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By OCD; Dr. Oberding at 3:30 pm, Jun 19, 2015

April 2015

**C-147 Registration Package for  
Greenclean –Big XL  
Recycling Containment and  
Recycling Facility  
Section 35 T23S R33E, Lea County**



*View north shows Big XL fresh water frac pond. The area in the foreground will become the Greenclean-Big XL Containment. The recycling facility will be due east of the containment.*

**Prepared for:  
Devon Energy Production Company  
Oklahoma City, Oklahoma**

**Prepared by:**

**R.T. Hicks Consultants, Ltd.  
901 Rio Grande NW  
F-142  
Albuquerque, New Mexico**

# R. T. HICKS CONSULTANTS, LTD.

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Artesia ▲ Carlsbad ▲ Durango ▲ Midland  
901 Rio Grande Blvd NW ▲ Suite F-142 ▲ Albuquerque, NM 87104 ▲ 505.266.5004 ▲ Fax: 505.266-0745

April 30, 2015

Dr. Tomas Oberding  
NMOCD District 1  
1625 French Drive  
Hobbs, NM 88240  
Via E-Mail

RE: Devon Energy Greenclean-Big XL Recycling Facility and Containment  
C-147 Registration Package

Dear Dr. Oberding:

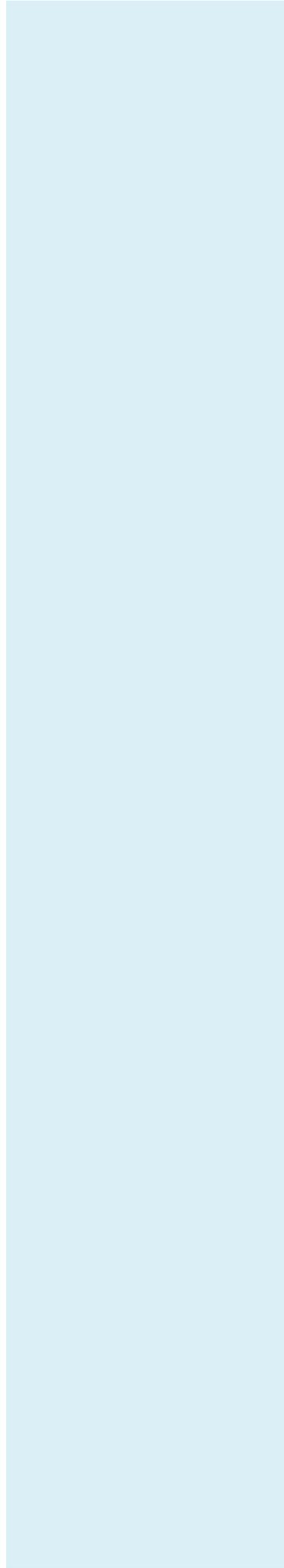
Enclosed is a fully assembled C-147 registration for a recycling facility and containment located at the in Section 35 T23S R33E. I believe the attached registration is complete and meets all of the criteria for approval under NMOCD Rules. Please let us know if you need any additional information or clarification regarding the application. Note the surface owner is copied on this transmission.

Sincerely,  
R.T. Hicks Consultants



Randall Hicks  
Principal

Copy: Devon Energy  
Ed Martin, SLO (surface owner)



# **C-147 and Site Specific Information**

**R.T. Hicks Consultants, Ltd.**

901 Rio Grande Blvd. NW, Suite F-142  
Albuquerque, NM 87104

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 March 31, 2015

## 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: Devon Energy (For multiple operators attach page with information) OGRID #: 6137  
Address: 333 W. Sheridan, Oklahoma City, OK 73102-8260  
Facility or well name (include API# if associated with a well): Greenclean Big XL Containment and Recycling Facility  
OCD Permit Number: \_\_\_\_\_ (For new facilities the permit number will be assigned by the district office)  
U/L or Qtr/Qtr \_\_\_\_\_ Section 35 Township 23S Range 33E County: Lea  
Surface Owner:  Federal  State  Private  Tribal Trust or Indian Allotment

2.  
 **Recycling Facility:**  
Location of recycling facility (if applicable): Latitude 32.2657 Longitude -103.5378 NAD:  1927  1983  
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:** Greenclean- Big XL  
 Annual Extension after initial 5 years (attach summary of monthly leak detection inspections for previous year)  
Center of Recycling Containment (if applicable): Latitude 32.26573079 Longitude -103.53789065 NAD:  1927  1983  
 For multiple or additional recycling containments, attach design and location information of each containment  
 Lined  Liner type: Thickness 60mil (HDPE primary) 30-mil (LLDPE secondary)  LLDPE  HDPE  PVC  Other \_\_\_\_\_  
 String-Reinforced  
Liner Seams:  Welded  Factory  Other Field Welds Volume: 337,900 bbl Dimensions: L 400 x W 400 x D 18.7 (at sump)  
 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 \_\_\_\_\_ Chain link (see registration) \_\_\_\_\_

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.

- Yes  No
- NA

- Written confirmation or verification from the municipality; written approval obtained from the municipality

Within the area overlying a subsurface mine.

- Yes  No

- Written confirmation or verification or map from the NM EMNRD-Mining and Minerals Division

Within an unstable area.

- Yes  No

- Engineering measures incorporated into the design; NM Bureau of Geology & Mineral Resources; USGS; NM Geological Society; topographic map

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).

- Yes  No

- Topographic map; visual inspection (certification) of the proposed site

Within 1000 feet from a permanent residence, school, hospital, institution, or church in existence at the time of initial application.

- Yes  No

- Visual inspection (certification) of the proposed site; aerial photo; satellite image

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.

- Yes  No

- NM Office of the State Engineer - iWATERS database search; visual inspection (certification) of the proposed site

Within 500 feet of a wetland.

- Yes  No

- US Fish and Wildlife Wetland Identification map; topographic map; visual inspection (certification) of the proposed site

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): Walter Harvey Title: Field Landman

Signature:  Date: 4/30/15

e-mail address: Walter.Harvey@dm.com Telephone: 575-748-1807

11.

**OCD Representative Signature:** \_\_\_\_\_ **Approval Date:** \_\_\_\_\_

**Title:** \_\_\_\_\_ **OCD Permit Number:** \_\_\_\_\_

- OCD Conditions** \_\_\_\_\_
- Additional OCD Conditions on Attachment**

## Distance to Groundwater

**Figure 1, Figure 2, and the discussion below demonstrates that groundwater (fresh water as defined by NMOCD Rules) at the location is greater than 50 feet beneath the containment**

Figure 1 is a geologic/ topographic map that shows:

1. The location of the proposed containment with the surface elevation.
2. Water wells from the OSE database are plotted as a blue triangle inside colored circles that indicate well depth (see legend). OSE wells are often mis-located in the WATERS database as older wells are plotted in the center of the quarter, quarter, quarter, of the Section Township and Range.
3. Water wells from the USGS database as large colored triangles that represent the unit in which the well was completed.
4. Water wells, which are not documented in the public databases but were identified by field inspection or other published reports as colored squares.
5. The depth-to-water from the most recent available measurement for each well is provided adjacent to the well symbol.

## Geology

Our examination of the geology of the area near the proposed containment causes us to conclude that, on a regional basis, the uppermost water-bearing zone lay in the Triassic Chinle Formation, the basal unit of which is the Santa Rosa Sandstone. Existing data do not allow us to determine if the water in the Chinle is unconfined or confined. For a confined aquifer, the depth to groundwater is the top of the permeable unit (e.g. 100 feet) but the depth to groundwater (the potentiometric surface) can be a few feet below the ground surface.

Saturated alluvium exists southwest of the location within the Bell Lake Sink. Two wells were developed within this depression, both of which are abandoned. Alluvium also exists northeast of the site, but this unit does not appear to hold groundwater. The hydrogeology of the area is described in the next section.

Figure 2 is the same scale as geologic and topographic map that shows:

1. The location of the proposed containment.
2. Water wells measured by the USGS or other professionals, the formation completion depth of the well (see Figure 1 Legend) and the calculated elevation of the groundwater surface and the date of the observation.
3. Isocontour lines displaying the elevation of the groundwater surface of the Rustler Formation.

## Hydrogeology

We relied upon the most recent data measured by the USGS to create the water table elevation map shown in Figure 2 as well as the “Misc” well data (see Figure 1). The Misc data are measured water levels in wells or logged borings for hydrogeologic information. This dataset can contain errors (generally of location) that are not often present in the USGS data; but all of the Misc wells shown in Figure 2 have been inspected by Hicks Consultants . Water level data

## Siting Criteria (19.15.34.11 NMAC) Devon Energy – Big XL Containment

from the OSE database rely upon observed water levels by drillers during the completion of the water well. The OSE dataset provides some useful data in certain areas. The Bell Lake area contains sufficient high-quality data that we did not rely on OSE data.

For the potentiometric surface map (Figure 2), we honored all data that we know are accurate to the best of our knowledge. For example, data from the Atoka Bank 3H rathole (Misc. 136), Jackson Unit 15H rathole (Misc-98), the Mogi 9 State 1H rathole (Misc-69) and the Brinninstool 4 State 3H rathole (Misc-70) are lithologic data logged by Hicks Consultants during drilling – the cuttings were dust/dry at a depth of 120 feet. While the borings terminated above the regional aquifer, they provide data that are useful for the mapping. It is these data that help define the horizontal limits of water bodies that are perched within the Bell Lake Sink and similar depressions.

In addition to the perched water within certain closed depressions, some wells in the area are completed in the lowest permeable unit of the Chinle/Dockum aquifer: the Santa Rosa Sandstone. We are relatively sure that Misc.-15 at the Brinninstool Ranch Headquarters is one such well. Water levels in other Chinle/Dockum wells shown on Figure 2 are 300 feet or more higher in elevation and obviously tap permeable units higher in the stratigraphic column of the relatively thick Chinle/Dockum. The USGS identified another well in the Santa Rosa Aquifer in Section 3 T23S R32E, which, like the Brinninstool Headquarters well, shows a relatively low groundwater elevation.

From these data we conclude:

- Based upon the groundwater map of the regional aquifer (permeable units in the upper Chinle/Dockum), the elevation of the groundwater surface beneath the proposed containment is about 3,510 feet above mean sea level.
- The perched, shallow groundwater zones present within the Bell Lake Sink and Cotton Place do not extend to the area beneath the proposed containment.
- The distance between the bottom of a 20-foot deep containment and the potentiometric surface of the regional aquifer is approximately  $(3,647 - 20 - 3510 =)$  117 feet.

### **Distance to Surface Water**

**Figure 3 and the site visit demonstrates that the location is not within 300 feet of a continuously flowing watercourse or any other significant watercourse or 200 feet from lakebed, sinkhole, or playa lake (measured from the ordinary high-water mark).**

- No continuously flowing watercourses or other water bodies, as defined by NMOCD Rules, exist within the prescribed setback criteria for containment.
- The nearest surface water body is a lake/pond located about 1 mile west
- The Bell Lake Sink is an ancient collapse feature but is not considered a sinkhole as typically used in NMOCD Rules.
- We examined the small depression surrounding the Tip Top wells north of the location. This low exhibited no evidence of collapse features or unstable ground nor any evidence of a watercourse as defined by NMOCD Rules.

### **Distance to Permanent Residence or Structures**

**Figure 4 and the site visit demonstrates that the location is not within 1000 feet from an occupied permanent residence, school, hospital, institution, church, or other structure in existence at the time of initial application.**

- The nearest structures are oil and gas wells and tank batteries.
- A cattle gathering area with corrals is located about 1 mile north of the proposed containment in the area of the Tip Top wells.

### **Distance to Non-Public Water Supply**

**Figures 1 and Figure 2 demonstrates that the location is not within 500 horizontal feet of a private, domestic fresh water well or spring that less than five households use for domestic or stock watering purposes, or within 1,000 horizontal feet of any other fresh water well or spring, in existence at the time of initial application.**

- Figure 1 shows the locations of all area water wells, active or plugged.
- The nearest water wells are located approximately ½ mile north (Tip Top Wells). Two of these wells are abandoned and one may be active.
- There are no known domestic water wells located within 1,000 feet of the proposed containment.
- No springs were identified within the mapping area (see Figure 3).

### **Distance to Municipal Boundaries and Fresh Water Fields**

**Figure 5 demonstrates that the location is not within incorporated municipal boundaries or within defined municipal fresh water well fields covered under a municipal ordinance adopted pursuant to NMSA 1978, Section 3-27-3, as amended**

- The closest municipality is Eunice, NM approximately 25 miles to the east.
- The closest public well field is located approximately 50 miles to the west and/or 50 miles north.

### **Distance to Wetlands**

**Figure 6 demonstrates the location is not within 700 feet of wetlands.**

- The nearest designated wetlands are a “freshwater emergent wetland” located approximately 1 mile to the south (Jog Tank)

### **Distance to Subsurface Mines**

**Figure 7 and our general reconnaissance of the area demonstrate that the nearest mines are caliche pits. This location is not within an area overlying a subsurface mine.**

- The nearest mapped caliche pit is located approximately 1.5 miles to the northeast.

### **Distance to High or Critical Karst Areas**

**Figure 8 shows the location of the temporary containments with respect to BLM Karst areas.**

- The proposed temporary containment is located within a “low” potential karst area.

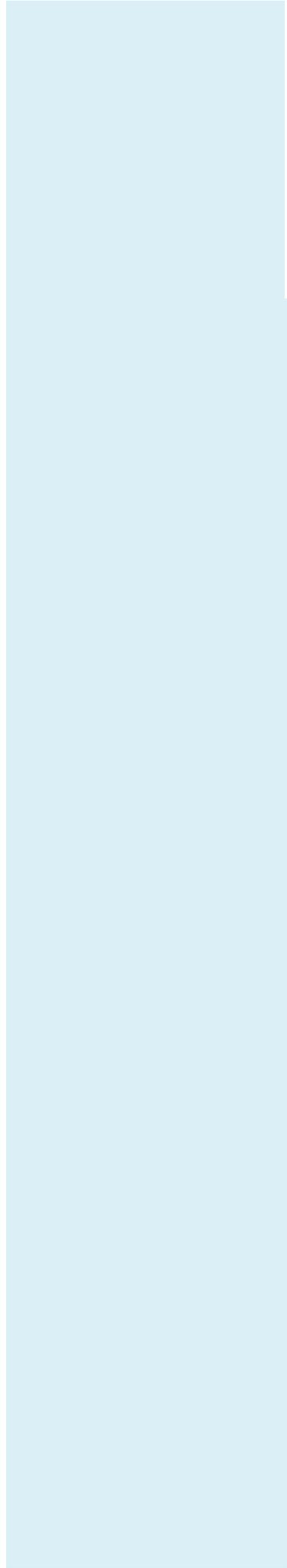
Siting Criteria (19.15.34.11 NMAC)  
Devon Energy – Big XL Containment

- The nearest “high” or “critical” potential karst area is located approximately 18 miles west of the site.
- No evidence of solution voids were observed near the site during the field inspection.
  - A professional geologist (Randall Hicks) conducted the field survey and concluded that the ground is stable.

### **Distance to 100-Year Floodplain**

**Figure 9 demonstrates that the location is within Zone D as designated by the Federal Emergency Management Agency with respect to the Flood Insurance Rate 100-Year Floodplain.**

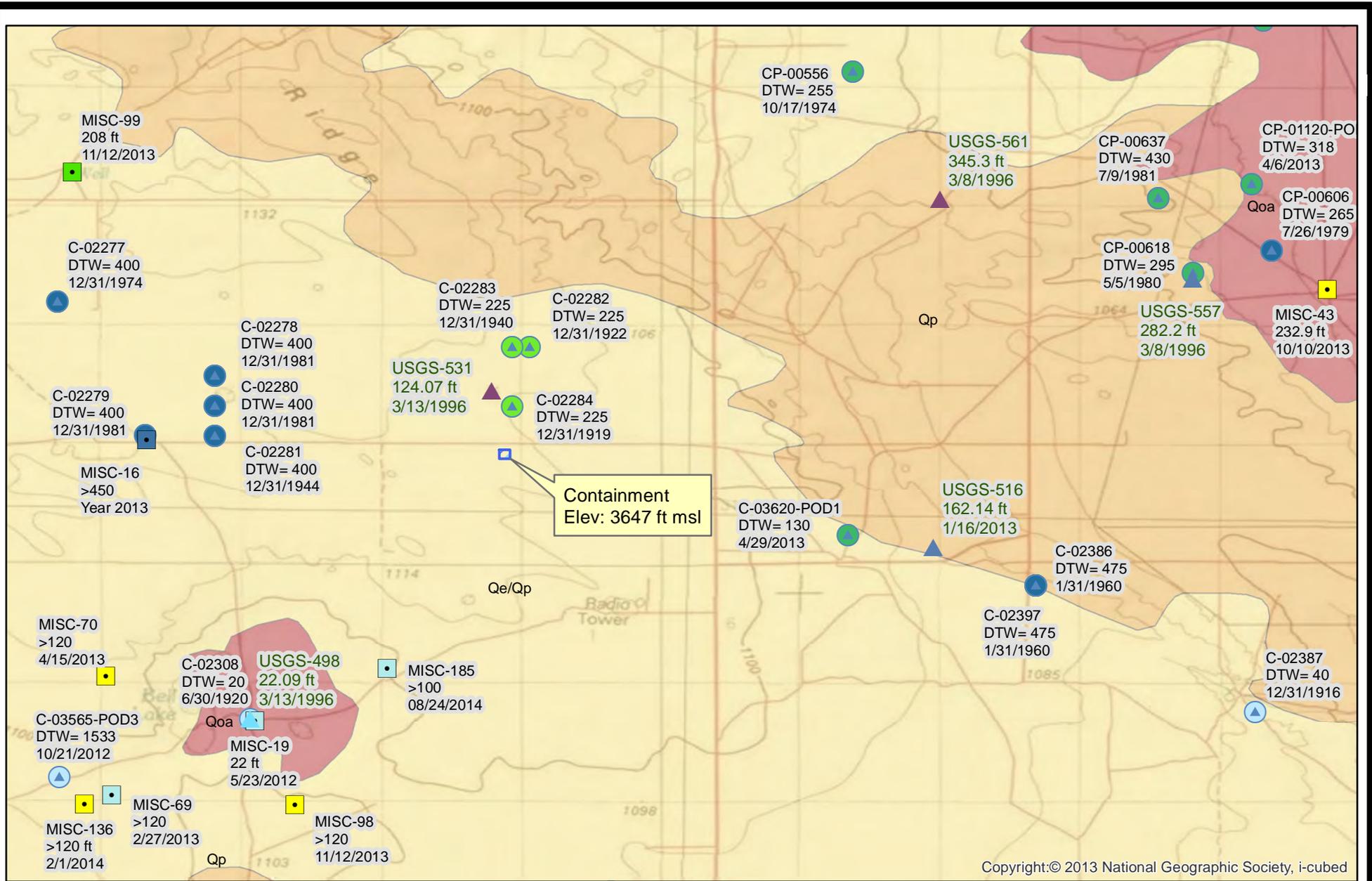
- Zone D is described as areas with possible but undetermined flood hazards. No flood hazard analysis has been conducted.
- Our field inspection and examination of the topography permits a conclusion that the location is not within any floodplain and has low risk for flooding.



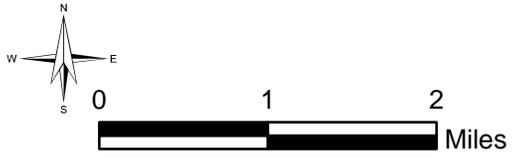
# **Site Specific Information Figures from C-144**

**R.T. Hicks Consultants, Ltd.**

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Albuquerque, NM 87104



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R.T. Hicks Consultants, Ltd  
 901 Rio Grande Blvd NW Suite F-142  
 Albuquerque, NM 87104  
 Ph: 505.266.5004

Depth To Water and Geology  
 Devon Energy: Big XL

Figure 1  
 April  
 2014

**Legend**

 Containment

**USGS Gauging Station (DTW, Date)**

**Aquifer Code, Well Status**

 Ogallala

 Chinle

 Santa Rosa

**Misc Water Wells (DTW, Date)**

**Well Depth (ft)**

 No Data

 <=150

 151 - 350

 >500

**OSE Water Wells**

**Well Depth (ft)**

 <= 150

 151 - 350

 351 - 500

 501 - 1000

**NM Geology**

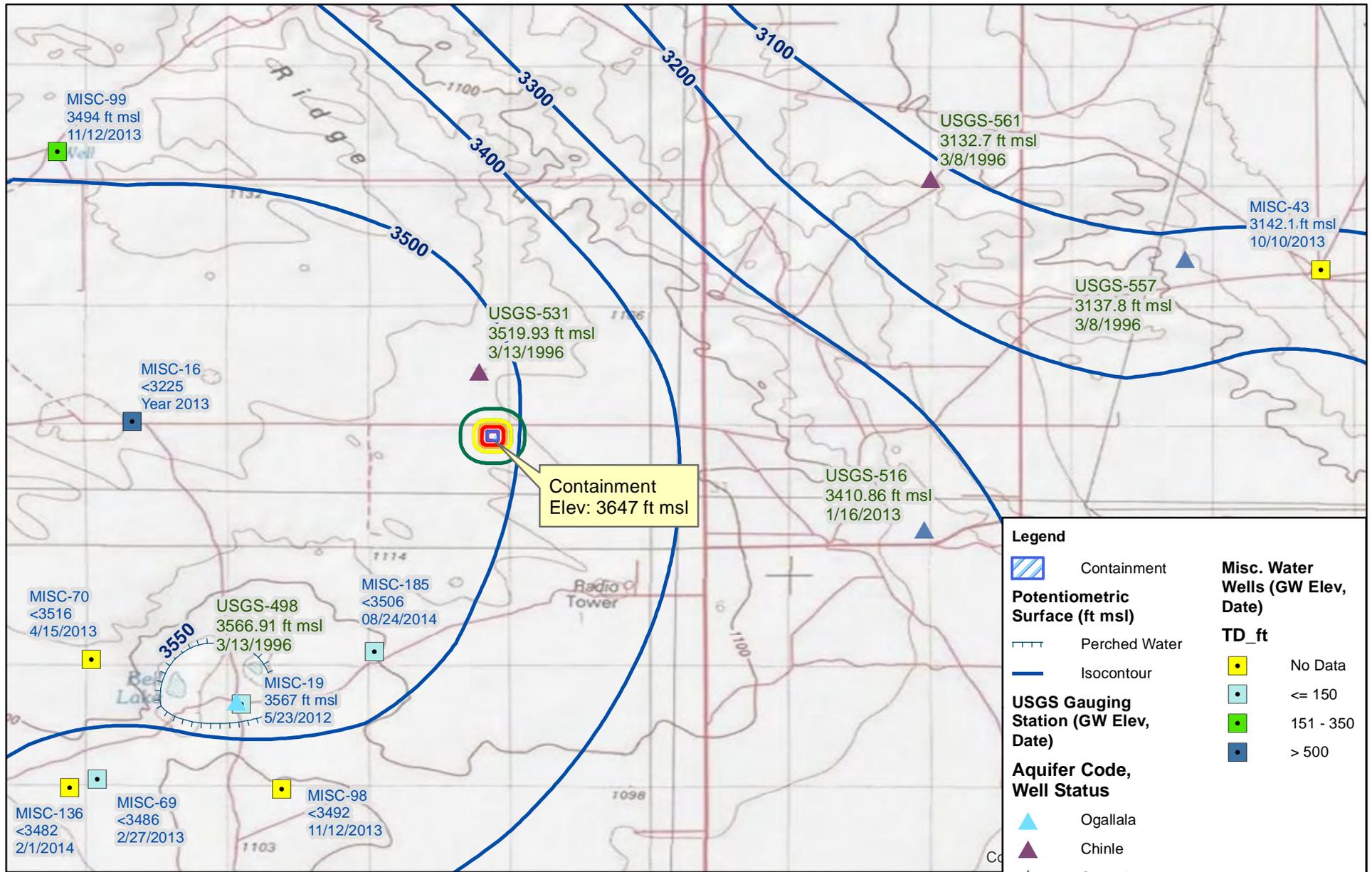
**Map Unit, Description**

 Qe/Qp, Quaternary-Eolian Piedmont Deposits

 Qoa, Quaternary-Older Alluvial Deposits

 Qp, Quaternary-Piedmont Alluvial Deposits

R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Legend - Depth To Water and Geology	Figure 1 Legend
	Devon Energy: Big XL	April 2014



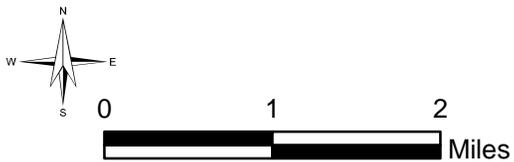
**Legend**

**Containment**  
 Containment

**Potentiometric Surface (ft msl)**  
 Isocontour  
 Perched Water

**USGS Gauging Station (GW Elev, Date)**  
 Santa Rosa  
 Chinle  
 Ogallala

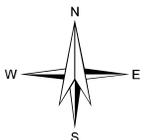
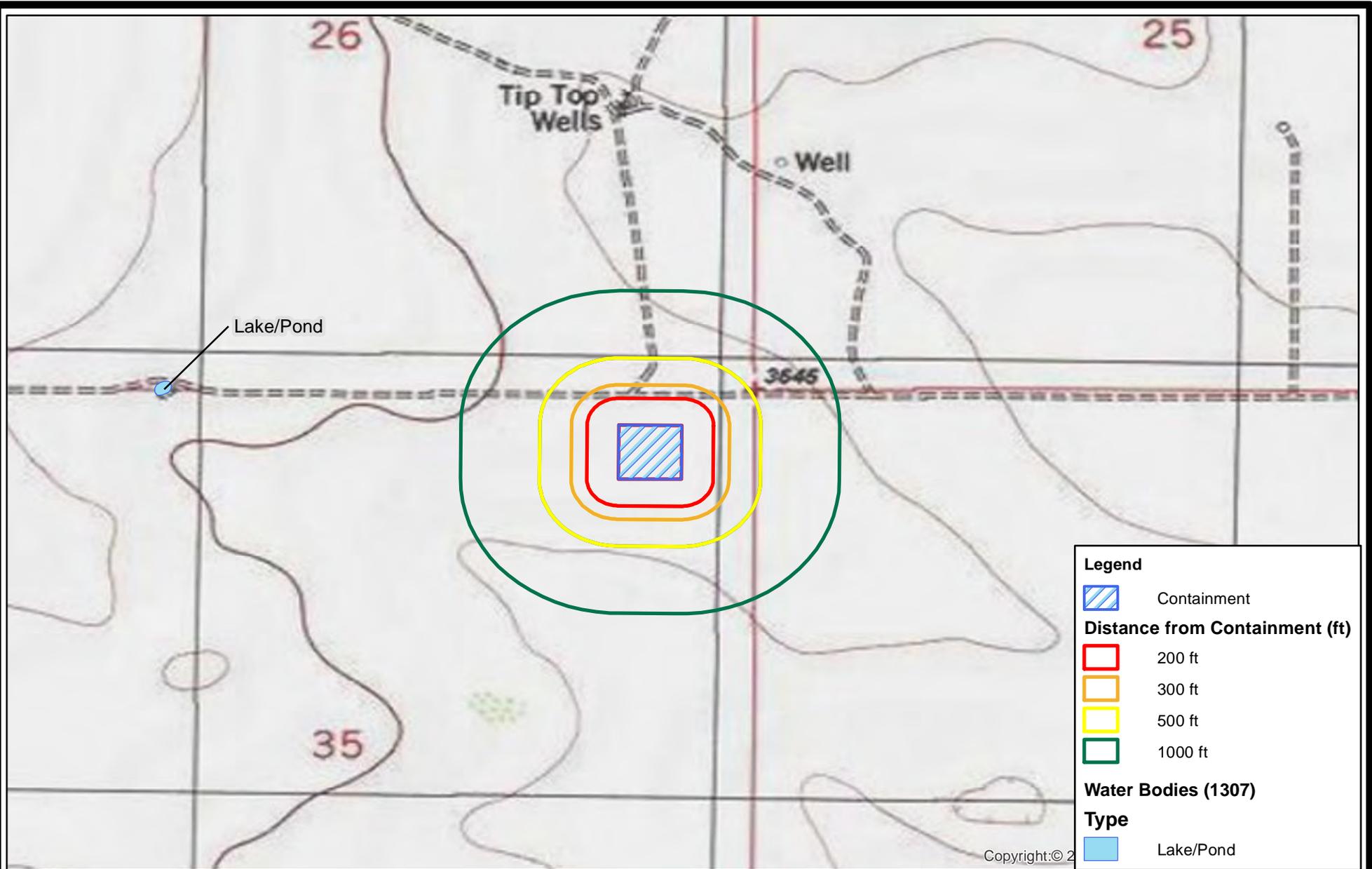
**Misc. Water Wells (GW Elev, Date)**  
**TD\_ft**  
 No Data  
 <= 150  
 151 - 350  
 > 500



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 Albuquerque, NM 87104  
 Ph: 505.266.5004

Potentiometric Surface and Groundwater Elevation  
 at Nearby Water Wells  
 Devon Energy: Big XL

Figure 2  
 April 2015



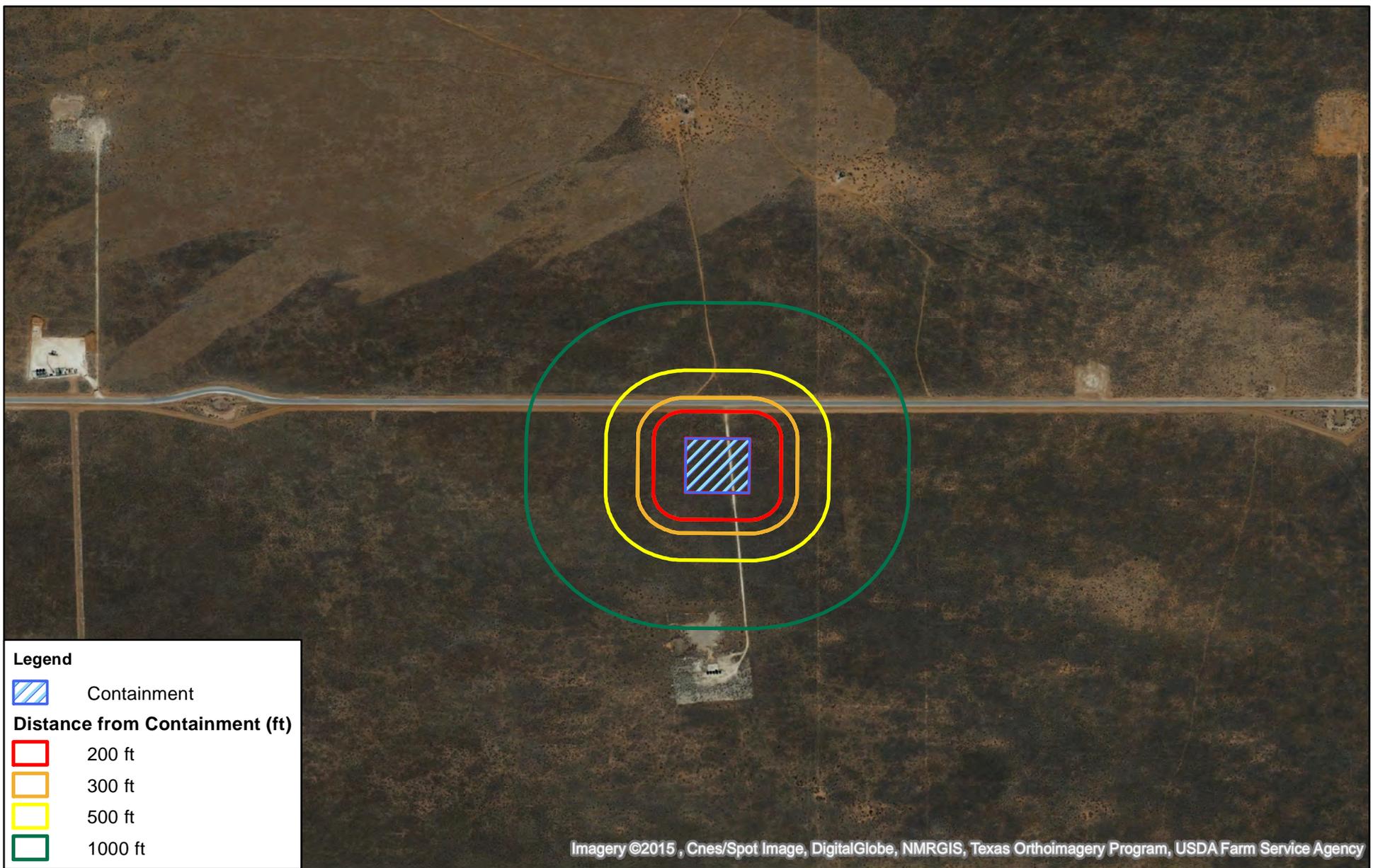
R.T. Hicks Consultants, Ltd  
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Surface Water and Topography

Devon Energy: Big XL

Figure 3

April 2015



**Legend**

 Containment

**Distance from Containment (ft)**

 200 ft

 300 ft

 500 ft

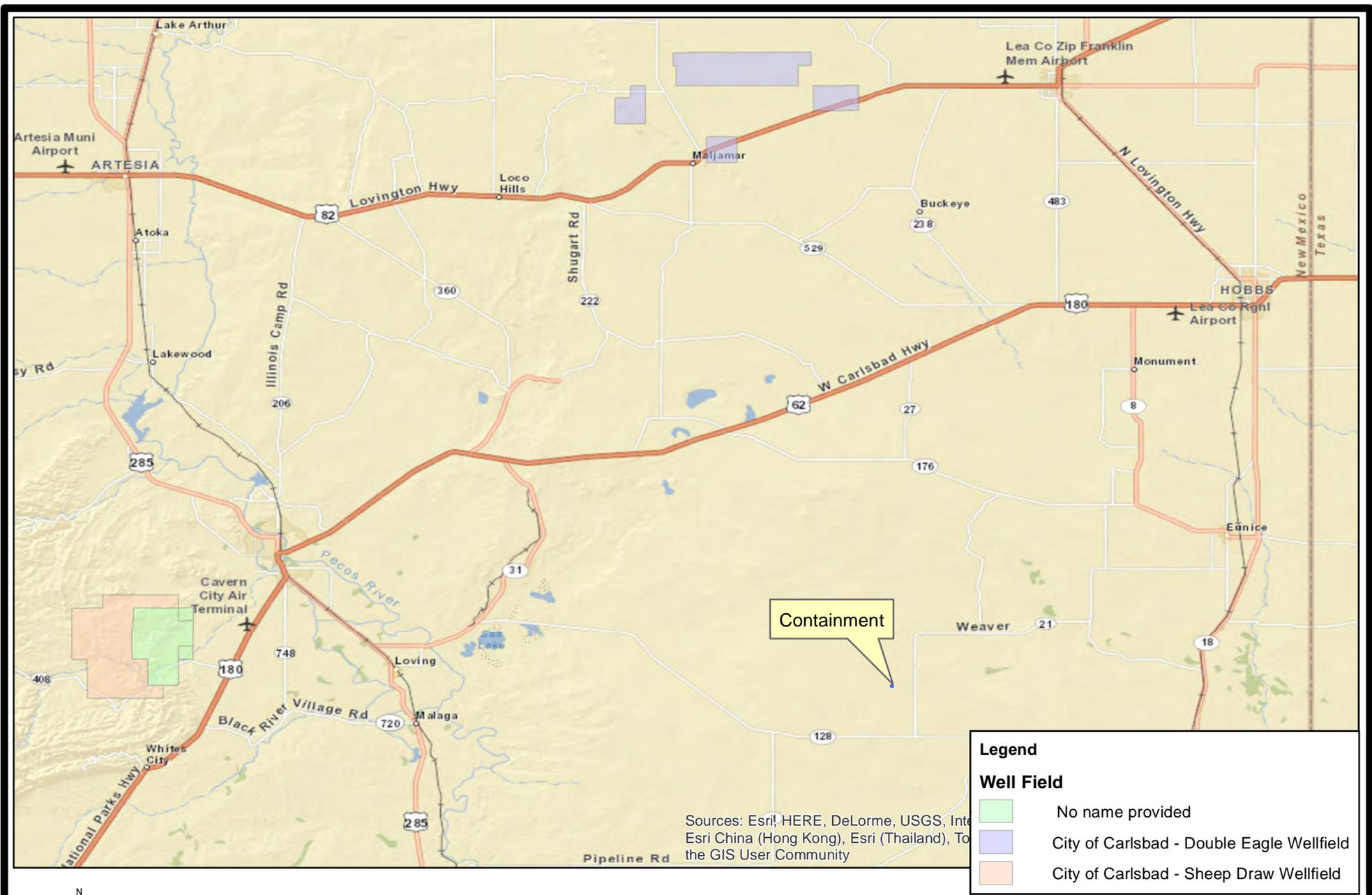
 1000 ft



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Nearby Structures
Devon Energy: Big XL

Figure 4  
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Nearby Municipalities and Well Fields

Devon Energy: Big XL

Figure 5

April 2015

**Legend**

 Containment

**Distance from Containment (ft)**

 200 ft

 300 ft

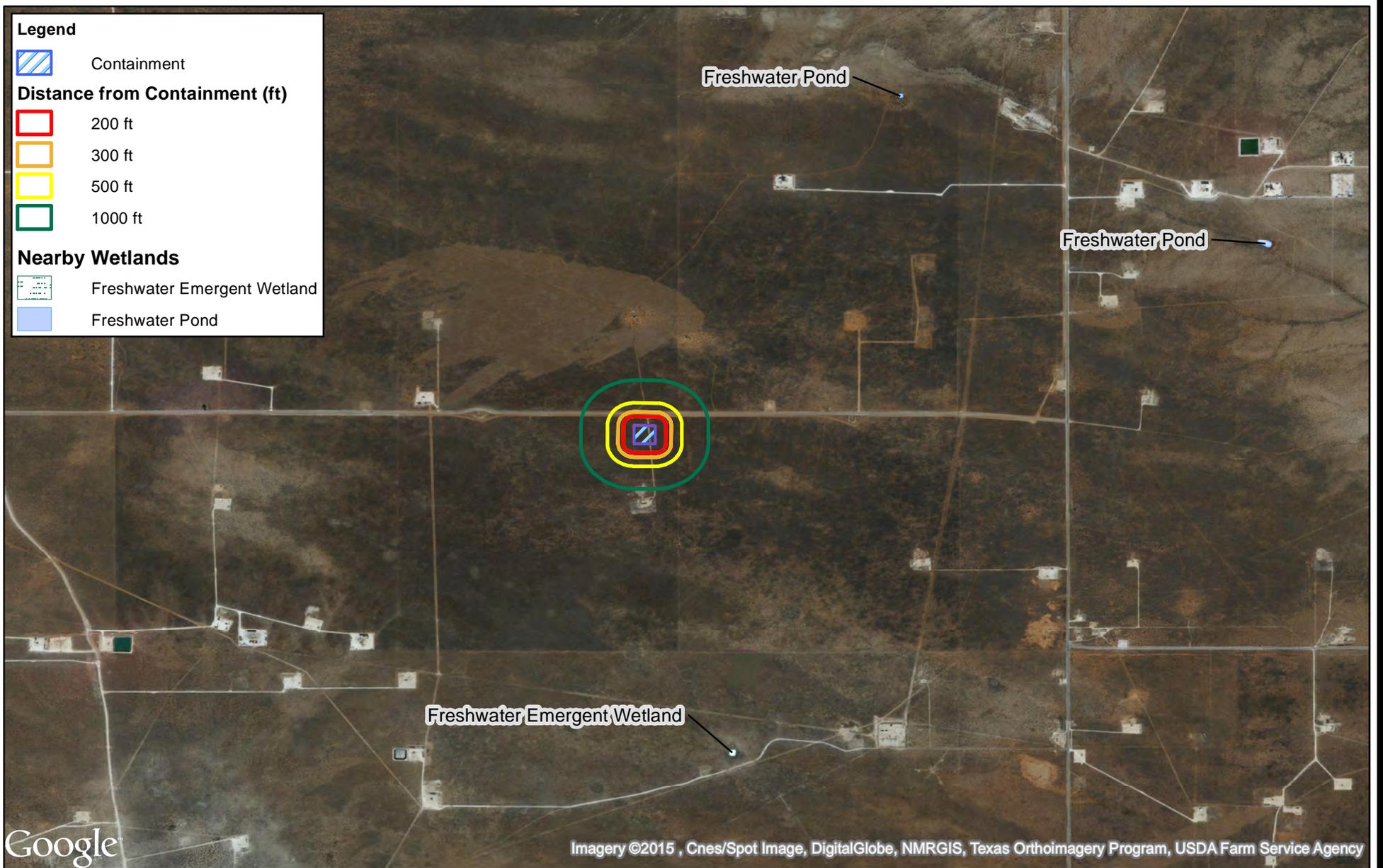
 500 ft

 1000 ft

**Nearby Wetlands**

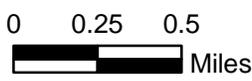
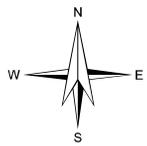
 Freshwater Emergent Wetland

 Freshwater Pond



Google

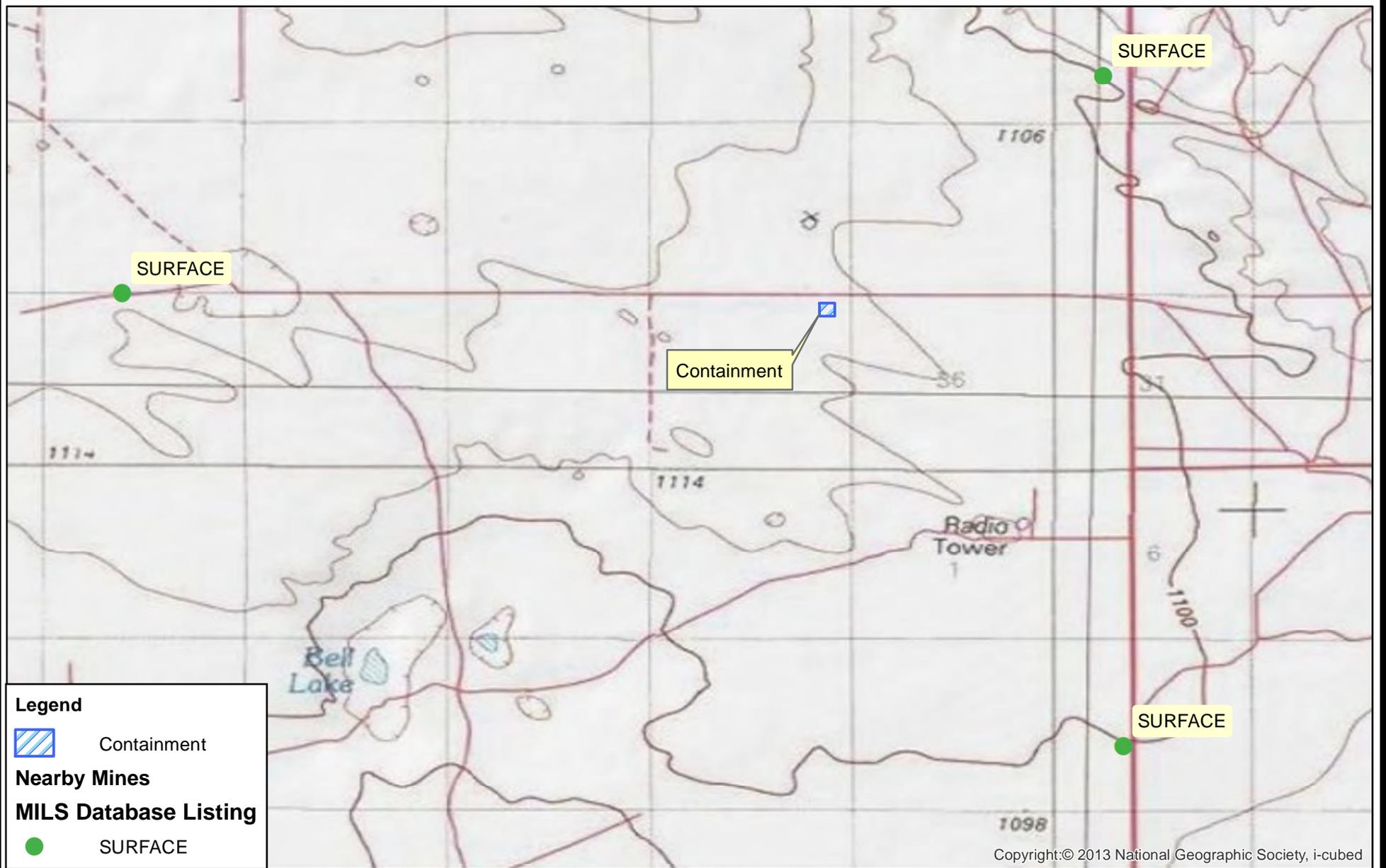
Imagery ©2015 , Cnes/Spot Image, DigitalGlobe, NMRGIS, Texas Orthoimagery Program, USDA Farm Service Agency



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Nearby Wetlands
Devon Energy: Big XL

Figure 6  
 April 2015



**Legend**

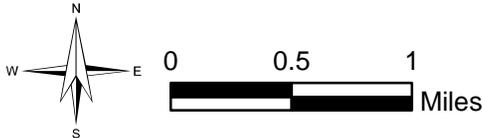
 Containment

**Nearby Mines**

**MILS Database Listing**

 SURFACE

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Nearby Mines and Minerals

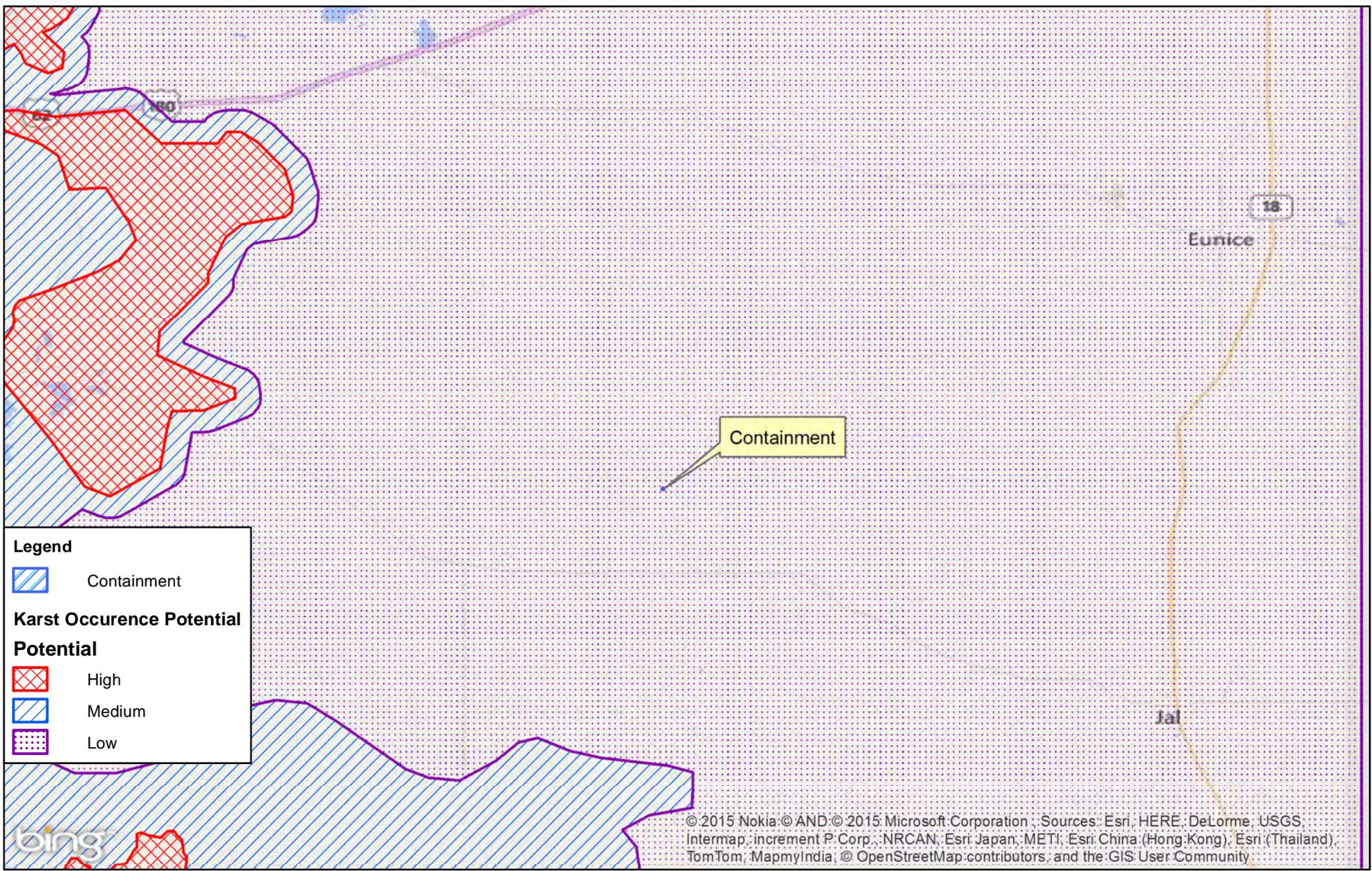
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Devon Energy: Big XL

Figure 7

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April 2015



**Legend**

 Containment

**Karst Occurrence Potential**

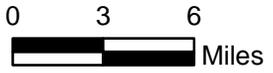
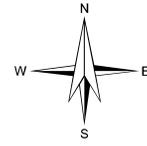
**Potential**

 High

 Medium

 Low

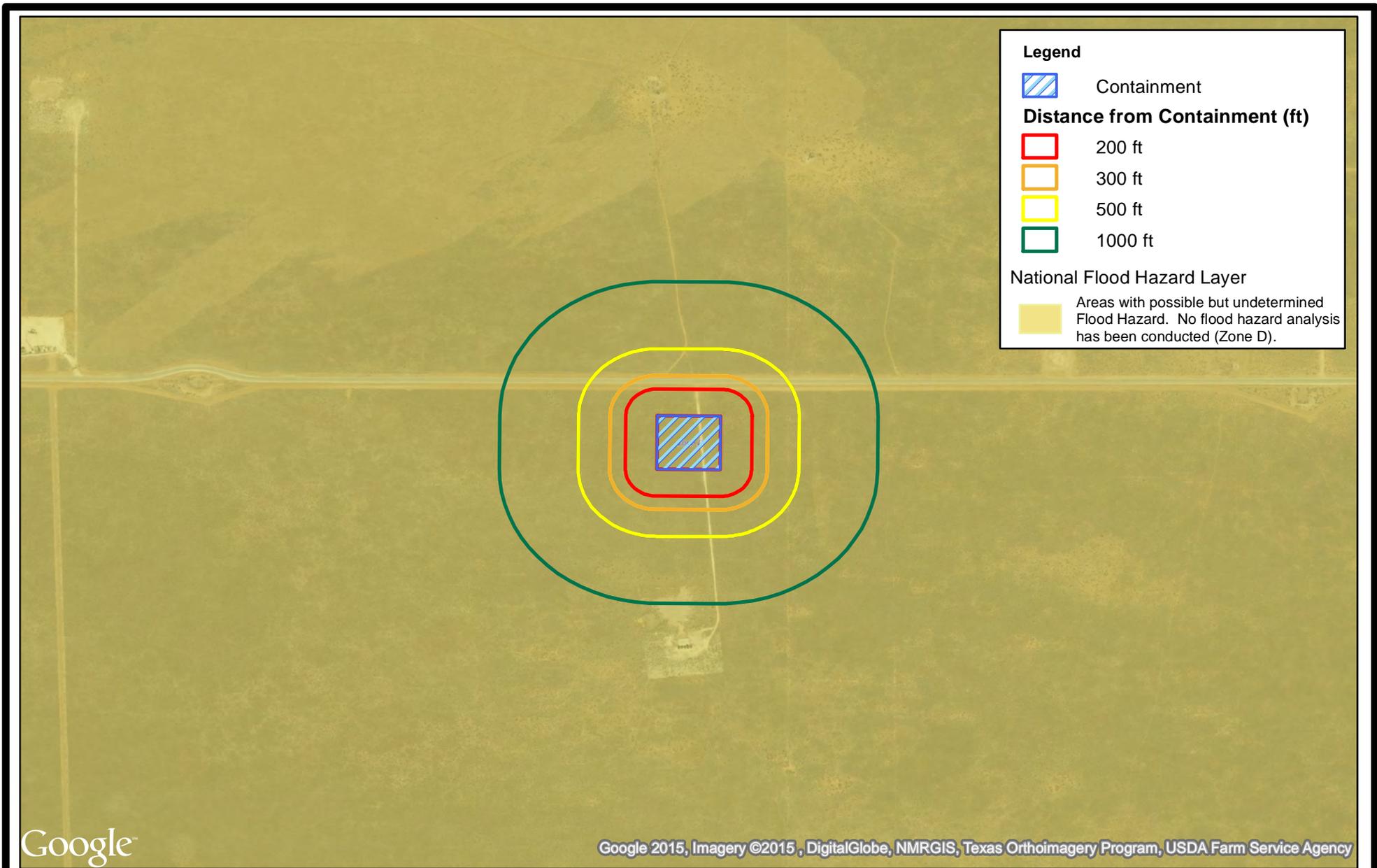
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Karst Potential
Devon Energy: Big XL

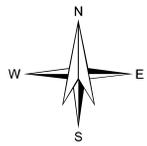
Figure 8  
 April 2015



Google

Google 2015, Imagery ©2015, DigitalGlobe, NMRGIS, Texas Orthoimagery Program, USDA Farm Service Agency

FEMA Source: <https://hazards.fema.gov/gis/nfhl/services/public/NFHLWMS/MapServer/WMSServer>



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FEMA Flood Map
Devon Energy: Big XL

Figure 9  
 April 2015



# **Site Inspection Photographs and Survey**

**R.T. Hicks Consultants, Ltd.**

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Albuquerque, NM 87104



View south from Big XL fresh water frac pond showing general location of proposed containment. Tank battery on horizon is Owl SWD Tophat AJQ State #1.



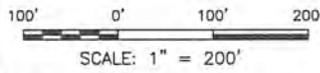
View west-northwest showing nature of vegetation on low stabilized sand dunes from the west edge of the proposed containment.



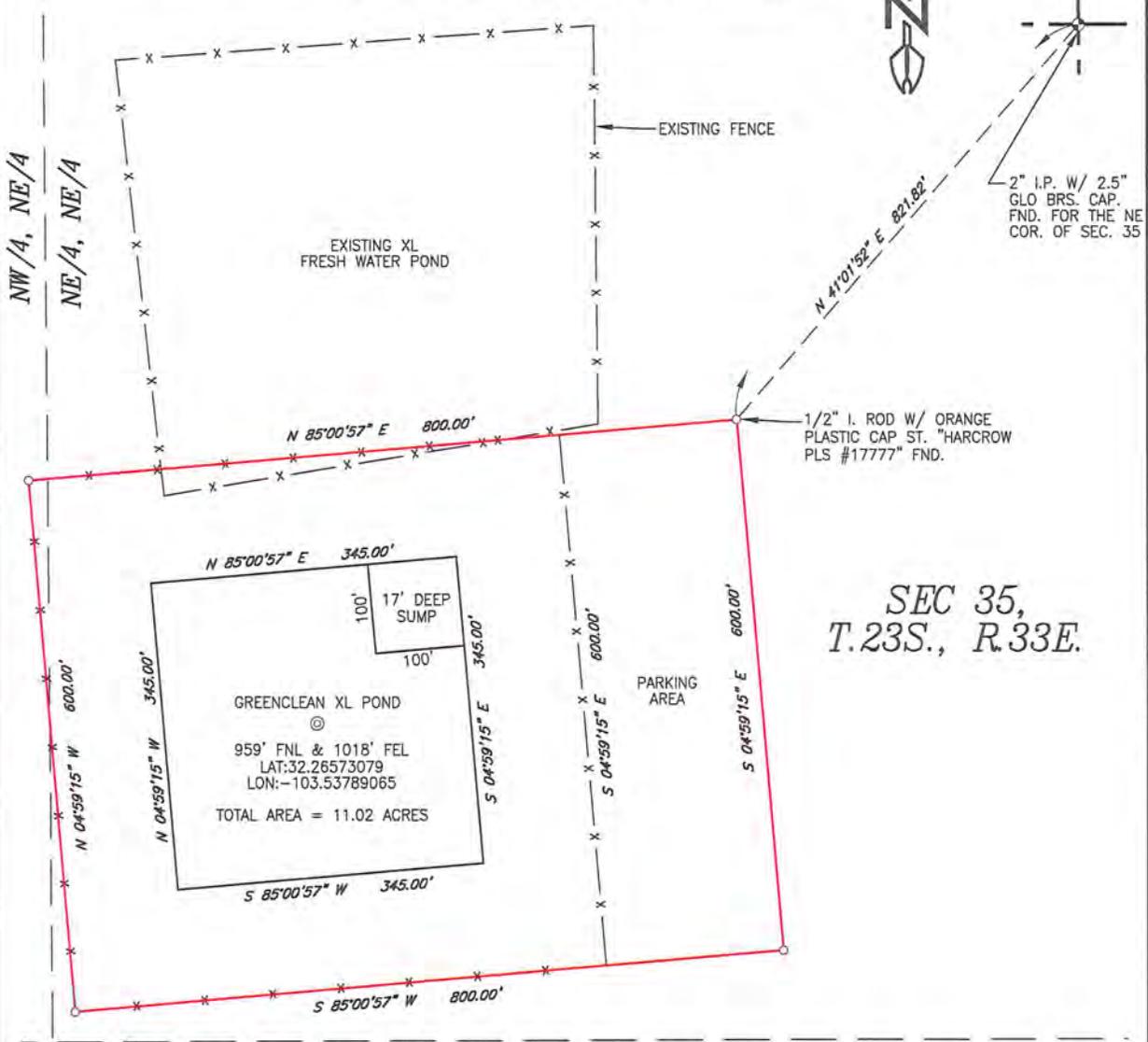
View east from center of proposed containment showing nature of vegetation and small stabilized sand dunes



View north from Big XL fresh water frac pond showing location of two windmills (Tip Top Wells) in center of photograph.



DEVON ENERGY PRODUCTION COMPANY, L.P.  
 GREENCLEAN XL POND  
 SECTION 35, T-23-S, R-33-E  
 LEA COUNTY, STATE OF NEW MEXICO



SEC 35,  
 T.23S., R.33E.

DESCRIPTION

A tract of land lying in State of New Mexico Land in Section 35, Township 23 South, Range 33 East, N.M.P.M., Lea County, New Mexico described as follows:

Beginning at 1/2 inch iron rod with plastic cap stamped "HARCROW PLS #17777", in the Northeast quarter of the Northeast quarter of said Section 35, at a point from which a 2 inch iron pipe with 2-1/2 inch GLO brass cap, found for the Northeast corner of Section 35, T-23-N, R-33-E, bears N 41°01'52" E a distance of 821.82 feet.

THENCE S 04°59'15" E a distance of 600.00 feet, S 85°00'57" W a distance of 800.00 feet, N 04°59'15" W a distance of 600.00 feet, N 85°00'57" E a distance of 800.00 feet, to the POINT OF BEGINNING,

Said tract of land containing a total of 11.02 acres.

NE/4 NE/4 10.95 acres  
 NW/4 NE/4 0.07 acres



LLOYD P. SHORT, PS No. 21653 DATE: APRIL 14, 2015

*Lloyd P. Short*

**BASIS OF BEARING**  
 ALL BEARINGS AND COORDINATES REFER TO NAD 83, NEW MEXICO STATE PLANE COORDINATE SYSTEM, EAST ZONE, U.S. SURVEY FEET. (ALL BEARINGS AND DISTANCES ARE GRID MEASUREMENTS.)

**CERTIFICATION**  
 I, LLOYD P. SHORT, NEW MEXICO PROFESSIONAL SURVEYOR NO. 21653, DO HEREBY CERTIFY THAT THIS EASEMENT SURVEY PLAT AND THE ACTUAL SURVEY ON THE GROUND UPON WHICH IT IS BASED WERE PERFORMED BY ME OR UNDER MY DIRECT SUPERVISION; THAT I AM RESPONSIBLE FOR THIS SURVEY; THAT THIS SURVEY MEETS THE MINIMUM STANDARDS FOR SURVEYING IN NEW MEXICO; AND THAT IT IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF. I FURTHER CERTIFY THAT THIS SURVEY IS NOT A LAND DIVISION OR SUBDIVISION AS DEFINED IN THE NEW MEXICO SUBDIVISION ACT AND THAT THIS INSTRUMENT IS AN EASEMENT SURVEY PLAT CROSSING AN EXISTING TRACT OR TRACTS.

LEGEND	
--- B.O.L.	--- E.O.L.
--- ROAD WAY	--- FENCE
⊙ ROAD	--- SECTION LINE
--- EASEMENT	--- LOT LINE
--- PAD	
⊙ PROPERTY MONUMENT	⊙ WELL HOLE

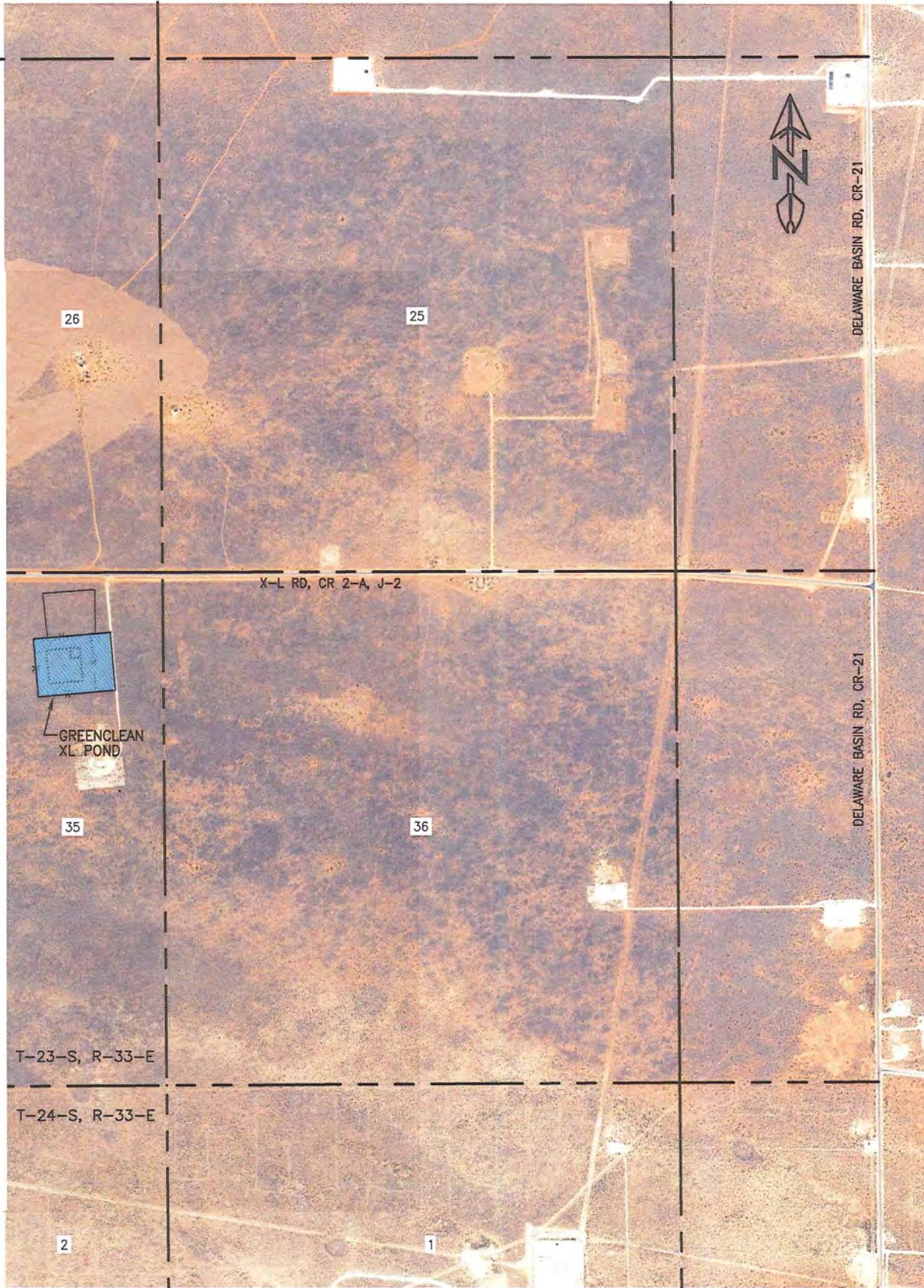
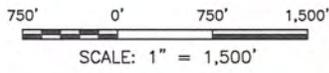
1309 LOUISVILLE AVE. (318) 323-6900  
 MONROE, LA 71201 FAX (318) 362-0064



GREENCLEAN XL POND

SHEET 1 OF 4		JOB NO.: R3559	
DRAWN BY: DMR		DWG. NO.	
1	04/14/2015	GENERAL REVISIONS	RJR LPS
REV.	DATE	DESCRIPTION	BY
CHECKED BY: LPS		R3559-XL-Pond	

DEVON ENERGY PRODUCTION COMPANY, L.P.  
 GREENCLEAN XL POND  
 SECTION 35, T-23-S, R-33-E  
 959' FNL & 1018' FWL  
 LEA COUNTY, STATE OF NEW MEXICO



LEGEND		B.O.L. - BEGINNING OF LINE	E.O.L. - END OF LINE
	ROAD WAY		FENCE
	ROAD		SECTION LINE
	EASEMENT		LOT LINE
	PAD		POND
	PROPERTY MONUMENT		WELL HOLE

**DIRECTIONS TO LOCATION:**  
 FROM INTERSECTION OF DELAWARE BASIN RD. AND X-L RD:  
 TURN RIGHT (WEST) ONTO X-L RD (CO RD 2-AJ-2) = 1.5 MILES;  
 TURN LEFT (SOUTH) ONTO A CALICHE ROAD AND CONTINUE  
 ±0.03 MILES TO THE GREEN CLEAN XL POND; POND WILL BE  
 ON THE RIGHT (WEST).

1309 LOUISVILLE AVE.  
 MONROE, LA 71201



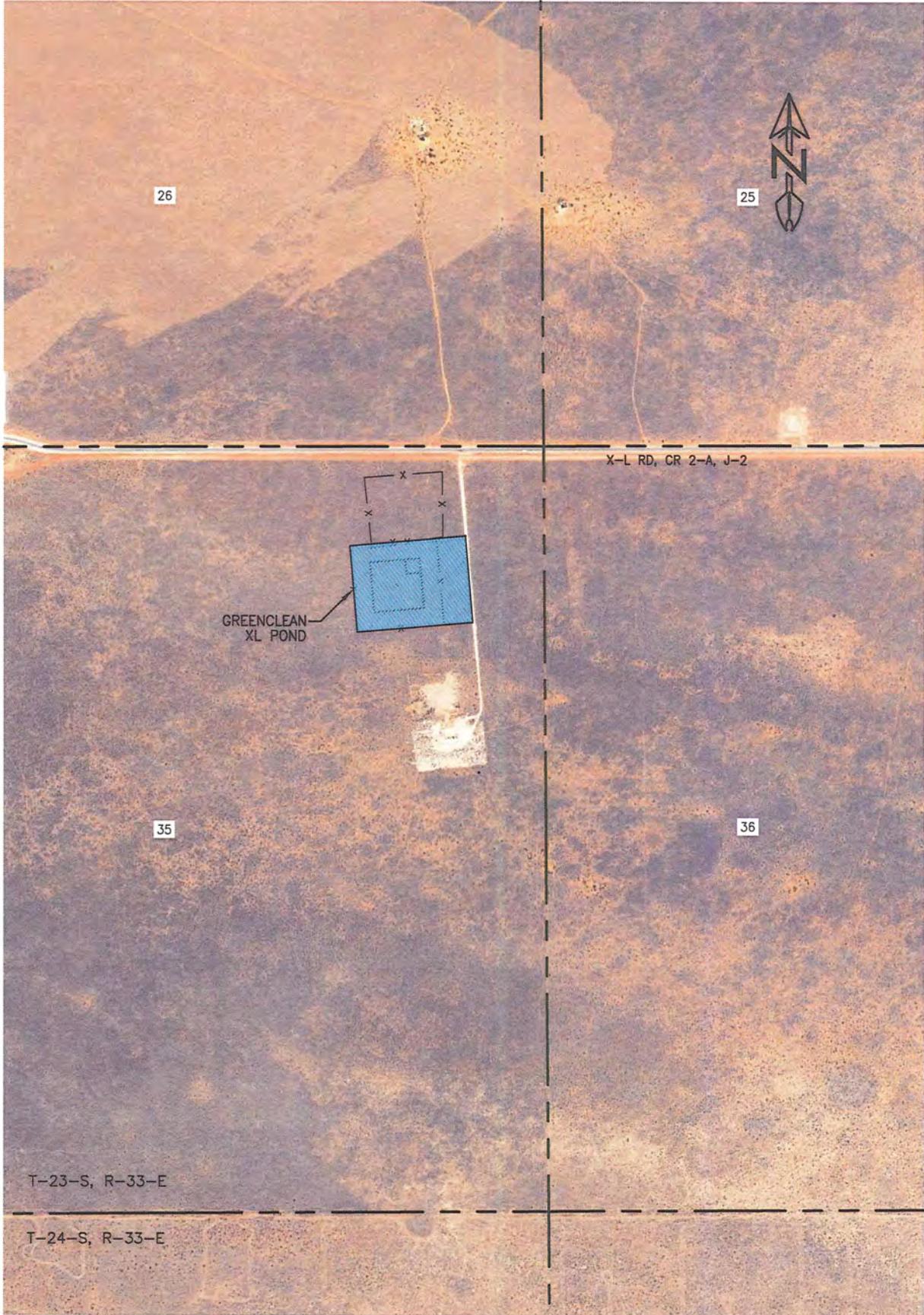
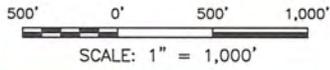
(318) 323-6900  
 FAX (318) 362-0064



GREENCLEAN XL POND

				SHEET 2 OF 4	JOB NO.: R3559
				DRAWN BY: OMR	DWG. NO.
1	04/14/2015	GENERAL REVISIONS	RJR LPS	DATE: 04/10/2015	R3559-NM-LE-NAIP
REV.	DATE	DESCRIPTION	BY	CHECKED BY: LPS	

DEVON ENERGY PRODUCTION COMPANY, L.P.  
 GREENCLEAN XL POND  
 SECTION 35, T-23-S, R-33-E  
 959' FNL & 1018' FWL  
 LEA COUNTY, STATE OF NEW MEXICO



LEGEND		B.O.L. - BEGINNING OF LINE	E.O.L. - END OF LINE
	ROAD WAY		FENCE
	ROAD		SECTION LINE
	EASEMENT		LOT LINE
	PAD		POND
	PROPERTY MONUMENT		WELL HOLE

1309 LOUISVILLE AVE.  
 MONROE, LA 71201



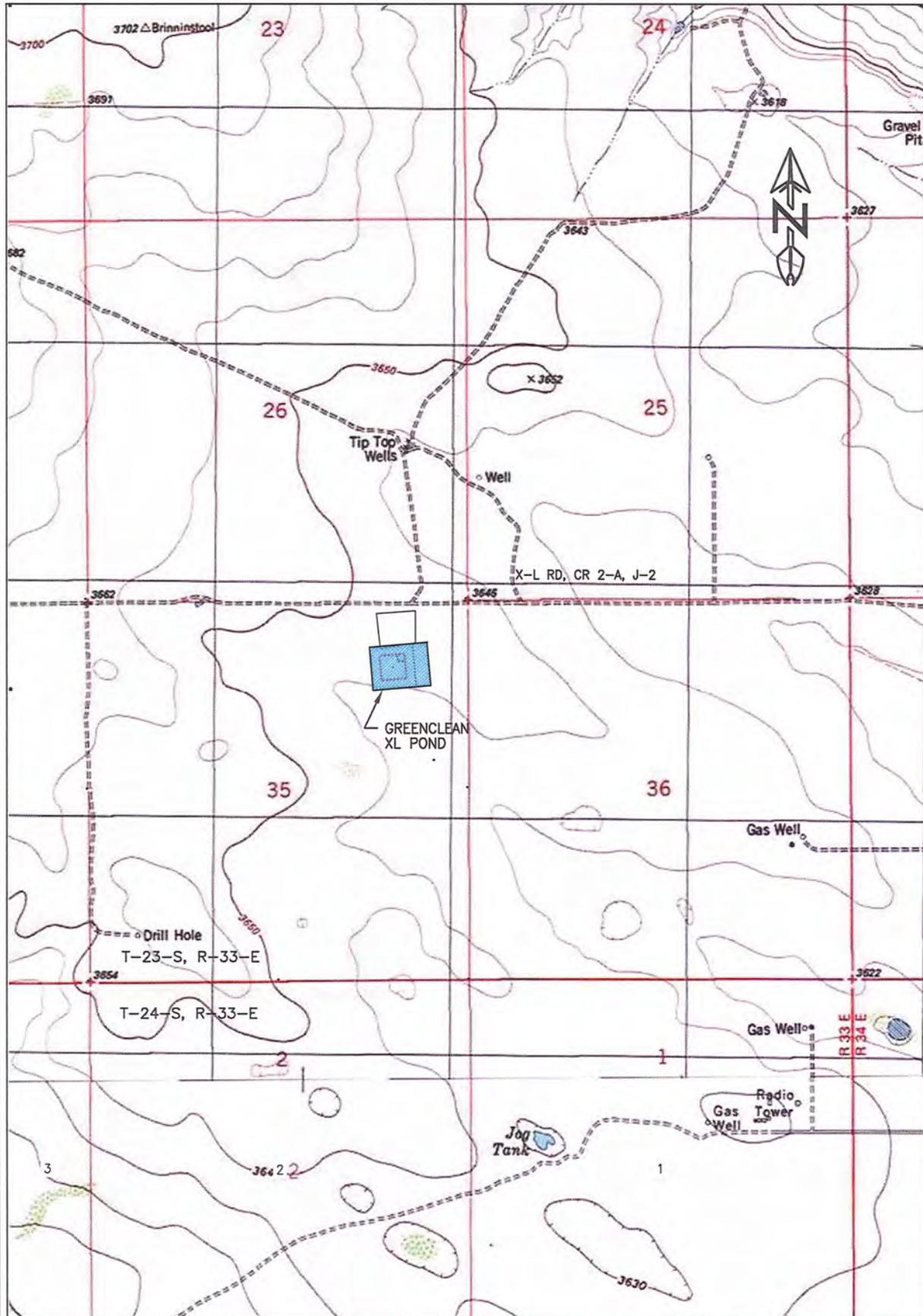
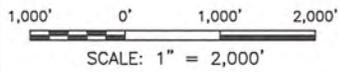
(318) 323-6900  
 FAX (318) 362-0064



GREENCLEAN XL POND

				SHEET 3 OF 4	JOB NO.: R3559
				DRAWN BY: OMR	DWG. NO.
1	04/14/2015	GENERAL REVISIONS	RJR LPS	DATE: 04/10/2015	R3559-NM-LE-NAIP
REV.	DATE	DESCRIPTION	BY	CHECKED BY: LPS	

DEVON ENERGY PRODUCTION COMPANY, L.P.  
 GREENCLEAN XL POND  
 SECTION 35, T-23-S, R-33-E  
 959' FNL & 1018' FWL  
 LEA COUNTY, STATE OF NEW MEXICO



LEGEND	
--- B.O.L. - BEGINNING OF LINE	--- E.O.L. - END OF LINE
--- ROAD WAY	---x--- FENCE
⊙ ROAD	--- SECTION LINE
--- EASEMENT	--- LOT LINE
--- PAD	--- POND
--- PROPERTY MONUMENT	⊙ WELL HOLE

1309 LOUISVILLE AVE.  
 MONROE, LA 71201



(318) 323-6900  
 FAX (318) 362-0064



GREENCLEAN XL POND

				SHEET 4 OF 4		JOB NO.: R3559	
				DRAWN BY: OMR		DWG. NO.	
				DATE: 04/10/2015		R3559-NM-LE-TOPO	
				CHECKED BY: LPS			
REV.	DATE	DESCRIPTION	BY	CHKD			
1	04/14/2015	GENERAL REVISIONS	RJR	LPS			

# **Appendix A**

## **Engineering Drawings**

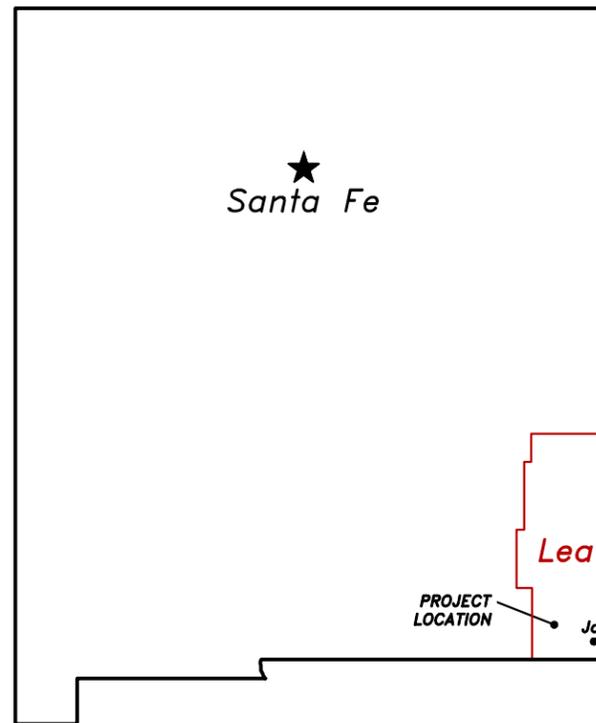
# GREEN CLEAN BIG XL WATER IMPOUNDMENT DEVON ENERGY CORPORATION

JAL, NEW MEXICO 88252

APRIL 2015



Vicinity Map

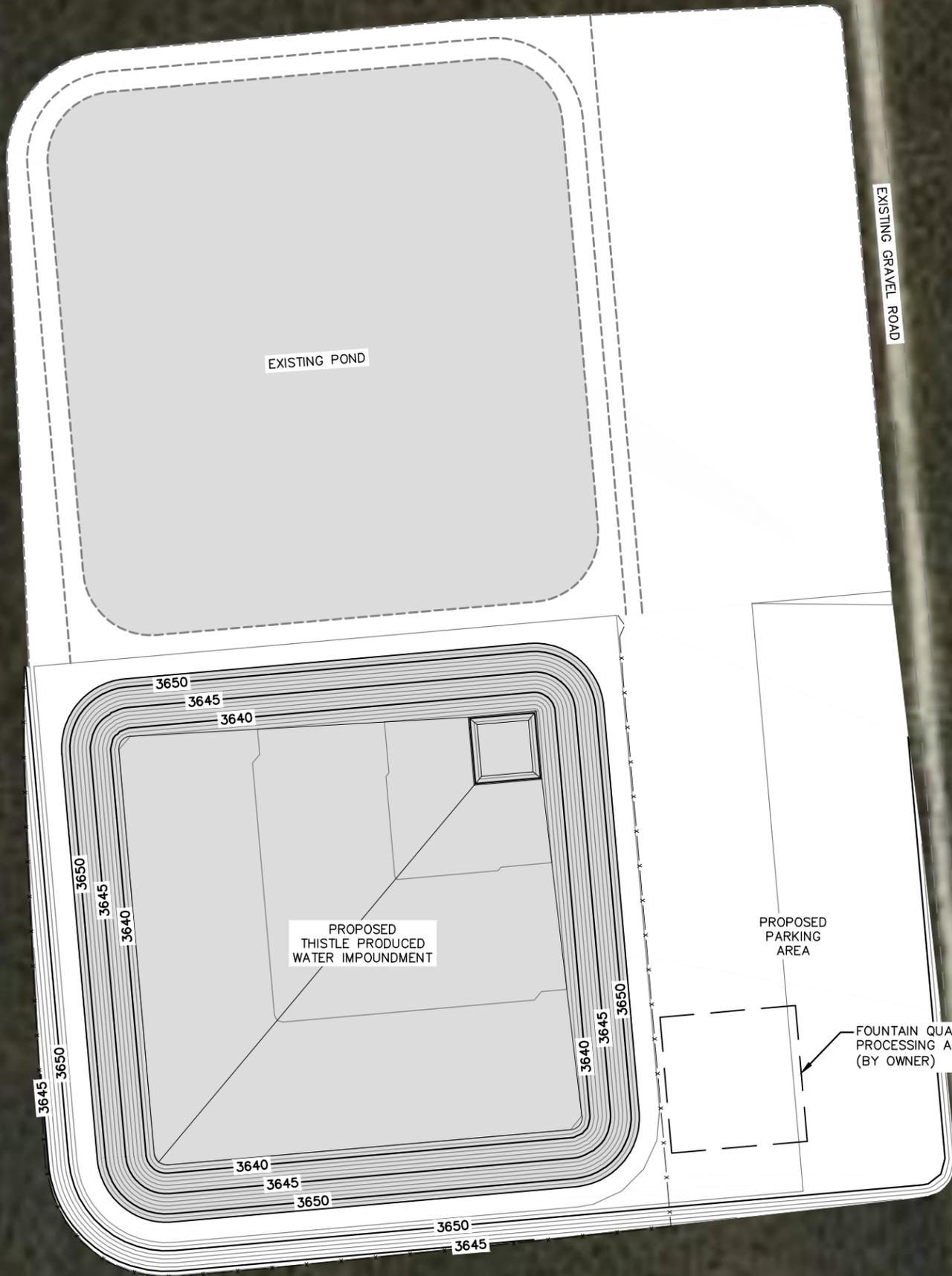


INDEX OF DRAWINGS	
SHT #	SHEET TITLE
1	AERIAL PROJECT OVERVIEW
2	PROPOSED SITE PLAN
3	PROPOSED POND SECTION VIEWS
4	SUMP DETAILS
5	PROJECT DETAILS
6	PROJECT DETAILS



PROJECT NO. DEVO-9966

**ISSUED FOR CONSTRUCTION**



NOTES:

1. EXISTING TOPOGRAPHY IS FROM USGS DIGITAL ELEVATION MODEL (DEM).
2. LOCATION OF EXISTING SITE ELEMENTS IS APPROXIMATE.

LEGEND:

- EXISTING SITE ELEMENTS
- PROPOSED MAJOR CONTOURS
- PROPOSED MINOR CONTOURS



ISSUED FOR CONSTRUCTION

GREEN CLEAN BIG XL WATER IMPOUNDMENT  
DEVON ENERGY CORPORATION

JAL, NEW MEXICO 88252

SHEET TITLE:  
AERIAL PROJECT OVERVIEW

NO.	DATE	DESCRIPTION

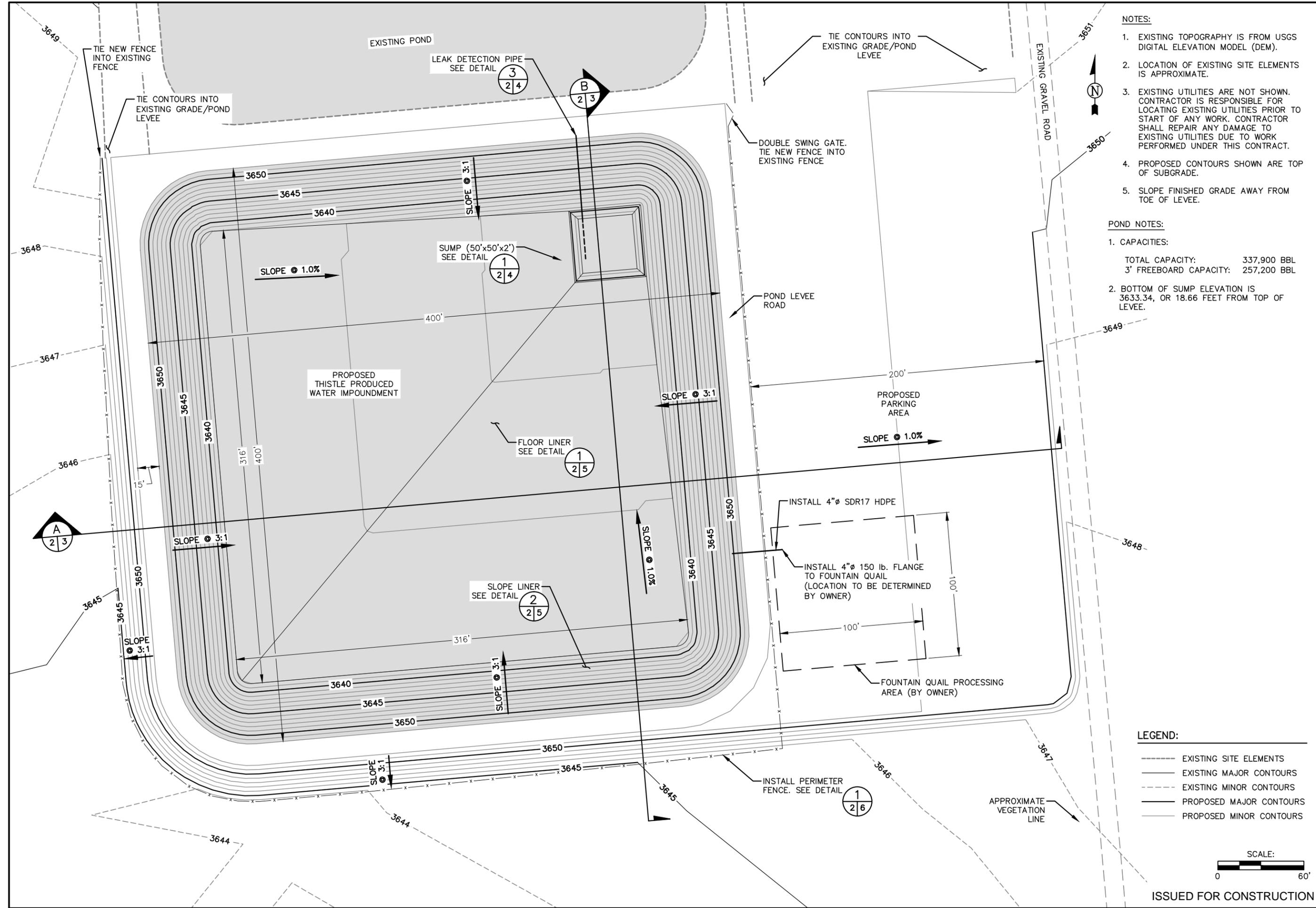
CIVIL ENGINEERING AND ENVIRONMENTAL SERVICES  
3612 South Shakerlton Road  
Albuquerque, NM 87106  
PH: (505) 221-7122 FX: (505) 221-7775

DESIGNED BY: B/JW DATE: APR. 9, 2015  
DRAWN BY: B/JW  
CHECKED BY: B/JW

SCALE: 1" = 100'  
FILE: L:\DEVON ENERGY CORPORATION\DEV-9966 THISTLE PRODUCED WATER IMPOUNDMENT\DRAWINGS\01-03 FP SITE PLANS REV.DWG

JOB NUMBER:  
DEVO-9966

SHEET NO.: 1



- NOTES:**
- EXISTING TOPOGRAPHY IS FROM USGS DIGITAL ELEVATION MODEL (DEM).
  - LOCATION OF EXISTING SITE ELEMENTS IS APPROXIMATE.
  - EXISTING UTILITIES ARE NOT SHOWN. CONTRACTOR IS RESPONSIBLE FOR LOCATING EXISTING UTILITIES PRIOR TO START OF ANY WORK. CONTRACTOR SHALL REPAIR ANY DAMAGE TO EXISTING UTILITIES DUE TO WORK PERFORMED UNDER THIS CONTRACT.
  - PROPOSED CONTOURS SHOWN ARE TOP OF SUBGRADE.
  - SLOPE FINISHED GRADE AWAY FROM TOE OF LEVEE.

- POND NOTES:**
- CAPACITIES:  
 TOTAL CAPACITY: 337,900 BBL  
 3' FREEBOARD CAPACITY: 257,200 BBL
  - BOTTOM OF SUMP ELEVATION IS 3633.34, OR 18.66 FEET FROM TOP OF LEVEE.

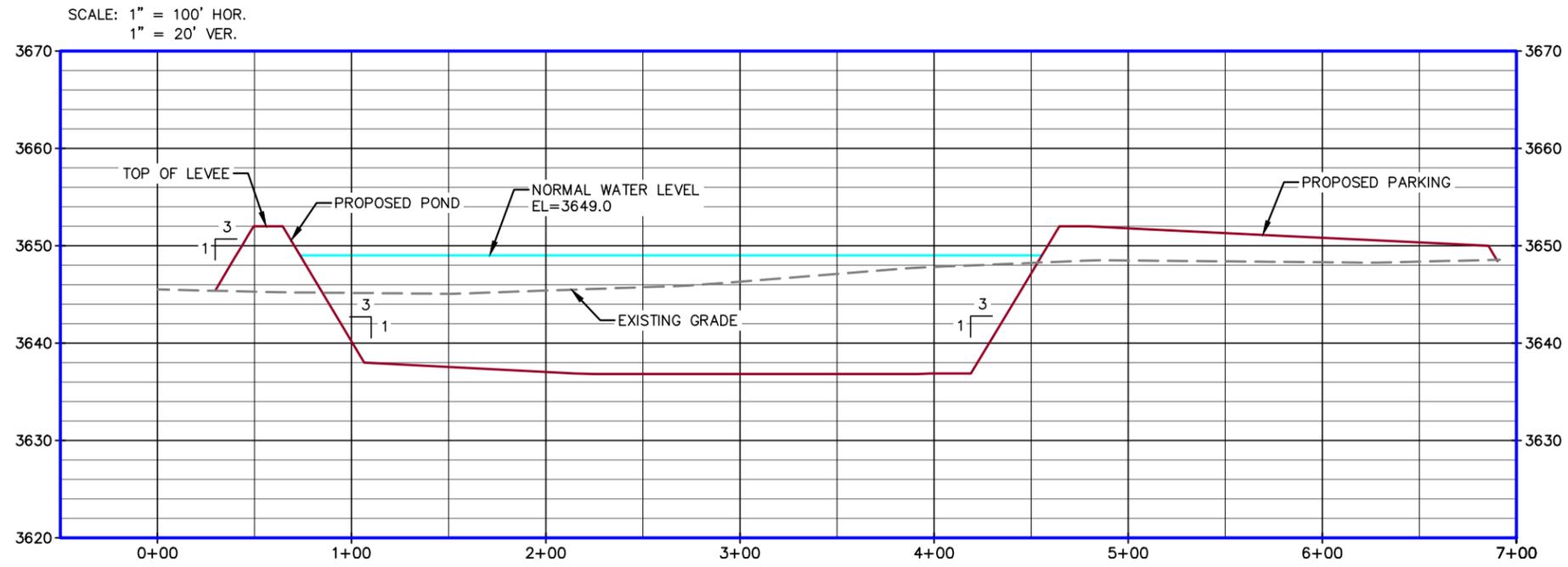
GREEN CLEAN BIG XL WATER IMPOUNDMENT  
 DEVON ENERGY CORPORATION  
 JAL, NEW MEXICO 88252

SHEET TITLE: PROPOSED SITE PLAN		REVISIONS:	NO:	DATE:	BY:
CIVIL ENGINEERING AND ENVIRONMENTAL SERVICES 3612 South Shafterford Road Albuquerque, NM 87106 PH: (505) 221-7122 FAX: (505) 221-7775		DESCRIPTION:			
DESIGNED BY:	DATE:	NO:	DATE:	BY:	
DRAWN BY:	DATE:	NO:	DATE:	BY:	
CHECKED BY:	DATE:	NO:	DATE:	BY:	
JOB NUMBER: DEVO-9966		SCALE: 1" = 60'		SHEET NO.: 2	

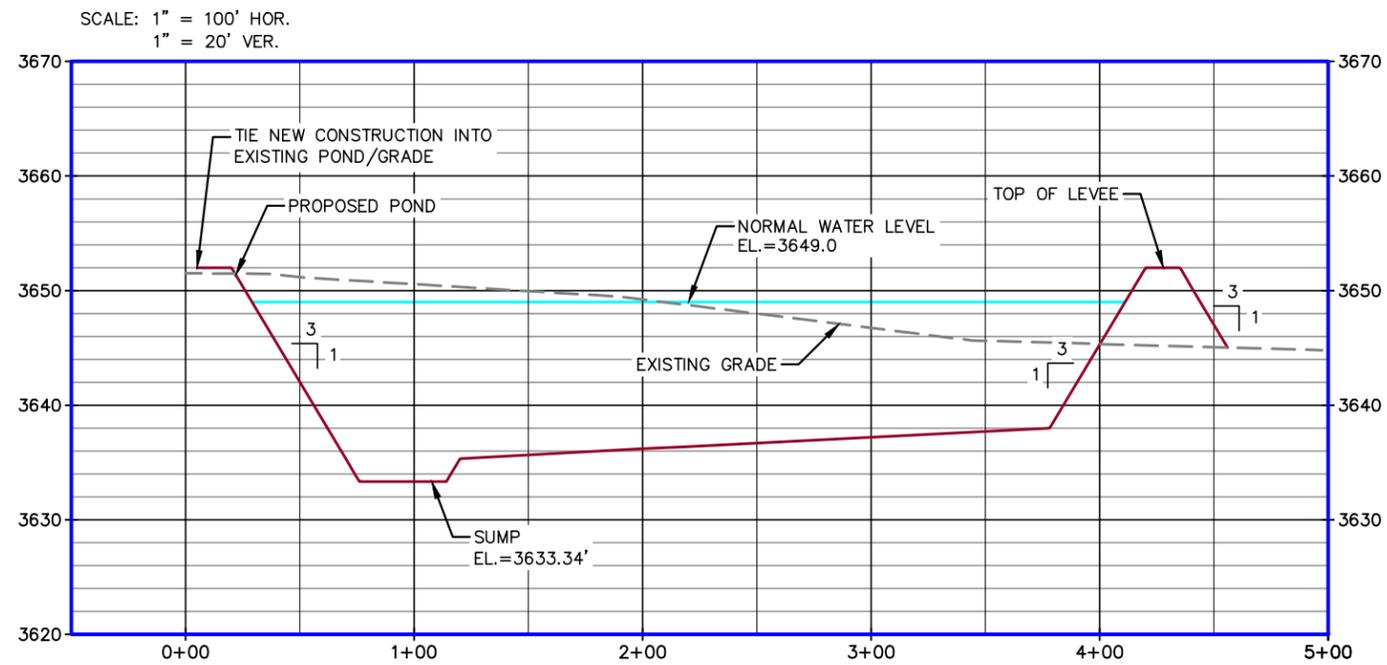
- LEGEND:**
- EXISTING SITE ELEMENTS
  - EXISTING MAJOR CONTOURS
  - EXISTING MINOR CONTOURS
  - PROPOSED MAJOR CONTOURS
  - PROPOSED MINOR CONTOURS



ISSUED FOR CONSTRUCTION



WEST-EAST POND SECTION A  
2 | 3



NORTH-SOUTH POND/SUMP SECTION B  
2 | 3

GREEN CLEAN BIG XL WATER IMPOUNDMENT  
DEVON ENERGY CORPORATION

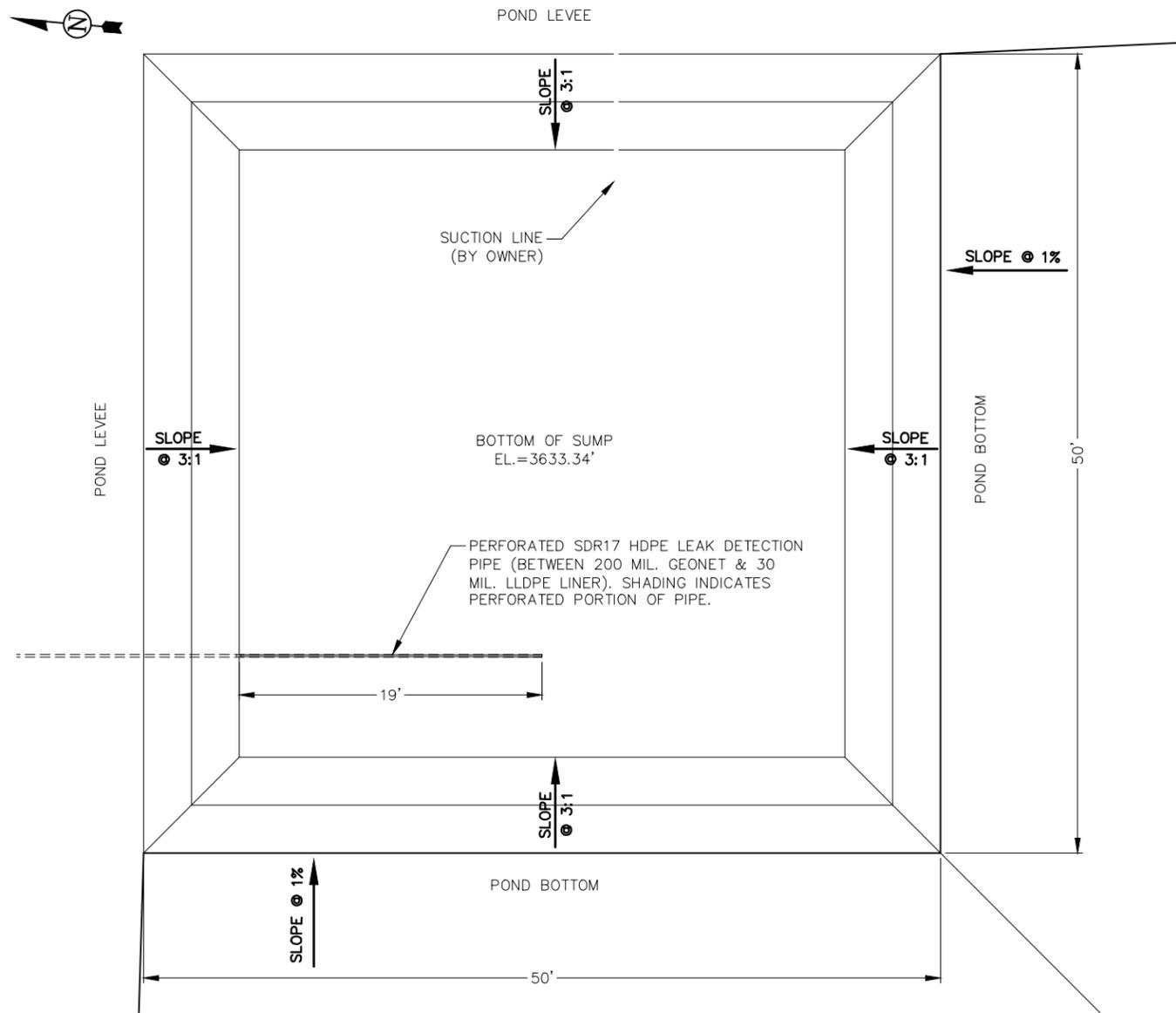
JAL, NEW MEXICO 88252

SHEET TITLE: PROPOSED POND SECTION VIEWS		NO.:	DATE:	BY:
REVISIONS:		NO.:	DATE:	BY:
DESIGNED BY:		APR. 9, 2015		SCALE: AS NOTED
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CHECKED BY:		BJW		

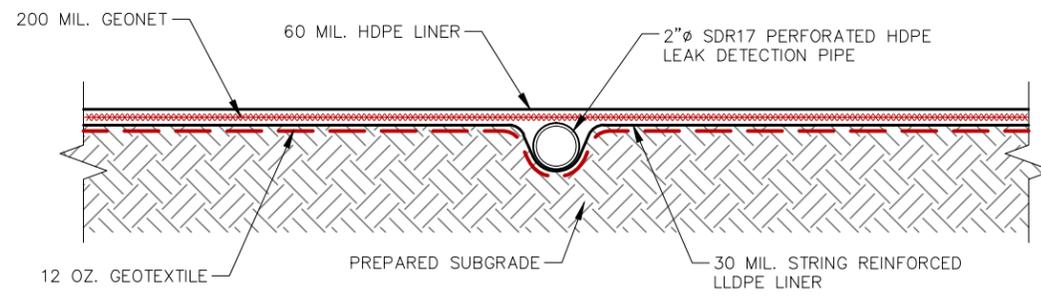
JOB NUMBER:  
DEVO-9966

ISSUED FOR CONSTRUCTION

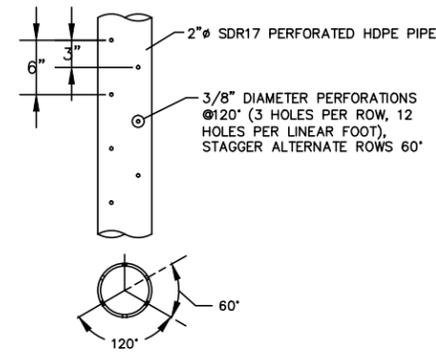
SHEET NO.: 3



**POND SUMP PLAN VIEW** 1  
SCALE: NTS 2 | 4

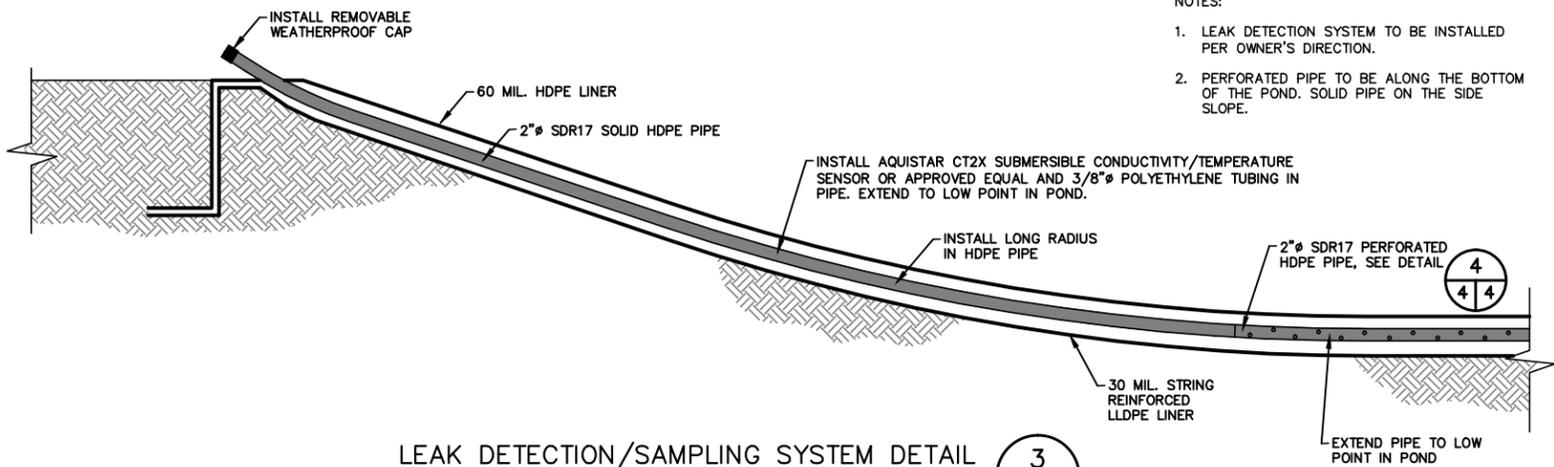


**LEAK DETECTION PIPE DETAIL** 2  
SCALE: NTS 3 | 4



**PERFORATED PIPE DETAIL** 4  
SCALE: NTS 4 | 4

- NOTES:
- LEAK DETECTION SYSTEM TO BE INSTALLED PER OWNER'S DIRECTION.
  - PERFORATED PIPE TO BE ALONG THE BOTTOM OF THE POND. SOLID PIPE ON THE SIDE SLOPE.



**LEAK DETECTION/SAMPLING SYSTEM DETAIL** 3  
SCALE: NTS 2 | 4

GREEN CLEAN BIG XL WATER IMPOUNDMENT  
DEVON ENERGY CORPORATION

JAL, NEW MEXICO 88252

SHEET TITLE: SUMP PLAN & DETAILS		NO.	DATE	BY:
REVISIONS:		NO.	DATE	DESCRIPTION
DESIGNED BY:	BJW	DATE:	APR. 9, 2015	SCALE: AS NOTED
DRAWN BY:	BJW	CHECKED BY:	BJW	

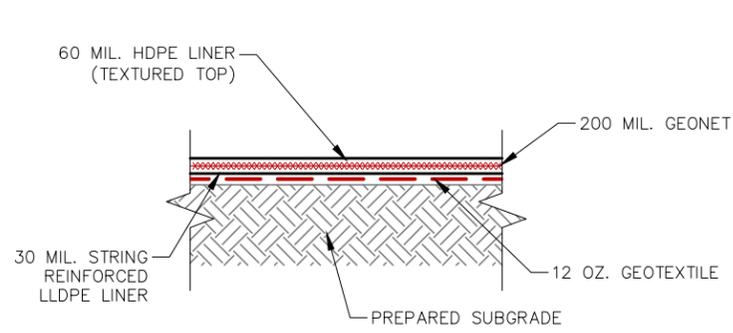
CIVIL ENGINEERING AND ENVIRONMENTAL SERVICES  
3512 South Shakerford Road  
Albuquerque, NM 87106  
PH: (505) 221-7122 FAX: (505) 221-7775

PMI  
FILE: G:\DEVON ENERGY CORPORATION\DEV-9966 PROJECTS\WATER IMPOUNDMENT\DRAWINGS\04-06 PROJECT DETAILS.DWG

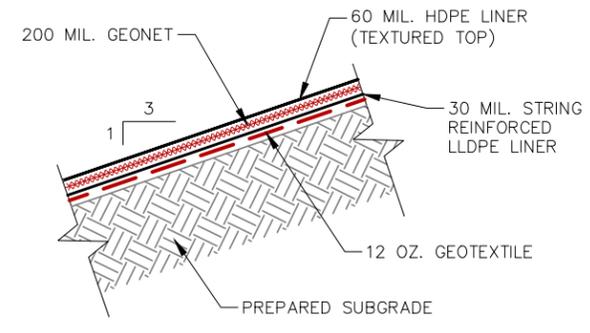
JOB NUMBER:  
DEVO-9966

ISSUED FOR CONSTRUCTION

SHEET NO.: 4



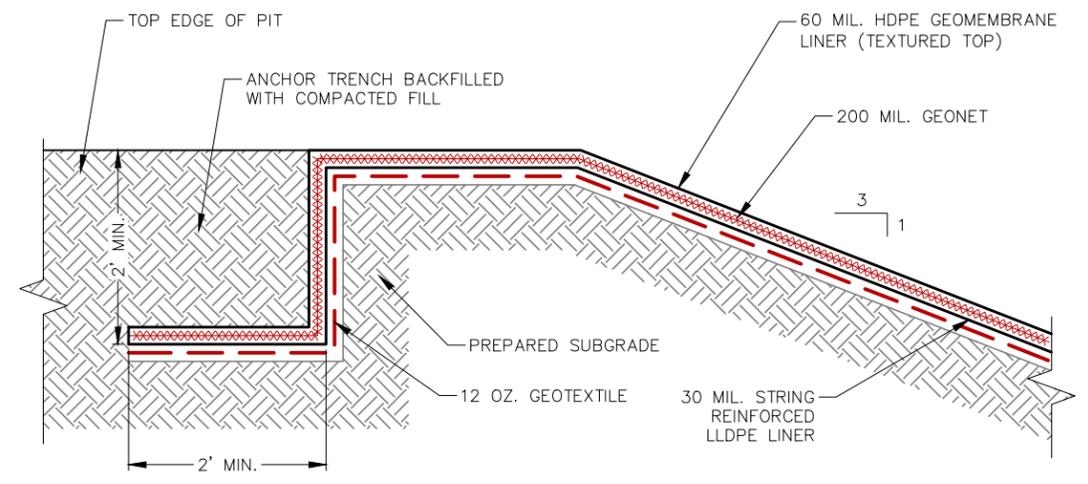
LINER SYSTEM FLOOR DETAIL 1  
SCALE: NTS 2 | 5



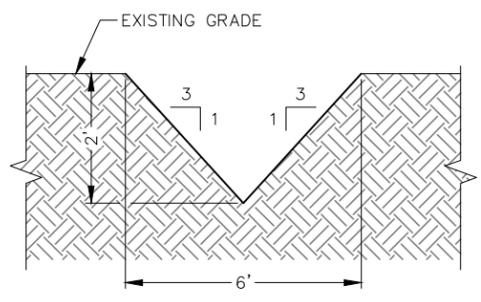
LINER SYSTEM SIDE SLOPE DETAIL 2  
SCALE: NTS 2 | 5

**GENERAL NOTES:**

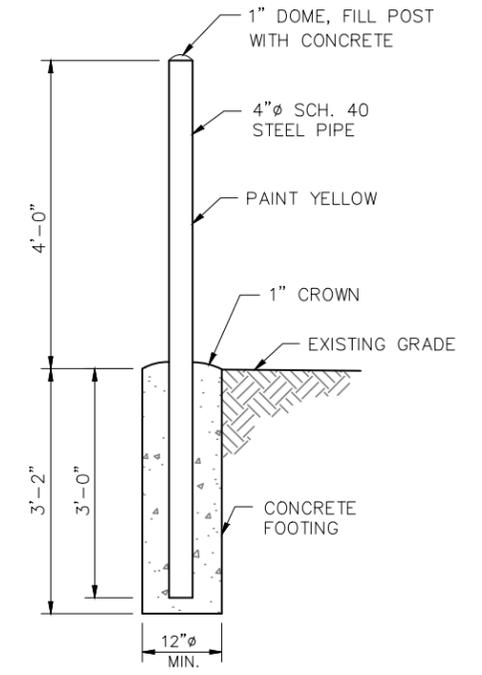
1. PREPARED SUBGRADE MEANS COMPACTED SMOOTH SUBGRADE FREE OF ROCK, ROOTS, WOOD DEBRIS, CONCRETE RUBBLE AND ANY SHARP OBJECTS THAT MIGHT PUNCTURE THE HDPE LINER.
2. IF SUBGRADE IS NOT FREE OF SHARP OBJECTS, THEN 16 OUNCE GEOTEXTILE MATERIAL SHALL BE INSTALLED UNDER ALL HDPE LINER.
3. ALL EMBANKMENT SLOPES SHALL HAVE A RATIO OF 3:1. COMPACTED EARTH EMBANKMENTS TO BE CONSTRUCTED WITH 12 INCH (MAXIMUM) LOOSE LIFTS, COMPACTED TO 90% STANDARD PROCTOR DENSITY.
4. PERFORM GEOTECHNICAL ANALYSIS OF EXISTING SOIL TO CONFIRM SOIL IS SUITABLE FOR USE IN THE LEVEE.



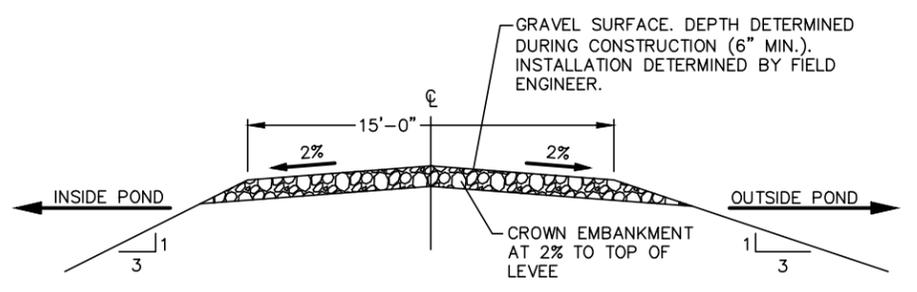
ANCHOR TRENCH DETAIL 3  
SCALE: NTS 2 | 5



TYPICAL DRAINAGE SWALE DETAIL 4  
SCALE: NTS 2 | 5



PIPE BOLLARD DETAIL 5  
SCALE: NTS 2 | 5



TYPICAL CREST DETAIL 6  
SCALE: NTS 2 | 5

GREEN CLEAN BIG XL WATER IMPOUNDMENT  
DEVON ENERGY CORPORATION

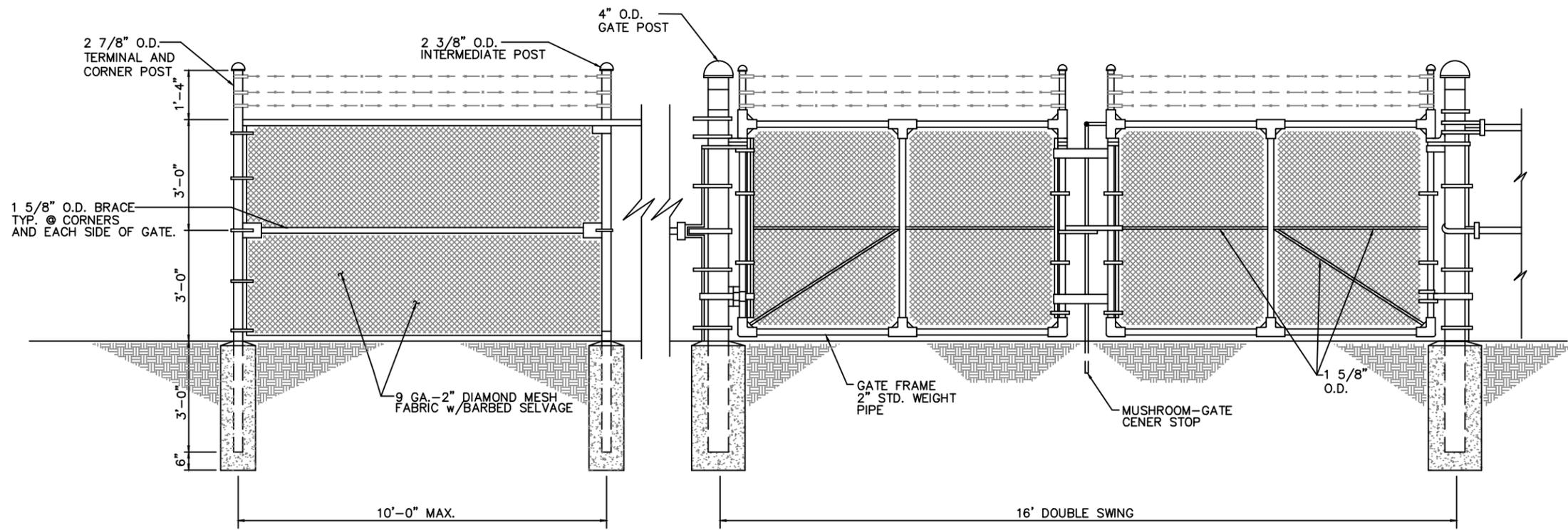
JAL, NEW MEXICO 88252

PROJECT DETAILS	
DESIGNED BY: B/JW	DATE: APR. 9, 2015
DRAWN BY: B/JW	SCALE: AS NOTED
CHECKED BY: B/JW	FILE: G:\DEVON ENERGY CORPORATION\DEV-9966\PROJECTS\LEVEE IMPROVEMENT\DRAWINGS\04-06 PROJECT DETAILS.DWG

JOB NUMBER:  
DEVO-9966

ISSUED FOR CONSTRUCTION

SHEET NO.: 5



FENCE/DBL SWING GATE DETAIL  
SCALE: NTS



GREEN CLEAN BIG XL WATER IMPOUNDMENT  
DEVON ENERGY CORPORATION

JAL, NEW MEXICO 88252

<b>CIVIL ENGINEERING AND ENVIRONMENTAL SERVICES</b> 9512 South Stackleton Road Albuquerque, NM 87123 PH: (505) 221-7122 FX: (505) 221-7775	SHEET TITLE: <b>PROJECT DETAILS</b>	
	DESIGNED BY: DRAWN BY: CHECKED BY:	DATE: APR. 9, 2015
REVISIONS: NO. DATE DESCRIPTION	JOB NUMBER: DEVO-9966	SHEET NO.: 6

ISSUED FOR CONSTRUCTION

# **Appendix B**

## **Design/Construction Plan**

## C-147 Supplemental Information: Design and Construction Plan Lined Earthen Containments

Applicable mandates in Rule 34 are underlined. This plan addresses construction of lined earthen containments. Appendix A presents Engineering Design Plans.

Field conditions may create the need for minor modification of the containment design (e.g. changing the length, width or depth).

### **Dike Protection and Structural Integrity**

Design elements are addressed in the section of this submission containing the foundation recommendations. The recommendations are based on site-specific data. The operator, engineer, and selected contractor will review the recommendations prior to beginning the earthwork and adhere to the specific recommendations.

The design and operation provide for the confinement of 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 (berm) and diversion ditch to prevent run-on of surface water.

### **Stockpile Topsoil**

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 perimeter fence surrounding the containment or incorporated into the levee.

### **Signage**

The design calls for 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 sign is posted in a manner and location such 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

### **Fencing**

The design provides for a fence to enclose the recycling containment in a manner that deters unauthorized wildlife and human access. The design calls for a 7-foot tall chain link and barbed wire fence around the containment to exclude wildlife (see detail on last page of engineering design). This fence provides greater wildlife (and human) deterrence than the minimum required barbed wire fence with four strands evenly spaced in the interval between one foot and four feet above ground level. The fence will be gated to provide access for maintenance and placement of pumps and other necessary equipment. As stated in the O&M plan, the operator will ensure that all gates associated with the fence are closed and locked when responsible personnel are not onsite.

### **Netting and Protection of Wildlife**

The game fence on the containment levee will be effective in excluding antelope, coyotes and most other terrestrial wildlife.

The containment will contain *treated* produced water that has not shown to be a material threat to birds due to hydrogen sulfide gas or floating, free-phase hydrocarbons. With respect to protection of birds, the operator will regularly inspect the lined earthen containment and report, within 30 days of discovery, any migratory or wildlife death to the appropriate wildlife agency as required by OCD Rules.

Thus, the recycling containment is otherwise protective of wildlife, including migratory birds. The O&M plan calls for the operator to inspect for and, within 30 days of discovery, report the discovery of dead migratory birds or other wildlife to the appropriate wildlife agency and to the division district office in order to facilitate assessment and implementation of measures to prevent incidents from reoccurring

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### **Earthwork**

As part of this plan, a geotechnical investigation will be performed to provide recommendations regarding the foundation for the containment liner (see following section). The containment will 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 may be placed under the liner when needed to reduce localized stress-strain or protuberances that otherwise may compromise the liner's integrity.

Appendix A shows the

- a. levee has inside grade no steeper than two horizontal feet to one vertical foot (2H: 1V).
- b. levee outside grade is no steeper than three horizontal feet to one vertical foot (3H: 1V)
  - a. top of the levee is wide enough to install an anchor trench and provide adequate room for inspection and maintenance.
  - b. caliche gravel placed on the outside levee provides additional erosion control.
  - c. The containment is excavated into the ground such that most of fluid force lies against native earth and the engineered foundation (see Appendix A and forthcoming geotechnical report with foundation recommendations)

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 and Drainage Geotextile Installation**

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

The primary (upper) liner is a geomembrane liner composed of an impervious, synthetic material that is resistant to ultraviolet light, petroleum hydrocarbons, salts and acidic and alkaline solutions. It is 60-mil HDPE. The secondary liner is 30-mil LLDPE string reinforced. Liner compatibility meets or exceeds a subsequent relevant publication to EPA SW -846 method 9090A.

The recycling containment design has a leak detection system between the upper and lower geomembrane liners of 200-mil geonet to facilitate drainage. The leak detection system consists of a properly designed drainage and collection and removal system placed above the lower geomembrane liner in depressions and sloped to facilitate the earliest possible leak detection. The containment floor design calls for a slope of approximately 1% toward the sump in the northeast corner. This slope combined with the highly transmissive geonet drainage layer provide for the earliest possible leak detection.

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

- i. minimizing liner seams and orient them up and down, not across, a slope of the levee.
- ii. use factory welded seams where possible.
- iii. use field seams in geosynthetic material are thermally seamed and prior to field seaming, overlap liners four to six inches.
- iv. minimize the number of field seams and comers and irregularly shaped areas.
- v. provide for no horizontal seams within five feet of the slope's toe.
- vi. use qualified personnel to perform field welding and testing.
- vii. avoid excessive stress-strain on the liner
- viii. The edges of all liners are anchored in the bottom of a compacted earth-filled trench that is at least 18 inches deep

At points of discharge into the lined earthen containment the pipe configuration (see Appendix A) effectively protects the liner from excessive hydrostatic force or mechanical damage during filling.

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, numerous lines are permanently placed in the containment with floats attached to prevent damage to the liner system. The containment

## C-147 Supplemental Information: Design and Construction Plan Lined Earthen Containments

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.

External discharge or suction lines do not penetrate the liner.

### **Leak Detection and Fluid Removal System Installation**

The leak detection system, contains the following design elements

- a. The 200-mil Hypernet drainage material between the primary and secondary liner that is sufficiently permeable to allow the transport of fluids to the observation ports.
- b. The containment floor is sloped towards the monitoring riser pipe facilitate the earliest possible leak detection of the containment bottom. A pump may be placed in an observation port to provide for fluid removal.
- c. 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 (see Appendix A).
- d. The slope of the interior sub-grade is approximately 1%

# **Appendix C**

## **Operating and Maintenance Plan**

## **Operating and Maintenance Procedures**

In this plan, underlined text represents the language of the Rule.

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 fresh water 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 is 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

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- 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-foot 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.

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

- A. Inspect diversion ditches and berms around the containment to check for erosion and collection of surface water run-on.
- B. Inspect the leak detection system for evidence of damage or malfunction and monitor for leakage
- C. 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.
- D. 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 on form C-148.

E. 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.

***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 nearby oil and gas wells is managed by injection wells.

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 injection wells

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 Appendix A, 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 (see Appendix A).

Staff 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.

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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.

# **Appendix D**

## **Closure Plan**

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In this plan, underlined text represents the language of the Rule.

After operations cease, the operator will remove all fluids within 60 days and close the containment within six months from the date the operator ceases operations from the containment for use.

The operator shall substantially restore the impacted surface area to

- the condition that existed prior to the construction of the recycling containment or
- to a condition imposed by federal, state trust land or tribal agencies on lands managed by those agencies as these provisions govern the obligations of any operator subject to those provisions.

### ***Excavation and Removal Closure Plan – Protocols and Procedures***

The workover pit is expected to contain a small volume of solids, the majority of which will be windblown sand and dust with some mineral precipitates from the water

1. The operator will remove all liquids from the pits and either:
  - a. Dispose of the liquids in a division-approved facility, or
  - b. Recycle, reuse or reclaim the water for reuse in drilling and stimulation.
2. The operator will close the recycling containment by first removing all fluids, contents and synthetic liners and transferring these materials to a division approved facility:
3. After the removal of the pit contents and liners, soils beneath the workover pit will be tested by collection of a five-point (minimum) composite sample which includes stained or wet soils, if any, and that sample shall be analyzed for the constituents listed in Table I of 19.15.34.14.
4. After review of the laboratory results
  - a. If any contaminant concentration is higher than the parameters listed in Table I, additional delineation may be required and the operator must receive approval before proceeding with closure.
  - b. If all contaminant concentrations are less than or equal to the parameters listed in Table I, then the operator will proceed to
    - i. backfill with non-waste containing, uncontaminated, earthen material. Or
    - ii. undertake an alternative closure process pursuant to a variance request after approval by OCD

### ***Reclamation and Re-vegetation***

- a. The operator will reclaim the containment's location to a safe and stable condition that blends with the surrounding undisturbed area.
- b. Topsoils and subsoils shall be replaced to their original relative positions and contoured so as to achieve erosion control, long-term stability and preservation of surface water flow patterns.
- c. The disturbed area shall then be reseeded in the first favorable growing season following closure of a recycling containment.

### ***Closure Documentation***

Within 60 days of closure completion, the operator shall submit a closure report on form C-147, including required attachments, to document all closure activities including sampling

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results and the details on any backfilling, capping or covering, where applicable. The closure report shall certify that all information in the report and attachments is correct and that the operator has complied with all applicable closure requirements and conditions specified in division rules or directives.

The operator shall notify the division when reclamation and re-vegetation are complete. Specifically the notice will document that all ground surface disturbing activities at the site have been completed, and a uniform vegetative cover has been established that reflects a life-form ratio of plus or minus fifty percent (50%) of pre-disturbance levels and a total percent plant cover of at least seventy percent (70%) of pre-disturbance levels, excluding noxious weeds.