State of New Mexico
Energy Minerals and Natural Resources
Department Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505
https://www.emnrd.nm.gov/ocd/ocd-e-permitting/

Form C-147
Revised October 11, 2022

Recycling Facility and/or Recycling Containment

Type of Facility: ☒ Recycling Facility ☒ Recycling Containment*

Type of action: ☒ Permit ☐ Registration ☐ Modification ☐ Extension ☐ Closure ☐ Other (explain) _____

*** At the time C-147 is submitted to the division for a Recycling Containment, a copy shall be provided to the surface owner.**

Be advised that approval of this request does not relieve the operator of liability should operations result in pollution of surface water, ground water or the environment. Nor does approval relieve the operator of its responsibility to comply with any other applicable governmental authority's rules, regulations or ordinances.

1.
Operator: XTO PERMIAN OPERATING LLC. (For multiple operators attach page with information) OGRID #: 373075
Address: 6401 N. Holiday Hill Rd, Bldg 5, Midland, TX 79707
Facility or well name (include API# if associated with a well): PLU Row 2 West Frac Pond
OCD Permit Number: 2RF-219 (For new facilities the permit number will be assigned by the district office)
U/L or Qtr/Qtr _____ Section 17 Township 24S Range 30E County: Eddy
Surface Owner: ☒ Federal ☐ State ☐ Private ☐ Tribal Trust or Indian Allotment

2.
☒ **Recycling Facility:**
Location of recycling facility (if applicable): Latitude 32.2124577 Longitude -103.8976535 NAD83
Proposed Use: ☒ Drilling* ☒ Completion* ☒ Production* ☒ Plugging *
The re-use of produced water may NOT be used until fresh water zones are cased and cemented
☐ Other, ***requires permit for other uses. Describe use, process, testing, volume of produced water and ensure there will be no adverse impact on groundwater or surface water.***
☒ Fluid Storage
☐ Above ground tanks ☒ Recycling containment ☐ Activity permitted under 19.15.17 NMAC explain type_____
☐ Activity permitted under 19.15.36 NMAC explain type:_____ ☐ Other explain _____
☒ For multiple or additional recycling containments, attach design and location information of each containment
☐ **Closure Report (required within 60 days of closure completion):** ☐ Recycling Facility Closure Completion Date:_____

3.
☒ **Recycling Containment:**
☐ Annual Extension after initial 5 years (attach summary of monthly leak detection inspections for previous year)
Center of Recycling Containment (if applicable): Latitude 32.2130 Longitude -103.8980 NAD83
☒ For multiple or additional recycling containments, attach design and location information of each containment
☒ Lined ☒ Liner type: Thickness 60 mil ☐ LLDPE ☒ HDPE ☐ PVC ☒ Other 40 mil HDPE (secondary liner)
☐ String-Reinforced
Liner Seams: ☒ Welded ☐ Factory ☒ Other Field Volume: 590,000 bbl Dimensions: L 708 x W 319 x D 24
☐ Recycling Containment Closure Completion Date:_____

4.

Bonding:

☒ Covered under bonding pursuant to 19.15.8 NMAC per 19.15.34.15(A)(2) NMAC **(These containments are limited to only the wells owned or operated by the owners of the containment.)**

☐ Bonding in accordance with 19.15.34.15(A)(1). Amount of bond $_____ **(work on these facilities cannot commence until bonding amounts are approved)**

☐ Attach closure cost estimate and documentation on how the closure cost was calculated.

5.

Fencing:

☐ Four foot height, four strands of barbed wire evenly spaced between one and four feet

☒ Alternate. Please specify 8' game fence with 3 strands of barbed wire at the top

6.

Signs:

☒ 12"x 24", 2" lettering, providing Operator's name, site location, and emergency telephone numbers

☐ Signed in compliance with 19.15.16.8 NMAC

7.

Variances:

Justifications and/or demonstrations that the proposed variance will afford reasonable protection against contamination of fresh water, human health, and the environment.

Check the below box only if a variance is requested:

☒ Variance(s): Requests must be submitted to the appropriate division district for consideration of approval. If a Variance is requested, include the variance information on a separate page and attach it to the C-147 as part of the application.

If a Variance is requested, it must be approved prior to implementation.

8.

Siting Criteria for Recycling Containment

Instructions: The applicant must provide attachments that demonstrate compliance for each siting criteria below as part of the application. Potential examples of the siting attachment source material are provided below under each criteria.

General siting

Ground water is less than 50 feet below the bottom of the Recycling Containment. NM Office of the State Engineer - iWATERS database search; USGS; Data obtained from nearby wells	☐ Yes ☒ No ☐ NA
Within incorporated municipal boundaries or within a defined municipal fresh water well field covered under a municipal ordinance adopted pursuant to NMSA 1978, Section 3-27-3, as amended. - Written confirmation or verification from the municipality; written approval obtained from the municipality	☐ Yes ☒ No ☐ NA
Within the area overlying a subsurface mine. - Written confirmation or verification or map from the NM EMNRD-Mining and Minerals Division	☐ Yes ☒ No
Within an unstable area. - Engineering measures incorporated into the design; NM Bureau of Geology & Mineral Resources; USGS; NM Geological Society; topographic map	☐ Yes ☒ No
Within a 100-year floodplain. FEMA map	☐ Yes ☒ No
Within 300 feet of a continuously flowing watercourse, or 200 feet of any other significant watercourse, or lakebed, sinkhole, or playa lake (measured from the ordinary high-water mark). - Topographic map; visual inspection (certification) of the proposed site	☐ Yes ☒ No
Within 1000 feet from a permanent residence, school, hospital, institution, or church in existence at the time of initial application. - Visual inspection (certification) of the proposed site; aerial photo; satellite image	☐ Yes ☒ No
Within 500 horizontal feet of a spring or a fresh water well used for domestic or stock watering purposes, in existence at the time of initial application. - NM Office of the State Engineer - iWATERS database search; visual inspection (certification) of the proposed site	☐ Yes ☒ No
Within 500 feet of a wetland. - US Fish and Wildlife Wetland Identification map; topographic map; visual inspection (certification) of the proposed site	☐ Yes ☒ No

9.
Recycling Facility and/or Containment Checklist:
Instructions: Each of the following items must be attached to the application. Indicate, by a check mark in the box, that the documents are attached.

- ■ Design Plan - based upon the appropriate requirements.
- ■ Operating and Maintenance Plan - based upon the appropriate requirements.
- ■ Closure Plan - based upon the appropriate requirements.
- ■ Site Specific Groundwater Data -
- ■ Siting Criteria Compliance Demonstrations –
- ■ **Certify that notice of the C-147 (only) has been sent to the surface owner(s)**

10.
Operator Application Certification:
I hereby certify that the information and attachments submitted with this application are true, accurate and complete to the best of my knowledge and belief.

Name (Print): Kristen Houston Title: Regulatory Advisor
Signature: Kristen Houston Date: 03/27/2025
e-mail address: Kristen.Houston@exxonmobil.com Telephone: (432) 894-1588

11.
OCD Representative Signature: Victoria Venegas **Approval Date:** 03/28/2025
Title: Environmental Specialist **OCD Permit Number:** 2RF-219
☒ OCD Conditions
☒ Additional OCD Conditions on Attachment

Venegas, Victoria, EMNRD

From: Venegas, Victoria, EMNRD
Sent: Friday, March 28, 2025 9:45 AM
To: Houston, Kristen /C
Subject: 2RF-219 - PLU ROW 2 WEST FRAC POND [fVV2507951055]
Attachments: C-147 2RF-219 - PLU ROW 2 WEST FRAC POND [fVV2507951055].pdf

2RF-219 - PLU ROW 2 WEST FRAC POND [fVV2507951055]

Good morning Ms. Houston,
NMOCD has reviewed the recycling containment permit application and related documents, submitted by [373075] XTO PERMIAN OPERATING LLC on 03/27/2025, Application ID 446162, for 2RF-219 - PLU ROW 2 WEST FRAC POND [fVV2507951055] in P-17-24S-30E, Eddy County, New Mexico. [373075] XTO PERMIAN OPERATING LLC requested variances from 19.15.34 NMAC for 2RF-219 - PLU ROW 2 WEST FRAC POND [fVV2507951055].

The following variances have been approved:

- The variance from 19.15.34.13.E NMAC for the installation of an audible “Bird-X Mega Blaster Pro” bird deterrence system is approved.
- The variance to NMAC 19.15.34.12.D to install a wire mesh, game fence, eight (8) feet in height is approved.
- The variance to 19.15.34.12.A.(4) NMAC for the installation of a 40-mil HDPE as secondary liner is approved. The proposed liner system cross-section for the earthen containment is as follows: prepare subgrade, 10 oz. geotextile, 40-mil HDPE secondary liner, 200-mil geonet, 60-mil HDPE primary liner.

The form C-147 and related documents for the 2RF-219 - PLU ROW 2 WEST FRAC POND [fVV2507951055] are approved with the following conditions of approval:

- The purpose of this permit is for oil and gas activities regulated under the NMAC 19.15.34.3 STATUTORY AUTHORITY: 19.15.34 NMAC is adopted pursuant to the Oil and Gas Act, Paragraph (15) of Section 70-2-12(B) NMSA 1978, which authorizes the division to regulate the disposition of water produced or used in connection with the drilling for or producing of oil and gas or both and Paragraph (21) of Section 70-2-12(B) NMSA 1978 which authorizes the regulation of the disposition of nondomestic wastes from the exploration, development, production or storage of crude oil or natural gas.
- [373075] XTO PERMIAN OPERATING LLC shall construct, operate, maintain, close, and reclaim the 2RF-219 - PLU ROW 2 WEST FRAC POND [fVV2507951055] in compliance with 19.15.34 NMAC.
- 2RF-219 - PLU ROW 2 WEST FRAC POND [fVV2507951055] is approved for five years of operation from the date of permit application of 03/27/2025. 2RF-219 - PLU ROW 2 WEST FRAC POND [fVV2507951055] permit expires on 03/27/2030. If [373075] XTO PERMIAN OPERATING LLC, wishes to extend operations past five years, an annual permit extension request must be submitted using Form C-147 through OCD Permitting by 02/27/2030.
- The 2RF-219 - PLU ROW 2 WEST FRAC POND [fVV2507951055] consists of two double-lined Containment cells with leak detection. Cell one will hold approximately 590,000 barrels with three (3) feet of freeboard providing a total workable volume of approximately 475,000 barrels, and cell two will hold approximately 182,000 barrels with three (3) feet of freeboard providing a total workable volume of approximately 142,000 barrels.
- [373075] XTO PERMIAN OPERATING LLC shall notify NMOCD when construction of the 2RF-219 - PLU ROW 2 WEST FRAC POND [fVV2507951055] commences.

- [373075] XTO PERMIAN OPERATING LLC shall notify NMOCD when recycling operations commence and cease at 2RF-219 - PLU ROW 2 WEST FRAC POND [fVV2507951055].
- A minimum of 3-feet freeboard must be maintained 2RF-219 - PLU ROW 2 WEST FRAC POND [fVV2507951055] recycling containment, at all times during operations.
- If less than 20% of the total fluid capacity is utilized every six months, beginning from the first withdrawal, operation of the facility is considered ceased and notification of cessation of operations should be sent electronically to OCD Permitting. An extension to extend the cessation of operation, not to exceed six months, may be submitted using a C-147 form through OCD Permitting.
- [373075] XTO PERMIAN OPERATING LLC shall submit monthly reports of recycling and reuse of produced water, drilling fluids, and liquid oil field waste on NMOCD form C-148 even if there is zero activity.
- [373075] XTO PERMIAN OPERATING LLC shall comply with 19.15.29 NMAC Releases in the event of any release of produced water or other oil field wastes at 2RF-219 - PLU ROW 2 WEST FRAC POND [fVV2507951055].

Please reference number 2RF-219 - PLU ROW 2 WEST FRAC POND [fVV2507951055] in all future communications.
Regards,

Victoria Venegas ● Environmental Specialist Advanced
EMNRD - Oil Conservation Division
506 W. Texas Ave. Artesia, NM 88210
575.909.0269 | **Victoria.Venegas@emnrd.nm.gov**

XTO PERMIAN OPERATING LLC.
C-147 REGISTRATION PACKAGE
PLU ROW 2W RECYCLING FACILITY
SECTION 17, TOWNSHIP 24 SOUTH, RANGE 30 EAST
EDDY COUNTY, NEW MEXICO



ENSOLUM

Environmental, Engineering &
Hydrogeologic Consultants

February 25, 2025

Table of Contents

Part 1 – Introduction

XTO PERMIAN OPERATING LLC. (XTO) is requesting a permit under New Mexico Administrative Code (NMAC) 19.15.34 for the following recycling Facility and registration of associated Containments on land located in Unit P, Section 17, Township 24 South, Range 30 East, in Eddy County, New Mexico (Facility).

The proposed recycling Facility will be solely for recycling fluids used for completing wells owned and operated by XTO. The recycling Containment and recycling Facility will cover an area of 23.182 acres and will consist of two double-lined Containment cells with leak detection. Cell one will hold approximately 590,000 barrels with three (3) feet of freeboard providing a total workable volume of approximately 475,000 barrels, and cell two will hold approximately 182,000 barrels with three (3) feet of freeboard providing a total workable volume of approximately 142,000 barrels. In addition, there will be a loading area, a pad for a temporary recycle Facility, and a stockpile area for the removed topsoil. The Facility is expected to be in use for at least 5 years.

Included in the appendices is Figure 1 containing a United States Geological Survey (USGS) Map which identifies the location of the proposed recycling Facility and the recycling Containment. Both the recycling Facility and recycling Containment will be located on the same tract of land located on federal land managed by the Bureau of Land Management.

Compliance with the requirements of New Mexico Administrative Code (NMAC) 19.15.34 are described in the application. XTO is requesting a total of three (3) variances from the requirements. Those variance requests are described in detail in Part 3 of this application.

A copy of Form C-147 included in Part 2 has been submitted to the surface owner, as required under 19.15.34.10.A.

Part 2 – NMOCD Form C-147

3. Recycling Containment (South) :

Annual Extension after initial 5 years (attach summary of monthly leak detection inspections for previous year)

Center of Recycling Containment (if applicable): Latitude _32.2121____ Longitude __-103.8964____ NAD83

For multiple or additional recycling containments, attach design and location information of each containment

Lined Liner type: Thickness _60___mil LLDPE **HDPE** PVC Other __40 mil HDPE (secondary liner)_____

String-Reinforced

Liner Seams: **Welded** Factory **Other** __Field____ Volume: __182,000___bbl Dimensions: L_250__ x W_319__ x D_24__

All construction appendices apply to the South Pond as well as the North Pond. Review drawings and specifications for details.

Part 3 – Variance Requests

The following paragraphs describe the variances that are being requested.

3.1 Liner

XTO is requesting a variance to NMAC 19.15.34.12A.(4) requiring the secondary (lower) liner of the recycling Containment to be 30-mil string reinforced Linear Low-Density Polyethylene (LLDPE) equivalent with a hydraulic conductivity no greater than $1x10^{-9}$ centimeters per second (cm/sec). XTO is requesting approval to use 40-mil High Density Polyethylene (HDPE) in place of the specified material. The proposed 40-mil HDPE liner is appropriate material for the proposed use of the Containment and is compatible with the stored water. This material will provide equal or better environmental protection than the specified 30-mil string-reinforced LLDPE. The proposed 40-mil HDPE will be seamed in a manner that will allow nondestructive pressure testing of the seams to ensure proper sealing.

The proposed liner system cross section is as follows: prepared subgrade, 8 oz. geotextile, 40 mil HDPE, single sided 200 mil geonet, 60 mil HDPE (smooth on bottom, textured on slopes). This cross section is shown in Appendix E.

3.2 Fencing

The recycling Containment will be constructed with an 8-foot-high game fence with 3 strands of barbed wire on top to deter wildlife and human access. This is a variance from the required 4-foot fence with at least 4 strands of barbed wire evenly spaced in intervals between 1 foot and 4 feet above ground level and provides equivalent or greater wildlife and human deterrence due to the extended height. The fence will be gated to provide access to XTO personnel and will be closed and locked when access is not required. In our experience this design of fencing works as well or better than the stated specification.

3.3 Netting and Wildlife Protection

XTO is proposing to use the 8-foot-high game fence described above to deter terrestrial wildlife and install an audible avian deterrence system in lieu of netting. XTO will use an electronic sonic/ultrasonic avian deterrence system equivalent to or equal to the Bird-X BroadBand Pro or the Bird-X Mega Blaster Pro.

This type of system has been utilized by other recycling facility operators in southeast New Mexico and has been demonstrated to be an effective deterrent for avian species, including migratory birds. The operations and maintenance (O&M) plan require the operator to inspect and, within 30 days of discovery, report the identification of dead migratory birds or other wildlife to the appropriate wildlife agency. Reporting will also be completed for the division district office in order to facilitate assessment and implementation of measures designed to prevent incidents from reoccurring.

Part 4 – Siting Requirements

4.1 Distance to Groundwater

This section describes the hydrology and geology surrounding the XTO PLU Row 2W recycling Facility. Figure 1 shows the location of the proposed XTO recycling Containment and recycling Facility overlain on a geologic map. Figure 2 identifies potential nearby receptors.

The New Mexico Oil Conservation Division (NMOCD) requires that groundwater at the proposed location be greater than 50 feet below the Containment bottom. Depth to groundwater is estimated to be greater than 100 feet below ground surface (bgs) based on the nearest groundwater well data. The closest permitted groundwater well with depth to groundwater data is New Mexico Office of the State Engineer (NMOSE) boring C-03960 POD 1, located approximately 0.9 miles southeast of the Facility. The depth to groundwater in the well was measured at 250 feet bgs on November 12, 2016, at the time of drilling. In addition, approximately 5 wells or borings permitted by the NMOSE or the United States Geological Survey exist within a 1.25-mile radius of the Site. All wells with depth to groundwater data indicate groundwater is at least 100 feet bgs in the region. Available groundwater within the area of the proposed recycling Containment and recycling Facility is noted to be within the Carlsbad Basin, by the NMOSE. The Carlsbad Basin contains two major water bearing features: the Capitan Reef and shallower alluvial and terrace aquifer systems. Water bearing zones include the Carlsbad and Capitan Limestones, and the Rustler Formation and Dockum Group. Other major aquifers in the area include the Pecos River Basin alluvial aquifer system, Captain Reef, Roswell Basin, and High Plains Aquifer.

A geological map for the vicinity of the Facility was obtained from the U.S. Geological Survey, Mineral Resources Program and was used to review the geologic setting for the proposed recycling Containment and recycling Facility location. Based on the review of the geologic map, the recycling Containment and recycling Facility location lies within older alluvial deposits oof upland plains and piedmont areas, and calcic soils and eolian cover sediments of High Plains region, overlying the Rustler Formation.

On November 26, 2024, Facility-specific geotechnical borings were conducted to a depth of 20–60 feet with no detected or observed groundwater presence. The test boring logs can be found in Appendix G.

4.2 Distance to Surface Water

Figure 2 demonstrates that the Facility location is not within 300 feet of a continuously flowing watercourse or other significant watercourse, or within 200 feet of a lakebed, sinkhole, or playa lake (as measured from the ordinary high-water mark). Figure 2 also shows that there are no continuously flowing watercourses or other water bodies as defined by the New Mexico Oil Conservation Division (NMOCD). The closest surface water body is Dog Town Draw, located approximately 0.6 miles north of the proposed recycling Containment and recycling Facility.

4.3 Distance to Permanent Residences, Institutions, or Structures

Figure 3 demonstrates the Facility location is not within 1,000 feet of an occupied permanent residence, school, hospital, institution, church, or other permanent structure in existence at the time of initial application. The closest permanent structure is approximately 4.5 miles west of the proposed recycling Containment and recycling Facility.

4.4 Distance to Non-Public Water Supply

The Facility is not located within 500 horizontal feet of a private, domestic fresh water well or spring that less than five households use for domestic or stock watering purposes. In addition, the Facility is not located within 1,000 feet of any other freshwater well or spring, according to current records available at

the time of this application. Figure 2 shows the location of water wells, active or plugged, relative to the proposed Facility location. The nearest fresh water well listed is C-3960, which is located approximately 4,665 feet from the Containment boundary according to the NMOSE database.

4.5 Distance to Municipal Boundaries and Freshwater Fields

Figure 2 demonstrates that the Facility is not located within an incorporated municipal boundary or within a defined municipal freshwater field covered under a municipal ordinance adopted pursuant to New Mexico Statutes Annotated (NMSA) 1978, Section 3-27-3. The closest municipality to the Facility is Malaga, New Mexico located approximately 9 miles west of the Facility. In addition, the municipality of Loving, NM is located approximately 12.5 miles northwest of the Facility. The closest municipal well field is located approximately 12 miles from the Facility (Nash Draw well field) serving the community of Carlsbad, New Mexico.

4.6 Distance to Wetlands

The U.S. Fish and Wildlife National Wetlands Inventory maps were reviewed for the area of the Facility. Figure 2 demonstrates the Facility is not located within 100 feet of a mapped wetland. The closest mapped wetland is a Freshwater Emergent Wetland with the wetland code PEM1J located approximately 2.2 miles from the Facility.

4.7 Distance to Subsurface Mines

General knowledge based on a search of the New Mexico Energy, Minerals, and Natural Resources Department (NM EMNRD) Mining and Minerals Division database confirms that there are no subsurface mines in proximity of the recycling Containment and recycling Facility (Figure 2). The only identified facility in the general vicinity is an active potash mine located approximately 10 miles from the Facility.

4.8 Distance to Medium or Critical Karst Area (Unstable Areas)

The recycling Containment and recycling Facility are located within a Bureau of Land Management (BLM) identified medium potential karst zone. Figure 2 shows BLM inventory data of existing cave/karst features, and results of the Facility specific geotechnical studies are detailed in Appendix G.

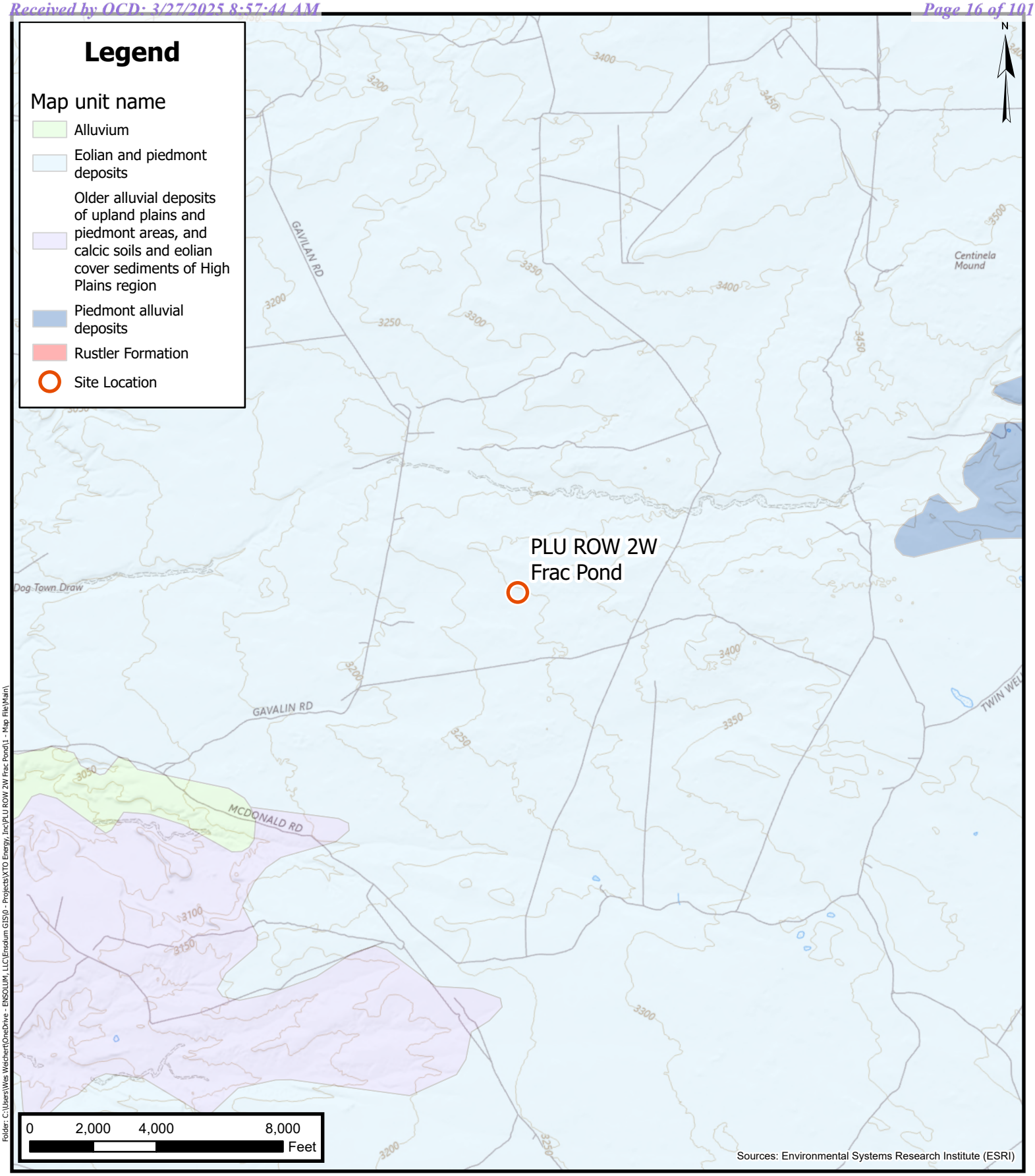
4.9 Distance to 100 Year Floodplain

The Federal Emergency Management Agency (FEMA) Flood Insurance maps were reviewed for the Facility location. The Facility is not located within a “Printed Flood Map Boundary”. Figure 2 demonstrates the area of the Facility is not located within a 100-year floodplain.

Appendix A – Financial Assurance Requirement

XTO has existing financial assurance in place with NMOCD as required by 19.15.8 NMAC and use of the recycling Containment will be limited to support completion of only wells owned and operated by XTO. Therefore, no additional assurance associated with the recycling Containment is required.

Appendix B – Figures



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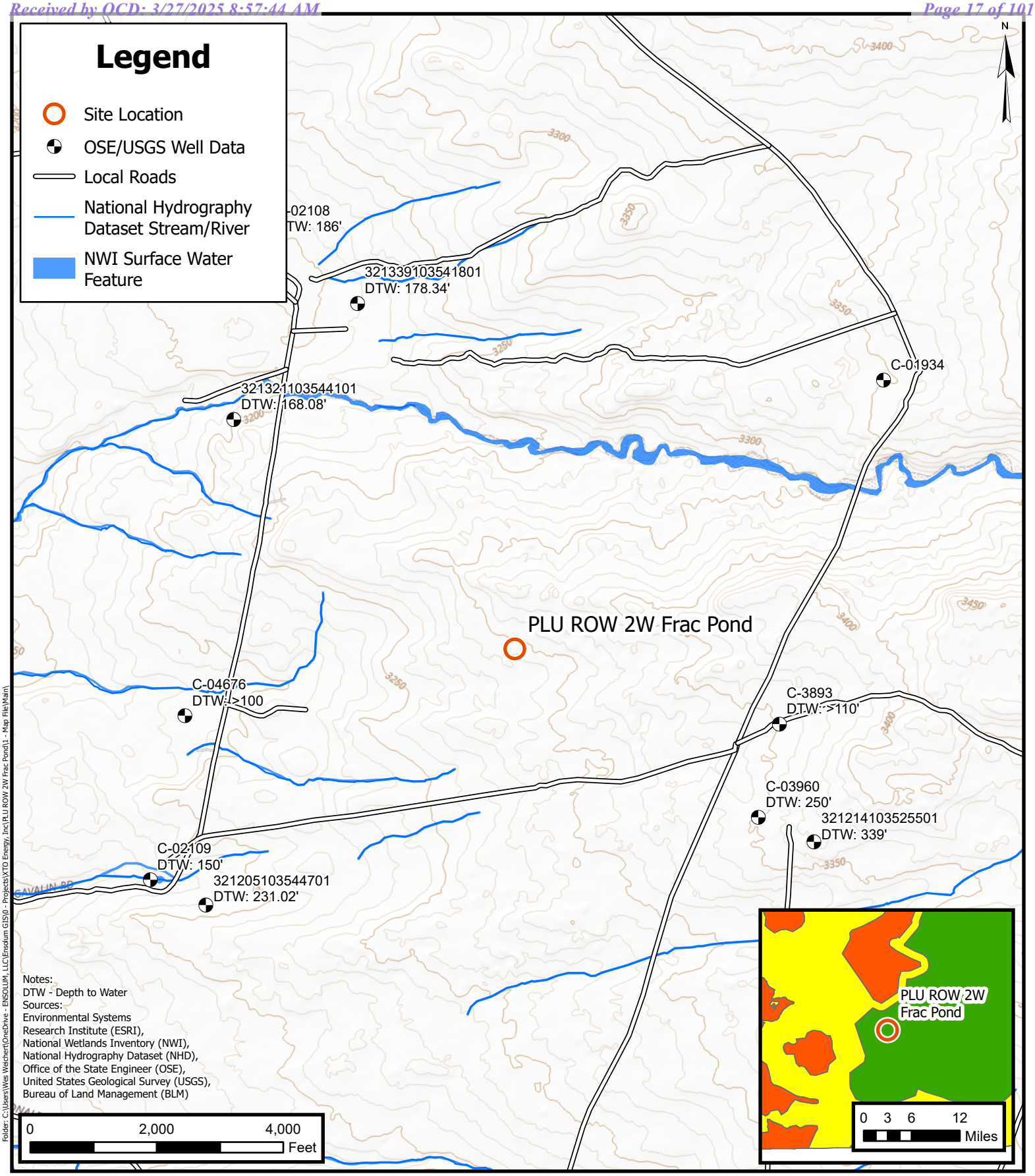
USGS Geologic Map

XTO Delaware Basin, LLC
PLU ROW 2W Frac Pond
Unit P, Sec 17, T24S, R30E
Eddy County, New Mexico

FIGURE 1



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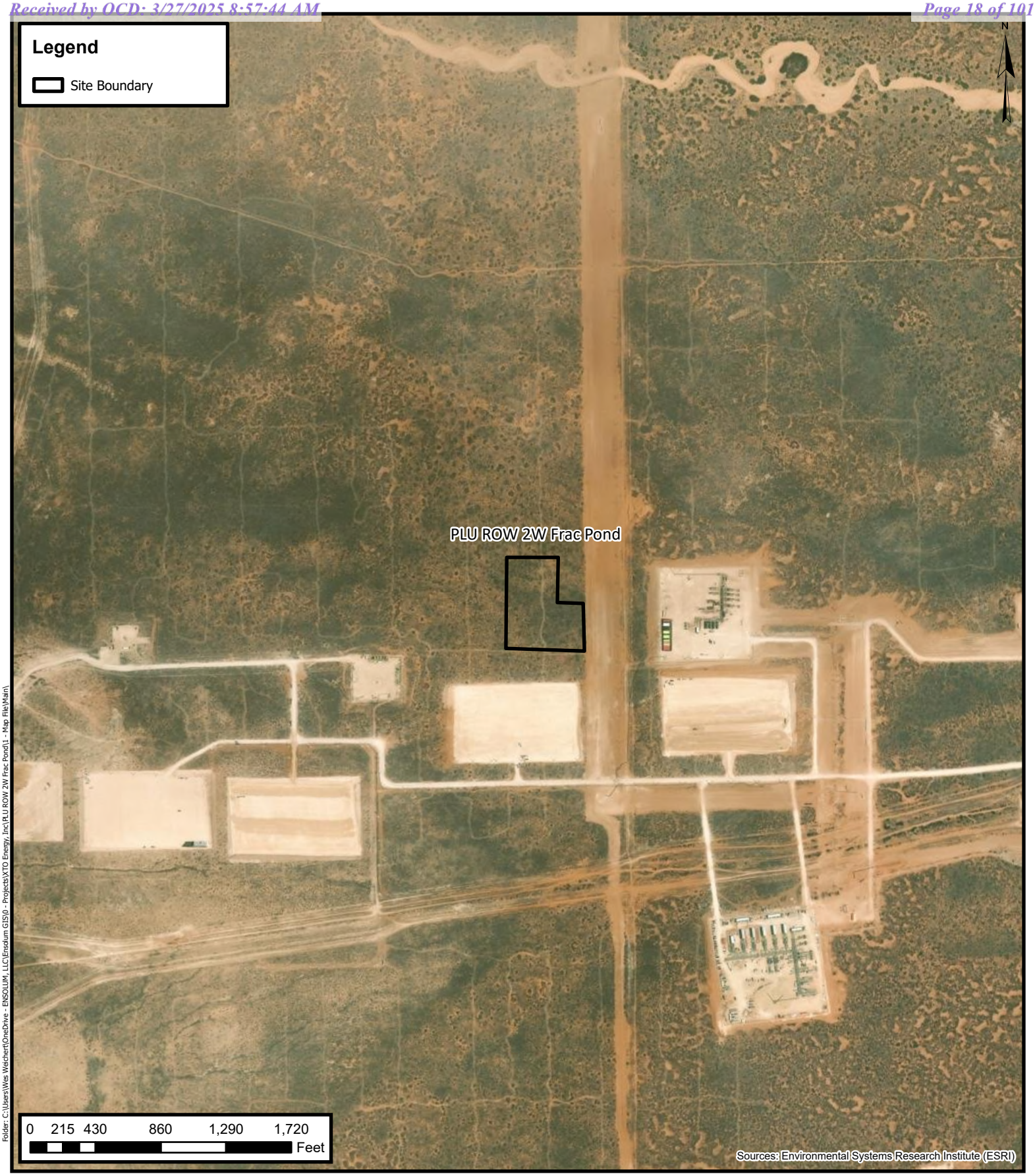
Site Receptor Map

XTO Delaware Basin, LLC
PLU ROW 2W Frac Pond
Unit P, Sec 17, T24S, R30E
Eddy County, New Mexico

FIGURE 2



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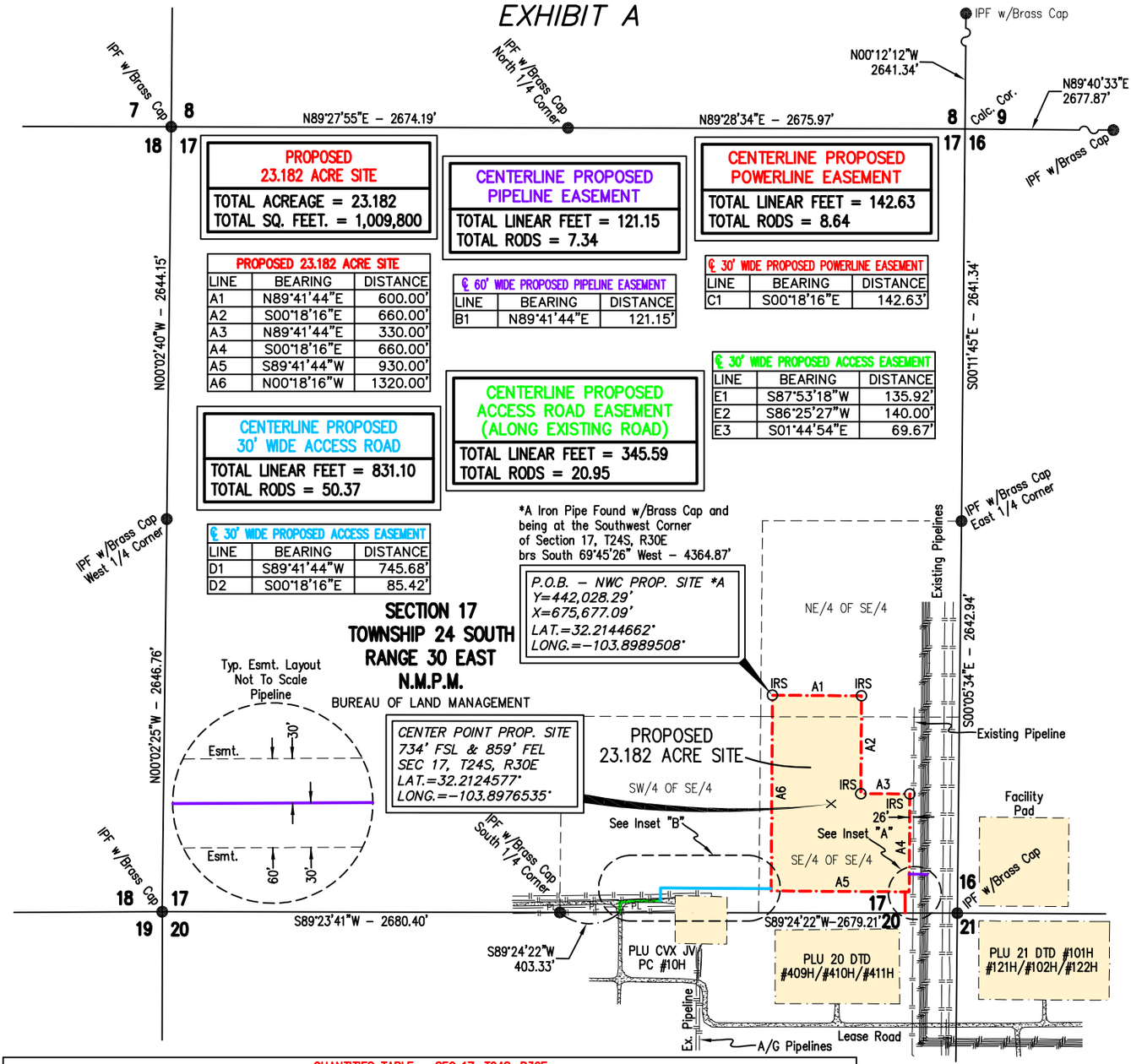
Aerial Survey

XTO Delaware Basin, LLC
PLU ROW 2W Frac Pond
Unit P, Sec 17, T24S, R30E
Eddy County, New Mexico

FIGURE 3

Appendix C – Site Location

EXHIBIT A



PROPOSED 23.182 ACRE SITE
TOTAL ACREAGE = 23.182
TOTAL SQ. FEET. = 1,009,800

CENTERLINE PROPOSED PIPELINE EASEMENT
TOTAL LINEAR FEET = 121.15
TOTAL RODS = 7.34

CENTERLINE PROPOSED POWERLINE EASEMENT
TOTAL LINEAR FEET = 142.63
TOTAL RODS = 8.64

CENTERLINE PROPOSED 30' WIDE ACCESS ROAD
TOTAL LINEAR FEET = 831.10
TOTAL RODS = 50.37

CENTERLINE PROPOSED ACCESS ROAD EASEMENT (ALONG EXISTING ROAD)
TOTAL LINEAR FEET = 345.59
TOTAL RODS = 20.95

PROPOSED 23.182 ACRE SITE

LINE	BEARING	DISTANCE
A1	N89°41'44"E	600.00'
A2	S00°18'16"E	660.00'
A3	N89°41'44"E	330.00'
A4	S00°18'16"E	660.00'
A5	S89°41'44"W	930.00'
A6	N00°18'16"W	1320.00'

℄ 60' WIDE PROPOSED PIPELINE EASEMENT

LINE	BEARING	DISTANCE
B1	N89°41'44"E	121.15'

℄ 30' WIDE PROPOSED POWERLINE EASEMENT

LINE	BEARING	DISTANCE
C1	S00°18'16"E	142.63'

℄ 30' WIDE PROPOSED ACCESS EASEMENT

LINE	BEARING	DISTANCE
D1	S89°41'44"W	745.68'
D2	S00°18'16"E	85.42'

℄ 30' WIDE PROPOSED ACCESS EASEMENT

LINE	BEARING	DISTANCE
E1	S87°53'18"W	135.92'
E2	S86°25'27"W	140.00'
E3	S01°44'54"E	69.67'

QUANTITIES TABLE – SEC 17, T24S, R30E

LOCATION	AREA (SITE)	LENGTH	AREA (EASEMENT)
NE/4 OF SE/4	1.985 ACRES/86,457.1 SQ. FT.	N/A	N/A
SE/4 OF SE/4	21.197 ACRES/923,342.9 SQ. FT.	121.15 FT./7.34 RODS (PIPE)	0.167 ACRES/7268.8 SQ. FT. (PIPE)
		142.63 FT./8.64 RODS (PWR)	0.098 ACRES/4279.0 SQ. FT. (PWR)
		82.72 FT./5.01 RODS (RD)	0.057 ACRES/2479.8 SQ. FT. (RD)
SW/4 OF SE/4	N/A	1093.97 FT./66.30 RODS (RD)	0.753 ACRES/32,813.1 SQ. FT. (RD)

Typ. Esmt. Layout Not To Scale Powerline & Road
Esmt. Esmt. 30' 15' 15'

LEGEND
- IRS = 1/2" IRON ROD SET
- EXISTING POWERPOLE
- PROPOSED POWERPOLE
- PROPOSED SITE PERIMETER
- ℄ PROPOSED PIPELINE EASEMENT
- ℄ PROPOSED POWERLINE EASEMENT
- ℄ PROPOSED ACCESS ROAD EASEMENT
- ℄ PROPOSED ACCESS ROAD EASEMENT (ALONG EXISTING ROAD)

GRID N

BUREAU OF LAND MANAGEMENT
AREA OF PROPOSED SITE EASEMENT: 23.182 ACRES/1,009,800 SQ. FT.
TOTAL DISTANCE ACROSS PROPERTY (℄ PROPOSED PIPELINE EASEMENT): 121.15/7.34 RODS
TOTAL AREA OF PROPOSED PIPELINE EASEMENT: 0.167 ACRES/7268.8 SQ. FT.
TOTAL DISTANCE ACROSS PROPERTY (℄ PROPOSED POWERLINE EASEMENT): 142.63/8.64 RODS
TOTAL AREA OF PROPOSED POWERLINE EASEMENT: 0.098 ACRES/4279.0 SQ. FT.
TOTAL DISTANCE ACROSS PROPERTY (℄ PROP. ACCESS ROAD ESMT): 1176.69/71.32 RODS
TOTAL AREA OF PROPOSED ACCESS ROAD EASEMENT: 0.810 ACRES/35,292.9 SQ. FT.

NOTES:

FIELD NOTES ACCOMPANY THIS PLAT.

BEARINGS, DISTANCES & AREAS ARE GRID BASED ON THE TRANSVERSE MERCATOR PROJECTION OF THE NEW MEXICO STATE PLANE COORDINATE SYSTEM, EAST ZONE (3001), NAD 83 (2011) US SURVEY FEET AS DERIVED FROM GPS OBSERVATIONS.

SURVEYOR HAS NOT ABSTRACTED TITLE. OWNERSHIP INFORMATION SHOWN HEREON IS BASED ON DATA PROVIDED BY OTHERS.

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I, CONNOR G. BROWN, NEW MEXICO PROFESSIONAL SURVEYOR NO. 23391, DO HEREBY CERTIFY THAT THIS EASEMENT SURVEY PLAT AND THE ACTUAL SURVEY ON THE GROUND UPON WHICH IT IS BASED WERE PERFORMED BY ME OR UNDER MY DIRECT SUPERVISION: THAT I AM RESPONSIBLE FOR THIS SURVEY; THAT THIS SURVEY MEETS THE MINIMUM STANDARDS FOR SURVEYING IN NEW MEXICO; AND THAT IT IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF. I FURTHER CERTIFY THAT THIS SURVEY IS NOT TO BE USED FOR A LAND DIVISION OR SUBDIVISION AS DEFINED IN THE NEW MEXICO SUBDIVISION ACT AND THAT THIS INSTRUMENT IS AN EASEMENT.

CONNOR G. BROWN NEW MEXICO 23391 PROFESSIONAL SURVEYOR

05-21-202419:55:58-05:00

CONNOR G. BROWN
NEW MEXICO PROFESSIONAL LAND SURVEYOR
NO. 23391

21072 FM 2493
BULLARD, TEXAS 75757

☒ PROPOSED STAKING ☐ OPEN DITCH ☐ AS-BUILT ☐ AFTER-BUILT

Tract Owner: Bureau of Land Management

XTO DELAWARE BASIN LLC

Revisions
5/10/24
5/21/24

Project:
PLU ROW 2 WEST FRAC POND SITE, 60' WIDE PIPELINE, 30' WIDE POWERLINE & ACCESS ROAD EASEMENTS

Date: 4/16/2024 G:\2024\441348\EXHIBIT\E-1348EXH(17-T24S-R30E)C

EDDY COUNTY, NEW MEXICO

Page 1 of 5

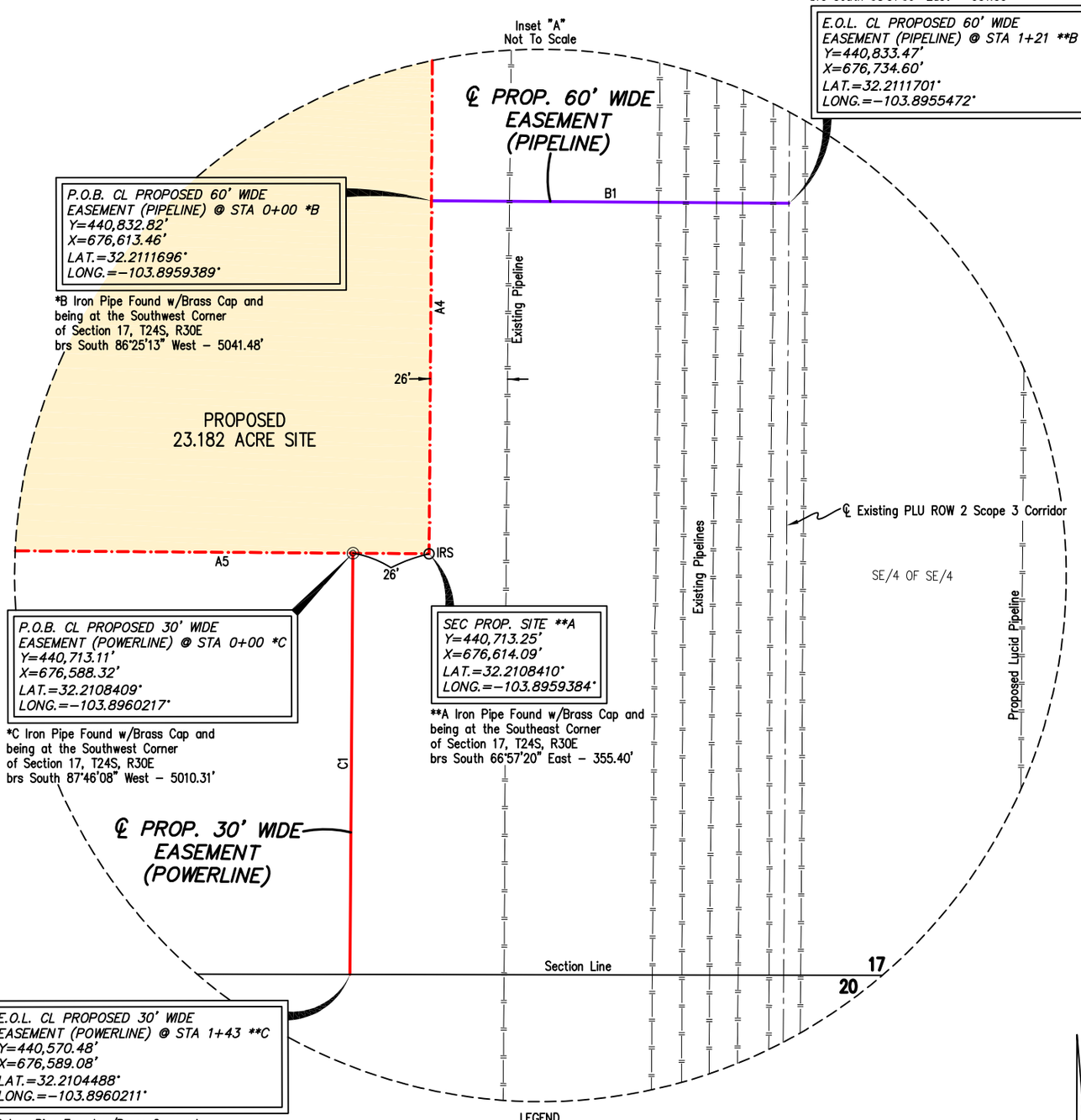
ELS SURVEYING & MAPPING INC. 21072 FM 2493, Bullard, Texas 75757 (903) 581-7759 www.elssurveying.com

Checked By E.L.L.

1000' 500' 0 1000'
1" = 1000'

Drafter: KRH FB/PG: 2776/3; 2769/35 Job No. 441348 Map No. E-1348EXH(17-T24S-R30E)C

EXHIBIT A



NOTES:

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BUREAU OF LAND MANAGEMENT

AREA OF PROPOSED SITE EASEMENT: 23.182 ACRES/1,009,800 SQ. FT.
TOTAL DISTANCE ACROSS PROPERTY (℄ PROPOSED PIPELINE EASEMENT): 121.15/7.34 RODS
TOTAL AREA OF PROPOSED PIPELINE EASEMENT: 0.167 ACRES/7268.8 SQ. FT.
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CONNOR G. BROWN NEW MEXICO 23391 PROFESSIONAL SURVEYOR

05-21-202419:56:14-05:00

CONNOR G. BROWN
NEW MEXICO PROFESSIONAL LAND SURVEYOR
NO. 23391

21072 FM 2493
BULLARD, TEXAS 75757

☒ PROPOSED STAKING ☐ OPEN DITCH ☐ AS-BUILT ☐ AFTER-BUILT

Tract Owner: Bureau of Land Management

XTO DELAWARE BASIN LLC

Revisions
5/10/24
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Date: 4/16/2024 G:\2024\441348\EXHIBIT\E-1348EXH(17-T24S-R30E)C

EDDY COUNTY, NEW MEXICO

Page 2 of 5

ELS SURVEYING & MAPPING INC.
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Checked By E.L.L.

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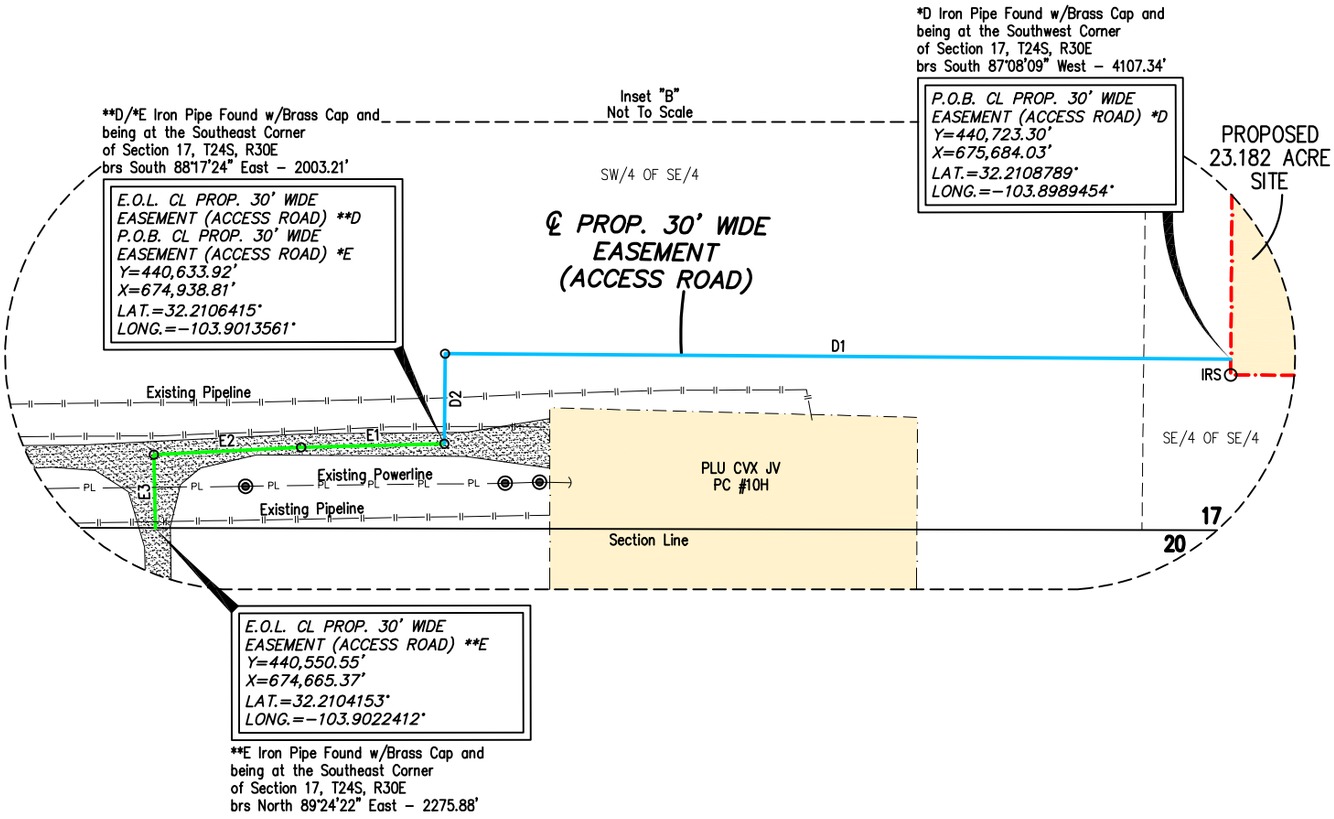
1" = 1000'

Drafter: KRH | FB/PG: 2776/3; 2769/35 | Job No. 441348 | Map No. E-1348EXH(17-T24S-R30E)C

EXHIBIT A



LEGEND

- IRS = 1/2" IRON ROD SET
- EXISTING POWERPOLE
- PROPOSED POWERPOLE
- PROPOSED SITE PERIMETER
- ℄ PROPOSED PIPELINE EASEMENT
- ℄ PROPOSED POWERLINE EASEMENT
- ℄ PROPOSED ACCESS ROAD EASEMENT
- ℄ PROPOSED ACCESS ROAD EASEMENT (ALONG EXISTING ROAD)

N GRID

NOTES:

FIELD NOTES ACCOMPANY THIS PLAT.

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BULLARD, TEXAS 75757

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Tract Owner: Bureau of Land Management

XTO DELAWARE BASIN LLC

Revisions
5/10/24
5/21/24

Project:
PLU ROW 2 WEST FRAC POND SITE, 60' WIDE PIPELINE, 30' WIDE POWERLINE & ACCESS ROAD EASEMENTS

Date: 4/16/2024 G:\2024\441348\EXHIBIT\E-1348EXH(17-T24S-R30E)C

EDDY COUNTY, NEW MEXICO

Page 3 of 5

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Checked By E.L.L.

1000' 500' 0 1000'
1" = 1000'

Drafter: KRH FB/PG: 2776/3; 2769/35 Job No. 441348 Map No. E-1348EXH(17-T24S-R30E)C

EXHIBIT "A"

XTO DELAWARE BASIN LLC
Surface Ownership: Bureau of Land Management
Proposed Site/60 Foot Wide Pipeline/30 Foot Wide Powerline/Access Road Easements
PLU ROW 2 West Frac Pond
Section 17, Township 24 South, Range 30 East, N.M.P.M.
Eddy County, New Mexico
Job No. 441348, Map No. E-1348EXH(17-T24S-R30E)C, May 21, 2024

PROPOSED 23.182 ACRE SURFACE SITE DESCRIPTION

BEING a proposed site over, under, and across Section 17, Township 24 South, Range 30 East, N.M.P.M., in Eddy County, New Mexico, said proposed site being more particularly described as follows:

BEGINNING at a 1/2-inch iron rod set with a cap for the northwest corner of said proposed site, from which an iron pipe found with a brass cap and being at the southwest corner of said Section 17, Township 24 South, Range 30 East bears South 69°45'26" West a distance of 4364.87 feet, said point of beginning having a coordinate value of Latitude: 32.2144662°, Longitude: -103.8989508°;

THENCE along the perimeter of said proposed site over, under and across said Section 17, Township 24 South, Range 30 East as follows:

North 89°41'44" East a distance of **600.00 feet** to a 1/2-inch iron rod set with a cap for the most northernly northeast corner of said proposed site;
South 00°18'16" East a distance of **660.00 feet** to a 1/2-inch iron rod set with a cap for an angle corner of said proposed site;
North 89°41'44" East a distance of **330.00 feet** to a 1/2-inch iron rod set with a cap for the most southernly northeast corner of said proposed site;
South 00°18'16" East a distance of **660.00 feet** to a 1/2-inch iron rod set with a cap for the southeast corner of said proposed site, from which an iron pipe found with a brass cap and being at the southeast corner of said Section 17, Township 24 South, Range 30 East bears South 66°57'20" East a distance of 355.40 feet, said point of beginning having a coordinate value of Latitude: 32.2108410°, Longitude: -103.8959384°;
South 89°41'44" West a distance of **930.00 feet** to a 1/2-inch iron rod set with a cap for the southwest corner of said proposed site;
North 00°18'16" West a distance of **1320.00 feet** to the **POINT OF BEGINNING** and containing a total of **23.182 acres (1,009,800 square feet)**.

60 FOOT WIDE PIPELINE EASEMENT CENTERLINE DESCRIPTION

BEING a proposed pipeline easement over, under, and across Section 17, Township 24 South, Range 30 East, N.M.P.M., in Eddy County, New Mexico, said proposed pipeline easement being 60 feet wide, 30 feet either side of the following described centerline:

CENTERLINE "B":
BEGINNING at a point on the east side of said proposed site, from which an iron pipe found with a brass cap and being at the southwest corner of said Section 17, Township 24 South, Range 30 East bears South 86°25'13" West a distance of 5041.48 feet, said point of beginning having a coordinate value of Latitude: 32.2111696°, Longitude: -103.8959389°;

THENCE along the centerline of said 60 foot wide proposed pipeline easement over, under and across said Section 17, Township 24 South, Range 30 East **North 89°41'44" East** a distance of **121.15 feet** to a point of termination at the centerline of the existing PLU ROW 2 Scope 3 Corridor, from which an iron pipe found with a brass cap and being at the southeast corner of said Section 17, Township 24 South, Range 30 East bears South 38°31'59" East a distance of 331.53 feet, said point of termination having a coordinate value of Latitude: 32.2111701°, Longitude: -103.8955472° and covering a total distance of 7.34 rods (121.15 feet).

30 FOOT WIDE POWERLINE EASEMENT CENTERLINE DESCRIPTION

BEING a proposed powerline easement over, under, and across Section 17, Township 24 South, Range 30 East, N.M.P.M., in Eddy County, New Mexico, said proposed powerline easement being 30 feet wide, 15 feet either side of the following described centerline:

CENTERLINE "C":
BEGINNING at a proposed power pole, from which an iron pipe found with a brass cap and being at the southwest corner of said Section 17, Township 24 South, Range 30 East bears South 87°46'08" West a distance of 5010.31 feet, said point of beginning having a coordinate value of Latitude: 32.2108409°, Longitude: -103.8960217°;

THENCE along the centerline of said 30 foot wide powerline easement over, under and across said Section 17, Township 24 South, Range 30 East **South 00°18'16" East** a distance of **142.63 feet** to a point of termination on the south line of said Section 17, Township 24 South, Range 30 East, from which an iron pipe found with a brass cap and being at the southeast corner of said Section 17, Township 24 South, Range 30 East bears North 89°24'22" East a distance of 352.07 feet, said point of termination having a coordinate value of Latitude: 32.2104488°, Longitude: -103.8960211° and covering a total distance of 8.64 rods (142.63 feet).

EXHIBIT "A"

XTO DELAWARE BASIN LLC
Surface Ownership: Bureau of Land Management
Proposed Site/60 Foot Wide Pipeline/30 Foot Wide Powerline/Access Road Easements
PLU ROW 2 West Frac Pond
Section 17, Township 24 South, Range 30 East, N.M.P.M.
Eddy County, New Mexico
Job No. 441348, Map No. E-1348EXH(17-T24S-R30E)C, May 21, 2024
Page 5 of 5

30 FOOT WIDE ACCESS ROAD EASEMENT CENTERLINE DESCRIPTION

BEING a proposed access road easement over, under, and across Section 17, Township 24 South, Range 30 East, N.M.P.M., in Eddy County, New Mexico, said proposed access road easement being 30 feet wide, 15 feet either side of the following described centerlines:

CENTERLINE "D":
BEGINNING at a point on the west side of said proposed site, from which an iron pipe found with a brass cap and being at the southwest corner of said Section 17, Township 24 South, Range 30 East bears South 87°08'09" West a distance of 4107.34 feet, said point of beginning having a coordinate value of Latitude: 32.2108789°, Longitude: -103.8989454°;

THENCE along the centerline of said proposed 30 foot wide access road easement, over, under, and across said Section 17, Township 24 South, Range 30 East as follows:
South 89°41'44" West a distance of **745.68 feet;**
South 00°18'16" East a distance of **85.42 feet** to a point of termination in the centerline of an existing lease road, from which an iron pipe found with a brass cap and being at the southeast corner of said Section 17, Township 24 South, Range 30 East bears South 88°17'24" East a distance of 2003.21 feet, said point of termination having a coordinate value of Latitude: 32.2106415°, Longitude: -103.9013561° and covering a total distance of 50.37 rods (831.10 feet).

CENTERLINE "E":
BEGINNING at a point in the centerline of an existing lease road, from which an iron pipe found with a brass cap and being at the southeast corner of said Section 17, Township 24 South, Range 30 East bears South 88°17'24" East a distance of 2003.21 feet, said point of beginning having a coordinate value of Latitude: 32.2106415°, Longitude: -103.9013561°;

THENCE along the centerline of said proposed 30 foot wide access road easement, over, under, and across said Section 17, Township 24 South, Range 30 East as follows:
South 87°53'18" West a distance of **135.92 feet;**
South 86°25'27" West a distance of **140.00 feet;**
South 01°44'54" East a distance of **69.67 feet** to a point of termination on the south line of said Section 17, Township 24 South, Range 30 East, from which an iron pipe found with a brass cap and being at the southeast corner of said Section 17, Township 24 South, Range 30 East bears North 89°24'22" East a distance of 2275.88 feet, said point of termination having a coordinate value of Latitude: 32.2104153°, Longitude: -103.9022412° and covering a total distance of 20.95 rods (345.59 feet).

NE/4 of SE/4 (SITE)	1.985 acres	86,457.1 square feet	
SE/4 of SE/4 (SITE)	21.197 acres	923,342.9 square feet	
SE/4 of SE/4 (PIPE EASEMENT)	121.15 feet	7.34 rods	0.167 acres
SE/4 of SE/4 (PWR EASEMENT)	142.63 feet	8.64 rods	0.098 acres
SE/4 of SE/4 (ROAD EASEMENT)	82.72 feet	5.01 rods	0.057 acres
SW/4 of SE/4 (ROAD EASEMENT)	1093.97 feet	66.30 rods	0.753 acres

ALL CENTERLINES having an **AGGREGATE TOTAL** of **68.67 rods (1133.19 feet)** and **0.864 acres.**

The bearings, distances, and areas recited hereon are grid based on the Transverse Mercator Projection of the New Mexico State Plane Coordinate System, East Zone (3001), NAD83 (2011) US Survey Feet, as derived from GPS observations. Rods described hereon as set are 1/2-inch rods with yellow plastic cap stamped "ELS-PS 23391". A plat accompanies these field notes.

I, Connor G. Brown, Professional Land Surveyor, do hereby certify these field notes to be written from an actual on the ground survey made under my direction and supervision.

GIVEN UNDER MY HAND AND SEAL, this the 21st day of May, 2024.

05-21-202419:56:46-05:00

Connor G. Brown
Professional Land Surveyor
State of New Mexico No. 23391
E.L.S. Surveying & Mapping Inc.
21072 FM 2493, Bullard, Texas
(903) 581-7759

CONNOR G. BROWN
NEW MEXICO
23391
PROFESSIONAL SURVEYOR

Appendix D – Design and Construction Plan

General Specifications

Appendix E contains the design drawings and details for the recycling Containment, which are designed and stamped by a Professional Engineer licensed in the State of New Mexico. Appendix F contains construction specifications to accompany the design drawings and details. These design drawings and specifications meet or exceed the NMOCD requirements for recycling containments. Appendix G contains the geotechnical engineering testing results for the recycling Facility.

This plan addresses the construction of double lined earthen Containment. Field conditions may create the need for minor modifications of the Containment design (i.e. changing length, width or depth) during construction.

The following general specifications have been incorporated into the design and will be met during construction.

- The recycling Containment is designed and will be constructed to ensure confinement of produced water, to prevent releases, and to prevent overtopping due to wave action or rainfall. The recycling Containment is being designed using a 3-foot freeboard as a design criteria.
- The recycling Containment, as designed, will be constructed with a proper foundation and interior slopes consisting of a firm, unyielding base, which is smooth and free of rocks, debris, sharp objects and irregularities. In addition, an 8-ounce (oz) non-woven geotextile will be installed under the secondary (lower) liner as needed to provide additional protection from any protuberances in the foundation and to reduce any localized stress-strain.
- The recycling Containment will be constructed with inside and outside slope grades of three horizontal feet to one vertical foot (3H:1V), which is flatter and provides greater stability than the NMOCD 2H:1V specifications for the inside grade.
- The recycling Containment will be constructed with a 40-mil HDPE secondary (lower) liner, a 60-mil HPDE primary (upper) liner, and a leak detection system.
- The exterior of both liners will be anchored in the bottom of a 24-inch-deep compacted earth filled trench, which exceeds the NMOCD 18-inch specification.
- Liner seams will be minimized and orientated vertically rather than across slopes. Factory welded seams will be utilized to the maximum extent possible. Sloped liner panels will extend a minimum of five (5) feet beyond the point of grade change to prevent seams from resting on the grade break.
- All field seams and welds will be subjected to non-destructive field testing by qualified personnel per the appropriate testing standard to ensure proper thermal sealing. Field seams will be overlapped at a minimum of 6 inches.
- The primary (upper) liner will be protected from excessive hydraulic force or mechanical damage from discharge or suction within the recycling Containment. No discharge or suction lines will penetrate the liners.
- The recycling Containment will be constructed with a 200 mil geonet leak detection system located between the primary (upper) and the secondary (lower) liners. The system is properly designed to facilitate effective drainage, collection, and removal of liquid above the secondary (lower) liner and the leakage detection at the earliest possible time.
- The recycling Containment is designed to prevent run-on of surface water. The minimal distance from the existing surface elevation to the top of the Containment berm will be approximately 10 feet.

Stockpiling of Topsoil

Where topsoil is present, prior to constructing the recycling Containment, it will be stripped and stockpiled on-site for use as final cover or fill.

Signs

An upright sign no less than 12 inches by 24 inches with lettering no less than 2 inches in height will be installed in a conspicuous place on the fence surrounding the recycling Containment. The sign will be installed in such a manner and location so that personnel can easily read the sign. The sign will include:

- The operator's name;
- The location of the Facility by quarter-quarter or unit letter, section, township, range; and
- Emergency telephone number.

Fencing

The recycling Containment will be constructed with an 8-foot-high game fence equipped with 3 strands of barbed wire at the top to deter unauthorized wildlife and human access. The fence will be gated to provide access to operations personnel and will be closed and locked when access is not required.

Netting and Wildlife Protection

The game fence, as described above, surrounding the recycling Containment and recycling Facility will be effective in excluding terrestrial wildlife. XTO is proposing to install an audible avian deterrence system in lieu of installing netting. XTO is proposing to install an electronic sonic/ultrasonic avian deterrence system equivalent or equal to the Bird-X Broadband Pro or the Bird-X Mega Blaster Pro.

This type of system has been utilized by other recycling containment operators in southeast New Mexico and has been demonstrated to be an effective deterrent for avian species, including migratory birds. The O&M plan calls for the operator to inspect for and within 30 days of discovery, report the discovery of dead migratory birds or other wildlife to the appropriate wildlife agency and to the division district office in order to facilitate assessment and implementation of measures to prevent incidents from reoccurring.

Appendix E – Engineering Design Drawings

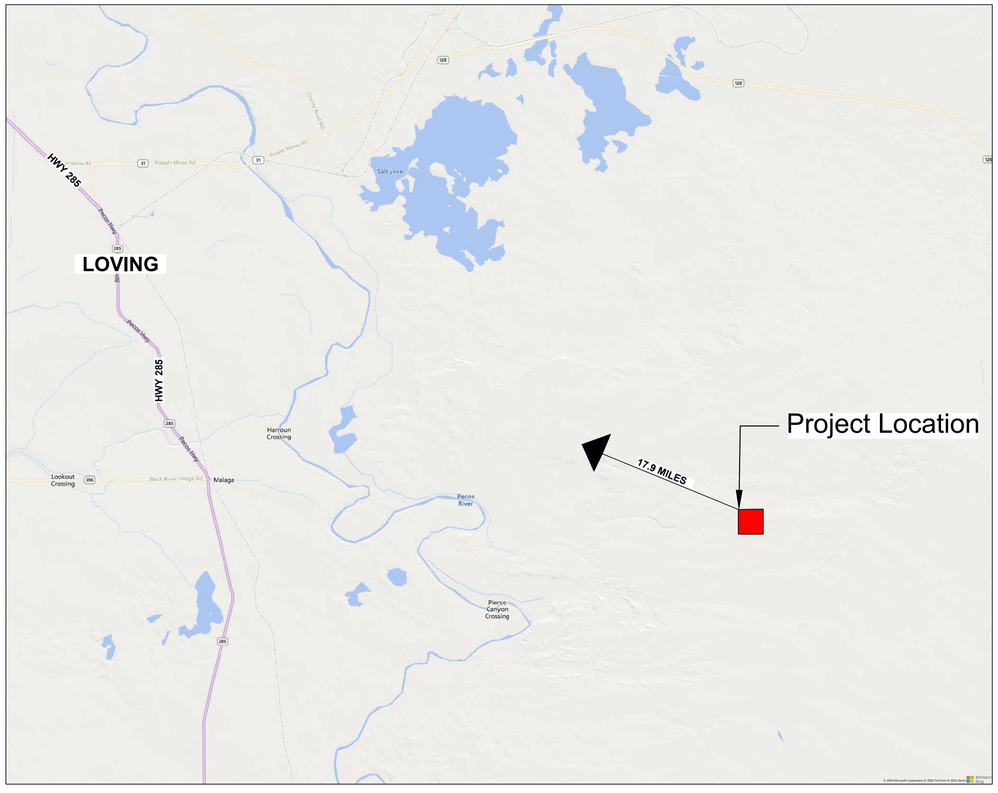
SquareRoot services
Engineering | Surveying
Materials Testing
7921 N. World Dr.
Hobbs, NM 88242
Squarerootservices.net
575-231-7347

CIVIL PLANS

XTO

POKER LAKE UNIT ROW 2 WEST FRAC POND

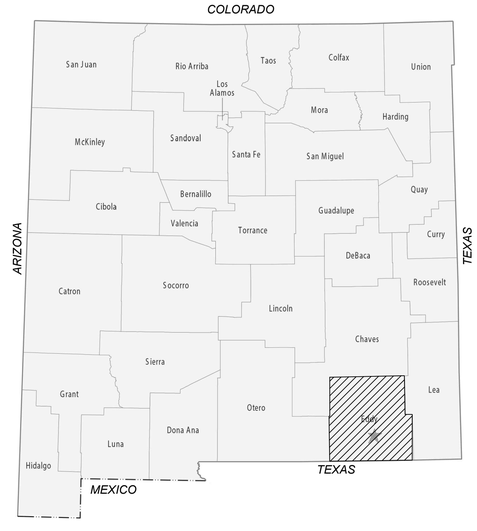
CITY OF LOVING
SECTION 17, TOWNSHIP 24 SOUTH, RANGE 30 EAST
N.M.P.M., EDDY COUNTY, NEW MEXICO



VICINITY MAP
N.T.S.

INDEX OF SHEETS		
SHEET	NAME	DESCRIPTION
1	C-100	COVER SHEET
2	C-101	GENERAL NOTES
3	CS-101	CIVIL SITE PLAN
4	CS-102	NORTH CONTAINMENT EAST TO WEST PLAN & PROFILE
5	CS-103	NORTH CONTAINMENT NORTH TO SOUTH PLAN & PROFILE
6	CS-104	SOUTH CONTAINMENT EAST TO WEST PLAN & PROFILE
7	CS-105	SOUTH CONTAINMENT NORTH TO SOUTH PLAN & PROFILE
8	CS-106	DIVERSION DITCH P&P STA 0+50 TO STA 4+00
9	CS-107	DIVERSION DITCH P&P STA 4+00 TO STA 6+00
10	CS-108	DIVERSION DITCH P&P STA 6+00 TO STA 13+00
11	CS-109	DIVERSION DITCH P&P STA 13+00 TO STA 18+00
12	CS-110	DIVERSION DITCH P&P STA 18+00 TO STA 23+00
13	CS-501	LEAK DETECTION DETAILS
14	CS-502	LINER DETAILS
15	CS-503	FENCE DETAILS
16	CS-504	CATTLEGUARD DETAIL

EDDY COUNTY
NEW MEXICO



(505)-254-7310

THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.

Geotechnical Engineering Report
PLU Row 2W Frac Pond | Eddy County, NM
January 14, 2025 | Terracon Proposal No. A4245238

Exploration Plan

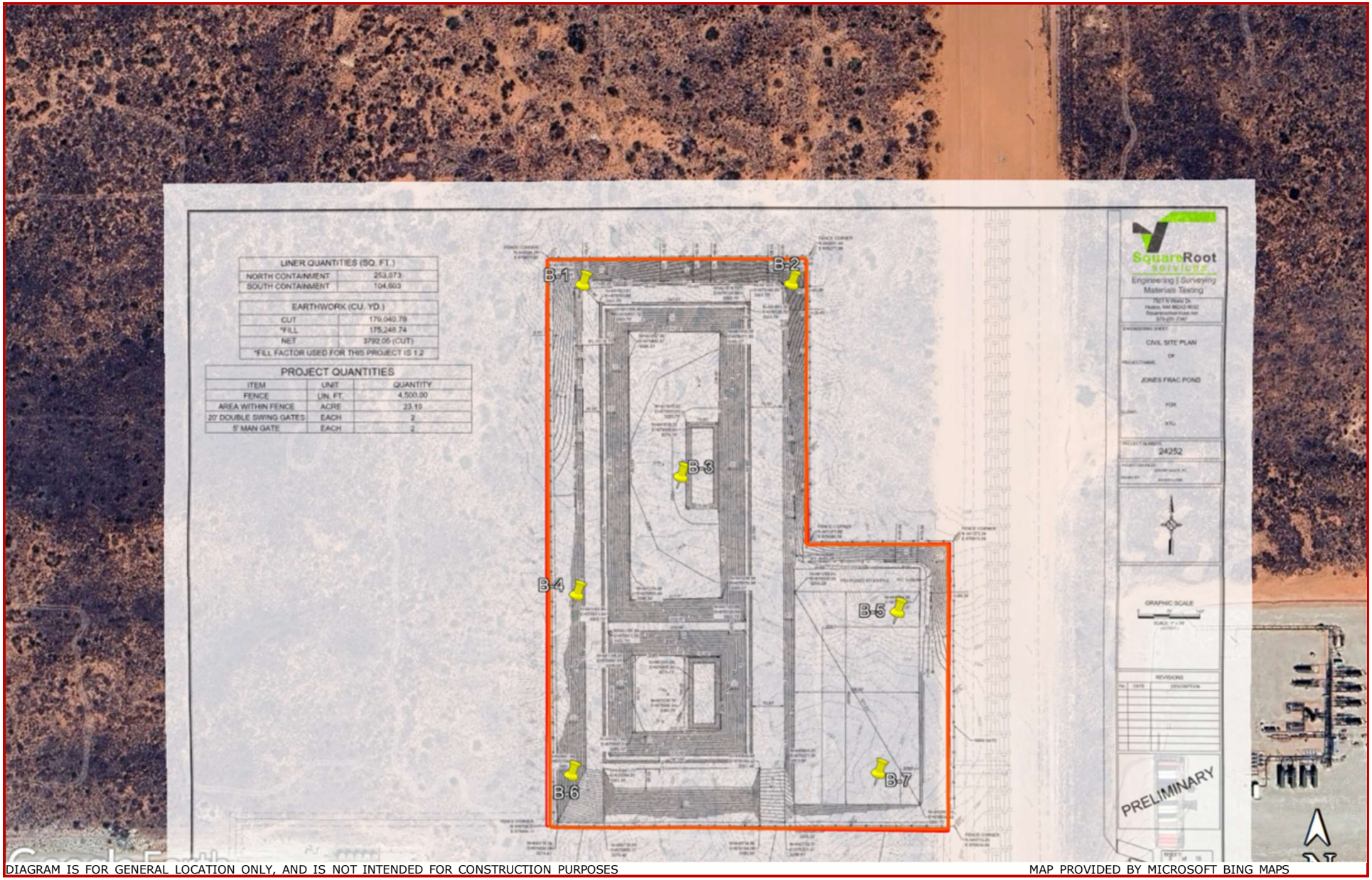


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY MICROSOFT BING MAPS

GENERAL NOTES

1. NEW MEXICO ADMINISTRATIVE CODE TITLE 19, CHAPTER 15, PART 34, DESIGN CRITERIA FOR RECYCLING CONTAINMENTS SHALL APPLY TO THIS PROJECT.
2. ALL BOUNDARY, TOPOGRAPHIC AND UTILITY INFORMATION SHOWN ARE BASED ON SURVEY INFORMATION FURNISHED BY TOPOGRAPHIC.
3. THE CONTRACTOR SHALL IDENTIFY AND LOCATE UTILITY LINES, MONITORING WELLS, SURVEY MONUMENTS, AND OTHER NEARBY STRUCTURES PRIOR TO PERFORMING WORK.
4. COORDINATE INFORMATION IS BASED ON STATE PLANE COORDINATES, NEW MEXICO EAST, NAD 83.
5. THE CONTRACTOR SHALL IDENTIFY ANY DISCREPANCIES PRIOR TO PROCEEDING WITH CONSTRUCTION AND CONTACT THE ENGINEER IN WRITING.
6. THE CONTRACTOR SHALL IMPLEMENT AND MAINTAIN BEST MANAGEMENT PRACTICES (BMPS) TO MINIMIZE EROSION AND CONTROL SEDIMENT TO PROTECT SURFACE WATER QUALITY DURING STORM EVENTS.

EARTHWORK NOTES

1. THE CONTRACTOR SHALL USE WATER FOR COMPACTION AT ALL TIMES. THE CONTRACTOR SHALL ENSURE THEIR BID INCLUDES CONSTRUCTION WATER. NO EARTHWORK OPERATIONS SHALL TAKE PLACE IF CONSTRUCTION WATER IS NOT AVAILABLE ONSITE.
2. THE CONTRACTOR SHALL BUILD THE LEVEES USING COMPACTED LAYERS. UNCONTROLLED AND INCONSISTENT PUSHING AND PILING OF MATERIAL FOR LEVEE CONSTRUCTION IS NOT ACCEPTABLE. THE CONTRACTOR SHALL DEVELOP A SUCCESSFUL COMPACTION PATTERN EARLY IN THE PROCESS, VERIFIED THROUGH NUCLEAR DENSITY OR SAND CONE TESTING, AND SHALL MAINTAIN CONSISTENCY IN THE COMPACTIVE EFFORT AS LONG AS THE MATERIALS ENCOUNTERED REMAINS CONSISTENT. IF ONSITE SOILS ENCOUNTERED CHANGE, THE CONTRACTOR SHALL DEVELOP A NEW COMPACTION PATTERN.
3. FILL FOR LEVEES SHALL BE PLACED AND COMPACTED IN HORIZONTAL LIFTS WITH MAXIMUM LOOSE LIFT THICKNESS OF 10 INCHES, OR AS DIRECTED BY ENGINEER. CONSTRUCT EACH LAYER CONTINUOUSLY AND APPROXIMATELY HORIZONTAL FOR THE WIDTH AND LENGTH OF THE LEVEE. FILL SHALL BE COMPACTED TO AT LEAST 95 PERCENT OF MAXIMUM DRY DENSITY DETERMINED BY THE ASTM D698 AND AT MOISTURE CONTENT WITHIN +2% TO -2% OF OPTIMUM MOISTURE CONTENT AS DETERMINED BY A STANDARD PROCTOR SOILS TEST ON SAMPLES FROM THE SOURCE AREA.
4. FILL SHALL NOT BE PLACED AND COMPACTED WHEN THE MATERIALS ARE TOO WET TO PROPERLY COMPACT. MATERIAL WHICH IS TOO WET SHALL BE SPREAD ON THE FILL AREA AND PERMITTED TO DRY, ASSISTED BY HARROWING IF NECESSARY, UNTIL THE MOISTURE CONTENT IS REDUCED TO ALLOWABLE LIMITS. IF THE ENGINEER DETERMINED THAT ADDED MOISTURE IS REQUIRED, WATER SHALL BE APPLIED UNIFORMLY OVER THE AREA TO BE TREATED, AND GIVE COMPLETE AND ACCURATE CONTROL OF THE AMOUNT OF WATER TO BE USED. IF TOO MUCH WATER IS ADDED, THAT AREA SHALL BE PERMITTED TO DRY BEFORE COMPACTION IS CONTINUED.
5. PERFORM ONE NUCLEAR DENSITY GAGE TEST PER 2500 CY MINIMUM OR AS DIRECTED BY THE ENGINEER.
6. EARTHWORK CONTRACTOR SHALL PERFORM A VISUAL INSPECTION OF THE FINISHED COMPACTED POND BOTTOM AND SIDE SLOPES BEFORE HDPE LINER INSTALLATION, REMOVING ALL DEBRIS, SHARP OBJECTS AND GRAVEL LARGER THAN 3/4 INCH.
7. EARTHWORK CONTRACTOR SHALL ROLL SURFACE WITH A SMOOTH ROLLER TO ELIMINATE RUTS.

LINER NOTES

1. LINER CONTRACTOR SHALL INSPECT GRADED SURFACE FOR DEBRIS, ROCKS OR OTHER MATERIAL THAT MAY DAMAGE THE LINER AND COORDINATE WITH OWNER IF ADDITIONAL SUBGRADE RESURFACING IS NEEDED PRIOR TO PERFORMING WORK.
2. LINER CONTRACTOR TO PROVIDE SUBMITTAL OF LINER PANEL LAYOUT.
3. LINER CONTRACTOR TO SIGN SUBGRADE ACCEPTANCE FORM (PROVIDED BY OWNER REPRESENTATIVE) DAILY PRIOR TO INSTALLATION.
4. LINER TO BE INSTALLED PER GRI SPECIFICATIONS, GUIDES AND PRACTICES.
5. CONTRACTOR SHALL PLACE SANDBAGS ON LINER DURING INSTALLATION AS REQUIRED TO PREVENT WIND UPLIFT UNTIL POND IS FILLED TO A DEPTH OF 3 FEET.
6. CONTRACTOR SHALL USE BLACK 60 MIL HDPE SMOOTH GEOMEMBRANE AS THE PRIMARY LINER AND BLACK 40 MIL HDPE SMOOTH GEOMEMBRANE AS THE SECONDARY LINER.
7. A 3' DIAMETER MINIMUM PIECE OF 40MIL LINER SHALL BE EXTRUDED WELDED WHERE THE PIE SHAPED CORNER SECTIONS MEET FOR SEAM REINFORCEMENT.
8. INSTALL A FULL DOUBLE WIDTH SECTION OF BLACK OR WHITE 60 MIL TEXTURED HDPE GEOMEMBRANE RUB SHEET. EXTRUDE WELD TO LINER. WELDS SHALL BE 2" LONG AND SPACED EVERY 12" ALONG BOTH SIDES OF THE SHEET. DO NOT WELD END EDGES. SECTION SHALL EXTEND FROM SUMP AND INSTALLED INTO LINER ANCHOR TRENCH AS SHOWN.
9. LINER SHALL BE PROTECTED WITH A 8 OZ. NONWOVEN GEOTEXTILE IF ROCK OR OTHER ANGULAR MATERIALS WITH A DIMENSION GREATER THAN 3/4 INCH ARE PRESENT.
10. SUMPS SHALL BE BACKFILLED WITH NON-ANGULAR MAXIMUM 3/8 INCH SIZED PEA GRAVEL.
11. ALL SEAMS MUST BE WELDED WITH A 6" MINIMUM OVERLAP.
12. CONTRACTOR SHALL NON-DESTRUCTIVELY TEST ALL SEAMS THEIR FULL LENGTH USING AN AIR PRESSURE OR VACUUM TEST, THE PURPOSE OF THIS TEST IS TO CHECK THE CONTINUITY OF THE SEAM.
13. FOR AIR PRESSURE TESTING (ASTM 5820), THE FOLLOWING PROCEDURES ARE APPLICABLE TO THE SEAMS WELD WITH DOUBLE SEAM FUSION WELDER.
    a. THE EQUIPMENT USED SHALL CONSIST OF AN AIR TANK OR PUMP CAPABLE OF PRODUCING A MINIMUM 35 PSI AND A SHARP NEEDLE WITH A PRESSURE GAUGE ATTACHED TO INSERT INTO THE AIR CHAMBER.
    b. SEAL BOTH ENDS OF THE SEAM BY HEATING AND SQUEEZING THEM TOGETHER. INSERT THE NEEDLE WITH THE GAUGE INTO THE AIR CHANNEL. PRESSURIZE THE AIR CHANNEL TO A MINIMUM OF 35 PSI. NOTE TIME STARTS AND WAIT A MINIMUM OF 5 MINUTES TO CHECK. IF PRESSURE AFTER 5 MINUTES HAD DROPPED LESS THAN 2 PSI THE TEST IS SUCCESSFUL (THICKNESS OF MATERIAL MAY CAUSE VARIANCE).
    c. CUT OPPOSITE SEAM END AND LISTEN FOR PRESSURE RELEASE TO VERIFY FULL SEAM HAS BEEN TESTED.
    d. IF THE TEST FAILS, FOLLOW THESE PROCEDURES.
        I. WHILE CHANNEL IS UNDER PRESSURE WALK THE LENGTH OF THE SEAM LISTENING FOR A LEAK.
        II. WHILE CHANNEL IS UNDER PRESSURE APPLY A SOAPY SOLUTION TO THE SEAM EDGE AND LOOK FOR BUBBLES FORMED BY AIR ESCAPING.
        III. RE-TEST THE SEAM IN SMALLER INCREMENTS UNTIL THE LEAK IS FOUND.
    e. ONCE LEAK IS FOUND USING ONE OF THE PROCEDURES ABOVE, CUT OUT THE AREA AND RETEST THE PORTIONS OF THE PORTIONS OF THE SEAMS BETWEEN THE LEAK AREAS PER 6A AND 6B ABOVE. CONTINUE THIS PROCEDURE UNTIL ALL SECTIONS OF THE SEAM PASS THE PRESSURE TEST.
    f. REPAIR THE LEAK WITH A PATCH AND VACUUM TEST.
14. ALL NON-DESTRUCTIVE TESTS WILL BE NOTED IN THE NON-DESTRUCTIVE LOGS.
15. LINER GAS VENTS SHALL BE SPACED ALONG THE INSIDE SLOPE AT APPROXIMATELY 100 FEET ON CENTER OR MINIMUM 2 VENTS PER SIDE.
16. WHEN ANY PIPING EQUIPMENT, INLET, OR OUTLET IS IN DIRECT CONTACT WITH THE LINER, AN APRON CONSISTING OF 60 MIL HDPE MATERIAL SHALL BE INSTALLED BENEATH THE EQUIPMENT OR STRUCTURE TO PROTECT THE PRIMARY LINER.
17. LAY BOTH LINERS IN ANCHOR TRENCH. BACKFILL ANCHOR TRENCH IN 2 LIFTS AND COMPACT.

SUGGESTED CONSTRUCTION SEQUENCE

1. CLEAR EXISTING VEGETATION.

2. STRIP AND STOCKPILE TOPSOIL AT THE LOCATION DESIGNATED ON THESE PLANS.

3. PERFORM EARTHWORK OPERATIONS:
    3.1. CONSTRUCT STORMWATER DIVERSION CHANNEL.
    3.2. PERFORM RIPPING/EXCAVATING OPERATIONS.
    3.3. REPLACE EXCAVATED MATERIAL IN COMPACTED LAYERS ON THE LEVEE/PAD IN ACCORDANCE WITH THE DETAILS AND SPECIFICATIONS.
    3.4. FINISH SLOPES USING A SMOOTH ROLLER.
    3.5. DIG ANCHOR TRENCH.

4. INSTALL NEW CHAIN LINK FENCE AND GATES.

5. INSTALL GEOMEMBRANES:
    5.1. INSTALL GEOTEXTILE AS NEEDED, SECONDARY LINER, GEONET, LEAK DETECTION SYSTEM AND PRIMARY LINER.
    5.2. INSTALL RUB SHEETS AND WATER LEVEL GAGE/LADDER.
    5.3. BACKFILL AND COMPACT ANCHOR TRENCH.

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ENGINEERING SHEET:
GENERAL NOTES
OF
PROJECT NAME:
POKER LAKE UNIT ROW 2 WEST FRAC POND
FOR
CLIENT:
XTO

PROJECT NUMBER: 24252

PROJECT ENGINEER: JEREMY BAKER, PE
DRAWN BY: XAVIER CLARK

REVISIONS

No.	DATE	DESCRIPTION

PRELIMINARY

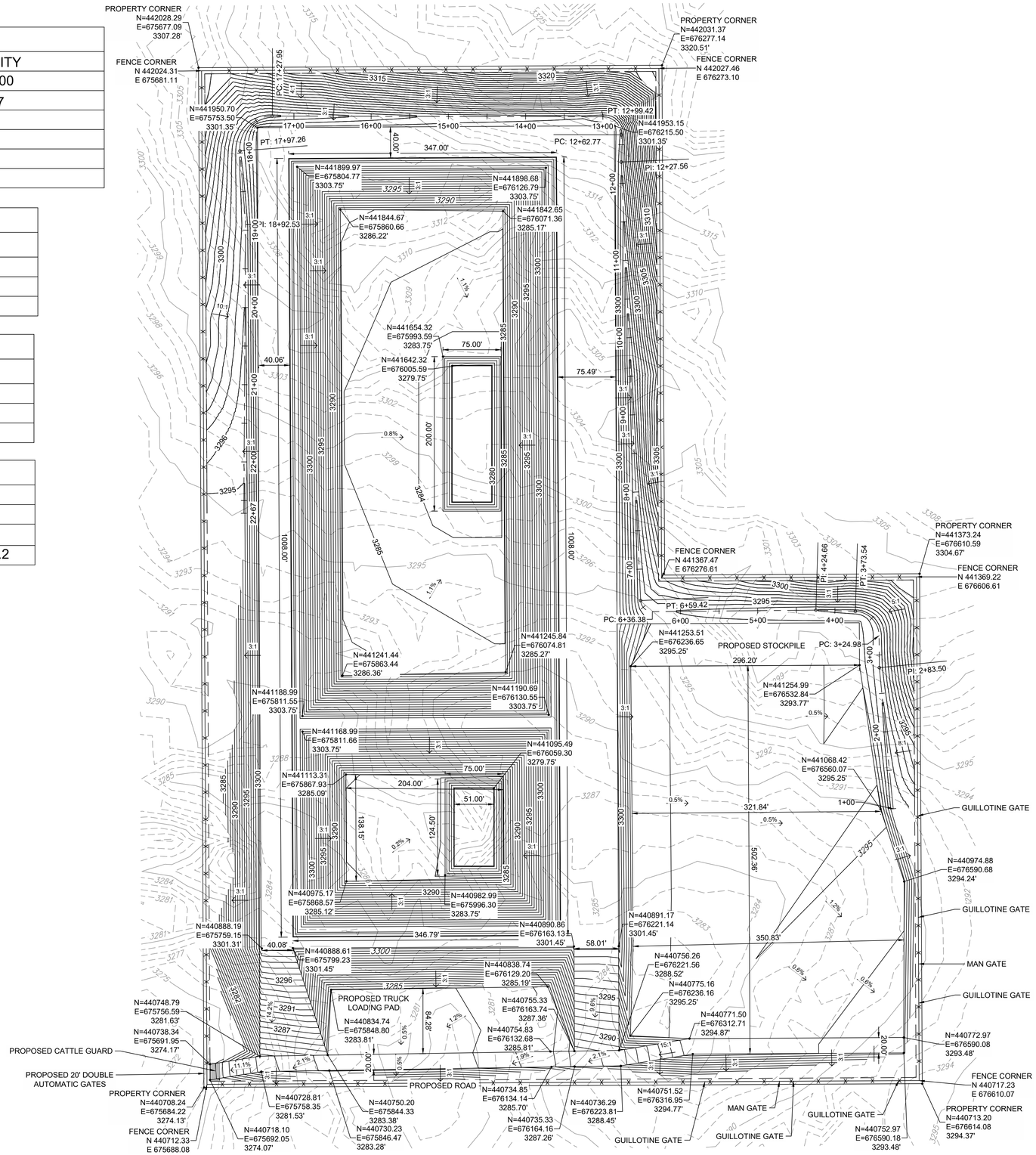
SHEET: 2 of 15
C-101

PROJECT QUANTITIES		
ITEM	UNIT	QUANTITY
FENCE	LIN. FT.	4,468.00
AREA WITHIN FENCE	ACRE	22.77
20' DOUBLE AUTO GATES	EACH	1
5' MAN GATE	EACH	2
2' x 4' GUILLOTINE GATES	EACH	6
CATTLE GUARD	EACH	1

LINER QUANTITIES (SQ. FT.)	
NORTH CONTAINMENT	
BOTTOM OF POND	118,103
SIDE SLOPES	134,965
TOTAL	253,068

LINER QUANTITIES (SQ. FT.)	
SOUTH CONTAINMENT	
BOTTOM OF POND	24,078
SIDE SLOPES	66,905
TOTAL	90,983

EARTHWORK (CU. YD.)	
CUT	169,664.60
*FILL	170,779.84
NET	1115.24 (FILL)
*FILL FACTOR USED FOR THIS PROJECT IS 1.2	



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ENGINEERING SHEET:

CIVIL SITE PLAN

OF

PROJECT NAME:

POKER LAKE UNIT ROW 2
WEST FRAC POND

FOR

CLIENT:

XTO

PROJECT NUMBER:

24252

PROJECT ENGINEER: JEREMY BAKER, PE

DRAWN BY: XAVIER CLARK

MAGNETIC NORTH

GRAPHIC SCALE

0 70' 140'

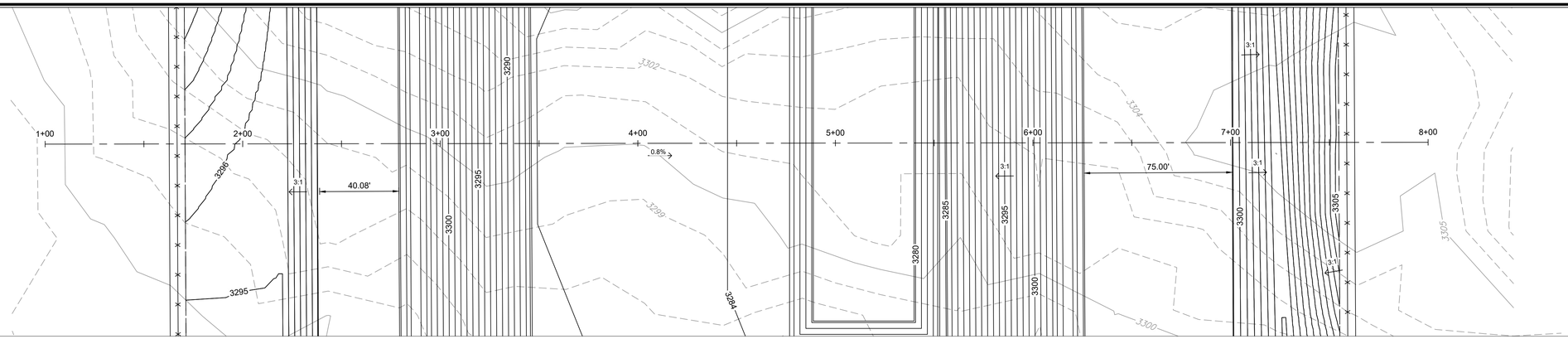
SCALE: 1" = 70'
(IN FEET)

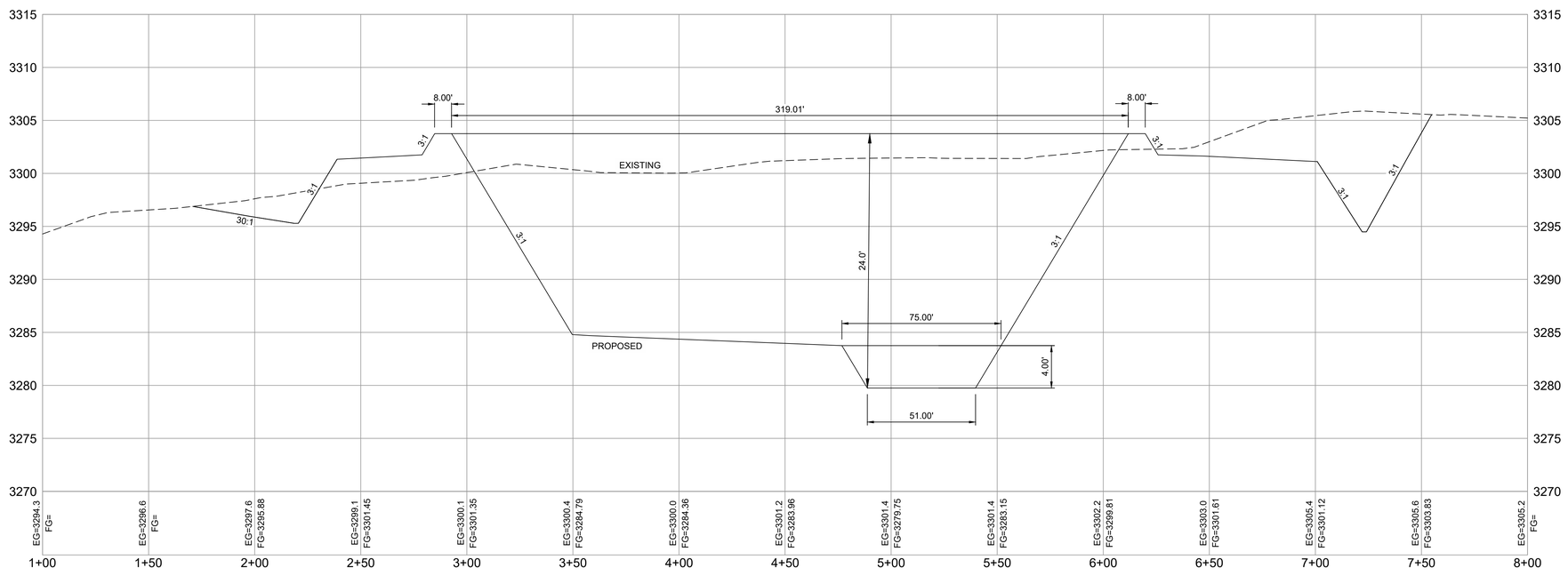
REVISIONS		
No.	DATE	DESCRIPTION

PRELIMINARY

SHEET: 3 of 16

CS-101





ELEVATION (FT)	CONTAINMENT DEPTH (FT)	REMAINING STORAGE (FT)	REMAINING STORAGE VOL (FT3)	REMAINING STORAGE VOL (GAL)	REMAINING STORAGE VOL (BBL)	PERCENT OF TOTAL VOL (%)	VOL IN CONTAINMENT (FT3)	VOL IN CONTAINMENT (GAL)	VOL IN CONTAINMENT (BBL)	VOL IN CONTAINMENT (AC-FT)	PERCENT OF TOTAL VOL (%)	
3,303.75	0	24	0	-	-	0%	3,319,349	24,832,047	591,157	76.20	100%	
3,302.75	1	23	222,785	1,666,653	39,677	7%	3,096,564	23,165,394	551,481	71.09	93%	FREEBOARD
3,301.75	2	22	439,480	3,287,746	78,269	13%	2,879,869	21,544,301	512,889	66.11	87%	
3,300.75	3	21	650,156	4,863,821	115,789	20%	2,669,192	19,968,227	475,368	61.28	80%	MAX VOLUME
3,299.75	4	20	854,887	6,395,411	152,251	26%	2,464,461	18,436,636	438,907	56.58	74%	
3,298.75	5	19	1,053,744	7,883,058	187,666	32%	2,265,605	16,948,990	403,492	52.01	68%	
3,297.75	6	18	1,246,798	9,327,299	222,048	38%	2,072,550	15,504,748	369,110	47.58	62%	
3,296.75	7	17	1,434,123	10,728,675	255,409	43%	1,885,226	14,103,373	335,748	43.28	57%	
3,295.75	8	16	1,615,790	12,087,724	287,763	49%	1,703,559	12,744,323	303,394	39.11	51%	
3,294.75	9	15	1,791,870	13,404,982	319,122	54%	1,527,478	11,427,065	272,035	35.07	46%	STORAGE
3,293.75	10	14	1,962,437	14,680,993	349,499	59%	1,356,911	10,151,055	241,658	31.15	41%	VOLUME
3,292.75	11	13	2,127,562	15,916,289	378,907	64%	1,191,787	8,915,759	212,251	27.36	36%	
3,291.75	12	12	2,287,316	17,111,414	407,358	69%	1,032,032	7,720,634	183,799	23.69	31%	
3,290.75	13	11	2,441,773	18,266,904	434,866	74%	877,576	6,565,143	156,291	20.15	26%	
3,289.75	14	10	2,591,003	19,383,297	461,443	78%	728,345	5,448,751	129,714	16.72	22%	
3,288.75	15	9	2,735,080	20,461,134	487,102	82%	584,269	4,370,914	104,055	13.41	18%	
3,287.75	16	8	2,874,075	21,500,953	511,857	87%	445,274	3,331,095	79,301	10.22	13%	
3,286.75	17	7	3,008,059	22,503,291	535,718	91%	311,289	2,328,757	55,439	7.15	9%	
3,285.75	18	6	3,135,555	23,457,084	558,425	94%	183,794	1,374,964	32,733	4.22	6%	FLOOR
3,284.75	19	5	3,231,465	24,174,590	575,506	97%	87,884	657,458	15,652	2.02	3%	VOLUME
3,283.75	20	4	3,271,782	24,476,201	582,686	99%	47,567	355,847	8,471	1.09	1%	
3,282.75	21	3	3,285,968	24,582,329	585,213	99%	33,380	249,719	5,945	0.77	1%	
3,281.75	22	2	3,298,577	24,676,655	587,458	99%	20,772	155,393	3,699	0.48	1%	SUMP
3,280.75	23	1	3,309,680	24,759,714	589,435	100%	9,669	72,334	1,722	0.22	0%	VOLUME
3,279.75	24	0	3,319,349	24,832,047	591,157	100%	0	0	0	0.00	0%	

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ENGINEERING SHEET:

NORTH CONTAINMENT EAST TO WEST PLAN & PROFILE

OF

PROJECT NAME:

POKER LAKE UNIT ROW 2 WEST FRAC POND

FOR

CLIENT:

XTO

PROJECT NUMBER: 24252

PROJECT ENGINEER: JEREMY BAKER, PE

DRAWN BY: XAVIER CLARK

MAGNETIC NORTH

GRAPHIC SCALE
HORIZONTAL
0 30' 60'
SCALE: 1" = 30'
(IN FEET)

GRAPHIC SCALE
VERTICAL
0 6' 12'
SCALE: 1" = 6'
(IN FEET)

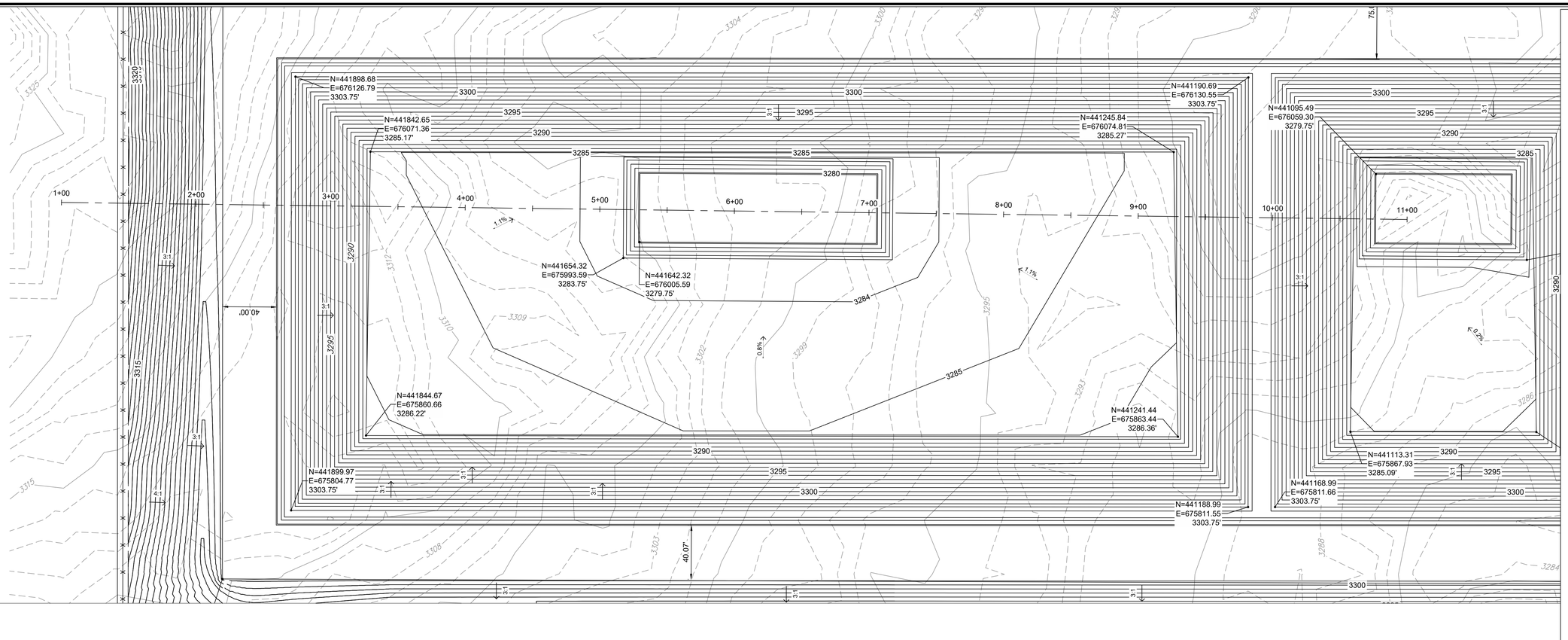
REVISIONS

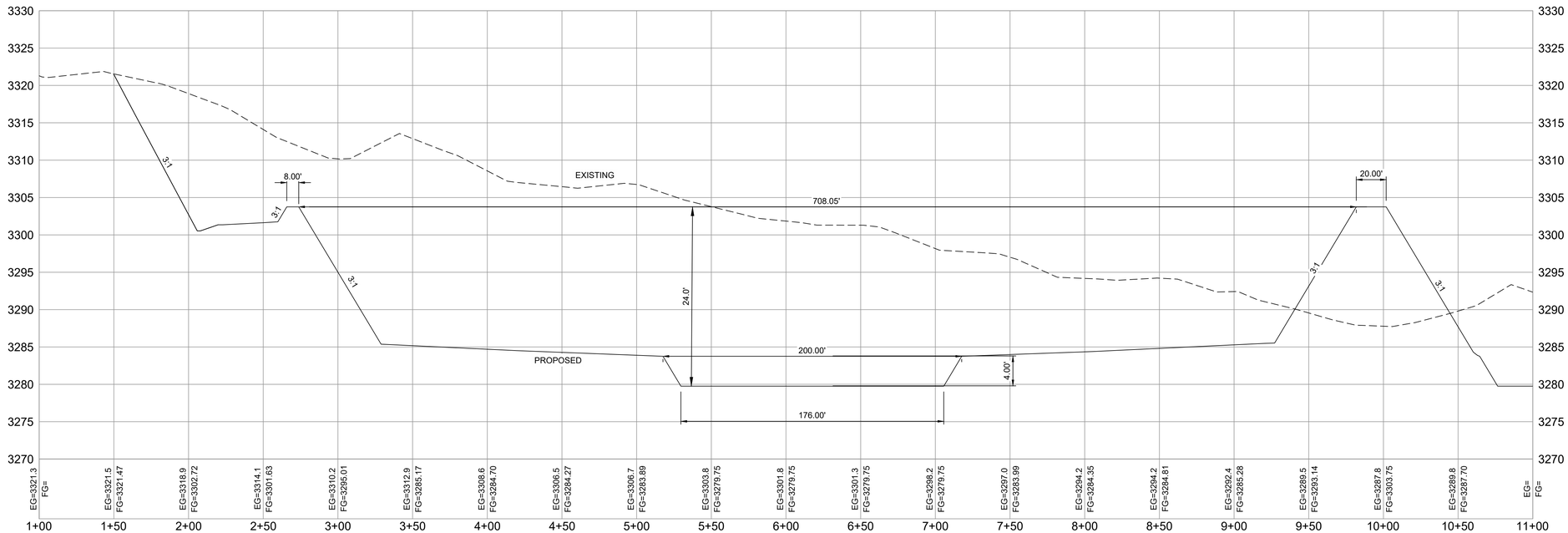
No.	DATE	DESCRIPTION

PRELIMINARY

SHEET: 4 of 16

CS-102





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ENGINEERING SHEET:

NORTH CONTAINMENT NORTH TO SOUTH PLAN & PROFILE

OF

PROJECT NAME:

POKER LAKE UNIT ROW 2 WEST FRAC POND

FOR

CLIENT:

XTO

PROJECT NUMBER: 24252

PROJECT ENGINEER: JEREMY BAKER, PE

DRAWN BY: XAVIER CLARK

MAGNETIC NORTH

GRAPHIC SCALE
HORIZONTAL
0 40' 80'
SCALE: 1" = 40'
(IN FEET)

GRAPHIC SCALE
VERTICAL
0 8' 16'
SCALE: 1" = 8'
(IN FEET)

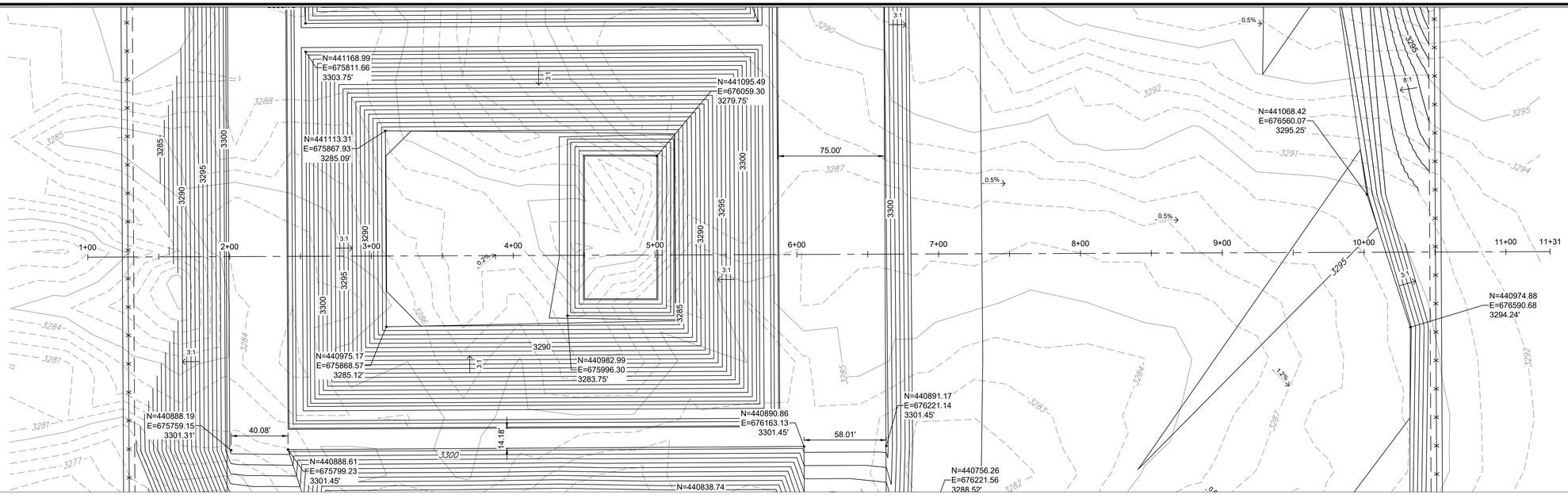
REVISIONS

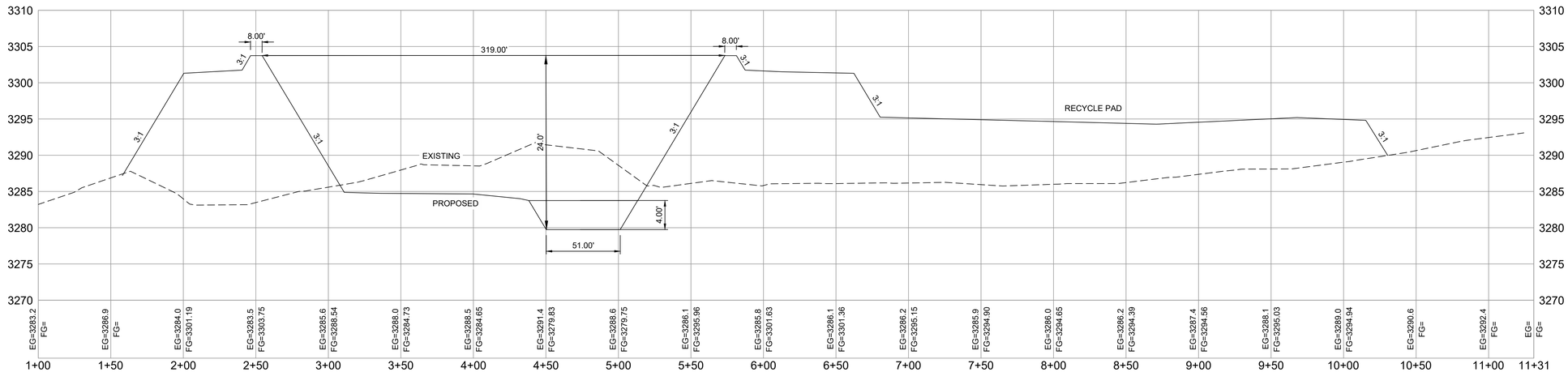
No.	DATE	DESCRIPTION

PRELIMINARY

SHEET: 5 of 16

CS-103





ELEVATION (FT)	CONTAINMENT DEPTH (FT)	REMAINING STORAGE (FT)	REMAINING STORAGE VOL (FT3)	REMAINING STORAGE VOL (GAL)	REMAINING STORAGE VOL (BBL)	PERCENT OF TOTAL VOL (%)	VOL IN CONTAINMENT (FT3)	VOL IN CONTAINMENT (GAL)	VOL IN CONTAINMENT (BBL)	VOL IN CONTAINMENT (AC-FT)	PERCENT OF TOTAL VOL (%)	
3,303.75	0	24	0	-	-	0%	1,022,227	7,647,282	182,053	23.47	100%	
3,302.75	1	23	78,055	583,926	13,901	8%	944,173	7,063,356	168,152	21.68	92%	FREEBOARD
3,301.75	2	22	152,767	1,142,853	27,207	15%	869,460	6,504,430	154,846	19.96	85%	
3,300.75	3	21	224,210	1,677,314	39,931	22%	798,017	5,969,968	142,122	18.32	78%	MAX VOLUME
3,299.75	4	20	292,455	2,187,855	52,085	29%	729,772	5,459,428	129,968	16.75	71%	
3,298.75	5	19	357,573	2,675,007	63,682	35%	664,654	4,972,276	118,371	15.26	65%	
3,297.75	6	18	419,638	3,139,312	74,735	41%	602,589	4,507,970	107,318	13.83	59%	
3,296.75	7	17	478,721	3,581,310	85,257	47%	543,506	4,065,972	96,795	12.48	53%	
3,295.75	8	16	534,893	4,001,538	95,262	52%	487,334	3,645,744	86,791	11.19	48%	
3,294.75	9	15	588,228	4,400,537	104,760	58%	433,999	3,246,745	77,293	9.96	42%	STORAGE
3,293.75	10	14	638,797	4,778,841	113,766	62%	383,430	2,868,442	68,287	8.80	38%	VOLUME
3,292.75	11	13	686,672	5,136,992	122,292	67%	335,555	2,510,290	59,761	7.70	33%	
3,291.75	12	12	731,925	5,475,528	130,352	72%	290,303	2,171,754	51,701	6.66	28%	
3,290.75	13	11	774,627	5,794,987	137,957	76%	247,600	1,852,296	44,096	5.68	24%	
3,289.75	14	10	814,852	6,095,909	145,121	80%	207,375	1,551,373	36,932	4.76	20%	
3,288.75	15	9	852,671	6,378,832	151,856	83%	169,556	1,268,450	30,197	3.89	17%	
3,287.75	16	8	888,156	6,644,294	158,176	87%	134,071	1,002,989	23,877	3.08	13%	
3,286.75	17	7	921,379	6,892,833	164,092	90%	100,849	754,450	17,961	2.32	10%	
3,285.75	18	6	952,412	7,124,990	169,619	93%	69,816	522,292	12,434	1.60	7%	FLOOR
3,284.75	19	5	980,747	7,336,968	174,666	96%	41,480	310,315	7,387	0.95	4%	VOLUME
3,283.75	20	4	993,684	7,433,752	176,970	97%	28,543	213,531	5,083	0.66	3%	
3,282.75	21	3	1,002,435	7,499,220	178,528	98%	19,792	148,063	3,525	0.45	2%	
3,281.75	22	2	1,010,062	7,556,273	179,886	99%	12,165	91,009	2,167	0.28	1%	SUMP
3,280.75	23	1	1,016,635	7,605,449	181,057	99%	5,592	41,834	996	0.13	1%	VOLUME
3,279.75	24	0	1,022,227	7,647,282	182,053	100%	0	0	0	0.00	0%	

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ENGINEERING SHEET:

SOUTH CONTAINMENT EAST TO WEST PLAN & PROFILE

OF

PROJECT NAME:

POKER LAKE UNIT ROW 2 WEST FRAC POND

FOR

CLIENT:

XTO

PROJECT NUMBER: 24252

PROJECT ENGINEER: JEREMY BAKER, PE

DRAWN BY: XAVIER CLARK

MAGNETIC NORTH

GRAPHIC SCALE
HORIZONTAL
0 40' 80'
SCALE: 1" = 40'
(IN FEET)

GRAPHIC SCALE
VERTICAL
0 8' 16'
SCALE: 1" = 8'
(IN FEET)

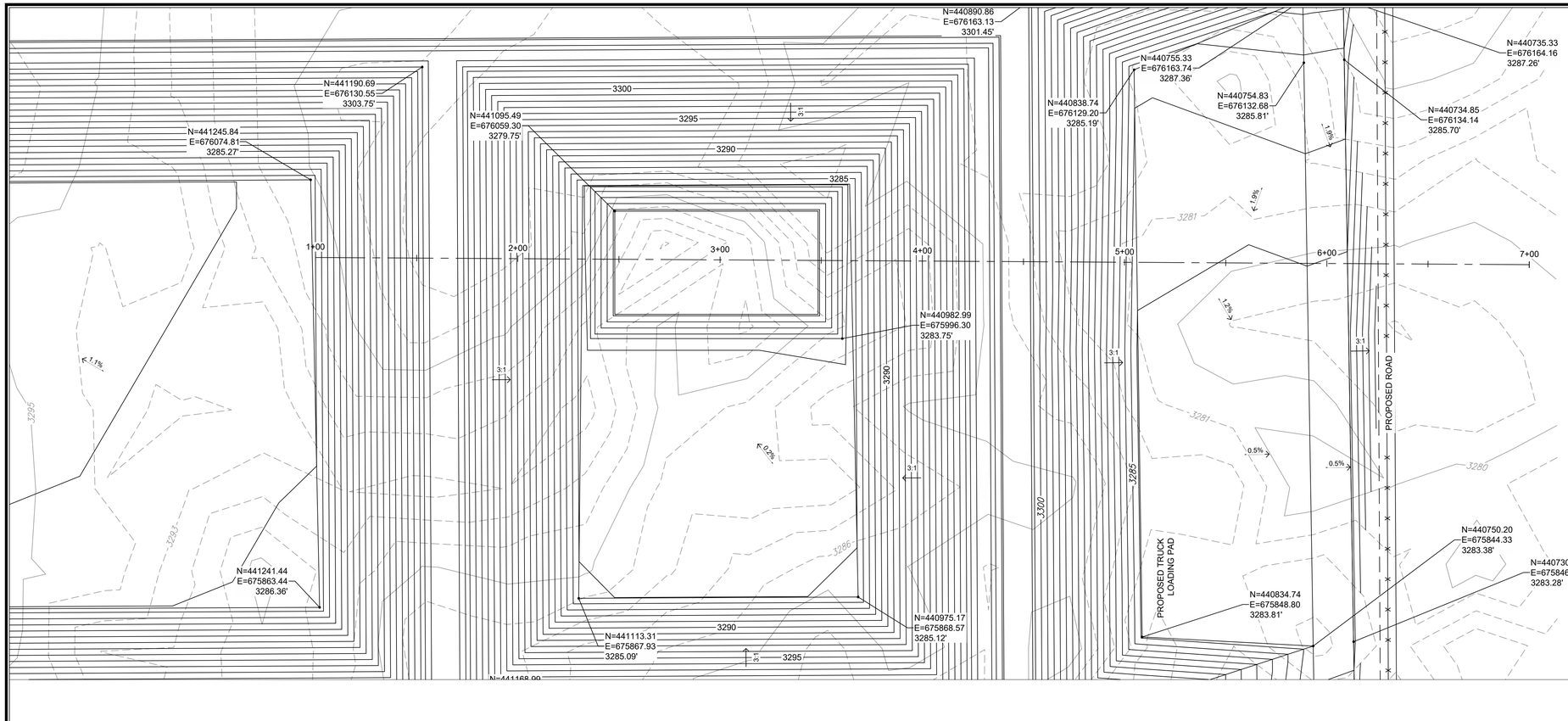
REVISIONS

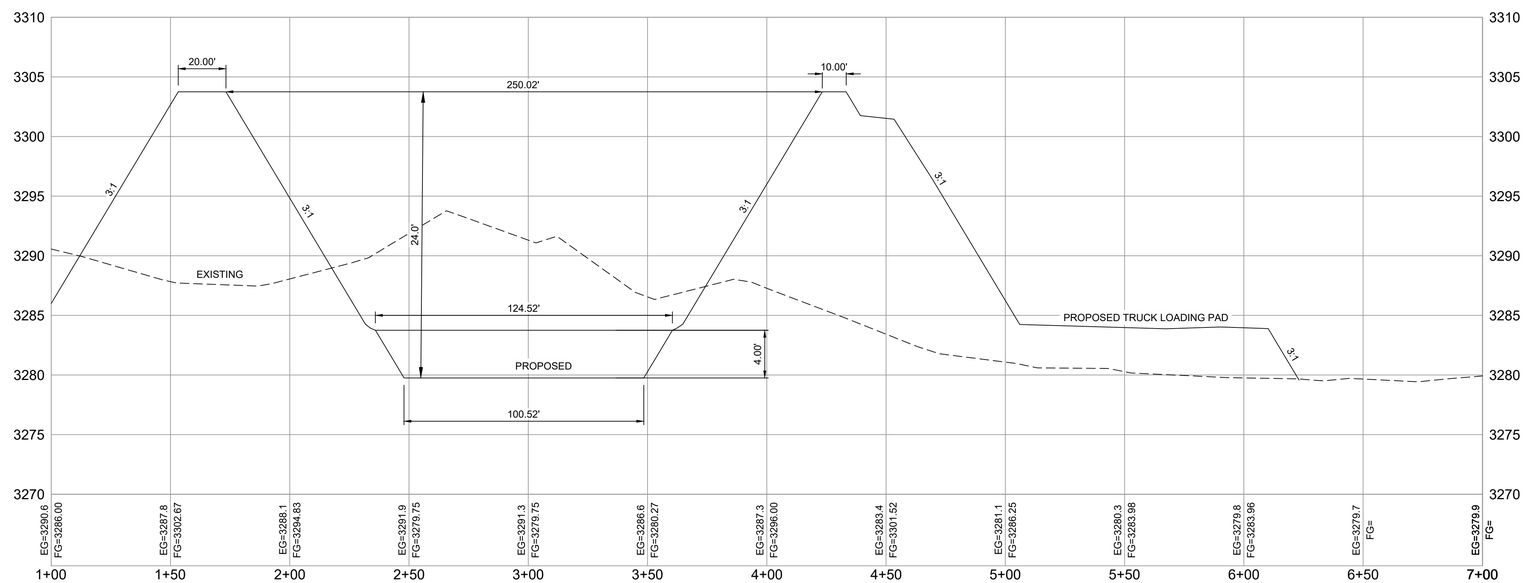
No.	DATE	DESCRIPTION

PRELIMINARY

SHEET: 6 of 16

CS-104





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ENGINEERING SHEET:

SOUTH CONTAINMENT NORTH TO SOUTH PLAN & PROFILE

OF

PROJECT NAME:

POKER LAKE UNIT ROW 2 WEST FRAC POND

FOR

CLIENT:

XTO

PROJECT NUMBER:

24252

PROJECT ENGINEER: JEREMY BAKER, PE

DRAWN BY: XAVIER CLARK

MAGNETIC NORTH

GRAPHIC SCALE
HORIZONTAL

0 30' 60'

SCALE: 1" = 30'
(IN FEET)

GRAPHIC SCALE
VERTICAL

0 6' 12'

SCALE: 1" = 6'
(IN FEET)

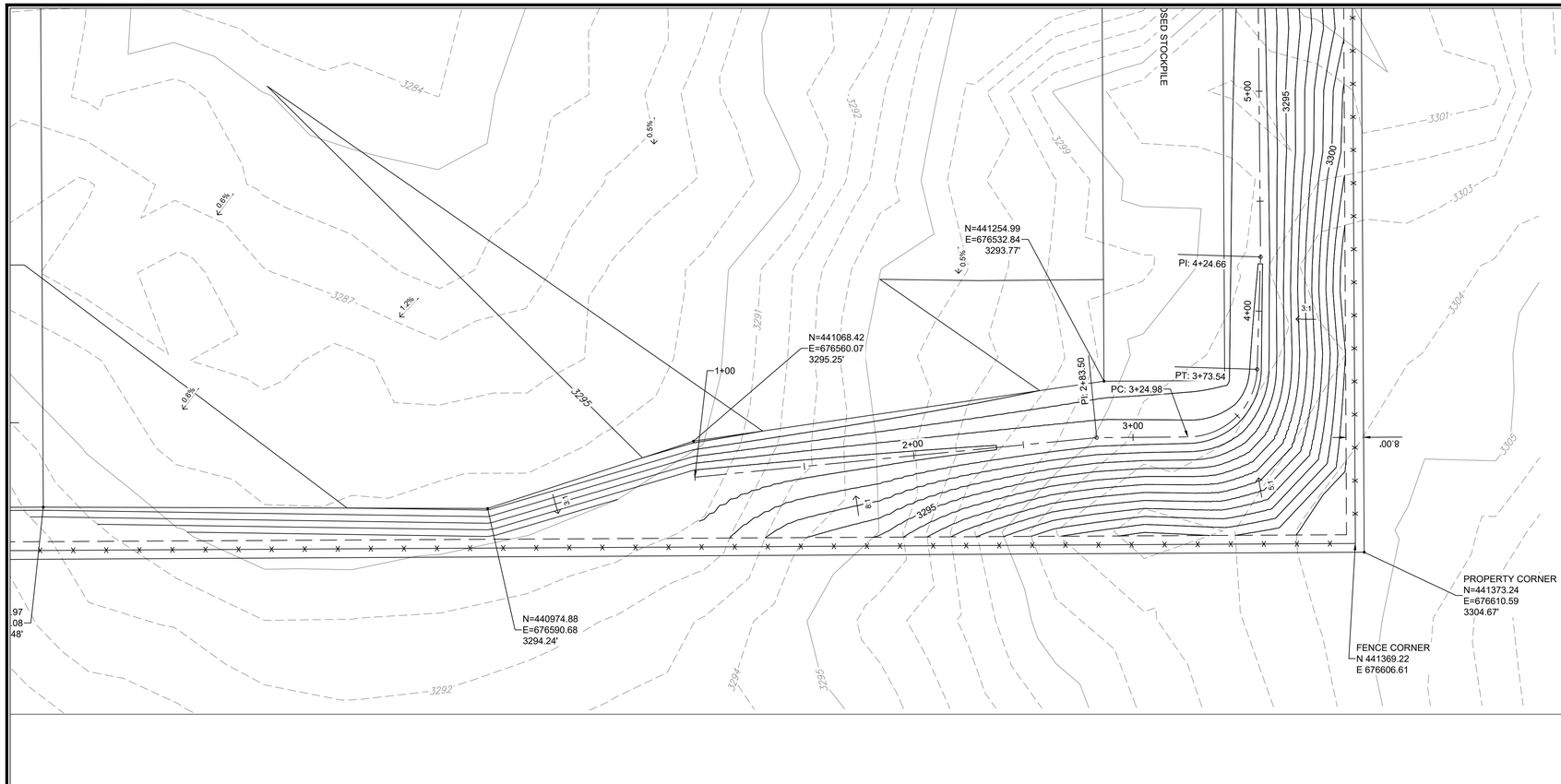
REVISIONS

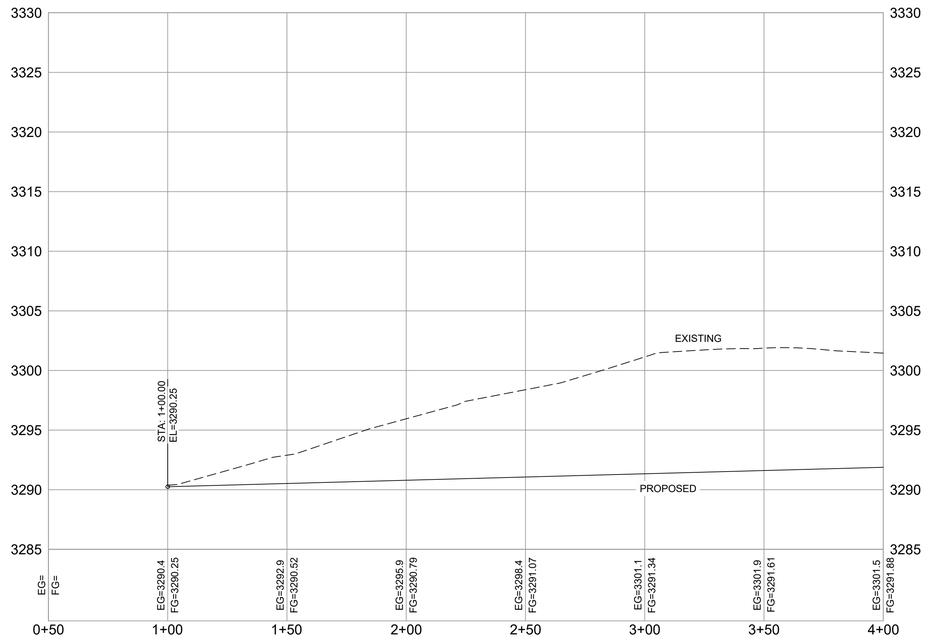
No.	DATE	DESCRIPTION

PRELIMINARY

SHEET: 7 of 16

CS-105





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ENGINEERING SHEET:

DIVERSION DITCH P&P
STA 0+50 TO STA 4+00

OF

PROJECT NAME:

POKER LAKE UNIT ROW 2
WEST FRAC POND

FOR

CLIENT:

XTO

PROJECT NUMBER:

24252

PROJECT ENGINEER: JEREMY BAKER, PE

DRAWN BY: XAVIER CLARK

MAGNETIC NORTH

GRAPHIC SCALE
HORIZONTAL
0 30' 60'
SCALE: 1" = 30'
(IN FEET)

GRAPHIC SCALE
VERTICAL
0 6' 12'
SCALE: 1" = 6'
(IN FEET)

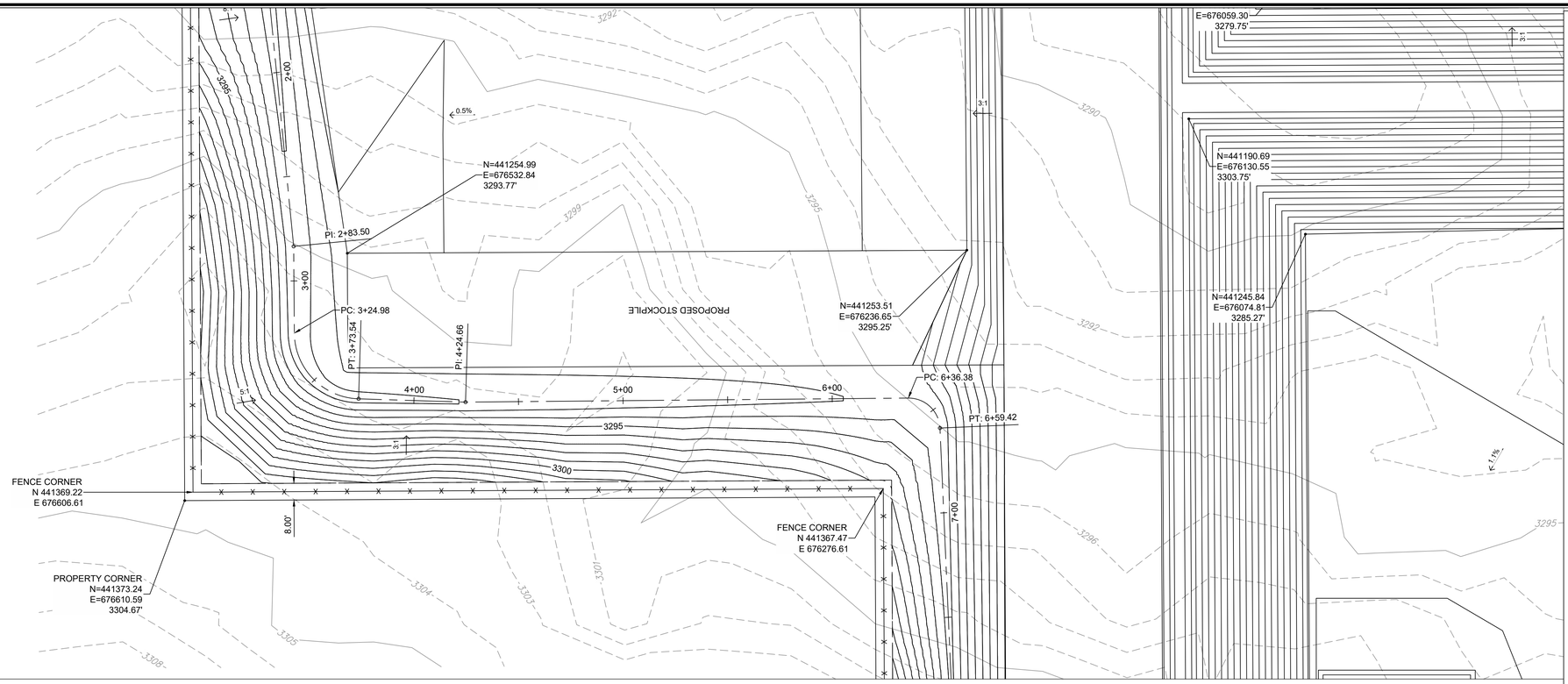
REVISIONS

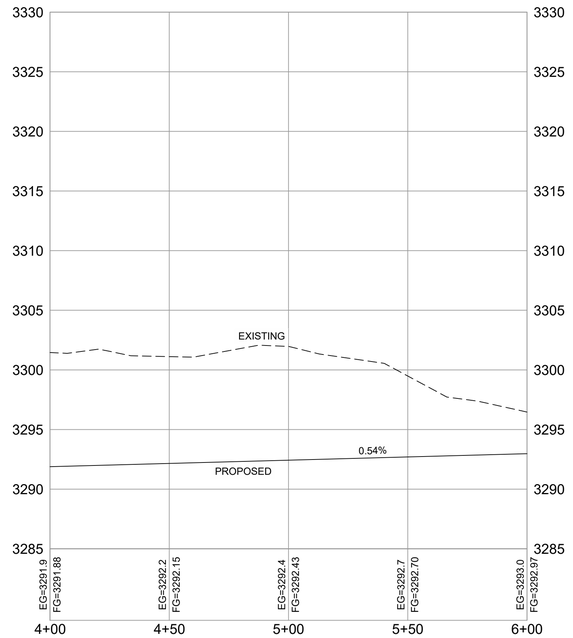
No.	DATE	DESCRIPTION

PRELIMINARY

SHEET: 8 of 16

CS-106





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ENGINEERING SHEET:

DIVERSION DITCH P&P
STA 4+00 TO STA 6+00

OF

PROJECT NAME:

POKER LAKE UNIT ROW 2
WEST FRAC POND

FOR

CLIENT:

XTO

PROJECT NUMBER:
24252

PROJECT ENGINEER:
JEREMY BAKER, PE

DRAWN BY:
XAVIER CLARK

MAGNETIC NORTH

GRAPHIC SCALE
HORIZONTAL
0 30' 60'
SCALE: 1" = 30'
(IN FEET)

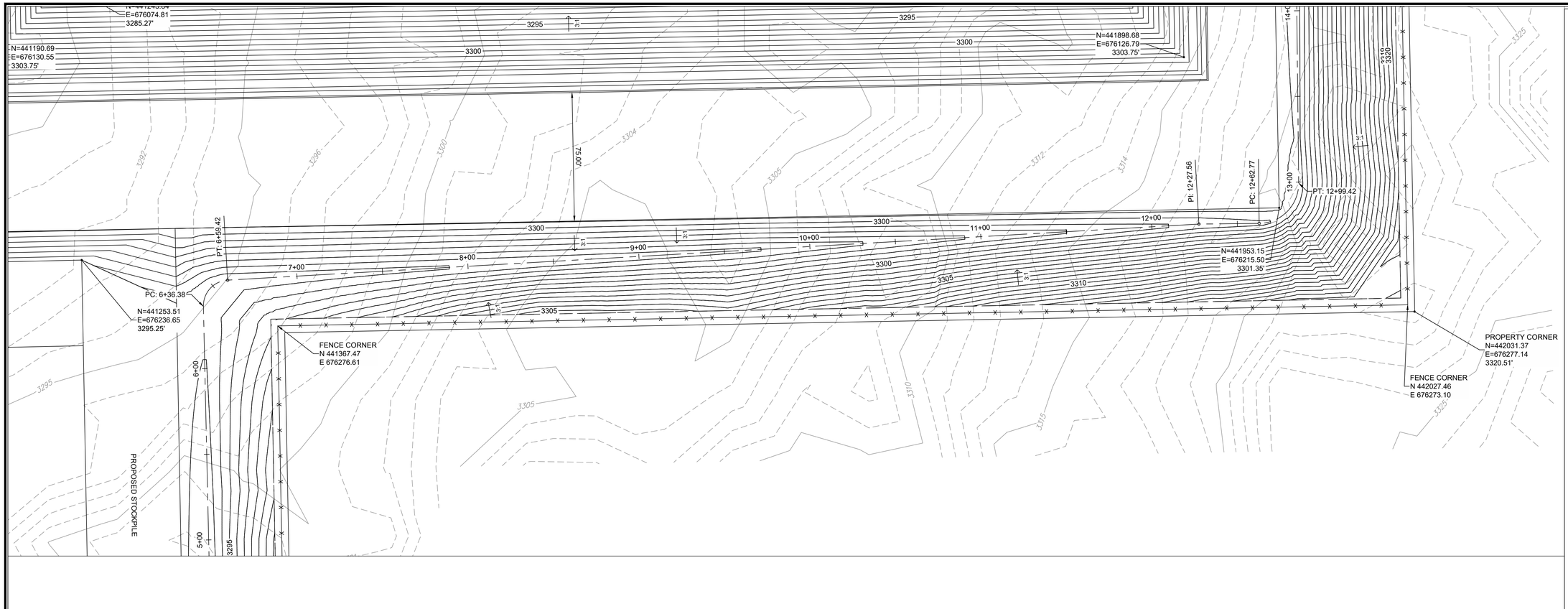
GRAPHIC SCALE
VERTICAL
0 6' 12'
SCALE: 1" = 6'
(IN FEET)

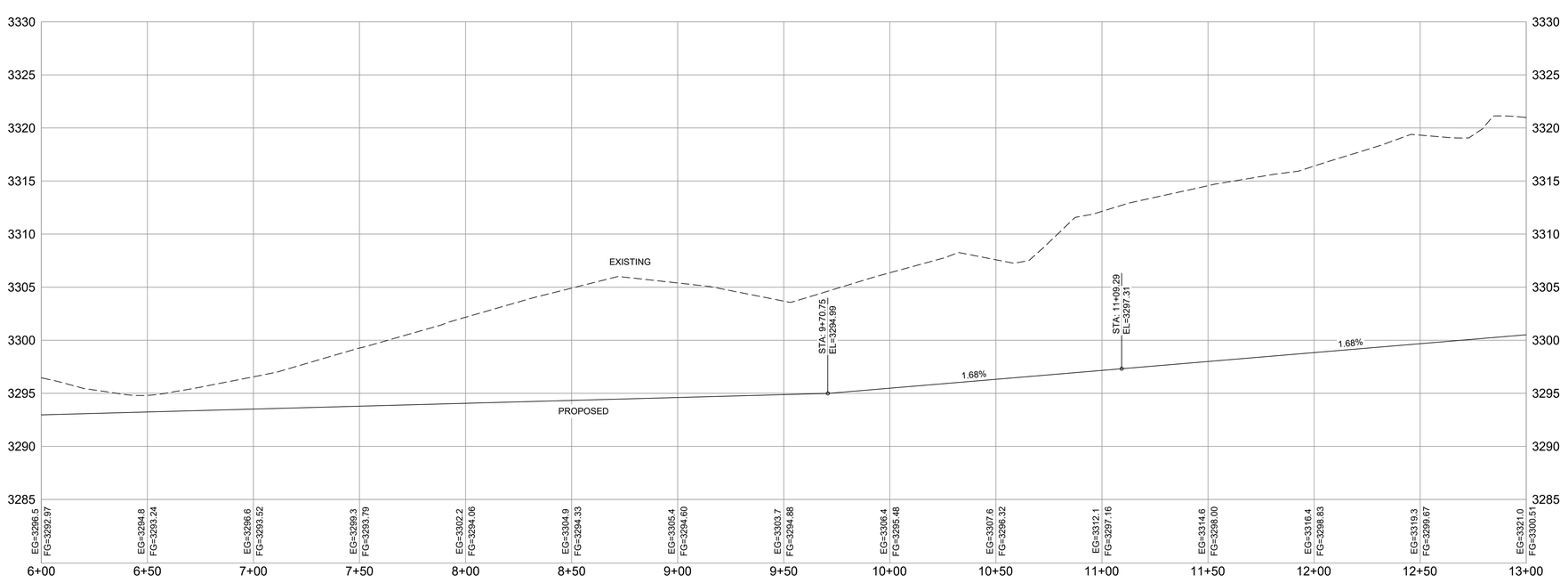
REVISIONS

No.	DATE	DESCRIPTION

PRELIMINARY

SHEET:
9 of 16
CS-107





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ENGINEERING SHEET:

DIVERSION DITCH P&P
STA 6+00 TO STA 13+00

OF

PROJECT NAME:

POKER LAKE UNIT ROW 2
WEST FRAC POND

FOR

CLIENT:

XTO

PROJECT NUMBER:

24252

PROJECT ENGINEER: JEREMY BAKER, PE

DRAWN BY: XAVIER CLARK

MAGNETIC NORTH

GRAPHIC SCALE
HORIZONTAL
0 30' 60'
SCALE: 1" = 30'
(IN FEET)

GRAPHIC SCALE
VERTICAL
0 6' 12'
SCALE: 1" = 6'
(IN FEET)

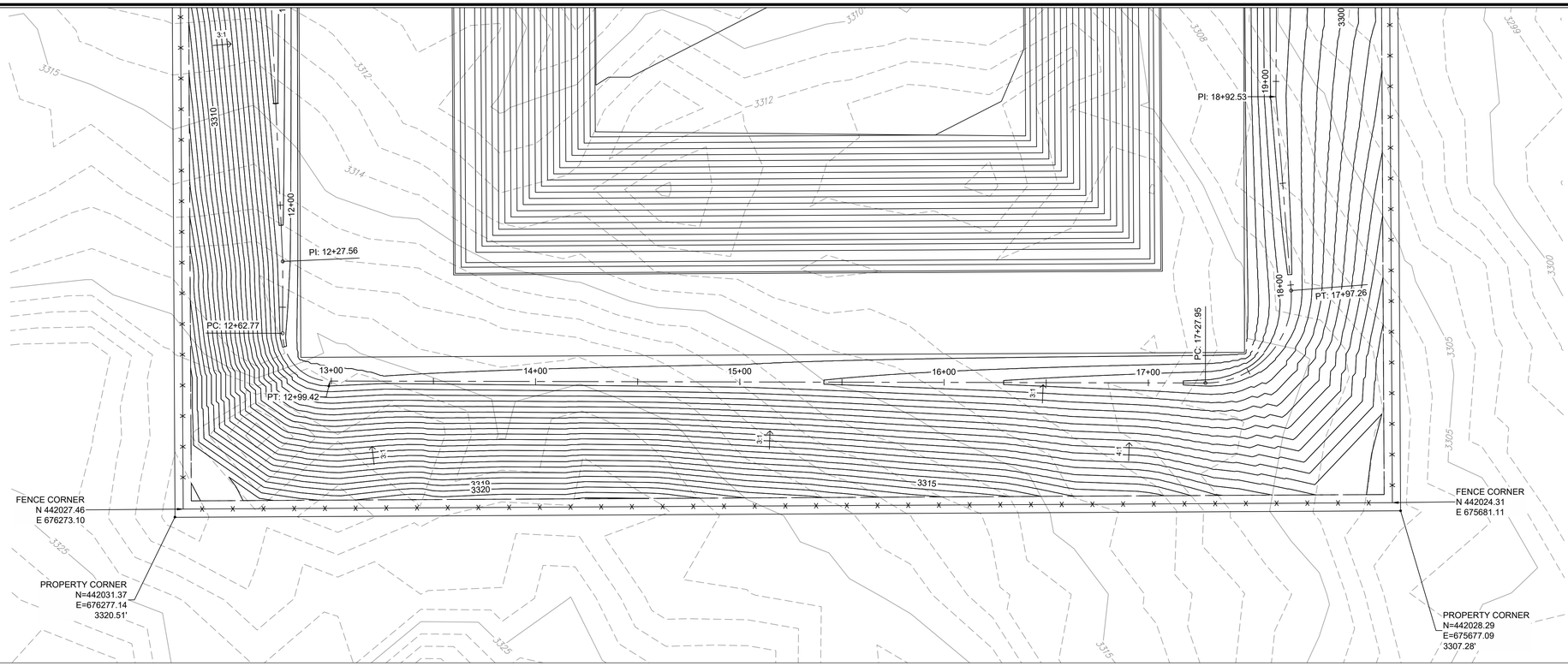
REVISIONS

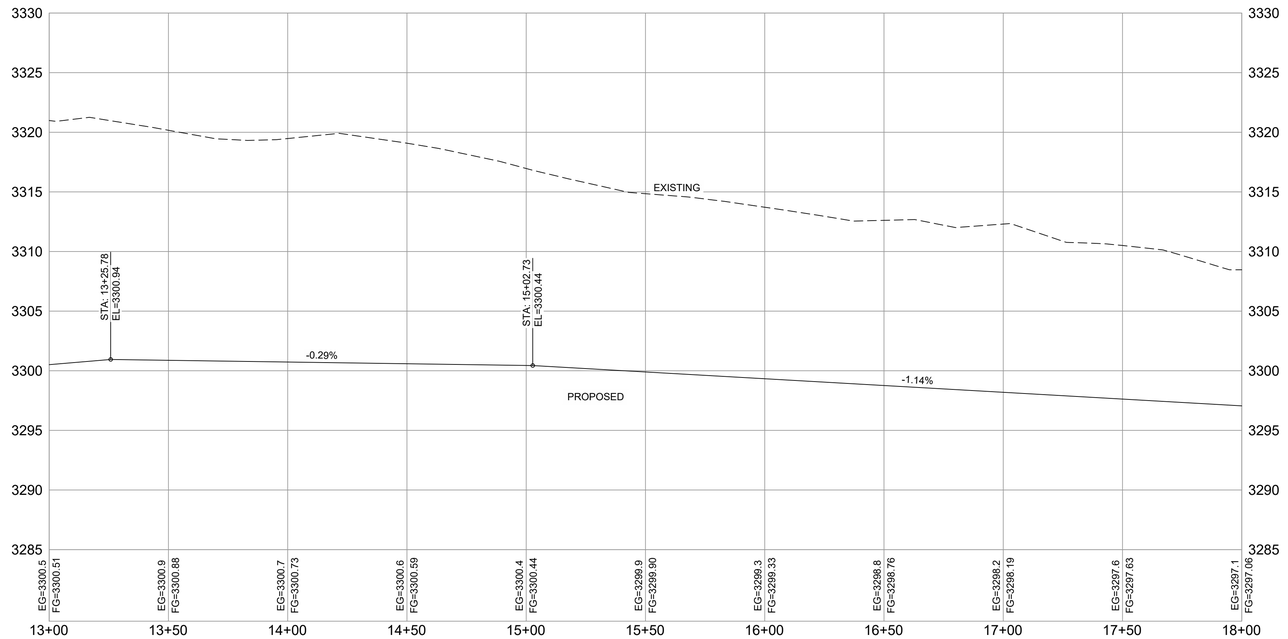
No.	DATE	DESCRIPTION

PRELIMINARY

SHEET: 10 of 16

CS-108





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ENGINEERING SHEET:

DIVERSION DITCH P&P
STA 13+00 TO STA 18+00

OF

PROJECT NAME:

POKER LAKE UNIT ROW 2
WEST FRAC POND

FOR

CLIENT:

XTO

PROJECT NUMBER:
24252

PROJECT ENGINEER: JEREMY BAKER, PE

DRAWN BY: XAVIER CLARK

MAGNETIC NORTH

GRAPHIC SCALE
HORIZONTAL
0 30' 60'
SCALE: 1" = 30'
(IN FEET)

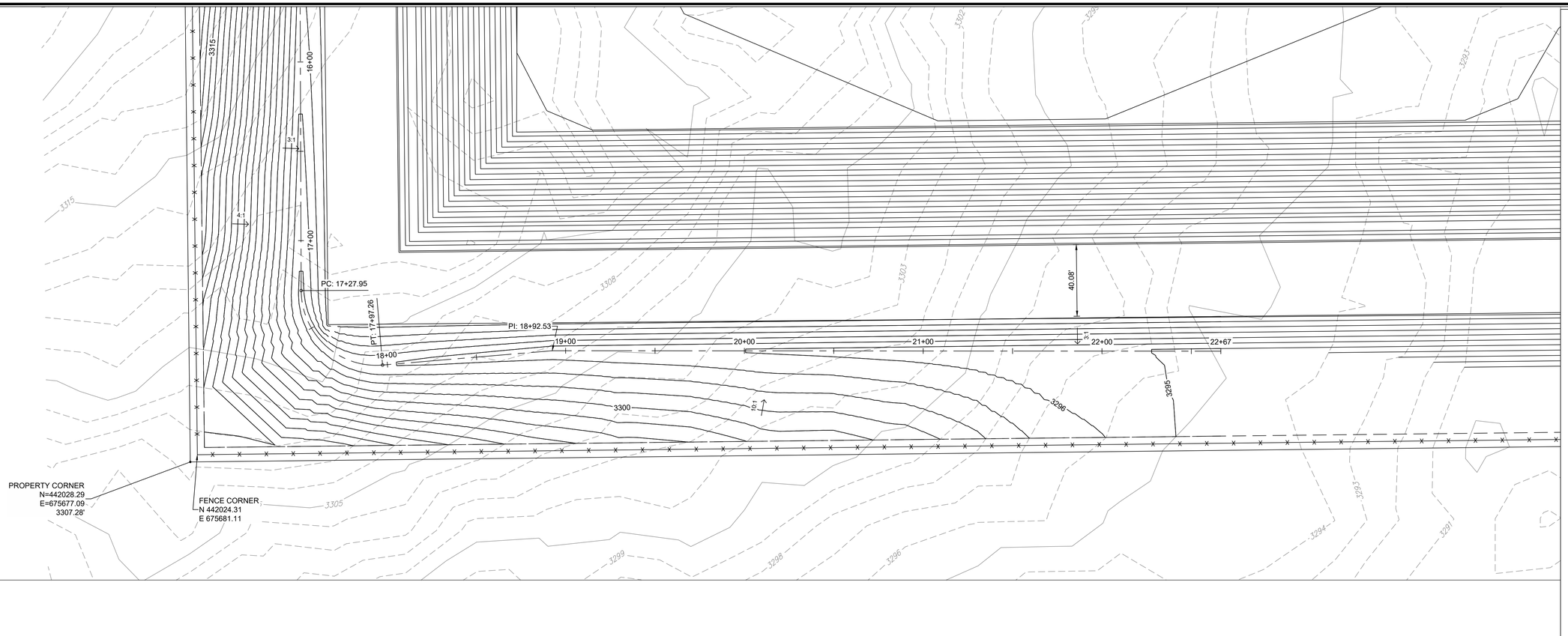
GRAPHIC SCALE
VERTICAL
0 6' 12'
SCALE: 1" = 6'
(IN FEET)

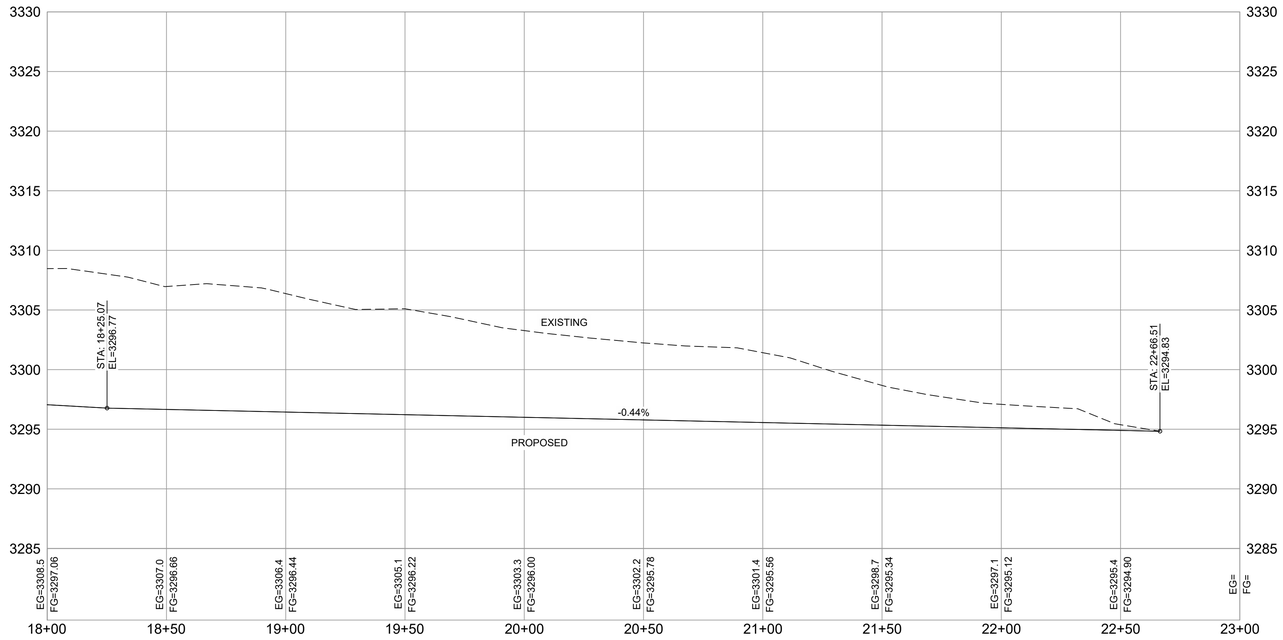
REVISIONS

No.	DATE	DESCRIPTION

PRELIMINARY

SHEET: 11 of 16
CS-109





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ENGINEERING SHEET:

DIVERSION DITCH P&P
STA 18+00 TO STA 23+00

OF

PROJECT NAME:

POKER LAKE UNIT ROW 2
WEST FRAC POND

FOR

CLIENT:

XTO

PROJECT NUMBER:

24252

PROJECT ENGINEER: JEREMY BAKER, PE

DRAWN BY: XAVIER CLARK

GRAPHIC SCALE
HORIZONTAL

0 30' 60'

SCALE: 1" = 30'
(IN FEET)

GRAPHIC SCALE
VERTICAL

0 6' 12'

SCALE: 1" = 6'
(IN FEET)

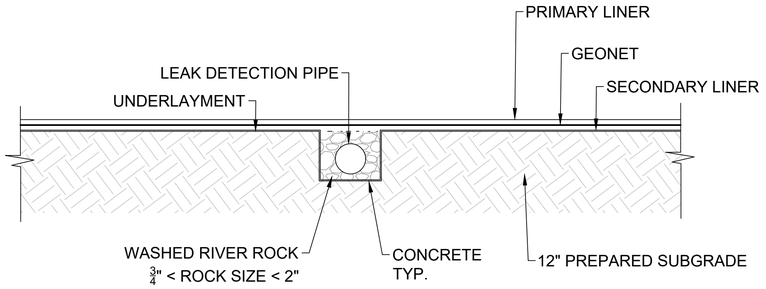
REVISIONS

No.	DATE	DESCRIPTION

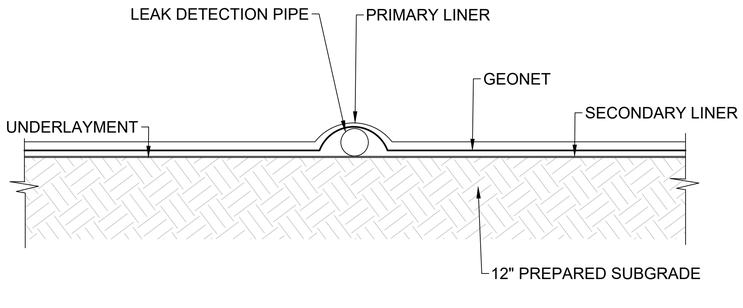
PRELIMINARY

SHEET: 12 of 16

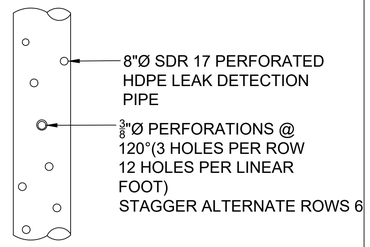
CS-110



1A SUMP DETECTION CROSS SECTION
N.T.S.



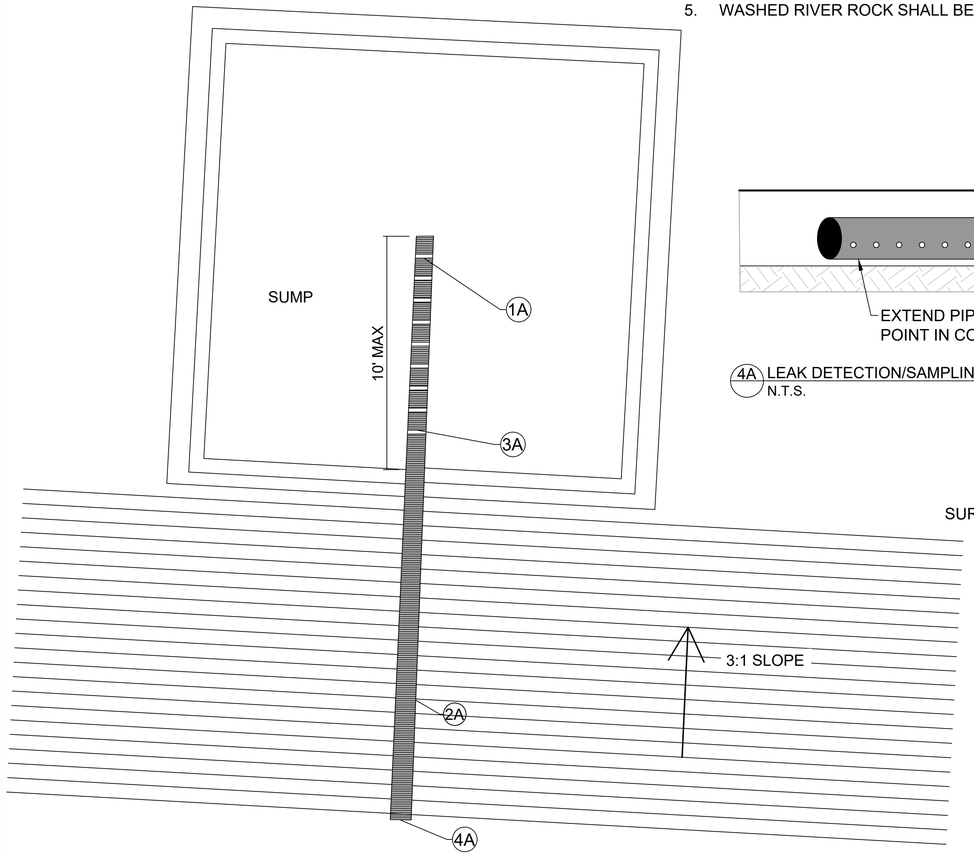
2A SIDE SLOPE LEAK DETECTION PIPE DETAIL
N.T.S.



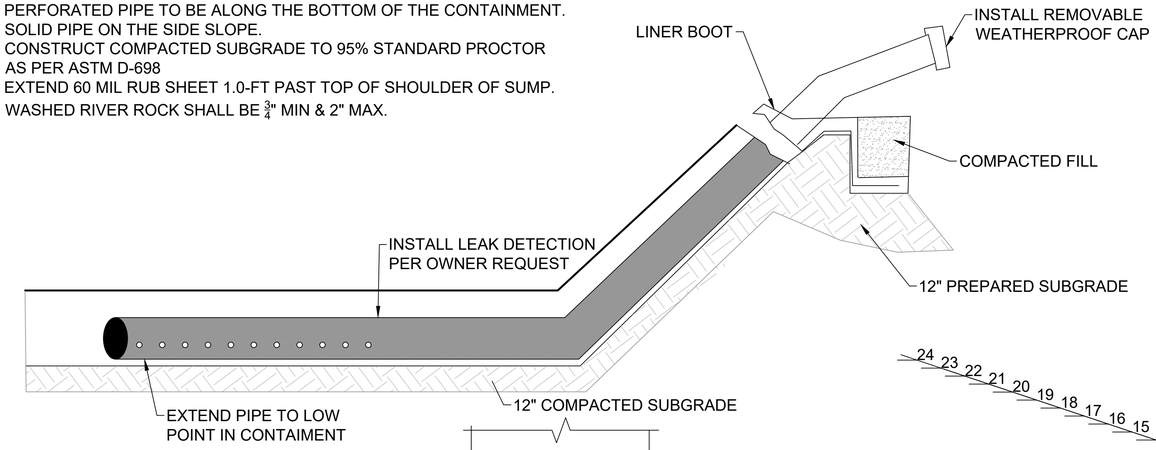
3A PERFORATED PIPE DETAIL
N.T.S.

NOTES:

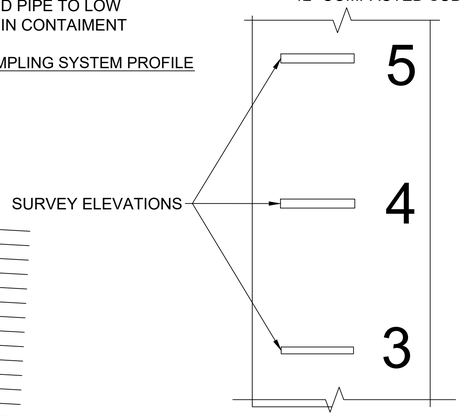
1. LEAK DETECTION SYSTEM TO BE INSTALLED BY OWNER.
2. PERFORATED PIPE TO BE ALONG THE BOTTOM OF THE CONTAINMENT. SOLID PIPE ON THE SIDE SLOPE.
3. CONSTRUCT COMPACTED SUBGRADE TO 95% STANDARD PROCTOR AS PER ASTM D-698
4. EXTEND 60 MIL RUB SHEET 1.0-FT PAST TOP OF SHOULDER OF SUMP.
5. WASHED RIVER ROCK SHALL BE ¾" MIN & 2" MAX.



1 CONTAINMENT SUMP PLAN DETAIL
N.T.S.



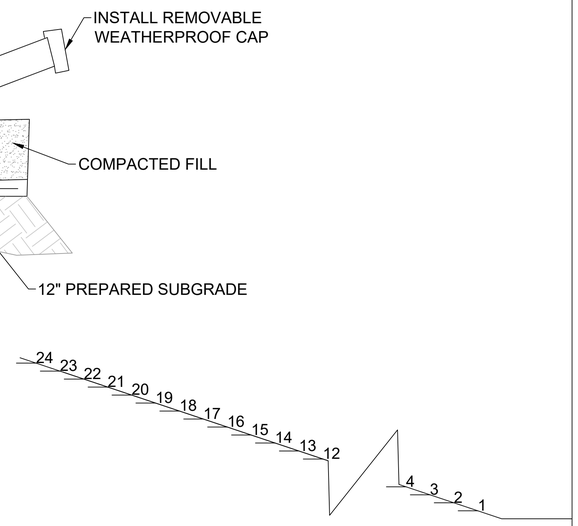
4A LEAK DETECTION/SAMPLING SYSTEM PROFILE
N.T.S.



NOTE:

1. LEVEL MARKS TO BE LOCATED BY SURVEYOR
2. MARKS TO BE MADE BY AN EXTRUSION WELDER USING BLACK FILAMENT (OR WHITE FILAMENT ON BLACK LINER)
3. MARKS WILL BE DETERMINE ON THE FIELD BY THE OWNER AND CONTINUE TO THE TOP OF THE BERM.
4. REFERENCE PIT CAPACITY TABLES FOR ACCURATE ELEVATIONS.

2 WATER LEVEL MARKS
N.T.S.



PROPOSED PIT REFERENCE TABLE

DETAIL	DESCRIPTION
PRIMARY LINER	60 MIL HDPE LINER
LEAK DETECTION	200 MIL GEONET
SECONDARY LINER	40 MIL HDPE LINER
UNDERLAYMENT	COMPACTED SUBGRADE/10 OZ GEOTEXTILE
NORTH CONTAINMENT	
BOTTOM OF CONTAINMENT	3,279.75'
BERM (2' ABOVE ROAD)	3,303.75'
SOUTH CONTAINMENT	
BOTTOM OF CONTAINMENT	3,279.75'
BERM (2' ABOVE ROAD)	3,303.75''
LEAK DETECTION PIPING	8-IN SDR17 X PERFORATED HDPE PIPE LEAK DETECTION PIPE

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ENGINEERING SHEET:
LEAK DETECTION DETAILS
OF
PROJECT NAME:
POKER LAKE UNIT ROW 2 WEST FRAC POND
FOR
CLIENT:
XTO

PROJECT NUMBER: 24252

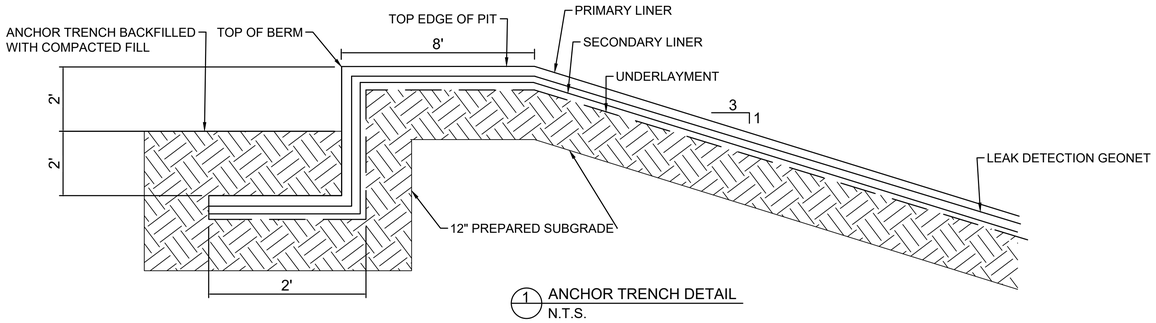
PROJECT ENGINEER: JEREMY BAKER, PE
DRAWN BY: XAVIER CLARK

REVISIONS

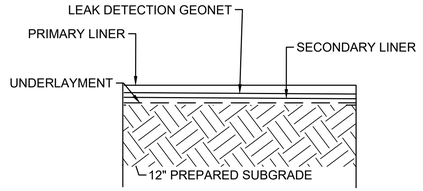
No.	DATE	DESCRIPTION

PRELIMINARY

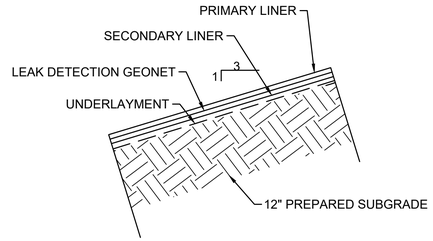
SHEET: 13 of 16
CS-501



1 ANCHOR TRENCH DETAIL
N.T.S.



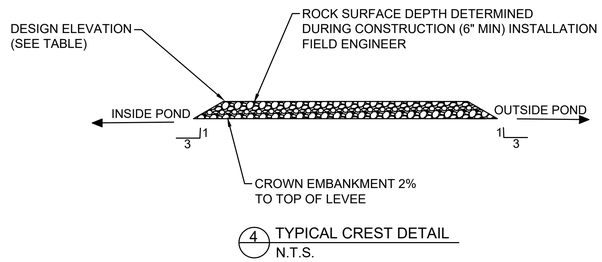
2 LINER SYSTEM FLOOR DETAIL
N.T.S.



3 LINER SYSTEM SIDE SLOPE
N.T.S.

GENERAL NOTES:

1. PREPARED SUBGRADE MEANS COMPACTED SMOOTH SUBGRADE FREE OF ROCK, ROOTS, WOOD DEBRIS, CONCRETE RUBBLE AND ANY SHARP OBJECTS THAT MAY PUNCTURE THE HDPE LINER, A MINIMUM COMPACTED DEPTH OF 12".
2. ALL INTERIOR SLOPES AND TOP OF BERMS TO BE SMOOTH DRUM ROLLED
3. ALL EMBANKMENT SLOPES SHALL HAVE A SLOPE (H:V RATIO) OF 3:1.
4. COMPACTED EARTH EMBANKMENTS TO BE CONSTRUCTED WITH 12 INCH (MAXIMUM LOOSE LIFTS, COMPACTED TO 95% STANDARD PROCTOR DENSITY)
5. PERFORM GEOTECHNICAL ANALYSIS ON EXISTING SOIL TO CONFIRM SOIL IS SUITABLE FOR USE IN THE LEVEE.
6. LINER SPECIFICATIONS PROVIDED ON SHEET CS - 501



4 TYPICAL CREST DETAIL
N.T.S.

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ENGINEERING SHEET:
LINER DETAILS
OF
PROJECT NAME:
POKER LAKE UNIT ROW 2
WEST FRAC POND
FOR
CLIENT:
XTO

PROJECT NUMBER:
24252

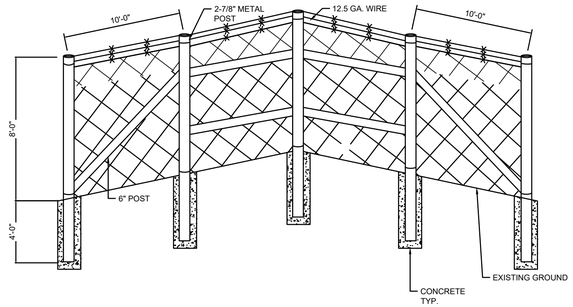
PROJECT ENGINEER:
JEREMY BAKER, PE
DRAWN BY:
XAVIER CLARK

REVISIONS

No.	DATE	DESCRIPTION

PRELIMINARY

SHEET:
14 of 16
CS-502



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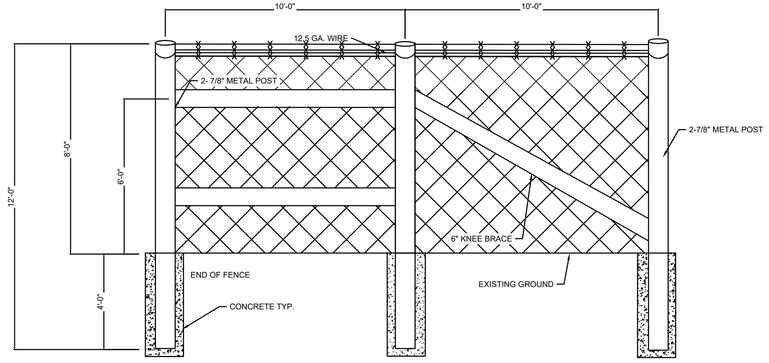

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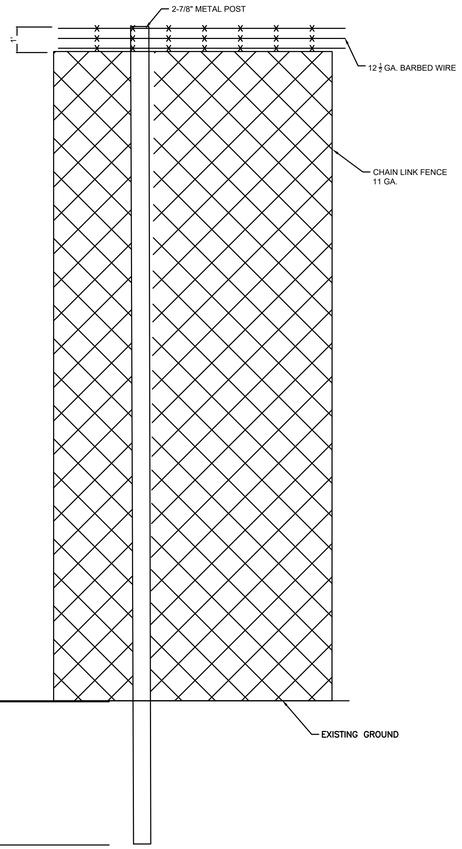

4A METAL POST
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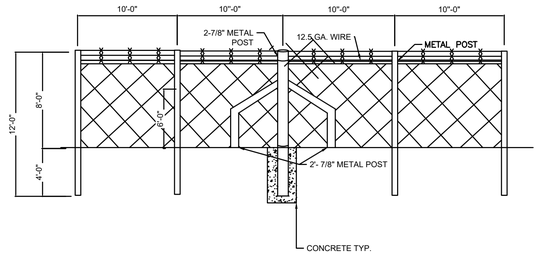
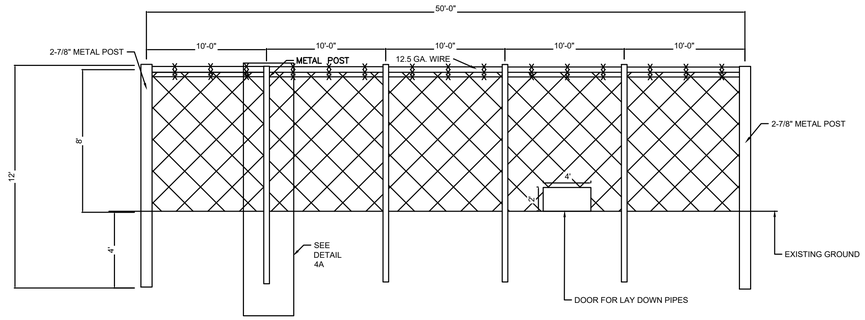


3 LINE BRACE POST
N.T.S.



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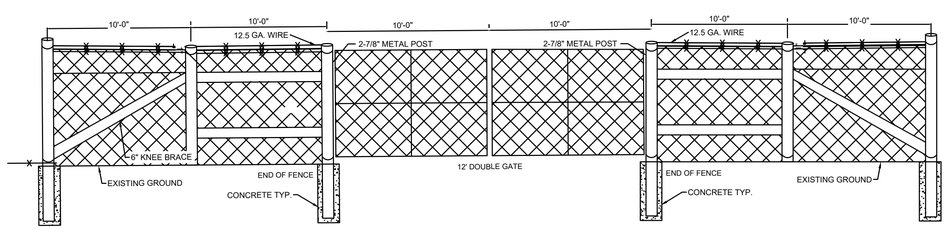
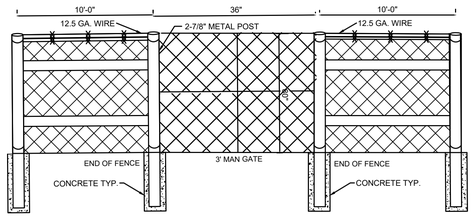


5 GATE POSTS
N.T.S.



6 MAN GATE
N.T.S.

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ENGINEERING SHEET:

FENCE DETAILS

OF

PROJECT NAME:

POKER LAKE UNIT ROW 2
WEST FRAC POND

FOR

CLIENT:

XTO

PROJECT NUMBER:
24252

PROJECT ENGINEER:
JEREMY BAKER, PE

DRAWN BY:
XAVIER CLARK

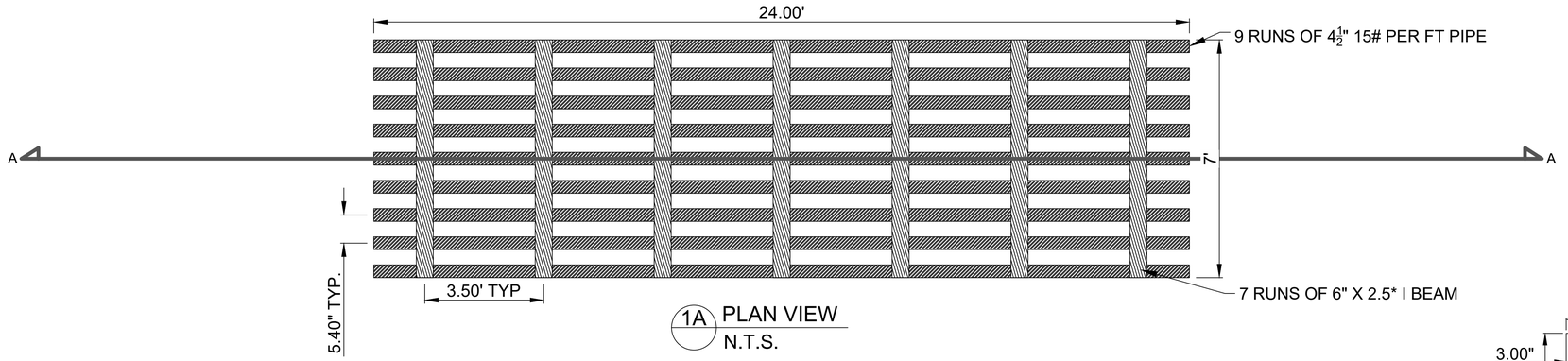
REVISIONS

No.	DATE	DESCRIPTION

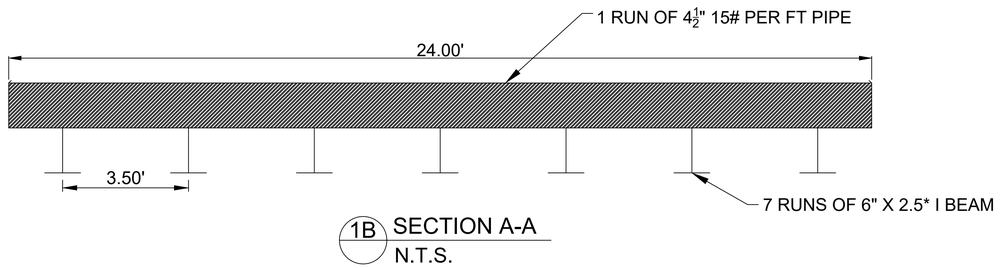
PRELIMINARY

SHEET: 15 of 16

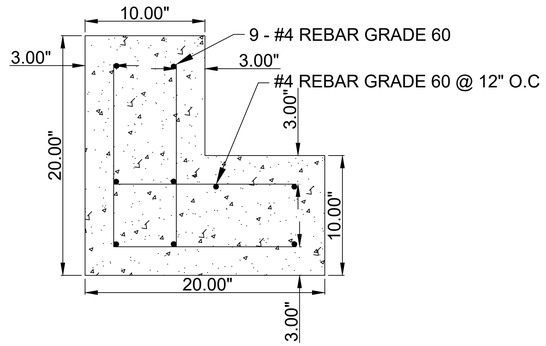
CS-503



1A PLAN VIEW
N.T.S.



1B SECTION A-A
N.T.S.



2 TYPICAL FOUNDATION DETAIL
N.T.S.

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Hobbs, NM 88242-9032
Squarerootservices.net
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ENGINEERING SHEET:
CATTLEGUARD DETAIL
OF
PROJECT NAME:
POKER LAKE UNIT ROW 2 WEST FRAC POND
FOR
CLIENT:
XTO

PROJECT NUMBER:
24252

PROJECT ENGINEER:
JEREMY BAKER, PE
DRAWN BY:
XAVIER CLARK

REVISIONS

No.	DATE	DESCRIPTION

PRELIMINARY

SHEET: 16 of 16
CS-504

Appendix F – Construction Specifications

SUGGESTED CONSTRUCTION SEQUENCE

1. Clear existing vegetation
2. Strip and stockpile topsoil at the location designated on site plans
3. Perform earthwork operations
    a. Construct stormwater diversion channel
    b. Perform ripping/excavating operations
    c. Replace excavated material in compacted layers on the levee/pad in accordance with the details and specifications
    d. Finish slopes using a smooth roller
    e. Dig anchor trench
4. Install new chain link fence and gates
5. Install geomembranes
    a. Install geotextile as needed, secondary liner, geonet, leak detection system and primary liner
    b. Install rub sheets and water level gage/ladder
    c. Backfill and compact anchor trench

SITE PREPARATION

Summary
The requirements of this section shall consist of third-party contractor providing all required clearing, grubbing, and stripping related labor, materials, equipment, tools, and services for the work.
Prior to placing fill, stripping of existing topsoil, vegetations, and root mats will be performed in the proposed construction area. The soil materials which contain less than 5 percent organics may be reused as structural fill provided the material is moisture conditioned and properly compacted.

Clear and grub all borrow areas to the extent necessary to provide fill materials free of all objectionable matter described above.

Vegetation located outside the construction limits shall not be damaged.

All brush, vegetation, rubbish, organic soils, and other debris from clearing and grubbing operations, including all debris remaining from previous clearing operations, shall be stockpiled separately at a location designated by owner.

If present, excavate topsoil from areas designated for project grading or construction, as encountered. In addition, excavate topsoil from areas designated for use as waste locations for earth subsoil material. Remove lumped soil, vegetative material, boulders, and rocks from the excavated topsoil to be stockpiled.

Stockpile, if available, sufficient topsoil material on-site for use as vegetative cover for future reclamation purposes. Protect stockpile from erosion and grade to prevent ponding of water. Organic soils shall be segregated from soil materials that may be suitable for other uses described in these specifications and shown on the drawings.

Dispose of excess topsoil and waste topsoil not intended for reuse in a location selected by the owner.

Disposal and handling of this material shall be performed following the requirements of the appropriate government agencies.

SUBGRADE PREPARATION

The ground surface elevation at the Facility varies from about 3,279 feet above mean sea level (AMSL) to 3,322 feet AMSL. After the initial stripping of topsoil, vegetations or organic materials is carried out, the entire project shall be proof rolled. The proof rolling can be conducted with an adequately loaded vehicle such as a fully loaded tandem-axle dump truck. Proof rolling should be performed under the observation of the engineer. Areas excessively deflecting under the proof rolling should be delineated and subsequently addressed by the engineer. Excessively wet or dry material should either be removed, or moisture conditioned and recompacted.

Over-excavation and fill placement could be required at the Facility. Over-excavations should be performed in accordance with OSHA 29 CFR, Part 1926, Subpart P, “Excavations” and its appendices, and in accordance with any applicable local and/or state regulations. Engineer should be on-site during earthwork operations. During grading or recycling Containment’s berm construction, soil should be compacted as per fill placement and compaction requirements.

EARTHWORK

Earthwork is anticipated to include clearing and grubbing, excavations, and engineered fill placement. The following sections provide recommendations for use in the preparation of specifications for the work. Recommendations include critical quality criteria, as necessary, to render the project area in the state considered in the geotechnical engineering evaluation for Containment construction.

Provide construction staking and grade control. Establish and set required lines, levels, grade, contours, and datum by construction staking.

Provide for dust control in accordance with Facility requirements and owner’s direction.

Locate, identify, and protect all utilities and existing structures from damage (including overhead and suspended utilities).

Protect temporary or permanent benchmarks, survey stakes, settlement monuments, existing structures, fences, and existing work from damage or displacement by construction equipment and vehicular traffic.

Coordinate traffic control, operations, and haul routes with the owner and liner contractor.

Protect the exposed surfaces of compacted lifts from drying and cracking due to excessive heat, or softening due to excessive moisture, until overlying fill material is placed and compacted.

Any earthen surface upon which the liner is installed shall be prepared and compacted in accordance with the project specifications. The surface shall be smooth, firm, and unyielding. The top six inches of fill beneath the surface shall be free of:

- Vegetation/Roots/Sticks
- Construction debris
- Sharp, angular rocks
- Rocks larger than 1 inch in diameter
- Void spaces
- Abrupt elevation changes
- Standing water
- Cracks larger than six millimeters in width

Any foreign matter that could contact the liner

Provide for dewatering as necessary for finish excavation and fill placement. The contractor shall use water for compaction at all times. No earthwork operations shall take place if construction water is not available on-site.

The contractor shall build the levees using compacted layers. Uncontrolled and inconsistent pushing and piling of material for levee construction is not acceptable. The contractor shall develop a successful compaction pattern early in the process, verified through nuclear density or sand cone testing, and shall maintain consistency in the compactive effort as long as the materials encountered remain consistent. If on-site soils encountered change, the contractor shall develop a new compaction pattern.

Fill for levees shall be placed and compacted in horizontal lifts with maximum loose lift thickness of 10 inches, or as directed by engineer. Construct each layer continuously and approximately horizontal for the width and length of the levee. Fill shall be compacted to at least 95 percent of maximum dry density determined by the ASTM D698 and at moisture content within +2% to 2% of optimum moisture content as determined by a standard proctor soils test on samples from the source area.

Fill shall not be placed and compacted when the materials are too wet to properly compact. Material which is too wet shall be spread on the fill area and permitted to dry, assisted by harrowing, if necessary, until the moisture content is reduced to allowable limits. If the engineer determined that added moisture is required, water should be applied uniformly over the area to be treated and give complete and accurate control of the amount of water to be used. If too much water is added that area shall be permitted to dry before compaction is continued.

Perform one nuclear density gage test per 2,500 cubic yards (cy) minimum or as directed by the Engineer.

Earthwork contractor shall perform a visual inspection of the finished compacted Containment bottom and side slopes before HDPE liner installation, removing all debris, sharp objects, and gravel larger than ¾ inch.

Earthwork contractor shall roll surface with a smooth roller to eliminate ruts.

Immediately prior to liner deployment, liner contractor shall arrange for the subgrade to be final graded by the earthwork contractor to fill in all the voids or cracks, then smooth rolled to provide the best practicable surface for the liner. At completion of this activity, no wheel ruts, footprints or other irregularities in the subgrade are permissible. Furthermore, all protrusions extending more than 0.5-inches from the surface shall be removed, crushed, or pushed into the surface with a smooth-drum roller compactor.

On a continuing basis, the owner’s representative shall examine the subgrade for suitability before liner placement.

It shall be the contractor’s responsibility to indicate to the owner or engineer any change in the condition of the subgrade that could cause the subgrade to be non-compliant with any specification requirement. If the contractor has not notified the owner or engineer of changes that cause the subgrade to be non-compliant and installs the liner, then the contractor has determined and assumes responsibility that the subgrade is acceptable for liner installation.

At the crest of the embankments, an anchor trench for the liner shall be constructed by the earthwork contractor as detailed on the drawings. Any deviation from the anchor trench details shown on the drawings requires review and approval by the engineer. No loose soil shall be allowed at the bottom of the trench, and no sharp corners or protrusions shall exist anywhere within the trench.

Verify as applicable that all underlying components such as geomembrane and piping have been installed, tested, and accepted in accordance with the drawings and specifications.

EXCAVATION

Summary
The section describes the following:

Based on the Facility conditions, heavy-duty construction equipment, such as a hoe ram, heavy dozer equipped with ripper, a rock saw or jack hammer or with rock trenching equipment, will be required to excavate subsurface materials from depths of about 6 to 10 feet bgs to the proposed Containment depth at the Facility.

All excavation required to reach planned grades and contours, install project components, and to construct temporary run-on and run-off conveyance systems.

Placement of various fill materials:

Compacted embankment fill
Drainage aggregate (drain rock)
Material placement and compaction
Site grading
Foundation preparation
Construction of fills and backfills
Compaction requirements

The work shall be done in accordance with the specifications and as shown in the drawings. The work includes furnishing all labor, tools, materials, equipment, and supervision necessary to construct the project as described in the contract documents.

All excavations shall be constructed within the tolerance as shown in these specifications except where dimensions or grades are shown or specified as minimum or maximum in the drawings. All grading shall be performed to maintain slopes and drainages as shown in the drawings.

Excavate to within a horizontal and vertical tolerance of ± 0.1 -foot on all slopes flatter than 10% and within a vertical tolerance of ± 0.2 -foot on all slopes 10% or steeper unless otherwise approved by the engineer or owner.

Place drain rock aggregate within a vertical tolerance of ± 0.1 -foot, regardless of the steepness of the slope.

Excavate material shown on the drawings and as necessary to complete the work. Excavation carried below the grade lines shown on the drawings shall be repaired as specified by the owner unless previously approved by the owner. Correction of all over-excavated areas shall be at the contractor's sole expense.

All necessary precautions shall be taken to preserve the material below and beyond the established lines of all excavation in the soundest possible condition. Any damage to the work beyond the required excavation lines due to wetting, drying, or the contractor's operations shall be repaired at the contractor's sole expense.

Excavation, shaping, and any other work related to material removal, shall be carried out by the method(s) considered most suitable, provided it meets the design intent as determined by the engineer.

Limits of excavation to accomplish the work safely shall be determined by the contractor. Any minimum excavation limits shown on the drawings are for material identification only and do not necessarily represent safe limits. All excavations shall be free of overhangs, and the sidewalls shall be kept free of loose material. As a minimum, the contractor shall slope, bench and shore all excavations as necessary to

prevent any unsafe conditions as required by OSHA 29 CFR 1926.651 and 1926.652.

Accurate trimming of the slopes of excavations to be filled will not be required, but such excavations shall conform as closely as practical to the established lines and grades.

For pipe trench excavations, grade trench bottom to provide uniform bearing for the entire length of pipe to be installed. Fill in voids, gaps, low points (“dips” or “bellys”) and bridging areas within trench bottom and along the entire length of pipe.

Subsoil not to be used in the construction of earth fills or reclamation shall be stockpiled in areas designated by owner and in accordance with applicable laws, rules, and regulations.

Permanently stockpiled earth material shall be graded to drain and blended seamlessly into the natural landscape.

Provide and operate equipment adequate to keep all excavations and trenches free of water.

Excavate unsuitable areas of the subgrade and replace with approved fill materials. Compact to density equal to requirements for subsequent fill material.

The subgrade of each Containment shall be proof-rolled and compacted in place prior to fill placement or grading.

Grade top perimeter of excavation to prevent surface water from draining into excavation.

SUBSURFACE CONDITIONS

Subsurface investigations have been conducted at the Facility by the engineer. The results of the subsurface investigations can be provided to the contractor at the contractor’s request.

The contractor shall identify and locate utility lines, monitoring wells, survey monuments, and other nearby structures prior to performing work. Utilities, flow lines, wells, survey monuments and other nearby structures shall be protected from damage during construction. Any damage to utility lines, flow lines, wells, survey monuments, and other nearby structures during construction shall be repaired by the contractor at no additional cost to the owner. Costs associated with these repairs shall include the actual repair costs and all engineering costs required by the engineer to coordinate and obtain regulatory approval of repairs, if required.

FILL MATERIAL

Fill required to achieved design grade should be classified as structural fill and general fill. Structural fill is a material used below, or within 10 feet of structures, pavements, or constructed slopes. General fill is a material used to achieve grade requirements outside of these areas.

Excavated on-site soils can generally be reused as structural fill. Material property requirements for on-site soil for use as general fill and structural fill are noted in the table below:

Property	General Fill	Structural Fill
Composition	Free of construction debris and deleterious material	Free of construction debris and deleterious material
Maximum particle size	6 inches	4 inches
Plasticity	Not limited	Maximum liquid limit of 35 and maximum plasticity index of 15
GeoModel Layer	1, 2[2]	1, 2[2]

Expected to be Suitable[1]		

1. Based on subsurface exploration. Actual material suitability should be determined in the field at the time of construction.
2. Caliches should be crushed into sizes less than 4 inches in maximum dimensions and properly mixed with on-site soils before they are used as structural fill.

Imported fill materials should meet the following material property requirements. Regardless of its source, compacted fill should consist of approved materials that are free of organic matter and debris. Frozen material should not be used, and fill should not be placed on frozen subgrade.

Soil Type[1]	USCS Classification	Acceptable Parameters (for Structural Fill)
Low Plasticity Cohesive	CL, CL-ML	Liquid limit less than 35 Plasticity index less than 15 25% to 50% retained on No. 200 sieve
Granular	GW, GP, GM, GC, SW, SP, SM, SC	10% to 50% passing No. 200 sieve

1. Structural and general fill should consist of approved materials free of organic matter and debris. A sample of each material type should be submitted to the engineer for evaluation prior to use on this Facility.

Structural and general fill should meet the following compaction requirements.

Item	General Fill	Structural Fill
Maximum Lift Thickness	Same as structural fill	• 8 inches or less in loose thickness when heavy, self-propelled compaction equipment is used. • 4 inches in loose thickness when hand guided equipment (i.e., jumping jack or plate compactor) is used.
Minimum Compaction Requirements [1, 2]	Same as structural fill	At least 95% of the material's maximum dry density in all fill areas.
Water Content Range [1]	As required to achieve min. compaction requirement	-2% to +2% of material's optimum moisture content in all fill areas

1. Maximum density and optimum content as determined by the modified Proctor Test (ASTM D1557).
2. If the granular material is a coarse sand or gravel, or of a uniform size, or has a low fines content, compaction comparison to relative density may be more appropriate. Granular materials should be compacted to at least 98% relative density (ASTM D4253 & D4254).

The upper six (6) inches of the Containment bottom, interior embankment slopes, and sump shall be regular, smooth, and compacted; and shall be free of sharp changes in elevation, rocks larger than 1.0 inch, clods, organic debris, and standing water, other unsuitable objects, deleterious materials, or soft unsuitable areas. One hundred percent of the prepared subgrade soil material gradation shall pass a U.S. standard

#4 sieve.

Structural fill material used for the prepared Containment bottom shall meet the liner manufacturer's specifications for material suitable for liner placement.

Drainage aggregate (Drain Rock) is defined as engineered fill material consisting of selected or processed granular material that meets the requirements of the specifications and is in accordance with this section. Drain Rock shall be obtained from on-site- approved stockpiles or outside sources approved by the engineer or owner.

Particles shall be rounded and free of sharp, angular edges that may damage the liner.

Drain rock aggregate shall be free of organic material, frozen material, ice, snow, or excess moisture.

Drain rock aggregate material must be hard, durable, and not subject to grain crushing. Individual rock fragments shall be dense, sound, and resistant to abrasion and shall be free from cracks, seams, and other defects that would tend to increase their destruction from water and frost actions. Drain rock aggregate shall be less than 5 percent carbonate.

Material shall be poorly graded within the specification limits with a uniform grading of coarse to fine particles. No gap-graded material, as determined by the engineer, shall be acceptable.

Verify that all necessary pre-construction submittals such as conformance testing of the drain rock aggregate have been performed prior to placement or importing.

FILL PLACEMENT

Transport, process, place, spread, compact, and complete fill using the appropriate equipment to achieve lift thickness, design lines and grades and compaction specified in the drawings and specifications.

To the extent practicable, fill shall be placed by routing the hauling and spreading units approximately parallel to the axis of the embankment.

Hauling equipment shall be routed in such a manner that they do not follow in the same paths but spread their traveled routes evenly over the surface of the fill.
Protect installed measurement instrumentation, structures, and utilities from damage.

Care shall be taken at all times to avoid segregation of material being placed, and all pockets of segregated or undesirable material shall be removed and replaced with material matching the surrounding material.

Each zone shall be constructed with materials meeting the specified requirements and shall be free from lenses, pockets, and layers of materials that are substantially different in gradation from surrounding material in the same zone.

No material shall be placed on material that is too soft, smooth, wet, or dry, or that has been damaged by drying, cracking, frost, runoff, or construction activities. Previously completed portions of the subgrade that are deemed unsuitable for construction shall be repaired until approved by the engineer. The top 8 inches of the foundation surface shall be scarified, moisture conditioned (as necessary), and compacted so fill material will bond firmly to surfaces of excavation. Remove standing water prior to placement of all fill material.

To the extent practicable, fill materials shall be brought to the placement area at the recommended moisture content.

Moisture conditioning is the operation required to increase or decrease the moisture content of material to within the specified limits for proper material placement and compaction. If moisture conditioning is necessary, it may be carried out by whatever method the contractor deems suitable, provided it produces the moisture content specified in the specifications.

SLOPE STABILITY

The Containment embankment slopes are planned to be constructed on 3H:1V slope ratios. Slope stability analyses were performed for the planned 3H:1V slope ratios. Fill and cut slope heights are not expected to exceed 20 feet. Sil parameters for the analyses were derived from borings, experience, and laboratory tests. A surcharge load of 250 psf was included in the analysis for construction equipment loading. Stability analyses were conducted using the computer program Slide2 published by Rocscience. Soil properties used in the analysis are presented in the following table:

Cut Slope Height in Fill of 24 feet			
Material	**Moist Unit Weight (pcf)**	**Drained Cohesion (psf)**	**Drained Friction Angle (degrees)**
Upper Soil Layer	105	0	30
Lower Soil Layer	115	0	32

During excavation, subsurface materials may get disturbed, and excavation wall may appear unstable. Construction contractors should evaluate the conditions at the time of the excavation and proper benching, or reinforcement may be needed.

The result of slope stability calculation is presented in the geotechnical report presented in Appendix I and shows the slope geometry, soil layering, soil strength values, and critical shearing surface. The calculated factors of safety for the identified critical shearing surface are shown in the following table. A minimum factor of safety for long term slope stability is recommended to be 1.5.

Slope	**Cut and Fill Slope Height of 20 feet**
3 (Horizontal): 1 (Vertical)	1.75 Factor of Safety

CONTAINMENT DESIGN AND CONSTRUCTION RECOMMENDATIONS

Since the proposed Containment will be designed to retain water, Containment material is required to be impermeable. On-site subsurface materials are expected to have relatively high values of hydraulic conductivity, thus; they are not suitable to be used as liners. Recommended liner is a high-density reinforced polypropylene (synthetic) liner material be used. The liner materials should have a maximum hydraulic conductivity value in a range of 10^{-7} to 10^{-9} cm/second. There are many companies that manufacture this type of liner. Recommend the liner contractor strictly follow the manufacturer's manual for liner installation. The contractor should pay attention to orientation/placement of sheeting, overlapping, sealing, seam testing, and top anchorage.

Based on slope stability analysis, the proposed Containment slopes meet the requirement of minimum factor of safety. The Containment can be constructed with permanent embankments of no steeper than 3 (horizontal): 1 (vertical). Any material within 6 inches of the proposed Containment liner should be free of any vegetation, debris, and rocks or protrusions greater than 1-inch maximum dimension.

LINER NOTES

Liner contractor shall inspect graded surface for debris, rocks, or other material that may damage the liner and coordinate with the owner if additional subgrade resurfacing is needed prior to performing work.

Liner contractor to provide submittal of liner panel layout.

Liner contractor to sign subgrade acceptance form (provided by owner) daily prior to installation.

Liner to be installed per GRI specifications, guides and practices.

Liner contractor shall place sandbags on liner during installation as required to prevent wind uplift until Containment is filled to a depth of 3 feet.

Liner contractor shall use gray 60 mil HDPE smooth geomembrane as the primary liner and black 40 mil HDPE smooth geomembrane as the secondary liner.

A 3-foot diameter minimum piece of 40 mil liner shall be extruded welded where the pie shaped corner sections meet for seam reinforcement.

Install a full double width section of black or white 60 mil textured HDPE geomembrane rub sheet. Extrude weld to liner. Welds shall be 2 inches long and spaced every 12 inches along both sides of the sheet. Do not weld end edges. Section shall extend from sump and installed into liner anchor trench as shown on the drawings.

Liner shall be protected with an 8 oz. nonwoven geotextile if rock of other angular materials with a dimension greater than ¾ inch are present.

Sumps shall be backfilled with non-angular maximum 3/8 inch sized pea gravel.

All seams must be welded with a 6” minimum overlap.

Contractor shall non-destructively test all seams their full length using an air pressure or vacuum test, the purpose of this test is to check the continuity of the seam.

For air pressure testing (ASTM 5820), the following procedures are applicable to the seams weld with double seam fusion welder.

The equipment used shall consist of an air tank or pump capable of producing a minimum 35 psi and a sharp needle with a pressure gauge attached to insert into the air chamber.

Seal both ends of the seam by heating and squeezing them together. Insert the needle with the gauge into the air channel. Pressurize the air channel to a minimum of 35 psi. Note time starts and wait a minimum of 5 minutes to check. If pressure after minutes has dropped less than 2 psi the test is successful (thickness of material may cause variance).

Cut the opposite seam end and listen for pressure release to verify full seam has been tested.

If the test fails, follow these procedures:

While channel is under pressure walk the length of the seam listening for a leak.

While channel is under pressure apply a soapy solution to the seam edge and look for bubbles formed by air escaping.

Re-test the seam in smaller increments until the leak is found.

Once leak is found using one of the procedures above, cut out the area and retest the portions of the seams between the leak areas per 6A and 6B above. Continue this procedure until all sections of the seam pass the pressure test.

Repair the leak with a patch and vacuum test.

All non-destructive tests will be noted in the non-destructive logs.

Liner gas vents shall be spaced along the inside slope at approximately 100 feet on center or minimum of 2 vents per side.

When any piping equipment, inlet, or outlet is in direct contact with the liner, an apron consisting of 60 mil HDPE materials shall be installed beneath the equipment or structure to protect the primary liner.

Lay both liners in anchor trench. Backfill anchor trench in 2 lifts and compact.

Appendix G – Geotechnical Report

PLU Row 2W Frac Pond

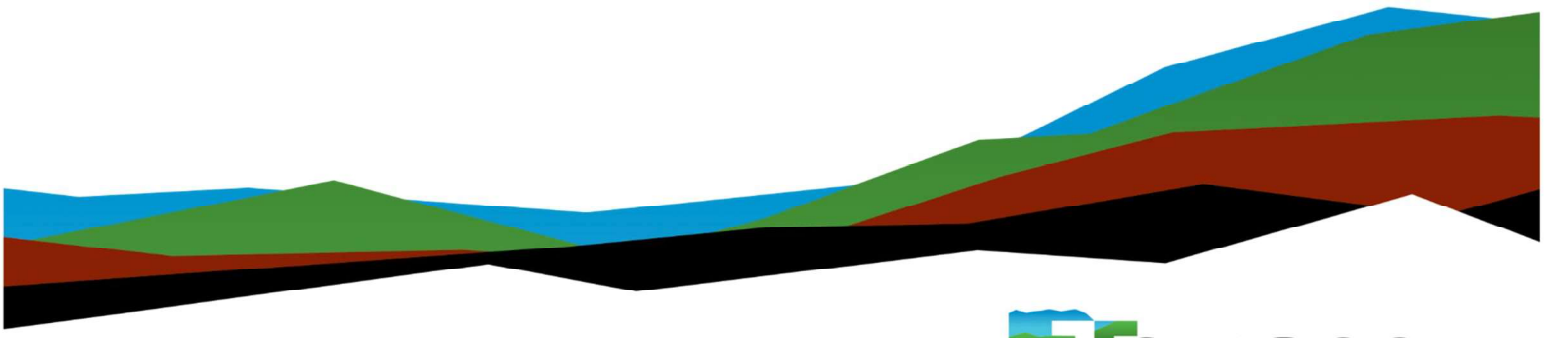
Geotechnical Engineering Report

Eddy County, NM

January 14, 2025 | Terracon Project No. A4245238

Prepared for:

XTO Energy Inc.
6401 N Holiday Hill Rd., Bldg. 5
Midland, TX 79707



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January 14, 2025

XTO Energy Inc.
6401 N Holiday Hill Rd., Bldg. 5
Midland, TX 79707

Attn: Ms. Yiling Loh
D: 281.743.4685
E: yiling.loh@exxonmobil.com

Re: Geotechnical Engineering Report
PLU Row 2W Frac Pond
4.5 Miles Northwest from Intersection of Twin Wells Road and Buck Jackson Road
Eddy County, NM
Terracon Project No. A4245238

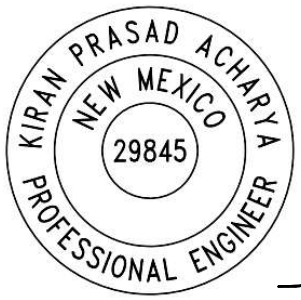
Dear Ms. Loh:

We have completed Geotechnical Engineering services for the above referenced project in general accordance with Terracon Proposal No. PA4245238 dated October 7, 2024. This report presents findings of subsurface exploration and provides geotechnical engineering recommendations concerning earthwork, design and construction of the proposed project.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report or if we may be of further service, please contact us.

Sincerely,

Terracon
New Mexico PE Firm License 362650



Kiran P Acharya, Ph.D., P.E.
Project Engineer

Jitendra "JT" Thakur, Ph.D., P.E. (TX)
Principal/Geotechnical Department Manager

Copy to: Aviraj Chatterjee; Project Engineer with ExxonMobil (aviraj.chatterjee@exxonmobil.com)

Table of Contents

Figures

Attachments

Note: This report was originally delivered in a web-based format. **Blue Bold** text in the report indicates a referenced section heading. The PDF version also includes hyperlinks which direct the reader to that section and clicking on the Terracon logo will bring you back to this page. For more interactive features, please view your project online at **client.terracon.com**.

Refer to each individual Attachment for a listing of contents.

Report Summary

Topic [1]	Overview Statement [2]
Project Description	A new frac pond will be constructed at the project site. The depth of the frac pond will be about 20 to 24 feet.
Geotechnical Characterization	■ On-site subsurface materials consisted of loose to very dense sandy soils with varying amounts of silt, sand, and clay. Very dense sandy soils are locally called caliche. ■ Potential vertical rise (PVR) of on-site subsurface materials is estimated to be less than 1 inch. We believe on-site subsurface materials are generally suitable for use as structural fill. ■ Groundwater was not encountered in any of the borings during our field exploration. Groundwater is not expected to affect pond construction on the site.
Earthwork	■ Heavy-duty excavation equipment could be required to excavate subsurface materials from depths of about 6 to10 feet below ground surface (bgs) to the proposed pond depth at the site. ■ We understand that permanent slopes of 3 (horizontal):1 (vertical) ae planned to be used for the pond. Stability analyses were conducted on these slopes and a factor of safety (FS) of 1.75 was obtained for long-term consideration. This FS is greater than the typically used FS of 1.5 and a side slope of 3 (horizontal):1 (vertical) is considered safe.
General Comments	This section contains essential information about the limitations of this geotechnical engineering report.

1. If the reader is reviewing this report as a pdf, the topics above can be used to access the appropriate section of the report by simply clicking on the topic itself.
2. This summary is for convenience only. It should be used in conjunction with the entire report for design purposes.

Introduction

This report presents the results of our subsurface exploration and Geotechnical Engineering services performed for the proposed PLU Row 2W Frac Pond to be located about 4.5 Miles Northwest from Intersection of Twin Wells Road and Buck Jackson Road in Eddy County, NM. The purpose of these services was to provide information and geotechnical engineering recommendations relative to:

- Subsurface soil conditions
- Groundwater conditions
- Seismic site classification per IBC
- Excavation considerations
- Slope stability analysis and result
- Pond design and Construction

The geotechnical engineering scope of services for this project included the advancement of soil-testing borings, laboratory testing, engineering analysis, and preparation of this report.

Drawings showing the site and boring locations are shown on the **Site Location and Exploration Plan**, respectively. The results of the laboratory testing performed on soil samples obtained from the site during our field exploration are included on the boring logs and as separate graphs in the **Exploration and Laboratory Results** section.

Project Description

Our initial understanding of the project was provided in our proposal and was discussed during project planning. A period of collaboration has transpired since the project was initiated, and our final understanding of the project conditions is as follows:

Item	Description
Project Description	A frac pond will be constructed on the project site with an approximate area of 23.5 acres. The frac pond will be about 20 feet deep. A sump pump will be about 4 feet below bottom of the pond.
Maximum Loads [Assumed]	The hydrostatic pressure at the bottom of the 20 feet deep pond will be about 1,250 pounds per square foot (psf). However, approximately 2,400-psf overburden pressure will be removed with pond excavation, so net vertical pressure should be less than zero.

Item	Description
Grading/Slopes	Permanent slopes should not be steeper than 3 (horizontal):1 (Vertical).

Terracon should be notified if any of the above information is inconsistent with the planned construction, especially the grading limits, as modifications to our recommendations may be necessary.

Site Conditions

The following description of site conditions is derived from our site visit in association with the field exploration and our review of publicly available geologic and topographic maps.

Item	Description
Parcel Information	The PLU Row 2W Frac Pond will be located about 4.5 Miles Northwest from Intersection of Twin Wells Road and Buck Jackson Road in Eddy County, NM. See **Site Location and Exploration Plan.**
Existing Improvements	The planned construction area is undeveloped; however, the parcels on the south and southeast of the site have been developed.
Current Ground Cover	Exposed soil, grasses and shrubs
Existing Topography	Relatively level

Geotechnical Characterization

We have developed a general characterization of the subsurface conditions based upon our review of the subsurface exploration, laboratory data, geologic setting, and our understanding of the project. This characterization, termed GeoModel, forms the basis of our geotechnical calculations and evaluation of the site. Conditions observed at each exploration point are indicated on the individual log. The individual log can be found in the **Exploration and Laboratory Results** and the GeoModel can be found in the **Figures** attachment of this report.

As part of our analyses, we identified the following model layers within the subsurface profile. For a more detailed view of the model layer depths at each boring location, please refer to the GeoModel.

Model Layer	Layer Name	General Description
1	Sand	Silty sand, clayey sand, poorly graded sand, poorly graded sand with silt; loose to very dense
2	Caliche	Poorly graded sand, poorly graded sand with silt; very dense

Excavation difficulties are generally anticipated within Model Layer 2. Caliche has many resemblances to rock. It is hard to excavate caliche materials.

The borings were advanced in the dry using continuous flight auger drilling technique that allows short-term groundwater observation to be made while drilling. Groundwater seepage was not encountered in any of the borings during our field exploration. Groundwater is not expected to affect pond construction at this site.

Groundwater conditions may be different at the time of construction. Groundwater conditions may change because of seasonal variations in rainfall, runoff, and other conditions not apparent at the time of drilling. It is possible that groundwater could temporarily perch seasonally at shallow depths depending on the permeability of the soils in the area. The possibility of groundwater level fluctuations should be considered when developing the design and construction plans for the project. Long-term groundwater monitoring was outside the scope of services for this project.

Seismic Site Class

The seismic design requirements for the structures are based on Seismic Design Category. Site Classification is required to determine the Seismic Design Category for a structure. The Site Classification is based on the upper 100 feet of the site profile defined by a weighted average value of either shear wave velocity, standard penetration resistance, or undrained shear strength in accordance with Section 20.4 of ASCE 7 and the International Building Code (IBC). Based on the soil/rock properties observed at the site and as described on the exploration logs and results, our professional opinion is that a **Seismic Site Classification of D** be considered for the project. Subsurface exploration at this site was extended to the approximately maximum depth of 60 feet bgs. The site properties below the boring depth to 100 feet were estimated based on our experience and knowledge of geologic conditions of the general area. Additional deeper borings or geophysical testing may be performed to confirm the conditions below the current boring depth.

Geotechnical Overview

The areas on the south and southeast of the project site have been developed. Although no deleterious materials, such as construction debris, or organics were encountered during our field exploration or observed in the collected samples, we caution that potential existing fill that contains deleterious materials could exist on the project site in areas between or away from our borings. If deleterious materials are detected during construction, Terracon should be notified immediately to provide consultation.

The site appears suitable for the proposed development based upon geotechnical conditions encountered in the test borings, provided that the recommendations provided in this report are implemented in the design and construction phases of this project.

We expect on-site subsurface materials to have low potential for shrink/swell with fluctuations in moisture content. Moisture-induced PVR of the on-site subsurface materials is estimated to be less than 1 inch. The on-site soils are generally suitable for use as structural fill.

On-site subsurface materials are expected to have relatively high values of hydraulic conductivity, thus; they are not suitable to be used as liner. We recommend a high-density reinforced polypropylene (synthetic) liner material be used. The slope stability analyses result shows that the pond can be constructed with permanent slopes of no steeper than 3 (horizontal): 1 (vertical), as planned.

The recommendations contained in this report are based upon the results of field and laboratory testing (presented in the **Exploration and Laboratory Results**), engineering analyses, and our current understanding of the proposed project. The **General Comments** section provides an understanding of the report limitations.

Earthwork

Earthwork is anticipated to include clearing and grubbing, excavations, and engineered fill placement. The following sections provide recommendations for use in the preparation of specifications for the work. Recommendations include critical quality criteria, as necessary, to render the site in the state considered in our geotechnical engineering evaluation for pond construction.

Site Preparation

Prior to placing fill, stripping of existing topsoil, vegetations, and root mats should be performed in the proposed construction area. The soil materials which contain less than 5

percent organics can be reused as structural fill provided the material is moisture conditioned and properly compacted.

Subgrade Preparation

We understand that the ground surface elevation on the site varies from about 3,279 feet above mean sea level (AMSL) to 3,322 feet AMSL. After the initial stripping of topsoil, vegetations or organic materials is carried out, we recommend the entire project site be proofrolled. The proofrolling can be conducted with an adequately loaded vehicle such as a fully-loaded tandem-axle dump truck. The proofrolling should be performed under the observation of the Geotechnical Engineer or his/her representative. Areas excessively deflecting under the proofrolling should be delineated and subsequently addressed by the Geotechnical Engineer or the representative. Excessively wet or dry material should either be removed, or moisture conditioned and recompacted as per **Fill Placement and Compaction Requirements** section.

We expect overexcavation and fill placement could be required on the site. Overexcavations should be performed in accordance with OSHA 29 CFR, Part 1926, Subpart P, "Excavations" and its appendices, and in accordance with any applicable local and/or state regulations. Terracon should be involved in supervising earthwork operations. During grading or pond's berm construction, soil should be compacted as per **Fill Placement and Compaction Requirements** section.

Excavation

Based on the conditions encountered, we believe heavy-duty construction equipment, such as a hoe ram, a heavy dozer equipped with a ripper, a rock saw or jack hammer or with rock trenching equipment, could be required to excavate subsurface materials from depths of about 6 to10 feet bgs to the proposed pond depth at the site.

The descriptions provided below are a guide to conditions generally encountered in the region of the project site. Required excavation techniques will vary based on weathering of the materials to be excavated, and the fracturing, jointing and overall stratigraphy of the feature. Actual field conditions usually display a gradual weathering progression with poorly defined and uneven boundaries between layers of different materials. We recommend that the following definitions for rock in earthwork excavation be included in bid documents:

Excavation Type	Definition
Mass Excavation	Any material occupying an original volume of more than 1 cubic yard which cannot be excavated with a single-toothed ripper drawn by a crawler tractor having a minimum draw bar pull rating of not less than 80,000 pounds usable pull (Caterpillar D-8 or larger).
Trench Excavation	Any material occupying an original volume of more than 1/2 cubic yard which cannot be excavated with a backhoe having a bucket curling rate of not less than 40,000 pounds, using a rock bucket and rock teeth (a John Deere 790 or larger).

Construction site safety is the sole responsibility of the contractor who controls the means, methods, and sequencing of construction operations. Under no circumstances shall the information provided herein be interpreted to mean Terracon is assuming responsibility for construction site safety or the contractor's activities; such responsibility shall neither be implied nor inferred.

Excavations or other activities resulting in ground disturbance have the potential to affect adjoining properties and structures. Our scope of services does not include review of available final grading information or consider potential temporary grading performed by the contractor for potential effects such as ground movement beyond the project limits. A preconstruction/precondition survey should be conducted to document nearby property/infrastructure prior to any site development activity. Excavation or ground disturbance activities adjacent or near property lines should be monitored or instrumented for potential ground movements that could negatively affect adjoining property and/or structures.

Fill Material Types

Fill required to achieve design grade should be classified as structural fill and general fill. Structural fill is a material used below, or within 10 feet of structures, pavements, or constructed slopes. General fill is a material used to achieve grade requirement outside of these areas.

Reuse of On-Site Soil: Excavated on-site soils can generally reused as structural fill. Material property requirements for on-site soil for use as general fill and structural fill are noted in the table below:

Property	General Fill	Structural Fill
Composition	Free of construction debris and deleterious material	Free of construction debris and deleterious material

Property	General Fill	Structural Fill
Maximum particle size	6 inches	4 inches
Plasticity	Not limited	Maximum liquid limit of 35 and maximum plasticity index of 15
GeoModel Layer Expected to be Suitable[1]	1,2[2]	1,2[2]

1. Based on subsurface exploration. Actual material suitability should be determined in the field at the time of construction.
2. Caliches should be crushed into sizes less than 4 inches in maximum dimensions and properly mixed with on-site soils before they are used as structural fill.

Imported Fill Materials: Imported fill materials should meet the following material property requirements. Regardless of its source, compacted fill should consist of approved materials that are free of organic matter and debris. Frozen material should not be used, and fill should not be placed on a frozen subgrade.

Soil Type [1]	USCS Classification	Acceptable Parameters (for Structural Fill)
Low Plasticity Cohesive	CL, CL-ML	Liquid Limit less than 35 Plasticity index less than 15 25% to 50% retained on No. 200 sieve
Granular	GW, GP, GM, GC, SW, SP, SM, SC	10% to 50% passing No. 200 sieve

1. Structural and general fill should consist of approved materials free of organic matter and debris. A sample of each material type should be submitted to the Geotechnical Engineer for evaluation prior to use on this site.

Fill Placement and Compaction Requirements

Structural and general fill should meet the following compaction requirements.

Item	Structural Fill	General Fill
Maximum Lift Thickness	• 8 inches or less in loose thickness when heavy, self-propelled compaction equipment is used. • 4 inches in loose thickness when hand-guided equipment (i.e., jumping jack or plate compactor) is used.	Same as structural fill

Item	Structural Fill	General Fill
Minimum Compaction Requirements [1,2]	At least 95% of the material's maximum dry density in all fill areas	Same as structural fill
Water Content Range [1]	-2% to +2% of material's optimum moisture content in all fill areas	As required to achieve min. compaction requirements

1. Maximum density and optimum water content as determined by the modified Proctor test (ASTM D1557).
2. If the granular material is a coarse sand or gravel, or of a uniform size, or has a low fines content, compaction comparison to relative density may be more appropriate. In this case, granular materials should be compacted to at least 98% relative density (ASTM D4253 and D4254).

Slope Stability

The pond embankment slopes are planned to be constructed on 3H:1V slope ratios. Slope stability analyses were performed for the planned 3H:1V slope ratios. Fill and cut slope heights are not expected to exceed 20 feet. Soil parameters for the analyses were derived from our borings, experience, and laboratory tests. A surcharge load of 250 psf was included in the analysis for construction equipment loading. Stability analyses were conducted using the computer program Slide2 published by Rocscience. Soil properties used in the analysis are presented in the following table:

Cut Slope Height in Fill of 24 feet			
Material	**Moist Unit Weight (pcf)**	**Drained Cohesion (psf)**	**Drained Friction Angle (degrees)**
Upper Soil Layer	105	0	30
Lower Soil Layer	115	0	32

During excavation, subsurface materials may get disturbed, and excavation wall may appear unstable. Construction contractors should evaluate the conditions at the time of excavation and proper benching, or reinforcement may be needed.

Slope Stability Results

The result of the slope stability calculation is presented in the **Figures** that shows the slope geometry, soil layering, soil strength values, and critical shearing surface. The calculated factors-of-safety for the identified critical shearing surface is shown in the following table. A minimum factor of safety for long-term slope stability is recommended to be 1.5.

Slope	Cut and Fill Slope Height of 20 feet
3 (Horizontal): 1 (Vertical)	1.75 Factor of Safety

Pond Design and Construction Recommendations

Since the proposed pond will be designed to retain water, pond material is likely required to be impermeable. On-site subsurface materials are expected to have relatively high values of hydraulic conductivity, thus; they are not suitable to be used as liners. We recommend a high-density reinforced polypropylene (synthetic) liner material be used. The liner materials should have a hydraulic conductivity value in a range of 10^{-7} to 10^{-9} cm/second. There are many companies that manufacture this type of liner. We recommend the contractor for this project strictly follow the manufacturer's manual for liner installation. The contractor should pay attention to orientation/placement of sheeting, overlapping, sealing, seam testing, and top anchorage.

Based on slope stability analysis, the proposed pond slopes meet the requirement of minimum factor of safety. The pond can be constructed with permanent embankments of no steeper than 3 (horizontal) :1 (vertical). Any material within 6 inches of the proposed pond liner should be free of any vegetation, debris, and rocks or protrusions greater than 1 inch in maximum dimension.

General Comments

Our analysis and opinions are based upon our understanding of the project, the geotechnical conditions in the area, and the data obtained from our site exploration. Variations will occur between exploration point locations or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction. Terracon should be retained as the Geotechnical Engineer, as noted in this report, to provide observation and testing services during pertinent construction phases. If variations appear, we can provide further evaluation and supplemental recommendations. If variations are noted in the absence of our observation and testing services on-site, we should be immediately notified so that we can provide evaluation and supplemental recommendations.

Our Scope of Services does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

Our services and any correspondence are intended for the sole benefit and exclusive use of our client for specific application to the project discussed and are accomplished in accordance with generally accepted geotechnical engineering practices with no third-party beneficiaries intended. Any third-party access to services or correspondence is solely for information purposes to support the services provided by Terracon to our client. Reliance upon the services and any work product is limited to our client and is not intended for third parties. Any use or reliance on the provided information by third parties is done solely at their own risk. No warranties, either express or implied, are intended or made.

Site characteristics as provided are for design purposes and not to estimate excavation cost. Any use of our report in that regard is done at the sole risk of the excavating cost estimator as there may be variations on the site that are not apparent in the data that could significantly affect excavation cost. Any parties charged with estimating excavation costs should seek their own site characterization for specific purposes to obtain the specific level of detail necessary for costing. Site safety and cost estimating including excavation support and dewatering requirements/design are the responsibility of others. Construction and site development have the potential to affect adjacent properties. Such impacts can include damage due to vibration, modification of groundwater/surface water flow during construction, foundation movement due to undermining or subsidence from excavation, as well as noise or air quality concerns. Evaluation of these items on nearby properties are commonly associated with contractor means and methods and are not addressed in this report. The owner and contractor should consider a preconstruction/precondition survey of surrounding development. If changes in the nature, design, or location of the project are planned, our conclusions and recommendations shall not be considered valid unless we review the changes and either verify or modify our conclusions in writing.

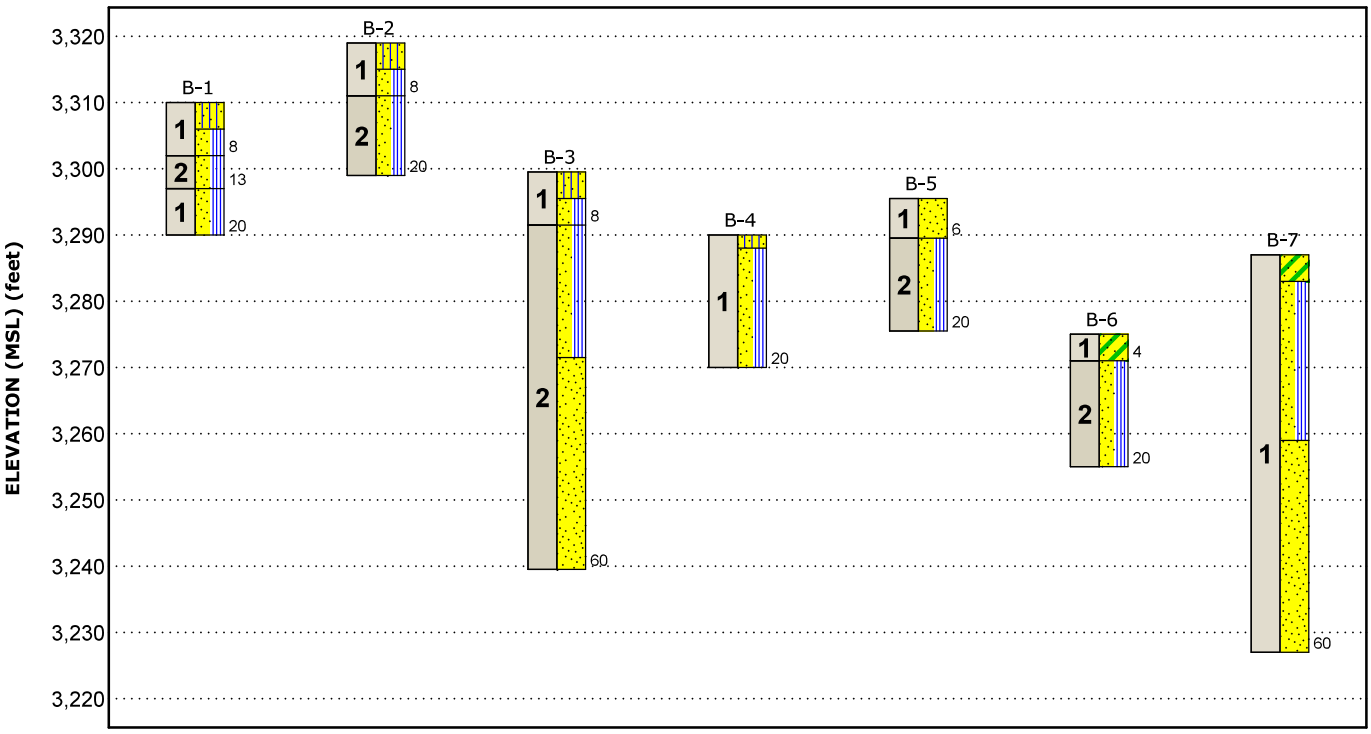
Figures

Contents:

PLU Row 2W Trae Pond
4.5 miles Northwest from Intersection of Twin Wells Road and Buck Jackson Road | Eddy County, NM
Terracon Project No. A4245238

10400 State Highway 191
Midland, TX

GeoModel



This is not a cross section. This is intended to display the Geotechnical Model only. See individual logs for more detailed conditions.

Model Layer	Layer Name	General Description
1	Sand	Silty sand, clayey sand, poorly graded sand, poorly graded sand with silt; loose to very dense
2	Caliche	Poorly graded sand, poorly graded sand with silt; very dense

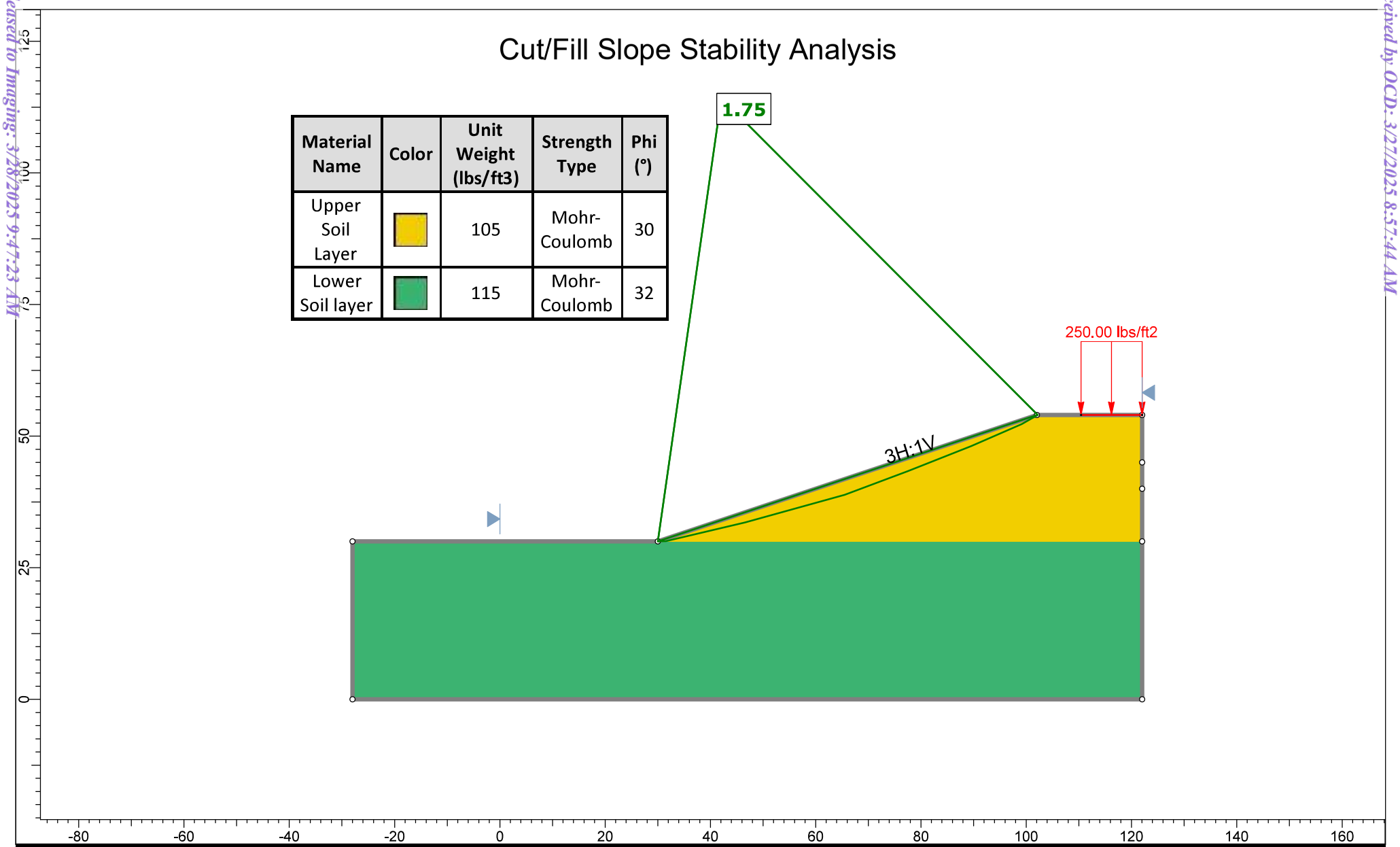
Legend

- Silty Sand
- Poorly-graded Sand with Silt
- Poorly-graded Sand
- Clayey Sand

NOTES:
Layering shown on this figure has been developed by the geotechnical engineer for purposes of modeling the subsurface conditions as required for the subsequent geotechnical engineering for this project. Numbers adjacent to soil column indicate depth below ground surface.

Cut/Fill Slope Stability Analysis

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Phi (°)
Upper Soil Layer		105	Mohr-Coulomb	30
Lower Soil layer		115	Mohr-Coulomb	32



rocscience

SLIDEINTERPRET 9.037

Project	PLU Row 2W Frac Pond; A4245238		
Group	Group 1	Scenario	Normal Operations
Drawn By		Company	Terracon
Date	10/12/2023, 5:06:43 PM	File Name	Embankment cut and fill to 24 feet; FS 1.75.slmd

Attachments

Exploration and Testing Procedures

Field Exploration

Borings	Boring Depth (feet) [1]	Location
B-1 to B-7	20 to 60[2]	Within the Project Boundary at Client Designated Locations

1. Below ground surface (bgs)

Boring Layout and Elevations: Our client provided boring layout. Elevations were estimated at the boring locations using a topographic map provided by the client. We used handheld GPS equipment to locate borings with an estimated horizontal accuracy of +/-20 feet.

Subsurface Exploration Procedures: We advanced the borings with a truck-mounted rotary drill rig using continuous flight auger drilling technique. Five samples were obtained in the upper 10 feet of each boring and at intervals of 5 feet thereafter. In the split-barrel sampling procedure, a standard 2-inch outer diameter split-barrel sampling spoon was driven into the ground by a 140-pound automatic hammer falling a distance of 30 inches. The number of blows required to advance the sampling spoon the last 12 inches of a normal 18-inch penetration is recorded as the Standard Penetration Test (SPT) resistance value. The SPT resistance values, also referred to as N-values, are indicated on the boring logs at the test depths. For safety purposes, all borings were backfilled with auger cuttings after their completion.

We also observed the boreholes while drilling and at the completion of drilling for the presence of groundwater. Groundwater was not observed at these times in the boreholes.

The sampling depths, penetration distances, and other sampling information was recorded on the field boring logs. The samples were placed in appropriate containers and taken to our soil laboratory for testing and classification by a Geotechnical Engineer. Our exploration team prepared field boring logs as part of the drilling operations. These field logs included visual classifications of the materials observed during drilling and our interpretation of the subsurface conditions between samples. Final boring logs were prepared from the field logs. The final boring logs represent the Geotechnical Engineer's interpretation of the field logs and include modifications based on observations and tests of the samples in our laboratory.

Laboratory Testing

The project engineer reviewed the field data and assigned laboratory tests. The laboratory testing program included the following types of tests:

- Moisture Content
- Atterberg Limits
- Grain size analysis

The laboratory testing program often included examination of soil samples by an engineer. Based on the results of our field and laboratory programs, we described and classified the soil samples in accordance with the Unified Soil Classification System.

Site Location and Exploration Plans

Contents:

Site Location Plan
Exploration Plan

Note: All attachments are one page unless noted above.

Site Location

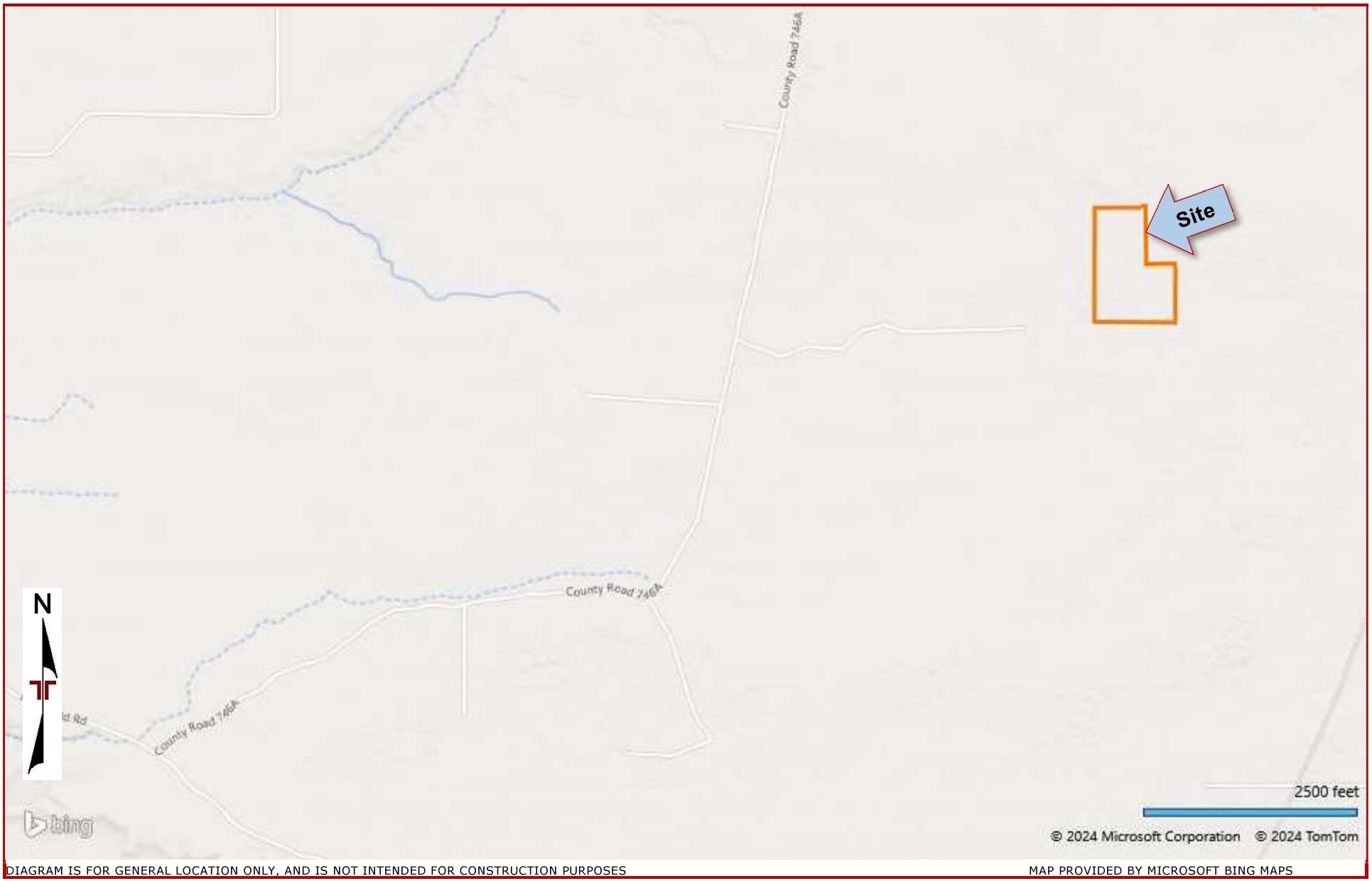


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY MICROSOFT BING MAPS

Exploration Plan

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY MICROSOFT BING MAPS

Exploration Plan

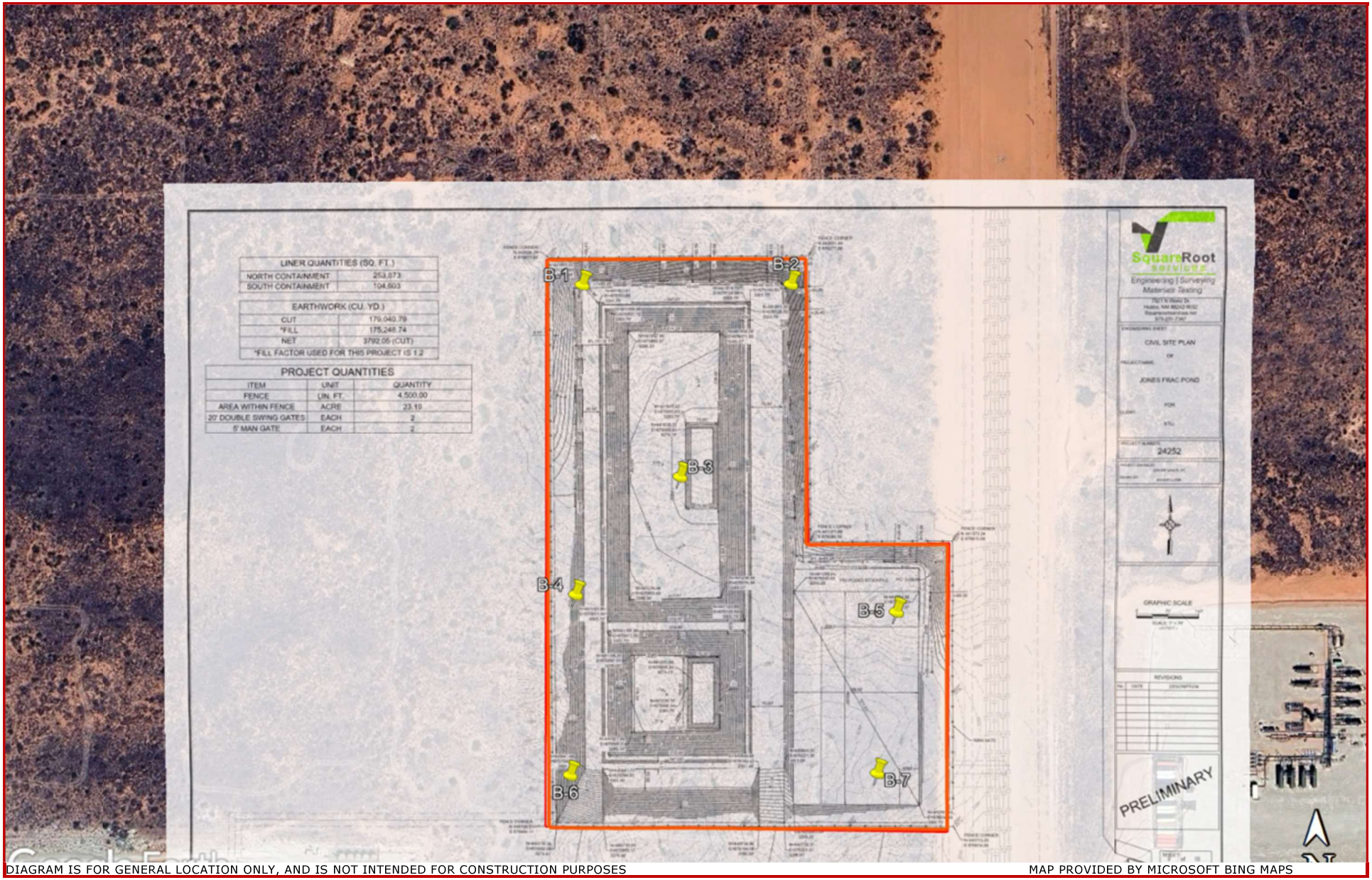


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY MICROSOFT BING MAPS

Exploration and Laboratory Results

Contents:

Boring Logs (9 Pages)
Atterberg Limit Results
Grain Size Distribution (3 Pages)

Note: All attachments are one page unless noted above.

4.5 miles Northwest from Intersection of Twin Wells Road and Buck Jackson Road | Eddy County, NM
Terracon Project No. A4245238

10400 State Highway 191
Midland, TX

Boring Log No. B-1

Location: See Exploration Plan

Latitude: 32.2142° Longitude: -103.8987°

Depth (Ft.) | Elevation: 3310 (Ft.) +/-

Model Layer	Graphic Log	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Water Content (%)	Atterberg Limits LL-PL-PI	Percent Fines
1		**SILTY SAND (SM)**, brown to tannish red, loose to medium dense 4.0 / 3306			2-3-4 N=7			
					5-6-7 N=13			
		POORLY GRADED SAND WITH SILT (SP-SM), tannish red, medium dense			8-10-11 N=21			
		8.0 / 3302			8-12-12 N=24			
2		**POORLY GRADED SAND WITH SILT, locally called caliche (SP-SM)**, tannish white to tan, very dense			12-26-50/5"	6.0	NP	23
		13.0 / 3297						
1		**POORLY GRADED SAND WITH SILT (SP-SM)**, tan to light brown, dense to very dense			16-21-25 N=46			
		20.0 / 3290			21-29-35 N=64			
		Boring Terminated at 20 Feet						

5 10 15 20

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation Reference: Elevations obtained from topographic map provided by client

Water Level Observations
No groundwater observed during drilling

Dry at completion of drilling

Drill Rig
CME 45

Hammer Type
Automatic

Driller
Mario (Blue Hole Drilling)

Notes
NP: Non Plastic

Advancement Method
Continuous flight auger

Abandonment Method

Logged by
Aron

Boring Started
11-26-2024

Boring Completed
11-26-2024

4.5 miles Northwest from Intersection of Twin Wells Road and Buck Jackson Road | Eddy County, NM
Terracon Project No. A4245238

10400 State Highway 191
Midland, TX

Boring Log No. B-2

Model Layer	Graphic Log	Location: See Exploration Plan Latitude: 32.2142° Longitude: -103.8971° Depth (Ft.) / Elevation: 3319 (Ft.) +/-	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Water Content (%)	Atterberg Limits LL-PL-PI	Percent Fines
1		**SILTY SAND (SM)**, brown, medium dense 4.0 / 3315				1-4-6 N=10	1.8	NP	6
						5-8-8 N=16			
		POORLY GRADED SAND WITH SILT (SP-SM), tan to brown, dense to very dense	5			9-16-16 N=32			
		8.0 / 3311				11-24-28 N=52			
2		**POORLY GRADED SAND WITH SILT, locally called caliche (SP-SM)**, brown to light brown, very dense	10			30-50/6"			
			15			23-36-44 N=80			
		20.0 / 3299	20			20-38-34 N=72			
		Boring Terminated at 20 Feet							

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).
See Supporting Information for explanation of symbols and abbreviations.
Elevation Reference: Elevations obtained from topographic map provided by client

Water Level Observations
No groundwater observed during drilling
Dry at completion of drilling

Drill Rig
CME 75

Hammer Type
Automatic

Driller
Mario (Blue Hole Drilling)

Notes
NP: Non Plastic

Advancement Method
Continuous flight auger

Abandonment Method

Logged by
Aron

Boring Started
11-25-2024

Boring Completed
11-25-2024

4.5 miles Northwest from Intersection of Twin Wells Road and Buck Jackson Road | Eddy County, NM
Terracon Project No. A4245238

10400 State Highway 191
Midland, TX

Boring Log No. B-3

Location: See Exploration Plan

Latitude: 32.2130° Longitude: -103.8980°

Depth (Ft.) | Elevation: 3299.5 (Ft.) +/-

Model Layer	Graphic Log	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Water Content (%)	Atterberg Limits LL-PL-PI	Percent Fines
1		**SILTY SAND (SM)**, brown to tannish white, medium dense			3-5-7 N=12			
					6-8-10 N=18			
		4.0 3295.5						
		POORLY GRADED SAND WITH SILT (SP-SM), tannish white, dense			13-23-27 N=50	2.1	NP	11
					10-9-36 N=45			
		8.0 3291.5						
2		**POORLY GRADED SAND WITH SILT, locally called caliche (SP-SM)**, tannish white to light brown, very dense			30-45-50/6"	2.4	NP	6
					25-43-45 N=88			
					18-38-50/5"	7.7	NP	11
		-dense below 23'			18-23-27 N=50			
		28.0 3271.5						
		POORLY GRADED SAND, locally called caliche (SP), light brown to brown, very dense			50/4"			
		-dense at 33'			15-12-38 N=50			
					11-50/4"	2.8	NP	5
					12-50/4"			
					9-27-47 N=74			

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation Reference: Elevations obtained from topographic map provided by client

Water Level Observations
No groundwater observed during drilling

Dry at completion of drilling

Drill Rig
CME 45

Hammer Type
Automatic

Driller
Mario (Blue Hole Drilling)

Notes
NP: Non Plastic

Advancement Method
Continuous flight auger

Abandonment Method

Logged by
Aron

Boring Started
11-26-2024

Boring Completed
11-26-2024

TPLC RDW 2W Frac Pond

4.5 miles Northwest from Intersection of Twin Wells Road and Buck Jackson Road | Eddy County, NM

Terracon Project No. A4245238

10400 State Highway 191
Midland, TX

Boring Log No. B-3

Model Layer	Graphic Log	Location: See Exploration Plan Latitude: 32.2130° Longitude: -103.8980° Depth (Ft.) Elevation: 3299.5 (Ft.) +/-	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Water Content (%)	Atterberg Limits LL-PL-PI	Percent Fines
2		**POORLY GRADED SAND, locally called caliche (SP)**, light brown to brown, very dense *(continued)*	55			12-30-50/5"			
		60.0 3239.5	60			8-28-48 N=76			
		Boring Terminated at 60 Feet							

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation Reference: Elevations obtained from topographic map provided by client

Water Level Observations
No groundwater observed during drilling

Dry at completion of drilling

Drill Rig
CME 45

Hammer Type
Automatic

Driller
Mario (Blue Hole Drilling)

Notes

Advancement Method
Continuous flight auger

Abandonment Method

Logged by
Aron

Boring Started
11-26-2024

Boring Completed
11-26-2024

4.5 miles Northwest from Intersection of Twin Wells Road and Buck Jackson Road | Eddy County, NM
Terracon Project No. A4245238

10400 State Highway 191
Midland, TX

Boring Log No. B-4

Location: See Exploration Plan

Latitude: 32.2123° Longitude: -103.8988°

Depth (Ft.) | Elevation: 3290 (Ft.) +/-

Model Layer	Graphic Log	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Water Content (%)	Atterberg Limits LL-PL-PI	Percent Fines
1		**SILTY SAND (SM)**, brown, loose 2.0 / 3288			1-1-3 N=4			
		POORLY GRADED SAND WITH SILT (SP-SM), tannish red to tannish brown, loose			3-4-4 N=8			
					3-4-5 N=9			
		-dense between 6 and 13'			12-18-20 N=38			
					17-18-19 N=37			
					4-4-4 N=8	1.8	NP	5
		- medium dense below 18' 20.0 / 3270			11-8-5 N=13			
		Boring Terminated at 20 Feet						

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation Reference: Elevations obtained from topographic map provided by client

Water Level Observations
No groundwater observed during drilling

Dry at completion of drilling

Drill Rig
CME 45

Hammer Type
Automatic

Driller
Mario (Blue Hole Drilling)

Notes
NP: Non Plastic

Advancement Method
Continuous flight auger

Abandonment Method

Logged by
Aron

Boring Started
11-26-2024

Boring Completed
11-26-2024

4.5 miles Northwest from Intersection of Twin Wells Road and Buck Jackson Road | Eddy County, NM
Terracon Project No. A4245238

10400 State Highway 191
Midland, TX

Boring Log No. B-5

Model Layer	Graphic Log	Location: See Exploration Plan Latitude: 32.2121° Longitude: -103.8964° Depth (Ft.) / Elevation: 3295.5 (Ft.) +/-	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Water Content (%)	Atterberg Limits LL-PL-PI	Percent Fines
1		**POORLY GRADED SAND (SP)**, brown to tannish white, loose to medium dense				1-2-2 N=4			
						4-6-8 N=14	0.9	NP	5
			5			5-8-13 N=21			
		6.0 / 3289.5							
2		**POORLY GRADED SAND WITH SILT, locally called caliche (SP-SM)**, tannish brown, very dense				39-50/5"			
			10			39-50/4"			
			15			22-48-50/4"			
		20.0 / 3275.5				26-50/5"			
		Boring Terminated at 20 Feet	20						

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation Reference: Elevations obtained from topographic map provided by client

Water Level Observations
No groundwater observed during drilling

Dry at completion of drilling

Drill Rig
CME 75

Hammer Type
Automatic

Driller
Mario (Blue Hole Drilling)

Notes
NP: Non Plastic

Advancement Method
Continuous flight auger

Abandonment Method

Logged by
Aron

Boring Started
11-25-2024

Boring Completed
11-25-2024

4.5 miles Northwest from Intersection of Twin Wells Road and Buck Jackson Road | Eddy County, NM
Terracon Project No. A4245238

10400 State Highway 191
Midland, TX

Boring Log No. B-6

Model Layer	Graphic Log	Location: See Exploration Plan Latitude: 32.2111° Longitude: -103.8988° Depth (Ft.) / Elevation: 3275 (Ft.) +/-	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Water Content (%)	Atterberg Limits LL-PL-PI	Percent Fines
1		**CLAYEY SAND (SC)**, brown to light brown, loose to medium dense				1-3-5 N=8			
		4.0 / 3271				3-6-9 N=15			
2		**POORLY GRADED SAND WITH SILT (SP-SM)**, light brown, dense	5			13-16-17 N=33			
		-medium dense at 6'				8-12-13 N=25	3.4	NP	12
		-very dense at 8'	10			15-24-30 N=54			
		-medium dense to dense below 13'	15			8-12-15 N=27			
		20.0 / 3255	20			7-12-25 N=37			
		Boring Terminated at 20 Feet							

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).
See Supporting Information for explanation of symbols and abbreviations.
Elevation Reference: Elevations obtained from topographic map provided by client

Water Level Observations
No groundwater observed during drilling
Dry at completion of drilling

Drill Rig
CME 75

Hammer Type
Automatic

Driller
Mario (Blue Hole Drilling)

Notes
NP: Non Plastic

Advancement Method
Continuous flight auger

Abandonment Method

Logged by
Aron

Boring Started
11-26-2024

Boring Completed
11-26-2024

4.5 miles Northwest from Intersection of Twin Wells Road and Buck Jackson Road | Eddy County, NM
Terracon Project No. A4245238

10400 State Highway 191
Midland, TX

Boring Log No. B-7

Location: See Exploration Plan

Latitude: 32.2111° Longitude: -103.8965°

Depth (Ft.) | Elevation: 3287 (Ft.) +/-

Model Layer	Depth (Ft.)	Material Description	Water Level Observations	Sample Type	Field Test Results	Water Content (%)	Atterberg Limits LL-PL-PI	Percent Fines
1	0	**CLAYEY SAND (SC)**, brown to tannish white, medium dense			1-10-12 N=22			
		-very dense below 2'			15-31-31 N=62	4.2	26-17-9	31
	4.0 (3283)	**POORLY GRADED SAND WITH SILT (SP-SM)**, tannish white to light brown, very dense			11-22-34 N=56			
	5	-medium dense between 6 and 13'			5-8-9 N=17			
	10				6-11-14 N=25			
		-loose to medium dense below 13'			1-3-4 N=7			
	15				3-4-7 N=11			
	20				3-7-13 N=20			
	25							
	28.0 (3259)	**POORLY GRADED SAND (SP)**, light brown, medium dense			1-6-11 N=17	0.9	NP	1
	30				5-10-17 N=27			
	35				4-8-16 N=24			
	40				2-7-14 N=21			
	45				8-12-16 N=28	0.7	NP	2
	50							

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation Reference: Elevations obtained from topographic map provided by client

Water Level Observations
No groundwater observed during drilling

Dry at completion of drilling

Drill Rig
CME 75

Hammer Type
Automatic

Driller
Mario (Blue Hole Drilling)

Notes
NP: Non Plastic

Advancement Method
Continuous flight auger

Abandonment Method

Logged by
Aron

Boring Started
11-26-2024

Boring Completed
11-26-2024

4.5 miles Northwest from Intersection of Twin Wells Road and Buck Jackson Road | Eddy County, NM
Terracon Project No. A4245238

10400 State Highway 191
Midland, TX

Boring Log No. B-7

Model Layer	Graphic Log	Location: See Exploration Plan Latitude: 32.2111° Longitude: -103.8965° Depth (Ft.) Elevation: 3287 (Ft.) +/-	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Water Content (%)	Atterberg Limits LL-PL-PI	Percent Fines
1		**POORLY GRADED SAND (SP)**, light brown, medium dense *(continued)*	55			3-4-8 N=12			
		60.0 3227	60			4-6-10 N=16	0.8	NP	1
		Boring Terminated at 60 Feet							

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).
See Supporting Information for explanation of symbols and abbreviations.
Elevation Reference: Elevations obtained from topographic map provided by client

Water Level Observations
No groundwater observed during drilling
Dry at completion of drilling

Drill Rig
CME 75

Hammer Type
Automatic

Driller
Mario (Blue Hole Drilling)

Notes

Advancement Method
Continuous flight auger

Abandonment Method

Logged by
Aron

Boring Started
11-26-2024

Boring Completed
11-26-2024

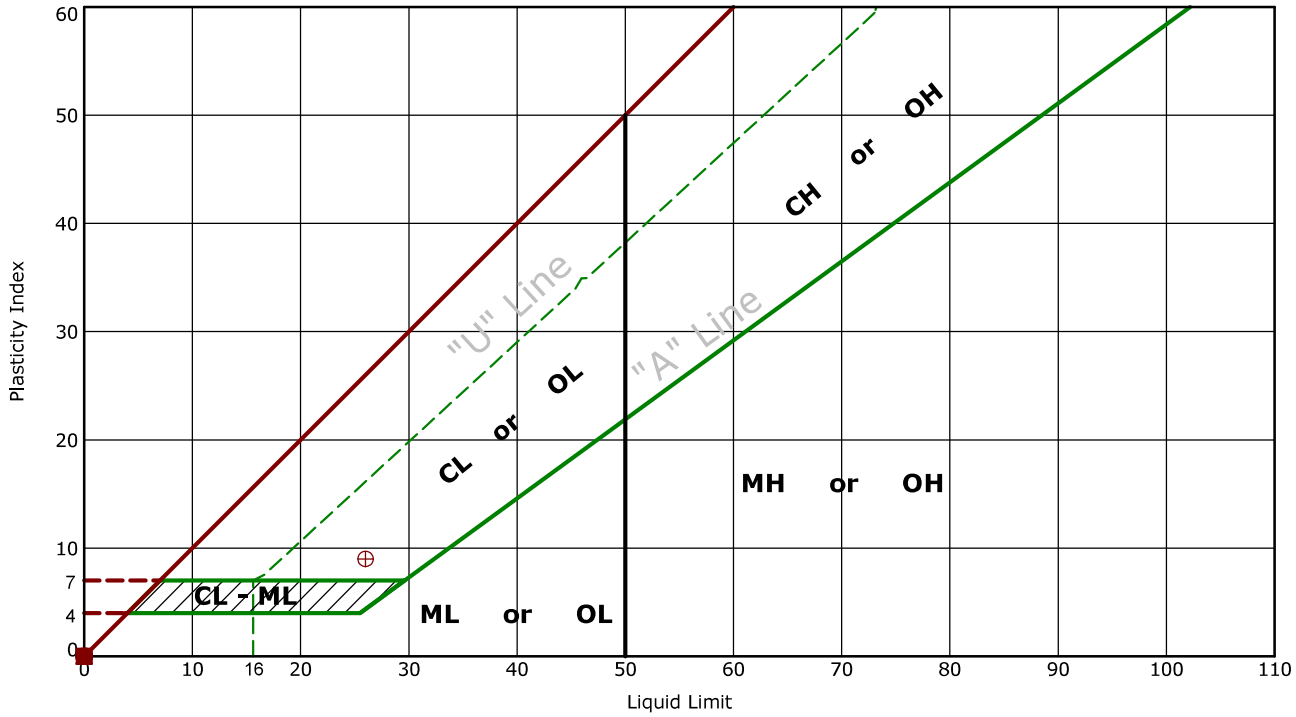
PLU Row 2W Frac Pond

4.5 miles Northwest from Intersection of Twin Wells Road and Buck Jackson Road | Eddy County, NM
Terracon Project No. A4245238

10400 State Highway 191
Midland, TX

Atterberg Limit Results

ASTM D4318



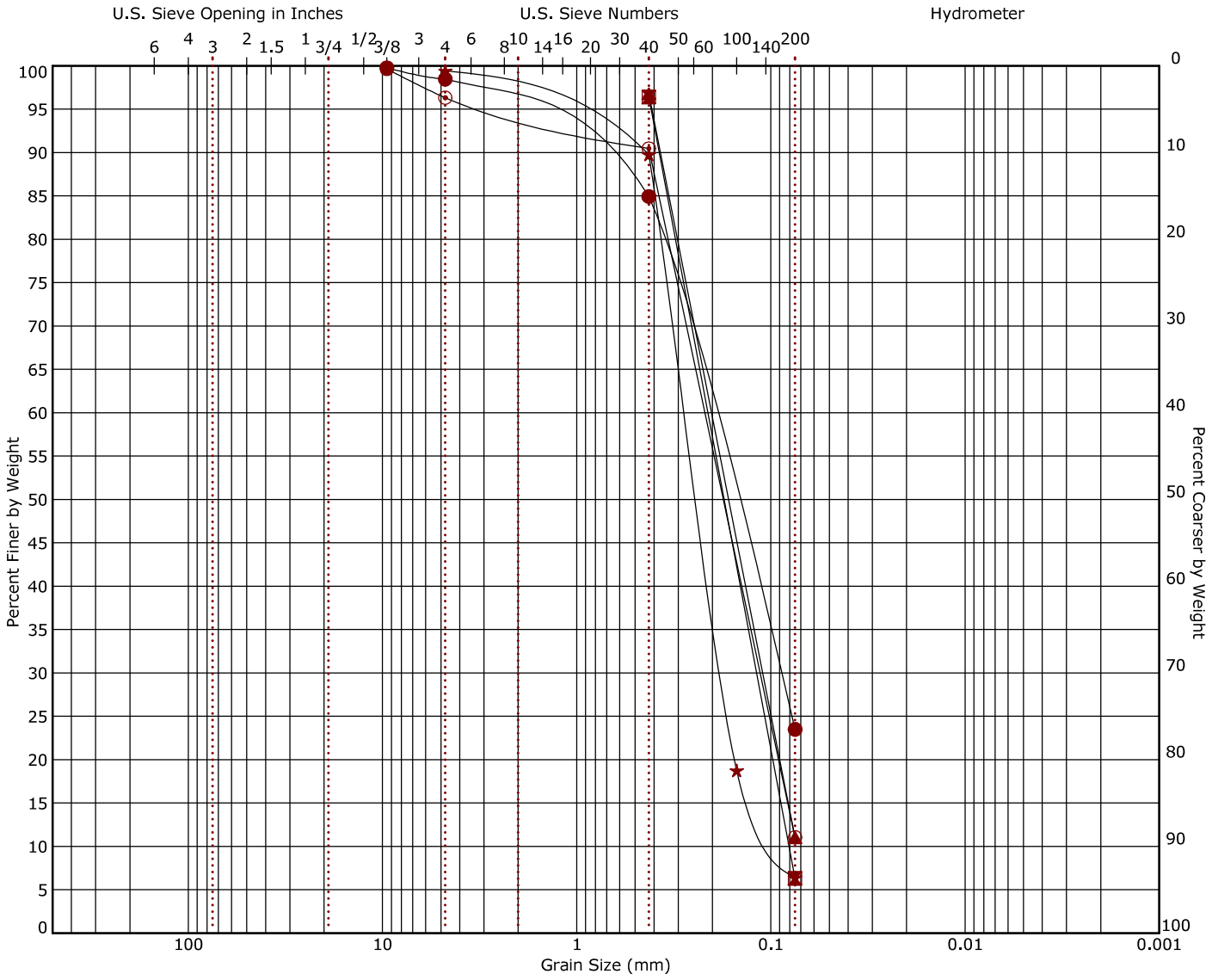
	Boring ID	Depth (Ft)	LL	PL	PI	Fines	USCS	Description
●	B-1	8.5 - 9.9	NP	NP	NP	23.5	SM	SILTY SAND
⊠	B-2	0 - 1.5	NP	NP	NP	6.3	SP-SM	POORLY GRADED SAND with SILT
▲	B-3	4 - 5.5	NP	NP	NP	11.0	SP-SM	POORLY GRADED SAND with SILT
★	B-3	8.5 - 10	NP	NP	NP	6.4	SP-SM	POORLY GRADED SAND with SILT
⊙	B-3	18.5 - 19.9	NP	NP	NP	11.1	SP-SM	POORLY GRADED SAND with SILT
✿	B-3	38.5 - 39.3	NP	NP	NP	5.0	SP-SM	POORLY GRADED SAND with SILT
○	B-4	13.5 - 15	NP	NP	NP	5.1	SP-SM	POORLY GRADED SAND with SILT
△	B-5	2 - 3.5	NP	NP	NP	4.7	SP	POORLY GRADED SAND
⊗	B-6	6 - 7.5	NP	NP	NP	11.9	SP-SM	POORLY GRADED SAND with SILT
⊕	B-7	2 - 3.5	26	17	9	30.5	SC	CLAYEY SAND
□	B-7	28.5 - 30	NP	NP	NP	1.2	SP	POORLY GRADED SAND
⊠	B-7	48.5 - 50	NP	NP	NP	2.3	SP	POORLY GRADED SAND
◒	B-7	58.5 - 60	NP	NP	NP	1.3	SP	POORLY GRADED SAND

PLU Row 2W Frac Pond
4.5 miles Northwest from Intersection of Twin Wells Road and Buck Jackson Road | Eddy County, NM
Terracon Project No. A4245238

10400 State Highway 191
Midland, TX

Grain Size Distribution

ASTM D422 / ASTM C136 / AASHTO T27



Cobbles	Gravel		Sand			Silt or Clay
	coarse	fine	coarse	medium	fine	

Boring ID		Depth (Ft)	Description		LL	PL	PI	Cc	Cu
●	B-1	8.5 - 9.9	SILTY SAND		NP	NP	NP		
⊠	B-2	0 - 1.5	POORLY GRADED SAND with SILT		NP	NP	NP	0.82	2.62
▲	B-3	4 - 5.5	POORLY GRADED SAND with SILT		NP	NP	NP	0.82	2.75
★	B-3	8.5 - 10	POORLY GRADED SAND with SILT		NP	NP	NP	1.24	2.99
⊙	B-3	18.5 - 19.9	POORLY GRADED SAND with SILT		NP	NP	NP	0.80	2.98

Boring ID		Depth (Ft)	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Fines	%Silt	%Clay
●	B-1	8.5 - 9.9	9.5	0.21	0.09			1.3	75.0	23.5		
⊠	B-2	0 - 1.5	0.425	0.211	0.118	0.08			90.1	6.3		
▲	B-3	4 - 5.5	0.425	0.202	0.11				85.8	11.0		
★	B-3	8.5 - 10	4.75	0.275	0.177	0.092			93.0	6.4		
⊙	B-3	18.5 - 19.9	9.5	0.218	0.113			3.3	85.3	11.1		

PLU Row 2W Frac Pond
4.5 miles Northwest from Intersection of Twin Wells Road and Buck Jackson Road | Eddy County, NM
Terracon Project No. A4245238

10400 State Highway 191
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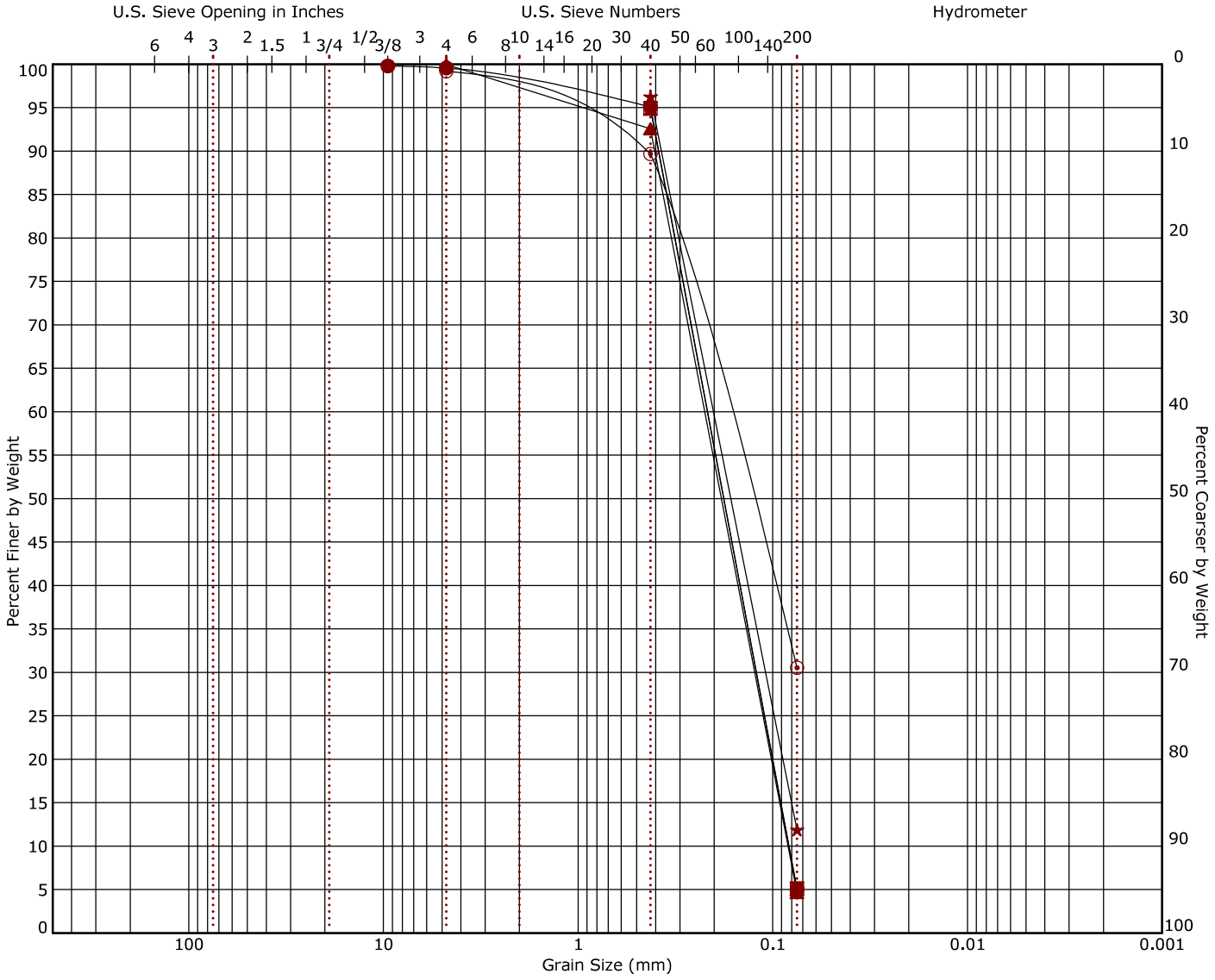
Grain Size Distribution

ASTM D422 / ASTM C136 / AASHTO T27



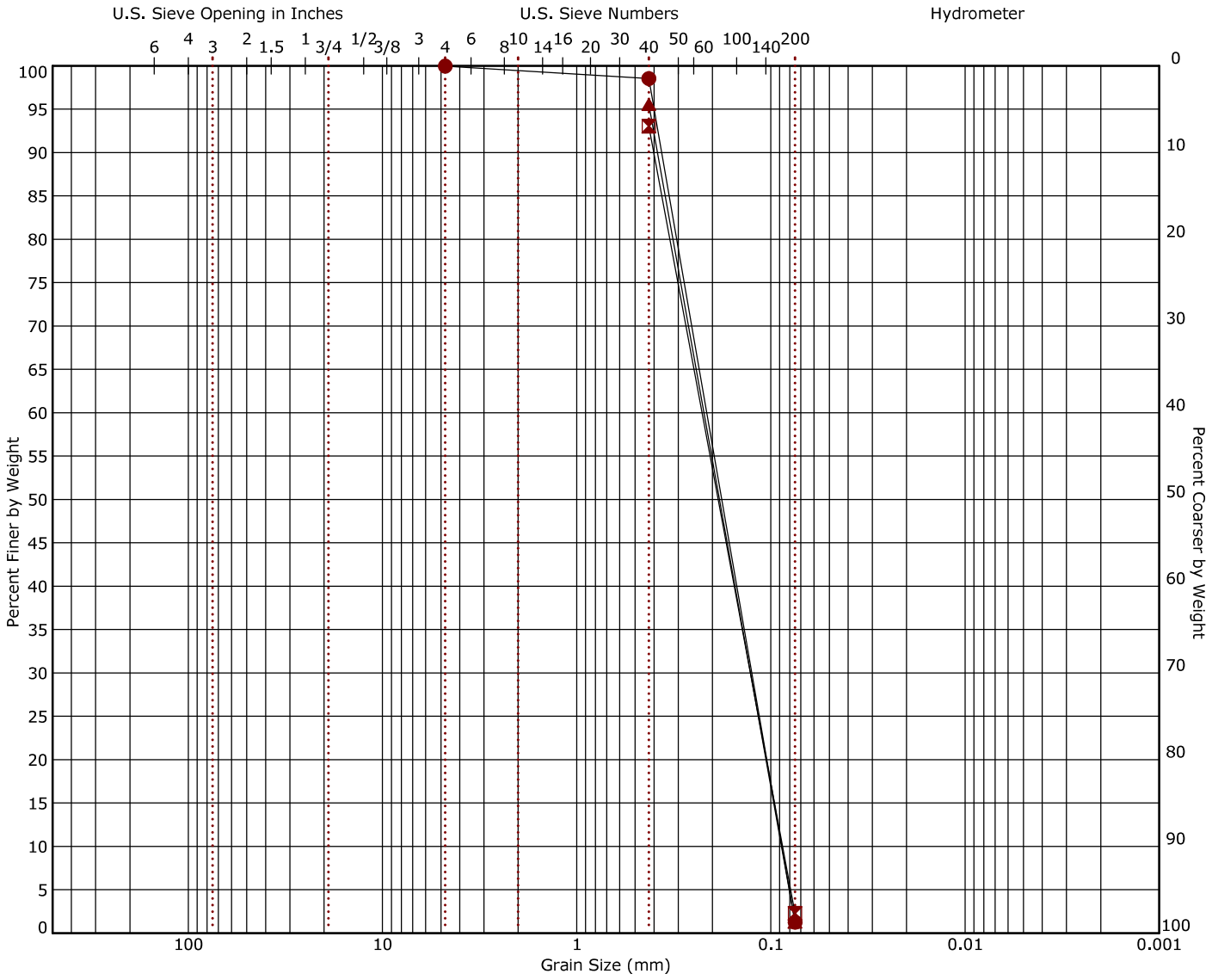
Cobbles	Gravel		Sand			Silt or Clay
	coarse	fine	coarse	medium	fine	

Boring ID		Depth (Ft)	Description		LL	PL	PI	Cc	Cu
●	B-3	38.5 - 39.3	POORLY GRADED SAND with SILT		NP	NP	NP	0.82	2.62
⊠	B-4	13.5 - 15	POORLY GRADED SAND with SILT		NP	NP	NP	0.82	2.63
▲	B-5	2 - 3.5	POORLY GRADED SAND		NP	NP	NP	0.82	2.68
★	B-6	6 - 7.5	POORLY GRADED SAND with SILT		NP	NP	NP	0.81	2.79
⊙	B-7	2 - 3.5	CLAYEY SAND		26	17	9		

Boring ID		Depth (Ft)	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Fines	%Silt	%Clay
●	B-3	38.5 - 39.3	9.5	0.216	0.121	0.083		0.2	94.5	5.0		
⊠	B-4	13.5 - 15	0.425	0.216	0.121	0.082			89.8	5.1		
▲	B-5	2 - 3.5	4.75	0.223	0.124	0.083			95.3	4.7		
★	B-6	6 - 7.5	0.425	0.202	0.109				84.4	11.9		
⊙	B-7	2 - 3.5	4.75	0.178					68.7	30.5		

Grain Size Distribution

ASTM D422 / ASTM C136 / AASHTO T27



Cobbles	Gravel		Sand			Silt or Clay
	coarse	fine	coarse	medium	fine	

	Boring ID	Depth (Ft)	Description		LL	PL	PI	Cc	Cu
●	B-7	28.5 - 30	POORLY GRADED SAND		NP	NP	NP	0.84	2.44
⊠	B-7	48.5 - 50	POORLY GRADED SAND		NP	NP	NP	0.83	2.60
▲	B-7	58.5 - 60	POORLY GRADED SAND		NP	NP	NP	0.83	2.51

	Boring ID	Depth (Ft)	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Fines	%Silt	%Clay
●	B-7	28.5 - 30	4.75	0.214	0.125	0.088			98.7	1.2		
⊠	B-7	48.5 - 50	0.425	0.226	0.127	0.087			90.8	2.3		
▲	B-7	58.5 - 60	0.425	0.221	0.127	0.088			94.3	1.3		

Supporting Information

Contents:

Note: All attachments are one page unless noted above.

4.5 miles Northwest from Intersection of Twin Wells Road and Buck Jackson Road | Eddy County, NM
Terracon Project No. A4245238

Terracon
10400 State Highway 191
Midland, TX

General Notes

Sampling	Water Level	Field Tests
☒ Standard Penetration Test	Water Initially Encountered Water Level After a Specified Period of Time Water Level After a Specified Period of Time Cave In Encountered Water levels indicated on the soil boring logs are the levels measured in the borehole at the times indicated. Groundwater level variations will occur over time. In low permeability soils, accurate determination of groundwater levels is not possible with short term water level observations.	N Standard Penetration Test Resistance (Blows/Ft.) (HP) Hand Penetrometer (T) Torvane (DCP) Dynamic Cone Penetrometer UC Unconfined Compressive Strength (PID) Photo-Ionization Detector (OVA) Organic Vapor Analyzer

Descriptive Soil Classification

Soil classification as noted on the soil boring logs is based Unified Soil Classification System. Where sufficient laboratory data exist to classify the soils consistent with ASTM D2487 "Classification of Soils for Engineering Purposes" this procedure is used. ASTM D2488 "Description and Identification of Soils (Visual-Manual Procedure)" is also used to classify the soils, particularly where insufficient laboratory data exist to classify the soils in accordance with ASTM D2487. In addition to USCS classification, coarse grained soils are classified on the basis of their in-place relative density, and fine-grained soils are classified on the basis of their consistency. See "Strength Terms" table below for details. The ASTM standards noted above are for reference to methodology in general. In some cases, variations to methods are applied as a result of local practice or professional judgment.

Location And Elevation Notes

Exploration point locations as shown on the Exploration Plan and as noted on the soil boring logs in the form of Latitude and Longitude are approximate. See Exploration and Testing Procedures in the report for the methods used to locate the exploration points for this project. Surface elevation data annotated with +/- indicates that no actual topographical survey was conducted to confirm the surface elevation. Instead, the surface elevation was approximately determined from topographic maps of the area.

Strength Terms

Relative Density of Coarse-Grained Soils (More than 50% retained on No. 200 sieve.) Density determined by Standard Penetration Resistance		Consistency of Fine-Grained Soils (50% or more passing the No. 200 sieve.) Consistency determined by laboratory shear strength testing, field visual-manual procedures or standard penetration resistance		
Relative Density	**Standard Penetration or N-Value (Blows/Ft.)**	**Consistency**	**Unconfined Compressive Strength Qu (tsf)**	**Standard Penetration or N-Value (Blows/Ft.)**
Very Loose	0 - 3	Very Soft	less than 0.25	0 - 1
Loose	4 - 9	Soft	0.25 to 0.50	2 - 4
Medium Dense	10 - 29	Medium Stiff	0.50 to 1.00	4 - 8
Dense	30 - 50	Stiff	1.00 to 2.00	8 - 15
Very Dense	> 50	Very Stiff	2.00 to 4.00	15 - 30
		Hard	> 4.00	> 30

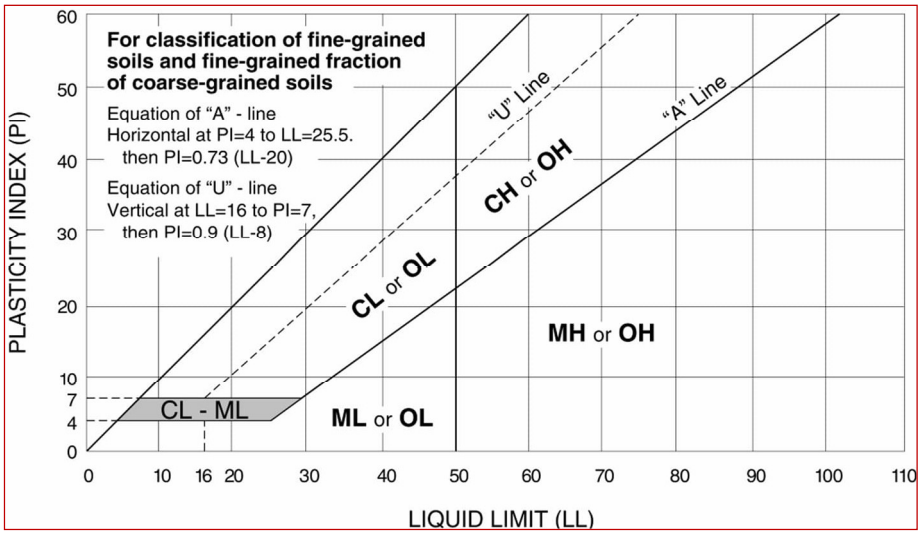
Relevance of Exploration and Laboratory Test Results

Exploration/field results and/or laboratory test data contained within this document are intended for application to the project as described in this document. Use of such exploration/field results and/or laboratory test data should not be used independently of this document.

Unified Soil Classification System

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests [A]				Soil Classification	
				Group Symbol	Group Name [B]
Coarse-Grained Soils: More than 50% retained on No. 4 sieve	**Gravels:** More than 50% of coarse fraction retained on No. 4 sieve	**Clean Gravels:** Less than 5% fines [C]	Cu≥4 and 1≤Cc≤3 [E]	GW	Well-graded gravel [F]
			Cu<4 and/or [Cc<1 or Cc>3.0] [E]	GP	Poorly graded gravel [F]
		Gravels with Fines: More than 12% fines [C]	Fines classify as ML or MH	GM	Silty gravel [F, G, H]
			Fines classify as CL or CH	GC	Clayey gravel [F, G, H]
	Sands: 50% or more of coarse fraction passes No. 4 sieve	**Clean Sands:** Less than 5% fines [D]	Cu≥6 and 1≤Cc≤3 [E]	SW	Well-graded sand [I]
			Cu<6 and/or [Cc<1 or Cc>3.0] [E]	SP	Poorly graded sand [I]
		Sands with Fines: More than 12% fines [D]	Fines classify as ML or MH	SM	Silty sand [G, H, I]
			Fines classify as CL or CH	SC	Clayey sand [G, H, I]
Fine-Grained Soils: 50% or more passes the No. 200 sieve	**Silts and Clays:** Liquid limit less than 50	**Inorganic:**	PI > 7 and plots above "A" line [J]	CL	Lean clay [K, L, M]
			PI < 4 or plots below "A" line [J]	ML	Silt [K, L, M]
		Organic:	$\frac{LL\ oven\ dried}{LL\ not\ dried} < 0.75$	OL	Organic clay [K, L, M, N]
					Organic silt [K, L, M, O]
	Silts and Clays: Liquid limit 50 or more	**Inorganic:**	PI plots on or above "A" line	CH	Fat clay [K, L, M]
			PI plots below "A" line	MH	Elastic silt [K, L, M]
		Organic:	$\frac{LL\ oven\ dried}{LL\ not\ dried} < 0.75$	OH	Organic clay [K, L, M, P]
					Organic silt [K, L, M, Q]
Highly organic soils:	Primarily organic matter, dark in color, and organic odor			PT	Peat

[A] Based on the material passing the 3-inch (75-mm) sieve.
[B] If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.
[C] Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.
[D] Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay.
[E] $Cu = D_{60}/D_{10}$ $Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}}$
[F] If soil contains ≥ 15% sand, add "with sand" to group name.
[G] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.
[H] If fines are organic, add "with organic fines" to group name.
[I] If soil contains ≥ 15% gravel, add "with gravel" to group name.
[J] If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.
[K] If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.
[L] If soil contains ≥ 30% plus No. 200 predominantly sand, add "sandy" to group name.
[M] If soil contains ≥ 30% plus No. 200, predominantly gravel, add "gravelly" to group name.
[N] PI ≥ 4 and plots on or above "A" line.
[O] PI < 4 or plots below "A" line.
[P] PI plots on or above "A" line.
[Q] PI plots below "A" line.



Appendix H – Operating and Maintenance Plan

The recycling Containment will be operated in such a manner to contain liquids and solids. The integrity of the liner and leak detection system will be monitored in such a manner to prevent contamination of fresh water and protect public health and the environment as described below. The purpose of the recycling Containment is to facilitate recycling of treated produced water from nearby oil and gas wells for new well completions. When treated produced water is not needed for well completion activity, produced water will be properly injected at one of XTO's or a third party's authorized saltwater disposal (SWD) facility or other approved produced water disposal method. The recycling Containment will not be used for disposal or storage of other oilfield wastes.

The recycling Containment and associated leak detection system will be inspected at least weekly by XTO field operations personnel while it contains any fluid, and the results of the inspection will be documented on an inspection checklist. The completed checklists will be retained and made available for review upon request. These inspections will address, at a minimum, the following:

- Removal of any visible layer of oil from the liquid surface;
- Verification that a minimum of 3 feet freeboard is maintained;
- If a liner breach is identified above the liquid surface, the liner will be repaired, or liner replacement will be initiated within 48 hours of detection. Alternatively, the NMOCD district office will be contacted within 48 hours to seek an extension for liner repair/replacement;
- If a liner breach is identified below the liquid surface, all liquid above the identified breach will be removed, the NMOCD district office will be notified, and liner repair/replacement shall be initiated within 48 hours of discovery;
- Visual inspection of berm integrity and condition to ensure the prevention of surface water run-on; and
- Determination that an oil boom is present and in proper condition to contain an unanticipated release.

The Containment will be equipped with permanent HDPE stingers (supported by sacrificial liner) for withdrawal of fluid during operation so that external discharge or suction lines do not penetrate the liner.

Treated produced water deposits into and withdrawals from the recycling Containment will be measured and documented to determine when the system has ceased operations (less than 20% of the total fluid capacity is used during each rolling six-month period following the initial withdrawal of produced water).

XTO will submit Form C-148 monthly to NMOCD within 30 days of the end of the calendar month listing:

- volumes of produced water received
- volumes of fresh or brackish water received; and
- total volume of water leaving the recycling Facility.

Upon cessation of operation, the NMOCD district office will be notified. XTO will submit to NMOCD a completed Form C-148 within 30 days following the end of each calendar month. Each submittal will certify that the recycling Containment has not ceased operation based on the 20% threshold described above.

Appendix I – Closure Plan

After operations cease (less than 20% of the total fluid capacity is used every six months following the initial withdrawal of produced water), all fluids will be removed within 60 days and the recycling Containment closed within six months.

All removed liquids, solids, and liner materials will be removed and transferred to an NMOCD approved disposal facility within the six-month period.

A five-point composite sample will be collected from beneath the Containment and tested for contamination. The composite sample will include stained or wet soil areas, if any, and analyzed for constituents listed in Table 1 of 19.15.34.14 NMAC.

- If any contaminant concentration exceeds the values listed in Table 1 (based on depth from bottom of Containment to groundwater), the NMOCD district office will be contacted requesting approval before proceeding with closure activity.
- If all contaminant concentrations are less than or equal to the values listed in Table 1, closure will proceed by backfilling with non-waste containing, uncontaminated, earthen material.

Within 60 days of completing closure, a Closure Report on NMOCD Form C-147, including required attachments, will be submitted to document all closure activities including sampling results and details of any backfilling, capping, or covering, where applicable. The Closure Report will certify that all information in the report and attachments is correct and that all applicable closure requirements and conditions specified in NMOCD rules and directives have been met.

The recycling Containment's location will be reclaimed to a safe and stable condition that blends with the surrounding undisturbed areas. Topsoil and subsoil will be replaced to their original relative positions and contoured to achieve erosion control, long-term stability, and preservation of surface water flow patterns.

The location will be reseeded in the first favorable growing season following closure with the goal of substantially restoring the impact surface location to the existing condition prior to construction of the recycling Containment. Surface reclamation will be deemed complete when: all ground surface disturbing activities have been completed; a uniform vegetative cover with a life-form ratio of plus or minus 50% of pre-disturbance levels has been established; and a total percent plant over of at least 70%, excluding noxious weeds, has been established.

Surface reclamation obligations imposed by the Bureau of Land Management will supersede these requirements, provided that these other requirements provide equal or greater protection of fresh water, human health, and the environment. NMOCD will be notified when reclamation and re-vegetation are complete.

www.ensolum.com

ENSOLUM

Sante Fe Main Office
Phone: (505) 476-3441

General Information
Phone: (505) 629-6116

Online Phone Directory
https://www.emnrd.nm.gov/ocd/contact-us

State of New Mexico
Energy, Minerals and Natural Resources
Oil Conservation Division
1220 S. St Francis Dr.
Santa Fe, NM 87505

CONDITIONS

Operator:	OGRID:
XTO PERMIAN OPERATING LLC. 6401 HOLIDAY HILL ROAD MIDLAND, TX 79707	373075
	Action Number: 446162
	Action Type: [C-147] Water Recycle Long (C-147L)

CONDITIONS

Created By	Condition	Condition Date
vvenegas	• [373075] XTO PERMIAN OPERATING LLC shall construct, operate, maintain, close, and reclaim the 2RF-219 - PLU ROW 2 WEST FRAC POND [fVV2507951055] in compliance with 19.15.34 NMAC. 2RF-219 - PLU ROW 2 WEST FRAC POND [fVV2507951055] permit expires on 03/27/2030. If [373075] XTO PERMIAN OPERATING LLC, wishes to extend operations past five years, an annual permit extension request must be submitted using Form C-147 through OCD Permitting by 02/27/2030. • [373075] XTO PERMIAN OPERATING LLC shall comply with 19.15.29 NMAC Releases in the event of any release of produced water or other oil field wastes at 2RF-219 - PLU ROW 2 WEST FRAC POND [fVV2507951055].	3/28/2025