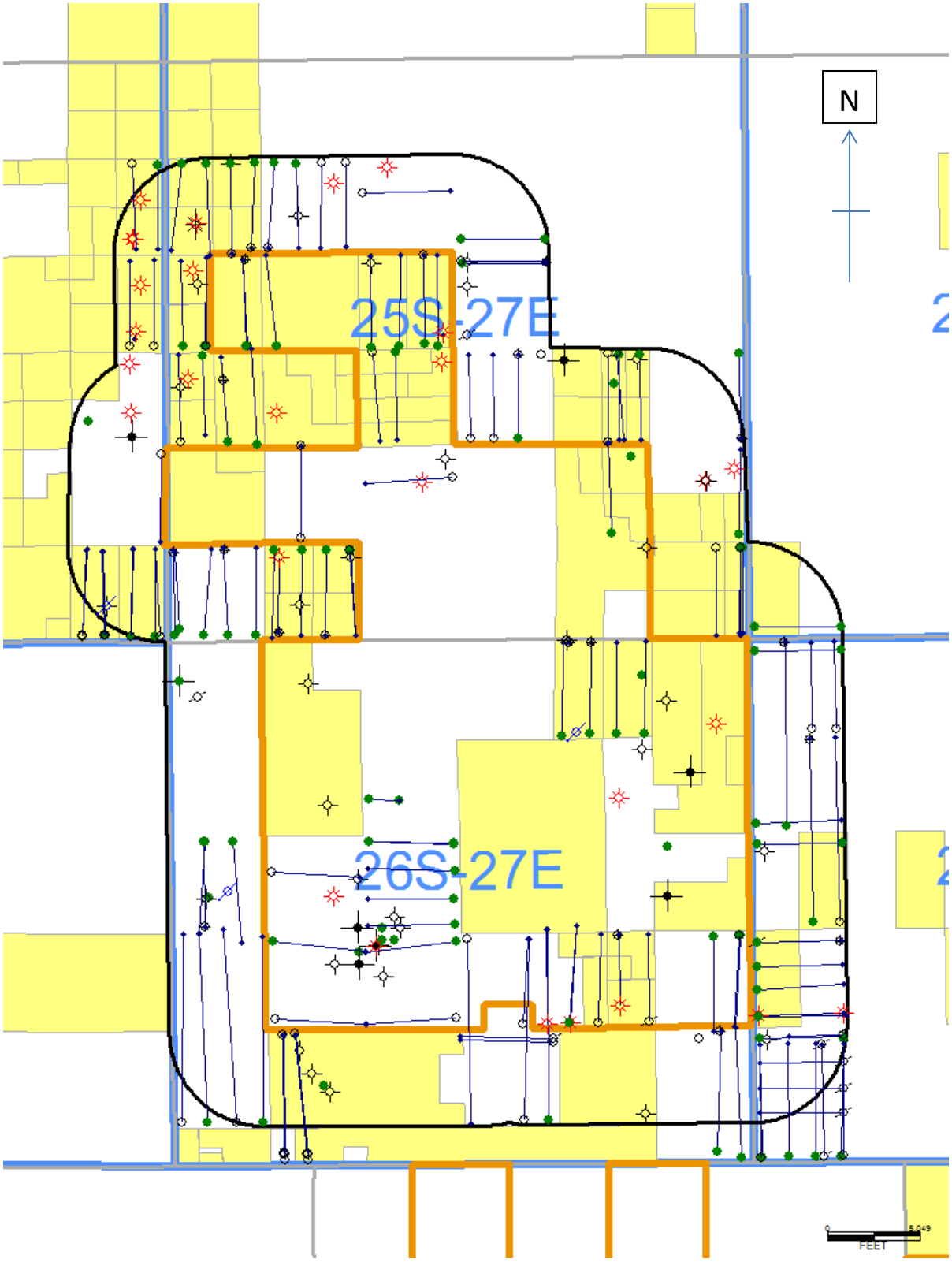


Exhibit 4 – Location of Existing and/or Proposed Production Facilities
and Infrastructure (roads, pipelines, power lines)

See Figures F.1 through F.8 in the HDA Master Development Plan Proposed Action Appendix F

Exhibit 5 – Location of Existing and/or Proposed Water Infrastructure (pipelines, frac ponds)

See Figure F.11 in the HDA Master Development Plan Proposed Action Appendix F

Exhibit 6A – Well Site Layout Map / Diagram

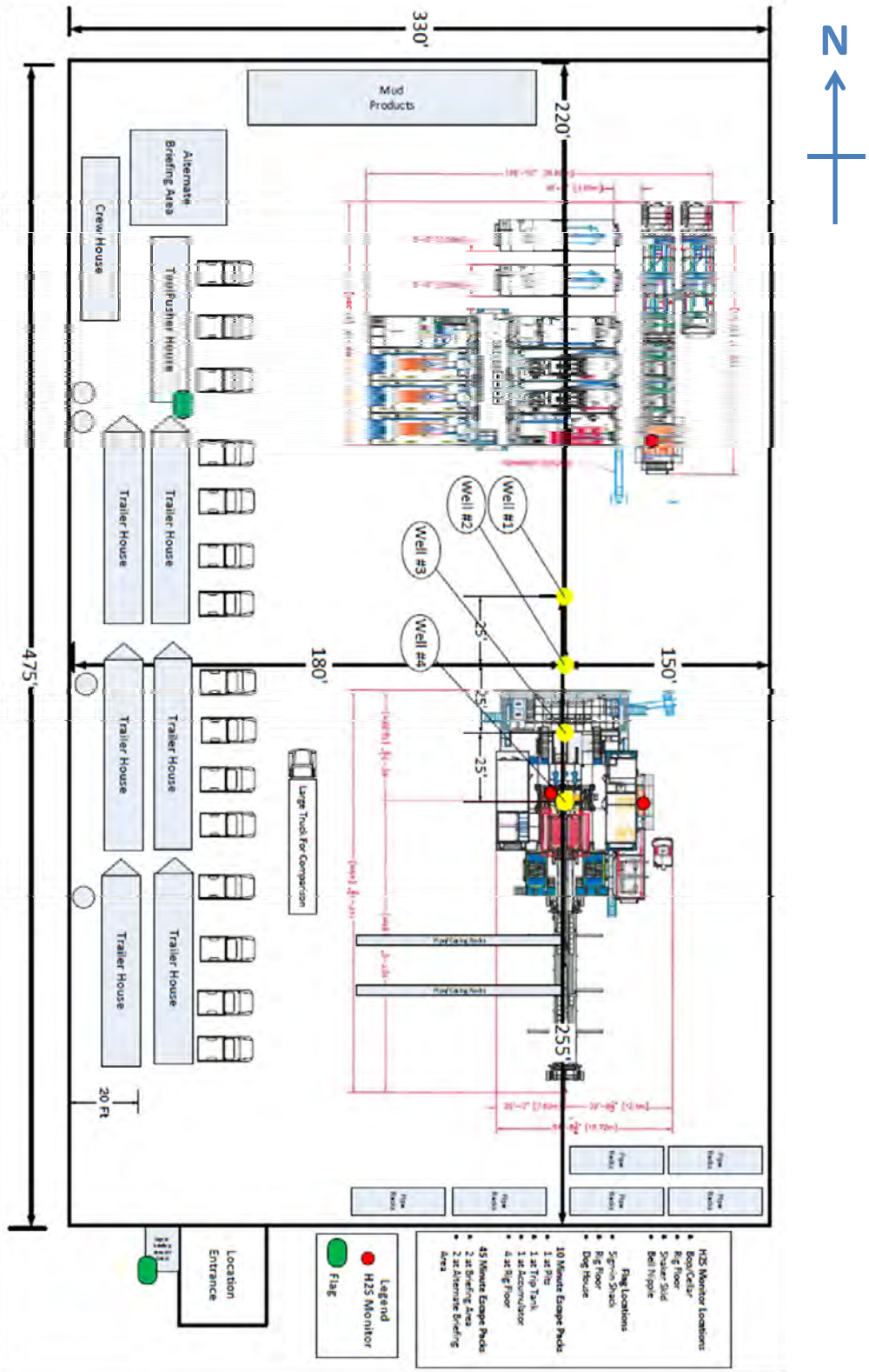


Exhibit 6B – Interim Reclamation Diagram

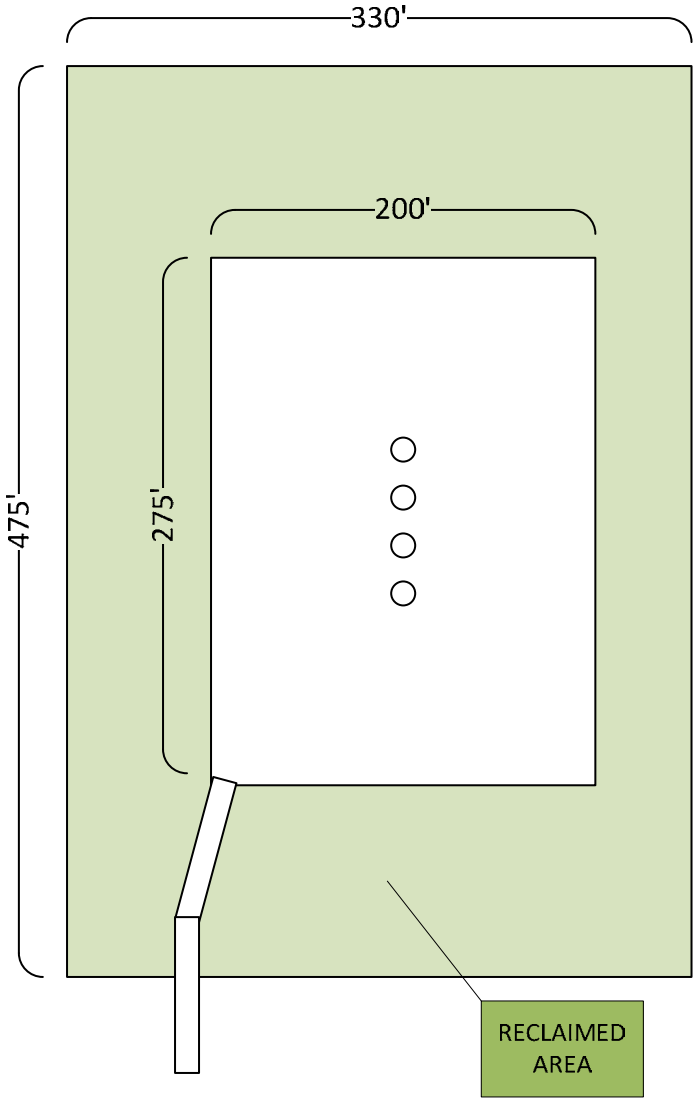


Exhibit 7 – Surface Tenant Allotment Map

See Figure E.1 in the HDA Master Development Plan Proposed Action Appendix E

APPENDIX C

WELL PAD TYPICAL
(DRILLING AND PRODUCTION)

Exhibit 6A – Well Site Layout Map / Diagram

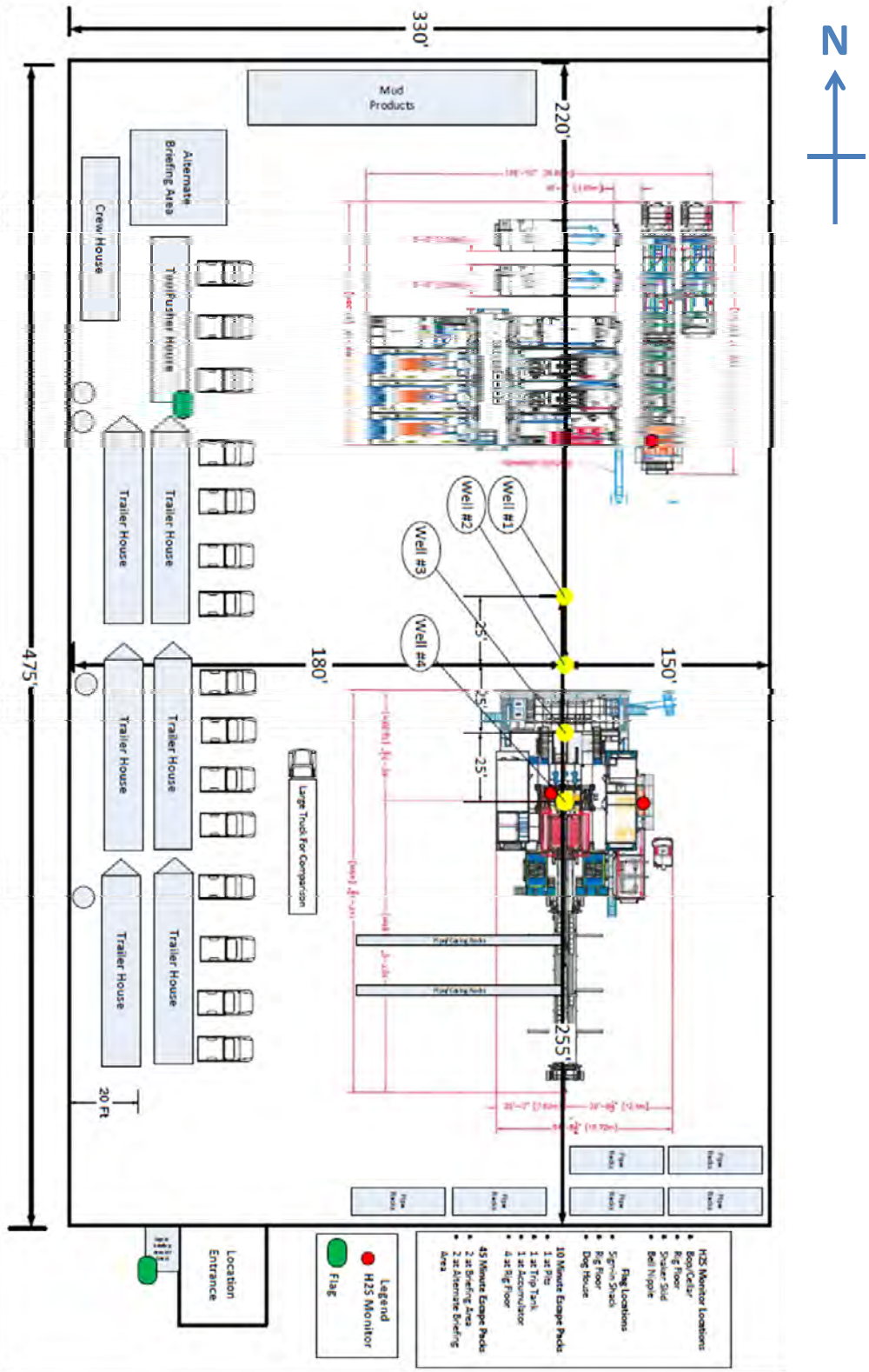
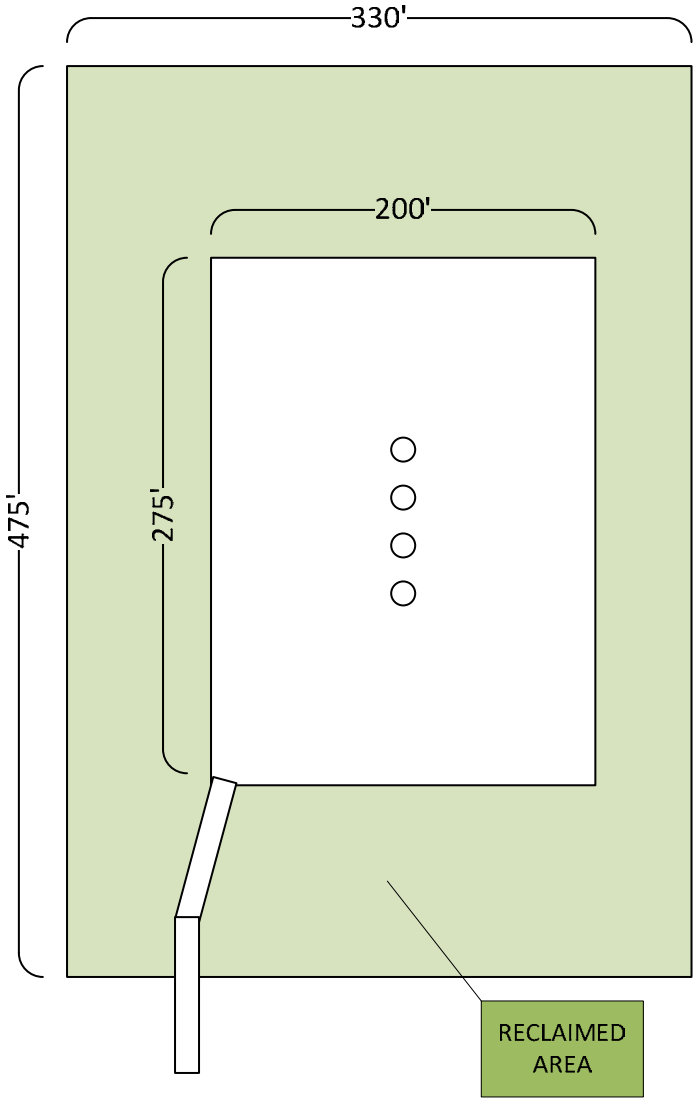


Exhibit 6B – Interim Reclamation Diagram



HYDRAULIC FRACTURING WHITE PAPER

BUREAU OF LAND MANAGEMENT
NEW MEXICO STATE OFFICE
DIVISION OF FLUID MINERALS

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This document is a publication of the Bureau of Land Management Fluid Minerals Division of the New Mexico State Office. Questions or comments regarding this document should be directed to:

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EXECUTIVE SUMMARY

This White Paper is written as a technical document to support the preparation of NEPA-compliant documents relative to the leasing of Federal minerals in the New Mexico State Office Region. A white paper is traditionally an authoritative report or guide informing a diverse audience about a complex issue intended to help readers understand an issue, solve a problem, or make a decision.

Hydraulic fracturing (also known as HF, fracking, or hydro-fracking) has played an important role in the development of America's oil and gas resources for more than 60 years. Currently, in the U.S., an estimated 35,000 wells are hydraulically fractured every year. It is estimated that over one million wells have been fracked in the U.S. since the late 1940s. As production from conventional oil and gas fields continues to mature and taper off, the shift to non-conventional hydrocarbon resources (such as shale plays or formations that are difficult to produce due to low permeability and porosity) increases, suggesting that the importance of fracking will also increase.

Hydraulic fracturing is a well stimulation technique that has been used in the oil and gas industry since 1947. It is based on controlled subsurface injection of a working fluid at high pressure, which carries with it tiny particles to hold open the artificially stimulated fractures created by the pressurized fluid. The process involves perforating the casing of a wellbore where it passes through the well's target geologic formation and injecting fracturing fluids into the formation with enough energy to force the rock layers apart, creating cracks through which oil or natural gas can then flow to the wellbore. While the concept and procedures for hydraulic fracturing are similar across all subsurface fluid hydrocarbon resource types, variations in design occur at different locations (basins) and resources (reservoirs or formations). Shale gas wells drilled using horizontal drilling technologies often require larger amounts of fracturing agents (e.g., water), and more stages than vertically drilled wells.

Hydraulic fracturing has become an integral part of oil and gas development across the United States. Improvements in fracking technology have yielded more oil and gas production, dramatically reduced the environmental footprint of development, and made it economically feasible to pursue fluid mineral resources that in the past have been impossible to develop. The 60-year history of hydraulic fracturing demonstrates how technology has evolved to support development of different resource types in diverse locations, to lessen environmental impacts, to improve economics, and to address regulatory considerations. Fracking is now being used to complete up to 95% of new wells, and hydraulic fracturing design is being continuously refined and modified to optimize fracture networking and maximize resource production.

Concerns over the environmental impacts associated with hydraulic fracturing have led to extensive research and studies. Air emissions, withdrawals of surface and ground water, produced water management, surface impacts, biological impacts, vibrations, noise, visual and

community impacts have all been brought forward as potential problems by individuals and organizations concerned about possible environmental consequences of fracking. However, as technology has progressed, operators and regulators have identified and developed extensive project design features and mitigation measures to ameliorate potential adverse impacts.

Limitations of economics, technological capabilities and water availability influence the oil and gas industry across scales ranging from local to global. This paper is intended to discuss the use and challenges of hydraulic fracturing today, as well as future use of the technology.

As hydraulic fracturing is applied to unconventional resources in previously undeveloped areas, it has become the focus of many regulatory revisions at Federal, regional, state, and local levels. Although fracking is currently regulated at all of these levels, many groups and individuals have called for additional federal regulation. In 2010, Congress directed the EPA to investigate fracking and its effects on water in several states. EPA is expected to release a draft report on the potential impacts of hydraulic fracturing on drinking water in 2015. In October 2012, EPA promulgated regulations for air emissions from hydraulically fractured gas wells. Future developments in hydraulic fracturing will likely include techniques for more efficient water usage, increased use of environmentally benign chemicals, active treatment systems (or water remediation) and movement away from high water volume fracturing to foam fluid fracturing or other technologies such as sonic or microwave. Monitoring and simulation technologies will likely become more advanced, leading to further advancements in fracture designs.

INTRODUCTION

1. Definition of Hydraulic Fracturing

Hydraulic fracturing is defined as:

> Operations conducted in an individual wellbore designed to increase the flow of hydrocarbons from the rock formation to the wellbore through modifying the permeability of reservoir rock by applying fluids under pressure to fracture it.

Hydraulic fracturing (fracking, HF, or hydro-fracking) is not a "drilling process." Hydraulic fracturing is used after drilling of the "hole," or wellbore, is completed. Fracking creates pathways through geologic formations that increase the rate at which fluids can be produced from the reservoir. Since each oil and gas formation (or zone) is different, the fracking treatments vary in each basin, reservoir, and sometimes well-by-well. While the process remains essentially the same, fracking treatments are designed to meet the unique conditions of each well. Additives to fracturing fluids are used in every treatment, but the exact mixture and proportions will vary based on the site-specific characteristics of the target formation.

Fracking is carried out in predesigned stages that can be altered for site-specific conditions or adjusted during the treatment, if necessary. When designing a frack job, the engineer gathers information on the reservoir to be fractured and uses it to select, optimize, and place the treatment. Many data sources inform the frack design process and may include 3D seismic, geologic mapping, core analysis, drilling logs, and open-hole logs.

The fracking treatment is performed after perforations are made through the casing, the metal pipe that lines the wellbore, into the target formation. In general, these steps are as follows:

- Pad – The initial step of the fracture treatment, the "pad" typically consists only of fluids. In some cases, very small amounts of sand may be used to more fully open the perforations in the casing. The pad sets up for better penetration of the proppant-laden fluid steps to follow.
- Proppant – After the pad is pumped into the wellbore, the next step introduces fluids carrying "proppant," solid particles intended to "prop" open the fractures newly created in the formation. The most common proppant is sand.
- Displacement or Flushing – Displacement flushes out excess proppant. This step consists mostly of water with no additives.

Multistage fracking, in very deep wells and in horizontal wells, may be done in multiple stages and locations from within a single wellbore. These multiple stages are completed from the bottom to the top of the productive interval(s), continuing up-hole to access the entire interval or to frack other formations. Staging the fracking treatments allows for better control and monitoring of the process.

Typically, fracking is done during the initial completion process of the well, following drilling, and its costs are associated with the drilling of the well. However, many existing wells can be re-fracked when they have declining production levels and would no longer be economically productive without re-stimulation.

2. The Technology of Hydraulic Fracturing

The first commercial application of fracking occurred in 1947 in the Hugoton Field of Kansas. In the following 60-plus years, the use of fracking technology has been developed to the point where it is routinely used to complete oil and gas wells, particularly in areas of "unconventional production," such as tight shale reservoirs. It is estimated that approximately 35,000 wells are fracked each year in the United States. By July 2010, over 600 trillion cubic feet (tcf) of natural gas and 7 billion barrels (bbls) of oil had been produced from wells that had undergone stimulation by hydraulic fracturing.

Since the first commercial "Hydrafrac" application, the fracking process has undergone a number of technological advances to adapt to the variety of reservoirs responsive to stimulation through fracking. Advancements in other technologies, such as horizontal drilling, have also played a role in the development of new fracking techniques. The first hydrofracturing treatments used about 750 gallons of fluid and 400 pounds of sand. Today, treatments can exceed 1 million gallons of fluid and 5 million pounds of proppant.

Originally, fracking operations were performed with gelled crude oil, followed by kerosene and other refined and crude oils. In 1952, developers began to use water as fracking fluid and identified the need for gelling agents to thicken the water enough to keep proppant suspended during stimulation. In the years to follow, more additives, including surfactants, clay-stabilizing agents, and metal cross-linking agents, were patented to make fracking treatments more efficient and successful. Today, water-containing fluids like acid and brines make up approximately 96% of all fracturing treatments that use a propping agent.

Numerous propping agents have been used throughout the years, including plastic pellets, shell shot, Indian glass beads, aluminum pellets, high strength glass beads, rounded nut shells, resin-coated sands, and others. But from the beginning, standard mesh sand has been the most popular proppant. Initial sand concentrations were low, but have steadily increased, with a spike in recent years due to advances in pumping equipment and improved hydraulic fracturing fluids.

Fracking designs are constantly being refined to optimize fracture networking, or interconnectivity, and maximize resource production while ensuring that fracture development is confined to the target formation for both horizontal and vertical wells. Initial treatments were designed using complex charts, monographs, and calculations. Modern formation stimulation practices have become very complex and the process has developed into a sophisticated engineered process in which production companies work to design a fracking treatment that helps forecast placement of fracture networks in specific areas.

The latest advances in fracking design utilize computer simulations and models, microseismic fracture mapping, and tilt measurements to analyze the treatment. These technologies can be used to define the success and orientation of the fractures created, thus providing engineers the ability to manage the resource through intelligent placement of additional wells to limit the drilling of unnecessary exploration wells and exploit the natural conditions of the reservoirs.

Coupled with the advancements in the fracking process, horizontal drilling has become a more viable option to better produce hydrocarbon resources. In combination, these technologies have proven a successful means to economically develop unconventional tight and shale gas reservoirs. Horizontal drilling was used as early as the 1930s, but like fracking, has been continually modified and improved. By the 1980s, horizontal drilling had become a standard industry practice in some areas. The combined technologies of horizontal drilling and hydraulic fracturing were very successfully applied to the Barnett Shale in Texas and have since been replicated in other shale gas basins, making previously un-developable resources some of the largest natural gas-producing fields in the country.

The technological development of fracking has been greatly influenced over time by the need to address specific resource locations and geological barriers to the extraction of oil and gas. No single fracking technique is equally optimum for all applications. Variations in reservoir properties require tailoring each frack by using different techniques, fluids, and additives.

Development of unconventional energy resource plays, including coal bed methane, tight sands, and shale, has been a growing source of oil and gas exploitation in the U.S. Since 1998, unconventional natural gas production has increased nearly 65% through use of fracking.

The technological developments specific to fracking that have been driving factors for successful exploitation of unconventional resources have been:

- Slickwater fracturing (SWF), a process developed whereby very few additives are added to the frack fluid
- Multi-stage fracks along horizontally drilled wellbores (especially successful in shale formations)
- Simultaneous or sequential fracking of multiple wells in an area
- Foam fracks (typically using nitrogen as the primary fluid)

3. Hydraulic Fracturing: From Drilling to Fracking

Hydraulic fracturing is the injection of fluids into a subsurface geologic formation containing oil and/or gas at pressure sufficient to create fractures through which oil and gas can flow to a wellbore. All the following activities must be successfully completed before fracking can start.

3.1 Well Design and Construction

Drilling and completing a well consists of several sequential activities:

- Site construction
- Rigging up (drilling rig, ancillary equipment, and monitoring and testing equipment)
- Drilling the well
- Logging the hole
- Running casing
- Cementing the casing
- Logging the casing
- Perforating the casing
- Stimulation, or fracking
- Installing production equipment
- Bringing well production online
- Monitoring well performance and integrity
- Reclaiming disturbance in areas no longer needed during production

Well construction and integrity are essential for isolation and protection of hydrocarbon-productive and water-bearing zones. This isolation serves to eliminate potential for cross contamination or leaks. The design and construction of a well emphasizes the integrity of the casing as a barrier and zone isolation, by using the fundamentals of wellbore preparation, mud removal, casing and cementing placement. The placement of casing and cement, specifically, is done primarily to protect groundwater and provide isolation of hydrocarbon-bearing zones.

3.2 Casing and Cement

The design and selection of the casing used in a wellbore is of the utmost importance. The casing must withstand the various compressive, tensional, and bending forces exerted throughout the well construction and production phases. It must also withstand the collapse and burst pressures that may exist during other phases in the life of the wellbore.

A typical well casing design has four main components: conductor, surface, intermediate, and production casing. Setting depths for each casing string is determined as part of the engineering design and are approved by both Federal and State Agencies. Every long section of casing pipe or "casing string" is designed to assure isolation and provide sufficient integrity to support subsequent drilling operations downhole.

- Conductor casing – the first string of casing installed. This string serves as the foundation of the well. Its purpose is to hold back unconsolidated surface sediment, protect subsequent casing stings from corrosion, and sometimes serve as structural support for the wellhead equipment. This string is always cemented from the bottom to the surface.

- Surface casing – installed after the conductor pipe is cemented and pressure tested. The main purpose of the surface casing is protection of usable water aquifers. In some instances, unique geologic conditions prevent the surface casing from being run deep enough to cover the deepest groundwater aquifer (such as in the San Juan Basin). In such cases, aquifer isolation should be achieved by running additional strings of casing, including single or multiple intermediate strings. Typically, these casing strings are also required to be cemented to surface. The surface casing is pressure tested to validate that integrity of the casing and cement has been achieved before drilling the subsequent hole.
- Intermediate casing - installed after the surface casing is pressure tested and determined to be structurally competent. The purpose of the intermediate casing is to isolate formations that might contribute to wellbore instability and to provide wellbore protection from high-pressure formations. In cases where the surface casing has not been run deep enough to protect the lowest groundwater aquifer, the intermediate casing serves as the primary layer of usable water protection. Although it is not always necessary or desirable to cement the intermediate casing back to surface, it is essential that cement extend above any usable water or hydrocarbon bearing zone. If cement is not circulated to surface, a diagnostic tool (CBL, CEL, etc.) is required to be run to determine areas where cement is behind the casing and to ensure achievement of zone isolation. The intermediate casing is pressure tested to validate casing and cementing integrity required before drilling the subsequent hole. If the pressure test is a failure, remedial action may be required. Some locations may require a second intermediate casing string for resource protection (such as portions of the Capitan Reef in the Permian Basin).
- Production casing – the last string of casing installed in the wellbore, is often set to the total depth of the well. The purpose of the production casing is to provide isolation between the producing zone and all other formations. Fracking operations may be conducted through this string of casing, or through another temporary casing placed inside it for the frack. The most important function of this production casing string is to contain the hydrocarbon production within the wellbore and isolate it from the producing zone. Downhole equipment is contained in this casing string, including such things as tubing, packers, and submersible pumps. Cementing options for this string of casing are many and vary depending on uphole wellbore design and geologic conditions. If the productive formation is to be hydraulically fractured, cement should be pumped at least 500 feet above the formation(s) to be fracked. A diagnostic tool (CBL, CEL, etc.) must be run to determine exactly where the cement is. Prior to fracking, the production casing is pressure tested.

Cementing is a critical part of well construction and is a fully designed and engineered element of a well. The purpose of cementing the casing is to provide zonal isolation between different formations, including full isolation of usable water and other resources, and to provide structural support for the well. Cement is fundamental to maintaining a well's integrity throughout its life. The combination of casing and cementing provides the basis for a successful fracking job.

3.3 Perforating

A perforation is a hole that is created through the casing and into the producing hydrocarbon reservoir. A perforation is made by detonating a shaped charge through the casing and into the formation using hot, high-pressured gas. These holes are the points in the casing through which oil and gas can be produced into the wellbore.

3.4 Hydraulic Fracturing Process

The process of hydraulic fracturing increases the exposed area of the producing formation, creating a high conductivity path for fluids to flow from the formation into the fracture, and then into and up the wellbore. During the fracking process, fluid is pumped into the production casing (or into a frack string installed for the purpose), through the perforations, and out of the wellbore into the specifically targeted formation at pressures high enough to break the rock and form fractures. With continued high-pressure fluid injection, the fractures continue to grow, or propagate. As the fractures continue to propagate, a proppant, such as sand, is added to the fluid. When the high-pressure pumping is stopped, the fracture attempts to close, however, it cannot close completely because the proppant is left in the created fractures, effectively wedging them open and allowing reservoir fluids to flow into the wellbore. The laws of physics dictate that the fractures will propagate along the path of least resistance.

3.5 Fracking Treatment Monitoring

Data is collected and analyzed during the fracking treatment to ensure that it is successfully performed and that usable waters are protected. Parameters that are continuously monitored during the frack include surface injection pressure, slurry rate, proppant concentration, fluid rate, and proppant rate.

3.5.1 Pressure Monitoring

Pressure behavior throughout the entire fracking treatment is monitored so that any unexplained deviation from the pretreatment design can be immediately detected and analyzed before operations continue. Unexpected or unusual pressure behavior could indicate a potential problem. Severe problems detected through pressure monitoring may be cause to shut down the treatment immediately.

3.5.2 Fracture Mapping

Mapping of the created fractures allows for evaluation of the path and extent of a frack treatment, which can lead to improvements in future frack jobs. A tiltmeter may be used to measure the change in the inclination of the wellbore and through the use of computer programs, allow for data to be monitored in real time.

Microseismic mapping allows for monitoring of microseismic events associated with fracture growth, in three dimensions, in real time. Microseismic monitoring provides a means to evaluate

critical fracking parameters such as vertical extent, lateral extent, and azimuth. This allows for controlling the treatment and containing the treatment to the desired formation.

3.6 Post-completion Monitoring

Well conditions are monitored to ensure sufficient integrity of the well throughout its lifetime. Components typically monitored include the casing, all downhole equipment, the well head, and production equipment.

ENVIRONMENTAL CONCERNS

Table 1 summarizes some possible direct and indirect environmental impacts along with possible design features for conducting hydraulic fracturing operations. This table is for illustration purposes only; it is not intended to be a complete compilation of potential impacts that may be associated with fracking. Specific environmental impacts for all Federal actions are required by law to be disclosed in accordance with National Environmental Policy Act (NEPA).

1. Air Emissions

Air pollutants are emitted during the performance of a hydraulic fracturing job. The EPA promulgated regulations in 2012 that require stimulation/completion of hydraulically fractured gas wells to be green starting in 2015; rather than letting it escape to the air, natural gas would be captured, separated and placed in pipelines for sale, when and where possible. However, EPA has no air quality regulations that apply to hydraulically fractured oil and gas wells or other aspects of hydraulic fracturing that emit air pollutants. Air emissions related directly to fracking include:

- Diesel, dust and greenhouse gas emissions from truck traffic related to water hauling and equipment mobilization. Design features that can be implemented to reduce air emissions from truck traffic and equipment include stabilization of road surfaces by watering and/or use of dust suppressants, locating source water close to well sites, use of temporary or permanent pipelines, water recycling, and water handling at centralized locations.
- Diesel engine power sources are also potential points of emissions. Possible design features to reduce emissions include using smaller engines or solar or battery powered engines to power blenders, pumps, and other equipment.
- Post-stimulation (after frack) activities from production of the well. These take place during the flowback of fluids after the frack job has been completed. The release of natural gas may occur during this time and until the well is connected to the pipeline or is placed on production. Design features to decrease completion emissions include “green completions”.
- Hydrocarbon emissions from storage of post-fracking produced water in surface pits. Design features to reduce these emissions include the use of closed-loop systems for the handling of produced water.

Minimizing air emissions is not only in the best interest of the public, but may also have economic benefits. Capturing methane emissions can generate additional revenue, increase operational efficiency, and conserve natural gas while reducing environmental impacts.

2. Water Sources

Water used in fracking can come from surface water, groundwater, and reused water from other sources, such as previous fracking operations. There are concerns that when surface or groundwater is used in fracking and disposed of in underground injection wells, it may lost to the natural water lifecycle.

2.1 Surface water

The utility of surface water for fracking is affected by several factors, including availability and distance from streams or lakes. Water availability may be affected by seasonally low stream flows or drought. In addition, the distance from the water source to the well location may be so far that it negates the practicality of use due to the high economic or environmental costs of transportation. Direct and cumulative impacts to surface water sources used for fracking include:

- Impacts to stream flow, aquatic life, wetlands and habitats and water quality degradation can occur when runoff and other contaminants are not adequately diluted by usual flow amounts. Design features to reduce impacts include careful selection of the withdrawal location, analysis and/or monitoring to demonstrate that sufficient flow capacity is available, and capturing water during high surface flows and storing it until needed. Specific conservation measures can be required to protect special status species, such as screening pump intakes to protect endangered fish.
- Impacts to municipal and industrial water supplies can occur if they are used as the main source for water for use in fracking operations. Design features to reduce impacts include reuse or recycling of water used in previous fracking operations.

2.2 Groundwater

A primary concern associated with groundwater withdrawals for fracking purposes is the potential for aquifer drawdown or depletion, which would impact other uses such as public and private water supply wells. Groundwater withdrawals for individual frack jobs might not cause substantial impacts; however, multiple withdrawals in concentrated areas that were in excess of the recharge rate could result in direct or cumulative impacts such as a decrease in the water table or depletion of resources that are currently used by others. Other possible impacts from groundwater withdrawal include salt water intrusion, contamination from surface spills, lower water levels in surface water bodies, and the release of free gas. Design features to reduce impacts include lined containment with leak detection, monitoring groundwater to assure that safe levels and water quality are maintained for all users.

2.3 Produced Water

Typically, some fracturing fluid remains in the formation after fracking operations are complete. The volume recovered varies among basins, plays, and even wells. Volumes may range from less than 30% to more than 70% of the original injected volume. The remaining fluid might not be recovered during production of the well. "Produced water," a byproduct of oil and gas wells, can be treated and reused as a major component of frack fluid, reducing the volume of "new" or fresh water needed from other sources. This can lessen multiple environmental impacts from water transportation and from depletion of water sources. Reuse of produced water also reduces impacts associated with produced water disposal. In some cases produced water is mixed with fresh water to dilute its constituents to concentrations that enable its reuse and recycling. Recycled produced water can be used as needed on-site or stored for future use at a centralized water handling facilities.

2.3.1 Produced Water Management Challenges and Concerns

Best Management Practices (BMPs) are generally employed by industry as design features to manage post-frack produced water, or "flowback," to protect surface and groundwater resources and reduce future demands for fresh water. Use of BMPs may be affected by regulatory requirements of Federal, state or local governments. Typical management and BMPs include:

- Underground injection when suitable geological conditions are present
- Treatment and discharge or reuse
- Recycling

BMPs that reduce environmental impacts for produced water storage may include:

- Aboveground rigid tanks in lieu of pits
- Lined pit with leak detection system
- Impoundment facilities

3. Surface Disturbance

A pad for a well that will undergo fracking operations must be big enough to provide for storage of the water, additives, and equipment used to perform the stimulation. Surface water impoundments or facilities may be constructed to store freshwater for drilling and/or fracking operations or to hold produced water before it is transported to a disposal site. Buried or temporary surface pipelines may be installed to carry fresh and produced water to or from the site to a central water storage or handling facility, minimizing impacts from truck transport.

Surface disturbance is decreased by drilling horizontal rather than vertical wells, partly due to their capacity to be completed by use of fracking. When oil and gas wells are developed horizontally, fewer wells must be drilled to effectively produce the fluid mineral resources, substantially reducing the overall amount of surface disturbance from new well pads, roads,

pipelines, etc. Additionally, when multiple horizontal wells are drilled on a single pad, further surface disturbance is prevented. Drilling and hydraulically fracturing horizontal wells is a direct means of minimizing and mitigating surface impacts that would otherwise be expected as typical results of oil and gas development. Not only are multi-well pads being developed, but also centralized water handling and fracking facilities to service them, greatly reducing the surface disturbance that could otherwise be associated with drilling and completing multiple wells.

The surface disturbances associated with fracking are typically short-term relative to the life of the producing well. Once a well has been drilled and completed, the portions of the well pad that are no longer needed during the production phase of the well are reclaimed. Once a well reaches its economic limit and production is no longer viable, the well is plugged and abandoned. The remaining surface disturbances are reclaimed and restored.

4. Biological Impacts

Developing an oil and gas field using horizontal wells drilled from multi-well pads, and stimulating them by fracking minimizes the number of wells and surface disturbance needed to fully develop that fluid mineral resource, therefore minimizing biological impacts. Research has documented that activities associated with oil and gas production can affect resources like plants, wildlife and their habitats. State regulations, and sometimes local ordinances, include mandatory operational restrictions to protect wildlife and other sensitive resources. Federal mitigation measures that could be mandated include restricting development where resource concerns are sensitive, attaching project-specific Conditions of Approval to a permit, and otherwise establishing limitations on operations that could affect wildlife or other sensitive resources. For example, a wildlife restriction might require a fracking schedule to avoid a 60-day period when deer typically occupy their critical winter range. Such resource protection should be considered by operators as project design features when oil and gas development is being planned.

5. Induced Seismicity

Recent seismic events in areas with oil and gas development have caused concern about whether they correlate directly to fracking activities. Though there is little evidence to directly link hydraulic fracturing to induced seismicity, mounting evidence suggests that injection of produced water underground as a means of disposal can induce seismicity under certain geologic settings or conditions. In some areas, disposal wells are necessary to manage produced water, including that produced as flowback from fracked wells. To mitigate the possible effects of seismic events, geologic structures surrounding injection wells needs to be thoroughly investigated and injection rates and quantities monitored. Ongoing studies to determine connections between underground injection and seismic activity should provide more comprehensive information.

6. Noise

The noise impacts associated with fracking include noise created by vehicle traffic noise and by fluid handling and pumping. Design features to reduce noise include reusing produced water and transporting water via pipeline from a centralized water handling facility or water source, rather

than trucking it. Maximizing the distance from human and wildlife noise receptors, restricting timing of operations, using noise-directing equipment to conduct sound away from receptors, and using constructed or natural sound barriers are all methods to reduce the impact of noise associated with fracking. Noise related to fracking activities is a short-term impact. In instances where noise may adversely affect humans or wildlife, the BLM may require operators to perform noise monitoring and analysis to determine appropriate noise abatement strategies.

7. Visual Impacts

The visual impacts associated with fracking are due primarily to the large number of trucks and amount of equipment required to conduct for the fracking operations. These impacts are considered short-term relative to the life of the well. Visual impacts should be anticipated and minimized as part of the planning and design of a proposed location. Setback requirements for the distance from the well pad to occupied dwellings or other key observation points may be established site-specifically by BLM or by other regulatory entities, to reduce visual impacts.

Lighting issues are also of concern when developing oil and gas resources at the urban interface or near occupied dwellings, and occasionally where sensitive nocturnal wildlife would be affected. BLM may require the use of directional lighting or use of alternative types of lighting to minimize such impacts. In some cases, BLM could stipulate that drilling or completion operations must be completed during daylight hours.

8. Community Impacts

Community impacts associated with fracking include short-term increases in traffic volume, road damage, fugitive dust, visual impacts and noise, as previously described. Mitigation measures include avoidance, best management practices, schedule adjustments, dust abatement measures, installation of sound barriers, use of temporary pipelines, timely road maintenance, and maximizing distance as possible between community members and oil and gas operations.

Table 1: Environmental Issues of HF

Environmental Issue	Impact	Design Feature
Air Emissions	Truck traffic emissions	Locating water near well site Installing temporary pipelines Water management
	Diesel engines for pumps	Smaller, more powerful engines Solar powered batteries
	Produced frack fluids, methane emissions	"Green" completion
Water sourcing: Surface water	Stream flow, aquatic life, wetlands, habitat	Ensuring sufficient flow capacity before withdrawal Selective withdrawal locations Locating wellpad at least 300' from flowing water Use of screen pump intakes (fine mesh)
		Capturing water during high surface flows
	Municipal water supply	Ensuring sufficient flow capacity before withdrawal State/local agency permitting requirements may require mitigation measures
Water sourcing: Ground water	Salt water intrusion Contamination from surface Lower water table levels Release of free gas	Monitoring to assure safe levels are maintained Post-frack analysis to confirm water isolation from the hydrocarbon zone
Produced water management	Storage in pits can impact groundwater	Use above-ground tanks in lieu of pits Line pits and use leak detection systems Groundwater monitoring wells
Surface impacts	Land disturbance	Multi-well pads Centralized fracturing facilities Interim and final reclamation
Biological impacts	Wildlife and habitat impacts	State regulations, lease stipulations Restrictions on development Permitting Conditions of Approval Timing restrictions for operations
Vibration	Seismic events	Investigation of injection wells Monitoring of injection rates
Noise	Vehicle traffic	Reuse of produced water Use of temporary above ground pipelines Centralized water facilities and management
	Fluid handling and pumping	Maximize distance from human and wildlife receptors Timing restrictions for operations Installing noise-directing equipment Artificial or natural sound barriers
Visual	Trucks and equipment	Design to minimize visual impacts Setback requirements Directional lighting Centralized fracturing facilities
Community Impacts	Traffic volume increase	Avoidance practices Timing restrictions for operations Temporary above ground pipelines
	Road damage	Road maintenance and repair agreements Temporary above ground pipelines
	Dust	Dust abatement techniques
	Noise	Sound barriers

ECONOMIC IMPACTS

Economic impacts to industry and to the public (as consumers and as citizens) are many. In addition to its use during the initial completion stage of a well, fracking is also used to improve production rates in existing wells where production has declined to uneconomic limits, prolonging the productive life of the wells and eliminating the need to drill new ones. In new and existing wells, hydraulic fracturing increases production rates and total hydrocarbon recovery. Fracking allows for effective production of the fluid mineral reservoir while minimizing the need for more wells and so results in fewer well pads, roads, pipelines and related disturbances.

Fracking also provides a new means to economically produce oil and gas trapped in formations that would otherwise be unattainable. Shale gas is a specific resource that can be economically recovered only through the use of fracking. The combination of horizontal drilling and fracking has helped to create a boom in the development of shale gas resources across the U.S. Without fracking, production losses are estimated at 183,000 barrels of oil per day and 425 billion cubic feet of gas annually. Four billion dollars in Federal royalty payments would <u>not</u> be paid every year into the US Treasury.

The BLM issued the Hydraulic Fracturing Rule (effective June 24, 2015), which includes an economic analysis to estimate the costs and benefits of fracking. The calculation of these costs and benefits was based on risks that fracking poses to the environment and on the cost of remediating environmental impacts. This economic analysis is included in the BLM Administrative Record associated with the Hydraulic Fracturing Rule and is available upon request for public review.

FUTURE USE AND ADVANCEMENTS IN TECHNOLOGY

Fracking technology is continually evolving to address both public concerns and the needs of industry. The ability to fully address in this report all current advancements in technology and new research being developed for fracking is beyond its scope. The following information is intended to provide a broad overview of advancements and possibilities of their future use.

Each frack job performed provides new information and insight into the process and the geologic horizon where it is applied. A major focus of current technological research and development is fracking's association with shale gas and shale oil resources. Research currently being conducted in shale horizons will likely lead to even more effective and efficient use of fracturing technology in other geologic horizons.

1. New Technology to Limit Surface Impacts

The surface impacts from fracking operations vary depending on operation equipment and needs. Service companies that perform the fracking treatments are now experimenting with automated equipment that can be run from remote location centers, which would minimize the number of

pumping engines that are usually required on the well pad. Service companies are also employing more reliable pumping engines, alleviating the need for multiple backup engines to be onsite. The development of new wellsite equipment, such as "stand up" sand-handling equipment, is also likely to reduce the area occupied onsite during fracking operations. Centralized water pits, tanks, pools and other water handling facilities reduce the need for water containment equipment onsite, so that well pad footprints are smaller. In areas where air quality is of concern, contained tanks are used for flowback water, which minimizes air emissions. In areas of sensitive resource concerns, such as critical habitat, wetlands and municipal watersheds, drilling rigs and fracking equipment can be placed on raised platforms without removing all existing vegetation on the well pad, to diminish impacts and reduce potential for contamination from spills.

Centralized fracking facilities are another option for minimizing surface impacts. Pipelines are constructed (often temporary) to transport water to and from the fracked wells, reducing water hauling trips by truck, which reduces fugitive dust and tailpipe emissions.

2. Fluids and Chemicals

The service companies typically associated with fracking chemicals are developing and improving "green" chemicals to use in frack fluids. These "green" chemicals are designed to effectively achieve their necessary purpose during the treatment and then convert back to inert or stable end products. In developing these chemicals, the goal is to reduce potential surface and subsurface hazards. Other advancements will help eliminate or reduce the need for chemicals in fracking. Use of ultraviolet light to replace biocides is one example, providing a mechanical means of achieving what is currently being performed via chemical reaction.

The use of closed-loop fracking systems allows for complete containment of all chemicals used throughout the fracking process. Complete containment reduces air emissions, the chances of spills and ensures that all produced water is captured and held without discharge to the surface.

3. Proppants

Sand has been the most popular and widely used proppant, due to its availability and low cost, but new options are currently available and constantly in development. The goal of developing new proppants is to minimize risks to the health and safety of people handling them. Development of proppants other than sand could help eliminate exposure to airborne silica, which has been linked to silicosis, a form of lung disease resulting from long-term occupational exposure to silica dust.

Ceramics offer an alternative to sand proppants. Shaped into uniformly sized grains, they provide maximum porosity and superior strength for improved production of oil and gas in a variety of reservoir types. Non-radioactive traceable proppants are also being used to help identify fracture length and height in a wide variety of reservoir types. Non-radioactive proppants have been proven safe and environmentally benign. They do not require special handling or disposal.

4. Equipment Advancement

Just as the choice of fluid chemistries and additives varies relative to basin and well, so does the type and performance of equipment needed to successfully perform fracking treatments. Fracking equipment used must be designed to meet the differences in bottomhole conditions. Fracturing pumps can now accommodate a wide range of pressures and rates; some even use wireless remote controls and monitoring of rates and pressures wirelessly. Data acquisition vehicles can monitor several dozen fracturing pumps and associated equipment simultaneously.

5. Frack Design

Design technology has advanced greatly over time, and will continue to improve. Today, the design of a frack job may take into account not only the individual well stimulation, but also production factors that relate to the entire reservoir and interaction between wells.

Detailed design of any frack job is critical to its success. Upfront design uses past performance to identify why a job has been successful or not, and then identifies how to capitalize on knowledge of that past performance to design the next job. When designing a frack job, the engineer gathers information on the reservoir to be fractured and uses it to select, optimize, and place the treatment. Many data sources inform the frack design process and may include 3D seismic, geologic mapping, core analysis, drilling logs, and open-hole logs.

6. Onsite Real-time Job Management

The technology to monitor and manage onsite frack jobs has improved rapidly over the years. Today, sophisticated computer systems in technical monitoring vehicles serve the fracking service provider, engineers, pump operators and company representatives. From these vehicles, frack-related activities are monitored and coordinated, including all treatment pressures, other pressures, chemical volumes, fluid velocity, and proppant density.

During onsite job management, stimulations are continuously monitored to evaluate and document the events as they occur. Monitoring includes tracking wellhead and downhole pressures, microseismically estimating orientation and approximate sizes of induced fractures, monitoring pumping rates, measuring fracking fluid density, tracking volumes of additives, tracking water volumes, and ensuring that equipment is functioning properly. Tracking and monitoring this data helps onsite personnel assess whether the frack is performing as expected and also provides staff the opportunity to address changes in the job as necessary to assure a successful well completion. During a typical fracking event for a horizontal well, more than thirty service company representatives may be onsite to perform and monitor the stimulation. Other personnel present may include additional staff from the operator and witnesses from Federal and State agencies.

7. Post-Frack Assessment

After frack completion, the information collected is used to perform an after-action assessment to help identify both the potential for improvement and to the successes that occurred. In addition

to the collected information, production of fluids (oil, gas, and water) is also measured to verify success. This post-completion analysis is essential to analyze the success of the just-performed frack and also to inform future design and performance expectations. Post-completion analysis helps to visually indicate the distance between fracture height and the water table, graphically illustrating that the water table is sufficiently isolated from the hydrocarbon zone to be produced.

Continued refinement of the fracking process occurs as resource-specific data is collected and analyzed. Engineers can incorporate this new information into future designs to optimize fracture patterns, better place proppant, and better control in-zone fracture growth, resulting in less waste and increased resource recovery. Data collection also makes modelling possible. Models can help with infield development and other areas of future resource extraction.

8. Groundwater Protection

Federal and state regulations place strong emphasis on casing design and protection of usable water resources. The BLM's Hydraulic Fracturing Rule requires isolation of usable water by requiring the use of cement evaluation tools (CBL, CEL, etc.) to verify placement and quality of cement. Current well construction requirements include installing multiple strings of protective steel casing and cement that are specifically designed to isolate and protect any usable water from the productive hydrocarbon-bearing zone.

The design of the wellbore, including the casing and cementing, must be approved by the regulating agencies. Design and modeling cannot always anticipate the unpredicted events that can develop while drilling or over the life of the well. Examples of unanticipated events include over-pressuring, formation subsidence, or tectonic activity. Conscientious operators typically include BMPs as project design features and employ them in order to be prepared for unanticipated events. BMP examples include incorporating strengthening additives in cement to act as a last resort should the casing fail. BMPs can also be required by BLM and attached to approved Applications for Permit to Drill as Conditions of Approval.

Generally, the only time the well casing would be subjected to high pressures is during the fracking process. To guard against adverse effects of high pressure on the casing, another layer of steel casing, the "frack-string" is temporarily run inside the original cemented steel well casing. This frack-string is removed after the job is complete. Employing a "frack-string" ensures that neither the casing nor the cement outside it is subjected to the high pressure of the frack treatment. It also protects the well casing from potential abrasion by the proppant.

As previously mentioned, ground water protection is also supported by post-frack check that the water table is sufficiently isolated from the hydrocarbon zone.

9. Water Management

Concerns about water management and the amount of water used for fracking have grown considerably over the last decade. Some completion techniques that are enabling economically viable development of shale gas plays, such as high volume hydraulic fracturing (HVHF),

require large volumes of water. This elicits concerns about surface and groundwater availability and water management, particularly in areas with low water supplies or that have usable water near a productive fluid hydrocarbon formation. Through water reuse and recycling, the volume of fresh water needed is reduced. Use of other substances as the fracking fluid (such as nitrogen foam) can also reduce the demand on water supplies.

9.1 Water Sources

The need for high volumes of water in HVHF is driving evaluation and more use of recycled and reused water. Currently HVHF demands for water require the continued development of additional sources, as well as fracking technologies that use less water. Shale formations have been successfully fractured using nitrogen or other gases as the carrier fluid for the frack. The success of these alternatives is dependent on the characteristics of shale reservoirs, which are predominantly tight, low-permeability formations. Under-pressured reservoirs have also been successfully fracked using nitrogen as a foaming agent. The frack fluid can comprise up to 98% of the volume of the fracking mixture, with the remaining volume comprised of additives.

Recycling of produced water and use of alternative sources of water is expected to be a critical component of future development for fracking and for production of oil and gas resources in general. Treatment chemicals as well as strategies to recover higher volumes of produced water for reuse are in development.

9.2 Produced water

The quality of water produced by oil and gas development, which includes frack "flowback," is being scrutinized as development expands and where water disposal options are limited. Historically, more than 95% of the produced water associated with oil and gas operations has been injected into disposal wells. Where geologically suitable injection horizons are unavailable, alternate methods of disposal like reuse and treatment of produced water predominate.

Water treatment systems are currently being used to bring produced water quality to standards suitable for disposal and reuse. As needs increase, existing facilities are expanding their capacity and some treatment technologies have become mobile. Not only can the treated water be made available for future frack jobs, it can also of suitable quality to reintroduce into the hydrological cycle, reducing the overall water demands.

MOVING FORWARD

The evolution of fracking continues as "green" chemicals and improved monitoring and water management technologies are more commonly employed. Future developments may include reduced water needs, larger selections of environmentally benign chemicals, active treatment systems that reduce the chemical input during the fracking treatment, and movement toward newer technologies to create permeability. In the future, the development of artificial proppants, which are lighter and stronger than natural materials like sand, could result in increased

permeability development, higher produced water recovery rates (also reducing the volume of "new" water needed), and reduction of health hazards (such as silicosis) associated with the use of silica-based natural materials. Sonic, microwave, or foam technologies, when used as carrier fluids instead of water, may reduce some environmental impacts, with less produced water being returned to the surface and reductions in chemical usage.

Monitoring equipment will likely advance to the point where mapping of fracture development will lead to further advances in fracture design to optimize permeability and maximize contact with the producing formation. Drilling and completion equipment is likely to evolve to facilitate development of longer horizontal laterals and pinnate or other advanced horizontal well drilling techniques. These, in turn, could allow the production of larger reservoir areas from a single wellbore. Each advancement in development and completion equipment and monitoring equipment can further refine the fracking process, resulting in lower volumes of water and chemical usage while increasing permeability development, which may lead to increasing production volumes.

CONCLUSION

Hydraulic fracturing is an essential technology for producing oil and natural gas from subsurface fluid mineral reservoirs such as coalbed methane (CBM) formations, hydrocarbon-bearing shales and other tight formations with very low natural porosity and permeability. Without the use of hydraulic fracturing, a major proportion of domestic hydrocarbon resources could not be technically or economically produced.

The hydraulic fracturing is based on controlled subsurface injection of a working fluid at high pressure, with entrained particles of proppant that keep open the artificially stimulated fractures induced by the pressurized fluid. Given the broad variations in reservoir properties, maximum effectiveness of hydraulic fracturing requires tailored modifications for each reservoir or each stimulation activity, including customized preparations of fluids and proppants.

Through association with horizontal wells, hydraulic fracturing decreases the overall surface footprint of oil and gas development and enables the use of other technologies to drill multiple wells from a single well pad, ultimately providing for increased hydrocarbon production and decreased land use with fewer impacts. Ongoing refinements to hydraulic fracturing practices will be key to further reducing environmental consequences of oil and gas production. The use of BMPs to avoid and mitigate fracking-associated impacts, such as air emissions and noise, will sustain environmentally conscientious fracking. BMPs such as produced water treatment, closed-loop systems, and centralized fracking and water handling areas will increase reuse of water, which will continue to be essential to future development of oil and gas resources.

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APPENDIX E

VASCULAR PLANT LIST

Vascular Plant List

CUPRESSACEAE BARTL. CYPRESS FAMILY	
One-Seeded Juniper	Juniperus monosperma (Engelm.) Sarg.
EPHEDRACEAE DUM. EPHEDREA FAMILY	
Torrey Ephedra, Mormon Tea	Ephedra torreyana S. Wats.
BERBERIDACEAE JUSS. BARBERRY FAMILY	
Agarito, Current-of-Texas, Algerita	Berberis trifoliolata Moric.
CACTACEAE JUSS. CACTUS FAMILY	
Nipple Beehive Cactus	Coryphantha macromeris
Purple Prickly Pear	Opuntia macrocentra
Rainbow Hedgehog Cactus	Echinovereus rigidissimus
Fendler's Hedgehog Cactus	Echinovereus Fendleri
Horse Crippler Cactus	Echinocactustexensis
Engelmann's Prickly Pear	Opuntia engelmannii Salm-Dyck.
Indian Fig Prickly Pear	Opuntia ficus-indica (L.) Mill.
Cane Cholla, Tree Cholla	Opuntia imbricate (HAW.) DC
Tasajillo, Pencil Cholla, Christmas Cholla	Opuntia leptocaulis DC.
CHENOPODIACEAE VENT. GOOSEFOOT FAMILY	
Fourwing Saltbush, Chamizo, Chamiza	Atriplex canescens (Pursh) Nutt.
Russian Thistle	Salsola kali L.
POLYGONACEAE JUSS. KNOTWEED FAMILY	
Havard's Buckwheat	Eriogonum havardii S. Watson.
TAMARICACEAE LINK. TAMARISK FAMILY	
Tamarisk, Salt Cedar	Tamarix sp. L.
CUCURBITACEAE GOURD FAMILY	
Coyote Melon, Buffalo Gourd	Cucurbita foetidissima
Deer-Apples, Slimlobe, Globeberry	Ibervillea tenuisecta
CAPPERACEAE JUSS. CAPER FAMILY	
Allthorn, Crown of Thorns, Spiny Allthorn	Koeberlinia spinose Zucc.
FABACEAE LINDL. LEGUME FAMILY	
Catclaw Acacia, Gregg Catclaw	Acacia greggii Gray.
Whitethorn Acacia	Acacia neovernicosa Isley
Honey Mesquite	Prosopis glandulosa Torr.
EUPHORBIACEAE JUSS. SPURGE FAMILY	
Bush Croton, Encinilla, Hierba Loca	Croton fruticulosus Engelm. ex Torr.
RHAMNACEAE JUSS. BUCKTHORN FAMILY	
Javelinabush	Condalia ericoides (Gray.) M.C. Johnst.
Graythorn, Lotebush	Ziziphus obtusifolia (Hook. ex T.&D.) Gray.
ANACARDIACEAE LINDL. SUMAC FAMILY	
Littleleaf Sumac, Desert Sumac	Rhus micorphylla Engelm. Ex Gray.
ZYGOPHYLLACEAE R. BR. CALTROP FAMILY	
Creosotebush, Gobernadora	Larrea tridentata (Sesse & Moc. ex DC.) Cov.
Peganum, African Rue	Peganum harmala L. HARMAL
Goathead, Puncturevine	Tribulus terrestris L.
VERBENACEAE J.St.-Hil. VERVAIN FAMILY	
Blue Verbena, Swamp Verbena	Verbena hastate L.
SCROPHULARIACEAE JUSS. FIGWORT FAMILY	
Big Bend Silverleaf, Big Bend Barometer Bush, Big Bend Cenizo	Leucophyllum minus Gray.

Vascular Plant List

ASTERACEAE DUM. SUNFLOWER FAMILY	
Prairie Broomweed	Ampiachyris dracunculoides (DC.) Nutt.
White Sagebrush, Gray Sagewort, Prairie Sage	Artemisia ludoviciana Nutt.
Broom Snakeweed	Gutierrezia sarothrae (Pursh) Britt. & Ruby.
Guadalupe Goldenweed, Rubber Rabbitbrush	Ericameria nauseosa (Pallas ex Pursh) Nesom & Baird.
Tarbush, Hojase	Flourensia cernua D.C.
Curlycup Gumweed	Grindelia squarrosa (Pursh) Dunal
Coulter's Horseweed	Laennecia coulteri (A. GRAY) G.L.
Creeping Zinna, Threadleaf Glowwort	Sartwellia flaveriae A. Gray
Long-Stalk Greenthread	Theleperma longipes Gray.
POACEAE L. GRASS FAMILY	
Silver Bluestem	Bothriochloa laguroides (DC.) Herter.
Sideoats Grama	Bouteloua curtipendula (Michx.) Torr.
Gyp Grama	Bouteloua breviseta Vasey.
Red Grama	Bouteloua trifida S. Wats.
Alkali Sacaton, Wright's Dropseed	Sporobolus airoides (Torr.) Torr.
Gypgrass, Gypsum Dropseed	Sporobolus neallei Vasey
Tobosa	Hilaria mutica (Buckl.) Benth.
AGAVACEAE ENDL. AGAVE FAMILY	
Smooth Sotol, Desert Candle	Dasylirion leiophyllum Engelm. ex Trel.
Soaptree Yucca, Palmella, Soapweed	Yucca elata (Engelm.) Engelm.
Spanish Dagger, Torrey Yucca	Yucca torreyi Shafer.