BOPCO, LP

C-147 REGISTRATION PACKAGE

PLU NORTH RECYCLING CONTAINMENT FACILITY
SECTION 6, TOWNSHIP 24 SOUTH, RANGE 30 EAST

EDDY COUNTY, NM

PLU North Recycling Containment Facility

PREPARED FOR

BOPCO, LP

AUGUST 10, 2017

11490 WESTHEIMER, ROAD, SUITE 700
HOUSTON, TEXAS 77077

TBPE Firm Registration No. F-3043

CDM Smith

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Part 1
Introduction

BOPCO, LP (BOPCO) is requesting registration under NMAC 19.15.34 for the following recycling containment and recycling facility in the development area on a tract of land of located in Section 6, Township 24 South, Range 30 East, in Eddy County, New Mexico.

The proposed recycling facility will be solely for recycling of fluids used for completing wells owned and operated by BOPCO. The recycling containment ponds will cover an area of 29 acres and will consist of two double lined containment ponds with leak detection that will each hold approximately 500,000 barrels. The facility is expected to be in use for at least 5 years.

Appendix A contains a survey plat identifying the location of the proposed recycling containment and the recycling facility. Both the recycling containment and the recycling facility will be located on the same tract of land.

Compliance with the requirements of NMAC 19.15.34 are described in the application. BOPCO 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 found in **Part 2** has been submitted to the Bureau of Land Management, which is the surface owner, as required under 19.15.34.10.A.

Part 2

NMOCD Form C-147

District I
1625 N. French Dr., Hobbs, NM 88240
District II
811 S. First St., Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

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

Form C-147
Revised April 3, 2017

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: BOPCO, L.P_____(For multiple operators attach page with information) OGRID #: 260737_____

Address: P.O. Box 2760 Midland, Texas 79702_____

Facility or well name (include API# if associated with a well): PLU North Recycling Facility_____

OCD Permit Number: _____(For new facilities the permit number will be assigned by the district office)

U/L or Qtr/Qtr _H/I_____ Section 6_____ 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 _____ Longitude _____ 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 _ 32.246083° _ Longitude ___ -103.832971° _____ NAD83

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

☒ Lined ☐ Liner type: Thickness 40mil LLDPE / 60mil HDPE ☒ LLDPE ☒ HDPE ☐ PVC ☐ Other _____

☐ String-Reinforced

Liner Seams: ☒ Welded ☐ Factory ☐ Other _____ Volume: 1,000,000bbl Dimensions: L 910' x W 550' x D 14'

☐ 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 w/3 strands barbed wire

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. – See Attachment

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): Stephanie Rabadue Title: Regulatory Analyst

Signature: Stephanie Rabadue Date: 08/11/2017

e-mail address: stephanie_rabadue@xtoenergy.com Telephone: 432-620-6714

11.

OCD Representative Signature: _____ **Approval Date:** _____

Title: _____ **OCD Permit Number:** _____

☐ OCD Conditions _____

☐ Additional OCD Conditions on Attachment

Part 3
Variance Requests

The following paragraphs describe the variances that have been requested.

3.1 Liner

BOPCO is requesting a variance to rule 34 Part 12(A)(4) requiring the secondary (lower) liners to be 30-mil string reinforced LLDPE or equivalent with a hydraulic conductivity no greater than $1x10^{-9}$ cm/sec. BOPCO is requesting approval to use 40 mil HDPE in place of the specified material. The proposed 40 mil HDPE is appropriate material for the proposed use of the containment and is compatible with the water that will be stored. This material will provide equal or better environmental protections 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: prepare 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 on Sheet C-6 in **Appendix G.**

3.2 Fencing

The recycling containment will be constructed with an eight (8) foot high game fence with three (3) strands of barbed wire on top to deter wildlife and human access. This is a variance from the required four (4) foot fence with at least four (4) stands of barbed wire evenly spaced in the intervals between one (1) foot and four (4) foot above ground level and provides equivalent or greater wildlife and human deterrence. The fence will be gated to provide access to BOPCO personnel and will be closed and locked when access in not required.

3.3 Netting and Wildlife Protection

The game fence, as described above, surrounding the recycling containment and recycling facility will be effective in excluding terrestrial wildlife. BOPCO, is proposing to install an audible avian deterrence system in lieu of installing netting. BOPCO 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.

Part 4

Siting Requirements

4.1 Distance to Groundwater

This section describes the hydrology and geology surrounding the BOPCO PLU North recycling containment and recycling facility. **Figure 1-1** shows the location of the proposed BOPCO recycling containment and recycling facility. **Figure 1-2** is a 7.5-minute USGS topographic map that shows the surface elevations at the site and surrounding area.

The New Mexico Oil and Gas Division (NMOCD) requires that groundwater (freshwater as defined by NMOCD rules) at the location be greater than 50-feet below the containment bottom. **Figure 2-1** and the discussion below demonstrates that depth to groundwater at the proposed location is greater than 75 feet beneath the bottom of the recycling containment and the recycling facility. **Figure 1-3** is a geologic map from the U.S. Geological Survey, Mineral Resources Program of geologic units and structural features in the general location of the proposed recycling containment and the recycling facility. **Figure 2-2** shows the proposed recycling containment and the recycling facility location is not located within a mapped major aquifer system. Major aquifers in the area include the Edwards-Trinity, Roswell Basin, Pecos River Basin Alluvial, and High Plains Aquifer. Available groundwater within the area of the proposed recycling containment and the recycling facility is noted to be within the Carlsbad Basin, by the New Mexico OSE. The Carlsbad Basin contains two major water-bearing features including shallower alluvial aquifer systems and a deeper "artesian" carbonate system. Water-bearing zones include the Triassic age Chinle Formation, of which the Santa Rosa Sandstone is the basal unit.

A geological map for the vicinity of the site 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 (Figure 1-3). Based on the review of the geologic map, the recycling containment and the recycling facility location lies within the Eolian and Piedmont deposits (Qep). These deposits consist of interlayed eolian sands and piedmont-slope deposits.

On June 20, 2017, site-specific geotechnical borings were conducted to a depth of 75 feet with no detected or observed groundwater presence and the boreholes remained dry for a period of at least 24 hours following drilling. The test boring logs may be found in Figure 2-1.

4.2 Distance to Surface Water

Figure 2-2 demonstrates that the site 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 2-2 shows that there are no continuously flowing watercourses or other water bodies defined by NMOCD rules. The closest surface water bodies are the Pecos River, located approximately 5 miles southwest and Salt Lake, which is located approximately 3 miles northwest of the proposed recycling containment and recycling facility location.

4.3 Distance to Permanent Residences, Institutions, or Structures

Figure 2-3 demonstrates the site 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 nearest structures to the site location appear to be pump jacks and oil field tank batteries. The Harroun School and Tempe Costa Church are approximately 7 miles west of the proposed recycling containment and recycling facility location.

4.4 Distance to Non-Public Water Supply

The site 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 site is not located within 1,000-feet of any other fresh water well or spring, as documented at the time of this application. **Figure 2-4** shows the location of area water wells, active or plugged, relative to the proposed site location. There are no known domestic water wells located within 1,000-feet of the proposed site location. The nearest fresh water well listed in the is C-02108 which is located approximately 1 mile south of the site according to the NMOSE/ISC database accessed on June 12, 2017. No springs were identified within the mapping area.

4.5 Distance to Municipal Boundaries and Freshwater Fields

Figure 2-5 demonstrates that the location is not located within incorporated municipal boundaries or within a defined municipal fresh water field covered under a municipal ordinance adopted pursuant to NMSA 1978, Section 3-27-3. The closest municipality to the site is Malaga, New Mexico located approximately 9 miles east of the site. In addition, the municipalities of Loving, NM is located approximately 12 miles northwest of the site, and Carlsbad, NM located approximately 20 miles southeast of the site. The closest municipal well field is located approximately 30 miles west (Sheeps Draw well field) and 44 miles north (Double Eagle well field) both 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 site. **Figure 2-6** demonstrates the site is not located within 100 feet of a mapped wetland. The nearest designated wetland to the site is riverine with a wetland code "R4SBC" (Riverine, Intermittent, Streambed, Seasonally Flooded). The mapped wetland is located approximately 2,000 feet northeast of the site.

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 2-7**). The only identified facilities in the general vicinity are salt mines..

4.8 Distance to High or Critical Karst Areas (Unstable Areas)

The recycling containment and the recycling facility are located within a BLM-identified medium potential karst zone. **Figure 2-8** shows BLM inventory data of existing cave/karst features, and results of site-specific geotechnical studies as detailed in **Appendix I** verifies that the recycling containment and the recycling facility are not located within an unstable area.

4.9 Distance to 100-Year Floodplain

The Federal Emergency Management Agency (FEMA) Flood Insurance maps were reviewed for the location of the site. The site is located on FEMA map panel number 35015C1625D, which was noted as "Printed Flood Map Boundary." **Figure 2-9** demonstrates the area of the site is not located within a 100-year Floodplain. **Figure 2-9a** shows the FEMA (Flood Insurance Rate Map) FIRM panels associated with the site and that the site is located within "Zone X." Zone X is described as areas determined to be outside the 0.2% annual chance floodplain.

Appendix A
Design and Construction Plan

General Specifications

Appendix A 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 H** contains the construction specifications to accompany the design drawings and details. These design drawings and specifications meet or exceed the NMOCD requirements for recycling containments. **Appendix I** contains the geotechnical engineering testing results for the recycling containment site.

This plan addresses 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 three (3) foot freeboard as the 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 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 with 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 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 that a person can easily read the sign. The sigh will include:

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

Fencing

The recycling containment will be constructed with an eight (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. BOPCO, is proposing to install an audible avian deterrence system in lieu of installing netting. BOPCO 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 B
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 BOPCO's or a third party's authorized SWDs. The recycling containment will not be used for disposal of produced water or other oilfield wastes.

The recycling containment and associated leak detection system will be inspected at least weekly by BOPCO 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 three (3) foot 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 and 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 absorbent boom is present and in proper condition to contain an unanticipated release.

The containment will be equipped with permanent HDPE stingers (supported by a sacrificial liner) for withdrawal of fluid during operations 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.

BOPCO 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. BOPCO 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 C
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 I of 19.15.34.14 NMAC.

- If any contaminant concentration exceeds the values listed in Table I (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 I, 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, were 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 locations 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 or New Mexico State Trust Land on lands managed by those agencies 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.

Appendix D

Financial Assurance Requirement

BOPCO 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 BOPCO. Therefore, no additional financial assurance associated with the recycling containment is required.

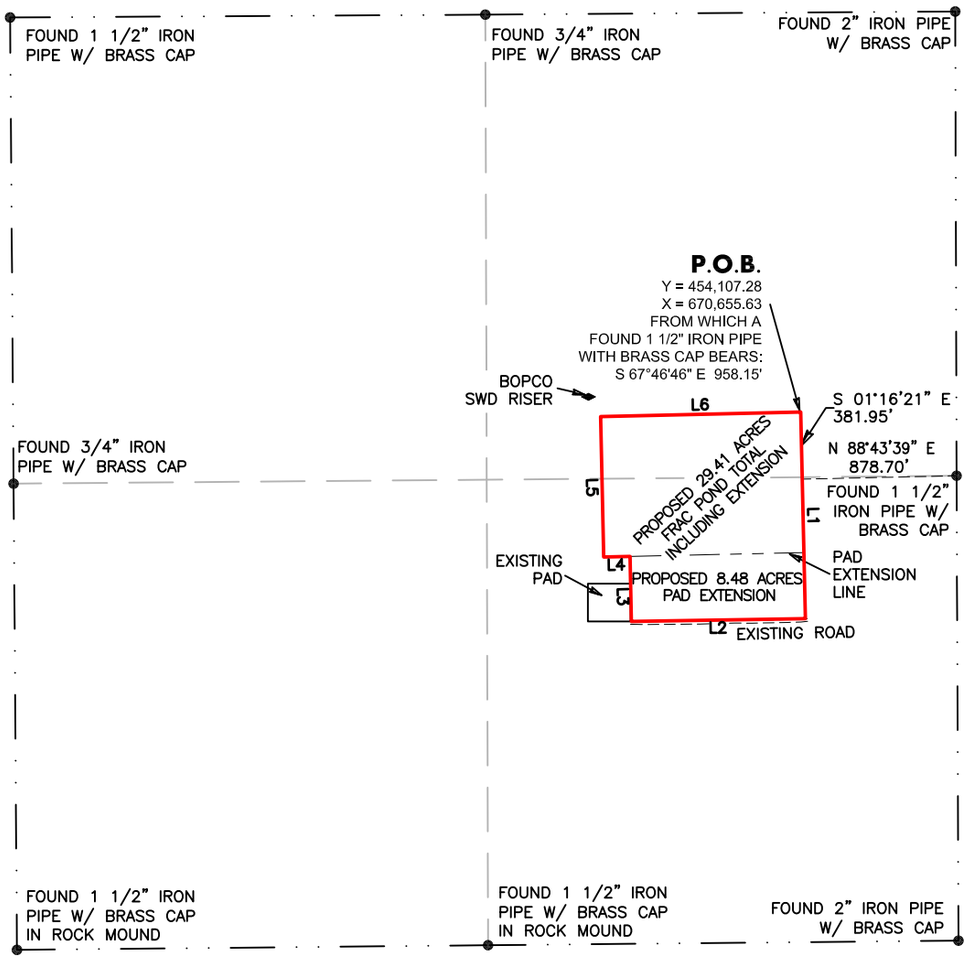
Appendix E

Survey Information

0 500' 1000'
1" = 1000 FEET

SECTION 6

TOWNSHIP 24 SOUTH, RANGE 30 EAST
NEW MEXICO PRIME MERIDIAN



LINE	BEARING	DISTANCE
L1	S 01°16'21" E	1175.85'
L2	S 89°03'23" W	990.08'
L3	N 01°15'36" W	370.48'
L4	S 88°45'08" W	149.80'
L5	N 01°16'44" W	799.58'
L6	N 88°43'32" E	1139.88'

GENERAL NOTES

1. COORDINATES SHOWN ARE BASED ON THE NEW MEXICO STATE PLANE COORDINATE SYSTEM OF NAD 83 (HPGN), NEW MEXICO, EAST ZONE.
2. VERTICAL DATUM IS NAVD 88.
3. LATITUDE AND LONGITUDE ARE WGS84 AS SHOWN.
4. AREA AND COORDINATES ARE "GRID" AND DISTANCES ARE OF SURFACE VALUE.
5. UNITS ARE UNITED STATES SURVEY FOOT.

LEGEND

- EXISTING PAD
- PROPOSED FRAC POND
- SECTION LINE
- EXISTING ROAD
- P.O.B. — POINT OF BEGINNING
- EXISTING PIPELINE RISER

LEGAL DESCRIPTION

A TRACT OF LAND LOCATED IN SECTION 6, TOWNSHIP 24 SOUTH, RANGE 30 EAST, N.M.P.M., EDDY COUNTY, NEW MEXICO AND BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT WHICH LIES S 01°16'21" E, 381.95 FEET AND N 88°43'39" E 878.70 FEET FROM A POINT ON THE EAST QUARTER CORNER OF SAID SECTION 6; THENCE S 01°16'21" E, A DISTANCE OF 1,175.85 FEET; THENCE S 89°03'23" W, A DISTANCE OF 990.08 FEET; THENCE N 01°15'36" W, A DISTANCE OF 370.48 FEET; THENCE S 88°45'08" W, A DISTANCE OF 149.80 FEET; THENCE OF N 01°16'44" W, A DISTANCE OF 799.58 FEET; THENCE OF N 88°43'32" E, A DISTANCE OF 1,139.88 FEET TO THE POINT OF BEGINNING. SAID TRACT OF LAND CONTAINING 29.41 ACRES, MORE OR LESS.

I HEREBY STATE THAT THIS PLAT SHOWS THE SUBJECT SURFACE LOCATION AS STAKED ON THE GROUND.

PRELIMINARY, THIS DOCUMENT SHALL NOT BE RECORDED FOR ANY PURPOSE AND SHALL NOT BE USED OR VIEWED OR RELIED UPON AS A FINAL SURVEY DOCUMENT

MARK DILLON HARP
REGISTERED PROFESSIONAL LAND SURVEYOR
STATE OF TEXAS NO. 6445

FSC INC
SURVEYORS+ENGINEERS
550 Bailey Ave., 205 - Fort Worth, TX 76107
Ph: 817.349.9800 - Fax: 979.732.5271
TBPE Firm 17957 | TBPLS Firm 10193887
www.fscinc.net

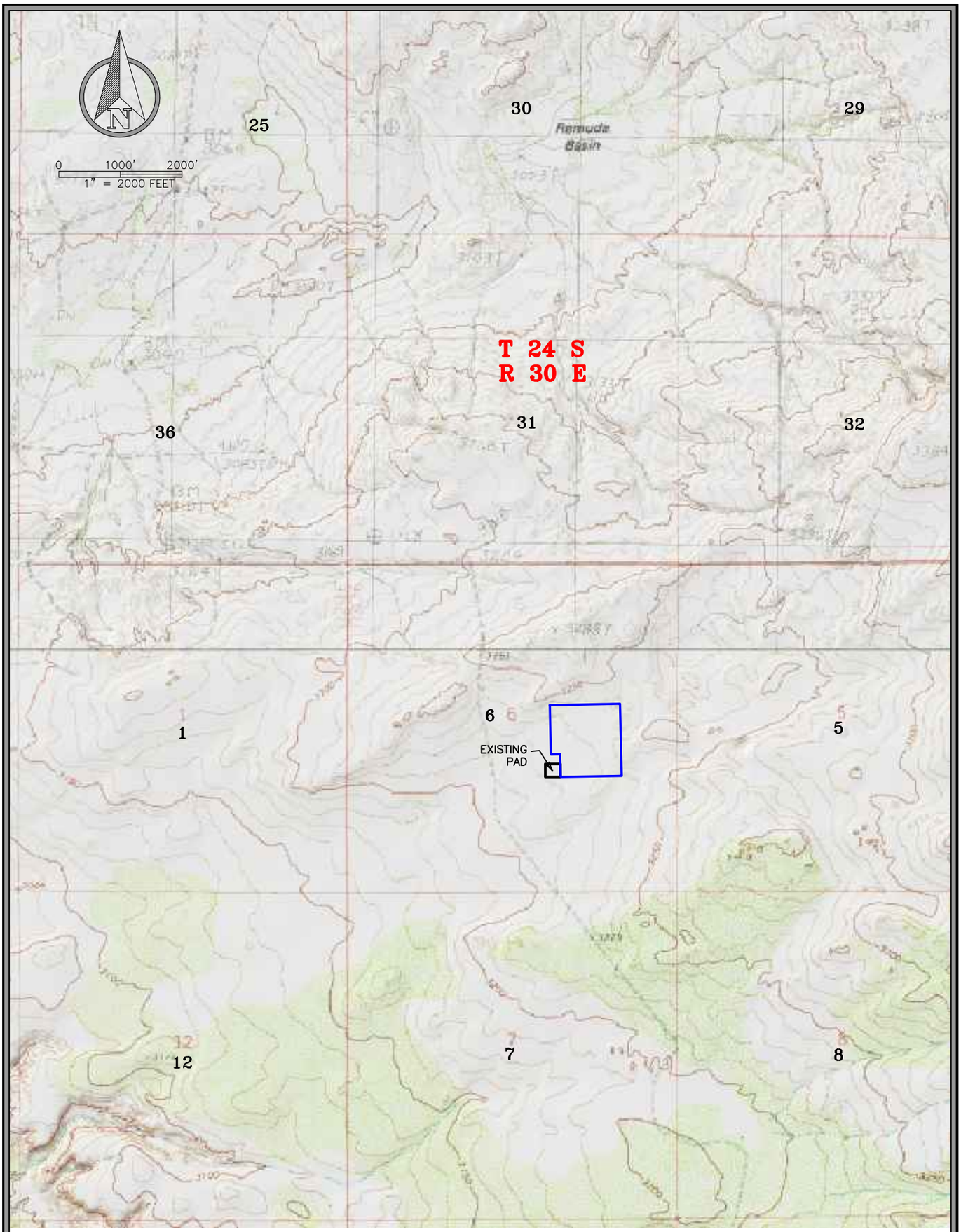
PROPOSED FRAC POND FOR:

XTO ENERGY INC.

POKER LAKE UNIT NORTH FRAC POND

SITUATED IN SECTION 6, TOWNSHIP 24 SOUTH, RANGE 30 EAST, N.M.P.M., AND BEING LOCATED APPROXIMATELY 9.8 MILES SOUTHEAST OF LOVING, IN EDDY COUNTY, NEW MEXICO.

DATE:	5-3-2017
DRAWN BY:	JAR
CHECKED BY:	DH
FIELD CREW:	RE
PROJECT NO:	2017040558
SCALE:	1" = 1000'
SHEET:	1 OF 1
REVISION:	NO



LEGEND

PROPOSED FRAC POND

EXISTING PAD

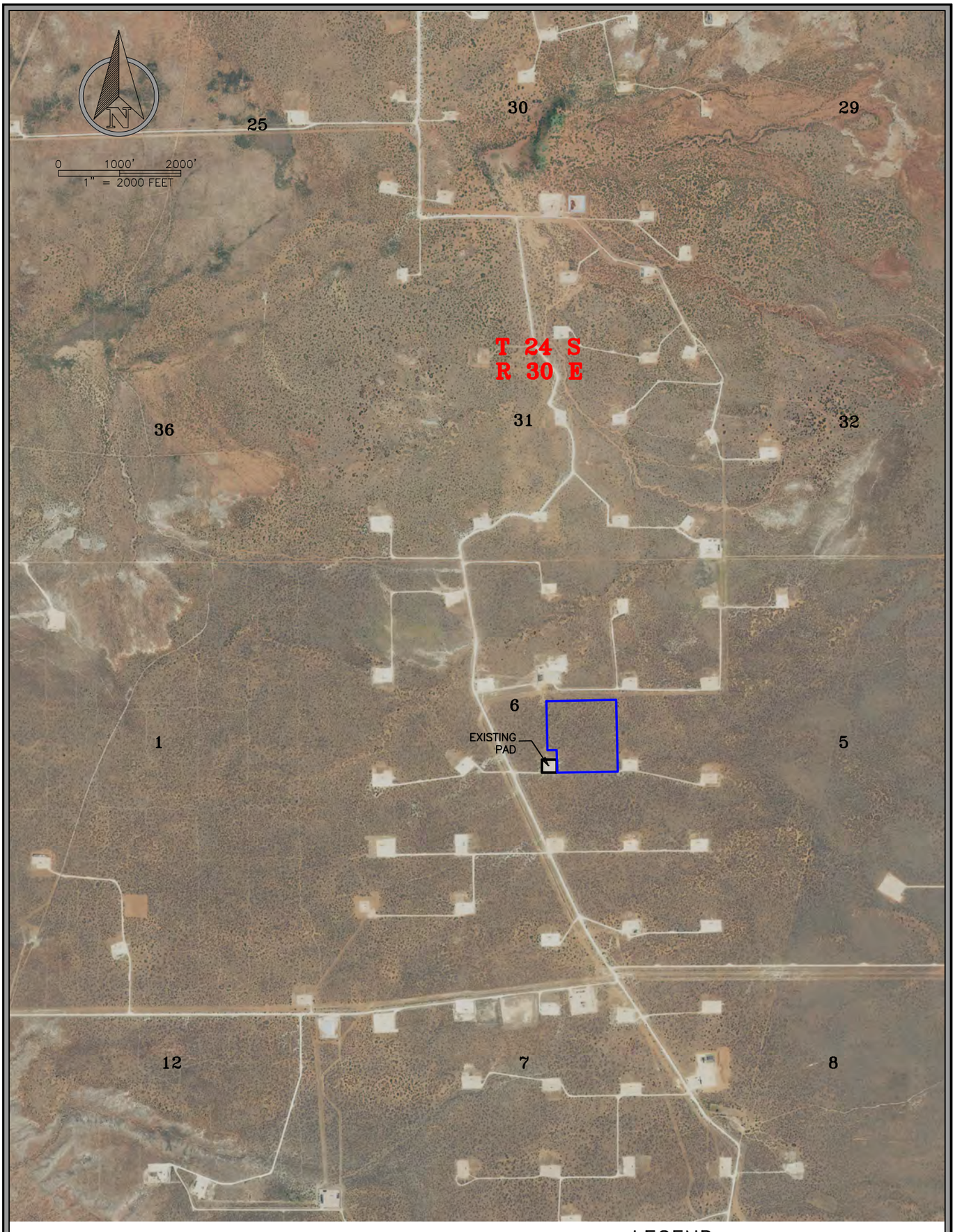
PROPOSED FRAC POND FOR:

XTO ENERGY INC.

SECTION 6, TOWNSHIP 24 SOUTH, RANGE 30 EAST, N.M.P.M., EDDY COUNTY, NEW MEXICO.

FSC INC
SURVEYORS+ENGINEERS
550 Bailey Ave., 205 - Fort Worth, TX 76107
Ph: 817.349.9800 - Fax: 979.732.5271
TBPE Firm 17957 | TBPLS Firm 10193887
www.fscinc.net

DATE:	5-3-2017
DRAWN BY:	JAR
CHECKED BY:	DH
FIELD CREW:	RE
PROJECT NO:	2017040558
SCALE:	1" = 2000'
SHEET:	1 OF 1
REVISION:	NO



LEGEND

PROPOSED FRAC POND

EXISTING PAD

PROPOSED FRAC POND FOR:

XTO ENERGY INC.

SECTION 6, TOWNSHIP 24 SOUTH, RANGE 30 EAST, N.M.P.M., EDDY COUNTY, NEW MEXICO.

FSC INC
SURVEYORS+ENGINEERS
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DATE:	5-3-2017
DRAWN BY:	JAR
CHECKED BY:	DH
FIELD CREW:	RE
PROJECT NO:	2017040558
SCALE:	1" = 2000'
SHEET:	1 OF 1
REVISION:	NO

Appendix F

Figures

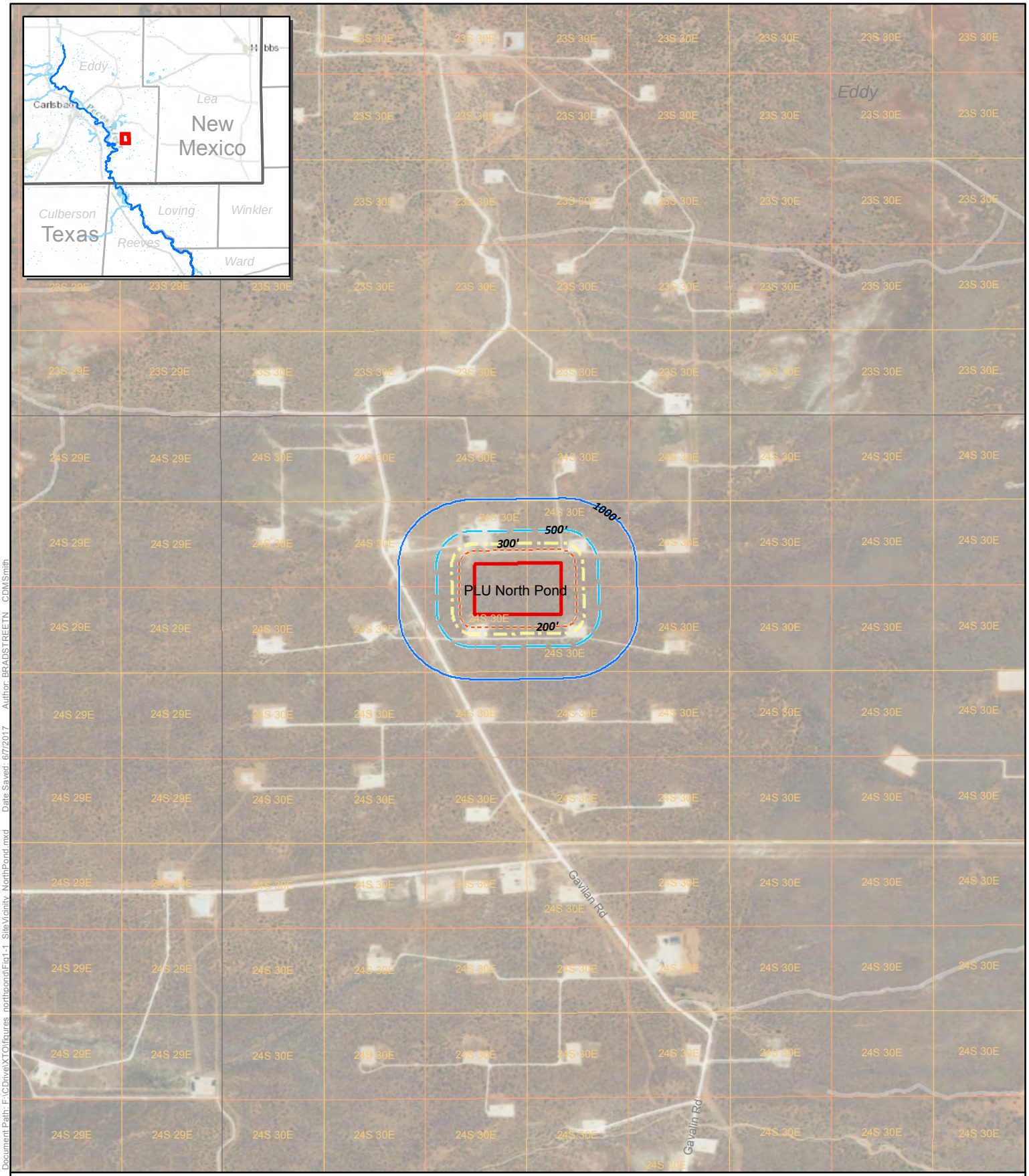

Figure 1-1 Site Vicinity Map

BOPCO Proposed North Pond Recycling Containment Location

N

0 1,000 2,000 4,000 ft

200'

300'

500'

1,000'

Proposed Facility Boundary

CDM Smith

Service Layer Credits: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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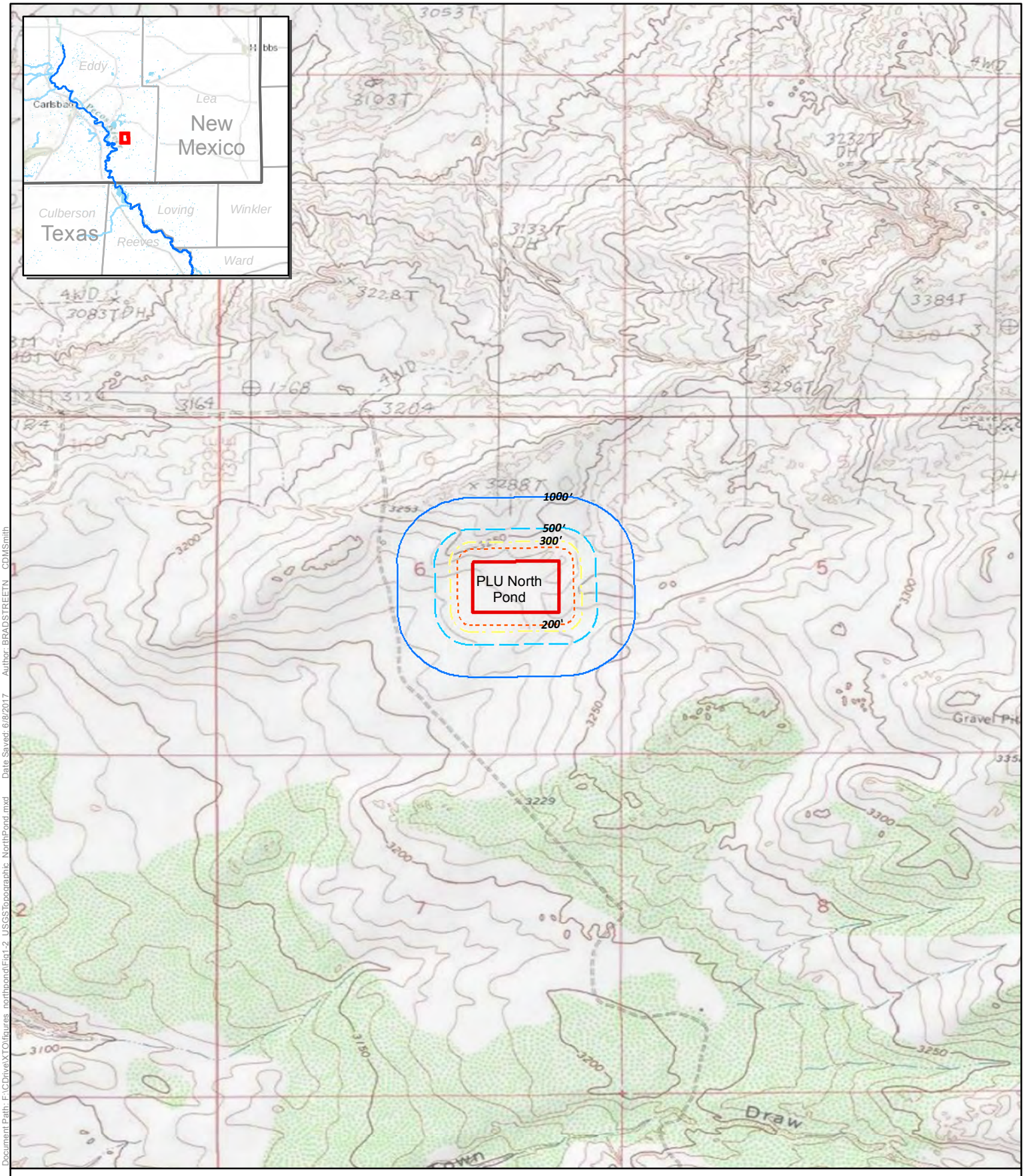

Figure 1-2 USGS 7.5 MinuteTopographic Map
BOPCO Proposed North Pond Recycling Containment Location

N

0 1,000 2,000 4,000 ft

200'
300'
500'
1,000'

Proposed Facility Boundary

CDM Smith

Document Path: F:\CDrive\XTO\figures_northpond\Fig1-2_USGSTopographic_NorthPond.mxd Date Saved: 6/8/2017 Author: BRADSTREETN_CDMSmith

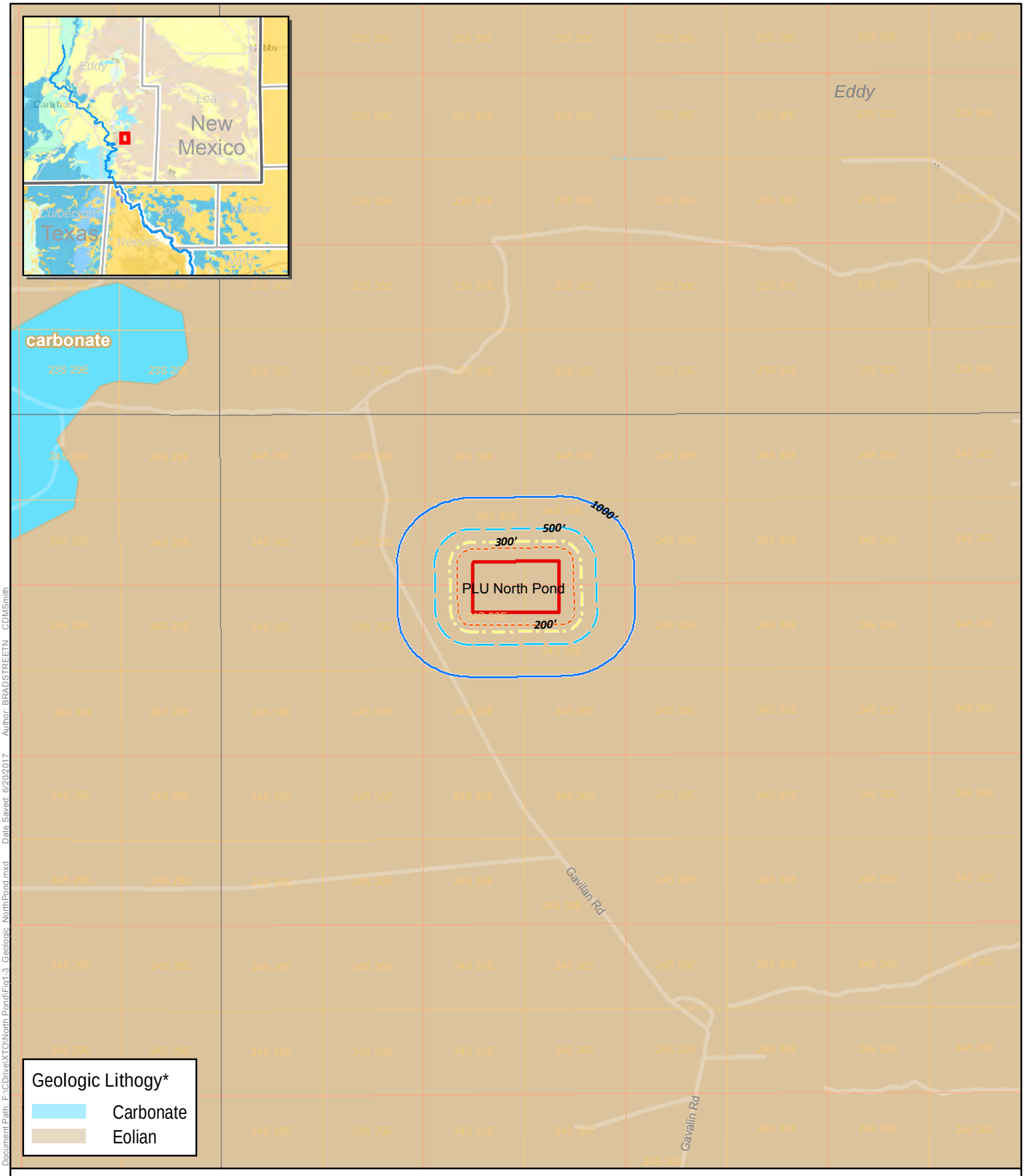

Figure 1-3 USGS Geologic Map
BOPCO Proposed North Pond Recycling Containment Location

Source: *U.S. Geological Survey, Mineral Resources Program

CDM Smith

Service Layer Credits: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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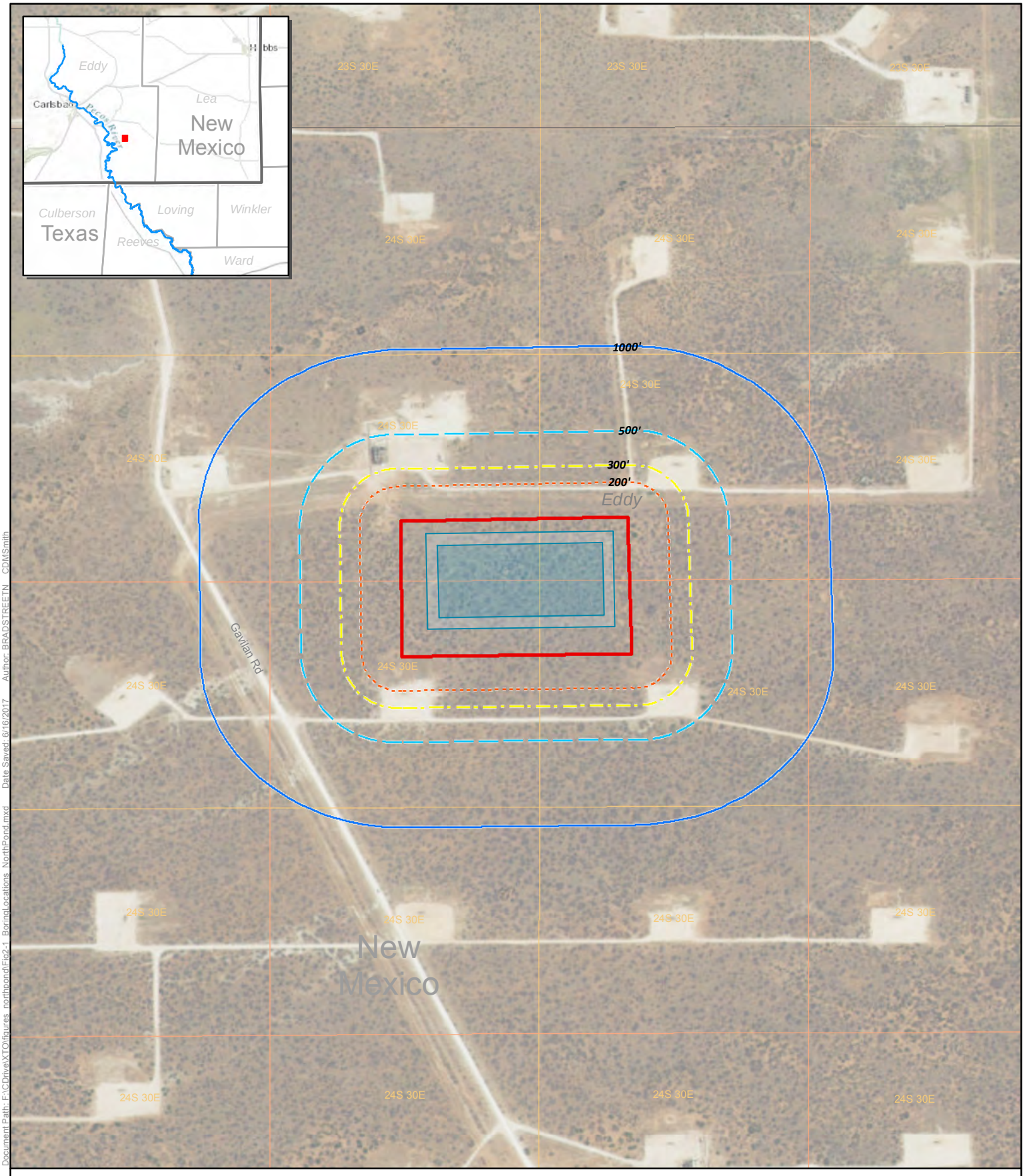

Figure 2-1 Boring Log Map

BOPCO Proposed North Pond Recycling Containment Location

N

0 375 750 1,500 ft

200'
300'
500'
1,000'

Pond

Proposed Facility Boundary

CDM Smith

Service Layer Credits: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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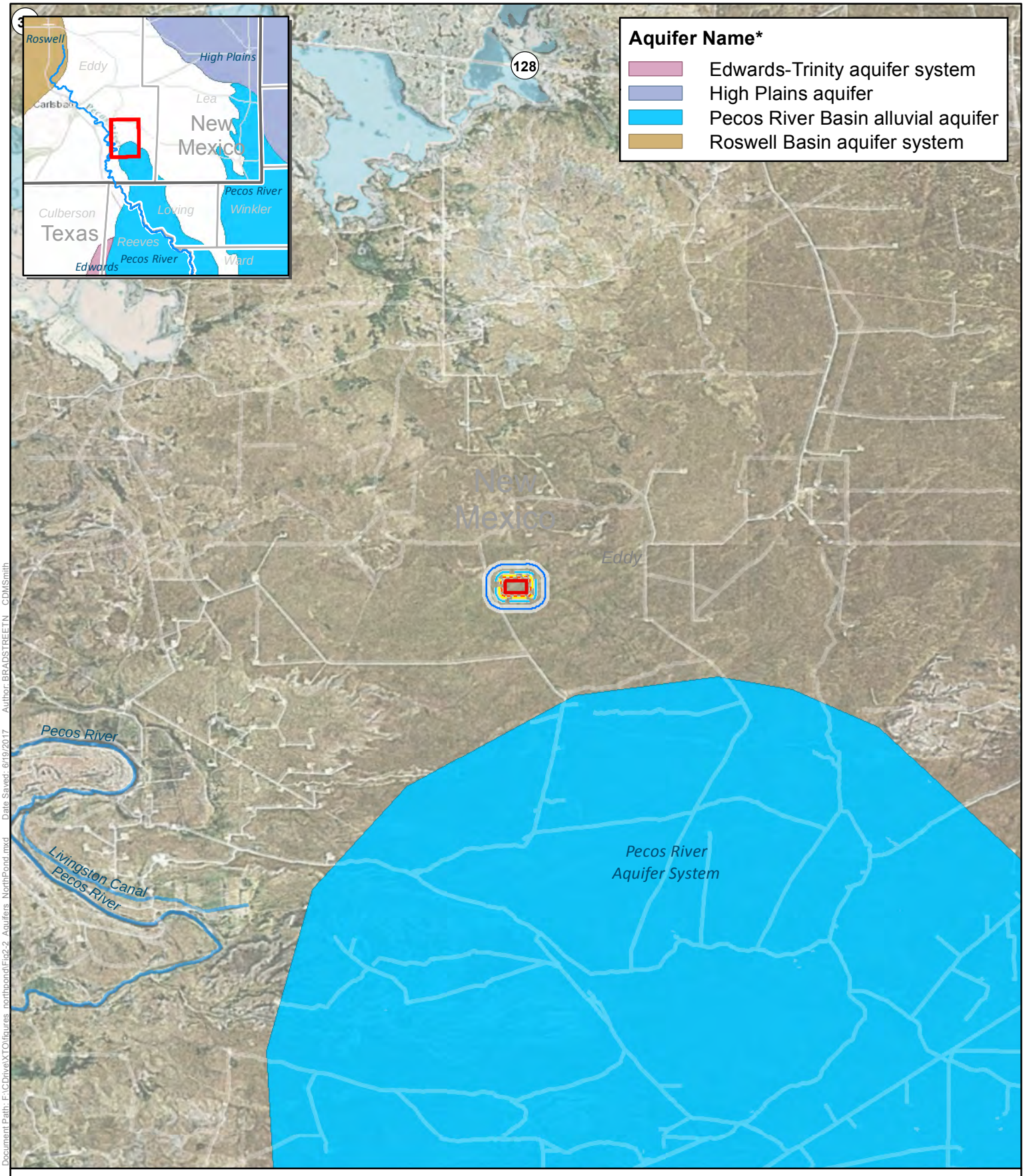

Figure 2-2 Aquifer Map
XTO Proposed North Pond Recycling Containment Location

N

0 4,000 8,000 16,000 ft

200'
300'
500'
1,000'

Proposed Facility Boundary

Source: *Water Resources of the United States, U.S. Geological Survey

CDM Smith

Service Layer Credits: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
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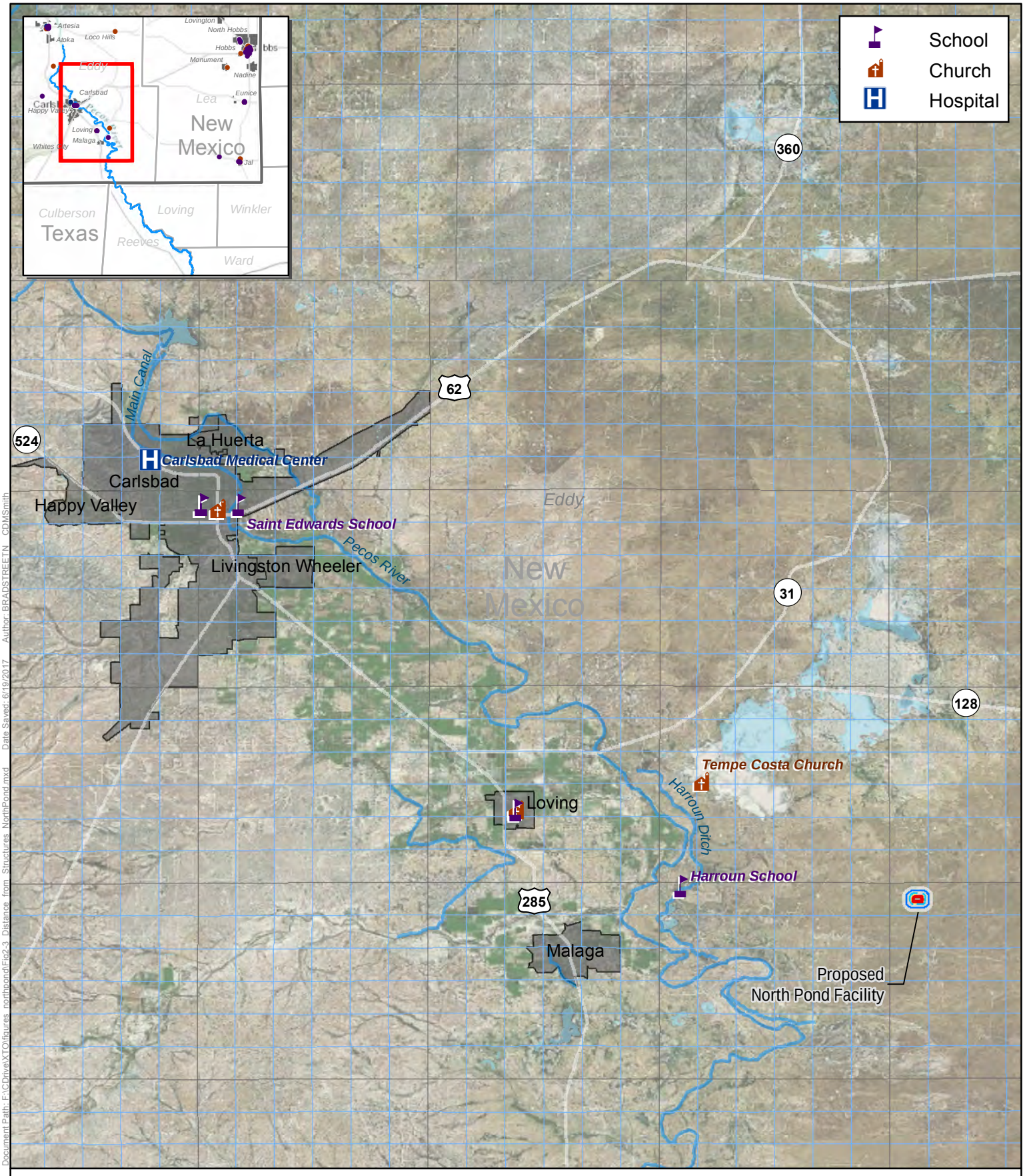

Figure 2-3 Distance from Structures Map
BOPCO Proposed North Pond Recycling Containment Location

N

0 2 4 8 mi

200'
300'
500'
1,000'

Proposed Facility Boundary
US Census Designated Place*

Source: *U.S. Census Bureau

CDM Smith

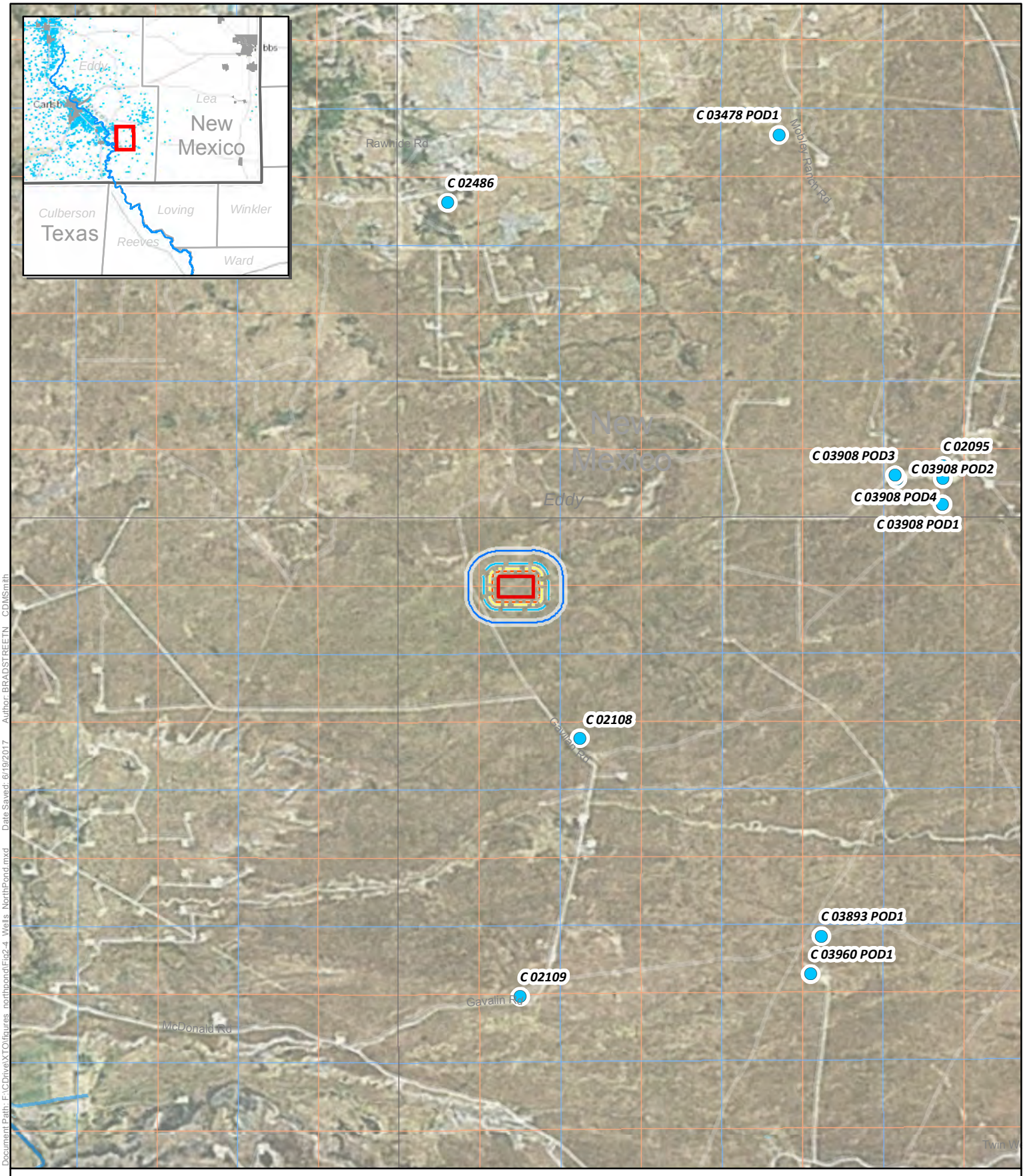

Figure 2-4 Distance from Wells Map
BOPCO Proposed North Pond Recycling Containment Location

N

0 2,500 5,000 10,000 ft

Well*

Proposed Facility Boundary

200'
300'
500'
1,000'

Source: *New Mexico Office of the State Engineer

CDM Smith

Service Layer Credits: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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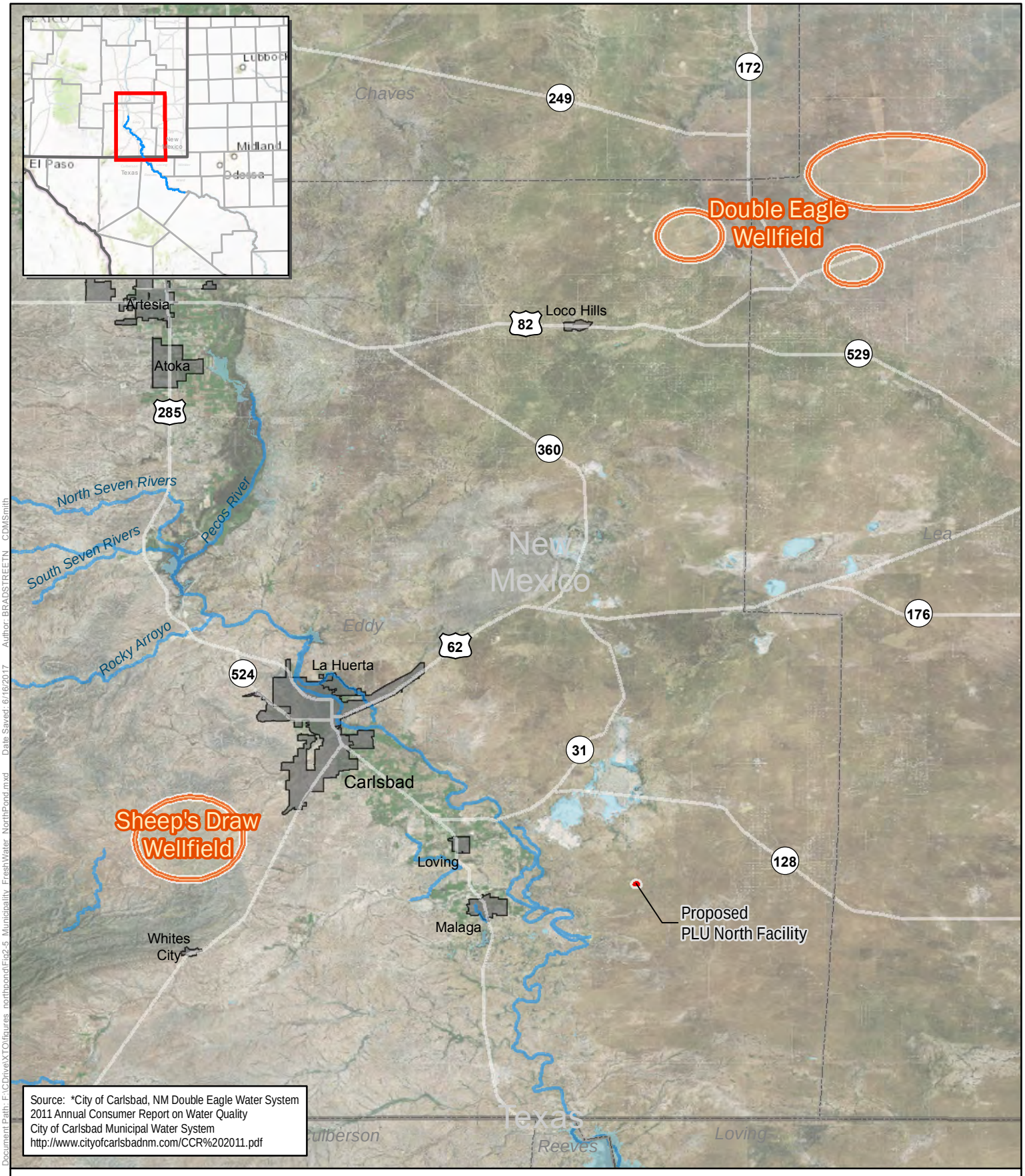

Source: *City of Carlsbad, NM Double Eagle Water System 2011 Annual Consumer Report on Water Quality
City of Carlsbad Municipal Water System
http://www.cityofcarlsbadnm.com/CCR%202011.pdf

Figure 2-5 Distance from Municipalities and Freshwater Fields Map
BOPCO Proposed North Pond Recycling Containment Location

N

0 4.5 9 18 mi

Proposed Facility Boundary
Freshwater Field*
US Census Designated Place

CDM Smith

Service Layer Credits: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
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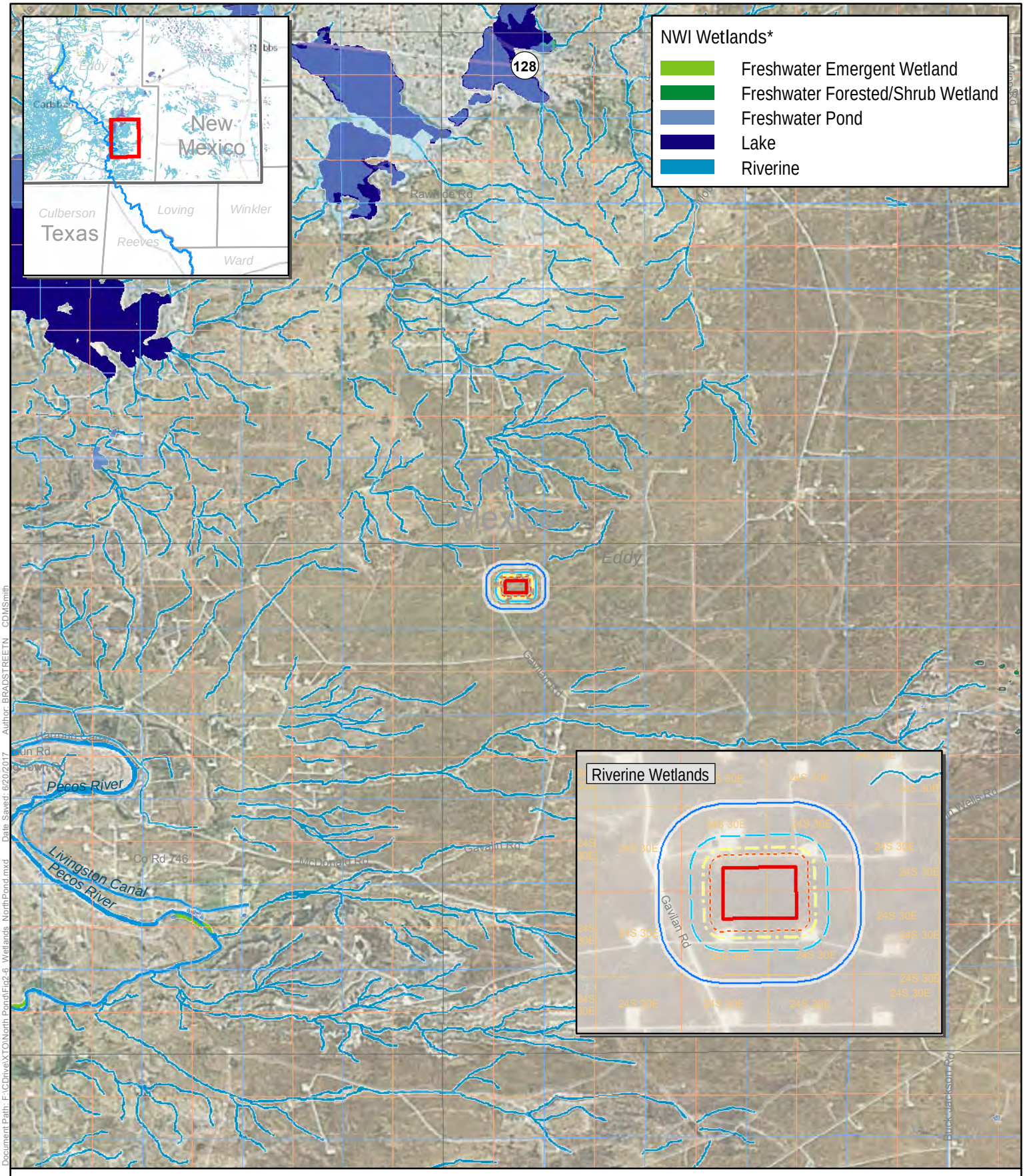

Figure 2-6 Wetlands Location Map
BOPCO Proposed North Pond Recycling Containment Location

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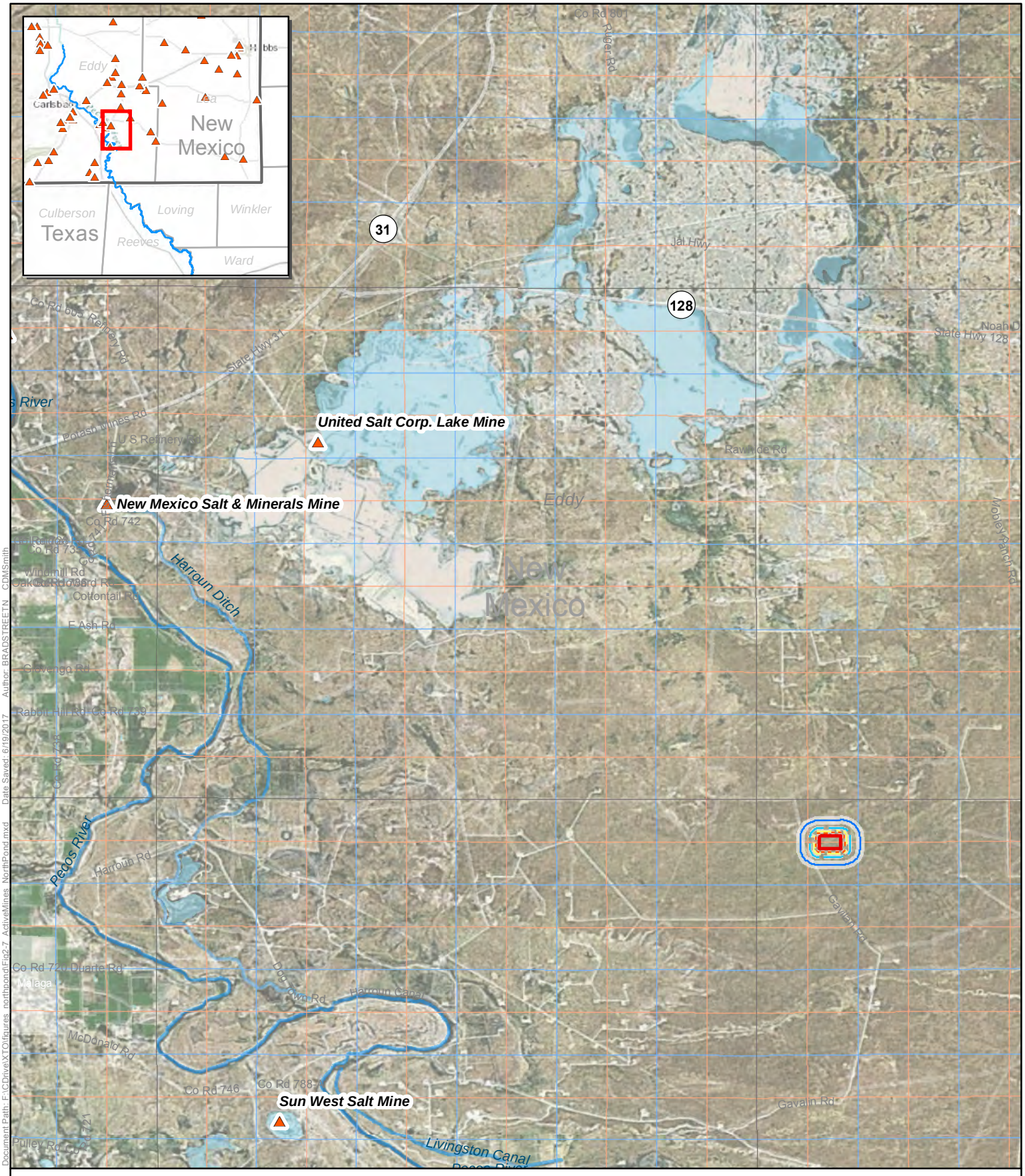

Figure 2-7 NM Mining and Minerals Division Active Mines Map
BOPCO Proposed North Pond Recycling Containment Location

N

0 0.75 1.5 3 mi

200'
300'
500'
1,000'

Active Mine*
Proposed Facility Boundary

Source: *U.S. Fish and Wildlife Service, National Wetlands Inventory

CDM Smith

Service Layer Credits: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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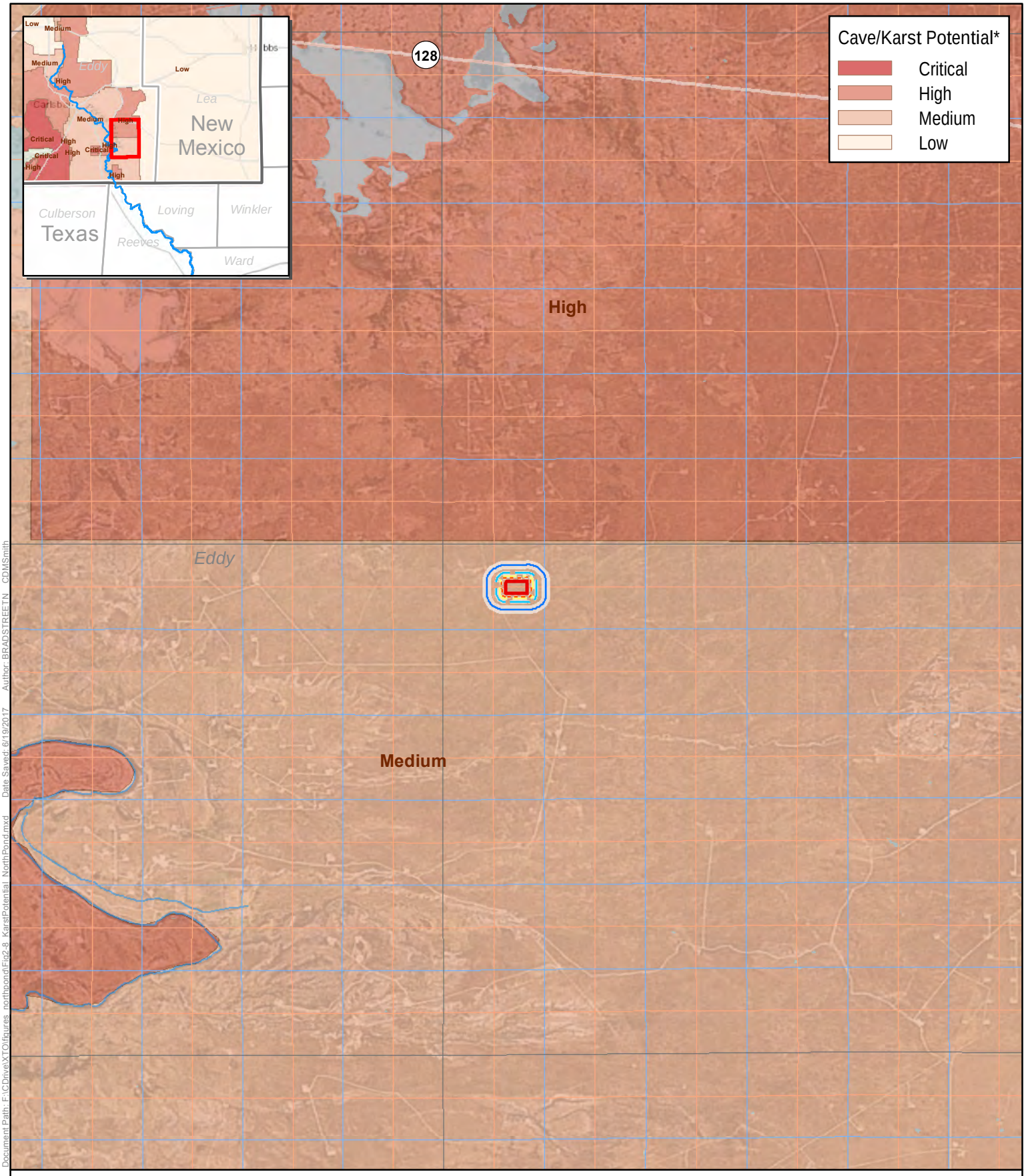

Figure 2-8 Karst Potential Map
BOPCO Proposed North Pond Recycling Containment Location

N

0 4,000 8,000 16,000 ft

200'
300'
500'
1,000'

Proposed Facility Boundary

Source: *Bureau of Land Management, Carlsbad Field Office

CDM Smith

Figure 2-9 FEMA Map
BOPCO Proposed North Pond Recycling Containment Location

N

0 4,000 8,000 16,000 ft

200'
300'
500'
1,000'

Proposed Facility Boundary
100-Year Floodplain*

Source: *Federal Emergency Management Agency

CDM Smith

Service Layer Credits: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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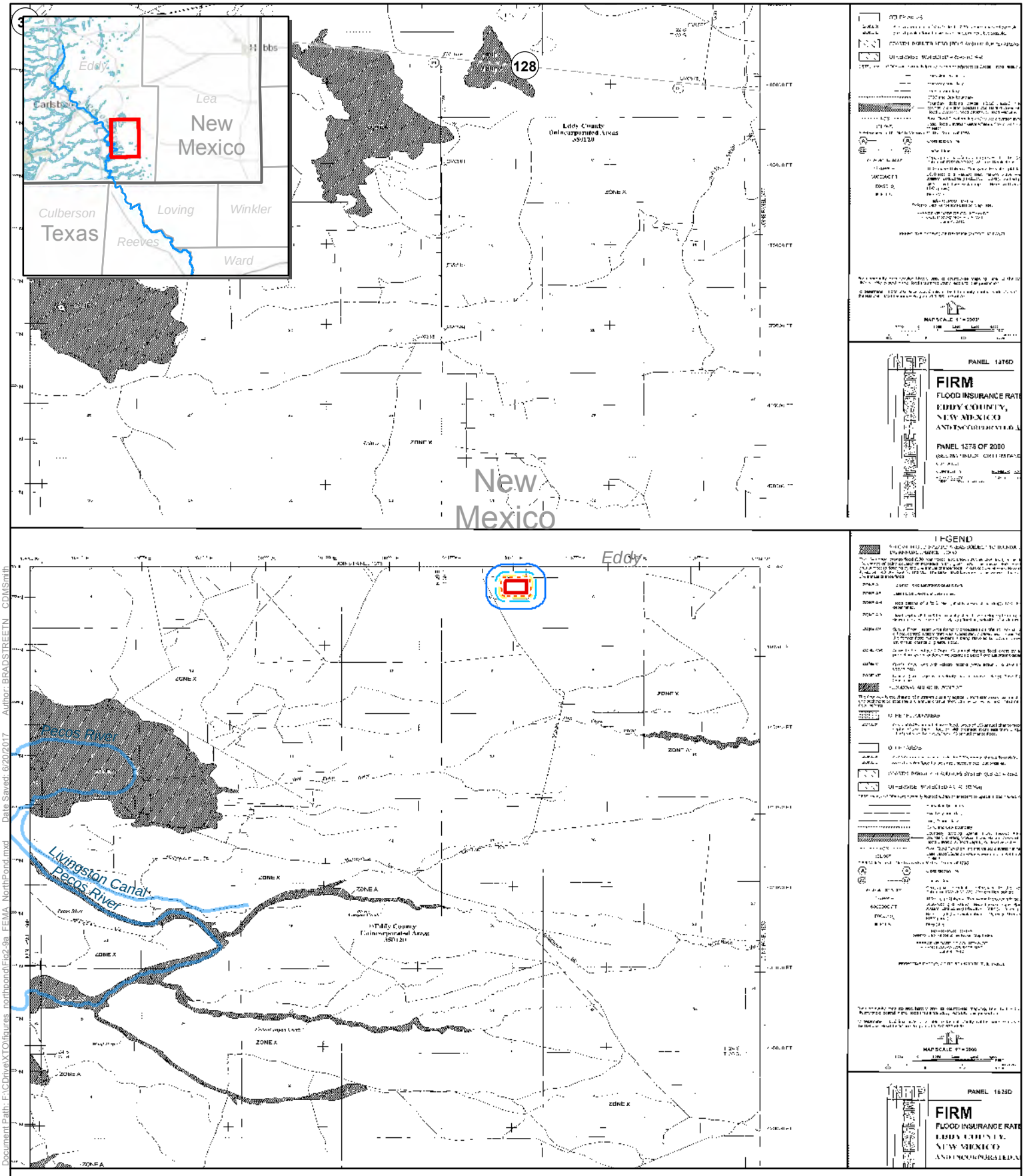

Figure 2-9a FEMA Map
BOPCO Proposed North Pond Recycling Containment Location

N

0 4,000 8,000 16,000 ft

200'
300'
500'
1,000'

Proposed Facility Boundary

Source: *Federal Emergency Management Agency; Panel 35015C1625D

CDM Smith

Service Layer Credits: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

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Appendix G

Engineering Design Drawings

BOPCO, LP
MIDLAND, TEXAS

PLU NORTH 1,000,000 BLS RECYCLING CONTAINMENT

(TWO DOUBLE LINED CONTAINMENTS)

AUGUST 2017

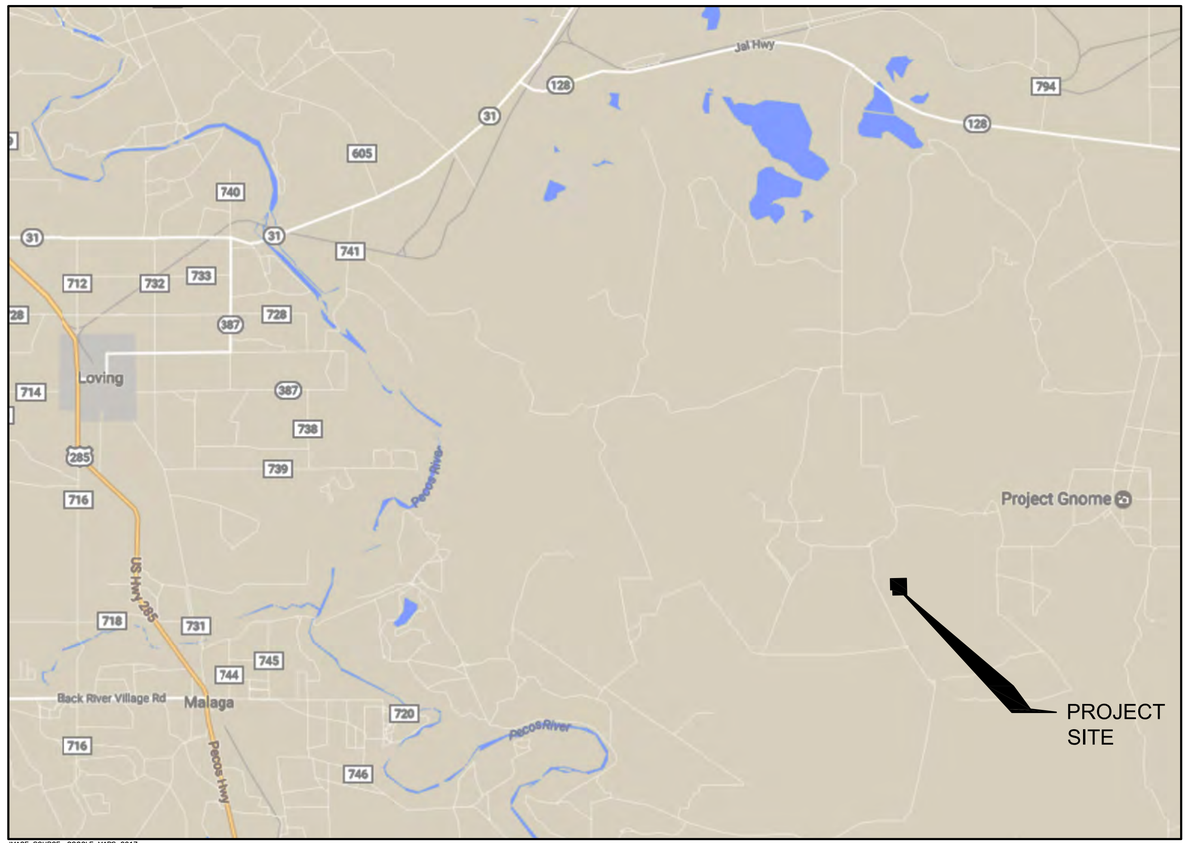

IMAGE SOURCE: GOOGLE MAPS 2017

VICINITY MAP
APPROX SCALE: 1" = 1 mi

DRAWING INDEX

JASON A. VICKERY
NEW MEXICO
17697
PROFESSIONAL ENGINEER

PREPARED BY:

CDM Smith
11490 Westheimer Road, Suite 700
Houston, TX 77077
Tel: (713) 423-7300
TBPE Firm Registration No. F-3043

XREFs: [] Images: [north pond vic, REMUDA LOCATION MAP GOOGLE 2017, REMUDA VICINITY MAP GOOGLE 2017]
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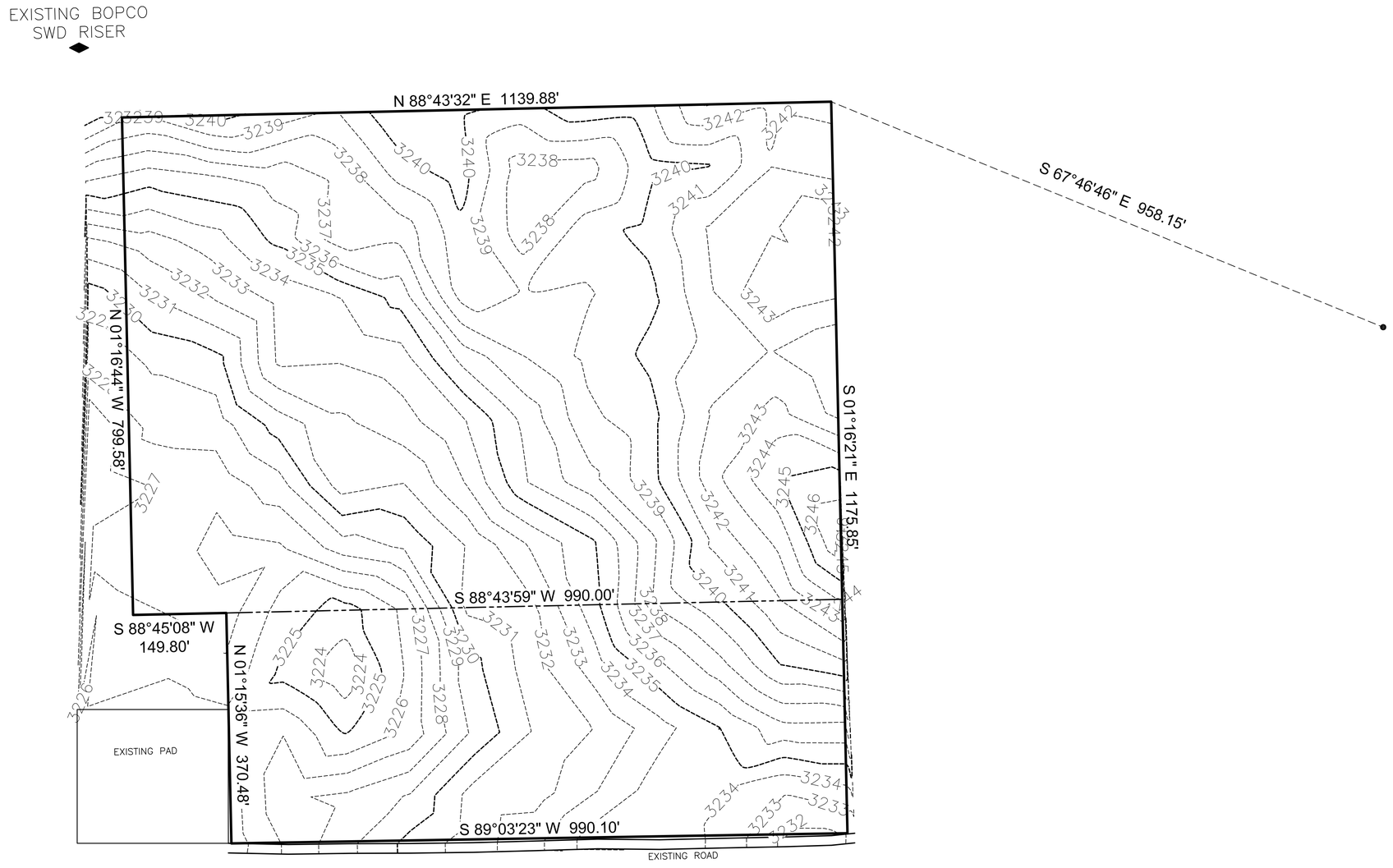


N

1" = 100'

50 0 100

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: J. VICKERY
DRAWN BY: M. WAINWRIGHT
SHEET CHK'D BY:
CROSS CHK'D BY:
APPROVED BY:
DATE: AUGUST 2017

CDM Smith
11490 Westheimer Road, Suite 700
Houston, TX 77077
Tel: (713) 423-7300
TBPE Firm Registration No. F-3043

JASON A. VICKERY
NEW MEXICO
17697
PROFESSIONAL ENGINEER

BOPCO, LP
MIDLAND, TEXAS

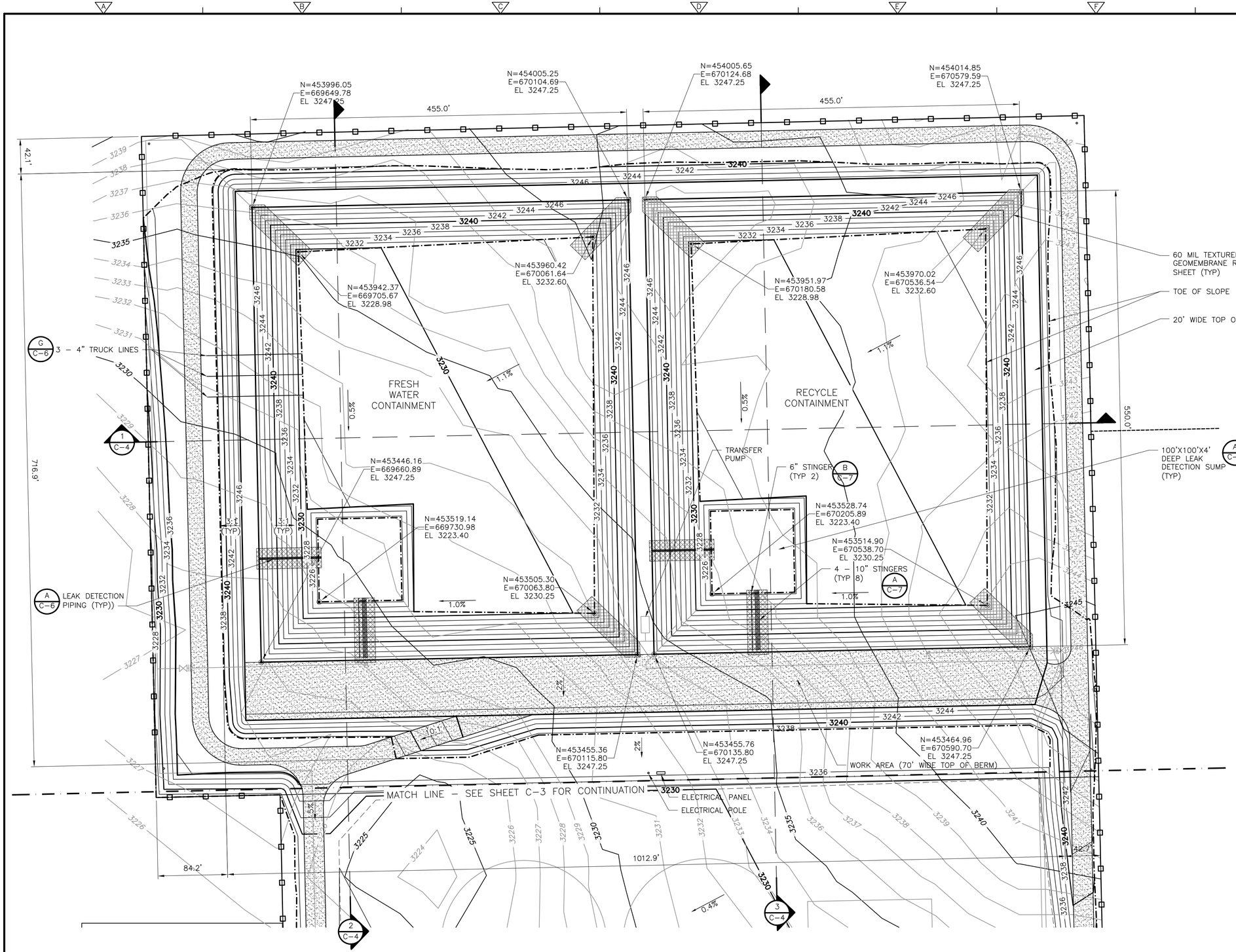
PLU NORTH 1,000,000 BBL RECYCLING CONTAINMENT

EXISTING CONDITIONS PLAN

PROJECT NO. 5000-218809
FILE NAME: C001STPL.DWG

SHEET NO.
C-1

PRELIMINARY DRAWINGS - NOT FOR CONSTRUCTION



NOTES:

1. FILL FOR BERMS SHALL BE PLACED AND COMPACTED IN HORIZONTAL LIFTS WITH MAXIMUM LOOSE LIFT THICKNESS OF 12 INCHES, OR AS DIRECTED BY ENGINEER. CONSTRUCT EACH LAYER CONTINUOUSLY AND APPROXIMATELY HORIZONTAL FOR THE WIDTH AND LENGTH OF THE DIKE. FILL SHALL BE COMPACTED TO AT LEAST 95 PERCENT OF MAXIMUM DRY DENSITY DETERMINED BY THE ASTM D1557 AND AT MOISTURE CONTENT WITHIN +2% TO −2% OF OPTIMUM MOISTURE CONTENT AS DETERMINED BY A MODIFIED PROCTER SOILS TEST ON SAMPLES FROM THE SOURCE AREA (ASTM D1557).
2. 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 DETERMINES 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.
3. PERFORM ONE NUCLEAR DENSITY GAUGE TEST PER 2500 CY OR AS DIRECTED BY ENGINEER.
4. 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 ¾ INCH.

LEGEND

- 3050 — PROPOSED INDEX CONTOUR
- 3051 — PROPOSED INTERMEDIATE CONTOUR
- GAME FENCE
- 3050 — EXISTING INDEX CONTOUR
- 3051 — EXISTING INTERMEDIATE CONTOUR

N

1" = 60'
30 0 60

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: J. VICKERY
DRAWN BY: M. WAINWRIGHT
SHEET CHK'D BY:
CROSS CHK'D BY:
APPROVED BY: J. VICKERY
DATE: AUGUST 2017

CDM Smith
11490 Westheimer Road, Suite 700
Houston, TX 77077
Tel: (713) 423-7300
TBPE Firm Registration No. F-3043

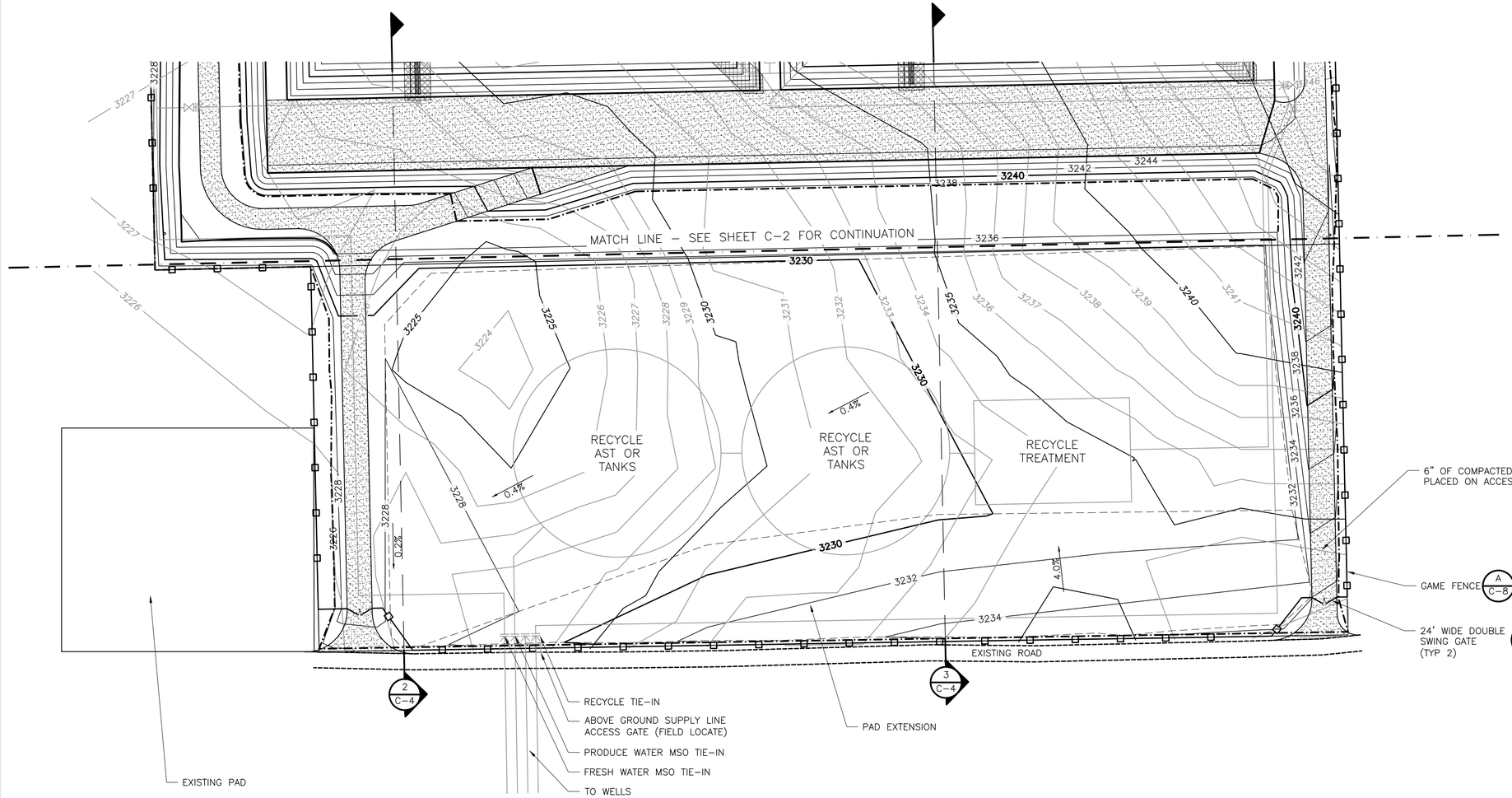
JASON A. VICKERY NEW MEXICO 17697 PROFESSIONAL ENGINEER

BOPCO, LP
MIDLAND, TEXAS
PLU NORTH 1,000,000 BBL
RECYCLING CONTAINMENT

PROPOSED CONTAINMENT GRADING PLAN SHEET 1 OF 2

PROJECT NO. 5000-218809
FILE NAME: C002STPL.DWG
SHEET NO.
C-2

PRELIMINARY DRAWINGS - NOT FOR CONSTRUCTION



NOTES:

1. FILL FOR BERMS SHALL BE PLACED AND COMPACTED IN HORIZONTAL LIFTS WITH MAXIMUM LOOSE LIFT THICKNESS OF 12 INCHES, OR AS DIRECTED BY ENGINEER. CONSTRUCT EACH LAYER CONTINUOUSLY AND APPROXIMATELY HORIZONTAL FOR THE WIDTH AND LENGTH OF THE DIKE. FILL SHALL BE COMPACTED TO AT LEAST 95 PERCENT OF MAXIMUM DRY DENSITY DETERMINED BY THE ASTM D1557 AND AT MOISTURE CONTENT WITHIN +2% TO −2% OF OPTIMUM MOISTURE CONTENT AS DETERMINED BY A MODIFIED PROCTER SOILS TEST ON SAMPLES FROM THE SOURCE AREA (ASTM D1557).
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3. PERFORM ONE NUCLEAR DENSITY GAUGE TEST PER 2500 CY OR AS DIRECTED BY ENGINEER.
4. 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 ¼ INCH.

6" OF COMPACTED 4" MINUS AGGREGATE TO BE PLACED ON ACCESS ROAD, RAMP, AND WORK AREA

GAME FENCE (A C-8)

24' WIDE DOUBLE SWING GATE (TYP 2) (A C-8)

LEGEND

- 3050 — PROPOSED INDEX CONTOUR
- 3051 — PROPOSED INTERMEDIATE CONTOUR
- GAME FENCE
- 3050 — EXISTING INDEX CONTOUR
- 3051 — EXISTING INTERMEDIATE CONTOUR

N

1" = 60'
30 0 60

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: J. VICKERY
DRAWN BY: M. WAINWRIGHT
SHEET CHK'D BY:
CROSS CHK'D BY:
APPROVED BY: J. VICKERY
DATE: AUGUST 2017

CDM Smith
11490 Westheimer Road, Suite 700
Houston, TX 77077
Tel: (713) 423-7300
TBPE Firm Registration No. F-3043

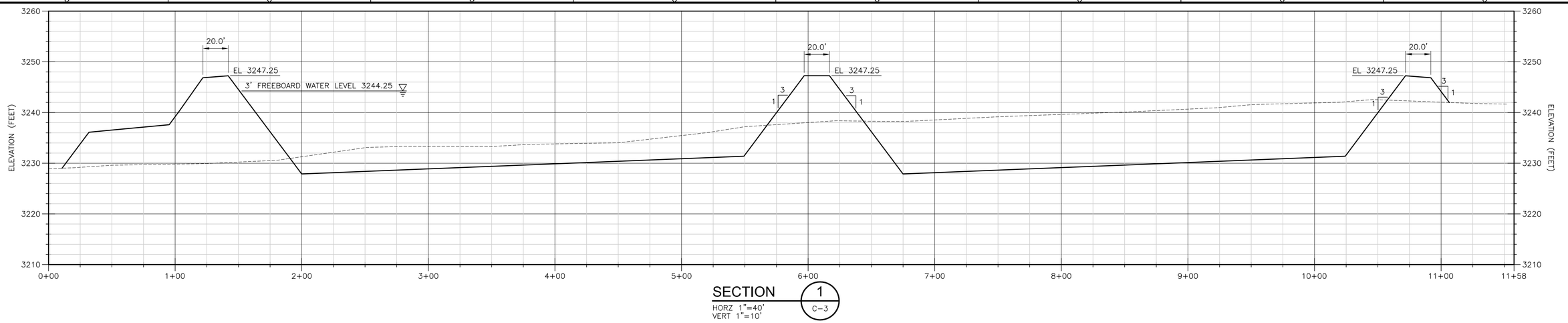
JASON A. VICKERY NEW MEXICO 17697 PROFESSIONAL ENGINEER

BOPCO, LP
MIDLAND, TEXAS
PLU NORTH 1,000,000 BBL
RECYCLING CONTAINMENT

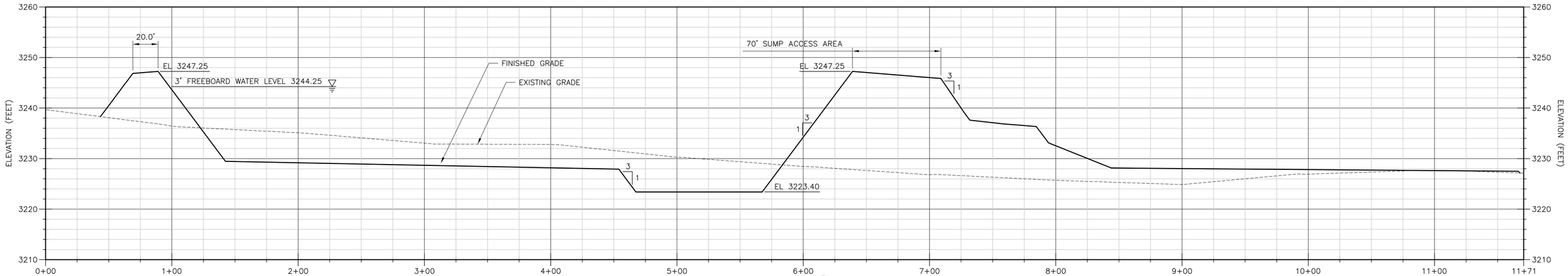
PROPOSED CONTAINMENT GRADING PLAN SHEET 2 OF 2

PROJECT NO. 5000-218809
FILE NAME: C002STPL.DWG
SHEET NO.
C-2

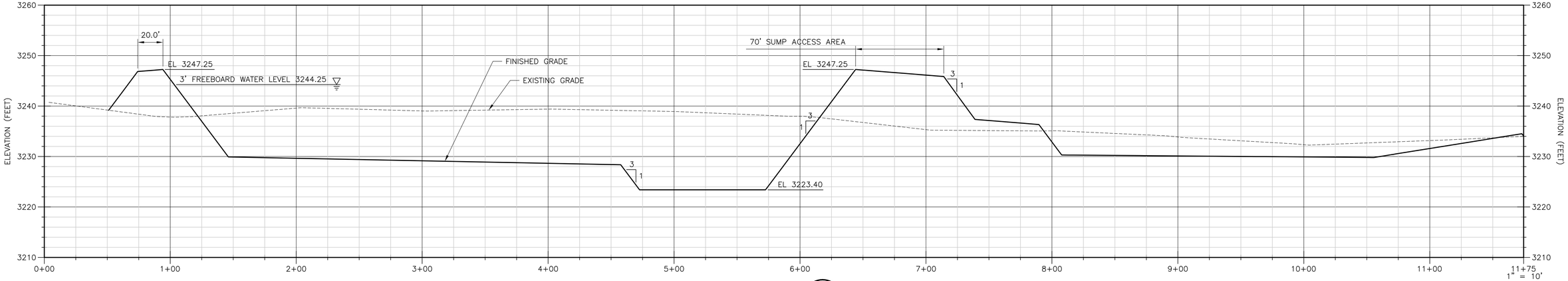
PRELIMINARY DRAWINGS - NOT FOR CONSTRUCTION



SECTION 1
HORZ 1"=40'
VERT 1"=10'
C-3



SECTION 2
HORZ 1"=40'
VERT 1"=10'
C-3



SECTION 3
HORZ 1"=40'
VERT 1"=10'
C-3

VERT 1" = 10'
HORIZ 1" = 40'

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: J. VICKERY
DRAWN BY: M. WAINWRIGHT
SHEET CHK'D BY:
CROSS CHK'D BY:
APPROVED BY: J. VICKERY
DATE: AUGUST 2017

CDM Smith
11490 Westheimer Road, Suite 700
Houston, TX 77077
Tel: (713) 423-7300
TBPE Firm Registration No. F-3043

JASON A. VICKERY NEW MEXICO 17697 PROFESSIONAL ENGINEER

BOPCO, LP
MIDLAND, TEXAS

PLU NORTH 1,000,000 BBL
RECYCLING CONTAINMENT

PROPOSED CONTAINMENT SECTIONS

PROJECT NO. 5000-218809
FILE NAME: C004STPL.DWG

SHEET NO.
C-4

PRELIMINARY DRAWINGS - NOT FOR CONSTRUCTION

N=453996.05
E=669649.78
EL 3247.25

SEE NOTE 3
(TYP OF 4)

N=454005.25
E=670104.69
EL 3247.25

N=454005.65
E=670124.68
EL 3247.25

N=454014.85
E=670579.59
EL 3247.25

DOUBLE LINED
ANCHOR TRENCH
C
C-6

N=453960.42
E=670061.64
EL 3232.60

N=453942.37
E=669705.67
EL 3228.98

N=453951.97
E=670130.58
EL 3228.98

N=453970.02
E=670536.54
EL 3232.60

N=453446.16
E=669660.89
EL 3247.25

N=453519.14
E=669730.98
EL 3223.40

N=453528.74
E=670205.89
ELI 3223.40

N=453514.90
E=670538.70
EL 3230.25

N=453505.30
E=670068.80
ELI 3230.25

N=453455.36
E=670115.80
EL 3247.25

N=453455.76
E=670135.80
EL 3247.25

N=453464.96
E=670590.70
EL 3247.25

SEE NOTE 4

SUMP - SEE C-5 FOR
DOUBLE LINED AND LEAK
DETECTION DETAILS

PANEL LAYOUT SHALL BE THE SAME
ORIENTATION FOR BOTH LINER LAYERS.
GEONET SEAMS SHALL BE ORIENTED
PERPINDICULAR TO THE LINER SEAMS

1.7%
0.5%
1.0%

NOTES:

1. INSTALLER TO SIGN SUBGRADE ACCEPTANCE FORM (PROVIDED BY OWNER REPRESENTATIVE) DAILY PRIOR TO INSTALLATION.
2. CONTRACTOR TO PROVIDE SUBMITTAL OF LINER PANEL LAYOUT.
3. A 3' DIAMETER MINIMUM PIECE OF 40 MIL HDPE AND 60 MIL HDPE LINER SHALL BE EXTRUDED WELDED WHERE THE PIE SHAPED CORNER SECTIONS MEET FOR SEAM REINFORCEMENT.
4. INSTALL A FULL DOUBLE WIDTH SECTION OF BLACK 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.
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 INSPECT GRADED SURFACE FOR DEBRIS, ROCKS OR OTHER MATERIAL THAT MAY DAMAGE THE LINER.
7. CONTRACTOR SHALL ROLL SURFACE WITH A SMOOTH ROLLER TO ELIMINATE RUTS.
8. CONTRACTOR SHALL USE BLACK 40 MIL HDPE GEOMEMBRANE AS THE SECONDARY (LOWER) LINER AND GREY 60 MIL HDPE TEXTURED MEMBRANE AS THE PRIMARY (UPPER) LINER.
9. LINER TO BE INSTALLED PER MANUFACTURER'S RECOMMENDED PROCEDURES (GSE INSTALLATION QUALITY ASSURANCE MANUAL AND THE GSE DROP-IN SPECIFICATIONS FOR GEOMEMBRANES - WWW.GSEWORLD.COM).
10. ALL SEAMS MUST BE WELDED WITH A 6" MINIMUM OVERLAP.
11. 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 PER THE INSTALLATION QUALITY ASSURANCE MANUAL.
12. FOR AIR PRESSURE TESTING, 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 35 PSI. NOTE TIME TEST 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 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.
13. ALL NON-DESTRUCTIVE TESTS WILL BE NOTED IN THE NON-DESTRUCTIVE LOGS.
14. 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.

LEGEND

P1 LINER PANEL NUMBER

RUB SHEETS

N

1" = 50'
25 0 50

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: J. VICKERY
DRAWN BY: M. WAINWRIGHT
SHEET CHK'D BY:
CROSS CHK'D BY:
APPROVED BY: J. VICKERY
DATE: AUGUST 2017

CDM Smith
11490 Westheimer Road, Suite 700
Houston, TX 77077
Tel: (713) 423-7300
TBPE Firm Registration No. F-3043

JASON A. VICKERY
NEW MEXICO
17697
PROFESSIONAL ENGINEER

BOPCO, LP
MIDLAND, TEXAS

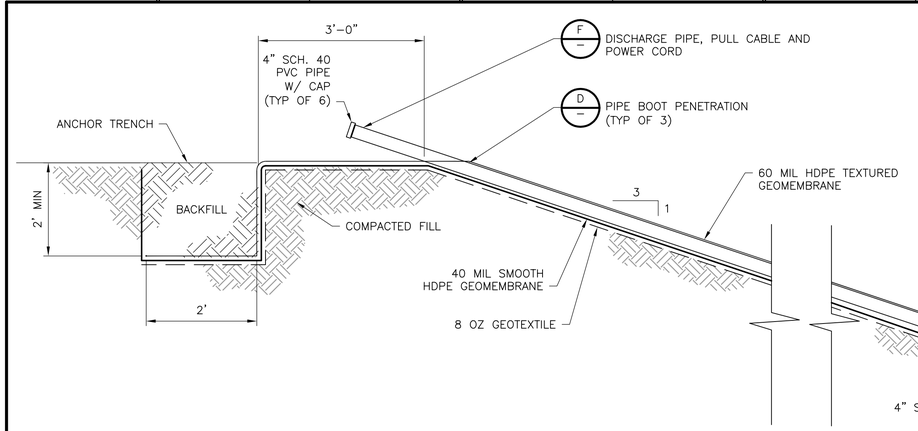
PLU NORTH 1,000,000 BBL
RECYCLING CONTAINMENT

PROPOSED LINER PANEL LAYOUT

PROJECT NO. 5000-218809
FILE NAME: C005STPL.DWG

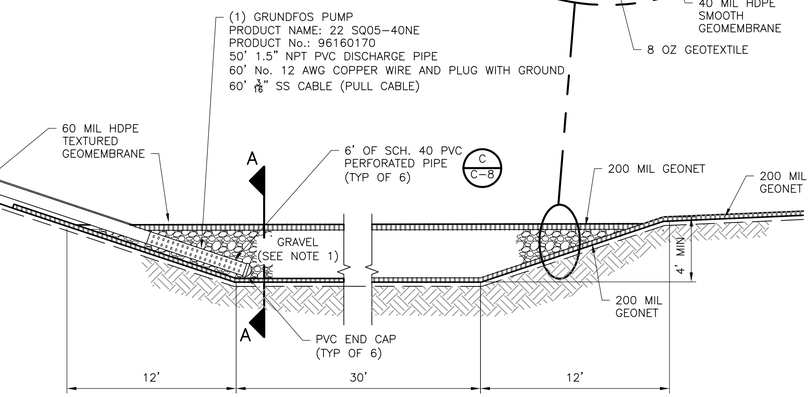
SHEET NO.
C-5

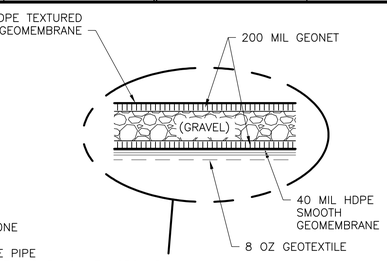
PRELIMINARY DRAWINGS - NOT FOR CONSTRUCTION



LEAK DETECTION CROSS SECTION WITH SUMP

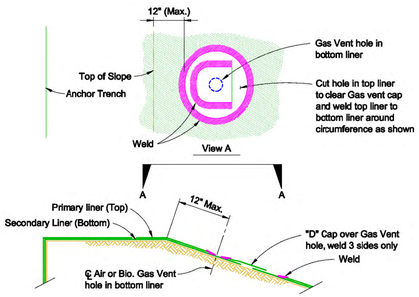
DETAIL A — N.T.S. — A / C-5





NOTES:

1. SUMPS SHALL BE BACKFILLED WITH NON-ANGULAR MAXIMUM 3/8-INCH SIZED PEA GRAVEL.
2. LINER GAS VENTS SHALL BE SPACED ALONG THE INSIDE SLOPE AT APPROXIMATELY 100 FEET ON CENTER OR MINIMUM 2 VENTS PER SIDE.
3. 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 SYSTEM.
4. LAY BOTH LINERS IN ANCHOR TRENCH. BACKFILL ANCHOR TRENCH IN 2 LIFTS AND COMPACT PER NOTE 1 ON SHEET C-2.

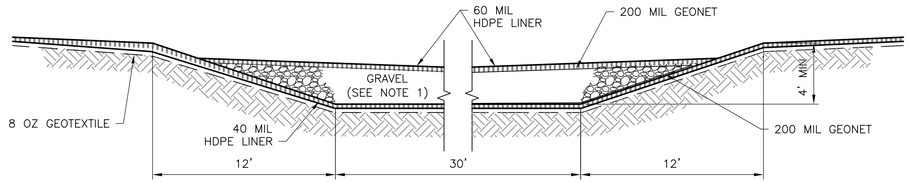


Typical Double Liner Gas Vent
Not to scale

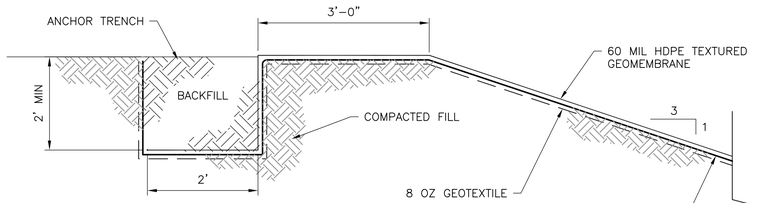
SOURCE: GCE LINING TECHNOLOGY, LLC

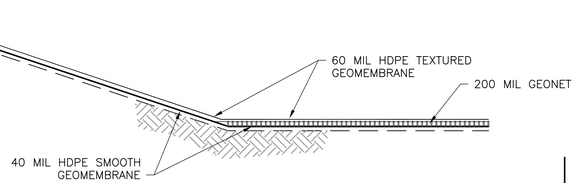
TYPICAL DOUBLE LINER GAS VENT

DETAIL B — N.T.S. — (SEE NOTE 2)



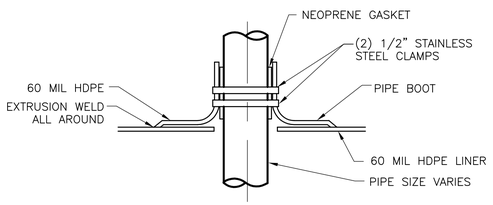
SECTION A-A'





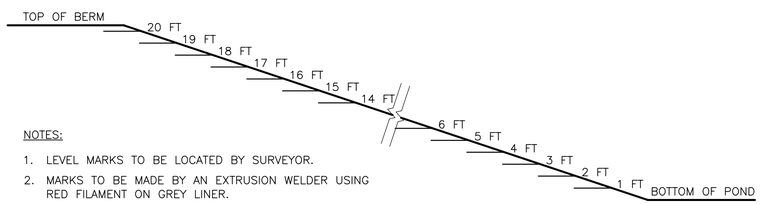
DOUBLE LINER CROSS SECTION

DETAIL C — N.T.S. — C / C-5



PIPE BOOT PENETRATION

DETAIL D — N.T.S. — D / –

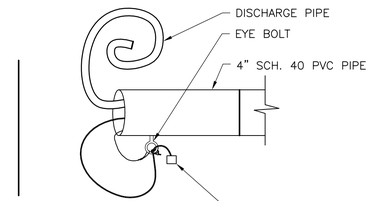


NOTES:

1. LEVEL MARKS TO BE LOCATED BY SURVEYOR.
2. MARKS TO BE MADE BY AN EXTRUSION WELDER USING RED FILAMENT ON GREY LINER.
3. MARKS SHOULD REFERENCE THE LOWEST POINT ON BERM.
4. FIELD LOCATE PER OWNER

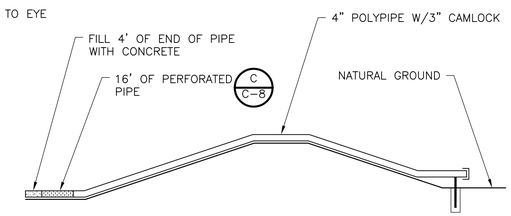
WATER LEVEL MARKS

DETAIL E — NTS — E / –



DISCHARGE PIPE, PULL CABLE AND POWER CORD

DETAIL F — N.T.S. — F / –



TRUCK-LINE

DETAIL G — N.T.S. — G / C-2

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: J. VICKERY
DRAWN BY: M. WAINWRIGHT
SHEET CHK'D BY:
CROSS CHK'D BY:
APPROVED BY:
DATE: AUGUST 2017

CDM Smith
11490 Westheimer Road, Suite 700
Houston, TX 77077
Tel: (713) 423-7300
TBPE Firm Registration No. F-3043

JASON A. VICKERY — NEW MEXICO — 17697 — PROFESSIONAL ENGINEER

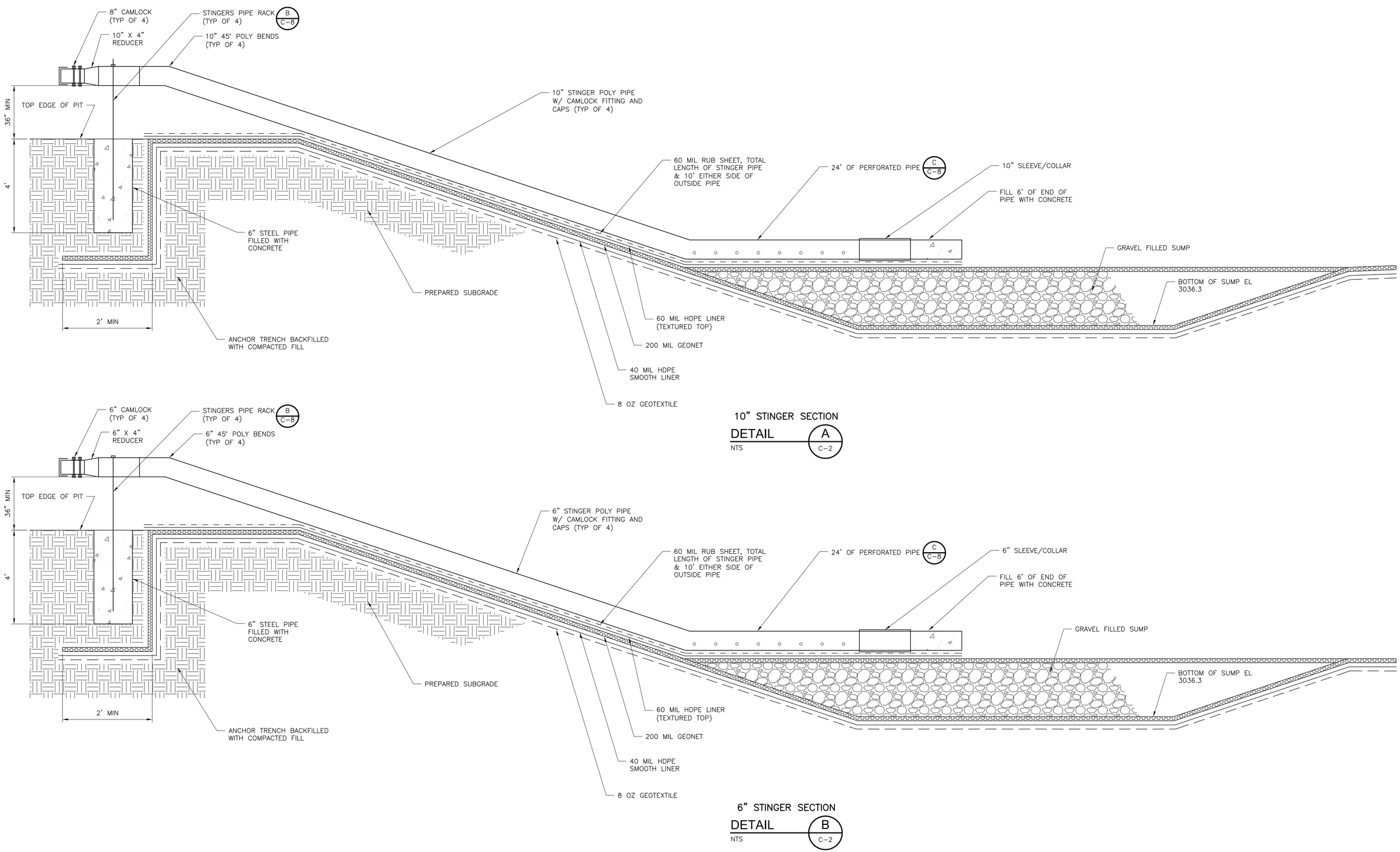
BOPCO, LP
MIDLAND, TEXAS

PLU NORTH 1,000,000 BBL RECYCLING CONTAINMENT

DOUBLE LINER AND LEAK DETECTION DETAILS

PROJECT NO. 5000-218809
FILE NAME: C006STDT.DWG
SHEET NO. C-6

PRELIMINARY DRAWINGS - NOT FOR CONSTRUCTION



10" STINGER SECTION

DETAIL A (C-2)

NTS

6" STINGER SECTION

DETAIL B (C-2)

NTS

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: J. VICKERY
DRAWN BY: M. WAINWRIGHT
SHEET CHK'D BY:
CROSS CHK'D BY:
APPROVED BY:
DATE: AUGUST 2017

CDM Smith
11490 Westheimer Road, Suite 700
Houston, TX 77077
Tel: (713) 423-7300
TBPE Firm Registration No. F-3043

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BOPCO, LP
MIDLAND, TEXAS

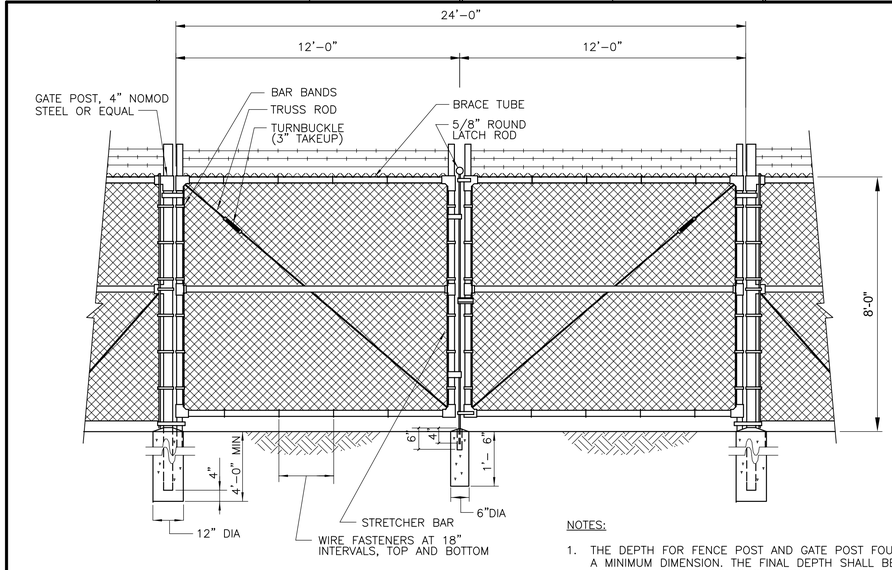
PLU NORTH 1,000,000 BBL
RECYCLING CONTAINMENT

STINGER SECTIONS

PROJECT NO. 5000-218809
FILE NAME: C007STDT.DWG

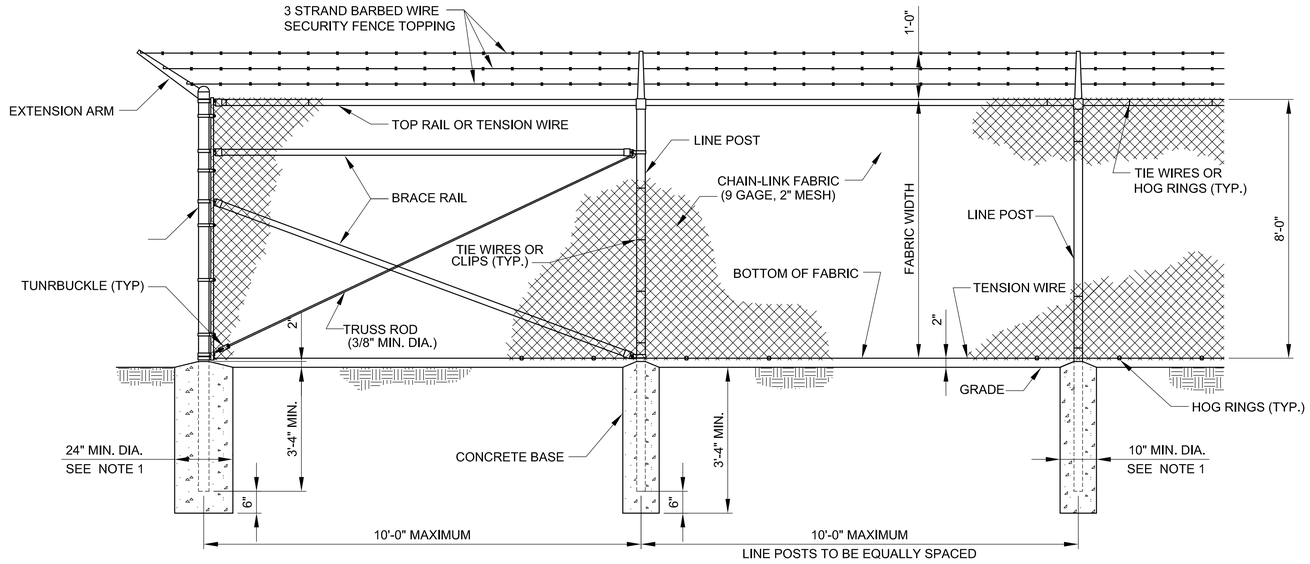
SHEET NO.
C-7

PRELIMINARY DRAWINGS - NOT FOR CONSTRUCTION



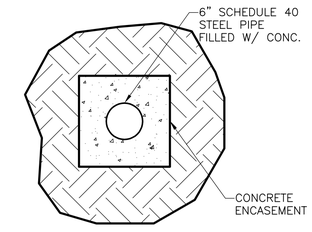
NOTES:

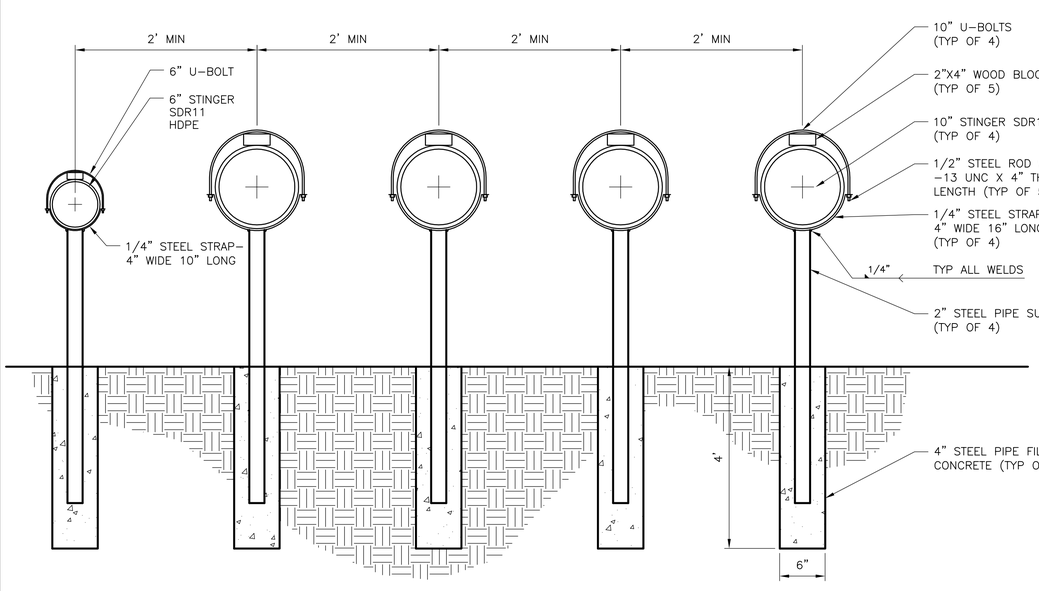
1. THE DEPTH FOR FENCE POST AND GATE POST FOUNDATIONS IS A MINIMUM DIMENSION. THE FINAL DEPTH SHALL BE DEEPER IN AREAS WHERE SOIL CONDITIONS WARRANT.
2. PROVIDE LOCKING MECHANISM FOR GATES.



CHAIN LINK GAME FENCE AND VEHICLE GATE

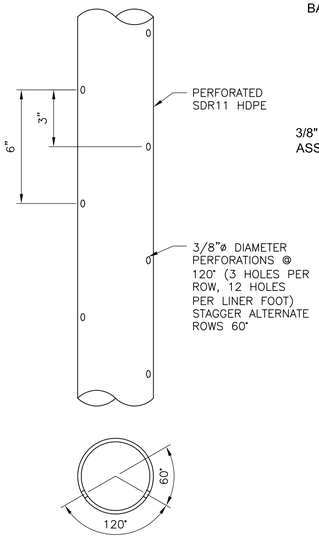
DETAIL A — NTS — C-3





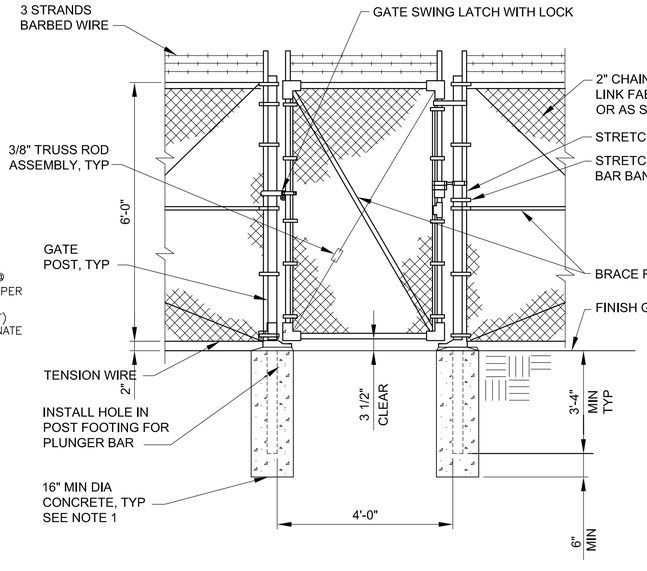
STINGER SYSTEM ANCHOR

DETAIL B — NTS — C-7



PERFORATED PIPE DETAIL

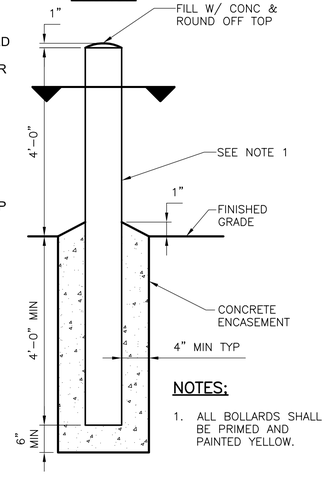
DETAIL C — NTS — C-7



4 FOOT WIDE MAN GATE

DETAIL D — NTS — –

SECTION



NOTES:

1. ALL BOLLARDS SHALL BE PRIMED AND PAINTED YELLOW.

BOLLARD

DETAIL E — NTS — –

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: J. VICKERY
DRAWN BY: M. WAINWRIGHT
SHEET CHK'D BY:
CROSS CHK'D BY:
APPROVED BY: J. VICKERY
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BOPCO, LP
MIDLAND, TEXAS
PLU NORTH 1,000,000 BBL RECYCLING CONTAINMENT

STINGER AND FENCING DETAILS

PROJECT NO. 5000-218809
FILE NAME: C008STDT.DWG
SHEET NO. C-8

PRELIMINARY DRAWINGS - NOT FOR CONSTRUCTION