C-147 Registration Package

Cedar Canyon Recycling Facility
Cedar Canyon – East Recycling Containment (A)

Submitted: August 10th, 2017

Prepared by:
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District IV
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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: Oxy USA, Inc. (For multiple operators attach page with information) OGRID #: 16696

Address: 5 Greenway Plaza, Ste. 110, Houston, Texas 77046

Facility or well name (include API# if associated with a well): Cedar Canyon 15 Produced Water Recycle Facility

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

U/L or Qtr/Qtr K Section 15 Township 24 S Range 29 E County: Eddy

Surface Owner: ☐ Federal ☐ State ☒ Private ☐ Tribal Trust or Indian Allotment

2.

☒ **Recycling Facility:**

Location of recycling facility (if applicable): Latitude 32.216187 Longitude -103.975685 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:** Cedar Canyon –East Recycling Containment "A" (U/L: L, Section 10, T24S R29E, Eddy County)

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

Center of Recycling Containment (if applicable): Latitude 32.229015 Longitude -103.978186 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 _____

☐ String-Reinforced

Liner Seams: ☒ Welded ☐ Factory ☐ Other _____ Volume: 194,000 bbl Dimensions: L 300' x W 400' x D 27.5'

☐ 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 6 ft. chain-link with barbed wire 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): Dylan Allen Title: Environmental Specialist

Signature: Date: 8/10/2017

e-mail address: Dylan_Allen@oxy.com Telephone: 432-685-5614

11.
OCD Representative Signature: **Approval Date:**

Title: **OCD Permit Number:**

☐ OCD Conditions
☐ Additional OCD Conditions on Attachment

Table of Contents

Introduction

In accordance with NMAC 19.15.34, Oxy USA Inc. requests the modification of the Cedar Canyon Recycling Facility and registration of the proposed Cedar Canyon – East Recycling Containment "A" through the approval of this C-147 registration package. The facility and containments will be used to treat and recycle produced water for re-use in Oxy USA Inc. drilling/completion activities.

This package contains the C-147 form and associated documents for modification of the Cedar Canyon Recycling Facility and registration of the Cedar Canyon – East Recycling Containment "A".

A copy of the C-147 will be submitted to the private land owner.

Siting Criteria for Recycling Containments – Cedar Canyon

All figures and maps located in Appendix 2.

Distance to Groundwater

Figure 1a, Figure 1a.2, Figure 1a.3, Figure 1b and the 80 ft. boring report (Appendix 3) demonstrate the depth to groundwater and groundwater quality trend in the surrounding area. In Figure 1a and Figure 1a.2, the area is characterized by relatively shallow groundwater with high chloride concentrations. Figure 1b shows that the proposed recycling containment is not within a "Highly Sensitive" aquifer area. Figure 1a.3 and Table 1 show the nearest New Mexico Office of the State Engineer mapped water wells. A geologic map of the area is shown in Figure 1a.1.

A geotechnical analysis, consisting of four exploratory borings (three 30 ft. borings, one 80 ft. boring), was performed on the Cedar Canyon – Recycling Containments site area. Groundwater was encountered at 35' below ground surface. A groundwater sample taken from below the proposed containment showed a TDS concentration of 75,700 mg/L and a chloride concentration of 40,500 mg/L; therefore, the water is not considered fresh water or protectable groundwater by the New Mexico Administrative Code. The variance request for the 50ft. setback criteria is outlined in the "Variances" section (Page 16) of this registration package. An analysis of the soil showed the site consists of up to 3' of red silty sand, underlain by 5' of tan clayey sand, underlain by 22' of alternating layers of red silty sand and tan clayey sands.

Distance to Subsurface Mines

Figures 1c and 1d demonstrate that the recycling containment is not located within the area overlying a subsurface mine. Figure 1c is a map from the NM EMNRD – Mining and Mineral Division verifying the recycling containment is not near an active mine. Figure 1d shows that there are not any near caliche pits and the recycling containment area is not within a potash lease.

Distance to Cave/Karst High or Critical Areas

Figure 1f demonstrate that the proposed containment is located in a BLM designated "Medium Potential" cave/karst area. The nearest "Low Potential" cave/karst area is located 0.75 miles southeast. The nearest "High Potential" cave/karst area is located 3.8 miles southwest. A geotechnical analysis consisting of four exploratory borings (three 30 ft. borings, one 80 ft. boring) was performed on the Cedar Canyon – Recycling Containments site area. There were no karst features found during the geotechnical analysis. Soil conditions and analysis are discussed in depth in the Geotechnical/Boring Report (Appendix 3).

Distance to Surface Water

Figures 1h and 1g demonstrate that the proposed recycling containment is not located within 300 feet of a continuously flowing watercourse, or 200 feet of any other significant watercourse, or lakebed,

sinkhole, or playa lake (measure from the ordinary high-water mark). The nearest continuously flowing water course is the Pecos River located approximately 0.75 miles southwest. The nearest significant watercourse, as designated by the BLM, is approximately 0.5 miles east. According to the National Wetlands Inventory (Figure 1i), the nearest freshwater pond is approximately 1000 feet northeast. This siting criteria was verified by a visual inspection of the proposed site.

Distance to Non-Public Water Supply

Figure 1a.3 demonstrates that the proposed recycling containment is not located 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 the initial application. The OSE database shows the nearest well (C-004642) is approximately 1 mile southwest of the proposed recycling containment. This water well appears to be used for a USGS monitoring well. A site inspection also verified no fresh water wells or springs within 500 horizontal feet of the proposed recycling containment.

Distance to Structures

Figure 1h demonstrates that the proposed recycling containment is not located within 1000 feet from a permanent residence, school, hospital, institution, or church in existence at the time of initial application. The nearest structures are oil and gas wells and tank batteries.

Distance to Wetlands

Figure 1i demonstrates that the proposed recycling containment is not within 500 feet of a wetland. According to the U.S. Fish and Wildlife Service National Wetlands Inventory map, the nearest wetland is a riverine located approximately 1000 feet east. This was verified by a visual inspection of the site and a topographic map (Figure 1g).

Distance to Municipal Boundaries and Defined Fresh Water Fields

Figure 1j demonstrates that the proposed recycling containment is not 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. The closest municipal fresh water field (Sheep Draw) is approximately 20 miles east and services Carlsbad (20 miles northwest).

Distance to 100-Year Floodplain

Figure 1k and the FEMA Flood Insurance Rate Map (FIRM) (Appendix 7) demonstrates that the proposed recycling containment is not within a 100-year floodplain. The FEMA FIRM map shows the proposed recycling containment to be located in “Zone X”: Area determined to be outside the 0.2% annual chance

floodplain. This is confirmed by the BLM Flood Zone layer shown in Figure 1k. The nearest 100-year floodplain area is located 0.4 miles south.

Design and Construction Plan – Recycling Containments

This plan addresses construction of lined earthen containments. Field conditions may create the need for minor modification of the containment design (e.g. changing the length, width or depth).

Engineering Drawings (Appendix 4)

The design elements are addressed in the section of this submission containing the engineering drawings. The recommendations for compaction and preparation of the liner foundation will be based on site-specific and nearby data. The operator, engineer, and selected contractor will review the recommendations prior to beginning work on the liner foundation and adhere to the specific recommendations.

The proposed design and operation provide for the confinement of treated produced water, to prevent releases and to prevent overtopping due to wave action or rainfall. Additionally, the design prevents run-on of surface water as the containment is surrounded by an above-grade levee (a berm) and diversion ditch (between the levee and the soil stockpile) to prevent run-on of surface water.

Fencing & Netting for Wildlife Protection

The design offers multiple solutions for wildlife protection. This includes a fence to enclose the recycling containment in a manner that deters unauthorized wildlife and human access. The fence will either be a barbed wire fence with four strands evenly spaced in the interval between 1 foot and 4 feet above ground level – satisfying the minimum requirements or a 6 ft. chain-link fence with barbwire on top – in order to provide extra protection.

Depending on the pond size limitations, the recycling containment will either be netted, flagged, or equipped with an audible avian species protection system (Appendix 8), which effectively deters birds from approaching the area. This will serve to be protective of wildlife, including migratory birds in accordance with NMAC 19.15.34.12(E).

The O&M plan calls for the operator to inspect the containments on a monthly basis 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.

Material Excavated

Where topsoil is present, prior to constructing containment, the operator will strip and stockpile the topsoil for use as the final cover or fill at the time of closure. The topsoil will be stockpiled adjacent to containment levee, outside of working areas. The operator will take care to limit the height of the soil stockpile to allow the soil to remain aerobic. Material excavated during construction will not be located within a 100 feet of continuously flowing water course and/or lakebed, or 200 feet of any other significant watercourse and/or wetland.

Earthwork

A geotechnical assessment will be performed prior to construction to develop recommendations regarding the foundation for the containment liner. The containment will have a properly constructed foundation and interior slopes consisting of a firm, unyielding base that is smooth and free of rocks, debris, sharp edges or irregularities to prevent the liner's rupture or tear. Geotextile will be placed under the liner as needed to reduce localized stress-strain or protuberances that otherwise may compromise the liner's integrity. The containment will be constructed in compliance with NMAC requirements as shown below;

- ✓ Inside grade no steeper than two horizontal feet to one vertical foot (2H:1V).
- ✓ Outside grade is no steeper than three horizontal feet to one vertical foot (3H:1V)
- ✓ Top of the berm is wide enough to install an anchor trench and provide adequate room for inspection and maintenance.
- ✓ Caliche gravel placed on the outside levee provides additional erosion control.
- ✓ The containment is excavated into the ground such that most of fluid force lies against native earth and the engineered foundation

Field conditions may create the need for changes to the design. Any changes to the construction or grade requirements due to unforeseen conditions will be reviewed and approved prior to initiating installation of the liner system. Any design change that does not conform to the NMOCD Rule will be the subject of a variance request and will be submitted to the OCD for review and approval.

Liner Installation (see Appendix 4)

The containment will have a primary (upper) liner and a secondary (lower) liner with a leak detection system appropriate to the site's conditions.

Liner installation will be in compliance with the NMAC requirement. The proposed primary (upper) liner is a 60-mil HDPE geomembrane liner composed of an impervious, synthetic material that is resistant to ultraviolet light, petroleum hydrocarbons, salts and acidic and alkaline solutions. The proposed secondary liner is 30-mil LLDPE string reinforced. Liner compatibility meets or exceeds a subsequent relevant publication to

EPA SW -846 method 9090A.

The liners and drainage material will be installed consistent with the Manufacture's specifications. In addition to any specifications of the Manufacturer, protocols for liner installation include measures to:

- ✓ Minimize liner seams and orient them up and down, not across, a slope of the levee.
- ✓ Use factory welded seams where possible.
- ✓ Ensure field seams in geosynthetic material are thermally seamed and prior to field seaming, overlap liners four to six inches.
- ✓ Minimize the number of field seams and comers and irregularly shaped areas.
- ✓ Ensure no horizontal seams within five feet of the slope's toe.
- ✓ Use qualified personnel to perform field welding and testing.
- ✓ Avoid excessive stress-strain on the liner
- ✓ The edges of all liners are anchored in the bottom of a compacted earth-filled trench that is at least 18 inches deep
- ✓ Ensure injection/withdrawal of fluids from the containment shall be through a header or diverter or other hardware that prevents damage to liner.
- ✓ Top of the levee shall be wide enough to install an anchor trench and provide adequate room for inspection and maintenance.

The design show that at any point of discharge into or suction from the recycling containment, the liner is protected from excessive hydrostatic force or mechanical damage. External discharge or suction lines do not penetrate the liner.

Pumping from the containment to hydraulic fracturing operations is the responsibility of stimulation contractors. Typically, lines are permanently placed in the containment with floats attached to prevent damage to the liner system. The containment may be equipped with permanent HDPE

stinger (supported by a sacrificial liner or geotextile) for withdrawal of fluid if the owner deems necessary during operations. Appendix A shows the details of the outflow pipes.

Leak Detection System Installation (see Appendix 4)

The recycling containment design has a leak detection system between the upper and lower geomembrane liners of 200-mil geonet to facilitate drainage sufficiently permeable to allow the transport of fluids to the observation ports. The leak detection system consists of a properly designed drainage and collection and removal system placed above the lower geomembrane liner in depressions. The slope of the interior sub-grade is approximately 1% toward the monitoring riser pipe to facilitate the earliest possible leak detection of the containment bottom. A pump may be placed in the observation port to provide for fluid removal. Piping will withstand chemical attack from any seepage; structural loading from stresses and disturbances from overlying water, cover materials, equipment operation or expansion or contraction

Signage

Installed signage per NMAC rules will be an upright sign no less than 12 inches by 24 inches and lettering not less than two inches in height in a conspicuous place on the fence surrounding the containment. The sign will be posted in a manner and location that a person can easily read the legend. The sign will provide the following information:

- ✓ the operator's name,
- ✓ the location of the site by quarter-quarter or unit letter, section, township and range, and
- ✓ emergency telephone numbers

Operating and Maintenance Plan

The operator will operate and maintain the lined earthen containment to contain liquids and solids (blow sand and minimal precipitates from the treated produced water) and maintain the integrity of the liner system in a manner that prevents contamination of surface or groundwater and protects public health and the environment as described below. The purpose of the lined earthen containment is to facilitate recycling, reuse and reclamation of produced water derived from nearby oil and gas wells. During periods when water for E&P operations is not needed, produced water will discharge to one of the injection wells in the operator's SWD system. The containment will not be used for the disposal of produced water or other oilfield waste.

The operation of the containment are summarized below.

a. Via pipeline, produced water generated from nearby oil and gas wells is delivered to a treatment system located as indicated in the C-147.

b. After treatment, the produced water discharges into the containment

c. When required, treated produced water is removed from the containment for E&P operations. At this time, treated produced water will be used for drilling beneath the fresh water zones (beneath surface casing), for well stimulation (e.g. hydraulic fracturing) and other E&P uses as approved by OCD.

d. Whenever the maximum fluid capacity of the containment is reached, treatment and discharge to the containment ceases (see Freeboard and Overtopping Plan, below)

e. The operator will keep accurate records and shall report monthly to the division the total volume of water received for recycling, with the amount of fresh water received listed separately, and the total volume of water leaving the facility for disposition by use on form C-148.

f. The operator will maintain accurate records that identify the sources and disposition of all recycled water that shall be made available for review by the division upon request.

g. The containment shall be deemed to have ceased operations if less than 20% of the total fluid capacity is used every six months following the first withdrawal of produced water for use. The operator will report cessation of operations to the appropriate division district office. The appropriate division district office may grant an extension to this determination of cessation of operations not to exceed six months.

The operation of the lined earthen containment will follow the mandates listed below:

1. The operator will not discharge into or store any hazardous waste (as defined by 40 CFR 261 and NMAC 19.15.2.7.H.3) in the containments.

2. If the containment's primary liner is compromised above the fluid's surface, the operator will repair the damage or initiate replacement of the primary liner within 48 hours of discovery or seek an extension of time from the division district office.
3. If the primary liner is compromised below the fluid's surface, the operator will remove all fluid above the damage or leak within 48 hours of discovery, notify the division district office and repair the damage or replace the primary liner.
4. If any penetration of the containment liner is confirmed by sampling of fluid in the leak detection system (see Inspection and monitoring plan), The operator will

    a. Begin and maintain fluid removal from the leak detection/pump-back system
    b. Notify the district office within 48 hours (phone or email) of the discovery
    c. Identify the location of the leak and
    d. Repair the damage or, if necessary, replace the containment liner

5. The operator will install, or maintain on site, an oil absorbent boom or other device to contain an unanticipated release and the operator will remove any visible layer of oil from the surface of the recycling containment.
6. The operator will report releases of fluid in a manner consistent with NMAC 19.15.29
7. The containment will be operated to prevent the collection of surface water run-on.
8. The operator will maintain the containment free of miscellaneous solid waste or debris.
9. The operator will maintain at least three feet of freeboard for the containment and will use a free-standing staff gauge to allow easy determination of the required 3-feet of freeboard.
10. As described in the design/construction plan, the injection or withdrawal of fluids from the containment is accomplished through a hardware that prevents damage to the liner by erosion, fluid jets or impact from installation and removal of hoses or pipes.
11. The operator shall ensure that all gates associated with the fence are closed and locked when responsible personnel are not onsite.
12. The operator will maintain the fences in good repair

Monitoring, Inspection, and Reporting Plan

The operator will inspect the recycling containment and associated leak detection systems weekly while it contains fluids. The operator shall maintain a current log of such inspections and make the log available for review by the division upon request. See Appendix 9 for a sample template of the Weekly Visual Inspection Report.

Weekly inspections consist of

- ✓ reading and recording the fluid height of staff gauges
- ✓ recording any evidence that the pond surface shows visible oil
- ✓ visually inspecting the containment's exposed liners
- ✓ checking the leak detection system for any evidence of a loss of integrity of the primary liner.

As stated above, if a liner's integrity is compromised, or if any penetration of the liner occurs above the water surface, then the operator will notify the District office within 48 hours (phone or email).

Monthly, the operator will

- ✓ Inspect diversion ditches and berms around the containment to check for erosion and collection of surface water run-on.
- ✓ Inspect the leak detection system for evidence of damage or malfunction and monitor for leakage
- ✓ Inspect the containment for dead migratory birds and other wildlife. 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.
- ✓ Report to the division the total volume of water received for recycling, with the amount of fresh water received listed separately, and the total volume of water leaving the facility for disposition by use of the form C-148.
- ✓ Record sources and disposition of all recycled water

The operator will maintain a log of all inspections and make the log available for the appropriate Division district office's review upon request. See Appendix 10 for a sample template of the Monthly Inspection Log.

Freeboard and Overtopping Prevention Plan

The method of operation of the containment allows for maintaining freeboard with very few potential problems. When the capacity of the containment is reached (3-feet of freeboard), the discharge of treated produced water ceases and the produced water generated by surrounding oil and gas wells is managed by injection into the nearby salt water disposal (SWD) well.

If rising water levels suggest that 3-feet of freeboard will not be maintained, the operator will implement one or more of the following options

I. Cease discharging treated produced water to the containment

II. Accelerate re-use of the treated produced water for purposes approved by the Division

III. Transfer treated produced water from the containment to the nearby salt water disposal (SWD) well.

The reading of the staff gauge typically occurs daily when treatment operations are ongoing and weekly when discharge to the containment is not occurring.

Protocol for Leak Detection Monitoring, Fluid Removal and Reporting

As shown in the attached Engineering Drawings (Appendix 4), the leak detection system includes a monitoring system. Any fluid released from the primary liner will flow to the collection sump where fluid level monitoring is possible at the monitoring riser pipe associated with the leak detection system.

The site operator may employ a portable electronic water level meter to determine if fluid exists in the monitoring riser pipe. Obtaining accurate readings of water levels in a sloped pipe beneath a containment can be a challenge. An electrician's wire snake may be required to push the probe to the bottom of the port and the probe may be fixed in a 2-inch pipe "dry housing" to avoid false readings due to water condensation on the pipe. There are many techniques to determine the existence of water in the sumps – including low flow pumps and a simple small bailer affixed to an electrician's snake. The operator will use the method that works best for this containment.

If seepage from the containment into the leak detection system is suspected by a positive fluid level measurement, the operator will

1. Re-measure fluid levels in the monitoring riser pipe on a daily basis for one week to determine the rate of seepage.
2. Collect a water sample from the monitoring riser pipe to confirm the seepage is treated produced water from the containment via field conductivity and chloride measurements.
3. Notify NMOCD of a confirmed positive detection in the system within 48- hours of sampling (initial notification).
4. Install a pump into the monitoring riser pipe sump to continually (manually on a daily basis or via automatic timers) remove fluids from the leak detection system into the containment until the liner is repaired or replaced.

5. Dispatch a liner professional to inspect the portion of the containment suspected of leakage during a “low water” monitoring event.
6. Provide NMOCD a second report describing the inspection and/or repair within 20 days of the initial notification

If the point of release is obvious from a low water inspection, the liner professional will repair the loss of integrity. If the point of release cannot be determined by the inspection, the liner professional will develop a more robust plan to identify the point(s) of release.

The inspection plan and schedule will be submitted to OCD with the second report. The operator will implement the plan upon OCD approval.

C-147 Recycling Containments Closure Plan

This C-147 closure plan contains the requirements and documentation for closure and site reclamation of recycling containments per NMAC 19.15.34.14.

Closure Criteria/Requirements

This closure plan will be executed when recycling containment operations have ceased or if less than 20% of the normal fluid capacity is used every six months following the first withdrawal of produced water for use.

1. Once operations have ceased, notification will be sent to the District 2 - New Mexico Oil Conservation Division Office.
2. After operations have ceased, all fluids will be removed within 60 days and the containment will be closed within six months.
3. All fluids, contents, and synthetic liners will be removed before closing of the containment and transferred to division approved facility. Fluids and contents may be removed by recycling, reusing, or reclaiming for operations.
4. The soil beneath the containment will be tested for impacts using a five point composite sample, including stained/wet soils, and analyzed for constituents in Table I (as required by NMAC 19.15.34.14). If the concentrations of a contaminant exceed the parameters in Table I, additional delineation and approval may be required by the division in order to proceed the closure process. If all concentrations of contaminants are below or equal to the parameters in Table I, the closure process will proceed with non-waste containing, uncontaminated, earthen material.

Table I **Closure Criteria for Recycling Containments**			
Depth below bottom of containment to groundwater less than 10,000 mg/l TDS	Constituent	Method*	Limit**
51 feet - 100 feet	Chloride	EPA 300.0	10,000 mg/kg
	TPH (GRO+DRO+MRO)	EPA SW-846 Method 8015M	2,500 mg/kg
	GRO+DRO	EPA SW-846 Method 8015M	1,000 mg/kg
	BTEX	EPA SW-846 Method 8021B or 8260B	50 mg/kg
	Benzene	EPA SW-846 Method 8021B or 8260B	10 mg/kg
> 100 feet	Chloride	EPA 300.0	20,000 mg/kg
	TPH (GRO+DRO+MRO)	EPA SW-846 Method 8015M	2,500 mg/kg
	GRO+DRO	EPA SW-846 Method 8015M	1,000 mg/kg
	BTEX	EPA SW-846 Method 8021B or 8260B	50 mg/kg
	Benzene	EPA SW-846 Method 8021B or 8260B	10 mg/kg

* Or other test methods approved by the division.

** Numerical limits or natural background level, whichever is greater.

[19.15.34.14 NMAC - N, 3/31/15]

Reclamation Criteria/Requirements

1. After the containment has been closed, either 1) the surface owner reclamation requirements will be completed; or 2) the location will be reclaimed to safe and stable conditions that blend into the surrounding undisturbed area. Topsoils and subsoils will be replaced to the original features of the area and contoured in order to achieve erosion control, long term stability, and maintain current surface flow patterns. During the first favorable growing season after closure, the area will be reseeded.
2. Reclamation will be deemed completed when all ground disturbance has ceased and a uniform vegetative cover has been established (life-form ratio of plus or minus 50% of pre disturbance level and total plant cover of at least 70% of pre-disturbance level).
3. Re-vegetation, reclamation, or any obligations imposed by the surface owner shall supersede these provisions and govern any obligations, provided that the other requirements provide equal or better protection of fresh water, human health, and the environment.

Documentation/Correspondence

1. Within 60 days after closure completion, a C-147 form closure report package, including all required attachments, will be submitted to the division. The division will be notified when reclamation and re-vegetation activities are completed.
2. As required, correspondence will be made to the surface owner when reclamation and re-vegetation are complete.

Financial Assurance Requirements for Recycling Containments

In accordance with NMAC 19.15.34.15.A(2), Oxy USA Inc. does not require additional financial assurance due to NMAC 19.15.8. These containments are limited to only wells owned or operated by Oxy.

Variances

The Cedar Canyon Recycling Facility and Containments C-147 Registration Package requests two variances: 1) To use an audible bird protection system as an alternative to netting the recycling containments and 2) An exception to the 50ft. setback criteria for depth to groundwater, due to the groundwater under the proposed containment location being designated as not fresh water by New Mexico Administrative Code (NMAC).

1. Depending on the pond size limitations, the recycling containment will either be netted, flagged, or equipped with an audible avian species protection system (Appendix 8), which effectively deters birds from approaching the area. This will serve to be protective of wildlife, including migratory birds in accordance with NMAC 19.15.34.12(E).

2. NMAC, Title 19, Chapter 15, Part 34 regulates produced water containments. Per 19.15.34.6, the objective of the rule is to "…afford reasonable protection against contamination of fresh water…". The State Engineer of New Mexico and 19.15.2.7F.(3) have defined protectable underground water as all waters in the State of New Mexico containing 10,000 milligrams/liter or less of total dissolved solids (TDS).

   Site-specific groundwater data (Appendix 11) obtained from 35ft. beneath the proposed containment show a TDS concentration of 75,700 mg/L and a chloride concentration of 40,500 mg/L. Recent field data obtained within 3 miles from the proposed containment show TDS concentration of 37,500 mg/L (Oxy Cedar Canyon 23 Federal 4H conductor boring) and TDS concentration of 58,600 mg/L (Oxy Cedar Canyon 27 Federal 6H mouse hole). This is consistent with chloride concentrations (based on a 1970 USGS report[1]) shown in Appendix 2 – Figure 1a.2. The groundwater movement in the Malaga Bend area is described in Appendix 11- Figure 3 from a 1954 USGS report[2]. The area between Malaga Bend to the north and the Pecos River to the east and south is underlain by a pressurized brine water-bearing zone in the basal Rustler Formation. The pressurized brine moved upward into the alluvium and the Pecos River creating a historic saline groundwater zone that seeps into the Pecos River. Recently, a private salt

company has begun pumping at Malaga Bend and transferring water to evaporation ponds. This and other interesting information are outlined in a Pecos River Commission presentation[3].

Based on this information, the TDS concentrations in the groundwater below the containment and surrounding area significantly exceeds a TDS concentration of 10,000 mg/L. Consequently, this ground water is not considered fresh water by NMAC definition, and the proposed recycling containment would afford reasonable protection against contamination of fresh water.

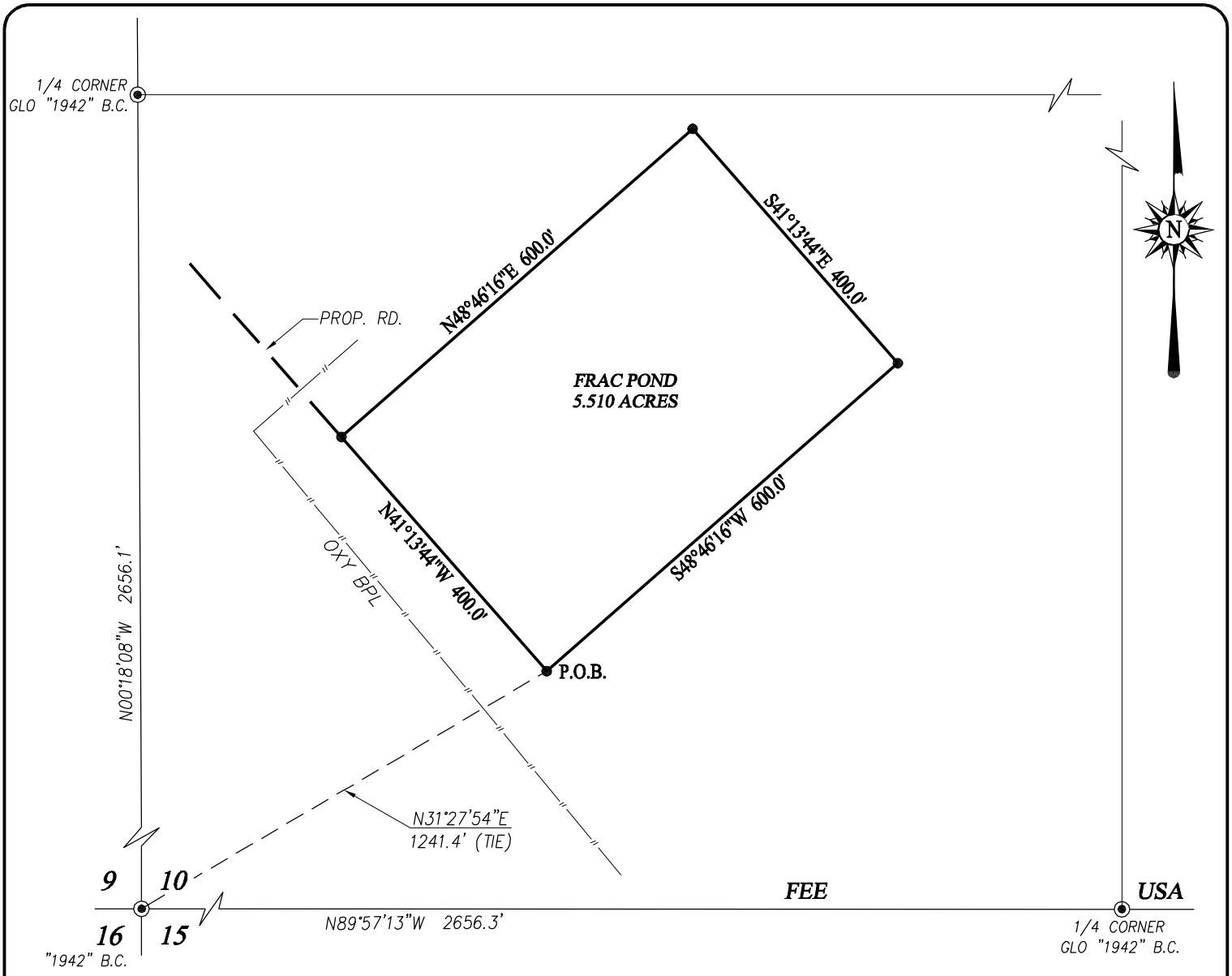
[1]1 Havens, J.S., 1970. Malaga Bend Experimental Salinity Alleviation Project – A Comprehensive Interim Report – Eddy County, NM. USGS in cooperation with the Pecos River Commission

[2]Hale, W.E. Hughes, L.S., and Cox, E.R. 1954. Possible Improvement of Quality. Of Water of the Pecos River by Diversion of Brine at Malaga Bend, Eddy County, NM. Pecos River Commission New Mexico and Texas, in cooperation with United States Department of the Interior, Geological Survey, Water Resources Division, Carlsbad, NM.

[3]http://pecosbasin.tamu.edu/media/453325/malaga-bend-ppt_prc-meeting_april-2014.pdf

Appendices

Appendix 1 – Survey Plats



LEGEND

- ◉ DENOTES FOUND CORNER AS NOTED
- ● DENOTES SET SPIKE NAIL

NOTE

BEARINGS SHOWN HEREON ARE MERCATOR GRID AND CONFORM TO THE NEW MEXICO COORDINATE SYSTEM "NEW MEXICO EAST ZONE" NORTH AMERICAN DATUM 1983. DISTANCES ARE SURFACE VALUES.

I, RONALD J. EIDSON, NEW MEXICO PROFESSIONAL SURVEYOR No. 3239, DO HEREBY CERTIFY THAT THIS 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.

RONALD J. EIDSON Ronald J Eidson

DATE: 05/25/2017

RONALD J. EIDSON NEW MEXICO 3239 REGISTERED PROFESSIONAL SURVEYOR

DESCRIPTION:

A PROPOSED TRACT SITUATED IN THE SOUTHWEST QUARTER OF SECTION 10, TOWNSHIP 24 SOUTH, RANGE 29 EAST, N.M.P.M., EDDY COUNTY, NEW MEXICO AND BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT THE SOUTHWEST CORNER OF THE PROPOSED TRACT WHICH LIES N31°27'54"E 1241.4 FEET FROM THE SOUTHWEST CORNER; THEN N41°13'44"W 400.0 FEET; THEN N48°46'16"E 600.0 FEET; THEN S41°13'44"E 400.0 FEET; THEN S48°46'16"W 600.0 FEET TO THE POINT OF BEGINNING AND CONTAINING 5.510 ACRES MORE OR LESS.

200 0 200 400 Feet

Scale: 1"=200'

OXY U.S.A. INC.

SURVEY FOR A FRAC POND
SITUATED IN THE SW/4 OF SECTION 10,
TOWNSHIP 24 SOUTH, RANGE 29 EAST, N.M.P.M.
EDDY COUNTY, NEW MEXICO

PROVIDING SURVEYING SERVICES
SINCE 1946
JOHN WEST SURVEYING COMPANY
412 N. DAL PASO HOBBS, N.M. 88240
(575) 393-3117 www.jwsc.biz
TBPLS# 10021000

Survey Date: 5/11/17	CAD Date: 5/23/17	Drawn By: ACK
W.O. No.: 17110453	Rev: .	Rel. W.O.:	Sheet 1 of 1

C-147 Registration Package

Cedar Canyon Recycling Facility
Cedar Canyon – West Recycling Containment (B)

Submitted: August 10th, 2017

Prepared by:
Oxy Environmental – Dylan Allen
Oxy Facilities Engineering – Trey Fournier

Pettigrew and Associates – Claudius Sanchez

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: Oxy USA, Inc. (For multiple operators attach page with information) OGRID #: 16696
Address: 5 Greenway Plaza, Ste. 110, Houston, Texas 77046
Facility or well name (include API# if associated with a well): Cedar Canyon 15 Produced Water Recycle Facility
OCD Permit Number: _____ (For new facilities the permit number will be assigned by the district office)
U/L or Qtr/Qtr K Section 15 Township 24 S Range 29 E County: Eddy
Surface Owner: ☐ Federal ☐ State ☒ Private ☐ Tribal Trust or Indian Allotment

2.
☒ **Recycling Facility:**
Location of recycling facility (if applicable): Latitude 32.216187 Longitude -103.975685 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:** Cedar Canyon – West Recycling Containment "B" (U/L: L, Section 10, T24S R29E, Eddy County)
☐ Annual Extension after initial 5 years (attach summary of monthly leak detection inspections for previous year)
Center of Recycling Containment (if applicable): Latitude 32.228489 Longitude -103.978922 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 _____
☐ String-Reinforced
Liner Seams: ☒ Welded ☐ Factory ☐ Other _____ Volume: 194,000 bbl Dimensions: L 300' x W 400' x D 27.5'
☐ 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 6 ft. chain-link with barbed wire 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): Dylan Allen Title: Environmental Specialist

Signature: Date: 8/10/2017

e-mail address: Dylan_Allen@oxy.com Telephone: 432-685-5614

11.
OCD Representative Signature: **Approval Date:**

Title: **OCD Permit Number:**

☐ OCD Conditions
☐ Additional OCD Conditions on Attachment

Table of Contents

Introduction

In accordance with NMAC 19.15.34, Oxy USA Inc. requests the modification of the Cedar Canyon Recycling Facility and registration of the proposed Cedar Canyon – West Recycling Containment "B" through the approval of this C-147 registration package. The facility and containments will be used to treat and recycle produced water for re-use in Oxy USA Inc. drilling/completion activities.

This package contains the C-147 form and associated documents for modification of the Cedar Canyon Recycling Facility and registration of the Cedar Canyon – West Recycling Containment "B".

A copy of the C-147 will be submitted to the private land owner.

Siting Criteria for Recycling Containments – Cedar Canyon

All figures and maps located in Appendix 2.

Distance to Groundwater

Figure 1a, Figure 1a.2, Figure 1a.3, Figure 1b and the 80 ft. boring report (Appendix 3) demonstrate the depth to groundwater and groundwater quality trend in the surrounding area. In Figure 1a and Figure 1a.2, the area is characterized by relatively shallow groundwater with high chloride concentrations. Figure 1b shows that the proposed recycling containment is not within a "Highly Sensitive" aquifer area. Figure 1a.3 and Table 1 show the nearest New Mexico Office of the State Engineer mapped water wells. A geologic map of the area is shown in Figure 1a.1.

A geotechnical analysis, consisting of four exploratory borings (three 30 ft. borings, one 80 ft. boring), was performed on the Cedar Canyon – Recycling Containments site area. Groundwater was encountered at 35' below ground surface. A groundwater sample taken from below the proposed containment showed a TDS concentration of 75,700 mg/L and a chloride concentration of 40,500 mg/L; therefore, the water is not considered fresh water or protectable groundwater by the New Mexico Administrative Code. The variance request for the 50ft. setback criteria is outlined in the "Variances" section (Page 16) of this registration package. An analysis of the soil showed the site consists of up to 3' of red silty sand, underlain by 5' of tan clayey sand, underlain by 22' of alternating layers of red silty sand and tan clayey sands.

Distance to Subsurface Mines

Figures 1c and 1d demonstrate that the recycling containment is not located within the area overlying a subsurface mine. Figure 1c is a map from the NM EMNRD – Mining and Mineral Division verifying the recycling containment is not near an active mine. Figure 1d shows that there are not any near caliche pits and the recycling containment area is not within a potash lease.

Distance to Cave/Karst High or Critical Areas

Figure 1f demonstrate that the proposed containment is located in a BLM designated "Medium Potential" cave/karst area. The nearest "Low Potential" cave/karst area is located 0.75 miles southeast. The nearest "High Potential" cave/karst area is located 3.8 miles southwest. A geotechnical analysis consisting of four exploratory borings (three 30 ft. borings, one 80 ft. boring) was performed on the Cedar Canyon – Recycling Containments site area. There were no karst features found during the geotechnical analysis. Soil conditions and analysis are discussed in depth in the Geotechnical/Boring Report (Appendix 3).

Distance to Surface Water

Figures 1h and 1g demonstrate that the proposed recycling containment is not located within 300 feet of a continuously flowing watercourse, or 200 feet of any other significant watercourse, or lakebed,

sinkhole, or playa lake (measure from the ordinary high-water mark). The nearest continuously flowing water course is the Pecos River located approximately 0.75 miles southwest. The nearest significant watercourse, as designated by the BLM, is approximately 0.5 miles east. According to the National Wetlands Inventory (Figure 1i), the nearest freshwater pond is approximately 1000 feet northeast. This siting criteria was verified by a visual inspection of the proposed site.

Distance to Non-Public Water Supply

Figure 1a.3 demonstrates that the proposed recycling containment is not located 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 the initial application. The OSE database shows the nearest well (C-004642) is approximately 1 mile southwest of the proposed recycling containment. This water well appears to be used for a USGS monitoring well. A site inspection also verified no fresh water wells or springs within 500 horizontal feet of the proposed recycling containment.

Distance to Structures

Figure 1h demonstrates that the proposed recycling containment is not located within 1000 feet from a permanent residence, school, hospital, institution, or church in existence at the time of initial application. The nearest structures are oil and gas wells and tank batteries.

Distance to Wetlands

Figure 1i demonstrates that the proposed recycling containment is not within 500 feet of a wetland. According to the U.S. Fish and Wildlife Service National Wetlands Inventory map, the nearest wetland is a riverine located approximately 1000 feet east. This was verified by a visual inspection of the site and a topographic map (Figure 1g).

Distance to Municipal Boundaries and Defined Fresh Water Fields

Figure 1j demonstrates that the proposed recycling containment is not 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. The closest municipal fresh water field (Sheep Draw) is approximately 20 miles east and services Carlsbad (20 miles northwest).

Distance to 100-Year Floodplain

Figure 1k and the FEMA Flood Insurance Rate Map (FIRM) (Appendix 7) demonstrates that the proposed recycling containment is not within a 100-year floodplain. The FEMA FIRM map shows the proposed recycling containment to be located in “Zone X”: Area determined to be outside the 0.2% annual chance

floodplain. This is confirmed by the BLM Flood Zone layer shown in Figure 1k. The nearest 100-year floodplain area is located 0.4 miles south.

Design and Construction Plan – Recycling Containments

This plan addresses construction of lined earthen containments. Field conditions may create the need for minor modification of the containment design (e.g. changing the length, width or depth).

Engineering Drawings (Appendix 4)

The design elements are addressed in the section of this submission containing the engineering drawings. The recommendations for compaction and preparation of the liner foundation will be based on site-specific and nearby data. The operator, engineer, and selected contractor will review the recommendations prior to beginning work on the liner foundation and adhere to the specific recommendations.

The proposed design and operation provide for the confinement of treated produced water, to prevent releases and to prevent overtopping due to wave action or rainfall. Additionally, the design prevents run-on of surface water as the containment is surrounded by an above-grade levee (a berm) and diversion ditch (between the levee and the soil stockpile) to prevent run-on of surface water.

Fencing & Netting for Wildlife Protection

The design offers multiple solutions for wildlife protection. This includes a fence to enclose the recycling containment in a manner that deters unauthorized wildlife and human access. The fence will either be a barbed wire fence with four strands evenly spaced in the interval between 1 foot and 4 feet above ground level – satisfying the minimum requirements or a 6 ft. chain-link fence with barbwire on top – in order to provide extra protection.

Depending on the pond size limitations, the recycling containment will either be netted, flagged, or equipped with an audible avian species protection system (Appendix 8), which effectively deters birds from approaching the area. This will serve to be protective of wildlife, including migratory birds in accordance with NMAC 19.15.34.12(E).

The O&M plan calls for the operator to inspect the containments on a monthly basis 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.

Material Excavated

Where topsoil is present, prior to constructing containment, the operator will strip and stockpile the topsoil for use as the final cover or fill at the time of closure. The topsoil will be stockpiled adjacent to containment levee, outside of working areas. The operator will take care to limit the height of the soil stockpile to allow the soil to remain aerobic. Material excavated during construction will not be located within a 100 feet of continuously flowing water course and/or lakebed, or 200 feet of any other significant watercourse and/or wetland.

Earthwork

A geotechnical assessment will be performed prior to construction to develop recommendations regarding the foundation for the containment liner. The containment will have a properly constructed foundation and interior slopes consisting of a firm, unyielding base that is smooth and free of rocks, debris, sharp edges or irregularities to prevent the liner's rupture or tear. Geotextile will be placed under the liner as needed to reduce localized stress-strain or protuberances that otherwise may compromise the liner's integrity. The containment will be constructed in compliance with NMAC requirements as shown below;

- ✓ Inside grade no steeper than two horizontal feet to one vertical foot (2H:1V).
- ✓ Outside grade is no steeper than three horizontal feet to one vertical foot (3H:1V)
- ✓ Top of the berm is wide enough to install an anchor trench and provide adequate room for inspection and maintenance.
- ✓ Caliche gravel placed on the outside levee provides additional erosion control.
- ✓ The containment is excavated into the ground such that most of fluid force lies against native earth and the engineered foundation

Field conditions may create the need for changes to the design. Any changes to the construction or grade requirements due to unforeseen conditions will be reviewed and approved prior to initiating installation of the liner system. Any design change that does not conform to the NMOCD Rule will be the subject of a variance request and will be submitted to the OCD for review and approval.

Liner Installation (see Appendix 4)

The containment will have a primary (upper) liner and a secondary (lower) liner with a leak detection system appropriate to the site's conditions.

Liner installation will be in compliance with the NMAC requirement. The proposed primary (upper) liner is a 60-mil HDPE geomembrane liner composed of an impervious, synthetic material that is resistant to ultraviolet light, petroleum hydrocarbons, salts and acidic and alkaline solutions. The proposed secondary liner is 30-mil LLDPE string reinforced. Liner compatibility meets or exceeds a subsequent relevant publication to

EPA SW -846 method 9090A.

The liners and drainage material will be installed consistent with the Manufacture's specifications. In addition to any specifications of the Manufacturer, protocols for liner installation include measures to:

- ✓ Minimize liner seams and orient them up and down, not across, a slope of the levee.
- ✓ Use factory welded seams where possible.
- ✓ Ensure field seams in geosynthetic material are thermally seamed and prior to field seaming, overlap liners four to six inches.
- ✓ Minimize the number of field seams and comers and irregularly shaped areas.
- ✓ Ensure no horizontal seams within five feet of the slope's toe.
- ✓ Use qualified personnel to perform field welding and testing.
- ✓ Avoid excessive stress-strain on the liner
- ✓ The edges of all liners are anchored in the bottom of a compacted earth-filled trench that is at least 18 inches deep
- ✓ Ensure injection/withdrawal of fluids from the containment shall be through a header or diverter or other hardware that prevents damage to liner.
- ✓ Top of the levee shall be wide enough to install an anchor trench and provide adequate room for inspection and maintenance.

The design show that at any point of discharge into or suction from the recycling containment, the liner is protected from excessive hydrostatic force or mechanical damage. External discharge or suction lines do not penetrate the liner.

Pumping from the containment to hydraulic fracturing operations is the responsibility of stimulation contractors. Typically, lines are permanently placed in the containment with floats attached to prevent damage to the liner system. The containment may be equipped with permanent HDPE

stinger (supported by a sacrificial liner or geotextile) for withdrawal of fluid if the owner deems necessary during operations. Appendix A shows the details of the outflow pipes.

Leak Detection System Installation (see Appendix 4)

The recycling containment design has a leak detection system between the upper and lower geomembrane liners of 200-mil geonet to facilitate drainage sufficiently permeable to allow the transport of fluids to the observation ports. The leak detection system consists of a properly designed drainage and collection and removal system placed above the lower geomembrane liner in depressions. The slope of the interior sub-grade is approximately 1% toward the monitoring riser pipe to facilitate the earliest possible leak detection of the containment bottom. A pump may be placed in the observation port to provide for fluid removal. Piping will withstand chemical attack from any seepage; structural loading from stresses and disturbances from overlying water, cover materials, equipment operation or expansion or contraction

Signage

Installed signage per NMAC rules will be an upright sign no less than 12 inches by 24 inches and lettering not less than two inches in height in a conspicuous place on the fence surrounding the containment. The sign will be posted in a manner and location that a person can easily read the legend. The sign will provide the following information:

- ✓ the operator's name,
- ✓ the location of the site by quarter-quarter or unit letter, section, township and range, and
- ✓ emergency telephone numbers

Operating and Maintenance Plan

The operator will operate and maintain the lined earthen containment to contain liquids and solids (blow sand and minimal precipitates from the treated produced water) and maintain the integrity of the liner system in a manner that prevents contamination of surface or groundwater and protects public health and the environment as described below. The purpose of the lined earthen containment is to facilitate recycling, reuse and reclamation of produced water derived from nearby oil and gas wells. During periods when water for E&P operations is not needed, produced water will discharge to one of the injection wells in the operator's SWD system. The containment will not be used for the disposal of produced water or other oilfield waste.

The operation of the containment are summarized below.

a. Via pipeline, produced water generated from nearby oil and gas wells is delivered to a treatment system located as indicated in the C-147.

b. After treatment, the produced water discharges into the containment

c. When required, treated produced water is removed from the containment for E&P operations. At this time, treated produced water will be used for drilling beneath the fresh water zones (beneath surface casing), for well stimulation (e.g. hydraulic fracturing) and other E&P uses as approved by OCD.

d. Whenever the maximum fluid capacity of the containment is reached, treatment and discharge to the containment ceases (see Freeboard and Overtopping Plan, below)

e. The operator will keep accurate records and shall report monthly to the division the total volume of water received for recycling, with the amount of fresh water received listed separately, and the total volume of water leaving the facility for disposition by use on form C-148.

f. The operator will maintain accurate records that identify the sources and disposition of all recycled water that shall be made available for review by the division upon request.

g. The containment shall be deemed to have ceased operations if less than 20% of the total fluid capacity is used every six months following the first withdrawal of produced water for use. The operator will report cessation of operations to the appropriate division district office. The appropriate division district office may grant an extension to this determination of cessation of operations not to exceed six months.

The operation of the lined earthen containment will follow the mandates listed below:

1. The operator will not discharge into or store any hazardous waste (as defined by 40 CFR 261 and NMAC 19.15.2.7.H.3) in the containments.

2. If the containment's primary liner is compromised above the fluid's surface, the operator will repair the damage or initiate replacement of the primary liner within 48 hours of discovery or seek an extension of time from the division district office.
3. If the primary liner is compromised below the fluid's surface, the operator will remove all fluid above the damage or leak within 48 hours of discovery, notify the division district office and repair the damage or replace the primary liner.
4. If any penetration of the containment liner is confirmed by sampling of fluid in the leak detection system (see Inspection and monitoring plan), The operator will

    a. Begin and maintain fluid removal from the leak detection/pump-back system
    b. Notify the district office within 48 hours (phone or email) of the discovery
    c. Identify the location of the leak and
    d. Repair the damage or, if necessary, replace the containment liner

5. The operator will install, or maintain on site, an oil absorbent boom or other device to contain an unanticipated release and the operator will remove any visible layer of oil from the surface of the recycling containment.
6. The operator will report releases of fluid in a manner consistent with NMAC 19.15.29
7. The containment will be operated to prevent the collection of surface water run-on.
8. The operator will maintain the containment free of miscellaneous solid waste or debris.
9. The operator will maintain at least three feet of freeboard for the containment and will use a free-standing staff gauge to allow easy determination of the required 3-feet of freeboard.
10. As described in the design/construction plan, the injection or withdrawal of fluids from the containment is accomplished through a hardware that prevents damage to the liner by erosion, fluid jets or impact from installation and removal of hoses or pipes.
11. The operator shall ensure that all gates associated with the fence are closed and locked when responsible personnel are not onsite.
12. The operator will maintain the fences in good repair

Monitoring, Inspection, and Reporting Plan

The operator will inspect the recycling containment and associated leak detection systems weekly while it contains fluids. The operator shall maintain a current log of such inspections and make the log available for review by the division upon request. See Appendix 9 for a sample template of the Weekly Visual Inspection Report.

Weekly inspections consist of

- ✓ reading and recording the fluid height of staff gauges
- ✓ recording any evidence that the pond surface shows visible oil
- ✓ visually inspecting the containment's exposed liners
- ✓ checking the leak detection system for any evidence of a loss of integrity of the primary liner.

As stated above, if a liner's integrity is compromised, or if any penetration of the liner occurs above the water surface, then the operator will notify the District office within 48 hours (phone or email).

Monthly, the operator will

- ✓ Inspect diversion ditches and berms around the containment to check for erosion and collection of surface water run-on.
- ✓ Inspect the leak detection system for evidence of damage or malfunction and monitor for leakage
- ✓ Inspect the containment for dead migratory birds and other wildlife. 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.
- ✓ Report to the division the total volume of water received for recycling, with the amount of fresh water received listed separately, and the total volume of water leaving the facility for disposition by use of the form C-148.
- ✓ Record sources and disposition of all recycled water

The operator will maintain a log of all inspections and make the log available for the appropriate Division district office's review upon request. See Appendix 10 for a sample template of the Monthly Inspection Log.

Freeboard and Overtopping Prevention Plan

The method of operation of the containment allows for maintaining freeboard with very few potential problems. When the capacity of the containment is reached (3-feet of freeboard), the discharge of treated produced water ceases and the produced water generated by surrounding oil and gas wells is managed by injection into the nearby salt water disposal (SWD) well.

If rising water levels suggest that 3-feet of freeboard will not be maintained, the operator will implement one or more of the following options

I. Cease discharging treated produced water to the containment

II. Accelerate re-use of the treated produced water for purposes approved by the Division

III. Transfer treated produced water from the containment to the nearby salt water disposal (SWD) well.

The reading of the staff gauge typically occurs daily when treatment operations are ongoing and weekly when discharge to the containment is not occurring.

Protocol for Leak Detection Monitoring, Fluid Removal and Reporting

As shown in the attached Engineering Drawings (Appendix 4), the leak detection system includes a monitoring system. Any fluid released from the primary liner will flow to the collection sump where fluid level monitoring is possible at the monitoring riser pipe associated with the leak detection system.

The site operator may employ a portable electronic water level meter to determine if fluid exists in the monitoring riser pipe. Obtaining accurate readings of water levels in a sloped pipe beneath a containment can be a challenge. An electrician's wire snake may be required to push the probe to the bottom of the port and the probe may be fixed in a 2-inch pipe "dry housing" to avoid false readings due to water condensation on the pipe. There are many techniques to determine the existence of water in the sumps – including low flow pumps and a simple small bailer affixed to an electrician's snake. The operator will use the method that works best for this containment.

If seepage from the containment into the leak detection system is suspected by a positive fluid level measurement, the operator will

1. Re-measure fluid levels in the monitoring riser pipe on a daily basis for one week to determine the rate of seepage.
2. Collect a water sample from the monitoring riser pipe to confirm the seepage is treated produced water from the containment via field conductivity and chloride measurements.
3. Notify NMOCD of a confirmed positive detection in the system within 48- hours of sampling (initial notification).
4. Install a pump into the monitoring riser pipe sump to continually (manually on a daily basis or via automatic timers) remove fluids from the leak detection system into the containment until the liner is repaired or replaced.

5. Dispatch a liner professional to inspect the portion of the containment suspected of leakage during a “low water” monitoring event.
6. Provide NMOCD a second report describing the inspection and/or repair within 20 days of the initial notification

If the point of release is obvious from a low water inspection, the liner professional will repair the loss of integrity. If the point of release cannot be determined by the inspection, the liner professional will develop a more robust plan to identify the point(s) of release.

The inspection plan and schedule will be submitted to OCD with the second report. The operator will implement the plan upon OCD approval.

C-147 Recycling Containments Closure Plan

This C-147 closure plan contains the requirements and documentation for closure and site reclamation of recycling containments per NMAC 19.15.34.14.

Closure Criteria/Requirements

This closure plan will be executed when recycling containment operations have ceased or if less than 20% of the normal fluid capacity is used every six months following the first withdrawal of produced water for use.

1. Once operations have ceased, notification will be sent to the District 2 - New Mexico Oil Conservation Division Office.
2. After operations have ceased, all fluids will be removed within 60 days and the containment will be closed within six months.
3. All fluids, contents, and synthetic liners will be removed before closing of the containment and transferred to division approved facility. Fluids and contents may be removed by recycling, reusing, or reclaiming for operations.
4. The soil beneath the containment will be tested for impacts using a five point composite sample, including stained/wet soils, and analyzed for constituents in Table I (as required by NMAC 19.15.34.14). If the concentrations of a contaminant exceed the parameters in Table I, additional delineation and approval may be required by the division in order to proceed the closure process. If all concentrations of contaminants are below or equal to the parameters in Table I, the closure process will proceed with non-waste containing, uncontaminated, earthen material.

Table I **Closure Criteria for Recycling Containments**			
Depth below bottom of containment to groundwater less than 10,000 mg/l TDS	Constituent	Method*	Limit**
51 feet - 100 feet	Chloride	EPA 300.0	10,000 mg/kg
	TPH (GRO+DRO+MRO)	EPA SW-846 Method 8015M	2,500 mg/kg
	GRO+DRO	EPA SW-846 Method 8015M	1,000 mg/kg
	BTEX	EPA SW-846 Method 8021B or 8260B	50 mg/kg
	Benzene	EPA SW-846 Method 8021B or 8260B	10 mg/kg
> 100 feet	Chloride	EPA 300.0	20,000 mg/kg
	TPH (GRO+DRO+MRO)	EPA SW-846 Method 8015M	2,500 mg/kg
	GRO+DRO	EPA SW-846 Method 8015M	1,000 mg/kg
	BTEX	EPA SW-846 Method 8021B or 8260B	50 mg/kg
	Benzene	EPA SW-846 Method 8021B or 8260B	10 mg/kg

* Or other test methods approved by the division.

** Numerical limits or natural background level, whichever is greater.

[19.15.34.14 NMAC - N, 3/31/15]

Reclamation Criteria/Requirements

1. After the containment has been closed, either 1) the surface owner reclamation requirements will be completed; or 2) the location will be reclaimed to safe and stable conditions that blend into the surrounding undisturbed area. Topsoils and subsoils will be replaced to the original features of the area and contoured in order to achieve erosion control, long term stability, and maintain current surface flow patterns. During the first favorable growing season after closure, the area will be reseeded.
2. Reclamation will be deemed completed when all ground disturbance has ceased and a uniform vegetative cover has been established (life-form ratio of plus or minus 50% of pre disturbance level and total plant cover of at least 70% of pre-disturbance level).
3. Re-vegetation, reclamation, or any obligations imposed by the surface owner shall supersede these provisions and govern any obligations, provided that the other requirements provide equal or better protection of fresh water, human health, and the environment.

Documentation/Correspondence

1. Within 60 days after closure completion, a C-147 form closure report package, including all required attachments, will be submitted to the division. The division will be notified when reclamation and re-vegetation activities are completed.
2. As required, correspondence will be made to the surface owner when reclamation and re-vegetation are complete.

Financial Assurance Requirements for Recycling Containments

In accordance with NMAC 19.15.34.15.A(2), Oxy USA Inc. does not require additional financial assurance due to NMAC 19.15.8. These containments are limited to only wells owned or operated by Oxy.

Variances

The Cedar Canyon Recycling Facility and Containments C-147 Registration Package requests two variances: 1) To use an audible bird protection system as an alternative to netting the recycling containments and 2) An exception to the 50ft. setback criteria for depth to groundwater, due to the groundwater under the proposed containment location being designated as not fresh water by New Mexico Administrative Code (NMAC).

1. Depending on the pond size limitations, the recycling containment will either be netted, flagged, or equipped with an audible avian species protection system (Appendix 8), which effectively deters birds from approaching the area. This will serve to be protective of wildlife, including migratory birds in accordance with NMAC 19.15.34.12(E).

2. NMAC, Title 19, Chapter 15, Part 34 regulates produced water containments. Per 19.15.34.6, the objective of the rule is to "…afford reasonable protection against contamination of fresh water…". The State Engineer of New Mexico and 19.15.2.7F.(3) have defined protectable underground water as all waters in the State of New Mexico containing 10,000 milligrams/liter or less of total dissolved solids (TDS).

   Site-specific groundwater data (Appendix 11) obtained from 35ft. beneath the proposed containment show a TDS concentration of 75,700 mg/L and a chloride concentration of 40,500 mg/L. Recent field data obtained within 3 miles from the proposed containment show TDS concentration of 37,500 mg/L (Oxy Cedar Canyon 23 Federal 4H conductor boring) and TDS concentration of 58,600 mg/L (Oxy Cedar Canyon 27 Federal 6H mouse hole). This is consistent with chloride concentrations (based on a 1970 USGS report[1]) shown in Appendix 2 – Figure 1a.2. The groundwater movement in the Malaga Bend area is described in Appendix 11- Figure 3 from a 1954 USGS report[2]. The area between Malaga Bend to the north and the Pecos River to the east and south is underlain by a pressurized brine water-bearing zone in the basal Rustler Formation. The pressurized brine moved upward into the alluvium and the Pecos River creating a historic saline groundwater zone that seeps into the Pecos River. Recently, a private salt

company has begun pumping at Malaga Bend and transferring water to evaporation ponds. This and other interesting information are outlined in a Pecos River Commission presentation[3].

Based on this information, the TDS concentrations in the groundwater below the containment and surrounding area significantly exceeds a TDS concentration of 10,000 mg/L. Consequently, this ground water is not considered fresh water by NMAC definition, and the proposed recycling containment would afford reasonable protection against contamination of fresh water.

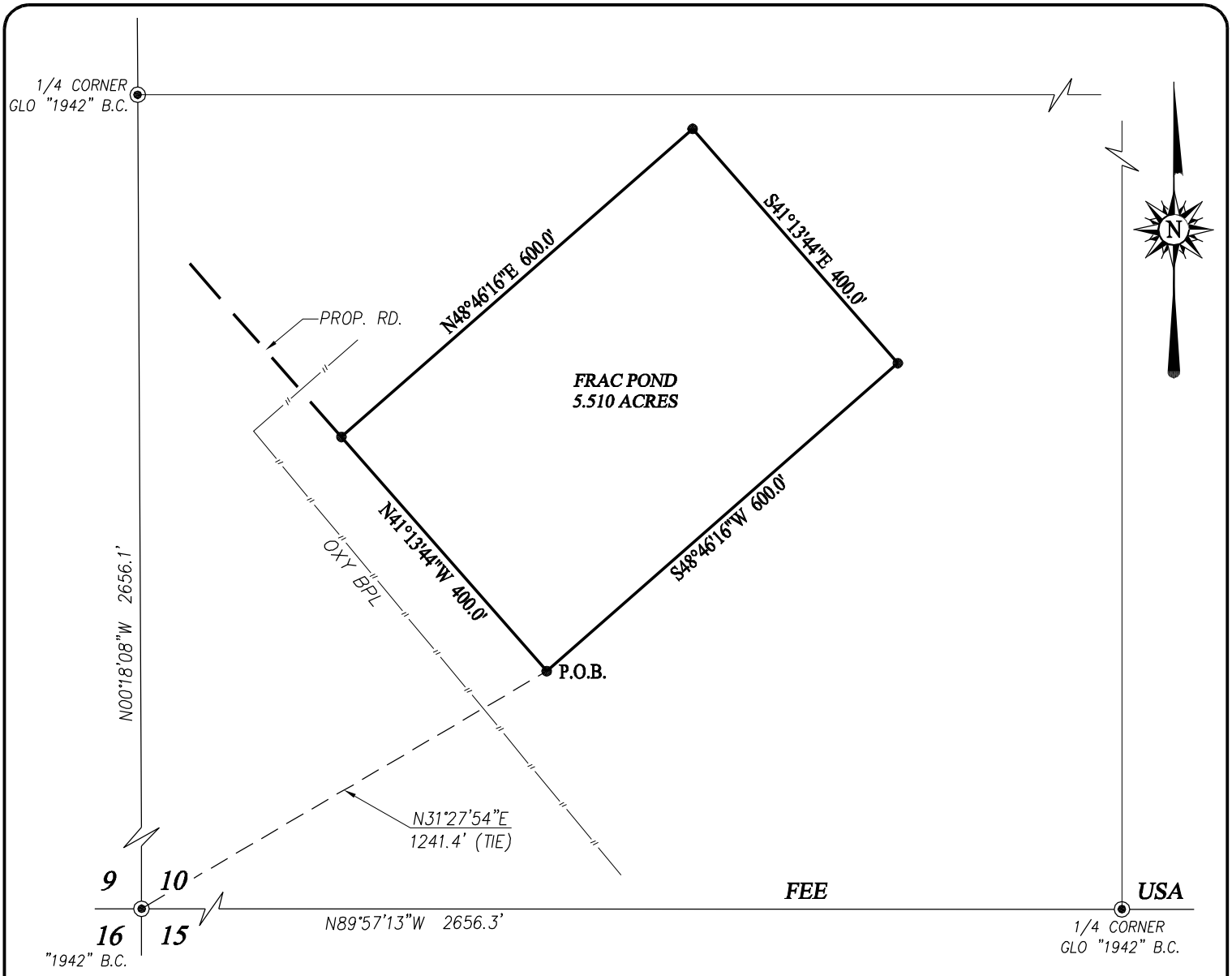
[1]1 Havens, J.S., 1970. Malaga Bend Experimental Salinity Alleviation Project – A Comprehensive Interim Report – Eddy County, NM. USGS in cooperation with the Pecos River Commission

[2]Hale, W.E. Hughes, L.S., and Cox, E.R. 1954. Possible Improvement of Quality. Of Water of the Pecos River by Diversion of Brine at Malaga Bend, Eddy County, NM. Pecos River Commission New Mexico and Texas, in cooperation with United States Department of the Interior, Geological Survey, Water Resources Division, Carlsbad, NM.

[3]http://pecosbasin.tamu.edu/media/453325/malaga-bend-ppt_prc-meeting_april-2014.pdf

Appendices

Appendix 1 – Survey Plats



LEGEND

- ◉ DENOTES FOUND CORNER AS NOTED
- ● DENOTES SET SPIKE NAIL

NOTE

BEARINGS SHOWN HEREON ARE MERCATOR GRID AND CONFORM TO THE NEW MEXICO COORDINATE SYSTEM "NEW MEXICO EAST ZONE" NORTH AMERICAN DATUM 1983. DISTANCES ARE SURFACE VALUES.

I, RONALD J. EIDSON, NEW MEXICO PROFESSIONAL SURVEYOR No. 3239, DO HEREBY CERTIFY THAT THIS 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.

RONALD J. EIDSON Ronald J Eidson

DATE: 05/25/2017

RONALD J. EIDSON NEW MEXICO 3239 REGISTERED PROFESSIONAL SURVEYOR

DESCRIPTION:

A PROPOSED TRACT SITUATED IN THE SOUTHWEST QUARTER OF SECTION 10, TOWNSHIP 24 SOUTH, RANGE 29 EAST, N.M.P.M., EDDY COUNTY, NEW MEXICO AND BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT THE SOUTHWEST CORNER OF THE PROPOSED TRACT WHICH LIES N31°27'54"E 1241.4 FEET FROM THE SOUTHWEST CORNER; THEN N41°13'44"W 400.0 FEET; THEN N48°46'16"E 600.0 FEET; THEN S41°13'44"E 400.0 FEET; THEN S48°46'16"W 600.0 FEET TO THE POINT OF BEGINNING AND CONTAINING 5.510 ACRES MORE OR LESS.

200 0 200 400 Feet

Scale: 1"=200'

PROVIDING SURVEYING SERVICES
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JOHN WEST SURVEYING COMPANY
412 N. DAL PASO HOBBS, N.M. 88240
(575) 393-3117 www.jwsc.biz
TBPLS# 10021000

OXY U.S.A. INC.

**SURVEY FOR A FRAC POND
SITUATED IN THE SW/4 OF SECTION 10,
TOWNSHIP 24 SOUTH, RANGE 29 EAST, N.M.P.M.
EDDY COUNTY, NEW MEXICO**

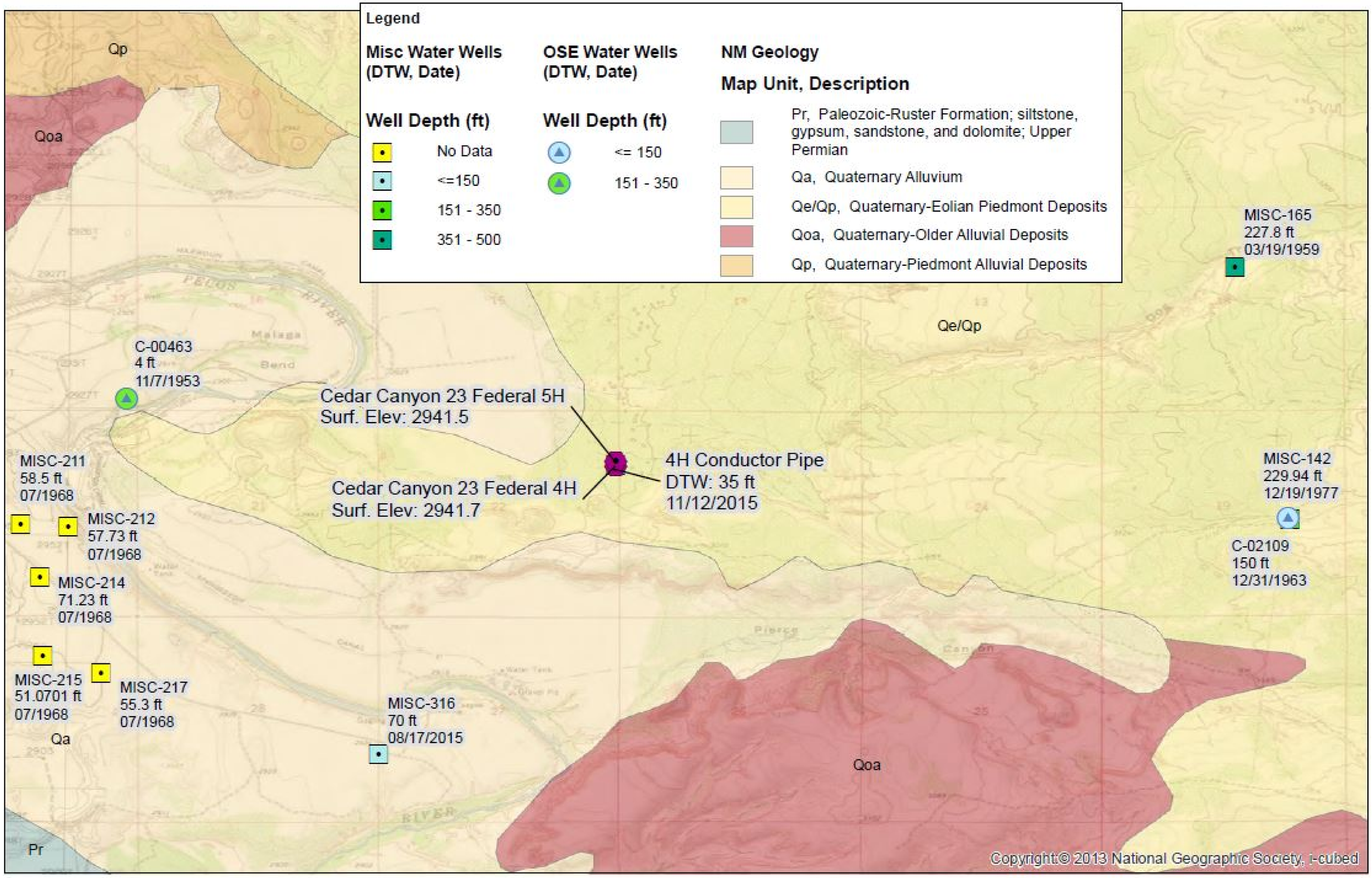
Survey Date: 5/11/17	CAD Date: 5/23/17	Drawn By: ACK
W.O. No.: 17110453	Rev: .	Rel. W.O.:	Sheet 1 of 1

Appendices

Appendix 2 – Cedar Canyon- Recycling Containment Figures and Maps

Depth to Groundwater

Figure 1a



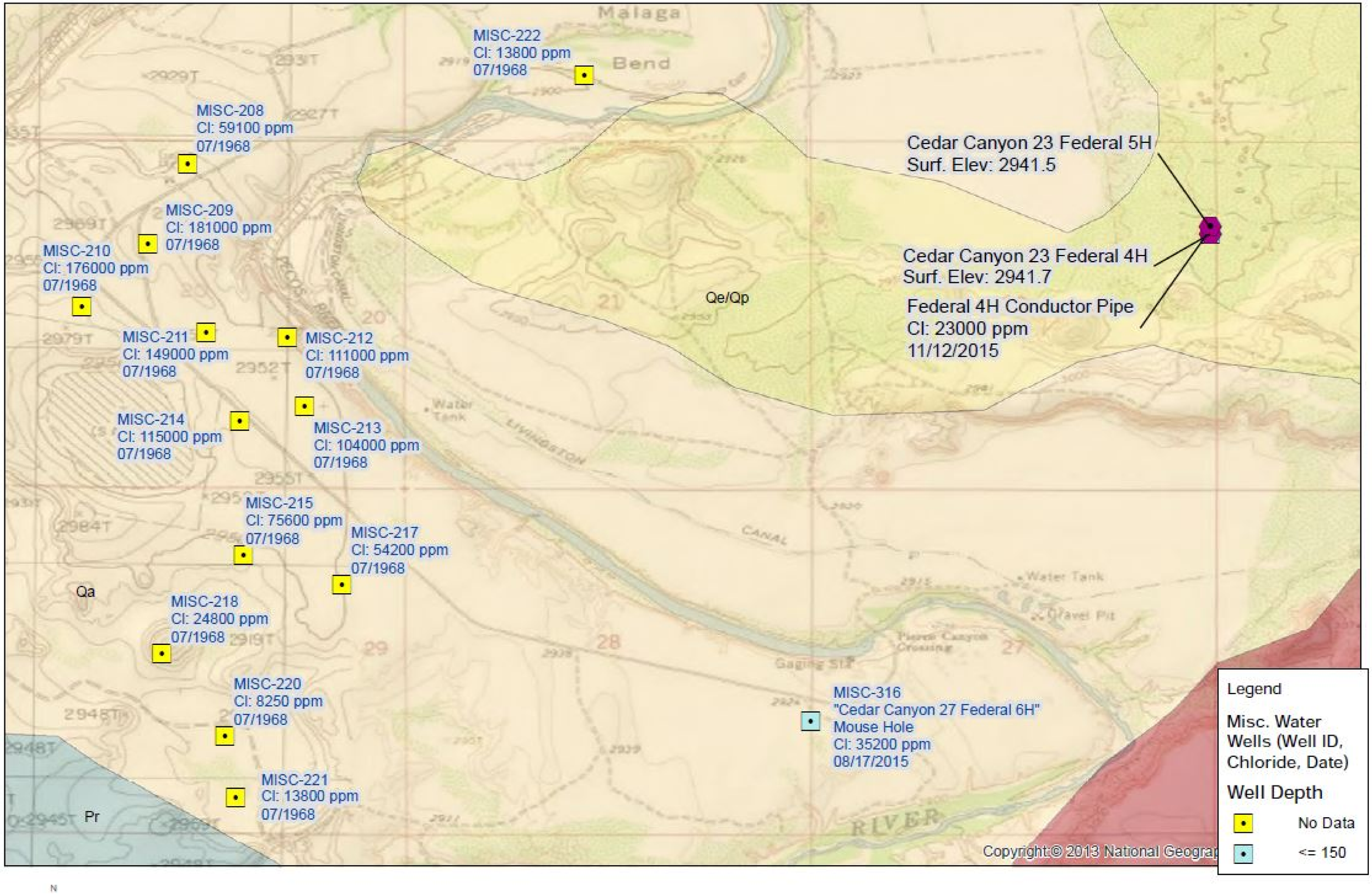
Data obtained for USGS, New Mexico OSE, and published reports.

Date: 7/12/2017

Author: Dylan Allen

Chloride Concentrations

Figure 1a.2



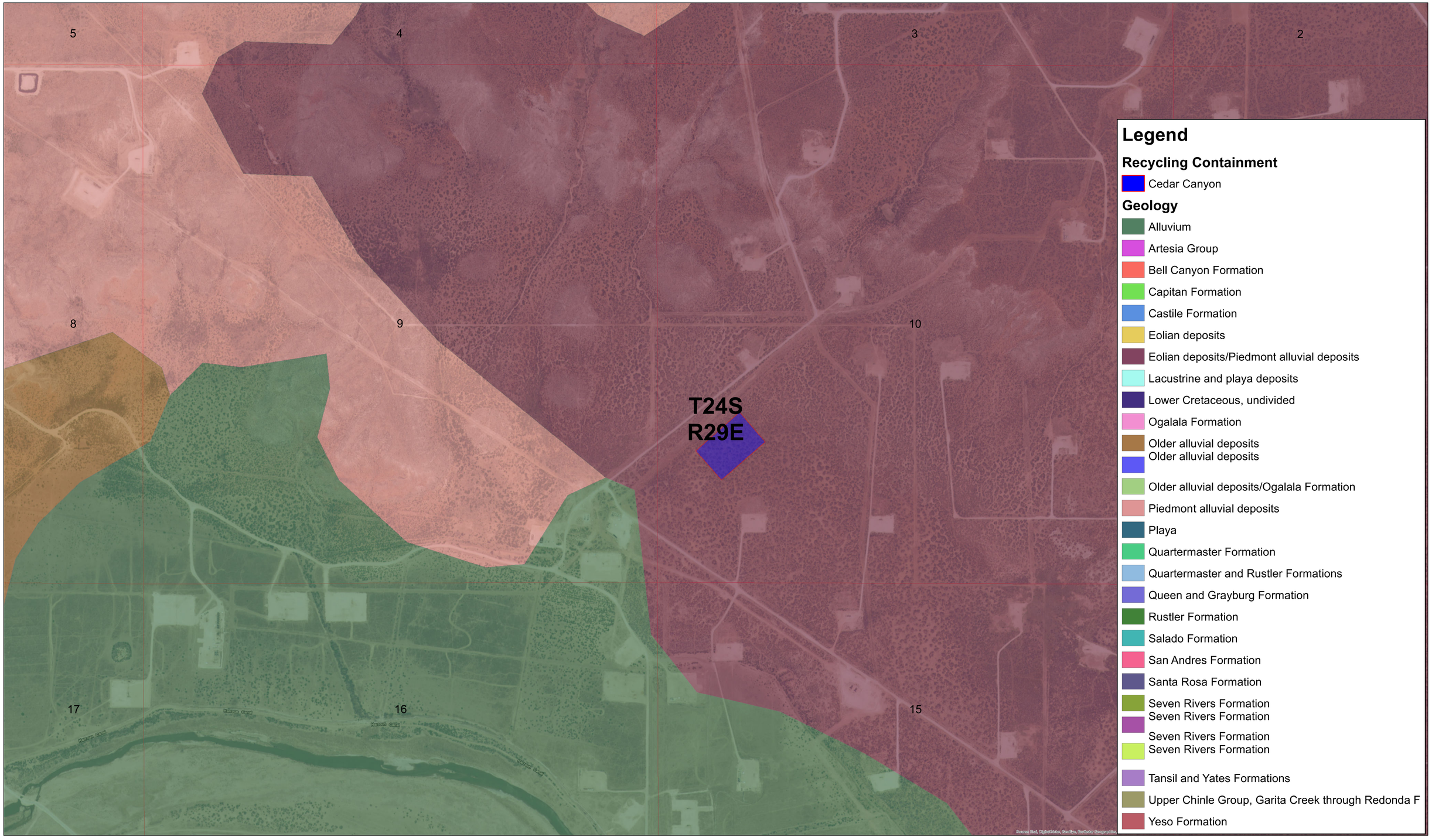
Data obtained from USGS, New Mexico OSE, and published reports.

Date: 7/12/2017

Author: Dylan Allen

Geologic Map

Figure 1a.1



N

W E

S

Data obtained from BLM

1:5,000

Date: 7/12/2017

Author: Dylan Allen

OSE Well Locations - Cedar Canyon

Figure 1a.3

July 12, 2017

OSE Wells

- Other
- ACT
- PEN

OSE District Boundary

1:36,112

0 0.35 0.7 1.4 mi

0 0.5 1 2 km

Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors
Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user community
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics,

New Mexico Office of the State Engineer
These maps are distributed "as is" without warranty of any kind.

Aquifer Sensitivity - New Mexico Environment Department

Figure 1b

N
W E
S

Data from NMED - Aquifer sensitivity maps prepared for NMED by Lee Wilson and Associates in 1989 have been digitized and are a data layer available on the NMED GIS webmap.

1:5,000

Depth to Ground Water/TDS (mg/L)	2,000 or less	2,000 to 10,000	greater than 10,000
less than 100 feet	highly sensitive	moderately sensitive	moderately sensitive
100-300 feet	moderately sensitive	moderately sensitive	less sensitive
greater than 300 feet	less sensitive	less sensitive	less sensitive

Recycling Containment Date: 7/12/2017

Cedar Canyon

Aquifer Sensitivity

Moderately Sensitive

Less Sensitive

Highly Sensitive

OXY

Author: Dylan Allen

Cedar Canyon Recycling Containment - Active Mines in New Mexico

Figure 1c

July 12, 2017

Active Mines, registered

Salt

1:72,224

0 0.5 1 2 mi

0 1.25 2.5 5 km

Sources: Esri, DeLorme, USGS, NPS
Sources: Esri, USGS, NOAA

NM EMNRD ITO GIS
Sources: Esri, USGS, NOAA | BLM and RGIS, of course | RGIS, CadNSDI, TRD, J R Jenks | Sources: Esri, DeLorme, USGS, NPS |

Potash Leases and Caliche Pits

Figure 1d

N

W E

S

Layers obtained from the BLM

1:5,000

Date: 7/12/2017

Author: Dylan Allen

Karst Potential

Figure 1f

N

W E

S

Layers obtained from the BLM

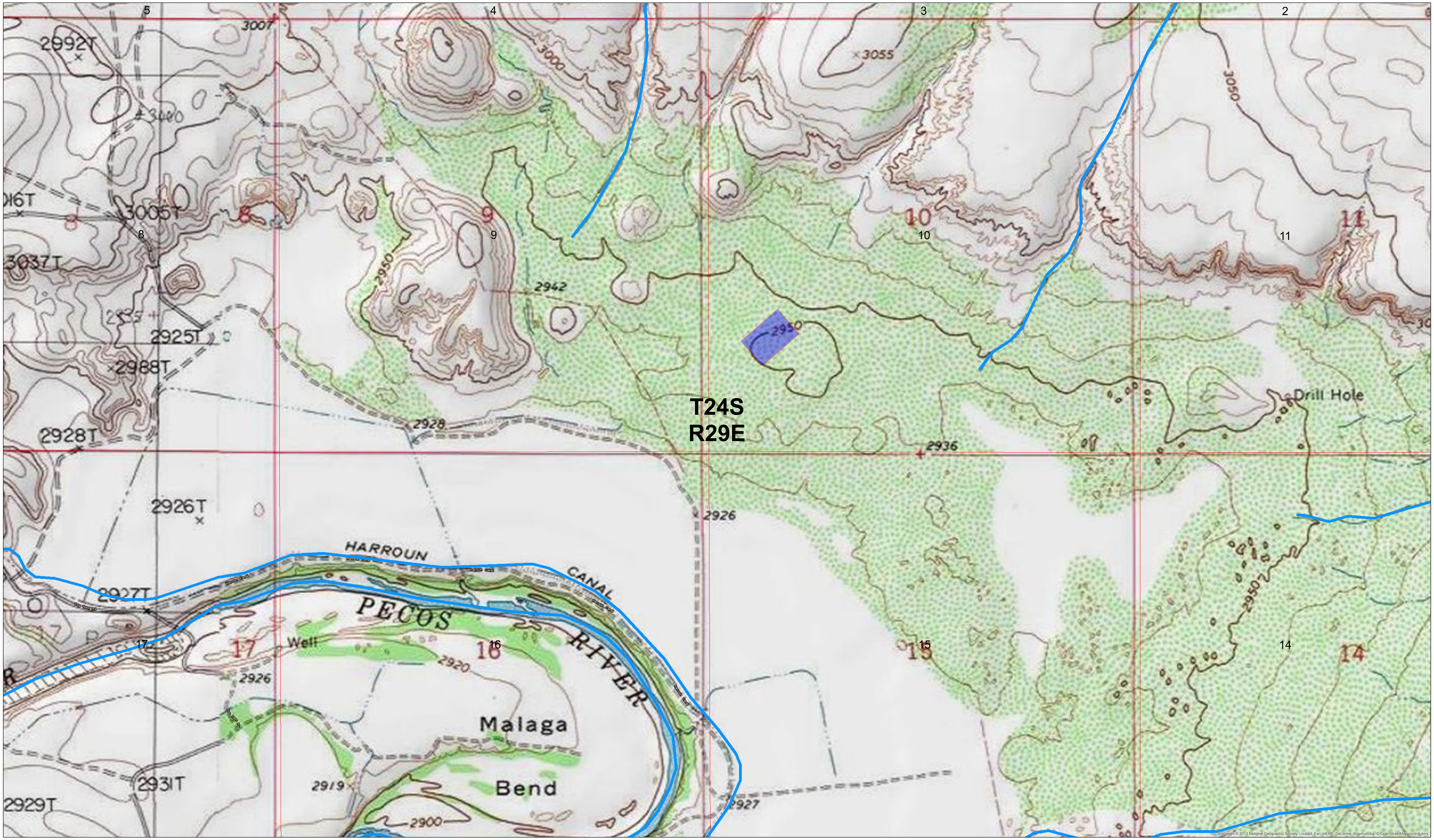
1:5,000

Date: 7/12/2017

Author: Dylan Allen

Topographic/BLM Streams and Rivers

Figure 1g



Layers obtained from the BLM

1:6,000

Date: 7/12/2017

Recycling Containment

Cedar Canyon

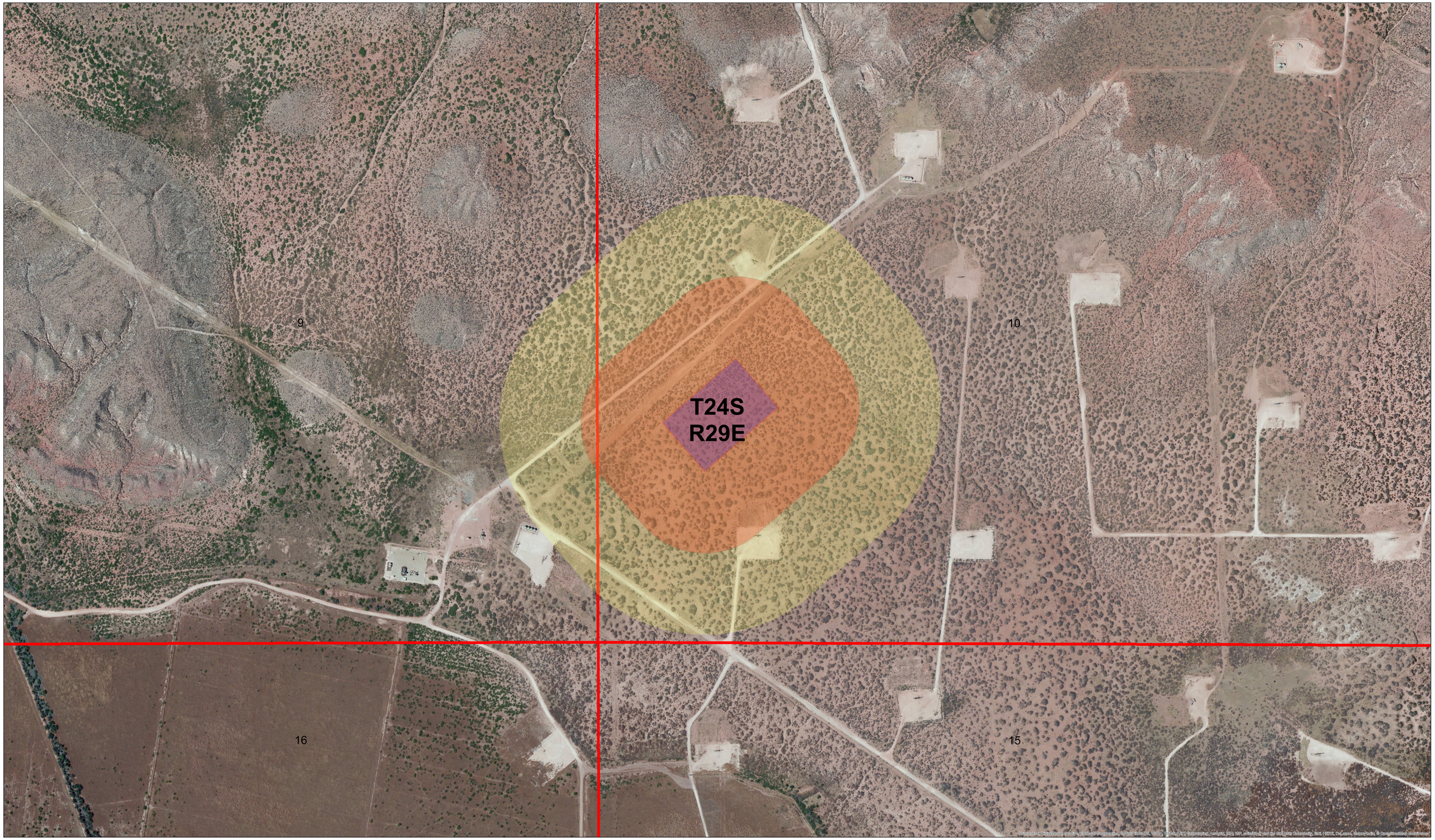
BLM

Streams and Rivers

Author: Dylan Allen

Nearby Structures

Figure 1h



N
W E
S

1:3,000

Date: 7/12/2017

1000 ft. Buffer

500 ft. Buffer

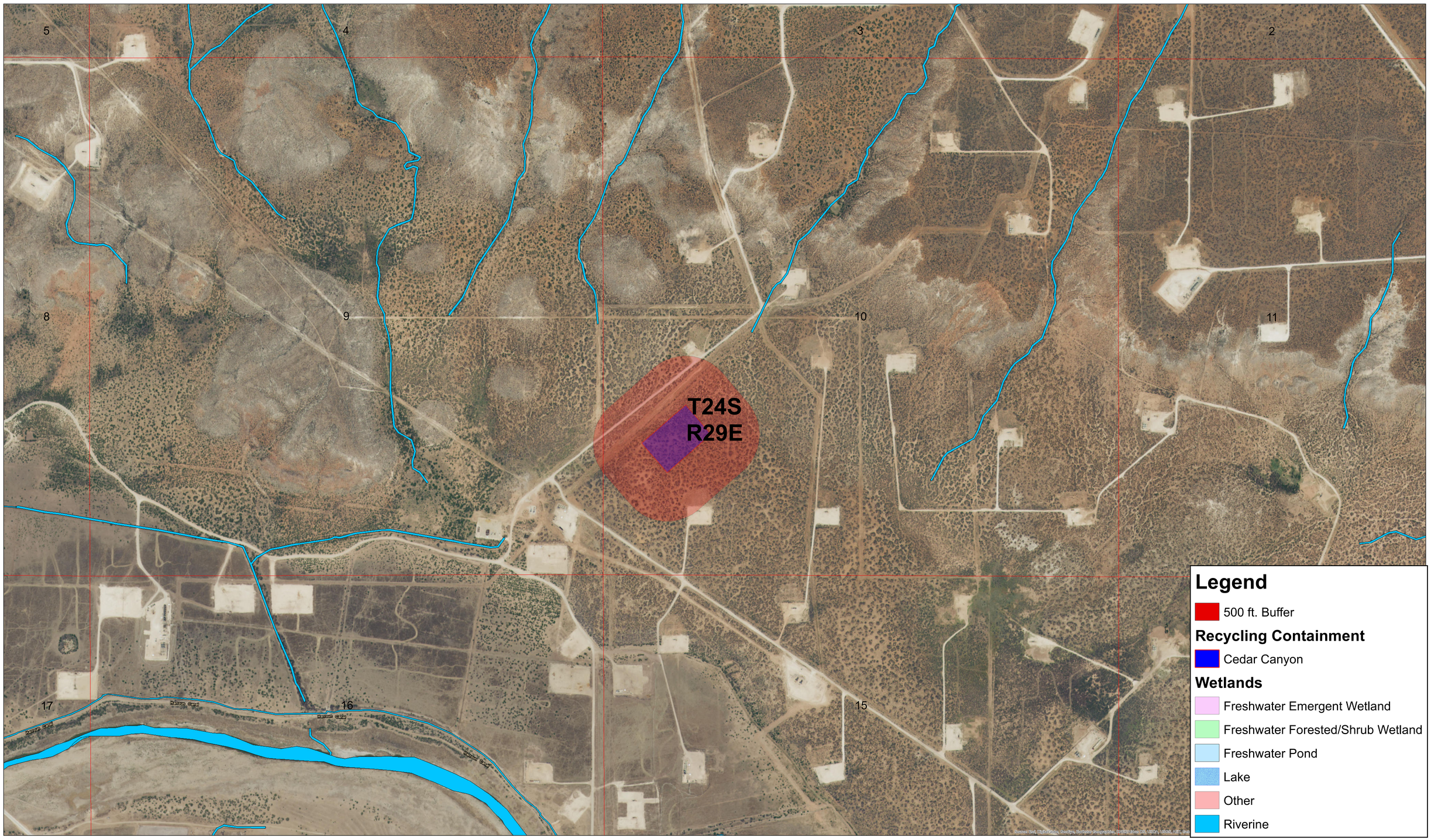
Recycling Containment

Cedar Canyon

Author: Dylan Allen

Wetlands

Figure 1i



N

W E

S

Layers obtained from the US Fish and Wildlife Wetland Identification Map

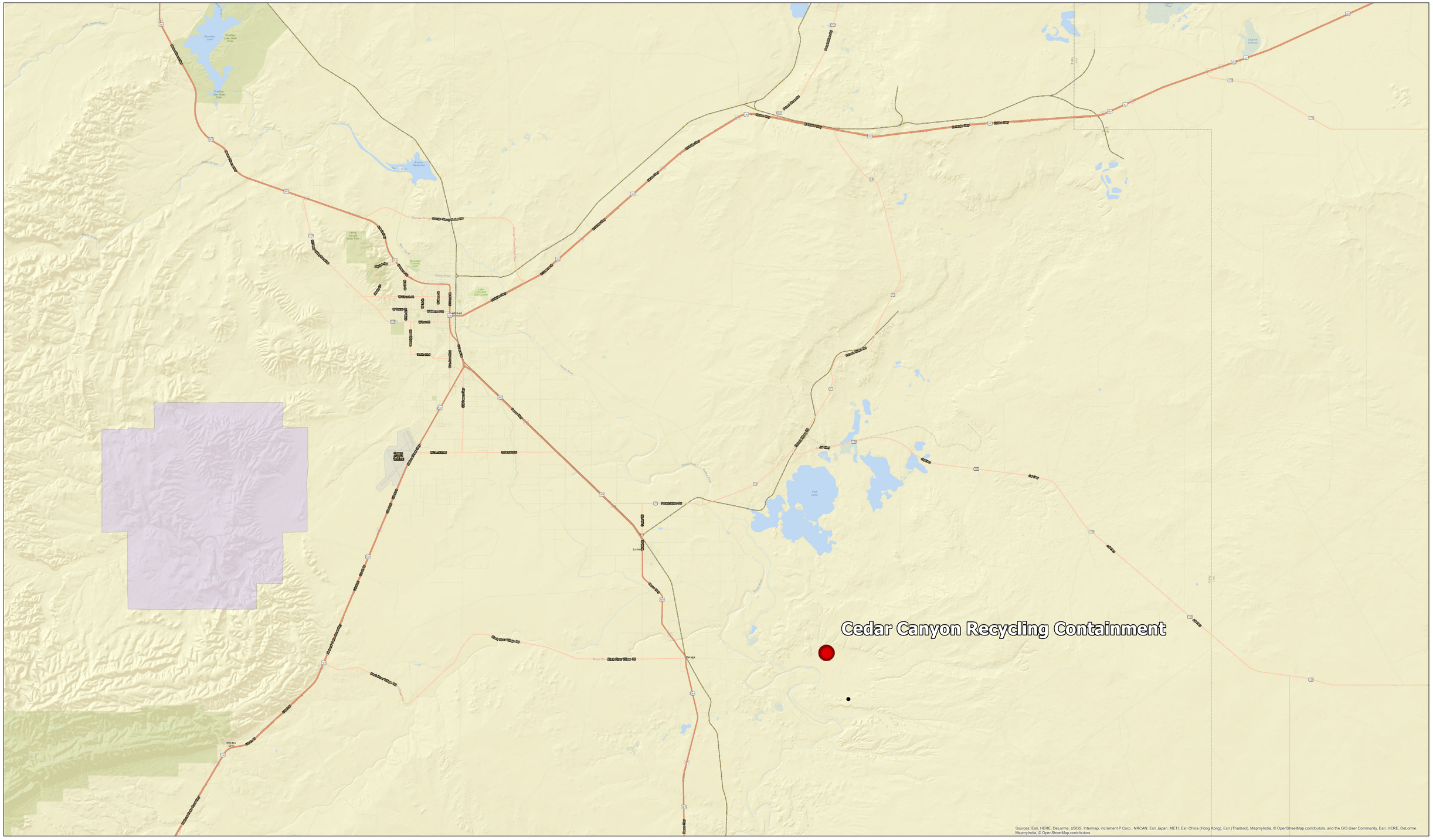
1:5,000

Date: 7/12/2017

Author: Dylan Allen

Municipalities/Defined Fresh Water Well Fields

Figure 1j



N

W E

S

Layers obtained from the City of Carlsbad

1:100,000

Date: 7/12/2017

Recycling Containment

- Cedar Canyon
- Double Eagle Wellfield
- Sheep Draw

Author: Dylan Allen

FEMA Flood Zones

Figure 1k

N

W E

S

Layers obtained from the BLM

1:5,000

Date: 7/12/2017

Author: Dylan Allen

PETTIGREW & ASSOCIATES PA

ENGINEERING | SURVEYING | TESTING

DEFINING QUALITY SINCE 1965

Soils Investigation

Cedar Canyon Produced Water Ponds
Eddy County, New Mexico

Debra P. Hicks, PE/LSI
NM 10871

PREPARED FOR:

Oxy USA, Inc.
Attn: Trey Fournier, Project Manager
5 Greenway Plaza, Ste. 110
Houston, TX 77046

LAB No. 17 5620
PROJECT No. 2017.1129

August 2, 2017

PREFACE

This report is generated specifically for the purpose of providing design criteria for the Cedar Canyon Produced Water Ponds – Eddy County, NM. Under no circumstances shall it be used for any other project on or off the site. This report is meant to provide information that will inform Oxy USA, Inc. of appropriate design criteria for the planned use. The conditions encountered in field exploration and reported herein are accurate for the test location(s), time and conditions. It is not meant to eliminate the uncertainty regarding the potential for variation or changes in subsurface conditions at the site. Subsurface descriptions contained herein are of a generalized nature to provide highlights of major strata and conditions revealed in the soil samples, however it represents only the conditions at the actual boring locations.

Debra P. Hicks, PE/LSI

NM 10871

Table of Contents

Soils Investigation

Introduction

This report presents the results of the field and laboratory soils investigation for the Cedar Canyon Produced Water Ponds – Eddy County, NM. This investigation was performed at the direction and authorization of Mr. Trey Fournier of Oxy USA, Inc.

The purpose of this investigation is to determine the characteristics of the subsoils and provide recommendations for foundation design. This report provides an overview of existing geotechnical/geologic conditions at the proposed site and geotechnical design parameters for the proposed facilities. The geotechnical site conditions presented herein are based on our field exploration. This report does not include environmental site characterization, hazardous materials testing, or other environmental services.

Proposed Development

Oxy USA, Inc. proposes to build two produced water ponds. Each pond will have an approximate capacity of 250,000 bbls (not including the 3' freeboard).

Field Exploration

Five (5) exploratory borings were drilled June 20, 2017. The exploratory borings were drilled to approximate depths listed in Table 1 of this Report. Boring locations are shown on the Boring Location Map. Drilling was carried out using a truck-mounted drill rig contracted by Tetra Tech. Field sampling and logging was provided by Tetra Tech.

TABLE – 1 Boring Dates and Depths

Boring	Date Drilled	Depth (Feet)
BH-1	6/20/17	30'0"
BH-2	6/20/17	30'0"
BH-3	Not drilled	0'0"
BH-4	6/20/17	30'0"
BH-5	6/20/17	80'0"

Subsurface materials were sampled at varying intervals by split spoon sampler and/or drill cuttings where applicable.

Air-rotary/auger drilling methods were employed to cut the test borings. During the drilling, the soils encountered were continuously examined, visually classified and, where applicable, sampled.

Standard penetration tests (SPT) were performed at varying depths. Penetration resistance was measured in accordance with ASTM D 1586 by driving a standard 2" split tube sampler having a 30" free fall drop hammer weighing 140 pounds. The penetration resistance value is a useful index in estimating the consistency, relative density or hardness of the materials encountered.

Laboratory Analysis

Representative samples were tested in the laboratory to determine certain engineering properties of the soils. Mechanical analysis and soil constant determinations were performed for classification and identification of each soil type encountered. Classifications are in accordance with the Unified Soil Classification System ASTM D 2487. The results of the laboratory tests are presented on the Logs.

The following tests were conducted on selected soil samples:

- Moisture Content
- Sieve Analysis
- Atterberg Limits

Site Conditions

The Cedar Canyon Ponds are located in the southwest quarter of Section 10 in Township 24 South and Range 29 East. This site is currently undeveloped. The surface has native vegetation. The drill rig could not access the northeast corner of the site due to the uneven topography and vegetation.

Subsurface Soil Conditions

Stratigraphy

In general, the site consists of up to 80' of sand. There is a pocket of tan clayey sand present at an approximate elevation of 2947' (3'6" bgs) in Borings 1, 4 and 5. This layer is presumed to be 5 feet thick. This material should be stockpiled during excavation as it is most suitable for construction of berm.

Groundwater

Groundwater was encountered at 35' below ground surface in Boring 5. The borehole was left open overnight to ensure static water level was reached. Water samples were obtained for Chlorides and Total Dissolved Solids (TDS) tests. Test results for chlorides were 40,500 mg/L and the TDS measured 75,700 mg/L.

Discussion and Recommendations

The following discussion and recommendations are based upon the results of field and laboratory testing, engineering analyses, experience with similar soil conditions, and our understanding of the proposed project.

Site Work

In general, field test results indicate that the silty sands vary from very loose at the surface to very dense in relative density as indicated by measured SPT-N Values of 3 blows in 12" to 97 blows per 10". Very dense materials (N>30) were encountered at variable depths. Based on the results of the field investigation, excavations within the soil matrix and cemented zones may be difficult.

Recommendations

1) **CLEARING AND GRUBBING:** All vegetation and other deleterious materials should be removed from the construction site prior to construction activities. Stripped materials consisting of vegetation and organic materials (estimated depth of 8") should be wasted from the site, or stockpiled for reuse during pit closure. Deleterious material should be removed from the site.

2) **EXISTING MATERIALS:** The pits are anticipated to be approximately 25' below ground surface. The general contractor will excavate the insitu soils to the depths and grades shown on the construction plans. The surface soils will be stockpiled and stored onsite for reuse and the caliche materials stockpiled for use in construction of berm walls, roads, pads, etc.

3) **SUBGRADE PREPARATION:** All soils that are to receive foundation elements including primary liner and dike should be scarified a minimum of 10" and compacted, at approximately optimum moisture (plus 2% to minus 2%), to not less than 95% of Laboratory Density as determined by ASTM D 698. The entire site should then be proofrolled to observe for unsuitable or weak soils. At least five passes with a heavy vibratory roller should be made during proofrolling. Soft materials or loose soils indicated during proofrolling should be stripped or further compacted. Areas of subgrade in which pumping or significant deflections are observed should be removed or stabilized. Use of lime, fly ash, kilm dust, cement or geotextiles could be considered as a stabilization technique.

4) All fill and/or backfill be placed in lifts not to exceed 8" (loose), and compacted at approximately optimum moisture (plus 2% to minus 2%), to not less than 95% of Laboratory Density as determined by ASTM D 698.

5) **ENGINEERED FILL:** Materials for Engineered Fill shall be composed of an appropriate combination of crushed stone, crushed or screened gravel, caliche, and/or sand to meet the specifications contained herein. Materials shall be free from vegetable matter and all other deleterious materials, including silt and clay balls.

Size	Cumulative % Passing
2"	100
½"	30-80
#4	20-60
#200	5-20

Liquid Limit	35 max
Plasticity Index	4 min to 15 max

6) All imported fill material shall be from same source.

7) **CONTROLLED FILL:** Unless otherwise provided for in the specifications, materials to be used for non-load bearing dike embankment (controlled fill) shall be constructed with moisture and density control as specified herein. Materials for controlled fill shall have a maximum particle size of two and one-half (2-1/2) inches, and a plasticity index of four (4) minimum to fifteen (15) maximum. The liquid limit shall not exceed thirty-five (35).

8) **PRIMARY LINER BEDDING:** Upon completion of pit excavation and subgrade preparation, a site inspection shall be conducted to determine the need for bedding beneath the liner. In accordance with liner installation guidelines, subgrade shall be free of rocks, roots, and other protruding objects. All loose or disturbed material soil shall be removed from bearing surface. In accordance with the New Mexico Administrative Code, geotextile is required under the liner when needed to reduce localized stress-strain or protuberances that otherwise may compromise the liner's integrity.

9) **SUITABILITY OF EXISTING SOILS FOR ENGINEERED FILL:** Site soils are not suitable for use as Engineered Fill. However, as previously discussed the tan clayey sand layer, present in Borings 1, 4 and 5, may be used for the construction of berms.

10) **MOISTURE PROTECTION:** Positive drainage should be established away from the pit during and after construction. The ground immediately adjacent to the pit shall be sloped away from the dike at a slope not less than 5% for a minimum of 10'. In no case should long-term ponding of water be allowed around the perimeter of the dike.

11) **PORTLAND CEMENT CONCRETE:** Portland Cement Concrete shall be proportioned in accordance with ACI 211.1-81; all portland cement shall be an approved American (USA) brand conforming to ASTM C150, Type II, or Type V with Class F flyash, where concrete is to be placed against high sulfate content soils, low alkali; and, all exposed Portland Cement Concrete or Portland Cement Concrete slabs on grade shall be air entrained.

12) **OSHA EXCAVATIONS:** Temporary construction slopes should be designed and excavated in strict compliance with the rules and regulations of the Federal Register, Volume 54, No. 209 (October 1989), the United States Department of Labor, Occupational Safety and Health Administration (OSHA), 29 CFR, Part 1926. This document was prepared to better insure the safety of workers entering trenches or excavations, and requires that all excavations conform to the new OSHA guidelines.

The contractor is solely responsible for protecting excavations by shoring, sloping, benching or other means as required to maintain stability of both the excavation sides and bottom. Pettigrew & Associates, P.A. does not assume any responsibility for construction site safety or the activities of the contractor.

For this site, the overburden soil encountered in the exploratory borings consisted of mostly sand, OSHA classification Type C. OSHA recommends a maximum slope inclination of 1.5H:1V for Type C soils. Excavation requirements will vary depending on the actual soil conditions in some areas. Temporary construction slopes should be closely observed for signs of mass movement, such as tension cracks near the crest, bulging at the toe of the slope, etc.

Construction Quality Assurance

Pettigrew & Associates shall perform construction observation and testing of the following:

- Subgrade preparation and proof-rolling;
- Suitability of Engineered fill and controlled fill;
- Backfill and compaction of excavations;
- Fill placement and compaction; and
- Compliance with the geotechnical recommendations.

Testing Frequency

Subgrade (Insitu soils) - One (1) soil density every 2500 square feet of prepared surface for dike or pit bottom and side slopes (ASTM D 698 and ASTM D 2922)

Engineered Fill/Primary Liner Bedding - One (1) soil density every 2500 square feet of prepared pit surface including bottom and side slopes per compacted lift (ASTM D 698 and ASTM D 2922)

Controlled Fill - One (1) soil density every 150 lineal feet of dike per lift of compacted material (ASTM D 698 and ASTM D 2922)

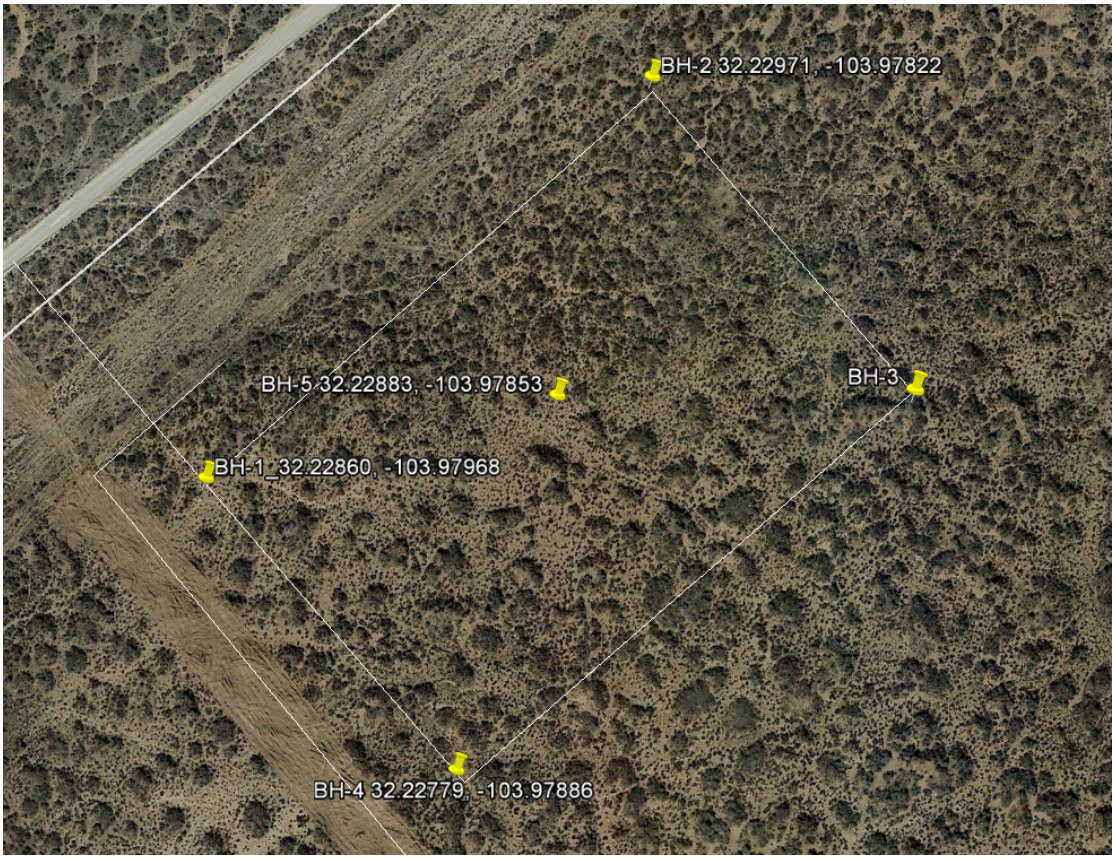
One (1) sieve analysis and plasticity index per material (subgrade, engineered fill, controlled fill) (ASTM C 136 and ASTM D 4318)

One (1) moisture density determination (proctor) per each type of material (ASTM D 698)

Closure

Our conclusions, recommendations and opinions presented herein are based upon our evaluation and interpretation of the findings of the field and laboratory investigation. **If during construction, conditions are found to be other than those presented in this report, this office should be consulted.**

Boring Location Map



Logs and Summaries

PETTIGREW & ASSOCIATES PA
ENGINEERING | SURVEYING | TESTING
DEFINING QUALITY SINCE 1965

BORING NO.: BH-1

CLIENT: Oxy Usa, Inc.
PROJECT NAME: Cedar Canyon Ponds
PROJECT NO.: 2017.1129
DATE DRILLED: 6/20/17

COORDINATES: 32.22860 -103.97968
SURFACE ELEVATION: 2946.70'
BOREHOLE DEPTH: 30'0"
DEPTH TO WATER: N/A

DEPTH (FT)	LITHOLOGIC SYMBOL	SAMPLE RECOVERED	BLOWS PER FOOT	DESCRIPTION	SOIL CLASSIFICATION	LABORATORY TEST DATA: % MOISTURE	% PASSING 3/4"	% PASSING #4	% PASSING #10	% PASSING #40	% PASSING #200	LIQUID LIMIT (LL)	PLASTIC LIMIT (PL)	PLASTICITY INDEX (PI)	BEARING CAPACITY (psf)	qu (psf)	SHEAR STREGTH (tsf)
0		X	5	Red Silty Sand	SM	3.2	100	99	98	96	24.6	SNP	SNP	SNP	310		
5		X	25	Tan Clayey Sand	SC	3.6	97	95	94	89	36.1	25	17	8	4,720		
10		X	33	Reddish Tan Poorly Graded Sand with Silt	SP/SM	2.1	100	93	86	71	10.9	SNP	SNP	SNP	6,480		
15		X	17	Light Red Silty Sand		2.1									2,950		

X SPLIT SPOON SAMPLE AIR ROTARY WATER SHELBY SAMPLE

PETTIGREW & ASSOCIATES PA
ENGINEERING | SURVEYING | TESTING
DEFINING QUALITY SINCE 1965

BORING NO.: BH-1

CLIENT: Oxy Usa, Inc.
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DEPTH (FT)	LITHOLOGIC SYMBOL	SAMPLE RECOVERED	BLOWS PER FOOT	DESCRIPTION	SOIL CLASSIFICATION	LABORATORY TEST DATA: % MOISTURE	% PASSING 3/4"	% PASSING #4	% PASSING #10	% PASSING #40	% PASSING #200	LIQUID LIMIT (LL)	PLASTIC LIMIT (PL)	PLASTICITY INDEX (PI)	BEARING CAPACITY (psf)	qu (psf)	SHEAR STREGTH (tsf)
					SM		100	99	98	95	21.7	SNP	SNP	SNP			
		X	20	Tan Clayey Sand	SC	8.2	97	95	94	89	36.1	25	17	8	3,620		
20																	
		X	31	Light Red Silty Sand	SM	5.5	100	99	98	95	21.7	SNP	SNP	SNP	6,040		
25																	
		X	19			17.8									3,400		
30																	

X SPLIT SPOON SAMPLE ▮▮ AIR ROTARY ▽ WATER ▮ SHELBY SAMPLE

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ENGINEERING | SURVEYING | TESTING
DEFINING QUALITY SINCE 1965

BORING NO.: BH-2

CLIENT:	Oxy Usa, Inc.	**COORDINATES:**	32.22971 -103.97822
PROJECT NAME:	Cedar Canyon Ponds	**SURFACE ELEVATION:**	2950.78'
PROJECT NO.:	2017.1129	**BOREHOLE DEPTH:**	30'0"
DATE DRILLED:	6/20/17	**DEPTH TO WATER:**	N/A

DEPTH (FT)	LITHOLOGIC SYMBOL	SAMPLE RECOVERED	BLOWS PER FOOT	DESCRIPTION	SOIL CLASSIFICATION	LABORATORY TEST DATA: % MOISTURE	% PASSING 3/4"	% PASSING #4	% PASSING #10	% PASSING #40	% PASSING #200	LIQUID LIMIT (LL)	PLASTIC LIMIT (PL)	PLASTICITY INDEX (PI)	BEARING CAPACITY (psf)	qu (psf)	SHEAR STREGTH (tsf)
0				Red Silty Sand		4.0											
			7												750		
						4.4											
			9												1,190		
5					SM		100	99	98	96	24.6	SNP	SNP	SNP			
						5.8									530		
			6														
10				Tan Clayey Sand		10.0											
			26												4,940		
15																	

SPLIT SPOON SAMPLE AIR ROTARY WATER SHELBY SAMPLE

PETTIGREW & ASSOCIATES PA
ENGINEERING | SURVEYING | TESTING
DEFINING QUALITY SINCE 1965

BORING NO.: BH-2

CLIENT: Oxy Usa, Inc.
PROJECT NAME: Cedar Canyon Ponds
PROJECT NO.: 2017.1129
DATE DRILLED: 6/20/17

COORDINATES: 32.22971 -103.97822
SURFACE ELEVATION: 2950.78'
BOREHOLE DEPTH: 30'0"
DEPTH TO WATER: N/A

DEPTH (FT)	LITHOLOGIC SYMBOL	SAMPLE RECOVERED	BLOWS PER FOOT	DESCRIPTION	SOIL CLASSIFICATION	LABORATORY TEST DATA: % MOISTURE	% PASSING 3/4"	% PASSING #4	% PASSING #10	% PASSING #40	% PASSING #200	LIQUID LIMIT (LL)	PLASTIC LIMIT (PL)	PLASTICITY INDEX (PI)	BEARING CAPACITY (psf)	qu (psf)	SHEAR STREGTH (tsf)
					SC		97	95	94	89	36.1	25	17	8			
20			38	Reddish Tan Poorly Graded Sand with Silt	SP/SM	3.6	100	93	86	71	10.9	SNP	SNP	SNP	7,360		
25			28	Light Red Silty Sand	SM	3.3	100	99	98	95	21.7	SNP	SNP	SNP	5,380		
30			34			10.1									6,700		

SPLIT SPOON SAMPLE | AIR ROTARY | WATER | SHELBY SAMPLE

PETTIGREW & ASSOCIATES PA
ENGINEERING | SURVEYING | TESTING
DEFINING QUALITY SINCE 1965

BORING NO.: BH-3

CLIENT:	Oxy Usa, Inc.	**COORDINATES:**	32.22884 -103.97736
PROJECT NAME:	Cedar Canyon Ponds	**SURFACE ELEVATION:**	2953.79'
PROJECT NO.:	2017.1129	**BOREHOLE DEPTH:**	0'0"
DATE DRILLED:	6/20/17-6/21/17	**DEPTH TO WATER:**	N/A

DEPTH (FT)	LITHOLOGIC SYMBOL	SAMPLE RECOVERED	BLOWS PER FOOT	DESCRIPTION	SOIL CLASSIFICATION	LABORATORY TEST DATA									BEARING CAPACITY (psf)	qu (psf)	SHEAR STREGTH (tsf)
						% MOISTURE	% PASSING 3/4"	% PASSING #4	% PASSING #10	% PASSING #40	% PASSING #200	LIQUID LIMIT (LL)	PLASTIC LIMIT (PL)	PLASTICITY INDEX (PI)			
0				Not drilled due to difficult and uneven ground surface. Abrupt changes in ground elevations exist within short distances.													
5																	

SPLIT SPOON SAMPLE AIR ROTARY WATER SHELBY SAMPLE

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DEFINING QUALITY SINCE 1965

BORING NO.: BH-4

CLIENT:	Oxy Usa, Inc.	**COORDINATES:**	32.22779 -103.97886
PROJECT NAME:	Cedar Canyon Ponds	**SURFACE ELEVATION:**	2950.30'
PROJECT NO.:	2017.1129	**BOREHOLE DEPTH:**	30'0"
DATE DRILLED:	6/20/17	**DEPTH TO WATER:**	N/A

DEPTH (FT)	LITHOLOGIC SYMBOL	SAMPLE RECOVERED	BLOWS PER FOOT	DESCRIPTION	SOIL CLASSIFICATION	LABORATORY TEST DATA: % MOISTURE	% PASSING 3/4"	% PASSING #4	% PASSING #10	% PASSING #40	% PASSING #200	LIQUID LIMIT (LL)	PLASTIC LIMIT (PL)	PLASTICITY INDEX (PI)	BEARING CAPACITY (psf)	qu (psf)	SHEAR STREGTH (tsf)
0			3	Red Silty Sand	SM	3.1	100	99	98	96	24.6	SNP	SNP	SNP	0		
5			41	Tan Silty Sand	--	8.3	100	96	93	85	35.5	--	--	--	>8,000		
10			9	Reddish Tan Poorly Graded Sand with Silt	SP/SM	2.9	100	93	86	71	10.9	SNP	SNP	SNP	1,190		
15			17	Light Red Silty Sand		5.8									2,950		

SPLIT SPOON SAMPLE | AIR ROTARY | WATER | SHELBY SAMPLE

PETTIGREW & ASSOCIATES PA
ENGINEERING | SURVEYING | TESTING
DEFINING QUALITY SINCE 1965

BORING NO.: BH-4

CLIENT:	Oxy Usa, Inc.	**COORDINATES:**	32.22779 -103.97886
PROJECT NAME:	Cedar Canyon Ponds	**SURFACE ELEVATION:**	2950.30'
PROJECT NO.:	2017.1129	**BOREHOLE DEPTH:**	30'0"
DATE DRILLED:	6/20/17	**DEPTH TO WATER:**	N/A

DEPTH (FT)	LITHOLOGIC SYMBOL	SAMPLE RECOVERED	BLOWS PER FOOT	DESCRIPTION	SOIL CLASSIFICATION	LABORATORY TEST DATA: % MOISTURE	% PASSING 3/4"	% PASSING #4	% PASSING #10	% PASSING #40	% PASSING #200	LIQUID LIMIT (LL)	PLASTIC LIMIT (PL)	PLASTICITY INDEX (PI)	BEARING CAPACITY (psf)	qu (psf)	SHEAR STREGTH (tsf)
20		X	36		SM	12.9	100	99	98	95	21.7	SNP	SNP	SNP	7,140		
25		X	31			7.0									6,040		
30		X	33			4.0									6,480		

X SPLIT SPOON SAMPLE ▮▮ AIR ROTARY ▼ WATER ▮ SHELBY SAMPLE

PETTIGREW & ASSOCIATES PA
ENGINEERING | SURVEYING | TESTING
DEFINING QUALITY SINCE 1965

BORING NO.: BH-5

CLIENT: Oxy Usa, Inc.
PROJECT NAME: Cedar Canyon Ponds
PROJECT NO.: 2017.1129
DATE DRILLED: 6/20/17

COORDINATES: 32.22883 -103.979853
SURFACE ELEVATION: 2950.59'
BOREHOLE DEPTH: 80'0"
DEPTH TO WATER: 35'0"

DEPTH (FT)	LITHOLOGIC SYMBOL	SAMPLE RECOVERED	BLOWS PER FOOT	DESCRIPTION	SOIL CLASSIFICATION	LABORATORY TEST DATA: % MOISTURE	% PASSING 3/4"	% PASSING #4	% PASSING #10	% PASSING #40	% PASSING #200	LIQUID LIMIT (LL)	PLASTIC LIMIT (PL)	PLASTICITY INDEX (PI)	BEARING CAPACITY (psf)	qu (psf)	SHEAR STREGTH (tsf)
0		X	5	Red Silty Sand	SM	3.3	100	99	98	96	24.6	SNP	SNP	SNP	310		
5		X	14	Tan Clayey Sand	SC	5.5	97	95	94	89	36.1	25	17	8	2,290		
10		X	23	Reddish Tan Poorly Graded Sand with Silt	SP/SM	2.1	100	93	86	71	10.9	SNP	SNP	SNP	4,280		
15		X	24	Light Red Silty Sand		4.3									4,500		

X SPLIT SPOON SAMPLE ‖ AIR ROTARY ▽ WATER ▮ SHELBY SAMPLE

PETTIGREW & ASSOCIATES PA
ENGINEERING | SURVEYING | TESTING
DEFINING QUALITY SINCE 1965

BORING NO.: BH-5

CLIENT: Oxy Usa, Inc.
PROJECT NAME: Cedar Canyon Ponds
PROJECT NO.: 2017.1129
DATE DRILLED: 6/20/17

COORDINATES: 32.22883 -103.979853
SURFACE ELEVATION: 2950.59'
BOREHOLE DEPTH: 80'0"
DEPTH TO WATER: 35'0"

DEPTH (FT)	LITHOLOGIC SYMBOL	SAMPLE RECOVERED	BLOWS PER FOOT	DESCRIPTION	SOIL CLASSIFICATION	LABORATORY TEST DATA: % MOISTURE	% PASSING 3/4"	% PASSING #4	% PASSING #10	% PASSING #40	% PASSING #200	LIQUID LIMIT (LL)	PLASTIC LIMIT (PL)	PLASTICITY INDEX (PI)	BEARING CAPACITY (psf)	qu (psf)	SHEAR STREGTH (tsf)
20		X	18		SM	3.9	100	99	98	95	21.7	SNP	SNP	SNP	3,180		
25		X	30	Reddish Tan Silty Sand with Gravel	--	6.7	88	82	79	74	20.1	--	--	--	5,820		
30		X	37	Light Red Silty Sand		8.1									7,360		

X SPLIT SPOON SAMPLE AIR ROTARY WATER SHELBY SAMPLE

PETTIGREW & ASSOCIATES PA
ENGINEERING | SURVEYING | TESTING
DEFINING QUALITY SINCE 1965

BORING NO.: BH-5

CLIENT:	Oxy Usa, Inc.	**COORDINATES:**	32.22883 -103.979853
PROJECT NAME:	Cedar Canyon Ponds	**SURFACE ELEVATION:**	2950.59'
PROJECT NO.:	2017.1129	**BOREHOLE DEPTH:**	80'0"
DATE DRILLED:	6/20/17	**DEPTH TO WATER:**	35'0"

DEPTH (FT)	LITHOLOGIC SYMBOL	SAMPLE RECOVERED	BLOWS PER FOOT	DESCRIPTION	SOIL CLASSIFICATION	LABORATORY TEST DATA: % MOISTURE	% PASSING 3/4"	% PASSING #4	% PASSING #10	% PASSING #40	% PASSING #200	LIQUID LIMIT (LL)	PLASTIC LIMIT (PL)	PLASTICITY INDEX (PI)	BEARING CAPACITY (psf)	qu (psf)	SHEAR STREGTH (tsf)
35		X	19	Water encountered @ 35' below ground surface. Chlorides = 40,500 mg/L TDS = 75,700 mg/L	SM	24.1	100	99	98	95	21.7	SNP	SNP	SNP	3,400		
40		X	21			20.2									3,840		
45																	

X SPLIT SPOON SAMPLE ‖ AIR ROTARY ▽ WATER ▮ SHELBY SAMPLE

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DEFINING QUALITY SINCE 1965

BORING NO.: BH-5

CLIENT:	Oxy Usa, Inc.	**COORDINATES:**	32.22883 -103.979853
PROJECT NAME:	Cedar Canyon Ponds	**SURFACE ELEVATION:**	2950.59'
PROJECT NO.:	2017.1129	**BOREHOLE DEPTH:**	80'0"
DATE DRILLED:	6/20/17	**DEPTH TO WATER:**	35'0"

DEPTH (FT)	LITHOLOGIC SYMBOL	SAMPLE RECOVERED	BLOWS PER FOOT	DESCRIPTION	SOIL CLASSIFICATION	LABORATORY TEST DATA: % MOISTURE	% PASSING 3/4"	% PASSING #4	% PASSING #10	% PASSING #40	% PASSING #200	LIQUID LIMIT (LL)	PLASTIC LIMIT (PL)	PLASTICITY INDEX (PI)	BEARING CAPACITY (psf)	qu (psf)	SHEAR STREGTH (tsf)
50		☒	32	Light Red Siltly Sand		15.8									6,260		
55																	
60		☒	43			16.1									>8,000		

☒ SPLIT SPOON SAMPLE ▮▮ AIR ROTARY ▼ WATER ▮ SHELBY SAMPLE

PETTIGREW & ASSOCIATES PA
ENGINEERING | SURVEYING | TESTING
DEFINING QUALITY SINCE 1965

BORING NO.: BH-5

CLIENT:	Oxy Usa, Inc.	**COORDINATES:**	32.22883 -103.979853
PROJECT NAME:	Cedar Canyon Ponds	**SURFACE ELEVATION:**	2950.59'
PROJECT NO.:	2017.1129	**BOREHOLE DEPTH:**	80'0"
DATE DRILLED:	6/20/17	**DEPTH TO WATER:**	35'0"

DEPTH (FT)	LITHOLOGIC SYMBOL	SAMPLE RECOVERED	BLOWS PER FOOT	DESCRIPTION	SOIL CLASSIFICATION	LABORATORY TEST DATA: % MOISTURE	% PASSING 3/4"	% PASSING #4	% PASSING #10	% PASSING #40	% PASSING #200	LIQUID LIMIT (LL)	PLASTIC LIMIT (PL)	PLASTICITY INDEX (PI)	BEARING CAPACITY (psf)	qu (psf)	SHEAR STREGTH (tsf)
65					SM		100	94	92	88	31.1	19	17	2			
		X	49			21.0									>8,000		
70																	
75																	

SPLIT SPOON SAMPLE AIR ROTARY WATER SHELBY SAMPLE

PETTIGREW & ASSOCIATES PA
ENGINEERING | SURVEYING | TESTING
DEFINING QUALITY SINCE 1965

BORING NO.: BH-5

CLIENT:	Oxy Usa, Inc.	**COORDINATES:**	32.22883 -103.979853
PROJECT NAME:	Cedar Canyon Ponds	**SURFACE ELEVATION:**	2950.59'
PROJECT NO.:	2017.1129	**BOREHOLE DEPTH:**	80'0"
DATE DRILLED:	6/20/17	**DEPTH TO WATER:**	35'0"

DEPTH (FT)	LITHOLOGIC SYMBOL	SAMPLE RECOVERED	BLOWS PER FOOT	DESCRIPTION	SOIL CLASSIFICATION	LABORATORY TEST DATA: % MOISTURE	% PASSING 3/4"	% PASSING #4	% PASSING #10	% PASSING #40	% PASSING #200	LIQUID LIMIT (LL)	PLASTIC LIMIT (PL)	PLASTICITY INDEX (PI)	BEARING CAPACITY (psf)	qu (psf)	SHEAR STREGTH (tsf)
80			97/10"			11.3									>8,000		

SPLIT SPOON SAMPLE | AIR ROTARY | WATER | SHELBY SAMPLE

APPENDIX A – UNIFIED SOIL CLASSIFICATION

TERMS DESCRIBING CONSISTENCY OR CONDITION

COARSE-GRAINED SOILS (major portions retained on No. 200 sieve): includes (1) clean gravel and sands and (2) silty or clayey gravels and sands. Condition is rated according to relative density as determined by laboratory tests or standard penetration resistance tests.

Descriptive Terms	Relative Density	SPT Blow Count
Very loose	0 to 15 %	< 4
Loose	15 to 35 %	4 to 10
Medium dense	35 to 65 %	10 to 30
Dense	65 to 85 %	30 to 50
Very dense	85 to 100 %	> 50

FINE-GRAINED SOILS (major portions passing on No. 200 sieve): includes (1) inorganic and organic silts and clays, (2) gravelly, sandy, or silty clays, and (3) clayey silts. Consistency is rated according to shearing strength, as indicated by penetrometer readings, SPT blow count, or unconfined compression tests.

Descriptive Terms	Unconfined Compressive Strength kPa	SPT Blow Count
Very soft	< 25	< 2
Soft	25 to 50	2 to 4
Medium stiff	50 to 100	4 to 8
Stiff	100 to 200	8 to 15
Very Stiff	200 to 400	15 to 30
Hard	> 400	> 30

GENERAL NOTES

1. Classifications are based on the United Soil Classification System and include consistency, moisture, and color. Field descriptions have been modified to reflect results of laboratory tests where deemed appropriate.

2. Surface elevations are based on topographic maps and estimated locations.

3. Descriptions on these boring logs apply only at the specific boring locations and at the time the borings were made. they are not guaranteed to be representative of subsurface conditions at other locations or times.

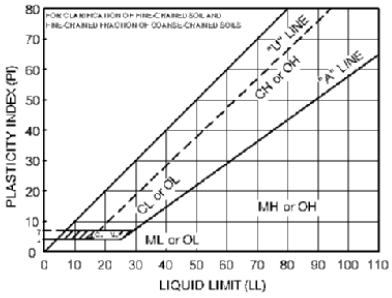
Major Divisions			Group Symbols	Typical Names
Coarse-Grained soils (more than half the material is larger than No. 200 sieve size)	Gravels (more than half of coarse fraction is larger than No. 4 sieve size)	Clean gravel (Little or no fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines
			GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines
		Gravel with fines (Appreciable amount of fines)	GM* d / u	Silty gravels, gravel-sand-silt mixtures
			GC	Clayey gravels, gravel-sand-silt mixtures
	Sands (more than half of coarse fraction is smaller than No. 4 sieve size)	Clean sands (Little or no fines)	SW	Well-graded sands, gravelly sands, little or no fines
			SP	Poorly-graded sands, gravelly sands, little or no fines
		Sands with fines (Appreciable amount of fines)	SM* d / u	Silty sands, sand-silt mixtures
			SC	Clayey sands, sand-clay mixtures
Fine-Grained soils (more than half the material is smaller than No. 200 sieve size)	Silts and Clays (Liquid limit less than 50)		ML	Inorganic silts and very fine sands, rock floor, silty or clayey fine sands or clayey silts with slight plasticity
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
			OL	Organic silts and organic silty clays of low plasticity
	Silts and Clays (Liquid limit greater than 50)		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, organic silts
			CH	Inorganic clays of high plasticity, fat clays
			OH	Organic clays of medium to high plasticity, organic silts
	Highly Organic Soils		Pt	Peat and other highly organic soils

Laboratory Classification Criteria

Determine percentages of sand and gravel from grain size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve) coarse-grained soils are classified as follows:

Less than 5 percent..... GW, GP, SW, SP
More than 12 percent..... GM, GC, SM, SC
6 to 12 percent..... Borderline cases requiring dual symbols**

$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3		
Not meeting all gradation requirements for GW		
Atterberg limits below "A" line or P.I. less than 4	Above "A" line with P.I. between 4 and 7 are border-line cases requiring use of dual symbols	
Atterberg limits below "A" line or P.I. greater than 7		
$C_u = \frac{D_{60}}{D_{10}}$ greater than 6; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3		
Not meeting all gradation requirements for SW		
Atterberg limits below "A" line or P.I. less than 4	Above "A" line with P.I. between 4 and 7 are border-line cases requiring use of dual symbols	
Atterberg limits below "A" line or P.I. greater than 7		



Plasticity Chart

Particle Size Material	Particle Size mm	Particle Size Sieve	Sieve sizes
			< #200
Silt or Clay	< 0.074		# 200 to # 400
Sand			
Fine	0.074 to 0.42		# 40 to #10
Medium	0.42 to 2.00		#10 to #4
Coarse	2.00 to 4.76		
Gravel			
Fine	4.76 to 19.1	#4 to 3/4 in.	
Coarse	19.1 to 76.2	3/4 in. to 3 in.	
Cobble	76.2 to 304.8	3 in. to 12 in.	
Boulders	304.8 to 914.4	12 in. to 36 in.	

* Division of GM and SM groups into subdivisions of d and u are for roads and airfields only. Subdivision is based on Atterberg limits; suffix d used when L.L. is 23 or less; the suffix is used when L.L. is greater than 25.

** Borderline classifiactions used for soils possessing characteristics of two groups are designated by combinations of groups symbols. For example; GW-GC, well-graded gravel-sand mixture with clay binder.

APPENDIX B – TERMINATION

TERMINOLOGY USED TO DESCRIBE THE RELATIVE DENSITY,
CONSISTENCY, OR FIRMNESS OF SOILS

The terminology used on the boring logs to describe the relative density, consistency, or firmness of soils relative to the standard penetration resistance is presented below. The standard penetration resistance (N) in blows per foot is obtained by ASTM D1586 procedure using 2" O.D., 1-3/8" I.D. samplers.

1. Relative Density. Terms for description of relative density of cohesionless, uncemented sands and sand-gravel mixtures.

N	Relative Density
0 - 4	Very Loose
5 - 10	Loose
11 - 30	Medium Dense
31 - 50	Dense
50+	Very Dense

2. Relative Consistency. Terms for the description of clays which are saturated or near saturation.

N	Relative Consistency	Remarks
0 - 2	Very Soft	Easily penetrated several inches with fist
3 - 4	Soft	Easily penetrated several inches
5 - 8	Medium Stiff	Can be penetrated several inches with thumb with moderate effort
9 - 15	Stiff	Readily indented with thumb, but penetrated only with great effort
16 - 30	Very Stiff	Readily indented with thumbnail
30+	Hard	Indented only with difficulty with thumbnail

3. Relative Firmness. Terms for the description of partially saturated and/or cemented soils which commonly occur in the Southwest including clays cemented granular materials, silts, and silty and clayey granular soils.

N	Relative Firmness
0 - 4	Very Soft
5 - 8	Soft
9 - 15	Moderately Firm
16 - 30	Firm
31 - 50	Very Firm
50+	Hard

APPENDIX C – CHLORIDES AND TOTAL DISSOLVED SOLIDS

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

June 23, 2017

ERICA HART

Pettigrew & Associates

100 E. NAVAJO DRIVE, SUITE 100

Hobbs, NM 88240

RE: CEDAR CANYON POND

Enclosed are the results of analyses for samples received by the laboratory on 06/21/17 11:35.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-16-8. Accreditation applies to drinking water, non-potable water and solid and chemical materials. All accredited analytes are denoted by an asterisk (*). For a complete list of accredited analytes and matrices visit the TCEQ website at www.tceq.texas.gov/field/qa/lab_accred_certif.html.

Cardinal Laboratories is accreditated through the State of Colorado Department of Public Health and Environment for:

Method EPA 552.2	Haloacetic Acids (HAA-5)
Method EPA 524.2	Total Trihalomethanes (TTHM)
Method EPA 524.4	Regulated VOCs (V1, V2, V3)

Accreditation applies to public drinking water matrices.

This report meets NELAP requirements and is made up of a cover page, analytical results, and a copy of the original chain-of-custody. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Celey D. Keene

Celey D. Keene

Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

Pettigrew & Associates
ERICA HART
100 E. NAVAJO DRIVE, SUITE 100
Hobbs NM, 88240
Fax To: (505) 393-1543

Received:	06/21/2017	Sampling Date:	06/21/2017
Reported:	06/23/2017	Sampling Type:	Water
Project Name:	CEDAR CANYON POND	Sampling Condition:	** (See Notes)
Project Number:	2017-1129	Sample Received By:	Tamara Oldaker
Project Location:	EDDY COUNTY, NM		

Sample ID: WATER BOTTLES (H701625-01)

Chloride, SM4500Cl-B **mg/L** **Analyzed By: AC**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride*	**40500**	4.00	06/22/2017	ND	104	104	100	3.92	

TDS 160.1 **mg/L** **Analyzed By: CK**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
TDS*	**75700**	5.00	06/23/2017	ND	214	100	213	2.61	

Cardinal Laboratories *=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Notes and Definitions

ND	Analyte NOT DETECTED at or above the reporting limit
RPD	Relative Percent Difference
**	Samples not received at proper temperature of 6°C or below.
***	Insufficient time to reach temperature.
-	Chloride by SM4500Cl-B does not require samples be received at or below 6°C
	Samples reported on an as received basis (wet) unless otherwise noted on report

Cardinal Laboratories *=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

101 East Marland, Hobbs, NM 88240
(575) 393-2326 FAX (575) 393-2476

Company Name:	Pettigrew & Associates, PA	BILL TO	
Project Manager:	Erica Hart	P.O. #:	
Address:	100 E. Navajo Drive STE 100	Company:	Pettigrew
City:	Hobbs	State: NM Zip: 88240	Attn: Erica Hart
Phone #:	575-705-393-9827	Fax #: 575-393-1543	Address: "
Project #:	2017.1129	Project Owner: EXY	City: "
Project Name:	Cedar Canyon Pond		State: " Zip: "
Project Location:	Eddy Co, NM		Phone #: "
Sampler Name:	Raj (Tetratech)		Fax #: "

FOR LAB USE ONLY				MATRIX						PRESERV.			SAMPLING		ANALYSIS REQUEST	
Lab I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER :	ACID/BASE:	ICE / COOL	OTHER :	DATE	TIME	Chlorides	TDS
H701625 1	Water Bottles			X									6/21/17	8:02am	X	X

PLEASE NOTE: Liability and Damages. Cardinal's liability and client's exclusive remedy for any claim arising whether based in contract or tort, shall be limited to the amount paid by the client for the analyses. All claims including those for negligence and any other cause whatsoever shall be deemed waived unless made in writing and received by Cardinal within 30 days after completion of the applicable service. In no event shall Cardinal be liable for incidental or consequental damages, including wthout limitation, business interruptions, loss of use, or loss of profits incurred by client, its subsidiaries, affiliates or successors arising out of or related to the performance of services hereunder by Cardinal, regardless of whether such claim is based upon any of the above stated reasons or otherwise.

Relinquished By: Erica Hart	Date: 6/21/17 Time: 11:20	Received By:	Phone Result: ☐ Yes ☐ No Add'l Phone #:
Relinquished By:	Date: 6-21-17 Time: 11:35	Received By: Tamara Oldaker	Fax Result: ☐ Yes ☐ No Add'l Fax #:
Delivered By: (Circle One) Sampler - UPS - Bus - Other:	21.1c°	Sample Condition Cool: ☐ Yes ☑ No Intact: ☑ Yes ☐ No	CHECKED BY: (Initials) TO-#75

REMARKS: Rush!! 6/22/17 T.O.

† Cardinal cannot accept verbal changes. Please fax written changes to (575) 393-2326

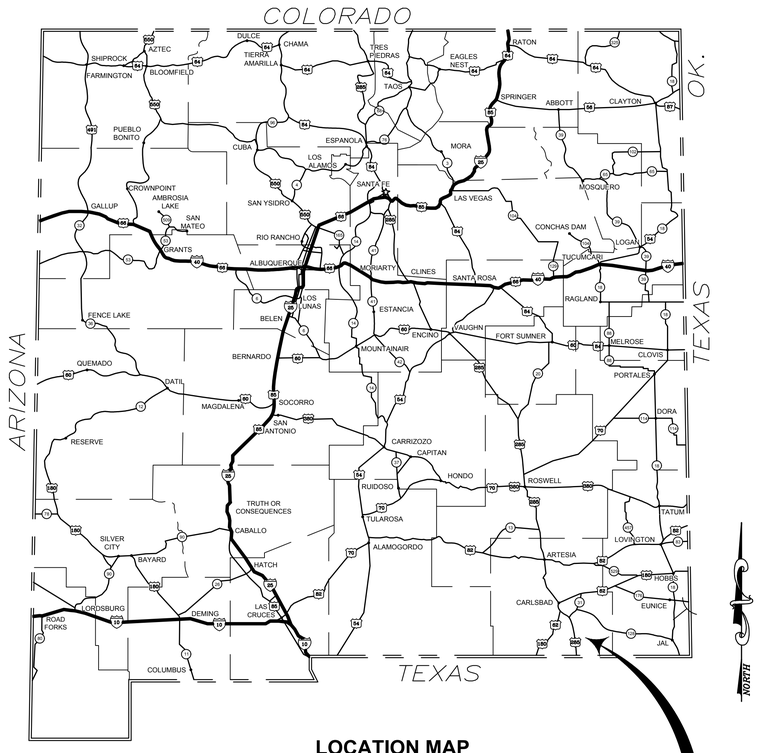
CEDAR CANYON RECYCLING CONTAINMENT

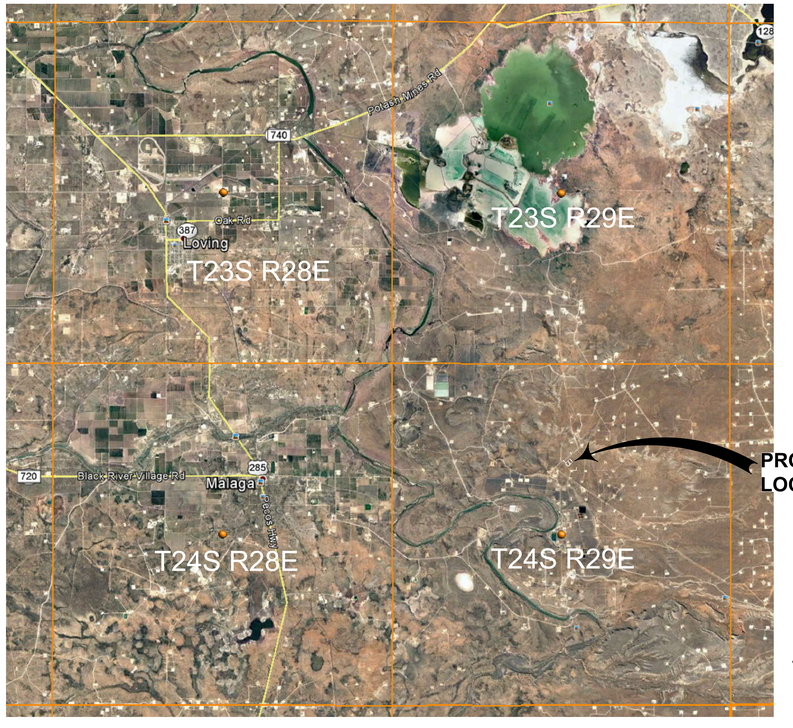
OXY U.S.A. INC.

EDDY COUNTY, NEW MEXICO

S10 T24S R29E

INDEX OF DRAWINGS





811 Know what's **below.** **Call** before you dig.

THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. 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.

FLOOD NOTE

THIS PROJECT IS LOCATED IN ZONE X AS DESCRIBED IN FEMA FIRM PANEL 35015C1625D, WITH AN EFFECTIVE DATE OF JUNE 4, 2010

CONTACTS

OWNER
TREY FOURNIER
OXY- NM DEVELOPMENT
1502 W. COMMERCE DRIVE
CARLSBAD, NM 88220
C: (832)-291-5426 I O: (713)-366-5798
Trey_Fournier@oxy.com

CIVIL ENGINEERING
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Pettigrew.us

CLAUDIUS SANCHEZ CZYZEWSKA NEW MEXICO 22897 PROFESSIONAL ENGINEER

08/09/2017

PROJECT ENGINEER: Claudius Sanchez Czyzewska, PE
PROJECT DESIGNER: Juan C. Saenz, EIT
DRAWN BY: JCS

REVISIONS

No.	DATE	DESCRIPTION

COVER SHEET

CEDAR CANYON RECYCLING CONTAINMENT
OXY U.S.A. INC.

REVISION 1
08/09/2017
ISSUED FOR CONSTRUCTION

EDDY COUNTY, NEW MEXICO

PROJECT NUMBER: 2017.1129

SHEET: C-001

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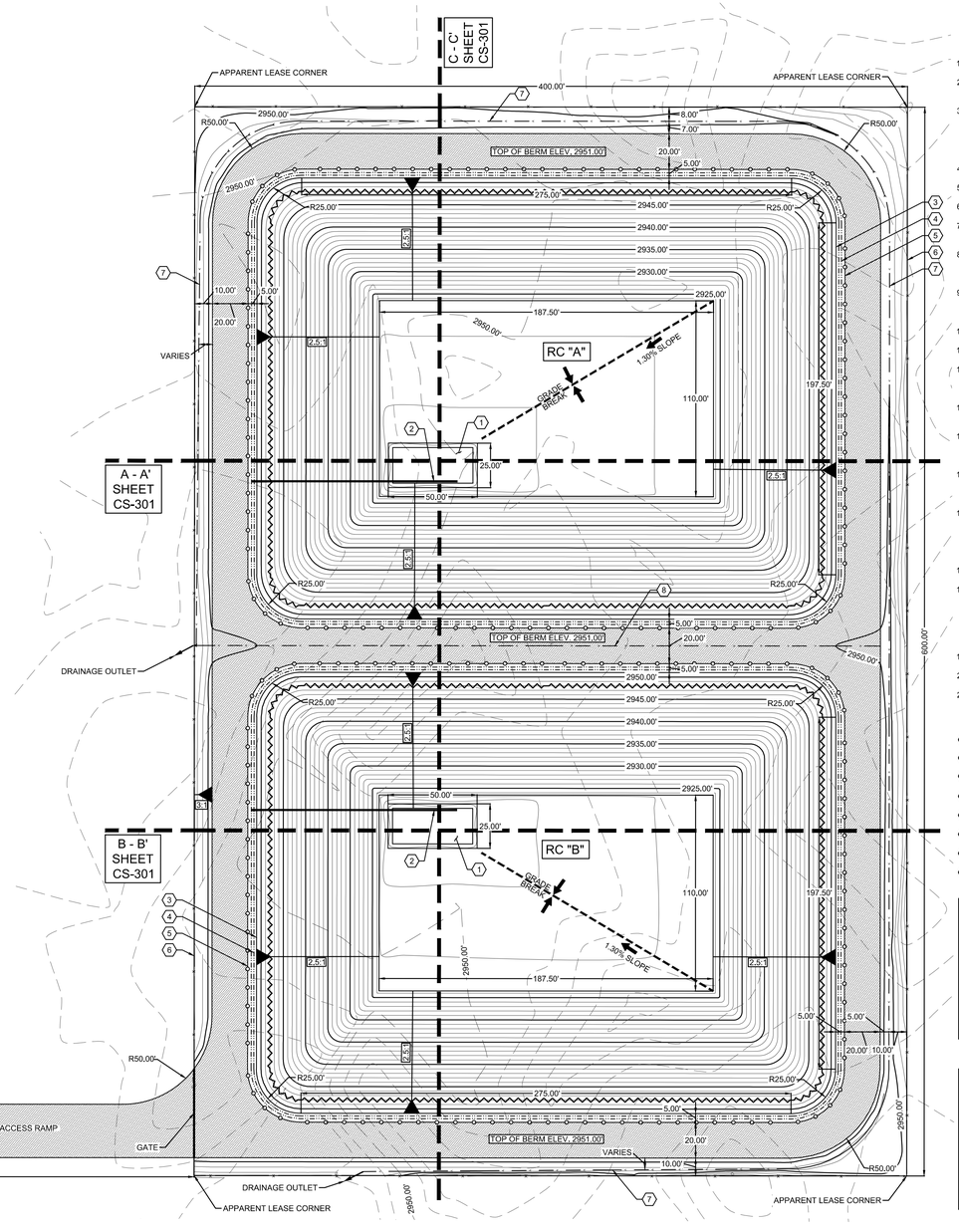


GENERAL NOTES

1. THE PROPOSED DESIGN IS BASED ON TOPOGRAPHIC AND BOUNDARY INFORMATION OBTAINED FROM JOHN WEST SURVEYING COMPANY, W.O. No.: 17110453 DATED 05/25/2017.
2. ALL CONSTRUCTION SHALL BE PERFORMED IN ACCORDANCE WITH THE PROJECT CONSTRUCTION PLANS OF THE REGISTRATION/PERMIT. NEW MEXICO STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION LATEST EDITION SHALL APPLY TO THIS PROJECT.
3. ALL DATA SHOWN HEREIN CONCERNING EXISTING PRIVATE AND/OR PUBLIC OWNED UTILITIES HAVE BEEN OBTAINED FROM THE OWNERS AND/OR FIELD OBSERVATIONS. THESE MAY OR MAY NOT BE ACCURATE. THE CONTRACTOR IS CAUTIONED THAT HE IS RESPONSIBLE FOR THE EXACT LOCATION AND PROTECTION OF ALL LINES DURING CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING, IN ADVANCE OF HIS/HER CONSTRUCTION OPERATIONS, IF OVERHEAD UTILITY LINES, SUPPORT STRUCTURES, POLES, GUYS, ETC. ARE AN OBSTRUCTION TO CONSTRUCTION OPERATIONS. IF ANY OBSTRUCTION IS EVIDENT, THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING WITH THE APPROPRIATE UTILITY OWNER TO REMOVE OR SUPPORT THE UTILITY OBSTRUCTION. ANY COST ASSOCIATED WITH THIS EFFORT IS INCIDENTAL TO THE PROJECT.
4. IT WILL BE THE CONTRACTOR'S RESPONSIBILITY TO SECURE AND SUPPLY WATER FOR THE PROJECT.
5. THE BOTTOM OF PIT SHALL BE SLOPED AT A MINIMUM 1.30% AS SHOWN.
6. THE PERIMETER OF THE SITE SHALL BE ENCLOSED WITH CHAINLINK FENCE AS PRESCRIBED BY DESIGN/CONSTRUCTION PLAN IN REGISTRATION/PERMIT APPLICATION.
7. STRIP AND STOCKPILE TOP SOIL FOR FUTURE CLOSURE USE. NEW MEXICO ADMINISTRATIVE CODE 19.15.34 AND (DESIGN AND CONSTRUCTION SPECIFICATIONS FOR A RECYCLING CONTAINMENT IN REGISTRATION/PERMIT) SHALL APPLY TO THIS PROJECT.
8. THE RECYCLING CONTAINMENT SHALL HAVE A PROPERLY CONSTRUCTED FOUNDATION AND INTERIOR SLOPES CONSISTING OF A FIRM, UNYIELDING BASE, SMOOTH AND FREE OF ROCKS, DEBRIS, SHARP EDGES OR IRREGULARITIES TO PREVENT THE LINER'S RUPTURE OR TEAR. GEOTEXTILE IS REQUIRED UNDER AND OVER THE LINER WHEN NEEDED TO REDUCE LOCALIZED STRESS-STRAIN OR PROTUBERANCES THAT OTHERWISE MAY COMPROMISE THE LINER'S INTEGRITY.
9. AS DESCRIBED IN THE DESIGN/CONSTRUCTION PLANS OF THE REGISTRATION/PERMIT, ALL PRIMARY (UPPER) LINERS IN A RECYCLING CONTAINMENT SHALL BE GEOMEMBRANE LINERS COMPOSED OF AN IMPERVIOUS, SYNTHETIC MATERIAL THAT IS RESISTANT TO ULTRAVIOLET LIGHT, PETROLEUM HYDROCARBONS, SALTS AND ACIDIC AND ALKALINE SOLUTIONS. ALL PRIMARY LINERS SHALL BE 60-MIL HDPE LINERS. SECONDARY LINERS SHALL BE 60-MIL HDPE. LINER COMPATIBILITY SHALL MEET OR EXCEED THE EPA SW-846 METHOD 9090A OR SUBSEQUENT RELEVANT PUBLICATIONS.
10. LINER SEAMS SHALL BE MINIMIZED AND ORIENTED UP AND DOWN, NOT ACROSS, A SLOPE OF THE LEVEE. FACTORY WELDED SEAMS SHALL BE USED WHERE POSSIBLE.
11. EXPANSION WRINKLE SHALL BE INSTALLED INSIDE OF PIT CONTAINMENT FOR THERMAL EXPANSION / CONTRACTOR.
12. UNLESS DIFFERENTLY STATED IN THE CONSTRUCTION PLAN OF THE REGISTRATION PERMIT,THE OPERATOR SHALL ENSURE FIELD SEAMS IN GEOSYNTHETIC MATERIAL ARE THERMALLY SEAMED. PRIOR TO FIELD SEAMING, THE OPERATOR SHALL OVERLAP LINERS FOUR TO SIX INCHES. THE OPERATOR SHALL MINIMIZE THE NUMBER OF FIELD SEAMS AND CORNERS AND IRREGULARLY SHAPED AREAS. THERE SHALL BE NO HORIZONTAL SEAMS WITHIN FIVE FEET OF THE SLOPE'S TOE. QUALIFIED PERSONNEL SHALL PERFORM FIELD WELDING AND TESTING.
13. AT A POINT OF DISCHARGE INTO OR SUCTION FROM THE RECYCLING CONTAINMENT, THE OPERATOR SHALL INSURE THAT THE LINER IS PROTECTED FROM EXCESSIVE HYDROSTATIC FORCE OR MECHANICAL DAMAGE. EXTERNAL DISCHARGE OR SUCTION LINES SHALL NOT PENETRATE THE LINER.
14. THE OPERATOR SHALL POST AN UPRIGHT SIGN NO LESS THAN 12 INCHES BY 24 INCHES WITH LETTERING NOT LESS THAN TWO INCHES IN HEIGHT IN A CONSPICUOUS PLACE ON THE FENCE SURROUNDING THE CONTAINMENT. THE OPERATOR SHALL POST THE SIGN IN A MANNER AND LOCATION SUCH THAT A PERSON CAN EASILY READ THE LEGEND. THE SIGN SHALL PROVIDE THE FOLLOWING INFORMATION: THE OPERATOR'S NAME, THE LOCATION OF THE SITE BY QUARTER-QUARTER OR UNIT LETTER, SECTION, TOWNSHIP AND RANGE, AND EMERGENCY TELEPHONE NUMBERS.
15. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO CONTACT NEW MEXICO 811 (FORMERLY NEW MEXICO ONE CALL) A MINIMUM OF 48 HOURS BEFORE EXCAVATION. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL EXCAVATE AND VERIFY THE HORIZONTAL AND VERTICAL LOCATIONS OF ALL DESIGNATED UNDERGROUND UTILITIES. SHOULD A CONFLICT EXIST, THE CONTRACTOR SHALL NOTIFY THE ENGINEER SO THAT THE CONFLICT CAN BE RESOLVED WITH A MINIMUM AMOUNT OF DELAY.
16. DURING CONSTRUCTION OF THE CONTAINMENT, THE CONTRACTOR WILL REPORT AND RESPOND TO ANY SPILLS OF HAZARDOUS MATERIALS SUCH AS GASOLINE, DIESEL, MOTOR OILS, SOLVENTS, CHEMICALS, TOXIC OR CORROSIVE SUBSTANCES, ETC. A SPILL IS DEFINED AS ANY RELEASE OF A CORROSIVE, HAZARDOUS, TOXIC OR RADIOACTIVE SUBSTANCE THAT MAY BE A THREAT TO PUBLIC HEALTH OR THE ENVIRONMENT. REPORTS OF SPILLS WILL BE MADE IMMEDIATELY TO BOTH THE NEW MEXICO ENVIRONMENT DEPARTMENT EMERGENCY RESPONSE TEAM (505-827-9329 OR 866-428-6535). THE CONTRACTOR WILL BE RESPONSIBLE FOR REPORTING AND CLEANUP OF ANY SPILL ASSOCIATED WITH PROJECT CONSTRUCTION. THE CONTRACTOR WILL BE RESPONSIBLE FOR REPORTING ANY DISCOVERIES OF PAST SPILLS OR CURRENT SPILLS NOT ASSOCIATED WITH CONSTRUCTION.
17. CONTRACTOR MUST OBTAIN CLIENT PERMISSION BEFORE SALVAGING ANY ITEMS SPECIFIED FOR REMOVAL AND DISPOSAL AFTER COMPLETION OF CONSTRUCTION OF THE CONTAINMENT.
18. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING DISPOSAL SITES THAT ARE ENVIRONMENTALLY SUITABLE FOR DISPOSAL OF ITEMS NOT SPECIFIED TO BE SALVAGED. THE CONTRACTOR IS EXPECTED TO ABIDE BY ALL FEDERAL, STATE, AND LOCAL LAWS AND REGULATIONS IN OBTAINING THE NECESSARY PERMITS FROM ALL APPLICABLE AGENCIES AND/OR PRIVATE PROPERTY OWNERS. ALL COSTS ASSOCIATED WITH OBTAINING THESE PERMITS SHALL BE INCIDENTAL TO THE COMPLETION OF THE PROJECT AND NO DIRECT MEASUREMENT OR PAYMENT SHALL BE MADE THEREFORE. THE CONTRACTOR SHALL PROVIDE THE ENGINEER WITH COPIES OF ALL PERTINENT INFORMATION, AGREEMENTS, AND PERMITS RELATED TO DISPOSAL SITES UTILIZED. BORROW MATERIAL, ROCK WASTE, AND VEGETATIVE DEBRIS SHALL NOT BE PLACED IN WETLANDS, ARROYOS, OR AREAS THAT MAY IMPACT THREATENED OR ENDANGERED SPECIES. ARCHEOLOGICAL AND ENVIRONMENTAL CLEARANCES MUST BE OBTAINED BEFORE DISPOSAL.
19. ALL MATERIALS SHALL BE APPROVED BY OXY CONSTRUCTION REPRESENTATIVES PRIOR TO PURCHASING AND SHALL BE DISCLOSED IN BID.
20. LINER INSTALLATION SHALL BE PERFORMED PER INDUSTRY BEST PRACTICES, STANDARDS AND OXY PROVIDED GUIDELINES.
21. VENTILATION OPENINGS SHALL BE LOCATED EVERY 50 FEET TYPICAL. RUB SHEETS PER SQUARE YARDS, VENTS PER EACH AND LEVEL GAGES PER EACH COMPLETE SHALL BE PROVIDED IN THE BID.

KEYED NOTES

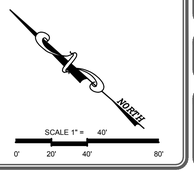
1. POND SUMP PER DETAIL 1, SHEET CS-501
2. LEAK DETECTION SYSTEM PER DETAILS 1, 2 AND 3, SHEET CS-501
3. 3' FREEBOARD DEPTH (ELEV. 2948.00')
4. ANCHOR TRENCH PER DETAIL 4, SHEET CS-501
5. CONTAINMENT FENCE WITH NETTING (BY OTHERS)
6. 4 STRAND BARBED WIRE PERIMETER FENCE PER DETAIL 6, SHEET CS-501
7. DRAINAGE DITCH PER DETAIL 10, SHEET CS-501
8. DRAINAGE DITCH PER DETAIL 11, SHEET CS-501

RECYCLING CONTAINMENT A	
TOP OF BERM ELEVATION	2951.00 FT
HIGH WATER ELEVATION	2948.00 FT
BOTTOM OF POND ELEVATION	2923.50 FT
SUMP ELEVATION	2920.50 FT
TOTAL CONTAINMENT VOLUME	234,000 BBL
TOTAL FLUID VOLUME BELOW 3' FREEBOARD ELEVATION	194,000 BBL

RECYCLING CONTAINMENT B	
TOP OF BERM ELEVATION	2951.00 FT
HIGH WATER ELEVATION	2948.00 FT
BOTTOM OF POND ELEVATION	2923.50 FT
SUMP ELEVATION	2920.50 FT
TOTAL CONTAINMENT VOLUME	234,000 BBL
TOTAL FLUID VOLUME BELOW 3' FREEBOARD ELEVATION	194,000 BBL

ESTIMATED CUT/FILL QUANTITIES*		
CUT (Cu. Yd.)	FILL (Cu. Yd.)	NET (Cu. Yd.)
136,500.00**	22,510.00***	113,990.00 (EXCESS)

*CUT AND FILL FACTORS NOT APPLIED. ALL QUANTITIES ARE "IN PLACE".
**CUT QUANTITY INCLUDES TOPSOIL.
***FILL QUANTITY IS OBTAINED FROM 2,700 C.Y. ABOVE EXISTING ORIGINAL SURFACE PLUS 19,810 C.Y. OF FILL ABOVE BERM BEARING LAYER ELEVATION.



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CLAUDIUS SANCHEZ CZYZEWSKA
NEW MEXICO
22897
PROFESSIONAL ENGINEER
08/09/2017

PROJECT ENGINEER:	Claudius Sanchez Czyzewska, PE
PROJECT DESIGNER:	Juan C. Saenz, EIT
DRAWN BY:	JCS

LEGEND

- FENCE
- EXIST. GRADE 1.0' CONTOUR
- EXIST. GRADE 5.0' CONTOUR
- FINISHED GRADE 1.0' CONTOUR
- FINISHED GRADE 5.0' CONTOUR
- DRIVING SURFACE
- 3' FREEBOARD DEPTH
- CONTAINMENT FENCE
- ANCHOR TRENCH
- DITCH FLOWLINE

REVISIONS

No.	DATE	DESCRIPTION

SITE GRADING PLAN
AND
GENERAL NOTES

CEDAR CANYON
RECYCLING
CONTAINMENT
OXY U.S.A. INC.

REVISION 1
08/09/2017
ISSUED FOR CONSTRUCTION

EDDY COUNTY, NEW MEXICO

PROJECT NUMBER:
2017.1129

SHEET:
CS-101

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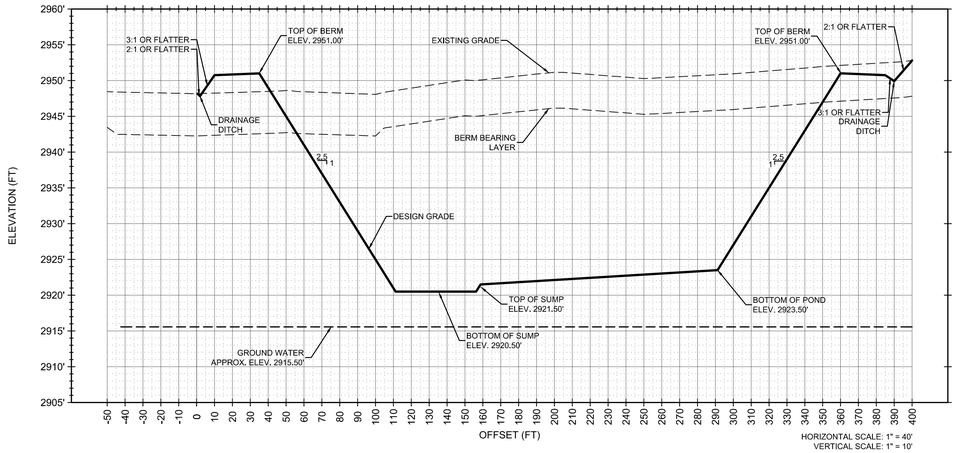
SECTION A - A'



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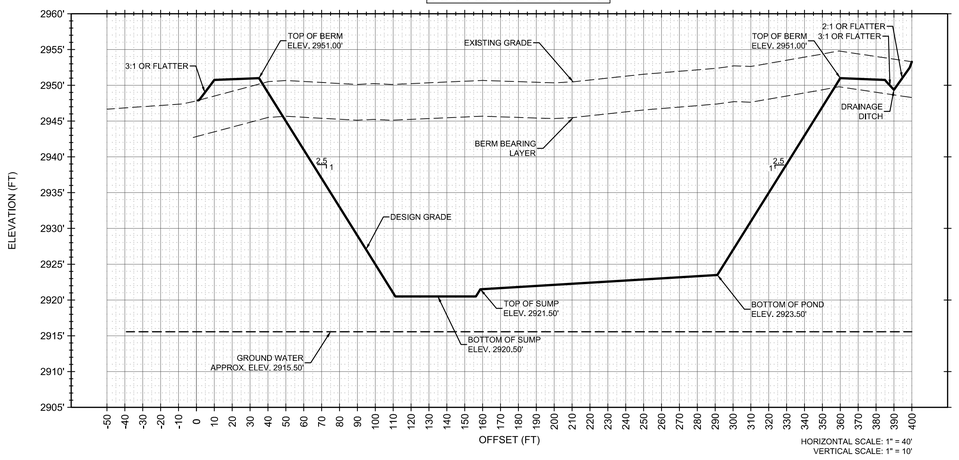
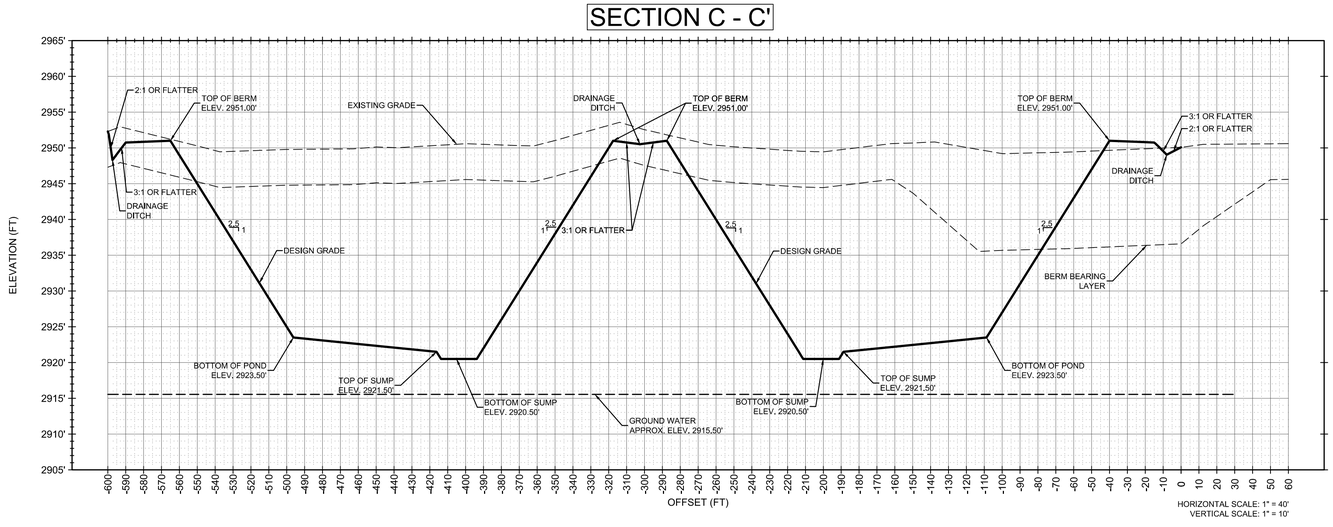
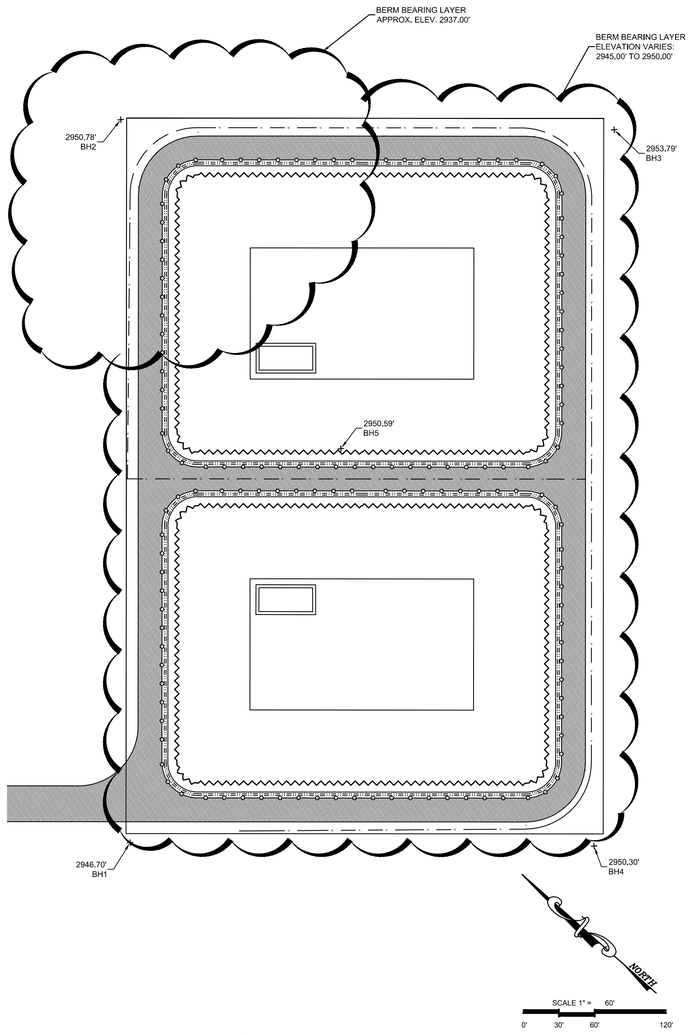


SECTION C - C'





1 BERM BEARING LAYER ELEVATION PLAN
SCALE: 1" : 60'

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DEFINING QUALITY SINCE 1965
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CLAUDIUS SANCHEZ CZYZEWSKA
NEW MEXICO
22897
PROFESSIONAL ENGINEER

08/09/2017

PROJECT ENGINEER: Claudius Sanchez Czyzewska, PE
PROJECT DESIGNER: Juan C. Saenz, EIT
DRAWN BY: JCS

REVISIONS

No.	DATE	DESCRIPTION

SECTIONS

CEDAR CANYON
RECYCLING
CONTAINMENT
OXY U.S.A. INC.

REVISION 1
08/09/2017
ISSUED FOR CONSTRUCTION

EDDY COUNTY, NEW MEXICO

PROJECT NUMBER:
2017.1129

SHEET:
CS-301

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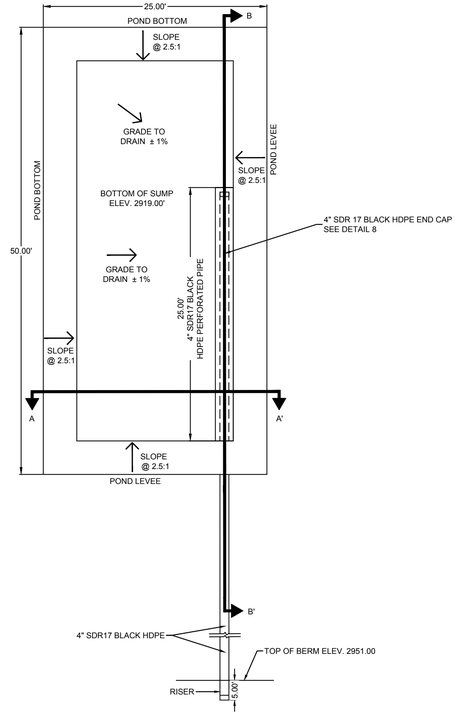
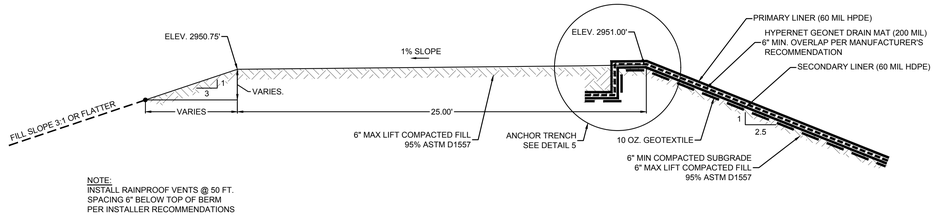
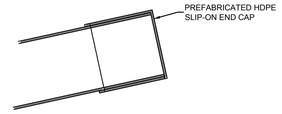


1 POND SUMP PLAN VIEW
SCALE: N.T.S.

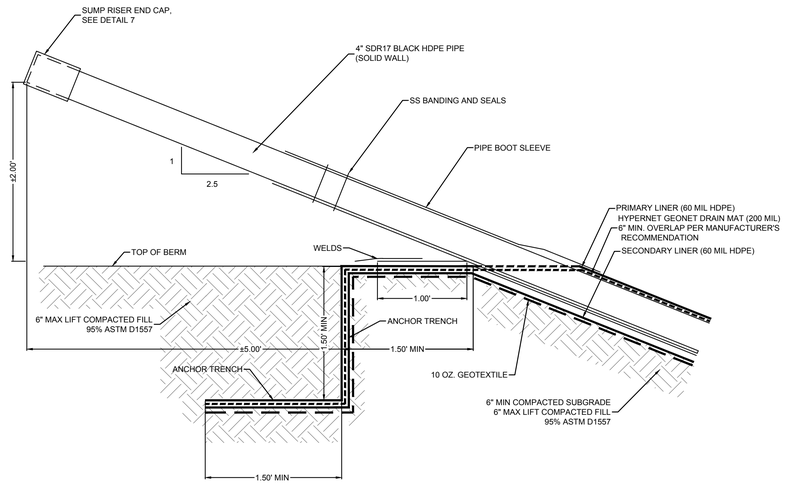


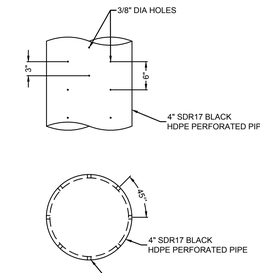
NOTE:
INSTALL RAINPROOF VENTS @ 50 FT. SPACING 6" BELOW TOP OF BERM PER INSTALLER RECOMMENDATIONS

4 TYPICAL TOP OF BERM AND EDGE DETAIL
SCALE: N.T.S.

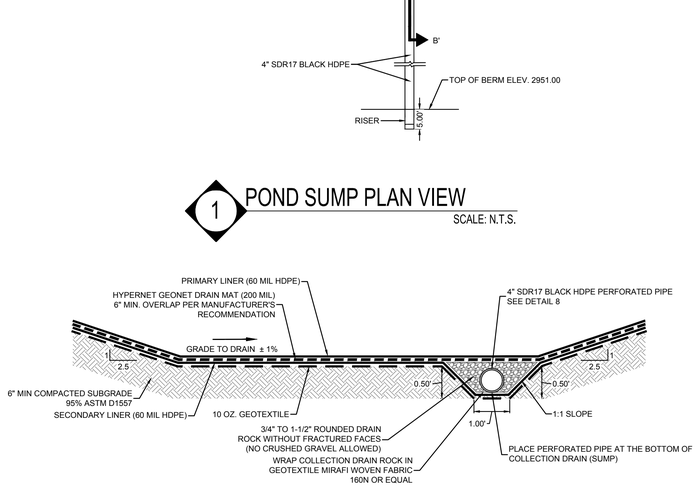


7 SUMP RISER END CAP
SCALE: N.T.S.

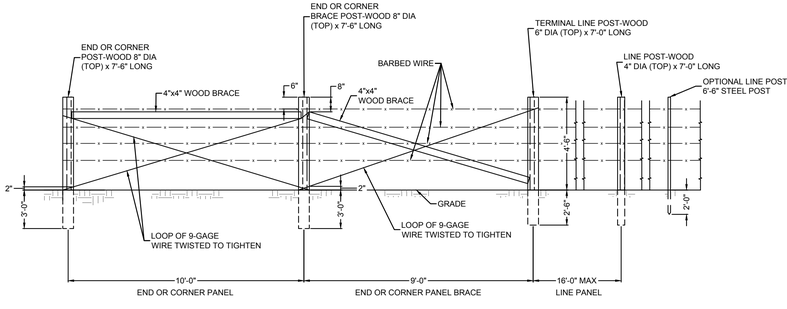




8 LEAK DETECTION SYSTEM PIPE PERFORATION DETAIL
SCALE: N.T.S.



2 LEAK DETECTION SYSTEM SECTION A - A'
SCALE: N.T.S.



6 4 STRAND BARBED WIRE FENCE
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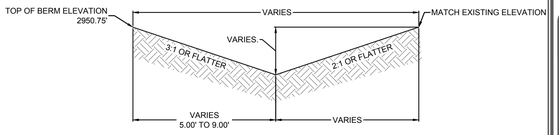
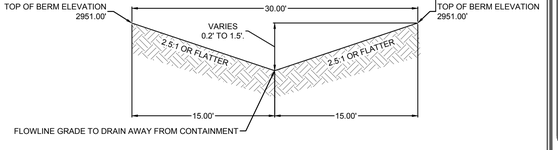
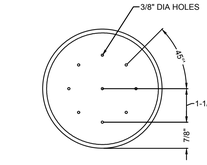


10 TYPICAL DRAINAGE DITCH DETAIL
SCALE: N.T.S.



11 TYPICAL DRAINAGE DITCH DETAIL
SCALE: N.T.S.



9 LEAK DETECTION SYSTEM PERFORATED END CAP DETAIL
SCALE: N.T.S.

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CLAUDIUS SANCHEZ CZYZEWSKA NEW MEXICO 22897 PROFESSIONAL ENGINEER

08/09/2017

PROJECT ENGINEER:	Claudius Sanchez Czyzewska, PE
PROJECT DESIGNER:	Juan C. Saenz, EIT
DRAWN BY:	JCS

REVISIONS

No.	DATE	DESCRIPTION

DETAILS

CEDAR CANYON RECYCLING CONTAINMENT
OXY U.S.A. INC.

REVISION 1
08/09/2017
ISSUED FOR CONSTRUCTION

EDDY COUNTY, NEW MEXICO

PROJECT NUMBER:
2017.1129

SHEET:
CS-501

Z:\2017.1129\Engineering\ACAD\CS-501_DETAIL.dwg 8/8/2017 11:29 AM

Appendices

Appendix 5 – Cedar Canyon - Recycling Containment Site Photographs

Site Photographs – Recycling Containments – Cedar Canyon

Photograph #1: View from southwest corner looking east.

Photograph #2: View from inside containment looking east.

Photograph #3: Boring

Appendices

Appendix 6 – Cedar Canyon - Recycling Containment
OSE Water Wells

New Mexico Office of the State Engineer
Water Column/Average Depth to Water

(A CLW##### in the POD suffix indicates the POD has been replaced & no longer serves a water right file.)

(R=POD has been replaced, O=orphaned, C=the file is closed)

Table 1

(quarters are 1=NW 2=NE 3=SW 4=SE)
(quarters are smallest to largest) (NAD83 UTM in meters) (In feet)

POD Number	POD Code	Sub-basin	County	Q 64	Q 16	Q 4	Sec	Tws	Rng	X	Y	Depth Well	Depth Water	Water Column
C 00381	C	C	ED	3	2	3	07	24S	29E	591682	3566297*	2797		
C 00463		C	ED	4	4	4	17	24S	29E	594332	3564282*	260	4	256
C 02713		C	ED	4	4	1	16	24S	29E	591633	3565944	230	18	212

Average Depth to Water: **11 feet**

Minimum Depth: **4 feet**

Maximum Depth: **18 feet**

Record Count: 3

Basin/County Search:

Basin: Carlsbad **County:** Eddy **Subbasin:** Carlsbad

PLSS Search:

Township: 24S **Range:** 29E

***UTM location was derived from PLSS - see Help**

New Mexico Office of the State Engineer
Water Column/Average Depth to Water

(A CLW##### in the POD suffix indicates the POD has been replaced & no longer serves a water right file.)

(R=POD has been replaced, O=orphaned, C=the file is closed)

Table 2

(quarters are 1=NW 2=NE 3=SW 4=SE)
(quarters are smallest to largest) (NAD83 UTM in meters) (In feet)

POD Number	POD Sub-Code	basin	County	Q 64	Q 16	Q 4	Sec	Tws	Rng	X	Y	Depth Well	Depth Water	Water Column
C 00232		C	ED	1	3	2	07	24S	28E	582362	3566826*	160		
C 00329		C	ED	2	1	2	13	24S	28E	590682	3565677*	95	30	65
C 00346		C	ED		2	2	15	24S	28E	587715	3565591*	90	32	58
C 00353	C	C	ED		3	4	13	24S	28E	590603	3564367*	2726		
C 00354	C	C	ED		4	4	13	24S	28E	591005	3564367*	2739		
C 00361	C	C	ED		3	3	08	24S	28E	583283	3565926*	2575		
C 00406		C	ED		1	1	08	24S	28E	583270	3567142*	78	50	28
C 00488		C	ED	2	1	2	15	24S	28E	587412	3565688*	64	8	56
C 00511		C	ED		2	3	02	24S	28E	588518	3568001*	268	140	128
C 00513		C	ED	2	2	2	20	24S	28E	584605	3564021	212	48	164
C 00513 S		C	ED	1	3	3	16	24S	28E	584802	3564432	161	42	119
C 00570		C	ED		1	1	10	24S	28E	586490	3567195*	100	28	72
C 00618		C	ED	3	4	4	12	24S	28E	590880	3565885*	80	40	40
C 00648		C	ED	2	2	2	17	24S	28E	584593	3565644*	96	58	38
C 00709		C	ED	3	3	3	16	24S	28E	584802	3564232*			
C 00903		C	ED		2	1	13	24S	28E	590178	3565575*	57	30	27
C 00962		C	ED		3	3	10	24S	28E	586505	3565992*	63	9	54
C 00983		C	ED	4	4	4	12	24S	28E	591080	3565885*	92	40	52
C 01154		C	ED	2	1	2	13	24S	28E	590682	3565677*	95	50	45
C 01237		C	ED	1	1	2	10	24S	28E	587197	3567298*	123		
C 01244		C	ED		4	4	06	24S	28E	582860	3567543*	109	70	39
C 01265		C	ED	2	4	1	26	24S	28E	543750	3561658	126		
C 01442		C	ED		1	2	10	24S	28E	587298	3567199*	100		
C 01731		C	ED		4	2	05	24S	28E	584483	3568367*	80	30	50
C 02057		C	ED		1	4	14	24S	28E	588956	3564774*	126	52	74
C 02184		C	ED	2	4	3	01	24S	28E	590248	3567700*	87	60	27

***UTM location was derived from PLSS - see Help**

(A CLW##### in the POD suffix indicates the POD has been replaced & no longer serves a water right file.)

(R=POD has been replaced, O=orphaned, C=the file is closed)

(quarters are 1=NW 2=NE 3=SW 4=SE)
(quarters are smallest to largest) (NAD83 UTM in meters) (In feet)

POD Number	POD Sub-basin	Code	County	Q 64	Q 16	Q 4	Sec	Tws	Rng	X	Y	Depth Well	Depth Water	Water Column
C 02186	C		ED			2	02	24S	28E	589128	3568606*	100	55	45
C 02198	C		ED			1	01	24S	28E	589940	3568611*	78		
C 02306	C		ED		3	2	04	24S	28E	585690	3568382*	75	25	50
C 02524 POD2	C		ED	2	2	2	15	24S	28E	587814	3565690*	90	11	79
C 02836	C		ED	2	2	2	16	24S	28E	586203	3565676*		15	
C 03132	C		ED	1	2	4	15	24S	28E	587616	3564877*	90	19	71
C 03358 POD1	C		ED	1	4	1	26	24S	28E	588416	3562116	135		
C 03703 POD1	C		ED	1	2	1	09	24S	28E	585259	3567225	74	15	59
C 03833 POD1	C		ED	2	1	2	26	24S	28E	589014	3562545	96	55	41

Average Depth to Water: **40 feet**

Minimum Depth: **8 feet**

Maximum Depth: **140 feet**

Record Count: 35

Basin/County Search:

Basin: Carlsbad **County:** Eddy **Subbasin:** Carlsbad

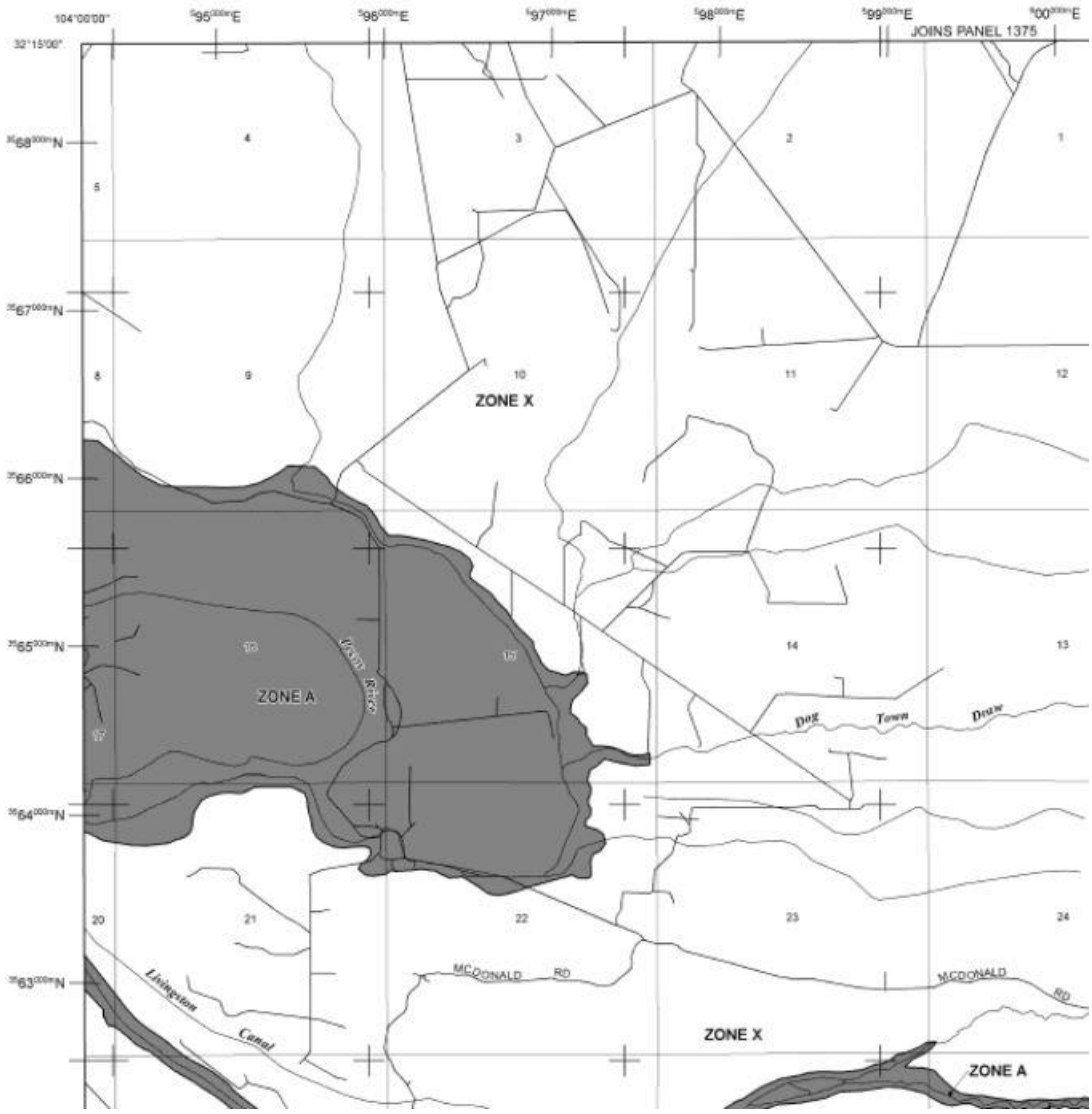
PLSS Search:

Township: 24S **Range:** 28E

***UTM location was derived from PLSS - see Help**

Appendices

Appendix 7 – Cedar Canyon - Recycling Containment FEMA FIRM


104°00'00"
595000mE
596000mE
597000mE
598000mE
599000mE
600000mE
JOINS PANEL 1375
32°15'00"
3568000mN
3567000mN
3566000mN
3565000mN
3564000mN
3563000mN
ZONE X
ZONE A
Dog Town Draw
MCDONALD RD
Livingston Canal
ZONE X
ZONE A

Appendices

Appendix 8 – Cedar Canyon - Recycling Containment Mega Blaster PRO

selected recordings in a sequential order. *The Random Mode is recommended to keep birds from adapting to a preset pattern of sounds.* To operate the unit in Random mode, set switch **5** in **Mode settings** as follows:

Switch 5	Mode
ON	Random mode ON
OFF	Random mode OFF

PROGRAMMING EXAMPLE

Recording Switches: 1, 3, 5 and 6 to "ON" position

Results Plays Bird 1, 3, 5 & 6

Mode Switches

1 = "OFF" position
2 = "ON" position (Medium), every 1 to 4 minutes
3 = "ON" position
4 = "OFF" position Operates during daylight hours only
5 = "ON" position In random, non-sequential order

VOLUME CONTROL

The unit has a volume control dial on the front panel of the unit. Turning the dial toward low will result in reduced sound output and rotating the dial toward high will result in an increase in sound output.

CAUTION: Take care when turning the dial since the unit may be in an inactive state when the dial is rotated. It could then reactivate at a very high level of sound which could be painful to your ears.

POWER SWITCH

The power switch enables the unit to operate. Slide the switch to the ON position to start the unit. If you turn the unit OFF, be sure to leave it off for about 30 seconds before turning it back on to allow the electronics to properly reset.

TROUBLESHOOTING

PROBLEM	SOLUTION
Unit is on, but no sound is heard	• Check volume settings. • Check time of operation settings. • Check that at least one bird is selected to play.
Unit is on, but plays the same bird over and over, regardless of settings	Reset the unit by turning it off for 30 seconds and then back on.
Unit is not operating properly in the DAY or NIGHT mode	• Double check Mode switch settings. • Make sure photocell is not obstructed. • Make sure the photocell is not affected by bright lights in either the front or the back of the unit.
Unit does not function properly when connected to a 12 volt battery	• Check battery condition. • Turn power switch on unit to the OFF position. Reconnect the battery, wait 30 seconds, then switch the unit back on.

LIMITED WARRANTY

IF YOU ARE NOT COMPLETELY SATISFIED, CONTACT THE PLACE OF PURCHASE OR OUR CUSTOMER SERVICE DEPARTMENT WITHIN 1 YEAR OF YOUR DATE OF PURCHASE FOR PROMPT AND COURTEOUS REPLACEMENT, REPAIR OR REFUND.

BIRD-X INC'S LIABILITY HEREUNDER SHALL BE LIMITED TO REFUNDING THE PURCHASE PRICE PAID BY CUSTOMER OR REPLACING THE PRODUCT, IN BIRD-X'S SOLE DISCRETION, AND UNDER NO CIRCUMSTANCES SHALL BIRD-X INC BE LIABLE FOR ANY CONSEQUENTIAL OR INCIDENTAL DAMAGES, OF ANY NATURE WHATSOEVER, ARISING FROM THE CUSTOMER'S USE OR OPERATION OF THE PRODUCT; PROVIDED, HOWEVER, THAT THIS LIMITATION MAY BE LIMITED BY STATE LAW.

EXCEPT FOR THE EXPRESS ONE-YEAR LIMITED WARRANTY SPECIFICALLY DESCRIBED HEREIN, BIRD-X INC DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, RELATING TO THE PRODUCT, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR IMPLIED WARRANTY OF FITNESS; AND THE EXPRESS WARRANTIES ARE IN LIEU OF ALL OBLIGATIONS OR LIABILITIES ON THE PART OF BIRD-X INC ARISING OUT OF OR IN CONNECTION WITH THE SALE, USE, OR OPERATION OF THE PRODUCT.

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Chicago, IL 60612
312.226.2473 • solutions@bird-x.com

EPA Establishment Number 62617-OR-001

BIRD-X MEGABLASTER

PRIOR TO INSTALLATION

Your complete Bird-X Mega-Blaster kit includes a control unit, 40 watt solar panel, battery cable with clips and a 20 speaker tower. Open the control unit by lifting the two latches on the side of the enclosure.

Cable Strain Relief

Prior to operation, route the speaker and power cables from their respective jacks on the control panel down through the cable strain relief in the lower part of the enclosure.

IMPORTANT: Be certain that the power switch is in the OFF position and the volume control is set to the minimum (LOW) volume level (counterclockwise) as shown in Fig. 1 when powering up the unit.

Fig. 1

SETUP AND INSTALLATION

1) Use the mounting hardware (included) to mount the control unit box to a wall, post, pole or other vertical surface.

2) Attach the battery cable assembly to a 12V battery (not included) matching the positive and negative terminals. The other end of the cable comes preinstalled into the power terminal block. Attach the

Complete system shown mounted on a pipe with solar panel.

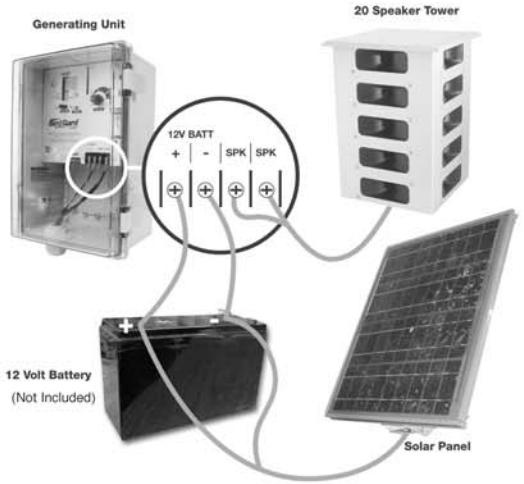


Fig. 2 **Wiring Setup Diagram**

two speaker wires from the 20 speaker tower to the speaker terminals on the generating unit. Connect the solar panel to the battery matching the positive and negative terminals on both ends. (Fig. 2)

3) It is recommended to mount the 20 speaker tower on a pole or surface that is aimed directly and at the same level as the infected area.

4) Set the Recording switches, Mode Setting switches, Time-Off switches, Time of Operation switches and Random Operation switches to the desired settings. (See PROGRAMMING YOUR MEGABLASTER for complete details on how to program your bird repeller).

5) Make sure the volume setting is set to **LOW** (all the way counterclockwise).

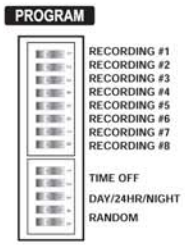
6) Slide the power switch to the **ON** position. The unit may take a few seconds before starting.

7) Adjust the volume to the desired level.

8) Close the cover and latch shut.

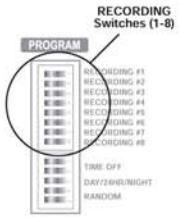
PROGRAMMING YOUR MEGABLASTER

To program your Megablaster unit you will need a small screwdriver, toothpick, or other small, rigid



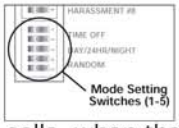
object to toggle the switches in the switch array. The switch array is the switch bank located in the top left corner of the unit (under "PROGRAM") . **A switch is ON if the switch is pressed down on the right-hand side. The switch is OFF if the left side is pressed down.**

RECORDING SETTING SWITCHES



The Recording switches are the first eight switches in the switch array. Each switch has a recording number to the right of it that corresponds with the bird descriptions listed on the foil label inside the unit.

MODE SETTING SWITCHES



The Mode Setting switches set the various modes of operation: such as the amount of time between playing bird distress calls, when the unit will operate (day only, night only, or 24 hours), and whether the unit will operate in the Random Mode or Normal Mode.

Switch	Mode or Function
1	Sets the Time-Off Period
2	Sets the Time-Off Period
3	Sets the Time the unit plays
4	Sets the Time the unit plays
5	Turns Random Mode On or Off

TIME-OFF SWITCHES

The **two** Time-Off switches are located **just below the Recording switches** in the switch array.When the unit is set to one of the various Time-Off modes, the unit will delay a number of seconds or minutes between recorded sounds. Please note that the unit will play all of the selected recordings (either sequentially or non-sequentially, depending on the Random Mode) then it will go into a delay. The time the unit stays off depends on the Time-Off and the Random Mode settings. If the unit is operating in Random Mode, the unit will delay anywhere from

the minimum value to the maximum value for that time-off setting. If the unit is not in Random Mode, it will delay only the minimum value. To set the Time-Off period (or delay interval), use the following settings on switches 1 and 2 in the mode function settings.

Switch 1	Switch 2	Time Off Period
ON	OFF	Short
OFF	ON	Medium
ON	ON	Long
OFF	OFF	Extra Long

Mode	Min	Max
Short	17 sec	50 sec
Medium	1 min	4:15 min
Long	5:00 min	10:00 min
XLong	10 min	30 min

TIME OF OPERATION SWITCHES

The **two** "Day/24hour/Night" switches are **located just under the Time-Off switches** in the switch array. 'Night Mode' operates the unit at night and 'Day Mode' operates the unit during the day. However, the photocell that senses the sunlight is susceptible to bright lights. Take care not to have bright lights shining towards the unit since this can prevent the unit from operating properly. In 24-hour mode, the unit will operate continuously, regardless of the time of day. To set the time period for the unit to operate set switches **3** and **4** in the Mode Function settings to the following:

Switch 3	Switch 4	Mode
ON	OFF	Day Only
OFF	ON	24-Hour
ON	ON	Night Only
OFF	OFF	also Night Only

RANDOM OPERATION SWITCH

The "Random" switch is the bottom switch in the switch array. When operating in Random Mode, the unit will randomly play the selected recordings in non-sequential order. When the unit is not operating in the Random Mode, the unit will play the

EFFECTIVE WIDE-AREA BIRD CONTROL!

Mega Blaster PRO
sonic bird repeller
covers 30 acres!

- NEMA Rated Case
- Crystal-Clear Digital Sounds

Mega Blaster PRO uses intermittent distress calls to create a "danger zone" that frightens infesting birds away for good.

PREDATOR cries help scare all the birds.

- *Laughing Gull*
- *Ring-Billed Gull*
- *Herring Gull*
- *California Gull*
- *Black-Headed Gull*
- *Glaucous-Winged Gull*
- *Double Crested Cormorant*
- *Marsh Hawk*

Perfect for Landfills, Airfields, Fish Farms, Farm Fields or any multi-acre facility.

Our most powerful system features two high-output amplifiers that drive our specially-designed 20 speaker tower. The intense sound output covers up to 30 acres (12 hectares).

It features solid-state electronics mounted inside a NEMA-type control box, suitable for most any application.

The generating unit mounts easily to a post or pole using the included hardware. The unit comes pre-recorded in four different configurations for the most common bird infestations.

Choose any or all of the 8 sounds, including predators to give the birds even more of a sense of danger. Customize by choosing volume and silent time between sounds.

CONFIGURATIONS AVAILABLE:

- Agricultural
  # MEGA-AG
- Crow / Raven
  # MEGA-CROW
- Woodpecker
  # MEGA-WP
- Marine / Gull
  # MEGA-MAR

Mega Blaster PRO

Complete system includes the generating unit with two built-in high-output amplifiers, 20-speaker tower with audio cables, 40 watt solar panel, battery clips and all mounting hardware.

BIRD-X

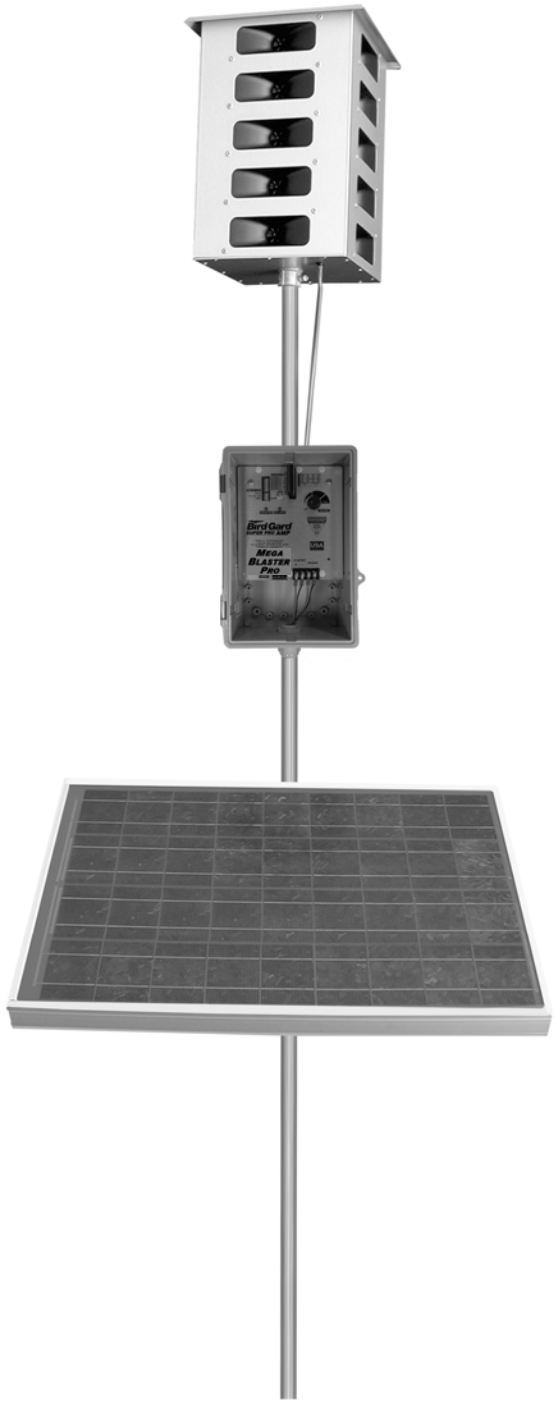
The Bird Control 'X'-Perts

NOTE: This unit is capable of sound output up to 125 decibels. **HEARING PROTECTION IS RECOMMENDED.**

MEGA BLASTER PRO

BIRD-X

User's Manual



Overview

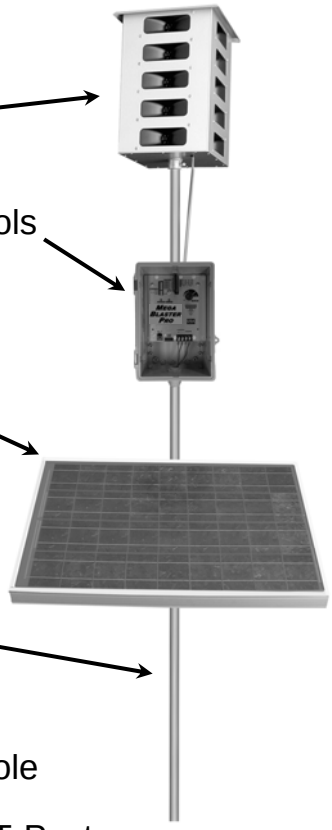
The Bird-X Mega Blaster Pro utilizes the innate power of the natural survival instincts of birds to effectively repel them. Digital recordings of distressed and alarmed birds, along with the sounds made by their natural predators are broadcast through high fidelity weather-resistant speakers over the top of areas. This action triggers a primal fear and flee response. Pest birds soon relocate to where they can feed without feeling threatened.

Your Bird-X Mega Blaster Pro system consists of:

20-Speaker Tower broadcasts the bird sounds

Control Unit produces the bird sounds and contains all operational controls

Solar Panel recharges the 12-volt deep cycle battery



Items needed but <u>not</u> included:

(1) **Mounting Pole** or **Mast** tall enough to raise the 20-Speaker Tower at least 5 feet above the top of the areas, trees or other obstructions

(1) **12-volt Deep Cycle Battery** (RV/Marine) Group 27 or larger wet cell

(1) **T-Post** or similar (Optional) may be needed to support the mounting pole

(1) **Bailing Wire or zip-tie** (Optional) to secure the Mounting Pole to the T-Post

CAUTION: THE MEGA BLASTER PRO IS CAPABLE OF PRODUCING SOUNDS UP TO 125 DECIBELS. PROPER HEARING PROTECTION MUST BE WORN ANYTIME THE UNIT IS TURNED ON.

Bird Control Management Guidelines

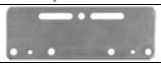
An active bird control management program is a key to successfully repelling pest birds. Bird feeding patterns may take several days or weeks to break. Follow all suggestions for maximum effectiveness. Read all instructions prior to installation.

For best results:

- **It is extremely important to fully protect your entire area from birds.** Any areas not fully protected will allow birds to begin feeding at the fringes of the sound coverage. They will soon become bolder and learn the sounds are nothing to fear. This will cause the effectiveness to diminish. Complete Bird-X product coverage forces birds to leave the area entirely.
- Install the Mega Blaster Pro unit at least two weeks before birds are attracted to your area. It is much easier to keep birds away before they have found a food source than it is to repel them once they have developed a feeding pattern.
- Most birds begin feeding from the perimeter of an area. Place Mega Blaster Pro units so the sound protection covers past the edges of the area.
- Birds will often use tall trees for roosting and observation. If birds are in bordering trees it is necessary to position the units so the sound protection covers the trees as well.
- Mount the 20-Speaker Tower at least five feet above trees, areas and structures for maximum coverage. The higher the better. Sound will disperse or reflect off structures or foliage. Mount control unit out of direct sun, if possible.
- When first installed, run Mega Blaster Pro units at FULL volume and on SHORT time off periods. This ensures maximum “bird stress” and creates a hostile environment.
- Watch for changes in bird activity and adjust the location of your Mega Blaster Pro unit if needed.
- **Check the battery and unit settings often to insure continuous bird control. Be certain that the system is not turned down or has a dead battery. Field hands or harvesters may turn down the volume.**
- Changing settings and switches often helps to prevent bird habituation. Periodically change the switch settings of the eight sounds (turning them ON or OFF). NEVER turn OFF the distress calls of the target birds you are trying to repel and always keep at least one predator bird sound turned ON.
- If different bird species enter the protected area and begin causing damage contact us immediately for an updated Sound Recording Card designed to repel the new invading birds.
- Remember that the Mega Blaster Pro system is a management tool, and should be used as part of your overall bird control strategy, sometimes in conjunction with other bird control techniques and devices.

Be aware that under extreme drought or other adverse conditions, birds will disregard all deterrents and risks in order to survive

Materials List

Item	Qty		Notes
Mega Blaster Pro Control Box	1		
Sound Recording Card	1		Pre-installed in control box
20-Speaker Tower	1		
Control Box Mounting U-Bolts	2		1/4” x 1” x 2”
Control Box Brackets	2		
40-Watt Solar Panel	1		
Solar Panel Mounting Bracket	1		
Solar Panel Mounting U-Bolts	2		1/4” x 1-1/8” x 2”
Control Box Connector Cable	1		2 Wire, 4 ft. Long
Battery Box	1		

Assembly

Note: You will find it easier to pre-assemble the following components prior to installation in the field.

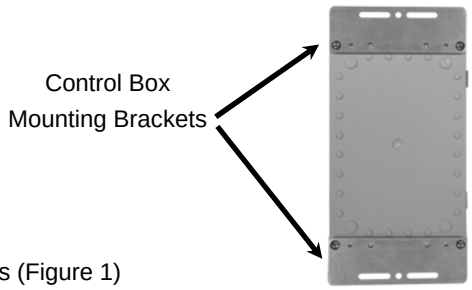


Figure 1

Control Unit

1. Lay the Control Unit face down
2. Attach the two Control Box Mounting Brackets to the back with the included screws (Figure 1)

Solar Panel

3. Install the two Solar Panel Mounting U-Bolts in the Head of the Solar Panel Mounting Bracket (Figure 2)
4. Loosen, but do not remove the Carriage Bolts securing the movable Clamp Plates on the Solar Panel Mount Bracket
5. Lay the solar panel on a flat surface with the glass side down
6. Lay the Mounting Arm across the Solar Panel with the Clamp Plates down. Position the Mounting Arm at an angle so the Clamp Plates slide under the lip of the Solar Panel (Figure 3A)
7. Rotate the Mounting Arm and secure it to the Solar Panel by tightening the Carriage Bolts (Figure 3B)

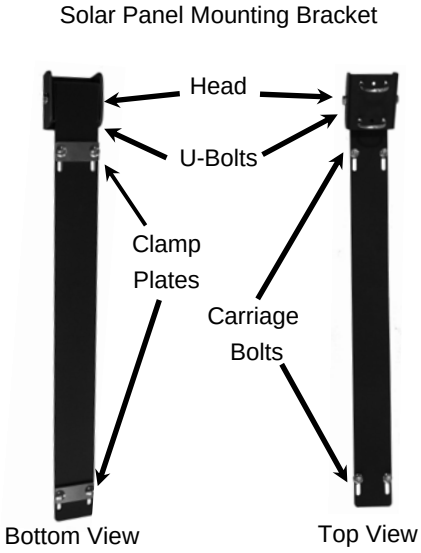


Figure 2

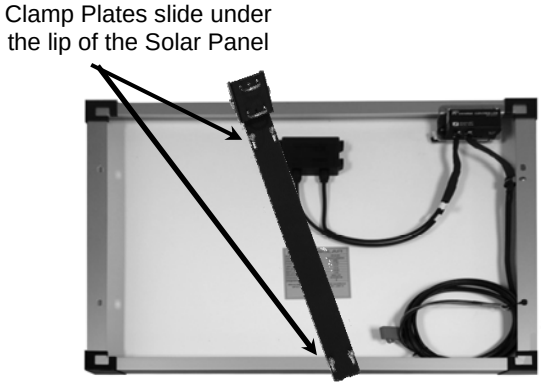


Figure 3A

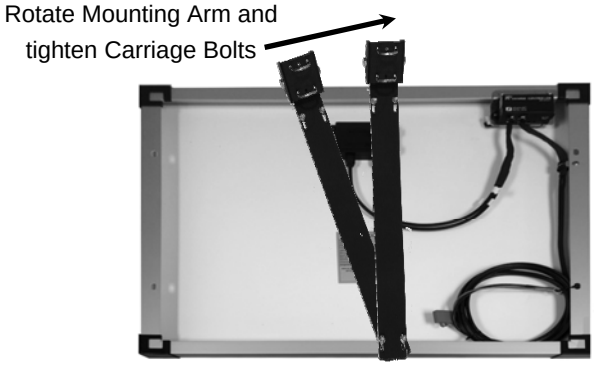


Figure 3B

Placement

Your Mega Blaster Pro will protect an area up to approximately 600 feet in all directions.

Factors to consider when selecting the best location include:

- Birds typically feed from the perimeter of the area and work their way in. Place Mega Blaster Pro units so the sound protection covers all the way to the edges of the area. For larger areas Mega Blaster Pro units should be positioned 400-500 feet inside the area and spaced every 1,200 feet.
- Mount the 20-Speaker Tower at least 5 feet above terrain, areas, trees and other obstacles.
- Placing the Mega Blaster Pro on top of a hill or small rise will give you much better coverage than at the bottom of a valley. The greater the height the further the sounds will travel.
- Wind can blow the sound waves. If the area you need to protect has consistent wind coming from the same direction, position your Mega Blaster Pro more “upwind.”
- Trees surrounding areas provide birds with a safe perch that allows them to fly in, grab food and fly out. It is much more difficult to eliminate bird damage if the birds are able to use the surrounding trees as a staging area for attacks on your areas. Your Mega Blaster Pro unit should be positioned close to any trees bordering your areas. If birds are roosting in the trees at night the TIME OF OPERATION should be set to 24 HOUR.
- Lakes, rivers and wetlands are a favorite resting and hiding place for birds. Your Mega Blaster Pro unit should be placed so the sound thoroughly covers any areas where birds frequent.
- Neighbors, businesses and others may not appreciate hearing the bird sounds. At the limits of the effective range the sounds from your Mega Blaster Pro are at a level people may find annoying. Avoid placing the unit where it becomes a nuisance.

Building a Mounting Pole or Mast

CAUTION: TALL POLES AND MASTS CAN BE HEAVY AND POTENTIALLY DANGEROUS. USE EXTREME CAUTION WHEN CONSTRUCTING OR WORKING AROUND TALL POLES AND MASTS. BIRD-X, INC., ASSUMES NO RESPONSIBILITY FOR DAMAGES OR INJURIES.

Things to consider:

- The 20-Speaker Tower is designed to mount onto a 1 in. (outside diameter) pipe at least 14 in. long. 1 in. conduit works well as it is light, rigid, inexpensive and available in 10 ft. lengths making it ideal for low areas, vineyards and bushes.
- You will want to take down your Mega Blaster Pro unit after harvest and store it in a dry location until the next season.

A suggestion for masts up to 20 feet tall:

1. 3/4 inch Galvanized steel water pipe has a 1 inch outside diameter and is the correct size to fit inside the 20-Speaker Tower. It is often available in 20 ft. lengths from hardware and plumbing supply stores. If these are not available, 10 ft. lengths are common and can be fastened together with a threaded coupler. Assemble the poles on the ground.
2. Slide the 20-Speaker Tower over the pipe and tighten the set screw in the collar at the base.
3. Stand the pole assembly up just inside the drip line of a tree and securely tie the pole to a few heavy branches.
4. Drive a T-Post into the ground at the base of the pole and secure with wire.

For masts taller than 20 feet:

1. Use 20 ft. lengths of galvanized steel water pipe or similar, securely fastened together with threaded reducing couplers.
2. Starting with 3 in. pipe, step the size down with each length of pipe.
3. The last 10 ft. can be 1 in. (O.D.) conduit hose clamped to the final section of galvanized pipe.

A semi-permanent mast support can be made by digging a hole 4 ft. deep and 4 ft. round. In the middle of the hole sink a length of galvanized water pipe large enough that your mast will easily fit inside. Make sure at least 2 ft. of pipe is above ground level. Fill the area around the pipe with packed sand, leaving the last foot filled with concrete to form a cap over the hole. Your mast can be dropped into the galvanized water pipe “receiver” for support. At the end of harvest the mast can be lifted out and positioned on the ground for easy disassembly and storage.

Installation

Note: Foliage, trees, and other obstructions severely reduce the effective range of Mega Blaster Pro units. It is critical that the 20-Speaker Tower is mounted at least 5 feet above all obstructions to achieve the maximum protection.

Mounting Pole or Mast

1. The Mounting Pole or Mast will need to be supported by a T-Post, fence post, tree or other means. The Pole Support should be in place before proceeding.

20-Speaker Tower

2. Lay the 20-Speaker Tower on its side on the ground and cut the zip-tie securing the speaker cables.
3. Slide the 1 in. (outside diameter) Mounting Pole through the Collar at the bottom of the 20-Speaker Tower until it slides over the positioning bolt inside the top of the Tower (Figure 4).
4. Tighten the Set Screw in Collar securely.

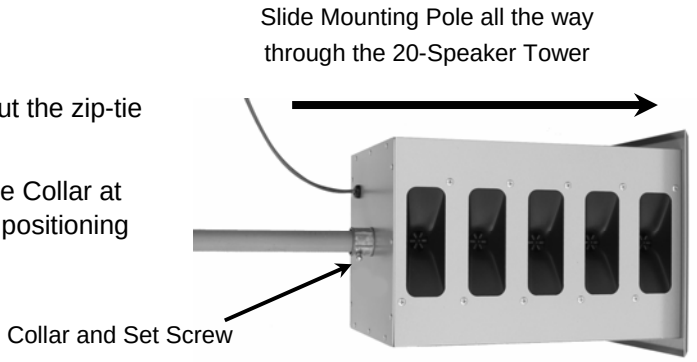


Figure 4

Solar Panel

5. Rest the lower end of the Mounting Pole on the Solar Panel Mounting Bracket approximately three feet from the bottom of the pole with the top of the solar panel facing the 20-Speaker Tower (Figure 5).
6. Lean up the Mounting Pole with the 20-Speaker Tower on top, against the Pole Support and fasten the Mounting Pole to the Pole Support securely with wire or other semi-permanent means.
7. Rotate the solar panel so it receives sunlight.

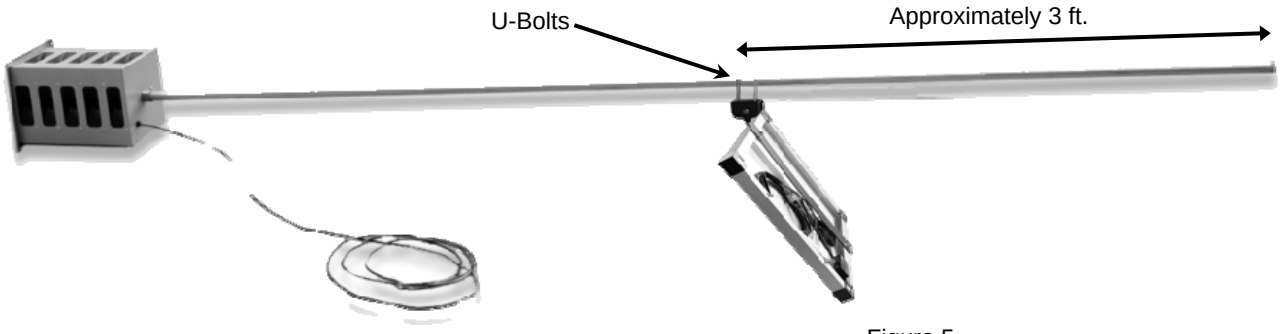


Figure 5

Control Box

8. Attach the Control Box to the Mounting Pole with the U-Bolts.
9. Feed the Speaker Cables through the Cable Strain Relief at the bottom
10. Attach the Speaker Cables from the 20-Speaker Tower to the screws marked “SPEAKER” on the faceplate of the control panel.
11. Locate the Control Box Connector Cable (the grey 2 lead cables) and feed one end through the Cable Strain Relief.
12. Connect the RED wire to the screw marked “+” and the BLACK wire to the screw marked “-” under “12V BATTERY” on the faceplate of the control panel.
13. **MAKE SURE THE POWER SWITCH IS TURNED OFF BEFORE ATTACHING BATTERY.**
14. Connect the other end of the RED wire to the “+” terminal on the 12-volt Deep Cycle battery (not included). Connect the BLACK wire to the “-” terminal on the battery.
15. Hand tighten the Tapered Cinch Nut on the bottom of the Cable Strain Relief to help keep insects and moisture out.

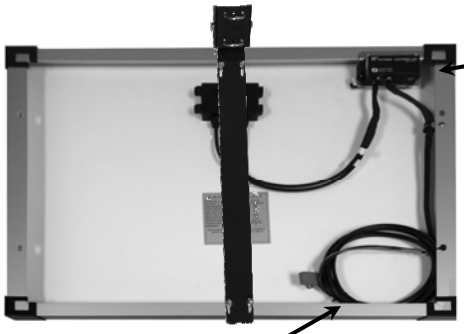
Figure 6

Solar Panel Connections

16. Cut the black zip-ties securing the RED and BLACK wires on the underside of the solar panel. (Figure 7)
17. Connect the RED wire to the “+” terminal on the 12-volt battery and connect the BLACK wire to the “-” terminal on the battery.

NOTE: If you are using a “Sealed Gel” 12-volt battery (instead of a Lead Acid battery) you will need to cut the indicated small BLUE wire on the attached voltage regulator. This prevents Sealed Gel batteries from being overcharged. Failure to cut this wire can result in permanent battery damage. (Figure 8)

Figure 7



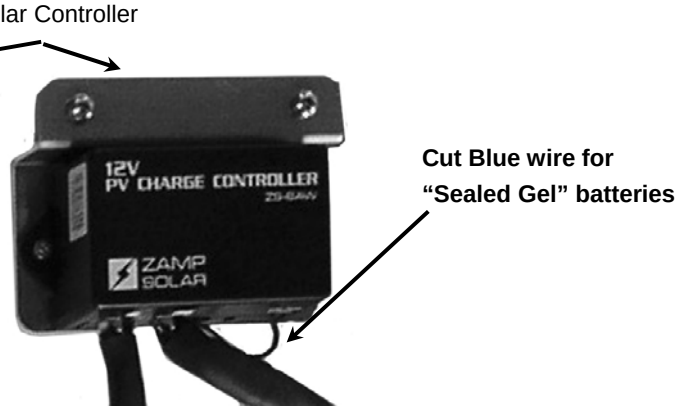


Figure 8

CAUTION: The Mega Blaster Pro is capable of producing sounds up to 125 decibels. Hearing protection must be worn anytime the unit is on!

Settings

Repelling birds requires regular monitoring and active management. Birds are intelligent and highly adaptable so it is important to create and maintain an environment the birds perceive as hostile and dangerous. This is achieved by playing the sounds frequently and at a high volume, otherwise the birds will not be fully repelled and will soon learn to adapt.

Below are the initial settings that should be used when your Mega Blaster Pro is first installed. Please see the "Bird Control Management Guidelines" section for more information.

Recordings

There are eight separate bird sounds contained on the Replaceable Sound Card. The label on the sound card lists each sound with a number corresponding to the eight "RECORDINGS" dip switches to the left of the Sound Card. Initially all RECORDING switches should be turned ON. If the target birds begin returning, periodically change the switch settings for the eight sounds (turning them ON or OFF). ***NOTE:*** **NEVER turn OFF the distress calls of the target birds you are trying to repel and always keep at least one predator bird sound turned ON.**

Mode Settings

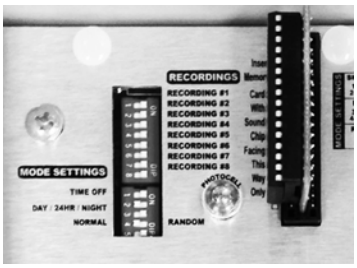
TIME OFF INTERVAL controls the time off periods between each playing of the bird recordings.

Setting	Time Off Duration	Switch #1	Switch #2
SHORT	**17-50 Seconds**	**ON**	**OFF**
MEDIUM	1:00-4:15 Minutes	OFF	ON
LONG	5:00-10:00 Minutes	ON	ON
XLONG	10:00-30:00 Minutes	OFF	OFF

When the Mega Blaster Pro unit is first installed the TIME OFF INTERVAL should be set to SHORT to create the greatest sense of danger and move the birds out of the area the fastest. Once the birds have left the area completely for a week or more you may try increasing the TIME OFF INTERVAL gradually, but you must monitor the birds carefully. Switch back to SHORT at the first sign birds are returning.

TIME OF OPERATION controls when the bird recordings play.

Setting	Switch #3	Switch #4
DAY ONLY	**ON**	**OFF**
24-HOUR	OFF	ON
NIGHT ONLY	ON	ON



Recommended Settings

In most cases birds are only active during the day so the DAY ONLY is recommended. If birds are roosting in bordering trees at night you will need to set the TIME OF OPERATION for 24-HOUR.

RANDOM OPERATION should always be turned **ON**. **VOLUME should be set as high as possible.**

Troubleshooting

Problem	Possible Cause	Solution
No Sound	Volume turned down	Turn volume up
	Dead battery	Charge or replace battery
	Loose battery connection	Verify all battery connections are tight
	All RECORDINGS are turned OFF	Verify all RECORDINGS are switched to ON
	Sound Card not fully seated	Remove sound card and reinstall, making sure it is fully inserted into the socket
	Sound Card is installed backward	Unplug the sound card and reinstall with the label facing to the left
	TIME OF OPERATION set to DAY ONLY without enough light	Change TIME OF OPERATION to 24-HOUR
	Unit was not shut down before the battery was disconnected causing the unit to go into “SAFE MODE”	1. Turn the POWER switch OFF 2. Disconnect the battery 3. Remove the sound card 4. Wait 30 seconds 5. Reinstall sound card 6. Reconnect the battery 7. Turn the POWER switch ON
Was working but stopped	The battery is dead	Connect the battery to a battery charger and see if it will hold a charge. Replace if necessary
	Solar Panel is not getting enough sunlight	Reposition the Solar Panel

Limited Warranty

THIS MEGA BLASTER PRO UNIT IS WARRANTED AGAINST DEFECTS IN MATERIAL AND WORKMANSHIP FOR SIX MONTHS FROM DATE OF PURCHASE (EXTENDED WARRANTY AVAILABLE). BIRD-X WILL REPLACE OR REPAIR, PROVIDED DEFECT OCCURS UNDER NORMAL USE. *RETURNS ACCEPTED ONLY WITH AUTHORIZATION FROM OUR CHICAGO OFFICE.*

300 North Oakley Blvd.
Chicago, IL 60612
Toll-Free (800) 662-5021
Fax (312) 312-2480
www.Bird-X.com
Info@Bird-X.com

EPA Establishment Number 075130-OR-001

Mega Blaster Pro P/N 655-0065-00 (Rev. 9/2013)

CE

Appendices

Appendix 9 – Cedar Canyon - Recycling Containment Weekly Inspection Report

OXY Permian	**Weekly Inspection Report** **Water Treatment Facility and Containment**			
Work Order No:				
Inspected by (name and signature):				**Date/Time:**
Review of Prior Corrections	**Yes**	**No**	**N/A**	**Comments**
Have all identified issues from the previous facility inspection report been corrected and noted?				
Equipment Description	**Leak or spill? (Y/N)**	**Working condition? (Good / Needs Repairs)**	**Comments**	
Water Treatment Facility				
Upstream Pump (20 HP)				
Flow Line to Reaction Tanks				
Reaction Tanks				
Treatment pump (50 HP)				
Weir Tanks				
Manifold at Weir Tank				
Recycle & Flowback Lines				
Downstream Pump (20 HP)				
Flow Line to Treated Water Pond				
Treated Water Containment(s) / Pond(s)				
Manifold				
Leak Detection System*				
Are exposed liners intact?*				
Does surface show visible oil?				
Fluid Height of Staff Gauge(s):				
** If a liner's integrity is compromised, or if any penetration of the liner occurs above the water surface, then the operator will notify the District office within 48 hours (phone or email).*				
Additional Comments (including any equipment not checked off):				

Appendices

Appendix 10 – Cedar Canyon - Recycling Containment Monthly Inspection Report

OXY Permian	**Monthly Inspection Report** **Treated Water Containment / Pond**			
Work Order No:				
Inspected by (name and signature):				**Date/Time:**
Review of Prior Corrections	**Yes**	**No**	**N/A**	**Comments**
Have all identified issues from the previous facility inspection report been corrected and noted?				
Equipment Description	**Yes or No**	**Working condition? (Good / Needs Repairs)**	**Comments**	
Are diversion ditches and berms around the containment secure? (check for erosion and collection of surface water run-on)				
Is the leak detection system intact? (check for evidence of damage or malfunction and monitor for leakage).				
Are there any dead migratory birds and other wildlife inside pond/treated water?*				
Are the sources and disposition of all recycled water recorded?**				
** 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* *** Report to the division the total volume of water received for recycling, with the amount of fresh water received listed separately, and the total volume of water leaving the facility for disposition by use of the form C-148*				
Additional Comments (including any equipment not checked off):				

Appendices

Appendix 11 – Cedar Canyon - Recycling Containment Site Specific Groundwater Data

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

June 23, 2017

ERICA HART

Pettigrew & Associates

100 E. NAVAJO DRIVE, SUITE 100

Hobbs, NM 88240

RE: CEDAR CANYON POND

Enclosed are the results of analyses for samples received by the laboratory on 06/21/17 11:35.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-16-8. Accreditation applies to drinking water, non-potable water and solid and chemical materials. All accredited analytes are denoted by an asterisk (*). For a complete list of accredited analytes and matrices visit the TCEQ website at www.tceq.texas.gov/field/qa/lab_accred_certif.html.

Cardinal Laboratories is accreditated through the State of Colorado Department of Public Health and Environment for:

Method EPA 552.2	Haloacetic Acids (HAA-5)
Method EPA 524.2	Total Trihalomethanes (TTHM)
Method EPA 524.4	Regulated VOCs (V1, V2, V3)

Accreditation applies to public drinking water matrices.

This report meets NELAP requirements and is made up of a cover page, analytical results, and a copy of the original chain-of-custody. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Celey D. Keene

Celey D. Keene

Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

Pettigrew & Associates
ERICA HART
100 E. NAVAJO DRIVE, SUITE 100
Hobbs NM, 88240
Fax To: (505) 393-1543

Received:	06/21/2017	Sampling Date:	06/21/2017
Reported:	06/23/2017	Sampling Type:	Water
Project Name:	CEDAR CANYON POND	Sampling Condition:	** (See Notes)
Project Number:	2017-1129	Sample Received By:	Tamara Oldaker
Project Location:	EDDY COUNTY, NM		

Sample ID: WATER BOTTLES (H701625-01)

Chloride, SM4500Cl-B mg/L **Analyzed By: AC**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride*	**40500**	4.00	06/22/2017	ND	104	104	100	3.92	

TDS 160.1 mg/L **Analyzed By: CK**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
TDS*	**75700**	5.00	06/23/2017	ND	214	100	213	2.61	

Cardinal Laboratories *=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Notes and Definitions

ND	Analyte NOT DETECTED at or above the reporting limit
RPD	Relative Percent Difference
**	Samples not received at proper temperature of 6°C or below.
***	Insufficient time to reach temperature.
-	Chloride by SM4500Cl-B does not require samples be received at or below 6°C
	Samples reported on an as received basis (wet) unless otherwise noted on report

Cardinal Laboratories *=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

101 East Marland, Hobbs, NM 88240
(575) 393-2326 FAX (575) 393-2476

Company Name:	Pettigrew & Associates, PA	**BILL TO** P.O. #:	
Project Manager:	Erica Hart	Company:	Pettigrew
Address:	100 E. Navajo Drive STE 100	Attn:	Erica Hart
City:	Hobbs	Address:	"
State:	NM	City:	"
Zip:	88240	State:	" Zip: "
Phone #:	575-705-393-9827	Phone #:	"
Fax #:	575-393-1543	Fax #:	"
Project #:	2017.1129	Project Owner:	OXY
Project Name:	Cedar Canyon Pond		
Project Location:	Eddy Co, NM		
Sampler Name:	Raj (Tetratech)		

FOR LAB USE ONLY Lab I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	MATRIX: GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER:	PRESERV.: ACID/BASE:	ICE / COOL	OTHER:	SAMPLING DATE	TIME	ANALYSIS REQUEST: Chlorides	TDS
H701625 1	Water Bottles			X									6/21/17	8:02am	X	X

PLEASE NOTE: Liability and Damages. Cardinal's liability and client's exclusive remedy for any claim arising whether based in contract or tort, shall be limited to the amount paid by the client for the analyses. All claims including those for negligence and any other cause whatsoever shall be deemed waived unless made in writing and received by Cardinal within 30 days after completion of the applicable service. In no event shall Cardinal be liable for incidental or consequental damages, including wthout limitation, business interruptions, loss of use, or loss of profits incurred by client, its subsidiaries, affiliates or successors arising out of or related to the performance of services hereunder by Cardinal, regardless of whether such claim is based upon any of the above stated reasons or otherwise.

Relinquished By: Erica Hart	Date: 6/21/17 Time: 11:20	Received By:	
Relinquished By:	Date: 6-21-17 Time: 11:35	Received By: Tamara Oldaker	
Delivered By: (Circle One) Sampler - UPS - Bus - Other:	21.1°	Sample Condition Cool: ☐ Yes ☑ No Intact: ☑ Yes ☐ No	CHECKED BY: (Initials) TO-#75

Phone Result: ☐ Yes ☐ No Add'l Phone #:
Fax Result: ☐ Yes ☐ No Add'l Fax #:
REMARKS: Rush!! 6/22/17 T.O.

† Cardinal cannot accept verbal changes. Please fax written changes to (575) 393-2326

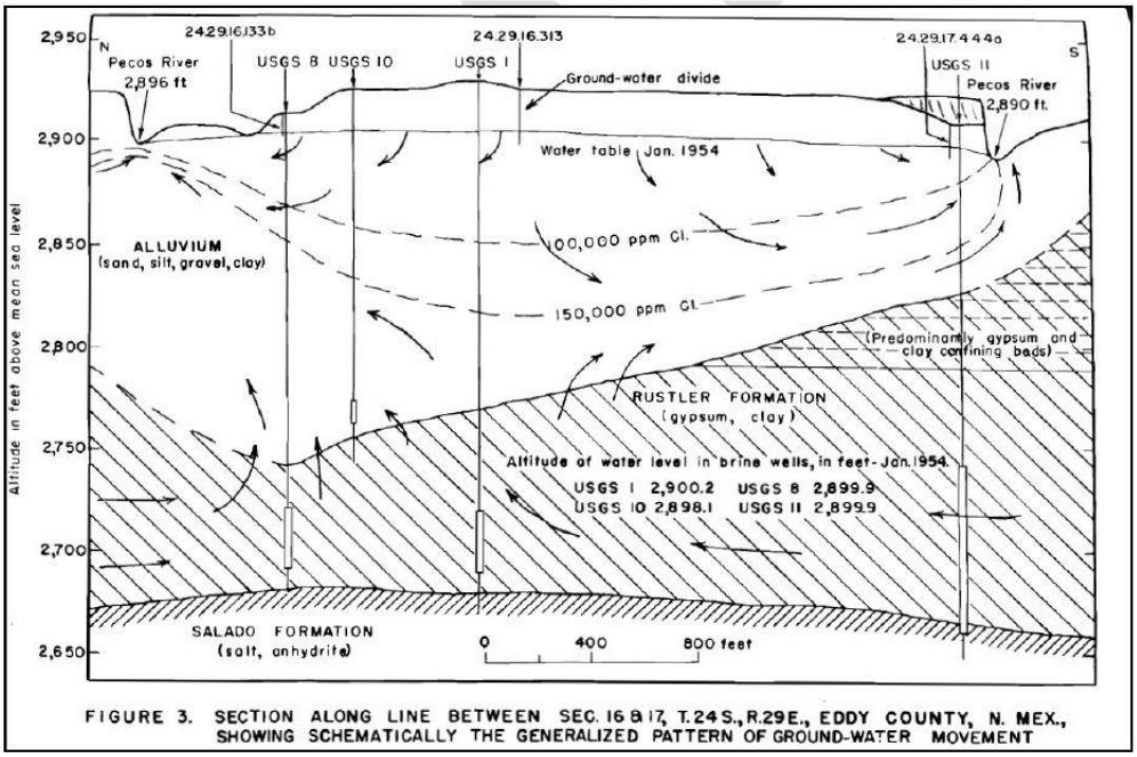
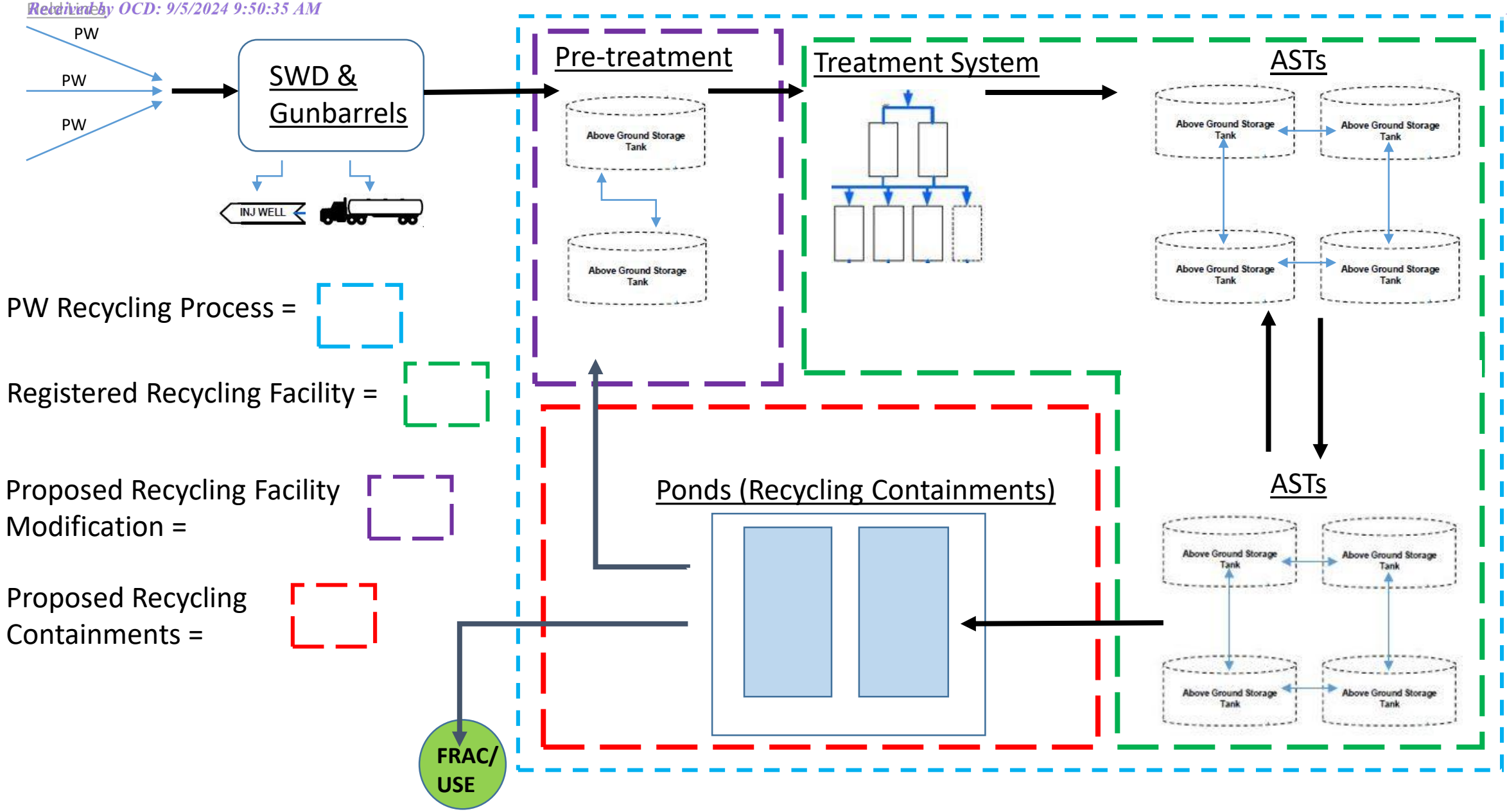


FIGURE 3. SECTION ALONG LINE BETWEEN SEC. 16 & 17, T. 24 S., R. 29 E., EDDY COUNTY, N. MEX., SHOWING SCHEMATICALLY THE GENERALIZED PATTERN OF GROUND-WATER MOVEMENT


PW
PW
PW
SWD &
Gunbarrels
INJ WELL
Pre-treatment
Above Ground Storage Tank
Above Ground Storage Tank
Treatment System
ASTs
Above Ground Storage Tank
Above Ground Storage Tank
Above Ground Storage Tank
Above Ground Storage Tank
PW Recycling Process =
Registered Recycling Facility =
Proposed Recycling Facility Modification =
Proposed Recycling Containments =
Ponds (Recycling Containments)
ASTs
Above Ground Storage Tank
Above Ground Storage Tank
Above Ground Storage Tank
Above Ground Storage Tank
FRAC/
USE

Venegas, Victoria, EMNRD

From: Allen, Dylan L <Dylan_Allen@oxy.com>
Sent: Tuesday, March 8, 2022 12:21 PM
To: Raley, Jacob J
Subject: FW: RF for Cedar Canyon - 2RF-144

From: Billings, Bradford, EMNRD <Bradford.Billings@state.nm.us>
Sent: Thursday, August 8, 2019 3:13 PM
To: Allen, Dylan L <Dylan_Allen@oxy.com>
Subject: [EXTERNAL] RF for Cedar Canyon - 2RF-144

Oxy, USA, Inc.
5 Greenway Plaza, Ste. 110
Houston, Texas 77046

Dear Mr. Allen,

The assigned number for Cedar Canyon Recycling Facility (Both A and B Containments) is **2RF-144**.

Note on C-148's to use A or B in flow calculations and other pertinent aspects of the select containments.

Variance for audible avian control is approved.

Variance for depth to water requirement is approved based on data provided indicating first encountered groundwater is non-protectable, at minimum based on TDS of 75,000 plus mg/l.

It may be some days before C-147 package(s) for A and B are uploaded to OCD on line data base, nonetheless, the 2RF-144 indicator may now be used for the Cedar Canyon Recycling Facility at Unit K, Section 15, Township 24 S, Range 29E in Eddy County, New Mexico.

Again, the Oil Conservation Division (OCD) apologize for time delay on this issue and appreciate your patience.

Sincerely,

Bradford Billings
EMNRD/OCD
Santa Fe

District I
1625 N. French Dr., Hobbs, NM 88240
Phone:(575) 393-6161 Fax:(575) 393-0720
District II
811 S. First St., Artesia, NM 88210
Phone:(575) 748-1283 Fax:(575) 748-9720
District III
1000 Rio Brazos Rd., Aztec, NM 87410
Phone:(505) 334-6178 Fax:(505) 334-6170
District IV
1220 S. St Francis Dr., Santa Fe, NM 87505
Phone:(505) 476-3470 Fax:(505) 476-3462

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

CONDITIONS

Action 380882

CONDITIONS

Operator: OXY USA INC P.O. Box 4294 Houston, TX 772104294	OGRID: 16696
	Action Number: 380882
	Action Type: [C-147] Water Recycle Long (C-147L)

CONDITIONS

Created By	Condition	Condition Date
vvenegas	None	9/5/2024